EFFECTS OF SELECTED AGRICULTURAL COMMODITIES EXPORTS ON ECONOMIC GROWTH IN ESWATINI

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Abstract

The economy of Swaziland comprises of mixed sectors which include agriculture (6.6%), industry (13.7%) and services (57.7%) This shows a situation where agriculture is relegated to the background that is not good for Swaziland, given the roles of agriculture in development, such as, high employment generation capacity, food security issues, foreign exchange earnings, raw materials for the home industries, and poor performance of Swaziland in SACU. There is dearth of information on the contributions of major agricultural commodities to the GDP of the

country, hence this study attempted to establish the effects of export values of sugar, pineapple and beef on the GDP of the country. Time series data from 1973 to 2015 were analyzed using, ADF, Cointegration and ECM to establish both the magnitude and direction of the relationship between GDP and the selected agricultural commodities. The results showed a positive long run relationship between sugar and beef exports with economic growth in Swaziland while pineapples export and economic growth showed a negative relationship. It is suggested that the government of Swaziland should diversify and promote exports in order to fully benefit from the agricultural sector.

Keywords: Agricultural Commodities Exports, Gross Domestic Product, Cointegration, Error Correction Model

INTRODUCTION

The economy of Swaziland comprises of mixed sectors which include agriculture (6.6%), industry (13.7%) and services (57.7%) (Central Bank of Swaziland, 2015). This shows a situation where agriculture is yet to contribute substantially to the development of Swaziland given its roles in high employment generation capacity, food security issues, foreign exchange earnings, raw materials for the home industries, as well as the poor performance of Swaziland in SACU. Be that as it may, agriculture remains the backbone of the Swazi kingdom's economy. About three-quarters of the working population depend on agriculture for their income and livelihood (Central Bank of Swaziland, 2015). In spite of the great potential of this sector as a way out of poverty, large proportion of the population in this sector remains poor due to adverse factors. Diminished rainfall and drought is a cause for concern for those living in drought areas. Swaziland has the highest HIV/AIDS infection rate in the world (Swaziland HIV Incidence Measurement Survey (SHIMS), 2015). This is having an adverse effect on national crop and economic output.

Swaziland's economy continues to decline with growth projected to have declined to -0.6% in 2016 from 1.7% in 2015 due to slump in the primary sector as agricultural production declined as a result of drought (African Economic Outlook (AEO), 2017). Crops such as maize and cotton which are not irrigated, along with irrigated crops, mainly sugar cane, recorded significant declines. In addition, a large decline in revenues from SACU put considerable pressure on the fiscal account. Against this backdrop, an expansionary fiscal stance amplified the negative impact of these shocks. Short-term prospects in 2017 and 2018 indicate a sluggish recovery, with growth remaining at 1.4% and 2.3% respectively, mainly predicated on improved

agricultural performance due to improved weather conditions, as evidenced by normal to above normal rains in the 2016/17 planting season.

The key national strategic objective for agriculture is to improve agricultural production and increase agricultural contribution to the GDP by 30% by 2010 from the contribution of 8.7% in 2005/2006. Towards this, exports are important to a country's economy since the ratio of exports to GDP can be used as an index to openness, where a large ratio of the exports to GDP indicates that the country has more open economy whereas when there is lower ratio of exports to GDP, it indicates that the country has less open economy. Larger economies (measured by area, population, and size of the domestic market) can produce and absorb a larger share of their output domestically; they tend to have lower ratios (Pereira and Xu, 2000).In Swaziland, textile exports were affected so hard by the removal of trade preferences under AGOA while the sugar exports to the EU market faced a drastic fall in favoured prices for sugar. As a result, Swaziland has to find new market for its products. Swaziland's beef export markets through Swaziland Meat Industry are destined for Europe, Norway, France and Mozambique (Food Agricultural Organisation, 2015).

Following the aforementioned reasons, there is need for informed policies and workable strategies to reverse declining trend of agricultural outputs, creation of job opportunities in agricultural sector thus reducing unemployment rate in the country. Generally, the study was able to establish the effects of selected agricultural commodities exports on the economy of Eswatini. In specifics, the study evaluated the trend of selected agricultural exports over time, examined the relationship among exports of sugar, beef, pineapples and economic growth and estimated the contributions of sugar, beef and pineapples to economic growth in Swaziland.

REVIEW OF LITERATURE

Although many studies conducted on the impact of agricultural exports on economic growth depict a positive relationship between total exports and economic growth, it is reasonable to question whether this relationship holds for all the primary exports. The main argument for a differing impact, according to Fosu (1990), is due to differences in the output and also the fact that individuals and companies (who uses more technologically intensive method) are involve in the production of agricultural products.

According to Smith (1776) countries can benefit from trade by specializing in the production of those goods, for which their resources are best suited. The classical school of economics argues that trade stimulates the economic growth through exports of surplus commodities. The Neoclassical trade theory is based on the principles of comparative

advantage, but in contrast with the classical theory as it assumes two production factors (Feenstra, 2008).

Ricardo (1817) observed that trade was driven by comparative rather than absolute costs (of producing a good). One country may be more productive than others in all goods, in the sense that it can produce any good using fewer inputs (such as capital and labor) than other countries require to produce the same good. Ricardo (1817) understands that such a country would still benefit from trading according to it comparative advantage, that is, exporting products for which its absolute advantage was greatest and importing those for which its absolute advantage was comparatively less. As a result of comparative advantage, trade raises the living standards of both countries.

The relationship between economic growth and exports in Pakistan was studied by Aurangzeb (2006) based on the analytical framework developed by (Feder, 1983). The author tested the applicability of the hypothesis that the economic growth increased as exports expanded by using time series from 1973 to 2005. The study concluded that an export oriented and outward looking approach was needed for high rates of economic growth in Pakistan since the findings of the study showed that export sector had significantly higher social marginal productivities.

Sanjuan-Lopez and Dawson (2010) estimated the contribution of agricultural exports to economic growth in developing countries. They estimated the relationship between Gross Domestic Product and agrarian and non-agrarian exports. Panel co-integration technique was used in analyzing the data set of 42 developing countries. The results of the study indicated that there existed long run relationship and the agriculture export elasticity of GDP was 0.07. The non-agriculture export elasticity of GDP was 0.13. Based on the empirical results, the study suggested that the poor countries should adopt balanced export promotion policies but the rich countries might attain high economic growth from non-agricultural exports.

The impact of agricultural exports on economic growth of Cameroon, specifically with reference to coffee, banana and cocoa using co-integration test was studied by Noula, Sama and Gwah (2013). Results from the study showed mixed effects on economic growth in Cameroon. Coffee export and banana export has a positive and significant relationship with economic growth. On the other hand, cocoa export was found to have a negative and insignificant effect on economic growth. Noula, Sama and Gwah, (2013) recommended, based on their empirical results of the study, that implementation of policies aimed at increasing the productivity and quality of cash crops and value addition to cocoa and coffee beans before exporting to increase the growth of economic growth in Cameroon.

Nadeem (2007) provided the empirical analysis of the dynamic influences of economic reforms and liberalization of trade policy on the performance of agricultural exports in Pakistan. The author examined the effect of both domestic supply side factors and external demand on the performance of agricultural exports. The major finding of the study was that export diversification and trade openness contributed more in agriculture exports performance. The results of the study suggested that agricultural exports performance is more elastic to change in domestic factors.

METHODOLOGY

The study used time series data collected from 1973 to 2015 by Central Statistics Office (CSO), Swaziland and data from Food and Agricultural Organization (FAO) on the three agricultural exports (sugar, beef and pineapple). Variables of interest include, real Gross Domestic Product (GDP), exchange rate and consumer price index from World Bank Development Indicators.

The study employed descriptive statistics, trend analysis and correlation as well as cointegration analyses to establish the long-run relationship between economic growth (GDP) and the export value of sugar, beef and pineapple in Swaziland. Agricultural time series tend to be trended and regressions of trended data, even though giving high coefficient of determination (R^2) and significant t-ratios, may be spurious, leading to misleading conclusions and recommendations for policy makers (Granger and Nwbold, 1974). Stationarity of the time series data on beef, sugar and pineapple was first established because the statistical properties of the estimators rely on the data being stationary. Since cointegration says nothing about the casual direction of the casual relationship between the variables and the concept requires that if two variables are found to be contegrated it follows that there must be granger causality in at least one direction. To determine the direction and magnitude of the causation between GDP and each of the three variables, a granger causality test was conducted.

Having examined the causal relationship between the variables, and confirmed that the models are rightly specified; ECMs are specified to ascertain both the short and the long run dynamics of growth. Hallam and Zanoli (1993) have demonstrated the relevance of the ECM to agricultural supply response, and how it avoids the partial adjustment's unrealistic assumption of a fixed target supply based on stationary expectations.

The ECM for GDP growth and effects of the three commodities is specified as:

$$\Delta GDP = \alpha_0 + \alpha_1 \Delta sugar + \alpha_2 \Delta beef + \alpha_3 \Delta pineapple - \gamma(GDP_{t-1} - beef_{t-1} - bineapple_{t-1}) + \mu_1$$

Where, ΔGDP is the change in the GDP, $\Delta sugar$, $\Delta beef$, $\Delta pineapple$ is the change in export value of sugar, beef and pineapple respectively. The term in the brackets in equation provides

the error correction mechanism, with γ representing the error correction term. If the GDP growth rises above its long run equilibrium level at time t-1, the term in the brackets become positive.

RESULTS AND DISCUSSION

Descriptive Analysis

Table 1 presents the summary statistics of the variables used. It shows that the average real GDP at market prices was E19636.88 million. The average real exchange rate is 202.02 and the average consumer price index was 63.63. On the average sugar export is E544.32 million. Sugar has been exported below its average from 1973 to 1995. From 1996 sugar export increased at an increasing rate, hence it recorded value of exports higher than its mean value. This could be attributed to many reform programmes that have been put in place by the Swaziland government. The average beef export is E7.23 million. The beef export in Swaziland was showing an inconsistent trend until in 2013 where beef export showed a dramatic increase hence beef has been exported above its mean export. On average, pineapple export was E25.85 million.

Table 1 Summary Statistics

Variable	Mean	Std.dev	Min	Max
GDP	19636.88	11435.67	2219	40197
Sugar	544.32	502.45	18.83	2095.08
Beef	7.28	6.93	0.04	29.98
Pine apple	25.85	23.29	0.05	82.50
RER	4.53	3.37	0.68	12.76
CPI	43.23	40.08	2.08	135.42

Source: Author's calculation based on data from FAO and SRA

Trend Analysis

Trend of sugar exports in Eswatini

Swaziland produces sugar and exports it to the European Union countries. Given the recent agricultural support programmes in Swaziland, sugar production was expected to increase as a result of expansion of cane growing area under the Lower Usuthu Smallholder Irrigation project. Further, market created by the existing sugar processing plants is an incentive to attract new farmers into the sugar production. The area under sugar cane production was projected to increase by 607 hectares with an anticipated increase in yields; sugar production was projected to increase by 4% in 2014/2015 (CBS, 2015). Although the sugar market was restrained due to

over-supply of sugar from major sugar producers (Brazil and India) hence the exchange rate movements was an important factor in 2014/2015. A sustained depreciation in the Lilangeni against major trading currencies was a shock to returns from non-SACU sales. Figure 1 shows that there was a steady upward trend in the production of sugar from 1973 to 2000. From this period to 2015 the central tendency was E544.322 million with a minimum of E18.829 million in 1973 and a maximum of E2095.08 million in 2012. Sugar export value fell from its peak in 2012, to as low as about E54 million as a result of long spell of drought experienced in Swaziland in 2015. The study further revealed an upward trend in the export value of sugar since 2015.
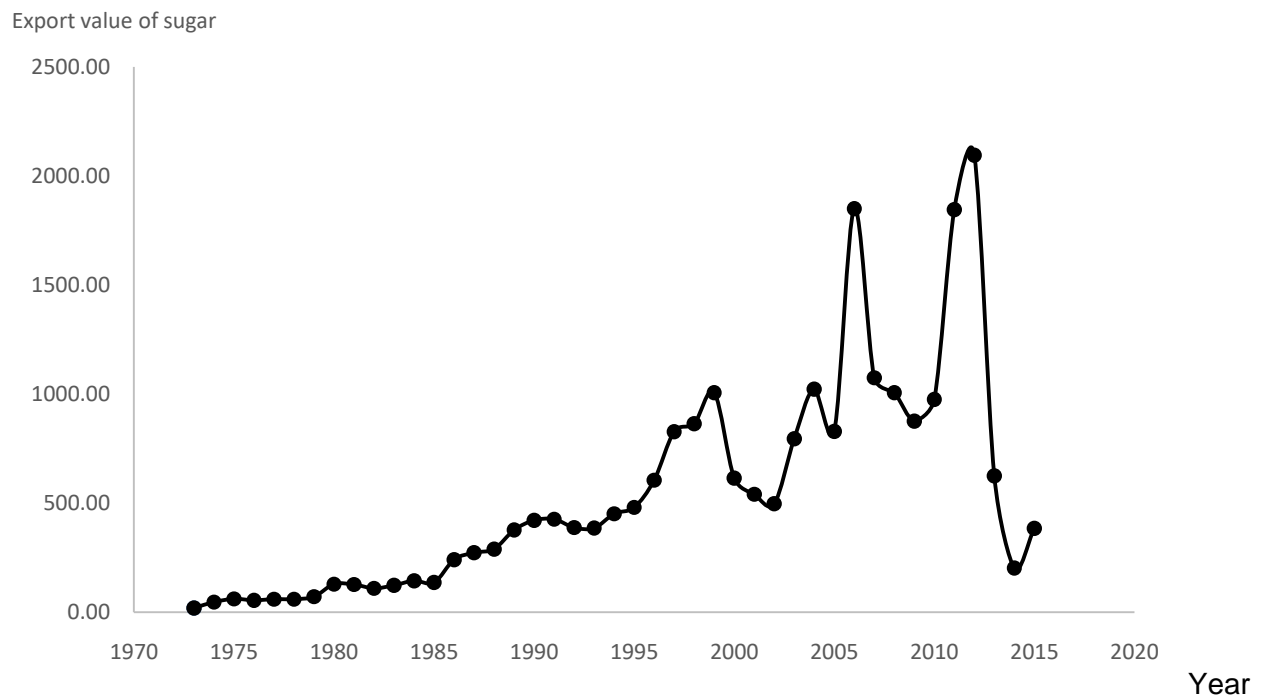
Export value of sugar

Figure 1. The trend in sugar export in Swaziland (E Million) from 1973-2015
Source: Author's calculation based on data from FAO and SRA (2018)

Trend of beef exports in Swaziland

Swaziland exports its beef to the European and Norwegian markets, France and Mozambique. Beef exports in Swaziland showed a mean of E7.286156 million over the past 43 years, that is, from 1973 to 2015. It is remarkable to note the steady upward trend in the export value of beef since 2012. It is evident that the sector has more potential to make huge positive impact on the GDP of Swaziland. The standard deviation of the beef export value showed E6.937182 million with the lowest export value of E0.0366061 million 2008, 2009 and 2010 in compared to a maximum export value of E29.97549 million in 2015.
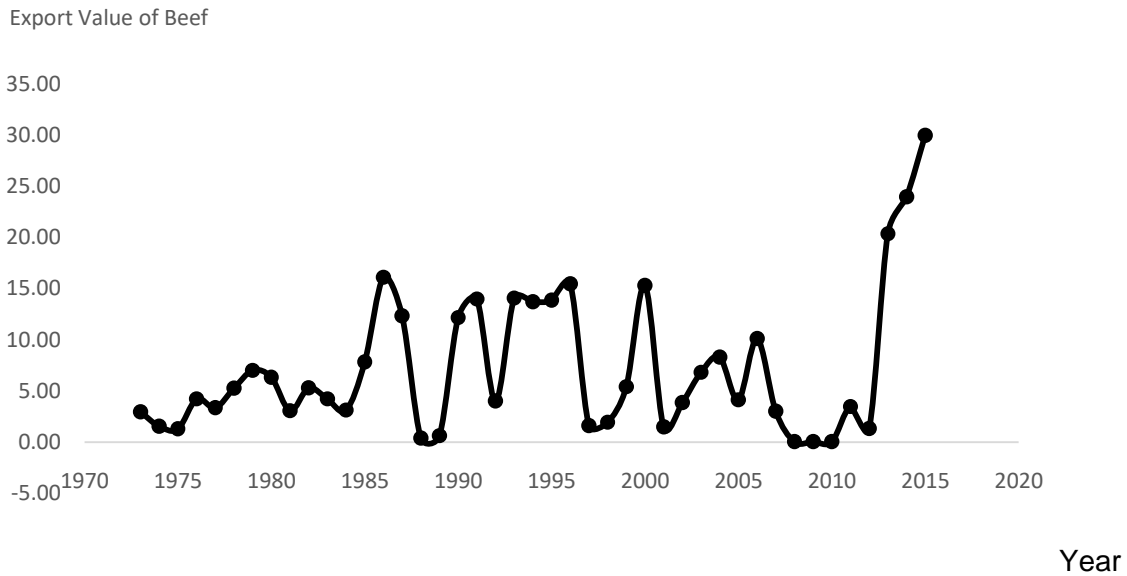
Export Value of Beef

Figure 2. The trend in beef export in Swaziland (Million Emalangeni) from 1973-2015.
Source: Author's calculation based on data from FAO and SRA (2018)

Trend of pineapples exports in Swaziland

Pineapple exports in Swaziland have been experiencing fluctuations as a result of periodic falls in output, pressures of supplying the domestic market and unpredictable international prices. Figure 3 shows that there has been a continuous downward trend in the export value of pineapple since 2011. This in turn calls for urgent intervention of workable strategies to boost the export value of the product in the country.
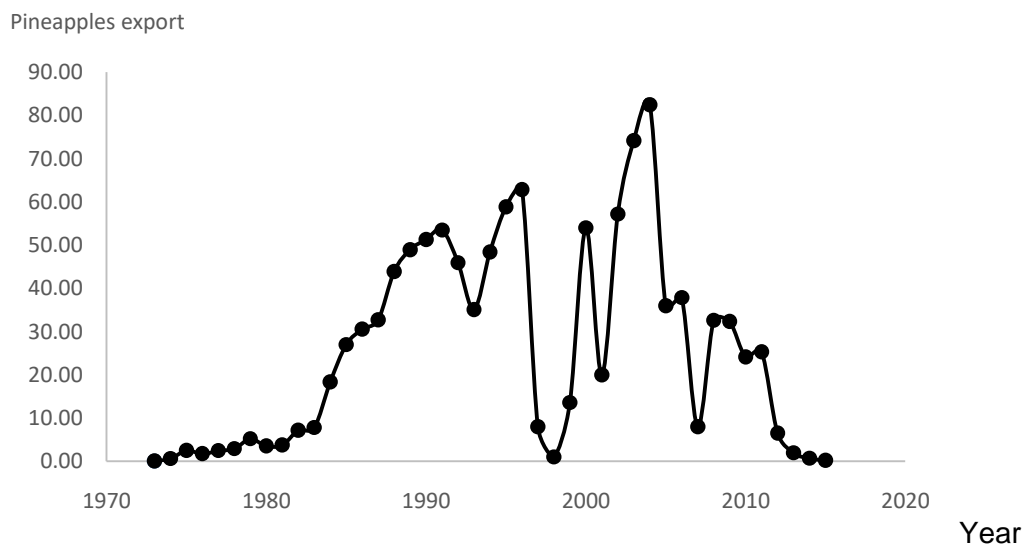
Pineapples export

Figure 3. The trend in pineapple export in Swaziland (Million Emalangen) from 1973-2015
Source: Author's calculation based on data from FAO and SRA (2018)

Correlation of the selected commodities

Here attempt was made to show how strongly the three commodities are related. Both the strength and direction of the linear relationship between three commodities were estimated. GDP and Sugar exports are highly positively correlated with a correlation of 0.92. There is a weak negative correlation of 0.03 between GDP and beef and GDP and pineapples are also weakly positively correlated with 0.46. Table 2 shows the relationship of among Sugar, Beef, Pineapples and GDP.

Table 2. Correlation matrix of the variables.

Variable	GPD	Be	Pi	Sug	RER	CPI
GDP	1.000					
Beef	-0.0345	1.000				
Pineapple	0.4624	-0.0675	1.0000			
Sugar	0.9154	-0.1358	0.5669	1.0000		
RER	0.8171	-0.0676	0.0818	0.7053	1.0000	
CPI	0.7957	-0.1223	-0.0017	0.6936	0.9341	1.0000

Source: Author's calculation based on data from FAO and SRA.

Cointegration Analysis

This study used the maximum Eigen value although sometimes the trace and maximum Eigen value statistics might give differing results. Johansen (1988) recommended basing on one of them to identify the number of co integration vectors to solve this differing results.

H_0: Residuals are non-stationary (randomness)

H_1: Residuals and the series are co-integrated (stationary)

Table 3 shows that maximum statistics (trace statistic) indicated 1 co-integrating vector (equation). Since at the null hypotheses of co-integration rank (r=0), the max value of 37.75 is greater than the 5% critical values of 29.68, hence the Null hypothesis of no co-integration is rejected. The author concluded that there is cointegration.

The evidence of co-integration by both methods indicates the existence of long run relationship among the variables. There is evidence that sugar export, beef export, pineapples export, real exchange rate and consumer price index proxy to inflation are long-run determinants of economic growth in Swaziland.

Table 3. Results of the test for the number of cointegration vectors

Johansen tests for co-integration

Trend: constant				Number of obs = 38	
Sample: 1978 - 2015				Lags = 5	
Maximum	rank	LL	eigenvalue trace statistic	5% critical value	
0	-18.158631	37.7459	29.68		
1	-5.5781475	0.48425	12.5849*	15.41	
2	-1.0358066	0.21264	3.5002	3.76	
3	.71429432	0.08800			

Autoregressive Integrated Moving Average (ARIMA)

Table 4 shows that the magnitude of the coefficient of beef, variable suggests that an increase in the export value of beef by 10% will lead to a marginal increase of 0.5 % in GDP. Sugar seems to have a stronger impact on GDP.

A 10% increase in the export value of sugar leads to 7.3% increase in GDP. On the other hand, pineapple has negative impact on the GDP. Attempt to increase its export value by 10% leads to a marginal decrease of 0.4% in the GDP.

Drought and poor technology in pineapple production could be blamed for the poor performance of pineapple.

The findings lend support to the view that Africa, particularly Swaziland is in dare need of smart agricultural policies, which will take into cognizance, the reality of climate change and sufficient incentives to farmers.

Table 4. ARIMA regression for selected agricultural exports

Sample = 1973 - 2015			Number of obs = 43			
Variable	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Beef	.0493541	.0383528	1.29	0.198	-.025816	.1245241
Pineapple	-.0414307	.0448354	-0.92	0.355	-.1293065	.046445
Sugar	.7263222	.0489981	14.82	0.000	.6302878	.8223567

Note: The test of the variance against zero is one sided, and

the two-sided confidence interval is truncated at zero.

Error Correction Model

Table 5 shows that when the predictions from the cointegrating equation are positive (0.06), pineapples are above its export value because the coefficient on pineapples in the cointegrating

equation is positive. The estimate of the coefficient of beef is -0.167. Thus when the average export value in beef is too high, it quickly falls back toward the beef level. The estimated coefficient of sugar is -0.9 implies that when the average export value in sugar is too high, the average export value in sugar quickly adjusts toward the GDP level at the same time that the GDP prices are adjusting. Overall, the output indicates that the model fits well. The coefficient on beef, sugar and pineapples in the cointegrating equation are statistically significant, as are the adjustment parameters.

Table 5. Error-correction model

Johansen normalization restriction imposed						
	Beta Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Beef	-.1666609	.046854	-3.56	0.000	-.2584931	-.0748286
Sugar	-.8952751	.080955	-11.06	0.000	-1.053944	-.7366062
Pineapple	.0641882	.0574469	1.12	0.264	-.0484057	.1767821

CONCLUSION AND RECOMMENDATIONS

Agricultural exports trends in Swaziland have shown deterministic and stochastic patterns over time. The results of the long run showed a positive and significant association between sugar export and economic growth. Equally a positive and significant effect is found between beef export and economic growth in Swaziland. A negative relationship is found between pineapples export and economic growth. The fair adjustment could be related to the emphasis given to the export growth and expansion policies by government and other favourable conditions in Swaziland.

It is suggested that the government of Swaziland should diversify and promote exports in order to fully benefit from the agricultural sector hence promote economic growth. Sugar export seems to have high potential for economic growth hence a rigorous effort should be focussed toward productive channels of sugar cane in the economy so as to enhance economic growth. Modern production technologies of sugar should be adopted to promote large commercial farms.

Beef export value could also be increased if government embarks on breeding programme for productive cattle breeds. The negative effect of pineapple on GDP could be reversed if concerted efforts are made to improve both the management and production of high yielding and drought resistant varieties of pineapple. Infusion of science and technology in the production of the sugar, beef and pineapple will greatly increase the export value of these commodities.

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