

## EXPLORING ECONOMIC OPPORTUNITIES IN SOME SELECTED SPICES FARMING ENTERPRISE IN ONDO STATE, NIGERIA

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**Abstract.** This study explored the current economic issues and isolated constraints involved in the spice business in Ondo State, Nigeria. A quantitative research approach was used to elicit information from 60 randomly selected respondents through an individual interview schedule with the aid of a well-structured questionnaire. Data collected was explored using descriptive statistics, and budgetary and multiple regression analyses. The results showed that most (57%) respondents were male, and 87% were married with a mean household size of 7. Most (77%) had at least a primary education, and all of them were members of an association with the majority (78%) engaged in cooperative marketing of spices. Also, of the four selected spices, *Aframomum melegueta*, *Piper guineense*, *Monodora myristica*, *Sylopia acthipea*, only *Aframomum melegueta* was cultivated, others were gathered from the wild. The prominent constraints identified were the inability to propagate *Piper guineense*, *Monodora myristica*, and *Sylopia acthipea*; the lack of technology to harvest and dry *Sylopia acthipea* to meet the standard of the buyers; and the lack of access to high-value markets. The rate of return on investment was 0.98, and the factors that determine the profitability of the spice business included the level of education, household size, labor and value addition. Research efforts should be focused on the propagation of *P. guineense*, *M. myristica*, *S. acthipea*, the technology for drying and harvesting of *S. acthipea*, and capacity building on value addition to increase business profitability.

**Keywords:** spices, profitability, enterprise, constraints

### INTRODUCTION

Spices are dried part of plants that usually have strong and special smells/flavors. They can come from different parts of a plant, including: seeds, fruit, roots, bark, stems, rhizomes or flowers. There are about 50 spices of international importance and thousands of other less known local spices used for traditional cooking. Although many of these spices originated from Latin America, the Caribbean and Asia (especially India, China and Indonesia), many of them are now successfully grown across Africa.

The best-known use of spices is in food preparation and cooking. Traditionally and by research studies, spices have been known to function more than just been flavorants. It has found important use in ethno-medicine (Nasri et al., 2014; Awasthi and Pandey, 2016; Yashin et al., 2017), and this is the reason why consumers are turning more towards ethnic cuisine, spicy foods and the development of new uses for spices. Consequently, this has led to a drastic increase in the demand for spices among other herbs in the world market (UNIDO and FAO, 2005). In fact, the global demand forecast for herbs and spices, especially for their use as dietary supplements in complementary alternative medicine or orthodox medical practices, shows that it will continue on the upward trend. This provides a development opportunity for pharmaceutical raw materials.

World markets for spices and herbs, particularly in industrializing countries and in local markets, are

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expanding and can offer good returns to small-scale farmers. According to FAO data, there has been an increase in the quantity of spices produced globally. For instance, 2.10 million tons of spices were produced in 2012 globally, compared to 2.81 million tons in 2017. Asia is recorded to contribute about 94% to global spices production. India is the main producer in the continent, in 2017, 1.94 million tons of spices were produced in India (Factfish.com, 2020). In Nigeria, the potential in spices production is underutilized, and there is lack of information on how to cultivate and use them despite their economic importance (Adebayo et al., 2011). Therefore, there is good trade potential for small-scale farmers; they can benefit from spices as higher-value, low-volume cash crops to enhance their income and thus improve their livelihoods. A large proportion of spices traded in both local and export markets are produced by small-scale farmers. On a worldwide basis, trade in spices provides multi-billion U.S. dollar earnings for small-scale farmers (Ulhan et al., 2006; FAO, 2011).

Meanwhile, a literature review revealed that considerable work had been carried out to discover the importance of spices around the world. Most authors focused on the medicinal value of spices (De Milto and Fray, 2005; Nasri et al., 2014; Damanhouri and Ahmad, 2014; Fasoriyo, 2015; Yashin et al., 2017; Prasad et al., 2017). Also, there is a number of studies focused on spice consumption (Shinoj and Mathur, 2006; Akinpelu and Salman, 2015). Olife et al. (2013) and Adebayo et al., 2011 surveyed the production of spices in Nigeria but neglected the economic aspect. Akinpelu et al. (2011) also worked on the economic analysis of spices but their focus was on the marketing. Therefore, this research addresses four selected spices that are cultivated and/or gathered by farmers in Ondo East Local Government area of Ondo State: Alligator pepper (*Aframomum melegueta*), African nutmeg (*Monodora myristica*), Eeru (*Sylophia acthipea*) and iyere (*Piper guineense*). The study seeks to explore the current status of spice production in the area, the profitability of the business, the constraints facing the spices enterprise and the factors that determine the profitability of the enterprise in the study area.

## METHODOLOGY

### Descriptions of the study area

The study area was Ondo State, located at latitudes between 5°45'N and 7°45'N and longitudes between

4°20'E and 6°03'E. It is bounded by Edo and Delta States on the east, Ogun and Osun States on the west, Ekiti and Kogi States on the north, and the Bight of Benin and the Atlantic Ocean on the south. The state occupies a land area of about 15,000 km<sup>2</sup> with a population of 3,441,924 according to the 2006 census. The state has eighteen (18) Local Government Areas, with Akure as the capital city and the largest settlement. Agriculture is believed to be the mainstay of the people of Ondo State.

### Sampling procedure

A multistage sampling technique was used in selecting the respondents for the study. At the first stage, Ondo East Local Government Area was purposively selected because of the presence of spice farmers in the area. Five villages (Bomodeoku, Oboto, Itaoba, Adaja and Akinseye), where spice farmers are organized into groups, were purposively selected at the second stage. At the third stage, twelve farmers were randomly selected from the list of spice farmers in each village to give a total of sixty respondents.

### Data collection and analytical techniques

This study used a mixed-method research design involving both quantitative and qualitative research approaches to elicit information from the respondents selected. Primary data was used for this study. Data was collected using a well-structured questionnaire; a Focus Group Discussion was conducted to gain an in-depth understanding of various activities that are carried out in the spice business. Quantitative data collected was analyzed using descriptive statistics, and budgetary and multiple regression routines. In turn, discourse analysis was used for qualitative data.

### Budgetary technique

The budgetary technique was used to analyze the costs and return rates of the selected spices business. The net revenue (NR) and profitability ratio were used to examine the profitability.

Revenue analysis is given by:

$$GM = TR - TVC \quad (1)$$

$$NR = GM - TFC \text{ or } TR - TC \quad (2)$$

where:

GM: Gross Margin, the difference between total revenue generated from the sales of the spices and total variable costs

TR: Total Revenue, the sum of the quantity of spices gathered or harvested multiplied by the average price per kilogram

TVC: Total Variable Cost, the sum total of all the variable costs in the production of spices during the period

NR: Net Revenue, the difference between total revenue generated and total costs of inputs used in the production of spices

TC: Total Cost, the sum of both variable and fixed costs

TFC: Total Fixed Cost, the cost of variables that are fixed in the production of spices.

The performance and economic worth of the enterprise was determined using the following profitability ratios:

- (1) Benefit cost ratio (BCR) = TR/TC
- (2) Expense structure ratio (ESR) = FC/VC
- (3) Ratio of return (ROR) = NR/TR
- (4) Gross ratio (GR) = TC/T

#### Multiple linear regression model

The multiple linear regression analysis is a form of a predictive modeling technique which investigates the relationship between a dependent variable (target) and independent variables (predictors). This technique is used to find the causal effect relationship between the variables. Multiple linear regression was therefore used to establish a causal effect relationship between the net farm income accrued to spices farmers and selected socioeconomic variables. The coefficient of multiple determination ( $R^2$ ) was obtained as a measure of goodness of fit. It is the percentage of total variation of the dependent variable (Y) explained by the variation in the independent variable ( $X_1-X_9$ ). The multiple regression equation and explanation of variables are expressed below as:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_n X_n + \varepsilon$$

where:

- Y = net farm income (dependent variable)
- $X_1$  = age of respondents (actual number)
- $X_2$  = gender (male = 1, female = 0)
- $X_3$  = marital status (married = 1, single = 0)
- $X_4$  = years of formal education (years)
- $X_5$  = household size (actual number)
- $X_6$  = cost of labor (NGN)
- $X_7$  = farm distance from home (km)
- $X_8$  = value addition (Yes = 1, No = 0)
- $X_9$  = years of experience (years)
- $\varepsilon$  = error term

## RESULTS AND DISCUSSION

### Demographic characteristics of spice farmers

The demographic characteristics of the respondents are presented in Table 1. The results showed that the average age of farmers involved in the spice business was

**Table 1.** Distribution of spice farmers by demographic characteristics ( $n = 60$ )

Variables description	Category	Frequency	Percentage (%)
1	2	3	4
Age (age of the respondents in actual number)	≤ 29	3	5
	30–59	41	69
	60–89	47	26
Mean		54	
Marital status (indicates whether the respondent is married or single)	Single	7	12
	Married	52	87
	No response	1	1
Family size (actual number of persons in the respondent's household)	1–5	29	48
	6–10	9	15
	11–15	11	18
	16–20	10	17
	No response	1	2
Mean		7	
Gender (this distinguishes between male and female biological sex)	Male	34	57
	Female	26	43
Education (actual number of years spent in formal education)	Not educated	20	33
	1–6	17	28
	7–12	16	27
	Above 12	7	12
Mean		6.65	
Experience (actual number of years the respondent has been involved in the spices business)	1–20	23	38.3
	21–40	27	45
	41–50	9	15
	41–60	10	16.7
Mean		26	

**Table 1 cont.**

1	2	3	4
Primary occupation (occupation that gives the highest income)	Agriculture-related activities	48	80
	Formal private employment	7	12
	Public sector employment	3	5
	Artisan	2	3

Source: field survey, 2018.

ca. 54; the majority were between 30 to 59 years old, married, with an average family size of 7. More (57%) male farmers were involved in the business. While one-third of the sample respondents did not have a formal education, two-thirds attained different levels of formal education which affords them the opportunity to write and read and also access information that could enhance productivity. The average experience in the business was about 26 years; most (45%) of the respondents had between 21 and 40 years of experience, and the primary occupation of the majority (80%) was related to agriculture.

### Economic activities of spice farmers

Table 2 presents various economic activities that spice farmers are engaged in. All (100%) farmers were members of associations such as a cooperative; this had facilitated the marketing of the produce, as 78% sold their

**Table 2.** Distribution of spice farmers by economic activities

Variables description	Category	Frequency	Percentage (%)
1	2	3	4
Association in terms of membership of a cooperative	Yes	60	100
	No	0	0
Marketing strategies in terms of whether the respondents pool their produce together to market or market individually	Cooperatives	47	78
	Individuals	13	22

**Table 2 cont.**

1	2	3	4
Sales outlets in terms of who buys the spices from the respondents	Village merchant	10	17
	Broker	3	5
	Cooperate	41	68
	Government agency	0	0
	Individuals	6	10
Marketing strategy satisfaction	Satisfied	49	82
	Not satisfied	11	18
Good pricing in terms of whether or not the respondents have a good price for their produce	Yes	48	80
	No	12	20
Profitability in terms of how the respondents perceive their business profitability	Yes	57	95
	No	3	5
International market in terms of whether the respondents have access to international market or not	Yes	3	5
	No	57	95
Business expansion in terms of whether the respondents intend to expand their business in the future	Yes	60	100
	No	0	0

Source: field survey, 2018.

produce through the cooperative they belong to. Also, membership of association afforded the majority of farmers (68%) the opportunity to pool their produce and sell it to cooperative organizations. As a result, 82% testified to the fact that they were satisfied with the marketing strategy adopted by the cooperative. About 80% of the respondents received good pricing for their produce, and 95% attested to the fact that the business was profitable. Only 5% had connection with the international market; all the farmers desired business expansion in the nearest future. These findings suggest a promising future for the spice business in the study area.

### Sources and quantity of spices in the 2016/2017 production year

As presented in Table 3, spices are either propagated or gathered from the wild. The result showed that only *Aframomum melegueta* is propagated while others were gathered. The quantity of *Aframomum melegueta* produced in 2016/2017 was 4,044 kg. The quantity of *Monodora myristica* was the highest (26,960 kg) while *Piper guineense* had the smallest quantity harvested during the 2016/2017 production year.

**Table 3.** Sources and quantity of spices in the 2016/2017 production year

Spices	Qty gathered (kg)	Percentage (%)	Qty planted (kg)	Percentage (%)
<i>Monodora myristica</i>	26,960	88	–	–
<i>Aframomum melegueta</i>	–	–	4,044	100
<i>Sylophia acthipea</i>	2,160	7	–	–
<i>Piper guineense</i>	1,440	5	–	–

Source: field survey, 2018.

### Constraints to spices production in the study area

The constraints to the spice business identified in the study area are as follows: lack of access to credit; inability to propagate some spices; pests and diseases; inefficient local and international market; herdsmen, fire outbreak and deforestation; lack of adequate knowledge on the processing and storage to meet industrial standards (Table 4). About 21% of the farmers had no access to credit, and 25% were unable to propagate the desired type of spices as indicated in Table 4. Out of the four spices considered in the study, only one could be propagated by the farmers, the remaining three are gathered from the wild. Only 7% were faced with problems of pest and diseases; 26% had inefficient market channels and links with the international market; and 19% had problems with processing and storage to meet industrial standards. These findings suggest that the farmers' inability to propagate some species of spices and inefficient

**Table 4.** Constraints faced by spice farmers

Problems	Frequency	Percentage	Rank
Lack of access to credit	46	21	3 <sup>rd</sup>
Inability to propagate some species of spices	56	25	2 <sup>nd</sup>
Pest and diseases	15	7	5 <sup>th</sup>
Inefficient local and international markets	58	26	1 <sup>st</sup>
Herdsmen, fire outbreak and deforestation	5	2	6 <sup>th</sup>
Processing and storage to meet industrial standards	43	19	4 <sup>th</sup>

Source: field survey, 2018.

market channels are the prominent problems they face in the study area.

### Profitability of the spice business

Table 5 shows the estimated average costs of and returns on the spice business in the study area to be NGN 26,841.31 (USD 74.25) and NGN 437,024.58 (USD 1208.92) per annum, respectively. Among the cost components, labor inputs had the largest share (42%) in total costs, followed by fertilizers/manure (20%). Gross margin and net revenue were NGN 413,172.81 (USD 1142.94) and 410,183.50 NGN (USD 1,134.67), respectively. The benefit/cost ratio of 16.28 indicates that the spice business is highly profitable in the study area; this shows that about NGN (USD) 16.28 is to be realized on every NGN (USD) 1.00 investment in the spice business. This result is in line with Akinpelu et al. (2011) who found that the spice business is highly profitable.

### Determinants of profitability of the spice business in the study area

The multiple regression model was used to analyze the determinants of net income from the spice business in the study area. The adjusted R<sup>2</sup> shows that all the explanatory variables included in the model jointly explained about 76% of the adjusted variability in the profit from spices. Also, the F-statistic was statistically significant at 1%, which indicates the overall significance of the model.

Nine variables (age, gender, marital status, education, household size, labor, distance, value addition, and

**Table 5.** Costs of and returns on the spice business in the 2016/2017 production year

Items	Mean price/kg (NGN)	Mean amount (NGN)	%
<b>Revenue</b>			
516.67 kg of <i>Monodora myristica</i>	734.17 (2.03)	379,319.44 (1,049.29)	
67.5 kg of <i>Sylophia acthipea</i>	250 (0.69)	16,875.00 (46.68)	
34.2 kg of <i>Piper guineese</i>	600 (1.66)	20,571.43 (56.91)	
67.53 kg of <i>Aframomum melegueta</i>	300 (0.83)	20,260.00 (56.04)	
Total revenue		437,025.87 (1,208.92)	
<b>Variable cost</b>			
Cost of seedling per unit		3,376.67 (9.34)	14
Cost of fertilizer/manure		4,685.80 (12.96)	20
Cost of chemicals		4,250.00 (11.76)	18
Cost of labor inputs		10,000.00 (27.66)	42
Cost of management		1,540.00 (4.26)	6
Total variable cost		23,852.47 (65.98)	100
Gross margin (GM) = (TR – TVC)		413,173.40 (1,142.94)	
<b>Fixed cost</b>			
Depreciation on sprayer		1,468.72 (4.06)	
Depreciation on hoe		260.90 (0.72)	
Depreciation on cutlass		665.81 (1.84)	
Depreciation on file		85.65 (0.24)	
Depreciation on shovel		127.37 (0.35)	
Depreciation on fruit hooks		381.42 (1.06)	
Total fixed cost (TFC)		2,989.90 (8.27)	
Total cost (TC) = (TFC + TVC)		26,842.37 (74.25)	
Net income (NI) = (GM – TFC)		410,183.50 (1134.67)	
Benefit cost ratio (BCR) = TR/TC		16.28	
Expense/cost ratio (ECR) = TFC/TVC		0.12	
Rate of return (ROR) = NI/TR		0.94	
Gross ratio = TC/TR		0.061	
Operating cost ratio (%) = TVC/TR		0.055	

Figures in parenthesis are equivalent amounts in USD.  
Source: field survey, 2018.

**Table 6.** Determinants of profitability of the spice business in the study area

Independent variables	Coefficients	Standard error	<i>p</i> -value
Intercept	4789.499	49178.02	0.922805
Age	164.8517	383.2194	0.668916
Gender	5168.657	8205.937	0.531649
Marital status	-15821.2	12463.79	0.210186
Education	2693.985	4450.095	0.017667*
Household size	2117.243	1722.258	0.024698*
Labor	-6132.83	6248.016	0.03104*
Distance	-911.16	1770.85	0.609146
Value addition	25545.01	12741.35	0.050404*
Experience	-169.394	329.0208	0.60893
Constant	4789.499	49178.02	0.922805
F-value	0.0104**		
R <sup>2</sup>	0.7528		
Adjusted R <sup>2</sup>	0.689		

\*5% significance level \*\*1% significance level.  
Source: field survey, 2018.

experience) were included in the model. Four (education, household size, labor and value addition) out of nine included independent variables were found to be significant, as presented in Table 6.

The level of education of spice farmers in the study area was significant and positively related to net income ( $p \leq 0.05$ ); a one-year increase in the years of formal education will increase the level of net income by NGN 2,693.99 (USD 7.45). The model also revealed that household size is a major determinant of profit in the spice business. An additional household member increases spices profit by NGN 2,117.24 (USD 5.86). Value addition was also significant ( $p \leq 0.05$ ) and had a positive influence on net revenue from spices. An increase in the level of value added to the spices increased the farmers' net income by NGN 2,5545.01 (USD 70.66). This indicates that processed spice products, such as spices that have been removed from the pod, had more profit than spices sold without any level of processing. The model also showed labor as a significant but negative variable, which implies that an additional unit of labor will reduce the farmers' profit by NGN 6,132.83

(USD 16.96). These results corroborate the findings by Mariyono (2018) that while household size is a positive determinant of net income from vegetable business, the cost of labor has a negative impact.

## CONCLUSION AND RECOMMENDATIONS

The study explores the economic opportunities in some selected spices business in Ondo State, Nigeria. The results indicated that only *Aframomum melegueta* are propagated by the farmers while *Monodora myristica*, *Sylopia acthipea* and *Piper guineense* are mostly gathered from the wild. The constraints faced by the farmers, in order of preference, are: inefficient local and international market; the farmers' inability to propagate some of the spices on their farmland; lack of access to credit facilities; lack of knowledge on how to process and store spices in order to meet the standards of specialized market outlets; problem of pests and diseases; and lastly, the problem of herdsmen, fire outbreak and deforestation. The results of the study further showed

that the business is profitable: the rate of return on investment was 0.98 and the benefit/cost ratio showed that ca. NGN 17 is realized on every NGN 1 investment in the spice business. More so, the determinants of profitability of the spice business in the study area are education, household size, labor and value addition.

Based on these findings, the following is recommended:

- The study advocates research focus on the propagation of spices such as *Monodora myristica*, *Sylopia acthipea* and *Piper guineense*, that the farmers have difficulty in planting. Also, farmers need to be trained on how to plant them on their farmland.
- There should be training for the farmers on how to process and store their produce to meet specialized market demand.
- Also, the farmers should be trained on how to add value to some of these spices locally to boost their income.

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