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Perceptions of Cocoa Farmers on the Utilization of Cocoa Pod Husk in Ado-Ekiti Farm Settlements, Nigeria.

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Abstract

Cocoa pod husk (CPH) disposal constitutes a serious problem in cocoa farms and cocoa processing areas. This study was designed to determine the perceptions and practices of cocoa farmers regarding CPH disposal. A stratified random sampling using proportional allocation based on the number of cocoa farmers in the 36 farm settlements in Ado- Ekiti was done to select 400 cocoa farmers who were interviewed with the aid of a questionnaire. Results of the questionnaire survey showed that the ages of the respondents ranged from 31 to 90 years and composed of 90.0% male and 10.0% female. The respondents are predominantly farmers, with 85.3% practicing farming on a full time basis; others combine farming with other activities such as trading (9.25%), carpentry (1.00%), civil service (1.00%), electricians (0.75%) and teaching (2.75%). All the respondents reported that they leave CPH in heaps on the farm after harvesting the cocoa beans. About 93.0% believed that this practice could promote black pod disease while others (7.0%) believed that the heaps only occupy space in their plantations thereby reducing the land use. Respondents also reported that they used CPH for soap making (38.3%) and for medicinal purposes (61.8%). Majority of the respondents (61.75%) admitted knowledge of CPH being used as herb that cures certain diseases such as malaria, epilepsy and certain skin diseases.

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Other respondents (38.25%) admitted to knowing that CPH can be used in soap making. Whatever they may use the CPH for, the ultimate goal is a way of managing the waste.

Keywords: Cocoa pod husk; Respondents; plantations; Cocoa farmers and resource utilization.

1. Introduction

Cocoa pod husk (CPH) is the pericarp portion of the cocoa fruit and is 75 % of the whole fruit on fresh weight basis [1]. Millions of tonnes of CPH are produced as farm waste across the West African sub-region annually [2]. Wide arrays of investigations in Nigeria and Ghana have indicated the potential usefulness of CPH in livestock feeds [3]. Fresh or dried CPH may be used as livestock feed, but theobromine content (Ca. 0.4%) restricts the proportion that can be consumed and its use has been limited. Cocoa pod husks contain 3 to 4 per cent potassium on a dry basis [4]. Pod husk ash which is obtained from burning CPH, has been used to make soap in Ghana and Nigeria [5, 6]. Ghana currently, is the third world leading producer of cocoa and employs about 40 % of its labour force in the cocoa industry. Cocoa pod husk, which is the major agricultural waste of the cocoa industry, has been found to be unusually rich in potassium and can constitute a viable source of potash production [7, 8].

Potash has a wide range of industrial uses, some of which are for the production of other potassium salts, dehydrating agents, fertilizer (KCL) and others. Reports indicate that pod meal can constitute 20 % of ration of poultry, 30 to 50% for pigs, and 50% for sheep, goats and dairy cattle, but these values may be too high [4]. The author in [9] reported that about 1 million tonnes of dried CPH is produced annually in Nigeria. Even though an appreciable percentage of this pod husk is found to be used for feeding ruminants, the remaining waste is not properly put into other uses to avert the imminent black pod disease when left on the plantation sites.

The aim of this study was to assess the general perceptions of the cocoa farmers in Ado-Ekiti farm settlements on the utilization of the CPH that is produced and left on their cocoa plantations annually without a substantial form of utilization.

2. Materials and Methods

2.1. Description of study area

The study was carried out in selected farm settlements located in Ado – Ekiti Local Government Area of Ekiti State. Ado – Ekiti is located between longitude $4^0 45^1$ to $5^0 45^1$E and latitude $7^0 15^1$ to $8^0 5^1$N [10]. Ado –Ekiti is the capital city of Ekiti State in Nigeria. The city also serves as a Local Government Headquarter in one of the sixteen Local Government Areas in Ekiti state. The authors in [11] reported that the town is located on a justly high level with about 390 meters above sea level in the southern part of a stream called Ireje and about 540 meters above sea level in the north eastern limits of the town. The authors further reiterated that the climatic condition of the town is not different from the general climatic condition of the South Western Nigeria that is hugely categorised by seasonal dry and wet seasons with double highest rainfall happening in July and

September.

2.2 Study Design

Four hundred cocoa farmers were randomly selected and interviewed using interviewer administered questionnaire within 36 farm settlements of Ado-Ekiti Local Government Area. This number of cocoa farmers in this study was obtained using the following formula;

$n = Z^2pq/d^2$

Where n = the desired sample size

z = 1.96 (95% confidence interval)

p = 0.50 (50% proportion)

q = 0.05

d = 0.05 (degree of accuracy)

$n = (1.96)^2 (0.05) (o.05) / 0.05^2$

n = 384 cocoa farmers

This number was made up to 400 of cocoa farmers with a view to accommodating the effect of loss due to attrition. A stratified random sampling using proportional allocation based on the number of cocoa farmers in the 36 farm settlements in Ado- Ekiti was done to select the 400 cocoa farmers that were interviewed with the aid of a questionnaire. Having got 400 cocoa farmers based on the proportional allocation, a simple random sampling through the use of balloting was adopted in selecting the cocoa farmers that were actually interviewed.

The questionnaire was made up of sections containing socio-demographic features, current perceptions and practices of cocoa farmers regarding CPH, area of land occupied by cocoa plantation and management of alternative wastes. Five research assistants were trained and subsequently assisted in the collection of data from the cocoa farmers. A pre-test of the questionnaire was conducted amongst five cocoa farmers based in Ilawe Ekiti, Ekiti State, Nigeria before the actual commencement of the data collection from the targeted cocoa farmers. Descriptive statistics such as bar graphs, pie-charts and frequency tables were used to summarize the results.

3. Results

The results obtained from the age distribution of cocoa farmers in Ado – Ekiti Local Government farm settlement in Figure 1 indicated that out of the 400 respondents that took part in this study, the age range of respondents between 51 to 60 years was the highest with 38.8%, while the lowest (1.5%) range was for 81 to 90

years. The sex of the respondents was 90.0% for male and 10.0% for female (Table 1). The marital status of the respondents is equally presented in Table 1. The distribution indicated that 84.5% of the respondents were married; 0.5% was single; 3.05% were separated; 9.0% were widows and 2.5% were divorced.

Respondents are predominantly farmers (Table 1), with 85.3% practicing farming on a full time basis; others combine farming with other activities such as trading (9.25%), carpentry (1.00%), civil service (1.00%), electrician (0.75%) and teaching (2.75%). The distribution of respondents according to educational background showed that 60.0% of the respondents had no formal education, 4.0% respondents attended Islamic School, 25.3% respondents attended primary school, and 6.8% respondents attended secondary school while the remaining 4.0% respondents attained tertiary education (Table 1).

On the basis of ethnic grouping, 95.5% of the respondents were Yoruba, 2.5% respondents are Ibo while the remaining 2.0% belongs to other tribes in Nigeria as shown in Table 1. The religion of the respondents shown Table 1 indicates that majority of the respondents were Christians (69.8%) while 22.3% were Muslims while only 9.0% practice traditional religions.

The perception of the respondents on the consequence of leaving CPH in heaps on their farms indicated that 93.0% of the respondents believed such practice promotes black pod disease during the fruiting stage. Others (7.0%), believed that it only occupies space and completely ignorant of their negative consequences (Figure 2).

The economic importance of CPH from the respondents' perception is presented in Figure 3. Majority of the respondents (61.75%) admitted knowledge of CPH being used as herb that cures certain diseases such as Malaria, epilepsy and certain skin diseases. Other respondents (38.25%) admitted to knowing that CPH can be used in soap making.

The number of cocoa plantation owned by respondents is shown in Figure 4. it can be inferred that 31.00% of the respondents had one cocoa plantation each, 35.75% of the respondents had two cocoa plantations each, 15.50% of the respondents had three cocoa plantations each, 9.00% respondents had four cocoa plantations each while the remaining 8.75% respondents had above five cocoa plantations. The size of the cocoa plantations ranged between one and more than five hectares as shown in Figure 5. Respondents with one hectare of cocoa plantation were 14.74% while 28.0% of the respondents had two hectares each, 19.0% of the respondents had three hectares each, 20.3% respondents had four hectares of each while 18.0% respondents had above five hectares of cocoa plantation each.

Investigation of the sources of labour employed by the respondents for clearing of their respective cocoa plantations revealed that 77.25% respondents employ labourers to clear their cocoa plantations while only 22.75% respondents manage their cocoa plantations using personal labour.

Apart from CPH, other wastes that constitute disposal problem on farmers' farm were investigated. Out of the 400 respondents in this study, only 0.25% stated that Kola pod husk is another waste that requires management on their farms, 5.50% respondents responded that other wastes like palm kernel, Banana, Mango, Orange and so on, require management on their farms while the majority (94.25%) of the respondents felt there was no other

waste that warrants management on their farms.

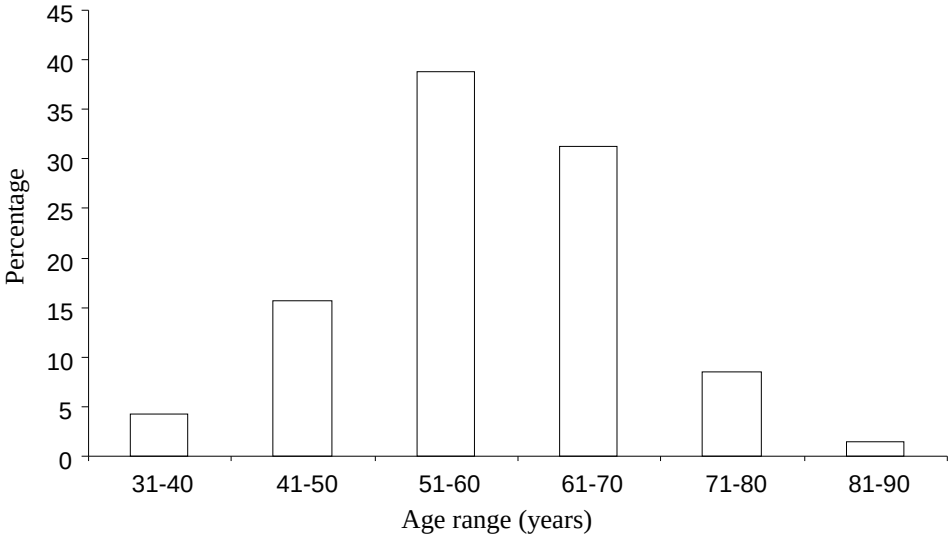

Figure 1: Age distribution of cocoa farmers in Ado-Ekiti farm settlements

Table 1: Socio-demographic Data of the respondents

	Frequency (n)	***Percentage (%)***	***Cumulative Frequency***
Sex of the respondents			
Male	360	90.00	90.00
Female	40	10.00	100.00
Marital status of the respondents			
Married	338	84.50	84.50
Single	2	0.50	85.00
Separated	14	3.05	88.50
Widowed	36	9.00	97.50
Divorced	10	2.50	100.00

Major occupation of the respondents			
Farming	341	85.25	85.25
Trading	37	9.25	94.50
Carpentry	4	1.00	95.50
Civil Service	4	1.00	96.50
Rewiring	3	0.75	97.50
Teaching	11	2.75	100.00
Highest level of education of the respondents			
None	240	60.00	60.00
Islamic school	16	4.00	64.00
Primary school	101	25.30	89.30
Secondary school	27	6.80	96.00
Tertiary e.g NCE, OND, HND, BSc And PhD	16	4.00	100.00

Ethnic group of the respondents			
Yoruba	385	95.50	95.50
Ibo	10	2.50	98.00
Others	8	2.00	100.00
Religion of the respondents			
Christianity	275	68.75	68.75
Islam	89	22.25	91.00
Traditional	36	9.00	100.00

4. Discussion

Majority of the respondents in this study had no formal education therefore their level of understanding regarding the imminent effect of leaving CPH in heaps in their cocoa plantations is very low. All the respondents interviewed in this study, responded to be aware of cocoa pod problems in the farms. They are seasoned cocoa farmers. All the respondents took to leaving the cocoa pod husks as heaps in their plantations after they must have taken the cocoa beans in it. This again justifies the known traditional practice of leaving CPH as heaps after taking the cocoa beans from it in the cocoa plantations. This finding coincides with the report of [3] that millions of tonnes of CPH are produced and left as heaps inside cocoa plantations annually across the West Africa sub-region.

The perception of the respondents on the consequence of leaving CPH in heaps on their farms indicated that majority of the respondents believed such practice promotes black pod disease during the fruiting stage. This finding, justifies the claim of [12] that CPH become a significant source of disease inoculums when used as mulching materials inside the plantation. Other respondents believed that it only occupies space in their plantations and were completely ignorant of the use of CPH as organic fertilizer.

Majority of the respondents admitted knowledge of CPH being used as herb that cures certain diseases such as Malaria, epilepsy and certain skin diseases while other respondents admitted to knowing that CPH can be used in soap making. This finding again coincides with the submission of [5] and [6] that pod husk ash has been used to make soap in Ghana and Nigeria. The finding again corroborated the report of [13] that black soap is made from roasted cocoa pods, plantain skins' ashes mixed with palm oil. These uses to which CPH is put by the farmers although can be a way of managing the waste, the quantity utilized is not sufficient enough to raid the farms of the waste.

The >3 hectare farm size of over 60% of respondents is a demonstration of their commitment to farming as means of livelihood despite the advanced ages of the cocoa farmers. This finding has again supported the report

of [14] that Ondo State (Ekiti State inclusive then) produced above 70% of the cocoa production in Nigeria and that largely peasant farmers grow this.

Figure 2: Problems faced by cocoa farmers in disposing cocoa pod husk

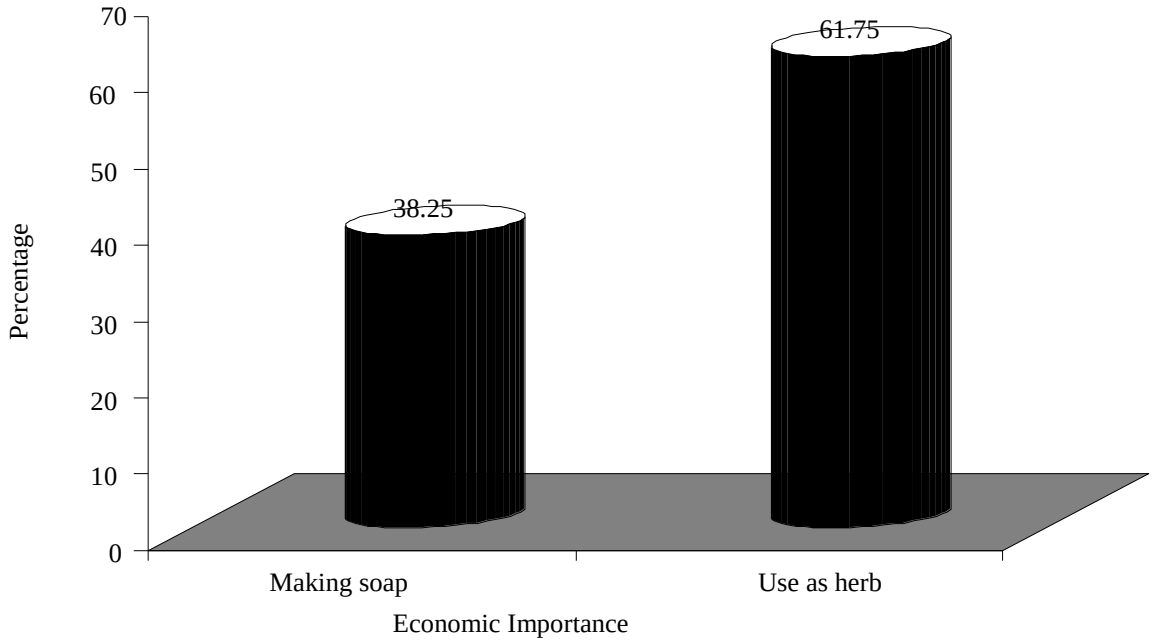

Figure 3: Respondents' perception of the economic importance of cocoa pod husk.

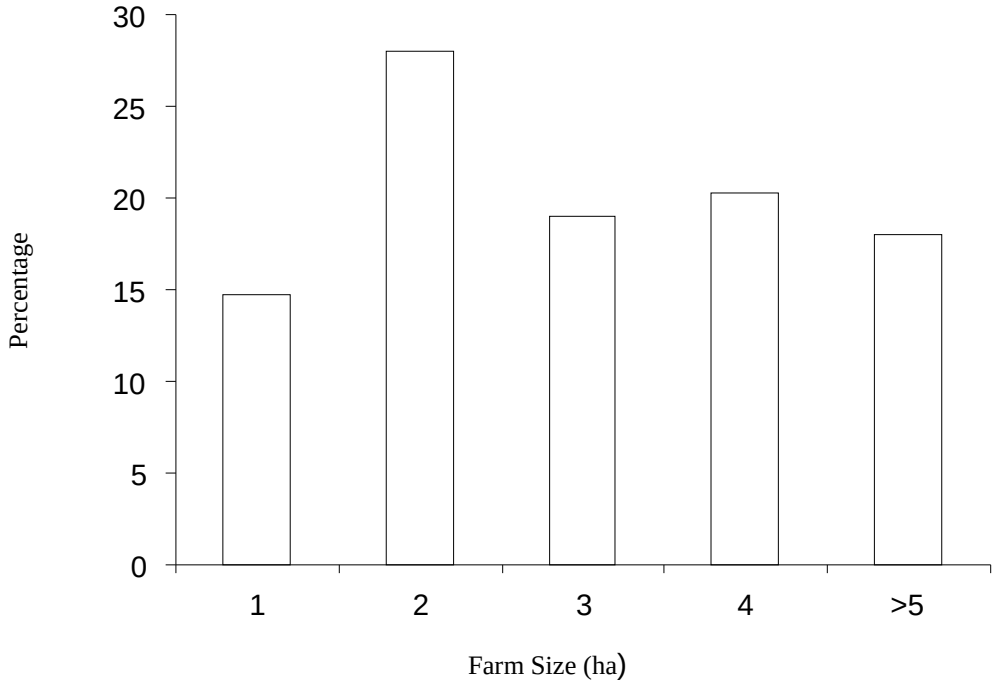

Figure 5: The hectares of cocoa plantation owned by respondents

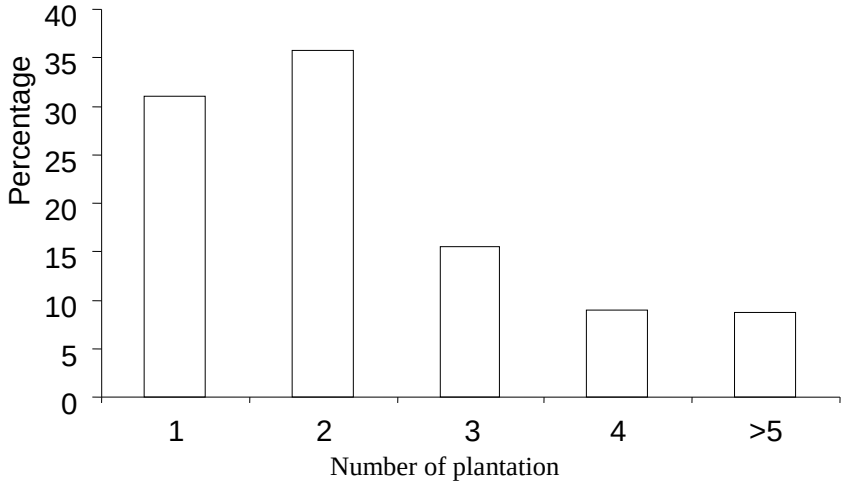

Figure 4: The number of cocoa plantation owned by respondents

5. Conclusion and Recommendation

The outcome of this study indicated that cocoa farmers in Ado – Ekiti Local Government Area are used to leaving CPH as heaps in their plantations after they must have taken the cocoa beans from it. Although these CPH are produced and left as heaps in their plantations annually, nothing is done to maximize the utilization and benefit from the resource value. This is due to the fact that all the cocoa farmers whose perception on the utilization of CPH was assessed have only utilized a minute percentage of the overall percentage of the CPH

tuned out year in year out. So, millions of tonnes of CPH they turn out annually are left on their plantations unattended to.

From the results obtained in this study, there is a need to adequately educate and encourage cocoa farmers that produce CPH in their plantations to maximize the use by adopting environmentally friendly practices such as resource recovery and utilization that will help in eliminating the imminent black pod disease it causes when left in their cocoa plantations.

References

[1]. O. A. Fagbenro. "Utilization of Cocoa-pod husk in low-cost diets by the clariid catfish, *Clarias isheriensis* Sydenham". Aquaculture Research. Volume 23, pp. 175 – 182, 1992.

[2]. O. Sobamiwa. "Cocoa pod husk meal in small livestock production in West Africa" In: Proceeding of the Refresher course on: Appropriate Technology Options for small Livestock husbandry in West Africa: Organised by IPC Livestock, Barneveld College, the Netherlands of her West African Alumni, 23 November – 6 December 1997, Kumasi, Ghana, 1998. pp. 99-103.

[3]. O. Sobamiwa. "Cocoa pod husk utilization in animal feeds: Summaries and strategies": In: proceedings, 12th International cocoa research conference, Ilheus, Brazil, Nov. 1996.

[4]. G.A.R Wood and E. A. Lass. Cocoa 4th edition. Longman Group UK Limited, Harlow, Essex, England, 1985, pp. 11-37.

[5]. O. O. Oduwole and G. L. Arueya. "An economic analysis of Soap production from cocoa pod husk", Café, cacao. The 34:231-234, 1990.

[6]. G. L. Arueya. "Utilization of cocoa pod husk in the production of washing powders". In: Abst. International cocoa conference: Challenges in the 90s, Kuala Lumpur, Malaysia, 25-28 Sept; 1991.

[7]. A. Douglas. "Feasibility and Viability report on the production of potash from cocoa pod husk in Ghana": Exclusive summary. Submitted on June 7, 2006 – 16:37.

[8]. G. O. Adeoye, M. K. C. Sridhar and R. R. Ipinmoroti. "Potassium recovery from farm wastes for crop growth". Communications in Soil Science and Plant Analysis, **32**: Nos. 15 & 16, pp. 2347-2358, 2001.

[9]. O. B. Smith. "Solutions to the practical problems of feeding cocoa pods to ruminants". Department of Animal Science, OAU, Ile – Ife, Nigeria, pp. 1-8, 1989.

[10]. A. E. Salami, S. O. Omotoso and O. P. Aiyelari. "Influence of rooting media and shade on the growth of plantain macropropagales". Journal of Applied and Environmental Sciences. Vol. 2 No 1. pp. 59-63, 2006.

[11]. J.T. Owolabi and W.O. Adebayo. "Climate Variability and Physiological Comfort Measurement in Ado Ekiti, Ekiti State, Nigeria". Journal of Natural Sciences Research. Vol.3, No 15, pp. 128, 2013.

[12]. L. K. Opeke. Tropical Crops in Spectrum. Ibadan, 1992, pp. 116-122.

[13]. PRWeb. "African Black soap from Ghana unscented pure and All Natural". Internet: www.prweb.com/releases/2006/3/preweb360869.htm, March 20, 2006 [May 29, 2007].

[14]. M. A. O. Oladokun. "Encouraging domestic consumption of cocoa and cocoa products in

Nigeria". Issues in production, processing and Trade. Proceedings of exhibition and workshop on cocoa held at the Ondo State Trade Fair Complex, Akure, Nigeria, April 19-24, 1995, pp. 30-32.