

Original Research Article

Abstract

The emerging high level technology is a threat to small scale retail livelihood business in Nigeria. Wood carving business particularly mortar and pestle production and marketing is an important component of local household economy and culture of many tribes especially in southwestern Nigeria. This study analyzed marketing of mortar and pestle in Oyo state, Nigeria. Primary data were collected through administration of questionnaire using snowballing techniques to select 37 traders who are involved in marketing of mortar and pestle in five major markets in Ibadan metropolis. Data were analysed using descriptive statistics to describe socio-demographic characteristics of the respondents. Marketing margin analysis was used to determine the profitability in mortar and pestle among the traders. The results revealed that majority of the respondents involved in mortar and pestle marketing were male (90.3) with more than three-quarter having primary education. The respondents are in their active and middle age with average age of 38 years. The estimated monthly return on the marketing of mortar and pestle was ₦19,000.00. *Vitellaria paradoxa* was ranked first among the tree species used in mortar production while *Irvingia gabonensis* was ranked last. The average price of *Vitellaria paradoxa* ₦4,000.00 was highest while *Pterocarpus soyauxii* was the cheapest for all the types of mortar and pestle in terms of size. Majority (90.32%) of the respondents preferred to consider the species during marketing of mortar and pestle. The study therefore recommends that efforts be made towards the establishment of tree plantations and sustainable forest management to ensure continuous availability of wood species for mortar and pestle business enterprise.

Keywords: Mortar, Pestle, Marketing, Snowballing, Tree species

INTRODUCTION

Forest products are important for socio economic development of any nation and serve as a major source of income in many developing countries. These are materials derived from forestry for direct consumption or commercial use, such as lumber, paper, or forage for livestock. Wood is the dominant product of forests which is used for many purposes, such as wood fuel (e.g. in form of firewood or charcoal) or the finished structural materials used for the construction of buildings, or as a raw material in the form of wood pulp that is used in the production of paper (

36 Belcher, 2005; Fuwape, 2000). Based on usage, forest products can be divided into several
37 categories: Timber, Non timber and minor minerals (Oriabure *et al.*, 2017).

38 Many household implements including furniture, tools, cooking equipment and utensils are
39 produced from forest materials; mortar and pestle is one set of such products.

40 Mortar is a cylindrical bowl shaped wood with a hollowed-outer interior, cut out of the stem used
41 for pounding and grinding of food substances such as yam, cocoyam, cassava, fresh herbs, dried
42 herbs, spices, etc. while a pestle is a club-shaped 2–3 m long tree stem with 3–6 cm diameter
43 used together with a mortar to crush, mash or grind materials (Njoh *et al.*, 2014). Mortar and
44 pestle are made from tree stumps and logging waste after harvesting of timber from natural
45 forests, farms and the surrounding villages (Larinde and Aiyeloja 2015). They are made in
46 different shapes and sizes. Mortar and pestle making is part of wood carving that serves as an
47 important economic activity, that provides full and part time employment for both local and
48 urban dwellers in Nigeria (Aiyeloja, 2007; Kozak, 2007). And also, it helps in locking-up of
49 carbon thereby mitigating climate change. Some of the varieties of tree species used for making
50 wooden mortar and pestle are *Nauclea diderrichii*, *Milicia excelsa*, *Terminalia ivorensis*
51 *Vitellaria paradoxa*, *Azalia africana*, *Pterocarpus soyauxii* and *Irvingia spp* (Ndah 2013). In
52 most African countries, mortar and pestle have been considered as a major wooden cookware
53 both in rural and urban communities; for instance in Cameroon, it is used in the pounding of
54 millets and maize, dried cassava to cassava flour, *Gnetum africanum*, *Colocasia sp* “Achu” and
55 pounding cassava “water fufu” (Njoh *et al.*, 2014); in Ghana carbohydrate-rich foods such as
56 maize, cassava, yams, cocoyam and plantains are processed for considerable duration via
57 repeated kneading and/or pounding with Mortar and Pestle (Mensah *et al.*, 2012) while in
58 Nigeria it is used to prepare rich cultural food such as pounded yam. Despite the invention of

59 modern machine meant to replace mortar and pestle a traditional kitchen utensil, most consumers
60 of pounded yam still prefer the one prepared from wooden mortar and pestle. (Adeyeye and
61 Oluwatola, 2014). This shows that wood carving is a potential business to local artisans in
62 Nigeria. However, the business is facing threat due to scarcity of wood for production, modern
63 technology or the use of machine to pound, lack of financial support from both the government
64 and citizen and stunted development due to neglect by policy makers (Bunza *et al*, 2018). Thus,
65 efforts must be made to keep these people in business for their socio economic sustenance and
66 stability. This study therefore evaluates marketing of mortar and pestle in the study area.
67 Specifically, it described the socio demography of mortar and pestle marketers, identified the
68 wood species used in mortar and pestle production, estimated the cost and return in mortar and
69 pestle marketing and; determined the marketers' preference for mortar and pestle in terms of
70 species, size and price.

71 **METHODOLOGY**

72 **Study Area-**The study was conducted in selected markets in Ibadan, Oyo State, Nigeria located
73 in southwestern Nigeria and lies on longitude 7.3775° N and latitude 3.9470° E. There are eleven
74 local governments in Ibadan metropolitan area consisting of five urban local governments in the
75 city and six semi urban local governments in the less-city. The urban local government
76 comprises of Ibadan North, Ibadan North East, Ibadan North West, Ibadan South West, Ibadan
77 South East. The Ibadan semi urban comprises of Akinyele, Egbeda, Ido, Lagelu , Ona Ara, and
78 Oluyole. The city's total area is 1,190 sq mi (3,080 km²).

79 **DATA COLLECTION**

80 **Sampling and Data Collection Procedure-** Data used for this study were mainly primary and
81 were obtained from mortar and pestle marketers in the study area. Purposive sampling technique
82 was used to select the respondents from five Local Government Areas (LGAs) in Ibadan

83 metropolis based on the presence of mortar and pestle marketers. Snowballing technique was
84 used to select a total of thirty-one (31) marketers across five major markets in the study area.
85 These are Bodija, Shasha, Oja-Oba, Oje and Orita-Merin markets. Selection of 31 respondents
86 which seems relatively small was due to the population involved in the business in the study
87 area. Data were collected with the use of questionnaire and interview schedule. Information were
88 collected on socio-demographic, wood species used in mortar and pestle, cost and return in
89 mortal and pestle marketing as well as marketers' preference for mortar and pestle.

90 **DATA ANALYSIS**

91 **Analytical Techniques-** The following analytical methods were used:

- 92 a. Descriptive statistics such as frequency count and percentages
- 93 b. Marketing margin analysis: This involves the calculation of costs and returns to determine
94 the profitability of mortar and pestle marketing. The formula is specified as follows:

$$95 \quad GI = TR - TVC$$

96 Where: GI = Gross income; TR = Total Revenue; and TVC = Total Variable Cost

97 Fixed cost is negligible, hence the study used marketing margin analysis instead of net income
98 that require fixed cost estimate.

99 **RESULTS AND DISCUSSIONS**

100 **Socio economic and Demographic Characteristics of the Respondents-** The results in Table 1
101 showed the demographic characteristics of the respondents. It was revealed that most of the
102 respondents 90.3% were male while 9.7% were female. This shows that males are more involved
103 in the business, this may be due to the fact that it is energy-demanding task requiring physical
104 strength. This supports the assertion of Adedokun, (2018) that wood carving and its sales require
105 much energy and it is associated with physical stress which most women cannot cope with. The
106 age of the respondents showed that 64.5% were between the ages of 31-40years while 3.2% were
107 50years and above implying that most of the respondents were in their active age. It is a good

108 indication for entrepreneurship development in wood carving and marketing as majority of the
 109 people involved are youths. It was further noted that majority of the respondents 87% were
 110 married. The implication of marital status in small scale business is associated with availability
 111 of family labour. Larinde and Aiyeloja (2015) in their study on contribution of mortar and pestle
 112 production to rural livelihood reported that mortar and pestle production and marketing provides
 113 livelihood benefits that can secure a living for households. Majority of the respondents were
 114 literate as only 3.2% had no formal education. Educational level is very important to small scale
 115 livelihood business because literates will be willing to diversify the income sources to cope with
 116 socio economic needs of household members.

117 **TABLE 1: Socio Demographic Characteristics of the Respondents**

| Variables | Frequency | Percentage |
|--------------------------------------|------------------|-------------------|
| Gender | | |
| Male | 28 | 90.3 |
| Female | 3 | 9.7 |
| Age | | |
| 21-30 | 2 | 6.5 |
| 31-40 | 20 | 64.5 |
| 41-50 | 8 | 25.8 |
| >50 | 1 | 3.2 |
| Marital status | | |
| Single | 2 | 6.5 |
| Married | 27 | 87.0 |
| Divorced | 2 | 6.5 |
| Educational level | | |
| No formal education | 1 | 3.2 |
| Primary education | 27 | 87.1 |
| Secondary education | 3 | 9.7 |
| Mode of business operations | | |
| Mortar and pestle selling only | 28 | 90.3 |
| Mortar/pestle selling and farming | 2 | 6.5 |
| Mortal/pestle production and selling | 1 | 3.2 |
| Total | 37 | 100 |

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119 **Species used in Production of Mortar and Pestle in the study area**

120 The results listed in Table 2 show that the tree species used in the production of mortar and
 121 pestle in the study area. It was revealed that *Vitellaria paradoxa* was ranked first among the tree
 122 species used in mortar production. This was followed by *Milicia excels* which was ranked second
 123 while *Terminalia ivorensis* and *Daniella ollivera* were ranked third and fourth among the species
 124 used in mortar production. *Irvingia gabonensis* was less important among the tree species used
 125 in mortar production as it was ranked last. The use of shea tree is because it is a utility timber
 126 that is hard, strong, heavy, durable, resilient and also termite resistant. (Orwa *et al.* 2009).The
 127 Wood used in the production of mortar are usually hard wood species that requires extremely
 128 hard and durable capability of absorbing the applied force without developing cracks due to the
 129 force of impact of the pestle (Mensah *et al.* 2012). It also must have low sensitivity to moisture
 130 be fungi and insect resistance. Larinde and Aiyeloja, (2015) reported that the value chains of
 131 mortar and pestle are characterized by a limited number of stages between production, trade, and
 132 end use.

133

134

135 **Table 2: Tree Species used in Production of Mortar and Pestle in the study area**

| S/N | Species | Family | Trade name | Frequency | Percentage | Rank |
|-----|-----------------------------|--------------|-------------|-----------|------------|------|
| 1 | <i>Vitellaria paradoxa</i> | Sapotaceae | Shea butter | 31 | 100.00 | 1 |
| 2 | <i>Milicia excelsa</i> | Moraceae | Iroko | 25 | 80.65 | 2 |
| 3 | <i>Irvingia gabonensis</i> | Irvingiaceae | Bush mango | 7 | 22.58 | 6 |
| 4 | <i>Pterocarpus soyauxii</i> | Fabaceae | Camwood | 10 | 32.26 | 5 |
| 5 | <i>Terminalia ivorensis</i> | Combretaceae | Afara | 21 | 67.74 | 3 |
| 6 | <i>Daniella ollivera</i> | Caepinaceae | Iya | 11 | 35.48 | 4 |

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138 **Cost and returns in mortar and pestle marketing-** The average gross income as shown in
 139 Table 3 revealed that monthly income from the sales of mortar and pestle is ₦19,000 showing
 140 that the business is profitable. The estimated profit obtained in this study is above the current
 141 minimum wage. Essentially, it is important to develop this local enterprise to enhance household
 142 economy. The implication of this also means that wood curving business is of one the potential
 143 livelihood options (Babalola, 2009). The income from the marketing is of great importance and
 144 support for those engaged in the business. Many forest based businesses provide substantial
 145 employment opportunity and supplementary income (FAO, 2009). They also provide sources of
 146 livelihood to millions of people both in the rural and urban areas particularly in developing
 147 countries (Mutinda, 2014; Adeoye and Bhadmus, 2015).

148
 149 **TABLE 3: Costs and returns in mortar and pestle marketing**

| Items | Value (₦) |
|-----------------------|-----------|
| Gross Revenue | 105,000 |
| Average Variable Cost | 86,000 |
| Gross Income | 19,000 |

150
 151 **Prices of mortar and pestle by the species and sizes-**

152 Table 4 shows that average prices of Mortar and Pestle produced from *Vitellaria paradoxa* were
 153 ₦5000-₦6500, ₦2500-4500 and 1500-2500 for big, medium and small sizes respectively. The
 154 price obtained for *Milicia excelsa* were ₦4000-5500, ₦2000-4000, ₦1500-2500 for big, medium
 155 and small sizes respectively. The price of big, medium and small of the mortar and pestle
 156 produced from *Pterocarpus soyauxii* ₦3100-4500, ₦2200-3000, and ₦1500-2000 respectively.
 157 This result implied that mortar and pestle made from *Vitellaria paradoxa* is the most expensive
 158 which could be due to durability, numerous socio economic and ecological values of the tree
 159 species (Ismaila and Abibou, 2002). The mortar and pestle made from *Pterocarpus soyauxii* was
 160 the cheapest as stated by the traders.

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TABLE 4: Prices of Mortar and pestle based on species and sizes

| Species | Sizes | Prices(N) |
|-----------------------------|------------------|------------------|
| <i>Vitellaria paradoxa</i> | Big (>25cm) | 5000- 6500 |
| | Medium (18-25cm) | 2500-4500 |
| | Small (<18cm) | 1500-2500 |
| <i>Milicia excels</i> | Big | 4000-5500 |
| | Medium | 2000-4000 |
| | Small | 1500-2500 |
| <i>Irvingia gabonensis</i> | Big | 3500-4000 |
| | Medium | 2100-3500 |
| | Small | 1200-2000 |
| <i>Pterocarpus soyauxii</i> | Big | 3000-3500 |
| | Medium | 2000-3000 |
| | Small | 1200-1800 |
| <i>Terminalia ivorensis</i> | Big | 4500-6000 |
| | Medium | 2500-4000 |
| | Small | 1800-2500 |
| <i>Daniella oliveri</i> | Big | 3100-4500 |
| | Medium | 2200-3000 |
| | Small | 1500-2000 |

165 **Note:** Big (>25cm); Medium (18-25cm); Small (<18cm)

166

167 **Respondents' preference for mortar and pestle in terms of species, size and price-** The
168 results listed in Table 5 showed that the species of mortar and species is the major factor
169 determining their preference as majority (90.32%) stated that the first thing they consider is the
170 species. About half (48.39%) of the respondents consider size of the mortar. Those that prefer the
171 species and size constitute 33.61% while those that prefer mortar and pestle based on species and
172 price constitute 17.72%. The results implies that species type is the major factor that determine
173 the demand for mortar and pestle among the traders. However, Mensah *et al.*, (2012) Suppliers',

174 manufacturers' and retailers' preferences for specific wood species for most wooden cookware
175 differed from that of consumers (end-users).

176
177 **TABLE 5: Distribution of Respondents' preference for mortar and pestle**
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| Variable | Frequency | Percentage |
|-------------------|-----------|------------|
| Species | 28 | 90.32 |
| Size | 15 | 48.39 |
| Price | 12 | 33.61 |
| Species and size | 17 | 17.72 |
| Species and price | 12 | 33.61 |
| Size and price | 15 | 48.39 |

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180

181 **CONCLUSIONS AND RECOMMENDATIONS**

182 This study reveals that men are actively involved in the selling and that the marketing of mortar
183 and pestle is a profitable business that provides livelihood benefits that secure living. It was also
184 revealed that the wood species used in the making of mortar and pestle are of great value even
185 though they can be made from tree stumps and logging waste after harvesting of timber from
186 natural forests, farms and the surrounding. Hence it is important not to underestimate the role
187 that they play in easing poverty. It is therefore recommended that establishment of tree
188 plantations and sustainable forest management should be encouraged to ensure continuous
189 availability of wood species for mortar and pestle business enterprise.

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