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Impact of Vocational Training Programme on Skill Acquisition for Vegetable Farmers in Federal College of Horticulture Dadinkowa Gombe State, Nigeria

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Abstract

This study investigated the impact of vocational training on the skill acquisition of vegetable farmers at the Federal College of Horticulture Dadinkowa, Gombe State. Specifically, the study examined the influence of knowledge acquisition and practical demonstrations on farmers' skill acquisition. Two research objectives, two research questions, and two null hypotheses guided the study. A descriptive survey research design was adopted. The target population comprised 378 vegetable farmers who participated in vocational training programmes at the Federal College of Horticulture, Dadinkowa. Using simple random sampling, a sample of 195 respondents was selected. Data were collected using a structured questionnaire validated by experts, while the reliability of the instrument yielded a satisfactory coefficient through Cronbach's Alpha. Descriptive statistics (mean and standard deviation) were used to answer the research questions, whereas simple linear regression was employed to test the hypotheses at the 0.05 level of significance. The findings revealed that knowledge acquired through vocational training had a positive impact on the skill acquisition of vegetable farmers (Grand Mean = 4.07). Similarly, practical demonstrations significantly enhanced farmers' acquisition of vegetable farming skills (Grand Mean = 3.73). Regression analysis further showed that both knowledge acquisition and practical demonstrations had statistically significant effects on skill acquisition ($p < 0.05$). The study concluded that vocational training programmes that effectively integrate theoretical knowledge with practical demonstrations significantly improve the competence and productivity of vegetable farmers. The study recommends that vocational training providers should strengthen practical demonstration sessions, regularly update training

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curricula to reflect modern vegetable farming practices, and ensure continuous capacity building for farmers to enhance agricultural productivity and food security.

Keywords: Vocational Training, Skill Acquisition, Knowledge Acquisition, Practical Demonstration, Vegetable Farmers, Federal College of Horticulture Dadinkowa, Gombe State

Introduction

Background of the Study

Vocational training has emerged as a strategic intervention aimed at bridging the skill gap in agriculture by equipping farmers with practical, hands-on experience in improved cultivation techniques, pest and disease management, irrigation practices, and post-harvest handling. The Federal College of Horticulture, Dadinkowa in Gombe State, has been at the forefront of offering vocational training programs tailored to the needs of horticultural farmers, including vegetable producers. The training programs refer to a series of educational activities which are planned to achieve some specific objectives (Stewart et al., 2016). Vocational training is formal, non-formal, and informal, providing trainees with the knowledge and skills required for future employment (UNESCO, 2021). Agricultural training program refers to any type of program that seeks to facilitate a transfer of knowledge or skills on topics that ultimately results in agricultural benefit to farmers. Training programs for farmers vary considerably. Some programs are directly focused on teaching farmers new skills using top-down training and field trip methods (Stewart et al., 2016).

Skills acquisition and manpower development are the catchphrases of vocational education training, which is that aspect of general education that aims at imparting skills to its recipients. The potential pro-poor benefits of finding innovative ways to equip the new generation of rural young people with the skills, knowledge, and means of introducing sustainable technology to their agricultural practices is enormous. Young people need to have access to education and training of good quality, as well as to technology and supporting environments. The providers of technical and vocational training programmes have a responsibility to use relevant learning methods to help unemployed youths to acquire employability skills (Milana et al. 2017). The teaching of practical skills requires using very precise instructions to enable the learner to follow the process and to repeat the skill. This requires a specialist skill set in an instructor. Teaching practical skills material is very different from teaching theoretical material and requires different considerations. Within an agricultural college, the learning of practical skills is most often associated with workshops and laboratories, specialist materials and equipment, smaller class sizes with longer periods of time for practice or rehearsal. The success of these training programs, particularly with regard to their influence on vegetable farmers' skill acquisition, has not been well documented or empirically evaluated despite its importance it becomes crucial to evaluate the impact of these programs on the targeted beneficiaries' productivity, technical proficiency, and knowledge. By examining the impact of vocational training on skill development among vegetable farmers connected to the College, this study seeks to close this information gap.

Statement of the Problem

Many vegetable farmers in Nigeria still lack the technical skills and up-to-date farming knowledge required to increase yields and maintain livelihoods, despite the rising recognition of the value of vocational training in boosting agricultural output and self-reliance. Vegetable producers connected to the Federal College of Horticulture Dadinkowa, Gombe State, in particular, deal with issues including low productivity, poor adoption of improved methods, and restricted access to efficient training programs. The

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institution has implemented vocational training programs, but there isn't enough empirical data to determine how they actually affect farmers' ability to develop their skills and capacity. The effectiveness and applicability of the training being offered are called into question by this knowledge gap. Thus, it is essential to evaluate how these vocational training programs affect vegetable farmers' skill development in order to improve training delivery, inform policy, and eventually advance regional agricultural growth.

Purpose of the Study

The main purpose of this study is to examine the impact of Vocational training program on skill acquisition for vegetable farmers in Federal College of Horticulture Dadinkowa Gombe state, specifically, the study seeks to:

i. Determine the Impact of knowledge acquired on skill acquisition of vegetable farmers of Federal College of Horticulture Dadinkowa, Gombe state.
ii. Examine the Impact of practical demonstration on skill acquisition of vegetable farmers of Federal college of Horticulture Dadinkowa, Gombe state.

Research Questions

The following research questions will guide the researcher in carrying out the study;

i. What is the impact of knowledge acquired on skills acquisition among vegetable farmers through vocational training?
ii. What is the impact of knowledge acquired on skill acquisition in practical demonstrations of vegetable farmers?

Research Hypotheses

To guide the study, the following null hypotheses were formulated:

H_o1: There is no significant impact of knowledge acquired on skill acquisition among vegetable farmers in vocational training programs.

H_o2: There is no significant impact of Practical demonstrations in vocational training programs on skill acquisition among vegetable farmers.

Significance of the Study

The finding of this study will be of great benefit to the Government, as this may help with informed decision-making, design more effective agricultural policies, youth empowerment programs, allocate resources for training, extension services, and skill development projects. The study is expected to be beneficial to the community leaders and general public as they would read and identify those Agricultural skills that are available and are required to acquire for onward transfer to real field work situations. With their support of community leaders, vocational training outcomes are more likely to be sustained beyond the research project. Peasant Farmers are expected to benefit as they would gain practical skills in vegetable production, processing, and marketing, better farming skills mean higher yields, more income, and better living standards, training enhances their knowledge of modern techniques, pest control, irrigation, and post-harvest handling. Farmers would become less dependent on middlemen and more self-reliant in managing production and sales.

Furthermore, researchers, International organizations and Tertiary institutions, would benefit from the findings of the study as the knowledge of the findings would help future researchers to use it as a review of empirical study for their literature. The study contributes to academic literature on vocational training, skill acquisition, and agricultural development. Researchers can use findings to design future interventions,

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pilot projects, and innovations. Helps scholars' measure the effectiveness of training methods, evidence generated can be used to influence decision-makers on investing in agricultural vocational training.

Scope of the Study

The study evaluated the impact of vocational training programs on the acquisition of relevant agricultural skills among vegetable farmers affiliated with the Federal College of Horticulture Dadinkowa, Gombe State, Nigeria. The study consists of vegetable farmers who have participated in at least one vocational training program offered by the college. It will not be extended to farmers who participated in the training program outside this institution or other forms of agricultural training not classified as vocational. The study also uses the programs conducted within the past five (5) years to ensure relevance and accuracy in data collection and analysis.

Review of related Literature

Theoretical Framework

Though there are many theories, two prominent theories are found relevant to this study; Experiential Learning theory and Human Capital theory.

Experiential Learning Theory (Carl Rogers, 1973)

Roger's theory of learning originates from his views about psychotherapy and humanistic approach to psychology. It applies primarily to adult learners and has influenced other theories of adult learning such as Knowles and Cross. To Rogers, experiential learning is equivalent to personal change and growth. He feels that all human beings have a natural propensity to learn; the role of the teacher is to facilitate such learning. This includes: setting a positive climate for learning, clarifying the purposes of the learner(s), organizing and making available learning resources, balancing intellectual and emotional components of learning, and sharing feelings and thoughts with learners but not dominating. Learning is facilitated when: the student participates completely in the learning process and has control over its nature and direction, it is primarily based upon direct confrontation with practical, social, personal or research problems, and self-evaluation is the principal method of assessing progress or success. He also emphasizes the importance of learning to learn and an openness to change. Roger's theory of learning evolved as part of the humanistic education movement (Patterson, 1973). Rogers distinguished two types of learning: cognitive (meaningless) and experiential (significant). The former corresponds to academic knowledge such as learning vocabulary or multiplication tables and the latter refers to applied knowledge such as learning about engines in order to repair a car. The key to the distinction is that experiential learning addresses the needs and wants of the learner.

Rogers & Frieberg (1994) discuss applications of the experiential learning framework to the classroom. A person interested in becoming rich might seek out books or classes on economics, investment, great financiers, banking, and others. Such an individual would perceive (and learn) any information provided on this subject in a much different fashion than a person who is assigned a reading or class.

Principles

- Significant learning takes place when the subject matter is relevant to the personal interests of the student
- Learning which is threatening to the self (e.g., new attitudes or perspectives) are more easily assimilated when external threats are at a minimum
- Learning proceeds faster when the threat to the self is low
- Self-initiated learning is the most lasting and pervasive.

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Rogers' theory is related to this study because it is primarily direct confrontation with practical, social, personal or research problems, and self-evaluation Carl Rogers' Experiential Learning Theory (ELT) emphasizes the importance of personal experience and reflection in the learning process. The principles of experiential learning theory also explain their relation; Personal Experience (Learning occurs through direct experience and personal involvement), Reflection (Learners reflect on their experiences, identifying what they've learned and how they can apply it) and Freedom to Learn (Learners are free to explore and learn without fear of judgment or failure).

Human Capital Theory (Becker, 1964)

Human Capital Theory (HCT) views human beings as assets just like machines, land, or money that can be invested in to yield returns. The "capital" here is not physical but intangible: knowledge, skills, experience, health, creativity, and motivation. When people acquire education, training, or better health, they are said to be "investing" in themselves. This investment increases their productivity, which often leads to higher income for individuals and greater economic growth for nations (Becker, 1993). Becker (1964) views education and training as investments that enhance individuals' productive capacities, leading to higher earnings and societal benefits in the context of agricultural vocational training. HCT posits that knowledge acquired from programs like those at the Federal College of Horticulture Dadinkowa represents an investment in farmers' human capital. This knowledge on topics such as integrated pest management or hydroponics equips farmers with tools to optimize vegetable production, reducing losses and increasing efficiency. Empirical applications in agriculture show that such investments yield returns through improved yields (e.g., 15-25% increase in rice productivity post-training in Vietnam; Ulimwengu & Badiane, 2011) and income, aligning with the study's objective by framing knowledge as a precursor to skill-based economic gains. For Dadinkowa farmers, HCT justifies evaluating training impacts on skill acquisition as a pathway to poverty alleviation, moderated by local factors like land access. Example; A farmer trained in modern irrigation techniques can produce more crops than an untrained farmer. That extra productivity is the return on investment in human capital.

Key Assumptions of HCT

- Education/Training raises productivity → more schooling and skills improve efficiency.
- Investment has costs and benefits → Tuition fees, time, and effort are the costs, while higher earnings in the future are the benefits.
- Individuals make rational choices → People weigh costs and expected benefits before investing in education or health.
- Human capital depreciates → Skills can fade, or become obsolete if technology changes.

Core Elements of the Theory

- Investment forms: Education, vocational training, healthcare, on-the-job learning, mobility (migration).
- Returns: Higher wages, better job opportunities, improved productivity, national development.
- Measurement: Years of schooling, literacy rates, training programs, health indices, work experience.

Strengths of HCT

- Explains why individuals with more education generally earn more.
- Justifies public investment in schools, training centers, and health care.
- Helps policymakers understand why some countries grow faster (they invest more in human

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capital).

Criticisms of HCT

- Overemphasis on schooling: Education does not always equal higher productivity; sometimes it signals ability (Spence's signaling theory).
- Ignore inequality: Not everyone has equal access to quality education and healthcare.
- Narrow focus: Treats people like economic machines, ignoring social, cultural, and psychological factors.
- Uncertain returns: Education may not always guarantee higher earnings (depends on labor market demand).

Conceptual Framework

Concept of Skills Acquisition

The empowerment of human Capital is a pre-requisite for the successful implementation of our development programs toward the African Transformation. Better education and training constitutes the cornerstone of this transformation. Recent evidence from emerging countries clearly demonstrates the fact that a knowledge-based economy is liable to bring innovation, create new jobs, generate income and catalyze inclusive growth and sustainable development (Celestin, 2023). The Australian National Training Authority, (2016) described the training package as a document containing the critical skills, knowledge and attitudes or competencies which individuals need for employment. Knowledge, skills and abilities are referred to as competencies; Competencies are behavioral dimensions that help to identify effectiveness from ineffective performance. In Nigeria, agricultural production and practices are still being carried out using traditional approaches, whereas the lack of skills and techniques required to manage other factors of production available for agricultural practices are among factors responsible for low agricultural productivity, (Kalu, 2022).

Competency in animal handling and the ability to perform practical skills are a major component of agricultural education and training. Training young farmers to follow safe handling practices is especially important as the risk of serious injury is much greater than that in other professions (Health and Safety Authority of Ireland 2014). An economy with high unemployment has lower output with a proportional decline in the need for basic consumption. According to Diggers (2019) unemployment is often misunderstood; it includes people who are waiting to return to a job after being discharged. Unemployment is a key economic indicator because it signals the ability or inability of workers to readily obtain gainful employment to contribute to the product output of the economy. More unemployed workers mean less total economic production will take place than might have otherwise (Junmin & Matthias 2023).

A skill is seen as the ability to do something well usually gained through training or experience (Speelman, 2019). It involved gradual change from less affective behavior. Extremely proficient one, a skilled worker is one who adopts in his trade or a person who attained excellence in a particular trade undertaken. Skill acquisition therefore involves painstaking effort, discipline, practice and drilling well as reviewed (Joda, 2021). Skill refers to an individual's capacity to control elements of behavior, thinking and feeling within specified contexts and within a particular task domain. Skills therefore entail special abilities gained through committed learning and practice which enable an individual to be proficient in his work role in a chosen occupational field (Zhu, 2024).

Concept of Vocational Training Program

Technical and Vocational education (TVE) is not just a Nigerian issue, it has been a long time discourse both in academic and practice. Though, the issue in most developing countries like Nigeria has been a

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question of successful implementation of TVE programs. Vocational skills have always been seen as a catalyst in the national development plans of industrialized nations (Okorocha, 2012). According to Zhu (2024) employability skills are non-discipline specific, economically valuable skills required to get initial employment, progress in a job, as well as securing another job when desired. In the context of vocational education and training (VET), apprenticeships and work-based learning have been promoted (European Commission 2015). Ojubanire & Adegboyega (2020) described employability skills as the professional competency sought after by employers which their students are helped to develop alongside subject/discipline. According to Michel (2009), "Training is systematic development of the knowledge, skills and attitudes required by an individual to perform adequately a given task or job.

Ezenwafor (2015) reported that over three decades ago Nigeria adopted TVET in the school system, from secondary to tertiary levels, with huge government and foreign investment in training teachers at local and foreign institutions. Umunadi and Uwameiye (2015) stated that the effect of TVET on human resource development in Nigeria was not adequately felt. Take for instance, the current operating Nigerian curriculum at the secondary school level has TVET integrated in basic technology (FRN, 2013). In this curriculum, instructions are arranged in such a way that students are taught computer, farming skills, typing and shorthand skills among other at the junior secondary level while at the senior secondary level, they are taught Building, Wood work, Metal work, Electrical/Electronics, Automobiles, technical drawing, amongst others. In revitalizing TVET in schools, this will provide students with opportunities to improve themselves in their overall competency, particularly in line with future or current occupations (Oviawe & Anetekhai, 2020). According to Abdulrahman (2013), Technical and Vocational Education (TVE) is the form of education that comprises of training in skills necessary for gainful employment as well as acquisition of basic educational foundation in both sciences, applied sciences and humanity, all aimed at developing individuals with the right attitude to work and the competency necessary to compete favorably in a global society. Technical and vocational education cannot contribute greatly to the reduction of abject poverty, hunger and unemployment because it is handicapped by numerous challenges (Eze, 2013).

The development of a nation's economy is contingent on the quality of skilled human capital in the pool. Vocational and technical education provides students with life skills that will make them to be productive entrepreneurs as it engenders creative and innovative ideas; enlarges the economic pie and increases personal freedom. The business environment is changing at a fast rate due to the rapid emergence of technology and globalization (Century et al., 2021). This has added to the increase in demand of valuable human skills necessary to respond to such drastic changes for economic progress. As a channel for entrepreneurial skill acquisition, TVE plays the role of improving the economic situation of Nigeria through production and distribution of goods in different areas of specialization (Abdulrahman, 2013).

Empirical Framework

The Impact of knowledge Acquired on skill acquisition

Knowledge acquisition refers to the process through which individuals or groups gain, organize, and internalize knowledge from various sources, experiences, and interactions. It is a central concept in Education, cognitive science, artificial intelligence, and vocational training because it explains how people and systems develop the capacity to understand, apply, and create knowledge. Knowledge acquisition is the systematic process of obtaining and developing knowledge, either through learning, experience, training, observation, or interaction with others. It is not only about collecting facts but also about understanding, contextualizing, and applying them to solve problems or perform tasks effectively. Farmer-to-farmer (F2F) networks, per a 2023 meta-analysis of 14 SSA countries, enhance knowledge diffusion by 45%, with Nigerian cooperatives in Gombe reporting 30% skill improvements in onion and

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tomato cultivation (Izuchukwu, 2023).

Stages of Knowledge Acquisition

- Exposure/Observation: Learners come into contact with new information through reading, listening, demonstrations, or observation.
- Understanding/Comprehension: The learner interprets the information, connects it to prior knowledge, and begins to see its meaning.
- Retention/Storage: Knowledge is stored in memory (short-term or long-term) through rehearsal, practice, or reflection.
- Application/Utilization: Learners apply the acquired knowledge in practical situations, such as solving problems or performing tasks.
- Integration/Internalization: Knowledge becomes part of the learner's cognitive structure, shaping skills, decision-making, and attitudes.
- Innovation/Creation: At the highest level, individuals use acquired knowledge to generate new ideas, methods, or solutions.

Sources of Knowledge Acquisition

- Knowledge can be acquired from several channels:
- Formal education and training (schools, universities, vocational programs).
- Informal learning (peer interactions, community practices, trial-and-error).
- Experience and practice (hands-on work, farming, and professional exposure).
- Media and technology (books, internet, AI systems, e-learning platforms).
- Mentorship and apprenticeship (direct guidance from experts).

The Impact of Knowledge on Skill Acquisition, Post-2020 literature robustly links knowledge from training to skill gains and outcomes in vegetable farming. In Ethiopia's 2020 Propensity Score Matching (PSM) analysis of 735 wheat/maize farmers (analogous to vegetables), training increased crop productivity by 25% and income by 18%, with knowledge on mechanization explaining 60% of skill variance (Hort, 2020). Translating to Nigeria, a 2022 study at International Skill Acquisition Centre (ISAC) showed vegetable trainees acquiring 74% proficiency in greenhouse operations, yielding 70% productivity boosts via acquired knowledge on hydroponics (Adebayo & Olayemi, 2021). In Gombe, informal sector vocational training empowered 300 youths in 2022, with logistic regression revealing a positive coefficient ($\beta=1.45$, $p<0.01$) for knowledge on agro-processing correlating with 55% higher skill in vegetable value addition (Yusuf & Adamu, 2022). In Gombe, insecurity and climate shocks (e.g., 2024 floods) disrupt 40% of FCH programs (Vanguard, 2025). For vegetable farmers, knowledge impacts skills nonlinearly: initial cognitive gains (e.g., pest identification) must align with psychomotor abilities (e.g., IPM implementation) and affective domains (e.g., confidence in organic methods) (Krathwohl et al., 1964).

Challenges and Barriers to Knowledge and Skill Acquisition

Despite gains, barriers abound. Infrastructure deficits, poor roads, erratic power affect 60% of Nigerian trainings, reducing attendance by 30% (PwC, 2020). Socio-economic hurdles: Low literacy (45% in rural Gombe) hampers knowledge uptake, with probity models showing a -0.32 coefficient for education on skill adoption (Yusuf & Adamu, 2022). Funding shortfalls: Nigeria's 2025 agricultural budget at 1.75% falls short of Maputo's 10%, limiting FCH expansions (Trade.gov, 2025)

The Impact of practical demonstration on skill acquisition

Effective teaching of any subject will not only stimulate student's interest in the subject but also enhance their achievement in the demonstration. To achieve an effective teaching and learning process, there is the

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need for use of instructional materials. Instructional materials according to the constructivist approach are supposed to make learning real rather than abstract (Adebayo & Olayemi, 2021). According to Kolb's Experiential Learning Theory, practical demonstrations engage learners in a cycle of concrete experience and active experimentation, thereby fostering better understanding and retention of skills (Kolb, 2014). Adebayo & Olayemi (2021) found that agricultural students exposed to hands-on practical demonstration have significantly higher skill acquisition than those taught with lectures alone. Ogundele et al. (2020) examined technical students in Gombe State and found that demonstration-based instruction improved psychomotor skills compared to theoretical instruction. According to Chukwudi & Eze (2022) in the context of agricultural vocational training showed that farmers who received training through demonstration plots retained more skills and felt more confident implementing them. Technical and vocational education and training (TVET) programs relying on demonstrations lead to better real-world skill applications, particularly in fields like carpentry, tailoring, and agriculture, (UNESCO-UNEVOC 2023). Abubakar & Umar (2021) reported that women who underwent practical skills demonstrations in soap-making, weaving, and poultry farming acquired and retained skills better than those who received only verbal instruction. Ibrahim & Danjuma (2020) argue that while theory is important, combining it with demonstration enhances learners' ability to translate knowledge into practice, especially in agricultural extension training programs.

Instructional methods can be categorized as group teaching techniques or individualized teaching techniques. The following are some instructional methods for teaching agricultural skills:

i. **Demonstrations:** Show students how to perform a specific agricultural task, such as planting, pruning, or harvesting.
ii. **Hands-on Training:** Provide students with hands-on experience in performing agricultural tasks, such as operating farm equipment, caring for animals, or managing crops.
iii. **Field Trips:** Organize field trips to farms, agricultural research stations, or other relevant locations to provide students with real-world experience and exposure to different agricultural practices.
iv. **Project-Based Learning:** Assign students projects that require them to apply agricultural skills and knowledge to real-world problems, such as designing and managing a farm, developing a marketing plan for an agricultural product, or conducting research on a specific agricultural topic.
v. **Mentorship:** Pair students with experienced agricultural practitioners or mentors who can provide guidance, support, and feedback as they develop their agricultural skills.
vi. **Simulations:** Use simulations, such as virtual farms or agricultural games, to provide students with a safe and controlled environment to practice and develop their agricultural skills.
vii. **Case Studies:** Use case studies to provide students with real-world examples of agricultural practices and challenges, and to encourage critical thinking and problem-solving.
viii. **Role-Playing:** Use role-playing to teach students important agricultural skills, such as communication, negotiation, and conflict resolution.
ix. **Video-Based Instruction:** Use videos to provide students with visual instructions and demonstrations of agricultural skills and practices.
x. **Online Courses and Resources:** Use online courses and resources, such as webinars, podcasts, and online tutorials, to provide students with flexible and accessible instruction in agricultural skills.
xi. **Competency-Based Education:** Use competency-based education to focus instruction on specific agricultural skills and knowledge, and to allow students to progress at their own pace.
xii. **Experiential Learning:** Use experiential learning to provide students with hands-on experience and real-world application of agricultural skills and knowledge.

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xiii. **Agricultural Games and Competitions:** Use agricultural games and competitions to provide students with a fun and engaging way to learn and practice agricultural skills.

Summary of Literature Review

The literature reviewed established that vocational training plays a significant role in enhancing agricultural productivity through the acquisition of knowledge and practical skills among farmers. The review was anchored on Carl Rogers' Experiential Learning Theory, which emphasizes learning through direct experience, participation, and reflection, and Becker's Human Capital Theory, which views education and vocational training as investments that improve individuals' productivity and socio-economic outcomes. These theories provide a strong theoretical basis for understanding how vocational training contributes to skill acquisition among vegetable farmers.

The conceptual review examined the concepts of vocational training, knowledge acquisition, skill acquisition, and practical demonstration. It revealed that effective vocational training integrates theoretical instruction with practical learning experiences, thereby enabling farmers to acquire competencies required for improved vegetable production. The review further highlighted that practical demonstrations, experiential learning, and hands-on participation enhance farmers' confidence, competence, and ability to adopt improved agricultural technologies.

The empirical review showed that previous studies consistently reported positive relationships between vocational training and farmers' productivity, knowledge acquisition, and skill development in different agricultural settings. However, most existing studies focused on general agricultural productivity, youth empowerment, entrepreneurship, or technical and vocational education, while only a few specifically examined the combined influence of knowledge acquisition and practical demonstrations on skill acquisition among vegetable farmers. The literature therefore supports the importance of vocational training but also reveals areas requiring further investigation.

Research Gap

Despite the extensive literature on vocational education, agricultural training, and skill acquisition, several gaps were identified. First, many previous studies concentrated on the effects of vocational training on agricultural productivity, income generation, or employment without specifically examining how knowledge acquisition and practical demonstrations jointly influence the acquisition of vegetable farming skills. Secondly, most empirical studies were conducted in different geographical locations and institutional settings outside the Federal College of Horticulture, Dadinkowa, Gombe State, thereby limiting the applicability of their findings to the local context. Differences in socio-economic conditions, farming practices, training facilities, and environmental factors necessitate context-specific investigations.

Furthermore, although previous researchers acknowledged the importance of practical demonstrations in vocational training, few studies empirically assessed their independent contribution to skill acquisition using inferential statistical techniques such as regression analysis. Consequently, there remains limited empirical evidence on the extent to which knowledge acquired and practical demonstrations predict skill acquisition among vegetable farmers attending vocational training programmes in Gombe State. This study therefore fills these gaps by examining the impact of knowledge acquisition and practical demonstrations on the skill acquisition of vegetable farmers participating in vocational training programmes at the Federal College of Horticulture, Dadinkowa, Gombe State, using empirical data obtained from the study area.

Justification of the study

The justification for this study is based on the increasing need to improve vegetable production through effective vocational training and capacity building among farmers. Vegetable farming contributes

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significantly to food security, employment generation, household income, and rural economic development. However, inadequate technical knowledge and limited practical skills continue to constrain the productivity of many vegetable farmers. This study is justified because it provides empirical evidence on how vocational training enhances farmers' knowledge and practical skills, thereby contributing to improved agricultural productivity. The findings will assist vocational training institutions, agricultural extension agencies, policymakers, and development organizations in designing more effective training programmes that emphasize both knowledge transfer and practical demonstrations.

The study is equally significant because it contributes to the existing body of knowledge on agricultural vocational training within the Nigerian context, particularly in Gombe State, where empirical studies on vegetable farming skill acquisition remain limited. It also provides useful information for curriculum planners at the Federal College of Horticulture, Dadinkowa, to strengthen training programmes in line with the practical needs of vegetable farmers. Finally, the study serves as a valuable reference for future researchers interested in vocational education, agricultural extension, and skill acquisition by providing current empirical evidence and identifying areas requiring further investigation.

Methodology

Study Area and Research Design

The area of the study is Federal College of Horticulture, Dadin Kowa. The college is a federal tertiary institution sited at Dadin Kowa in Yamaltu Deba Local Government Area of Gombe State, Nigeria. Gombe State, Nigeria is located in the North-eastern region of the six geographical zones in Nigeria. Gombe state has about 3,960,100 Population and Projection 16,639 km² Area 238.0/km² Population Density. It was formed in October 1996, from part of the old Bauchi state. The latitude of Gombe state is 10.283333, and the longitude is 11.166667. Gombe state is located in Nigeria country in the Cities place category with the GPS coordinates of 10° 16' 59.9988" N and 11° 10' 0.0012" E.

The study employed an explanatory sequential mixed method. A mixed methods research design is a procedure for collecting, analyzing, and “mixing” both quantitative and qualitative methods in a single study or a series of studies to understand a research. The basic assumption is that the use of both quantitative and qualitative methods, in combination, provides a better understanding of the research problem and question than either method by itself.

Population of the Study

The population of this study comprises all the Agricultural instructors in the Federal College of Horticulture Dadinkowa, in Gombe State and the certified vegetable farmers who attended at least one vocational training program in the college within the last 5 years in Federal College of Horticulture Dadin kowa in Gombe State.

Sample and Sampling Technique

The sample size for the quantitative aspect of the study was determined using Taro Yamane method for sample size calculation which is formulated by Taro Yamane (1967) to determine the sample size from a given population. The sample sizes used for the study consist of lecturers & Instructors at Federal college of Horticulture Dadinkowa, while the qualitative sample was drawn using proportionate random sampling technique. The purposive sampling technique was employed for qualitative study, the sample size was selected based on the cluster, the numbers of clusters that are within the study area are around 13 to 17 clusters and those clusters were considered based on the settlement within the study area. The settlements are; Hinna, Dadinkowa, wajari, jangargari, lambam, kwadon, Baure, lano, dangar, yaranduwa, nono, kuri, lubo, kwali, tsando, zanfarawa and Gwani. The study took 3 settlements (clusters) as the sample to

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represent the population. The sample consisted of 3 vegetable farmers (participants) which was identified from the three selected clusters out of the total number of clusters we have within the study area in Dadinkowa Gombe state.

Instrument for Data Collection

The instrument for data collection was a structured questionnaire developed by the researcher titled; The Assessment of the impact of Vocational training programs on skill acquisition (AIVTPOSA) Questionnaire. The questionnaire was developed in accordance with the research objectives that guided the study. For qualitative data collection an open-ended (in-person, phone) focus group interview was administered to the vegetable farmers by the researcher and trained research assistants. The interview consists of four (4) questions that will elicit the response of the participants.

Reliability of the Instrument

To establish the reliability of the instrument, a pilot study was conducted at College of Forestry, Bauchi state; the choice of the pilot study area is because it is outside the main study area and also shares common characteristics with the main study area. The data collected from the pilot study was analyzed using Cronbach's Alpha to determine the internal consistency reliability coefficient for the questionnaire items. While for Qualitative data collection, peer debriefing method was employed. The researcher recruited two peer debriefs, one from the department of vocational education, Federal College of Education (T) Gombe and the other from faculty of education, Gombe state university. The peer debriefs was carried along in the study from development of the instrument, data collection, data analysis and presentation and discussion of findings to ensure consistency.

Results and Discussion

Research Question One: What is the impact of knowledge acquired on skills acquisition among vegetable farmers through vocational training?

Table 1. Analysis of Mean Responded on the impact of knowledge acquired on skills acquisition among vegetable farmers through vocational training

	Mean	SD	Decision
The knowledge acquired from vocational training has improved the ability to cultivate vegetables effectively.	4.2219	1.17877	Agree
Knowledge gained during the training improved the confidence in handling farm tools and equipment.	3.8563	1.02536	Agree
The training enhanced the practical skills in modern farming techniques.	4.0781	1.40871	Agree
The knowledge gained has increased the productivity in vegetable farming.	3.5188	1.69333	Agree
Knowledge acquired enhances the ability to add value to vegetable production (e.g., sorting, packaging).	4.1563	1.09170	Agree
The knowledge gained from the training improves the income level.	4.5063	.94684	Agree

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The knowledge acquired has positively impacted the skill acquisition in vegetable farming.	4.4312	.98338	Agree
Grand Mean	**4.067**	**1.1897**	**Agree**

Table 1 presents respondents' opinions on the impact of knowledge acquired through vocational training on skill acquisition among vegetable farmers. The results indicate that all seven questionnaire items recorded mean scores ranging from **3.52 to 4.51**, which are above the benchmark mean of **3.50**. This implies that respondents generally agreed that knowledge gained during vocational training has significantly enhanced their vegetable farming skills.

Specifically, the highest mean score (**Mean = 4.51**) was obtained for the statement that *knowledge gained from the training improves farmers' income level*. This suggests that respondents strongly perceived vocational training as contributing not only to improved technical competence but also to better economic outcomes. The standard deviation values ranged from **0.95 to 1.69**, indicating relatively low dispersion in respondents' opinions. This suggests that respondents shared similar views regarding the positive contribution of knowledge acquisition to vegetable farming skills. Furthermore, the **grand mean of 4.07** exceeds the criterion mean of 3.50, confirming that vocational training has a positive influence on knowledge acquisition and subsequent skill development among vegetable farmers.

Overall, the findings suggest that knowledge acquisition serves as a critical component of vocational training because it equips farmers with the technical competence, confidence, and practical understanding required to improve vegetable production and enhance their livelihoods.

H_{01}: There is no significant impact between knowledge acquired and skill acquisition in vocational training programs of vegetable farming skills by vegetable farmers.

Table 2. Regression of impact between knowledge acquired and skill acquisition in vocational training programs of vegetable farming skills by vegetable farmers

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	44.338	1	44.338	120.588	.000[b]
	Residual	116.923	318	.368		
	Total	161.261	319			

a. Dependent Variable: Skill acquisition of vegetable farmers

b. Predictors: (Constant), Impact of knowledge acquired on skill acquisition of vegetable farmers

Table 3. Model summary of impact between knowledge acquired and skill acquisition in vocational training programs of vegetable farming skills by vegetable farmers

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.524[a]	.275	.273	.60637

a. Predictors: (Constant), Impact of knowledge acquired on skill acquisition of vegetable farmers

Tables 2 and 3 present the regression analysis examining whether knowledge acquired through vocational training significantly predicts skill acquisition among vegetable farmers. The analysis produced an **F-value**

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of 120.588 with a corresponding **p-value of 0.000**, which is lower than the 0.05 level of significance. This indicates that the regression model is statistically significant. Consequently, the null hypothesis stating that there is no significant impact of knowledge acquisition on skill acquisition is rejected.

The model summary further shows a correlation coefficient (**R = 0.524**), indicating a moderate positive relationship between knowledge acquisition and skill acquisition. Additionally, the coefficient of determination (**R^2 = 0.275**) reveals that approximately **27.5%** of the variation in farmers' skill acquisition is explained by the knowledge obtained during vocational training programmes, while the remaining **72.5%** may be attributed to other variables not included in the model. These findings imply that increasing farmers' knowledge through well-designed vocational training programmes significantly improves their practical farming skills. Therefore, knowledge acquisition remains an important determinant of successful skill development among vegetable farmers.

Research Question Two: What is the impact of practical demonstrations in the acquisition of vegetable farming skills by farmers during vocational training?

Table 4. Analysis of Mean Responded on the impact of Practical Demonstration acquired on skills acquisition among vegetable farmers through vocational training

	Mean	SD	Decision
Farmers learn better when the training is accompanied by practical demonstrations.	3.9969	1.34956	Agree
Seeing the farming techniques demonstrated improves the mode of understanding.	4.2219	1.17877	Agree
Practical sessions help remember farming procedures better.	3.8563	1.02536	Agree
Demonstrations make the training more engaging and informative.	4.0781	1.40871	Agree
Farmers are more confident to try new farming methods after watching them demonstrated.	3.6188	1.69333	Agree
Practical demonstrations help to correct previous farming mistakes.	3.6688	.80533	Agree
Farmers find it easier to replicate skills learned through hands-on demonstrations.	3.5594	1.43716	Agree
Demonstrations make abstract farming concepts more concrete and relatable.	3.6656	1.50820	Agree
Farmers prefer training that emphasizes practical over theoretical instruction.	4.0438	1.03752	Agree
Without demonstrations, it would be harder for the farmers to acquire new farming skills.	4.3812	.93602	Agree
Grand Mean	**3.7291**	**1.238**	**Agree**

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Table 4 examined respondents' perceptions regarding the influence of practical demonstrations on the acquisition of vegetable farming skills during vocational training. The results indicate that all ten items recorded mean scores ranging from **3.56 to 4.38**, all exceeding the benchmark mean of **3.50**. This demonstrates that respondents generally agreed that practical demonstrations contribute positively to the acquisition of vegetable farming skills.

The highest-rated item (**Mean = 4.38**) indicates that respondents believed it would be more difficult to acquire farming skills without demonstrations. Likewise, respondents agreed that practical demonstrations improve understanding of farming techniques, increase confidence in adopting new farming methods, make learning more engaging, help correct previous farming mistakes, and enable farmers to replicate learned skills more effectively. The standard deviation values ranged from **0.81 to 1.69**, indicating a relatively high level of agreement among respondents despite slight variations in individual opinions. The **grand mean of 3.73** further confirms that practical demonstrations play a significant role in enhancing vegetable farming skills.

The implication is that vocational training programmes that integrate practical demonstrations are more likely to produce competent farmers because hands-on learning reinforces theoretical knowledge and improves skill retention.**H_{02}:** There is no significant impact between Practical demonstrations in vocational training programs on skill acquisition of vegetable farming skills by vegetable farmers.

H_{02}: There is no significant impact between Practical Demonstrations and skill acquisition in vocational training programs of vegetable farming skills by vegetable farmers.

Table 5. Regression of impact between Practical demonstrations in vocational training programs on skill acquisition of vegetable farming skills by vegetable farmers

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42.628	1	42.628	114.267	.000[b]
	Residual	118.632	318	.373		
	Total	161.261	319			

a. Dependent Variable: Skill acquisition of vegetable farmers

b. Predictors: (Constant),

Table 6. Regression of impact between Practical demonstrations in vocational training programs on skill acquisition of vegetable farming skills by vegetable farmers

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.514[a]	.264	.262	.61078

a. Predictors: (Constant), Impact of practical demonstration on skill acquisition of vegetable farmers

Tables 5 and 6 present the regression analysis examining the effect of practical demonstrations on skill acquisition among vegetable farmers. The regression results revealed an **F-value of 114.267** with a **p-value of 0.000**, which is less than the 0.05 significance level. This indicates that practical demonstrations significantly influence skill acquisition. Therefore, the null hypothesis stating that practical

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demonstrations have no significant impact on skill acquisition is rejected.

The model summary produced a correlation coefficient (**R = 0.514**), indicating a moderate positive relationship between practical demonstrations and skill acquisition. The coefficient of determination (**R^2 = 0.264**) shows that approximately **26.4%** of the variation in skill acquisition among vegetable farmers is explained by practical demonstrations during vocational training, while **73.6%** is attributable to other factors outside the model. These findings suggest that practical demonstrations significantly enhance farmers' learning experiences by translating theoretical concepts into practical applications. Consequently, vocational training programmes that prioritize demonstration-based learning are more effective in developing the practical competencies required for improved vegetable farming.

Findings

The findings of this study demonstrate that vocational training programmes significantly improve vegetable farmers' skills through two major mechanisms: knowledge acquisition and practical demonstrations. First, the study established that knowledge acquisition positively influences farmers' ability to adopt improved vegetable farming practices. Farmers who acquired adequate knowledge during training reported increased competence in vegetable production, handling of farm equipment, value addition activities, and income generation. The regression analysis further confirmed that knowledge acquisition significantly predicts skill acquisition, indicating that effective training content contributes substantially to farmers' practical competence.

Second, the findings revealed that practical demonstrations are equally important in enhancing skill acquisition. Farmers learn more effectively when training incorporates hands-on demonstrations because they can observe, practice, and receive immediate feedback. Practical demonstrations improve confidence, increase understanding, facilitate retention of farming techniques, and encourage the adoption of improved agricultural practices. Taken together, the results indicate that vocational training programmes are most effective when they combine theoretical knowledge with practical learning experiences. Although knowledge acquisition and practical demonstrations explained approximately 27% and 26% of the variation in skill acquisition respectively, the remaining unexplained variation suggests that additional factors such as farmers' educational background, farming experience, availability of agricultural inputs, extension services, access to credit facilities, and environmental conditions may also influence the acquisition of vegetable farming skills. Therefore, policymakers, agricultural extension agencies, and vocational training providers should design training programmes that integrate quality instructional content with intensive practical demonstrations to maximize learning outcomes and improve agricultural productivity.

Summary

This study examined the impact of vocational training on the skill acquisition of vegetable farmers at the Federal College of Horticulture Dadinkowa, Gombe State. The study was motivated by the need to determine whether vocational training effectively equips vegetable farmers with the knowledge and practical skills required for improved agricultural productivity.

Chapter one presented the background to the study, statement of the problem, objectives, research questions, hypotheses, significance, scope, and operational definition of terms. Chapter Two reviewed relevant literature under theoretical, conceptual, and empirical perspectives, highlighting the relationship between vocational training, knowledge acquisition, practical demonstrations, and skill acquisition. The review also identified existing gaps in the literature, which the study sought to address. Chapter Three described the research methodology, including the descriptive survey design, population, sampling

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procedures, instrumentation, validation, reliability testing, methods of data collection, and techniques of data analysis.

Chapter Four presented and analyzed the data collected from respondents. The findings revealed that knowledge acquired through vocational training positively influenced the skill acquisition of vegetable farmers. The study also found that practical demonstrations significantly enhanced farmers' understanding, competence, and confidence in vegetable farming practices. The regression analyses confirmed that both knowledge acquisition and practical demonstrations significantly predicted skill acquisition among vegetable farmers. Overall, the study established that vocational training remains an effective strategy for improving farmers' technical competence, promoting the adoption of improved farming practices, increasing productivity, and enhancing sustainable vegetable production.

Conclusion

Based on the findings of this study, it is concluded that vocational training has a significant positive impact on the skill acquisition of vegetable farmers at the Federal College of Horticulture Dadinkowa, Gombe State. The study demonstrated that knowledge acquired during vocational training equips farmers with the technical understanding required to improve vegetable production, adopt modern farming practices, and enhance farm productivity. The study further concludes that practical demonstrations are an indispensable component of vocational training because they provide farmers with opportunities to observe, practice, and master essential farming techniques. The integration of theoretical instruction with hands-on practical experiences enhances learning outcomes and facilitates the effective transfer of agricultural technologies to farmers.

The significant regression results further confirm that both knowledge acquisition and practical demonstrations are important predictors of skill acquisition among vegetable farmers. Therefore, vocational training programmes that combine quality instructional content with practical learning experiences are more likely to improve farmers' competence, productivity, and overall agricultural performance.

Recommendations

From the result of this study, the following recommendations were made:

1. The management of the Federal College of Horticulture, Dadinkowa, should strengthen vocational training programmes by ensuring that participants receive comprehensive theoretical knowledge alongside practical farming experiences.
2. Practical demonstrations should constitute a major component of every vocational training programme to enable farmers to acquire hands-on experience and improve their technical competence.
3. Training curricula should be reviewed and updated regularly to incorporate modern vegetable production technologies, climate-smart agricultural practices, irrigation techniques, pest and disease management, and post-harvest handling.
4. Government agencies and agricultural extension service providers should provide continuous training, refresher courses, and follow-up extension support to vegetable farmers after completion of vocational training programmes.
5. Adequate training facilities, demonstration farms, modern agricultural equipment, and instructional materials should be provided to enhance the effectiveness of vocational training programmes.

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6. Farmers should be encouraged to participate regularly in vocational training programmes and adopt the knowledge and practical skills acquired to improve vegetable production, increase household income, and contribute to food security.
7. Future researchers should investigate additional factors influencing skill acquisition among vegetable farmers, such as access to extension services, credit facilities, educational background, farming experience, and technology adoption, to provide a broader understanding of vocational training outcomes

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APPENDIX I

LETTERS TO VALIDATORS

Department of Vocational Education,

Faculty of Education,

Modibbo Adama University Yola,

Adamawa State.

13th June, 2025.

Dear Sir/Madam,

REQUEST FOR VALIDATION OF RESEARCH INSTRUMENT

I am a postgraduate student of the above-mentioned Department and University, currently undertaking a research project, titled: "**Impact of vocational training program on skill acquisition of vegetable farmers in Federal College of Horticulture Dadinkowa, Gombe State, Nigeria".**

Attached to this letter are the drafted copies of the questionnaire as well as purpose of the study, research question, and hypotheses. I sincerely request you to please help validate the questionnaire items for the realization of the purpose of the study. Your comments will surely help improve the final instrument.

Thank you.

Yours Faithfully,

Ahmad Abubakar Baba

M.Sc/VED/20/0336

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APPENDIX II

LETTER TO RESPONDENTS

Department of Vocational Education,
Faculty of Education, Modibbo
Adama University Yola,
Adamawa State.
13th June, 2025.

Dear Sir / Madam,

REQUEST FOR COMPLETION OF QUESTIONNAIRE

I am a postgraduate student of the above-mentioned Department and University, currently undertaking a research project titled: **"Impact of vocational training program on skill acquisition of vegetable farmers in Federal College of Horticulture Dadinkowa, Gombe State, Nigeria".** Attached to this letter is the questionnaire scheduled to illicit the necessary information, and you are pleased to respond to the items objectively as possible. All information supplied will be treated as confidential and will be used strictly for this research.

Thank You

Yours Faithfully
Ahmad Abubakar Baba
MSC/VED/20/0336
08036188548

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APPENDIX III

PARTICIPANTS CONSENT LETTER

Department of Vocational Education,
Faculty of Education,
Modibbo Adama University Yola,
Adamawa State.
13th June, 2025.

…….

……

……..

Dear Sir,

REQUEST FOR CONSENT TO PARTICIPATE IN THE STUDY

I write to request for the above subject matter, I am a post graduate student of the above named institution currently undergoing a full time course leading to master's degree in Agricultural Technology Education. However I am conducting a research titled "**Impact of vocational training program on skill acquisition of vegetable farmers in Federal College of Horticulture Dadinkowa, Gombe State, Nigeria".** To this end, I have selected you as a participant in this research study. The date, venue and time of the interview will be agreed upon between me and you.

I am looking forward to the acceptance of my offer. I am assuring you that your response will be treated with utmost confidentiality. You may wish to contact me via my phone number underneath.

Thank you in anticipation of your maximum cooperation.

Yours Faithfully,

Ahmad Abubakar Baba
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APPENDIX IV

QUESTIONNAIRE

Part 1: **The Impact of knowledge acquired on skill acquisition of vegetable farmers.**

[**Note**: This section is continued in the subsequent response due to character limitations.]

KEY: Strongly Agree (SA) = 5, Agree (A) = 4, Undecided (U) = 3, Disagree (D) = 2 and Strongly Disagree (SD) = 1.

S/NO	ITEM	S D	D	U	A	SA
1	The knowledge acquired from training has improved my ability to prepare land for vegetable farming.					
2	Knowledge gained has enhanced my skills in planting and spacing of vegetable crops.					
3	I can now apply improved irrigation practices due to the knowledge acquired.					
4	Knowledge gained has improved my skills in pest and disease control.					
5	I have acquired skills in proper use of farm tools and equipment through the training.					
6	The knowledge gained has enhanced my ability to apply modern vegetable farming techniques.					
7	I have developed skills in harvesting and post-harvest handling of vegetables.					

PART 3: The Impact of practical demonstration on skill acquisition of vegetable farmers.

KEY: Strongly Agree (SA) = 5, Agree (A) = 4, Undecided (U) = 3, Disagree (D) = 2 and Strongly Disagree (SD) = 1.

S/NO	ITEM	S D	D	U	A	SA
1	Practical demonstrations have improved my ability to prepare land for vegetable farming.					

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2	Demonstrations during training have enhanced my skills in planting and spacing of crops.					
3	I can now effectively apply irrigation techniques demonstrated during training.					
4	Practical demonstrations have improved my skills in pest and disease control.					
5	I have learned how to properly use farm tools through hands-on demonstrations.					
6	Demonstrations have improved my skills in harvesting and post-harvest handling.					
7	I can replicate vegetable farming techniques after observing practical demonstrations.					
8	Practical demonstrations have improved my ability to apply modern farming methods.					
9	Demonstrations have enhanced my ability to avoid common farming mistakes.					
10	Hands-on demonstrations have improved my overall vegetable farming skills.					

SECTION B: FOR VEGETABLE FARMERS ONLY

Part 1: The Impact of knowledge acquired on skill acquisition of vegetable farmers.

i. How supportive do you think the knowledge gained during the training improved the confidence in handling farm tools and equipment?

ii. How likely the Knowledge acquired enhances the ability to add value to vegetable production (e.g., sorting, packaging)?

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Part 3: The Impact of practical demonstration on skill acquisition of vegetable farmers.

i. How important is it to learn better when training is accompanied by practical demonstrations?

ii. To what extent do you think the Practical sessions help you remember farming procedures better?



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