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Global GAP Standard Compliance and Profitability: A Case Study of Smallholder Pineapple Farmers in Akuapem South of Ghana

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Abstract

The present study examined the perception of smallholder pineapple farmers on Global GAP standard compliance, assessed compliant farmers' rate of adherence to standard requirements, and compared the average farm profit of Global GAP compliant and non-compliant pineapple farmers in Akuapem South Municipal Area of Ghana. The study used mainly farm level data solicited from 150 randomly selected pineapple farmers. Findings of the study indicated that compliant farmers perceived Global GAP to offer market premium on certified products as it is the case for organic certification. Factors that accounted for farmer non-compliance with Global GAP included: high cost of standard compliance, uncompetitive farm gate price and low farm yield. Although average farm profit of Global GAP compliant farmer (GH¢9,083.64) was higher than that of non-compliant farmer (GH¢8,893.62), the difference was insignificant. The study recommended, among others, that a concerted attempt should be made by the Government of Ghana and the private sector to create a national commodity exchange institution that will seek to provide a transparent and efficient marketing system for Ghana's key agricultural commodities.

Keywords:
farm profit, Ghana, Global GAP compliance, pineapple, smallholder farmers

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INTRODUCTION

Agriculture is a key sector of the Ghanaian economy; it contributed about 30% of GDP and employed over 60% of the entire working population (Ghana Statistical Service, 2010). According to Mosquera et al. (2012), agricultural trade enables countries to gain foreign exchange which is used to create sustainable jobs and investment. The horticultural industry in Ghana is growing faster than above average of the agricultural sector and the country currently relies on the horticultural sub-sector as an engine of economic growth and poverty alleviation (Kuwornu & Mustapha, 2013). More importantly, Ghana, upon signing the Economic Partnership Agreement (EPA) with the European Union (EU), can expand horticultural exports to the EU. Ghana can also take advantage of increasing production and supplying horticultural products to the ever-expanding modern retail shops in the domestic market.

The pineapple production sub-sector plays a very vital role in Ghana's fruit industry (Voisard & Jaeger, 2003). This sector has generated a lot of employment opportunities for farmers, traders, processors, and exporters resulting inthe enhancement of welfare and poverty reduction in Ghana (Mensah & Brummer, 2016). According to Sefa-Dedeh (2005), pineapple has been Ghana's most developed horticultural export crop. It was the biggest contributor to agricultural non-traditional exports (NTEs), ranging from 36% to 39% of total value of export earnings (Kasalu-Coffin et al., 2005). Pineapple continues to be the backbone of Ghana's fruit industry accounting for 66% of foreign exchange earnings from the fruit industry to the Ghanaian economy during the period of 2000 to 2013 (Eurostat, 2013). Ghana's pineapple production is estimated between 120,000-150,000 tons annually (Kleemann, 2011), and according to Ghana Living Standards Survey (2009), about 2% of all households in Ghana grow pineapple, but not all of them are on commercial basis.

Attractive results in terms of poverty-and-inequality reducing effects of trade policy reforms have provided another reason for countries to seek further liberalization of national and world markets (Anderson et al., 2010). Yet, recent concerns on food safety and technical regulations are increasingly dominating international trade debates (Patricceone et al., 2011). This is as a result of increasingly cases of food poisoning and outbreak of food-borne diseases (FAO & WHO, 2001) which has led to the proliferation of food safety standards particularly private standards. On the contrary, producers in developing countries encounter difficulties in meeting requirements associated with implementation of such market standards (Asfaw et al., 2008). Even though there has been the general agreement not to use food standards as a competitive tool to segregate firms, it seems to be the case (FAO, 2010).

In Ghana, Global working group for Good Agricultural Practice (Global GAP) is the commonest private standard complied by farmers. Global GAP is a set of good agricultural practice standards pertaining to food safety, plant and animal protection, worker's health, and safety (Hobbs, 2010). It was established in 2007 by consortium of European food retailers as a system of self-appraisal certification among horticultural producers. Global GAP seeks to revolve growers' attitudes toward food production by imposing a performance standard with defined criteria to follow in order to render production processes safe (Global GAP, 2011). Even though Global GAP is a voluntary standard, its implementation has become a necessity to obtain access to the EU (Graffham et al., 2007) and other international markets. Quiet recently, Global GAP has also become a prerequisite in accessing modern retail markets in Ghana (Annor et al., 2016). However, Global GAP has been noted as a complex food safety standard that entails high investment cost (Mausch et al., 2006). This means that smallholder farmers need to comply with Global GAP in order to expand their access to the afore-mentioned markets. According to Kuwornu and Mustapha (2013), a number of smallholder farmers in developing countries including Ghana rely on traditional methods of production and suffer from technical, human resources, and financial constraints which prevent them from fulfilling Global GAP standard requirements. This has necessitated farmers to

seek political supports to offset the burden of regulations regarding food safety, animal and plant welfare and the environment (Rausser & de Gorter, 2013).

The horticultural industry in Ghana over the years has received assistance from national and international organizations with the goal of creating enabling environment to make the sector more competitive and to enhance access to international markets. In 2002, the Ghana Private-Public Partnership Food Industry Development Program was initiated by the Partnership for Food Industry Development for fruits and vegetables to enhance horticultural export crop profitability and efficiency (Afari-Sefa, 2010). In 2005, there was collaboration between Trade and Investments Program for Competitive Export Economy (TIPCEE) and Ghana Standards Board in supporting pineapple, pawpaw, and medicinal plants farmer's to obtain Global GAP group certifications (Option II). Between 2008 and 2011, the German Technical Cooperation's Market Oriented Agriculture Program (GTZ-MOAP) sought to improve the capacity of agricultural producers, processors, and other actors in the agricultural sector to compete in national, regional and international markets (Market Oriented Agriculture Program, 2009). Moreover, Government of Ghana through the Ministry of food and Agriculture (MoFA) established Food and Agriculture Sector Development Policy (FASDEP II) for the time frame 2009-2015 and one of its policy objectives was to increase competitiveness and enhance integration into domestic and international markets. Specifically, the government together with the donor agencies have aided in improving technology transfer, construction of fruit and vegetable storage and processing center at Nsawam. They also supported smallholder farmers in obtaining the Global GAP Option II group certification and improved the supply of quality new planting materials such as MD-2 pineapple variety through the establishment of specialist nurseries in Akuapem South Municipality.

Ghana continued to experience disparities in the number of smallholder farmers' involvement in exportable pineapple production and volume of pineapple exports after the introduction of Global GAP standard despite these interventions. The share of smallholder production in exportable pineapple in 2007 was about 45% (United Nations Conference on Trade and development, 2008). Yet, in 2010, this declined to about 39% (Kleemann, 2011). The volume of pineapple exports fell from 60.751 metric tons in 2006 to 35.134 metric tons in 2007 (Ghana Export Promotion Council, 2008). Both the volume and value of non- traditional exports declined for virtually all horticultural products in 2009 and earnings from the horticultural export sub-sector fell by 9% from US$1,340.9 million in 2008 to US$1,216.6 million in 2009 (Institute of Social, Statistics and Economic Research, 2010).

The study area is Akuapem-South Municipality. The Municipality is a leading producer of horticultural export crops like pineapple, pawpaw, and pepper. Pineapple is the leading crop produced in the municipality and accounts for the largest share of Ghana's pineapple exports with large number of smallholder farmers (Banson, 2007). In 2010, Akuapem South produced 23.055 metric tons of pineapple which constituted about 53% of total pineapple exports and 38%of national output (MoFA, 2011). One key challenge confronting smallholder pineapple farmers in the municipal area is their inability to comply with GlobalGAP requirements which has been continuously subject to variations taking into consideration current technological and market dynamics. As at 2009, the number of registered pineapple farmers was 10,837. This number fell to 3,753 (about 65% decline) farmers as at the year ending 2010 and as indicated by Tyers and Anderson (1992), anything destabilizing food market forces is of fundamental concern to the people and their industry.

According to Asfaw et al. (2008) the new landscape of proliferating and growing stringent food safety and quality standards will be a basis for competitive repositioning and enhanced export performance of developing countries. For a country to remain competitive in the high value food market, then, it should have the ability to upgrade capacity and make necessary adjustments in the structure and operation of its

supply chains. The study, therefore, seeks to, first, examine the perception of smallholder pineapple farmers on Global GAP compliance; second, to estimate the rate of adherence of Global GAP compliant farmers with standard requirements, and third, to compare farm profit of Global GAP compliant and non-compliant smallholder pineapple farmers in the study area. This study aims to make policy recommendations to aid decision makers in designing and implementing strategies poised in making food safety standards compliance easier, effective, and sustainable in Ghana.

Conceptual framework of the study

This study utilizes the concept of profit maximization to explain farmer's compliance decision on Global GAP standard. The theory of profit maximization relies on the principle that a farmer will attempt to obtain the highest farm profit from income generating activities. The farmer will therefore decide to manage his farm operations in such a manner as to increase farm profit. It then becomes realistic when the farmer pays critical attention to the revenue and cost components of farm production (Annor et al., 2016; Muriithi, 2008). The objective of the farmer would be to maximize revenue and minimize production cost to attain the highest farm profit. For the farmer to realize this objective, he will not only attempt to improve production efficiency but also enhance market acceptability of his farm produce through compliance with required market access standards such as Global GAP.

As shown in Figure 1. GlobalGAP compliance is expected to improve farm yield and market value of farm produce as a result of producing guaranteed safe food and upgrading the market acceptability of farm produce. This is expected to increase farm revenue which translates to high farm profit. However, standard compliance may raise both variable and fixed production costs which could negatively affect farm profit. It is envisaged that a farmer will comply with the standard if additional revenue obtained as a result of an increase in market access of farm produce exceeds the extra production cost incurred in meeting standard requirements and vice versa.

MATERIALS AND METHODS

Data collection and sampling method

Data on farm and household characteristics, pineapple outputs and prices, production costs, quality characteristics, and farmer's perception on GlobalGAP compliance were elicited through the use of semi-structured questionnaire and informal interviews. Secondary data on list of registered pineapple farmers, Global GAP Option II certified farmers and average weight per pineapple fruit were also elicited from the Municipal Directorate of the Ministry of Food and Agriculture (MoFA) in Akuapem South. With assistance from MoFA extension agents, four pineapple growing communities were purposively

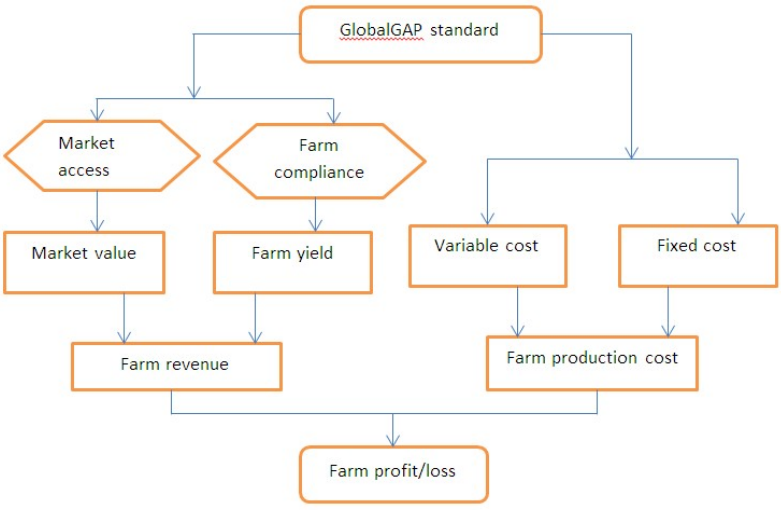

Figure 1. Conceptual Framework of GlobalGAP Compliance and Profitability

selected, namely; Aburi, Brekuso, Fotobi, and Nsawam. These communities were selected due to their keen involvement in the production of pineapple for exports and processing firms. Using the simple random sampling technique, 150 pineapple farmers were selected for questionnaire administration. Field survey was conducted in March, 2014. Data was analyzed using descriptive statistics and profitability techniques with the aid of computer software SPSS and Microsoft Excel.

Method of Analysis

Farmer's perception on Global GAP Standard compliance

Objective one sought to examine smallholder farmer's perception on Global GAP standard compliance and this was captured using data obtained from the questionnaire. The variables captured included level of awareness of Global GAP, level of compliance with Global GAP and factors influencing Global GAP non-compliance. Data collected were analyzed and results presented as percentages.

Farmer's adherence to Global GAP requirements

The second objective aimed at assessing the rate at which Global GAP compliant (Option II certified) farmers adhere to standard requirements. This was achieved by carefully selecting 30 compliance requirements (18 major musts; 10 minor musts; and two recommendations) from the Fruit and Vegetable Version of Global GAP Integrated Farm Assurance Manual attention was given to fruit requirements. Farmer's rate of adherence is expressed as a function of Global GAP requirements; $Yi=f(X_i)$ where Y_i represents farmer's rate of adherence and X_i represents GlobalGAP requirements to be adhered by the ithfarmer and Xiis given as $X_1 + X_2 + X_3$+----------$+X_{28} + X_{29} + X_{30}$ where X_1 to X_{30} represent the thirty (30) selected Global GAP requirements to be adhered by the ithfarmer (X_i variables are dummies; 1= yes and 0= no). The independent variables (X_i) are sub categorized into 11 major headings;

$X_i = GSR_i = TB_i + PM_i + SHM_i + SM_i + FM_i + IPM_i + PPP_i + E_i + HPH_i + WHW_i$

and $TB_i = X_1 + X_2$, $PMi = X_3 + X_4$, $SHM_i = X_5 + X_6$, $SM_i = X_7$, $FM_i = X_8 + X_9 + X_{10}$, $IMi = X_{11} + X_{12} + X_{13}$, $IPMi = X_{14} + X_{15}$, $PPPi = X_{16} + X17 + X_{18} + X_{19} + X_{20} + X_{21} + X_{22}$, $E_i = X_{23}$, $HPH_i = X_{24} + X_{25} + X_{26} + X_{27} + X_{28}$, and $WHW_i = X_{29} + X_{30}$

where; GSR_i= Global GAP Standard requirements, TB_i = Traceability requirements, PM_i = Propagation material requirements, SHM_i = Site history and management requirements, SM_i = Soil management requirements, FM_i = Fertilizer management requirements, IPM_i = Integrated pest management requirements, PPP_i = Plant protection products requirements, E_i = Equipment requirements, HPH_i = Harvesting and produce handling requirements, and WHW_i = Workers health and welfare requirements. Farmer's average rate of adherence (Y_i) is further expressed as; $Y_i = f(X_i) = \sum \bar{X_i}/n \geq 0.95$

where $\bar{X_i}$ represents the means of GlobalGAP Standard requirements and $\bar{X_i} = f(X_i)/N$ where N = total number of respondents $= \sum f_i$ and n represents the number of observations (GlobalGAP requirements). The 95% (0.95) is the minimum rate of adherence with GlobalGAP minor-musts compliance criteria and the study used this minimum rate as basis for comparison to ascertain whether a farmer adheres or does not adhere to GlobalGAP Standard requirements.

Effect of GlobalGAP Standard compliance on farm profit

The third objective of the study sought to estimate and compare farm profits among GlobalGAP compliant and non-compliant smallholder pineapple farmers. This was achieved by using economic indicators such as average pineapple yield, total revenue, variable cost of production, and depreciated fixed cost of production. Farm profit is computed as follows:

Farm profit *(P)* is expressed as the difference between total revenue *(TR)* and total cost of production *(TC)*. Thus, $P(GH¢) = TR - TC$, where *TR (GH¢)* = unit price of pineapple *(GH¢/kg)* × total quantity sold (kg) +extra revenue from sale of pineapple suckers *(GH¢)*. Total cost of production *(TC)* is also expressed as total variable

cost *(TVC)* + total depreciated fixed cost *(TFC)*. Variable cost items *(TVC)* that were included in this study included:cost of land preparation *(CLp)*, cost of suckers *(Cs)*, cost of planting *(Cp)*, cost of weed and pest control *(Cw)*, cost of harvesting and marketing *(Ch)* and other overhead costs *(Co);* hence, *TVC (GH¢) = CLp + Cs + Cp + Cw + Ch + Co*. Depreciated fixed cost *(TFC)* of the following assets were estimated and incorporated in the study:standard certification *(Sc)*, land *(L)*, farm tools (*Ft;* cutlass, hoe, mattock, rake, earth chisel, etc.), irrigation gadgets *(Ig)*, toilet facility *(Tf)*, chemical store *(Cs)*, equipment room *(Er)* and other fixed costs *(Ofc)*. This study used the straight-linemethod for depreciating assets due to its simplicity in computation. Hence, *TFC (GH¢) =Sc + L + Ft +Ig +Tf + Cs + Er + Ofc*

RESULTS AND DISCUSSION

Descriptive statistics of respondent farmers

From among the 150 respondent farmers interviewed, 110 representing 73% were Global GAP compliant farmers under the Option II Global GAP group certification with mean years of certification of 2.56, whereas the remaining 27% were non-compliant farmers. One hundred and twenty-five respondents (83%) were male headed household as against 25 (17%) being female headed households. This shows that males are more involved in the production of pineapple than their female counterparts. Mean ages of compliant and non-compliant farmers were 44 and 43 years, respectively. There was no clear difference between the ages of these farmer groups. Majority of farmers had attained secondary education with the mean years of education being 9 and 8 years for compliant and non-compliant farmers, respectively. Global GAP compliant farmers are more experienced in pineapple farming with mean age of 11 years as against 9 years for non-compliant farmers. Average size of pineapple farm enterprise owned by compliant and non-compliant were 0.8 hectares and 0.78 hectares, respectively. There was no clear variation in average farm sizes owned by the two farmer groups. This also confirms that the majority of farmers in the study area are smallholder farmers since their average farm size is below 5 hectares (Annor et al., 2016; Kuwornu & Mustapha, 2013). About 44% of compliant farmers had access to off-farm income as against 23% of non-compliant farmers, suggesting that compliant farmers are more diversified and can mitigate risks through reliance on other sources of income. With regards to market access, exporters were the major buyers (about 60%) of complaint farmers' pineapple produce, while the remaining is shared among processors (25%) and the local market (15%). The Global GAP non-compliant farmer market structure is characterized by the majority of fresh pineapple being sold in the local market (70%) and processors constituting the remaining 30%. Data indicated that no exporter buys from non-compliant farmers since they do not meet the required market requirements. All compliant farmers received extension services in the last 18months compared to 60% of non-compliant farmers receiving extension services. This shows that compliant farmers are more informed on current good agricultural practices (GAPs). Moreover, all Global GAP compliant farmers were members of farmer associations and only 25% of non-compliant farmers engaged in farmer associations, indicating that compliant farmers are more organized in executing their farm businesses. Both farmer groups do not receive adequate supports from buyers. On average, only about 27% of both compliant and non-compliant farmers benefited from buyer supports. Almost all (95%) compliant farmers received supports from development partners. Only about 15% of non-compliant farmers benefited from such supports, because they were not well-organized compared to compliant farmers. The development partners were mainly TIPCEE under Millennium Development Agency (MiDA) and GTZ-MOAP. They were supported in the area of finance (60%) for training and certification as well as construction of chemical stores for farmers groups. Production supports accounted for 30% like the supply of quality planting materials with the remaining 10% on marketing.

Table 1
Perception of Smallholder Farmers on Global Gap Compliance

VARIABLE	Frequency	Percentage
Farmer awareness with Global GAP		
Yes	121	81
No	29	19
Farmer knowledge on Global GAP		
Standard for International market access	49	40
Standard for domestic market access	4	03
Standard to ensure food quality and safety	30	25
Standard to obtain market premium on products	38	32
Farmer compliance with Global GAP		
Yes	110	73
No	40	27
Farmer reasons for non-compliance with Global GAP		
Small farm sizes (an average of 0.8 hectare)	8	20
Standard is not a requirement for local market access	4	10
Unattractive farm gate price	12	30
High cost of standard compliance	14	35
Low pineapple yield	2	05

Perception of smallholder farmers on Global GAP compliance

As shown in Table 1, 81% of respondent farmers confirmed that they were aware of Global GAP standard. Only about 19% of respondents declared their unawareness of the standard. This indicates that farmers have general knowledge about Global GAP standard. The study went further to examine farmers' understanding of Global GAP standard. About 40% of respondents understood Global GAP to be a market standard for international market access. They perceived Global GAP to be a pre-requisite in accessing global markets, and obtaining such a standard will enable farmer to export farm produce to international markets. About one-third (32%) of farmers understood Global GAP to be a market standard that guarantees high market premium on certified produce as it is the case with organic products. This is a misconception on the part of farmers, because unlike organic certification where market premium is given on produce, Global GAP is a conventional standard and does not offer such a condition, and hence it requires more farmer education to clarify this anomaly. About quarter (25%) of respondents also understood Global GAP as a market standard seeking to ensure that food is produced under safe and hygienic conditions. Only about 3% of farmers perceived Global GAP to be a pre-requisite standard for domestic market access and this could be attributed to the lack of consumer drive for food quality and safety in the domestic markets.

The majority (73%) of respondent farmers are Global GAP compliant farmers certified under the Option II Global GAP group certification whilst the remaining 27% constituted non-compliant farmers. The study investigated further to ascertain the unwillingness of some farmers to comply with Global GAP standard. About 35% of farmers indicated that Global GAP demands high compliance costs for which they are financially incapacitated to afford. This confirms the findings of Graffham et al. (2007) and Asfaw et al. (2008) that Eurep GAP (now Global GAP) entails costly investments in both fixed and variable costs that pose major challenge for smallholder farmers compliance with standard requirements. Secondly, farmers complained about the uncompetitive farm gate price offered to them for certified pineapple produce visa-vi the high production cost and this constituted about 30% of farmers response. The third most pressing issue (representing about 20% of farmers' responses) has to do with small farm sizes owned by farmers with an average of 0.79 hectare per farmer. Farmers were not motivated

Table 1
Compliant Farmers' Adherence with Global GAP Standard

GLOBALGAP Requirements	Adherence Rate (%)	Remarks
Traceability	98.18	Yes
Propagation Materials	79.09	No
Site History and Site Management	95.0	Yes
Soil Management	99.09	Yes
Fertilizer Management	95.76	Yes
Irrigation Requirements	4.24	No
Integrated Pest Management (IPM)	88.64	No
Plant Protection Products (PPPs)	85.97	No
Equipment	99.50	Yes
Harvesting and Produce Handling	86.18	No
Workers Health and Welfare	70.0	No
Average Adherence	81.93	No
Average Adherence (excluding Irrigation requirements)	89.70	No

*Yes = meets standard, No= otherwise. Regarding this study, a farmer is said to be a Global GAP compliant farmer when he adheres to more than 95% of standard requirements and non-compliant farmer when he adheres to less than 95% of requirements. Hence Global GAP certified farmers are considered to be compliant farmers.

to comply with Global GAP because they could not take advantage of economies of scale to reduce production cost and increase farm profit. The fourth most pressing issue has to do with Global GAP not being a requirement for local market access (representing 10% of farmers' responses). This prevailing condition could account for the large number of compliant farmers shifting to non-compliance prior to challenges in the standard compliance process. They will then produce and sell in local markets where Global GAP standard is not a pre-requisite for market access. The last most pressing challenge has to do with the low yield of pineapple (representing 5% of farmers' responses). This could be attributed to the regulated input use such as fertilizer, pesticide and herbicide applications on the part of Global GAP compliance as against non-compliance where input can be misapplied as there is no mechanism to monitor input use.

Results on farm audit of Global GAP compliant smallholder pineapple farmers

The minor-musts compliance criteria was used as a basis for comparison (95% and above farmer adherence with Global GAP requirements). Compliant farmers' adherence to traceability requirements (98%), site history and management (95%), soil management (99%), fertilizer management (96%), and equipment (99%) met the minimum requirements for Global GAP compliance. However, there were challenges with compliant farmers' adherence to propagation material (79%), irrigation methods (4%), pest management (89%), plant protection products (86%), harvesting and produce handling (86%), and workers' health and welfare (70%) since adherence rates were below the minimum requirements of 95%. These indicate that compliant farmers are expected to elevate their adherence to these requirements so as to continue sustaining their Global GAP group certification. The reason given by farmers for the very low adherence to irrigation requirements was that pineapple being an arid crop does not require much water for its production. They admitted that their farm sizes were small with an average farm size of 0.8 hectares and rain water was enough for them to carry on production. Assuming irrigation is not vital to smallholder pineapple production and is excluded from the estimation of average adherence rate as indicated in Table 2, the adherence rate is about 90% and this is still below the minor-must compliance criteria of 95%.

In the area of low adherence to propagation material requirements, compliant farmers were challenged in accessing guaranteed quality planting materials. With respect to workers' health and welfare, the low compliance rate was due to compliant farmers' inability to insure their

Table 3
Comparing Farm Profit of Global Gap Compliant and Non-Compliant Farmers

Variable		Compliant Farmers	Non-compliant Farmers	F-test (2 tailed sig.)
Farm size (ha)	mean	2.00	1.95	0.896
	SD	2.37	1.84	
Pineapple yield (kg/ha)	mean	27095.95	29945.00	0.000***
	SD	4130.50	5177.30	
Gross revenue (GH¢)	mean	13659.07	12919.90	0.005***
	SD	624.44	240.80	
Variable cost of Production (GH¢)	mean	3056.41	2952.19	0.000***
	SD	172.56	253.74	
Dep. Fixed Cost of production(GH¢)	mean	1564.03	1074.08	0.000***
	SD	552.21	226.21	
Total production Cost (GH¢)	mean	4620.44	4026.27	0.030**
	SD	633.87	367.81	
Farm profit(GH¢)	mean	9038.64	8893.62	0.374
	SD	988.66	462.72	

*for p<0.1, **for p<0.05 and ***for p<0.01, $1=GH¢3.8, Unit price of pineapple was found to be GH¢ 0.504 and GH¢0.430 for compliant and non-compliant farmers respectively. This was achieved by dividing gross revenue by pineapple yield. Profit percentages for compliant and non-compliant farmers were 66% and 69% respectively. This was also estimated by finding the ratio of farm profit to total revenue and expressing it in percentage form.

families and farm workers in health and other insurance schemes due to financial constraints. Moreover, the majority of farmers had no first-aid boxes on their farms. For detailed results, please refer to Appendix 1 on page 14.

Effect of Global GAP standard compliance on farm profit

As shown in Table 3, the study estimated and compared farm profits among GlobalGAP compliant and non-compliant smallholder farmers per hectare of pineapple farm. The study revealed that Global GAP non-compliant farmers obtained a higher farm yield (29, 945 kg/ha) than compliant farmers (27,096 kg/ha), and the difference was statistically significant. This condition could be attributed to the regulated input use (recommended pesticide use and fertilizer applications) on the part of Global GAP compliant farmers as opposed to the uncontrolled input use by non-compliant farmers. Although gross revenue of compliant farmers (GH¢13,650/ha) exceeded that of non-compliant farmers (GH¢12,920/ha), there was no clear difference between their unit prices (GH¢ 0.504 for compliant farmers as against GH¢ 0.431 for non-compliant farmers). This attests that compliant farmers do not obtain competitive farm gate price for their pineapple produce despite the difficulties they go through to comply with standard requirements. It is envisaged that middlemen (market intermediaries) retain larger bulk of the returns supposed to directly boost farmer's income. Moreover, compliant farmers are confronted with high production cost (GH¢ 4,620.44/ha) as against a relatively lower cost for non-compliant farmers (GH¢ 4,026.27/ha). Hence accounting for the insignificant difference in farm profit among compliant farmers (GH¢ 9,083.64) and non-compliant farmers (GH¢ 8,893.62). Moreover, profit percentages of compliant and non-compliant farmers were 66% and 69% respectively. This signifies that non-compliant farmers performed better than compliant farmers in terms of farm profitability.

CONCLUSION AND RECOMMENDATIONS

The study examined the perception of smallholder pineapple farmers on Global GAP standard compliance, assessed compliant farmers' rate of adherence to Global GAP requirements, and compared the average farm profit between Global GAP compliant and non-compliant farmers. Findings of the study revealed that majority of farmers (81%) were aware of Global GAP standard. About one-third (32%) of respondent farmers perceived Global GAP to be a market standard that guarantees market premium to certified farmers. However, this is a misconception

since Global GAP does not attract market premium on certified products unlike organic certification where market premium is given on certified organic products. According to farmers, the most pressing factor for non-compliance with Global GAP was the high cost of standard compliance. The second and third most pressing factors included uncompetitive farm gate price of certified pineapple produce and small sizes of their pineapple farms (an average of 0.8ha). Other pressing factors focused on Global GAP standard not being a pre-requisite for local market access and low yield of certified pineapple produce. The study also revealed that farmers are constrained in adhering to standard requirements. Farmers' rate of adherence was about 90% which is still below the minor-must compliance criteria of 95%. This testifies that some complaint farmers could lose their Global GAP Option II certification in any subsequent farm audit by Global GAP standard certifiers if they fail to uplift their adherence to standard requirements. On the part of profit estimation, compliant farmers recorded a lower farm yield (27,096kg/ha) than non-compliant farmers (29,945kg/ha). Although the unit farm gate price for compliant farmers (GH¢ 0.504/kg) was higher than non-compliant farmers (GH¢0.431), there was no clear difference between these two prices. This confirms the findings of Kuwornu and Mustapha (2013), that there is not much difference between Global GAP certified and non-certified farmers in Ghana. Nonetheless, compliant farmers are confronted with higher production cost (GH¢4,620.44/ha) than non-compliant farmers (GH¢4,026.27/ha). These factors accounted for the insignificant difference in farm profit between compliant (GH¢9,083.64) and non-compliant farmers (GH¢8,893.62).

The study therefore makes the following recommendations: First, the government of Ghana, through the Ministry of Food and Agriculture (MoFA),should support the provision of extension services to farmers on food quality and safety standards compliance particularly the scope and significance of Global GAP standard which happens to be the commonest food safety standard in Ghana. Exporters, as well as non-governmental organizations (NGOs) can support this education process. Second, standard formulators and regulators must consider how compliance will be made easier and affordable to farmers. They should therefore seek the concerns of producers and other stake-holders during the standard formulation process. This will boost farmers' certainty in complying with the proposed standard. Third, there should be the collaborative efforts by the Ministry of Trade and Industry (MoTI), MoFA and the private sector in establishing a national commodity exchange institution that will seek to provide a transparent and efficient marketing system for Ghana's agricultural commodities. This will enhance market access and fair returns for smallholder farmers.

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REFERENCES

Afari-Sefa, V. (2010). Horticultural exports and livelihood linkages of rural dwellers in southern Ghana: An agricultural household modeling application. *The Journal of Developing Areas, 44*(1), 1-23.

Anderson, K., Cockburn, J., & Martin, W. (Eds) (2010). *Agricultural Price Distortions, Inequality, and Poverty*.World Bank, Washington, DC.

Annor, B. P., Mensah-Bonsu, A., & Jatoe, J. B. D. (2016). Compliance with Global GAP standards among smallholder pineapple farmers in Akuapem-South, Ghana. *Journal of Agribusiness in Developing and Emerging Economies, 6*(1), 21-38

Asfaw, S., Mithofer, D., & Waibel, H. (2008). Food-safety standards: *A catalyst for the winners –a barrier for the losers? The case of Global*

GAP on horticultural export from Kenya. The World Agroforestry Centre (ICRAF), Nairobi, Kenya.

Banson, E. (2007). Effects of innovations on the production and marketing of fresh pineapples for export in Ghana, Ghana Atomic Energy Commission, BNARI, Legon, Accra.

Eurostat (2013). Eurostat international trade data. EU Fruit Import from Ghana (2000 - 2013). (Eurostat is the Official Statistical Office of the European Union). Retrieved from http: //ec.europa.eu/eurostat

Food and Agriculture Organization (FAO) (2010). *Private food safety standards: Their role in food safety regulation and their impact.* Paper prepared by Renata Clarke for presentation and discussion at the 33rd Session of the Codex Alimentarius Commission, FAO 00153 Rome, Italy.

Food and Agriculture Organization (FAO), & World Health Organization (WHO) Joint Publication (2001). *Assuring food safety and quality: Guidelines for strengthening national food control systems.* FAO and Food Nutriotion Paper 76, ISSN 0054-4725 Rome, Italy.

Ghana export promotion council (GEPC) (2012). *Non-Traditional Exports Statistics-2011*. Accra, Ghana.

Ghana Living Standards Survey Fifth Round (GLSS) (2009). Ghana Statistical Service. Retrieved from www.statsghana.gov.gh/docfiles/glss5 _report.pdf

Ghana Statistical Service. (2010). Ghana Statistical Service. New Series of the Gross Domestic Product (GDP) Estimates, 1–5 Retrieved from statsghana.gov.gh/.../news/gdp_newsletter_ rebased_gdp_nov_2010.pdf .

GLOBAL GAP (2011). Global working group for good agricultural practice, control points and criteria, integrated farm assurance; fruits and vegetable regulations, GLOBALGAP c/o Food PLUS GmbH, Cologne, 1-15,

Graffham, A., Karehu, E., & MacGregor, J. (2007). Impact of Eurep GAP on small-scale vegetable growers in Kenya, Fresh Insights No. 6, Natural Resources Institute, Kent, Retrieved from www.agrifoodstandards.net.

Hobbs, J.E. (2010). Public and private standards for food safety and quality: International trade implications. *Centre Journal of International Law and Trade Policy, 11* (1), 136-152.

Institute of Social Statistical and Economic Research (ISSER) (2010). *The state of the Ghanaian economy in 2009.* University of Ghana, Legon, Accra.

Voisard, J.M., & Jaeger, P. (2003). Regional study on agricultural trade facilitation/export promotion in SSA; Ghana Horticulture Sector Development Study, including Agricultural Sub-Sector Investment Program Restructuring. ESSD Department of the World Bank. Retrieved from: http://hubrural.org/IMG/pdf/ghana_horticultural_development_study.pdf

Kasalu-Coffin, E., Bedinger, T., & Dosso, H. (2005). *Export marketing and quality awareness project, appraisal report*. African Development Fund, Tunis, pp. 35-40.

Kleemann, L. (2011). *Organic pineapple farming in Ghana – a good choice for smallholders?* Working Paper (No. 1671), Kiel Institute for the World Economy, Kiel, Germany

Kuwornu, J.K.M., & Mustapha, S. (2013). Global GAP standard compliance and smallholder pineapple farmers'access to export markets: Implications for incomes. *Journal of Economics and Behavioral Studies, 5*(2), 69-81.

Mausch, K., Dagmar, M.D., Asfaw, S., & Waibel, H. (2006). *Impact of Eurep Gap standards in Kenya: Comparing smallholder to large-scale vegetable producers*. Paper presented at the Conference on IARD, University of Bonn, Germany.

Mensah, A., & Brummer, B. (2016). Drivers of technical efficiency and technology gaps in Ghana's mango production sector: A stochastic metafrontier approach. *African Journal of Agricultural Economics, 11*(2),101-117.

Market Oriented Agricultural Programme (2009). Program progress report 2009 in collaboration with MoFA and GTZ. Market Oriented Agriculture Program, Accra, Ghana.

Ministry of Food and Agriculture (2011). Year 2010 facts and figures on pineapple production. Ministry of Food and Agriculture, Akuapem South Municipal Directorate of Agriculture, Nsawam.

Mosquera, M., Evans, E., & Spreen, T. (2012). *Assessing the potential impact of strengthening food safety regulations on developing countries: The US food safety and modernization act*. Selected paper prepared for the presentation on the Southern Agricultural Economics Association Annual Meeting (February 4-7), Birmingham, AL.

Muriithi, B.W. (2008). *Compliance with EUREPGAP standards: Determinants, costs and implications on profitability among smallholder French beans exporters in Kirinyaga District, Kenya*. Unpublished thesisin Agriculture and Applied Economics, Egerton University, Kenya, pp. 15-45.

Patriccione, G., dell'Aquila, C., Perito, A.M., Cioffi, A., & Garcia-Alvarez-Coque, J.M. (2011). *EU fruit and vegetable sector: Overview and post 2013 CAP perspective. Directorate-General for Internal policy.* Policy Department B: Structural and Cohesion Policies, European Parliament, Brussels, Retrieved from:http://edz.bib.uni-mannheim.de/daten/edz-ma/ep/11/EST43068.pdf

Rausser, G.C., & de Gorter, H. (2013). Agricultural commodity price fluctuations, 2006-2012. In Pinstrup-Andersen P. (Ed.), Political Economy of Food Price Policy, Oxford University Press, Oxford UK.

Sefa-Dedeh, S. (2005). *Ghana private-public partnership food industry development program*. Final Report for USAID Associate Cooperative Agreement No. 641-A-00-03-0003, Accra, pp. 75-105.

Tyers, R., & Anderson, K. (1992). *Disarray in World Food Markets: A Quantitative Assessment*. Cambridge University Press, Cambridge and New York, NY.

United Nations Conference on Trade and Development (2008). Implications for exports of fruit and vegetables from Sub-Saharan Africa: Experiences of Ghana, Kenya, and Uganda.UNCTAD/DITC/TED/2007/13, UN, New York, NY.

APPENDIX

Compliant Farmers' Rate of Adherence with Global GAP Standard

#		N	Mean	Mean (%)	%Yes	% No
A.	**Traceability**					
1.	Availability of traceability document	110	.9636	96.36	98.18	1.82
2.	GLOBALGAP compliant certification	110	1.0000	100		
B.	**Propagation Material**					
3.	Records on guaranteed seed quality	110	.8000	80	79.09	20.91
4.	Records on chemical treatment of suckers	110	.7818	78.18		
C.	**Site History and Site Management**					
5.	Records on planting rate and date of planting	110	.9909	99.09	94.55	5.45
6.	Practicing crop rotation	110	.9000	90		
D.	**Soil Management**					
7.	Practicing field cultivation technique	110	.9909	99.09	99.09	0.91
E.	**Fertilizer Management**					
8.	Recommendations for fertilizer application	110	1.0000	100	95.76	4.24
9.	Records on fertilizer application	110	.9727	97.27		
10.	Stores fertilizer separately from plant protection products	110	.9000	90		
F.	**Irrigation Method**					
11.	Artificial supply of water	110	.0818	8.18	4.24	95.76
12.	Records on artificial supply of water	110	.0091	0.91		
13.	Quality supply of water	110	.0364	3.64		
G.	**Integrated Pest Management (IPM)**					
14.	Training or advice on Integrated Pest Management	110	.9909	99.09	88.64	11.38
15.	Non chemical pest control approach	110	.7818	78.18		
H.	**Plant Protection Products (PPPs)**					
16.	PPPs used authorized in Ghana	110	1.0000	100	85.97	14.03
17.	Training or advice on PPPs to be used	110	1.0000	100		
18.	Records on PPPs application	110	.9545	95.45		
19.	Conversant with MRL regarding country of destination of produce	110	.3636	36.36		
20.	Undergo risk assessment regarding MRLs	110	.9909	99.09		
21.	No other use of PPPs containers	110	.7364	73.64		
22.	Safe storage point for PPPs container disposal	110	.9727	97.27		
I.	**Equipment**					
23.	Correct operation of knapsack sprayer	110	.9905	99.50	99.50	0.5
J.	**Harvesting and Produce Handling**					
24.	Training in hygiene on handling products	110	.9818	98.18	86.18	13.82
25.	Hygiene risk assessment been conducted	110	.9545	95.45		
26.	Crates and harvesting tools clean from contamination	110	.7000	70		
27.	Access to clean toilet and hand washing facilities	110	1.0000	100		
28.	Access to suitable changing facilities on farm	110	.6727	67.27		
K.	**Workers Health and Welfare**					
29.	Wear protective clothes especially during pest control	110	.9727	97.27		
30.	Farmer and workers are registered on an insurance scheme	110	.4273	42.73	70	30
	Valid N (listwise)					
	Average %	110			81.93	18.07
	Average % (Excluding Irrigation Methods)				89.70	10.30

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