Trend of Production and Export of Commercial Crops of Vanuatu: 1991-2012

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ABSTRACT

Agriculture is the mainstay of the rural population of Vanuatu. Obviously, improvements in crop production and exports will enhance standard of living of rural people and help support economic development. In Vanuatu beef, copra, cocoa and kava account for the bulk of export earnings. This study analysed trends in area, production and export of coconut, cocoa and kava crops during the 1991-2012 period. The study revealed that area under cocoa and kava crops has been declining during the study period, while the area under coconut crop was stagnant. The production of cocoa and kava showed negative trends. Copra production also showed a declining trend during the study period. Consequently, exports of cocoa and coconut products were declining during the reference period. However, exports of kava showed increasing trend but it also in the later part of the study period started declining. Evidently there is a positive relation between quantity of crop produced and exported. Vanuatu's climate and land are conducive to produce these export-oriented crops, but detailed investigations are required to understand the problems and constraints faced by farmers in crop production, processing and export. In reversing the downward trend of agriculture export sector in Vanuatu, the integration of production and marketing will prove to be a crucial element of the agricultural development strategy.

Key words: Vanuatu export crops, trend of area and crop production.

INTRODUCTION

Vanuatu, a South Pacific island nation is home to 271,519 people distributed among its 83 islands. Population density is 19 persons per km^2. The agricultural sector contributes 22.4 percent share to gross national product and it comprised majority of Vanuatu's exports (ADB 2009). The coconut sub-sector has been the mainstay of the national economy accounting for over 30 percent of annual exports alongside timber, beef, cocoa and kava (Howes and Soni, 2009). International trade has always been important for agricultural products globally. Historically, Vanuatu country has had an inward-orientation, focused mainly on import substitution sectors with low external trade priority. However, it has shifted to be a more open economy with a few trade restrictions benefiting from significant foreign investment, substantial imports of wide range of goods and continuous reliance on limited exports (ADB, 2009).

In Vanuatu, agriculture exports have been traditionally driven by copra and followed by kava, timber and beef. Other agriculture goods such as trochus shell, cocoa, vanilla and root crops make up remainder of exports (Gay, 2008). Yari (2003) Reported that Vanuatu suffered considerably as the instability measure of export earnings for Vanuatu was higher than other leading countries in the South Pacific. Apart from trade, production levels of the agricultural commodities have also fluctuated (Jayaraman and Ward, 2006). Fleming (2007), Reddy (2007) and ADB (2000) pointed out that taxes, policies and regulations are responsible for the slow growth of the agriculture sector creating uncertainty and restricting foreign investment. In addition, agricultural supply is constrained by uncertainty in the land tenure, diseconomies of scale, minimal education and poor infrastructure and limited access to credit

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affecting its productivity potential. In the developing countries, *f*or overall economic development it is essential to enhance production in the agriculture sector (Johnston & Mellor, 1961).

In pacific island countries farmers have relied on exports to provide markets for their products as their productive capacity is greater than their domestic consumption at local markets. This study was undertaken to analyze changes and fluctuations in the area, production and export of three main export crops (i.e., coconut cocoa, and kava) of Vanuatu during the period 1990- 2012. Such studies are important to comprehend happenings in the commercial crop sector to provide policy makers with critical information for formulating effective development strategies conducive to export growth and economic development.

METHODOLOGY

The required data for the period 1990-2012 about area, production and export of coconut products, cocoa and kava crops were obtained from published and unpublished records of Vanuatu National Statistics Office (VNSO), Reserve Bank of Vanuatu (RBV) and FAO STAT database.

Time-series data for the period (1991-2012) about the crop area, production and export of each of the three crops (coconut cocoa and kava) under study were analysed to examine their trends. Linear trend lines were fitted by using least-squares method of regression analysis. The specification of the regression model was as follows:

$$Y_t = \alpha + \beta X_t + e_t$$

Where,

Y_t = **magnitude** of the dependent variable in time period t

X_t = independent variable (time)

α = Y-axis intercept (computed trend figure of the Y variable when X = 0 in base period.

β = slope of the trend regression line (rate of change in Y for a given change in t)

e_t = Random error term

RESULTS AND DISCUSSION

The results are discussed under three subheads: (i) changes in the area of crops, (ii) changes in the production of crops, and (iii) changes in the exports of crops.

Changes in the area under Coconut, Cocoa and Kava crops

The data on changes in area harvested of coconut, cocoa and kava crops are shown in Table 1. The regression coefficients of the linear trend lines of area of coconut, cocoa and kava crops are presented in Table 2. The trends of changes in the area harvested of coconut, cocoa and kava crops are also illustrated in Figures 1, 2 and 3, respectively.

In Vanuatu, in 1991 area under coconut crop was 69,000 hectares which rose to 96,000 hectares by the year 2011. The annual growth rate for coconut area was positive (1.91%). The overall average area harvested for coconut was 80,391 hectares (Table 1). For the coconut crop the regression coefficient of slope of the trend line (β), was positive and statistically significant at 1 percent probability. The regression analysis showed that every year about 1536.56 ha area was added to the total area under coconut trees. The coefficient of determination (R^2) showed that 77 percent variation in the coconut area (y) was explained by the time trend variable (x). Trend of coconut area harvested is shown in Figure 1.

Table 1: Area, production and export of coconut, copra and kava crops in Vanuatu.

Particulars	1991	2011	Average * (1991-2011)	Annual growth rate %
Coconut area (ha)	69,000	96,000	80,391	1.91
Coconut production (tons)	356800	373,500	288,204	0.40
Copra production (tons)	45071	31,000	31,203	- 0.42
Copra export (tons)	37,297	13,596	21,682	-5.85
Cocoa area (ha)	4,987	2,100	2,564	-2.73

Cocoa production (tons)	2,173	1,500	1,384	-1.73
Cocoa export (tons)	1,956	1,414	1,272	-2.41
Kava area (ha)	3,055	2,500	2,527	-2.00
Kava production (tons)	42	734	420	7.715
Kava export (tons)	27	643	376	7.88

Sources of data: FAOSTAT & Reserve Bank of Vanuatu various quarterly reviews
*Average of all 22 years data for the period 1991 to 2011, and not just of data of first year and last year of the time-series.

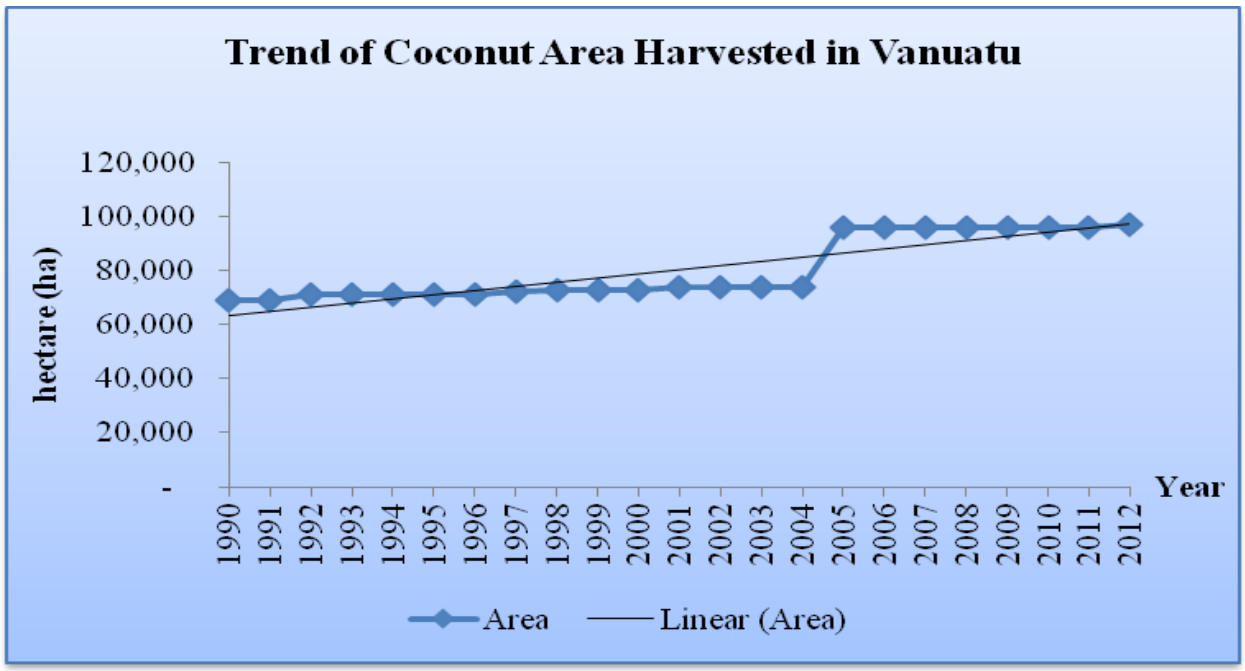

Figure 1: Trend of coconut area harvested in Vanuatu

There was declining trend of the area under cocoa crop in Vanuatu is shown in Table 2 and Figure 2. From 1991 to 2011 the area under cocoa crop reduced from 4987 ha to 2100 ha representing a reduction of 2.73% per annum. The regression coefficient of slope of the trend line was negative and statistically significant (Table 2). During the 22 years study period there was a 69.92 ha decline in area under cocoa crop every year.

The trend of kava area is shown in Figure 3 was also decreasing. In 1991 kava crop area was 3,055 ha which fluctuated a lot in between to be 2,500 ha in 2011. The average decline rate in kava area was 2 percent per annum. This declining rate was also reflected in the sign of slope coefficient of the trend line which was negative and statistically significant. The area under kava crop reduced about 50.48 ha every year.

Table 2: Management systems, feeding and housing of local chickens (*n*=173)

Dependent Variable	Regression coefficients of linear trend line		R^2
	Intercept, α	**Slope, β**	
Coconut area (ha)	61952.57*** (2470.831)	1536.561*** (180.204)	0.7759
Coconut production (tons)	274365.2*** (24050.02)	1153.261 ^{NS} (1754.028)	0.0172
Copra production (tons)	32783.37*** (2980.26)	-131.676^{NS} (217.358)	0.0176
Copra export (tons)	36272.04*** (3912.94)	-1268.7*** (297.9264)	0.4755
Cocoa area (ha)	3560.407*** (349.791)	-69.918** (25.5111)	0.2635
Cocoa production (tons)	1696.292*** (169.4614)	-23.9881* (12.3592)	0.1521
Cocoa export (tons)	1731.221*** (185.2546)	-30.6911* (14.1051)	0.1914
Kava area (ha)	3198.9610*** (329.6303)	-50.4828* (25.0976)	0.1683
Kava production (tons)	31.23715 ^{NS} 91.97222	32.40415*** 6.707764	0.526355
Kava export (tons)	34.94805 ^{NS} (72.3854)	29.6409*** (5.5113)	0.5912

Sources of data: FAOSTAT and Reserve Bank of Vanuatu various quarterly reviews
Figures in parenthesis denote standard error of respective regression coefficients
* Significant at 10% level; ** Significant at 5% level; and *** Significant at 1% level.
Number of observations (years) of the regression variables = 22.

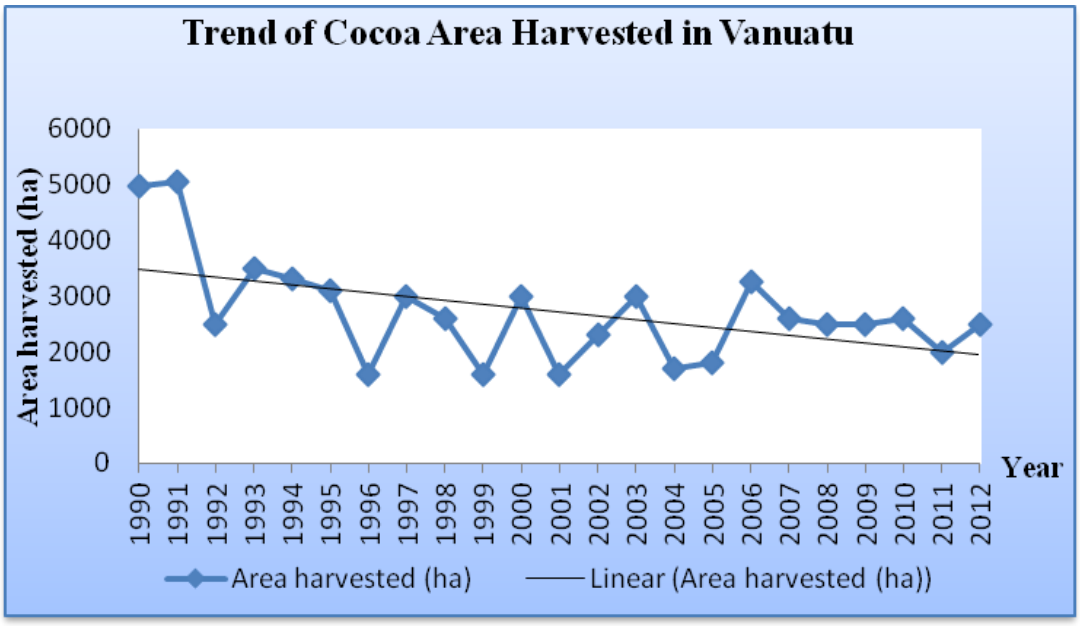

Figure 2: Trend of cocoa area harvested in Vanuatu

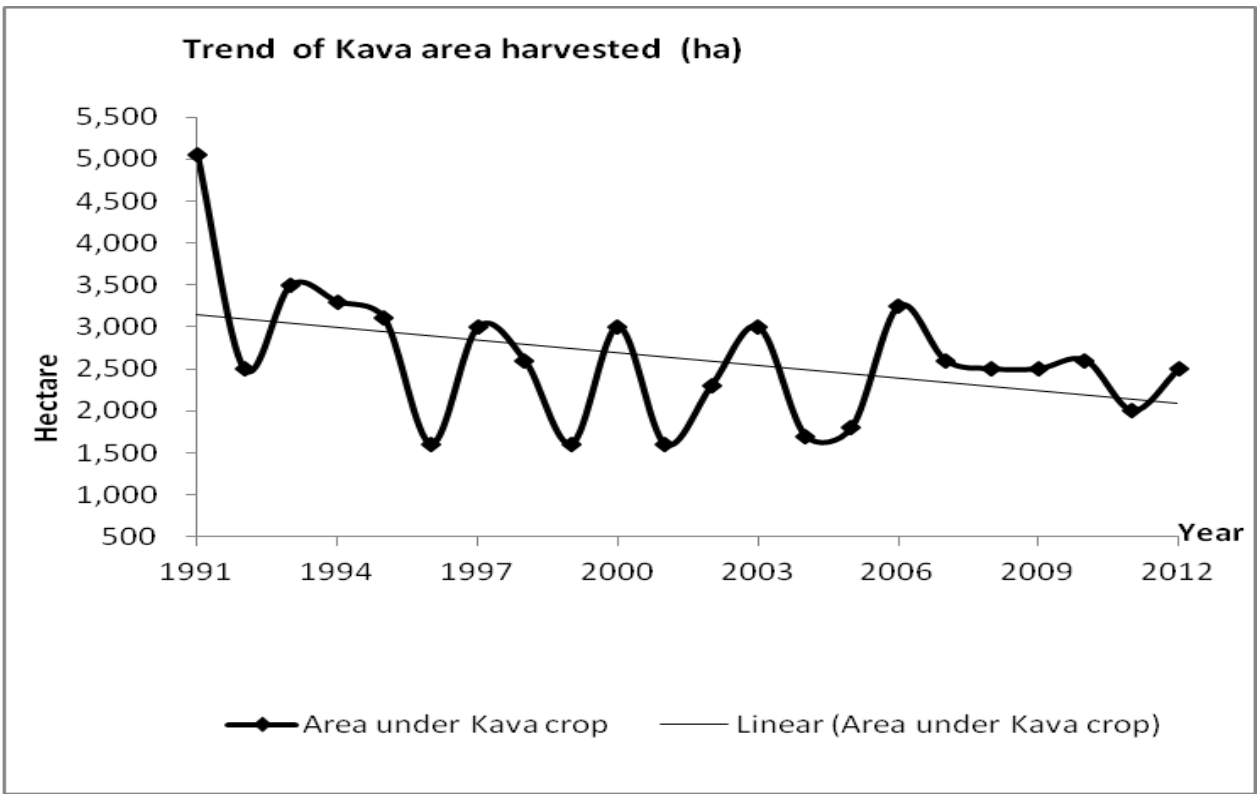

Figure 3: Trend of kava area harvested in Vanuatu

Changes in the Production of Coconut, Cocoa and Kava

The trend of changes in production of coconut, cocoa and kava crops are shown in Table 1. The regression coefficients of the trend equation of production of coconut, cocoa and kava crops are presented in Table 2. The changes in production of coconut, cocoa and kava crops are also illustrated in Figures 4, 5 and 6, respectively.

In Vanuatu, in 1991 coconut production was 356,800 tons which fluctuated year to year and was maintained at 373,500 tons in 2011. The annual growth rate of coconut production was 0.4 percent only. The regression coefficient of the slope of trend line of coconut production was positive but was not significantly different from zero; meaning thereby that the production of coconut was almost stagnant over the study period. Trend of coconut production is shown in Figure 4.

Copra is a major product of coconut farming. Its production consists of gathering nuts, scooping out the meat and drying. Copra production in 1991 was 54071 tons. It fluctuated a lot and was 31,000 tons in 2011. The average annual growth rate of copra production was negative (-0.42%).. The regression coefficients of trend line copra production for the period 1991-2012 are shown in Table 2. The regression coefficient of slope of trend line was negative but was insignificant statistically. Trend of copra production is shown in Figure 5. The reason for this trend was that there had been successive cyclones and droughts during this period that had impacted coconut trees and hence the copra production. Cowen, et al. (2002) reported that reduction in coconut production in 2001 was a direct impact of the two cyclones early that year. Fortunately, production recovered in 2004 owing to increase in world price that had been stable for sometime (RBV, 2004). Yet another drop in average price of copra provided disincentive for farmers to produce in 2006 (RBV, 2006). Since the government introduced subsidy in 2007 there had been a major response in production in 2008. ADB (2002a & 2002b) predicted that there will be a fall in copra production given the downward trend in real world prices due to which farmers will be reluctance to engage in the copra industry. Another contributing factor for reduction in copra production was the deterioration of quality of copra production in the country due to aging copra driers that were formerly funded through programs and could not

be replaced by smallholders because of their lack of financial resources. As a result, production of copra in Vanuatu had not recovered till 2012.

Data in Table 1 show that in 1991, cocoa production was 2,173 tons which reduced to 1,500 tons by 2011. The average annual production of cocoa beans during this period was 1,384 tons. There were great fluctuations in annual production of cocoa in Vanuatu and it has gradually declined in the last two decade (see Figure 6). The average annual growth rate of cocoa production was –1.73 percent. The regression coefficient of slope of cocoa production trend line was negative and it was statistically significant at 10 percent level. Regression line showed that production of cocoa had been declining by 23.99 tons per year. During 1991-1999, Vanuatu was undergoing economic recovery when it was struck by successive cyclones and droughts causing considerable damage to cocoa trees and therefore reducing the amount of area harvested for production (RBV, 2000). Also, cocoa production fell as a result of suspension of activities of large plantation estates that accounted for two-fifth of cocoa production in Vanuatu (UNESCAP, 2003). The decline in 2007 production was mainly due to a drop in yield from the major cocoa producing plantation, Metensel Cocoa Estate, in response to land related issues (McGregor et al., 2009). Apart from this, RBV (2000) reported that the reduction in area harvested was due to bad weather conditions. The pickup in production in the consecutive year was mainly attributed to favourable market prices of cocoa beans such as in 2010 (RBV, 2010).

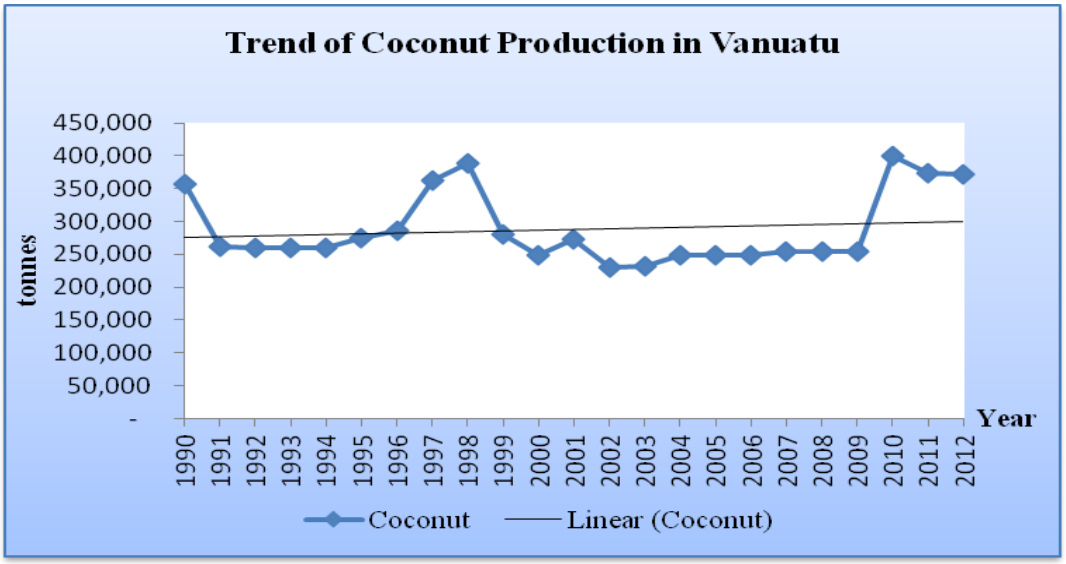

Figure 4: Trend of coconut production in Vanuatu

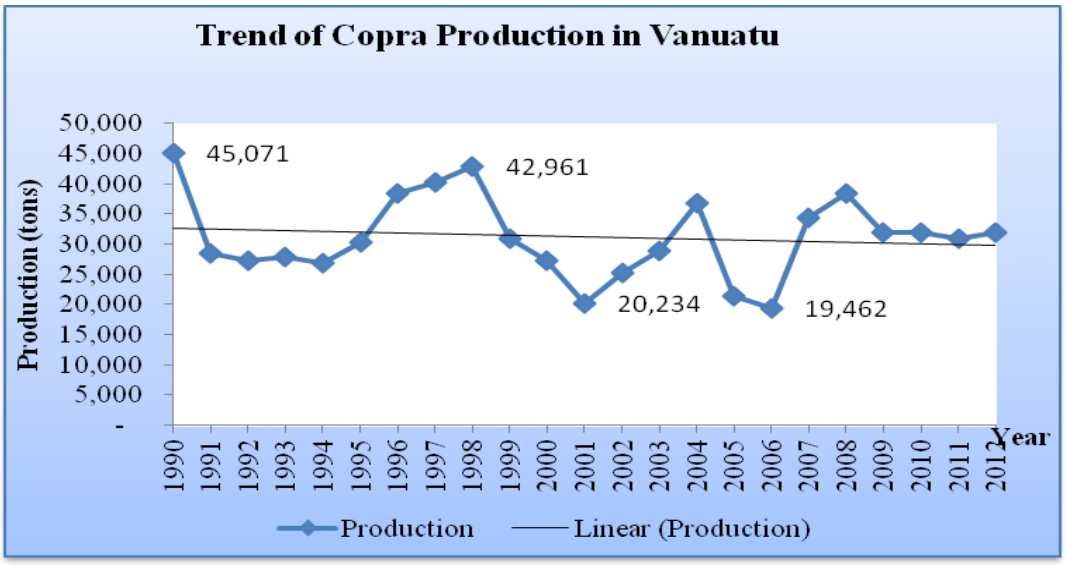

Figure 5: Trend of copra production in Vanuatu

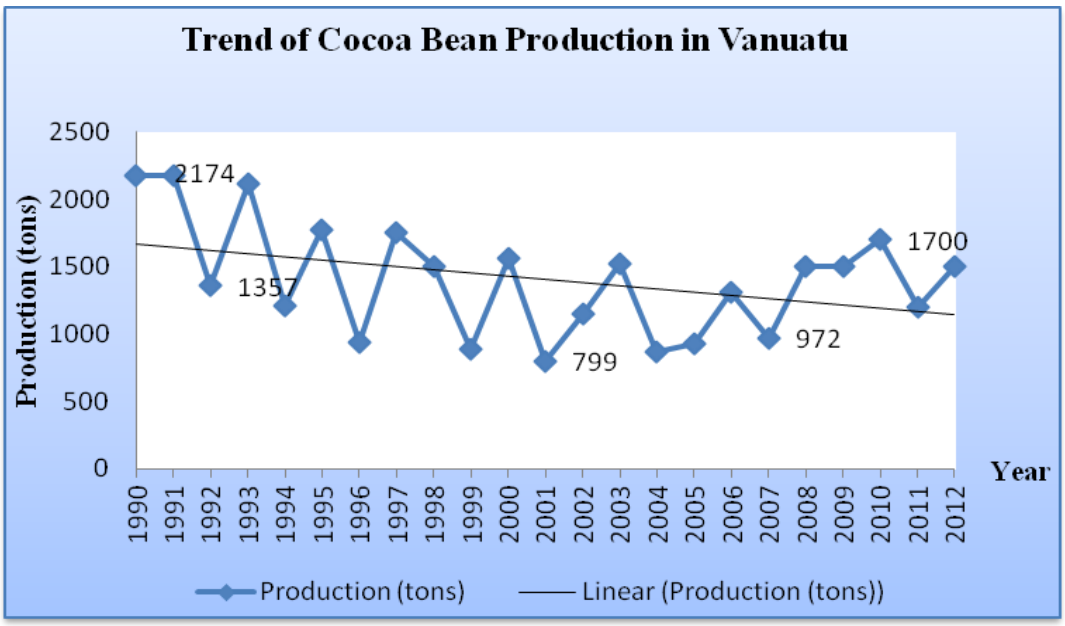

Figure 6: Trend of cocoa production in Vanuatu

As regards kava crop, the production of kava was 42 tons in 1991 which increased to 734 tons by 2011. Overall, average of kava production was 420 tons during this period. The average annual growth rate of kava production was 7.7 percent. The slope coefficient of trend line of kava production was positive and significant at 1 percent level of probability. About 32.4 tons of kava production increased every year during the study period. The increasing trend of kava production is illustrated in Figure 7. Overall, kava production has shown remarkable increase in Vanuatu during the last two decades and a lot of this change occurred after 1997. Kava production surged in 1998 following increased foreign demand after the crop was discovered to be a natural, non-additive alternative to benzodiazepine synthetic compound in the European markets. Markets in United States also showed great interest that lead to high production for export and more returns for Vanuatu.

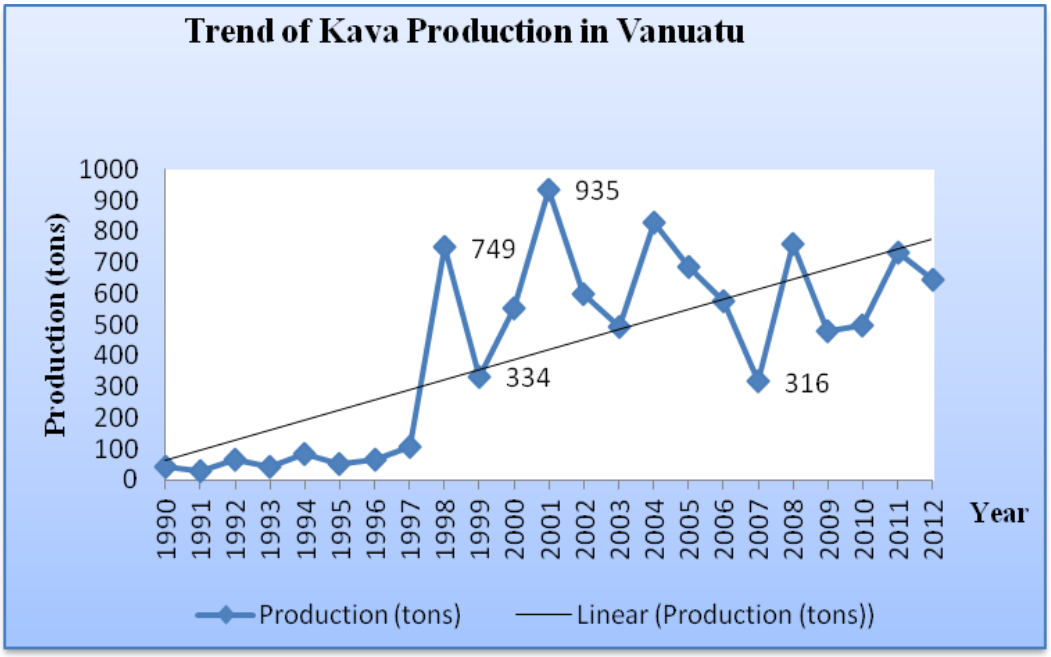

Figure 7: Trend of kava production in Vanuatu

Changes in the Export of Copra, Cocoa and Kava

Pacific Island Countries rely considerably on international trade to promote economic growth. Its sustainability rests on a positive balance of trade between exports and imports (Reed, 2001). With a limited domestic market for agriculture products and small export base, Vanuatu has been running a yearly trade deficit throughout its history and is financed by foreign aid, tourism receipts, and foreign direct investment (Gay, 2008). Jayaraman and Ward (2006) suggested that Vanuatu's 'trade deficit' can be solved only by export growth promotion measures. Agricultural commodities make up 70-80 percent of the nation's total annual goods exported however; returns to Gross Domestic Product (GDP) are low. For instance, despite comprising 71 percent of total goods exported in 2006, agriculture's proportion in GDP was only 15 percent (Gay, 2008). The data on changes in the exports of copra, cocoa beans and kava are shown in Table 1. The regression analysis of trends of exports of copra, cocoa and kava are presented in Table 2. The trends of changes in exports of copra, cocoa and kava are also illustrated in Figures 8, 9 and 10, respectively.

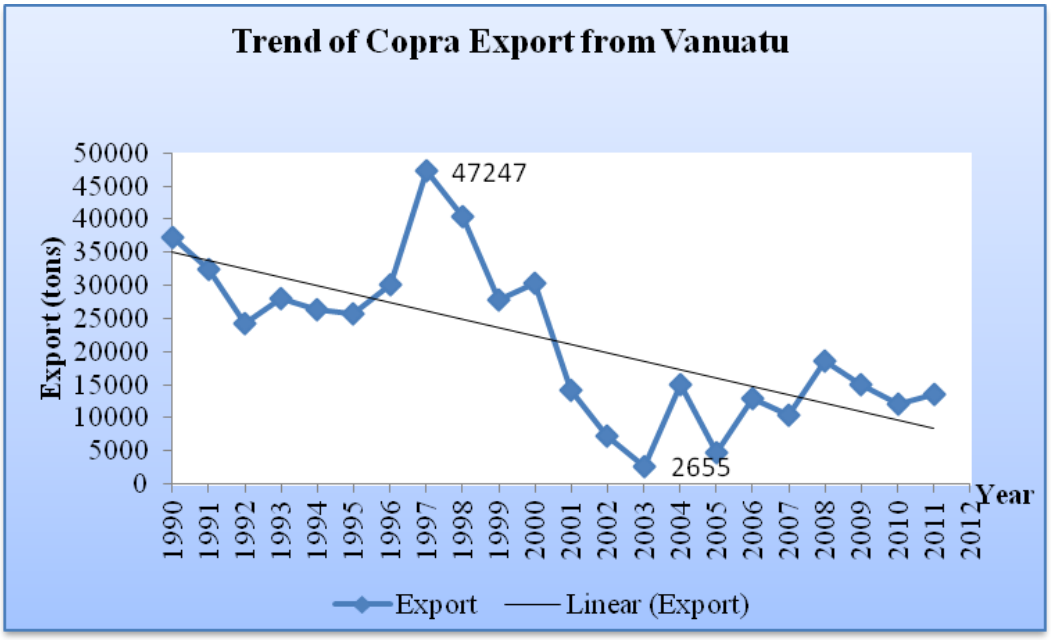

Figure 8: Trends in copra export from Vanuatu

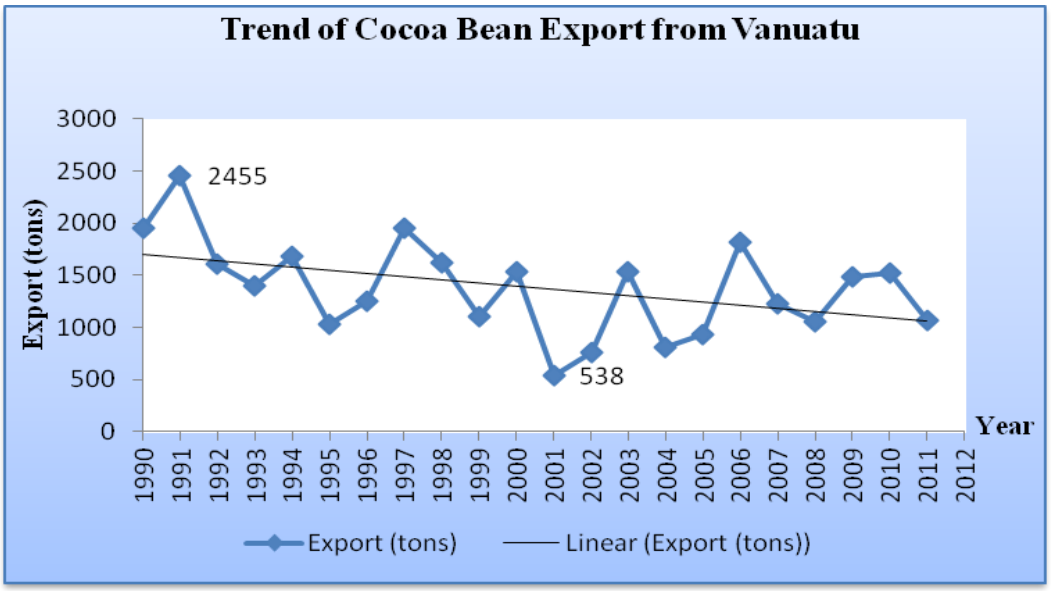

Figure 9: Trends in cocoa bean export from Vanuatu

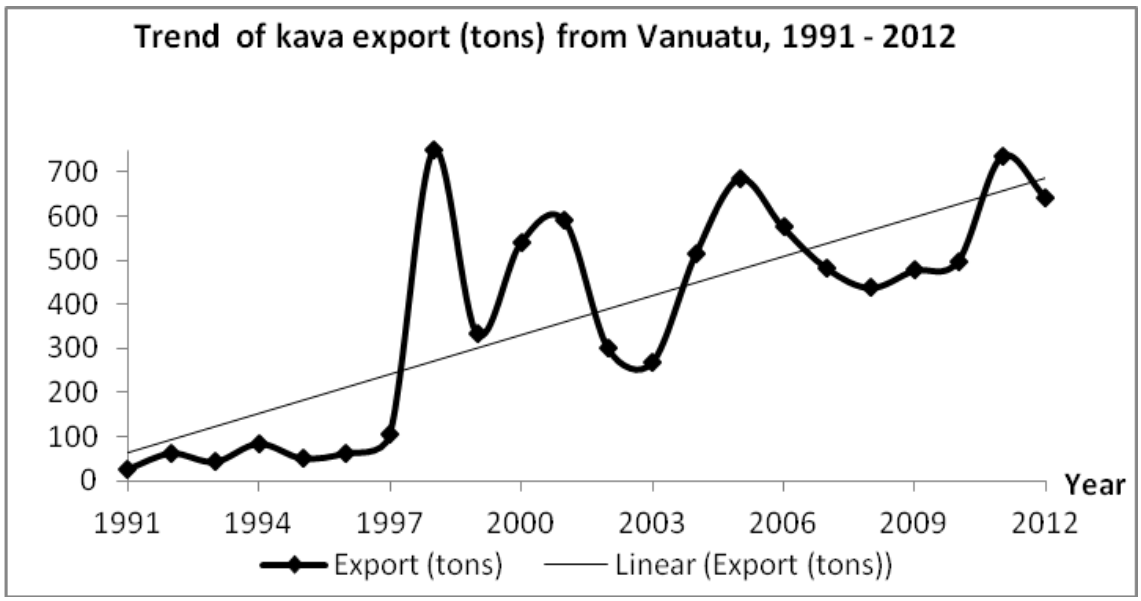

Figure 10: Trends in kava export from Vanuatu

Copra accounts for about one-third share of total export value. In 1991 copra export was 37,297 tons which declined to 13,596 tons in 2011. Results of regression analysis of trend of copra exports are shown in Table 2. The regression analysis showed that change in copra export was significantly negative. The annual growth rate was negative (–5.85 percent). Every year copra export declined by 1268.70 tons. Trend of copra export is shown in Figure 8, which clearly shows that there was a negative trend of copra export throughout the study period, Traditional agriculture based exports like copra could increase substantially in Vanuatu and there would be greater opportunities for exports of coconut products if hindrances are removed. This pattern relates to trend of production however the production declined at a lower rate (–0.42 % per annum) as compared to the decline rate in copra export (–5.85 % per annum).

Trend of cocoa export from Vanuatu is shown in Table 1. In 1991 cocoa bean export was 1956 tons and in 2011 it was 1414 tons. There were a lot of fluctuations in cocoa exports as is shown in Figure 9. Overall, the annual growth rate of cocoa export was –2.41 percent. The slope coefficient of the regression trend line was negative and statistically significant. Cocoa exports were declining by 30.69 tons per year. Throughout the study period, cocoa export has shown a continuous decline and this is similar to decline in cocoa production. This was mainly due to the suspension of activities in the large cocoa production estate, Metensel.

Kava has emerged as an important export product. Kava produced in Vanuatu was utilised locally for traditional and subsistence purposes, but its commercial development has introduced new kava product lines basically targeting export markets. In 1991 only 27 tons of kava was exported which increased to 643 tons in 2011. The average export was 373 tons during this period. The regression analysis showed that growth trend was statistically significant. The average growth of kava export was 7.88 per cent per annum. The peak in production in 2001 was a result of maturing kava plants after the 1998 harvest.

The kava production surged in 1998 following increased foreign demand after the crop was discovered to be a natural, non-additive alternative to benzodiazepine synthetic compound which generated great interest for kava that lead to high production for export and more returns for Vanuatu (VKW, 2012). The growth in kava export was short-lived, as in 1999 production declined as there was no new demand from Neutraceutical companies for more kava roots (Prasad and Raj, 2006). Nevertheless, Vanuatu still maintained a good production and value level in consequence of increased imports from the Fiji market as theirs was plagued with die-back disease (Kalouniviti, 2012, Prasad and Raj, 2006). The trend of kava export is illustrated in Figure 10.

CONCLUSIONS AND RECOMMENDATIONS

Obviously Vanuatu's climate and land is conducive to produce primary agricultural products. In Vanuatu beef, copra, cocoa and kava account for the bulk of exports. This study analysed trends in area, production and export of coconut, cocoa and kava crops. The study showed that area under cocoa and kava declined while it was stagnant under coconut crop during 1990-2012. Consequently, there were negative trends in the production of cocoa and kava and also in copra production due to decline in yield. The exports cocoa and coconut products were declining. However, the exports of kava showed increasing trend but in later part of period it also started declining. The most common problems in production of perennial crops were the damage to trees by cyclones and droughts, and continuous decline in world market prices for copra and cocoa. Other main constraints were land issues with the major producing plantation firms. In kava production the key issue was the de-facto ban in the European market that threatened kava export worldwide. However, trends in kava production and export value have been promising and can be even more promising if strict quality measures are undertaken to ensure kava is safe to use.

There is a need for detailed studies to understand the problems of production and export of these important commercial crops at the farm level. Some important issues that need urgent investigation are: (i) how should the problems of product quality and food safety be solved at farm level to meet the growing world quality standards? (ii) How and what value addition and diversification can be done for export crops at the farm and village levels to safeguard against risks of fluctuating prices? (iii) When the large plantation firms are leaving production of export crops how could the indigenous smallholder farmers be encouraged to move from subsistence farming to production of commercial export crops? What are the supply chain problems of farmers located in remote areas and outer islands and how could these be tackled in the short run?

The integration of production and marketing is a crucial element to successful development of agriculture export sector. If Vanuatu does not improve its production and export strategy of these major export crops now, then we may probably be looking at the same downward trend for the next decade.

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