

Skill Improvement Needs of Pepper Small Holder Farmers for Increased Production in Rivers State, Nigeria

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Abstract

The study determined the skill improvement needs of pepper small holder farmers for increased production in River State, Nigeria. Survey research design was used for the study. Four objectives, four research questions and two hypotheses were used for the study. The population of the study is made up of 20,100 registered pepper farmers and 64 extension agents across the State. The sample size for the study was 400 which was determined using Taro Yamane Formula. After which simple random sampling techniques were applied to select the respondents for the study comprising of North, Central and Southern senatorial District. The instrument for data collection was a self-development questionnaire titled: "Skill improvement needs of farmers in pepper production for increased production Questionnaire (SINFPPIPQ)" which was designed in line with the research questions and hypotheses raised for the study. The instrument was subjected to face and content validation by three experts; one from the department of Agricultural education, one from the department of agronomy and one from the department of educational foundation all from Ignatius Ajero University, River state. The questionnaire was subject to a trial testing with (30) respondents (farmers) and (10) extension agents in Akwa Ibom State, Nigeria. Data collected from the trial testing were analysed using Cronbach Alpha reliability method which gave a coefficient of 0.81 and 0.84 for need and performance respectively indicating that the instruments are reliable. The instrument was administered by the researcher with the help of three (3) research assistants in the study area. 400 copies of questionnaires were administered to the respondents and were collected immediately. A rating scale of four points was used as response to questions. eg: VH = Very High 4, H= High 3, L= Low 2 and Very low 1 for the Need and performance respectively. The data collected was analyzed using weighted mean and Improvement Needed Index (INI) to answer research questions while Chi square was used to test the research hypotheses at 0.05 level of significance. Based on the findings, it could be concluded that pepper farmers in River State, particularly in areas such as planning, planting, harvesting and marketing of pepper should be given adequate training to enhance better performance. It was therefore recommended that extension agents should establish targeted training programmes to improve farmers' skills in planning as well as provide practical training on how to carry out pepper planting for better production in the area.

Keywords: Skills improvement needs, Pepper small holder farmers and increased production.

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INTRODUCTION

The skill required by an individual to perform a particular task is very essential for such a person to have a successful future. It on this note Ngbongha, Gote & Benson, (2024) described skill as the capacity to carry out a task expertly. The authors further added that skill entails the development of performance capability through the repeated execution of an action. Skill is a present, observable competence to perform a learned psychomotor act. Effective performance of skills requires application of related knowledge and facilitates acquisition of new knowledge. (Julie et al, 2017). Skill is the habit of acting, thinking and behaving in specific activity in such a way that the process becomes natural to the individual through practice (Ngbongha & Akaa, 2020). In this context, skills refer to the ability of Pepper farmers to carry

out pepper production with optimum results with a view of improving on it. It is also an act of making something better (Eze & Adeyemi, 2023). It represents a positive change or upgrade from the olden method of production to the new method of production by the farmers.

Farmers are producers of agricultural products and traditional pepper farmers, who tend to be relatively modest, and most of who are autarkic (although not in complete need). That is to say, most of foodstuff and other things they produce are consumed by themselves. Therefore, farmers are autarkic agricultural producers.” This also means that, in traditional agricultural background, identity farmers is positioned as “agricultural producers”. Zheng & Wu, (2019). The key of developing modern agriculture is the issue of farmers, since modern agriculture is in need of new types of farmers who will apply these skills to enable them function in the world production which is also expected by the pepper farmers.

Peppers are warm season crops and require about the same growing conditions as tomato and eggplant. They are very sensitive to light and grow poorly during cool periods when temperatures are between 4.4 °C to 15.6 °C. According to Jaliya & Sani (2017) peppers require more heat and are more sensitive to cold than most common garden crops grown in Nigeria. Very little fruit set occurs when temperatures are above 32°C during the day and 15°C in the night. Fruits that do set when temperature is above 27°C are usually small and poorly shaped (Motes, Criswell & Damicone, 2020). The author added that optimum growth temperature of pepper ranges from 21°C to 25°C. Pepper is also described as an important widely grown spice crop that is extensively used in foods and medicines in the world. It is ranked third amongst the world’s very important vegetable crops, following onion and tomato.

According to Bosland and Votava (2016), about 22 wild and five domesticated species of pepper are cultivated. The five domesticated specie include, *C. annum* L., *C. baccatum* L., *C. chinensis* L., *C. pubescens* L., and *C. frutescens* L., (Singletary, 2015). The only important variety in the *C. baccatum* species is the Yellow Peruvian Pepper. Bosland and Votava (2016) also explained that Capsicum cultivars are divided into several groups based on features such as fruit characteristics from the perspectives of colour, shape, intended use, pungency, size and flavour. Lin, *et al*, (2017) submit that in spite of the differences in features of the crop, most varieties of Capsicum grown in large quantities in the world are of the *C. annum* L species The cultivars usually cultivated in Nigeria are; Cayenne pepper or red pepper-Sombo (*C. frutescens*) bird peppers-atawere (*C. frutescens*), Tatase (*C. annum*), Nsukka yellow pepper (*C. annum*) and Atarodo (*C. annum*).

Both sweet and hot peppers (*Capsicum annum* and *Capsicum frutescens*), originated in southern Mexico and Central and South America (Gardenersnet, 2015). Evidence of their cultivation can be traced back thousands of years. Christopher Columbus found peppers growing in the West Indies, but they were not introduced in Europe until the sixteenth century. South America, Spain, England, and the Caribbean were involved in the introduction. According to U.S. Department of Agriculture records, commercial bell peppers were first produced in the southern United States in 1925. Today, seed companies distribute several hundred varieties of both sweet and hot peppers and they are now widely spread throughout the tropical and subtropical regions of the world. Peppers can be produced on a wide variety of soil types. They grow best, however, in deep, medium textured sandy loam or loamy, fertile, well-drained soils (Jaliya & Sani, 2016). In field production, plants depend on the soil for physical support and anchorage, nutrients and water. The degree to which the soil adequately provides these three factors depends upon topography, soil type, soil structure and soil management. For pepper production, proper tillage is crucial for adequate soil management and optimal yields.

According to Singletary (2018) pepper production has increased worldwide and this could be ascribed partly to its high nutritional value. FAO statistics estimate world production of capsicum peppers in 2011 at 21.3 million tonnes (t) from a harvested area of 1.6 million hectares (ha) (average yield 13.4 t/ha); China is the largest producer with 10 million t, followed by Mexico (1.9 million t) and Turkey (1.5 million t). India is probably erroneously represented with only 50,000. The income derived from pepper farming contributes significantly to the well-being of their families and the local economy. However, pepper farmers often face numerous challenges that hinder their productivity and income potential. Despite their crucial role in pepper production, Pepper farmers in River State face several challenges such as limited access to land, credit, and agricultural inputs such as improved seeds, fertilizers, and pesticides, which are essential for increasing productivity, farmers continue to use traditional and less efficient farming methods, resulting in lower yields and reduced income, inadequate training and extension services on modern agricultural practices, pest and disease management, and post-harvest handling are often lacking, preventing women from adopting best practices and many more. It's on this note the researcher investigate the skill improvement needs of pepper small holder farmers for increased production in River State.

Statement of the Problem

The production of pepper as an enterprise is one of the most profitable vegetable businesses anyone can engage in. When given proper attention, pepper production has potentials for increasing the income levels of Farmers in River State thereby alleviating their poverty level when the required production skills are deployed. The researcher observed that the market demand for pepper in River State is increasing drastically with the growing population. Over the years, there has been an over-dependence on pepper supply from other parts of the country into Kaduna State, due to low output of the crop in the State. The overdependence of external supply of the produce may be connected with the competencies of pepper farmers. The researcher's interaction with some farmers on pepper production in some communities in Kaduna State shows that the extent to which farmers produce pepper depends on the knowledge and skills learnt from subsistence practices. In spite of the known nutritional, health and economic benefits of the crop, coupled with the fact that this spice is used widely and daily in almost every household in the State the level of production has not been improved. And this may be attributed to attack of pests and diseases, limited land, poor prices of produce, low adoption of improved pepper cultivation technologies and inefficiencies arising from the allocation of production resources. Perhaps the low production may also be due to inadequate management skills in areas such as, planning, land preparation, planting operation, post-planting operations, management skills and many more.

Purpose of the Study

The main purpose of this study was to determine the skill improvement needs of pepper farmers for increased production in Rivers State. Specifically, the study sought to;

1. determine the skill improvement needs of farmers for effective planning of pepper for increase production in Rivers State,
2. determine the skill improvement needs of farmers in planting of pepper for increase production in Rivers State,
3. find out the skill improvement needs of farmers in harvesting of pepper in Rivers State,
4. find out the skill improvement needs of farmers in marketing of pepper in Rivers State.

Research Questions

1. What are the skill improvement needs of farmers for effective planning of pepper for increase production in Rivers State?
2. What are the skill improvement needs of farmers in planting of pepper for increase production in Rivers State?
3. What are the skill improvement needs of farmers in harvesting of pepper in Rivers State?
4. What are the skill improvement needs of farmers in marketing of pepper in Rivers State?

Null Hypotheses

1. There is no significant difference in the mean rating of the responses of farmers on skill improvement needs in planning for pepper production in River State.
2. There is no significant difference in the mean rating of the responses of farmers on skill improvement needs in marketing of pepper in River State.

METHODOLOGY

The study adopted descriptive survey research design. A survey research design is a form of research in which data is collected by use of formulated questions in other to eliciting data from the subjects on the topic understudy. The population of the study comprised 20,100 registered pepper farmers and 64 extension agents across the State. Cluster and simple random sampling techniques were used to select the respondents for the study. River State was clustered into three senatorial districts including; North senatorial district, Central Senatorial District and Southern Senatorial district. The sample size for this research is 400 which was determined using the Taro Yamani formula of sample size determination. The instrument for data collection was a self-development questionnaire titled: "Skill improvement needs of farmers in pepper production for increased production Questionnaire (SINFPPIPQ)" which was designed in line with the research questions and hypotheses raised for the study. A rating scale of four points was used as response to questions. The options were: VH = Very High 4, H= High 3, L= Low 2, VL= Very low 1 for the Need and performance respectively. The instrument was subjected to face and content validated by three experts; two from the department of Agricultural education, one from the department of agronomy all from Ignatius Ajero University, River state. The questionnaire was subject to a trial testing with (30) respondents (farmers) and (10) extension agents in Akwa Ibom State, Nigeria, Data collected from the trial testing were analysed using Cronbach Apha reliability method which give coefficient of 0.81 and 0.84 for need and performance respectively indicating that the instruments are reliable. The instrument was administered by the researcher with the help of three (3) research assistant in the study area. 400 copies of questionnaires were administered to the respondents and was collected immediately. The data collected was analyzed using weighted mean and Improvement Needed Index (INI) to answer research questions while Chi square was used to test the research hypotheses at 0.05 level of significance. The needs performance was determined by calculating the mean (X_n) of the needed category for each item. The performance Gap (PG) was therefore determined by finding the difference between X_n and X_p for each item ($PG = X_n - X_p$). In a situation where the value of PG is positive (+ve), it means improvement is needed because the level at which pepper farmers are performing is lower than what is expected. On the other hand, where PG is negative (-ve), it means improvement is not needed because pepper farmers are performing more than what is required. And when PG is Zero (0), it means improvement is not needed because the level at which the pepper farmers is equal to the level needed. Each item was assigned a (4) rating scale with a value of 4, 3, 2 and 1 respectively and in testing the null hypotheses, if the P-value calculated is less than .05 level of significance, the null hypotheses were rejected but otherwise accepted.

RESULTS

Research Question 1

What are the skill improvement needs of farmers in effective planning of pepper production in River State?

Table 1: Skill Improvement Needs of Farmers in Planning for Pepper Production in River State.

S/N	ITEM STATEMENT	$\bar{X}_n$	$\bar{X}_p$	PG ($\bar{X}_n - \bar{X}_p$)	Remark
1	Arrange for pepper fruit growing enterprise	3.30	1.70	1.6	IN
2	Formulate specific objectives for growing pepper fruit enterprise	4.00	1.00	3.00	IN
3	Review objectives for steady production of pepper fruit periodically.	4.00	1.00	3.00	IN
4	Draw programme on land preparation and field management of pepper fruit.	3.50	1.50	2.00	IN
5	Decide on the type of farming practice to adopt	3.50	1.50	2.00	IN
6	Budget for all the management practices until the crop is established	3.56	1.43	2.13	IN
7	Identify sources of finance for growing pepper fruit	3.8	1.20	2.60	IN
8	Identify market for selling pepper when produced	1.45	3.45	-2.00	INN
9	Procure relevant inputs such as seeds, fertilizer and herbicides	1.68	3.33	-1.65	INN
10	Draw up a season' availability of products calendar	4.00	1.00	3.00	IN
11	Create procedure and rules for workers involved in producing pepper fruit.	3.98	1.03	2.95	IN
12	Provide time-table for workers involved in growing Pepper fruit.	4.00	1.00	3.00	IN
	Pooled PG	3.40	1.60	1.79	IN

Keys: $\bar{X}_n$ - mean of need category, $\bar{X}_p$ -mean of performance category, PG- performance gap, IN- improvement needed, INN- improvement not needed

The result of the data presented in Table 1 shows that all the items except items 8 and 9 had their performance gap (PG) ranging from 1.6 to 3.00 and are all positive. This means that the level at which the pepper farmers perform in the items are lower than the level at which they are needed, implying that improvement is needed in the items. However, items 8 and 9 had their performance gap (PG) ranging from -2.00 to -1.65 and are negative. This means that the items are performing higher than they are needed, implying that pepper farmers do not need improvement in those planning items. The pooled PG of 1.79 implies that in all, pepper farmers need improvement in planning of pepper production

HO₁: There is no significant difference in the mean rating of the responses of farmers on skill need and performance in planning of pepper production

Table 2: Chi- square result in the Mean Rating of the Responses of Farmers on Skill needed in Planning for Pepper Production

Test	Value	Df	P value
Pearson Chi-Square	2491.231	120	.000
Likelihood Ratio	1311.467	120	.000
Linear-by-Linear Association	213.950	2	.000
Number of Valid Cases	400		

df= difference, N of Valid Cases= Number of Valid Cases

The result in Table 2 shows that Chi-Square statistic was significant, $\chi^2 (120, N = 400) = 2491.231, p < .001$. Similarly, the likelihood ratio was also significant $\chi^2 (120) = 1311.467, p < .001$. These results indicate that the observed differences in the mean ratings of skill need and performance are unlikely to have occurred by chance. Therefore, the null hypothesis is rejected, indicating that there is a significant difference in the mean rating of the responses of farmers regarding skill need and performance in planning for pepper production.

Research Question 2

What are the skill improvement needs of farmers in planting of pepper for increase production in River State?

Table 3: Skill Improvement Needs of Farmers in Planting of Pepper Production in River State.

S/N	ITEM STATEMENT	$\bar{X}_n$	$\bar{X}_p$	PG ($\bar{X}_n - \bar{X}_p$)	Remark
1	Transplant pepper seedlings at 10-15cm height with a ball of earth around April and May using a hand trowel.	1.93	3.05	-1.12	INN
2	Plant seedlings at a spacing of 60cm x 60cm on the beds or ridges.	3.88	1.13	2.75	IN
3	Cover the seedling stands with light soil.	1.68	3.33	-1.65	INN
4	Apply organic manure to the pepper seedlings transplanted.	2.55	2.45	0.10	IN
5	Use single node cuttings for mass propagation.	3.98	1.03	2.95	IN
6	Use upper nodal position of juvenile materials cut.	3.98	1.03	2.95	IN
7	Mulch the base of grooves with dry grass.	3.88	1.13	2.75	IN
8	Use high humidity propagator and watered twice a day.	3.65	1.35	2.30	IN
	Pooled PG	3.19	1.81	1.38	IN

Keys: X_n - mean of need category, X_p -mean of performance category, PG- performance gap, IN- improvement needed, INN- improvement not needed

The result of the data presented in Table 3 indicate that all the items except items 1 and 3 had their performance gap (PG) ranging from 0.10 to 2.95 and are all positive. This means that the level at which the pepper farmers perform in the items are lower than the level at which they are needed, implying that improvement is needed in the items. However, items 1 and 3 had their performance gap (PG) ranging from -1.12 to -1.65 and are negative. This means that the

items are performing higher than they are needed, implying that pepper farmers do not need improvement in those planting items. The pooled PG of 1.38 implies that in all, pepper farmers need improvement in planning of pepper production

Research Question 3

What are the skill improvement needs of farmers in harvesting of pepper in River State?

Table 4: Skill Improvement Needs of Farmers in harvesting of Pepper in River State.

S/N	ITEM STATEMENT	$\bar{X}_n$	$\bar{X}_p$	PG ($\bar{X}_n - \bar{X}_p$)	Remark
1	Plan for the harvesting of matured fruits by picking.	1.58	3.43	-1.85	INN
2	Pick the first harvest of pepper beginning from 8-12 weeks after transplanting.	3.55	1.45	2.10	IN
3	Pick fresh green pepper fruits 5-15 days before the peppers ripen.	3.48	1.53	1.95	IN
4	Arrange for packing of fruits in well aerated baskets.	1.93	3.08	-1.15	INN
5	wash with water within 230-1,430min after being harvested to remove impurities.	3.88	1.13	2.75	IN
6	scald the fresh pepper fruits in the steps to harvest the seed.	3.90	1.10	2.80	IN
Pooled PG		3.05	1.95	1.10	IN

Keys: $\bar{X}_n$ - mean of need category, $\bar{X}_p$ -mean of performance category, PG- performance gap, IN- improvement needed, INN- improvement not needed

The result of the data presented in Table 4 reveals that all the items except items 1 and 4 had their performance gap (PG) ranging from 1.95 to 2.80 and are all positive. This means that the level at which the pepper farmers perform in the items are lower than the level at which they are needed, implying that improvement is needed in the items. However, items 1 and 4 had their performance gap (PG) ranging from -1.15 to -1.85 and are negative. This means that the items are performing higher than they are needed, implying that pepper farmers do not need improvement in those items in harvesting. The pooled PG of 1.10 implies that in all, pepper farmers need improvement in harvesting of pepper.

Research Question 4

What are the skill improvement needs of farmers in marketing of pepper in River State?

Table 5: Skill Improvement Needs of Farmers in Marketing of Pepper in River State.

S/N	ITEM STATEMENT	$\bar{X}_n$	$\bar{X}_p$	PG ($\bar{X}_n - \bar{X}_p$)	Remark
1	Prepare pepper for sale fresh or dry to recommendations	1.55	3.55	-2.00	INN
2	Advertise for pepper fruit.	3.67	1.33	2.34	IN
3	Search for market for Pepper fruit.	3.93	1.08	2.85	IN
4	Grade your pepper according to quality and quantity.	3.90	1.10	2.80	IN
5	Determine prices based on colour and size.	3.93	1.08	2.85	IN
6	Determine when to sell pepper fruit for profit.	3.95	1.02	2.93	IN
7	Supply pepper fruit to the consumers	1.48	3.53	-2.05	INN
8	Keep adequate records of pepper harvested and sold at all Times	3.93	1.08	2.85	IN
9	Keep record of pepper fruit sales	3.95	1.05	2.90	IN

10	Evaluate services to consumers	3.93	1.28	2.65	IN
11	Record all income and expenses			2.75	IN
		3.85	1.10		
12	Determine the profit margin in pepper fruit marketing	4.00	1.00	3.00	IN
Pooled PG		3.51	1.51	2.00	IN

Keys: Xn- mean of need category, Xp-mean of performance category, PG- performance gap, IN- improvement needed, INN- improvement not needed

The result of the data presented in Table 5 shows that all the items except items 1 and 7 had their performance gap (PG) ranging from 2.34 to 3.00 and are all positive. This means that the level at which the pepper farmers perform in the items are lower than the level at which they are needed, implying that improvement is needed in the items. However, items 1 and 7 had their performance gap (PG) ranging from -2.00 to -2.05 and are negative. This means that the items are performing higher than they are needed, implying that pepper farmers do not need improvement in those items in marketing. The pooled PG of 2.00 implies that in all, pepper farmers need improvement in marketing of pepper.

HO₂: There is no significant difference in the mean rating of the responses of farmers on skill need and performance in marketing of pepper.

Table 6: Chi- square result in the Mean Rating of the Responses of Farmers on Skill needed in Marketing of Pepper

Test	Value	Df	P value
Pearson Chi-Square	4000.000 ^a	100	.000
Likelihood Ratio	1514.791	100	.000
Linear-by-Linear Association	399.000	1	.000
N of Valid Cases	400		

df= difference, N of Valid Cases= Number of Valid Cases

The P Chi-Square test revealed a significant result, $\chi^2(100, N = 400) = 4000.000$, $p < .001$. Similarly, the likelihood ratio was also significant ($\chi^2(100) = 1514.791$, $p < .001$). These findings demonstrate that the differences in the mean ratings of skill need and performance in marketing are statistically significant and not due to chance.

Consequently, the null hypothesis is rejected. This result indicates a significant difference in the mean rating of the responses of farmers on skill need and performance in marketing of pepper. The findings suggest that gaps exist between the skills required and actual performance in marketing activities, which may impede the effective distribution and sale of pepper.

Discussion of Findings

The findings showed that there was the significant skill improvement needs of farmers in planning for pepper production in River State. This aligns with previous research conducted by Ajah *et al.* (2021), who emphasized that skill gaps in agricultural planning significantly hinder productivity and profitability. The Performance Gap (PG) reflects inadequate proficiency in critical aspects of planning, which may include seed selection, resource allocation, and pest management, as noted in similar contexts by Smith and Adegbite (2020). However, the findings agreed Johnson and Udo (2019), who reported minimal skill gaps in similar regions, attributing better performance to sustained extension services. This contrast underscores the variability in access to agricultural training programmes across different communities, as highlighted by Adebayo and Omotola (2023).

The significant Chi-Square statistic ($\chi^2 (120, N = 400) = 2491.231, p < .001$) as tested reinforces that the observed differences in skill need and performance are not random but indicative of systematic deficiencies. This corroborated findings by Okeke *et al.* (2022), who identified significant correlations between training deficits and productivity shortfalls in rural agricultural sectors. Addressing these gaps could facilitate better decision-making and resource utilization, ultimately enhancing pepper production.

The findings revealed a significant need for skill enhancement among farmers in planting operations for pepper production in River State, as evidenced by the Performance. This, highlights notable deficiencies in planting techniques, including seed spacing, planting depth, and crop management. These findings aligned with earlier research by Adekunle and Umeh (2022), who noted that inadequate planting skills often lead to suboptimal crop yields, particularly among smallholder farmers. However, these findings agreed Johnson *et al.* (2021), who reported minimal skill deficiencies in planting operations, attributing this to the availability of agricultural extension services in their study area. This discrepancy underscores the need for context-specific interventions, particularly for women farmers in resource-limited regions such as River State. Bridging these skill gaps can empower farmers to adopt best practices, thereby improving their level of production.

The findings showed a significant need for skill improvement in harvesting operations among women farmers involved in pepper production in River State. The Performance Gap suggests that deficiencies in critical harvesting skills, such as proper timing, handling, and storage techniques, impact both the quality and efficiency of the process. This finding aligned with Adeyemi *et al.* (2022), who noted that skill deficits in harvesting operations often lead to post-harvest losses and reduced market value in smallholder farming. Conversely, Johnson and Udo (2019) observed minimal gaps in harvesting skills in regions with robust extension service networks, suggesting that support structures can mitigate skill deficiencies. However, the present study's findings reflect the unique challenges faced by farmers in River State, including limited access to extension services and agricultural resources. Addressing these skill gaps through practical training and resource allocation could significantly improve the quality and efficiency of pepper harvesting operations.

The findings showed that there is a substantial need for skill enhancement among farmers in pepper marketing in River State. Key areas requiring improvement include financial management, market analysis, and consumer engagement. These skills are essential for increasing profitability and operational efficiency. This aligned with Adekunle and Umeh (2022), who identified similar gaps in marketing skills among smallholder farmers, noting that inadequate knowledge in these areas often results in reduced market competitiveness. However, Johnson and Musa (2021) reported contrasting findings in regions with established cooperative societies, where collective marketing strategies mitigated individual skill deficiencies. This suggests that structural support systems may influence the extent of skill gaps. Addressing the identified needs through capacity-building programmes and access to market information could empower women farmers to engage effectively in pepper marketing, improving their profitability and overall economic resilience.

The result confirms a systematic difference in skill needs and performance. This corroborated with findings of Adekunle and Johnson (2023), who identified that limited technical knowledge in post-harvest handling undermines value addition and market competitiveness. Furthermore, Olayemi *et al.* (2023) emphasized that inadequate skills in advanced processing, such as spice blending and inventory management, reduce profitability in small-scale farming enterprises.

CONCLUSION

Based on the findings of this research, the researchers conclude that pepper farmers in River State, particularly in areas such as planning, planting, harvesting and marketing of pepper should be given adequate training to enhance better performance. The significant Performance Gaps, supported by Chi-Square test results, revealed that these deficiencies are not due to chance but represent systemic challenges that hinder production and profitability.

RECOMMENDATIONS

Base on the findings, the following recommendations were made:

1. Extension agent should establish targeted training programmes to improve farmers' skills in planning for pepper production.
2. Farmers should be provided with practical training by extension agents on how to carry out pepper planting for better growth and production in the area.
3. The extension agents should organize workshops in skill acquisition Centre to demonstrate to farmers proper harvesting practices, including timing, to minimize losses and maintain pepper quality.
4. Stakeholders in pepper farming should create capacity-building programmes focused on financial management, market analysis, and consumer engagement to enhance the profitability and operational efficiency of pepper marketing by farmers.

REFERENCES

- Adebayo, T. & Omotola, E. (2023). Bridging agricultural skill gaps in Nigeria: A case study approach. *Journal of Rural Development*, 35(2), 89–102.
- Adekunle, S. & Umeh, I. (2022). Addressing marketing skill gaps in smallholder farming. *Journal of Agricultural Economics*, 33(4), 150–163
- Adeyemi, L., Usman, T. & Oladipo, R. (2022). Post-harvest practices and skill enhancement in smallholder farming. *African Journal of Agricultural Research*, 47(3), 89–103.
- Ajah, L., Emmanuel, U. & Bello, K. (2021). Enhancing agricultural productivity through skills training. *African Journal of Agricultural Research*, 56(3), 210–220
- Bosland P.W. and E. J. Vatava (2016) Peppers, Vegetables and Spices, Capsicum CABI publishing. Walling Ford; United Kingdom, pp 204.
- Delelegn, S. (2018). Evaluation of Elite Hot Pepper Varieties (Capsicum Species) for Growth, dry pod yield and quality under Jimma Condition, South West Ethiopia. M.Sc. Thesis Jimma University College of Agriculture and Veterinary Medicine. Pp 221
- Eze, O. & Adebayo, K. (2023). Skill development and agricultural productivity: Insights from pepper farming. *African Journal of Agricultural Research*, 56(2), 98–114.
- Gardenersnet (2015). The varieties of pepper. Retrieved from www.gardenersnet.com on the 20th of August 2025.
- Jaliya M.M. & Sani B.M. (2017) Pepper production under irrigation. A publication of NAERLS.Extension Bulletin, No. 206, AgricEngr Series No. 7
- Johnson, K. & Musa, D. (2021). Role of agricultural extension services in improving farmers' competencies. *International Journal of Rural Studies*, 28(4), 67–83.

- Julie, F. H, T. Grady, R, Kim .E, D, Theresa, P. M (2017). Knowledge, Skills, and Abilities for Agricultural Science Teachers: A Focus Group Approach. *Journal of Agricultural Education* Volume 48, Number 1, pp. 86 – 96 DOI: 10.5032/jae.2007.01086.
- Lin, J.-H.; Kiyota, N.; Ikeda, T & Nohara, T. (2017), Acyclic diterpene glycosides, capsianosides C, D, E, F and III, from the fruits of hot red pepper *Capsicum annum* L. used in Kimchi and their revised structures. *Chem. Pharm. Bull.*, 55, 1151–1156. [CrossRef] [PubMed].
- Motes, J.E., Criswell, J.T. & Damicon, J.P. (2020) Pepper Production. Oklahoma Cooperation Extension Fact Sheets. Retrieved from <http://osfacts.okstate.edu>.
- Ngbongha. I. O, Ale, G. C & Benso., D. N (2024). Skills required by secondary school teachers in orange production for food security in Benue State. *International Journal of Agribusiness and Economic Growth*. ISSN: 2384-5329, Volume 8, Issue 1. Pp 33-43
- Ngbongha, I O & Akaa, I (2020). Entrepreneurial Skill needs of Agricultural Education Graduates in Vocational Training for Combating Unemployment in F.C.T, Nigeria. *Asian Journal of Social Science and Management Technology* ISSN: 2313-7410 Volume 2 Issue 3
- Okeke, N., Chukwu, P. & Eze, O. (2023). Skill deficits and agricultural output in rural Nigeria. *International Journal of Agronomy*, 28(4), 302–319.
- Singletary, K. (2018) Black Pepper: Overview of health benefits. *Nutrition Today*, 45(1), 43 – 46.
- Zheng, H & Wu, L, (2014). Theory of “Farmer” and Its Policy System to be Re-Constructed. *Journal of Renmin University of China*, (5).