

## FOOD SECURITY STATUS AMONG PARTICIPATING MAIZE FARMERS UNDER CLIMATE CHANGE ADAPTATION AND AGRIBUSINESS SUPPORT PROGRAMME IN JIGAWA STATE: A HOUSEHOLD FOOD CONSUMPTION SCORE APPROACH

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### ABSTRACT

*The study assessed food security status among participating maize farmers under climate change adaptation and agribusiness support programme in Jigawa State: a HFCS approach. Primary data collected through multistage sampling procedure were gotten from 123 maize farmers randomly selected using the systematic method. Descriptive statistics such as frequency, percentage, mean, Household Food Consumption Score (HFCS) and House Dietary Diversity Score (HDDS) were used to analyze the collected data. The HFCS classifies maize farmers using a consumption index. The result revealed that the 37% of participating maize farmers in programme were between the age ranges of 38 – 47 with mean age 42 years. The result also showed that over 90% were male and 80% were married with average household size of 11 peoples and farm size of 1.95 hectares. Most of the maize farmers (90%) were food insecure and only 10% were food secure. The maize farmers about 20% have acceptable consumption class of 35.5 – 112 consumption indexes and the most widely used coping strategies by the farmers under Climate Chang Adaptation and Agribusiness Support Programme in the state include hand work, purchased from market on credit, selling of livestock/assets.*

**Keywords:** Food security, Maize farmers, Support programme and HFCS approach

### INTRODUCTION

Globally, hunger is severe, as almost 30% of the World's population is presently experiencing suffering from diverse forms of unbalanced nutrition, including shortage of protein, pitiable dietary quality, insufficient caloric consumption, and inadequate concentrations of protein and micronutrients (Dingchou, Abdullahi and Barau, 2022). The diminishing rate in food insecurity occurs to be a major policy threat in developing countries. As individual and communities are struggling with

hardships often face challenges in increasing adequate and nutritious food supply. Limited financial resources or income can lead to insufficient food purchasing power, resulting in inadequate diets and malnutrition. Nigeria faces food security problems caused by conflicts, economic instability and atypical staple food prices.

According to FAO (2009) believed that by 2050, the global population is projected to

growth above 9 billion and this increase in World's population will no doubt increase the request for food which will be motivated by the hiked population and differences in climatic conditions in the coming decades. However, innovations are required for enhancing sustainable management practices, an understanding of current soil management and cropping systems is required to identify site-specific choices that better fit sustainability principles for a better rural change in the circumstance of climate change (Diwediga and Zucca, 2018).

Globally, Nigeria is rank 103<sup>rd</sup> out of 121 countries in global hunger index (GHI) with a score of 27.3 that signifies hunger is serious (GHI, 2022). In terms of poverty, 63% of persons (133 million people) are multi-dimensionally poor, out of which 65% (86 million) live in the North, while 35% (47 million) live in the South. The poverty in rural areas is 72% compared to 42% in urban areas (National Bureau of Statistics, 2022). On income measure of poverty, 40% (83 million people) of the population lives below the International Poverty Line of \$1.90 daily and food insecure, whilst another 25% are vulnerable (World Bank, 2021). The challenge of food security has been linked to unfavourable climate, insurgency and conflict, poverty, and farmer-herder crisis, and so on. Agricultural policies and programs designed and implemented by the Federal.

Maize (*Zea mays* L.) is one of the staple food and feed crops in Africa, providing over 60% of the calories for over 1.2 billion people. About 40.7 million hectares are under maize production in Africa and this translates to almost 100 million metric tonnes, which accounts for close to 40% of total cereal production on the continent (FAO, 2022). Climate change adaptation and agribusiness support programme (CASP) was designed, reliable with IFAD's strategic goal (2016 – 2025) of put in rural people to enable them to overcome poverty and realize food security through remunerative, sustainable and

resilient livelihoods. The initiative is in alignment with the National Agricultural Transformation Agenda (ATA) of the Federal Government of Nigeria, intended at increasing, on a sustainable basis, the income of smallholder farmers and rural entrepreneurs that are engaged in the production, processing, storage and marketing of the priority commodity value chains. In addition, the CASP was designed to significantly contribute to Agenda 2030 of the Sustainable Development Goals, the duration of the project is 6 years, extending from March, 2015 till September, 2021 (Zebra, 2021).

Bashir *et al.* (2018) defined food security as the ability of all people to have physical and economic access, at all times, to safe nutritious food to maintain a healthy and active life. However, a household becomes food insecure when such a household is incapable to afford, or have access at all times to such quantity and quality of food that makes for healthy living (Obayelu and Orosile, 2015). Food security can be measured by proxies such as food consumption scores, household dietary diversity score, months of adequate food provision, household food expenditure (Pritchard, Rammohan and Vicol, 2019). Food consumption score (FCS) is a composite score based on the dietary diversity, food frequency, and relative nutritional importance of the various food groups consumed (Upton, Lisse and Barrett, 2016).

The household dietary diversity score (HDDS) measures how many food groups (out of 13) are consumed during a week reporting period (Barrett and Constanas, 2014). Households that over seven-day period consumed foods from four or fewer food groups out of thirteen are classified as having low dietary diversity. Even among households who satisfy their calorie requirements, those who consume a non-diversified, unbalanced and unhealthy diet, can be classified as food insecure. The higher the FCS, the higher is the dietary diversity and frequency. High food consumption increases the

possibility that a household achieves nutrient adequacy (WFP, 2008). The household indicator for food insecurity behaviour that reveals how households manage or survive with shortfalls in food consumption is referred to as Coping Strategy Index (CPI). Hussain, Memon and Hanif (2020) observed that there are two types of CSI which are context-specific CSI and a reduced CSI (rCSI). While the former is based on a series of context-specific strategies and context-specific severity scores, the later always relies on short list of five (5) coping strategies and the same severity weights.

Caccavale and Giuffrida (2020) believed that there is no agreement on the single 'best' food security among scientists or practitioners for measuring, analyzing, and monitoring food security. The use of appropriate indicators for the different dimensions (availability, access, utilization, and stability) and components (quantity, quality and cultural acceptability/individual) are crucial things to consider in selecting the methodology applied to measure the indicators (i. e. data, methods and models). The several international agencies also use their own sets of food security indicators (example World Food Programme: Food Consumption Score, USAID: HFIAS; FAO: POU and FIES; and EIU: GFSI). According to Manikas *et al.* (2023) the most applied food security indicators at household/individual that measure the access dimension of food security include calorie/nutrient adequacy, Food Adequacy Questionnaire (FAQ), Dietary Diversity indicators, Food Insecurity Experience Scales, coping strategy indices, and experience-based indicators.

The objectives of the study were to describe food security status of maize farmers under CASP programme and coping strategies adopted in the study area.

## Methodology

### Study Area

This study was conducted in Jigawa State,

Nigeria. The State is situated in the North-western part of the country between latitudes 11.00 ° N to 13.00 ° N and longitudes 8.00 ° E to 10.15 ° E. The State has a total land area of approximately 22,410 square kilometers and the State has a projected population of 7,688,132 people in 2024 at the growth rate of 3.2 %. Over 80% of the State's total land mass is considered arable, which makes it one of the most agriculturally endowed States in Nigeria. The major cultivations in Jigawa State are the rainy and dry season crops. Rain fed crops includes millet, sorghum, cowpea, groundnuts, sesame, rice, maize. The dry season farming production include tomatoes, pepper, onions, wheat, sugarcane, carrots, cabbage, lettuce, maize and a host of other leafy vegetables. About 90% of the 6.3 million people of Jigawa State are predominantly engaged in Agriculture, making the sector the major source of livelihoods, food security and poverty reduction (Jigawa State Ministry of Agriculture, 2023).

### Sampling procedure

This study adopted multi-stage sampling procedure. The first stage involved purposive selection of three LGAs participated in CASP programme and choose maize crop. The LGAs selected include Auyo, Miga, and Taura LGAs in Jigawa State. However, the list of participating maize communities and participating maize farmers were obtained from CASP Local Government Support Officer (LGSO). The second stage involved purposive selection of three (3) communities from the selected LGAs where the programme was implemented. The last stage involved the use of systematic random sampling technique to select 25% of the sampling frame, four-hundred and ninety-one participants (491). This gives a total of one hundred and twenty-three (123) participants to serve as a sample size of the study from the nine participating communities.

Table 1: Sampling Technique

| LGAs  | Communities | Sample frame | Sample size |
|-------|-------------|--------------|-------------|
| Auyo  | Auyakayi    | 60           | 15          |
|       | Ayan        | 49           | 12          |
|       | Gamfoi      | 48           | 12          |
| Miga  | Hantsu      | 60           | 15          |
|       | Agufa       | 50           | 13          |
|       | Jamaga      | 25           | 06          |
| Taura | Bardo       | 66           | 17          |
|       | Gilima      | 68           | 17          |
|       | Maje        | 65           | 16          |
| Total | 09          | 491          | 123         |

Primary data were collected through the use of structured questionnaire deployed in Kobo-Toolbox collect with help of trained enumerators under the supervision of the researcher.

#### Analytical Technique

Descriptive statistics such as frequency, percentage and mean. Food security status of maize farmers under CASP programme was measured using Household Dietary Diversity Score (HDDS), and Household Food Consumption Score (HFCS).

#### Household Dietary Diversity Score (HDDS)

The following twelve groups of food was used to compute the HDDS indicator namely; cereals, roots and tubers, vegetables, fruits, meat, poultry and offal, eggs, fish and sea food, pulses, legumes, nuts, milk and milk products, oil and fats, sugar and honey, and others. Each food is given a score of 1 = consumed and 0 = not consumed. The household score ranges from 0 – 12 and it is equal to the number of food groups consumed by the household.

$$HDDS = C_1 + C_2 + C_3 + C_4 + C_5 + C_6 + C_7 + C_8 + C_9 + C_{10} + C_{11} + C_{12} \dots\dots\dots(1)$$

Where  $C_1 - C_{12}$  are the different food groups.

The average HDDS for the households for this study can be calculated as:

$$\text{Average HDDS} = \frac{\text{Sum of Household Dieatary Diversity score}}{\text{Total number of household survey}}$$

Therefore, any Average HDDS equal to or greater than 6 is called food secure while less than 6 is called food insecure.

#### Household Food Consumption Score (HFCS)

HFCS includes the frequency of consumption of diets over a seven-day period and weighs according to the relative nutritional value of the food group consumed. The assigned weights for each food group (i.e., meat, milk, and fish = 4, pulses = 3, staples = 2, vegetables and fruits = 1, sugar and oil = 0.5) were determined by a team of analysts based on the energy, protein, and micronutrient



densities of each food group According to this score, three classifications of household food consumption (0 – 21 = poor, 21.5 – 35 = borderline, or > 35 = acceptable) can be resulted (Wiesmann *et al.*, 2009 and Douyon, *et al.*, 2022).

$$FCS = E_i^8 = Di W_i \dots\dots\dots, (4)$$

Where i = food groups

D = number of consumption days in the past 7 days from each food groups (1 – 7) and

W = is the weight of each food groups.

## Result and Discussions

### Age, sex and marital status of maize farmers

The result on age distribution of maize farmers in the study area as presented in Table 1 revealed that 37% of participating maize farmers in CASP were between the age range of 38 – The mean age of participating in CASP programme were 42 years. This shows that the participating maize farmers were creative, young and economically in active age. The finding of this study is supported by Adetomiwa *et al.* (2020) who found out that participants of Fadama III programme were young and active in carry out farming activities that will increase their production in the Southwest, Nigeria. This implied that the age of participants was within the energetic middle-age cohort, characterized with strength and commitment in the study area.

The findings showed that majority (92%) of the participating maize farmers in CASP programme were male while 8% were female. This indicates that male maize farmers participated in the CASP programme than female maize farmers in the study area due to the cultural and religious belief which restricted them from actively involved in farm activities. This finding agrees with the findings of Gambo *et al.* (2016) who revealed that most (over 60%) and (over 30%) of the participants and non-participants in the study area were male and female respectively.

**Table 1: Socio-economic characteristics of maize farmers under CASP programme**

| Variable                 | Frequency | Percentage |
|--------------------------|-----------|------------|
| <b>Age</b>               |           |            |
| 18 – 27                  | 9         | 7          |
| 28 – 37                  | 37        | 30         |
| 38 – 47                  | 46        | 37         |
| 48 – 57                  | 23        | 19         |
| 58 – 67                  | 6         | 5          |
| 68 – 77                  | 2         | 2          |
| <b>Mean</b>              | 42        |            |
| <b>Sex</b>               |           |            |
| Male                     | 113       | 92         |
| Female                   | 10        | 8          |
| <b>Marital status</b>    |           |            |
| Single                   | 12        | 9          |
| Married                  | 107       | 87         |
| Divorced                 | 2         | 1          |
| Widower/widow            | 2         | 2          |
| <b>Household size</b>    |           |            |
| 1 – 5                    | 43        | 35         |
| 6 – 10                   | 27        | 22         |
| 11 – 15                  | 21        | 17         |
| 16 – 20                  | 13        | 11         |
| 21 and above             | 19        | 15         |
| <b>Mean</b>              | 11        |            |
| <b>Educational level</b> |           |            |
| Non-formal               | 26        | 21         |
| Primary                  | 31        | 25         |
| Secondary                | 49        | 40         |
| Tertiary                 | 17        | 14         |
| <b>Farm size</b>         |           |            |
| 0.1 - 2.9                | 98        | 80         |
| 3.0 - 5.9                | 20        | 16         |
| 6.0 - 8.0                | 4         | 3          |
| 9.0 - 11.9               | 1         | 1          |
| <b>Mean</b>              | 1.95      |            |
| <b>Total</b>             | 123       | 100        |

Source: Field survey, 2024

However, the result presented in Table 1 revealed that 87% and 9% were married and single among the participating maize farmers. This implies that over 80% of participating maize farmers were married and involved in maize production in the study area. The major importance of marital status on crop production is linked with the supply of agricultural family labour. This finding is similar to the finding of Adetomiwa *et al.* (2020) which revealed that majority over 80% of the participants were married on account of the fact that marriage is cherish institution in the study area and this help in family labour for farming activities and

### Household size and educational level of maize farmers\

The study revealed that about (35%) of the participants had household size of 1 – 5 persons with a mean household size of 11 people (Table 1). This implies that the respondents had a relatively large household size, which has an implication for labour accessibility for farm activities. The result also implies that more hands were accessible to carry out required practices introduced to the participating farmers. This is in line with the study conducted by Umar (2023) who indicated that the mean

household size for participants in irrigation project was 11 people and this implies that farmers can utilize family labour, hence the larger the household size the more family labour will be utilized. The farm size of the maize farmers as presented in Table 1 shows that majority (80%) of participating maize farmers had 0.1 – 2.9 hectares. The average farm size was 1.95 hectares. The result implies that the farmers are smallholder farmers. Size of farmland is expected to aid the participation in agricultural programme by farmers because farmers that lack enough farmland cannot sacrifice their land for trials of new technology. This is similar to the findings of Salau *et al.* (2013) who revealed that majority (84.7%) of participants in Fadama III programme had a farm size of 0.1 – 2.0 ha with an average farm size of 1.7 ha for participants.

Figure 1 indicated that 90% of participating maize farmers consumed cereals among food groups followed by vegetables 20%, fruits 18%, roots and tubers 14%, legumes 15% and milk and milk products 15%. Others were poultry, offals and egg 12%, sugar and honey 11%, oil, butter and fats 6%, fish and sea food 5% and others 3%.



Figure 1: Food groups consumed by participating maize farmers

The food security status of maize farmers based on Household Dietary Diversity Score (HDDS) was presented in Table 1. The HDDS with high food group ( $\geq 6$  food groups) were ranked food secure while those below this threshold were ranked food insecure. The result revealed that 90% of the participating maize farmers were food insecure respectively while 10% were food secure for participating maize farmers. This implies that most of the participating maize farmers under CASP programme were food insecure due to the political influence and poor disbursement of funding during the farming season.

**Table 1: Food security status of maize farmers by HDDS**

| Food security status | Frequency  | Percentage |
|----------------------|------------|------------|
| Food insecure        | 111        | 90         |
| Food secure          | 12         | 10         |
| <b>Total</b>         | <b>123</b> | <b>100</b> |

**Source:** Field survey, 2024

The food security status of maize farmers based on Household Food Consumption Score (HFCS) was presented in Table 2. The FCS with 1 – 27 showed poor food consumption, 28 – 41 borderline food consumption and 42 – 112 acceptable food consumption. The result indicated that 35% have poor food consumption among participating maize farmers. This implies that participating maize farmers were food insecure with inadequate access to food.

However, 45% of participating maize farmers were in the borderline food consumption which implies that maize farmers were average food insecure with restricted access to food but still susceptible.

However, the result also revealed that 20% have acceptable food consumption among participating maize farmers. This shows good food security with adequate access to food.

**Table 2: Distribution of maize farmers according to food security status**

| Food consumption class | Consumption index | Frequency  | Percentage |
|------------------------|-------------------|------------|------------|
| Poor                   | 1 – 21            | 43         | 35         |
| Border line            | 21.5 – 35         | 55         | 45         |
| Acceptable             | 35.5 – 112        | 25         | 20         |
| <b>Total</b>           |                   | <b>123</b> | <b>100</b> |

**Source:** Field survey, 2024

#### Coping strategies adopted by maize farmers

The food insecurity coping strategies adopted by maize farmers to mitigate effects of food insecurity were presented in figure 2. Based on the result, the most widely used strategies by the maize farmers under CASP programme are handwork (33%), purchased from market on

credits (25%), selling of livestock/assets (24%), begging (7%), meal skip for children (6%) and borrow food products (5%). This implies when households are challenged with food scarcity, the direct strategy they adopt is to go for credit or loan and handwork. The finding is at variance with Muktar (2019) who revealed that eating



less preferred food, reducing food consumption portion, children eating first, purchasing food on credit or borrowing food, leasing of assets, relying on help from relatives and friends and skipping meals.

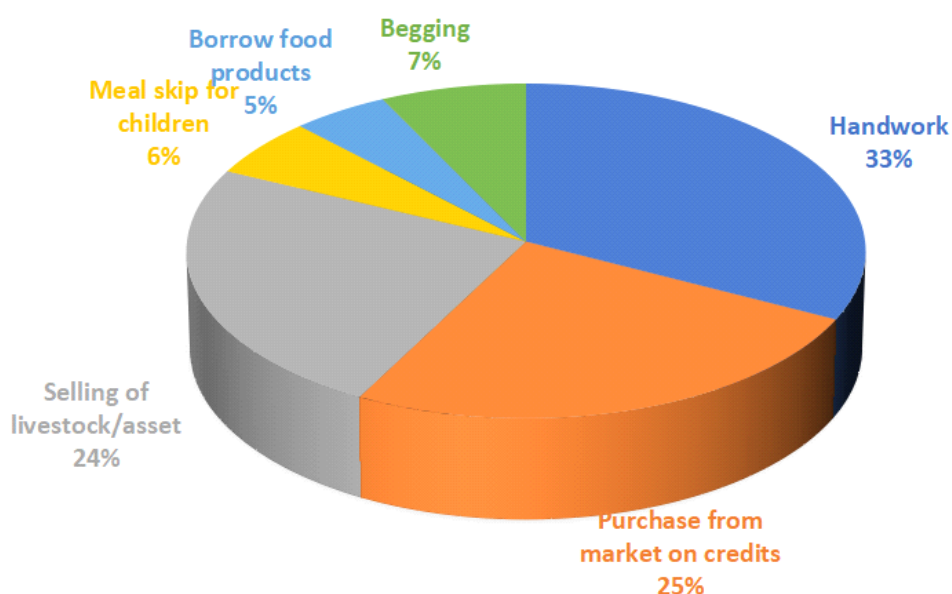


Figure 2: Coping strategies adopted

### Conclusion and recommendation

From the findings of this study, it can be concluded that the participating maize farmers were in their active age and had experience in maize production. The finding also revealed that

participating maize farmers were literate. The most widely used coping strategies by the farmers under CASP programme were hand work, purchased from market on credit, selling of livestock/assets.

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