

ASSESSMENT OF POST-HARVEST HANDLING ACTIVITIES AND MARKETING PATTERNS OF NON-TIMBER FOREST PRODUCTS BY RURAL WOMEN IN SOUTHWESTERN NIGERIA

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ABSTRACT

Non-Timber Forest Products (NTFPs) play an important role in the life of rural women and the economy of rural households in Nigeria. The study assessed the post-harvest handling activities and marketing patterns of non-timber forest products and identified the socioeconomic variables associated with post-harvest handling activities in the fringe communities of Southwestern Nigeria. Three States (Ondo, Osun and Ogun) were purposively selected from the six States in Southwestern Nigeria. Data were collected from 320 respondents from 32 communities out of 158 in Omo, Oluwa, Akure-Ofosu and Shasha Forest Reserves using both structured and unstructured interview guides. Results on marketing patterns showed that 68.1% of the respondents used the nearest town market; 47.2% home sales; 40.6% in informal local markets; 24.4% used the roadside and 22.5% used the door-to-door channel. The majority (73.1%) of the respondents reported no organised marketing arrangement for their products. A majority (83.1%) used no specialized storage facilities and 89.4% did not carry out any value addition before selling their products. Results of the binary logistic regression showed that age ($Z=2.6$, $p<0.05$), marital status ($Z=-3.5$, $p<0.01$), number of dependants ($Z=-3.42$, $p<0.01$), ownership of land ($Z=-2.57$, $p<0.05$), and number of children ($Z=-2.5$, $p<0.05$) were significantly related to post-harvest handling activities. The study concluded that most women do not have an organised market for their NTFPs business and most do not add value to the NTFPs collected. We thus recommended that Government and private institutions/NGOs should provide a centralised modern market and specialized storage facilities to prevent the wastage of certain NTFPs which could have been converted to money.

Keywords: Forest reserves; Fringe communities; Marketing patterns; NTFP; Post-harvest;

1.0 INTRODUCTION

The forest has many benefits, ranging from ecological to economic benefits. Forests provide man with both timber and non-timber products. Non-Timber Forest Products (NTFPs) are referred to as all biological materials other than timber obtained from natural forests which are useful to man and animals either as food, fuel, drugs or for

economic purposes (Ochi and Zaman, 2022). Globally NTFPs are defined as “forest products consisting of goods of biological origin other than wood, derived from the forest, other woodland and trees outside forests” (Melese 2016; Adedayo 2017). Therefore, different terms such as secondary, minor or non-wood forest products (NWFPs) are also being used to describe the NTFPs

(Sheppard, *et al.*, 2020). Examples of NWFPs are products used as food and additives (like edible nuts, mushrooms, wild fruits, honey, herbs, spices and condiments, and aromatic plants), Bamboo, fibres (used in construction, furniture, clothing), gum, resins, plant and animal products used for medicinal, cosmetic or cultural purposes (Bamiwuye, *et al.*, 2020).

Non-timber forest products (NTFPs) are also a major source of livelihood for millions of people in forest communities across the world. For instance, in India, NTFPs are associated with the socioeconomic and cultural life of forest-dependent communities inhabiting wide ecological and geo-climatic conditions throughout the country and about 275 million poor rural people in India, depend on NTFPs for at least part of their subsistence and cash livelihoods (Pandey *et al.*, 2016, Kumar and Meena 2018). In a study conducted in Chilimo Forest, West Shewa, Ethiopia, Demie, (2019) found that a significant proportion of household income was from the collection of NTFPs. Sah, *et al.*, (2021) also found in a Nepalese study that NTFP trade plays an important role in poverty reduction and national economic development, especially among the poorest people in rural areas. In other studies, NTFPs exploitation has been found to generate employment and income for millions of rural poor who would have been searching for jobs as agricultural labourers or in the non-agricultural sector (Guleria *et al.*, 2017; Cotta 2015; Nadkarni *et al.*, 2017;). In developing countries, the importance or contribution of NTFPs to rural livelihoods has also become extensively recognized (Mugido and

Shackleton 2017; Rasmussen *et al.*, 2017; Leßmeister *et al.*, 2018 Adepoju *et al.* 2021 and Delgado, *et al.*, 2022). In addition to the contributions of NTFP exploitation to the rural economy and livelihoods of rural households, it has relatively little impact on the forest and might be an important course to prevent deforestation, forest degradation, biodiversity loss and rural poverty that may occur through logging or ranching (Chicas, 2017). NTFP trade thus plays an important role in the life of rural women and the economy of rural households.

Despite the contribution of NTFPs to rural livelihoods, rural women who collect NTFPs are often poorly organized and have great difficulty in selling their products at reasonable prices (Saini *et al.*, 2016). Rural women collect NTFPs and sell them to local traders who in turn sell them to the markets in urban centres before the products finally reach the consumers. Sometimes, rural women have to sell their materials as they need the money to meet their daily needs because of poor access to markets, insufficient capital to invest in improving their livelihoods and little or no bargaining power when selling their products in markets. As a result of these constraints, and especially the lack of direct access to markets, rural women who trade in NTFPs depend on intermediaries to sell their products thus, reducing their profit. (Pandey *et al.*, 2016).

Rural women traders in NTFPs carry out a number of post-harvest practices to make a major difference in the price and quality of their products. These include the removal of foreign material from the collected products,

sorting, drying, storage appropriately and packaging of collected materials. These value additions are aimed at increasing the value and quality of the products. Literature on post-harvest handling of NTFPs and marketing patterns and strategies by rural women in fringe communities in Nigeria is scanty. It is against this backdrop that the study carried out an assessment of the post-harvest handling activities and marketing patterns of non-timber forest products by rural women in Southwestern Nigeria – one of the six geopolitical zones with many forest reserves and a large number of forest communities. The study also identified the socioeconomic variables influencing post-harvest handling activities by women in the fringe communities of Southwestern Nigeria.

2.0 MATERIALS AND METHODS

The study population comprised all women living in the forest communities of the major forest reserves in Southwestern Nigeria who engaged in the collection and or trading of NTFPs. A total of 320 respondents were chosen for the study using a multi-stage sampling procedure. In the first stage, three states were selected out of the six states in Southwestern Nigeria based on the number and size of the forest reserves. There were 37 forest reserves in the chosen States (nine in Ogun, eleven in Osun, and seventeen in Ondo). In the second stage of sampling, 10 per cent of the total number of forest reserves were proportionately chosen from each state; that is, Oluwa and Akure-Ofosu in Ondo State, Omo in Ogun State, and Shasha in Osun State. In the third stage, 20 per cent of the communities in each Forest Reserve were

chosen; in Omo, 11 out of 54 communities, in Oluwa/Akure Ofosu, 10 out of 49 communities, and in Shasha, 11 out of 55 communities. Thus, in all, 32 communities constituted the sampling frame. At the fourth stage, 10 respondents were randomly selected for interview in each of the 32 communities making a total of 320 respondents. The sample size selection was based on the Fisher's formula for single proportions (Cochran, 1977) in Kotrlík and Higgins, (2001).

The study adopted mixed research method that involves quantitative and qualitative data collection. Structured interview schedule was administered on women who collect or trade in at least one NTFP to collect data on the socioeconomic characteristics of the respondents; post-handling activities of NTFPs and marketing patterns. Three separate Focus Group Discussion Sessions were conducted –one in each selected state in order to gain insight and depth into the NTFP trade in the communities. The FGD participants did not take part in the interview. Prior to the main fieldwork, both data collection tools were pre-tested in order to ensure compatibility with the field situation and to ensure no irrelevant questions were included and no relevant questions were excluded

The study utilised both descriptive and inferential statistics. The descriptive statistics utilised were frequency counts, percentages, means, standard deviation and bar charts. Stepwise binary logistic regression analysis was used to examine the simultaneous effects of selected socioeconomic variables on post-

harvest handling activities measured as whether respondents carried out post-harvest processing activities or not. Respondents who carried out post-harvest handling activities were scored as 1 or 0 otherwise. Qualitative data were analysed using content analysis and ZY Index Table.

3.0 RESULTS AND DISCUSSION

3.1 Socioeconomic Characteristics of Respondents

Results in Table 1 showed the socioeconomic characteristics of the respondents. Nearly half of the respondents (49.1%) were between the ages of 35 and 44 years while 27.5 percent were at least 45 years. The mean age of respondents and standard deviation were 40.9 and 11.5 respectively. This implies that many of the respondents were in their active age and are expected to be found in productive enterprises that will contribute to livelihood. This pattern of their age distribution was similar to the one reported by Olaniyi, Akintonde and Adetumbi (2013) in a study of the contribution of NTFPs to household food security among rural women in Iseyin local government area of Oyo State, Nigeria where a majority (80.0%) of the sampled women were between age 30 and 49 years.

Nearly all the respondents (91.9%) were married with 63.4 percent in monogamous relationships. The type of marriage may have implications on the extent of engagement in productive activities and choice of livelihood activities. At least 77.2 per cent were non-

indigene. This suggests that the majority of people living around the forest areas were migrants. The majority (71.3%) of the respondents had formal education and this could expose them to knowledge of the marketing strategies of NTFPs. The results also indicated that 71.3 per cent were Christians while 28.8 per cent were adherents of the Islamic religion.

The sample was predominantly Yoruba (85.3%) with 14.7 per cent representing other ethnic affiliations such as Igbo and Hausas. This is expected because the setting of the study is in South West Nigeria. A larger percentage of the respondents (91.9%) indicated that in the past year, they had travelled to other communities for one reason or another other which indicates high external orientation. The implication of the high external orientation of the respondents is that they will be exposed to more information on how things are done elsewhere which may in turn have positive effects on their trade and expose them to various means of livelihood. About 64.1 per cent of the women had 4 children or less. The mean number of children is 3.9 with a standard deviation of 1.9. Similarly, 57.5 per cent of the respondents had up to 4 dependants. The mean number of dependants is 4.2 with a standard deviation of 3.0. This implies that women may have to rely on forest resources around them because of the available family labour that can be utilized for NTFPs collection.

Table 1: Distribution of respondents by socioeconomic characteristics (n=320)

Socioeconomic characteristics	Frequency	Percentage	Mean	SD
Age				
Below 25	12	3.8	40.9	11.5
25-34	63	19.7		
35-44	157	49.0		
45+	88	27.5		
Marital status				
Single	10	3.1		
Married	294	91.9		
Others (widowed, divorced)	16	5.0		
Marriage type				
Monogamous	203	63.4		
Polygynous	117	36.6		
Indigenous status				
Indigene	73	22.8		
Non-Indigene	247	77.2		
External orientation				
Ever travelled out	294	91.9		
Never travelled out	26	8.1		
Highest educational level				
No education	92	28.8		
Primary	15	35.9		
Secondary	105	32.8		
Higher	8	2.5		
Religious affiliation				
Christianity	228	71.2		
Islam	92	28.8		
Ethnicity				
Yoruba	273	85.3		
Others	47	14.7		
Number of children				
0-4	205	64.1		
5 or more	115	35.9		
Mean/standard deviation			3.9	1.9
Number of dependants				
0-4	184	57.5		
5 or more	136	42.5		
Mean/standard deviation			4.2	3.0

3.2 Marketing Patterns and Post-harvest Handling Activities

Results in Figure 1 present the descriptive assessments of marketing patterns and post-harvest handling activities of NTFPs in the four forest locations. Five different marketing patterns were identified as follows: local informal markets, door-to-door sales, roadside, home sales and town markets. Field observations revealed that the type of NTFPs traded in most often will determine the marketing patterns. For example, most women trading in bushmeat were sighted along the roadside. At least two-thirds (68.1%) of the respondents took their goods to the town market to sell. Nearly half (47.2%) of the respondents also did home sales; 40.6 per cent of the respondents traded in informal local markets; 24.4 per cent use the roadside to market their NTFPs while 22.5 per cent engaged in door-door sales. Other marketing patterns of NTFPs have been reported in the literature, for example, Phumee & Pagdee, (2021). found that most local villagers harvest NTFPs for household consumption, about one-fifth do so for income generation while more than half take their NTFPs to the cities for marketing. Studies have also shown that villagers have changed their marketing strategies as a result of a surge in demand for NTFPs within the collection points. Rather than gathering NTFPs directly from the forests, some villagers purchase and re-sell them to local traders for higher prices. This shows a changing marketing pattern in local economies from subsistence to market-driven

and cash-dependent livelihoods (Phumee & Pagdee, 2021).

In terms of storage of products and other post-harvest handling activities by respondents, Table 2 showed that most of the women did not use any specialized storage facilities as revealed by 83.1 per cent of the women as they store in their houses. There is a dearth of storage facilities provided by the Government, private institutions or NGOs in the study locations according to nearly all (94.4%) the respondents.

Most (89.4%) of the respondents did not carry out any processing activities to add value to their products before selling them. On-the-spot field observations showed that some post-harvest activities were done without modern technology such as the extraction of palm kernel, washing and preservation of kola, and processing of bush meat. Ormsby *et al.*, (2021) also found in a Thailand study that the majority of local communities sold their NTFPs in raw form without processing. This suggests a possible loss of higher income when there is no value addition

The majority of respondents sold their NTFP items in local marketplaces with no value addition, as reported by Mahonya *et. al.*, (2019).’s study on the use and market chains for non-timber forest products in Southwest Malawi. As much as 73.1 per cent of respondents did not report any marketing arrangement for the NTFPs they traded in, in the study area.

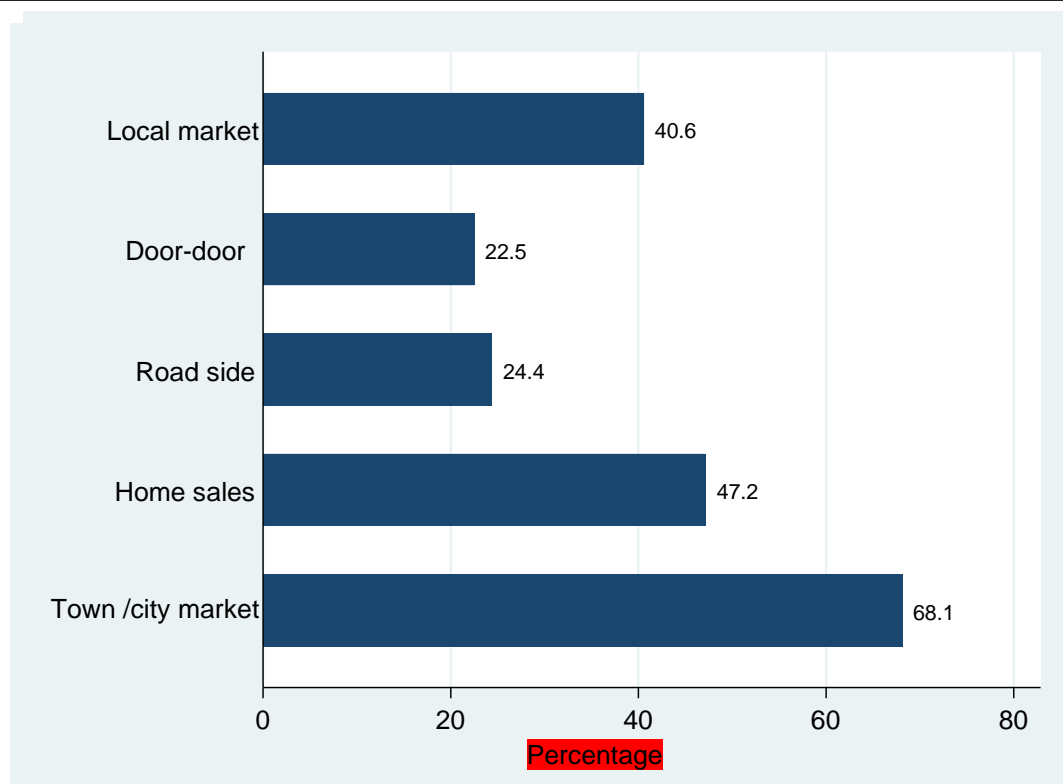


Fig 1: Distribution of respondents according to marketing channels of NTFPs

Table 2: Distribution of respondents according to marketing patterns and post-harvest handling activities of NTFPs (n=320)

Variable	Frequency	Percentage
Storage of NTFPs		
Own House	266	83.1
Store House	54	16.9
Any government, NGO or private storage facility for NTFPs?		
Yes	18	5.6
No	302	94.4
Payment for NTFPs storage		
Yes	51	15.9
No	269	84.1
Any processing activities on any NTFP?		
Yes	34	10.6
No	286	89.4
Any marketing arrangements set up for any NTFPs you trade in?		
Yes	86	26.9
No	234	73.1

2.2.1 Results of the Qualitative Data

To buttress the quantitative data with respect to the processing of NTFPs, the Focus Group Discussion (FGD) participants were asked whether there were things they do after the collection of any NTFPs before selling. This was with a view to investigating post-harvest handling activities like sorting, preserving/processing and storage by the women. Results in ZY index Table 3 below showed that a few respondents in three out of the four locations reported that they did some processing after collecting their NTFPs before the sale in order to add value to the products. Some of the processing activities mentioned included sorting, cleaning, drying and packaging. Processing of NTFPs was reported in Oluwa forest reserves because of the heavy presence of those that engaged in selling bush meat which they sell by the highways. Those who could not sell their raw bush meat often consume the meat and share it with neighbours to avoid getting spoilt. The following excerpts expressed the mind of the participants.

“We sell both raw and processed bush meat brought by the hunters in the forest and when we cannot see buyers for the raw meat, we process the raw meat to avoid getting spoilt. This is a lot of burden to me when smoking to preserve the animal although it attracts more profit than when sold raw”. (Oluwa, Woman 44 years)

“Most buyers prefer processed bush meat and they buy in bulk from different parts of Nigeria while those

who buy fresh animal are mostly travellers on the highway. Sometimes we consume the meat ourselves when we don’t see buyers to avoid total loss” (Omo, Woman 50 years)

“We have cried for government support at least to give us good roads to help our trade. We suffer a lot of losses especially during the rainy season because many roads are not accessible by vehicles and we have to hire bikes at a high cost or trek long distances carrying heavy loads on our heads most of the time. You can see that I look older than my real age, that is the sign of suffering” (laughter) (Shasha, Woman 47 years)

Results of the FGD from Table 3 showed that few participants in Shasha, Omo and Ofosu expressed that they processed some of their NTFPs after collection compared to many participants in Oluwa who expressed they engaged in some post-harvest handling such as sorting, cleaning, smoking and packaging of some NTFPs. Inadequate transportation facilities seem to be of concern to participants in Shasha Forest communities as none of the participants expressed that transportation facilities are readily available. In the other three locations, few respondents opined that transport facilities are available. This shows that the lack of transportation facilities is a constraint to the success of NTFP business among the rural women in all the locations especially in the Shasha Forest reserve. The implication of the findings is that with inadequate storage facilities and transportation problems, rural women are

likely to be experiencing a huge loss of income especially on perishable NTFPs.

Table 3: FGD results of post-harvest handling and marketing of NTFPs

Themes	Communities around the forest reserves			
	Sasha	Oluwa	Omo	Ofosu
Some NTFPs are processed after collection before marketing	+	++	+	+
Transportation facilities are readily available for marketing of NTFPs	-	+	+	+
Lack of/inadequate storage facilities for NTFPs	+	++	+	++

- opinion not expressed at all

+ opinion expressed by few or not more than 2 participants

++ opinion expressed by many or at least 3 participants

3.3 Binary regression analysis of determinants of post-harvest handling activities

Results of the relationship between socioeconomic variables and post-harvest handling activities were presented in Table 4 using stepwise binary logistic regression analysis. Results of the binary logistic regression indicated that the age of respondents ($Z=2.6$, $p<0.05$), the type of marital union ($Z=-3.5$, $p<0.01$) and the number of dependants of the respondents ($Z=-3.42$, $p<0.01$) were significantly related to

post-harvest handling activities of the respondents. Others were ownership of land ($Z=-2.57$, $p<0.05$) and number of children ($Z=-2.5$, $p<0.05$). The probability associated with a Likelihood Ratio (LR) Chi-square of 47.9 was small ($P<0.01$). This showed a significant joint effect of the selected socioeconomic variables on the post-harvest handling activities of the respondents. The implication of these findings is that certain socioeconomic variables affect the post-harvest handling activities of NTFPs.

Table 4 Binary regression analysis of determinants of post-harvest processing activities

Variables	Odds Ratio	Standard Error	Z	95% confidence interval
Number of dependants	0.799	0.052	-3.42 **	0.703 - 0.909
Primary Occupation				
NTFP-related	1.000			
Non-NTFP related	0.209	0.131	-2.50*	0.061 - 0.715
Both	0.130	0.108	-2.45*	0.025 - 0.662
Marital Union				
Monogamous	1.000			
Polygynous	0.214	0.096	-3.45**	0.089 - 0.515
Age	1.073	0.029	2.57*	1.016 - 1.131
Number of children	0.683	0.103	-2.54*	0.509 - 0.917
Ownership of land				
Yes	1.000			
No	0.224	0.130	-2.57*	0.072 - 0.702
Constant	76.479	91.763	3.61	7.282 - 803.26

n=320; LR Chi²(7) =47.86, p<0.01

* p<0.05; ** p<0.01

4.0 CONCLUSION

The following conclusions were drawn from the findings of the study. There is a dearth of storage facilities provided by the Government, private institutions or NGOs in the study locations. The respondents also did not carry out any processing activities to add value to their products before selling them. Different patterns of markets available to the respondents were nearest town market; home sales; informal local markets; roadside and door-to-door channels while the majority had no access to organised market arrangements for their products. Socioeconomic variables associated with post-harvest handling activities included the age of respondents, the type of marital union, the number of dependants of the respondents, ownership of land and the number of children. Based on the above findings, Government, and private institutions/NGOs should provide centralised

modern markets and specialized storage facilities to prevent the wastage of certain NTFPs which could have been converted to money. In addition, there is an urgent need for skill-building acquisition in the area of post-harvest handling and processing for value addition for higher income prospects for rural women who engaged in NTFP business

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