

Original Research Article

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

ABSTRACT

Aims: 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.

Study design: The study primarily made use of secondary data on commodity and aggregate agricultural export values for Ghana and the world, the latter being used as the reference group

Place and Duration of Study: The study covered the years 1987 to 2011

Methodology: In assessing export performance, the CEP and SCEP and In (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.

Results: 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 is attributed to recent 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.

Conclusion: 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 that, the growth observed is possibly due to major improvements in fewer subsectors. [Add recommendation](#)

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

List them alphabetically

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.

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22 Contribution of the sector to food security is observed primarily through its direct effect of
 23 adding to domestic food availability and indirectly by permitted access to food supplies
 24 through enhanced earnings. Beside these traditional roles, the agriculture sector, through its
 25 dimensions of food production and exports does influence (and is influenced by) both
 26 domestic and international markets through forward (product market) and backward (factor
 27 market) linkages. Even in developed countries where the role of the sector is deemed
 28 relatively minimal, agricultural landscape and production of food still are key aspects of
 29 national identity and social welfare [11, 8]. This makes the sector a fuel for growth in both
 30 developing and developed worlds, thereby attracting greater attention when exposed to
 31 shocks. With the economy of Ghana being heavily reliant on the agriculture sector during the
 32 early 1960s to mid-1970s, and the sector being more concentrated and extremely reliant on
 33 the cocoa subsector, the economy of Ghana witnessed a great depression following the
 34 collapse of world cocoa prices in the mid-to-late 1960s. Coupled with inappropriate response
 35 from the then government (by fuelling inflation and lowering real wages through printing of
 36 more money into the system) and intensification of fiscal and marketing inefficiencies,
 37 *"Ghana lost its stands of being one of the highest per capita income countries, government*
 38 *revenues fell from 15% of GDP in the early 1970s to 6% in 1982, public sector wages fell by*
 39 *an average of 10% in real terms per year between 1975 and 1983, export earnings fell to a*
 40 *low of 7% of GDP, and external financing dried up"* [9].

41 This experience triggered the initiation of an Economic Recovery Program (ERP) and more
 42 importantly initiatives to shield the country against future shocks from the international
 43 market. Among such initiatives was the Agricultural Diversification Project (ADP, 1991-1999)
 44 under the Medium Term Agricultural Development Programme (MTADP). The objective of
 45 this initiative was primarily to revitalize and enhance cultivation and expansion of export of
 46 non-cocoa tree crops (specifically oil palm, coffee, and rubber) and horticultural crops (with
 47 greater emphasis on pineapples) [1]. This was to promote import substitution and to reduce
 48 the country's extreme reliance on cocoa, as cocoa beans exports alone accounted for 93%
 49 of earnings from agricultural exports during the period 1961-1965 (see Table 1). Farmers
 50 were trained under the project and supported in diverse ways to ensure achievement of the
 51 objective of the ADP. Although the project is believed to have yielded a positive outcome,
 52 very little has actually been done so far on ascertain how the country performed under the
 53 project and is currently performing in exports of the commodities prioritized. Production and
 54 export of some of the products considered under the project are reported to have increased
 55 markedly in recent years [14]. This increase is said to have been led by pineapples, with
 56 output for many other products however believed to have stagnated or fallen. In spite of their
 57 suggestion, [14] failed to provide a clear picture on the performance of each of the
 58 commodities thereby providing no clearer picture on the impact of the initiative. Bridging of
 59 information gap along this line is the primary goal of the current study. The commodities
 60 covered in this study are cocoa, coffee, fruits and vegetables (as a unit), pineapples,
 61 bananas, oil palm and rubber.

62

63

64 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)				
Banana	198.40	420	1,947.80	5,742.80
Coffee (green)	1,124.00	1,896.00	603.00	497.50

Rubber (Nat. dry)	146.00	6,244.00	6,321.80	22,545.20
Oil Palm	11.60	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

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

66

67 2. LITERATURE REVIEW

68

69 Export performance or competitiveness has been defined in several ways along several
70 dimensions in literature. [5] defines competitiveness as the ability of a country (a firm/or an
71 entity) to offer products and services that meet local and international quality standards,
72 worth domestic and global market prices and provide adequate returns on the resources
73 used in producing them. [12] takes a more interesting stand by defining competitiveness as
74 the ability to sell products that meet demand requirements (price, quality, quantity) and, at
75 the same time, ensure profits over time that enable the unit under study (nation or firm) to
76 thrive. As a relative measure, the most important index amongst the lot that comes to mind
77 at the mention of competitiveness is the Balassa index [2]. Although blurrily perceived by
78 most trade experts as a measure of revealed comparative advantage (RCA), definition of the
79 index as given by Balassa rather reflects competitive advantage in exports, as it defines
80 export performance. Comparative advantage is defined as the ability of a country, a firm or
81 an individual to produce goods and/or services at a lower opportunity cost than other firms or
82 individuals. The Index is originally defined as

$$83 \quad RCA_{ij} = RX_{Aij} = (X_{ij}/X_{ik}) / (X_{nj}/X_{nk}) \dots \dots \dots \text{Eq. (1)}$$

84 Where X are exports; k represents all commodities other than j; n represents all countries
85 other than i [12]. Thus, a country's share in world exports of a given industry divided by its
86 share of overall world trade. The RCA by this definition provides no relevant information on
87 opportunity cost. The term comparative advantage is better reflected by the Domestic
88 Resource Cost (DRC) criterion proposed by [10]. Along this line, any modification of the
89 original version applied in the current study refers more to competitive advantage (reflecting
90 performance in exports which can result from subsidies and other policy or surrogate
91 measures of incentive like exchange rate depreciation among others) and not purely
92 comparative advantage as most researchers presume. The RCA has been defined in
93 several ways in literature thereby keeping researchers at sea about the true definition of the
94 index. The value of the index is as well subject to vary based on the reference group. To
95 avoid any further confusion, the comparative export performance (CEP) index, a modified
96 version of the RCA which uses the world as the reference group to minimize or avoid any
97 possible variations in the index observed for a given country is selected as the appropriate
98 index in this study. This index (by its appropriate definition) has been used in several studies
99 [including 5, 6, 13] but under the name "Revealed Comparative Advantage". The appropriate

name “Comparative Export Performance” is made use of in [4] who defines this measure of export specialization of a country for a particular product group as

$$\text{CEP} = (X_{iB}/X_B) / (X_{iA}/X_A) \dots \text{Eq. (2)}$$

Where the

X_{iB} : country B's exports of good i

X_B : country B's total merchandise exports

X_{iA} : total world exports of good i

X_A : total world merchandise exports

In the other studies in which the index was applied, the following definitions were assigned

X_{iB} : country B's exports of agricultural commodity i

X_B : country B's total agricultural exports

X_{iA} : total world exports of agricultural commodity i

X_A : total world agricultural exports

Although many other indices including the revealed competitiveness (RC) and relative trade advantage (RTA) [15], the Grubel-Lloyd measure (GL) [3] and the export-to-import price ratio [7] have been used in assessing competitiveness in other studies, the current study sticks to the CEP index due to irregular nature of import data for Ghana thereby precluding estimation of the index for all years deemed relevant to this study. According to the RCA as defined by Balassa and the CEP, an index greater than 1 indicates that the country under study has a competitive advantage in exports. In most of the studies in which the Balassa index for example have been applied, the author(s) randomly and/or at times systematically selected three or four years in total from different periods and base his/her/their decision on this. I tend to disagree with such assessments and hereby introduce some new thresholds along which decisions will be based in the present study and in other studies to follow. To appropriately assess the effectiveness of a policy instrument or initiative in enhancing a country's export performance for example over the period 1991 to 1999 and from 2000 to 2011 as is the case in the current study, it would be more appropriate to base decision on mean index developed for the last seven continuous years for the period 1991-1999 and 2000 to 2011 (thus for 1993-1999, assuming the initiative was introduced in 1991, and for 2005-2011). Decision can then be made based on the thresholds within which the mean falls. Use of the mean index helps in capturing the extreme improvements and flops in the yearly indices, this being usually ignored in studies that make use of randomly selected annual indices. A country could have an index below 1 for the years 2005, 2006, 2007, 2008, 2009 and 2010, but an index of say 1.6 for the year 2011. Concluding that the country is competitive based on index for the year 2011 alone is misleading. This is what the introduction of the mean index is to help avoid. In addition, concluding that countries with RCA or CEP of 1, 1.3, 20, 50 are all regarded competitive provides no stronger base for evaluating effectiveness of policy initiatives or addressing possible inefficiencies. Thresholds as show in Table 2 below have been carefully and critically developed to help in evaluating the effectiveness of initiatives in meeting export development goals (primarily in terms of performance) and can be applied to other indices that have similar intuition as the RCA (Revealed Comparative Advantage), the RXA (Relative Export Advantage) or CEP (Comparative Export Performance). In addition to the CEP, the SCEP, a symmetric measure shown in Table 2 provides a better picture of 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.

152 Table 2 Seven-year mean thresholds for assessing export performance
153

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

154 Source: Developed by author
155

156 Performance of Ghana in export of the commodities considered under the Agricultural
157 diversification project during the project phase and thereafter is assessed in the current
158 study based on these thresholds. Application of these established thresholds in a policy
159 environment could help in evaluating the effectiveness of for example an initiative that helps
160 achieve movement in performance from a lower threshold to a higher one and vice versa.
161 These as well could be used to identify inefficiencies in export trade in less diversified and
162 highly trade distorting environment and sectors (for example these thresholds could be
163 extremely informative when used in assessing performance of export trade in cotton both at
164 the local and global levels).
165

166 3. METHODOLOGY

167 3.1 Sources of data

168
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171 The study primarily made use of secondary data on value of exports for the respective
172 commodities from Ghana, that for aggregate agricultural exports and their corresponding
173 world values. All data used were gathered from the agricultural trade database of the FAO
174 (FAOSTAT) for the period 1987 to 2011.
175

176 3.2 Assessing export performance

177 In assessing the performance of the country in export of the commodities aforementioned,
178 the CEP (comparative export performance index), SCEP (symmetric comparative export
179 performance index) and Ln (CEP) are used. Decision is however based on seven-year
180 minimum thresholds developed for each of these measures of competitiveness. Comparison
181 is made between the periods 1993-1999 (during the Agricultural Diversification project) and
182 2005-2011 (current period based on data available). This comparison is to facilitate
183 identification of the performance status of the commodities prioritized under the project
184 during the initiative and now. Indices for the years 1987 to 1990 are as well provided to give
185 insight into the performance status of the commodities before the project was initiated. The
186 measures of competitiveness used in this study are defined as follows:

187 $CEP = (X_{iB}/X_B) / (X_{iA}/X_A) \dots \dots \dots \text{Eq.(3)}$

188 $SCEP = (CEP-1)/(CEP+1) \dots \dots \dots \text{Eq.(4)}$

189 $Ln(CEP) = \log(CEP) \dots \dots \dots \text{Eq.(5)}$

190 where

191 X_{iB} : value of export of agricultural commodity i from Ghana (cocoa, coffee, fruits and
192 vegetables, pineapples, bananas, oil palm, and rubber)

193 X_B : total value of agricultural exports from Ghana

194 X_{iA} : total value of world exports for agricultural commodity i

195 X_A : total value of world agricultural exports
196

197 The seven-year mean index for the respective measures is basically defined as:

198

$$199 \text{Exp}_m = \sum (\text{Exp}_{it}) / 7 \dots \dots \dots \text{Eq. (6)}$$

200

201 Where Exp_m represents the seven year mean index for each of the measures of competitiveness, with
202 Exp_{it} representing the index for commodity i in year t .

203

204 By the intuition behind the original definition of the Balassa index (RCA) and the CEP
205 employed in this study, a country is regarded competitive when a CEP of at least 1.00 or
206 SCEP and $\ln(\text{CEP})$ values of at least zero are observed. In the current study however, four
207 distinct classes based on the thresholds shown in Table 2 are used in informing the
208 performance of Ghana in export of the respective commodities. These thresholds and
209 classes could be applied in other sectors beyond the agriculture sector and for other
210 measures of competitiveness that hold the same intuition as the Balassa index. The classes
211 used are “Highly Competitive”, “Competitive”, “Weakly Competitive” and “Uncompetitive”.
212 The appropriate threshold for each of these classes is specified in Table 2 (*in the literature*
213 *review section*). The SCEP, a symmetric version of the CEP provides a clearer picture on
214 performance than the other two measure employed. By its symmetric nature, it provides
215 figures within the range of -1 and +1. The closer the figure is to 1, the higher the
216 performance of the country in export of a given commodity and vice versa. The $\ln(\text{CEP})$ is
217 as well a modified version of the $\ln(\text{RXA})^1$ proposed by [15]. Defining the CEP in log helps
218 to obtained figures that are symmetric at the origin [12].

219 4. RESULTS AND DISCUSSION

220 Although pineapple exports started in 1984, Ghana by the year 1987 was according to the
221 classes used in this study already “Highly Competitive” in export of the commodity. Besides,
222 pineapple, the country was as well “Highly Competitive” in cocoa exports. The country was
223 “Uncompetitive” in exports of coffee, fruits and vegetables (as a unit), bananas, oil palm and
224 rubber. In as much as introduction of the agricultural diversification project helped in
225 improving performance of all the commodities, export performance of only three of the
226 commodities was above the “Uncompetitive” class based on the lower boundaries of the
227 thresholds (thus CEP value less than 1.00). Performance of cocoa and pineapple remained
228 “Highly Competitive” under the initiative, while that for rubber also improved from being
229 “Uncompetitive” to being “Weakly Competitive”. The use of the thresholds is to reflect the
230 fragileness of being at the lower or upper boundary of a given threshold. In as much as
231 appropriate policy responses to market shifts and developments could ensure improvement
232 in export performance of a given commodity initially close to the lower boundary of a higher
233 threshold, implementation of inappropriate measures or decreased attention allotted a
234 subsector could lead to a decline in performance of the commodity when in a higher
235 threshold but close to the lower limit (movement from a higher threshold to a lower
236 threshold). Providing clarity on the performance of the commodities in the “Uncompetitive”
237 class, the CEP index for coffee increased from the range of 0.07-0.10 for the period 1987-
238 1990 to an average index of 0.28 for the period 1993-1999. Indices for fruits and vegetables,
239 Bananas and oil palm respectively increased from ranges of 0.03-0.09, 0.01-0.04, and 0.19-
240 0.88 for the period 1987-1990 to 0.23, 0.27 and 0.85 respectively for the period 1993-1999.
241 The CEP index for pineapple increased from a range of 1.86-16.97 for the period 1987-1990
242 to an average of 21.88 for the period 1993-1999, while that for rubber also increased from a
243 range of 0.07-0.63 for the period 1987-1990 to 1.16 for the period 1993-1999. Being already

¹ Relative Export Advantage index proposed by Vollrath (1991) to help avoid double counting between pair of countries, but holds the same definition as the Balassa index based on exports.

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 in the period 1987-1990.

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 palm	0.30	0.19	0.88	0.58	0.85	1.21
Rubber	0.07	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)

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.

In summary, 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 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 [14, 1,16] 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.

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