



## Climate Change as a Correlate of Food and Human Security among Farming Households in Abia State

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### ABSTRACT

The study was centered on climate change as a correlate of food and human security among farming households in Abia state, Nigeria. A correlational research design was used for the study. Three research questions and one null hypothesis guided the study. The hypothesis was tested at 0.05 level of significance. The target population consisted of 470 registered farmers in Aba South and Umuahia North Local Government Areas of Abia state. A sample of 212 registered farmers were selected through simple random sampling technique using Krejcie and Morgan's table (1970) 5% margin of error, 95% confidence level and was used for the study. Two structured questionnaires titled: Climate Change Awareness Level Questionnaire (CCALQ) and Climate Change & Food Insecurity Questionnaire (CCFIQ) were developed, validated and used for the study. The internal consistency reliability of the instruments was calculated using Cronbach Alpha procedure and reliability estimate of 0.82 and 0.80 were obtained for CCALQ and CCFIQ respectively. They were administered to the participants by hand with the help of 7 trained research assistants and all the copies were returned. The data obtained from data collection were analyzed using mean and standard deviation to answer for research question 1, Pearson Product Moment Correlation Coefficient for research question 2 and the hypothesis was also tested with Pearson Product Moment Correlation Coefficient at 0.05 level of significance. The results revealed that farmers had moderate awareness level of climate change and that climate change results to food and human insecurity in Abia state, Nigeria. However, it was recommended among others that researchers should conduct more on climate change, its impact and possible ways of ameliorating the negative effects on the society.

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### INTRODUCTION

The recent change in the global climatic condition has become a source of worry to different sectors of the world. This is so because, it has adversely affected the economic, political, educational, health, and other sectors. Climate change is the changing of weather patterns

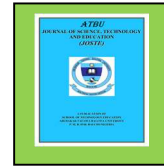
primarily as a result of the increase in carbon pollution in the atmosphere (Balbus, Crimmins, Gamble, Easterling, Kunkel, & Sarofim, 2016). According to them, these changes alter weather patterns which include rising temperatures, heavy rains and droughts, and some other kinds of severe weather. Francis (2014) noted that climate

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change is the latest challenge to sustainable human development. It may have negative impact on a nation's effort to achieve her developmental goals. The author saw climate change as a change in the statistical properties of the climate system. It includes changes in the earth's weather, including changes in temperature, wind, etc. Consequently, the author suggested that climate change be taught even at secondary school level, in order to acquaint the students with adequate knowledge of climate change which will in the end enhance their school adjustment. There is evidence that climate change is taking place in Nigeria. All the countries within Subsaharan Africa, including Nigeria are highly vulnerable to the impact of climate change (Building Nigerians Response to Climate Change – BNRCC Project, 2011).

Climate change is therefore a global phenomenon which requires both national and international approach, and indigenous knowledge. Ebele and Emodi (2016) opined that Nigerian's climate has been changing which is evident in increase in temperature, variable rainfall, rise in sea level and flooding, drought and desertification, land degradation, more frequent extreme weather events, affected fresh water resources and the lots of biodiversity. They added that the impact of climate change cut across ethnic, religious, national and international borders and as such, affects global sustainable development, livelihood and man's ability to live together on earth. Climate change is one of the most important environmental issues facing the world today. Currently, there is a general notion in the scientific community and even among decision makers that climate change is a reality and the impact is here with us.

Ekpoh and Ekpoh (2011) noted that climate change is any long time change in the pattern of the average weather of a specific region or the earth as a whole. It is an abnormal variation in the earth's climate that usually occur over durations ranging from decades to millions of years. Evidence shows that global mean of the temperature increased by 0.60c during the 20 century, with the six (6) hottest years occurring between 1997 and 2007 (IPCC, 2014). This

according to them was linked to higher concentration of carbondioxide and other green house gases (GHGs) in the atmosphere which are dominantly antropogenic origin, such as fossil fuel combustion, land use and deforestation (Ekpoh & Ekpoh, 2011). Climate change phenomenon has serious deleterious consequences for the earth in the form of significant variations in climate, recurrent drought, excessive heat waves, wind storms, killer floods etc. The researchers saw climate change as any alteration in climatic condition over a period of time, as a result of human activities or nature.

Human activities and nature are two major factors that affect climatic condition. Human activities like, deforestation, improper land use, combustion like fossil fuel combustion etc. Nature includes, changes in the ozone layer and other changes that are not man made. Climate change comes with consequences such as intense thunder storms, wide spread floods and incessant drought. Ogbuabor and Egwuchukwu (2017) observed that climate change impact pose serious danger with so many consequences on the Nigerian economy. According to Ogbuabor and Egwuchukwu (2017), extreme weather events such as flood can undermine economic growth through production and infrastructure loses and the need for extra ordinary spending. These impacts could lead to food security challenges and damage to infrastructure. Social dislocation and health challenges such as chronic heat rashes, cerebra-spinal meningitis, stroke, malaria, mental retardation and other related diseases are linked to climate change impacts (Osuafor & Nnorom, 2014). These factors can affect the agricultural production and subsequently food supply – hence security of farming households.

The world's demand for food is expected to double within the next 50 years, while the natural resources that sustain agriculture will become increasingly scarce, degraded, and vulnerable to the effects of climate change (FAO, 2016). In many poor countries, agriculture accounts for at least 40 percent of GDP and 80 percent of employment. At the same time, about 70 percent of the world's poor live in rural areas and most depend on agriculture for their

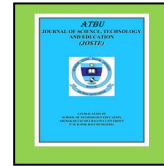
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livelihoods (World Bank, 2008). Also, in sub-Saharan Africa, two thirds of the working population still make their living from agriculture (ILO, 2007).

Climate change affects food availability through its increasingly adverse impacts on crop yields, fish stocks and animal health and productivity, especially in sub-Saharan Africa where most of today's food insecure live (Porter, Xie, Challinor, Cochrane, Howden, Iqbal, Lobell and Travasso, 2014). Along with a more volatile climate, there is tendency to be an increase in the intensity and frequency of climate-related natural disasters. Poor people, including many smallholder farmers and agricultural workers, are more vulnerable to the impacts of such disasters. Severe droughts or floods can sharply reduce incomes and cause asset losses that erode future income earning capacity. Both urban and rural poor would be most affected by increase in food prices, as they spend much higher shares of their income on food (World Bank, 2010).

Climate change therefore poses a major and growing threat to global food security. As climate change impacts on agriculture intensify, it will become increasingly difficult to grow crops, raise animals, manage forests and catch fish in the same ways and in the same places as we have done in the past. However, the evidence and impact of climate change are reflected in extreme temperature, droughts, heavy rainfall, floods and severe weather storms. These shocks are becoming the norm in several African countries leading to loss of farm lands, livestock resources, homes and livelihoods. These translate to reduced food production, income and asset base. The impact of climate shocks easily takes a severe effect on rural communities because production systems which include tree felling, bush burning, and other ecosystems unfriendly approaches are often practiced (Aworemi, Abdul-Azeez & Poola, 2011).

In the event of severe shocks, households in rural communities tend to seek off-farm/off household opportunities to tie them over difficult seasons. Traditionally, they diversify risks by planting several crops, developing a side-trade, taking on jobs with regular payment and migrating.

These impact brings about changes in environmental condition which force people to move out of their original habitation where they engage in food production and other economic activities, thus making them susceptible to food insecurity. From the findings of research studies, forced migration limits access to food thereby exposing the victims to under-nutrition. It is however becoming more common to have more households opt for migration as a result of climate shock impact on the farm and other means of livelihoods (Osuafor & Nnorom, 2014). Migration may be defined as the movement of people from one location to the other for economic, social or political reasons (Jolly & Reeves, 2005). For instance, migrants move to areas (destinations) that can give higher income (Cai, Feng, Oppenheimer & Pytlíkova, 2016).

As an adaptation strategy to climate change and climate shocks, smallholder farmers are faced with the decision to migrate or not to migrate. Whichever way the decision is taken, there are implications on the farming households and the rural economy. On one hand, migrants are able to send remittances to their households in the affected areas in order to cushion their expenditure and standards of living. Where production conditions return favourable, households are able to invest remittances in agriculture through inputs purchase as well as investment in improved technologies. Considering that smallholder farmers are resource poor; the low availability of human labour can have an obstructing effect on agricultural activities. There is also an increasing rural labour gap as a result of the continuous climate change; but there is no study that substantially revealed if climate change correlates food and human security of farming households. It is in this light that the study sought to examine climate change as a correlate of food and human security among farming households in Abia state, Nigeria.

## STATEMENT OF THE PROBLEM

A large quantity of food consumed in Nigeria is produced through small-scale agriculture (i.e. rural farming). These farmers constitute approximately 80 percent of the

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country's farming population and have low agricultural productivity. Currently, a wide gap exists between overall food crop production and Nigeria's growing population, with food production increasing arithmetically and the population increasing geometrically. Farmers in Nigeria have reported that climate change is causing uncertainty in the length and onset of the farming season, longer and shorter periods of rainfall, and reduced harmattan (a dust-laden wind with very little humidity on the Atlantic coast of Africa). Further, the frequency of storms and intense bursts of rainfall may reduce crop yield, or destroy it completely, and contribute to significant soil erosion and excessive flooding and lost of lives especially in the tropics.

Thus, uncertainty around anticipated weather can impact decisions around crop production (e.g., date of planting, seed purchasing, date of harvest), leading to food shortages. All of this indicates that climate change may undermine efforts to address existing and future food security in this area. There is a need to understand the impacts of climate change on food security in Nigeria through a robust academic framework. Estimating the impacts of climate change on food security is important for the development of policy that can support interventions and allocate resources focused on adaptive farming practices to ensure secure food production. Hence, the need for the study.

### **Purpose of the Study**

The purpose of the study was centered on climate change as a correlate of food and human security among farming households in Abia state, Nigeria.

Specifically, the study was designed to examine the:

1. level of awareness of farming households on the existence of climate change in Abia state, Nigeria.
2. relationship between climate change and food security among farming households in Abia state, Nigeria
3. relationship between climate change and human security among farming households in Abia state, Nigeria

### **Research Questions**

The following research questions were put forward to guide the study:

1. What is the level of awareness of farming households on the existence of climate change in Abia state, Nigeria?
2. What is the relationship between climate change and food security among farming households in Abia state, Nigeria?
3. What is the relationship between climate change and human security among farming households in Abia state, Nigeria?

### **Hypotheses**

The null hypothesis was tested at 0.05 level of significance.

Ho<sub>1</sub>: There is no significant relationship between climate change and food security among farming households in Abia state, Nigeria

Ho<sub>2</sub>: There is no significant relationship between climate change and human security among farming households in Abia state, Nigeria?

### **METHODOLOGY**

The research design adopted for this study was a mixed research design (descriptive and correlational research design). This is because it seeks to describe and also establish a relationship / association between two or more variables that do not readily lend themselves to experimental manipulation. Three research questions guided the study and two null hypotheses were posed; tested at 0.05 level of significance. The target population consisted of 470 registered farmers in Aba South and Umuahia North Local Government Areas of Abia state. A sample of 212 registered was selected through simple random sampling technique using Krejcie and Morgan's table (1970) 5% margin of error, 95% confidence level and was used for the study.

Two self-structured questionnaires titled: Climate Change Awareness Level Questionnaire (CCALQ) and Climate Change &

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Food/Human Insecurity Questionnaire (CCFHIQ) were developed, validated and used for the study. The internal consistency reliability of the instruments were calculated using cronbach Alpha procedure and reliability estimate of 0.82 and 0.80 were obtained for CCALQ and CCFIQ respectively. They were administered to the participants by hand with the help of 7 trained research assistants and all the copies were returned. The data obtained from data collection were analyzed using mean and standard to answer for research question 1, Pearson Product Moment Correlation Coefficient for research question 2, 3 and the hypothesis was further

tested with Pearson Product Moment Correlation Coefficient at 0.05 level of significance. The results revealed that farmers has a moderate awareness level of climate change and that climate change results to food and human insecurity in Abia state, Nigeria.

## RESULTS

**Research Question 1:** What is the level of awareness of farming households on the existence of climate change in Abia state, Nigeria?

**Table 1:** Mean and Standard Deviation on the level of awareness of farming households on the existence of climate change in Abia state, Nigeria

S/N	Climate change Awareness Level	$\bar{x}$	SD	Remark
1	I am aware that climate change impacts my agricultural productivity	3.20	.82	Agreed
2	I am aware that drought leads to crop failures resulting to food shortage in our house	3.23	.85	Agreed
3	I am aware that climate change results to high temperature harmful to health	3.30	.83	Agreed
4	I am aware that air pollution from bush burning can be detrimental to my health	3.10	.80	Agreed
5	I am aware that excessive heat impacts individual's health negatively	3.20	.82	Agreed
6	I am aware that climate change can result to flooding that can trigger trauma	3.20	.82	Agreed
7	I am aware that heavy rains make environment to become damp causing bacterial infections	2.93	.63	Agreed
8	I am aware that the smoke from bush burning causes respiratory health problems for people	3.15	.77	Agreed
9	I am aware that drought has resulted to higher food prices leading to inability of people to afford them	3.05	.74	Agreed

Data in Table 1 revealed that all the 9 items had their mean rating ranged from 2.93 to 3.30 and were above the cut-off point of 2.50. This indicated that the respondents agreed that they have quality awareness of climate change existence in Abia State. The standard deviation of all the items ranged from .74 to .85, which showed that the respondents were not too far from the mean and opinion of one another in their

responses on the awareness level of farming households on the climate change existence in Abia state, Nigeria.

## Research Question 2

What is the relationship between climate change and food security among farming households in Abia state, Nigeria?

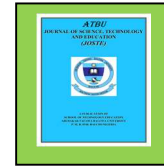
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**Table 2:** Pearson Product Moment Correlation Analysis of Climate Change and Food Insecurity among Farming Households in Abia State, Nigeria

Variable	N	X	SD	DF	r-cal	r-crit	Level of Sig.	Deci.
Climate Change	212	19.52	4.56	974	.1980	.062	0.05	Sign.
Food Insecurity	212	15.29	3.23					

In table 2, the 'r' calculated value of 0.198 was greater than the critical value of 0.062 and since the computed correlation coefficient is greater than zero ( $r > 0$ ), it is an indication of positive linear relationship between climate change and food insecurity, and individuals' scores did not vary on both variables. This implies that there was a significant relationship between

climate change and food insecurity among farming households in Abia state, Nigeria.

### Research Question 3

What are the relationship between climate change and human security among farming households in Abia state, Nigeria?

**Table 3:** Pearson Product Moment Correlation Analysis of Climate Change and Human security among Farming Households in Abia State, Nigeria

Variable	N	X	SD	DF	r-cal	r-crit	Level of Sig.	Deci.
Climate Change	212	21.30	5.25	974	.1990	.061	0.06	Sign.
Food Insecurity	212	13.51	2.54					

In table 3, the 'r' calculated value of 0.199 was greater than the critical value of 0.061 and since the computed correlation coefficient is greater than zero ( $r > 0$ ), it is an indication of positive linear relationship between climate change and human security, and individuals' scores did not vary on both variables. This implies that there was a significant relationship between

climate change and human security among farming households in Abia state, Nigeria.

### Hypotheses Testing

Hypothesis one

There is no significant relationship between climate change and food security among farming households in Abia state, Nigeria

**Table 4:** Correlation of climate change and their mean food security score of farming households

Variable	N	Climate Change	Food Insecurity	Sign.
Climate Change	212	1	.333**	0.000
Food Insecurity	212	.333	1	

\*\* Correlation is significant at the 0.01 level (2- tailed).

A Pearson Product – Moment correlation was run to determine the relationship between climate change and food insecurity among farming households. The data from Table 4 showed no violation of linearity. There was a positive correlation between climate change and food security among farming households which was statistically significant ( $r = .333$ ,  $n = 212$ ,  $p < .005$ ). Thus we reject the null hypothesis which

states that there is no significant relationship between climate change and food security among farming households and conclude that a relation exist between both variables.

### Hypothesis two

There is no significant relationship between climate change and human security among farming households in Abia state, Nigeria

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**Table 5:** Correlation of climate change and their mean human security score of farming households

Variable	N	Climate Change	Food Insecurity	Sign.
Climate Change	212	1	.640**	0.000
Food Insecurity	212	.640	1	

\*\* Correlation is significant at the 0.01 level (2- tailed).

A Pearson Product – Moment correlation was run to determine the relationship between climate change and human security among farming households. The data from Table 5 showed no violation of linearity. There was a positive correlation between climate change and food security among farming households which was statistically significant ( $r=.640$ ,  $n=212$ ,  $p < .005$ ). Thus, we reject the null hypothesis which states that there is no significant relationship climate change and food security among farming households and conclude that a relation exist between both variables.

#### FINDINGS OF THE STUDY

The following findings emerged from the study based on the research questions answered and hypothesis tested.

##### A. The awareness level of farming households on the climate change existence in Abia state, Nigeria are seen in the following ways:

1. I am aware that climate change impacts my agricultural productivity
2. I am aware that drought leads to crop failures resulting to food shortage in our house
3. I am aware that climate change results to high temperature harmful to health
4. I am aware that air pollution from bush burning can be detrimental to my health
5. I am aware that excessive heat impacts individual's health negatively
6. I am aware that climate change can result to flooding that can trigger traum
7. I am aware that heavy rains make environment to become damp causing bacterial infections
8. I am aware that the smoke from bush burning causes respiratory health problems for people

9. I am aware that drought has resulted to higher food prices leading to inability of people to afford them.

##### B. The relationship between climate change and food security among farming households in Abia state, Nigeria

The 'r' calculated value of 0.198 was greater than the critical value of 0.062 and since the computed correlation coefficient is greater than zero ( $r > 0$ ), it is an indication of positive linear relationship between climate change and food security, and individuals' scores did not vary on both variables. This implies that there was a significant relationship between climate change and food security among farming households in Abia state, Nigeria. More so, There was a positive correlation between climate change and food insecurity among farming households which was statistically significant ( $r=.333$ ,  $n=212$ ,  $p < .005$ ). Thus we reject the null hypothesis which states that there is no significant relationship between climate change and food security among farming households and conclude that a relation exist between both variables.

##### C. The relationship between climate change and human insecurity among farming households in Abia state, Nigeria

The 'r' calculated value of 0.199 was greater than the critical value of 0.061 and since the computed correlation coefficient is greater than zero ( $r > 0$ ), it is an indication of positive linear relationship between climate change and human security, and individuals' scores did not vary on both variables. This implies that there was a significant relationship between climate change and human

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security among farming households in Abia state, Nigeria. However, there was a positive correlation between climate change and food security among farming households which was statistically significant ( $r=.640$ ,  $n=212$ ,  $p < .005$ ). Thus

we reject the null hypothesis which states that there is no significant relationship climate change and food security among farming households and conclude that a relation exist between both variables.

## DISCUSSION OF FINDINGS

### ***Awareness of climate change existence in Abia State***

The findings on research question 1 revealed that all the items had their mean rating ranged from 2.93 to 3.30 and were above the cut-off point of 2.50. This indicated that the respondents agreed that they have quality awareness of climate change existence in Abia State. The standard deviation of all the items ranged from .74 to .85, which showed that the respondents were not too far from the mean and opinion of one another in their responses on the awareness level of farming households on the climate change existence in Abia state, Nigeria.

However, the findings of the above study is in agreement with the view of Ekpoh and Ekpoh (2011) who asserted that many people around African continents have a moderate awareness level of climate change. The authors further stated that the people should be motivated towards an environment-friendly lifestyle by inculcating informed awareness in them so that they can influence adoption of better climate policy by choosing pro-environment leadership and according to the researcher, in order to ensure such intensive appreciation of climate change by new generation, we need to build their awareness through a well-designed effective curricula which addresses the issue of Climate change adequately. The views and observations of the authors cited on the awareness level of farming households on the climate change existence has helped to justify the findings of the study on research question 1.

### ***Relationship between climate change and Food Security***

Table 2 revealed that changes in the climatic condition can affect the food security among farming households. Climate variability in

climatic condition have serious consequences on nutritional composition of food crops. The 'r' calculated value of 0.198 was greater than the critical value of 0.062 and since the computed correlation coefficient is greater than zero ( $r > 0$ ), it is an indication of positive linear relationship between climate change and food security, and individuals' scores did not vary on both variables. This implies that there was a significant relationship between climate change and food security among farming households in Abia state, Nigeria. This finding is in agreement with the result of Ikem (2018) who stated that one of the major reasons why climate change has remained a global concern is the threat it poses to agricultural production.

Empirical studies have revealed that higher and varying temperatures and rainfall patterns witnessed in Nigeria within the past decade is gradually shifting the usual agricultural production pattern in Nigeria. More so, Berhanu and Wolde (2019) stated that the composition of mineral elements in the soil are negatively affected by extreme weather events such as high rainfall, flooding and drought. According to the study, excessive rainfall can lead to loss of soil fertility from leaching and flooding can brings about increase in soil acidity. There was a positive correlation between climate change and food security among farming households. The relationship is statistically significance at .005 level of significance. The views and observations of the authors cited on the relationship between climate change and food security has helped to justify the findings of the study on research question 2.

### ***Relationship between climate change and Human Security***

Table 3 revealed that changes in the climatic condition can affect the human security

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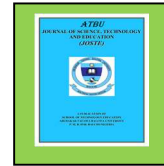
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among farming households. Climate change induces conditions such as desertification, erosion and ecological devastation thereby threatening human security in the affected regions. It also provokes droughts, floods and environmental extremes that limit agricultural production. The 'r' calculated value of 0.199 was greater than the critical value of 0.061 and since the computed correlation coefficient is greater than zero ( $r > 0$ ), it is an indication of positive linear relationship between climate change and human security, and individuals' scores did not vary on both variables. This implies that there was a significant relationship between climate change and human security among farming households in Abia state, Nigeria.

The findings of the above study is in agreement with the view of Osuafor and Nnorom (2014) who asserted that climate change has engulfed all aspects of human endeavours, its ravaging and devastating effects abound all over the world. More so, records from the National Emergency Management Agency (NEMA) in Nigeria indicates that severe flooding led to the death of 363 people, damages to properties, including schools, and displacement of 2, 157,419 people. The views and observations of the authors cited on the relationship between climate change and human insecurity has helped to justify the findings of the study on research question 3.

## CONCLUSION

Climate change no doubt presents an emerging threat to food and human security in Nigeria. The phenomenon causes complex forms of human security crises, which have resulted to destruction of human lives, loss of public peace and stability, destruction of communities, hunger, malnutrition, poverty and unemployment. Thus, the growing number of Nigerian that are malnourished, starving and poor are pointers to the fact that food and human security in Nigeria are in a very low ebb and if not addressed would continue to stimulates social instability and conflicts. It constitutes a growing risk to food security in Nigeria. Variability of climatic elements in recent times has gradually and increasingly altered the food production system in Nigeria.

Shortfall in food supply linked to climate change results to rising food prices in the country thereby worsening food security situation. Hence, Nigeria needs to adopt and implement some adaptive strategies that would enable her cope with the challenges of climate change to ensure food availability through sustainable agricultural system. Such measures will also address some challenges that lead to farmer herder crises in parts of the country that have worsened human security situation.

## RECOMMENDATIONS

Based on the findings of the study, the following recommendations are made:

1. Appropriate legislative measures and policies should be put in place to ensure environmental-friendly practices.
2. Practices such as gas flaring, deforestation, illegal construction of waterways and illegal diversion of natural waterways should be prohibited.
3. Government should employ measures that will help to control ozone layer depletion, such as afforestation and control of green house gases (GHGs).
4. Policy makers and other stakeholders in education should incorporate climate change as a subject in our schools, as this will go a long way in creating more awareness on the subject matter
5. Researchers should conduct more on climate change, its impact and possible ways of ameliorating the negative effects on the society

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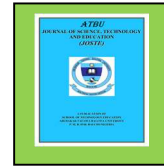
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