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Economic Assessment of Dual Purpose Type of Cattle Farming in Minahasa Regency – Indonesia

(Research Article)
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ABSTRACT

The aim of this study was to analyze dual purpose type of cattle farm households' economy in Langowan District Minahasa Regency, Indonesia. Data relies on sample survey of 100 farm households in Tumarats Village during 2017. Descriptive and quantitative analysis using a probit model was employed. Result of this study showed that Family labor absorbed by cattle farms on the first, second and third scales were 44.34, 27.46 and 16.82 man days/AU/year respectively. The contribution of cattle income on the first, second and third scales were 52.84%, 66.31% and 70.19% respectively. Value added of cattle, selling price, family labor, cattle labor and cultivated land area had significantly positive effect on households' decision to increase cattle scale of business.

1. INTRODUCTION

Three elements that always interact in household activity are production, income and consumption. Process of production, consumption, income and labor utilization on beef cattle farmers is influenced by government regulation. Cattle farmers have to work hard in order to increase their income and production.

Input price and labor wage will affect household's income and then influence household's consumption (Udoet al, 2011:25; Hartono, 2006:226; Wantasen et al. 2012:142; Dalie et al, 2015:93) Hence, process of production will affect households decision in consumption through household's income and expenditures. The increasing of farmers income will improve farmers welfare in the villages area. Farmers begin consume much more food especially high quality food such as grain, eggs, milk, fruits. Surplus of beef cattle production will increase farmer's standard of living (Anis et al, 2015:39)

Households food consumption pattern is determined by their income. If cattle farm household get more income they will change their consume pattern. Angel's low stated that the contribution of income in food consumption by households will decrease along with the income increase while non food consumption tend to be more than before. Increasing the share of non food consumption indicated that household economic condition are getting better. There are two types of non food consumption such as consumption by needs and consumption by wants. The consumption by wants will affect household saving, investment and production (Obayelu et al, 2009:21-23).

Households in village of Tumaratas Minahasa Regency are traditionally managing strain of ongole crossbreed cattle in small scale business and the cattle remains utilized as a source of farm labor processing and transportation of agricultural product. Therefore it was clear that cattle on this area is known as dual purpose type. Its provide meat, draught power for tillage, hauling carts, handling, dragging and stacking timber logs in forests and produce manure as input for crops production. Households income is obtained from on farm activities, off farm and non farm activities. The study of cattle households economy heve been conducted including In Indonesia (Umar et al, 2008:5; Bart et al, 2013: 155-156; Sikhweni and Hassan, 2013: 40; Kalangi et al, 2014:34). The studies showed the positive effect of input factor on beef cattle production, production cost, revenue and income as well as in dairy farm. Unfortunately detailed economic assessments of dual purpose type of cattle that covered cost production, revenue, households income, households consumption and factors affected households' decision to expand dual purpose cattle business scale in smallholder level are still rare. Therefore the present study was undertaken with the objectives to analyze cattle households economy, family labor utilization, cost of cattle production as well as its revenue, households income, expenditures and factors affect households' decision to increase cattle business scale.

2. MATERIALS and METHODS

This research was a case study employed in Tumaratas village, District of West Langowan, Minahasa Regency North Sulawesi Province. Tumaratas village was purposively chosen based on largest cattle population in District of West Langowan of 3,764 heads in 2016 (Center of Statistics Bureau, 2016:384) and farmers had implemented relatively good management on cattle compare to farmers in other villages (Wantasen and Paputungan, 2017: 298)

The study used 100 sample of respondents selected by stratified purposive random sampling considering that farmers at least had one ongole crossbreed cattle and ever sold it. There were 135 farm households of cattle on this study site fulfilled this criterion. Number of samples calculated by applying formula of Knottnerus (2003:153-154):

$$n = \frac{N}{N(d)^2 + 1}$$

Where :

n = Number of sample

N = Number of population = 135

d = Sample error (critical value 5% = 0.05)

where: N (d)2 + 1 = 135(0.05)2 + 1 = 1.34

n = 135/1.34 = 100.74

Data were analyzed by using descriptive and quantitative methods. Descriptive analysis described the source of households income, income from cattle business, number of cattle ownership, households expenditure or households consumption. In order to fit with the real condition in study site, selected sample are grouped into three scales of cattle ownership consist of ≤ 5 Animal Unit (AU) , 50 respondents, 5-10 AU, 30 respondents and >10 AU, 20 respondents. Survey method is used for data collection through interviews to farmers using questionnaires in 2017. Data collection consisted of cattle size, cultivated land area, family labor, farmers' education, age, value added of cattle, cattle price, cost of forage, production cost, households income and households expenditure. Quantitative analysis was used to determine the economic incentive or income and to determine factors influencing farmers' decision to improve cattle business scale. Income was computed by subtracting revenue obtained to cost of production spent by farmers. The formula is given as follow (Amir and Natnipscheer, 1989: 79) :

Π = TR – TC

Where:

Π = Income/ economic incentive (IDR/year/farmer)

TR = Total revenue (IDR/year/farmer)

TC = Total Cost (IDR/year/farmer)

Pyndick and Rubenfeld (1991: 229) stated, probit model is a type of regression where the dependent variable can take only two values. The purpose of the model is to estimate the probability that an observation with particular characteristics will fall into a specific one of the categories; moreover, classifying observations based on their predicted probabilities is a type of binary classification model. Suppose a response variable Y is binary, that is it can have only two possible outcomes which we will denote as 1 and 0. For example, Y may represent presence/absence of a certain condition, success/failure of some device, answer yes/no on a survey, etc. We also have a vector of regressors X, which are assumed to influence the outcome Y, and ϵ_i is random variables that assumes is normal. Specifically, we assume that the model takes the form

Pr $(Y_i{=}1)$ = Pr $(\epsilon_i \geq - \beta X_i)$ = 1- Φ $(- \beta X_i)$ = Φ (βX_i) ……………………………(1)

Since Pr $(Y_i = 0)$ = 1 - Pr $(Y_i {=}1)$…………………………………………………... (2)
can also say

Pr $(Y_i = 0)$ = Φ $(-\beta X_i)$……………………………………………………… (3)

where Pr denotes probability, and Φ is the Cumulative Distribution Function (CDF) of the standard normal distribution. The parameters β are typically estimated by maximum likelihood.

A probit model was used to determine factor affecting the farmers' decision to increase cattle scale of business. A procedure to measure breeders' decision was to apply both binary and non binary variables for quantify factors mostly affecting positive or negative of farmers' decision to rise cattle production. A probit procedure that specifies the binary dependent as a function of the number of quantitative explanatory variables was used for the ability of generating bounded probability estimates. For individual farmer (Borooah, 2002: 57). The formula used to estimate factors influencing farmers' decision to increase cattle business scale in the model of Gujarati (2001:387) showed as follows:

$Y_i = \alpha + \beta X_i + e_i$ …………………………………………………………………….(4)

Where X_i represent vectors of explanatory variables of the ith farmer, Y_i is a binary variables such as $Y_i = 1$ if the i th farmer wants to increase production of cattle and $Y_i = 0$ if otherwise. X_i is assumed to be stochastic and independent of the zero mean random variable e_i. Y_i can be assumed to two different values, i 0 and 1. So the expected probability could be obtained:

$E(Y_i) = 1 \times f_i(1) + 0 \times f_i(0) = f_i(1)$…………………………………………………. (5)

Where, $f_i(1)$ is probability of expanding operation for a farmer with a set of resources and economic characteristic (X_i). From (4) and (5)

$E(Y_i) = \alpha + \beta X_i$ …………………………………………………………………...(6)

meaning that the probability of $f_i(1)$ would be different for farmers with different levels of resources and economic characteristics. Hence, the expected probability $E(Y_i)$ which could be interpreted as the proportion of all farmers with resources and economic characteristics (X_i) mostly increasing production scale would be:

$0 \leq \alpha + \beta X_i \leq 1$ ………………………………………………………………….(7)

General probit model for ith farmer is shown as follows (Borooah, 2002:254)

FD = F (VAC, PRICE, HS, FLAB, CLAB, EDU, LAND, AGE, CFOR)

The dependent variable was hypothetical index of farmers' decision to increase cattle production. The maximum likelihood technique was used to estimate the coefficient of cattle business scale (Gujarati, 2001:177)

The independent variables in the model with expected signs are presented in Table 1:

Table 1. Explanatory Variables

Explanatory Variables	Explanation	Expected Sign
VAC	Value added of cattle	+
PRICE	Selling Price of cattle	+
HERD SIZE	Actual number of cattle	-
FLAB	Family Labors working on cattle business	+
CLAB	Cattle labor	+
EDU	Dummy variable whether or not farmers has a high school education or above (1= yes, 0= otherwise)	-
LAND	Cultivated land area	+
AGE	Actual age of farmer	-
CFOR	Cost of forage is measured by money value of time that spent by household to fed cattle	-

Stastitical likelihood ratio (LR) was used as F test on the OLS method to test null hypothesis that all the explanatory variables simultaneously affect the dependent variable. In order to know the goodness of regression line we use coefficient of determination developed by McFadden (R2McF) where the value is ranging 0 and 1. Completion analysis was conducted by using computer with Eviews software version 8.

3. RESULTS and DISCUSSIONS

3.1. Cattles Ownership

Most of people in Tumaratas Village worked in agricultural sector include of rearing cattle. This site is known as center of cattles' production and development in Minahasa Regency. Average rain fall is 2,500-3,000 mm per year, temperature ranging is 24oC – 28oC while moisture is 91%. Such climatic condition makes West Langowan district potensial for crops and livestock development. Farmers cultivated their land with various crops such as cabbage, tomato, chili, onion, carrot, maize, ground nut, red bean and patato. Farmers raised ongole breed of cattle since this type of cattle was very useful particularly to provide meat and cultivate their land. The average of herd size per household was 3.47 heads. Based on the result of this study that is presented in Figure 1 showed that number of cattle owned by households on the first, second and third scales were 3.90, 6.25 and 11.00 Animal unit (AU) respectively. The result was different with Jaleta and Gebremedhin (2012:204) stated that in Ethiopian highland on average households own about 6.5 AU but in parallel with Umar et al., (2008:7) that inform average household owned around 2 to 4 heads of cattles.
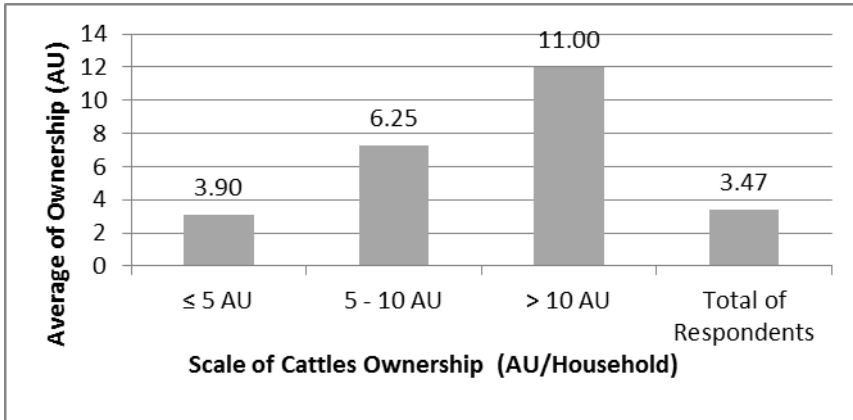
Figure 1. Average Of Cattle ownership

The result indicated that households had already taken advantage of all resources available in Village of Tumaratas and enhance their farming system due to cattle can produce meat, organic fertilizer, provide draught power and absorb family labor (Asmah, 2011:330; Franzluebbers, 2007:365-366)

3.2. Family Labor

Households still use family labor to manage the cattle business. As shown in figure 2 the study revealed that family labor absorbed in cattle farming on the first, second and third scales were 44.34, 27.46 and 16.82 man days/AU/year respectively. On the average the use of family labor is 41.22 men days/year. The study was in line with Dalie et al. (2011:30-31) revealed that the greater of herd size, the more efficient the use of family labor. Activities conducted by breeders in relation with rise cattle including feeding, matting, bathing, impounding, selling and manure processing, The study showed that cattle business was able to overcome the problem of labor in rural area especially in Minahasa Regency.
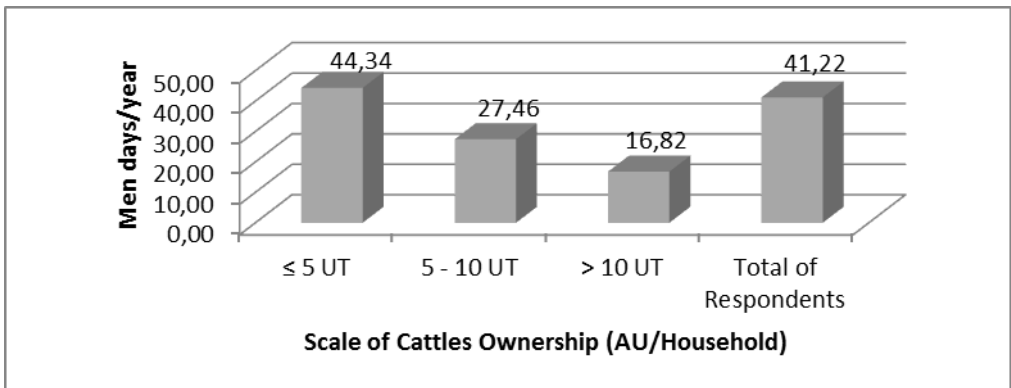
Figure 2. Family labor on cattle business

3.3. Households' Income

Household's income was obtained from on farm activities including raise cattle, plant cabbage, tomato, chili, onion, carrot, maize, ground nut, red bean and patato, off farm activies such as sell processed of agricultural products, and non farm activities such as non agriculture worker, remitant and national civil servant. Income share for on farm, off farm and non farm activities are presented in Table 2.

Table 2. Income Share for Each Activity of Household (IDR/Year/Household)

Income sources	≤ 5 AU	5-10AU	>10 AU	Total Samples
Rearing cattles	34,053,721 (52.84%)	102,745,856 (66.31%)	180,151,400 (70.19%)	39,636,226 (50.17%)
Crops	16,358,645 (25.38%)	24,628,681 (15.89%)	39,028,650 (15.21%)	17,081,548 (28.80%)
Off Farm	4,978,753 (7.72%)	3,883,333 (2.51%)	25,500,000 (9.93%)	5,118,240 (6.07%)
Non Farm	9,059,505 (14.06%)	23,691,667 (15.29%)	12,000.000 (4.68%)	9,966,840 (14.96%)

The contribution of income from cattle business was the largest one compared with other sources of income in the household. It was indicated that catlle was still the main bisiness of household especially on scale 2 (5-10 AU) and scale 3 (>10AU) for its contribution had exceed 60%. The studi was consistent with Pohler et al (2011:383) who stated that cows are viewed as primary income source of households' farmers in USA. The share of income from crops was relatively less for 15.21% to 25.38% . It can be seen in Table 2 that the increase of herd size, the income share of crops tend to decrease because households give more attention on their cattle business. Income from non farm activity seem to be lower by increasing of herd size. It considered make sense since household look for other income sources to meet their needs particularly when income from cattle business tend to decrease. Breeders earn income from cattle farming through selling cattles, organic fertilizer, value added of cattles, cattle labor, rent out of stud cattle. Cost of production included of cost of forage, cost of health, cost of labor and cost of stable. Households' income from cattle business is presented in Table 3.

Table 3. Households' Income on Cattle Business

Herds Size (AU)	Average of cattle ownership (AU)	Annual Revenue (IDR/AU)	Annual cost of Production (IDR/AU)	Annual Income (IDR/AU)
<5 AU	3.90	12,804,300	2,413,646	10,390,654
5-10 AU	6.25	14,726,325	1,654,847	13,071,478
>10 AU	11.00	15,195,833	1,103,117	14,092,716
Total of Respondents	3,47	13.363.280	2.276.538	11.086.742

Table 3 explained that the more the cattle raised, the more the income obtained by household from cattle business due to the higher scale of bisiness, household can sell more cattle and manure as well as rent out of cattle labor to obtained more income. Some researcher showed

that extensive, semi intensive and intensive farming included livestock was one of the approach to increase the production, productivity and income of smallholder farming (Stainfield and Mack, 2001:20; McLeod et al, 2007:112-113; Anis et al, 2015:39)

3.4. Households' Expenditures

Households' expenditures is a total amount of money spent by households to meet their needs at the certain period of time. The greater the portion of income used on non food consumption indicated the increase of household welfare. The pattern of household consumption expenditures was devided into two parts namely expenditures on food consumption and expenditures on non food consumption. Expenditures on food consumption included rice, eggs, meat, fish, cooking oil etc. Non food consumption expenditures included education, health, clothing, electricity, housing, water, soap, fuel, social and spiritual, recreation, feast, savings etc.

The study indicated that in absolute terms the more animal are kept, the greater the expenditure consumption but the percentage was getting smaller. (Table 4). This indicated that the dual purpose type of cattle business had improved quality of life of household in Minahasa Regency.

Table 4. Households' Consumption Expenditures

Type of Consumption	Total Consumption			Total Of Respondent
	< 5 AU	5-10 AU	> 10 UT	
Food Consumption (IDR/Year)	13,121,314	15,993,333	19,068,000	13,409,672
	(55.83%)	(54.26%)	(45.62%)	(55.77%)
Non Food Consumption (IDR/Year)	10,380,629	13,480,167	22,725,000	10,633,475
	(44.17%)	(45.74%)	(54.37%)	(44.23%)

3.5. Factors Influencing Households' Decision to Increase Cattle Business

Probit Regression of Households' Decision to Increase Cattle Business Scale is shown in Table 5.

Table 5.Probit Regression of Households' Decision to Increase Cattle Business Scale

Independent variables	Coefficient	Standart error	Probability
Constant	-9.33658	1.14773	0.0000
VAC	1.22644[***]	0.27115	0.0043
PRICE	1.05437[**]	0.37446	0.0366
HERD SIZE	-0.03175[*]	0.00433	0.0685
FLAB	1.33674[***]	0.25771	0.0008
CLAB	1.25635[***]	0.54358	0.0076
EDU	-1,32364[*]	0.54421	0.0845
LAND	0.14283[*]	0.25533	0.0772
AGE	0.01665	0.03442	0.7758
CFOR	0.19664	0.16643	0.9547
Log Likelihood	-48,72157[***]		0.0039
Mc Fadden R^2	0.78574		

*** Significant rate at 0.01 (p<0.01)
** Significant rate at 0.05 (p<0.05)
 * Significant rate at 0.10 (p<0.10)

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Table 5 showed that Value added of cattle, selling price, family labor, cattle labor and cultivated land area had a significant and positive effect on households' decision to increase cattle business scale. Level of education and herd size had a significant and negative impact on breeders' decision to increase cattle business scale while age and cost of forage were not affect farmers' decision. It implies that the factors of family labor, cattle labor and value added of cattle were mostly improve possibility of increasing productivity and provide better opportunity for increase income in the future. Altogether the dependent variables have effect to households' decision as much as 78.57% (R2McF = 0.7857). The value of log likelihood was 48.72 (p<0.01) meaning that all independent variables in the model effected the dependent variables simultaneously. Value added of cattle was closely related to household decision to increase cattle production (p< 0.01) because cattle can produce feces that could be made as organic fertilizer. Farm households had been able to process cow dung into organic fertilizer. They had several times received guidance from agricultural extension at the study site. Organic fertilizer was used by farmers on their crops. Moreover farmers could rent out cattle labor as well as cattle as stud. The organic fertilizer was very useful for crops and forage planted by farmers besides minimizes the use of agrochemicals, reduces environmental impact, improve soil structure and fertility. If farmers have larger value added from cattle they will increase the number of cattle due to the income they will have. The result was different with previews study since they didn't measure value added of cattle impact on income and households' decision to increase cattle business scale (Raharjo and Suroyo, 2013:143 Wantasen et al, 2013: 152). Family labor had a significant influence (p< 0.01) on households' decision to increase cattle business scale. Variety of tasks in rearing cattle such as feeding cattle, looking for forage, bathing and breeding need family labor to perform it. Therefore family with large members was useful for rearing cattle particularly to looking for forage as the main input. Availability of family labor was very important to guarantee the sufficient number of forage. Hence, household could increase business scale if the forage available in large number.

Cattle labor had a significant effect on households' decision (p<0.01) because there were many of cultivated lands needed cattle labor. Cattle can serve both as a source of power for ploughing farm land and as a means of transportation. Tractor usage was still considered more expensive than labor of cattle. Many farmers in village of Tumaratas rent out their cattle to get money income. Therefore the more cattle they rent out, the more income they earned. The implication was that household would improve the cattle scale if they earned more money.

Price of cattle had a significant influence on households' decision (p< 0.05) to increase the scale of cattle business. The selling price of cattle in the study area depends on the physical condition of livestock, sex and age. Farmers prefered to maintain cattle from ongole crossbreed type and had good characteristics included productive working on farm land, has clean- white colour, healthy body, have a high hump. All characteristics mentioned was considered as factors that had contributed on economic incentive of cattle price. Therefore household was interested in increasing their scale of cattle business.

Herd size had negative response (p<0.10) on households' decision to increase cattle scale. Farmers with smaller herd size will tend to increase the scale of cattle business due to their capacity and feed availability. If farmers have larger business scale of cattle they were not

interested in improving the scale of business because they need more forages to meet livestocks requirement.

Education had negative influenced ($p<0.10$) on households' decision to increase scale of cattle business. It showed that farmers with higher level of education tend to work outside of agricultural sector with more income and relatively high of social status. The result was in line with Asmah (2011:332) claimed the lower level of educated farmers had use less technology innovation on their business of cattle.

Although effort to increase scale of cattle need substantially large of cash input to purchase more cattle, forage and adequate infrastructures however the annually income of farmers from cattle business was average IDR 11,086,742 whereas the annually cost production was average IDR 2,276,538 indicating that household had economic incentive to increase their cattle scale of business. The result was consistent with Kalangi et al. (2007:32) and Bart et al.(2013:159) who claimed that income had significant influence on farmers' decision to increase the cattle business scale.

4. CONCLUSION

The study indicated that the cattle business on Tumaratas Village, Minahasa Regency was the main business of household due to absorbed family labor, increase both family income and non food consumption. Value added of cattle, family labor, cattle labor, selling price of cattle had positive impact on farmers' decision to increase cattle business scale. In contrary, level of education and herd size had negative effect on households'decision, while age of farmer and cost of forage had not indicated significant effect.

The study showed that cattle farming could improve farmers' income in Minahasa Regency. Nevertheless farmers still face problems to develop herd size such as forages availability and technology of cattle reproduction. Therefore the local government District of Minahasa should introduce the kind of quality forages and intensify the implementation of insemination technology and natural mating system by using superior bull cattle. Local government need to train cattle farmers to inseminate and facilitate them with equipment due to limited number of inseminator in the region. So that farmers will not rely on the inseminator officer to increase their owned cattle number.

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Meeting European Union's Food and Agricultural Products Imports Standards: Challenges and Opportunities for Developing Countries

(Research Article)
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ABSTRACT

This paper aims to examine the European Union (EU) sanitary and phytosanitary standards (SPSS) regulations and Rapid Alert System for Food and Feed (RASFF) mode of operation for importing food and agricultural products from developing countries. The authors discussed different EU's rules for importing food and agricultural products from developing countries. These includes food hygiene packing, hazard analysis of critical control point (HACCP), Traceability and RASFF activities. Accessing EU markets is not an easy tasks for agro-food industries among developing countries. Although there is no any barrier for trade to EU markets, but the stringent sanitary and phytosanitary standards (SPSS) make it difficult for developing countries to export their Food and Agricultural Products into EU markets.

1. INTRODUCTION

The European Union's food policy is based on high food safety standards, which aims to protect, and promote consumers' health. This policy take into consideration the risks associated with all stages of food supply chain and provide effectives rules and regulations to protect the consumers from effect of these risks. As a result, Sanitary and Phytosanitary Standard (SPSS) regulations was established in all EU member states to ensure food safety for its consumers. It main aim is to operate a competent control system that monitors and

enforces EU food safety rules and regulations to all exporting countries of food and agricultural products (FAP).

The SPSS regulations of EU is the most stringent in the world (Batz, et al., 2011) and getting access to the EU markets remains tough tasks especially for FAP exporters from developing countries. More often than none, exporters from developing countries who have a comparative advantage in exporting FAP are affected by the SPSS regulations due to inadequate traceability, poor storage facilities, limited access to international safety standard certification agencies and so on. Hence, agro-based industries from these nations are confronted with myriad of challenges in getting access to about 500 million consumers in the EU markets due to three main reasons. Firstly, the entire food supply chain from countries of origin are subjected to screening on regular basis by veterinary staff from EU. Secondly, strict border control for any FAP importing into EU member states. Thirdly, food that have successfully pass the border check-in patrol have to undergo internal quality control before they can be certified fit for the EU market. Information obtained from border and internal quality control are disseminated among all EU member states through a transmitter called Rapid Alert System for Food and Feed (RASFF). The EU member states use RASFF in exchanging information about actions taken concerning health risks identified in relation to FAP. This exchange of information assists member states to act accordingly and effectively in response to any potential health threats caused by FAP.

The question that this study aims to address is why exporting FAP by developing countries into European Union (EU) member states remains a challenging task for the past decades. The dilemma is that most farmers and agro-based industries in the developing nations lack full information about SPSS and RASFF and how it operates. More often than none, they export FAP to EU markets with the anticipation of making large profits but end up in a serious losses. Perhaps, this is because the FAP do not meet the minimum requirements of SPSS regulations and hence, rejected at border. Perhaps, sometimes the FAP may passed the border but unfortunately may found wanting and withdraw from the market. Such predicaments are detrimental to farmers as well as to agro-based industries in the developing countries where livelihood mostly depends on agriculture. Thus, it is against this background that this study aims to examine the EU's SPSS regulations and RASFF's mode of operation. The information will assist farmers and agro-based industries in developing countries in taking appropriate measures when exporting FAP into EU markets in order to ensure smooth passage of their products into the EU markets.

2. FOOD HYGIENE PACKAGE (FHP)

The latest regulations was the "EU General Food Law" (178/2002) which was officially announced in 2005 (Table 1). Its aim is to harmonize framework for food safety assurance from farm gate to final consumer within the EU member states (Bostock et al., 2004). This new rule offers a single and transparent food hygiene systems called "Food Hygiene Package (FHP)" (Ababouch et al., 2005). The key features of the FHP that are important for exporting countries are listed below (Ponte et al., 2005):

i.   food sectors needs to comply with the safety rules at all level of food supply chain,
ii. countries exporting their products to the EU must comply phytosanitary regulations,
iii. exporting countries are required to appoint competent authorities to ensure implementation of the sanitary and phytosanitary rules before certificate can be issued.

Table 1. New European Union Hygiene Package Regulations and Directives

Package	Regulation/Directive	Covering
Hygiene 1	European Parliament and Council Regulation (CE) 852/2004 on the hygiene of foodstuffs	General requirements primary production, technical requirements, HACCP, registrations/approval of food businesses, national guides to good practice
Hygiene 2	European Parliament and Council Regulation (CE) 853/2004 laying down specific hygiene rules	Specific hygiene rules for food of animal origin (approval of establishments, health and identification marking, imports, food chain information
Hygiene 3	European Parliament and Council Regulation (CE) 854/2004 laying down specific rules for the organization of official controls on products of animal origin intended for human consumption	Detailed rules for the organization of official controls on products of animal origin (methods to verify compliance with Hygiene 1 & 2 and animal by-products regulation 1774/2002
Hygiene 4	Council Regulation (CE) 882/04 laying down health rules governing the production, processing and importation of products of animal origin	Veterinary certification, compliance with EU rules
Hygiene 5	European Parliament and Council Directive 2004/41/EC repealing 17 existing Directives	

Source: Ababouch et al, (2005)

3. HAZARD ANALYSIS CRITICAL CONTROL POINT (HACCP)

The HACCP was first introduced in 1973 as a procedure to control and monitor food processing industries in the United States. However, it was later accepted and implemented worldwide by Codex Alimentarius, the EU and other countries including Canada, Australia, New Zealand and Japan. The EU officially legislated HACCP principles in 1991. These principles are mandatory for all EU member countries as well as exporting countries to the EU (Cato and Lima dos Santos, 1998). The EU demanded all exporting countries to comply with the HACCP principles. However, before the HACCP guidelines are to be implemented, certain prerequisites have to be observed. They are the 'Good Hygienic Practices (GHP)' and the 'Good Manufacturing Practice (GMP)'. The GMP is a general policy related to practices, procedures and processes that is vital to produce food products that are safe for consumption and of uniform quality. On the other hand, the GHP is an integral part of GMP that deals with measures required to ensure proper hygiene and safety of food products (Blackburn, 2003).

HACCP is a scientific and systematic approach that identifies, assesses and controls potential hazards to ensure that food and food products are safe for consumption at all levels of supply chain (Huss et al., 2004). This includes, production, processing, manufacturing, packaging, storage, transportation and distribution of food products, i.e. from the farm gate to the final consumer. The principles of HACCP are listed below (ICTSD, 2006; and Cato, and Lima dos Santos 1998):

    i.   Conduct a thorough hazard analysis
   ii.   Estimate the critical control points
  iii.   Estimate critical limits

iv.   Create a system to monitor the critical control point
 v.   Provide the corrective action to be taken when monitoring indicates that a particular critical point is not under control
vi.   Formulate a procedure for verification to confirm that the HACCP system is working effectively; and
vii.   Provide report concerning all procedures and records appropriate to these principles and their applications.

The EU established two monitoring systems in ensuring that exporting countries comply with the HACCP principles prior to arrival of their food products at the EU border. Firstly, exporting countries must obtain approval to export food products to the EU market. There are two categories of approvals granted to importing countries. The first type is granted to countries considered to have achieved high regulations and monitory system rates on food safety standards. Thus, these countries are given permits to import into the EU member states without border inspections. Nevertheless, samples of the consignments are randomly selected and subjected to various hazard tests. Any slight detection of a health hazard in the food products will prompt member countries to alert all other EU countries, usually via the RASFF. Ultimately, potential importing countries will be notified of the findings and have their consignments returned to their countries of origin.

The second category is for countries whose submissions are awaiting approval from EU authorities. Hence, their FAP are considered safe but consignments from these countries are subjected to series of vital and thorough tests. In this second category, FAP from developing countries must be certified by Competent Authorities (CA) approved by the destination EU country. Subsequently, certified food products are allocated HACCP certification number and this information is transmitted to EU accordingly (Ababouch et al. 2005). For instance, in Malaysia, the Ministry of Health has been appointed by the EU as the CA for fish and fishery products in 1996 under the Commission Decision 96/608/EC. Nevertheless, CA certified FAPs will be subjected to various vital hazard tests at borders and other entry points in the EU markets. If the FAP were considered unsafe for consumption they are outright rejected and sent back to country of origin. Similarly, those FAP that are initially fortunate to entered the EU market but later discovered to be contaminated are called back immediately through RASFF and destroy or sent back to its country of origin.

4. TRACEABILITY

The outbreak of mad cow disease and other food related diseases in the EU instigated radical changes in food industries. Hence, the issue of traceability was considered crucial. Traceability involves a process of proper documenting of activities along food supply chains such as feed, fertilizer, medications, antibiotics, pesticides, harvesting techniques, environmental monitoring, products handling, packaging and so on. The traceability systems are of two types; internal traceability and external traceability. The first refers to documentation at the production site while the later involves reporting activities along value chain (Lupin, 2006). Table 2 illustrates purposes, objectives and attributes of traceability system.

Table 2. Traceability, Purposes, Objectives, Attributes to Trace and Examples

Purpose	Objective	Attributes
Safety	Consumer protection (through recall and withdrawal)	Specified in food & fish safety regulations
Security	Prevention of criminal actions (through verifiable identification and deterrence)	Specified in security regulations
		Verification of selected attributes on package and/or food
Regulatory Quality	Consumer assurance (through recall and withdrawal)	Specific attributes included in regulations
Non-regulatory quality & Marketing	Creation and maintenance of credence attributes	Specific attributes included in public standards
Food chain trade & logistics management	Food chain uniformity & improved logistics	Specific attributes required to food and services suppliers by contract
Plant Management	Productivity improvement and costs reduction	Internal logistics and link to specific attributes

Source: Lupin (2006)

5. RAPID ALERT SYSTEM FOR FOOD AND FEED (RASFF)

The primary role of RASFF is to provide information on measures taken in response to risks associated with certain FAPs. These measures depend on the gravity of the risks identified and potential frequencies of their occurrences. It includes destruction of the consignments, re-dispatching and complete withdrawal of the product from markets. In some cases involving livestock, staffs from veterinary offices in EU countries are sent to the concerned potential importing countries to investigate the FAP production processes. Based on findings of such missions, countries in violation can incur stringent penalties such as banning of FAPs from a particular company or the entire industry of affected countries. A case in point is the EU ban of fish and fish products on Malaysia in 2008 (Alavi, 2009). Similarly, Benin Republic was given a two year ban on shrimp importation into the EU in 2003. (Houssa and Verpoorten, 2015). Other countries who experienced bans on fish products to EU include Bangladesh, Kenya and Uganda. Many empirical studies shows that the impact of such bans resulted in great economic losses. Though, the import bans of FAPs into EU markets has negative economic consequences. However, it is argued that such restrictions trigger overall improvement of the industries in the long run. Such experiences enable potential exporting countries strive to meet The EU's stringent sanitary and Phytosanitary standards, thereby gaining access to about 500 Million consumers. (Alavi, 2009; Dey, et al., 2005; Yunus, 2009;

Cato and Santos, 2000; Calzadilla-Sarmiento, 2002; Keizire, 2004; Henson and Jaffee 2006; Henson and Loader 2001)

RASFF notifications are classified into three divisions. They are alert, information and border rejection notifications.

5.1 Alert Notification

An alert notification is signaled when a food products, feed or food contact material that is in the market but is showing serious risk, thus necessitating a quick action. Among its responsibilities is to verify the market presence of the risky FAP from all network members and so, take immediate necessary actions. The alerts are generated by the member of the network that identified the case and has started appropriate measures, such as withdrawal or recall. Each network member country have their own approaches in carrying out such measures, including the provision of comprehensive information about the menace through the media if necessary. The percentage of alert notification growth over a period of five years is about 3.6% as shown in Table 3.

5.2 Information Notification

Information notification is specific to an identified health risk associated with FAP that do not necessitate immediate actions. Probable reasons could be that the risk is insignificant or the FAP concerned is yet to reach the EU market. The information notification is further classified into two sub-divisions namely information notification for follow-up and information notification for attention. The first is for FAP that are already in the market or intended for markets in another member country while the second one is for FAP that are present only in the notifying member country, has not been released to the market or is no longer available in the market.

5.3 Border Rejection Notification

A border rejection notification is targeted at consignments of FAP that are completely denied entry into the EU markets due to high risks associated to human health, animal health or to the environment. Though, the border rejection is the highest among the three divisions of RASFF notifications, its percentage changes over the years (2011-2015) is only 1.7 as illustrated in Table 3. This indicates that the exporting countries could not meet the SPSS of EU perhaps due to reasons such as ignorance of its regulations, insufficient information and inadequate processing and logistic facilities.

Table 3: The number of notifications from 2011 to 2015

Year	Alert	Border rejection	information for attention	information for follow-up
2011	617	1820	720	551
2012	523	1712	679	507
2013	584	1438	679	429
2014	725	1357	605	402
2015	750	1380	476	378
% Changes	3.4	1.7	-21.3	-6

Source: RASFF, 2015 report.

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6. NOTIFICATIONS BY FOOD PRODUCTS CATEGORY AND CLASSIFICATION

Fruits and vegetables have received the highest border rejection notifications followed by nuts, nuts products and seeds for the past five years (Table 4). Food contact materials are third on the list of rejected food products. The overall notifications received in 2015 by fruit and vegetables is about 634 in which 424 (67%) are border rejection cases. Similarly, nuts, nut products and seeds have received a total of 477 notifications out of which 403 (85%) are border rejection case. This high border rejection rate could be related to contamination found in the products that are hazardous to human health. On the other hand, fish and fish products, poultry meat and poultry meat products and meat and meat products (other than poultry) recorded border reject notifications of 67, 59 and 24 in 2015, respectively. These three food categories received highest alert than rejection notifications. Milk and milk products received least number of notifications with no border rejection in 2013 and 2015, respectively. Perhaps, these products are exported from developed countries such as Netherlands and Denmark to EU markets. More often than none, these border rejections cases were mainly due to lack of information on sanitary and phytosanitary regulations and inadequate modern facilities from the exporting countries. Consequently, information on EU sanitary and phytosanitary standard regulations on FAP becomes imperative for exporting countries so as to enable them access market worth of 500 million consumers in the EU member countries.

Table 4: Notifications by product category and by classification

Products category	2011		2012		2013		2014		2015
	Alert	BR	Alert	BR	Alert	BR	Alert	BR	Alert
Fish and fish products	95	217	63	166	77	86	118	82	104
Fruit and vegetables	61	360	40	479	55	402	91	369	81
Meat and meat products	61	50	65	40	74	64	67	53	83
Poultry meat and poultry meat products	20	14	19	53	50	106	48	79	62
Milk and milk products	22	4	25	2	22	0	48	3	48
Herbs and spices	26	116	31	83	18	77	37	51	40
Cereal and bakery products	57	64	36	69	42	36	45	43	65
Nuts, nut products and seeds	30	424	15	272	30	215	31	250	46
Food contact materials	61	125	40	127	23	156	23	104	24
Feed materials	13	133	8	103	24	65	25	55	12

BR= border rejection; Source: RASFF, 2011-2015 annual reports

7. CONCLUSION

Exporting food and agricultural products (FAP) to the lucrative EU markets by developing countries is an intimidating and difficult task due to its stringent sanitary and phytosanitary regulations enforced by EU member states. According to the regulations, all FAP must undergo thorough health hazard investigation before they can be granted entries into EU markets. Therefore, any FAP found to be in violation of EU market standards, is out rightly rejected at the border and sent back to its country of origin. In some cases, FAP may be

successful with the border hazard tests but rejection notifications will be transmitted through RASFF for quick withdrawal of the products from the markets if they are later discovered to pose any risks. These situations have negatively affected the livelihoods of many farmers and agro-based industries in developing countries were agricultural practices are mostly traditional. Besides, several workers lost their jobs due to this strict food hygiene rules of EU. Therefore, government agencies and authorities responsible for food and agro-based industries in developing countries need to support farmers and agro-allied entrepreneurs by providing them with current information and effective guidelines to ensure that their products meet the EU's sanitary and phytosanitary standards. Furthermore, compensations should be provided by government to those whose FAP were rejected to cushion the impact of economic losses to their agribusiness. More importantly, EU states should ensure that rejected FAPs are prevented from returning to their countries of origin by properly disposing them.

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Muhasebe Meslek Mensuplarının Tükenmişlik ve İş Doyum Düzeyleri

(Araştırma Makalesi)

Burnout and Job Satisfaction Level of Accounting Professionals

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ÖZET

Anahtar kelimeler:

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Bu çalışmada muhasebe meslek mensuplarının tükenmişlik ve iş doyum düzeylerini ölçmek amacıyla bir anket uygulanmıştır. Önce katılımcıların demografik özellikleri sıklık ve yüzde değerleri itibariyle incelenmiştir. Sonra katılımcıların tükenmişlik anketinin üç ve iş doyum anketinin iki alt ölçeğine verdikleri karşılıkların ortalamalarının mesleki unvanları ve işletmedeki konumlarına göre farklılaşıp farklılaşmadığının analizi tek yönlü anova ile yapılmıştır. Duygusal tükenme, duyarsızlaşma ve kişisel başarı alt ölçeklerinden orta düzeyde tükenmişlik tespit edilmiştir. Bu ölçeklerdeki ifadelerin ortalamaları "çok nadir" ile "bazen" arasındadır. Meslek mensupları mesleki kariyerlerinde ilerledikçe duygusal tükenmişlik düzeyleri azalmaktadır. Minesota iş doyum anketindeki ifadelere verilen karşılıkların ortalamaları "memnunum" ve "kesinlikle memnunum" arasındadır. Ruhsat sahibi olmak ve buna yaklaşmak iş doyumunu arttıran bir faktördür. Ayrıca meslek mensubu işletme sahipliğine doğru ilerledikçe iş doyumu artmaktadır.

ABSTRACT

Keywords:

Professional accountant
Burnout
Job satisfaction

In this study, a questionnaire form was applied to measure the burnout and job satisfaction levels of accounting professionals. First, the demographic features of the participants were examined in terms of frequency and percentage. Later, the analyses of whether the averages of responses given to the three subscales of burnout and two subscales of the job satisfaction questionnaire by the participants are different or not were made via one-way anova. Moderate burnout was identified in emotional exhaustion, depersonalization and personal accomplishment subscales. The averages of expressions in this scale are between "sometimes" and "very rare". The levels of emotional exhaustion are decreasing as professionals move in their professional careers. The averages of the responses to the statements in the Minnesota job satisfaction questionnaire are between "satisfied" and "absolutely satisfied". Becoming a license holder and getting close to it is a factor that increases job satisfaction. In addition, as the members of the professions move towards the ownership of the business, the job satisfaction increases.

1. GİRİŞ

Tükenmişlik kavramı ilk olarak Freudenberger tarafından incelenmiştir. Freudenberger tükenmişliği, kişilerin yıpranması, kendilerini zorlamaları sonucunda güç kaybetmeleri ve diğer kişilerin isteklerini tam olarak karşılayamama hissinin kişiyi tüketmesi olarak tanımlamıştır (Aybas vd, 2013: 78). Mesleki tükenmişlik; bireyin bir eğitim sonucunda sahip olduğu meslek veya meslek unvanına karşı psikolojik olarak soğuması ve uzaklaşması olarak tanımlanabilir. Meslekte tükenme duygusu, bireyin sahip olduğu meslekte beklentilerini bulamaması, mesleğini isteyerek seçmemesi, mesleğinin gerekleri ile bireysel yeteneklerinin uyuşmaması, mesleğinin sağladığı bilgi ve becerileri kendine uygun bulmaması, mesleğin bireyin geleceğine ilişkin avantajlar sağlamaması ve mesleğine karşı psikolojik bir yakınlık hissetmemesi gibi nedenlerle ortaya çıkmaktadır. Meslekte tükenme psikolojik bir durum olarak bireyin mesleğine ilişkin tutum ve davranışlarının belirlenmesinde etkili olmaktadır (Dinçerol, 2013: 37).

Günümüzde tükenmişliğin en yaygın ve kabul gören tanımı, aynı zamanda kendi adıyla anılan Maslach Tükenmişlik Ölçeği (MBI)1'ni de geliştirmiş olan Christina Maslach tarafından yapılmıştır. Maslach'a göre tükenmişlik "işi gereği yoğun duygusal taleplere maruz kalan ve sürekli diğer insanlarla yüz yüze çalışmak durumunda olan kişilerde görülen fiziksel bitkinlik, uzun süreli yorgunluk, çaresizlik ve umutsuzluk duygularının, yapılan işe, hayata ve diğer insanlara karşı olumsuz tutumlarla yansıması ile oluşan bir sendrom"dur (Ardıç ve Polatçı, 2008: 70-71). Maslach tükenmişliği duygusal tükenme, duyarsızlaşma ve kişisel başarı olarak üç boyutta ele almıştır. Duygusal tükenme boyutu ile kişinin aşırı iş yükü nedeniyle yaşadığı tükenme anlatılmaktadır. Duyarsızlaşma boyutu ile kişinin hizmet verdiği diğer kişilere yönelik olarak duygusuz hale gelmesi ifade edilmektedir. Kişisel başarı boyutunda ise, kişi kendi başarılarının farkına varamaz hale gelir, hatta kendisini başarısız olarak değerlendirme eğilimindedir (Aybas vd, 2013: 78). Duygusal Tükenme alt ölçeği, ölçekte yer alan 1, 2, 3, 6, 8, 13, 14, 16 ve 20; duyarsızlaşma alt ölçeği 5, 10, 11, 15 ve 22 ve kişisel başarı ölçeği ise 4, 7, 9, 12, 17, 18, 19 ve 21 numaralı ifadelerden meydana gelir.

Araştırmada iş tatmini ölçeği olarak Minesota İş Doyum ölçeği kullanılmıştır. Weiss, Davis, England ve Lofquist tarafından geliştirilen, Baycan tarafından Türkçeye uyarlaması yapılan ölçekte toplam 20 madde bulunmaktadır (Akbulut, 2010;60). Ölçekteki 1, 2, 3, 4, 7, 8, 9, 10, 11, 15, 16 ve 20 numaralı ifadeler içsel doyumu; 5, 6, 12, 13, 14, 17, 18, 19 numaralı ifadeler dışsal doyumu ve ölçekte yer alan tüm ifadeler birlikte genel iş doyumunu ölçer.

İş doyumu, kişisel bir tutum olup, çalışanların iş ve iş yaşamındaki beklentilerine ulaştıkları zaman duydukları olumlu duygusal bir durumdur. İşyerinde yaşanan tatminsizlik bireyi olumsuz duygulara yöneltir. Böylece bireyin beden ve ruh sağlığında bozulmalar görülebilir. Çalışan bu durumda işinden uzaklaşma, işi terk etme, işe karşı kayıtsızlık, sürekli işten yakınma, mesleğin geleceğinden umutsuzluk vb. düşüncelerle tatminsizlik belirtileri gösterebilir (Akbulut, 2010;56). Tükenmişlik ve iş tatmini arasındaki ilişki kesin sınırlarla birbirinden ayrılmamıştır. İşinden memnun olmayan birey büyük olasılıkla tatminsiz olacaktır. Tatminsiz çalışan işini sevmezken; tükenmişlik hisseden bir kişi işini çok seviyor fakat yetmediğini düşünüyor olabilir. İş tatmininde işin olumsuz özellikleri ön plandayken tükenmişlikte bunlara ek olarak kişinin bakış açısı ve değerlendirmeleri de vardır. Birey işinde istediği tatmine ulaşamıyorsa tatminsiz, hem tatmine ulaşamıyor hem de kendisinin yetersiz olduğunu düşünüyorsa kendisini tükenmiş hisseder. Tükenmişlik kavramı ve iş

tatmini arasında ayrıma bakıldığında iki kavram arasında negatif bir ilişki olduğu dikkati çeker (Akbulut, 2010;56).

Muhasebe meslek mensuplarının tükenmişlik düzeyleriyle ilgili çok sayıda çalışma yapılmıştır. Yapılan tez çalışmalarında Nazlıoğlu (2009) çalışmasında meslek mensuplarında düşük ve orta düzeyde tükenmişlik tespit etmiş, 45 yaşından sonra tükenmişlik düzeyinin arttığını belirtmiş ve kişisel başarı yönünden yüksek düzeyde tatmin tespit etmiştir. Boyar (2011) tezinde muhasebe meslek mensuplarında düşük düzeyde tükenmişlik tespit etmiştir. Taysı (2012) tezinde muhasebe meslek mensuplarında genel olarak tükenmişlik düzeyinin yüksek olmadığını, kadınlarda 26-35 yaş grubunda, ön lisans mezunlarında, serbest muhasebeci mali müşavirlerde ve mesleki tecrübesi 1-5 yıl arası olanlarda daha yüksek düzeyde tükenmişlik tespit etmiştir. Kotan (2016) tezinde tüm alt düzeylerde normal tükenmişlik tespit etmiştir.

Konuyla ilgili yayınlanmış pek çok makale vardır. Ersoy ve Utku (2005) tükenmişliğin tüm alt ölçeklerin birbirleriyle ve alt ölçeklerin genel tükenmişlik puanı ile pozitif yönde anlamlı ilişkili olmasının, literatürdeki diğer araştırmalar ile uyumlu olduğunu ortaya koymuşlardır. Doğan ve Nazlıoğlu (2010) Kayseri ilinde faaliyet gösteren muhasebe meslek mensuplarında farklı düzeylerde tükenmişlik yaşandığını ve tükenmişlik boyutlarının genellikle orta düzeyde olduğunu tespit etmiştir. Ay ve Avşaroğlu (2010) muhasebe çalışanlarının hizmet yılı ve çalışanların yaş durumları ile mesleki tükenmişlikleri arasında anlamlı farklılıkların olduğunu ortaya koymuştur. Dalğar ve Tekşen (2014) Muhasebecilerin rol çelişkisi arttıkça mesleki tükenmişlik düzeylerinin de arttığı ve kişisel başarılarının ise azaldığı sonucuna ulaşmışlardır. Ayrıca muhasebecilerin medeni hali, günlük çalışma süreleri ve çocuk sahibi olup olmama durumları ile mesleki tükenmişlikleri arasında istatistiksel olarak anlamlı ilişkinin olduğunu tespit etmişlerdir. Yılmaz (2014) araştırmasında duygusal tükenme ile işe bağlılık düzeyi arasında negatif yönlü bir ilişki, kişisel başarı hissi ile işe bağlılık arasında ise pozitif yönlü bir ilişki tespit etmiştir. Deran ve Beller (2015) çalışmalarında Giresun il merkezinde mesleğini icra eden kişilerde tükenmişlik düzeyinin duygusal tükenme, duyarsızlaşma ve kişisel başarı alt boyutları açısından yüksek seviyeye karşılık geldiği tespit etmişlerdir. Özkan ve Aksoy (2015) Gaziantep ilinde çalışan muhasebe meslek mensuplarının tükenmişlik düzeylerinin düşük olduğunu ortaya koymuşlardır.

2. ARAŞTIRMANIN METODOLOJİSİ

2.1. Araştırmanın Amacı

Araştırmanın amacı muhasebe meslek elemanlarının tükenmişlik düzeylerini ve iş doyumlarını ölçmektir. Ayrıca çalışmada muhasebe meslek mensuplarının tükenmişlik ve iş doyumları ile mesleki unvan ve işletmedeki konumları arasındaki ilişkilerin ortaya konulması amaçlanmıştır.

2.2. Araştırmanın Ana Kütlesi ve Örneklemi

Araştırmanın ana kütlesi Türkiye'de faaliyet gösteren muhasebe meslek mensuplarıdır. Çalışmaya ruhsat sahibi olmayan ancak mesleğin icrasında yer alan stajyer ve diğer çalışanlar da dahil edilmiştir. Örneklem İstanbul, Ankara ve Kütahya illerinde faaliyet gösteren meslek mensupları arasından rassal olarak seçilmiştir.

2.3. Araştırmanın Kapsam ve Sınırlılıkları

Araştırmamızda İstanbul, Ankara ve Kütahya illerinde rassal olarak seçilen 350 muhasebe meslek mensubuna anket uygulanmıştır. Çalışmada elde edilen kullanılabilir anket sayısı 252'dir. Bu itibarla çalışmamızın Türkiye'deki tüm muhasebe meslek mensuplarını temsil yeteneğinin düşük olduğu söylenebilir. Diğer taraftan daha önce çalışmamızın amacına benzer amaçlarla üretilmiş ve dünya çapında kullanılmış, yeterlilik ve güvenilirliğini kanıtlamış anket formları kullanılmış olmasına rağmen, çalışma katılımcıların ifadeleri yanlış anlamasından kaynaklanan hataları barındırıyor olabilir.

2.4. Ölçme Aracının Geliştirilmesi

Çalışmamızda birincil veri toplamak amacıyla katılımcıların demografik özellikleri, Maslach Tükenmişlik Ölçeği ve Minnesota İş Doyum Ölçeği kullanılarak hazırlanan anket formu kullanılmış ve katılımcılara uygulanmıştır. Böylece ölçülmek istenen kapsam önceden belirlenerek ifadeler/maddeler bu kapsama göre hazırlanmıştır. Anketin ifadeleri Likert tipi 5'li ölçek ile hazırlanmıştır. Katılımcı her madde ile ilgili tutum derecesini bu seçeneklerden birisini işaretleyerek belirtmiştir.

2.5. Veri Toplama Süreci

Anket formu 2017 yılı Ekim-Aralık döneminde İstanbul, Ankara ve Kütahya illerinde rassal olarak seçilen 350 muhasebe meslek elemanlarına doldurulmak üzere bırakılmıştır. Bu süreçte bazı meslek mensupları anketi cevaplamayı ret etmiş, bazıları da anket formunu iade etmemişlerdir. Böylece bırakılan anketlerden 259 adedi geri alınabilmiştir. 259 anket formundan 252 adedinin kullanılabilir olduğu ve anket geri dönüş oranının yaklaşık % 72 olduğu değerlendirilmiştir.

3. VERİLERİN ANALİZİ

Araştırma verilerinin değerlendirilmesinde çeşitli istatistiksel tekniklerden yararlanılmıştır. İstatistiksel işlemler SPSS 17 istatistik paket programı ile yapılmıştır. Bu analizler için betimsel ve yordamsal istatistik teknikleri kullanılmıştır. Öncelikle katılımcıların demografik özellikleri sıklık ve yüzde değerleri incelenmiştir. Daha sonra katılımcıların tükenmişliğin üç alt ölçeği ve iş doyumunun iki alt ölçeğine verdikleri karşılıkların ortalamalarının mesleki unvanları ve işletmedeki konumları itibariyle farklı olup olmadıkları tek yönlü anova ile analiz edilmiştir.

3.1. Araştırmanın Güvenilirliği

Anketin güvenirlik çalışması, iç tutarlık katsayı (Cronbach alpha) değerleri hesaplanarak yapılmıştır. Cronbach alfa katsayısı, ölçek içinde bulunan maddelerin iç tutarlılığının (homojenliğinin) bir ölçüsüdür. Alfa katsayısı ölçekte yer alan k ifadenin varyansları toplamının genel varyansa oranlanması ile bulunan bir ağırlıklı standart değişim ortalamasıdır (Özdamar, 1997: 493). Eğer ilgili ölçeğin alfa katsayısı yüksekse "bu ölçekte bulunan maddelerin o ölçüde birbirleriyle tutarlı ve aynı özelliğin öğelerini yoklayan maddelerden oluştuğu ya da tüm maddelerin o ölçüde birlikte çalıştığı" (Alpar, 2003: 381) şeklinde yorumlanır.

Araştırmada kullanılan Minnesota İş Doyum Ölçeği ve Maslach Tükenmişlik Ölçeğinin güvenilirliklerini test etmek için Cronbach Alfa testi kullanılmıştır. Çalışmada kullanılan ölçekler için alfa katsayıları; Minnesota İş Doyum Ölçeğinin tamamı için 0,925; Maslach

Tükenmişlik Ölçeğinin tamamı için 0,842; Minesota İş Doyum ölçeğinin alt ölçekleri, içsel iş doyum için 0,887 ve dışsal iş doyumu için 0,825; Maslach Tükenmişlik Ölçeğinin alt ölçekleri Duygusal Tükenme için 0,840, Duyarsızlaşma için 0,582 ve Kişisel Başarı için 0,801 olarak hesaplanmıştır. Cronbach Alfa Katsayısına bağlı olarak ölçeğin güvenilirliği aşağıdaki gibi yorumlanır (Kalaycı vd., 2006, 405; Alpar, 2003: 382):

$0,80 \leq \alpha \leq 1,00$ ise ölçek yüksek derecede güvenilir bir ölçektir,

$0,60 \leq \alpha \leq 0,80$ ise ölçek oldukça güvenilir bir ölçektir,

$0,40 \leq \alpha \leq 0,60$ ise ölçeğin güvenilirliği düşüktür,

$0,00 \leq \alpha \leq 0,40$ ise ölçek güvenilir değildir.

Buna göre Duyarsızlaşma alt ölçeğinin güvenilirliği düşük, iki ölçeğin tamamı ve Duyarsızlaşma dışında diğer tüm alt ölçeklerin güvenilirliği yüksektir.

3.2. Araştırmanın Bulguları

3.2.1. Demografik Özellikler

Çalışmada kullanılan anket formunda meslek mensubunun unvanı, cinsiyeti, işletmedeki konumu, eğitim düzeyi, yaşı, mesleki tecrübesi ile işletmenin faaliyet süresi, mükellef sayısı ve işletmenin faaliyet süresi araştırılmıştır. Elde edilen sonuçlar Tablo 1'de sunulmuştur.

Tablo 1. Demografik Özellikler

Cevaplayanın Özellikleri (n=252)	Sıklık	%	İşletmenin Özellikleri (n=252)	Sıklık	%
Meslek Mensubunun Unvanı			**Mükellef Sayısı**		
1) Yeminli Mali Müşavir	10	4,0	1) 10'dan az	8	3,2
2) Serbest Muhasebeci Mali Müşavir	93	36,9	2) 11-20	38	15,1
3) Staj Başlatmayı Kazanmış Stajyer	52	20,6	3) 21-30	50	19,8
4) Staj Başlatma Sınavına Hazırlanan	33	13,1	4) 31-40	44	17,5
5) Diğer	64	25,4	5) 41-50	38	15,1
Cinsiyet			6) 50 ve üzeri	74	29,4
1) Erkek	144	57,1	**İşletmede Çalışan Sayısı**		
2) Kadın	108	42,9	1) 1-2	73	29,0
Konum			2) 2-5	95	37,7
1) Büro sahibi	48	19,0	3) 5-10	51	20,2
2) Büro ortağı	31	12,3	4) 10-20	20	7,9
3) Büro çalışanı	173	68,7	5) 20 ve üzeri	13	5,2
Eğitim			**İşletmenin Faaliyet Süresi**		
1) İlköğretim	13	5,2	1) 0-4 Yıl	58	23,0
2) Lise	28	11,1	2) 5-9 Yıl	74	29,4
3) Ön lisans	19	7,5	3) 10-14 Yıl	60	23,8
4) Lisans	168	66,7	4)15-19 Yıl	28	11,1
5) Yüksek Lisans	22	8,7	5) 20 ve Yıl üzeri	32	12,7
6) Doktora	2	,8			

Yaş		
1) 25 ve altı	67	26,6
2) 26-30	50	19,8
3) 31-35	40	15,9
4) 36-40	48	19,0
5) 41 ve üzeri	47	18,7
Cevaplayanın Mesleki Tecrübesi		
1) 0-4 yıl	98	38,9
2) 5-9 yıl	55	21,8
3) 10-14 yıl	55	21,8
4)15-19 yıl	25	9,9
5) 20 ve yıl üzeri	19	7,5

Katılımcıların çoğunluğu, mesleki ruhsatını henüz almamış, 30 yaşın altında, 15 yıldan daha az mesleki tecrübeye sahip erkek katılımcılardan oluşmaktadır. Ayrıca katılımcıların çalıştıkları işletmelerin çoğunluğu, 50'den az mükellefe, 10'dan az çalışana ve 15 yıldan daha az faaliyet süresine sahip meslek mensuplarıdır.

3.2.2. Tükenmişlik Düzeyleri

Çalışmada katılımcıların tükenmişlik düzeylerini ölçmek için Maslach Tükenmişlik Ölçeği kullanılmıştır. Ölçekte (0 hiçbir zaman, 1 Çok Nadir, 2 Bazen, 3 Çoğu Zaman ve 4 Her Zaman şeklinde) 5'li likert ölçeği kullanılmıştır. Katılımcıların tükenmişlik düzeylerinin ölçeğin alt ölçeklerine göre hesaplanma şekilleri Tablo 2'de sunulmuştur. Çalışmada her bir düzey için alınabilecek en yüksek puan hesabında; duygusal tükenme için 9 ifade ve en yüksek puan olan 4 çarpılarak 36 bulunmuştur. Aynı şekilde duyarsızlaşma için 20 ve kişisel başarı düzeyleri için 32 değerleri hesaplanmıştır. Düşük, orta ve yüksek şeklinde üç düzey bulunduğundan en yüksek puanlar 3'e bölünerek üçlü bir derecelendirme yapılmıştır. Kişisel başarı için elde edilen puanlar, ifadelerin özelliğinden dolayı, ters olarak değerlendirilmiştir. Yapılan değerlendirmelerden sonra katılımcıların tamamı için duygusal tükenme, duyarsızlaşma ve kişisel başarı alt ölçeklerinden orta düzeyde tükenmişlik tespit edilmiştir.

Tablo 2. Maslach Tükenmişlik Alt Ölçek Ortalamaları ve Düzeyleri

	Duygusal Tükenme	**Duyarsızlaşma**	**Kişisel Başarı**
Alınabilecek en yüksek puan	9 * 4 = 36	5 * 4 = 20	8 * 4 = 32
Düzey Sayısı	3	3	3
Düşük	0-12	0-6,67	21,39 ve üzeri
Orta	13-24	6,68-13,36	10,69-21,38
Yüksek	25 ve üzeri	13,37 ve üzeri	0-10,68
Ortalama	14,7500	7,8254	15,2103
Standart Sapma	7,58412	3,76729	6,40401
Düzey	Orta	Orta	Orta

3.2.2.1. Duygusal Tükenme Alt Ölçeği

Duygusal tükenme alt ölçeğinde yer alan ifadelerin ortalama ve standart sapmaları Tablo 3'te sunulmuştur.

Tablo 3. Duygusal Tükenme Alt Ölçeğindeki İfadelerin Ortalama ve Standart Sapmaları

İfade	Ort.	S.S.
14. İşimde gücümün üstünde çalıştığımı hissediyorum	1,9008	1,25689
8. İşimin beni tükettiğini hissediyorum	1,8929	1,22736
16. Doğrudan insanlarla çalışmak bende çok fazla strese neden oluyor	1,8016	1,20768
13. İşimin beni kısıtladığını hissediyorum	1,7698	1,20862
2. İşgününün sonunda kendimi ruhen tükenmiş hissediyorum	1,7381	1,44585
3. Sabah kalktığımda bu işi bir gün daha kaldıramayacağımı hissediyorum.	1,5278	1,43214
20.Yolun sonuna geldiğimi hissediyorum	1,4444	1,30005
6.Bütün gün insanlarla birlikte çalışmaktan gerginlik duyuyorum.	1,4365	1,15006
1. Kendimi işimden duygusal olarak uzaklaşmış hissediyorum	1,2381	1,18374

Duygusal tükenme alt ölçeğindeki ifadelere verilen karşılıkların ortalamaları 1,9008 ile 1,2381; standart sapmaları 1,44585 ile 1,15006 arasındadır. Elde edilen sonuçlar doğrultusunda duygusal tükenme ölçeğindeki ifadelerin ortalamalarının, kullanılan ölçek dikkate alındığında, "çok nadir" ile "bazen" arasında olduğu söylenebilir.

3.2.2.2. Duyarsızlaşma Alt Ölçeği

Duyarsızlaşma alt ölçeğindeki her bir ifadenin ortalama ve standart sapmaları Tablo 4'te sunulmuştur. Duyarsızlaşma alt ölçeğindeki ifadelere verilen karşılıkların ortalamaları 1,7698 ile 1,1429; standart sapmaları ise 1,35423 ile 1,11287 arasındadır. Buna göre verilen karşılıkların ortalamaları "çok nadir" ile "bazen" arasındadır.

Tablo 4. Duyarsızlaşma Alt Ölçeğindeki İfadelerin Ortalama ve Standart Sapmaları

İfade	Ort.	S.S.
11. Bu işin beni giderek katılaştırmasından korkuyorum.	1,7698	1,27909
10. Bu mesleğe başladığımdan beri insanlara karşı katılaştığımı hissediyorum	1,7659	1,16931
22. Mükelleflerimin bazı problemleri için beni suçladıklarını hissediyorum	1,6032	1,35423
15. Bazı mükelleflerin başına gelenler gerçekten umurumda değil	1,5437	1,22803
5. İşim gereği karşılaştığım bazılarına sanki insan değillermiş gibi davranıyorum	1,1429	1,11287

3.2.2.3. Kişisel Başarı Alt Ölçeği

Kişisel başarı alt ölçeğindeki her bir ifadenin ortalama ve standart sapmaları Tablo 5'te sunulmuştur. Bu ölçekte yer alan ifadelerin özelliğinden dolayı bu ifadelere verilen karşılıkların ortalamalarının yüksek olması olumlu olarak değerlendirilir. Buna göre verilen karşılıkların ortalamaları "çok nadir" ile " bazen" arasındadır.

Tablo 5. Kişisel Başarı Alt Ölçeğindeki İfadelerin Ortalama ve Standart Sapmaları

İfade	Ort.	S.S.
4. İşim gereği karşılaştığım insanların ne hissettiklerini anlayabilirim	1,7778	1,21340
7. İşim gereği karşılaştığım insanların sorunlarına en uygun çözüm yollarını bulurum.	2,0119	1,28888
9. İşimle diğer insanların yaşamlarını olumlu yönde etkilediğimi hissediyorum	1,7540	1,19218
12. Kendimi çok enerjik hissediyorum	1,7024	1,19207
17. Hizmet verdiğim kişilerle birlikte, kolaylıkla rahat bir ortam oluşturabiliyorum.	2,2143	1,27874

18. Hizmet verdiğim kişilerle yakından ilgilenince kendimi canlanmış hissediyorum.	2,0437	1,21825
19. Bu işte kayda değer birçok başarı elde ettim.	1,9286	1,26981
21. İşimde duygusal sorunlara soğukkanlılıkla yaklaşırım.	1,7778	1,25218

3.2.3. Tükenmişlik Alt Ölçeklerinin Fark Analizleri

Çalışmanın bu bölümünde katılımcıların her bir alt ölçek için verdikleri karşılıkların ortalamalarının katılımcıların mesleki unvanları ve işletmedeki konumlarına göre farklılığının analizi yapılmıştır.

3.2.3.1 Duygusal Tükenme

Bu bölümde katılımcıların duygusal tükenme alt ölçeğinde yer alan ifadelere verdikleri karşılıkların ortalamalarının mesleki unvan ve işletmede bulundukları konuma göre farklılığının analizi yapılmıştır.

3.2.3.1.1. Mesleki Unvana Göre Duygusal Tükenme Fark Analizi

Katılımcıların duygusal tükenme ölçeğinde yer alan ifadelere verdikleri karşılıkların ortalamalarının katılımcıların mesleki unvanlarına göre farklılık gösterip göstermediğinin analizi tek yönlü anova testi ile yapılmıştır. Elde edilen sonuçlar Tablo 6'da sunulmuştur.

Tablo 6. Mesleki Unvan Duygusal Tükenme Alt Ölçeği Fark Analizi

İfade	Mesleki Unvan	n	Ort.	S.S.	Levene İst.değ.	p	Sonuç
1. Kendimi işimden duygusal olarak uzaklaşmış hissediyorum	YMM	10	,3000	,48305	,000	0,000	H₁ Kabul
	SMM	93	,8817	,87040			
	SBK	52	1,1154	1,18245			
	SBH	33	1,8788	1,31714			
	Diğer	64	1,6719	1,29780			
2. İşgününün sonunda kendimi ruhen tükenmiş hissediyorum	YMM	10	1,1000	1,19722	,001	0,000	H₁ Kabul
	SMM	93	1,2366	1,21044			
	SBK	52	1,8077	1,60927			
	SBH	33	2,4848	1,41689			
	Diğer	64	2,1250	1,40859			
3. Sabah kalktığımda bu işi bir gün daha kaldıramayacağımı hissediyorum.	YMM	10	,9000	1,28668	,058	0,000	H₁ Kabul
	SMM	93	,9785	1,23340			
	SBK	52	1,5769	1,44638			
	SBH	33	2,3636	1,38785			
	Diğer	64	1,9531	1,40780			
6. "Bütün gün insanlarla birlikte çalışmaktan gerginlik duyuyorum.	YMM	10	1,0000	,94281	,007	0,001	H₁ Kabul
	SMM	93	1,1613	1,00315			
	SBK	52	1,7500	1,35582			
	SBH	33	2,0000	1,19896			
	Diğer	64	1,3594	1,02921			
8. İşimin beni tükettiğini hissediyorum	YMM	10	2,0000	1,33333	,618	0,011	H₁ Kabul
	SMM	93	1,5914	1,07579			
	SBK	52	1,8077	1,29915			
	SBH	33	2,1515	1,32574			
	Diğer	64	2,2500	1,22150			

	YMM	10	2,0000	1,05409		
13. İşimin beni kısıtladığını hissediyorum.	SMM	93	1,4516	1,06848	,091	0,005
	SBK	52	1,7692	1,32273		H₁ Kabul
	SBH	33	1,7879	1,31714		
	Diğer	64	2,1875	1,16667		
	YMM	10	2,7000	1,33749		
14. İşimde gücümün üstünde çalıştığımı hissediyorum	SMM	93	1,4946	1,22140	,382	0,000
	SBK	52	1,7692	1,07768		H₁ Kabul
	SBH	33	2,2424	1,39262		
	Diğer	64	2,2969	1,16401		

Duygusal Tükenme alt ölçeğinde toplanan ifadelere verilen karşılıkların ortalamalarının katılımcıların mesleki unvanlarına göre farklılığının analizinde hipotezlerimiz:

H0: Meslek mensuplarının duygusal tükenme alt ölçeğinde toplanan ifadelere verdikleri karşılıkların ortalamaları mesleki unvanlarına göre farklılık göstermez.

H1: Meslek mensuplarının duygusal tükenme alt ölçeğinde toplanan ifadelere verdikleri karşılıkların ortalamaları mesleki unvanlarına göre farklılık gösterir.

Analizde uygulanan Levene testinin sonucunda 1, 2 ve 6 numaralı ifadeler dışındaki tüm ifadeler için grupların varyansları (değerleri 0,05'den büyük olduğu için) homojendir. Böylece belirtilen ifadeler için varyans analizinin temel varsayımı sağlanmıştır. Analiz sonuçlarına göre 16 ve 20. ifadeler için (p değerleri 0,05'ten büyük olduğundan) H0 hipotezi kabul edilmiş ve meslek mensuplarının duygusal tükenme alt ölçeğindeki bu ifadelere verdikleri karşılıkların ortalamalarının unvanlarına göre farklılık göstermediği görülmüştür. Grupların varyansları homojen olan "3. Sabah kalktığımda bu işi bir gün daha kaldıramayacağımı hissediyorum.", ifadesine en yüksek ortalama 2,3636 ile staja başlama sınavına hazırlanan katılımcılardadır. "8. İşimin beni tükettiğini hissediyorum." ve "13. İşimin beni kısıtladığını hissediyorum." ifadelerinde en yüksek ortalamalar sırasıyla 2,500 ve 2,1875 diğer grubundaki katılımcılardan elde edilmiştir. "14. İşimde gücümün üstünde çalıştığımı hissediyorum." ifadesinde en yüksek ortalama 2,7000 ile yeminli mali müşavirlerdedir. En düşük ortalamalar incelendiğinde; 3. ifadede 0,9000 ile yeminli mali müşavirler; 8, 13 ve 14 numaralı ifadelerde ise sırasıyla 1,5914, 1,4516 ve 1,4946 ile serbest muhasebeci mali müşavirlerden elde edilmiştir. Elde edilen sonuçlar doğrultusunda, meslek mensuplarının mesleki kariyerlerinde ilerledikçe duygusal tükenmişlik düzeylerinin azaldığını söylemek mümkündür.

3.2.3.1.2. İşletmedeki Konuma Göre Duygusal Tükenme Fark Analizleri

Duygusal tükenme alt ölçeğinde toplanan ifadelere verilen karşılıkların ortalamalarının katılımcıların işletmedeki konumuna göre farklılığının analizi tek yönlü anova ile yapılmıştır. Bu analizdeki hipotezlerimiz:

H0: Meslek mensuplarının duygusal tükenme alt ölçeğinde toplanan ifadelere verdikleri karşılıkların ortalamaları işletmedeki konumuna göre farklılık göstermez.

H1: Meslek mensuplarının Duygusal Tükenme alt ölçeğinde toplanan ifadelere verdikleri karşılıkların ortalamaları işletmedeki konumuna göre farklılık gösterir.

Analiz sonuçları Tablo 7'de sunulmuştur.

Tablo 7. İşletmedeki Konum Duygusal Tükenme Alt Ölçeği Fark Analizi

İfade	İşletmedeki Konum	n	Ort.	S.S.	Levene İst.değ.	p	Sonuç
1. Kendimi işimden duygusal olarak uzaklaşmış hissediyorum	Sahip	48	,8958	,85650	,000	,000	H₁ Kabul
	Ortak	31	,5806	,84751			
	Çalışan	173	1,4509	1,25019			
2. İşgününün sonunda kendimi ruhen tükenmiş hissediyorum	Sahip	48	1,1875	1,10427	,000	,000	H₁ Kabul
	Ortak	31	,9355	1,15284			
	Çalışan	173	2,0347	1,48205			
3. Sabah kalktığımda bu işi bir gün daha kaldıramayacağımı hissediyorum.	Sahip	48	,9375	1,24467	,004	,000	H₁ Kabul
	Ortak	31	,7742	1,14629			
	Çalışan	173	1,8266	1,43218			
8. İşimin beni tükettiğini hissediyorum	Sahip	48	1,7500	1,15777	,268	,043	H₁ Kabul
	Ortak	31	1,4516	,92516			
	Çalışan	173	2,0116	1,27584			
13. İşimin beni kısıtladığını hissediyorum.	Sahip	48	1,5208	1,03121	,012	,011	H₁ Kabul
	Ortak	31	1,3226	,90874			
	Çalışan	173	1,9191	1,27331			
14. İşimde gücümün üstünde çalıştığımı hissediyorum	Sahip	48	1,7083	1,32019	,119	,000	H₁ Kabul
	Ortak	31	1,1613	,96943			
	Çalışan	173	2,0867	1,23349			

Levene testinin sonucunda 8, 14, 16 ve 20 numaralı ifadeler için grupların varyansları homojen olduğundan sadece bu değişkenler için varyans analizinin temel varsayımı sağlanmıştır. Diğer taraftan analiz sonucunda temel varsayımı sağlayan ve H1 hipotezi kabul edilen "8. İşimin beni tükettiğini hissediyorum" ve "14. İşimde gücümün üstünde çalıştığımı hissediyorum" ifadelerinde en yüksek ortalamalar sırasıyla 2,0116 ve 2,0867 ile çalışanlardan; en düşük ortalamalar ise sırasıyla 1,4516 ve 1,1613 ile ortaklardan elde edilmiştir. Buradan gücünün üstünde çalıştığını ve tükendiğini en fazla hissedenlerin çalışanlar; bunu en az hissedenlerin ise ortaklar olduğu sonucuna ulaşabiliriz.

3.2.3.2. Duyarsızlaşma Fark Analizleri

Çalışmanın bu bölümünde katılımcıların duyarsızlaşma alt ölçeğine verdikleri karşılıkların ortalamalarının mesleki unvanları ve işletmedeki konumlarına göre farklılaşıp farklılaşmadığının analizi yapılmıştır.

3.2.3.1.2. Mesleki Unvana Göre Duyarsızlaşma Fark Analizi

Duyarsızlaşma alt ölçeğinde toplanan değişkenlere verilen karşılıkların ortalamalarının katılımcıların mesleki unvanlarına göre farklılığının analizinde tek yönlü anova analizi uygulanmıştır. Bu analizde hipotezlerimiz:

H0: Meslek mensuplarının Duyarsızlaşma alt ölçeğinde toplanan ifadelere verdikleri karşılıkların ortalamaları mesleki unvanlarına göre farklılık göstermez.

H1: Meslek mensuplarının Duyarsızlaşma alt ölçeğinde toplanan ifadelere verdikleri karşılıkların ortalamaları mesleki unvanlarına göre farklılık gösterir.

Analiz sonuçları Tablo 8'de sunulmuştur. Levene testinin sonucunda "5. İşim gereği karşılaştığım bazılarına sanki insan değillermiş gibi davranıyorum." ifadesi için grupların varyansları homojendir ve bu ifade için H0 hipotezi kabul edilmiştir. Diğer ifadeler için grupların varyansları homojen olmadığı için yapılacak fark analizinin sağlıklı olmayacağı düşünülür.

Tablo 8. Mesleki Unvan Duyarsızlaşma Alt Ölçeği Fark Analizi

İfade	Mesleki Unvan	n	Ort.	S.S.	Levene İst.değ.	p	Sonuç
15. Bazı mükelleflerin başına gelenler gerçekten umurumda değil	YMM	10	2,3000	1,70294	0,000	0,001	H₁ Kabul
	SMM	93	1,1505	0,94347			
	SBK	52	1,7308	1,17349			
	SBH	33	1,8485	1,22783			
	Diğer	64	1,6875	1,41281			
22. Mükelleflerimin bazı problemleri için beni suçladıklarını hissediyorum.	YMM	10	1,3	0,67495	0,012	0,004	H₁ Kabul
	SMM	93	1,2796	1,22799			
	SBK	52	2	1,54666			
	SBH	33	2,1212	1,2688			
	Diğer	64	1,5313	1,35657			

3.2.3.2.2. İşletmedeki Konuma Göre Duyarsızlaşma Fark Analizleri

Duyarsızlaşma alt ölçeğinde toplanan ifadelere verilen karşılıkların ortalamalarının katılımcıların işletmedeki konumuna göre farklılığının analizinde hipotezlerimiz:

H₀: Meslek mensuplarının Duyarsızlaşma alt ölçeğinde toplanan ifadelere verdikleri karşılıkların ortalamaları işletmedeki konumuna göre farklılık göstermez.

H₁: Meslek mensuplarının Duyarsızlaşma alt ölçeğinde toplanan ifadelere verdikleri karşılıkların ortalamaları işletmedeki konumuna göre farklılık gösterir.

Analiz sonuçları Tablo 9'da sunulmuştur. Levene testinin sonucunda 22 numaralı ifade dışındaki tüm ifadeler için grupların varyansları homojendir. Böylece bu ifadeler için varyans analizinin temel varsayımı sağlanmıştır. Varyans analizinin temel varsayımını sağlayan 5, 10, 11 ve 15 numaralı ifadelerde H₀ hipotezi kabul edilmiş ve katılımcıların verdikleri karşılıkların ortalamalarında işletmedeki konumuna göre farklılık olmadığı sonucuna ulaşılmıştır.

Diğer taraftan analiz sonucunda "22. Mükelleflerimin bazı problemleri için beni suçladıklarını hissediyorum." ifadesinde temel varsayım sağlanmamış ve H₁ hipotezi kabul edilmiştir. Bu ifadede en yüksek oran 1,7168 ile çalışanlardan, en düşük oran 0,9355 ile ortaklardan gelmiştir.

Tablo 9. İşletmedeki Konum Duyarsızlaşma Alt Ölçeği Fark Analizi

İfade	İşletmedeki Konum	n	Ort.	S.S.	Levene İst.değ.	p	Sonuç
22. Mükelleflerimin bazı problemleri için beni suçladıklarını hissediyorum	Sahip	48	1,6250	1,17826	,018	0,012	H₁ Kabul
	Ortak	31	,9355	1,20928			
	Çalışan	173	1,7168	1,39584			

3.2.3.3. Kişisel Başarı Fark Analizleri

Bu bölümde kişisel başarı alt ölçeğinde toplanan ifadelere katılımcıların verdikleri karşılıkların ortalamalarının mesleki unvan ve işletmedeki konumlarına göre farklılığının analizi tek yönlü anova kullanılarak yapılmıştır.

3.2.3.3.1 Mesleki Unvana Göre Kişisel Başarı Ölçeği Fark Analizleri

Bu ölçekte toplanan ifadelere verilen karşılıkların ortalamalarının katılımcıların mesleki unvanlarına göre farklılığının analizinde hipotezlerimiz:

H_0: Meslek mensuplarının kişisel başarı alt ölçeğinde toplanan ifadelere verdikleri karşılıkların ortalamaları mesleki unvanlarına göre farklılık göstermez.

H_1: Meslek mensuplarının kişisel başarı alt ölçeğinde toplanan ifadelere verdikleri karşılıkların ortalamaları mesleki unvanlarına göre farklılık gösterir.

Analiz sonuçları Tablo 10'da sunulmuştur.

Tablo 10. Mesleki Unvan Kişisel Başarı Alt Ölçeği Fark Analizi

İfade	Mesleki Unvan	n	Ort.	S.S.	Levene İst.değ.	p	Sonuç
7. İşim gereği karşılaştığım insanların sorunlarına en uygun çözüm yollarını bulurum	YMM	10	2,2000	,91894	0,000	0,004	H_1 Kabul
	SMM	93	1,6559	1,43326			
	SBK	52	2,1731	1,32430			
	SBH	33	2,6061	1,11634			
	Diğer	64	2,0625	1,02159			

Levene testinin sonucunda 7 ve 9 numaralı ifadeler dışındaki tüm ifadeler için grupların varyansları homojendir. Böylece bu ifadeler için varyans analizinin temel varsayımı sağlanmıştır. Temel varsayım sağlanan tüm ifadelerde H_0 hipotezi kabul edilmiştir. Böylece kişisel başarı alt ölçeğine verilen karşılıkların ortalamalarında katılımcıların mesleki unvanları yönünden anlamlı farklılık tespit edilememiştir.

3.2.3.3.2. İşletmedeki Konuma Göre Kişisel Başarı Fark Analizleri

Kişisel başarı ölçeğinde yer alan ifadelerin özelliğinden dolayı bu ifadelere verilen karşılıkların ortalamalarının yüksek olması olumlu olarak değerlendirilir. Bu ölçekte toplanan ifadelere verilen karşılıkların ortalamalarının katılımcıların işletmedeki konumuna göre farklılığının analizinde hipotezlerimiz:

H_0: Meslek mensuplarının Kişisel Başarı alt ölçeğinde toplanan ifadelere verdikleri karşılıkların ortalamaları işletmedeki konumuna göre farklılık göstermez.

H_1: Meslek mensuplarının Kişisel Başarı alt ölçeğinde toplanan ifadelere verdikleri karşılıkların ortalamaları işletmedeki konumuna göre farklılık gösterir.

Analiz sonuçları Tablo 11'de sunulmuştur. Levene testinin sonucunda 4 ve 7 numaralı ifadeler dışındaki tüm ifadeler için grupların varyansları homojen değildir. Böylece varyans analizinin temel varsayımı sağlanamamıştır.

Tablo 11. İşletmedeki Konum Kişisel Başarı Alt Ölçeği Fark Analizi

İfade	İşletmedeki Konum	n	Ort.	S.S.	Levene İst.değ.	p	Sonuç
4. İşim gereği karşılaştığım insanların ne hissettiklerini anlayabilirim	Sahip	48	1,7917	1,23699			
	Ortak	31	1,0968	1,13592	0,432	0,003	H₁ Kabul
	Çalışan	173	1,8960	1,18647			
7. İşim gereği karşılaştığım insanların sorunlarına en uygun çözüm yollarını bulurum.	Sahip	48	1,8958	1,27562			
	Ortak	31	1,1290	1,38424	0,824	0,000	H₁ Kabul
	Çalışan	173	2,2023	1,21023			
17. Hizmet verdiğim kişilerle birlikte, kolaylıkla rahat bir ortam oluşturabiliyorum.	Sahip	48	2,0000	1,52984			
	Ortak	31	1,4839	0,85131	0,000	0,000	H₁ Kabul
	Çalışan	173	2,4046	1,21444			
18. Hizmet verdiğim kişilerle yakından ilgilenince kendimi canlanmış hissediyorum.	Sahip	48	2,0000	1,28824			
	Ortak	31	1,3871	0,55842	0,000	0,004	H₁ Kabul
	Çalışan	173	2,1734	1,25011			
19. Bu işte kayda değer birçok başarı elde ettim.	Sahip	48	1,9375	1,37464			
	Ortak	31	1,2581	1,09446	0,027	0,006	H₁ Kabul
	Çalışan	173	2,0462	1,23804			
21. İşimde duygusal sorunlara soğukkanlılıkla yaklaşırım.	Sahip	48	1,6875	1,44629			
	Ortak	31	1,0968	1,01176	0,012	0,002	H₁ Kabul
	Çalışan	173	1,9249	1,19598			

Temel varsayımı sağlayan 4. İşim gereği karşılaştığım insanların ne hissettiklerini anlayabilirim." ve "7. İşim gereği karşılaştığım insanların sorunlarına en uygun çözüm yollarını bulurum." ifadelerinde H₁ hipotezi kabul edilmiştir. Böylece meslek mensuplarının sadece bu ifadelere verdikleri karşılıkların ortalamaları işletmedeki konumuna göre farklılık göstermiştir. Bu iki değişkene verilen karşılıklarda en yüksek ortalamalar sırasıyla 1,8960 ve 2,2023 ile çalışanlardan; en düşük ortalamalar ise sırasıyla 1,0968 ve 1,1290 ile ortaklardan elde edilmiştir. Böylece çalışanlar işi gereği karşılaştıkları insanların hislerini anlayıp, en uygun çözümleri bulma konusunda iddialı iken ortaklar bu konuda daha düşük ortalamaya sahiptirler.

3.2.4. İş Doyum Analizi

Çalışmada kullanılan anket formunda Minesota İş Doyum Ölçeği kullanılmıştır. Ölçekte (1 hiç memnun değilim, 2 memnun değilim, 3 kararsızım, 4 memnunum ve 5 çok memnunum şeklinde) 5'li likert ölçeği kullanılmıştır. Ölçek İçsel ve dışsal olmak üzere iki alt ölçekten oluşmaktadır.

3.2.4.1. İçsel İş Doyum Ölçeği

İçsel iş doyum alt ölçeği 12 ifadeden oluşmakta olup, ifadelere verilen karşılıkların ortalama ve standart sapmaları küçükten büyüğe sıralı olarak Tablo 12'de sunulmuştur. Ankete verilen karşılıkların ortalamaları incelendiğinde; ifadelerin tamamında 3'ün üzerinde ve "memnunum" ve "kesinlikle memnunum" arasında olduğu görülmektedir. Diğer taraftan standart sapmaların tüm ifadelerde 1'in üzerinde olması testin ayırt edici özelliğinin yüksek olduğunun ve katılımcı grubunun heterojen olduğunun göstergesidir.

Tablo 12. İçsel İş Doyum Alt Ölçeğine Verilen Karşılıkların Ortalama ve Standart Sapmaları

İfade	Ort.	S.S.
20. Şimdiki işimden yaptığım iş karşılığında duyduğum başarı hissi bakımından	4,0675	1,02528
8. Şimdiki işimden bana sabit bir iş sağlaması bakımından	3,9563	1,04961
2. Şimdiki işimden tek başıma çalışma olanağı olması bakımından	3,8333	1,07674
1. Şimdiki işimden beni her zaman memnun etmesi bakımından	3,8254	1,06804
16. Şimdiki işimden işimi yaparken kendi yöntemlerimi kullanabilme şansını vermesi bakımından	3,7976	1,12678
9. Şimdiki işimden başkaları için bir şeyler yapabilme olanağı vermesi bakımından	3,6310	1,13383
11. Şimdiki işimden kendi yeteneklerimi kullanma şansı vermesi bakımından	3,6151	1,18366
7. Şimdiki işimden vicdanıma aykırı olmayan şeyler yapabilme şansı	3,5873	1,28596
4. Şimdiki işimden toplumda saygın bir kişi olma şansını vermesi bakımından	3,5079	1,29508
15. Şimdiki işimden kendi kararlarımı uygulama serbestliğini vermesi bakımından	3,4286	1,31451
3. Şimdiki işimden ara sıra değişik şeyler yapabilme şansı bakımından	3,4048	1,37814
10. Şimdiki işimden kişilere emir verme şansına sahip olma bakımından	3,1865	1,33335

3.2.4.1.1. İçsel İş Doyum Alt Ölçeği Fark Analizleri

İçsel iş doyum alt ölçeğinde yer alan 12 ifadeye katılımcıların verdikleri karşılıkların ortalamalarının mesleki unvanları ve işletmedeki konumlarına göre anlamlı şekilde farklı olup olmadığının analizi tek yönlü anova testiyle yapılmıştır.

3.2.4.1.1.1. Mesleki Unvana Göre İçsel İş Doyum Fark Analizi

Çalışmada katılımcıların mesleki unvanları ile içsel iş doyum alt ölçeğindeki ifadelere verdikleri karşılıkların ortalamalarının farklılığının analizi yapılmıştır. Bu analizde hipotezlerimiz aşağıdaki şekildedir:

H_0: Meslek mensuplarının içsel iş doyum alt ölçeğindeki ifadelere verdikleri karşılıkların ortalamaları mesleki unvanlarına göre farklılık göstermez.

H_1: Meslek mensuplarının içsel iş doyum alt ölçeğindeki ifadelere verdikleri karşılıkların ortalamaları mesleki unvanlarına göre farklılık gösterir.

Analiz sonuçları Tablo 13'te sunulmuştur. Levene testinin sonucunda tüm ifadelere için grupların varyansları homojen değildir. Böylece varyans analizinin temel varsayımı sağlanamamıştır. Diğer taraftan varyans analizinin temel varsayımını sağlayamasa da yüzeysel bir karşılaştırma yapılabilir. Belirtilen ifadelerin tamamında elde edilen ortalamalarda en yüksek değerler yeminli mali müşavir ve serbest muhasebeci mali müşavirlerden elde edilmiştir. Burada meslek mensuplarının ruhsat sahibi olduktan sonra iş doyumlarının daha aşağı kademedeki meslek mensuplarına göre önemli oranda arttığı sonucunu çıkartabiliriz. Diğer taraftan 7. ifadede staja başlama sınavına hazırlanan meslek mensuplarından en düşük ortalamanın alındığı görülmektedir. Tüm ifadelerde staja başlama sınavını kazanmış meslek mensupları, ruhsat sahibi meslek mensupları ile diğer ve staja başlama sınavına hazırlanan meslek mensuplarının ortasında yer almaktadır. Buradan ruhsat sahibi olmak ve buna yaklaşmanın iş doyumunu arttıran bir faktör olduğunu söyleyebiliriz.

Tablo 13. Mesleki Unvan İçsel İş Doyum Fark Analizi

İfade	Mesleki Unvan	n	Ort.	S.S.	Levene İst.değ.	p	Sonuç
1. Şimdiki işimden **beni her zaman memnun etmesi** bakımından	YMM	10	4,6000	,51640	,029	0,000	H₁ Kabul
	SMM	93	4,1290	,93513			
	SBK	52	3,9038	,97538			
	SBH	33	3,4848	1,20211			
	Diğer	64	3,3750	1,10554			
2. Şimdiki işimden **tek başıma çalışma olanağı olması** bakımından	YMM	10	4,6000	,51640	,000	0,032	H₁ Kabul
	SMM	93	3,9785	,93225			
	SBK	52	3,6154	1,19071			
	SBH	33	3,6061	1,29758			
	Diğer	64	3,7969	1,05679			
3. Şimdiki işimden **ara sıra değişik şeyler yapabilme şansı** bakımından	YMM	10	4,5000	,70711	,005	0,000	H₁ Kabul
	SMM	93	3,9570	1,23283			
	SBK	52	2,8462	1,31931			
	SBH	33	2,6061	1,56004			
	Diğer	64	3,2969	1,17756			
4. Şimdiki işimden **toplumda saygın bir kişi olma şansını vermesi** bakımından	YMM	10	4,5000	,70711	,001	0,000	H₁ Kabul
	SMM	93	4,0000	1,02151			
	SBK	52	3,5962	1,15910			
	SBH	33	2,8182	1,37964			
	Diğer	64	2,9219	1,38363			
7. Şimdiki işimden **vicdanıma aykırı olmayan şeyler yapabilme şansı**	YMM	10	4,3000	1,05935	,037	0,000	H₁ Kabul
	SMM	93	4,0108	1,13726			
	SBK	52	3,3462	1,26622			
	SBH	33	2,8485	1,52318			
	Diğer	64	3,4375	1,16667			
8. Şimdiki işimden **bana sabit bir iş sağlaması** bakımından	YMM	10	4,5000	,70711	,002	0,000	H₁ Kabul
	SMM	93	4,2151	,95382			
	SBK	52	4,0385	,88476			
	SBH	33	3,7879	1,29319			
	Diğer	64	3,5156	1,06893			
9. Şimdiki işimden **başkaları için bir şeyler yapabilme olanağı vermesi** bakımından	YMM	10	4,5000	,70711	,026	0,002	H₁ Kabul
	SMM	93	3,8925	1,00501			
	SBK	52	3,4423	1,10991			
	SBH	33	3,3636	1,27029			
	Diğer	64	3,4063	1,19149			
10. Şimdiki işimden **kişilere emir verme şansına sahip olma** bakımından	YMM	10	4,4000	,84327	,004	0,000	H₁ Kabul
	SMM	93	3,7419	1,17864			
	SBK	52	2,9808	1,09348			
	SBH	33	2,7879	1,45253			
	Diğer	64	2,5625	1,30779			

11. Şimdiki işimden **kendi yeteneklerimi kullanma şansı vermesi** bakımından	YMM	10	4,6000	,51640	,000	0,000	H₁ Kabul
	SMM	93	4,0538	,94829			
	SBK	52	3,3846	1,14024			
	SBH	33	3,3636	1,19421			
	Diğer	64	3,1406	1,30770			
15. Şimdiki işimden **kendi kararlarımı uygulama serbestliğini vermesi** bakımından	YMM	10	4,4000	,69921	,000	0,000	H₁ Kabul
	SMM	93	4,0323	,99402			
	SBK	52	3,1731	1,04264			
	SBH	33	2,8485	1,43878			
	Diğer	64	2,9063	1,49835			
16. Şimdiki işimden **işimi yaparken kendi yöntemlerimi kullanabilme şansını vermesi** bakımından	YMM	10	4,4000	,69921	,000	0,000	H₁ Kabul
	SMM	93	4,2258	,92230			
	SBK	52	3,5385	,93853			
	SBH	33	3,5455	1,30122			
	Diğer	64	3,4219	1,26998			
20. Şimdiki işimden yaptığım **iş karşılığında duyduğum başarı hissi** bakımından	YMM	10	4,7000	,48305	,000	0,001	H₁ Kabul
	SMM	93	4,3441	,78705			
	SBK	52	3,9423	1,09210			
	SBH	33	3,8182	1,18466			
	Diğer	64	3,7969	1,12940			

3.2.4.1.1.2. İşletmedeki Konuma Göre İçsel İş Doyum Fark Analizi

Katılımcı grubun işletmedeki konumları ile içsel iş doyum alt ölçeğindeki ifadelere verdikleri karşılıkların ortalamalarının farklılığının analizinde tek yönlü anova kullanılmıştır. Bu analizde hipotezlerimiz:

H₀: Meslek mensuplarının içsel iş doyum alt ölçeğindeki ifadelere verdikleri karşılıkların ortalamaları işletmedeki konumlarına göre farklılık göstermez.

H₁: Meslek mensuplarının içsel iş doyum alt ölçeğindeki ifadelere verdikleri karşılıkların ortalamaları işletmedeki konumlarına göre farklılık gösterir.

Analiz sonuçları Tablo 14'te sunulmuştur. Levene testinin sonucunda "3. Şimdiki işimden ara sıra değişik şeyler yapabilme şansı bakımından" ve "8. Şimdiki işimden bana sabit bir iş sağlaması bakımından" ifadeleri için grupların varyansları homojendir. Böylece varyans analizinin temel varsayımı sağlanmıştır. Ayrıca bu ifadeler için verilen karşılıklarda anlamlı farklılık olduğu ortaya çıkmıştır. 3. ve 8 numaralı ifadelere verilen karşılıklarda en yüksek ortalamalar sırasıyla 4,1290 ve 4,3871 ile ortaklardan; en düşük ortalamalar ise sırasıyla 3,0809 ve 3,8786 ile işletme çalışanlarından elde edilmiştir. Buradan meslek mensubunun işletme sahipliğine doğru ilerledikçe iş doyumunun arttığı sonucunu çıkarmak mümkündür.

Tablo 14. İşletmedeki Konum İçsel İş Doyum Fark Analizi

İfade	İşletmedeki Konum	n	Ort.	S.S.	Levene İst.değ.	p	Sonuç
1. Şimdiki işimden **beni her zaman memnun etmesi** bakımından	Sahip	48	4,3958	,73628	0,004	0,000	H₁ Kabul
	Ortak	31	4,1935	,94585			
	Çalışan	173	3,6012	1,09300			
3. Şimdiki işimden **ara sıra değişik şeyler yapabilme şansı** bakımından	Sahip	48	4,1042	1,27562	0,248	0,000	H₁ Kabul
	Ortak	31	4,1290	1,14723			
	Çalışan	173	3,0809	1,32697			
4. Şimdiki işimden **toplumda saygın bir kişi olma şansını vermesi** bakımından	Sahip	48	4,2083	1,03056	0,001	0,000	H₁ Kabul
	Ortak	31	4,0323	,94812			
	Çalışan	173	3,2197	1,31550			
7. Şimdiki işimden **vicdanıma aykırı olmayan şeyler yapabilme şansı**	Sahip	48	4,2708	1,04657	0,001	0,000	H₁ Kabul
	Ortak	31	4,1935	,90992			
	Çalışan	173	3,2890	1,29747			
8. Şimdiki işimden **bana sabit bir iş sağlaması** bakımından	Sahip	48	4,2917	,87418	0,358	0,001	H₁ Kabul
	Ortak	31	4,3871	1,02233			
	Çalışan	173	3,7861	1,05953			
9. Şimdiki işimden **başkaları için bir şeyler yapabilme olanağı vermesi** bakımından	Sahip	48	3,9375	1,11863	0,011	0,007	H₁ Kabul
	Ortak	31	4,0000	,81650			
	Çalışan	173	3,4798	1,15934			
10. Şimdiki işimden **kişilere emir verme şansına sahip olma** bakımından	Sahip	48	3,8750	1,16006	0,008	0,000	H₁ Kabul
	Ortak	31	4,0645	,92864			
	Çalışan	173	2,8382	1,29729			
11. Şimdiki işimden **kendi yeteneklerimi kullanma şansı vermesi** bakımından	Sahip	48	4,0208	1,06170	0,001	0,000	H₁ Kabul
	Ortak	31	4,4194	,67202			
	Çalışan	173	3,3584	1,19539			
15. Şimdiki işimden **kendi kararlarımı uygulama serbestliğini vermesi** bakımından	Sahip	48	4,2083	,89819	0,002	0,000	H₁ Kabul
	Ortak	31	4,4194	,84751			
	Çalışan	173	3,0347	1,29353			
16. Şimdiki işimden **işimi yaparken kendi yöntemlerimi kullanabilme şansını vermesi** bakımından	Sahip	48	4,2917	,89819	0,000	0,000	H₁ Kabul
	Ortak	31	4,5806	,62044			
	Çalışan	173	3,5202	1,14419			
20. Şimdiki işimden yaptığım **iş karşılığında duyduğum başarı hissi** bakımından	Sahip	48	4,4167	,73899	0,000	0,000	H₁ Kabul
	Ortak	31	4,7419	,51431			
	Çalışan	173	3,8497	1,08395			

3.2.4.2 Dışsal İş Doyum Alt Ölçeği

Dışsal iş doyum alt ölçeği 8 ifadeden oluşmakta olup, bu ifadelere verilen karşılıkların ortalama ve standart sapmaları küçükten büyüğe sıralı olarak Tablo 15'te sunulmuştur. Ankete verilen karşılıkların ortalamaları ifadelerin tamamında 3'ün üzerinde (memnunum ve kesinlikle memnunum arasında) olduğu görülmektedir. Diğer taraftan standart sapmaların tüm ifadelerde 1'in üzerinde olduğundan testin ayırt edici özelliğinin yüksek olduğu söylenebilir.

Tablo 15. Dışsal İş Doyum Alt Ölçeğine Verilen Karşılıkların Ortalama ve Standart Sapmaları

İfade	Ort.	S.S.
18. Şimdiki işimden çalışma arkadaşlarımın birbirleri ile anlaşmaları bakımından	3,9881	1,00787
6. Şimdiki işimden yöneticimin karar vermedeki yeteneği bakımından	3,9048	1,01329
5. Şimdiki işimden yöneticimin ekibindeki kişileri idare tarzı bakımından	3,9008	1,05339
12. Şimdiki işimden iş ile ilgili kararların uygulanmaya konması bakımından	3,8929	1,10072
19. Şimdiki işimden yaptığım iyi bir iş karşılığında takdir edilme bakımından	3,7024	1,15817
17. Şimdiki işimden çalışma şartları bakımından	3,6310	1,20205
13. Şimdiki işimden yaptığım iş karşılığında aldığım ücret bakımından	3,3214	1,33742
14. Şimdiki işimden iş içinde terfi olanağımın olması bakımından	3,2540	1,45003

3.2.4.2.1 Dışsal İş Doyum Alt Ölçeği Fark Analizleri

Çalışmanın bu bölümünde dışsal iş doyum alt ölçeğinde yer alan 8 adet ifadeye katılımcıların verdikleri karşılıkların ortalamalarında mesleki unvan ve işletmedeki konumlarına göre anlamlı farklılık olup olmadığı araştırılmıştır.

3.2.4.2.1.1 Meslek Unvana Göre Dışsal İş Doyum Alt Ölçeği Fark Analizleri

Katılımcıların mesleki unvanları ile dışsal iş doyum alt ölçeğinde yer alan ifadelere verdikleri karşılıkların ortalamalarının farklılığının analizinde tek yönlü anova kullanılmış olup hipotezlerimiz şöyledir:

H_0: Meslek mensuplarının dışsal iş doyum alt ölçeğindeki ifadelere verdikleri karşılıkların ortalamaları mesleki unvanlarına göre farklılık göstermez.

H_1: Meslek mensuplarının dışsal iş doyum alt ölçeğindeki ifadelere verdikleri karşılıkların ortalamaları mesleki unvanlarına göre farklılık gösterir.

Analiz sonuçları Tablo 16'da sunulmuştur.

Levene testinin sonucunda "5. Şimdiki işimden yöneticimin ekibindeki kişileri idare tarzı bakımından" ifadesi dışındaki tüm ifadeler için grupların varyansları homojen değildir. Bu ifadeler için varyans analizinin temel varsayımı sağlanamamıştır. Temel varsayımı sağlayan 5. ifade için verilen karşılıklarda anlamlı fark bulunmuştur. Bu ifadeye verilen karşılıklarda en yüksek ortalamayı 4,6000 ile yeminli mali müşavirler ve en düşük ortalamayı 3,4531 ile diğer grubunda yer alan meslek mensupları vermiştir. Burada meslek mensuplarının ruhsat sahibi olduktan sonra iş doyumlarının daha aşağı kademedeki meslek mensuplarına göre önemli oranda arttığı sonucunu çıkartabiliriz.

3.2.4.2.1.1 İşletmedeki Konuma Göre Dışsal İş Doyum Alt Ölçeği Fark Analizleri

Katılımcıların işletmedeki konumları ile dışsal iş doyum alt ölçeğindeki ifadelere verdikleri karşılıkların ortalamalarının farklılığının analizinde tek yönlü anova kullanılmış olup hipotezlerimiz:

Tablo 16. Mesleki Unvan Dışsal İş Doyum Fark Analizi

İfade	Mesleki Unvan	n	Ort.	S.S.	Levene İst.değ.	p	Sonuç
5. Şimdiki işimden **yöneticimin ekibindeki kişileri idare tarzı** bakımından	YMM	10	4,6000	,51640	,156	0,000	H₁ Kabul
	SMM	93	4,1935	,92382			
	SBK	52	3,8654	1,06695			
	SBH	33	3,7879	,99240			
	Diğer	64	3,4531	1,13989			
6. Şimdiki işimden **yöneticimin karar vermedeki yeteneği** bakımından	YMM	10	4,4000	,69921	,015	0,000	H₁ Kabul
	SMM	93	4,2366	,75754			
	SBK	52	3,6731	1,02366			
	SBH	33	3,8485	1,14895			
	Diğer	64	3,5625	1,13913			
12. Şimdiki işimden **iş ile ilgili kararların uygulanmaya konması** bakımından	YMM	10	4,5000	,70711	,029	0,000	H₁ Kabul
	SMM	93	4,2258	,95700			
	SBK	52	3,7308	1,13958			
	SBH	33	3,5455	1,03353			
	Diğer	64	3,6250	1,20185			
13. Şimdiki işimden **yaptığım iş karşılığında aldığım ücret** bakımından	YMM	10	4,5000	,70711	,000	0,000	H₁ Kabul
	SMM	93	3,9247	1,04504			
	SBK	52	2,8654	1,34352			
	SBH	33	2,8788	1,53618			
	Diğer	64	2,8594	1,24553			
14. Şimdiki işimden **iş içinde terfi olanağımın olması** bakımından	YMM	10	3,9000	1,37032	,000	0,000	H₁ Kabul
	SMM	93	3,9032	1,20745			
	SBK	52	3,0192	1,21252			
	SBH	33	2,4545	1,27698			
	Diğer	64	2,8125	1,64148			
17. Şimdiki işimden **çalışma şartları** bakımından	YMM	10	4,8000	,42164	,001	0,000	H₁ Kabul
	SMM	93	3,9462	1,03594			
	SBK	52	3,5192	1,12877			
	SBH	33	3,1515	1,41689			
	Diğer	64	3,3281	1,23513			
18. Şimdiki işimden **çalışma arkadaşlarımın birbirleri ile anlaşmaları** bakımından	YMM	10	4,7000	,48305	,041	0,009	H₁ Kabul
	SMM	93	4,1720	,86758			
	SBK	52	3,9038	1,05272			
	SBH	33	3,9091	1,18226			
	Diğer	64	3,7188	1,04606			

	YMM	10	4,3000	,67495			
19. Şimdiki işimden **yaptığım iyi bir iş karşılığında takdir edilme** bakımından	SMM	93	4,0323	,98303	,004	0,000	H₁ Kabul
	SBK	52	3,8077	1,10327			
	SBH	33	3,3939	1,34488			
	Diğer	64	3,2031	1,19761			

H₀: Meslek mensuplarının dışsal iş doyum alt ölçeğindeki ifadelere verdikleri karşılıkların ortalamaları işletmedeki konumlarına göre farklılık göstermez.

H₁: Meslek mensuplarının dışsal iş doyum alt ölçeğindeki ifadelere verdikleri karşılıkların ortalamaları işletmedeki konumlarına göre farklılık gösterir.

Analiz sonuçları Tablo 17'de sunulmuştur. Levene testinin sonucunda "5. Şimdiki işimden yöneticimin ekibindeki kişileri idare tarzı bakımından" ve "18. Şimdiki işimden çalışma arkadaşlarımın birbirleri ile anlaşmaları bakımından" ifadeleri için grupların varyansları homojendir. Bu ifadeler için varyans analizinin temel varsayımı sağlanmıştır. Ayrıca bu ifadeler için H₁ hipotezi kabul edilmiş ve verilen ifadeler için anlamlı farklılık bulunmuştur. 5 ve 18 numaralı ifadelerde en yüksek ortalamalar 4,4194 ve 4,5806 ile ortaklardan; en düşük ortalamalar ise 3,7861 ve 3,8786 ile çalışanlar elde edilmiştir. Buradan da meslek mensubunun işletme sahipliğine doğru ilerledikçe iş doyumunun arttığı sonucunu çıkarmak mümkündür. Varyans analizinin temel varsayımını sağlayamayan ifadelerden elde edilen sonuçlar da bu sonucu desteklemektedir.

Tablo 17. İşletmedeki Konum Dışsal İş Doyum Analizi

İfade	İşletmedeki Konum	n	Ort.	S.S.	Levene İst.değ.	p	Sonuç
5. Şimdiki işimden **yöneticimin ekibindeki kişileri idare tarzı** bakımından	Sahip	48	4,2292	,85650	0,139	0,000	H₁ Kabul
	Ortak	31	4,4194	,76482			
	Çalışan	173	3,7168	1,09736			
6. Şimdiki işimden **yöneticimin karar vermedeki yeteneği** bakımından	Sahip	48	4,3542	,78522	0,048	0,000	H₁ Kabul
	Ortak	31	4,4516	,67521			
	Çalışan	173	3,6821	1,04413			
12. Şimdiki işimden **iş ile ilgili kararların uygulanmaya konması** bakımından	Sahip	48	4,3333	,78098	0,001	0,000	H₁ Kabul
	Ortak	31	4,5484	,85005			
	Çalışan	173	3,6532	1,13402			
13. Şimdiki işimden **yaptığım iş karşılığında aldığım ücret** bakımından	Sahip	48	4,1042	1,05668	0,005	0,000	H₁ Kabul
	Ortak	31	4,2903	,82436			
	Çalışan	173	2,9306	1,30109			
14. Şimdiki işimden **iş içinde terfi olanağımın olması** bakımından	Sahip	48	3,8750	1,19618	0,02	0,000	H₁ Kabul
	Ortak	31	4,3548	1,08162			
	Çalışan	173	2,8844	1,41768			
17. Şimdiki işimden **çalışma şartları** bakımından	Sahip	48	3,9792	,95627	0,004	0,002	H₁ Kabul
	Ortak	31	4,0968	1,19317			
	Çalışan	173	3,4509	1,22672			

18. Şimdiki işimden **çalışma arkadaşlarımın birbirleri ile anlaşmaları** bakımından	Sahip	48	4,0000	1,03142	0,253	0,002	H₁ Kabul
	Ortak	31	4,5806	,80723			
	Çalışan	173	3,8786	1,00131			
19. Şimdiki işimden **yaptığım iyi bir iş karşılığında takdir edilme** bakımından	Sahip	48	3,8125	1,08483	0,002	0,000	H₁ Kabul
	Ortak	31	4,4516	,67521			
	Çalışan	173	3,5376	1,19350			

SONUÇ

Çalışmamızda muhasebe meslek mensuplarının tükenmişlik düzeyleri ve iş doyumlarının ölçülmesi amaçlanmıştır. Bu amaçla birincil veri toplamak için katılımcıların demografik özellikleri, Minnesota İş Doyum Ölçeği ve Maslach Tükenmişlik Ölçeği kullanılarak hazırlanan anket formu kullanılmıştır. Böylece ölçülmek istenen kapsam önceden belirlenerek ifadeler/maddeler bu kapsama göre hazırlanmıştır. Anketin ifadelerinde Likert tipi 5'li ölçek kullanılmıştır. Katılımcı her madde ile ilgili tutum derecesini bu seçeneklerden birisini işaretleyerek belirtmiştir.

Araştırmamızda 2017 yılı Ekim-Aralık döneminde İstanbul, Ankara ve Kütahya illerinde rassal olarak seçilen 350 muhasebe meslek elemanına anket uygulanmıştır. Çalışmada elde edilen kullanılabilir anket sayısı 252 ve anket geri dönüş oranı yaklaşık % 72'dir.

Araştırma verilerinin değerlendirilmesi SPSS 17 istatistik paket programı ile yapılmıştır. Bu analizler için betimsel ve yordamsal istatistik teknikleri kullanılmıştır. Öncelikle katılımcıların demografik özellikleri sıklık ve yüzde değerleri itibariyle incelenmiştir. Daha sonra katılımcıların tükenmişliğin üç ve iş doyumunun iki alt boyutunda yer alan ifadelere verdikleri karşılıkların ortalamaları ile mesleki unvanları ve işletmedeki konumları itibariyle farklılık analizleri tek yönlü anova ile yapılmıştır.

Anketin güvenirlik çalışması, iç tutarlık katsayı (Cronbach alpha) değerleri hesaplanarak yapılmıştır. Çalışmada kullanılan ölçekler için alfa katsayıları; Minnesota İş Doyum Ölçeğinin tamamı için 0,925; Maslach Tükenmişlik Ölçeğinin tamamı için 0,842; Minesota İş Doyum ölçeğinin alt ölçekleri, içsel iş doyum için 0,887 ve dışsal iş doyumu için 0,825; Maslach Tükenmişlik Ölçeğinin alt ölçekleri Duygusal Tükenme için 0,840, Duyarsızlaşma için 0,582 ve Kişisel Başarı için 0,801 olarak hesaplanmıştır. Buna göre Duyarsızlaşma alt ölçeğinin güvenilirliği düşük, diğer iki ölçek ve bunların, Duyarsızlaşma dışında, alt ölçeklerinin güvenilirliği yüksektir.

Anketimizi cevaplayanların çoğunluğu, meslek belgesini henüz almamış, 30 yaşın altında, 15 yıldan daha az mesleki tecrübeye sahip erkek katılımcılardan oluşmaktadır. Ayrıca katılımcıların çalıştıkları işletmelerin çoğunluğu, 50'nin altında mükellefe, 10'un altında çalışana ve 15 yıldan daha az faaliyet süresine sahip işletmelerdir

Katılımcıların tamamı için duygusal tükenme, duyarsızlaşma ve kişisel başarı alt ölçeklerinden orta düzeyde tükenmişlik tespit edilmiştir. Duygusal tükenme, duyarsızlaşma ve kişisel başarı alt ölçeklerindeki ifadelere verilen karşılıkların ortalamaları kullanılan ölçek (0 hiçbir zaman, 1 çok nadir, 2 bazen, 3 çoğu zaman ve 4 her zaman) dikkate alındığında "çok nadir" ile "bazen" arasında olduğu görülmüştür. Meslek mensuplarının mesleki kariyerlerinde ilerledikçe duygusal tükenmişlik düzeyleri azalmaktadır. Gücünün üstünde çalıştığını ve tükendiğini en fazla hissedenler çalışanlar iken; bunu en az hissedenler ise ortaklardır.

Minesota iş doyum ölçeğine verilen karşılıkların ortalamaları incelendiğinde; ifadelerin tamamında 3'ün üzerinde olduğu görülmektedir. Ankette (1 hiç memnun değilim, 2 memnun değilim, 3 kararsızım, 4 memnunum ve 5 çok memnunum) 5'li likert ölçek kullanıldığı düşünülürse, ortalamaların tamamının kararsızlığın üstünde ve memnunum ve kesinlikle memnunum arasında olduğu görülmektedir. Buradan katılımcıların bu ifadelerin tamamına katıldıkları söylenebilir. Diğer taraftan standart sapmaların tüm ifadelerde 1'in üzerinde olması testin ayırt edici özelliğinin yüksek olduğunun ve katılımcı grubunun heterojen olduğunun göstergesidir.

Meslek mensuplarının iş doyumları ruhsat sahibi olduktan sonra önemli oranda artmaktadır. Ruhsat sahibi olmak ve buna yaklaşmak iş doyumunu arttıran bir faktördür. Ayrıca meslek mensubu işletme sahipliğine doğru ilerledikçe iş doyumu artmaktadır. Çalışmadan elde edilen sonuçlar muhasebe mesleğinin doğasını ortaya koymaktadır. Meslek mensubu kariyerinde ilerledikçe sürekli tekrarlayan kayıt tutma ve beyanname doldurma gibi işleri daha az yapmakta ve bilgi ve tecrübesini kullandığı karar verici pozisyonuna gelmektedir. Ayrıca elde ettiği gelir de yükselmektedir. Bu da iş doyumu arttırmakta ve tükenmişlik düzeyini azaltmaktadır.

Çalışmamızda meslek mensuplarının tükenmişlik düzeyleri ve iş doyumları konusunda durum tespiti yapmak amaçlanmıştır. Sonraki çalışmalarda meslek mensuplarının tükenmişlik nedenleri ve iş doyumunu arttırma yolları araştırılabilir.

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Productivity Determinants of Potato in Nigeria: An Autoregressive Distributed Lag Model Approach

(Research Article)
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ABSTRACT

This study examined the productivity determinants of potato in Nigeria. The data for this study were extracted from secondary sources for a period of 1961-2016. The Autoregressive Distributed Lag (ARDL) model was adopted. The findings revealed that variables such as capital, land, fertilizer and prices were significant both in the long-run and short-run while rainfall and temperature were insignificant in the short-run. The study recommends among others that access to capital by the potato farmers should be increased by making more capital available for loans and grants at a reduced interest rate and that the land tenure system in operation should be made flexible to enable potato farmers access more land to enable mechanization and increased output.

1. INTRODUCTION

There are many reasons for encouraging more production of potato as a means of livelihoods among African smallholder farmers. Potato as a staple crop that addresses food security and a horticultural crop for its high value per unit area of land. Potato has a short cropping cycle of three to four months and suits the dual cropping seasons in Nigeria, particularly in rain-fed systems. Harvestable potato tubers are available 60-100 days after the rainy season began—a major advantage potato has over grains, which require six to nine months to mature (FAO, 2005). This makes potato one of the initial harvests in any planting season, therefore an essential crop for the period between harvests when individuals can't access sufficient food to satisfy their energy and nutritional needs. Potato has a high water use efficiency and produces

more calories per unit of water than most crops (Nteranya, 2015). Potato has the potential yield of more than 51,000 calories/ha per day within a 3 -4 months growing season, it caloric and energy yield is the highest among most staple food crops, almost twice that of wheat and rice. Potato is an affordable and nutritionally rich staple food for the timing Nigerian population, contributing significantly to the protein, vitamin C, zinc, and iron needs of the peoples diet (FAO, 2005). There is always the paramount need to ensure the productivity of potato is on the increase.

Productivity (agricultural): is a measure determined by the ratio of the amount of agricultural output produced for a given amount of inputs. Productivity can be measured using the marginal physical product (MPP) technique in which case, the main purpose is the summation of total product (TP) which is a response of a unit increase in the use an input i.e., total factor productivity (TFP) growth, are measured with the frontier and non-frontier methods. Productivity can be measured and ascertained at farm level efficiency and the ratio of inputs and outputs at a macro level (Udoh and Falake, 2006). Productivity is generally determined in terms of the efficient utilization of factor inputs, such as land, labour, fertilizer, herbicides, tools, seeds and equipment etc yield a certain quantity of output (Umoh and Yusuf, 1999). Low productivity of potato is a great issue of concern, despite all human and material resources deployed in the production of potato, the level of productivity still fall under 50% considering the nutritional and economic importance of the crop (FDA, 1995 and Bamidele, Babatunde & Rasheed, 2008). The production practices of the predominant small-scale rural potato farmers are similar to their output such as subsistent level of production, small farm size due to tenure system, poor access to credit facilities and other production inputs.

Increasing the productivity of potato farming would require either increased input use especially land expansion, credit facilities, availability of farm machines, irrigation facilities etc. Irrigation facilities in Nigeria are very poor and this is a major challenge to the production of root and tuber crops. Root and tuber crops farming are left to suffer at the mercy of climate which is fast changing and unreliable (Enete, 2014). Nigerian agricultural activities largely depend on nature for irrigation and sunlight, with the long periods of drought resulting in the increasing temperature is a major setback to the farmers' ability to produce commercial quantities to meet international demands. Owing to the importance of potato as a source of food and income it is very imperative to ascertain the level of productivity of potato as well as its determinants.

2. ANALYTICAL REVIEW

Onyenweaku, Nwachukwu and Opara (2010) applied the Total Factor Productivity (TFP) in determining the level of food crop production. Shahabinejab and Akbril (2010) and Brady and Soghen (2008) applied the TFP in measuring the agricultural productivity growth respectively. Ajetomobi (2010) and Adedeji, Jayesola and Owolabi (2016) used the malmquist approach to TFP in estimating agricultural productivity considering inputs such as land, labour, capital, fertilizer etc. Eboh, Oduh and Ujah (2012) applied TFP based on 'solow residual' in estimating the productivity of agricultural products. This study adopted the malmquist approach to TFP because of its dynamic nature of considering inputs and output.

Macroeconomic variables are products of monetary, fiscal and financial policies when implemented, such variables are exchange rate, interest rate, tax rate, tariff and gross domestic product. Macroeconomic variables have serious economic and developmental implications for agricultural productivity and simulation of exports. There are so many literature to support the impact of macroeconomic variables on the productivity of agriculture.

Coa and Birchenall (2013) found that agricultural productivity contributes immensely to the total factor productivity (TFP) of the non agricultural sector as the agricultural sector productivity triggers employment and reallocation of output. Memon et al; (2008) revealed the existence of long-run relationship between agricultural output and exports. Ali et al; (2010) examined the relationship between some macroeconomic variables and agricultural income in Malaysia, adopting the Johansen co-integration approach with some key macroeconomic variables having both positive and negative impacts. In Nigeria, Garba (2000) and Akpokodje (2000) confirmed that major macroeconomic variables changes result in agricultural policy instability. Awokuse (2005) found that the changes in monetary supplies have a relatively low impact on agricultural produce price. Oluwatayese et al; (2016) adopted the vector error correction model to analyze the macroeconomic factors and the agricultural sector in Nigeria, the study revealed the existence of a long-run relationship between the variables. While Shariff (2015) adopted the autoregressive distributed lag approach to determine the existence of a long-run relationship between macroeconomic variables and the agricultural productivity in Malaysia. Climate variables are factors that determine the climate of a region, usually measured for a period of thirty years or more. The major variables include rainfall/ precipitation and temperature/ the sunshine. Though there are limited recent literature on the impacts of climate variables on the agricultural productivity, some related ones were reviewed. In determining climate effects on US total agricultural productivity, Liang et al; (2017) adopted the TFP in measuring productivity while examining its relationship with temperature and precipitation. Ayinde et al;(2011) adopted the Johansen co-integration technique in estimating the effects of climate variables on agricultural productivity, the study revealed that rainfall and temperature exerted positive and negative effects on agriculture respectively. Chukwunonso (2015) adopted the error correction model in estimating the impact of temperature and rainfall on crop yield, forestry production, livestock production and fish production in Nigeria. Nwachukwu et al; (2012) in estimating climate change effects on cocoa productivity in Nigeria considered rainfall and temperature which were significantly affecting productivity. Mbanasor et al; (2015) and Nwajiuba & Onyeneke (2010) in estimating the impact of climate change on the productivity and yield of some crops in Nigeria revealed that temperature and precipitation were significant factors affecting their productivity using the log quadratic regression approach and ordinary least square regression approach respectively. Onwumere and Ichie (2012) and Howard et al; (2016) revealed that rainfall is a significant factor influencing cassava and wheat production respectively using error correction approach. This study considered some key macroeconomic variables such as output, arable land, mechanization level, price, labour, fertilizer usage and capital. The major climate factors considered are rainfall and temperature. The autoregressive distributed lag model was adopted for this study.

3. METHODOLOGY

The study was carried out in Nigeria. Nigeria is a country located in West Africa along the Atlantic Ocean's Gulf of Guinea, its land borders are with Benin to the West Cameroon and Chad to the East and Niger to the North. It is between latitudes 40N and 140N and longitudes 30E and 150E Meridian. Nigeria's equatorial position gives its tropical climate but this does not mean a single environment. It has a tropical climate with relatively high temperatures throughout the year annual average temperature varying from 350c in the North to 310C in the south. Temperature is highest from February to April in the South and from March to June in the North and lowest in July and August over most of the country.

In fact, Nigeria is a country of diverse climates, landscapes, wildlife, cultures, and traditions. It is the most populous nation in Africa and has one of the fastest growing population in the world. The population of Nigeria is estimated at 158,000,000 people and growing at 2.45%, according to the 2010 CIA world factbook. And by this, Nigeria was ranked number 8 world's most populous nations in 2010. Currently, the population of Nigeria is being put at 167,000,000 people. It is being estimated that Nigeria will be ranked 4th by 2050 as the world most populous nations.

Nigeria has a land area of about 923,769km2 (FOS, 1989), a north-south length of about 1450km and west-east breath of about 800km. its total land boundary is 4047km while the coastline is 853km. The 1993 estimate of irrigated land by the federal ministry of environment of Nigeria was 9570 km2 and arable land is 35%, 15% pasture; 10% forest reserve; 10% for settlement and the remaining 30% considered uncultivable. (Boomie, 1998; Cleaver and Shreiber, 1994). Nigeria water bodies consist of an area of about 13,000 sq. km while the remaining land is about 910,769sq km.

Nigeria enjoys the humid tropical climate with two clear identifiable seasons, the wet and dry seasons. The climate condition varies among regions: equatorial in the south, tropical in the center and arid in the north. It is a country of marked ecological diversity and climatic contrast. Nigeria has a population of over 173.6 million people (NBS, 2013), with diverse biophysical characteristics, ethnic nationalities (more than 250), agro-ecological zones and socio-economic conditions. Farming is the predominant occupation of the people; about half of the working population is engaged in agriculture, the majority of who are smallholder farmers. Cassava, yam, sorghum, maize, millet, and rice are among the major food and cereal crops in Nigeria. The country has been warned against food scarcity and famine in 2017 (FAO, 2017).

3.1. Data source and collection procedure

This study adopted principally secondary data obtained from the Central Bank of Nigeria statistical bulletin, National Bureau of Statistics (NBS), Food and Agriculture Organization database, World Bank Statistical Bulletin, statistical reports and other sources for a period of 1961-2016.

3.2. Method of data analysis

Unit Root Test using the ADF test and Philip-Perron technique to test if the time series data is stationary, the tests will be done one by one for confirmation of the presence of constant means. Malmquist productivity index and Autoregressive Distributed Lag (ARDL) model was adopted.

3.2.1. Model Specification

Unit Root Test: Augmented Dickey-Fuller (ADF) Test (for stationary test)
The ADF test consist of estimating the following regression

$$\Delta Y_t = \beta_1 + \beta_1 + \delta Y_{t-1} + \Sigma^m_{t=1} \alpha_i \Delta Y_{t-1} + e_t \quad .... (1)$$

It is a one-sided test whose null hypothesis is $\delta=0$ versus $\delta<o$ (hence large negative values of the test statistics lead to the rejection of the null) and Δ is the difference operator. Under the null, Y_t must be differenced to achieve stationarity; under the alternative, Y_t is already stationary and no differencing is required.

The Augmented Dickey-Fuller (ADF) unit root test was employed to test the integration level and the possible integration of the variables.

Unit Root Test: Philip Perron (PP) Test (for stationary test)
Consider a model

$$Y_t = \theta_0 + \phi Y_{t-1} + a_t \qquad \text{.... ....} \quad (2)$$

$$PP \text{ test equation} : \Delta Y_t = \theta_0 + \delta Y_{t-1} + a_{t\$} \quad \text{..... ..}(3)$$

Add a correction factor to the DF test statistic. (ADF is to add lagged ΔY_t to 'whiten' the serially correlated residuals)

The hypothesis to be tested:

$$H_0 : \delta = 0$$
$$H_1 : \delta < 0$$

Autoregressive Distributed Lag (ARDL)

Autoregressive distributed lag (ARDL) framework by Pesaran and Shin (1995, 1999), Pesaran et al. (1996) and Pesaran (1997) to establish the direction of causation between variables. This approach is used when dealing with large set of variables which their level of integration may be purely I(0), purely I(1) or mixture of both, which means that the test on the existence relationship between variables in levels is applicable irrespective of whether the underlying regressors are purely I(0), purely I(1) or mixture of both (Duasa, 2006).

Basically, the ARDL approach to cointegration (Pesaran et al., 2001) involves estimating the conditional error correction (EC) version of the ARDL model.

The F test will be used for testing the existence of the long-run relationship. When a long-run relationship exists, F-test indicates which variable should be normalized. The null hypothesis for no cointegration among variables in equation (1) is H0: $\delta 1 = \delta 2 = \delta 3 = \delta 4 = ... = \delta n = 0$ against the alternative hypothesis H1: $\delta 1 \neq \delta 2 \neq \delta 3 \neq \delta 4 \neq ... \neq \delta n \neq 0$. The F-test has a non-standard distribution which depends on (i) whether variables included in the model are I(0) or I(1), (ii) the number of regressors, and (iii) whether the model contains an intercept and/or a trend. The test will involve asymptotic critical value bounds, depending on whether the variables are I(0) or I(1) or a mixture of both. Two sets of critical values are generated which one set refers to the I(1) series and the other for the I(0) series. Critical values for the I(1) series are referred to as upper bound critical values, while the critical values for I(0) series are referred to as the lower bound critical values.

If the F test statistic exceeds their respective upper critical values, we can conclude that there is evidence of a long-run relationship between the variables regardless of the order of integration of the variables. If the test statistic is below the upper critical value, we cannot reject the null hypothesis of no cointegration and if it lies between the bounds, a conclusive inference cannot be made without knowing the order of integration of the underlying regressors.

If there is evidence of long-run relationship (cointegration) of the variables, the following long-run model is estimated:

$$
\begin{bmatrix}
\Delta(Ms_o)_t = \alpha_0 + \sum_{i=1}^{P}\phi_i\Delta(Ms_o)_{t-i} + \sum_{i=0}^{P}\theta_i\Delta(z)_{t-i} + \sum_{i=0}^{P}\lambda_i\Delta(c)_{t-i} + \sum_{i=0}^{P}\varphi_i\Delta(g)_{t-i} \\
+ \sum_{i=0}^{P}\varphi_i\Delta(e)_{t-i} + \sum_{i=0}^{P}\varphi_i\Delta(h)_{t-i} + \sum_{i=0}^{P}\varphi_i\Delta(p_s)_{t-i} + \sum_{i=0}^{P}\varphi_i\Delta(r)_{t-i} + \sum_{i=0}^{P}\varphi_i\Delta(J)_{t-i} \\
+ u_t
\end{bmatrix}[\ldots\ldots\ldots \ (4)]
$$

The orders of the lags in the ARDL model are selected by either the Akaike Information criterion (AIC) or the Schwarz Bayesian criterion (SBC) before the selected model is estimated by ordinary least squares. For annual data, Pesaran and Shin (1999) recommended choosing a maximum of 2 lags. From this, the lag length that minimizes SBC is selected.

The ARDL specification of the short-run dynamics can be derived by constructing an error correction model (ECM) of the following form:

$$
\begin{bmatrix}
\Delta(Ms_o)_t = \alpha_2 + \sum_{i=1}^{P}\phi_{2i}\Delta(Ms_o)_{t-i} + \sum_{i=0}^{P}\theta_{2i}\Delta(z)_{t-i} + \sum_{i=0}^{P}\lambda_{2i}\Delta(c)_{t-i} + \sum_{i=0}^{P}\varphi_{2i}\Delta(g)_{t-i} \\
+ \sum_{i=0}^{P}\varphi_{2i}\Delta(e)_{t-i} + \sum_{i=0}^{P}\varphi_{2i}\Delta(h)_{t-i} + \sum_{i=0}^{P}\varphi_{2i}\Delta(p_w)_{t-i} + \sum_{i=0}^{P}\varphi_{2i}\Delta(r)_{t-i} + \sum_{i=0}^{P}\varphi_{2i}\Delta(J)_{t-i} \\
+ \psi ECM_{t-1} + \vartheta_t
\end{bmatrix}\ldots\ldots\ldots [5]
$$

Where

Ms = Potato productivity index (ratio of inputs/output), EX= exchange rate naira to US dollars, IN= interest rate in percentage, TR= tariff rate in percentage, GDP= Gross Domestic Product in Naira, g= agricultural labour (number), c=capital to agriculture (Naira), z= land for agriculture (km), e=machines and tractor (number), n= fertilizer and chemicals (kilograms per hectare of arable land), R= Annual mean Precipitation (mm), J= Annual mean temperature (°c), , Δ= Difference operator, Y= dependent variables, x= independent variables, t= time, $\sum$ = summation sign, ECM = Error correction term, u, ϑ_t = error term are independent identically distributed, δ, ϕ, θ, λ, φ = the coefficients, P= lag operator and r = percentage growth in total world exports from period

4. RESULTS and DISCUSSION

4.1. Unit root test of the variables

Prior to using the time series data for analysis, the variables were subjected to a stationary test using Augmented Dickey - Fuller test (ADF) and Philips-Peron test for confirmation and to ascertain the order of integration of the variables. The unit root test attempts to determine whether a given time series data is consistent with a unit root process. The presence of unit roots could lead to false inferences in regression between time series. From the results of the unit root tests presented in Table 1, most of the variables were stationary at first difference. Variable such as exchange rate, labour, cassava export, ginger import, root and tuber crops import, lead time to export, average time to clear exports, lead time to import, inflation rate, real interest rate, Gross domestic product, temperature, and tariff were stationary at level.

The coefficients compared with the critical values revealed that all the variables were stationary at the level, and first difference and on the basis of this; the null hypothesis of non-

stationary were rejected and safe to conclude that the variables are stationary. This implied that the variables are integrated. If two or more series are individually integrated (in the time series sense), the individual series are first-order integrated (I(1)) but some (cointegrating) vector of coefficients exists to form a stationary linear combination of them. The series may drift apart in the short-run, then follow a common trend which permits a stable long-run relationship between them.

Since all the variables are not integrated in the same order, there is a need for a co-integration test. This implies that some linear combinations of the series must be co-integrated, such that even though the individual series may be integrated in the order I(0) and I (1) the series may drift apart in the short-run, and then follow a common trend which permits stable long-run relationship between them.

Table 1. Unit root test of the variables continued

	ADF test		Philips-perron		
	Level	1st difference	Level	1st difference	Decision
ginger producer price	-2.30249	-3.53121	-2.41523	-6.6858	I(1)
potato area harvested	-1.11952	-5.6245	-1.05391	-7.46316	I(1)
potato yield	-2.38093	-3.95479	-2.62834	-6.18835	I(1)
potato import	-1.80783	-5.62857	-2.55751	-7.94026	I(1)
potato export	-0.08535	-6.12107	-0.31121	-9.75577	I(1)
potato world export	-1.67993	-7.77966	-2.17531	-12.536	I(1)
credit to agriculture	3.361983	-4.27255	3.358728	-9.04731	I(1)
machinery	-4.29216	-5.22615	-4.84198	-6.61951	I(1)
Fertilizer	-2.20688	-7.05718	-2.60919	-9.19398	I(1)
inflation	-3.90159	-7.61771	-3.35038	-7.30175	I(0)
real interest rate	-5.59578	-9.40358	-6.99084	-15.7352	I(0)
GDP per capita	3.786716	-3.62077	3.930985	-7.20249	I(0)
agricultural labour	3.13827	-3.78589	-1.84579	-2.05975	I(1)
Tariff	-4.25954	-9.49748	-6.16896	-14.7568	I(0)
Rainfall	-3.158	-7.94132	-4.60072	-12.2712	I(1)
Temperature	-5.56272	-9.63698	-6.40189	-13.5301	I(0)
potato productivity index	-1.75137	-10.0078	-1.75137	-10.3493	I(1)

-3.7498, -2.5005 & -1.9793 are Mackinnon critical value for rejection of hypothesis of unit root applied at 1%, 5% & 10% respectively. I(0) & I(1) indicates that the variable has a constant mean at the level, first difference & second difference respectively. Source: FAO database, World Bank development indicators, CBN statistical Bulletin various issues, UNDP climate data, Index Mundi, 2016 computed using Eviews 9.5

4.2. Long Run and Short-Run Macroeconomic and Climatic Determinants Potato Productivity

The long run and short run determinants macroeconomic and climate determinants of potato productivity, having conducted the unit root test autocorrelation tests using Breush-Godfrey serial correlation test.

4.2.1. Long run macroeconomic and climatic determinants potato productivity

With the value of the F-statistics was found to be statistically insignificant which implies that we accept the null hypothesis of no serial correlation in the long run determinants of potato productivity model estimated as presented in Table 2.

Table 2. Breusch-Godfrey Serial Correlation LM Test: long run determinants of potato productivity

F-statistic	0.449973	Prob. F(2,2)	0.6897
Obs*R-squared	15.51660	Prob. Chi-Square(2)	0.0004

Source: FAO database Source: FAO database, World Bank development indicators, CBN statistical Bulletin various issues, UNDP climate data, Index Mundi, 2016 computed using Eviews 9.

From Table 3 the Akaike Info Criterion(AIC) and the Schwarz criterion values of -14.795 and -13.036 which was minimal resulting in the selection of 5 lag lengths. The Durbin-Watson value of 2.087 confirms that the model is free from auto-correlation. The calculated F-statistics (F-statistic = 40.786), showing that the null of no cointegration can be rejected at 1.0 percent level as it was observed from the bound test that there is long run relationship running among the variables. This implies that there exists a long-run relationship or cointegration between potato productivity and its determinants. Having established the cointegration relationship, the next step is to estimate the long-run coefficients by estimating an ARDL. The result indicates that the long run overall model is well fitted as the independent variable explained over 99.8% (R2) movement in the dependent variable

Potato productivity of the previous seasons was significant at 10% for the 2nd lag and positively influenced the productivity of potato in the long run. This implies that the ginger productivity recorded previously affected the productivity positively i.e. the increase recorded in the previous years have a positive long-run impact on the productivity. The increase in the productivity is recorded gradually as an increase in technology and other inputs currently may lead to further increase in production. But in a situation of low productivity recorded in the previous years with 3rd and 4th been statistically significant at 5% and 10% respectively, to ensure enhanced productivity.

Land available for the potato farming was found to be significant at the 3rd and 4th lag periods and were significnat at 10% respectively. Capital accessibility and usage for the production of potato can have positive and negative long-run impact on the productivity of potato as can be seen from Table 3 were different lagged variables of land had positive and negative impacts. For the long run productivity of potato, there should increase access and better usage of capital to ensure enhanced productivity.

Fertilizer application for the production of potato can have positive and negative long-run impact on the productivity of potato as can be seen from Table 3 were different lagged variables of land had positive and negative impacts. It, therefore, means that the influence of fertilizer application can either be negative or positive depending on the application procedures.

Good price of the potato can have positive and negative long-run impact on the productivity of potato. The long run coefficient of potato price in the 1st lag was significant at 1% and positive, 2nd was significant at 5% and negative while in the 3rd lag it was statistically significant at 1% and positive. This result means that the pricing of potato can have long run negative and positive effect. Price instability is a structural characteristics of the potato

market as noted by Soule (2013) resulting in both positive and negative shocks to productivity.

Table 3. Long run determinants of potato productivity

Variable	Coefficient	Std. Error	t-Statistic	Level of significance
C	0.001172	0.000661	1.772404	*
(potato productivity(-1))	-0.123712	0.902779	-0.137034	
(potato productivity (-2))	1.716437	0.746734	2.298593	*
(potato productivity (-3))	-6.569422	2.179170	-3.014644	**
potato productivity (-4)	-0.622951	0.309304	-2.014038	*
(potato productivity (-5))	-2.152961	2.743908	-0.784633	
(Land(-1))	3.58E-08	3.65E-08	0.982661	
(Land (-2))	-1.08E-07	3.85E-08	-2.805349	**
(Land (-3))	2.10E-07	8.65E-08	2.427341	*
(Land (-4))	-3.66E-08	3.66E-08	-1.002304	
(Land (-5))	2.14E-07	1.05E-07	2.044205	*
(capital(-1))	1.83E-07	5.20E-08	3.512003	**
(capital(-2))	-3.32E-07	4.19E-08	-7.929881	***
(capital(-3))	5.45E-07	1.51E-07	3.604670	***
(capital(-4))	-5.62E-07	1.82E-07	-3.094041	**
(capital(-5))	5.86E-07	1.17E-07	5.024284	***
(Machines(-1))	-1.76E-06	1.83E-06	-0.961796	
(Machines (-2))	-8.29E-07	1.50E-06	-0.551134	
(Machines (-3))	-8.06E-07	1.15E-06	-0.697837	
(Machines (-4))	8.73E-07	1.32E-06	0.663497	
(Machines (-5))	1.23E-06	1.57E-06	0.784326	
(Fertilizer(-1))	0.004263	0.001402	3.040651	**
(Fertilizer (-2))	-0.006764	0.001620	-4.174678	***
(Fertilizer (-3))	0.006405	0.001484	4.316197	***
(Fertilizer (-4))	-0.007453	0.001376	-5.416427	***
(Fertilizer (-5))	0.005452	0.001444	3.774478	***
(Rain(-1))	-9.29E-06	1.30E-05	-0.716094	
(Rain (-2))	-2.77E-05	1.61E-05	-1.720225	
(Rain (-3))	-8.12E-06	1.90E-05	-0.426373	
(Rain (-4))	1.30E-05	1.27E-05	1.029015	
(Rain (-5))	1.50E-05	1.04E-05	1.449990	
(Temperature(-1))	0.000229	0.000220	1.041570	
(Temperature (-2))	0.000124	0.000308	0.402628	
(Temperature (-3))	0.000659	0.000377	1.746308	*
(Temperature (-4))	0.000732	0.000554	1.321669	
(Temperature (-5))	0.000261	0.000486	0.537379	
(Price(-1))	3.11E-07	1.23E-07	2.525018	*
(Price (-2))	-5.00E-07	1.54E-07	-3.243658	**
(Price (-3))	6.92E-07	1.89E-07	3.652880	***
(Price (-4))	-9.52E-07	2.14E-07	-4.444092	***
(Price (-5))	4.82E-07	2.04E-07	2.360347	*
(Labour(-1))	-1.68E-09	3.35E-09	-0.502500	
(Labour (-2))	7.39E-09	6.18E-09	1.195559	
(Labour (-3))	-5.08E-09	6.82E-09	-0.745043	
(Labour (-4))	-3.24E-09	7.94E-09	-0.407792	
(Labour (-5))	2.52E-09	3.16E-09	0.796363	
R-squared	0.997825	Mean dependent var		0.000278

Adjusted R-squared	0.973361	S.D. dependent var	0.001280
S.E. of regression	0.000209	Akaike info criterion	-14.79454
Sum squared resid	1.75E-07	Schwarz criterion	-13.03548
Log likelihood	415.8635	Hannan-Quinn criteria.	-14.12468
F-statistic	40.78640	Durbin-Watson stat	2.086629
Prob(F-statistic)	0.001212		

*,**& *** indicates that the values are significant at 10%, 5% & 1% respectively.
Source: FAO database Source: FAO database, World Bank development indicators, CBN statistical Bulletin various issues, UNDP climate data, Index Mundi, 2016 computed using Eviews 9.

Figure 1 presents estimate the CUSUM stability test in autoregressive distributed lags method (ARDL) for the long run determinants of potato productivity to show the stability of the model. Our variables, data are stable because the cumulative sum of recursive residuals CUSUM graph is within the limits of 5% significance level.
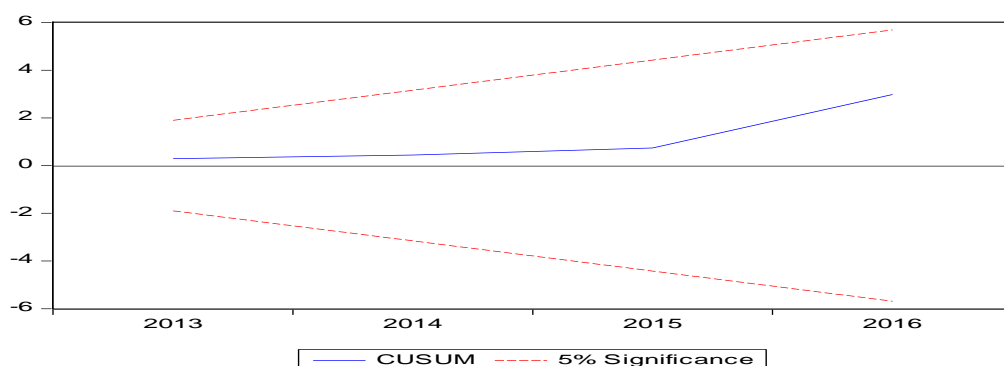

Figure 1. Cumulative sum control chart for long run determinants of potato productivity
Source: FAO database Source: FAO database, World Bank development indicators, CBN statistical Bulletin various issues, UNDP climate data, Index Mundi, 2016 computed using Eviews 9.

4.2.2. Short run macroeconomic and climatic determinants of potato productivity

With the value of the F-statistics was found to be statistically insignificant which implies that we accept the null hypothesis of no serial correlation in the short run determinants of potato productivity model estimated as presented in Table 4.

Table 4. Breusch-Godfrey Serial Correlation LM Test: short run determinants of potato productivity

F-statistic	0.830998	Prob. F(2,11)	0.4612
Obs*R-squared	6.694190	Prob. Chi-Square(2)	0.0352

Source: FAO database Source: FAO database, World Bank development indicators, CBN statistical Bulletin various issues, UNDP climate data, Index Mundi, 2016 computed using Eviews 9.

From Table 5 the Akaike Info Criterion(AIC) and the Schwarz criterion values of -11.689 and -10.250 which was minimal resulting in the selection of 4 lag lengths. The Durbin-Watson value of 1.799 confirms that the model is free from auto-correlation. The calculated F-statistics (F-statistic = 4.653), showing that the model is statistically significant. The result indicates that the long run overall model is well fitted as the independent variable explained over 93.0% (R2) movement in the dependent variable. The speed of adjustment from the

short term to the long term (ECM) was statistically significant at 10% and suggests a low speed of adjustment from short term to long term.

Potato productivity of the previous seasons was significant at 1% for the 4th lag and positively influenced the productivity of potato in the short run. This implies that the ginger productivity recorded previously affected the productivity positively i.e. the increase recorded in the previous years have a positive short-run impact on the productivity. The increase in the productivity is recorded gradually as an increase in technology and other inputs currently may lead to further increase in production. But in a situation of low productivity recorded in the previous years with 3rd been statistically significant at 1% and negative, potato productivity decreases in the long run with the decrease in the previous year's productivity.

Land usage as a major factor of production was statistically significant at 1% and positively influenced the short run productivity of potato this implies that availability and good management of land results to the increase in the productivity of potato in the short run.

Capital available for agricultural activities for the previous years had both short-run negative and positive impact on the potato productivity. In the initial and previous years capital was statistically significant at 1% for 1st, 2nd , and 3rd lag respectively and negatively influenced the short run productivity of potato. While for the 4th lag of the capital was statistically significant at 1% and positively influenced potato productivity. This result implies that funding is technical issue that needs to be transparently managed to boost productivity (Soule, 2013)

Mechanization had a short run positive impact on the short run productivity of potato with 5% statistical significance. This implies that the availability of machines for ridging and other farming processes may result in the short run increase in the productivity of potato.

Fertilizer applications was statistically significant at the 2nd and 4th lags at 10% and 5% respectively and negatively influence production. This result implies that at the short run the fertilizer applied did not result in the increase in the level of potato productivity in Nigeria. Fertilizer suppliers do not always honour delivery terms and product quality is sometimes questionable and this results to decreased production (Soule, 2013).

The price of potato in the short run was statistically significant at 5% and 10% for different lags. This implies that the price of potato in the short-run has resulted in the increase in the productivity of potato. While labour was statistically significant at 10% and positively influenced the productivity of potato at short run.

Table 5. Short run determinants of potato productivity

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000362	0.001261	0.286684	
D(potato productivity(-1))	0.065336	1.287061	0.050764	
D(potato productivity (-2))	-0.929806	1.495760	-0.621628	
D(potato productivity (-3))	-10.31189	2.688060	-3.836184	***
potato productivity (-4)	1.044130	0.258735	4.035518	***
D(Land(-1))	-3.90E-08	4.84E-08	-0.805329	
D(Land(-2))	3.20E-08	5.92E-08	0.540029	
D(Land(-3))	3.84E-07	9.78E-08	3.925444	***
D(Land(-4))	-4.16E-08	2.84E-08	-1.464387	
D(capital(-1))	-7.36E-08	3.96E-08	-1.860649	*
D(capital (-2))	-1.61E-07	4.41E-08	-3.645083	***

D(capital (-3))	-2.17E-07	4.52E-08	-4.808549	***
D(capital (-4))	1.28E-07	2.39E-08	5.348576	***
D(Machines(-1))	-2.91E-06	2.92E-06	-0.994901	
D(Machines(-2))	4.17E-06	1.35E-06	3.092867	**
D(Machines(-3))	-3.87E-06	2.34E-06	-1.655198	
D(Machines(-4))	2.13E-06	2.17E-06	0.982344	
D(Fertilizer(-1))	0.000582	0.000776	0.750283	
D(Fertilizer(-2))	-0.001416	0.000663	-2.136477	*
D(Fertilizer(-3))	-0.000769	0.000566	-1.358737	
D(Fertilizer(-4))	-0.003014	0.001043	-2.889771	**
D(Rain(-1))	1.31E-05	2.98E-05	0.439353	
D(Rain(-2))	-1.52E-05	3.51E-05	-0.433240	
D(Rain(-3))	2.44E-06	3.36E-05	0.072590	
D(Rain(-4))	3.04E-05	2.40E-05	1.266061	
D(Temperature(-1))	0.000527	0.000463	1.139733	
D(Temperature(-2))	2.49E-05	0.000595	0.041775	
D(Temperature(-3))	0.000435	0.000688	0.632289	
D(Temperature(-4))	0.000396	0.000585	0.676888	
D(Price(-1))	2.10E-07	1.21E-07	1.727567	*
D(Price(-2))	3.92E-08	4.95E-08	0.793317	
D(Price(-3))	9.84E-08	4.01E-08	2.451035	**
D(Price(-4))	2.49E-07	8.20E-08	3.033102	**
D(Labour(-1))	-7.93E-09	6.55E-09	-1.211762	
D(Labour(-2))	1.66E-08	9.65E-09	1.718326	*
D(Labour(-3))	-1.26E-08	8.86E-09	-1.424856	
D(Labour(-4))	3.26E-09	5.42E-09	0.600948	
ECM(-1)	0.015611	1.271673	0.012276	

R-squared	0.929829	Mean dependent var	0.000273
Adjusted R-squared	0.730112	S.D. dependent var	0.001268
S.E. of regression	0.000659	Akaike info criterion	-11.68924
Sum squared resid	5.64E-06	Schwarz criterion	-10.24984
Log likelihood	336.0757	Hannan-Quinn criteria.	-11.13920
F-statistic	4.655740	Durbin-Watson stat	1.799071
Prob(F-statistic)	0.002361		

*,**& *** indicates that the values are significant at 10%, 5% & 1% respectively.
Source: FAO database Source: FAO database, World Bank development indicators, CBN statistical Bulletin various issues, UNDP climate data, Index Mundi, 2016 computed using Eviews 9.

Figure 2 presents estimate the CUSUM stability test in autoregressive distributed lags method (ARDL) for the short run determinants of potato productivity to show the stability of the model. Our variables, data are stable because the cumulative sum of recursive residuals CUSUM graph is within the limits of 5% significance level.
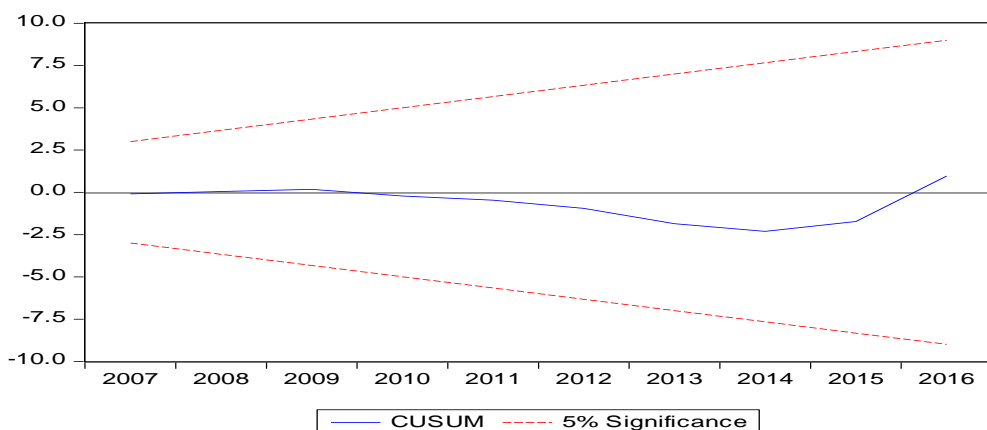
Figure 2. Cumulative sum control chart for short-run determinants of potato productivity
Source: FAO database Source: FAO database, World Bank development indicators, CBN statistical Bulletin various issues, UNDP climate data, Index Mundi, 2016 computed using Eviews 9.

4. CONCLUSION

Macroeconomic variables such as capital, land for agriculture, fertilizer usage and the price of the potato were significant determinants of potato productivity in Nigeria both in the long-run and short-run. We therefore recommend that Smallholder potato farmers should availability and accessibility to more land with other basic input are very essential for the increased production of potato in Nigeria. The land tenure system in operation should be made flexible to enable potato farmers access more land to enable mechanization and increased output. The accessibility of capital to the potato farmers should be increased by making more capital available for loans and grants at a reduced interest rate.

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Safe Water, Improved Sanitation and Hygiene in Rural North-Central Nigeria: Analysis of Households' Willingness to Pay

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ABSTRACT

Using the Contingent valuation method, logit and tobit models this article examined the willingness of rural households to pay for safe water and improved solid waste management in North-central Nigeria. Data used was collected from 352 households in North-central, Nigeria using questionnaire forms. Results revealed that 27.6 percent of households were willing-to-pay an average of N176/week for improved solid waste management while 30 percent were willing-to-pay an average of N21.60/20 liters of potable water. Also, gender, years of schooling, membership of cooperative societies, dependency ratio, health status and the monthly income are the factors that significantly influence their willingness-to-pay. It recommended that rural dwellers should be enlightened on the importance of proper waste management which will result in improved environmental health.

1. INTRODUCTION

In Nigeria, life expectancy is relatively low as it is reported to be less than 55 years of age (Central Intelligence Agency World Fact book, 2015; World Health Statistics, 2014). This is because majority of the populace particularly those who live in the rural areas do not have adequate access to basic infrastructures such as safe water and improved sanitation as well as proper solid waste management. All these result in exposure to hazardous substances, unsafe public spaces, changes in lifestyles, poor water and air quality as well as poor housing conditions. The standard of living in any country can be correlated with the standard of solid

waste management and access to improved quality drinking water. This will help to reduce the morbidity and mortality rates.

According to UNESCO (2006), it was estimated that about 1.2 billion people lack access to improve water supplies and the 2.6 billion people half of the developing world and 2 billion of who live in rural areas live without improved sanitation. Also the World Health Organization reported that a child dies every 15 seconds from water-related diseases. This amounts to nearly 6,000 deaths which is said to be an equivalent of 20 jumbo jets crashing every day. In 2000, the estimated mortality rate due to water sanitation hygiene-associated diarrheas and other water and/ or sanitation-associated diseases was about 2.2 million. This is because consumption of contaminated water can lead to a variety of illnesses including cholera, typhoid, and dysentery. This results to about 2.1 million deaths, which is equal to 90 percent of children under-five years of age. Water-borne parasites also cause illnesses. For example, more than 200 million people in the worldwide are infected by schistosomiasis, causing 20,000 deaths a year. An estimated 88 million of children are under fifteen years (Global Health Watch, 2005). All these result in health conditions that is generally life threatening. In Nigeria, only 31 percent of the people have access to improved sanitation facilities while about 57.4 percent have access to improved drinking water source. Annual population growth rate is 2.5 percent and an average household size is seven persons. Under-five mortality rate in Nigeria is 100 per 1000 live births and low birth weight was 26 percent. Adult literacy rate for males is 79 percent, while adult literacy rate for females is 65 percent (Multiple Indicator Cluster Survey, 2011).

According to the MDG report of United Nations (2011) for Nigeria, there has been a reasonable progress on increasing access to safe drinking water. However, rural areas are still lagging behind with more than one in ten people still without full access to safe drinking water. The health implications of inadequate access to safe water are enormous mostly for children. One of these is the endemic Malaria disease that is generally associated with unsatisfactory drinking water supplies, poor sanitation conditions and inadequate health education programs. Others include diarrhea, dysentery, gastro-enteritis, infectious hepatitis, hookworm, guinea worm, and other parasitic infections. Improving water supply infrastructure will therefore help improve the social well-being of the population.

Improved access to safe water supplies also has beneficial effects for women and girls. This is because they save the time thereof which results in reduced work load. When water must be fetched from farther locations and sometimes from multiple sources, women and girls are normally the ones who bear the burden. The time saved when there is improved access to safe water and improved sanitation can be devoted to other unpaid work such as collection of firewood or unpaid agricultural labor as well as other income generating activities (IOB, 2011). Also, large connection cost has been regarded by many literatures as one of the major obstacles to increased access particularly among the poor. It is therefore very important to consider if rural dwellers will be willing to pay and if yes, what is the amount they are willing to pay.

Studies such as those Khan et al (2010) for Northern Pakistan and Ifabiyi (2011) for households within Ilorin metropolis of Kwara state, Nigeria revealed that households' willingness-to-pay for improved drinking water was significantly determined by households' awareness, levels of education and income. While that of Herath and Masayuki (2012) for Khulna, Bangladesh showed that willingness-to-pay the monthly charge and connection cost are higher for richer households. More so, they found large connection cost to be a critical barrier to expanding the coverage most especially for the poor. For improved sanitation and

hygiene, studies such as those of Adepoju and Salimonu (2011) for Osogbo metropolis of Osun state, Nigeria, Dagnew et al, (2012) for residents of Mekelle, Ethiopia and Kwetey et al (2014) for Tuobodom, North District of Ghana revealed that gender, age income, household expenditure, years of education, awareness of environmental quality were significantly influenced households' willingness to pay for improved sanitation and hygiene.

Previous researches as reviewed above documented the willingness to pay for safe water and improved sanitation in the urban centers with little in rural areas in North Nigeria. This article therefore aims to fill the gap in existing literature. This article will also serve as a reference for individuals and organizations as well as for the government.

2. THEORETICAL FRAMEWORK

2.1. Theory of Change

This article is hinged on the theory of Change as proposed by Water, Sanitation and Hygiene (WASH) Alliance International in 2016. It is built upon three core pillars:

> i) Developing a functioning and enabling Water Sanitation and Hygiene (WASH) market, in which the private sector is providing quality products and services at an affordable price.

> ii) Developing an enabling public sector for WASH, in which the government takes up its responsibility as duty bearer and creates supportive policies and regulations for sustainable WASH services.

> iii) Empower, inform and organize citizens for sustainable WASH. This is essential because informed citizens will demand sustainable WASH services and practice healthy hygienic behavior. They will also enforce high quality WASH services from the market and also hold the government accountable for taking up their role as duty bearer.

A brief explanation of these pillars is given below.

Pillar 1: A functioning WASH market

This has to do with approaching households as consumers instead of beneficiaries for a WASH market to be able to function. This will encourage entrepreneurs to offer quality and affordable WASH services. This can be either through monthly tariffs or by buying the toilet or water facility with a loan or savings. However for this market to function, the government needs to provide good policies and regulations.

Pillar 2: A functioning and enabling public sector for WASH

This pillar views the provision of WASH services as the role of the government. Thus, if governments at all levels are aware of the importance of access to WASH services for sustainable economic development, know and acknowledge their role in this WASH service system, they are more likely to be willing to develop sound policies and regulations and also implement existing good policies. They will also be prepared to make enough budget available for WASH, know how to use this budget effectively and efficiently while ensuring that monitoring of WASH facilities and services function very well. This is essential as it will foster cooperation with the private sector, its citizens and the civil society.

Pillar 3: Empowered and organized citizens for sustainable WASH

This has to do with empowering and educating individual/citizens on sustainable WASH. This will help them to become aware of how healthy hygienic behavior improves their health, life and environment. As a result they will be more willing to pay for, use and maintain WASH services. This can be by organizing people in groups and providing insights in their WASH rights and responsibilities, for advocacy and for management of WASH services.

3. METHODOLOGY

3.1. Study Area

The North-central region of Nigeria consists of six states namely Kwara, Kogi, Niger, Nasarawa, Benue and Plateau as well as the Federal Capital Territory. These states are situated geographically in the middle belt region of the country spanning the west, around the confluence of the River Niger and the River Benue.

3.2. Sampling Techniques

The study employed a four-stage sampling technique. The first stage is the random selection of Kogi, Kwara and Niger states from the North-central region. Second is the random selection of two (2) agricultural zones from each of the three (3) states that was selected to make a total of six (6) agricultural zones. Third is the random selection of six (6) communities from each of the selected agricultural zones to make a total of thirty-six (36) communities and the last stage is the random selection of ten (10) farming households from each of the selected community to reach a total of 360 respondents. However, out of the 360 questionnaires administered in the study area, 352 were found useful for the purpose of data analyses.

3.3. Analytical Techniques

Descriptive statistics

Descriptive statistics such as frequencies, means, percentages, tables, bar charts, graphs etc. were used to examine the distribution of specific socioeconomic characteristics among rural households in the study area.

Contingent Valuation Method

The contingent valuation method was used to estimate the amount the rural households were willing to pay for safe water and improved solid waste management as hypothetical interventions. The hypothetical intervention scenarios were considered since it is one of the various ways through which the incidence and vulnerability to diseases can be reduced. It also improves the health status and productive capacity of the populace. These hypothetical interventions are such that could give the respondents access to a cleaner environment as well as safe and potable water. This will in turn result in a lower risk of waste and water related ailments. After describing the hypothetical intervention scenarios (proper waste management and safe water), the respondents were then asked whether they were willing to pay anything at all for any of them. Where the answer is 'no' the respondent was asked to give reason(s) and where the answer is 'yes' the respondent was asked to choose an amount from a payment list that corresponds to the maximum amount they are willing to pay for any of the hypothetical intervention scenarios. The payment lists used were generated from the price for proper waste management and potable water in the study area. It was determined from some of the households who participated in the pretest survey.

The Logistic Model

The logistic model was used to estimate the willingness to pay for these hypothetical interventions by rural households. It has the form

$$Logit\ (Y) = natural\ log\ (odds) = \ln\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta X$$

$$\pi = probability\ (Y = outcome\ of\ interest/X = x, \text{a specific value of X}) = \frac{e^{\alpha+\beta x}}{1+e^{\alpha+\beta x}}$$

Where: $\pi = probability\ of\ the\ outcome\ of\ interest$

$\quad\quad \alpha = intercept\ of\ Y$

$\quad\quad \beta = Regression\ coefficient$

$\quad\quad e = 2.71828\ (base\ of\ natural\ logarithims)$

Where:

$\quad\quad Y_i$ = Willingness to pay for any of the hypothetical interventions (Proper solid waste management and Safe water) (Yes = 1, 0 = otherwise)

$\quad\quad X_{1i}, X_{2i} \ldots X_{ni}$ = vectors of explanatory variables

$\quad\quad \beta_0, \beta_1 \ldots \beta_n$ = coefficients of explanatory variables

Where;

$\quad\quad X_1$ = Gender of household head (Yes = 1, 0 otherwise)

$\quad\quad X_2$ = Age of household head (years)

$\quad\quad X_3$ = Years of schooling of household head

$\quad\quad X_4$ = Membership of cooperative societies (Yes = 1, 0 otherwise).

$\quad\quad X_5$ = Health status (Normal =1, 0 = obese or lean)

$\quad\quad X_6$ = Dependency ratio

$\quad\quad X_7$ = Income (₦/month)

Tobit model

The tobit model was further used to assess the determinants of the maximum amount the rural households were willing to pay for each of the hypothetical intervention. The tobit model can be written as:

$$y_i^* = \beta x_i + u_i, \quad\quad\quad u_i N(0, \sigma^2)$$

Where:

$\quad\quad Y_i$ = Maximum amount they are willing to pay for any of the hypothetical interventions (Proper solid waste management and Safe water).

$\quad\quad X_{1i}, X_{2i} \ldots X_{ni}$ = vectors of explanatory variables

$\quad\quad \beta_0, \beta_1 \ldots \beta_n$ = coefficients of explanatory variables

Where;

$\quad\quad X_1$ = Gender of household head (Yes = 1, 0 otherwise)

$\quad\quad X_2$ = Age of household head (years)

$\quad\quad X_3$ = Years of schooling of household head

$\quad\quad X_4$ = Membership of cooperative societies (Yes = 1, 0 otherwise).

$\quad\quad X_5$ = Health status (Normal =1, 0 = obese or lean)

$\quad\quad X_6$ = Dependency ratio

$\quad\quad X_7$ = Income (₦/month)

4. RESULTS and DISCUSSION

4.1. Socioeconomic Characteristics

Table 1. Socioeconomic Characteristics

Characteristics	Frequency	Percentage
Gender of household head		
Male	341	96.9
Female	11	3.1
Age of household head (years)		
≤ 35	62	17.6
36-50	176	50.0
51-65	98	27.8
>65	16	4.5
Years of schooling of household head		
≤ 6	207	58.8
7-12	85	24.1
13-18	59	16.8
>18	1	0.3
Marital status		
Married	328	93.2
Single	11	3.1
Widowed	13	3.7
Separated	0	0.0
Primary occupation of Household Head		
Farming	279	79.3
Trading	25	7.1
Civil servant	38	10.8
Artisans	10	2.8
Household size (AE)		
≤5	203	57.7
6-10	129	36.6
11-15	15	4.3
>15	5	1.4
Per Capita Income (₦/month)		
<10000	287	81.5
10000-19999	49	13.9
20000-29999	10	2.8
≥30000	6	1.8
Membership of cooperative societies		
Yes	206	58.5
No	146	41.5
Per Capita Consumption Expenditure (₦/month)		
<10000	175	49.7
10000-19999	122	34.7
20000-29999	34	9.6
≥30000	21	6.0

Source: Field survey data, 2015, No of observation = 352 households; AE=Adult Equivalent.

Table 1 shows the male headed households are 96.9 percent as against the 3.1 percent of female household head. Age is also another important socio-economic characteristics, the modal age of the household heads was between 36-50 years which accounts for 50 percent of the rural households. Only 4.5 percent of them were above 65 years of age. This implies that

most of the respondents in the study area are in the active and agile age bracket. About 93.7 percent of the total respondents were also married. This might account for the presence of large households in the study area with 57.7 percent of the total rural households having about 5 members per household.

About 79.3 percent of the respondents engaged in farming as their primary occupation with 58.8 percent of the household heads have just about six (6) years of schooling. This implies that they stopped schooling at primary school level. Education is an important variable that is expected to have important effect on the decisions they make (William, 1999). This will in turn improve productivity, health status as well as reduce the negative features of life (UNESCO, 2002). Also, majority (58.5 percent) of them were also members of cooperative society which implies that they will have opportunity to benefit from what the members shared. This may include proper education on the various risk factors they are exposed to as rural dwellers as well as how to prevent some diseases within their communities among others. These results are not too different from that of Oyekale & Eluwa (2009;70-75) and Babatunde et al (2012;133-142) as the range of characteristics typical of rural communities in Nigeria. Table 1 further shows that 81.5 percent of the rural household earn about N10,000 as Per Capita Income (PCI) and also majority of the households spends about N10,000 per month and this accounts for 49.7 percent of the sampled households.

4.2. Willingness to Pay Analysis

This section consists of the results of the analysis of farming households' willingness-to-pay for hypothetical interventions (proper solid waste management and safe water). The tools of analysis used in this section are the contingent valuation method, logistic and tobit models. The results are presented in tables 2, 3 and 4.

Table 2. Willingness-to-pay Analysis

Hypothetical interventions	Willing-to-pay		Average Amount
	Frequency	Percentage	
Proper Solid waste Management	97	27.6	₦176/week
Safe and Potable Water	106	30.1	₦21.6/20 litres

Source: Field Survey data, 2015; Number of observation = 352 farming households

Results in table 2 shows that only 28 percent were willing-to-pay an average of N176 per week for proper solid waste management and 30 percent were willing-to-pay an average of N22 for every 20 liters of potable water. This may be attributed to the fact that rural households are not very enlightened as to the benefit that can be derived from taking preventive measures (such as access proper solid waste to management and safe water) that can enhance their health status and wellbeing. This result is not too different from that of Ezebilo (2013; 413-422) who also worked on a study regarding households' willingness to pay for improved residential solid waste management. He found an average of N3, 660 per year.

To further consolidate the results in table 2 above, the study examined the determinants of their willingness-to-pay, marginal effects and the amount using logistic and tobit regression respectively. These results are presented in tables 3 to 4.

Table 3. Determinants of Willingness to Pay for Proper Solid Waste Management

Variables	Logistic estimation of WTP (Yes=1, 0 otherwise)		Tobit estimation of maximum amount WTP
	Estimates	**Marginal effects**	**Estimates**
Gender of household head (Male =1)	-2.10***	-0.33***	-256.79***
	(-6.24)	(-7.91)	(-6.31)
Age of household head(years)	-0.02	-0.00	-1.05
	(-1.13)	(-1.13)	(-0.65)
Years of Schooling	-0.00	-0.00	-2.88
	(-0.11)	(-0.11)	(-0.89)
Members of cooperative society	0.85***	0.13***	111.08***
	(2.95)	(3.05)	(3.25)
Health status (Normal = 1, 0 otherwise)	0.47*	0.07*	54.70*
	(1.17)	(1.73)	(1.69)
Dependency ratio	1.25***	0.20***	172.32***
	(2.93)	(3.04)	(3.66)
Income (₦/month)	2.84e-06	4.49e-07	0.00
	(1.45)	(1.47)	(1.52)
Constant	0.06		-33.92
	(0.07)		(-0.33)
LRchi^2 (7)	70.66***		72.93***
Log-likelihood	-171.8972		-736.4438

Source: Field Survey data, 2015; Number of observation = 352 farming households

*, *** indicate significant levels of 10% and 1% respectively

Figures in bracket represent the z-values for logistic estimates and t-values for the tobit estimates.

Table 3 shows the logistic and tobit results of the factors that determine the willingness-to-pay, marginal effects as well as the maximum amount rural households are willing-to-pay for proper solid waste management. The result shows that the gender of household head, membership of cooperative societies, dependency ratio, health status and the monthly income of the household head are the significant factors that determine the rural households' willingness-to-pay for proper solid waste management. Also, all these factors were found to significantly influence the maximum amount the rural households were willing-to-pay for proper solid waste management. This implies that female headed households, household heads who are members of cooperative societies, have more dependents within their households and those who have normal BMI (those that were found to be healthy) are more likely to be willing-to-pay for proper solid waste management. This may be attributed to the fact that female headed households who have more number of dependents (children below 15 years and adults above 60 years of age) are more aware of the need and effect of clean physical environment and as such will be more willing-to-pay to achieve this. Also, individuals who are members of social groups like cooperative societies are likely to be more exposed to the health benefits inherent in proper solid waste management both for the members of his/her immediate households and the community within which he/she finds him/herself.

The results of the marginal effects also in table 3 shows that holding other variables constant for each of the variables that were significant, a unit increase in the number of dependents within in an household, female headed households, member of a cooperative society and those that were found healthy (those with BMI ranging from 18.5kg/m2 to 24.99kg/m2) have

the likelihood of increasing their willingness-to-pay for proper solid waste disposal by 20, 33, 13 and 7 percent respectively.

This result is consistent with those of Adepoju & Salimonu (2011), Dadson et al., (2013), Ezebilo (2013) and Kwabena & Gideon (2014) for a related study in Osun state, Nigeria, Kumasi, Ghana, Kwara state, Nigeria and Dunkwa-on-offin, Ghana respectively.

Table 4. Determinants of Willingness to Pay for Potable Water

	Estimates	Marginal effects	Estimates
Gender of household head (Male =1)	-0.44	-0.06	-6.71
	(-0.87)	(-0.87)	(-1.20)
Age of household head(years)	0.02	0.00	0.14
	(1.07)	(1.08)	(0.92)
Years of Schooling	0.22***	0.03***	2.31***
	(8.32)	(14.50)	(8.02)
Members of cooperative society	1.06***	0.15***	10.83***
	(3.28)	(3.48)	(2.80)
Dependency ratio	1.04**	0.15**	13.80***
	(2.28)	(2.34)	(2.58)
Health Status (Normal =1. 0 otherwise)	0.15	0.02	1.30
	(0.51)	(0.51)	(0.39)
Income (₦/month)	-0.00**	-7.21e-06**	-0.00
	(-2.20)	(-2.26)	(-1.37)
Constant	-4.33***		-40.27***
	(-4.30)		(-4.08)
LRchi^2 (7)	131.30***		104.69***
Log-likelihood	-156.7505		-625.5254

Source: Field Survey data, 2015; **, *** indicate significant levels of 5% and 1% respectively. Figures in bracket represent the z-values for logistic estimates and t-values for the tobit estimates.

The result shows that the years of schooling, membership of cooperative societies, dependency ratio and the monthly income of the household heads are the significant factors that determine the rural households' willingness-to-pay for safe and portable water. This implies that household heads with more years of schooling which are members of cooperative societies, those with a larger proportion of their households as dependents (younger than 15 years and older than 60 years) are more likely to be willing-to-pay for safe and potable water. This may be attributed to the fact that households with increased years of schooling and are members of cooperative societies are likely to be more exposed to the health benefits of having access to portable water and as such will be willing-to-pay for it. It is however important to note that the negative coefficient for the monthly income which was also found to be significant contradicts a priori expectations but can be said to reflect the nature of the commodity (water). Safe and potable is an example of a private good/commodity whose demand is inelastic in nature (in this case not necessarily dictated by increased income level). It is a basic necessity upon which good health depends. Hence in this case, when the level of income decreased, rural households in North-Central Nigeria were willing to pay more for safe and potable water.

Furthermore, the results of the marginal effects also in table 4 shows that holding other variables constant for each of the variables that were significant, a unit increase in years of schooling has the likelihood of increasing rural households' willingness-to-pay for safe and potable water by 3 percent. So also, as the dependency ratio increases and becoming a member of any cooperative society have the likelihood of increasing rural households'

willingness-to-pay for safe and potable water by 15 percent respectively. This result is not different from the findings of Khan et al., (2010) for northern Pakistan, Ifabiyi (2011) for Ilorin, Kwara state, Nigeria and Mohd et al., (2013) that all came to a consensus that the level of education (related to years of schooling used in this study) is an important factor determines willingness-to-pay for improved drinking water sources.

5. CONCLUSION and RECOMMENDATION

The article revealed that only 27.6 and 30.1 percent of the sampled rural households were willing to pay for proper solid waste management and potable water respectively. Also, the significant determinants of the amount these households are willing to pay include the gender and years of schooling of the household head, membership of cooperative societies, dependency ratio, health status and monthly income of the household head. This study therefore recommends that governmental and private organizations should engage on intensive health education in the rural areas emphasizing the need and importance of a clean environment. This will increase the awareness of the rural dwellers thus their willingness to pay. It will also improve the health status of the rural populace; increase the quality of labor available for production thereby enhancing sustainable economic development.

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Effect of Post-Harvest Losses of Tomato Fruits on the Income of the Marketers in Federal Capital Territory, Abuja, Nigeria

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ABSTRACT

Post-harvest losses of food crops, especially fruits and vegetables, are common phenomena in developing countries. Data were analysed with Ordinary Least Square technique and descriptive statistics. The results revealed that tomato marketing was male-dominated with a mean age of 36 years. The findings also revealed a gini-coefficient of 0.4 and that quantity of tomato fruits, time tomato fruits spent on farm after maturity and time taken before tomato is sold to consumers had significant effect on the income of the marketers. The major constraints faced by the marketers included bad road, inadequate storage facilities and, seasonality. It is therefore recommended that government should encourage the establishment of more tomato processing industries to purchase excess tomato fruits during the glut season.

1. INTRODUCTION

Agriculture is a very important sector in Nigeria economy. The inherent characteristics of farm products such as seasonality, bulkiness, perishability and their non-consumable nature make special demand on post harvest management of agricultural products most especially, fruits and vegetables which are usually harvested fresh. Postharvest handling refers to the stage in production process immediately after harvest which include storage, cleaning, packaging, transportation and sorting (Mbuk, 2011; Mrema and Rolle, 2002). It was reported that losses in agricultural production are estimated at 20 to 40% in developing countries, like Nigeria, depending on the crop and the season and that, as much as 40% vegetables are

wasted after harvest (Adenuga et al., 2013; Mrema and Rolle, 2002; Ogunleye and Adefemi, 2007). These post harvest losses occur, especially for tomato, if there is delay in harvesting after maturity; mechanical/physical injury during harvesting, sorting and packaging; poor methods of storage; excess supply over demand as a result of glut; bad road network or, as a result of physiological changes that occur during transit from the farm gate to the point of sale to the middlemen and/or to the final consumers.

Tomato is a major fruit vegetable crop that has achieved tremendous popularity over the last century. It is rich in minerals, vitamins, essential amino acids, sugars and dietary fibres. Aside these, researches have shown that it also contains much vitamin B and C, iron and phosphorus. Tomato fruits can also be consumed fresh in salads or cooked in sauces, soup and meat of fish dishes. They can be processed into purees, juice and ketchup (Ayandiji et al., 2011). In Nigeria, tomato is grown under irrigation in the north and strives best in the dry season between December and April when the temperature is very high. The high temperature which is usually about 40°C or more during the day increases the rate of microbial activities and resultant rot/deterioration few days after harvest. The consequences of which are wastages, inadequate supply and accessibility to fresh tomato fruits, a reduction in its market value and income accrued to the marketers. It can also have negative impact on food security and livelihood of the marketers' in the area. It is against this backdrop that this research assessed the socio-economic characteristics of the farmers, effect of post-harvest losses of tomato fruits on the income of the marketers and, the constraints facing the marketers in the area with a view to providing appropriate recommendations to policy makers.

2. MATERIALS and METHODS

2.1. Study Area

The study was conducted in Federal Capital Territory (FCT) of Nigeria. It has inter-state boundaries with Nasarawa State to the east and southeast, Niger State to the northwest, Kaduna State to the northeast and Kogi State to the southwest (Wikipedia, 2015). It covers an area of 7,753.9 square kilometres and lies between latitude 09°05ʹC North and longitude 07°32ʹ East. FCT had a population of 1,406,239 persons (National Population Commission (NPC), 2006) which was projected to 3,324000 at 2.5% growth rate (World Bank, 2013 and United Nations Funds for Population Activities (UNFPA), 2015). It has a population density of 192 people per square kilometre. It falls within the Guinean forest-savanna mosaic zone and experiences three weather conditions annually. These include a warm, humid rainy season and a blistering dry season. In between the two, there is a brief interlude of harmmatan occasioned by the northeast trade wind, with the main feature of dust haze and dryness. The rainy season begins from March to November every year. It is administered through six area councils which include Bwari, Kwali, Gwagwalada, Abaji, Kuje and AMAC (Wikipedia, 2015). Most people in the study area engage in farming at all level while few of them engage in white collar jobs. The major crops grown include millet, corn, sorghum, rice, yams, cassava, plantains, groundnuts, cowpeas and tomatoes and pepper while commercial rearing livestock such as cattle, sheep, and goats also occurs.

2.2. Data Collection

Primary data were collected through the use of well-structured interview-schedule to elicit relevant information from the tomato marketers. Multistage sampling technique was used to select the respondents due to the diversity of the area. The first stage involved a random selection of Abuja Municipal Area Council (AMAC) while the second stage involved a

random selection of Dei-dei and Gwagwa tomato markets. In the third stage as shown in Table1, 90% of the total sample frame (That is, the total number of registered tomato marketers in the area) was selected for each of the markets, which correspond to 69 and 32 sample size respectively thus making a total of 101 respondents.

Table 1. Selection procedure of the sampled markets in the study area

LGA	Markets	TSF(N)	TNRS (n=90% of TSF)
AMAC	Dei – dei	77	69
	Gwagwa	35	32
TOTAL		112	101

Source: Author's computation   AMAC = Abuja Municipal Area Council; TSF = Total Sampling Frame; TNRS = Total Number of Respondents Sampled

2.3. Analytical Techniques

Descriptive statistics such as frequency, tables and mean were used to identify the socio-economic characteristics of the marketers. The income distribution of the marketers was accessed with the aid of Lorenz curve. When the Gini Coefficient is close to 1, the income distribution is more uneven (unequal) because most income is earned by the richest marketer, whereas the lowest-income group earns much less. When the Gini Coefficient is close to 0, the income distribution is more even (equal) because the highest-income marketer does not earn much more than the lowest-income marketer. When the gini index expands, the Gini Coefficient will be nearer to 1; and the income distribution will be more unequal but when it diminishes, the gini coefficient will be nearer to 0 and, the income distribution will be more equal. When the Lorenz Curve is closer to the line of equality, the gini coefficient is smaller and closes to zero, representing a smaller income inequality.

Ordinary Least Square (OLS) technique was used to determine the effect of tomato fruit losses on the income of the marketers, the model is implicitly expressed as:

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, e_1)$

Where,

Y = Income (₦)

X_I = Age (Years)

X_2 = Year of experience (Years)

X_3 = Distance from farm to market (km)

X_4 = Time spent on the farm after maturity (Days)

X_5 = Quantity of tomato fruits loses (kg)

X_6 = Time taken to be sold in the market (Days)

X_7 = Years spent in formal education (Years)

e = Error term which is used to captured the influence of variables not included in the model.

Four functional forms (i.e. Linear function, Power, Semi-log and Exponential functions) were used for the analysis. The best fitted was chosen based on the magnitude of coefficient of the multiple determination, R^2 and the number of significant variables. The explicit forms of the model were stated as follows:

Linear

$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + e_i$

Power

$\ln Y = a + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + b_7 \log X_7 + e_i$

Semi-log

$Y = a + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + b_7 \log X_7 + e_i$

Exponential

$\ln Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 \log X7 + e_i$

Where Y, X_1, X_2, X_3, X_4, X_5, X_6 and X_7 are as defined in the implicit form

$b_1 – b_7$ = regression coefficients

a = constant term

e_i = error term

3. RESULTS and DISCUSSIONS

3.1. Socio-economic characteristics of tomato marketers

Table 2 shows the distribution of marketers according to their socio-economic characteristics such as sex, age, marital status, level of education, household size and marketing experience. The sex distribution of marketers showed that 51.5% of the marketers in the study area were males while 48.5% of them were females. The age distribution of the marketers also revealed that 22.8% of them were within the age bracket of 26-30 years with mean age of 36 years. Furthermore, the marital status of the marketers revealed that 73.7%, 19.6%, 3% and 2% of the marketers were married, single, divorcee and widow(er), respectively. In addition, education is very important in the adoption of innovation by marketers. As revealed in Table 1, 65.3% of the marketers had secondary education while 19.8%, 11.9% and 3.0% had primary, tertiary and qur'anic education, respectively and that over one-half of the marketers (52.4%) had formal education. The analysis of household distribution of the marketers revealed that 55.4%, 38.6% and 5.0% of the marketers had 1-5, 6-10 and 11-15 persons, respectively while the mean household size was 5. Moreover, the marketing experience of the marketers as presented revealed that 37.7%, 15.8% and 10.9% of the marketers had between 5-10, 10-15 and 15-20 years of marketing experience, respectively. Gender analysis indicated male dominance in tomato marketing in the study area. This agrees with the findings of Usman and Bakari (2013) in a research conducted on the profitability of small-scale dry season tomato production in Adamawa State, Nigeria. It was reported that gender was an important determinant of farmers' participation in tomato marketing but at variance with the findings of Adenuga et al., (2013) and Achoja and Okoh (2014). The age distribution of the marketers also implied that majority of tomato marketers in the study area were active and energetic adults who could be proactive in taking decisions that could improve their marketing strategies and thus could contribute positively to improving their marketing performance and overall efficiency of tomato marketing in the area. This assertion is in line with the findings of Haruna et al., (2012) in the study on the economic analysis of fresh tomato marketers in Bauchi State of Nigeria. Since most of the marketers were married, it may increase their market participation so as to meet the household food security needs of their families thereby improving their living standards. This result is at variance with Ayandiji et al., (2011), who reported that although married farmers are likely to have access to more family labour yet it could have serious implications on post harvest losses in tomato production due to poor handling skills when compared with hired labourers. In addition, the result on education analysis implied that all the marketers had formal education and thus, allowed for easier dissemination and adoption of innovations that could improve better handling, marketing and preservation of tomato fruits in the area. This corroborates the findings of Olaleye et al., (2009) in their study on the demographic and socio-economic characteristics of the women marketers of dry season tomato in Niger State. The analysis of

household distribution of the marketers also indicated that the marketers had enough family labour to undertake marketing activities though this depends on the willingness of the marketers and/or the household members to engage in tomato marketing in the area. Where there is that willingness, it will save cost of hiring labour, reduce unemployment and increase the accrued family income. The marketing experience of the marketers indicated that marketers with many years of experience would be able to make sound decision as well as increase efficiency in marketing activities. This result was corroborated with the findings of Adekunle and Adewumi (2015) who reported that the marketers had 5-15years of marketing experience and also revealed marketing experience as one of the important determinants of marketing efficiency. However, Ayandiji et al. (2011) carried out a research on the determinant of post harvest losses among tomato farmers in Imeko-afon Local Government Area of Ogun State, Nigeria and fond that majority (68.17%) of the farmers had below 16 years of marketing experience in tomato production. They believed the low years of experience in tomato production might be responsible for the farmers' lack of knowledge and, the unavailability of technology of tomato processing and preservation in the study area.

Table 2. Distribution of marketers according to their socio economic characteristics

Characteristics	Frequency	Percentage	Mean
Gender			
Male	52	51.5	
Female	49	48.5	
Total	101	100.0	
Age			
> 25	6	5.9	
26-30	23	22.8	
31-35	20	19.8	36
36-40	18	17.8	
41-45	15	14.9	
< 45	19	18.8	
Total	101	100.0	
Marital Status			
Single	26	22.8	
Married	84	73.7	
Divorcee	3	2.6	
Widower	1	0.9	
Total	101	100.0	
Level of Education			
Quranic	3	3.0	
Primary	20	19.8	
Secondary	66	65.3	
Tertiary	12	11.9	

Total	101	100.0	
Household size			
1-5	56	55.4	5
6-10	39	38.6	
11-15	5	5.0	
>15	1	1.0	
Total	101	100.0	
Marketing Experience			
< 5	11	10.9	15
5 – 10	35	37.7	
10 -15	16	15.8	
15 -20	11	10.9	
>20	29	28.7	
Total	101	100.0	

Source: Authors' computation

3.2. Mode of transportation adopted by the tomato fruits marketers

The results in Table 3 shows the distribution of the marketers based on the mode of transportation adopted in conveying the tomato fruits to their various places of sales. The result showed that majority of the marketers used keke (Tricycle) (30.7%) while 25.7% and 14% of the marketers used buses and trucks, respectively. Although few marketers conveyed their tomato fruits via trucks and buses, yet these means of transportation aided easy movement of large quantities of tomato fruits in a single trip by the wholesalers. This ensures economy of scale and increased revenue of the marketers. Use of keke and wheel barrows (22.8%) were however cheaper and easier to move baskets of tomato fruits within the markets and, to the points of sale to the final consumers by retailers. This is acceptable because the point of purchase by the retailers is always not too far away from the point of sale to the final consumers.

Table 3. The distribution of marketers based on the mode of transportation adopted

Mode Of Transport	Frequency	Percentage (%)
Car	1	1.0
Truck	14	13.9
Bus	26	25.7
Pickup	3	3.0
Keke	31	30.7
Motorcycle	3	3.0
Wheelbarrow	23	22.8
Total	101	100.0

Source: Authors' computation

3.3. Source of finance of the tomato fruits marketers

The result in Table 4 shows that majority (82%) of marketers in the area sourced for finance from personal savings. Only 11%, 6% and 1% of the marketers sourced for finance in

cooperative societies, money lenders and commercial banks, respectively. Sourcing of finance from commercial banks was lowest during the period. Sourcing of finance from commercial banks was lowest because most commercial banks' unwillingness to disburse loans to marketers because of the high risk and uncertainties embedded in agricultural related businesses. Aside this, even where there is that willingness, high interest rate, hidden charges, too much bureaucracy and use of assets as collateral security among others, tend to discourage the marketers from sourcing for finance in commercial banks. This result is in corroboration with Usman and Bakari (2013) on the analysis of the profitability of small scale dry season tomato production in Adamawa state. Result from their findings showed that (80%) of the respondents sourced for funds from their own personal savings.

Table 4. Source of finance of tomato marketers in the study area

Source	Frequency	Percentage (%)
personal savings	83	82.2
Bank loan	1	1.0
Cooperative society	11	10.9
Money lenders	6	5.9
Total	101	100.0

Source: Authors' computation

3.4. Analysis of income distribution among the marketers

The Lorenz curve (Figure 1) is a graphical representation of the cumulative income distribution of the marketers. It shows the percentage of the total income that was accrued to the marketers. The straight line represents perfect equality but any departure from this 45° line represents inequality and the larger that 'deficit', the larger the inequality of income and vice versa. From the Figure, the value of gini-index was 0.4 which revealed that income distribution was closer to 0 than 1. The result indicated low level of disparities in the income of the marketers. It was also an indication that richest among them did not have the power over the gross income of all the marketers, that is, the highest-income marketer did not likely earn much more than the lowest-income marketer.

Figure 1: Income distribution of the marketers
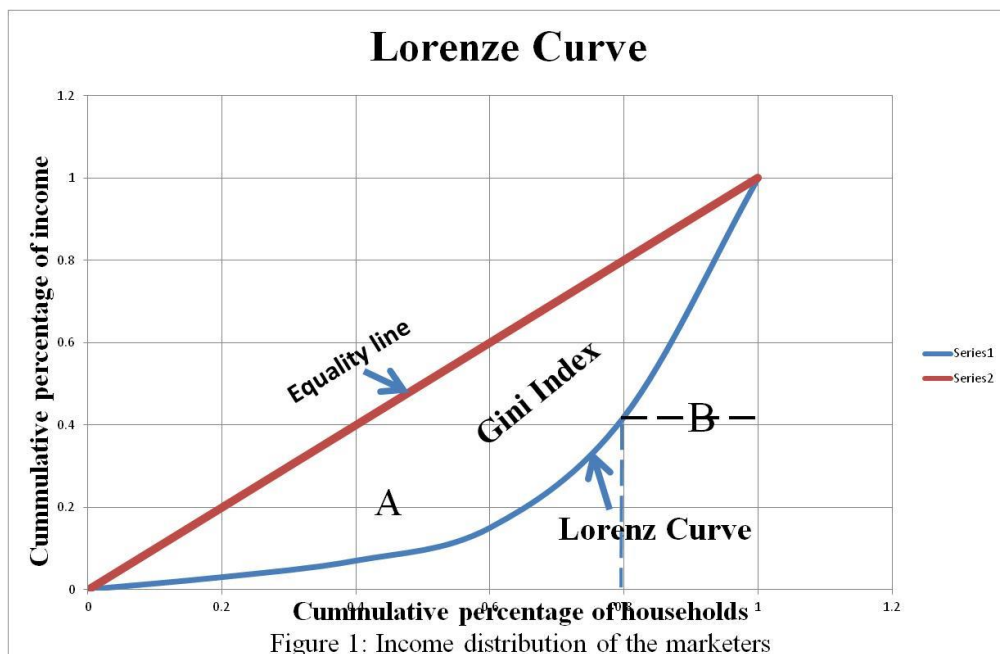
Effect of post-harvest losses of tomato fruit on the income of the marketers: Table 5 shows the results of the regression analysis of the effect of tomato fruit loses on the income of the marketers in the study area. Based on a priori economic and statistical criteria for selecting the 'lead' equation, exponential function out of the four functional forms was chosen as the 'best fit' because it has the highest number of significant variables and highest coefficient of determination, R^2. The F-ratio showed the significance of the whole model. Therefore, the F-ratio of 27.41 showed that the whole model was significant at $p < 0.01$ which implied that the model was of good fit. The estimated R^2 showed that 67% of the variability observed in the income of the marketers was explained by the included explanatory variables. Only five out of the included explanatory variables conformed to the a priori expectation. For instance, years of marketing experience (X_2) and distance from farm to market (X_3) were significant at $p < 0.01$ while time tomato fruits spent on farm after maturity (X_4), quantity of tomato fruits loses (X_5) and, time taken before tomato is sold to interested buyer (X_6) were significant at $p < 0.05$. The positive coefficients of years of marketing experience (X_2), distance from farm to market (X_3), time tomato fruits spent on farm after maturity (X_4), quantity of tomato fruits loses (X_5) and, time taken before tomato is sold to interested buyer (X_6) showed that 1% increase in any of these variables led to a 0.019%, 0.0015%, 0.0807% and 9.1200% increase in income of the marketers, respectively. However, the negative sign of X_6 implied that an increase in time taken before tomato fruits were sold led to decrease in the income of tomato marketers due to high rate of deterioration and hence, decrease in the market value of the tomato fruits and marketers' income. This finding corroborates the findings of Ayandiji et al., 2011 in the analysis of the determinants of post harvest losses among tomato farmers in Imeko-Afon Local Government Area of Ogun State, Nigeria. Their findings revealed that distance from farm to market, days fruits spent in the market before getting to the consumer, age of fruits at harvest among others were significant determinants of post harvest losses of tomato in the area.

Table 5. Regression analysis on the effect of tomato fruit loses on the income of the marketers

Variables	Coefficient	T – ratio	P – Value
Age	-0.0035	-0.58	0.563
Years of experience (X_2)	0.0190	2.81***	0.006
Distance from farm to market (X_3)	0.0015	4.06***	0.000
Time spent on farm after maturity (X_4)	0.0807	2.42**	0.017
Quantity of tomato fruit loses (X_5)	9.1200	2.43**	0.017
Time taken before tomato fruit is sold (X_6)	-0.1364	- 2.02**	0.046

Source: Authors' computation $R^2 = 0.6736$, F =27.41***
   *** Significant at 1%, ** Significant at 5%, * Significant at 10%.

Constraints faced by tomato fruits marketers in the area: The constraints faced by the marketers were as depicted in Table 6. From the Table, bad road (85%), inadequate storage facilities (79%), problem of seasonality (75%) and price fluctuation (72%) ranked 1st, 2nd, 3rd, and 4th, respectively, while inadequate capital and lack of customers were the least constraints which ranked 3% and 2%, respectively. The result implied that poor transportation network constituted a major hindrance limiting the ease of movement of tomato fruits from the point of production to the point of sale to final consumers in the study area. In addition, the result revealed that tomato marketing required little capital to start up the business and therefore can be a source of income to interested members of the society and invariably help reduce unemployment in the study area in particular and, Nigeria at large. Moreover, there was probably a consistent market for tomato fruits in the area despite the price fluctuations due to seasonality in production and marketing. This is supported by the findings of Haruna et al., (2012) on the economic analysis of fresh tomato marketers in Bauchi Metropolis of Bauchi State, Nigeria who reported that the main constraints facing the marketers were high cost of purchasing from farm gate during lean season production, lack of storage facilities (30%) and production fluctuation (10%).

Table 6. Distribution of marketers according to tomato fruits marketing constraints

Constraints	*Frequency	Percentage (%)	Rank
Bad road	86	85.1	1st
Inadequate storage facilities	80	79.2	2nd
Seasonality	76	75.2	3rd
Price fluctuation	73	72.3	4th
High tax	53	52.5	5th
Small market	37	36.6	6th
Exploitation by middlemen	32	31.7	7th
Infestation by rodents and insects	29	28.7	8th
Inadequate market	8	7.9	9th
Infrastructure	5	5.0	10th
Inadequate capital	3	3.0	11th
Lack of customers	2	2.0	12th
Total			

Source Authors' computation   * Multiple responses

4. CONCLUSION AND RECOMMENDATIONS

The study examined the effect of post-harvest losses of tomato fruits on the income of the marketers in Abuja municipal area council, Federal Capital Territory (FCT), Nigeria. The study revealed that tomato marketing was a male-dominated business with a mean age of 36 years. The gini coefficient of 0.4 showed that there was less inequality in the income of the marketers thus the highest-income marketer did not earn much more than the lowest-income marketer in the area. Also, the regression analysis of the effect of tomato fruit loses on the

income of the marketers in the study area showed R2 of 0.6736 while the F-value was significant at p < 0.01. Out of the included variables, years of marketing experience (X2), distance from farm to market (X3), time spent on farm after maturity (X4), effect of tomato fruits loses (X5) and time taken to be sold (X6) were significant at different levels of probability. The most critical problems facing the tomato marketers were inadequate good road (85.1%), lack of storage facilities (79.2%), price fluctuation (72.3%) and seasonality.

Based on the findings, the following recommendations were made:

1. Local Government Authorities should rehabilitate bad roads and construct new roads to aid ease of transportation of tomato fruits to the desired destination.
2. Central Bank of Nigeria should formulate policies that will among other things, reduce the lending rate for agricultural purposes so as to encourage patronage by the marketers
3. Government should intensify efforts in providing modern storage facilities that will reduce rate of deterioration of tomato fruits after harvesting.
4. Extension agents' contacts should not be limited to the production aspects of tomato but should be extended to the marketing so as to train the marketers on the improved method of storage and processing so as to reduce post-harvest losses.
5. Government should encourage the establishment of more tomato processing industries to purchase excess tomato fruits during the glut season.
6. To overcome the problem of price fluctuations, the private sector should be encouraged to establish tomato dehydration plants to process tomato into more durable products in the area. This may help to enhance all-year round availability of tomato fruits.

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