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## Farmers' Awareness and Knowledge of *Moringa oleifera* in Southwestern Nigeria: A Perceptual Analysis

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**Abstract:** This study investigated the crop farmers' (who are also rearing sheep and goat) perception of *Moringa oleifera* in Osun, Ekiti and Oyo states of southwestern Nigeria. Specifically, it identified the farmers' socio-economic attributes; their awareness, knowledge and willingness to plant *Moringa oleifera* and also established the relationship between their perception of the plant and some of their selected socio-economic characteristics. Pre-tested and validated structured interview schedule was designed and used to elicit information from one hundred and thirty-nine farmers that were identified across the region using snow-ball technique, aside the presentation of the plant (*Moringa oleifera*) to individual farmers for identification. Also, unstructured key informants' interviews were conducted to probe into some of the issues that were not satisfactorily buttressed during the administration of structured interview. Simple descriptive statistical techniques such as frequency counts, percentages, mean and bar chart were used to summarize the data collected, while the Pearson correlation and Chi square analyses were, respectively, used to establish the relationship and association between the respondents' perception of *Moringa oleifera* and some of their selected socio-economic characteristics. Majority of the farmers in this region were male (59.71%), Christians (81.29%) and educated (Over 60.00%) with 51 years mean age and N177, 639:00 mean income per annum. The study further revealed that many (61.87%) of the farmers was ignorance of the plant, that is, they could neither identify the plant physically nor by name. However, most (92.80%) of them indicated their willingness to cultivate the plant if introduced to them. Farmers' gender and years of knowledge of *Moringa oleifera* were found to significantly influence their level of perception of the plant. Popularization of the plant was, therefore, suggested using on-farm adaptive research.

**Key words:** Farmers, awareness, knowledge, perception, *Moringa oleifera*

### INTRODUCTION

Surveys in South Western Nigeria indicated that over 70% of rural households in some villages keep goats or sheep (ILCA, 1980, Odeyinka, 1996; Odeyinka and Torimiro, 2005). The economic importance of goats, in this zone, stems from their contribution to human diets. The major nutritional limitation often encountered in feeding ruminants (especially, sheep and goats) in Nigeria and elsewhere in the tropics is the poor quality and quantity of the feeds available leading to deficiencies of both energy and protein (Mannetje't, 1984; Onifade and Agishi, 1990; Odeyinka and Ademosun, 1993). The situation is exacerbated during the dry season where natural pastures have matured, with low contents of protein and available energy. Therefore, protein supplementation is often important to improve livestock

performance and this clearly needs to be done according to requirements of the animal and the balance of other nutrients available. Groundnut cake or Cottonseed cake has been widely and successfully utilized as a protein supplement for ruminants (McDonald *et al.*, 1997). However, the prices of the oil cakes have been rising continuously in recent years, while availability is often erratic (Akinfala *et al.*, 2001).

Recently, there has been an increased interest in the utilization of *Moringa oleifera*, commonly known as horseradish tree or drumstick tree, as a protein source for livestock (Makkar and Becker, 1997; Sarwatt *et al.*, 2002). It is a multipurpose tree of significant economic importance with industrial and medicinal uses (Morton, 1991). The leaves contain high concentrations of crude protein, essential vitamins, calcium, iron and proteins (Makkar and Becker, 1997; Gidamis *et al.*, 2003).

According to Duke (1998), *Moringa oleifera* is in the group of high-yielding nutritious browse plants with every part having food value. Its seed is said to be eaten in Malaya; thickened root is used as substitute for horseradish; foliage is eaten as greens, in salads, in vegetable curries, as pickles and for seasoning. Leaves pounded up and used for scrubbing utensils and for cleaning walls. Seeds yield 38-40% of non-yielding oil, known as Ben Oil, used in arts and for lubricating watches and other delicate machinery. *Moringa oleifera's* oil is clear, sweet and odorless, never becoming rancid; consequently, it is edible and useful in the manufacture of perfumes and hairdressings. Its wood also yields blue dye, its leaves and young branches are relished by livestock. It is commonly planted in Africa as a living fence (Hausa) tree and its bark could serve for tanning. Despite all these attributes of *Moringa oleifera*, however, there is a dearth of information of the plant in Nigeria.

Against this background, this study therefore, sought to document the crop farmers' (who are also rearing sheep and goat) perception of *Moringa oleifera* in southwestern Nigeria. Specifically, it identifies the farmers' socio-economic attributes; their awareness, knowledge and willingness to plant *Moringa oleifera* and also establishes the relationship between their perception of the plant and some of their selected socio-economic characteristics.

## MATERIALS AND METHODS

This study was conducted in three states (Osun, Ekiti and Oyo) that were randomly selected out of the seven states in Southwest Nigeria. These states are predominantly agrarian with many farm-households highly involved in animal (sheep and goat) rearing. The major agricultural produce in the southwestern Nigeria include: *Oryza sativa* (Rice), *Zea mays* (Maize), *Vigna* sp. (Cowpea), *Manihot* sp. (Cassava), *Dioscorea* sp. (Yam), *Musa* sp. (Plantain/Banana), *Citrus* sp. (Orange), fruity and leafy vegetables, *Theobroma* sp. (Cocoa), *Saccharium* sp. (Sugar cane), *Ananas* sp. (Pineapple), *Carica* sp. (Pawpaw), *Kola* sp. (Kolanut), *Elaeis* sp. (Oil palm) (Odeyinka and Ajayi, 2004).

Snow-ball technique was used to identify crop farmers who were also rearing either sheep or goat in each of the three selected states. A total of one hundred and thirty-nine farmers in that category were interviewed across the States. The plant (*Moringa oleifera*) was shown to the farmers individually for identification.

Pre-tested and validated structured interview schedule was designed and used to elicit information from the respondents under the following section: Socio-economic characteristics of the farmers; farmers' awareness, knowledge and willingness to plant *Moringa oleifera*; their perception of *Moringa oleifera*. Also,

unstructured key informants' interviews were conducted to probe into some of the issues that were not satisfactorily buttressed during the administration of structured interview. Simple descriptive statistical techniques such as frequency counts, percentages, mean, pie chart and bar chart were used to summarize the data collected, while the Pearson correlation and Chi square analysis were respectively used to establish the relationship and association between the respondents' perception of *Moringa oleifera* and some of their selected socio-economic characteristics.

## RESULTS AND DISCUSSION

**Socio-economic attributes of the farmers:** Table 1 revealed that the mean age of the farmers interviewed was 51 years old putting majority (over 67.00%) between 46

Table 1: Distribution of farmers according to their socio-economic characteristics

Socio-economic characteristics	Frequency	Percentage	Mean
<b>Age</b>			
<35	05	3.60	
35-45	32	23.02	
46-55	48	34.53	
56-65	47	33.81	
> 65	05	3.6	
NR	02	1.44	
Total	139	100.00	51
<b>Years of education</b>			
Not educated	62	44.6	
6-Jan	33	23.74	
12-Jul	33	23.74	
>12	11	7.92	
Total	139	100.00	4
<b>Marital status</b>			
Single	01	0.72	
Married	126	90.65	
Widowed	03	2.20	
NR	09	6.43	
Total	139	100.00	
<b>Household size</b>			
<4	09	6.47	
6-Apr	67	48.20	
9-Jul	44	31.65	
>9	11	7.91	
NR	08	5.77	
Total	139	100.00	6
<b>Major occupation*</b>			
Animal rearing	50	35.97	
Crop production	107	76.98	
Non-farming	32	23.02	
<b>Income per annum in Naira**</b>			
<20,000	03	2.16	
20,000-60,000	15	10.79	
61,000-80,000	08	5.76	
81,000-120,000	22	15.83	
121,000-160,000	28	20.14	
161,000-200,000	27	19.42	
201,000-240,000	17	12.23	
241,000-280,000	09	6.50	
>280,000	07	5.04	
No response	03	2.16	
Total	139	100.00	N177,639

Source: Field survey, 2006, \* Multiple responses; NR = No Response, \*\* N140:00 = 1 US\$

and 65 years of age, an indication that young people were not much involved in farming (Torimiro and Oluborode, 2006). This is not in consonant with the previous study conducted in Ogun State in the same region where about 70.00% of the people involved in crop farming were found to be within the age range of 31 and 45 years, meaning that most of the farmers were still in their productive age (Igben, 1988; Lawal-Adebowale and Oyegbami, 2004). This might further implies that older farmers are more involved in keeping sheep and goat along with crop production in the study area than the young farmers. Also, 59.71% of the farmers were of male gender while 40.29% were female gender. Although, it has been estimated that 50.00% of the food in Nigeria is produced by women (Olayiwola, 1984; Mijindadi, 1993), men were still found to be dominating crop production combined with sheep and goat rearing in the study area. More than 44.00% of the farmers were illiterate, they have never stepped into school and they could neither read nor write.

For those who attended schools, the mean year of their education was 4 years. About 23.74% claimed to have spent between 1 and 6 years in school, while the same percentage claimed to have spent between 7 and 12 years in school, an indication that many (over 60.00%) were educated. This is not in agreement with the notion of Lawal-Adebowale (2002), who claimed that farmers do not value education much because they could not see any link between high level of education and farming. This might, however, be due to the influence of Christianity predominating in the area as majority (81.29%) of the respondents was Christians and 17.99% were Muslims. High number of educated farmers in a predominant Christian's community was not unexpected, as studies (Sacerdote and Glaeser, 2001) have established significant relationship between literacy level and the predominant religion in a community.

Over 90.00% of the respondents were married with the mean household size of 6. Large household size was generally noticeable among the farmers in the region, Lawal-Adebowale and Oyegbami (2004) attributed it to the need of farmers to use the household-members as farm labour, thereby saving or reducing the cost of production resulting from hire of farm labour. Concerning the major occupation of the respondents, 76.98% indicated crop production, 35.97% indicated rearing of animals and few (23.02%) others engaged in non-farming business as their major occupation. The mean income of the respondents from their major occupation was N177, 639:00 (US\$1, 268.85) per annum, which was far above the poverty line of US\$730:00 per annum using US\$2 a day poverty line (ILO, 2001).

**Farmers' awareness and knowledge of and willingness to cultivate *Moringa oleifera*:** It was revealed in the study (Table 2) that 51.08% of the farmers were not aware of *Moringa oleifera*, while 48.92% indicated their awareness of the plant. Concerning the names by which *Moringa oleifera* is known to a few who indicated their awareness of the plant, it was revealed that different ethnic groups in the states identified the plant by different names.

For instance, those who identified it by English names called it either Horseradish tree or Drumstick tree; the Yoruba called it *Ewe ile*, *Ewe igbale* or *Otili igbo*; the Hausa called it either *Zogalla*, *Zogalla gnadi* and *Bagaruwar maka*, while the Fulani community in the state called it *Gawara*. These names have been documented in different literatures (Fuglie, 2001). However, many (61.87%) of the farmers claimed ignorance of the plant, that is, they could neither identify the plant physically nor by name. It was further revealed in the study that people, about 48.00%, who had knowledge of the plant, had it within the average of 5 years, mostly, through extension agents (30.94%), their friends (14.38%) and their parents (12.95%).

Majority (76.98%) of the farmers indicated that the plant was not available in their locality while few others (23.02%) indicated that the plant was available in their locality. Only 7.19% of the entire farmers indicated that they have ever planted *Moringa oleifera*. The purposes which include the following: As cattle fodder to improve milk yield (4.32%), for extraction of seed oil (2.16%), green manure (0.72%), dye (1.44%), juice extracted from its leaves to make a foliar (2.87%) and ornamental plant (4.32%). However, most (92.80%) of the farmers indicated their willingness to cultivate *Moringa oleifera* if introduced to them, while about 5.04% were indifferent to the possibility of cultivating the plant. Only very few (2.16%) indicated their non-willingness to cultivate the plant with the reasons ranging from insufficient land (5.76%), lack of finance and risk that may involve (1.44%).

On whether they have knowledge of someone planting or utilizing *Moringa oleifera*, a large percentage (74.11%) had no knowledge of anyone, while a few percentage (25.89%), who knew someone either planting or utilizing the it, indicated that the plant was either planted or utilized for the following purposes: as animal forage for feeding livestock in cut and carry system (16.55%), for traditional medicine (15.83%), as cattle fodder to increase milk yield (2.88%), for extraction of seed oil (2.16%), as green manure (0.72%), as domestic cleaning agent and for fencing (2.16%), juice extracted from its leaves to make foliar (0.72%) and for ornamental use

Table 2: Distribution of respondents according to their awareness, knowledge and willingness to plant *Moringa oleifera*

Awareness of <i>Moringa oleifera</i> crop		
Aware	68	48.92
Not Aware	71	51.08
Total	139	100.00
Years of Knowledge of <i>Moringa oleifera</i>		
No knowledge	71	51.08
<5 years	23	16.55
5-10	25	17.99
11-15	06	4.32
16-20	03	2.16
>20	11	7.91
Total	139	100.00
First source(s) of information about <i>Moringa oleifera</i> *		
Parents	18	12.95
Fellow farmers	13	9.35
Friends	20	14.38
Extension agents	43	30.94
Mass media	00	0.00
Market	12	8.63
Publication	02	1.44
NR	71	51.08
Knowledge of someone planting or utilizing <i>Moringa oleifera</i>		
Yes	36	25.89
No	103	74.11
Total	139	100.00
Their purpose of planting <i>Moringa oleifera</i> *		
As animal forage (feeding of livestock in cut and carry system)	23	16.55
As cattle fodder to increase milk yield	04	2.88
For extraction of seed oil	03	2.16
Green manure/fertilizer	01	0.72
Domestic cleaning agent	03	2.16
Fencing	03	2.16
Juice extracted from the leaves to make foliar	01	0.72
For traditional medicines	22	15.83
For ornamental use	05	3.60

Source: Field survey, 2006, \* Multiple responses, NR = No Response

(3.60%). Concerning their knowledge of where *Moringa oleifera* is grown, 51.08% claimed that they did not know, while 48.20% indicated that the plant exists in the bush, 12.23, 8.63%, respectively, claimed that the plant is either grown at home or on the farm.

**Farmers' perception of *Moringa oleifera*:** In order to determine the way *Moringa oleifera* was perceived by the farmers, 6 negative and 4 positive validated perceptual statements against a 5-point likert scale ranging from strongly agree (5), agree (4), undecided (3), disagree (2) and strongly disagree for positive and vice-versa for negative was administered to the farmers as shown in Table 3. More so, level of perception of *Moringa oleifera* was further determined using the mean perception score (40) plus or minus standard deviation (5) to classify the perception of the farmers into favourable, indifferent and unfavourable perception (Torimiro and Dionco-Adetayo, 2004).

It was then revealed that many (56.12%) farmers perceived *Moringa oleifera* indifferently. This implies that this category of farmers still needs to be informed about the usefulness of the crop in order to stimulate their

decisive perception on the plant. A good number (38.13%) did not have a favourable perception of the plant, while very few others (5.76%) perceived the plant unfavourably (Table 4). However, 49.64% of the farmers strongly agree that farmers in their community will adopt the cultivation of the plant if they know its importance.

**Relationship between the farmers' perception of *Moringa oleifera* and some selected socio-economic characteristics:** In order to determine the relationship between the farmers' level of perception of *Moringa oleifera* and some selected socio-economic characteristics, Pearson correlation was used (Table 5). The study revealed a significant and positive relationship between farmers' perception level and their years of knowledge of *Moringa oleifera* ( $r = 0.451^{**}$ ) at 0.01 probability level with about 20.3% contribution. This implies that as the farmers are conversant with the values and importance of the plant, the more they will favourably perceive the plant.

Farmers' years of education ( $r = 0.045$ ) and household size ( $r = 0.107$ ) were also found to have positive but non-significant relationships with their level of perception of

Table 3: Distribution of respondents according to their perception of *Moringa oleifera*

S/N	Perceptual statements on <i>moringa oleifera</i>	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
	Positive scale	5	4	3	2	1
	Negative scale	1	2	3	4	5
1.-	There is nothing special about the crop	03(2.16)	05(3.60)	72(51.30)	32(23.02)	27(19.92)
2.-	The crop is very dangerous	00(0.00)	00(0.00)	67(48.20)	42(30.24)	29(20.86)
3.+	The crop is of great economic importance	02(1.44)	02(1.44)	77(55.34)	48(34.53)	08(5.76)
4.-	We can not plant the crop in our community	00(0.00)	02(1.44)	24(17.30)	92(66.19)	21(15.10)
5.-	The crop will be too expensive to propagate in our community	00(0.00)	01(0.72)	53(38.13)	60(43.17)	22(15.83)
6.+	The crop is of great cultural value in our community	01(0.72)	05(3.6)	105(75.53)	23(16.55)	02(1.44)
7.+	The crop has medicinal value	00(0.00)	05(3.6)	81(58.27)	40(28.78)	10(7.19)
8.-	The crop is of no value at all	01(0.72)	02(1.44)	41(29.50)	60(43.16)	31(22.30)
9.-	Farmers in this community will never plant the crop	02(1.44)	01(0.72)	31(22.30)	56(40.29)	49(35.25)
10+.	Farmers in our community will adopt the planting of the crop if they know its importance	03(2.16)	00(0.00)	05(3.60)	62(44.6)	69(49.64)

Source: Field survey, 2006; Data in parentheses are percentages

Table 4: Distribution of respondents according to their perceptual level of *Moringa oleifera*

Level of perception	Frequency	Percentage
<35 (Unfavourable perception)	53	38.13
35-45 (Indifferent perception)	78	56.12
>45 (Favourable perception)	08	5.76
Total	139	100.00

Mean = 40; Standard deviation = 5

Source: Generated from the field survey, 2006

Table 5: Pearson correlation showing the relationship between the respondents' perception of *Moringa oleifera* and some of their selected socio-economic characteristics

Variables	r	r <sup>2</sup>
Age	-0.138	0.020
Years of education	0.045	0.002
Household size	0.107	0.015
Income	-0.130	0.017
Years of knowledge of <i>Moringa oleifera</i>	0.451**	0.203

Source: Generated from the field survey, 2006, \*\*Significant at 0.01 level, r = correlation co-efficient, r<sup>2</sup> = co-efficient of determination

Table 6: Chi-square analysis showing relationship between the farmers' level of perception of *Moringa oleifera* and some of their selected socio-economic characteristics

Variables	Chi-square calculated ( $\chi^2_c$ )	Chi-square tabulated ( $\chi^2_t$ )	Degree of freedom (df)	Contingency co-efficient
Gender	20.2**	9.21	2	0.40
Religion	1.01	13.27	4	-
Awareness	9.60**	9.21	2	0.30

Source: Generated from the field survey, 2006, \*\*Significant at 0.05 level

*Moringa oleifera* at 0.01 probability level, while the age (r = -0.138) and income (r = -0.130) were found to have negative and non-significant relationships with the level of perception at 0.01 probability level. This means that the higher the farmers' educational attainment and household size, the more favourably they will perceive *Moringa oleifera*; whereas age and income may inversely influence the level of perception.

Chi-square analysis was used to test the association between the level of perception of *Moringa oleifera* and some selected variables viz., gender, religion and awareness of *Moringa oleifera* (Table 6). It was then revealed that the farmers' gender and their

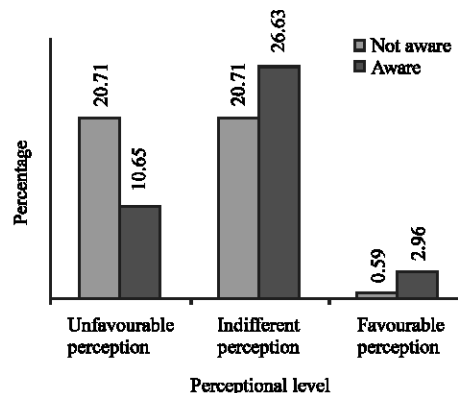


Fig. 1: Distribution of farmers according to their awareness and level of perception of *Moringa oleifera*

awareness of level of perception of the plant (Fig. 1). Contingency co-*Moringa oleifera* were significantly associated with the efficient of the two variables further revealed 40 and 30 percents strengths of association, respectively.

## CONCLUSIONS AND RECOMMENDATION

*Moringa Oleifera* still remains unpopular in southwestern Nigeria despite its acclaimed economic values and importance. Many farmers claimed not to be aware of the plant but a lot of them are willing to plant it if introduced to them. There is, therefore, the need to popularize the plant among the Nigerian farmers, most especially, in the Southwestern region of the country using on-farm adaptive research. More so, further work is recommended on *Moringa oleifera* as feedstuff for small ruminants in the region.

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