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Percieved Benefits and Knowledge Level of Mushroom Farmers Towards Mushroom Production in Selected Local Governments Area, Oyo State, Nigeria

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Abstract

The study examined the perceived benefits and knowledge level of the mushroom farmers on mushroom production in selected local governments area of Oyo State, Nigeria. The data obtained were analyzed with frequency, percentage, mean and standard deviation. Multistage sampling procedure was used to select 143 respondents using questionnaire and interview schedule. From the result it was affirmed that the majority (63.0%) of the respondents were males, also about 81.8% of the farmers were married. Radio (96.5%) was the most common source of information available to farmers, seconded by family and friends 86.0%. Based on the distribution of the knowledge level of farmers in mushroom production (63.6%) of the farmers had highest knowledge in mushroom production with the mean score (9.28). Majority (64.3%) of the mushroom farmers perceived mushroom production to be of benefit to them, with the mean score (10.35). It was concluded that majority of the farmers that had knowledge of mushroom production needs training in some specific aspects of the production process. It is recommended that research institutes, extension agents and Non-governmental organizations needs to organize training to enlightened and provide necessary information needed to the farmers on mushroom production.

Key Words: benefit, farmers, knowledge, mushroom, perceived, production

Introduction

Agricultural production is solely dependent on the climatic condition; and the climate is unpredictable because of the variability in the environment (Ojemade et al. 2018; Anarah et al. 2019; Elijah et al. 2020). Researchers and experts are finding some effective solutions that can mitigate climate change (Olive and David 2021). One of the game changer discovered is the mushroom production (Stamets 2020). Mushroom cultivation is a very reliable means of making profit for farmers in the face of unfavourable weather conditions. It will increase revenue, ensure food security and improve standard of living of farmers whenever there is crop failure brought by climate change (Osuafor et al. 2023).

The practice of cultivating mushrooms gained momentum in the late 20th century, with the introduction of modern cultivation techniques and increased awareness of

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the nutritional and economic benefits of mushrooms. Mushroom are healthy foods, they provide carbohydrates, but are low in fat and fiber and contain no starch, edible mushrooms are an excellent source of high quality protein, and white button mushrooms contain more protein than vegetables, grains and fruits (Gbolagade et al. 2006; Kumar et al. 2021). Typically mushroom have a very short shelf life due to their rapid respiratory rate, fresh mushroom have high water content and lack of cuticula structure (Castellanos-Reyes et al. 2021). We have different species of mushrooms which include: *Pleurotus tuberregium, Pleurotus pulmonarius, Pleurotus ostreatus, Volvariella volvacea, Lentinus squarroslus, Cantharellus lateritius* (Okigbo and Nwatu 2015).

Commonly Cultivated Edible Fungi are Button Mushrooms (*Agaricus* spp), Oyster Mushrooms (*Pleurotus* spp), Shiitake (*Lentinula edode*), Reishior or Ling Chi (*Ganoderma lucidum*), Lion's Mane (*Hericium erinaceus*), Nameko (*Pholiotanameko*), Ears (*Auricularia* spp) and Chicken-of-the-Woods (*Polyporus sulphureus*) (Jibrin et al. 2017). The study involved the life cycle of the oyster mushroom (Arora and Shepard 2008; Karataş 2022) reported that fully developed oyster mushroom comprises of a cap, gills and stalk.

Mushrooms are regarded as healthy foods because they are good source of vitamin B1, B2, B12, C, D and E, including niacin, riboflavin, thiamine, and foliate, and trace minerals including potassium, phosphorus, calcium, magnesium, zinc, selenium, iron and copper, but they are low in calories and fat (Dawadi et al. 2022). Its nutritional value, disease susceptibility, flavor, and appearance can be altered by preserving it for a long time (Zhang et al. 2018). Vegetarians also eat mushrooms because it serves as alternative protein supplement in their diets (Alcorta et al. 2021). Mushrooms have been used in folk medicine throughout the world since ancient times (Bautista-González et al. 2022).

Attempts have been made in many parts of the world to explore the use of mushrooms and their metabolites for the treatment of a variety of human ailments (Jose and Janardhanan 2000; Zeng et al. 2022). Mushrooms are one of the most diverse organisms on earth and since primitive times have played a vital role in human welfare (Martínez-Ibarra et al. 2019). Nigerian native doctors use various combinations of herbs and other ingredients in their medicine. *P. tuberregiumis* used in some of these combinations that are intended to cure headache, stomach ailments, colds and fever as well as asthma, smallpox and high blood pressure (Amorha et al. 2018).

In the South East of Nigeria, it is used to treat heart problem, while it is used to treat anemia, asthma, headache and fever, heart problem and obesity among the people of Edo State of Nigeria (Isikhuemhen and Okhuoya 2004; Osemwegie et al. 2010; Ganesan and Xu 2018). Mushrooms are often considered to provide a fair substitute for meat, with at least a comparable nutritional value to many vegetables, so the consumption of mushrooms can make a valuable addition to the often unbalanced diets of people in developing countries (Rautela et al. 2019).

Mushroom is fast growing organism that can be cultivated on a relatively small space, also requires little maintenance, using agro-industrial residues (Vega et al. 2022). Furthermore, mushroom cultivation also provides opportunities for improving the sustainability of small farming systems and improved nutrition especially in developing countries. Successful cultivation and trade of mushroom will not only reduce vulnerability to shocks, but also act upon other economic opportunities (Marshall and Nair 2009; Akter et al. 2022).

Mushroom farming in Nigeria faces several challenges. A recent article by the Guardian News paper highlighted some of the challenges faced by mushroom farmers in Nigeria which includes inadequate skilled labor, capital, clear-cut requirements for growers for certifications by the National Agency for Food, Drug Administration and Control (NAFDAC), limited access to resources, lack of infrastructure, and a lack of knowledge and expertise in mushroom production. However, despite these challenges, mushroom farming can be a sustainable and profitable business venture in Nigeria. (Jibrin et al. 2017) suggests that mushroom farming can play a significant role in enhancing the human diet in nations with growing populations and food demand issues, where a major portion of the population is highly selective of food preference.

Specifically, to acquire high level of information, exploit the potential of mushroom farmers and to improve the farmer's productivity. Thus, the perceived benefits and knowledge level of mushroom farmers towards mushroom production in Oyo State, Nigeria has been investigated. The research objectives were to describe the socio econom-

ics characteristics of the respondents, identify the respondents' sources of information on mushroom production, examined the knowledge level of the respondents towards mushroom production, determine the perceived benefits from mushroom production.

Materials and Methods

Study area

The study was carried out in Oyo State which is located in the South West geopolitical zone of Nigeria and is generally referred to as "Pacesetter state". Oyo State was one of the State carved out of the formal Western State or region of Nigeria in 1976. It is lies between latitude 7°N-9°N and longitude 2.5°E. The State covers an area of approximately 28,454 sq km representing approximately 4.08% of Nigeria's total area and is ranked 14th by size. Oyo State is homogenous mainly inhabited by the Yoruba ethnic group, Igbo, Hausa and others minority groups (National Population Commission 2006). Oyo State is an inland state in South − Western Nigeria, with its capital at Ibadan. It is bounded in the north by Kwara State, in the east by Osun State, in the South by Ogun State and in the west partly by Ogun State and partly by the Republic of Benin. The climate is equatorial, notably with dry and wet seasons and with relatively high humidity. The dry season lasts from November to March while the wet season starts from April and ends in October. Average daily temperature ranges between 25°C (77.0, °F) and 35°C (95.0, °F) almost throughout the year. As at the 2007 census, the entire population Oyo State is 6,617,720.

Sampling procedure and sample size

Multistage sampling technique was used to select the respondents for this study and two agricultural zones were purposive selected in Oyo State where mushroom production is prevalent. Thus, Ibadan/Ibarapa and Ogbomoso were selected and systematic random selection of two LGAs from each of the local government's area. 50% of mushroom farmers were randomly selected to give a total sample size of one hundred and forty-three respondents. Structured questionnaire and interview scheduled was used to obtained information from the respondents. Descriptive statistics used were frequency count, percentage, mean and standard deviation.

Thirteen knowledge level statements were provided on a two point scale of yes and no, yes was assigned for positive

Table 1. Distribution of respondents by socio economic and demographic characteristics (n=143)

Variable	Frequency	Percentage
Sex		
Male	90	62.9
Female	53	37.1
Age (years)		
25-34	28	19.6
35-44	55	38.5
45-54	42	29.4 (Mean=43.18)
Above 55	18	12.6 (SD=9.56)
Marital status		
Single	16	11.2
Married	117	81.8
Widowed	04	2.8
Separated	06	4.2
Education level		
Primary	15	10.5
Secondary	37	25.9
Tertiary	23	16.1
No formal education	68	47.6
Household size		
1-3	34	23.8
4-6	92	64.8 (Mean=4.62)
7-9	17	11.9 (SD=1.58)
Farming experience (years)		
1-10	90	62.9
11-20	32	22.4
21-30	16	11.2 (Mean=10.85)
Above 30 years	05	3.50 (SD=8.34)
Farm size (acre)		
Below 1	130	90.9
Above 1	13	9.10
Monthly income (N)		
1,000-10,000	34	23.8
11,000-20,000	42	29.4
21,000-30,000	28	19.6
31,000-40,000	28	19.6
41,000-50,000	07	4.90
Above 50,000	04	2.80
Sources of credit		
Personal savings	70	49.0
Family/friends	25	17.5
Loan from bank	14	9.80
Co-operative society	34	23.8

response statements and no for negatively response statements. Mean score was obtained and used to categorized respondents into high and low level knowledge. A composite score was generated and mapped into high level of knowledge when the score is greater or equal to mean score (9.28) of knowledge obtained by an average respondent. It is considered low level of knowledge when the score is less than the mean score.

On perceived benefit of mushroom farmers, benefits were considered on the aggregate based on the all the eleven perception questions presented to them. A composite score was generated and mapped into high level of benefit when the score is greater or equal to the mean benefit score (10.35) obtained by an average respondent. It is considered low level of benefits when the score is less than the mean score (10.35).

Results and Discussion

Distribution of respondent according to their personal characteristics

Result in Table 1 reveals that about 63.0% of the respondents were males while 37.0% were females in the study area. This implies that males are more predominant in mushroom production than females and 38.5% of the farmers in the study area were between the age of 35 and 44 years. This is an indication that the farmers were within the productive age and are likely to improve mushroom cultivation. Also, most 81.8% of the farmers were married. Majority (47.6%) of the respondents had no formal education. This simply reveals that about half of the respondents were illiterate.

The result also shows that more than half (62.9%) of the farmers had farming experience of between 1-10 years, despite long years of existence of mushroom. Farmers, are not much into its cultivation probably because of existence of wild edible types. Almost all (90.9%) of the farmers had less than 1 hectare of farm size. The farmers in this study are therefore small holders cultivating less than 1 acre of farm size. About one third (29.4%) of the respondents earned between N11,000 and N20,000 monthly from mushroom production. The result implies their present scale of production is small with a total amount generated as N50,000 and about half (49.0%) of the respondents obtained their capital for mushroom production through personal savings. Kumari et al. (2011) also found out that the major reason farmers undergo mushroom production training is to generate income for personal sustainability.

Table 2 shows sources of information available to famers are fundamental tools for increased productivity and development. In this study, radio is the most common source of information available to farmers (96.5%). A large percentage (86.0%) of the farmers also gets information that relates to their farming activities from family and friends. Other sources of information available to the mushroom farmers includes growers/marketing association (83.2%), neighbour (76.2%), training (68.5%), television (62.9%), newspaper/magazines (60.8%), workshop extension agents (54.5), workshop (44.8%) and internet (16.1%). This is corroborated by Oguntade et al. (2009) who found out that the leading sources of information available to mushroom farmers were radio, family and friends,

Table 2. Distribution of respondents by sources of information (n=143)

Sources of information	Yes (%)	No (%)	Mean	Rank
Radio	138 (96.5)	5 (3.50)	0.97	1st
Family and friends	123 (86.0)	19 (13.3)	0.87	2nd
Grower/marketing association	119 (83.2)	24 (16.8)	0.83	3rd
Neighbors	109 (76.2)	33 (23.1)	0.77	4th
Trainings	98 (68.5)	45 (31.5)	0.69	5th
Television	90 (62.9)	53 (37.1)	0.63	6th
Newspaper magazines	87 (60.8)	56 (39.1)	0.61	7th
Extension agents	78 (54.5)	65 (45.5)	0.55	8th
Workshop	64 (44.8)	79 (0.35)	0.45	9th
Internet	21 (16.1)	122 (85.3)	0.16	10th

extension agents, mushroom growers association, television and newspaper. The internet is the least source of information available to the mushroom farmers as only 16.1% use this avenue to source for farming information. The result is not surprising as about half (47.8%) had no formal education. This inability to reach out on a global level through use of modern means of sourcing information will impact negatively on their production and even limit their production and marketing prowess.

From Table 3, the farmers are knowledgeable about the medical benefits of mushroom. Only 2.1% of them do not know that mushroom consumption can prevent certain diseases. Farmers' knowledge on mushroom production includes the site of production. 97.2% are aware that mushroom can be grown indoor. Their knowledge on production process was investigated and the evidence on Table 3 reveals that farmers understand that mushroom production involves sterilization. 86% of them know that it is mushroom production require sterilization. They are also aware that contamination can occur in the process of production if adequate care is not taken. About two third of them (72.7%) attest to this fact. Further on production process, only a few of them (14.7%) are not aware of the need to water mushroom substrate during production. The farmers are equally knowledgeable about the consumption pattern of mushroom. 78.3% of them are aware that mushroom can be substituted for vegetable and can even be stored in refrigerator for later use (94.4%).

Farmers' level of knowledge on mushroom production was considered on the aggregate based on all the thirteen knowledge level statements presented to the respondents in Table 3. The result on Table 4 shows that majority (63.6%) of the respondents had high knowledge and some (36.4%) of the respondents had low level of knowledge on mushroom production. This implies that some of the respondents still require training in mushroom production. Although this group is not large, the majority that had knowledge of mushroom production needs training in some specific aspects of the production process.

Perceived benefits from cultivation of mushroom by farmers were numerous as revealed in this study. Table 5 shows that apart from nutritive value of mushroom (98.0%) which makes farmers to consume and cultivate mushroom, income (97.9%) was another principal reason that motivates

Table 3. Distribution of respondents by level of knowledge (n=143)

Knowledge on mushroom production	Yes (%)	No (%)	Mean	Rank
Mushroom consumption can prevent certain diseases	140 (97.9)	3 (2.1)	0.98	1st
It is possible to grow mushroom indoor	139 (97.2)	4 (2.8)	0.97	2nd
Mushroom cultivation requires the use of dark room	138 (96.5)	5 (3.5)	0.97	3rd
Mushroom can be grown on sawdust or wheat bran	137 (95.8)	4 (2.8)	0.97	4th
Mushroom can be stored by refrigeration	135 (94.4)	8 (5.6)	0.94	5th
Mushroom takes at least 30days before sprouting	123 (86.0)	20 (14.0)	0.86	6th
Mushroom cannot be cultivated with compost manure	108 (75.5)	35 (24.5)	0.76	7th
Mushroom cannot be contaminated during production	39 (27.3)	104 (72.7)	0.27	8th
Mushroom cannot be substituted for vegetable	31 (21.7)	112 (78.3)	0.22	9th
Mushroom can only be produced during rainy season	24 (16.8)	119 (83.2)	0.17	10th
Watering of mushroom substrate is not necessary in mushroom production	21 (14.7)	122 (85.3)	0.15	11th
Mushroom production does not require sterilization of the substrate	20 (14.0)	123 (86.0)	0.14	12th
All mushroom varieties are edible	8 (5.6)	135 (94.4)	0.06	13th

Table 4. Distribution of respondents' based on level of knowledge (n=143)

Knowledge	Frequency	Percentage (%)	Minimum	Maximum	Mean	Standard deviation
High	91	63.6	5.00	11.00	9.28	1.37
Low	52	36.4				
Total	143	100.0				

Table 5. Distribution of respondents by perceived benefits from mushroom cultivation (n=143)

Benefits	Yes (%)	No (%)	Mean	Rank
Nutritive value	141 (98.0)	2 (1.4)	0.99	1st
Increased income	140 (97.9)	3 (2.1)	0.98	2nd
Better health status	139 (97.2)	4 (2.8)	0.97	3rd
Red meat substitute	138 (96.5)	5 (3.5)	0.97	4th
Vegetable substitute	136 (95.1)	7 (4.9)	0.95	5th
Reduce risk of diabetes	131 (91.6)	12 (8.4)	0.92	6th
Lower cholesterol	130 (90.9)	13 (9.1)	0.91	7th
Build strong bone	129 (90.2)	14 (8.8)	0.90	8th
Prevent skin damage	125 (87.4)	18 (12.6)	0.87	9th
Decrease risk of cancer	123 (86.0)	20 (14)	0.86	10th

Table 6. Distribution of farmers by level of perceived benefit from mushroom (n=143)

Level of benefit	Frequency	Percentage (%)	Minimum	Maximum	Mean	Standard deviation
High	92	64.3	6.00	11.00	10.35	1.08
Low	51	35.7				
Total	143	100.0				

farmers to cultivate mushroom, (Shakil et al. 2014) stated that successful cultivation of mushroom has potential of earning and can be a good income generating activity for unemployed people. Other benefits respondents derive from mushroom were improved health status (97.2%), red meat substitute and vegetable substitute (95.1%). The proteins of mushroom are considered to be intermediate between that of vegetables and animals (Tolera and Abera 2017), reduction in risk of diabetes (91.6%), lower cholesterol (90.9%), build strong bone (90.2%), prevent skin damage (87.4%) and decrease risk of cancer (86.0%). This is in line with Onwubuya et al. (2015) in Abia State, Nigeria, who stated that mushrooms are used for treatment of diseases by Nigerian Herbalist. This may be that some of the respondents had eaten mushroom before or they might have heard about it on radio because of their level of exposure to information.

The result on Table 6 shows that majority (64.3%) of the farmers have high knowledge of mushroom benefits. A lesser proportion (35.7%) has low level of mushroom benefits. High knowledge of mushroom benefits can inform the need for respondents to seek training on mushroom production.

Conclusion

The findings of the study revealed that majority of the farmers received information on mushroom cultivation through radio, family and friends. More also, from the results obtained famers that had high knowledge of mushroom production believed that mushroom consumption can prevent certain diseases and it is possible to grow mushroom indoor but needs information in some specific aspects of the production process. The perceived benefits from mushroom production by the farmers were to improve health status, nutritive value which makes farmers to consume and cultivate mushroom and another principal reason was to increased income.

Other benefits the respondents derive from mushroom were improved health status, red meat and vegetable substitute, because of the protein content that are considered to be intermediate between that of vegetables and animals, reduction in risk of diabetes, lower cholesterol, build strong bone, prevent skin damage and decrease risk of cancer.

However, mushroom production has been found profitable from the findings. Therefore, more farmers should be encouraged on mushroom production through incentives and necessary assistance. So that mushroom production can

be another means of providing employment for the populace, thereby contributing to the economic development of the country. Farmers should engage in all season cultivation of diverse mushrooms.

Research institutes, extension agents and nongovernmental organizations need to organize training to enlightened and provide relevant information needed to the farmers on mushroom production. Access to affordable credit facilities should be provided to the farmers through the government since most of the farmers source of fund on mushroom production was through their personal savings.

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