

(RESEARCH ARTICLE)



## Income analysis of turmeric marketing in Onitsha agricultural zone, Anambra state, Nigeria

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### Abstract

The study examined income analysis of turmeric marketing in Onitsha agricultural zone, Anambra State, Nigeria. Specifically, it described the socioeconomic characteristics, profitability, economic efficiency, and constraints of turmeric marketing. Multistage and sample random sampling methods were used to select 160 intermediaries 80 wholesalers and 80 retailers for the study. Data were analyzed using descriptive statistics, enterprise Budgeting, Shepherd-Futrell techniques, and relative index techniques. Findings from socioeconomic characteristics revealed that the turmeric market is dominated by males mostly at wholesale marketing than women (60.00%) showing signs of gender sensitivity at different levels in the study area. Findings from the profitability of turmeric marketing showed that for every 1 Naira invested in the business, wholesalers returned 24 kobo while retailers returned 1.61 kobo. The result of the analyses revealed that both the wholesalers and retailers did not attain efficiency of 100% in the marketing of turmeric implying the existence of good level of inefficiencies among the actors (wholesalers and retailers). The level of inefficiency was higher (80.29%) among the wholesalers than the retailers (38.3%) implying that the retailers were more efficient in the marketing of turmeric than the wholesalers. The findings on constraints showed that online marketing, transportation and taxes, and LGA charges were the most perceived constraints on the wholesale level while on the retail level were online marketing, irregularity of market days, and insufficient start-up capital. Marketers should be encouraged to learn the act of on-line marketing to avoid being left out in modern trading and soft loan and grants should be made available for genuine marketers for efficient marketing were recommended.

**Keywords:** Profitability; Marketing; Turmeric; Income; Onitsha zone

### 1 Introduction

Agriculture, being one of the oldest and most crucial occupations, plays a vital role in the development of any country. In Nigeria, the agricultural sector remains a significant contributor to the gross domestic product (GDP) and overall economic growth, despite the prominence of the oil industry. This sector provides employment opportunities, ensures food security, and helps reduce the dependency on food imports, thus combating hunger [1]. Spices and condiments derived from plants are widely used for flavoring, seasoning, and enhancing the taste of various food, beverage, and medicinal products. They also find applications in cosmetics, perfumes, preservatives, and dyes and have antibacterial properties. These attributes make spices valuable in medical, religious, and industrial contexts [2-3].

Turmeric, scientifically known as *Curcuma longa*, belongs to the ginger family, Zingiberaceae. It is a perennial, herbaceous plant that thrives in regions with temperatures ranging from 20 to 30 degrees Celsius and high annual rainfall [4]. The rhizomes of the turmeric plant are used fresh, boiled, dried, and ground into a deep orange-yellow powder. This powder serves as a coloring and flavoring agent, commonly used in Asian cuisines, particularly in curries.

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Turmeric powder possesses a warm, bitter flavor reminiscent of black pepper, accompanied by an earthy, mustard-like aroma.

India, notably Dhok, is the leading producer of turmeric and holds a monopoly in spice production due to favorable climatic conditions. It is often referred to as the "Home of Spices" and the spice bowl of the world. India also ranks as the largest producer, consumer, and exporter of turmeric globally. Other major turmeric-producing countries include China, Indonesia, Iran, Sri Lanka, Peru, and Pakistan [5].

Curcumin, a chemical compound found in turmeric, exhibits anti-inflammatory, anticancer, and antioxidant properties, offering numerous health benefits [6]. Turmeric consumption can enhance the body's antioxidant capacity, promote the growth of new neurons in the brain, and potentially combat degenerative brain diseases. Furthermore, curcumin's presence in turmeric can contribute to reducing the risk of heart disease by reversing certain stages of the disease process. It is also considered beneficial in the treatment of Alzheimer's disease, exhibits positive effects on arthritis patients when consumed as a supplement, and possesses anti-depressant properties. Additionally, it has the potential in delaying aging and combating age-related chronic diseases.

Agricultural markets encompass various aspects, including demand and supply conditions, marketing operations, marketing functions, functionaries, costs, price fixation, market structure, conduct and performance, and marketing efficiency [7]. Turmeric, being a significant agricultural commodity, requires strategic marketing efforts [7]. Efficient markets not only facilitate the interaction between sellers and buyers based on supply and demand but also stimulate consumption, which is crucial for economic development [8]. Agricultural marketing encompasses the processes from farmers planning to meet specific demands and market prospects to the final delivery of products to consumers, thus promoting production, specialization, and increased productivity [8].

Marketing involves ensuring that the right goods and services are available in the right place, at the right time, and with appropriate communication and promotion strategies [9]. It encompasses legal, physical, and economic services required to make agricultural produce accessible to consumers, creating form, place, time, and possession utilities. It also enables farmers and middlemen to earn income that can be used to purchase other goods and services [9]. The movement of goods from production points to consumer points is an integral part of marketing, facilitating the fulfillment of consumer needs [9]. Marketing efficiency refers to the effective utilization of available resources by marketing agents to maximize revenue.

However, Nigerian agricultural markets often suffer from inefficiencies due to high market margins, abnormal profits, inadequate infrastructure, high market costs, and poor infrastructure in developing countries. These factors can negatively impact both consumers and turmeric marketers, affecting marketing structure, and efficiency, and posing challenges within the industry (Idris, Chinda, & Ahmed, 2015).

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## 2 Material and methods

The study was conducted in the Onitsha Agricultural zone, located in the southern part of Anambra State, Nigeria. The zone encompasses several Local Government Areas (LGAs), including Ekwusigo, Idemili North, Idemili South, Ihiala, Ogbaru, Onitsha North, and Onitsha South. The zone has an estimated population of approximately 2 million people [10]. The area is characterized by a lowland landscape and experiences two distinct seasons: a rainy season from the end of March to the end of October, and a dry season from November to February.

The Onitsha Agricultural Zone is known for its high level of commercial activities, largely attributed to the presence of the city of Onitsha and its main market, which is the largest single market in the West Africa Sub-region. In addition to the main market, several other markets exist in the zone, where a wide range of agricultural produce is marketed both at wholesale and retail levels. The commercial significance of the area contributes to its economic vibrancy and attracts traders from various regions. Furthermore, the Onitsha Agricultural Zone in Anambra State serves as a hub for agricultural trade, with its strategic location and bustling marketplaces playing a vital role in the marketing of agricultural products.

### 2.1 Population and Sampling Technique

The study was made up of all turmeric marketers in Onitsha Agricultural Zone, Anambra State, Nigeria. Multistage, purposive, and random sampling methods were used to select 4 Local Government Areas, 8 communities, 16 daily turmeric (Agricultural Food) markets, and 160 intermediaries (80 wholesalers and 80 retailers) for the study. The respondents were selected based on the size of the markets. Details of the selection process is given:

- **Stage 1:** Four Local governments were randomly selected from the agricultural zone.
- **Stage 2:** This involves the selection of 2 communities each from the 4 LGAs making it a total of 8 communities.
- **Stage 3:** This involves the selection of 2 daily markets with a large number of intermediaries and consumers from each selected community making it a total of 16 markets for the study.
- **Stage 4:** Ten turmeric marketers consisting of five wholesalers and five retailers were randomly selected from each of the 12 markets selected in stage three making it a total of 120 respondents for the study (80 wholesalers and 80 retailers).

## 2.2 Data Collection and Analysis

The data for this study were collected through primary sources. A structured questionnaire was used to gather information directly from the turmeric marketers, who were selected based on a sampling frame. Descriptive statistics, including tables, means, percentages, and frequency distributions, were utilized to analyze the socioeconomic characteristics of the participants. Additionally, enterprise budgeting and Shepherd-Futrell analysis were employed to assess profitability and economic efficiency. To identify the constraints related to turmeric marketing in the study area, a relative importance index was utilized. These methods allowed for a comprehensive understanding of the various aspects of the turmeric marketing process and the challenges faced by marketers.

## 2.3 Model Specification

The Budgetary Technique is expressed as:

$$NER = \sum P_{yxi} Y_i - (\sum P_{xij} X_{ij} + \sum F_{ij})$$

Where  $\sum$  =sum

$P_{yi} Y_i$  = unit price  $\times$  quantity of  $i^{th}$  respondents sales = Total revenue (TR) for  $i^{th}$  respondent.

$P_{xij} X_{ij}$  = Prices  $\times$  quantities of  $i^{th}$  respondents variable inputs= total variable cost (TVC) for  $j^{th}$  respondent.

$F_{ij}$  = Depreciation values of equipment, annual rent for store, interest on loan, for  $j^{th}$  respondents = Total fixed cost (TFC) for  $j^{th}$  respondent.

$$TC = \text{Total cost (TVC + TFC)}.$$

## 2.4 Marketing Efficiency

The marketing efficiency of marketers was achieved using the Shepherd-Futrell technique which is considered as an accurate marketing efficiency. The coefficient of marketing efficiency is the total cost of marketing to total revenue expressed in percentage terms. It is specified as

The marketing efficiency

$$ME = \frac{TC}{TR} \times \frac{100}{100}$$

Where:

ME = coefficient of marketing efficiency

TC = Total marketing cost incurred

TR= Total value of the product sold

MKS = Marketing cost

PDP = Product price

e = Stochastic error term.

It is implicitly represented below as

$$NMI = \beta (AGE_1, GEN_2, MRS_3, EDU_4, SOF_5, HOS_6, TOU_7, EXP_8, OBT_9, \dots, e_1)$$

### 3 Results and discussion

#### 3.1 Socioeconomic characteristics of turmeric marketers

**Table 1** Socioeconomic characteristics of turmeric marketers. n = 160

Variables	Frequency	Percentages
<b>Age</b>		
20-29	30	18.75
30-39	50	31.25
40-49	43	26.87
50-59	22	13.75
60 and above	15	9.37
<b>Gender</b>		
Male	96	60.00
Female	64	40.00
<b>Marital Status</b>		
Single	60	37.5
Married	79	49.37
Widow/Divorced	21	13.13
<b>Educational Status</b>		
0-6	56	35.00
7-12	75	46.87
13-18	29	18.12
<b>Source of Finance</b>		
Personal savings	93	58.13
Friends and relatives	37	23.12
Cooperatives/Isusu	28	17.5
Banks	2	1.25
<b>Household Size</b>		
1-4	58	36.25
5-8	81	50.63
9 and above	21	13.12
<b>Trade Union</b>		
Member	132	82.5
Non Member	28	17.5
<b>Market Experience</b>		
1-5	76	47.5
6-10	63	39.37
10 and Above	21	13.13

<b>Other biz Activities</b>		
Yes	123	76.87
No	37	23.13

Source, field survey, 2023.

The socioeconomic characteristics of marketers in Table 1 indicate that the majority of the marketers are within the age limit of 30-49 (58.12%). This implies that the marketers are relatively young, vibrant, and full of energy to tackle the hustle of agricultural business enterprises. The Turmeric market is dominated by males mostly at wholesale marketing than women (60.00%) showing signs of gender sensitivity at different levels in the study area with a large number of married marketers (49.37%) although there is a significant number of young unmarried folks. This is in agreement with Salau et al., who reported that ginger and garlic marketing is dominated by males in their study area [2]. Findings from educational status showed that the majority of the marketers are literate making the study area interesting for easy transaction. The result revealed that a high percentage of the marketers (58.13%) took off their business enterprise by personal savings and the assistance of friends and relations although there were cases of little borrowing from Isusu and banks. The result corroborates Ugwumba, et al. [9] that the marketing of giant snails was dominated by young, energetic, and self-sponsored marketers. The result from the field showed that 5-8 persons living and eating from one pot have a percentage of (50.63%) implying that the large household may be of great assistance in the marketing process. Although there were no official registered trade union members due organized themselves to form a group called Isusu group (82.5%) where they carted for the welfare of their members and form a force to tackle their challenges. Findings showed that there is an influx of new entrants repeatedly yearly (39.37%) as many young ones are becoming interested in agricultural marketing because of the scarcity of white-collar jobs this agricultural enterprise is a bit easy to start and it is gaining ground easily. Findings also revealed that the majority (76.87%) of marketers combine turmeric with another agricultural commodity for maximum profit

### 3.2 Profitability of turmeric marketing y the wholesalers and retailers

**Table 2** Estimated monthly profitability of Turmeric (Wholesale) marketing

Variable		Percentage (%)
Total Revenue	27,944,000.00	
VARIABLE COST (VC)		
Purchases	12,088,000.00	90.14
Transportation	400,000.00	2.98
Loading	473,200.00	3.52
Off-loading	135,600.00	1.01
Miscellaneous (Recharge car, water, food, nylon bag, small rope)	200,000+ Water 16,000+ nylon 96,000= 312,000.00	2.33
TOTAL VARIABLE COST (TVC)	13,408,800.00	100
FIXED COST (FC)		
Monthly shop rent	8,700,000.00	96.35
Ground levy		
Depreciation on equipment (chair, table, wheelbarrow)	48,000.00	0.53
Local government charges	160,000.00	1.77
Interest on loan	121,154.00	1.34
TOTAL FIXED COST(TFC)	9,029,154.00	99.99
TOTAL COST TC=TVC+TFC	22,437,954.00	
Gross margin =TR-TVC	14,535,200.00	

Net marketing income NMI=GM-TFC	5, 506, 046	
Return on investment TR/TC	1.24	
Net Return on Investment= NMI/TC	0.24	
Gross Ratio =TC/TR	0.802	
Marketing Efficiency TC/TRX100/1	80.29	

Source, field survey, 2023.

The profitability of turmeric marketing in the study area was assessed using enterprise budgeting analysis, and the results are presented in Tables 2 and 3. The analysis considered various cost components such as Total Cost (TC), Total Revenue (TR), Total Variable Cost (TVC), Total Fixed Cost (TFC), Gross Margin (GM), Net Marketing Income (NMI), and Net Return on Investment (NROI). For wholesalers, the analysis revealed that purchases constituted the majority of the total cost, accounting for 90.14%, while off-loading expenses represented the smallest proportion at 1.01%. After incurring a total variable cost of N13,408,800.00 and a total cost of N22,437,954.00, the wholesalers achieved a total revenue of N27,944,000.00. This resulted in a gross margin of N14,535,200.00, a net marketing income of N5,506,046.00, and a net return on investment of 0.24. The net return on investment indicates that wholesalers generated a return of 24 kobo for every 1 Naira invested in the business. On the other hand, retailers had a total cost of N2,465,347.30 and realized a total revenue of N6,435,450.00. This generated a gross margin of N4,063,207.50, a net marketing income of N1,506,046.00, and a net return on investment of 1.61. The net return on investment implies that retailers obtained a return of 1.61 kobo for every 1 Naira invested in the business. These results are consistent with previous studies conducted by Ugwumba et al. [9] and Nkamigbo et al. [11] on the marketing of giant snails and agricultural products using social networks, respectively. Furthermore, the profitability indicators, including gross margin, net marketing income, and net return on investment, demonstrate that turmeric marketing is a profitable venture in the study area. These findings contrast with the findings of Salau et al., who reported price spreads of 49k and 40k for every 1 Naira invested in ginger and garlic marketing, respectively [2].

**Table 3** Estimated monthly profitability of Turmeric (Retailers) marketing

Variable		Percentage (%)
Total Revenue	6,435,450.00	
VARIABLE COST (VC)		
Purchases	2,280,000.00	96.11
Transportation	41,567.00	1.75
Loading	18,675.500	0.76
Off-loading	-	
Miscellaneous (Recharge car, water, food, nylon bag, small rope)	32,000.00	1.35
TOTAL VARIABLE COST (TVC)	2,372, 242.5	100
FIXED COST (FC)		
Monthly shop rent	17,345.500	18.6
Ground levy	30,567.200	32.8
Depreciation on equipment (chair, table, wheelbarrow	9,340.60	10.03
Local government charges	34,786.500	37.36
Interest on loan	1065.00	1.14
TOTAL FIXED COST(TFC)	93,104.8	100
TOTAL COST TC=TVC+TFC	2, 465, 347.3	
Gross margin TR-TVC	4,063,207.5	
Net marketing income NMI=GM-TFC	3, 970,102.7	

Return on investment TR/TC	2.6	
Net Return on Investment NMI/TC	1.61	
Gross Ratio TC/TR	0.38	
Marketing Efficiency TC/TRX100/1	38.3	

Source, field survey, 2023.

### 3.3 Marketing efficiency of turmeric marketing

The Shepherd-Futrell method was used to determine the co-efficient of marketing efficiency. The method expresses marketing efficiency as the ratio of total cost to total revenue expressed as a percentage. The lower percentage, the better the marketing efficiency, since less proportion of the revenue will be expanded on the total cost of marketing.

The model is stated as

$$ME = \frac{TC * 100}{TR \quad 1}$$

For Wholesalers:

$$ME = \frac{22,437,954.00 * 100}{27,944,000.00 \quad 1}$$

$$= 80.29\%$$

For Retailers:

$$ME = \frac{2,465,347.3 * 100}{6,435,450.00 \quad 1}$$

$$= 38.3\%$$

The analysis revealed that both wholesalers and retailers did not achieve 100% efficiency in the marketing of turmeric, indicating the presence of significant inefficiencies among the actors. Among the wholesalers, the level of inefficiency was higher at 80.29%, while among the retailers, it was lower at 38.3%. This suggests that retailers were more efficient in the marketing of turmeric compared to wholesalers. One possible explanation for this is that retailers often source their products from nearby markets, which helps to reduce costs. This finding aligns with the study conducted by Chiekezie et al., which reported that retailers of dry maize were more efficient than wholesalers [12]. The efficiency difference could be attributed to the retailers' ability to reduce marketing costs by sourcing products from nearby markets, leading to better income and overall marketing efficiency compared to wholesalers, who incur higher costs.

### 3.4 Constraints to turmeric marketing

The constraints associated with the marketing of turmeric in the study area are summarized in Table 4. Both wholesalers and retailers face various challenges, although some are more prominent among wholesalers and vice versa. The most serious constraint perceived by wholesalers is online marketing (M=3.78), as online businesses, including agricultural products, have become a growing trend among young people. This form of business transaction incurs fewer expenses but often leads to lower sales prices. High transportation costs (M=3.70) pose another significant challenge for wholesalers, influenced by factors such as fuel scarcity and cash scarcity due to the CBN policy on Naira redesign, impacting the transportation of bulky produce to their sales locations. Taxes and charges imposed by local government authorities (M=3.60) also hinder turmeric marketing in the study area. The level of taxation and other levies imposed by park management negatively affect the smooth operation of the turmeric trade. Another constraint faced by turmeric marketers is the high cost of produce (M=3.20), which affects the volume of daily sales due to price variations. Insufficient startup capital (M=3.06) limits the purchasing capacity of marketers, while loading and off-loading costs (M=3.00) impact profit margins, particularly considering the economic hardship faced by many individuals who engage in menial jobs to support their families. Other constraints include inadequate storage facilities, price fluctuation, lack of credit facilities, and irregularity of market days.

For retailers, online marketing (M=3.90) and irregularity in market days (M=3.85) are perceived as highly challenging constraints. The sit-at-home situation in the Southeast has significantly affected retailers who rely on daily sales for their livelihoods. This aligns with the findings of Isibor and Nkamigbo, who observed the impact of sit-at-home orders on fresh pepper marketers [13]. Insufficient startup capital (M=3.45) also poses a serious challenge for retailers, as

some may lack the necessary resources to purchase the desired quantities of the commodity. The collection of daily fees by government agencies and market masters affects the net returns of these retailers. Additionally, other constraints affecting retail marketing include price fluctuation, high cost of produce, lack of credit facilities, inadequate storage, loading and off-loading costs, and transportation.

**Table 4** Constraints to turmeric marketing

Constraints	Wholesalers mean score	Rank	Retailers mean score	Rank
Insufficient startup capital	3.06	5 <sup>th</sup>	3.45	3 <sup>rd</sup>
Inadequate storage	2.50	7 <sup>th</sup>	1.80	8 <sup>th</sup>
Lack of credit facilities	1.90	9 <sup>th</sup>	2.05	7 <sup>th</sup>
Transportation	3.70	2 <sup>nd</sup>	1.40	10 <sup>th</sup>
On line marketing	3.78	1 <sup>st</sup>	3.90	1 <sup>st</sup>
Price fluctuation	2.01	8 <sup>th</sup>	3.04	5 <sup>th</sup>
Irregularity of market days	1.80	10 <sup>th</sup>	3.85	2 <sup>nd</sup>
High cost of produce	3.20	4 <sup>th</sup>	2.40	6 <sup>th</sup>
Loading and off-loading cost	3.00	6 <sup>th</sup>	1.65	9 <sup>th</sup>
Taxes and LGA charges	3.60	3 <sup>rd</sup>	3.15	4 <sup>th</sup>

Source, field survey, 2023.

#### 4 Conclusion

The study focuses on the income analysis of turmeric marketing in Onitsha agricultural zone, Anambra State, Nigeria. The findings of the study reveal various aspects related to the socioeconomic characteristics, profitability, marketing efficiency, and constraints faced by turmeric marketers in the study area. Regarding socioeconomic characteristics, it is found that the turmeric market is predominantly dominated by males, especially in wholesale marketing, accounting for 63.33% of the marketers. This indicates gender sensitivity in the market. Additionally, a significant number of married marketers (49.37%) are observed, alongside a considerable proportion of young unmarried individuals. Although there is no registered trade union, the marketers have organized themselves into a group called the Isusu group (82.5%) to address welfare and challenges collectively.

The profitability analysis reveals that wholesalers generated a gross margin of N14,535,200.00, a net marketing income of N5,506,046, and a net return on investment of 0.24. This implies that wholesalers earned 24 kobo for every 1 Naira invested in the business. On the other hand, retailers realized a gross margin of N4,063,207.50, a net marketing income of N1,506,046, and a net return on investment of 1.61. The retailers earned 1.61 kobo for every 1 Naira invested in the business. These profitability indicators suggest that turmeric marketing is a profitable venture in the study area. In terms of marketing efficiency, the study finds that wholesalers exhibited a higher level of inefficiency (80.29%) compared to retailers (38.3%). This indicates that retailers are more efficient in the marketing of turmeric, which can be attributed to their sourcing of the product from nearby markets, reducing costs.

The constraints faced by turmeric marketers are identified through the study. On the wholesale level, the most perceived constraints include online marketing, transportation costs, and taxes and charges imposed by local government authorities. On the retail level, the major constraints are online marketing, irregularity of market days, and insufficient startup capital. Overall, the study provides insights into the income analysis, socioeconomic characteristics, profitability, marketing efficiency, and constraints associated with turmeric marketing in the study area.

Turmeric marketing in Onitsha Agricultural zones is a profitable venture considering the profit indices on the analysis. It is expected that profitability will improve if adequate attention is taken by various stakeholders to address the necessary market constraints.



### *Recommendation*

- Marketers should be encouraged to learn the act of online marketing to avoid being left out in modern trading.
- Soft loans and grants should be made available for genuine marketers for efficient marketing.

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### **Compliance with ethical standards**

#### *Disclosure of conflict of interest*

The authors have declared no conflict of interest.

#### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study. I, therefore, grant the International Journal of Life Science Research Archive the right to publish and distribute the manuscript in both print and electronic formats. This includes the right to reproduce, transmit, and make the manuscript available to readers, subscribers, and databases.

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