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# **Impact Of Climate Change On Food Security For Health Sustainability Among Households In Southeast, Nigeria**

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## **ABSTRACT**

The study identified Climate change: impact on Food Security for Health Management and its Adaptation Strategies for Sustainability among Households in Southeast, Nigeria. The population comprised two hundred (200) Senior Health workers, and Agricultural extension officials in the Southeast Nigeria. Multistage sampling technique was used in determining sample size of one hundred and fifty (150) senior health workers and Agricultural extension officials in Southeast Nigeria. Thirty seven (37) items Questionnaire was used for data collection. Data collected were analyzed using frequency, and mean distribution. The findings include: 1. climate change impacts on food Security for health management in south-east Nigeria. 2. Climate change adaptation strategies on food security for health management in southeast Nigeria. Recommendations were made based on the research findings.

**Keywords:** Climate change impacts, food security, and health management.

## **INTRODUCTION**

Climate change is a natural process and human alterations that exist, causing the climate to change. Climate change can also be a gradual change in the climate system both natural and physical. It is the accumulation of manmade gases that traps the heat of the sun causing changes in the weather pattern. It is the adjustment of an area normal yearly precipitation (forms of water particles e.g. rain, snow, hailstorm among others), or adjustment in an area normal temperature for a month. According to United Nations Framework Convention on Climate Change (UNFCCC), climate change is a change which attributed directly or indirectly to human activities that alters the composition of the global atmosphere and natural climate variability observed over a comparable time periods. Climate Change is a global problem caused by natural and human activities. According to United Nations (2024), human activity are causing the temperature to rise with more intense heat waves and rising sea levels among others. Okoli and Ifeakor (2010) in Onyeazor and Chike (2020), illustrated that climate change is a global effect that is caused by natural variations, increase in the concentration of carbon dioxide and other heat trapping gases such as methane, ozone, nitrous that are naturally in the troposphere (lowest layer of the earth atmosphere). This is because the greenhouse gases prevent the direct heat of the sun from heating the surface of the earth;

increasing emission of carbon dioxide into the atmosphere to deplete the ozone layer that is poisonous and highly reactive (hazardous) to increase the earth's surface temperature to affect agricultural growth.

According to Onuorah and Nwabunwanne (2012) greenhouse effect are the human activities or expansion that cause carbon base gases to block heat from escaping and those long lived gases that are in one way or the other permanent in the atmosphere and force climate to change and respond to no chemical or physical reaction, heating the ozone layer (that prevents raise of the sun) to cause climate change that affect agricultural plants. The increased temperature causes flowing by melting the polar region that are full of ice causing water flows into the rivers and seas to flood and cause changes in crop and other agricultural activities thereby affecting farming; changing the average temperature, rainfall, and climate extremes (e.g. heat waves), pests diseases, atmospheric carbon dioxide and ground-level ozone concentrations. According to Factsheet (2016), the rising sea levels cause floods, damage crop and affect food production. Variable rainfall and increase temperature reduces nutrient yields in crops due to increase in crop failure and new patterns of pest diseases in many developing countries where food security is already a problem. These changes destroy the nutritional quality of most foods. Example droughts cause food and economic losses due to disruption in plant growth, causing low productivity in crops and livestock, fruit crops leading to mass food shortage and lack of food transportation. According to US EPA (2015) transportation changes can reduce the agricultural produce exportation ability of farmers to various international markets and thus affects agricultural production and exportation growth as well as global food prices thereby leading to serious impact on food security.

Food security is the measure of available food and ability of individuals to access safe, nutritious, food that meets dietary needs and preferences at all time. According to 1996 world food summit, food security is when all people at all times, have physical, and economic access to sufficient safe and nutritious food that meets their dietary need and food preferences for an active and healthy life. That is adequate supply of food production, adequate incomes, expenditures, markets and prices to achieve aim of food security; Adequate food utilization for nutritional status of individuals and adequate stability of these accesses. It is very necessary and important for the total population to be safe with adequate access to the rich, poor, male, female, young and the old. According to USDA (2015) climate change affects food security at the global, regional, and local level. It disrupts food availability and affects food quality. This is as a result of increase in temperature, changes in precipitation patterns, changes in extreme weather events, and reductions in water availability; causing reduced agricultural productivity, spoilage and contamination. It reduces the sugar content of food, improve weeds, cause bad coloration, and destroy storage stability in fruits (causing disease fungi like mildew, spotting on leaves, yellowing among others), harmful insects and reduction in land quality, temperature changes, droughts, floods. Habitat range and crop planting dates shifts and hinder farming practices thereby creating poor food production leading to poor food intake for sustainability. Example, fisheries are affected since it depends on specific climate conditions. Globally, every individual is affected by climate change mostly as a result of poor food quantity and quality. Example during extreme weather change; heat, poor air and even extreme cold, extreme floods / droughts; affects the quality of food production and reservation (Ebele & Emodi 2016). This leads to poor food nutrient content and food scarcity that often affects individuals especially the very young and old. Such various groups; both educated, the poor, pregnant women, dignitaries in the community among others who needed appropriate foods for sustainability are not benefiting. This touched the researcher to study on the impact of climate change on food security for sustainability among households in Southeast, Nigeria. The researcher observed that there is poor food security that is affecting health among different households in Southeast Nigeria due to problem of climate change on agriculture to determine the remedy of food security for individuals' sustainability in southeast Nigeria.

Sustainability therefore, is to meet the needs of the present without compromising the future needs. Food sustainability is the practice of producing and preparing food that will not harm the environment or the health and will continue to the future. That is creating a sustainability system that is economically viable, and socially beneficial with positive impact on the environment. According to Alonso (2020) biological diversity is essential for human health for sustainability and well being, economic prosperity, food safety and security. Alonso further stated that organisms, ecosystems, and ecological processes supply oxygen

and clean water, they help cycle carbon and fix nutrients, enable plants to grow, keep pests and diseases in check and hereby protect flooding and regulate the climate. Most foods are not appropriate due to loss of nutrient and some that are appropriate are scarce, expensive and are not obtained by many due to lack of money. Human sustainability is highly affected by climate change (WHO 2015). According to Olsen, and ACSM in Health editorial Team (2019), anemia is recognized as a public health epidemic; over 30 percent of the world's population is anemic. These are as a result of poor food intake such as dark leafy green, red meats, egg yolk (for red blood cells). Poor intake of antioxidant (beta carotene) from red orange, dark green produce, milk, eggs and among others, poor eye sight, poor reproductive health functioning in men and women, excess infections due to poor immune system against infectious diseases. Poor intake of vitamin A in the body affects the nervous system, weight loss, memory loss, and nerve and muscle damage thereby affecting the heart. When fatigue and confusion are neglected can lead to death. Climate change affects the body DNA due to lack of good quality agricultural food intake of folic acid (vitamin B-9) that helps brain development, spinal cord and nervous functioning system especially fetal development, birth defects, growth problems or anemia (Olsen, and ACSM 2019). Agricultural food products like beans and lentils, citrus fruits, leafy green vegetables, asparagus, meats, (poultry, pork), shellfish, grain products (but fortified) and whole grain are needed for intake. Olsen and ACSM (2019) further stated that the NIH (National Institute of Health) recommends that women who are pregnant or may become pregnant should consume up to 4000 micrograms of folic each day, over and above the Folate (vitamin B9) received from natural food will help prevent birth defects and it is very important. Vitamin D from agricultural produce fish, liver oils, fatty fish, mushroom, egg yolk, liver that when deficient in the body cause unhealthy bones. The body needs right quantity of calcium to regulate the development of teeth and bones. A lack causes stunted or poor bone growth and when combined with lack in calcium leads to porous and fragile bones (osteoporosis). This has been affecting health management of individuals in certain households. There is need to prevent health risks from agricultural food intake as a result of climate change. That is why the study impacts of climate change on food security for sustainability among households in Southeast, Nigeria. It will enable health management sustainability of every household.

### **Purpose of the Study**

The main purpose of this study was to determine impact of Climate Change: impacts on Foods Security for Sustainability among Households in Southeast, Nigeria. Specifically, the study sought to:

1. determine impact of climate change on food Security for sustainability among households in South-East Nigeria
2. determine the food security sustainability impact among households in Southeast Nigeria.

This study sought answers to the following research questions:

### **Research Questions**

1. What are the impact of climate change on food Security for sustainability among households in South-East Nigeria?
2. What are the food security sustainability impacts among households in Southeast Nigeria?

### **METHOD**

They study utilized a survey design to collect relevant information for the study. The survey design involves assessment of the people's, attitudes, motivation, interest and opinions. Survey research according to Check & Schuit, (2012) is the collection of information from a sample of individuals through their responses to questions. Check & Schuit (2012) further stated that this type of research allows variety of methods to recruit participants, collect data, and utilize various methods of instrumentation. The study was carried out among the states capitals in south east Nigeria comprising of Abia, Anambra, Ebonyi, Enugu, and Imo. The capital cities were Umuahia for Abia state, Awka for Anambra state, Abakaliki for Ebonyi state, Enugu for Enugu State and Owerri for Imo State. The population comprised of all the senior health workers in all the state government owned general hospitals with in the five (5) south-eastern States as well as the agricultural extension officials from the five agricultural developments programme within the southeast Nigeria. This comprised a population of, two hundred respondents. Multi stage

sampling technique was used to select respondents for the study. Stage one involved the sampling of two (2) general hospital from each of the five (5) states giving a total of ten (10) hospitals. Stage two (2) involved the sampling of ten (10) senior health officials and ten (10) agricultural extension officers from each of the ten (10) hospitals giving a total of 200 Senior health workers and agricultural extension officers. Therefore, the total sample size for the study was two hundred (200). The instrument used for data collection was structured questionnaire. The questionnaire items were produced based on the information collected from the review of related literature. The questionnaire was made up of two sections (1 – 2) with thirty seven (37) items coded based on a four (4) point rating scale of Strongly Agreed (SA) = 4, Agreed (A) = 3, Disagree (D) = 2, Strongly Disagree (SD) = 1 respectively. The researcher with the help of research assistants in each government owned hospital in each of the states administered the questionnaire to all the respondents. The instrument was subjected to face validation by producing draft copies of the questionnaire. This was given to three experts in the field of science education who critically examined the items included with the specific purpose of the study and made useful suggestions that improved the quality of the instrument. Their recommendations, advice, suggestion and observations were used to review the questionnaire items. To determine the reliability of the instrument, the questionnaire item was administered to five scientists outside Southeast zone. This was to ensure that the respondents used in the reliability testing were excluded from the study sample. Their responses was subjected to reliability test using Cronbach alpha coefficient which result was 0.75 and was considered reliable to be used in collecting data for the study.

Two hundred (200) questionnaires were administered by hand to the respondents and one hundred and fifty (150) were returned with the help of research assistants. Frequency counts and mean were used to analyze the data collected. Any item with a mean score of 2.50 and above was regarded as agreed. Similarly, any item scored 2.49 and below was regarded as disagreed.

**RESULTS/FINDINGS:**

These are as follows:

Table one: Mean rating of respondents on the impact of climate change on food security for health sustainability among households in southeast Nigeria.

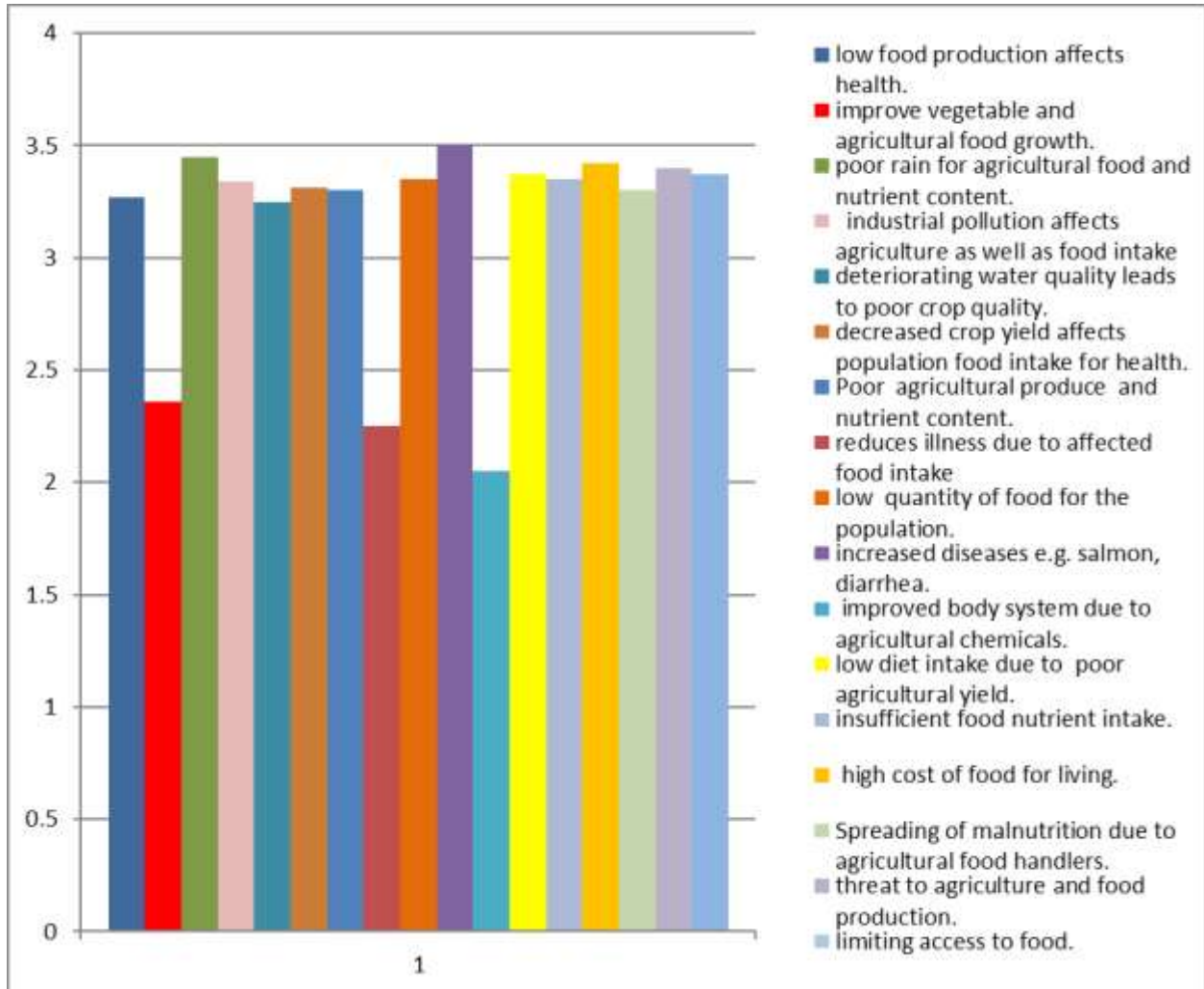
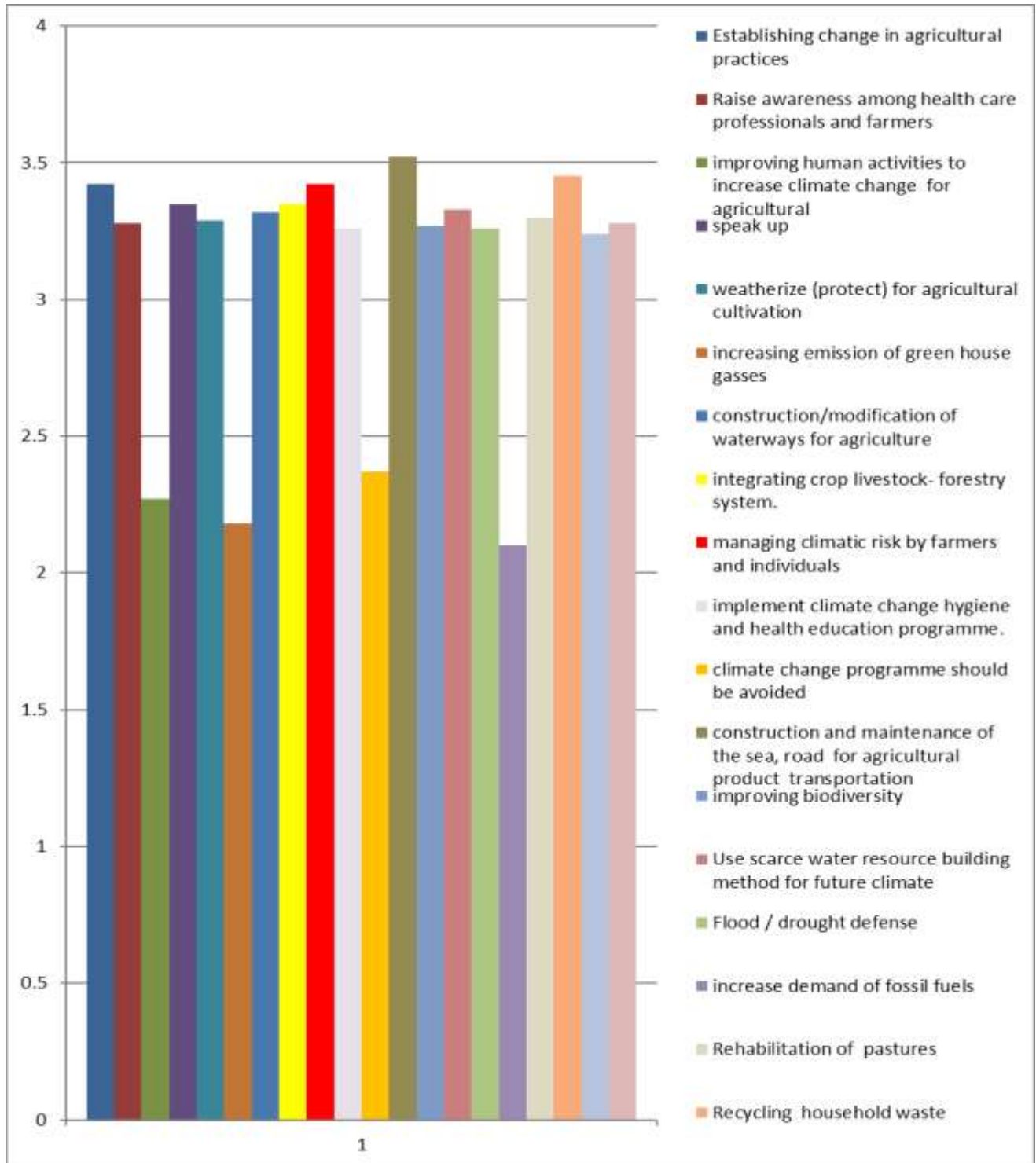


Table one, shows that all the respondents accepted all the items except three items to be appropriate for climate change impacts on food security for health management among households in South-East Nigeria.

Table two: Mean rating of respondents on climate change adaptation strategies on food security for health management among households in southeast Nigeria.



## DISCUSSION / CONCLUSION

Climate changes are the gradual change in the climate system both natural and physical. It is the accumulation of man-made gases that traps the heat of the sun causing changes in the weather pattern. The findings of this study impacts of Climate change on foods security for health sustainability and among households in Southeast, Nigeria” showed that natural processes and human activities causes climate change that causes most available agricultural plant poor growth, poor nutrient content as well as low produce for quality and quantity food consumption of individuals in most South-East Nigeria and the global world. It was observed from literature that globally, that climate changes and has impact on food security overcoming the detrimental effects on health sustainability of the global world. Spillages of crude oil on the environment; leakages from pipelines, underground and surface fuel storage tanks; in discriminate spills and careless deforestation and miss-management of waste and land use constitute the major sources of human activities; cause changes by releasing large amount of carbon to the atmosphere causing carbon dioxide concentration in the atmosphere to rise increasing green house effect. This is the major area needed for intervention against climate change impacts on food security for health sustainability. The result also proves that there are climate change impacts thus; low food production affecting, poor crop growth, chemicals for farm protection decreasing food and vegetable, poor rain for agricultural food and nutrient content, poor agricultural nutrient content due to industrial pollution, greenhouse gases among others and adaptation strategies of establishing changes in agricultural food production practices, awareness on climate change treats for agricultural food, reduce emission of greenhouse gases, chemical water treatment, sanitation and control of hazardous materials from agricultural farms among others which was where the researchers anchored the study to improve health sustainability among household in, South -east Nigeria. Hence the study is important globally to improve climate change impacts on food security for health sustainability among households. The study will direct and correct wrong attitudes and other ill practices that cause climate change impacts on food security.

## RECOMMENDATIONS

From the findings of this study, the following recommendations were made. There is need for the Government to:

1. provide educational knowledge like this study from time to time to improve climate change.
2. provide educational knowledge like this study from time to time to improve climate change potential impact on food security for health sustainability.
3. should develop tools and methods to intersect climate change and agriculture.
4. Study to explore root cause of agricultural climate change for development of qualitative and quantitative food nutrient in various institutions in the country

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**Appendices**

**Population sample for distribution of the questionnaire.**

S/N.	States	Capital Cities	No. of Teachers ( Science lecturers)	No. Health personnel
1.	Abia	Umuahia	20	20
2.	Anambra	Awka	20	20
3.	Ebonyi	Abakaliki	20	20
4.	Enugu	Enugu	20	20
5	Imo	Owerri	20	20
Total			100	100

**Table one. Mean rating on climate change: impact on food security for health management in South-East Nigeria.**

S/N.	impact on food security on health management include:	$\bar{X}$	RMK
1.	low food production affects health.	3.27	Agreed
2.	improve vegetable and agricultural food growth.	2.36	Disagreed
3.	poor rain for agricultural food and nutrient content.	3.45	Agreed
4.	industrial pollution affects agriculture as well as food intake	3.34	Agreed
5.	deteriorating water quality leads to poor crop quality.	3,25	Agreed
6.	decreased crop yield affects population food intake for health.	3.31	Agreed
7.	Poor agricultural produce and nutrient content.	3.30	Agreed
8.	reduces illness due to affected food intake	2.25	Disagreed
9.	low quantity of food for the population.	3.35	Agreed
10.	increased diseases e.g. salmon, diarrhea.	3.50	Agreed
11.	improved body system due to agricultural chemicals.	2.05	Disagreed
12.	low diet intake due to poor agricultural yield.	3.37	Agreed
13.	insufficient food nutrient intake.	3.35	Agreed
14.	high cost of food for living.	3.42	Agreed
15	Spreading of malnutrition due to agricultural food handlers.	3.30	Agreed
18.	threat to agriculture and food production.	3.40	Agreed
17.	limiting access to food.	3.37	Agreed

**Table two. Mean responses on climate change adaptation strategies on food security for health management in Southeast, Nigeria.**

S/N.	Adaptation Strategies for health management include:	$\bar{X}$	RMK
1.	Establishing change in agricultural practices	3.42	Agreed
2.	Raise awareness among health care professionals and farmers	3.28	Agreed
3.	improving human activities to increase climate change for agricultural	2.27	Disagreed
4.	speak up	3.35	Agreed
5.	weatherize (protect) for agricultural cultivation	3.29	Agreed
6.	increasing emission of green house gasses	2.18	Disagreed
7	construction/modification of waterways for agriculture	3.32	Agreed
8.	integrating crop livestock- forestry system.	3.35	Agreed
9.	managing climatic risk by farmers and individuals	3.42	Agreed
10.	implement climate change hygiene and health education programme.	3.26	Agreed
11.	climate change programme should be avoided	2.37	Disagreed
12.	construction and maintenance of the sea, road for agricultural product transportation	3.52	Agreed
13.	improving biodiversity	3.27	Agreed
14.	Use scarce water resource building method for future climate	3.33	Agreed
15	Flood / drought defense	3.26	Agreed
16.	increase demand of fossil fuels	2.10	Disagreed
17.	Rehabilitation of pastures	3.3	Agreed
18.	Recycling household waste	3.45	Agreed
19	Addressing green house gases accordingly	3.24	Agreed
20	Avoid chemical water treatment from agricultural farm.	3.28	Agreed