

# **Factors influencing the Use of Labour Saving Technologies on Cocoa Farms in Nigeria**

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## **Abstract**

The drudgery of farm operations on cocoa production is the bane of poor productivity and major cause of the non-involvement of youths in the cocoa business in the country. Labour Saving Technologies (LSTs) are the devices that reduce labour input thereby reducing the energy expended and overall cost of production on cocoa among farmers along the value chain at the same time improving production. Data were collected from the three high cocoa producing states in Nigeria using well structured questionnaire; two cocoa producing Local Government Areas (LGAs) were selected per state, 120 farmers were interviewed thus making a total of 360 respondents. The major objectives of the study were to identify the existing labour saving devices among farmers and to find the determinants of use of LSTs among cocoa farmers. The data collected were analyzed using descriptive and inferential statistics. Results of analysis revealed that 77.5 percent of the cocoa farm household heads were male, mean age of the household head was  $44.97 \pm 14.84$  years, household size was  $8 \pm 3$  persons, Farm size is  $5.33 \pm 3.94$  hectares, mean age of cocoa trees was  $18.71 \pm 11.56$  years, year of experience at  $28.15 \pm 14.41$  years. Mainly 78.4 percent of the farming households use hired labour on their farms, 14.7 percent use family labour and only 56.9 percent of the farming households claim to use labour saving technologies on their farms. Majority of the farmers' use pump sprayers (86.5 %), motorcycles are owned by only a few 38%, Wheelbarrows is owned by 42.3%. The regression result shows that the use of labour saving technologies is determined by access to credit, years of cocoa farming experience ( $p < 0.01$ ), access to extension services and age size of cocoa farms ( $p < 0.05$ ) among cocoa farming households.

In conclusion, most of the cocoa farmers see land clearing and weeding as the most laborious and costly of all labour activities on the cocoa plantation. Labour usage on cocoa farms showed that hired labour of between ages 18-30 years are mostly used for land clearing, weeding, parasite removal, harvesting, pod breaking, bagging and transportation of cocoa beans. For land clearing, motorized hand grass cutters/land slather was suggested; also for drying operations which has been a problem to farmers they have suggested the fabrication of an auto bus-like dryer to reduce the drudgery of cocoa production.

**Keywords: labour saving, cocoa, Nigeria**

## **Introduction**

Labour saving technologies are the devices that reduce labour input thereby reducing the energy expended and overall cost of production on cocoa among farmers along the value chain. There are some labour saving devices being used by the farmers in the area of production, processing and marketing of their produce in order to reduce cost and time spent on cocoa production along the value chain. The study identified the devices through interaction with the farmers, determines the need for the development of other labour saving technologies to augment the existing ones, and also determined the factors that influence the use of labour saving technologies among cocoa farmers in Nigeria.

## **Objectives**

- To identify the existing labour saving devices among farmers and
- To find the determinants of use of Labour Saving Technologies among cocoa farmers

## **Methodology**

In order to properly capture cocoa farmers in Nigeria, three cocoa producing states were surveyed. In each state, two cocoa producing Local Government Areas (LGAs) were selected while one hundred and twenty respondents were interviewed from each LGA selected thus making a total of 360 respondents used for the study. The data collected were analyzed using descriptive and inferential statistics

## **Result and Discussions**

On Tables 1 and 2, the results show that 77.5 percent of the respondent cocoa farm household heads were male. The mean age of the household head was  $44.97 \pm 14.84$  years. The mean household size was  $8 \pm 3.0$  persons per household. Mean Farm size was  $5.33 \pm 3.94$  hectares. The mean age of cocoa trees in the study areas was  $18.71 \pm 11.56$  years; year of experience at  $28.15 \pm 14.41$  years. About 72.4% of the cocoa farming household heads are married. About 38.20 percent of the household heads have secondary education. About 49.0 percent of the respondents inherited the land on which they planted cocoa, and only 59.8 percent are not members of any farmers' association or socio-economic group; Majority of those with membership belong to co-operative societies while only 10.5 percent belong to the farmers' associations. Most of the cocoa farming

households in the study area practice the owner-managed system of cocoa farming (95.1 percent). Mainly 78.4 percent of the farming households use hired labour on their farms; with this figure, the farmers will be expending a fortune of the income from cocoa maintain the farm of which nothing may be left for them to survive on till the next harvest season thereby exposing the households to income shock. Only 56.9 percent of the farming households claim to use labour saving technologies on their farms while the remaining 43.1percent do not use any form of labour saving techniques.

### **Existing devices and labour savers used on cocoa farms**

From table 3, only cutlasses, hoe, heavy sprayers, motorcycles, wheelbarrows, metal files for sharpening, bowls, baskets and go to hell are in use now. Which are still crude and may not be attractive to youth for considering taking up cocoa as a business

Cutlass: About 88.2 % of the farmers claim they use cutlass; the mean price of cutlass purchased by cocoa farmers was ₦731.86 ± 117.27.

Hoe: Most of the respondents, 58.8% make use of hoe while about 41.2% do not use the hoe for their farm work. It is bought for the average price of ₦612.94 ±439.5

Sprayers: Majority of the farmers' use the sprayers (86.5 %) of which is bought at a mean price of ₦9, 335. 23± 2,925.04.

The motorcycle which serves as a mode of conveyor for the farmers and their produce are owned by only a few of about 38.3% while the majorities do not have any. For those that have one, the average cost of a motorcycle is ₦95, 282.05 ± 10, 999.88.

Wheelbarrows are meant for carrying produce and other planting materials on the cocoa farms. It is owned by 42.3% of the respondents, the mean price of a barrow is ₦7, 000. Most of the farmers own metal files for sharpening their cutlasses and knives, bowl for watering and other activities on the farms, baskets for transplanting, carrying pods and beans for fermentation and go-to-hell for harvesting cocoa pods.

### **Cost of labour on cocoa farms**

From table 4, Majority of the cost on cocoa farming goes to land clearing and weeding. Land clearing is done by 80.8 % of the respondents with the mean cost spent at  $\text{N}43,989.13 \pm 13,115.29$ . The farmers suggested development of hand carried mower with sharp blades to cut down shrubs and small trees which invariably will minimize the use of cutlass, time and the energy expended on the operation.

Planting operations: All the respondents do planting on their cocoa farms either to gap up or rehabilitate or establish new plantations. The mean cost of planting spent by a cocoa farmer is  $\text{N}12,320.75 \pm 2,708.77$ .

Weeding: About 53.9% do manual weeding of their cocoa farms; the average cost of weeding is  $\text{N}44,100 \pm 22,865$ . The cocoa farmers suggested that government should ensure there are no fake chemicals for cocoa in the open markets.

Herbicide use: only 45.2 % use herbicides on cocoa farms using pump sprayers while the remaining does not use herbicides. For those that use, they spend a mean amount of  $\text{N}26,000 \pm 4,663.69$

Drying: All the respondents do drying and the majority of those involved in this operation are women. Most of them dry their cocoa after fermentation on the veranda or drying slab in front of their houses. They therefore suggested a drying shed like an auto bus with many slabs made of tarpaulin or matting opening on each of its sides at different heights like a set of drawers whereby each drawer receives sunshine independent and undisturbed by another and can be slid under the roof after each day drying.

### **Labour usage on cocoa farms**

As in table 4, majority of work done on cocoa plantations in areas surveyed were done by paid hired labourers for clearing operations hired labour (27), weeding (19), harvesting(10), pod breaking(10), parasite removal (8), watering and bagging (4each), all laborers were in the age range of 18-30 years. It is only for fermentation that hired labour of age group 13 to 18 years are engaged while older family labour greater than 50 years is used to support.

## **Factors influencing the use of Labour Saving Technologies among cocoa farmers**

Access to credit is significant and positive at 1 percent level of probability this results means that an increase in access to credit facilities among cocoa farmers will influence their use of labour saving technologies. This is implied because with more credit facilities, the farmers can purchase desired equipments and machines to make their cocoa farming business less tedious to achieve, less time consuming and this can also attract more youths, women and other people to take up cocoa farming as a business. This result corroborates other studies that reported that increased credit access enhances the adoption of new technologies such as the results of Dartanto and Nurkholis (2010) and Lawal (2016). This implies that access to credit is paramount for the welfare, expansion of cocoa business because if the farmer has access to credits he can break new ground, adopt more profit yielding varieties and technologies to improve his livelihood and better his welfare.

Also, cocoa farming experience is both positive and significant at 1 percent and this implies that the experience that the cocoa farmer had gathered over the years will also influence them to take up other tools and equipments that can reduce the drudgery of cocoa farming. This result is in consonance with the result of Awolala (2006).

Access to extension service is significant at 5percent level of probability implying that the technical advice and demonstration of use of labour saving devices by the extension experts can positively influence the use of labour saving technologies and devices. This result corroborates the findings of Ayinde (2008) and Lawal (2016), which opined that the more the farmers have news, trainings and information on new technologies, or even knowledge of research results to better their production; the rate of adoption of new technologies increases.

The age of cocoa farm/ plantation has a negative influence on use of labour saving technologies, this implies that the higher the age of the cocoa farm the lesser the influence to use the labour saving technologies. This is because the canopy of the plantations would have been covered and the trees matured and may not give opportunity for ease of movement in the plantations. But the increase in use of labour saving devices may be a positive effect if the machine was meant for processing because that will increase the efficiency of the machine to reduce time spent on time consuming operations.

**Table 5: Factors influencing the use of Labour Saving Technologies among cocoa farmers**

Explanatory Variables	Regression coefficients	T-Ratio
Age of farmer (years)	-0.221	-2.695
Access to credit, yes-1; no-0	0.878	10.288***
Cocoa farming experience (Years)	0.816	5.610***
Access to Extension ser (Yes-1; No-0)	0.258	3.497**
Age of cocoa farm (years)	-0.202	-2.812**
Size of cocoa farms(hectares)	0.816	1.308
Intercept	-7.296***	
R	0.968	
F-Ratio	100.004***	

**Source: Field Survey data, 2016**

Significant at \*\*\*1%, \*\*5% and \*10%

## Conclusions

This study used extensive field survey to illustrate current patterns of labour-use on cocoa farms. It is important to note that most of the cocoa farmers see land clearing and weeding as the most paramount of all labour on the cocoa plantation. Which are also costly and laborious and these are mostly done twice yearly. The farmers still currently rely on crude tools such as cutlasses and hoes to achieve land clearing operations, only a few use the herbicides due to lack of funds, mostly they only spray fungicides and sometimes insecticides on 25 liters sprayer which also is a form of drudgery to them.

Labour usage on cocoa farms showed that hired labour of between ages 18-30 years are mostly used for land clearing, weeding, parasite removal, harvesting, pod breaking, bagging and transportation of cocoa beans. While on the other hand, family labour is mostly used for planting operations and fermentation. The farmers suggested the responsible use of chemicals in automatic sprayers not more than 8 litres per load as against manual weeding.

For land clearing, motorized hand grass cutters were suggested as against the use of heavy machinery which is not feasible in cocoa plantations.

Also for drying operations which has been a problem to farmers, they have suggested the fabrication of an auto bus-like dryer which they feel will reduce their labour, help dry more beans and will be easy to manage by any member of the cocoa farming household.

This study therefore recommends that:

1. An automatic sprayer of not more than 8litres capacity be fabricated for the ease of chemical application on cocoa farms so that cost of hired labour can be reduced; Also that motorized hand-grass cutter be also fabricated for ease of weeding and land clearing in cocoa plantations to reduced the number and cost of hired labour used for land clearing;
2. And lastly, that an auto bus-like dryer with many drawers be fabricated for use on the cocoa estates in varying sizes depending on the production in such areas.
3. Also that motorized hand-grass cutter be also fabricated for ease of weeding and land clearing in cocoa plantations to reduced the number and cost of hired labour used for land clearing;

**Table 1: Socio-economic characteristics of cocoa farming households in the study area**

Variables	Percentage	Mean	Standard Deviation
Age		44.97	±14.84 years
Household size		8	±3.5 persons
Farm size		5.33	± 3.94 hectares
Age of cocoa trees		18.71	±11.56 years
Year of experience		28.15	±14.41years

**Table 2: Frequencies of Socio-economic characteristics of cocoa farming households in the study area**

Variables	Percentage
<b>Gender</b>	
Male	77.5
Female	22.5
<b>Marital status</b>	
Married	72.4
Single	14.6
Divorced	13.0
<b>Educational status</b>	
a.No formal	17.6
b.Primary	17.6
c.Secondary	38.2
<b>Land tenure system</b>	
a.inherited	49.0
b.land community	19.6
c.purchased	18.7
d.rented	12.76
<b>Membership of association</b>	
Yes	59.8 (cooperative 49.3; farmers' association 10.5)
No	40.2
<b>System of farm management</b>	
a.owner managed	95.1
b.sharecropping	2.9
c.leasehold	2.0
<b>Labour usage</b>	
a. hired	78.4
b.family	14.7
<b>Labour saving devices</b>	
Yes	56.9
No	43.1

Source: Field survey, 2016

**TABLE 3: Existing Devices in Use on Cocoa Farms**

Devices	yes	no	cost/unit(N)	Mean cost/unit (N)	No of units owned	lifespan(years)	No of month used	Days/month	Hr of use/day	no of labour
Cutlass	88.2%	11.8%	700(50%)	731.86±117.27	4(31.4%)	1(46.1%)	10.25±3.14	30 days(50%)	8hrs	3(29.4%)
			650 (32.4%)	2(22.5%)						
			1, 000(14.7%)							
			800-900()							
Hoe	58.8%	41.2%		612.94±439.5	3	1	5 to 6	22± 2.8	5	4
Sprayer	86.5%			9,335.23±2,924.04	2	7	6	12	7	2
Motorcycle	38.3%			95,282.05±10,999.88	1	6	8	30	5	1
Wheelbarrow	42.3%			7,000	2	3	7	30±14	4	2
Chainsaw		RENTED	(COST OF OWENERSHIP IS VERY HIGH)							
File										
Bowls										
Baskets										
Go- to –Hell										

Source: Field survey, 2016

Other suggestion: automated Pruners (in place of manually operated type)

**TABLE 4: Cost of labour on cocoa farm operations**

Operation	yes	no	mean cost	minimum cost	maximum cost	amount borrowed	device in use	prefer	yes	:	no	alternative suggestion	
Land clearing	80.8		43,989.13	5,000	90,000	13,100	cutlass (57.4%)	3.5%	:	35.7%		use of chemical 67%	
			±13,115.29			±12,336.81						continuous use of cutlass 33%	
<b>Suggested labour saving device .....</b>			<b>Hand-moved mower with sharp blades</b>										
Planting	100.0 %		12,320.75	9,000	20,000	11,282.05	cutlass (62.3%)	46.1%	:	--		98.3% (No alternative)	
			±2,708.77			±2,211.8	shovel (36.5%)						
							Iron rod (0.9%)						
Weeding	53.9%		44,100	6,000	100,000	10,000	cutlass (50.4%)	65.2%	:	34.8%		44.3% (use of chemicals)	
			±22,865				chemicals (48.7%)					.7% (organic cocoa farming)	
							Hoes (0.9%)						
Herbicide use	45.2%		26,000	1,000	20,000	-						spray pumps (20.0%)	
			±4,663.69										
<b>Suggested labour saving device .....</b>			<b>Automatic hand sprayers of 8 litres capacity (80%)</b>										
Drying	100.0%		----- family labour involved-----				-						
<b>Suggestion for drying</b>			<b>auto bus-like drying shed with many slabs</b>										

Source: Field survey, 2016

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