



INTRODUCTION OF SOIL TEST KIT TO SMALL-HOLDER COCOA FARMERS IN SOUTH-WESTERN NIGERIA

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ABSTRACT

Soil nutrients depletion of cocoa plantations is one of the causes of low cocoa production in Nigeria. Soil testing to determine the appropriate type and rate of fertilizer to boost cocoa bean yield suggests itself. Conventional soil testing is not within the reach of smallholder cocoa farmers because of its cost and other logistics but soil testing is necessary to avert negative consequences of blanket fertilizer recommendation. Therefore the objective of this study is to introduce an affordable soil test kit for soil testing to smallholders cocoa farmers. The study was carried out in Ondo and Osun States of Nigeria. Multi-stage random sampling technique was used to select eighty two cocoa farmers from the study area. Information was collected from the selected cocoa farmers with the aid of structured questionnaire and the data were analysed using descriptive statistics. The result shows that only 20.73% of the respondent farmers carry out soil test on their farms while 85.36% of the farmers know the relevance of soil test. The result also revealed that 98.78% of the farmers are ready to acquire the soil test kit. The study therefore recommends that (i) The soil test kit should be included among the subsidized inputs that government gives to farmers from time to time and (ii) private entrepreneurs could also procure and make the kits available to the farmers.

KEYWORDS: Introduction, soil test kit, soil testing, cocoa farmers, South-western Nigeria.

INTRODUCTION

Cocoa belongs to the family Steruliaceae and genus *Theobroma*. It is a perennial tree crop grown in tropical climates, with over 66 per cent produced by smallholder farmers in West Africa. Since the introduction of the crop into Nigeria in about 1874 (Oyedele, 2007), it has grown to be a major export crop. Nigeria is the third largest producer of cocoa in Africa, producing about 12 percent of the total world production behind Ivory Coast which produces 35 percent and Ghana's 13 percent (Wilcox and Abbot, 2004). The Nigerian cocoa economy has a rich history which is well documented in literature. The contributions of cocoa to the nation's economic development are vast and have been reported by many authors (Olayide, 1969; Olayemi, 1973; Folayan *et al.*, 2006). In terms of foreign exchange earnings, no single agricultural export commodity has earned more than cocoa. With respect to employment, the cocoa sub-sector still offers quite a sizeable number of people employment, both directly and indirectly (Sanusi and Oluyole, 2005; Abang, 1984; Folayan, *et al.*, 2006). In addition, it is an important source of raw materials, as well as source of revenue to governments of cocoa producing states (Oluyole and Adeogun, 2005). Because of its importance, the recent Federal Government's concern of diversifying the export base of the nation has placed cocoa in the centre-stage as the most important export tree crop. Evidence has however shown that the growth rate of cocoa production has been declining, which has given rise to a fall in the fortunes of the subsector among other reasons (Nkang *et al.*, 2006). Folayan *et al.* (2006) noted that cocoa production in Nigeria witnessed a downward trend after 1971 season, when its export declined to 216,000 metric tons in 1976, and 150,000 metric tons in 1986, therefore reducing the country's market share to about 6% and to

producer in the world to date. Prior to the Structural Adjustment Programme (SAP), cocoa marketing was carried out by the erstwhile highly regulated Commodity Marketing Boards, which were known to pay farmers far less than the export price of cocoa. This situation affected cocoa production and export in the past as it served as a disincentive to investment in cocoa production. Even after the abolition of the Marketing Boards structure, cocoa production has still not fared better as is evident in the declining production trend reported in previous studies (Nkang *et al.*, 2009). One of the possible reasons for this low yield may among other things, be due to nutrient depletion of cocoa plantation soils as a result of "nutrient mining" through cocoa pod harvest without nutrient replacement as more than 85% of smallholder cocoa farmers in Nigeria do not use fertilizer on cocoa (Ogunlade *et al.*, 2009). Cocoa farmers are being sensitized to use fertilizer on cocoa to increase bean yield given the low fertility status of cocoa plantation. Most cocoa farmers are showing interest to use fertilizer on their cocoa farms. However, blanket application must be avoided to derive maximum benefit from fertilizer usage. There is need for soil testing which should precede fertilizer recommendation and application. Soil testing through the conventional method is costly and electricity dependent with some logistic problems which makes it difficult for small-holder farmers to use. This difficulty notwithstanding, soil testing before fertilizer application is necessary. The objective of this study is to introduce an affordable, quick soil test kit that has significant correlation with the conventional soil testing method as reported by Ogunlade *et al.* (2012) to cocoa farmers.

METHODOLOGY

The study was carried out in four cocoa farming communities in Ondo and Osun states in the South-western Nigeria. Multistage random sampling technique was used to select the respondents from the study area. The first stage was the random selection of two cocoa producing States from the region; these are Ondo and Osun States. The second stage was the random selection of four local government areas from the randomly selected States. The third stage was the random selection of four communities from the randomly selected LGAs while the final stage was the random selection of eighty two respondents from the randomly selected communities. Information was collected from the respondents with the aid of structured questionnaire and the data retrieved from the questionnaire were analysed using descriptive statistics.

RESULTS & DISCUSSION

Table 1 shows that majority (81.71%) of the respondents were males while the proportion of the female respondents was 18.29%. This showed that males are frequently more involved in the ownership of cocoa farms in the study area. Table 1 also shows that 93.90% of the total respondents were married while 3.66% were widowed and 2.44% of the respondents were single. Since majority of the respondents were married, this signifies the possibility of more availability of family labour for farming activities. Respondents that were 40 years and below accounted for 29.27%, while 70.73% were more than 40 years of age showing that only few youths are involved in cocoa farming in the study area. However, majority of the respondents (81.71%) were of age 60 years and below while just 18.29% are above 60 years of age. This shows that the substantial proportion of the respondents is still in active stage of farming. The mean age of the farmers in the study areas was 49 years. Furthermore, Table 1 shows that about 84.15% of the respondents had formal education while just 15.85% of the respondents had no formal education. The result indicates a high level of literacy among the farmers. A high level of literacy will positively and significantly influence the farm business. High literacy levels will enable farmers to understand the intricacies of factor and product markets and also predispose them to adopt and use improved farm practices (Oluyole, 2005). About 86.6% of the total respondents had 5 hectares (12.5 acres) and below of farm size, while 13.4% had more than 5 hectares of farmland. However, the least proportion of the respondents (2.4%) had more than 10 hectares of land. The results however showed that majority of the farmers were small scale cocoa farmers. Meanwhile, the mean farm size for the study area is 3.52 hectares (8.8 acres). Hence, on average each farmer has less than 5 hectares of farm land. The result on Table 1 further shows that most (48.78%) had between 1 and 6 household members while 51.22% of the total respondents had more than 6 household members. The mean household members for the study area were 7. This shows that the substantial proportion of the farmers is having a reasonable number of household members that will significantly contribute to labour supply in the study area. Only 20.73% of the respondents carried out soil test while the remaining 79.27% did not (Table 2). Hence, majority of the farmers do not carry out soil test on

their farms. Soil test reveals both the physical and chemical properties of the soil body thereby showing the nutrients that are deficient in the soil and hence would need replacement. If this kind of replacement is not carried out or not properly carried out, then it would result in the low performance of the crop that is planted on it.

In Table 3, one could not conclude that farmers do not have the knowledge of the relevance of soil test. According to the table, 46.34% of the farmers agreed that soil test makes them to know the type of fertilizer they should add to their soil while another 39.02% of the respondents submitted that soil test makes them to know the fertility status of their farm. Hence, a total of 85.36% of the farmers had the knowledge of the relevance of soil test. Therefore, what could have been responsible for their inability to carry out the technology is likely to be the operational difficulty of the technology. Hence, if the farmers are trained on how to carry out the technology, the technology would be adopted by them. Therefore, the farmers need training on how to carry out soil test. This statement is however corroborated by the response of the farmers as revealed in Table 4. The result of the analysis in Table 4 shows that almost all (98.78%) the farmers responded that they need training on soil test. The high response of the farmers shows how anxious the farmers were to receive training on soil test. Their eagerness to receive training on the technology also informed their readiness to apply the technology on their farms. The farmers' response on their readiness to apply the technology is shown in Table 5. The Table shows that 97.56% of the total respondents agreed that if they are trained on the technology, they are ready to apply it on their farm. This result shows that majority of the farmers are anxious to adopt the technology if trained. This is a positive signal towards high cocoa productivity as soil test would enable the farmers know the required nutrients to be added to the soil to enhance cocoa production. However, the conventional soil test technology is specialized, costly and far away from rural communities where most of the farms are located, hence the farmers may not be able to afford it. This study has come up with a less laborious, less specialized and less costly technique by which farmers can carry out soil test themselves on their farms. This involves the use of a soil test kit. The kit is very easy to use and affordable. Like the conventional soil test technology, soil test kit technology gives an accurate result. This kit was introduced to the farmers and the farmers' response as regards its acceptability is shown in Table 6. Almost all the farmers (98.78%) are ready to acquire the kit to be used on their farms.

The study concluded that with the wide acceptance of the soil test kit and with the claim of the farmers that they would adopt the technology, the inherent problems associated with soil test among farmers would be resolved. This would have a positive impact on cocoa production and hence improves farmers' welfare thus contributing meaningfully to Nigerian government Agricultural Transformation Agenda (ATA) policy.

The study therefore recommends that-

- i. The soil test kit should be included among the subsidized inputs that government supplies to farmers from time to time.

- ii. Private entrepreneurs in cocoa business should procure the test kit and make it available to the farmers. proportion of the youths in cocoa farming in the study area is low.
- iii. More youths need to be encouraged into cocoa farming. This is quite imperative in as much that the

TABLE 1: Socio-economic variables of the farmers

Variables	Frequency	Percentage
Age (years)		
40	24	29.27
41-60	53	52.44
>60	5	18.29
Total	82	100.00
Mean	49	
Std. Deviation	14.05	
Sex		
Male	67	81.71
Female	15	18.29
Total	82	100.00
Educational level		
No formal education	13	15.85
Primary education	32	39.02
Secondary education	26	31.71
Tertiary education	11	13.41
Total	82	100.00
Marital status		
Single	2	2.44
Married	77	93.90
Widow/widower	3	3.66
Total	82	100.00
Farm size (acres)		
12.5	71	86.6
12.6-25	9	11.0
> 25	2	2.4
Total	82	100.00
Mean	8.80	
Std. Deviation	6.64	
Household size		
1- 6	40	48.78
7-10	36	43.90
>10	6	7.32
Total	82	100.00
Mean	7	
Std. Deviation	3.04	

Source: Field survey, 2013

TABLE 2: Percentage of farmers that carry out soil test

Category of farmers	Frequency	Percentage
Farmers that carry out soil test	17	20.73
Farmers that do not carry out soil test	65	79.27
Total	82	100.00

Source: Field survey, 2013.

TABLE 3: Relevance of Soil Test

Responses	Frequency	Percentage
No response	8	9.76
It makes me to know the fertility status of my farm	32	39.02
I don't need soil test because my soil is fertile	4	4.88
It makes me to know the type of fertilizer I should add	38	46.34
Total	82	100.00

Source: Field survey, 2013.

TABLE 4: Percentage of farmers that need soil test training

Categories of farmers	Frequency	Percentage
No response	1	1.22
Farmers that need training on soil test	81	98.78
Farmers that do not need training on soil test	0	0.00
Total	82	100.00

Source: Field survey, 2013.

TABLE 5: Percentage of farmers that are ready to carry out soil test on their farms

Categories of farmers	Frequency	Percentage
No response	2	2.44
Farmers that are ready to carry out soil test	80	97.56
Farmers that are not ready to carry out soil test	0	0.00
Total	82	100.00

Source: Field survey, 2013.

TABLE 6: Percentage of farmers that are ready to acquire soil test kit on their farms

Are u ready to acquire the soil test kit	Frequency	Percentage
No response	1	1.20
Farmers that are ready to acquire soil test kit	81	98.78
Farmers that are ready to acquire soil test kit	0	0.00
Total	82	100.00

Source: Field survey, 2013.

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