

# Assessing the Economic Effects of Cape Saint Paul's Wilt Coconut Disease on the People of Nzema East District

Wisdom Quaiku

School of Business Studies, Marketing Department, Takoradi Polytechnic, PO box 256, Takoradi, Ghana  
E-mail of the corresponding author: [wisdomquiku@yahoo.com](mailto:wisdomquiku@yahoo.com)

## Abstract

The Cape Saint Pauls Wilt Disease (CSPWD), a coconut disease in Ghana, still has no antidote. The physical scientists recommend the cutting down of affected trees, good farm hygiene and the application of fertilizer to aged farms, which the farmers are not prepared to do. Introduction to resistant varieties has also not caught up with the coconut farmers. The study was undertaken to examine the economic effects of CSPWD on the lives of the people of the Nzema East District. Among other things, the study investigated the effects of CSPWD on farm income levels, pig production and the internally generated revenue base of the Nzema East District Assembly. A sample size of two hundred and forty was considered for the study: half for household heads and the other half for pig farmers. The methods of analysis employed included partial budgeting, frequency tables and graphs. The study discovered a decline in both farm income levels and the internally generated revenue base of the Nzema East District Assembly by 70.60% and 22.09%, respectively. Another revelation was the change from coconut production to other crops especially food crops. It was also found out that the quantity of pigs being reared in the area has reduced by about 80%.

**Keywords:** Nzema East District, farmers, income, coconut, cape saint pauls wilt disease, CSPWD

## 1. Introduction

The coconut palm, *Cocos nucifera L.* with its tall, slender and uniformly thick stem and massive crown with large number of leaves, bearing bunches of nuts in their axils is one of the most beautiful and useful trees in the world. It is the 'tree of life' as it can produce products for food, shelter and energy to farm households, and various commercial and industrial products. Coconut first appeared along the coast of Ghana from La Cote d'Ivoire in the early twentieth century (Child, 1974). It is believed that the first coconut plantation in Ghana was established between Atuabo and Anochie in the Nzema East District, 45km away from Axim, by the then Gold Coast Department of Agriculture in 1921 (Aggrey, 1967).

The Cape Saint Paul's Wilt Coconut disease was first seen in the Far East of the country in 1932, at Cape Saint Paul, close to the Kaincope region in Togo, where the disease was also seen at the time. Over 100,000 coconut palms were killed at the site (Mariau *et al.*, 1996). According to them the disease reappeared some thirty years later, but in the west of the country at Cape Three Point. Green and Ofori (1998) observed that between 1968 and 1983 CSPWD had spread to cover a greater portion of the eastern part of Ankobra River and between 1988 and 1992, it was observed around Sekondi-Takoradi. The outbreak of the disease was detected at Asanta, a village of about 1.5 kilometres west of Ankobra River on Elubo-Mpataba highway in 1994, and at Ampain 14 kilometres west of Ankobra River in 1995. In 1986, the disease jumped some 60 kilometres east to Central Region, near the village of Ayensudu, where a very large focus developed within a few years. Shortly afterwards, a large number of foci of varying sizes appeared throughout the Central Region, (Mariau *et al.*, 1996). The disease has probably killed around a million palms in the central and western regions of southern Ghana. According to Sangare (1992), CSPWD has decimated a large area of coconuts in Western and Central Regions, which are the main coconut producing areas of Ghana.



Figure 1.1 Signs and Symptoms of Cape Saint Paul's Wilt Disease

The symptoms of Cape Saint Paul wilt disease are very similar from one country to another. The first sign of the disease is premature nut fall, starting with the oldest nuts. At the same time, the spikelets of the inflorescences still inside the spathes begin to blacken. Yellowing of the leaves rapidly spreads upwards, leading to the gradual decay and then the death of the coconut palm, generally within a year of the first symptoms (see fig. 1.1).

### 1.2 The Problem statement

The coconut palm since its introduction into the Nzema East District in 1923 has been the major cash crop of the farming communities in the district providing food, drink, shelter and raw materials for both domestic and industrial uses. Its lucrative nature has over the years, enticed many people from elsewhere to migrate to the Nzema East District. It is essentially a crop of the small landholder who obtains cash for the purchase of necessities of life by the sale of coconut and coconut products. The pig industry in the District depends on the coconut industry for feed in the form of chaff and copra cake and building materials for the construction of sty. The industry serves as a source of income for the youth who weed the farms, collect the nuts, crack the nut, and process the oil, drivers who convey the oil to the marketing centers and traders who sell the oil and other coconut products. The Nzema East District assembly also derives a substantial amount of revenue from the sale of coconut products.

All was well with the coconut industry until the Cape Saint Paul wilt disease struck the region in the 1960's in a town called Cape Three Point. Farming communities in the district that were to the east of the Ankobra River were the first to succumb to the disease. The disease, however, crossed the Ankobra River in 1994 taking havoc along its course. Unlike other plant diseases which reduce output, the CSPWD stops production and hence total loss of revenue. The disease had defied all attempts at control leading to untold hardships on the people. Even though researchers have been conducting research into the root cause of the disease, little is understood about the economic effects of the disease on the lives of the people. The professed benefits derived from the coconut industry and the gloomy future portrayed by rapid decline of the industry by the Cape Saint Paul wilt disease motivated this study into the economic effects of Cape Saint Paul wilt disease in the Nzema East District. These concerns give rise to the following questions:

1. What has been the effect of CSPWD on the farm income levels of affected households?
2. What has been the effect of CSPWD on the District Assembly's revenue base?
3. What has been the effect of CSPWD on pig production in the study area?

## 2. Research Methodology

In assessing the effect of the Cape Saint Paul wilt disease on the farm income levels, partial budgeting approach was employed to ascertain the change in farm income levels as result of the change in the farm enterprise. Partial budgeting is a planning and decision-making framework used to compare the costs and benefits of alternatives faced by a farm business. It focuses only on the changes in income and expenses that would result from implementing a specific alternative. Thus, all aspects of farm profits that are unchanged by the decision can be safely ignored (Bucket, 1981).

In investigating the effects of CSPWD on the Nzema East District Assembly, trend analysis was employed to examine trend of coconut revenue from 1990-2007 to determine any change that might have occurred as a result of CSPWD. Frequency tables and a graph of real values of coconut revenue were plotted against the number of years.

In examining the effects of the disease on pig production in the Nzema East District, the difference in the number of pigs for the periods 1990-1999 and 2007 were computed and statistically tested. The student t- test was used to test if there was any significant difference in the mean numbers for the periods under consideration. Frequency table was, however, used to compute the values. The composition of feed for the pigs for the periods 1990-1999 and 2007 were computed using frequency table.

## 3. Results And Discussions

The overall effect of the CSPWD on the internally generated revenue base of the Nzema East District Assembly, effect of CSPWD on pig production in the District and the effect of CSPWD on farm income levels of coconut farmers are discussed

### 3.2 The Effects of CSPWD on the Internally Generated Revenue Base on the Nzema East District Assembly

The Nzema East District Assembly derives its revenue from two main sources; these are made up of both internal and external sources of revenue. The internally generated sources include rates, lands, licenses, rent, investments, health and fees/fines. The external sources also include stool lands, ceded revenue and common fund. However, among the internally generated revenue sources fees/ fines is the major source of revenue to the Assembly, contributing about 40% to the internally generated revenue of the Nzema East district Assembly. Coconut is a sub- item under fees / fines as indicated in the Trial Balance of Nzema East District Assembly (NEDA, 2007).

Table 3.1 Average relative contribution of coconut revenue to the internally generated revenue of the Nzema East District Assembly(real amount 2007)

| Fees/Fines        | Revenue Generated |       |           |       |
|-------------------|-------------------|-------|-----------|-------|
|                   | 1990-1999         |       | 2000-2007 |       |
|                   | GH¢               | %     | GH¢       | %     |
| Market tolls      | 85845.00          | 42.27 | 117109.28 | 50.08 |
| Pounding          | 883.62            | 0.44  | 1948.85   | 0.88  |
| Lorry park        | 7622.20           | 3.75  | 45562.56  | 19.48 |
| Cattle owner      | 31.83             | 0.02  | 446.49    | 0.19  |
| Coconut           | 65402.31          | 32.20 | 23646.11  | 10.11 |
| Charcoal/firewood | 27289.97          | 13.44 | 11029.47  | 4.17  |
| Cemetery          | 47.25             | 0.02  | 3463.51   | 1.38  |
| Entertainment     | 126.64            | 0.06  | 115.38    | 0.05  |
| Marriage/divorce  | 67.39             | 0.03  | 1679.33   | 0.72  |
| Foodstuff/others  | 7181.42           | 3.54  | 7275.52   | 3.11  |
| Akpeteshie        | 8606.97           | 4.24  | 21579.21  | 9.23  |
| Total             | 203104.61         | 100   | 233855.71 | 100   |

Source: Appendix 1

Table 3.1 indicates that for the period 1990-1999, coconut contributed 32.20% to the fees/ fines aspect of the internally generated revenue of the Assembly and occupied an enviable position of second with market tolls recording 42.27% and topping the list. Currently, coconut contribution to fees/ fines of the internally generated revenue had dropped to 10.11% indicating 22.09% reduction and had also dropped to the third position.

Table 3.2 Nominal and Real amount of coconut revenue from 1990 to 2007

| Year | Nominal Amount | CPI Deflator<br>1997=100 | CPI Deflator<br>2007=1.00 | Real Amount<br>2007 |
|------|----------------|--------------------------|---------------------------|---------------------|
| 1990 | 397.52         | 19.84                    | 0.04962                   | 8011.29             |
| 1991 | 405.21         | 21.62                    | 0.05407                   | 7494.17             |
| 1992 | 455.80         | 23.87                    | 0.05970                   | 7634.84             |
| 1993 | 488.22         | 29.82                    | 0.07458                   | 6546.23             |
| 1994 | 927.41         | 37.54                    | 0.09389                   | 9877.57             |
| 1995 | 1064.44        | 60.90                    | 0.15231                   | 6988.62             |
| 1996 | 1089.25        | 82.69                    | 0.20680                   | 5267.17             |
| 1997 | 1250.84        | 100.00                   | 0.25009                   | 5001.58             |
| 1998 | 1265.45        | 119.76                   | 0.29951                   | 4225.07             |
| 1999 | 1426.08        | 130.91                   | 0.32740                   | 4355.77             |
| 2000 | 806.24         | 145.62                   | 0.36419                   | 2213.79             |
| 2001 | 1222.08        | 179.42                   | 0.44872                   | 2723.48             |
| 2002 | 973.56         | 212.03                   | 0.53027                   | 1835.97             |
| 2003 | 1069.56        | 264.43                   | 0.66132                   | 1617.31             |
| 2004 | 3606.61        | 308.35                   | 0.77116                   | 4676.86             |
| 2005 | 3516.78        | 361.52                   | 0.90414                   | 3889.64             |
| 2006 | 2987.88        | 398.69                   | 0.99687                   | 2997.26             |
| 2007 | 3691.80        | 399.85                   | 1.00000                   | 3691.80             |

Source: Appendix 1

The real values of coconut revenue over the past years have generally been dwindling ever since the CSPWD invaded coconut farms in the Nzema East District as depicted by table 3.2. The reduction in coconut revenue by 22.09% coupled with the fact that coconut revenue still counts among the top three revenue items on the revenue chart implies that the Nzema East District Assembly could lose a substantial amount of revenue if an antidote to the disease is not found. The rate of development of the district could also be adversely affected since the assembly would be compelled to rely on the District Assembly Common Fund, which is usually released quarterly and often, delayed as opposed to the internally generated revenue, which is more regular and handy to deal with immediate developmental projects.

### 3.2 Effects of CSPWD on Farm Income Levels

Table 3.3 Net Effect of Enterprise Substitution by coconut farmers (2007 prices)

| Losses  |                 | Gains  |                 |
|---|-----------------|--|-----------------|
|   | GH¢             |  | GH¢             |
| Addition to cost due to replacement crops:                  |                 | Addition to income due to replacement crops: |                 |
| Banana (29 ha)  | 18936.50        | Banana (29 ha)                               | 20915.50        |
| Cassava (162 ha)  | 55541.50        | Cassava (162 ha)                             | 60225.00        |
| Plantain (97 ha)  | 63937.50        | Plantain (97 ha)                             | 74555.00        |
| Pepper (69 ha)  | 27489.00        | Pepper (69 ha)                               | 29460.00        |
| Tomato (79 ha)  | 21907.25        | Tomato (79ha)                                | 26357.50        |
| Oil palm (31 ha)  | <u>21602.50</u> | Oil palm (31 ha)                             | <u>11415.00</u> |
| Total   | 209414.25       | Total  | 222928.00       |
| Income forgone due to loss of 467 hectares of coconut farm: | 322,636.66      | Cost saved due to loss of coconut farm:      |                 |
|   |                 | Labour cost                                  | 70455.00        |
|   |                 | Harvesting cost                              | <u>10905.34</u> |
|   |                 | Total  | 81360.34        |
|   |                 | Net loss                                     | 227762.57       |
| Total   | 532050.91       | Total  | 496625.91       |

Source: Appendix 2

The partial budget which was used to assess the effect of the CSPWD on farm income levels of affected households showed a net loss of farm income of GH¢227,762.57 (see table 3.3) explaining why every single household in the study area had a coconut farm and the main reason why coconut is the major cash crop of the study area. The partial budget results also showed that all the respondents of the survey have deployed their coconut farms to other crops instead of rehabilitating the diseased farms with the hybrid variety. The implication is that either the farmers have lost interest in coconut cultivation as a result of the Ministry of Food and Agriculture inability to find an antidote to the Cape Saint Paul wilt disease which had rendered almost all the coconut trees in the study area into "electric poles" or the unavailability of the hybrid variety for planting. The food crops which the farmers have substituted for the coconut plantation as a result of the CSPWD have made the farmers worse off since the food crops are not generating enough income to enable the farmers realize the maximum income they were hitherto deriving from coconut. The shift from coconut (cash crop) to food crops cultivation could also deny the farmers of very vital collateral. This is because about 95% of the respondents said they have used their coconut farms to source funds from oil processors.

### 3.3 The Effects of CSPWD on Pig Production in the District.

Table 3.4 Total monthly composition of feed before the Cape Saint Paul Wilt Disease (1990-1999) and now (2007)

| Feed components   | Before (1990 - 1999) |                         | Now (2007)        |                         |
|-------------------|----------------------|-------------------------|-------------------|-------------------------|
|                   | Quantity (tonnes)    | Percentage Contribution | Quantity (tonnes) | Percentage Contribution |
| Coconut chaff     | 28.0                 | 63.0                    | 3.5               | 61.7                    |
| Wheat bran        | 2.8                  | 6.3                     | 0.5               | 8.8                     |
| Fish meal (local) | 13.4                 | 30.0                    | 1.67              | 29.5                    |
| Total             | 44.2                 | 100.0                   | 5.67              | 100.0                   |

Source: Appendix 3

Pig farmers in the study area rely extensively on coconut chaff as the main feed component for their pigs. The proportion of coconut chaff in the composition of pig feed for the periods, 1990-1999 and 2007 has significantly remained the same. Coconut chaff constitutes about a little over 60% for the two periods under consideration as depicted by table 3.4. The fact that the proportion of coconut chaff in the composition of pig feed constitutes a greater proportion of pig feed could lead to the collapse of the pig industry. It is, therefore, not surprising when

90% of the respondents attributed the drastic reduction in the number of pigs to the unavailability of coconut chaff because the coconut chaff is virtually free. What makes the situation more disturbing is the fact that 95% of the pig farmers are also coconut farmers who rear pigs to supplement their farm incomes.

Table 3.5 Number of pigs before CSPWD (1990-1999) and now (2007)

| Type of pig | No. of Pigs        |            | Percentage Change |
|-------------|--------------------|------------|-------------------|
|             | Before (1990-1999) | Now (2007) |                   |
| Piglet      | 1061               | 184        | 83                |
| Sow         | 673                | 121        | 82                |
| Boer        | 790                | 131        | 83                |
| Total       | 2524               | 436        | 83                |

Source: Appendix 3

Table 3.5 depicts a little over 80% change in the number of pigs for the periods 1990 to 1999 and 2007. In order to establish whether there was a significant difference between the mean number of pigs in the 1990's and year 2007, the t- test was employed.

Table 3.6 Results of the t-test of mean numbers of pigs per annum for the periods (1990-1999) and (2007)

| Category of pigs | Mean no. of pigs per annum compared |      | No. of Observations | df  | T-statistics |
|------------------|-------------------------------------|------|---------------------|-----|--------------|
|                  | Period                              | No.  |                     |     |              |
| Piglets          | 1990-1999                           | 1061 | 120                 | 119 | 15.97263303  |
|                  | 2007                                | 184  |                     |     |              |
| Sows             | 1990-1999                           | 673  | 120                 | 119 | 18.31503473  |
|                  | 2007                                | 121  |                     |     |              |
| Boers            | 1990-1999                           | 790  | 120                 | 119 | 18.18712995  |
|                  | 2007                                | 131  |                     |     |              |

Source: Appendix 3

t- cal > t- critical.

Results as shown in table 3.6 indicate that for a two-tailed test, the critical t-values are 1.980 and 1.658 at 5% and 10% significant levels, respectively. The t-statistics calculated value being compared with the tabulated critical t-values shows that there is a significant difference between means of the number of pigs for the periods 1990-1999 and 2007 as t- calculated is greater than t- critical.

#### 4. Conclusions

The coconut industry since its introduction into the Nzema East District has been the major cash crop for farmers in the district. The demise of this industry would not only affect the coconut farmers but the entire economy of Nzema East District. Coconut farmers who out of frustration have gone into food crop production are worse off than before. Coconut farmers' reliance on pig production as a means of supplementing the households' income is in danger as the unavailability of coconut chaff has led to a drastic reduction in the number of pigs. Coconut revenue also contributes substantially to the internally generated revenue of the Nzema East District Assembly. The collapse of the coconut industry could affect developmental projects in the district if the situation is not immediately remedied.

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