Original Research Article

Comparative Performance of Agricultural Export Trade: During and Post- Agricultural Diversification Project in Ghana

.

ABSTRACT

This study compares export performance for seven agricultural commodities prior to, during and after initiation of the Agricultural Diversification project (1991-1999) in Ghana. This is to help identify the impact of the initiative on Ghana's agricultural exports and to ascertain the ability or otherwise of the country to sustain or improve on performances observed under the project. Covering the years 1987 to 2011, the study primarily made use of secondary data on commodity and aggregate agricultural export valuesfor Ghana and the world, the latter being used as the reference group. In assessing export performance, the CEP, SCEP and ln (CEP) indices were used and based on newly developed thresholds, commodities were placed under the categories "Highly Competitive", "Competitive", "Weakly Competitive" and "Uncompetitive". Use of the thresholds helped in appropriately reflecting the fragileness of agricultural export trade.The results show that besides cocoa and pineapples which were "Highly Competitive" in export performance before initiation of the project, only rubber exports witnessed major improvement among the five other commodities during the project phase. Export performance for rubber has however dropped beyond its previous level in recent years, with that for oil palm rather improving upon its previous level. Improvements in oil palm export performance have been attributed torecent efforts put in place by various stakeholders in the subsector to promote export development of the commodity, while decline in performance of rubber exports is attributed to a decrease in attention paid to the subsector among other potential inefficiencies.Although the export dimension of agriculture is believed to have witnessed major growth in recent years due to beneficial implications of the diversification project, the current study concludes based on findings that, the growth observed is possibly due to major improvements in fewer subsectors. Effort should therefore be put towards revisiting some of the growth enhancing measures implemented under the initiative, promoting stakeholder participation in export promotion and current production and marketing inefficiencies addressed to enhance export growth

Keywords: Agricultural diversification; export growth; export performance; Ghana; thresholds

1. INTRODUCTION

Agriculture has since the immediate post-independence era been the foundation for development in Ghana. The sector plays vital roles in the lives of the inhabitants, with such roles stretching from the enhancement of food security, creation of employment and generation of foreign exchange, supply of raw materials for industry, contribution to poverty reduction, buffer during shocks, to supporting environmental sustainability among others. Contribution of the sector to food security is observed primarily through its direct effect of adding to domestic food availability and indirectly by permitted access to food supplies

through enhanced earnings. Beside these traditional roles, the agriculture sector, through its dimensions of food production and exports does influence (and is influenced by) both domestic and international markets through forward (product market) and backward (factor market) linkages. Even in developed countries where the role of the sector is deemed relatively minimal, agricultural landscape and production of food still are key aspects of national identity and social welfare [12,6]. This makes the sector a fuel for growth in both developing and developed worlds, thereby attracting greater attention when exposed to shocks.With the economy of Ghana being heavily reliant on the agriculture sector during the early 1960s to mid-1970s, and the sector being more concentered and extremely reliant on the cocoa subsector, the economy of Ghana witnessed a great depression following the collapse of world cocoa prices in the mid-to-late 1960s. Coupled with inappropriate response from the then government (by fuelling inflation and lowering real wages through printing of more money into the system) and intensification of fiscal and marketing inefficiencies, "*Ghana lost its stand of being one of the highest per capita income countries, government revenues fell from 15% of GDP in the early 1970s to 6% in 1982, public sector wages fell by an average of 10% in real terms per year between 1975 and 1983, export earnings fell to a low of 7% of GDP, and external financing dried up*" [7].

This experience triggered the initiation of an Economic Recovery Program (ERP) and more importantly initiatives to shield the country against future shocks from the international market. Among such initiatives was the Agricultural Diversification Project (ADP, 1991-1999) under the Medium Term Agricultural Development Programme (MTADP). The objective of this initiative was primarily to revitalize and enhance cultivation and expansion of export of non-cocoa tree crops (specifically oil palm, coffee, and rubber) and horticultural crops (with greater emphasis on pineapples) [1]. This was to promote import substitution and to reduce the country's extreme reliance on cocoa, as cocoa beans exports alone accounted for 93% of earnings from agricultural exports during the period 1961-1965 (see Table 1). Farmers were trained under the project and supported in diverse ways to ensure achievement of the objective of the ADP. Although the project is believed to have yielded a positive outcome, very little has actually been done so far to ascertain how the country performed under the project and is currently performing in exports of the commodities prioritized. Production and export of some of the products considered under the project are reported to have increased markedly in recent years [15]. This increase is said to have been led by pineapples, with output for many other products however believed to have stagnated or fallen.In spite of their suggestion, [15] failed to provide a clear picture on the performance of each of the commodities thereby providing no clearer picture on the impact of the initiative. Bridging of information gap along this line is the primary goal of the current study. The commodities covered in this study are cocoa, coffee, fruits and vegetables (as a unit), pineapples, bananas, oil palm and rubber.

Table 1 Share of agricultural commodities in total value of agricultural exports

Commodities	**1961-1965**	**1991-1995**	**2001-2005**	**2007-2011**
	Value of exports ($1000)			
	198.40			
Banana	1,124.00	420	1,947.80	5,742.80
Coffee (green)	146.00	1,896.00	603.00	497.50
Rubber (Nat. dry)	11.60	6,244.00	6,321.80	22,545.20
Oil Palm		3,324.00	15,432.20	51,900.00
Pineapples	0	5,106.00	28,168.60	15,515.40
Cocoa beans	190,819.40	291,450.00	639,041.00	1,204,039.00
Agricultural products	204,724.80	348,533.80	915,672.80	1,712,036.60

	Share in agricultural exports (%)			
Banana	0.10	0.12	0.21	0.34
Coffee (green)	0.55	0.54	0.07	0.03
Rubber (Nat dry)	0.07	1.79	0.69	1.32
Oil Palm	0.01	0.95	1.69	3.03
Pineapples	0	1.46	3.08	0.91
Cocoa beans	93.21	83.62	69.79	70.33

Source: Author's computation with data from FAO (Agricultural Trade Database)

2. LITERATURE REVIEW

Export performance or competitiveness has been defined is several ways along several dimensions in literature. [4] defines competitiveness as the ability of a country (a firm/or an entity) to offer products and services that meet local and international quality standards, worth domestic and global market prices and provide adequate returns on the resources used in producing them. Taking a more interesting stand, [13] defines competitiveness as the ability to sell products that meet demand requirements (price, quality, quantity) and, at the same time, ensure profits over time that enable the unit under study (nation or firm) to thrive. Having been inappropriately used interchangeably with the concept of comparative advantage, the concept of competitiveness has in economic and business literature been given numerous interpretations, making it more ambiguous as new interpretations evolve every now and then. As a relative measure, the most used index among the lot that comes to mind at the mention of competitiveness is the Balassa Index [2]. Since the proposition of this index by Balassa however, definition of the index has been revised and modified such that a plethora of measures now exist [9]. In as much as the aim for some of such revisions has been towards applying the index at the global level [e.g. 19], others have applied the index at regional level [2] and for assessment of bilateral trade between two trading partners [10].

By its original definition, the Balassa index (RCA- revealed comparative advantage) measures normalized export shares, with respect to exports of the same industry in a group of reference countries. By this, the index (RCA) is defined as follows:

$$RCA = {(X_{IJ}/X_{It})}/{(X_{nj}/X_{nt})} \quad \text{.....eq. (1)}$$

Where X represents exports, *i* is a country, *j* is a commodity, *t* is a set of commodities and *n* is a set of countries. RCA > 1 is by this definition perceived to reveal comparative advantage of a country *i* in exports of commodity *j*. Thus, the index measures a country's exports of a commodity relative to its total exports and compares this outcome with that for a set of countries (reference group). This index is foremost flawed by deviation in the index value observed as the set of countries used as reference changes, thereby making the outcome context and reference specific and sensitive to reference definition. The index is as well susceptible to double counting between pairs of countries. In addition, although blurrily perceived as a measure of comparative advantage, the Balassa index does not measure comparative advantage in the rigorous sense, but instead reflects competitive advantage based on real factor induced or distortionary induced developments in export shares [16]. The concept of comparative advantage is rather better reflected by the Domestic Resource Cost (DRC) criterion proposed by [8] and discussed by many other researchers including [11] and [17].

To address the flaw in RCA of being sensitive to reference definition, [19] offered three alternative specifications in its stead. These are the relative trade advantage (RTA), logarithm of the relative export advantage (ln RXA) and revealed competitiveness (RC). The respective definitions are given as follows:

$$RTA = RXA - RMA \quad \text{.....eq. (2)}$$

Where RXA holds similar definition as Balassa's RCA but uses the world as a reference group (instead of some selected set of countries) and

$$RMA = \left(M_{IJ}/M_{It}\right) \Big/ \left(M_{nj}/M_{nt}\right) \quad \text{.....eq. (3)}$$

Where M represents import and n represents world.
Thus, the RTA is defined appropriately as follows

$$RTA = \left[\left(X_{IJ}/X_{it}\right)/\left(X_{nj}/X_{nt}\right)\right] - \left[\left(M_{IJ}/M_{it}\right)/\left(M_{nj}/M_{nt}\right)\right] \quad \text{.....eq. (4)}$$

Revealed competitiveness (RC) on the other hand is defined as

$$RC = \ln RXA - \ln RMA$$

Following proposition of these alternatives by [19], several claims have been put across on the failure of these alternatives to correct for/capture the effect of government interventions and other distortionary measures on trade. [20] however found export performance to be more affected by economic fundamentals than by government intervention, whereas the reverse holds for import behavior. Based on this finding and others thereafter, several studies including [19] have recommended the use of the relative export advantage (RXA) and its logarithmic form (ln RXA) in preference to RTA and RC as appropriate measures for assessing export performance due to the low susceptibility of the former two indices to policy-induced distortions, and the high susceptibility of the latter two due to the import component [9].

Based on this observation, the RXA which holds the same intuition as the RCA and the ln RXA have been used frequently in economic and business literature for assessing export performance. In spite of their advantage of being less susceptible to distortions, like the RCA index of Balassa, the RXA and ln RXA are less informative on the performance status of countries in exports of respective commodities due to the respective narrow bounds of <> 1 (for RXA) and <> 0 (for ln RXA) along which outcomes are interpreted. In interpreting outcomes of these indices for respective countries, many researchers [e.g. 14, 3] have mostly made use of fewer randomly selected years to inform decision on export performance, which I deem inappropriate. For example, in [3], Iran was found to have an RCA for Kiwifruit of 1.0 in the year 2000, 23.3 in the year 2005 and "N/A" for the year 2009. France on the other hand had respective year indices of 1.0, 0.7 and 0.7, while Italy had 7.5, 5.5 and 7.8. In as much as one may be able to in some way predict performance for Italy and France based on the lower deviations observed (which as well have some risk implications), informing decision on export performance for Iran could be misleading bearing in mind the wide variation in figures for the country and the information gap in performance for years between 2000-2005 and 2005-2009. Similarly, assuming an index value above 23.3 was observed for Iran during each of the years 2006, 2007, and 2008 but a value of less than 1 in 2009 (as a replacement for the "N/A"), informing decision on export performance based on the year 2009 could be misleading.

It is upon these flaws identified that this study seeks to propose a more appropriate technique for effectively assessing export performance. Although the approach to be suggested was indirectly applied by [9] through the use of seven-year mean indices (for 1992-1998) in assessing Revealed Comparative Advantages of Hungary with respect to the EU, the bounds (binary) used were as well very narrow thereby being less informative. Appropriate bounds/thresholds which are robust to minor improvements in the cardinal measures (index values) are proposed in the methodology section below. In assessing export performance in this study, use is made of the "Comparative Export Performance" index (CEP), the "Symmetric Comparative Export Performance" index (SCEP) and the logarithmic form of CEP. These indices are almost similar by definition to the RXA, and ln RXA indices proposed by [19], with the SCEP being a symmetric form of the CEP. Although under different names, by definition, the CEP index and the SCEP have been used in past research works [including 4, 14, 5]. In contrast however to assessing performance based on export of good j relative to all goods other than j at national and world levels as per the definition of the RXA, definition of the CEP is more sector-bound. Thus in assessing export performance for example of an agricultural commodity, the commodity specific exports at national and world levels are used alongside aggregate agricultural exports at the national and world levels. This makes the indices used easily comprehensive and minimizes any possible misinterpretation or misspecification as have been the case with Balassa's RCA. With conforming definition for other sectors along this line, the thresholds introduced in this study could as well be used in other sectors, thereby making it externally valid (for other sectors).

3. METHODOLOGY

In responding to flaws identified in economic and business literature on assessment of export performance for major commodities of interest to respective countries over the past three decades, effort is made in this study to appropriately address most of the flaws stated in the literature review section through proposition of new thresholds and use of more friendly and comprehensible measure of competitiveness. To assess export performance of the seven commodities prioritized under the Agricultural Diversification Project, this study primarily made use of secondary data on value of exports for the respective commodities (cocoa, coffee, fruits and vegetables (as a unit), pineapples, Bananas, Oil Palm and Rubber) from Ghana, that for aggregate agricultural exports and their corresponding world values. All data used were gathered from the agricultural trade database of FAO (FAOSTAT) for the period 1987 to 2011.

In assessing performance of the country in exports of the commodities aforementioned, the comparative export performance index (CEP), the symmetric comparative export performance index (SCEP) and the logarithmic form of CEP are used. These respective indices are defined as follows:

$$CEP = {(X_{iB}/X_B)}\Big/{(X_{iA}/X_A)} \quad \text{.....eq. (5)}$$

Where
X_{iB}: value of export of agricultural commodity ifrom Ghana
X_B: total value of agricultural exports from Ghana
X_{iA}: total value of world exports for agricultural commodity i
X_A: total value of world agricultural exports

The symmetric comparative export performance index is consequently defined as follows:

$SCEP = (CEP - 1)/\,(CEP + 1)$ ……eq. (6)

And

ln (CEP) = log (CEP) ……..eq. (7)

Among these three measures of competitiveness, the SCEP (as a symmetric measure of CEP) is perceived to provide a better picture on the performance of a country by setting boundaries between -1 and +1. The closer a given country is to +1, the higher its export performance and vice versa. With a similar intuition as the RXA and ln RXA, values of CEP of at least +1 and ln (CEP) of at least 0 reveal competitive advantage in exports. Besides these basic foundations of the respective measures, more appropriate thresholds/bounds as shown in Table 2 are introduced to aid efficient assessment of export performance, effectiveness of policy instruments, reflect fragileness ofagricultural export trade and as well capture possible inefficiencies in exports due to distortionary measures.

To inform decision on Ghana's performance in exports of the respective commodities, seven-year mean figures are used. To effectively assess the effect of a policy instrument or initiative in enhancing a country's export performance for example over the period 1991 to 1999 and from the year 2000 to 2011 as is the case in the current study, it is more appropriately to base decision on mean indices developed over the last seven continuous years for the period 1991-1999 and 2000-2011 (thus mean figures for 1993-1999 and 2005-2011). To ensure appropriate reflection of the impact of the project on export performance of the respective commodities, use is made of annual figures for the period 1987-1990 (due to limited data availability) which mark the pre-Agricultural Diversification Project period, and mean figures for the periods 1993-1999 (period of Agricultural Diversification Project) and 2005-2011 (current/post-Agricultural Diversification Project performance). Upon the figures observed for the respective periods, decision on export performance for each commodity during the respective periods is informed based on the following thresholds proposed to guide efficient and effective assessment of performance within sub-sectors:

Table 2 Seven-year mean thresholds for assessing export performance

Classes	**CEP**	**Ln (CEP)**	**SCEP**
Highly Competitive	≥ 4.20	≥ 1.44	0.62 – 1.00
Competitive	1.73 - 4.19	0.55 -1.43	0.27 – 0.61
Weakly Competitive	1.00 – 1.72	0.00 – 0.54	0.00 – 0.26
Uncompetitive	< 1.00	< 0.00	< 0.00

Source: Developed by Author

These thresholds were not just randomly selected, but were set at the respective upper and lower bounds after several rotations for robustness. This is to ensure that no minor changes in the cardinal measures (figures within respective thresholds) would lead to movement of a country from a lower export performance level to a higher level, but rather to move from a lower to a higher level would require effective and efficient policy instruments, reduction of existing inefficiencies in export market of the respective commodities, improvements in trade (including appropriate liberalization of internal and external marketing) and minimization of

distortionary measures which according to [18] reduces competitiveness. These thresholds are valid for assessing export performance in all sectors as long as definition of the measures of competitiveness and the underlying intuition for interpretation are in conformity with the CEP, SCEP and ln (CEP) indices as defined above. When used in a policy environment, these thresholds could be useful as a guide for evaluating the effectiveness of various policy instrument purposed on enhancing export growth. These as well could be used to identify inefficiencies in export trade in less diversified and highly trade distorting environment and sectors (they could for example be extremely informative when used in assessing performance of export trade in cotton). They are quite effective in reflecting fragileness of agricultural export trade.

4. RESULTS AND DISCUSSION

Although pineapple exports started in 1984, Ghana by the year 1987 was according to the classesused in this study already “Highly Competitive” in export of the commodity. Besides, pineapple, the country was as well “Highly Competitive” in cocoa exports. The country was “Uncompetitive” in exports of coffee, fruits and vegetables (as a unit), bananas, oil palm and rubber. In as much as introduction of the agricultural diversification project helped in improving performance of all the commodities, export performance of only three of the commodities was above the “Uncompetitive” class based on the lower boundaries of the thresholds (thus CEP value less than 1.00). Performance of cocoa and pineapple remained “Highly Competitive” under the initiative, while that for rubber also improved from being “Uncompetitive” to being “Weakly Competitive”. The use of the thresholds is to reflect the fragileness of being at the lower or upper boundary of a given threshold. In as much as appropriate policy responses to market shifts and developments could ensure improvement in export performance of a given commodity initially close to the lower boundary of a higher threshold, implementation of inappropriate measures or decreased attention allotted a subsector could lead to a decline in performance of the commodity when in a higher threshold but close to the lower limit (movement from a higher threshold to a lower threshold). Providing clarity on the performance of the commodities in the “Uncompetitive” class, the CEP index for coffee increased from the range of 0.07-0.10 for the period 1987-1990 to an average index of 0.28 for the period 1993-1999. Indices for fruits and vegetables, Bananas and oil palm respectively increased from ranges of 0.03-0.09, 0.01-0.04, and 0.19-0.88 for the period 1987-1990 to 0.23, 0.27 and 0.85 respectively for the period 1993-1999. The CEP index for pineapple increased from a range of 1.86-16.97 for the period 1987-1990 to an average of 21.88 for the period 1993-1999, while that for rubber also increased from a range of 0.07-0.63 for the period 1987-1990 to 1.16 for the period 1993-1999. Being already classified as “Highly Competitive” a CEP index of 125.46 was observed for cocoa under the diversification project, with a range of 69.71-131.71 being observed for the period 1987-1990.

Emphasizing once again on the fragileness of being close to the lower boundary of a threshold, a decline in export performance of rubber was observed during the period 2005-2011 (compared to 1993-1999), while that for oil palm improved. Export performance of oil palm improved from being “Uncompetitive” to being “Weakly Competitive” with the opposite being observed for rubber. Although still in the “Highly Competitive” class, the CEP index for pineapple decreased from 21.88 under the diversification project, to 7.36 during the period 2005-2011. CEP index of cocoa also decreased from 125.46 for the period 1993-1999 to 102.80 for the period 2005-2011, maintaining its “Highly Competitive” status in the process. In as much as export performance for fruits and vegetables and bananas have improved (although still uncompetitive) between the periods 1993-1999 and 2005-2011, that for coffee

declined from an index of 0.28 for the period 1993-1999 to 0.02 for the period 2005-2011, the lowest so far for the entire period considered.

Table 3 Export performance for selected agricultural commodities

1987	1988	1989	1990	1993-1999	2005-2011
CEP					
Cocoa	69.71	91.29	105.89	131.71	125.56	102.80
Coffee	0.08	0.10	0.07	0.07	0.28	0.02
Fruits and Veg.	0.03	0.05	0.07	0.09	0.23	0.41
Pineapples	1.86	5.44	9.01	16.97	21.88	7.36
Bananas	0.01	0.02	0.04	0.03	0.27	0.55
Oil palm0.30		0.19	0.88	0.58	0.85	1.21
Rubber0.07		0.09	0.20	0.63	1.16	0.63
SCEP						
Cocoa	0.97	0.98	0.98	0.98	0.98	0.98
Coffee	- 0.86	- 0.82	- 0.87	- 0.86	- 0.58	-0.96
Fruits and Veg	- 0.95	- 0.90	- 0.86	- 0.83	- 0.63	- 0.44
Pineapples	0.30	0.69	0.80	0.89	0.91	0.64
Bananas	- 0.98	- 0.96	- 0.93	- 0.94	- 0.59	- 0.42
Oil palm	- 0.54	- 0.68	- 0.06	- 0.27	- 0.11	0.05
Rubber	- 0.87	- 0.84	- 0.67	- 0.23	0.03	- 0.24
Ln (CEP)						
Cocoa	4.24	4.51	4.66	4.88	4.82	4.63
Coffee	- 2.57	- 2.29	- 2.68	- 2.61	-1.44	- 3.95
Fruits and Veg.	- 3.58	- 2.96	- 2.60	- 2.36	- 1.49	- 0.98
Pineapples	0.62	1.69	2.20	2.83	3.07	1.69
Bananas	- 4.60	- 4.02	- 3.34	- 3.40	-1.48	-1.10
Oil palm	- 1.21	- 1.67	- 0.12	- 0.54	- 0.24	0.10
Rubber	- 2.64	- 2.43	-1.60	- 0.47	0.06	-0.51

Source: Author's computation with data from FAOSTAT (Agricultural Trade Database)

In summary, as shown in Table 3, the agricultural diversification project enhanced performance in export of all the commodities considered, but besides cocoa and pineapple which were already "Highly Competitive" in export performance, only performance in export of rubber improved significantly from being "Uncompetitive" to being "Weakly Competitive". By current performance, Ghana is "Highly Competitive" in cocoa and pineapple exports, "Weakly Competitive" in oil palm exports and "Uncompetitive" in exports of coffee, fruits and vegetables, bananas and rubber. Although the country is found to be "Competitive" in export of pawpaw based on own-computation, the commodity was excluded from the analysis due to missing data for a significant number of years, while exports of commodities like oranges and pepper were found to be "uncompetitive" (also excluded due to issues with missing data for some years). Summary on classification by the thresholds is provided in Table 4.

Table 4 Performance according to thresholds for the period 1993-1999 and 2005-2011

Classes	CEP	SCEP	Ln (CEP)	Commodities
1993 – 1999				
Highly Competitive	≥ 4.20	0.62 -1.00	≥ 1.44	Cocoa, pineapple
Competitive	1.73 – 4.19	0.27 - 0.61	0.55 –1.43	
Weakly Competitive	1.00 – 1.72	0.00 - 0.26	0.00 – 0.54	Rubber
Uncompetitive	< 1.00	< 0.00	< 0.00	Coffee, fruits and vegetables, banana oil palm
2005 – 2011				
Highly Competitive	≥ 4.20	0.62 -1.00	≥ 1.44	Cocoa, pineapple
Competitive	1.73 – 4.19	0.27 - 0.61	0.55-1.43	
Weakly Competitive	1.00 – 1.72	0.00 - 0.26	0.00 -0.54	Oil palm
Uncompetitive	< 1.00	< 0.00	< 0.00	Coffee, fruits and Vegetables, Banana, rubber

Source: Author's construct based on developed thresholds and computations

5. CONCLUSION

This study affirms suggestions by [15, 1, and21] that the agricultural diversification project had a positive impact on export performance for the commodities prioritized under the initiative. In spite of the beneficial implications from the initiative however, besides cocoa and pineapples exports which were already in the "Highly Competitive" class prior to initiation of the project, only rubber exports improved from being "Uncompetitive" to being "Weakly Competitive" under the initiative. Failure of government, policy makers, exporters and various stakeholders to put in place effective measure to sustain and further enhance growth and performance of rubber exports after the diversification project has led in recent years to a decline in performance of rubber exports. Effective efforts from the Oil Palm Research Institute, other marketing bodies and stakeholders in the oil palm industry have gone a long way to improve the performance of the oil palm export industry. By current standards, Ghana is "Highly Competitive" in cocoa and pineapple exports, "Weakly Competitive" in oil palm exports, and "Uncompetitive" in exports of all the other four commodities, with performance in coffee exports being worst among the lot identified in this study. Improvement in export performance of the various commodities would require effective participation of various stakeholders in the respective subsectors and not just the introduction of an initiative. Although the export dimension of agriculture is believed to have witnessed major growth in recent years due to beneficial implications from the diversification project, the current study highlights that, the growth observed is possibly due to major improvements in fewer subsectors. There arises therefore a need to revisit effective tools under the diversification project, promote stakeholder participation in export development as well as addressing existing marketing and fiscal inefficiencies that in one way or another stands precluding export growth of the various commodities.

COMPETING INTERESTS

No competing interests exist

REFERENCES

1. Asuming-Brempong, S. Economic and agricultural policy reforms and their effects on the role of agriculture in Ghana. Policy Module, Ghana. Role of Agriculture Project International Conference, 20-22 October, 2003. Rome, Italy.
2. Balassa, B. Trade liberalization and revealed comparative advantage. *The Manchester School Econ. Soc. Stud.*1965:33(1):99-123
3. Bano, S., Scrimgeour, F. 2011. Market analysis and revealed comparative advantage. Univerity of Waikato *Working Paper in Economics* 08/11, Department of Economics, New Zealand. 2011
4. Boansi, D. Competitiveness and determinants of cocoa exports from Ghana. *International Journal of Agricultural Policy and Research*. 2013: 1(9):236-254
5. Boansi, D., Crentsil, C. Competitiveness and determinants of coffee exports, producer price and production for Ethiopia. *Journal of Advanced Research in Economics and International Business. ASERS Publishing*, 2013:1(1):31-56
6. Bosello, F., Jian, Z. Assessing climate change impacts: *Agriculture. CIP-Climate Impacts and Policy Division Working Paper* N.02.2007. Centro Euro-MediterraneoPer I CambiamentiClimatici. 2005
7. Brooks, J., Croppenstedt, A., Aggrey-Fynn, E. Distortions to Agricultural Incentives in Ghana. *Agricultural Distorions Working Paper* 47, December 2007, World Bank, Washington, DC.
8. Bruno, M. The optimal selection of export-promoting and import-substituting project. In Planning the External Sector: Techniques, Problems and Policies, New York, United Nations. 1965
9. Ferto, I., Hubbard, L.J. Revealed comparative advantage and competitiveness in Hungarian agri-food sectors. *The World Economy*, 2003: 26(2): 247-259
10. Gual, J., Martin, C. Trade and foreign direct investment with Central and Eastern Europe: its impacts on Spain. In Faini, R. and Portes, R. (eds), *EU Trade with Eastern Europe: Adjustment and Opportunities* (London: CEPR). 1995
11. Krueger, A. O. Evaluating restrictionist trade regimes: theory and measurement. *Journal of Political Economy*, 1972: 80(1):48-62
12. Landau, S. Socio-economic determinants of climate change impacts. Prepared for the United Nations Development Program, UNDP-Bratislava Regional Center. 2010
13. Latruffe, L. Competitiveness, productivity and efficiency in agricultural and agri-food sectors. *OECD Food, Agriculture and Fisheries Paper* No. 30, OECD Publishing. 2010
14. Nwachuku, I.N., Agwu, N., Nwaru, J., Imonikhe, G. Competitiveness and determinants of cocoa exports from Nigeria. *Report and Opinion*, 2010: 2(7):51-54
15. Sharma, R., Morrison,J. Articulating and mainstreaming agricultural trade policy and support measures. Trade and Markets Division, Food and Agriculture Organization of the United Nations, Rome, Italy. 2011
16. Siggel, E. International competitiveness and comparative advantage: a survey and a proposal for measurement. The many dimension of competitiveness. CESifo Venice Summer Institute 2007

17. Srinivasan, T.N., Bhagwati, J. Shadow prices for project selection in the presence of distortions: effective rates of protection and domestic resource costs. *Journal of Political Economy*,1978: 86(1): 97-116
18. Vollrath, T.L. Competitiveness and Protection in World Agriculture. Agricultural Information Bulletin No. 567, Economic Research Service (US Department of Agriculture, Washington DC). 1989
19. Vollrath, T.L. A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage. WeltwirtchaftlichesArchiv, 1991:130:265-279
20. Volrath, T.L., Vo, D.H. Agricultural Competitiveness in an independent world. In Agricultural and Governments in an Independent World. International Association of Agricultural Economists Occasional Paper No. 5 (Aldershot: Gower). 1990
21. Wolter, D. Ghana-Seizing new agribusiness opportunities, OECD. 2008