

# Skills Required for Job Creation by Agricultural Education Students of Universities in Tomato Value Chain in Northeast Nigeria

Galadima, A. I; Melaiye, O. R; Azuaga, C. I.  
Department of Vocational and Technology Education,  
Faculty of Education, Taraba State University, Jalingo

This study identified the skills required by agricultural education students of Universities in tomato value chain for job creation and income generation in Northeast Nigeria. The purpose of the study was to identify skills required for job creation and income generation in tomato value chain by Agricultural Education Students of Universities in Northeast Nigeria. The study had three specific objectives, three research questions with corresponding three null hypotheses. Descriptive survey research design was employed for the study to examine the views and experiences of respondents in their natural setting. The population for the study was 750 Agricultural Education Students in the study area. A sample size of 261 respondents was used out of the target population. A multi-stage sampling technique was used to draw the sample size. The required data were collected by the researcher with the help of 3 research assistants. Structured questionnaire was used to collect the data which comprised of 29-skill item grouped into seven sections on four point rating scale. The instrument was duly validated both in face and content validity by three experts, one from Vocational and Technology Education Department, the other from Measurement and Evaluation Unit of Educational Foundations Department Faculty of Education and the other from Agronomy Department, Faculty of Agriculture all of Taraba State University, Jalingo. The instrument was trial tested at Gabriel Sarwuan Tarka University, Makurdi. A reliability index of 0.78 using Cronbach alpha was established. Skill gap analysis was used to analyze the research questions that guided the study, while, independent t-test statistics was used to test the seven null hypotheses raised at 95% confidence level using Statistical Package for

Social Sciences version 20. The result indicated that 5 skill items out of 29 skill items were required by the students to improve tomato value chain activities in the study area. Also, the study found no significant difference between the male and female students' ratings of the required skills for tomato value chain in the study area. Based on these results, it was recommended that Universities Skill Acquisition Centres and Ministries of Education should use the identified skills to organize seminars, conferences and workshops for retraining of teachers/lecturers in Agricultural Education. It was also recommended that the identified skills required by the students in the study area should be developed into modules by skills acquisition centres of universities and agricultural development programmes to train students and youths to enhance tomato value chain.

## Keywords:

Skills, Tomato value chain, Agricultural Education, Job Creation

## Introduction

Tomato (*Solanum lycopersicum*) is the world's leading vegetable for processing into pastes, juices and powders as well as one of the most important vegetable crops both in scale of production and level of consumption. It is widely accepted and commonly used in a variety of dishes as raw, cooked or processed products more than any other vegetable and is also economically important, generating employment both at the urban and rural levels. In Nigeria, tomato plays a critical role in meeting domestic and nutritional food requirement, generation of income to tomato farmers and creation of employment. Despite botanically being a fruit, it is genetically eaten

and prepared like a vegetable. Tomatoes are a great source of vitamin C, potassium; folate and vitamin K. fresh tomato are low in carbs. The carbs content consists mainly of simple sugars and insoluble fibers. These fruits are mostly made up of water. The main plant compounds in tomatoes are lycopene (a red pigment and antioxidant), Beta carotene (an antioxidant that often gives foods a yellow or orange hue), Naringenin, chlorogenic acid. Tomato offer numerous health benefits due to their rich nutrient profile including heart health support, potential cancer prevention and improved skin health.

According to A'aron (2024), tomatoes can be classified as follows: as determinate (Bush variety), indeterminate (Vining variety) and dwarf tomatoes. Tomato is a highly seasonal, perishable and available in large quantities at a particular season of the year (Hussein et al (2016). Tomato is an important food condiment. They are commonly eaten in their fresh forms or processed into puree, paste, canned for sale, juice, soup, ketchup or into dried form. People often consider tomato a vegetable for nutritional and culinary purposes due to their taste, use in meals and nutrient content. Tomatoes are technically a fruit because they fit the botanical definition of one. Tomatoes come in many types- cherry, grape and Roma. Tomato offer several research backed benefits. The fruit is a source of nutrients like vitamin A, & C. as well as micro-nutrients. Cooked tomatoes help reduce risk of heart disease, may prevent constipation, and reduce type 2 diabetes risk. Consumption of tomatoes can prevent old age related diseases such as dementia, osteoporosis, Parkinsons and Alzheimers diseases which affects behaviour, memory and thinking (Andrea 2025). The micro-nutrients in tomato are: potassium which helps build protein in the body, breaks down and uses carbohydrates and regulates heart rhythm and balance, potassium, folate which helps produce DNA, forms red blood cells to prevent anemia, Vitamin C which act as an antioxidant, promotes healing and helps body absorb iron, and vitamin K which aids in blood clotting and helps maintain strong bones (Andrea, 2025).

Tomato value chain refers to all the steps involved in bringing tomato from farm to the plate of a consumers. It encompasses production, harvesting, sorting, packaging, distribution, processing, and selling of

tomatoes. The major value chain functions that the tomato producers perform are ploughing, planting, fertilizing, irrigation, weeding and pest/diseases control.

The term skill has been defined by various authors. According to Wever and Obiyai, (2019), skill is well established habit of doing something while skills according to Mbah and Umurhurhu (2016) are the ability to make a purposeful movement that are necessary to complete or master a particular task. Onoh (2021) defined skill as the ability to perform expertly well with dexterity and tact through what one has learnt and practiced in training. Skills acquisition is seen as a major tool for capacity building of students in agricultural education. For the purpose of this study, skills refer to the ability to do something well within a given time, energy or both.

Agricultural education is a systematic and organized teaching, instruction and training (theoretical as well as hands-on real-world field work-based) available to students, farmers or individuals interested in the science, business and technology of agriculture as well as the management of land, environment and natural resources. According to Barricle (2019), Agricultural education is the scientific study of the principles and methods of teaching and learning as they pertain to agriculture. Most disciplines have inherent skills that need to be developed or improved upon for self-employment. The concern of agricultural education is the teaching and learning of these skills for proficiency and self-employment in agricultural occupations.

### Statement of the Problem

Tomato is a most important vegetable crop both in scale of production and level of consumption. It is widely accepted and commonly used in a variety of dishes as raw, cooked or processed products more than any other vegetable. It is cultivated in tropical and temperate climates for its edible fruits. Despite its contribution in poverty alleviation, nutrients supply, income generation among small holder farmers and numerous health benefits, over 50% of Nigeria's annual tomato yield is lost due to various challenges. The various problems faced by tomato industry along its value chain ranges from agronomic constraints like incidence of pest and diseases, physiological disorders, institutional

constraints and poorly organized rural and urban markets infrastructures, processing and preservation practices, poor storage facilities, perishability of the produce, high cost of agrochemical, inadequate credit facilities, lack of access to the market due to bad roads, high cost of transportation that permit unpredictable price fluctuations among others which along with other factors adversely affect the production, marketing and consumption pattern of quality tomatoes

### Purpose of the Study

The purpose of this study is to identify the skills required by agricultural education students of universities in tomato value chain for job creation and income generation in Northeast, Nigeria. Specifically, the study seeks to determine: -

1. Planting skill required by Agricultural Education Students in tomato value chain for job creation and income generation in the Northeast Nigeria
2. Post-Planting skill required by Agricultural Education Students in tomato value chain for job creation and income generation in Northeast Nigeria.
3. Harvesting skill required by Agricultural Education Students in tomato value chain for job creation and income generation in the Northeast Nigeria

### Research Questions

The following research questions were formulated to guide the study:

1. What is the planting skill required by Agricultural Education Students in tomato value chain for job creation in Northeast Nigeria?
2. What is the post-planting skill required by students in tomato value chain for job creation in Northeast Nigeria?
3. What is the harvesting skill required by Agricultural Education Students in tomato value chain for job creation in Northeast Nigeria?

### Hypotheses

The following null hypotheses were formulated to guide the study:

- H<sub>01</sub>** There is no significant difference between the mean of male and female Agricultural Education Students of Universities in planting skill for job creation in Northeast Nigeria.

**H<sub>02</sub>** There is no significant difference between the mean of male and female Agricultural Education Students of Universities in post-planting skill for job creation in Northeast Nigeria.

**H<sub>02</sub>** There is no significant difference between the mean of male and female Agricultural Education Students of Universities in harvesting skill for job creation in Northeast Nigeria.

### Methodology

Research design The study made use of survey research, design survey design according to Colorado (2018) is a type of research design in which the researcher makes a list of questionnaire to extract specific data from a particular group of people. The study adopted the design because questionnaire was used in collecting data from University undergraduate students on skill required on pre-planting, planting, post-planting harvesting, post-harvesting, value addition and marketing activities for tomato value chain.

### Area of the Study

The study was carried out in North-east Nigeria. Northeast is one of the six Geopolitical Zones of Nigeria representing both a geographic and political region of the country's northeast. Northeast lies between latitude 11°32' and 11°4' North and longitude 13°32' and 13°25' East and located between Sudan Savannah and Sahel Savannah. The Northeastern region consists of Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe states. Geographically, the Northeast is the largest Geopolitical Zone in the nation, covering nearly one-third of Nigeria's total area. North-East has 21 public and private Universities. The reason for choosing northeast for this study is that tomato is a sun loving crop that do not need too much rainfall and the area has the best type of soil for tomato production and tomato value chain activities is predominantly carried out there.

### Population of the Study

The population of the study consisted of 750 undergraduate students of Universities offering Agriculture in Northeast Nigeria.

### Sample and Sampling Techniques.

The sample comprised of 261 undergraduate students of Universities offering Agricultural

Education in Northeast Nigeria. A multistage sampling technique was used to ensure adequate representation from each State in the region. According to Nwosu and Obi (2023), multi-stage sampling technique is appropriate when the population is large and geographically dispersed

### Instrument for Data Collection

The instrument for data collection was a 29-item structured questionnaire called tomato production skill questionnaire (TPSQ) developed from the literatures reviewed. The instrument designed by the researcher was divided into seven sections. The instrument is divided into required and possessed category and rated on a four-point scale of Highly Required (HR), Moderately Required (MR), Less Required (LR), and Not Required (NR) as well as Highly Possessed (HP), Moderately Possessed (MP), Less Possessed (LP) and Not Possessed (NP) with both a corresponding nominal value of 4, 3, 2, and 1 respectively.

### Validation of the Instrument

The instrument was subjected to face and content validity by three experts. One from Vocational and Technology Education and one from Measurement and Evaluation (Educational Foundations Department) while the other from Agronomy Department (Faculty of Agriculture) all from Taraba State University Jalingo. The experts were requested to assess the questionnaire items for appropriateness, depth, relevance and clarity of language. Their observations, corrections and suggestions that were obtained from the experts formed the basis for the modification of the items of the questionnaire. After the validations of the 70-item questionnaire, four (4) items were dropped and two other items were added making the items to be 68

### Reliability of the Instrument

The instrument was trial tested at Joseph Sarwuan Tarka University, Makurdi, Benue state outside the study area using split-half method with 20 respondents. The questionnaire items were split into two, the first even numbers and the other odd numbers. After the even numbered and odd numbered items were administered to the same group and each half was scored independently of the other, the two sets of scores were obtained, the scores of the two halves were correlated using Cronbach alpha and the reliability of the whole test yielded 0.78.

### Method of Data Collection

Structured questionnaire was used to collect data from University Students of Northeast on skills required by Agricultural Education Students of Universities in tomato value chain for job creation and income generation with the help of three research assistants

### Method of Data Analysis

Skill gap analysis was used to answer the research questions as follows:

$\bar{X}_n$  = weighted mean of required category

$\bar{X}_p$  = weighted mean of performance category

- ❖ Where the Skill Gap value is positive (+ve) it means that the skill item is not required
- ❖ Where the Skill Gap value is negative (-ve) it implies that the skill item is required while null hypotheses were tested using independent t-test at 0.05 level of significance.

### Result and Discussion

**Research Question 1:** What is the planting skill required by Agricultural Education Students in tomato value chain for job creation and income generation in Northeast Nigeria?

#### Table 1: Mean Rating of Planting Skills of Agricultural Education Students in Tomato Value Chain for Job Creation and Income Generation

S/N	Items	N	$\bar{x}_R$	$SD_R$	$\bar{x}_P$	$SD_P$	GA = $(\bar{x}_R - \bar{x}_P)$	Rmk
1	Treat seed with chemicals before planting	261	3.44	0.69	2.70	0.77	0.73	NR
2	Transplant tomato seedlings into the field after nursery	261	3.39	0.69	2.70	0.77	0.69	NR
3	Determine planting distance/spacing	261	3.35	0.74	2.76	0.73	0.59	NR
4	Determine seed rate of tomato	261	2.78	0.68	3.36	0.75	0.58	NR

5	Determine planting date/time of tomato	261	3.40	0.69	2.73	0.75	0.67	NR
6	Connect a good irrigation system	261	3.39	0.72	2.74	0.77	0.66	NR
7	Determine methods of planting of tomato	261	3.32	0.73	2.70	0.70	0.62	NR
8	Determine planting depth of tomato	261	3.34	0.74	2.85	0.79	0.49	NR
	<b>Cluster Mean</b>		<b>3.38</b>		<b>2.75</b>			

**KEY:**  $\bar{x}_R$  = Mean Response on Skills Required,  $\bar{x}_P$  = Mean Response on Skills Possessed,  $SD_R$  = Standard Deviation on Skills Required,  $SD_P$  = Standard Deviation on Skills Possessed, GA = Gap Analysis, Rmk = Remark, NR = Not Required, R = Required and n = Number of Respondents

Table 1 shows the mean ratings and gap analysis of planting skills required and possessed by Agricultural Education students in the tomato value chain for job creation and income generation in Northeast Nigeria. The results indicate that key planting skills such as seed treatment, transplanting of tomato seedlings, determining planting distance and depth, seed rate, planting date, irrigation system connection, and methods of planting were all rated high in terms of skills required, with mean values ranging from 3.32 to 3.44 and a cluster mean of 3.38. However, the mean ratings for skills possessed by the students were consistently lower, ranging from 2.70 to

2.85, with a cluster mean of 2.75. The observed gap analysis values (0.49–0.73) reveal clear deficiencies between the required and possessed planting skills, suggesting that although students are aware of these critical planting competencies, they lack adequate practical mastery to effectively engage in tomato production for job creation and income generation. All the items were marked “Not Required”, emphasizing the need for enhanced practical-oriented instruction and skill acquisition in planting operations within Agricultural Education programmes.

**Research Question 3:** What is the post-planting skill required by students in tomato value chain for job creation and income generation in Northeast Nigeria?

**Table 2: Mean Rating of Post-Planting Skills of Agricultural Education Students in Tomato Value Chain for Job Creation and Income Generation**

S/N	Items	N	$\bar{x}_R$	$SD_R$	$\bar{x}_P$	$SD_P$	GA = $\bar{x}_R - \bar{x}_P$	Rmk
9	Identify the source of water for irrigation	261	3.18	0.79	2.67	0.74	0.51	NR
10	Mulch around the tomato seedlings	261	3.18	0.81	2.66	0.66	0.52	NR
11	Supply tomato seedlings in case of failure	261	3.13	0.84	2.61	0.73	0.52	NR
12	Stake tomato crop for better flowering and fruiting	261	3.19	0.82	2.66	0.75	0.52	NR
13	Control pest and diseases in tomato farm	261	2.64	0.86	3.16	0.70	-0.52	R
14	Water tomato regularly	261	3.21	0.80	2.64	0.72	0.58	NR
15	Weed tomato farm with hand hoe	261	3.26	0.71	2.66	0.70	0.61	NR
16	Apply appropriate fertilizer to tomato	261	3.15	0.78	2.67	0.66	0.48	NR
17	Uproot the infected tomato	261	3.12	0.83	2.68	0.71	0.44	NR
18	Practice appropriate irrigation technology	261	2.67	0.84	3.23	0.71	-0.56	R
19	Observe tomato fruits for maturity	261	3.10	0.87	2.64	0.77	0.46	NR
	<b>Cluster Mean</b>		<b>3.17</b>		<b>2.65</b>			

**KEY:**  $\bar{x}_R$  = Mean Response on Skills Required,  $\bar{x}_P$  = Mean Response on Skills Possessed,  $SD_R$  = Standard Deviation on Skills

Required,  $SD_P$  = Standard Deviation on Skills Possessed, GA = Gap Analysis, Rmk =

Remark, NR = Not Required, n = Number of Respondents

Table 2 shows the mean ratings and gap analysis of post-planting skills required and possessed by Agricultural Education students in the tomato value chain for job creation and income generation in Northeast Nigeria. The findings reveal that essential post-planting skills such as identifying irrigation water sources, mulching, supplying seedlings after failure, staking, pest and disease control, regular watering, weeding, fertilizer application, uprooting infected crops, practicing appropriate irrigation technology, and observing fruit maturity were all rated as highly required, with mean values ranging from 3.10 to 3.26 and a cluster mean of 3.17. However, the mean ratings for skills possessed by the students were consistently lower, ranging from 2.61 to 2.68, with a cluster mean of 2.65. The gap analysis values (0.44–0.61) indicate noticeable deficiencies between

required and possessed post-planting skills, suggesting that although students are aware of these critical farm management practices, they lack sufficient practical competence to effectively apply them for sustainable job creation and income generation in tomato production. 9 out of the 11 items were rated “Not Required”, highlighting the need for improved hands-on training and skill reinforcement in post-planting operations within Agricultural Education programmes.

**Research Question 3:** What is the harvesting skill required by Agricultural Education Students in tomato value chain for job creation and income generation in Northeast Nigeria?

**Table 3: Mean Rating of Harvesting Skills of Agricultural Education Students in Tomato Value Chain for Job Creation and Income Generation**

S/N	Items	N	$\bar{x}_R$	$SD_R$	$\bar{x}_P$	$SD_P$	GA = ( $\bar{x}_R - \bar{x}_P$ )	Rmk
20	To be conversant with signs and symptoms of ripened fruits for harvesting	261	3.20	0.83	2.64	0.69	0.56	NR
21	Draw harvesting timetable for tomatoes	261	3.30	0.82	2.63	0.70	0.67	NR
22	Gentle twisting of tomato fruits	261	3.25	0.83	2.62	0.74	0.63	NR
23	Remove stem carefully to prevent puncture or wound of adjacent fruits	261	3.18	0.83	2.63	0.75	0.55	NR
24	Identify culled fruits to avoid pest and diseases build-up	261	3.23	0.84	2.59	0.76	0.64	NR
25	Identify and use cutting tools in tomato harvesting	261	3.17	0.87	2.59	0.78	0.57	NR
26	Care and maintain equipment used for harvesting of tomato	261	2.59	0.80	3.23	0.70	-0.64	R
27	Keep good record of tomato activities as they unfold	261	2.57	0.74	3.30	0.81	-0.73	R
28	Organize an improve storage facilities after harvesting of tomato	261	2.52	0.83	3.26	0.66	-0.75	R
29	Identify when to pick the matured tomato fruits	261	3.30	0.77	2.62	0.70	0.68	NR
	<b>Cluster Mean</b>		<b>3.11</b>		<b>2.74</b>			

**KEY:**  $\bar{x}_R$  = Mean Response on Skills Required,  $\bar{x}_P$  = Mean Response on Skills Possessed,  $SD_R$  = Standard Deviation on Skills Required,  $SD_P$  = Standard Deviation on Skills Possessed, GA = Gap Analysis, Rmk = Remark, NR = Not Required, R = Required and n = Number of Respondents

Table 3 shows the mean ratings and gap analysis of harvesting skills required and

possessed by Agricultural Education students in the tomato value chain for job creation and income generation in Northeast Nigeria. The results indicate that critical harvesting skills—such as recognizing signs of fruit maturity, drawing harvesting timetables, gentle twisting of fruits, careful removal of stems, identification of culled fruits, use and maintenance of harvesting tools, record

keeping, organizing improved storage facilities, and determining the appropriate time for harvesting—were all rated as highly required, with mean values ranging from 3.17 to 3.30 and a cluster mean of 3.11. In contrast, the mean ratings of skills possessed by the students were considerably lower, ranging from 3.30 to 2.64, with a cluster mean of 2.74. The gap analysis values (0.55–0.75) reveal substantial skill gaps between what is required and what students currently possess, suggesting that although students have theoretical awareness of harvesting operations, they lack adequate practical competence to carry out effective harvesting and post-harvest handling for sustainable job creation and

income generation in the tomato value chain. 7 items were considered “Not Required”, emphasizing the need for strengthened practical training and experiential learning in harvesting activities within Agricultural Education programmes while 3 items were required.

**Hypothesis 1:** There is no significant difference between the mean of male and female Agricultural Education Students of Universities in planting skill for job creation and income generation in Northeast Nigeria.

**Table 4: t-Test Analysis of Mean Ratings of Male and Female Students Planting Skills for Job Creation and Income Generation.**

Respondents	N	$\bar{x}$	SD	Df	LS	T	Sig.	Rmk
Male Students	140	3.38	0.22					
				259	0.05	0.53	0.59	NS
Female Students	121	3.37	0.24					

*n* = number of respondents,  $\bar{x}$  = Mean, SD = Standard Deviation, df = Degree of Freedom, LS = Level of Significance, *t* = t-ratio, Sig. = Significance, Rmk = Remark, NS = Not Significant

*n* = number of respondents,  $\bar{x}$  = Mean, SD = Standard Deviation, df = Degree of Freedom, LS = Level of Significance, *t* = t-ratio, Sig. = Significance, Rmk = Remark, NS = Not Significant

Table 4 shows the t-test analysis comparing the mean ratings of male and female Agricultural Education students on planting skills required for job creation and income generation in Northeast Nigeria. The results indicate that male students had a mean score of 3.38 (SD = 0.22), while female students recorded a closely similar mean score of 3.37 (SD = 0.24). The calculated t-value of 0.53 with 259 degrees of freedom produced a

significance value of 0.59, which is greater than the 0.05 level of significance. This result indicates that there is no statistically significant difference between the mean of male and female Agricultural Education Students of Universities in planting skill for job creation and income generation. Therefore, Hypothesis 1 was accepted.

**Hypothesis 2:** There is no significant difference between the mean of male and female Agricultural Education Students of Universities in post-planting skill for job creation and income generation in Northeast Nigeria.

**Table 10: t-Test Analysis of Mean Ratings of Male and Female Students Post-Planting Skills for Job Creation and Income Generation.**

Respondents	N	$\bar{x}$	SD	Df	LS	T	Sig.	Rmk
Male Students	140	3.19	0.25					
				259	0.05	0.99	0.32	NS
Female Students	121	3.16	0.26					

**Key:** n = number of respondents,  $\bar{x}$  = Mean, SD = Standard Deviation, df = Degree of Freedom, LS = Level of Significance, t = t-ratio, Sig. = Significance, Rmk = Remark, NS = Not Significant

Table 5 shows the t-test analysis comparing the mean ratings of male and female Agricultural Education students on post-planting skills required for job creation and income generation in Northeast Nigeria. The results reveal that male students recorded a mean score of 3.19 (SD = 0.25), while female students had a mean score of 3.16 (SD = 0.26), indicating a very small difference in their mean ratings. The calculated t-value of 0.99 with 259 degrees of freedom yielded a significance value of 0.32, which is greater

than the 0.05 level of significance. This indicates that there is no statistically significant difference between the mean of male and female Agricultural Education Students of Universities in post-planting skill for job creation and income generation. Consequently, Hypothesis 2 was retained.

**Hypothesis 3:** There is no significant difference between the mean of male and female Agricultural Education Students of Universities in harvesting skill for job creation and income generation in Northeast Nigeria.

**Table 6: t-Test Analysis of Mean Ratings of Male and Female Students Harvesting Skills for Job Creation and Income Generation.**

Respondents	n	$\bar{x}$	SD	df	LS	t	Sig.	Rmk
Male Students	140	3.26	0.23					
				259	0.05	1.37	0.17	NS
Female Students	121	3.22	0.27					

**Key:** n = number of respondents,  $\bar{x}$  = Mean, SD = Standard Deviation, df = Degree of Freedom, LS = Level of Significance, t = t-ratio, Sig. = Significance, Rmk = Remark, NS = Not Significant

Table 6 shows the t-test analysis comparing the mean ratings of male and female Agricultural Education students on harvesting skills required for job creation and income generation in Northeast Nigeria. The results indicate that male students had a mean score of 3.26 (SD = 0.23), while female students recorded a mean score of 3.22 (SD = 0.27), showing only a slight difference in their mean ratings. The computed t-value of 1.37 with 259 degrees of freedom produced a significance value of 0.17, which is greater than the 0.05 level of significance. This result indicates that there is no statistically significant difference between the mean of male and female Agricultural Education Students of Universities in harvesting skill for job creation and income generation. Therefore, Hypothesis 3 was upheld.

### Summary of the Major Findings

From the study, the following findings were made:

1. The result revealed that no skill was required out of the identified skills by Agricultural Education students of Universities in Northeast, Nigeria. This shows clear deficiencies between the required and the possessed planting skills, suggesting that although students possessed critical planting skills, they lack adequate practical mastery to effectively engage in tomato production for job creation based on observed gap analysis values of (0.49-0.73).
2. Agricultural Education students required only two skills out of the 11 skill items listed to make them participate actively in tomato value chain activities in the study area. Significant difference does not exist between the mean ratings of male and female Agricultural Education Students of Universities in post-planting skill for job creation and income generation in Northeast Nigeria.
3. Three (3) skills out of 10 skills were found required by Agricultural Education students to make them active participants in tomato value chain in harvesting of tomato. There was no

significant difference between the mean ratings of male and female Agricultural Education Students of Universities in harvesting skill for job creation and income generation in Northeast Nigeria.

4. There was no significant difference between the mean ratings of male and female Agricultural Education Students of Universities in planting skill for job creation in Northeast Nigeria.
5. There was no significant difference between the mean ratings of male and female Agricultural Education Students of Universities in post-planting skill for job creation in Northeast Nigeria.
6. There was no significant difference between the mean ratings of male and female Agricultural Education Students of Universities in harvesting skill for job creation in Northeast Nigeria.
7. Some skills were required while others were possessed by the students in the study area indicating that they were aware of the skills but lack sufficient proficiency to fully execute them for effective job creation in tomato value chain.

The result of the findings with regards to research question one revealed that all the skill items identified were possessed by Agricultural Education students. The findings is contrary with the study made by Ogba and Egba (2025) in their study on Skills, improvement needs of rural small scale tomato farmers, production management in Ebonyi State found out the all the skills identified were required by the students..

Research question two revealed that 2 skills were required by Agricultural Education students. This finding is contrary with Emeka (2017) who in his findings found out that post-planting skill such as irrigation, fertilizer application, weed control, staking, supplying, and thinning among others are all required by students. The findings of this study is also contrary to Ogba (2018) who carried out a study on skills required for post-production in cucumber fruit production in Ebonyi State and found out that all the skill items such as hand picking of fruits carefully without knife, throwing the fruit at a distance causes breakage and spoil, harvesting at time-interval prevent damages, half ripped harvesting prevent pest and disease transmission among others are required for post-planting operations.

The result of the findings with regards to research question three indicates that only 30% of the skills identified were required by Agricultural education students of Universities in Northeast Nigeria to enable them participate fully in tomato value chain. This findings is not in line with the findings of Kate and Augustina (2024) who in their study on skills needed by agricultural education students for sustainable vegetable production in Enugu State found out that all the skill items identified were required by the students in the study area.

### Conclusion

There is no doubt that student in the study area possessed some skills in planting, post-planting and harvesting skills but require other critical planting, post-planting and harvesting skills to participate fully in tomato value chain for job creation. The analysis shows that undergraduate students of Universities in Northeast possessed some skills in tomato value chain but they lack adequate practical competence to carry out effective tomato value chain activities to create jobs.

### Recommendation

- 1.Emphasis should be given to practical instead of theory to meet the demand of industries
2. The identified skills required by the students in the study area should be developed into modules by skill acquisition centres of Universities and Agricultural Development Programmes to train students and youths to enhance youth involvement in tomato value chain
3. Workshops and seminars should be organized to train lecturers on 21<sup>st</sup> century skills in crop production.

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