



Comprehensive Synthesis and Integrative Review of Agricultural Dynamics in Southwest Nigeria: Assessing Economic Viability, Technological Advances, and Rural Development Approaches

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Author's contribution

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ABSTRACT

The study focuses on agricultural economic viability, technological advancements, and rural development strategies. The review draws upon a spectrum of scholarly research to provide an integrative analysis, aiming to better understand and address the challenges and opportunities within this vital sector. The economic viability of agriculture in Southwest Nigeria is critically examined, highlighting the significance of credit acquisition and repayment among watermelon farmers, underscoring the financial challenges and opportunities within the sector. This aspect is crucial for understanding the broader economic context that shapes agricultural practices and

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outcomes. Additionally, the profitability of broiler production is explored, further illustrating the economic dimensions of agricultural practices in the region. Technological advances represent another pivotal aspect of agricultural dynamics. The influence of portable water supply on rural households is explored, reflecting how technological improvements in basic infrastructure can significantly affect agricultural productivity and rural lifestyles. The relationship between organizational citizenship behavior and job performance in agro facilities is also examined, highlighting the intersection of human factors and technology in agriculture. The importance of modern communication tools, such as video, in agricultural extension services, is emphasized, demonstrating how digital media can bridge knowledge gaps and facilitate better farming practices. It reveals how traditional practices are interwoven with modern innovations and how factors like credit acquisition, technological infrastructure, and rural development strategies impact agricultural productivity and sustainability. Recommendations are made based on these findings. The paper suggests the need for enhanced support systems for credit acquisition among farmers, investment in technological infrastructure to boost productivity, and adoption of sustainable and diversified farming practices to ensure long-term viability. It also highlights the importance of integrating socio-economic and environmental considerations into agricultural policies to address broader challenges.

Keywords: Nigeria; technology; malaria; machine; innovation; infrastructure; credit; extension; rural development.

1. INTRODUCTION

Agriculture in Southwest Nigeria, a region characterized by diverse ecosystems and rural communities, stands at the crossroads of traditional practices and modern innovations [1]. This comprehensive review aims to synthesize the multifaceted dynamics of agriculture in this region, focusing on its economic viability, technological advancements, and rural development strategies. The economic viability of agriculture in Southwest Nigeria is a critical area of study. Research by Olabimisi et al. [2] highlights the significance of credit acquisition and repayment among watermelon farmers in Ibarapa North, underscoring the financial challenges and opportunities within the sector. This aspect is crucial for understanding the broader economic context that shapes agricultural practices and outcomes. Similarly, Raheem et al. [3] provide valuable insights into the profitability of broiler production, further illustrating the economic dimensions of agricultural practices in the region.

Furthermore, technological advances represent another pivotal aspect of agricultural dynamics. Oladoyinbo et al. [4] explore the influence of portable water supply on rural households, reflecting on how technological improvements in basic infrastructure can significantly affect agricultural productivity and rural lifestyles. Additionally, Oose et al. [5] examine the relationship between organizational citizenship behavior and job performance in agro facilities

and highlight the intersection of human factors and technology in agriculture. Technological innovations are reshaping agricultural practices in Southwest Nigeria [6]. The effective dissemination of these technologies is vital for modernizing agriculture and enhancing productivity. Sadiq et al. [7] emphasizes the significance of modern communication tools, such as video, in agricultural extension services. Their research demonstrates how digital media can bridge knowledge gaps and facilitate better farming practices. Similarly, Ariwoola and Oladoyinbo [8] investigate the effectiveness of disseminating improved farm technologies to farmers, underlining the crucial role of knowledge transfer in agricultural development. These studies collectively suggest that embracing technological advancements and innovative extension methodologies is critical to advancing the agricultural sector in the region [9].

Additionally, rural development strategies play a critical role in shaping the agricultural landscape of Southwest Nigeria. Olabimisi et al. [10] provide insights into the present condition of rural infrastructural facilities and their impact on maize production. This study underscores the importance of infrastructure in rural agricultural productivity, highlighting how improvements in this area can lead to significant gains in crop yield and quality. Additionally, the research by Oladoyinbo et al. [11] on the utilization of Integrated Farming Systems (IFS) among urban farmers reveals a growing trend toward more sustainable and diversified agricultural practices.

This approach enhances food security and contributes to the ecological sustainability of farming operations. Hence, the dynamics of agricultural development in Southwest Nigeria are further complicated by social and environmental factors. Studies such as those by Oyediran et al. [12] on farmers' coping strategies with climate change effects and by Adamu et al. [13] on the influence of malaria on rice farmers' lifestyle highlight the intricate interplay between agriculture, health, and environmental conditions. These challenges necessitate a holistic approach to agricultural development, integrating health, environmental sustainability, and socio-economic factors.

Lastly, this review aims to provide a comprehensive understanding of the agricultural dynamics in Southwest Nigeria by examining the interrelated aspects of economic viability, technological innovation, and rural development strategies. By synthesizing findings from various studies, this paper seeks to contribute to the ongoing discourse on sustainable agricultural development in the region, offering insights for policymakers, practitioners, and researchers alike.

1.1 Background of the Problem

The agricultural sector in Southwest Nigeria confronts many challenges, intricately intertwined with economic, technological, and rural developmental aspects, necessitating a multi-faceted approach for resolution. Economic viability remains a primary concern, as evidenced by Oladoyinbo's study on watermelon farmers in Ibarapa North, highlighting critical issues in credit acquisition and repayment [14]. This financial bottleneck significantly impacts profitability and sustainability, posing a considerable hurdle for farmers striving for economic stability in a fluctuating market. Though pivotal in modern agriculture, technological advancements have not uniformly benefited the region. The gap between technology's potential and actual impacts on agriculture is stark. As Oladoyinbo [9] points out, the inadequate dissemination of modern agricultural technologies and innovative extension methodologies is a significant barrier. This technological divide hampers productivity and affects rural lifestyles, limiting the transformative potential of technology in agricultural practices.

Rural development strategies also present a complex scenario. The lack of robust

infrastructural facilities profoundly affects maize production, as Oladoyinbo [9] notes, and urban farmers' suboptimal utilization of Integrated Farming Systems (IFS) further complicates the situation. This infrastructural deficit extends beyond production to essential services like portable water supply, revealing a broader issue of rural neglect in developmental policies. Environmental and social factors add another layer of complexity. Climate change, for instance, poses a formidable challenge, altering growing conditions and introducing new risks to the agricultural sector. Oladoyinbo [9] highlights how these climatic shifts demand adaptive strategies to ensure agricultural resilience. Health issues like malaria indirectly affect agricultural productivity by impacting workforce health and availability, creating a ripple effect that extends throughout the agricultural value chain.

Therefore, to navigate these challenges effectively, there is an urgent need for integrated and tailored policy interventions. Strategies must address the immediate economic and technological issues and consider the broader socio-economic and environmental contexts. Oladoyinbo [9] advocates for a comprehensive approach that encompasses sustainable practices, technological innovation, and infrastructural development, underlining the necessity for responsive and forward-looking policies. This holistic perspective is crucial for realizing the full potential of agriculture in Southwest Nigeria, ensuring its economic viability, technological advancement, and significant contribution to rural development.

2. LITERATURE REVIEW

The literature review explores the economic viability of agricultural practices, highlighting their financial challenges and opportunities. It also assesses the impact of technological advancements on agriculture, from basic infrastructure improvements to the application of digital media for knowledge transfer. Additionally, the review discusses rural development strategies, focusing on the role of infrastructure in enhancing agricultural productivity and integrating sustainable farming practices. By synthesizing these studies, the review aims to offer a comprehensive understanding of the agricultural landscape in Southwest Nigeria, addressing both its challenges and potential pathways for sustainable growth and development.

2.1 Enhancing Workplace Productivity

The study conducted by Oose et al. [15] explores the utilization of Google applications (apps) by employees in two tertiary institutions in Ogun State, Nigeria. The primary objective was to assess the extent to which employees in these institutions use Google apps and to identify the constraints that affect their usage. The research employed a multistage sampling procedure, selecting 105 employees and collecting data through structured questionnaires. The findings reveal that Google Search, Google Chrome, and Google Mail were the most frequently used Google apps for employees. However, the overall utilization of Google apps was relatively low, with 67.6% of the respondents categorized as low utilizers. The study also identified constraints to Google app usage, with internet connectivity and unstable electricity being the most significant barriers. These results underscore the importance of efficient internet connectivity and stable electricity in the workplace to facilitate the effective use of Google apps. The study recommends that the management of the two institutions should organize training and re-training workshops on the use of Google apps and implement an ICT-driven workplace communication system. Oose et al.'s [5] research highlights the potential benefits of Google apps in enhancing workplace communication and productivity while also emphasizing the need to address infrastructure-related constraints for their effective utilization.

2.2 Factors Influencing Credit Acquisition and Repayment Performance Among Farmers

Olabimisi et al. [16] investigated watermelon farmers' credit acquisition and repayment performance in Oyo State, Nigeria. The research included 103 watermelon farmers, revealing significant demographic information about the respondents, including their mean age, gender distribution, marital status, education level, and household size. The primary agricultural credit sources were cooperative societies, agricultural banks, and money lenders. One of the study's key findings was that farming experience and education level played crucial roles in influencing watermelon farmers' access to credit. The research also highlighted factors that significantly affected the repayment performance of these farmers, such as the rising cost of cultivation, expectations of loan waivers, and health-related problems. Interestingly, the study revealed that

certain demographic factors, such as age, household size, years of education, farming experience, income, and farm size, had no significant relationship with loan repayment performance. The research provides valuable insights into the complexities of credit acquisition and repayment performance among watermelon farmers in a specific region, emphasizing the importance of tailored credit solutions for agricultural development.

2.3 Enhancing Poultry Farming Through Tailored Extension Services

The authors' investigation assessed poultry farmers' access to extension services in Atisbo Local Government Area of Oyo State, Nigeria. The researchers collected data from 120 randomly selected poultry farmers through structured interviews and employed descriptive statistics, chi-square, and Pearson's Product Moment Correlation for data analysis. The findings revealed that a substantial majority (83.3%) of the poultry farmers had access to extension services, with 59.2% accessing these services at least once a month. This frequent access was found to positively impact poultry production in the area. Additionally, the study identified significant relationships between access to extension services and farmers' personal characteristics, such as sex, educational level, and membership in farmers' associations. The study emphasizes the vital role of extension services in poultry farming and suggests that tailoring these services to individual characteristics can enhance their effectiveness. The findings have implications for improving livestock production and nutritional outcomes in Nigeria's agricultural sector.

2.4 Emotional Intelligence and Organizational Citizenship Behavior Boosts Agro-Faculty Job Performance

Oose et al. [15] delve into the significant influence of Emotional Intelligence (EI) and Organizational Citizenship Behavior (OCB) on job performance among agro-faculties in two Nigerian universities. Using a multistage sampling method, the researchers selected 110 participants and gathered data through structured questionnaires. Their analysis, utilizing regression techniques, revealed insightful correlations. The study found that the agro-faculties had a high level of EI, which significantly impacted their job performance ($t=5.60, p<0.05$).

This finding aligns with the notion that EI, involving the management of one's own and others' emotions, plays a crucial role in workplace effectiveness. Additionally, the study highlighted that most participants demonstrated a strong sense of OCB, characterized by a willingness to go beyond job requirements, which positively influenced their job performance.

Interestingly, the study also uncovered that most respondents were married (95.5%) and had an average of 10 years of experience in their field. The regression results indicated a significant association between EI and job performance among agro-faculties, suggesting that the ability to control emotions and feelings was a critical factor in their job effectiveness. Oose et al. [15] concluded that EI and OCB are pivotal in enhancing job performance among agro-faculties. They recommended continuous training and re-orientation to improve employees' OCB further, thus fostering a more productive and emotionally intelligent workforce in the agricultural education sector. This study contributes to the existing literature on EI and OCB and provides practical implications for improving job performance in educational institutions.

2.5 Enhancing ICT Adoption in Arable Crop Farming

The author investigates the utilization of Information and Communication Technology (ICT) among arable crop farmers in Ibarapa North Local Government Area of Oyo State, Nigeria. Using a multistage sampling method, data from 135 farmers were collected and analyzed using descriptive statistics [17]. The research revealed that most farmers were young males with low educational levels, primarily following Islam. Radios (98%) and GSM (55%) were the most used ICT tools. Challenges in ICT adoption included frequent power outages (92%), financial constraints (91%), high costs of ICT tools (83%), limited availability of facilities (86%), maintenance issues (78%), and a lack of training (70%). These obstacles suggest a need for strategic interventions to improve ICT access and literacy among farmers. The study concludes that the current level of ICT tool usage among these farmers is low. It advocates for expanding adult literacy programs to enhance ICT adoption in agricultural practices. This research contributes to understanding the barriers to and potential strategies for improving ICT use in

agriculture, particularly in rural Nigerian contexts [17].

2.6 Impact of Education and Experience on Agroforestry Adoption

The research offers critical insights into the adoption of agroforestry practices among farmers in Ogun State, Nigeria. Utilizing a multistage sampling method, the study involved 120 farmers, gathering data through interviews. Their demographic analysis revealed that most respondents were male (73.33%), with an average age of 48.8 years, predominantly married (90%), and a significant portion literate (79.17%). Regarding farming experience, 39.16% had been farming for over two decades, primarily on 1-2 hectares of land. The study found a moderate awareness of agroforestry practices among farmers (55.83%), with extension agents being the primary information source.

Key findings from Pearson Product Moment Correlation and Chi-Square analyses underscored the significant impact of educational status and farming experience on adopting agroforestry practices. The correlation between years of farming and adoption was significant ($r = 7.99, p < 0.05$), as was the relationship between educational status and adoption ($\chi^2 = 28.62, p < 0.05$). The research highlighted education and experience as crucial determinants in adopting agroforestry practices. This study provides valuable guidance for agricultural policymakers and extension services, emphasizing the need for educational initiatives to enhance agroforestry adoption in Nigeria.

2.7 Nutritional and Medicinal Relevance of Vegetables

Raheem et al. [18] conducted a comprehensive study in the Lagelu Local Government Area of Oyo State, Nigeria, focusing on the consumption and acceptability of wild lettuce, a lesser-known vegetable in the *Lactuca* genus. The research, which drew on primary data from 102 household interviews, used descriptive statistics, Pearson Product Moment Correlation, and Chi-square tests for analysis. It revealed that most respondents (74.5%) consume wild lettuce, acknowledging its medicinal benefits in treating ailments like cough, diabetes, and urinary tract infections. The study found a significant correlation between consumption levels and age,

household size, farm size, and farming experience.

However, 21.6% of participants abstained due to the belief that it diminishes the effectiveness of traditional protective charms. The demographic profile of the respondents, with an average age of 44 and a male majority (52.9%), provided more profound insights into the community's dietary preferences. Raheem et al. [19] advocate for increased awareness campaigns by nutritional organizations to highlight the plant's health benefits, especially in nutritionally vulnerable communities. This study underscores the importance of integrating cultural beliefs and demographic factors in understanding dietary choices and promoting nutritional health in rural Nigerian communities.

2.8 Impact of Public Tractor Hiring Services on Agricultural Productivity

The research underscores the critical role of mechanization in enhancing agricultural productivity in the region. The authors utilize a robust methodology, including structured interviews and multistage sampling, to gather data from a significant number of respondents, ensuring the reliability and relevance of their findings. One of the key findings of this study is the marked preference of farmers for orthodox over unorthodox healthcare services. This preference is influenced by factors such as income level, household size, and educational level, highlighting the socioeconomic dimensions of healthcare choices among arable crop farmers in the region. Interestingly, the study reveals that while a significant proportion of farmers patronize orthodox healthcare services, a notable fraction still rely on unorthodox services, mainly due to their affordability and accessibility.

Moreover, the research establishes a significant relationship between personal characteristics like income, educational level, and the utilization of orthodox healthcare services. This indicates that financial stability and literacy levels are pivotal in determining healthcare choices among these farmers. Ariwoola et al. [6] provide valuable insights into the healthcare preferences of arable crop farmers in Oyo State, Nigeria, and underscore the need for policy interventions that address the barriers to accessing orthodox healthcare services in rural communities. The study serves as a critical reference for stakeholders in the agricultural and healthcare sectors, aiming to enhance the well-being and productivity of farmers in similar contexts.

2.9 Exploring Video as a Tool for Agricultural Extension

The efficacy of video as a tool for agricultural extension in Ogun State, Nigeria, is thoroughly examined. This research addresses the disparity in extension agent-to-farmer ratios by exploring video as an alternative medium for disseminating rice cultivation practices. The study employed a robust quasi-experimental design involving 72 rice growers from Ogun State, selected through multi-stage sampling. Interviews were conducted to evaluate the impact of training methods on knowledge acquisition and to understand the socio-economic backgrounds of the farmers. The findings revealed a clear superiority of video training over traditional methods. Video-based training was found to offer clearer messaging, enhanced understanding, and improved retention of information [20].

A notable aspect of the study was the socio-economic analysis of the participants, primarily male farmers with limited formal education, a factor potentially affecting their comprehension of complex agricultural techniques. Most farmers earned below ₦50,000 and managed less than 10 acres, reflecting the economic challenges in the Nigerian agricultural sector. Farmers showed a marked preference for video training due to its clarity, ease of information retrieval, and flexibility. These findings underscore the potential of video training as an effective educational tool and a preferred method for knowledge dissemination among farmers. Sadiq et al. [21] concluded with recommendations for integrating adult literacy programs to augment the effectiveness of video-based training. They also advocated for adopting video as a primary method for agricultural information dissemination, especially where traditional extension services are limited. This study provides a valuable perspective on improving agricultural knowledge transfer in developing countries, highlighting the unique advantages of video in agricultural extension services.

2.10 Impact of Rural Infrastructure on Crop Production

The study provides a comprehensive assessment of the impact of rural infrastructural facilities on maize production in Oyo State, Nigeria. The researchers adopted a multistage sampling technique to select 153 maize farmers and utilized structured interviews alongside descriptive statistics and Pearson Product

Moment Correlation for analysis. They found that the average maize farmer was 52 years old, predominantly male (69.9%), married, and had a household size of seven, with an average farm size of 3 hectares [2]. The study revealed a significant correlation ($t = 4.224$; $p = 0.01$) between the condition of available rural infrastructure and the level of maize production, emphasizing the critical role of infrastructural facilities in agricultural productivity. The research highlighted major constraints in maize production, including lack of good roads, credit facilities, and adequate storage facilities, significantly hindering productivity. Most rural infrastructures, such as storage and healthcare facilities, were found to be either unavailable or not functioning effectively, impacting the production and profitability of maize farming in the region [10].

Olabimisi et al. [2] concluded that improving rural infrastructure is crucial for enhancing maize production in Oyo State. They recommended that government at all levels should prioritize the provision of essential rural infrastructures, such as roads, storage facilities, and health care services, to improve the standard of living and economic well-being of rural communities. Furthermore, the study suggested that community-led infrastructure projects should receive governmental support, highlighting the need for collaborative efforts between governments, non-governmental organizations, and farmers to address the infrastructural deficits in rural areas [10]. This research contributes significantly to understanding the nexus between rural infrastructure and agricultural productivity, particularly in developing countries like Nigeria, where agriculture remains a key economic sector.

2.11 Analyzing Agricultural Extension Services

Raheem et al.'s [22] study provides an insightful analysis of small ruminant farmers' access and use of agricultural extension services in Surulere, Oyo State, Nigeria. Utilizing primary data from 102 farmers gathered through interviews and snowball sampling, the study employs descriptive and inferential statistics, including Chi-square analysis, to unveil critical findings. The demographic profile reveals a majority of female farmers (90.2%), with a significant portion lacking formal education (36.3%). The study highlights a stark lack of access to crucial extension services, such as market assistance, veterinary services,

and home visits, essential for enhancing agricultural practices and farmer education, as Ariwoola [6] and the World Bank (2007) emphasized.

The research further explores the relationship between socio-demographic factors like sex, marital status, education, and access to these services. This correlation underscores the complexities in service delivery and the urgent need for improvement. The paper concludes with a call to revitalize Agricultural Development Programmes (ADP) by hiring more extension officers, a recommendation crucial for improving living standards and farming efficiency in rural Nigeria. Raheem et al.'s [23] study significantly contributes to understanding and enhancing agricultural extension services, which are vital for the agricultural sector's and rural livelihoods' progress.

2.12 Climate Change Resilience Strategies in Farming Communities

Over the past two decades, watermelon cultivation has become a crucial source of rural livelihood sustainability in Nigeria, particularly among young farmers. However, this promising agricultural sector faces severe threats from the adverse impacts of climate change. This study investigates the adaptive strategies employed by watermelon farmers in Igboora, Oyo State, Nigeria, to mitigate the effects of climate change [12]. Using a multi-stage sampling technique, Oyediran et al. [12] selected a sample of 150 watermelon farmers. They used descriptive statistics and chi-square analysis to examine the relationships between farmers' personal characteristics, information sources, and adaptation strategies. The research reveals statistically significant correlations ($p < 0.05$), highlighting that individual attributes and information sources substantially influence farmers' choice of adaptation strategies. One key finding emphasizes the necessity for government intervention and support from the Seed Council of Nigeria (SCN) to develop drought- and disease-resistant watermelon seeds. This initiative aims to enhance productivity and reduce reliance on expensive seed imports, benefiting local watermelon farmers. Furthermore, Oyediran et al. [12] illuminate the innovative fusion of scientific and indigenous farming practices adopted by watermelon farmers to confront the escalating challenges posed by climate change. This study contributes valuable insights to the broader discourse on climate change resilience

in agriculture, providing a foundation for researchers and policymakers.

Sadiq et al. [20] investigated the impact of climate change on arable crop farmers' productivity in Ibarapa Central Local Government, Oyo State, Nigeria. They collected data from 100 farmers using structured interviews and used statistical analysis tools. Results revealed that erratic rainfall significantly negatively affected productivity, with 83% of respondents attributing reduced yields to it. Socioeconomic factors such as age, sex, household size, income, and educational status were positively correlated with productivity [20]. This study highlights the vulnerability of arable crop farmers to climate change in the region. It underscores the need for adaptive measures, such as forming farmer associations for resource-sharing and improving weather forecasting services by relevant agencies. Climate change adaptation strategies are crucial for sustaining agricultural productivity and ensuring food security in changing climatic conditions.

2.13 The Impact of Malaria on Agricultural Productivity in Rural Areas

Adamu et al. [13] conducted a study investigating the impact of malaria attacks on the productivity of arable crop farmers in the Ibarapa central local government area of Oyo state, Nigeria. The research collected primary data from 100 arable crop farmers using a structured interview guide and a multistage sampling procedure. The data analysis involved descriptive statistics (frequency and percentage) and inferential statistics (partial correlation). The findings revealed that the mean age of the farmers was 47.6 years, with 97.0% being married. Notably, 97.0% of the arable crop farmers reported experiencing occasional malaria attacks within the last ten years, 83.0% had encountered malaria in the last five years, and 64.0% reported malaria incidents within the past year. The analysis further demonstrated significant relationships ($p < 0.05$) between various socio-economic characteristics of the farmers (e.g., age, sex, household size, income, and educational status) and the impact of malaria attacks on their productivity.

The study's results underscore the importance of addressing malaria-related challenges among arable crop farmers in rural areas, and the authors recommend the involvement of health-

based Non-Governmental Organizations (NGOs) to combat malaria in these regions [13]. Hence, its significance lies in exploring the socio-economic factors influencing malaria attacks on arable crop farmers and their productivity, highlighting the need for targeted interventions to improve this vulnerable group's well-being and agricultural productivity [24]. In essence, health is inherently relative, signifying an individual's aptitude to function effectively in the physical, mental, social, and spiritual dimensions, thereby allowing the unfettered expression of their unique potentialities within their environment. In succinct terms, "health primarily measures people's ability to pursue and realize their desired aspirations [24].

2.14 Indigenous Family Planning Practices Within Farming Households

The study focuses on using indigenous family planning methods among nursing mothers in the rural Ibarapa Central Local Government Area of Oyo State, Nigeria. The study's primary objective was to understand the extent of adoption and the factors influencing the use of these traditional practices. The researchers employed a structured interview guide to gather data from 102 nursing mothers selected through a simple random sampling technique. Their methodology was robust, utilizing descriptive and inferential statistical tools like Pearson Product Moment Correlation (PPMC) and Chi-square analysis to interpret the data. The findings revealed that the average age of the nursing mothers was approximately 56 years, with a significant majority being female and a considerable portion lacking formal education. The study highlighted a prevalent cultural belief in medicinal herbs among 78.8% of the respondents, illustrating a deep-rooted acknowledgment of indigenous practices. However, a notable 73.8% displayed an indifferent attitude towards formal family planning methods.

The statistical analysis showed a significant correlation between variables such as religion, marital status, primary and secondary occupation, and educational level with the challenges in adopting family planning practices. This underscores the multifaceted nature of the issue, involving socio-cultural and economic dimensions. Omisore et al. [25] emphasized the need for government intervention to promote and integrate indigenous family planning practices into the healthcare system. This recommendation

is crucial, considering Nigeria's high population growth rate and the underutilization of family planning methods, which the study situates within a broader socio-economic and health context. The research thus offers insightful perspectives on harnessing indigenous knowledge for family planning, which is vital for both the health of individuals and the country's socio-economic development.

2.15 Integrated Farming Systems (IFS) for Sustainable Urban Agriculture

According to Oladoyinbo et al. [11], integrated Farming Systems (IFS) represent a comprehensive approach to agriculture, emphasizing the interconnectedness of various components within a farm. The authors describe agricultural systems as intricate structures with interdependent components. Recognizing the limitations of disciplinary boundaries, Bujarbarua (2014) and Oladoyinbo et al. [11] argue for adopting a systems perspective in agricultural research. Raman et al. (2012) define Farming System research as an approach that views the entire farm as a system, considering controllable and uncontrollable factors. This perspective, as highlighted by Singh et al. (2012) and Oladoyinbo et al. [11], delves into farming systems' physical, biological, and socioeconomic aspects. Integrated Farming Systems, particularly the integration of crops and livestock, have gained attention for their potential to enhance sustainability and income in agriculture (Guatan et al., 2014; Oladoyinbo et al., [10]). IFS can empower farmers and improve agricultural production by optimizing agricultural waste utilization and extending biological cycles (Collision, 2017).

2.16 Assessment of Snail Farming as a Sustainable Micro-Livestock Option

The authors investigate the viability of snail farming as a sustainable micro-livestock option in Oyo East Local Government Area (LGA), Nigeria. This study was motivated by the growing interest in micro-livestock to address protein deficiency issues in Nigeria, focusing on the role of snails in rural households. Raheem et al. [18] collected primary data through interviews with 121 rural household members using a multi-stage sampling procedure to achieve this objective. The researchers applied various statistical methods, including descriptive statistics such as frequency counts, means, percentages, and inferential statistics like Pearson Product Moment Correlation (PPMC)

and linear regression analysis to analyze the collected data. The study reveals that snail farming holds promise as a sustainable micro-livestock option in the region. Rural households, although often lacking formal education, were generally aware of the nutritional benefits of snails. Snails were predominantly consumed for their nutritional value, with respondents acknowledging their role as protein, iron, and vitamin sources. Most households consumed snails occasionally, with a notable perception that snail meat is low in cholesterol [18]. The findings emphasize the importance of promoting awareness of the medicinal values of snails among rural households through educational campaigns led by experts in human nutrition.

2.17 Enhancing Sustainable Practices in Small-Scale Farming for Economic Growth and Food Security

Raheem et al. [18] conducted a study in Oyo State, Nigeria, to assess the profitability of broiler enterprises among small-scale farmers. The research involved 115 broiler farmers as respondents and employed a structured questionnaire for data collection. Data analysis encompassed descriptive statistics such as frequency distribution, percentages, mean, and inferential statistics like Chi-square and PPMC. The findings revealed several key insights. Firstly, most respondents (64.3%) fell within the age group of 21 to 40, with a mean age of 32. Additionally, the study found that most of the respondents (75.7%) were male. In terms of financial metrics, the total revenue generated per bird was N2,750, while the total cost of production was N2,448.11. Consequently, the net farm income per bird was N301.89 [18]. The authors concluded by emphasizing the need for government intervention to provide farmers with essential farm inputs such as feeds, drugs, and vaccines at the right time and subsidized prices. Such support could help reduce production costs and enhance broiler enterprises' profitability among small-scale farmers in Oyo State, Nigeria. This study sheds light on the profitability of broiler farming in a specific region, providing valuable insights for policymakers and stakeholders interested in improving the poultry industry's economic viability [18].

2.18 The Impact of Socioeconomic Factors on Healthcare Access

The work investigates the factors influencing the utilization of healthcare services among arable crop farmers in Oyo State, Nigeria. They

collected primary data through structured interviews with 200 respondents, employing a multistage sampling technique from different Oyo State Agricultural Development Programme zones. The study's analysis involved descriptive statistics, Pearson Product Moment Correlation (PPMC), Chi-square, and Analysis of Variance. The study revealed several key findings. The average age of the farmers was 52 years, with a majority being male (93.00%) and nearly half (47.50%) having no formal education. The average household size was nine persons, with an annual mean income of N238,435.00 and an average farm size of 3.84 hectares. Interestingly, most arable crop farmers (99.50%) indicated that the acceptability of orthodox healthcare services and the attitude of medical personnel had no impact on their utilization of such services.

One noteworthy finding was that 21.5% of the respondents mentioned the proximity of healthcare services as a problem affecting their utilization. Additionally, the study found a significant difference in the factors affecting healthcare service utilization among arable crop farmers across different locations in the study area. These findings shed light on the challenges and barriers arable crop farmers face in accessing healthcare services in Oyo State, Nigeria. Understanding these factors is crucial for developing effective policies and interventions to improve healthcare utilization among this population.

2.19 The Significance of Women Farmers in Ensuring Sustainable Food Security

Women's involvement in agriculture is paramount to achieving sustainable food security in Nigeria. This study, conducted by Raheem et al. [19], aimed to investigate the essential role played by women farmers in the context of the Ibarapa Central Local Government area in Oyo State. Using a simple random sampling technique, the researchers selected 102 female farmers as participants and employed interview schedules for data collection. The results unveiled significant insights into the socio-economic characteristics of these women, revealing that many were married and lacked formal education [19]. A notable proportion of the women primarily engaged in vegetable production, yet faced challenges related to maize production and the high cost of machinery. The findings emphasized the need for governmental empowerment initiatives for women in agriculture, including

improved access to credit facilities and incentives. The research underscores the crucial role of women farmers in contributing to sustainable food security in Nigeria and highlights the importance of gender-responsive policies in the agricultural sector [19].

2.20 Assessing Training Needs and Constraints of Small-Scale Farmers for Improved Production Technology

Sadiq et al. [20] conducted an extensive study to evaluate small-scale rice growers' training needs and constraints in the Obafemi/Owode Local Government Area (LGA) of Ogun State, Nigeria. In light of the evolution of hybrid seed varieties and advanced agricultural technologies, this research aimed to identify areas where small-scale rice farmers required training and support. The study employed a multi-stage sampling technique, selecting 120 regional rice growers. Results indicated that male farmers predominantly performed rice production, with over a quarter of respondents aged above 51 [20]. On average, the age of rice growers was 42 years. Notably, the primary training needs identified included seed rate and appropriate spacing (72.9%), seed treatment (63.6%), fertilizer application knowledge (54.2%), and pest/weed control (57.9%).

The study also identified marital status, education level, and household size as significant factors influencing these training requirements. This highlights the need for stakeholders to intensify technology transfer and training efforts for small-scale rice growers, with a particular emphasis on fertilizer application, seed treatment, seed rate, and spacing to enhance rice yields. Rice is a global staple, especially vital in Asia (International et al. Institute, 2001; Sadiq et al., [21]). Despite Nigeria's vast arable land, it grapples with costly rice imports, underscoring the urgency of improving training and technology dissemination for small-scale farmers to boost domestic production. Sadiq et al.'s [21] study illuminates these critical training needs and constraints, urging action to strengthen the country's agricultural sector.

2.21 The Impact of Rural-Urban Migration on Arable Crop Farming

The authors explore the repercussions of rural-urban migration on arable crop farming in the Oyo/Iseyin Agricultural zone of Oyo state,

Nigeria. This research aimed to comprehensively describe the socio-economic characteristics of respondents in the study area, identify the root causes of rural-urban migration, assess the effects of migration on arable crop production, and propose strategies for mitigating this migration trend (Olabamisi et al., 2015). Utilizing a multistage sampling technique, the researchers selected 95 arable crop farmers and gathered data through structured interviews. The findings unveiled critical insights: respondents had an average age of 45, with a significant majority being married. Education levels averaged 11 years, household size averaged 6, and annual income averaged ₦1,566,905. Notable drivers of migration included the absence of job opportunities, limited access to medical facilities, and deficient infrastructure. The study underlined the adverse consequences of rural-urban migration, including heightened poverty, reduced farmers' income, and diminished agricultural productivity. Statistical analyses highlighted the significance of various factors in influencing these effects. The study underscores the multifaceted dynamics of rural-urban migration's impact on arable crop farming in the Oyo/Iseyin Agricultural zone, offering pertinent recommendations for policymakers and stakeholders in the agricultural sector (Olabamisi et al., 2015).

2.22 Impact of Portable Water Supply on Rural Households' Lifestyle

Access to clean and safe drinking water is a fundamental human right with profound implications for rural households' lifestyles. Oladoyinbo et al. [11] conducted a study in Ibarapa North Local Government Area of Oyo State to investigate this relationship. Using a two-stage sampling procedure, they collected primary data from 91 rural household heads. Data analysis encompassed descriptive statistics, Pearson Product Moment Correlation, and Chi-square analysis. The findings revealed that the mean age of rural household heads was 35 years, predominantly male and married, with a notable proportion lacking formal education. Access to portable water sources included sachet water, treated stream/river water, and bottled water [11]. Additionally, rainwater, treated streams/river water, and sachet pure water were familiar sources. Certain lifestyle habits were adopted, such as using sieving nets and alum for water treatment. Inaccessibility to well or borehole construction posed a significant constraint. The study emphasized rural

households' need to diversify their economy for better access to potable water. This research underscores the vital role of portable water supply in shaping the lifestyles of rural communities, advocating for improved infrastructure and financial stability to enhance access [11].

2.23 Agricultural Growth through Leadership, Technology, Innovation, and Embracing Strategic Execution

At one corner, Abalaka et al. [26] and Adigwe et al. [27] illuminate the significance of strategic management and data-driven decision-making. While Abalaka et al. [26] focus on strategy execution within SMEs, particularly in the hospitality sector, their insights echo through agri-tourism and farm management. Simultaneously, [27] delve into innovative leadership, revealing how sectors like finance and IT can inform data analytics in agriculture, enhancing market analysis and financial planning. Meanwhile, Oladoyinbo et al. [9], Olagbaju et al. [28], and Olagbaju and Olaniyi [29] contribute from seemingly distant realms yet offer pertinent insights. Oladoyinbo et al. [9] highlight the importance of secure cloud-based data systems in agricultural technology, a critical aspect of modern farming. Similarly, Olagbaju et al.'s exploration of code alternation in ESL classrooms and Olagbaju & Olaniyi's focus on phonics instruction enrich agricultural communities by improving communication strategies and literacy skills, essential for disseminating agricultural knowledge.

The narrative deepens with Olaniyi et al. [30]. Olaniyi et al. discuss the potential of predictive analytics in agriculture, forecasting crop yields and market trends. Olaniyi's study on girls' education indirectly empowers critical figures in agriculture: women and girls. The collaborative study by Olaniyi et al. [31] opens vistas in agricultural risk management, drawing parallels from the business world. Hence, in a leap towards futuristic approaches, Olaniyi et al. [32] and Olaniyi et al. [33] envision a revolution in the business ecosystem, which includes agriculture. They explore how blockchain initiatives and big data analytics can transform agricultural supply chains and decision-making in large-scale farming operations.

Further exploring the digital realm, Olaniyi et al. [34] and Olaniyi et al. [35], and Olaniyi & Omubo [36] studies unravel the implications of digital

technologies in agriculture. From smart city concepts benefitting rural farming to the nuanced role of IT auditing and data policy in agricultural networks, these studies highlight the need for sophisticated information governance and secure communication systems [37]. Completing this rich mosaic, Omogoroye et al. [38] and Olaniyi et al. [39] focus on the practical aspects of energy management and infrastructure. Omogoroye et al. [38] address energy consumption forecasting, which is applicable to agricultural settings, while Olaniyi et al. [39] underscore the critical role of infrastructure in development. These works offer a compendium of strategies and methodologies that promise to enhance agricultural practices' efficiency, productivity, and sustainability, painting a vivid picture of an interconnected, data-driven, and strategically managed agricultural future [40,41].

3. METHODOLOGY

The methodology involves an extensive review and synthesis of existing scholarly research pertinent to Southwest Nigeria's agriculture. This includes studies on economic viability, technological advancements, and rural development strategies, providing a holistic view of the sector. The data analysis in this paper is comprehensive, integrating diverse findings from various studies to form a cohesive understanding of the agricultural dynamics in the region. The conclusions drawn from this analysis underscore the critical interdependence of economic, technological, and developmental aspects in shaping the agricultural landscape. To effectively understand the agricultural dynamics in Southwest Nigeria, this study incorporates a range of methodologies derived from a review of the existing literature. Each methodology comprehensively explains the region's economic viability, technological advancements, and rural development approaches. One fundamental approach observed in the literature involves structured interviews and sampling techniques. For instance, Oguniola et al. [24] explored indigenous family planning methods among nursing mothers in rural Oyo State, utilizing structured interviews with 102 participants. Their methodology included descriptive and inferential statistical tools such as Pearson Product Moment Correlation (PPMC) and Chi-square analysis. Similarly, another study on the impact of public tractor hiring services on agricultural productivity employed structured interviews supplemented by multistage sampling to ensure a diverse and representative sample.

Random sampling and descriptive statistics also play a crucial role in data collection and analysis, as evidenced in a study assessing poultry farmers' access to extension services. Here, researchers gathered data from 120 randomly selected poultry farmers using structured interviews, employing statistical tools like chi-square and Pearson's Product Moment Correlation for a thorough analysis. Additionally, the multistage sampling technique has proven effective in identifying rural areas' socio-economic factors and migration drivers. Olabamisi et al. (2015) used this technique to explore the root causes of rural-urban migration among arable crop farmers. They selected 95 farmers and conducted structured interviews, enabling a comprehensive understanding of the factors influencing migration trends.

Innovative approaches such as the quasi-experimental design have also been instrumental. Sadiq et al. [21] utilized this design in evaluating the efficacy of video training for rice growers, involving 72 participants. This method provided insights into the socio-economic backgrounds of farmers and the impact of different training methods on knowledge acquisition. As conducted by Sadiq et al. [21], the identification of training needs among small-scale rice growers showcases the utility of multi-stage sampling in understanding specific agricultural requirements. This study selected 120 rice growers to determine their training needs in areas like seed treatment and pest control, considering marital status, education level, and household size.

Lastly, structured questionnaires combined with statistical analysis were effectively used in a study by Raheem et al. [3], which assessed the profitability of broiler enterprises among small-scale farmers in Oyo State. The use of descriptive statistics such as frequency distribution, percentages, means, and inferential statistics like Chi-square and PPMC, provided valuable insights into the financial aspects of farming. Therefore, by integrating these varied methodologies, this study aims to offer a nuanced and comprehensive overview of the agricultural sector in Southwest Nigeria. The combination of structured interviews, random and multistage sampling, descriptive and inferential statistics, and innovative research designs ensures a multi-faceted understanding of the factors influencing agriculture in the region. This approach is critical for assessing economic

viability, technological advances, and the effectiveness of rural development approaches.

4. DATA ANALYSIS AND RESULTS

Several data analysis outcomes reveal a multifaceted view of the agricultural sector in Southwest Nigeria, encompassing economic viability, technological innovations, and rural development strategies. Regarding economic viability, studies like those by Olabimisi et al. (2022) have used descriptive and inferential statistics to understand how factors such as education and experience influence farmers' ability to access credit. This aspect is crucial, as credit accessibility can significantly impact the farmers' success, especially in specialized areas like watermelon farming. Similarly, an analysis by Raheem et al. [3] on the profitability of poultry farming provided deep insights into the financial dynamics of the sector, including revenue generation and the costs involved in production.

Technological advances in agriculture have also been a focal point of several studies. Research by Olabimisi et al. (2018) on utilizing Information and Communication Technology (ICT) among arable crop farmers showed that despite the potential benefits, the adoption rate is low, hindered by challenges like power outages and financial limitations. Additionally, a study by Sadiq et al. [7] compared traditional training methods with video-based training in rice cultivation, illustrating the effectiveness of modern instructional methods in enhancing farming practices. The rural development approaches in Southwest Nigeria's agriculture sector have been equally scrutinized. For instance, the impact of rural infrastructure on production levels, as studied by Olabimisi et al. (2022), highlights a significant correlation between the state of infrastructure and maize production efficiency.

Moreover, research on Integrated Farming Systems (IFS) by Oladoyinbo et al. [4] underlines the benefits of adopting sustainable and diversified agricultural practices, especially in urban farming scenarios. Across these studies, various statistical methods, including descriptive statistics (like frequency counts and means) and more complex inferential techniques (such as Pearson correlations and regression analyses), have been employed to draw meaningful conclusions. The synthesis of these findings paints a comprehensive picture of Southwest Nigeria's agricultural landscape. It becomes

evident that educational level, farming experience, and credit access are pivotal for economic success in agriculture.

Furthermore, integrating technology and effective training methods is essential for modernizing the sector. In terms of rural development, improvements in infrastructure and the adoption of sustainable farming practices emerge as critical factors. These insights lead to pertinent policy recommendations. There is a pressing need for policies that enhance credit accessibility, provide technological education, and focus on infrastructure development. Moreover, the findings pave the way for future research, particularly in assessing the long-term economic impacts of technological advancements and the effectiveness of various rural development strategies under different socio-economic conditions. Finally, this analysis offers a nuanced understanding of the agricultural dynamics in Southwest Nigeria, highlighting the interconnectedness of economic viability, technological progress, and rural development. It provides valuable guidance for agricultural sector stakeholders, shaping current practices and future research directions.

5. CONCLUSION

Drawing upon a spectrum of scholarly research, this paper provides an integrative analysis to understand better and address the challenges and opportunities within this vital sector. The economic viability of agriculture in the region, as emphasized by studies such as highlights the critical role of financial aspects like credit acquisition and profitability in farming practices, which are essential for the sustainability of agricultural practices (Olabimisi et al., 2023; Raheem et al., 2021). These studies provide a deeper understanding of the economic challenges and opportunities in the sector. Technological advances in agriculture have been identified as pivotal for modernizing agriculture and enhancing productivity. Works by Oladoyinbo et al. [9], Oose et al. [15], and Sadiq et al. [20] demonstrate the importance of technological innovations and the effective dissemination of these technologies in transforming agricultural practices. These studies collectively suggest that embracing technological advancements is crucial for the agricultural sector's advancement. As discussed in studies by Olabimisi et al. (2022) and Oladoyinbo et al. [1], rural development strategies play a significant role in shaping agricultural dynamics.

These studies highlight the importance of infrastructure and Integrated Farming Systems (IFS) in enhancing agricultural productivity and sustainability. In summary, this review underscores the interplay of economic, technological, and rural development aspects in shaping the agricultural landscape of Southwest Nigeria. The studies referenced provide valuable insights for policymakers, practitioners, and researchers, advocating for integrated approaches to address the challenges and harness the opportunities within this vital sector. The findings from various research efforts highlight the need for tailored solutions to promote sustainable agricultural development in the region, considering the unique socio-economic and environmental factors.

6. RECOMMENDATIONS

The comprehensive study underscores the interplay of economic, technological, and rural development aspects in shaping the agricultural landscape of Southwest Nigeria. It advocates for integrated approaches to address the sector's challenges, considering the region's unique socio-economic and environmental factors. The study on agricultural dynamics in Southwest Nigeria provides strong recommendations in three main areas:

1. **Economic Viability:** The research emphasizes financial aspects like credit acquisition and profitability in farming practices. Studies like those by Olabimisi et al. (2023) and Raheem et al. (2021) offer a deeper understanding of the economic challenges and opportunities in the sector, highlighting the need for tailored solutions that address these financial aspects to promote sustainable agricultural development.
2. **Technological Advances:** The importance of technological innovations in modernizing agriculture and enhancing productivity is underscored. Works by Oladoyinbo et al. (2022), Oose et al. (2022), and Sadiq et al. (2015) demonstrate the transformative impact of these technologies. The studies suggest that embracing technological advancements is crucial for advancing the agricultural sector.
3. **Rural Development Strategies:** The role of rural development strategies in shaping agricultural dynamics is significant. Studies like those by Olabimisi et al. (2022) and Oladoyinbo et al. (2015) highlight the

importance of infrastructure and Integrated Farming Systems (IFS) in enhancing agricultural productivity and sustainability. These aspects are key to addressing the challenges and harnessing the opportunities within the agricultural sector.

Likewise, the research on agricultural dynamics in Southwest Nigeria, while focused on a specific region, has broader implications for the global agricultural landscape in several ways:

- **Highlighting the Role of Finance in Agriculture:** By emphasizing the importance of credit acquisition and profitability, the study underscores a universal truth in agriculture: financial health and access to credit are pivotal for sustainable farming practices. This insight is relevant globally as farmers in many regions face similar financial challenges. The findings from this study can inspire financial models and credit systems tailored to the needs of farmers worldwide.
- **Promoting Technological Adoption:** The research demonstrates the transformative impact of technological innovations in agriculture. This has a global resonance, as many regions are still transitioning from traditional to modern agricultural practices. The successful implementation of technology in Southwest Nigeria can serve as a model for other regions, showcasing how technological advancements can enhance productivity and sustainability in diverse agricultural settings.
- **Rural Development as a Key Factor:** The emphasis on rural development strategies, including infrastructure and Integrated Farming Systems (IFS), is a crucial takeaway for the global community. The success of these strategies in Southwest Nigeria highlights the need for comprehensive rural development plans that can be adapted to different regions. This aspect is particularly relevant for developing countries where rural areas often lag in infrastructure and modern farming practices.
- **Integrated Approach for Sustainable Development:** The study advocates for an integrated approach to tackle agricultural challenges, considering economic, technological, and rural development aspects. This holistic perspective is essential for global agricultural policy, emphasizing the need for multifaceted strategies that address various aspects of farming and rural life.

- Tailored Solutions for Unique Challenges: Finally, the research's focus on tailored solutions, considering unique socio-economic and environmental factors, is a critical lesson for global agriculture. It suggests that solutions in agriculture should not be one-size-fits-all but should consider each region's specific conditions and needs.

The study's insights, while based on Southwest Nigeria, provide valuable lessons and frameworks that can be adapted and applied in different parts of the world, thereby influencing the global agricultural landscape.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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