



Characterization and Challenges of Melon Farmers in Enugu Ezike Agricultural Zone of Enugu State, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The study described the socio-economic characteristics and challenges of melon farmers in Enugu-Ezike Agricultural zone of Enugu State, Nigeria. Three blocks, nine circles and ninety melon farmers constituted the sample for the study. Data were collected through an interview schedule, while percentage, mean score and factor analysis were used in analyzing the data. Findings revealed that on average, the respondents were about 53 years, had household size of 9 persons and 11.4 years of farming experience. They spent ₦4,394.6 on melon production and realized ₦7,455.4 from it annually on average. Majority of the respondents cultivated local variety (77.9%) of melon in a farm located far away from their residence (91.1%) in a mixed cropping (81.8%) arrangement. They grew melon during rainy season (83.3%) using organic manure (52.2%). Melon produced were sold immediately after harvest (68.9%) to consumers (75.6%) in their homes (68.9%). Physical, institutional, stress/economic related problems were extracted based on factor loadings as challenges of melon farmers in the area. Thus, there is need for government to make appropriate

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agricultural policies that will guarantee farmers suitable land, inputs, infrastructure and advisory services so as to unleash the potentials of these farmers and channel them towards sustainable agricultural and economic growth and development.

Keywords: Characterization; challenges; melon; farmers Enugu-Ezike; agricultural zone.

1. BACKGROUND INFORMATION

Agriculture remains the main stay of the Nigerian economy in spite of the dominant role of petroleum sector as the major foreign exchange earner [1]. Agriculture serves as the main source of food, employs about 70-80 percent of the population, and contributes about 40 percent of Nigeria Gross Domestic Product (GDP) [2]. One of the most important sector of agriculture is the plant/crop sector, which comprises of several plant/crop species like yam, cocoyam, cassava, cowpea, cashew, mango, melon among others.

Melon, scientifically called *Citrulus lanatus* and locally termed "egusi" belongs to the family *cucurbitaceae* which consist of water melon, cucumber and pumpkin [3]. The oil obtained from the seeds and used as a common component of daily meals in West Africa, is predominantly composed of unsaturated fatty acids (percentage composition by weight of oil: lauric, 0.21%; myristic, 0.78%; palmitic, 13.45%; stearic 13.71%; oleic, 14.50%; linoleic, 56.94% and linolenic, 0.46%) [4]. The seed is widely used to thicken soups and stews. Hence, it is a very important and popular seed used to make various kinds of soup throughout African countries like Nigeria especially in the South Eastern Nigeria. Melon dry seeds are often eaten as snack [5,6,7].

The reason why melon seed soup or egusi soup is very good and important is that it is proven by scientists as an antioxidant [8]. Also, it was noted that melon seed can boost the immune system while mere using of egusi oil as one's table cooking oil assures a good supply of polyunsaturated fatty acids that has protective effects against coronary heart diseases (CHD) and also improve insulin sensitivity [9].

Melon production may serve as asset to farmers by serving multiple purposes. In agronomic terms. It poses a significant importance such as easy to plant, early maturity and high yield etc. Melon also has high tendency to out compete weeds easily [10]. It was also noted that the crop responds more to nutrient application in soils with low nutrient level. The crop has a yielding

potential of 1005 kg/ha [11] and it's production is profitable [12]. Hence, in agro ecological zones, a greater portion of farmers' incomes is gotten from melon production [13].

Irrespective of these potentials of melon, production is still seasonal and at subsistence level in Nigeria and specifically in Enugu-Ezike Agricultural zone of Enugu State. Consequently, there are glut and scarcity of the product during rainy and dry seasons of the year respectively, which culminates to fluctuation in the price of the commodity. This irregularity does not afford the farmers opportunity to expand their enterprise because of uncertainty associated with profit. On the other hand, small scale production will continue to characterize farmers as being poor and most importantly aggravate food insecurity. There may be other problems (natural, agronomic, biological, marketing etc) associated with melon production which need to be identified and tackled in order to boost output and income and ultimately reap maximum benefit of the crop. These aforementioned facts served as bases for this work. Thus, the study characterized melon farmers; described agronomic practices they used in melon production; described their marketing activities and ascertained challenges they face in melon production.

2. METHODOLOGY

2.1 Population and Sample

The study was carried out in Enugu-Ezike Agricultural zone of Enugu State. All melon farmers in the zone constituted the population for the study. A multi-stage sampling technique was employed in selecting the respondents for the study. In the first stage, the three blocks (Igbo-Eze North, Udenu and Igbo-Eze South) that make up Enugu-Ezike Agricultural zone were selected. In the second stage, three circles were randomly selected from each of the three blocks (a block is made up of 8 circles), giving a total of 9 circles. The third stage involved purposive selection of ten melon farmers from each of the selected circles, giving a total of ninety respondents for the study.

2.2 Data Collection

Data for the study were collected from respondents through the use of structured interview schedules that were administered by the researcher to the respondents. It contained relevant questions based on the objectives of the study.

Socio-economic characteristics of the respondents dealt on age of the farmers, sex, marital status, educational level, household size and farming experience. Respondents were also requested to provide and indicate from the list provided the agronomic practices they employed in their melon farm. Cropping pattern, variety grown, weeding, fertilizer application, harvesting, etc. were some of the agronomic practices examined. Information on marketing operations of melon farmers were elicited by asking the respondents to indicate who, where and when they market their melon as well as their estimated expenditure and income from melon production per growing season (annually). In order to ascertain challenges of melon farmers, a modified Likert-type scale was used with response options and values assigned as follows: to a great extent = 3; to a little extent = 2; and to no extent = 1. The data generated were subjected to factor analysis.

2.3 Data Analysis

Data were presented in percentage while factor analysis (varimax rotation and Kaiser Normalization) [14] where a variable with a loading of 0.4 and above is considered as having a high loading and may be used in naming a factor) was used in data analysis.

3. RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of the Respondents

3.1.1 Age

Data in Table 1 show that 51.1% of the respondents were between 51-60 years. The mean age of the respondents was 52.6 years. This implies that the respondents were relatively young and may accept new technology that will aid to boost melon production. Which is not the case with aged farmers who are usually tradition bound, not amenable to changes and are neither likely to adopt new technology which will aid their

production nor have the ability to perform manual work [15].

Table 1. Distribution of the respondents according to their socio economic characteristics

Variables	Percentage (%)	Mean (M)
Age (Years)		
21 – 30	6.7	52.6
31 – 40	24.4	
41–50	26.7	
51–60	51.1	
> 60	5.6	
Sex		
Male	34.4	
Female	65.6	
Marital status		
Single	15.6	
Married	74.4	
Widowed	5.6	
Educational level		
No formal education	11.1	
Primary education attempted	33.3	
Primary education completed	23.3	
Secondary education attempted	10.0	
Secondary education completed	16.8	
Tertiary education	23.3	
Household size		
2 – 5	44	9
6 – 10	51.5	
> 10	4.5	
Farming experience in years		
1 – 10	44.4	11.4
11 – 20	37.8	
21 – 40	11.1	
31 – 40	4.4	
> 40	2.2	

Source: Field survey, 2013

3.1.2 Sex

Data in Table 1 also show that majority (65.6%) of the respondents were female while the remaining 34.4% were male. Thus, more women served as respondents for this study. Women make essential contributions to the agricultural and rural economies in all developing countries which includes producing agricultural crops, tending animals, processing and preparing food, working for wages in agricultural or other rural

enterprises, engaging in trade and marketing, caring for family members and maintaining their homes [16].

3.1.3 Marital status

Data in Table 1 indicate that majority (78.9%) of the respondents were married, 15.6% were single, and 5.6% were widowed. Since the greater percentage of them were married, there is possibility of employing family labour in melon production which reduces the cost of production.

3.1.4 Educational level

Result in Table 1 shows that greater proportion (33.3%) of the respondents attempted primary education. Hence, most of the respondents (88.8%) were literate which may result to increased output/productivity since according to [17] education increases level of production in agriculture.

3.1.5 Household size

Result in Table 1 reveal that greater proportion (51.1%) of the respondents had 6-10 persons in their household, 44.4% had 1-5 persons while 4.5% had more than 10 persons in their household. The average household size was 9 persons. This shows that respondents had large household size probably because most of them were married. The larger the household size, the higher the availability of family labour, which will enhance melon production and reduces cost [18].

Table 1 further reveals that greater proportion (44.4%) of the respondents had farming

experience of 1-10 years; 37.8% had experience of 11-20 years; 11.1% had experience of 21-30 years; 4.4% had experience of 31-40 years while the remaining 2.2% of the respondents had experience of more than 40 years. The average farming experience of the respondents was 11.4 years. Generally, the farmers had relatively short farming experience when compared to their age, probably because of lack of interest and constraints associated with agriculture.

3.2 Expenditure and Income from Melon Production

Data in Table 2 show that about 23% of the respondents spent ₦2,000 or less in production of melon in a season (2012); 18.9% spent between ₦2,001-₦3,000 while respondents that spent between ₦3,001-₦4,000 and more than ₦4,000 accounted for 31.9% and 12.2% respectively. The average annual expenditure of the respondents on melon production was ₦4,394.6.

Data in Table 2 also reveal that about 51% of the respondents earned ₦10,000 or less in a season from melon production while 22.1% got between ₦10,001-₦20,000 in a season. Respondents that earned between ₦20,001-₦30,000 from melon in a season accounted for 6.7% while respondents that earned more than ₦30,000 accounted for 2.2%. The mean annual income of the respondents from melon production was ₦7,455.4 Therefore, the net income (i.e ₦7,455.4-₦4,394.6) from melon was ₦2,701.8 per season. This finding may be said to be in accordance with [12] who noted that melon (egusi) production is profitable.

Table 2. Distribution of the respondents according to annual expenditure and income from melon production

Annual expenditure and income	Frequency	Percentage	Mean
Expenditure (₦)			
No response	13	14.4	
≤2000	21	23.3	
2,001-3000	17	18.9	₦4,394.6
3,001-4000	28	31.1	
>4000	11	12.2	
Annual income from melon (₦)			
No response	13	14.4	
≤ 10,000	49	54.4	
10,001 – 20,000	20	22.1	₦7,455.4
20,001 – 30,000	6	6.7	
>30,000	2	2.2	

Source: Field survey may, 2013

3.3 Agronomic Practices of Melon Farmers (Planting Operations)

3.3.1 Production site

Data in Table 3 indicate that majority (91.1%) of the respondents situated their melon farm away from their residence; 11.1% of the respondents cultivated in a garden; 6.7% cultivated in swampy area and 2.2% of the respondents had their farms located within the residence. From the data presented above, melon farms of most of the respondents were located far away from their farm. Therefore for farmers to visit or work in their farms, they need to travel from their homes to the production site and vice versa, which may put stress on these farmers and increases the cost of production. Also, the distance may expose the farm to theft and the farm may not be properly managed.

3.3.2 Variety of melon grown

Majority (77.9%) of the respondents cultivated indigenous variety of melon; 13.3% cultivated improved variety while the remaining 8.9% of the respondents cultivated both the indigenous and improved varieties of melon. Cultivation of indigenous or local variety by the respondents may lead to low output and this may discourage farmers from embarking or investing on melon production. In line with this, [19] noted the type of planting material (poor seeds, low resistant varieties, etc) as constraints to melon production.

3.3.3 Cropping/planting system

Entries in Table 3 show that majority (81.1%) of the respondents practiced mixed cropping while 18.9% of the respondents practiced sole cropping. Generally, mixed cropping helps to guard against crop failure. According to [12], melon is grown in mixture with other crops such as cassava, maize and yam while [20], opined that melon is grown in mixture with other crop as a result of scarcity of land.

3.3.4 Production season

Table 3 reveals that majority (83.3%) of the respondents grew melon in rainy season (main); 10% grew in dry season (off) while the remaining 6.7% of the respondents grew melon in both rainy and dry season. Finding shows that melon production is seasonal in the area which may lead to fluctuation in availability and price of the commodity, farmers engagement in other

occupations and production remaining at subsistent level.

Table 3. Distribution of the respondents based on agronomic practices

Planting operation	Percentage
*Production site	
Farm located far from residence	91.1
Within the residence	2.2
Swampy area	6.7
Garden	11.1
Variety of melon grown	
Indigenous	77.9
Improved	13.3
Both	8.9
Cropping/planting system	
Sole cropping	18.9
Mixed cropping	81.1
Production season	
Dry season	10
Rainy season	83.3
Both	6.7
Type of fertilizer used	
Organic	52.2
Inorganic	19.2
Both	13
None	15.6
*Method of weed control	
Chemical control	14.4
Hand tools	87.8
Hand picking	32.2
Control itself	1.1
Number of weeding done per growing period	
Zero	1.1
Once	34.4
Twice	61.1
Thrice	3.3
Method of harvesting	
Manual	100

Source: Field survey may, 2013.

*Multiple responses

3.3.5 Type of fertilizer used

Data in Table 3 show that 52.2% of the respondents applied organic fertilizer; 9.2% applied inorganic fertilizer; 13.3% applied both organic and inorganic manure on their melon farm while 15.3% did not apply fertilizer on their farm. This shows that greater proportion of the respondents practiced organic farming, which invariably promote good health [21,22]. Also,

organic manure is cheap since it is produced and may be readily available at home or near the farm at very little or no cost other than labor cost of transferring it to the farm.

3.3.6 Method and frequency of weed control

Majority (87.8%) of the respondents used hand tools in weeding their farm; 32.2% did weeding manually; 14.4% used chemical in weeding their farm while 1.1% of the respondents didn't weed their farm at all (Table 3). Since majority of the respondents used hand tools instead of chemical in weeding, there may be reduction in acid concentration on the production site. This will help to conserve the nutrient of the soil/land [23].

Also, greater percentage (51.1%) of the respondents weeded their melon farm twice in a season; 34.4% weeded once; 3.3% weeded thrice while 1.1% of the respondents didn't weed their melon farm. This finding is in agreement with [24], who asserted that weeding in melon is done twice in a season; at the early growth stage and the flower initiation period respectively.

3.3.7 Method of harvesting

Entries in Table 3 show that all (100%) of the respondents harvested their melon manually. This may be because the farmers produced at subsistent level which may not favour the use of machines or sophisticated implements.

3.4 Marketing Operations of Melon

3.4.1 Time of sale

Greater percentage (68.9%) of the respondents sold their produce immediately after harvest, 60.0% sold after processing; 31.2% store and sold their produce during scarcity; 17.8% of the respondents didn't sell their produce after production and 3.3% of the respondents sold their produce after removing the husk (Table 4). Need for cash and lack of processing and storage facilities may have made the respondents to market their melon immediately after harvest. This suggests that the availability of the produce during off-season is not guaranteed.

3.4.2 Target buyers and market

Entries in Table 4 show that majority (75.6%) of the respondents sold their melon to consumers; 40.0% sold to retailers; 22.2% sold to

wholesalers and 8.9% sold to market/melon union.

Table 4. Distribution of the respondents based on the marketing channel of melon`

Marketing channel	Percentage
*Time of sale	
No response	17.8
Immediately after harvesting	68.9
After processing	60.0
Store until scarcity	31.2
After dehulling	3.3
*Target buyers	
Wholesalers	22.2
Retailers	40.0
Consumers	75.6
Market/melon union	8.9
*Target market	
Market	14.4
Home	68.9
Farm	32.2

Source: Field survey may, 2013.

* Multiple responses

Data in Table 4 further reveal that (68.9%) of the respondents sold their produce at home; 32.2% sold at farm while 14.4% of the respondents sold their produce at the market. Marketing melon directly to consumers may make farmers to get optimal profit because consumers are more likely to buy the product at reasonable price, Also, marketing of melon at home may not involve different operations of storage, transportation, processing grading packaging and consequently financing of these activities [25]. This could be reasons for the profit the respondents made in the enterprise as shown in Table 2.

3.5 Perceived Challenges of Melon Famers

Table 5 indicates that physical (factor 1), institutional (factor 2), and stress/economical problems (factor 3) were extracted as challenges facing melon farmers in the area. Specific factors that loaded high under physical problem were high cost/unavailability of equipment for melon production (0.693), high cost/unavailability of farm labour (0.615), poor extension contact (0.457) and pest and disease infestation (0.580). Subsequently, Low soil fertility (0.747), lack of incentives to farmers (0.605), poor market (0.447), high cost/unavailability of agro-chemical (0.638) and high rate of interest on credit to be deployed to melon production (0.428) were factors that loaded high under institutional

Table 5. Factor analysis of perceived challenges of melon famers

Perceived challenges	Factor 1	Factor 2	Factor 3
	Physical problem	Institutional problem	Stress/economic problem
Scarcity of land	-.011	.133	.670*
Lack of finance	.142	-.048	.519*
Laborious nature of melon production	.155	-.125	.406*
Low soil fertility	.062	.747*	-.015
Lack of incentives	.192	.605*	-.135
Poor market	-.260	.447*	.125
Lack/insufficient organic manure	.274	.173	.218
Lack/high cost of improved variety	.314	-.255	.239
Lack/high cost of fertilizer	.085	.379	.032
High cost/unavailability of agro-chemicals	-.023	.638*	.010
High interest rate on credit for melon production	.323	.428*	-.033
High cost/unavailability of equipment (such as tractors, etc) for melon production	.693*	.062	.001
High cost/unavailability of labor	.615*	.278	.269
Poor extension contact	.457*	.212	-.115
Wastage of produce due to rotting	-.179	.021	-.088
Lack of collateral requirement to get loan	.063	.128	.586*
Weeding problem	.259	-.034	-.461*
Pest and disease infestation	.580*	-.077	.163
Climate change and its effect	.434	-.415	-.346
Reduction of gain	.368	-.084	.151
Lack of processing and storage facilities	.278	-.122	.434*
Lack of specific innovation on melon	-.240	-.066	.071

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Source: Field survey may, 2013.

factors. According to [26], the main constraints to agricultural development include national and sub national policies and institutional structures as well as institutional and resource constraints at the local level.

Variables that loaded high under stress/economical factors were scarcity of land for planting (0.670), lack of finance (0.519), laborious nature of melon production (0.406), lack of collateral required to get loan (0.586), weeding problem (-0.461) and lack of processing and storage facilities (0.434). In line with the findings, [20] noted that despite the socio-economic importance of melon production, output has been on the decline due to the problems of scarcity of land resulting from land fragmentation, high cost of inputs, use of traditional techniques, inefficient allocation of resources etc.

4. CONCLUSION AND RECOMMENDATIONS

Married women with large household size dominated melon production enterprise in the

area. Melon production is profitable in spite of the fact that farmers employed traditional agronomic practices and sold their goods immediately after harvest at their homes. This signifies that a step further in provision of agricultural inputs, trainings and innovations to these farmers will do wonders by maximizing output and profit from melon production. Hence, innovations on improved agronomic practices especially on improved varieties and off season production techniques should be communicated to these farmers through agricultural extension agents using farm and home visit methods, result and method demonstrations. Application of these innovations in their farms will help to boost production and income from the enterprise and retain the farmers in melon production and agriculture.

Appropriate agricultural policies that will guarantee farmers suitable land, inputs, infrastructure and advisory services should be made/enacted by government. This will help to unleash the potentials of these farmers and channel them towards sustainable agricultural and economic growth and development.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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