International Journal of Agriculture, Environment and Bioresearch

Vol. 3, No. 03; 2018

ISSN: 2456-8643

ECONOMIC ANALYSIS OF MUSHROOM PRODUCTION IN SOUTH-WEST NIGERIA

Arowosoge, Oluwayemisi Grace
Department of Forest Resources and Wildlife Management, Ekiti State University, Ado Ekiti, Ekiti State, Nigeria

ABSTRACT

This research analysed the economic returns of mushroom production in South-West of Nigeria.Structured questionnaire and personal interview were used to collect data from mushroom farmers selected through snowball sampling technique in Oyo, Ondo and Ekiti States. Data were collected on the demographic characteristics of the mushroom industry, cost and revenue over a period of five year from 2012 to 2016. The collected data were analyzed using descriptive statistics, ordinal ranking, percentage mention, Benefit Cost Ratio (BCR), Rate of Return on Investment (RORI), Net Present value (NPV) and Sensitivity Analysis. The results show that no mushroom industry was established before 2005. Of the three mushroom species produced, Pleurotus sajor-caju ranked highest with 96.43% followed by Pleurotus oestratus with 92.86% while Pleurotus florida ranked the least with 46.43%. The production of these mushrooms was profitable with BCR and NPV of 1.45 and N15,658,173 respectively at 21% discount rate. The RORI ranged from 32.04% to 58.22% with an average of 45.36% for the five years studied. Sensitivity analysis revealed that at 50% increase in cost of production, mushroom production was no longer viable as the mean RORI was -3.1%. High cost of spawn, poor production technology and inadequate funding were the major problems militating against the production of mushroom. Research Institute in Nigeria, should be committed to train mushroom producers on how to produce spawn so as to reduce cost of production and encourage more people to produce mushroom.

Keywords: Mushroom Production, Benefit Cost Ratio,Net Present Value.

INTRODUCTION

There has been an increase in the world production of mushroom through cultivation at large, medium and low scale in more than 100 countries with China been the major world producer with share of 80% (25,717 tons) in 2011. This is followed by USA with 6%, while ten countries (Netherlands, Poland, Spain, Italy, France, Japan, Canada, UK, Germany and India) had 14%. (Manjit and Kamal, 2012; Wu *et al.*, 2013).In Nigeria, the cultivation of mushroom is still at low ebband this is despite the fact that some Research Institutes in Nigeria such as Forestry Research Institute of Nigeria (FRIN), Ibadan has been training farmers on how to produce mushroom (Nurudeen*et al.*, 2014).

The technology that is used in the production of mushroom in Nigeria though still at research stage according to Nurudeen*et al.*, (2014)involves the following stages:(1). substrate preparation. This usually involves the use of wood sawdust such as *Triplochitonscleroxylon, Ceibapetandra,*

Vol. 3, No. 03; 2018

ISSN: 2456-8643

*Gmelinaarborea*and *Tectonagrandis.* Five kilogram (kg) each of such sawdust are thoroughly mixedwith 10% of wheat bran and 1% lime ($CaCo_3$) diluted with 2litres of water until they became moist and attained 65% moisture content. After which 5kg of each substrate is measured, packed in nylon bag of size 15 x 25cm and tied firmly with rubber band to prevent air. (2). Pasteurization: The bagged substrates are arranged in a drum and heat, usually from firewood, is introduced steadily for two and half hours at 100^{o}C-121^{o}C to boiling point. This is done to destroy any form of contaminant that may be present in the substrate. (3).Inoculation of Substrate: After pasteurization, the substrates bags are packed into a basin to cool down in mushroom room, after which spawn (seed)is introduced into each substrate. The spawn is added at the rate of 2% of the wet weight basis of substrate. Before opening the substrates, the slab on which the basin containing the substrates is placed is sterilized with methylated spirit and the spirit lamp lightened up in order to destroy micro-organisms that may be present. (4).Ramification: The substrates are later transferred to the mushroom house and covered with a black polythene sheet for ramification to take place. The temperature and humidity are maintained at25±1°C and 80-90 % with sufficient ventilation for 3-4weeks. The substrates are left in the mushroom house till ramification process ended. (5). Spore emergence and Fruiting: After ramification the bags are opened and watered regularly to enhance spore emergence. A small layer of substrate is scrapped off from all the side of the bags after each harvest. The bags are usually maintained for harvest up to the fifth flush.

The cultivation of mushroom from the preparation of substrate to fruiting as stated above takes an average of 30 days. With a view to improving the production technology and increase yield, studies(Nurudeen*et al.,* 2012;Nurudeen*et al.,* 2014;Arowosoge*et al.,* 2017)have been conducted using different substrates in Nigeria without determining the profitability of the mushroom production. The low participation of farmers in the cultivation of mushroom could therefore be due to lack of awareness of the profitability of mushroom production in Nigeria, while mushroom production have been proved to be profitable in some other countries. According to Celik and Peker(2009), mushroom production is a lucrative and profitable cottage industry for low income rural households. It has also been providing gainful employment to rural and urban poor most especially the youth and women in many developing countries such as China and India while the average family household income per month ranged from $230 to $850 (Barmon*et al.,* 2012; Zhang *et al.,*2014). Furthermore, in China, mushroom industry ranked fifth among the agricultural industries of China and it has been contributing to economic development of China (with total value of 24 billion USD in 2011) through foreign exchange earnings from exports and income generation (Feng, 2009; Zhang *et al.,*2014).

In view of the economic benefits accruing from mushroom production in other countries as shown in past studies, it therefore becomes justifiable to determine the economic returns on mushroom production in Nigeria while prioritizing the mushroom produced and identifying the problem militating against its production. This is because the decision to invest in any enterprise depends largely on its economic returns. If mushroom production is found profitable, more farmers could be encouraged to start mushroom production, since studies have shown that there is available market for mushroom as its consumptions seasonal due to non-availability throughout the year in Nigeria (Gbolagade*et al.,* 2006; Arowosoge, 2017).More mushroom

Vol. 3, No. 03; 2018

ISSN: 2456-8643

production on the long run would go a long way in providing employment while contributing to the economic development of the country.

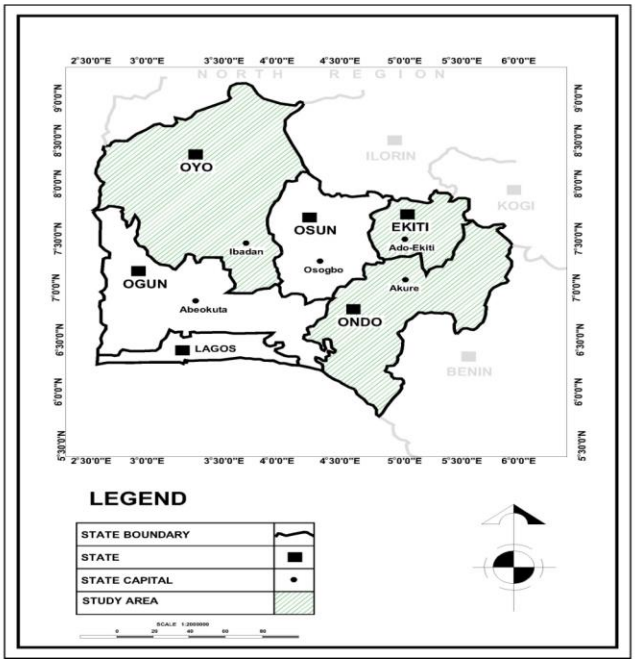
2. METHODOLOGY

2.1Description of the Study Area

This research work was conducted in South-West Nigeria. The South West geo-political zone which comprises of six states namely: Ekiti, Ondo, Osun, Oyo, Ogun and Lagoslies between longitude 2^0 31^1 and 6^0 00^1 East and Latitude $6^0 21^1$and 8^0 37^1N with a total land area of 77,818km^2 and a population of 28,767,752 (National Geograghic, 2016).
The climate of Southwestern Nigeria is tropical in nature and it is characterized by wet season which occurs between March and October and the dry season from November to February. The temperature ranges between 21°C and 34°C, the annual rainfall ranges between 1,200mm and 2,500mm while humidity varies between 40% and 80%.

2.2 Sampling Technique

Oyo, Ondo and Ekiti States were purposively selected for the study. This is because preliminary survey of mushroom farmers showed that they are areas with relative abundance of farmers that have been trained in mushroom production by The Federal Research Institute of Nigeria (FRIN), Ibadan. Figure 1 shows the map of the study area. Since mushroom farmers did not have associations and were not registered in the States, Snowball sampling technique was used in selecting the mushroom farmers. This method as used by Arowosoge and Oyerinde (2013), is whereby a sampled mushroom farmer introduced another mushroom farmer within the study area.



Vol. 3, No. 03; 2018

ISSN: 2456-8643

Figure 1: Map of South-West Nigeria showing the study area.
Source: Geography Department, Ekiti State University, Ado-Ekiti.

2.3 Data Collection

Data were collected from the three States through the use of a structured questionnaire and personal interview. The questionnaire was structured using open ended and guided questions with options. Data were collected on mushroom species producedin increasing order of preference, cost of production, revenue from sales and constraints to mushroom farming.

2.4 Model Specification for Data Analysis

2.4.1 Prioritization of Mushroom Species.

Based on preliminary survey that three species of mushroom are produced in the study area, the preference for the mushroom cultivated was determined using ordinal ranking. The number of respondent for a particular mushroom was multiplied by the weight given and this was expressed as a percentage of the maximum score possible. For the 3mushrooms cultivated, the respondents were to score between 1 and 3 in increasing order of importance, and zero for non- applicable options. The analysis of the ranking involved the summation of the product of the number of respondent for a particular mushroom by the weight given and this was expressed as a percentage of the maximum score point. The maximum score point is the product of the number of respondent and the maximum point any mushroom can have. The mushroom with highest percentage score was considered to be the most preferred. This relationship as adapted by Arowosoge and Tee (2010) is as follows:

$$Option\ Ranking = \sum_{i=1}^{n} FS_i / nSMX100/1 \qquad (1)$$

Where F = Frequency of respondents with same score for a mushroom species
Si = Respondents score for mushroom species; it ranges from 1 to 3
n = Number of respondents interviewed
SM = Maximum score point for mushroom species

2.4.2 Ranking of Problems Militating against the Production of Mushroom.

Percentage mention was used to rank the problems militating against the production of mushroom. % mention is as stated below:

$$\frac{NTVM}{NIC} \times \frac{100}{1} \qquad (2)$$

Where, *NTVM* = No of time a variable was mentioned; *NIC* = No of interviewed conducted.

2.4.3 Profitability Analysis

2.4.3.1 Benefit Cost Ratio (BCR):

Vol. 3, No. 03; 2018

ISSN: 2456-8643

The Benefit cost ratio is the ratio of discounted cost to discounted return. The decision for BCR is to adjudge the enterprise efficient if BCR is equal 1 or greater than 1. The higher the ratio, the higher the return per Naira invested (Adegeye and Dittoh 1985; Gittinger, 2012). This ratio was obtained by dividing the present worth of the benefit (discounted revenue) with the present worth of the cost (discounted cost). Mathematically it is expressed as:

$$BCR = \frac{\sum_{t=1}^{t=n} \frac{B_t}{(1+r)}}{\sum_{t=1}^{t=n} \frac{C_t}{(1+r)^t}} \quad (3)$$

Where, B_t = Benefit in each year; C_t = Cost in each year; r = Discount (interest) rate; t = 1, 2, ... n; n = 5years.

2.4.3.2 Net Present Value (NPV)

Net Present value is the value today of the surplus that an enterprise makes over and above what it could make by investing at its marginal rate (Adegeye and Dittoh, 1985). The decision criterion is to accept a project with positive NPV. The NPV of the mushroom wasdetermined by calculating the present worth of the incremental net benefit. NPV is mathematically represented as:

$$NPV = \sum_{t=1}^{t=n} \frac{R_t - C_t}{(1+r)^t} \quad (4)$$

Where variables R_t, C_t, r, t and n are as defined in equation 3 above

2.4.3.3 Rate of Return on Investment (RORI).

Rate of Return on Investment (RORI) was used to determine how much was realized on the money invested (Arene, 1998). It is expressed mathematically as:

$$RORI = \frac{\pi}{TC} \times \frac{100}{1} \quad (5)$$

$\pi = TR - TC$

$TC = P \times X_1 + P \times X_2 + ... P \times X_n + TFC$

$\pi = P \times Q - (P \times X_1 + P \times X_2 + ... P \times X_n + TFC)$

Where, π =Profit; TR = Total revenue; TC = Total Cost; TFC = Total fixed cost; P = Price; Q = Quantity produced; X = Production input; TVC = Total variable cost.

2.4.3.4 Sensitivity Analysis

Vol. 3, No. 03; 2018

ISSN: 2456-8643

This analysis was used to treat uncertainty. An added advantage of economic analysis is that sensitivity analysis could be used to test what happens to the earning capacity of a project if events differ from what is expected(Adegeye and Dittoh, 1985). There are no specific rules for choosing the parameters to be tested. However, the most common parameters for which sensitivity analysis is done are: cost of goods and services, and interest rates (FAO, 2002). The sensitivity of RORI of mushroom production in this study was determined by increasing cost.

3. RESULTS AND DISCUSSION

3.1 Demographic characteristics of the mushroom industry.

The demographic characteristics of the mushroom industry are as discussed below and presented in Tables 1. Most(60.7%) of the mushroom industry in the study area were established after 2015 followed by those that were established between 2010 and 2015 while none was established before 2005.This further confirm the findings of Gbolagade*et al.*,(2006) and Arowosoge *et al., (2017)*that the production of mushroom in the study area is new.The highest percentage (85.7%) of the mushroom industry were not registered with Corporate Affairs Commission (CAC) - the agency in charge of business registration, while 14.3% were registered. The non- registration of most of the mushroom industry only compounded their problem as it was discovered during the course of this study that many of them did not have access to financial aids from both the government and commercial institutions. As a matter of fact, one of the major criteria for funds to be made available under the Small and Medium Enterprise Equity Investment Scheme (SMIEIS) is registration with Corporate Affairs Commission (CAC) in compliance with Companies and Allied Matters Act (1990).

Sole proprietorship was the major form of ownership with 92.9% while 7.1% were operated as Private limited companies. The sole proprietorship of mushroom industry in the study area follows the general trend previously observed for small scale business in Nigeria. (Olorunnisola, 2000). This trend suggests why mushroom industry in Nigeria has been operating at abysmally low level, since they solely decide the extent of operation without any interference. Thus, their level of innovation is generally low. Furthermore, majority (75%) of the mushroom industry studied had their capital investment between ₦100,000 and ₦500,000 while only 3.6% had capital that is greater than ₦500,000. The highest percentage of the mushroom producer also had employment size that is between 1 person and 5 people most of whom were family members. This shows that all the mushroom industry studied were operating at cottage level and fall short of been classified as Small scale enterprise. Small and Medium Enterprise Equity Investment Scheme (SMEEIS) define Small Enterprise as any enterprise with a minimum asset base of ₦100 million (excluding land and working capital) and with at least 10 workers (SMEDAN, 2002)

Vol. 3, No. 03; 2018

ISSN: 2456-8643

Table 1: Demographic Characteristics of Mushroom Industry in the Study Area.

Variable/ Categories	Frequency (n = 28)	Percentage (%)
(i)Year of Establishment		
Before 2005	0	0.0
2005 -2010	2	7.1
2010 -2015	9	32.2
After 2015	17	60.7
(ii)Business Registration		
Yes	4	14.3
No	24	85.7
(iii) Forms of Ownership		
Sole Proprietorship	26	92.9
Private Limited Company	2	7.1
(iv) Capital Investment		
<100,000	6	21.4
100,000 – 500,000	21	75.0
>500,000	1	3.6
(v) Employment size		
1 - 5	21	75.0
6 – 10	7	25.0
>10	0	0
Source: Original, 2016		

Vol. 3, No. 03; 2018

ISSN: 2456-8643

3.2 Option Ranking of Mushroom species produced in the Study Area

Of the three mushroom species produced, *Pleurotussajor-caju* was mostly produced in the area as it ranked highest with 96.43%. This is closely followed by *Pleurotusoestratus*with 92.86% while *Pleurotusflorida* ranked the least with 46.43% (Table 2). Respondents claimed *Pleurotusflorida*was difficult to produce due to its sensitivity to any slight change in climate hence it ranked lowest.

Table 2. Option Ranking of Mushroom species produced

Variables	TS	SM	RV(%)
Pleurotussajor-caju	81	84	96.43(1^{st})
Pleurotusoestratus	78	84	92.86(2^{nd})
Pleurotusflorida	39	84	46.43(3^{rd})

TS = Total Score, SM = Maximum score-able point, RV = Rank Value (%)

3.3 Profitability Analysis of Mushroom Production

3.3.1 Estimated Revenue

The revenue for the 5 years of study was obtained by estimating the products of the average selling price of mushroom per kg and the quantity of mushroom produced per annum. The quantity of mushroom produced per annum varied from 7849.60 kg in 2012 to 9405.72 kg in 2016 (Table 3). Respondents were of the opinion that higher quantity of mushroom could be produced if the price of spawn is cheaper and if environmental condition is more favourable. The selling price of mushroom ranged from ₦1800 ($4.99) in year 2012 to ₦2400 ($6.65) in year 2016. At the international market, the price of mushroom ranges between ₦1,805 ($5) and ₦10,830 ($30) per kg depending on species**(**Dhar and Verma 2017**).**For the five years considered, the revenue obtained ranged from ₦14,129,280.00 in 2012 to ₦22,573,728.00 in 2016(Table 3).

Table 3. Revenue from Mushroom Production

Variable	Year				
	2012	2013	2014	2015	2016
Mushroom(Kg)	7,849.60	8,714.75	8,603.00	8,818.70	9,405.72
Selling Price/Kg (₦)	1,800.00	2,000.00	2,000.00	2,000.00	2,400.00
Total Revenue	14,129,280	17,429,500	17,206,000	17,637,400	22,573,728

Note. $1 = ₦361.

Vol. 3, No. 03; 2018

ISSN: 2456-8643

3.3.2 Cost Components for Mushroom Production

The cost components were building, drum, spraying pump, table, weighing balance, basket, fork, knife, fridge as fixed cost. The variable cost were spawn, wheat bran, rice bran, lime, transportation (mainly on sawdust), pesticide, labour, electricity, fuel, administrative charges (tax and telephone) and contingency(Table 4). The fixed cost were depreciated using straight line depreciation method to obtain the actual amount spent per year from the fixed cost item.

Table 4. Revenue, Cost and Bcr for Mushroom Production

Year / **Variable**	**2012**	**2013**	**2014**	**2015**	**2016**
REVENUE(₦)	14,129,280	15,429,500	13,606,000	15,037,400	20,173,728
COST (₦)					
Spawn	3,201,000	3,441,900	4,081,800	4,512,000	5,043,600
Wheat Bran	700	900	1,250	1,450	1,600
Rice Bran	7,500	8,450	8,400	8,200	9,340
Lime	6,800	7,200	7,000	6,700	7,650
Transportation	1,100,840	1,252,500	1,300,210	1,400,600	1,560,000
Pesticides	352,455	401,900	457,500	570,900	850,000
Fuel	1,870,350	2,350,855	1,980,675	2,157,240	2,005,150
Electricity	979,650	908,520	1,075,200	920,750	1,044,000
Salary	1,800,240	1,708,600	2,010,500	2,726,000	3,084,000
Weighing Balance	55,500	55,500	55,500	55,500	55,500
Building	22,400	22,400	22,400	22,400	22,400
Drum	16,000	16,000	16,000	16,000	16,000
Spraying Pump	56,250	56,250	56,250	56,250	56,250
Table	18,750	18,750	18,750	18,750	18,750
Fridge	100,800	100,800	100,800	100,800	100,800

Vol. 3, No. 03; 2018

ISSN: 2456-8643

Basket	10,838	10,838	10,838	10,838	10,838
Fork	1,550	1,550	1,550	1,550	1,550
Knife	3,557	3,557	3,557	3,557	3,557
Administrative Charges (Tax, Telephone)	85,000	125,000	126,450	132,100	151,200
Sub-Total	**9,690,179**	**10,491,469**	**11,334,629**	**12,721,584**	**14,042,184**
5% Contingency	**484,509**	**524,573**	**566,731**	**636,079**	**702,109**
Grand Total	**10,174,688**	**11,016,043**	**11,901,361**	**13,357,663**	**14,744,293**

Note: $1 = ₦361.

3.3.3 Benefit Cost Ratio (BCR),Net Present Value(NPV) and Rate of Return on Investment(RORI)

The results of BCR,NPV and RORI are presented in Table 5. The results show that at the actual cost of production of 21% discount rate, the BCR and NPV were 1.45 and ₦15,658,173 respectively. The RORI on mushroom production ranged from 32.04% to 58.22%. The highest RORI of 58.22% was obtained in the second year of production, while the least 32.04% was obtained in the fourth year of production with an average of 45.36% at five years. This shows that the mushroom production was profitable for the five years considered with 45kobo as profit on every ₦1 spent while the NPV was positive (Gittinger, 2012). Barmon*et al.,* (2012) and Zhang *et al.,* (2014) also reported that mushroom production is a profitable business capable of providing employment and generating income. Higher BCR of 1.61 and 1.72 has however been obtained for small scale mushroom industries in countries such as India and China (Celik and Peker 2009; Singha,*et al.,* 2010). Reason that could be deduced for the low BCR obtained in this study when compared to past studies could be due to the fact that respondent complained of higher cost of spawn used for production.

Table 5. Benefit Cost Ratio Analysis, Net Present Value and Rate of Return on Investment

Year	Discount Rate	Revenue	Cost	Profit	Discount Revenue	Discount Cost	Discount Profit (NPV)	RORI
1	0.826446	14,129,280	10,174,688	3,954,592	11,677,087	8,408,830	3,268,257	38.87
2	0.683013	17,429,500	11,016,043	6,413,457	11,904,575	7,524,100	4,380,475	58.22

Vol. 3, No. 03; 2018

ISSN: 2456-8643

3	0.564474	17,206,000	11,901,361	5,304,639	9,712,340	6,718,009	2,994,331	44.57
4	0.466507	17,637,400	13,357,663	4,279,737	8,227,971	6,231,443	1,996,527	32.04
5	0.385543	22,573.728	14,744,293	7,829,435	8,703,143	5,684,559	3,018,584	53.10
					50,225,115	34,566,942	**15,658,173**	**45.36**
					BCR	**1.45**		

3.3.4 Sensitivity Analysis ofRate of Returns on Investment (RORI) of Mushroom Production

Sensitivity analysis revealed that at 30% and 40% increase in cost of production respectively the mean RORI which was 45.4%at the actual cost of production reduced to 11.8% and 3.8% respectively. At 50% increase in cost of production, mushroom production was no longer viable as the mean RORI was -3.1%(Table 6). Thus, investment on mushroom production should not be greater than 40% since mushroom production break even with 0.4kobo as profit on every ₦1 spent.

Table 6: Sensitivity Analysis of Rate of Return on Investment o Mushroom Production

	Sensitivity Analysis of 'RORI' (Increasing Cost)			
Year	**21%**	**30%**	**40%**	**50%**
1	38.87	6.82	-0.81	-7.42
2	58.22	21.71	13.01	5.48
3	44.57	11.21	3.27	-3.62
4	32.04	1.57	-5.69	-11.97
5	53.10	17.77	9.36	2.07
Average	**45.36**	**11.82**	**3.83**	**-3.09**

3.4 Problems militating against mushroom production

Table 7 presents the problems confronting mushroom production in the study area. High cost of spawn ranked 1st with 92.9% mention, followed by poor production technology and inadequate funding with 75.0% and 71.4 % mention respectively. Inability to produce indigenous species ranked the least with 57.1% mention. As observed during the course of carrying out this study only one of the respondents was producing spawn while others were buying due to lack of

Vol. 3, No. 03; 2018

ISSN: 2456-8643

technical no how. Production of spawn by mushroom producer could reduce cost of production and thus increasing profit.

Table 7. Ranking of Problems Militating against Mushroom Production

S/N	Problems	No of time Mentioned	% Mention	Rank
1.	High cost of spawn	26(28)	92.86	1st
2.	Poor production technology	21(28)	75.00	2nd
3.	Inadequate funding	20(28)	71.43	3rd
4.	Inability to produce indigenous species	16(28)	57.14	4th

4. CONCLUSION AND RECOMMENDATION

This study has shown that no mushroom industry was established before 2005while three species of mushroom namely *Pleurotussajor-caju, Pleurotusoestratus* and *Pleurotusflorida* in order of preference were produced in South West Nigeria.The production of these mushroom was profitable with 45kobo as profit on every ₦1 spent at the actual cost of production. Sensitivity analysis revealed that at 50% increase in cost of production, mushroom production was no longer viable as the mean RORI was -3.1%.Major problems militating against the production of mushroom include high cost of spawn, poor production technology and inadequate funding.
In order to make mushroom production more profitable as it is in other countries such as China and India, Research Institute such as FRIN should be committed to train mushroom producer on how to produce spawn so as to reduce cost of production. The mushroom industry could also be financed by the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN). All these will go a long way in encouraging more people to go into mushroom production and thereby creating employment while contributing to the economic development of the country.

REFERENCES

Adegeye, A.J. and Dittoh, J.S (1985),"Essentials of Agricultural Economics", Impact Publishers Nig. Ltd., pp. 164-177.

Arene, C.J. (1998),"*Introduction to the Economic Analysis of Projects in Tropical Agriculture*",Falludu Publishing Company,Nsukka, Nigeria, pp. 45.

Arowosoge, O.G.E and Oyerinde, O.V. (2013),"Assessment of Fuelwood Trade in Ekiti State, Nigeria: Issues on Fuelwood Sustainability", *Nigerian Journal of Forestry.*Vol. 43 No.1, pp. 18-25.

Arowosoge, O.G.E. and Tee, N.T. (2010),"Evaluation of Consumers' Choice of Wooden Dining Furniture in Southwestern Nigeria: A Market Strategy for Furniture Manufacturers and Marketers",*African Journal of Biotechnology*,Vol. 9 No. 21, pp. 3109-3115.

Arowosoge, O.G.E. (2017), Assessment of Mushroom Consumption Pattern in three Local Government Areas of Ekiti State, Nigeria,*Delta Agriculturist*,Vol. 9 No.2, 129-142.

Arowosoge, O.G.E., Abejide, O.S. and Nurudeen T.A. (2017),"Comparative Assessment of *Pleurotussajor-caju*(Oyster Mushroom) Yield Cultivated from Indigenous and Exotic Wood Wastes",*Journal of Advances in Biology & Biotechnology,* Vol.16 No.1,pp.1-9.

Barmon, B.K., Sharmin I., Abbasi, P.K. and Mamun, A. (2012),"Economics of Mushroom (*Agaricusbisporus*) Production in a Selected Upazila ofBangladesh",*The Agriculturists* Vol. 10 No. 2, pp 77-89.

Celik, Y. and Peker, K. (2009),"Benefit/cost analysis of mushroom production for diversification of income in developing countries"*Bulg. J. Agric. Sci.,* Vol. 15, pp. 228-237.

Dhar, B.L and Verma, R.N. (2017),"The Indian mushroom"available at: industry.http://www.isms.biz/articles/the-indian-mushroom-industry/ (accessed 10 Febuary, 2017).

Feng, J. (2009),"Current status of edible mushroom sector in China",*Mod. Agric*. Vol. *2*, pp. 54–55.

Food and Agriculture Organization (2002),"Economic Assessment of Forestry Project Impacts",Rome 2002, *FAO Paper* 106, pp. 101-110.

Gittinger, J.P. (2012),"*Economic Analysis of Agricultural Project"*(4th edition.). Published by Ermy August Rush, pp. 56-67.

Gbolagade, J., Ajayi, A., Oku, I., and Wankasi, D. (2006),"Nutritive value of common wild edible mushrooms from Southern Nigeria",*Global Journal of Biotechnology and Biochemistry* Vol. 1 No 1, pp. 16-21.

Manjit, S and Kamal, S. (2012),"Mushroom Scenario in India. Agriculture year book", pp 2-6.

National Geographic (2016), "Geography of Nigeria" available at: http://en.m.wikipedia.org/.../Geography (accessed 10 September, 2016).

Nurudeen, T.A,, Ekpo, E.N. and Dania, V.O. (2012)," Effect of supplement on the growth and fruit body production *Pleurotussajor-caju*(Oyster Mushroom)", Proceedings of the 2nd Annual Conference of the Association of Woman in Forestry Environment (AWIFE). Held at FRIN Hall, Ibadan 6th Nov. 2012, pp. 74-99.

Vol. 3, No. 03; 2018

ISSN: 2456-8643

Nurudeen, T.A., Ekpo, E.N., Olasupo, O.O., Okunrotifa, A.O. and Haastrup, N.O. (2014),"Effect of supplements on the yield and nutritional composition of oyster mushroom (*Pleurotussajor-caju*) cultivated on sawdust",*JECET,*Vol. 3 No. 3 pp. 1142-1151.

Olorunsola, A.O. (2000),"Workshop Structure in the Small Scale Furniture Industry in Ibadan Metropolis",*Journal of Tropical Forest Resources*, Vol. 16 No. 1, pp. 46-57.

Singha, S.R., Bishnoib, D.K. and Singhc A. (2010)'"Cost Benefit Analysis and Marketing of Mushroom in Haryana", *Agricultural Economics Research Review,*Vol. 23, pp. 165-171.

Small and Medium Enterprises Development Agency of Nigeria (2002),"Policy Reversals ground under the small and medium enterprises equity investment scheme", available at: www.nigeriabusiness.info.com/nigeian-smes2002.htm.(accessed on 15 December, 2015).

Wu, S.R.; Zhao, C.Y.; Hou, B.; Tai, L.M.; Gui, M.Y. (2013),"Analysis on Chinese edible fungus production area layout of nearly five years". *Edible Fungi China*, Vol.1 pp.51-53.
Zhang, Y., Geng, W., Shen, Y., Wang Y. and Dai Y. (2014),"Edible Mushroom Cultivation for Food Security and Rural Development in China: Bio-Innovation, Technological Dissemination and Marketing",*Sustainability*, Vol. 6, pp. 2961-29