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# Fostering Sustainability Practices in Agribusiness through Technological Innovation: The Role of Incremental Innovation and Innovative Culture

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## *Abstract*

This study explores how incremental innovations, small but consistent improvements in processes, practices, and technologies, together with an innovative culture, can foster sustainable outcomes in agribusiness. Focusing on agribusinesses in South-West, Nigeria, the study adopts a quantitative approach. According to Krejcie and Morgan (1970), a sample size of 384 farmers was chosen for the study out of the 81,728 farmers in the chosen states. Out of 384 copies of questionnaires administered, 332 were validly returned, indicating that 86.46% of respondents were reached through the use of stratified random sampling techniques. The findings suggest that when agribusinesses embrace an environment that encourages creativity, knowledge sharing, and adaptability, incremental innovations can translate into meaningful gains in productivity, environmental stewardship, and social well-being. The study highlights that sustainability in agribusiness is not solely-dependent on disruptive breakthroughs but equally on cultivating a culture that values continuous improvement. These insights provide useful

guidance for agribusiness leaders, policymakers, and development partners who aim to build resilient and sustainable agricultural systems in emerging economies.

**Keywords:** Agribusiness, incremental innovation, innovative culture, sustainability, technological innovation

# Introduction

**Background to the Study**

Agribusiness firms are increasingly expected to balance productivity, environmental stewardship, and social responsibility in response to climate change, food insecurity, and resource depletion. Technological innovation has emerged as a strategic mechanism for achieving sustainability by improving production efficiency, reducing waste, and enhancing value-chain resilience. Within this context, incremental innovation, which focuses on continuous improvements in products, processes, and operational systems, plays a critical role in enabling agribusinesses to adapt to changing market and environmental conditions without incurring excessive risks or costs. Studies have shown that firms adopting incremental technological innovations often achieve higher operational sustainability and competitiveness than those relying solely on radical innovations (OECD, 2023; FAO, 2024). Consequently, agribusiness organisations are increasingly integrating digital technologies, precision agriculture, and data-driven management systems to strengthen sustainable agricultural development and long-term economic performance.

Furthermore, the success of technological innovation in agribusiness is strongly influenced by the presence of an innovative organisational culture. Innovative culture refers to shared values, beliefs, and practices that encourage creativity, knowledge sharing, experimentation, and continuous learning within firms. Organisations with strong innovative cultures are more likely to support employee participation in problem-solving and technology adoption, thereby fostering sustainable business transformation (World Bank, 2023). In agribusiness, where environmental uncertainties and market volatility remain prevalent, cultivating an innovation-oriented culture enhances adaptability and promotes the successful implementation of sustainable technologies. This relationship suggests that innovative culture serves as a foundational driver for maximizing the benefits of incremental innovation in agribusiness sustainability initiatives.

Despite growing scholarly attention to sustainability and innovation, limited empirical studies have comprehensively examined the combined influence of incremental innovation and innovative culture on sustainable agribusiness performance, particularly in developing economies. Existing research has primarily focused on technological adoption without adequately addressing organisational cultural dynamics that facilitate sustainability outcomes. Therefore, this study seeks to

contribute to the literature by examining how incremental innovation and innovative culture collectively foster sustainability in agribusiness. The findings are expected to provide valuable insights for policymakers, agribusiness managers, and stakeholders seeking to strengthen sustainable agricultural systems through innovation-driven strategies and organisational transformation.

**Statement of Research Problem**

Agribusiness firms are increasingly pressured to achieve sustainability goals while maintaining productivity, profitability, and competitiveness in rapidly changing markets. Despite growing investments in digital agriculture, renewable energy systems, precision farming, and climate-smart technologies, many agribusinesses, particularly in developing economies, continue to experience limited sustainable performance outcomes. Existing studies emphasize radical technological transformation; however, insufficient attention has been given to incremental innovation, which involves continuous improvements in products, processes, and operational systems that may significantly enhance long-term sustainability (Adebayo & Olusegun, 2024). Furthermore, the persistence of environmental degradation, inefficient resource utilization, and food insecurity suggests that technological adoption alone may not adequately foster sustainable agribusiness development (FAO, 2023).

Another critical issue is the inadequate understanding of how innovative culture influences the successful implementation of incremental innovation within agribusiness organisations. Innovative culture, characterized by openness to experimentation, employee creativity, collaborative learning, and adaptive leadership, is increasingly recognized as a determinant of organisational sustainability and resilience (Chen & Huang, 2023). However, empirical evidence explaining the interaction between innovative culture and incremental innovation in promoting sustainable agribusiness practices remains fragmented and underexplored. Many agribusiness enterprises continue to struggle with resistance to change, low technological capability, and weak institutional support, thereby limiting the effectiveness of innovation-driven sustainability initiatives (World Bank, 2024).

Therefore, the central research problem is the limited empirical understanding of how incremental innovation and innovative culture collectively contribute to fostering sustainability in agribusiness. Addressing this gap is important because sustainable agribusiness requires not only technological advancement but also organisational environments that support continuous innovation and adaptive capacity. This study seeks to examine the extent to which incremental innovation and innovative culture influence environmental, economic, and social sustainability outcomes in agribusiness firms. The findings may provide practical insights for policymakers, agribusiness managers, and development stakeholders seeking to strengthen sustainable agricultural transformation through innovation-oriented strategies (OECD, 2024).

The specific objectives are to:

i) ascertain the effect of incremental innovation on sustainable performance (social, environmental, economic, and innovative performance); and

ii) determine the effect of innovative culture on sustainable performance (social, environmental, economic, and innovative performance)

**Sustainability Practices in Agribusiness**

The adoption of organic farming practices emphasizes the reduction or elimination of synthetic inputs, such as chemical fertilizers and pesticides, promoting soil health, biodiversity, and minimizing environmental impact (Abbasi, 2025; Willer & Lernoud, 2023). Agroecological approaches, such as crop diversification, intercropping, and integrated pest management, further contribute to sustainable farming practices by mimicking natural ecosystems and fostering ecological resilience (FAO, 2023). These practices help to reduce dependency on external inputs, promote natural nutrient cycling, and enhance the overall health and sustainability of agroecosystems.

Sustainable water management practices are crucial for addressing water scarcity challenges in agribusiness, particularly in regions like South-West, Nigeria, vulnerable to climate variability (World Bank, 2020). Implementing **efficient irrigation techniques**, such as drip irrigation and precision irrigation, can significantly reduce water consumption while maintaining crop yields (OECD, 2023). Additionally, **rainwater harvesting** systems can capture and store valuable rainwater for later use, contributing to water security and resilience. By adopting these practices, agribusinesses can ensure responsible water use and safeguard vital resources for future generations.

Social sustainability involves fostering inclusive practices within agribusiness operations, recognizing the interconnectedness between economic success and local community well-being (Tripathi et al., 2024). **Community engagement initiatives**, such as participatory development planning and knowledge sharing, can empower local communities and ensure their voices are heard in decision-making processes. **Fair labor practices**, including ensuring living wages and safe working conditions, contribute to social justice and improve the lives of agricultural workers. Furthermore, **gender-inclusive approaches** that address gender inequalities and promote the participation of women in agriculture are essential for achieving social equity and sustainable development (FAO, 2023). By prioritizing collaboration, fair treatment, and inclusivity, sustainable agribusiness models can contribute to the well-being and empowerment of local communities.

**Incremental Innovation**

Recent literature highlights that incremental innovation defined as continuous improvement of existing technologies, remains central to enhancing productivity, resource efficiency, and climate resilience in agricultural value chains (FAO, 2022; OECD, 2023). Within agribusiness systems, this approach reduces adoption barriers for smallholders while enabling gradual alignment with sustainable development goals. A conceptual lens further clarifies how innovation diffusion is shaped not only by technological access but also by institutional support and learning ecosystems that reinforce adaptive capacity in production systems.

Fostering sustainability through technological innovation requires embedding innovative culture as a structural driver of agribusiness performance. Studies indicate that organisational culture influences how firms and farming communities' experiment with precision agriculture, digital platforms, and climate-smart practices (World Bank, 2024; Lavanya & Kumar, 2026). An innovative culture encourages risk-sharing, continuous learning, and collaboration across supply chains, thereby strengthening the effectiveness of incremental improvements. Conceptually, this aligns with socio-technical transition theory, where sustainability emerges from iterative interactions between technology, institutions, and human capital development.
The role of incremental innovation within an innovative culture is therefore pivotal in accelerating sustainable agribusiness transformation. Empirical syntheses show that combining low-cost technological upgrades with participatory innovation systems enhances productivity while reducing environmental degradation (UNEP, 2023; Smith et al., 2026). Conceptual review further suggests that sustainability outcomes depend on feedback loops between innovation adoption, institutional governance, and market incentives. Consequently, agribusiness systems that cultivate innovation-friendly environments are better positioned to achieve long-term resilience, food security, and ecological balance.

**Theoretical Review**

Diffusion of Innovation theory was introduced by Everett M. Rogers in 1962 and explains how new ideas and technologies spread within a social system. The central assumption is that adoption occurs through a time-dependent process influenced by communication channels and the perceived attributes of innovations, including relative advantage, compatibility, complexity, trialability, and observability. In agribusiness sustainability, the theory explains how incremental technological innovations—such as precision agriculture tools and climate-smart practices, diffuse across farmers and agri-firms, gradually shaping an innovative culture that supports sustainable production systems. Recent studies emphasize its continued relevance in digital and climate-resilient agriculture contexts (Dwivedi et al., 2023; Sharma & Patel, 2024).

The strengths of the theory lie in its simplicity, predictive utility, and broad applicability across sectors, making it valuable for understanding adoption behaviour and guiding policy interventions in sustainable agribusiness innovation. It effectively explains how early adopters influence later adopters and how innovation spreads through social networks. However, its weaknesses include a linear and overly rational model of adoption, limited consideration of power dynamics, institutional barriers, and environmental constraints, and insufficient attention to complex socio-technical transitions. Contemporary critiques argue that it should be integrated with systems-based approaches to better address sustainability challenges in agriculture (Verman et al., 2025; Mukaila & Enete, 2025).

Scholars such as Rogers (1962), Greenhalgh et al. (2022), Dwivedi et al. (2023), Sharma and Patel (2024), and Kumar and Adeyemi (2025) have applied diffusion of innovation theory to examine agri-tech adoption, precision farming, and sustainable supply chain transformation.

The theory remains highly relevant in explaining incremental innovation diffusion and the role of organisational and regional innovation culture in agribusiness sustainability. It highlights how farmer networks, extension services, and institutional support accelerate adoption pathways, ultimately contributing to sustainable agricultural transformation through gradual technological and behavioural change.

**Empirical Review**

Mustapha (2025) examined the role of innovation capacity in agribusiness clusters as a catalyst for socioeconomic growth in North Central Nigeria, focusing on its impact on education development and employment generation, with government policies as a moderating factor. A quantitative research design was employed, utilizing a multi-stage sampling method to survey 423 registered farmers under the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL) Agro-Geo Cluster Scheme in Niger, Nasarawa, and the Federal Capital Territory. Data were analysed using Partial Least Squares-Structural Equation Modeling (PLS-SEM) to assess the relationships between innovation, socioeconomic growth, and policy influence. The results reveal a significant positive relationship between innovation capacity and both education ($t = 16.164$, $p < 0.000$) and employment generation ($t = 15.228$, $p < 0.000$). Government policies do not strengthen these relationships, demonstrating a weak moderating effect ($\beta = 0.036$ for education; negative $\beta = (0.061)$ for employment). The study highlights how collaborative creative exchange within clusters enhances skills, innovation, and job creation. Policymakers should prioritize cluster-based initiatives that foster innovative activities, such as workshop programs and partnerships with educational institutions. Agribusinesses are encouraged to adopt cooperative learning models to drive socioeconomic development.

Zartha Sossa et al. (2025) proposed a sustainable Innovation Management Model (MGI) for the plantain agro-industrial chain, applied to the Quindío region of Colombia. A mixed-methods approach was employed, incorporating various techniques, including a systematic literature review using the Scopus database, which analyzed 95 documents through the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. The identification and prioritization of relevant variables, along with the validation of the proposed model, were also conducted through the use of three questionnaires, supplemented by relevance and congruence indices. The analysis identified 53 variables for the entry stage, 36 for the transformation stage, and 31 for the exit stage. The findings revealed significant gaps within the agro-industrial chain, particularly in areas such as leadership, strategic management, and resilience among key stakeholders. The MGI, as prioritized by stakeholders, provides a framework that integrates variables and information flows, facilitating the development of new open innovation challenges. These challenges engage not only seekers—entities that require innovation—but also solvers—organisations that offer solutions. The implementation of this model will require supportive public policies, projects, and web platforms, such as Innocentive/Wazoku, Ninesigma, Ruta N, Yet2.com, Itonics, and

Ennomotive, which, with the aid of artificial intelligence, can connect innovation supply and demand through open challenges.

Rushchitskaya, et al. (2024) offered a comprehensive exploration of how the integration of sustainable practices and technological advancements is reshaping the landscape of agribusiness. As the global demand for food increases alongside the need for environmental preservation, the agricultural sector is under pressure to innovate and adapt. This study systematically reviewed recent advancements in sustainable agricultural technologies, including precision farming, biotechnology, and renewable energy sources, and assesses their impact on productivity, sustainability, and economic viability. Through qualitative and quantitative analyses, the study highlights the significant role that sustainable practices play in enhancing resource efficiency, reducing environmental degradation, and improving the resilience of agricultural systems to climate change. It also examined the challenges and opportunities associated with the adoption of these technologies, such as investment costs, regulatory hurdles, and the need for skilled labour. Furthermore, the study discussed the implications of these transformations for stakeholders across the agribusiness value chain, from farmers to consumers, and the potential for collaborative efforts to promote sustainability.

Setyowati and Wida Riptanti (2023) assessed the motivational factors in creating an innovation culture in agribusiness of micro, small, and medium-sized enterprises (MSMEs) by examining the organisational perspective, including organisational culture, organisational learning, market orientation, and attitude to innovation culture. A random cluster sampling method was used to select 100 agribusiness MSMEs in Sukoharjo Regency. This research considered exogenous latent variables, such as organisational culture, organisational learning, market orientation, and attitudes toward intention to innovate. The endogenous latent variables used were innovation intentions and innovation culture. Data were collected through an online survey and analyzed using Structural Equation Modeling (SEM) and Partial Least Square (PLS) analysis tools. The results showed that organisational culture, market orientation, and attitudes influenced the intention to innovate, while the level of organisational learning did not. The intention to innovate, in turn, had a significant effect on innovative behaviour, as shown in the performance of agribusiness companies. This innovative behaviour was reflected in the emergence of new ideas to enhance the business, including the development of new product variants, the utilisation of e-commerce for sales, and the improvement of production technology to increase cost efficiency. Therefore, there was a relationship between cultural innovation and company performance.

Damke, et al. (2021) aimed to analyze the relationships between the adoption of sustainable management practices and innovation capacity in family agribusinesses certified by the Family Agribusiness Program. To this end, a quantitative study using a survey design was carried out with 128 certified Brazilian family agribusinesses. Sustainable management practices were assessed based on the models proposed by Global Reporting Initiative and Callado. Regarding innovation capacity, the study by Valladares was used as a

basis. *Homals* analysis (homogeneity analysis) was used for data analysis. The results showed that the family agribusinesses analyzed that have a high adoption of environmental practices consisting of transformative leaderships that inspire, encourage, and develop people and promote the involvement and cooperation of their employees, high organicity of the organisational structure that allows quick decision-making and open and transparent communication, and a management for people that allows adequate working conditions, training, and professional recognition.

**Research Design**

This study adopts an explanatory research design, a quantitative approach that involves the sequential collection and analysis of quantitative and qualitative data. The population comprises agribusiness stakeholders in South-West, Nigeria, including farmers, agribusiness entrepreneurs, government officials, and technology providers across the agribusiness value chain.

**Population of the Study**

The South-West, region is selected for its high level of technological innovation and the concentration of Agribusiness owners in the South-West, Nigeria. The target population is (81,728), of which Oyo was reported to have the largest number of Agribusiness owners with (17,522) followed by Ogun (15,600), Ekiti (13,408), Osun (12,988), Ondo (11,677), and Lagos (10,533).

**Table 1: Population of the Study**

| S/N | STATE | POPULATION |
|---|---|---|
| 1 | OYO | 17,522 |
| 2 | OGUN | 15,600 |
| 3 | EKITI | 13,408 |
| 4 | OSUN | 12,988 |
| 5 | ONDO | 11,677 |
| 6 | LAGOS | 10,533 |
| | TOTAL | (81,728) |

**Source: All-Farmers Association of Nigeria (AFAN) (2023).**

**Sample size and Sampling Technique**

Farmers: Individuals actively engaged in agricultural activities, cultivating crops or raising livestock, irrespective of scale (smallholder to large-scale). Agribusiness Entrepreneurs: Owners or managers of agribusiness enterprises, which may include processing, distribution, and other value-added activities within the agribusiness value chain. Technology Providers: Entities or individuals involved in the development, distribution, or implementation of agricultural technologies, including but not limited to innovations in farm machinery,

information systems, and sustainable practices. The exclusion criteria are Individuals or entities not directly involved in agribusiness activities within South-West, Nigeria. As well as those not willing or unable to participate in the study. To ensure representative sampling within each stakeholder category, a stratified random sampling technique is employed. Stratification allows for proportional inclusion of smallholder farmers, large-scale agribusiness entrepreneurs, government officials, and technology providers based on the overall distribution within the South-West, Nigeria agribusiness sector

**Table 2. Sample size and Sampling Technique**

| S/N | STATE | FORMULAR | CALCULATION | TOTAL |
|---|---|---|---|---|
| **1.** | OYO | $nh = \frac{n \text{ x } Nh}{N}$ | $\frac{17{,}522 \text{ x } 383}{81{,}728}$ | 82 |
| **2.** | OGUN | $nh = \frac{n \text{ x } Nh}{N}$ | $\frac{15{,}600 \text{ x } 383}{81{,}728}$ | 73 |
| **3.** | EKITI | $nh = \frac{n \text{ x } Nh}{N}$ | $\frac{13{,}408 \text{ x } 383}{81{,}728}$ | 63 |
| **4.** | OSUN | $nh = \frac{n \text{ x } Nh}{N}$ | $\frac{12{,}988 \text{ x } 383}{81{,}728}$ | 61 |
| **5.** | ONDO | $nh = \frac{n \text{ x } Nh}{N}$ | $\frac{11{,}677 \text{ x } 383}{81{,}728}$ | 55 |
| **6.** | LAGOS | $nh = \frac{n \text{ x } Nh}{N}$ | $\frac{10{,}533 \text{ x } 383}{81{,}728}$ | 49 |
| | **TOTAL** | | | **384** |

**Source: AFAN (2023)**

**Response Frequency**

The table 3 shows the number of respondents for each selected state included in the study. The questionnaire was administered individually to participants engaged in agricultural activities. It was filled out by respondents from all six states comprising the South-West, Nigeria: Ekiti, Lagos, Ogun, Ondo, Osun, and Oyo. The analysis of the collected data commenced with inquiries focused on the personal details of the participants. Subsequently, the questionnaire featured a section dedicated to gathering insights from respondents regarding various aspects of their businesses, including Product Innovation, Innovative Culture, Environmental Sustainability, Social Sustainability, and Economic Sustainability. The frequency of responses obtained from the survey participants is detailed in the table below.

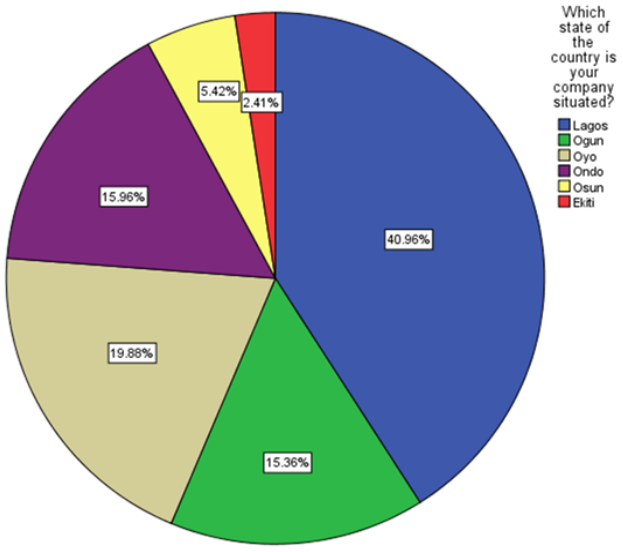
**Table 3: Response Frequency**

| Questionnaire | Frequency | Valid percentage |
|---|---|---|
| **Valid** | 332 | 86.46% |
| **Invalid** | 52 | 13.54% |
| **Total** | 384 | 100% |

**Source: Researcher's Compilation (2026)**

Out of 384 questionnaires, 332 were valid, indicating that 86.46% of respondents completed the survey accurately and comprehensively. These responses are crucial for understanding the research on product innovation, process efficiency, and sustainability practices in agribusiness. However, 13.54% of the responses were invalid, indicating areas for improvement in survey administration or respondent understanding. The high percentage of valid responses indicates the survey's success in gathering quality data from agricultural professionals in the South-West, Nigeria. This robust dataset will enable a deeper exploration of agricultural practices, innovation trends, and sustainability initiatives, benefiting future research and policymaking efforts in the agricultural sector.

**Figure 1: Breakdown of Response Rate Per State**




The study analysed the response rates across different states, providing valuable insights into regional participation and engagement. Below is the detailed interpretation of the data on response rates from various states. Lagos State had the highest response rate with 136 responses, constituting 41.0% of the total. This indicates a significant level of engagement and participation from Lagos, highlighting its central role in the study. Ogun State contributed 51 responses, making up 15.4% of the total responses. When combined with Lagos, these two states accounted for more than half of the responses (56.3%), underscoring their importance in the dataset.

Oyo State's contribution was 66 responses, representing 19.9% of the total. This state had the third-highest response rate, bringing the cumulative percent to 76.2%. This highlights Oyo's significant involvement in the study. Ondo State provided 53 responses, which accounts for 16.0% of the total responses. With the addition of Ondo, the cumulative response rate reached 92.2%, showing a substantial regional representation. Osun State had a lower response rate

with 18 responses, contributing 5.4% to the total. The cumulative percent of 97.6% indicates that Osun's participation, while smaller, still added to the overall regional data pool. Ekiti State had the smallest response rate with only 8 responses, making up 2.4% of the total. Despite the low numbers, Ekiti's inclusion brings the cumulative percent to 100%, completing the regional data collection.

**Demography of Respondents**

In this section, the respondents' demographics were presented, including their age, gender, marital status, required level of education, and duration of farming.

**Table 4: Demographic Distribution of the Respondents [n=332]**

| Items | | Frequency | Percentage |
|---|---|---|---|
| **Gender** | Male | 262 | 78% |
| | Female | 70 | 21.1% |
| **Total** | | **332** | **100%** |
| **Marital status** | Single | 87 | 26.2 |
| | Married | 123 | 37.0 |
| | Divorced | 122 | 36.7 |
| **Total** | | **332** | **100%** |
| **Education** | SSCE/OND | 124 | 37.3 |
| | B.Sc./HND | 52 | 15.7 |
| | M.Sc./MBA | 139 | 41.9 |
| | Others | 17 | 5.1 |
| **Total** | | **332** | **100%** |
| **Age** | Below 30 | 17 | 5.1 |
| | 31-40 | 227 | 68.4 |
| | 41-50 | 53 | 16.0 |
| | 51 above | 35 | 10.5 |
| **Total** | | **332** | **100%** |
| **Duration of Farming** | 1 year below | 17 | 5.1 |
| | 2-5 years | 70 | 21.1 |
| | 5 years above | 245 | 73.8 |
| **Total** | | **332** | **100%** |

**Source: Researcher's Computation (2026)**

The demographic distribution of the respondents, as illustrated in Table 4.2, reveals a predominantly male cohort, with men constituting 78% of the sample population. This notable gender disparity suggests that men are more inclined to engage in agribusiness in the region. In terms of marital status, the table reveals that the respondents are almost evenly split between married (37%) and divorced individuals (36.7%), with singles accounting for 26.2% of the

sample. This distribution indicates a fairly balanced representation between married and divorced individuals, although singles are somewhat less represented.

Regarding educational attainment, the result from the table shows that the majority of respondents have either SSCE/OND (37.3%) or M.Sc./MBA (41.9%) qualifications. Participants with a B.Sc./HND degree represent 15.7% of the sample, while those categorized under 'Others' make up 5.1%. This distribution underscores a high level of educational achievement among the respondents, with a significant proportion possessing advanced degrees.

The age distribution is predominantly skewed towards the 31-40 age group, which accounts for 68.4% of respondents. The 41-50 age group constitutes 16%, while those aged 51 and above account for 10.5%. Respondents below the age of 30 represent the smallest group at 5.1%. This demographic spread indicates that most participants are in their most productive and economically active years.

Hypothesis One

**$Ho_1$:** Incremental innovation does not have a significant influence on sustainability practices (social, environmental, economic and resource efficiency)

**Table 5: Crosstab of Incremental Innovation and Sustainability**

| **Crosstab** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Count** | | | | | | | |
| | | **Sustainability** | | | | | **Total** |
| | | **Strongly Agree** | **Agree** | **Undecided** | **Disagree** | **Strongly disagree** | |
| **Incremental Innovation** | Strongly Agree | 17 | 17 | 35 | 0 | 0 | 69 |
| | Agree | 106 | 35 | 0 | 18 | 35 | 194 |
| | Undecided | 17 | 18 | 0 | 17 | 17 | 69 |
| **Total** | | 140 | 70 | 35 | 35 | 52 | 332 |

The cross-tabulation analysis in Table 4.1 between Incremental Innovation and Sustainability reveals varying levels of agreement among respondents. Specifically, 17 respondents strongly agreed, and an additional 17 agreed that incremental innovation significantly contributes to social sustainability. Conversely, 35 respondents were undecided, and no respondents disagreed or strongly disagreed. This distribution suggests a generally positive perception among participants regarding the social benefits of incremental innovation within the agricultural sector, emphasising its potential to foster positive social impacts through continuous improvement initiatives.

**Hypothesis Two**

**$Ho_2$:** Innovative culture does not have a significant effect on sustainability (social, environmental, economic and resource efficiency)

**Table 6: Crosstab of Innovative Culture and Sustainability**

| Crosstab | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Count** | | | | | | | |
| | | **Sustainability** | | | | | **Total** |
| | | **Strongly Agree** | **Agree** | **Undecided** | **Disagree** | **Strongly Disagree** | |
| **Innovative Culture** | Strongly Agree | 35 | 35 | 0 | 0 | 0 | 70 |
| | Agree | 105 | 17 | 35 | 18 | 35 | 210 |
| | Undecided | 0 | 18 | 0 | 17 | 0 | 35 |
| | Disagree | 0 | 0 | 0 | 0 | 17 | 17 |
| **Total** | | 140 | 70 | 35 | 35 | 52 | 332 |

The cross-tabulation between innovative culture and sustainability reveals varying counts across different levels of agreement. Notably in Table 4.35, respondents who strongly agreed with statements regarding innovative culture also tended to strongly agree with social sustainability initiatives, as evidenced by the count of 35 in both categories. Similarly, those who agreed with an innovative culture were split across other sustainability categories, with 105 respondents agreeing and 17 disagreeing. The chi-square test performed on this data yielded a significant result, indicating a relationship between innovative culture and social sustainability among the surveyed population. Specifically, it suggests that organisations fostering innovative cultures may also be inclined to prioritise and support social sustainability initiatives within their operations.

Summary of Findings

The summary of the findings was also presented in the table below

**Table 7: Summary of the Hypotheses Results**

| S/N | Hypotheses | Analytical Tools | Decision | Findings |
|---|---|---|---|---|
| **1** | H3: Incremental Innovation | Chi-square $\chi^2$ | $Ho_1$ Rejected | Incremental innovation enhances social sustainability by fostering continuous improvement in working conditions and community engagement. It positively impacts environmental sustainability through gradual adoption of sustainable practices. Economically, incremental innovation leads to cost savings and efficiency gains, supporting economic sustainability. It improves resource efficiency by optimizing resource use and minimizing waste generation. |

| S/N | Hypotheses | Analytical Tools | Decision | Findings |
|---|---|---|---|---|
| **2** | H4: Innovative Culture | Chi-square $\chi^2$ | $Ho_2$ Rejected | An innovative culture significantly enhances social sustainability by promoting better working conditions and stronger community relations. It positively affects environmental sustainability by increasing the adoption of eco-friendly practices. Economically, an innovative culture drives growth and stability by fostering creativity and new ideas. It improves resource efficiency by promoting efficient resource use and reducing waste. |

**Theoretical Findings**

This research investigates the profound impact of technological innovations on sustainability within South-West, Nigeria agribusiness sector, utilising insights from the Diffusion of Innovations Theory (DOI) and Innovation Systems Theory (IST). These frameworks offer comprehensive perspectives on the adoption processes and systemic influences that determine the sustainability outcomes of technological innovations. Diffusion of Innovations Theory (DOI) DOI categorises stakeholders in agribusiness into innovators, early adopters, early majority, late majority, and laggards, identifying crucial factors that affect the adoption rate and scope of innovations (Rogers, 2003). In South-West, Nigeria, DOI reveals that innovations perceived as advantageous, compatible with existing practices, and easy to trial are more likely to be embraced by farmers and agribusiness owners.

**Hypothesis One: Incremental innovation has no significant impact on sustainability practices in agribusiness through technological innovation**

This study explored the impact of incremental innovation on sustainability in agribusiness. While respondents had varied views on its economic effects, results showed a significant relationship, indicating that fostering an innovative culture enhances efficiency, productivity, and market competitiveness.

Chi-square tests confirmed strong associations:

- Social Sustainability ($\chi^2 = 188.331$, $p < 0.05$)
- Environmental Sustainability ($\chi^2 = 87.303$, $p < 0.05$)
- Economic Sustainability ($\chi^2 = 117.168$, $p < 0.05$)
- Resource Efficiency ($\chi^2 = 122.263$, $p < 0.05$)

These findings support rejecting the null hypothesis, affirming that organisations embracing incremental innovation are more likely to integrate sustainability practices (Mustofa, et al., 2026).

Studies such as: Adams and Kehinde (2025) highlight that innovation in agribusiness fosters entrepreneurship, technological growth, and economic sustainability. These insights align

with global trends, showing that innovation-driven strategies enhance efficiency, reduce costs, and unlock market opportunities.

In practice, agribusinesses can leverage incremental innovation to boost productivity, optimise supply chains, and enhance market resilience. By fostering creativity, adaptability, and continuous improvement, they can drive long-term economic sustainability in the agricultural sector.

**Hypothesis Two: Innovative culture has no significant impact on sustainability practices in agribusiness through technological innovation**

This study examined how fostering an innovative culture impacts sustainability in agribusiness. Findings indicate a strong correlation, suggesting that organisations emphasising innovation perceive improved resource management and operational efficiency. Respondents supporting innovation linked it to enhanced resource efficiency, reinforcing the role of organisational culture in sustainability

Chi-square tests confirmed significant associations:

- Social Sustainability ($\chi^2 = 261.508$, $p < 0.05$)
- Environmental Sustainability ($\chi^2 = 219.737$, $p < 0.05$)
- Economic Sustainability ($\chi^2 = 123.831$, $p < 0.05$)
- Resource Efficiency ($\chi^2 = 79.681$, $p < 0.05$)

These results support rejecting the null hypothesis, affirming that organisations fostering innovation are more likely to adopt sustainable practices (Akinola et al., 2024).

Nigerian research (Okolo-Obasi et al., 2021) aligns with these findings, showing that innovation-driven agribusinesses improve resource management, reduce waste, and enhance productivity. These insights highlight how cultivating an innovation-centric culture leads to better resource utilisation and environmental sustainability.

Practically, agribusiness leaders can integrate innovation by embracing adaptive strategies, technological advancements, and sustainable procurement. Initiatives like precision agriculture, eco-friendly packaging, and renewable energy adoption can reduce costs, minimize waste, and strengthen environmental stewardship; positioning agribusinesses as sustainable industry leaders.

**Conclusion**

The pursuit of sustainability in agribusiness increasingly depends on the effective integration of technological innovation, particularly through incremental innovation and the cultivation of an innovative culture. Incremental innovation enables agribusiness firms to continuously improve products, processes, and resource utilization, thereby enhancing operational efficiency, environmental stewardship, and long-term competitiveness. Simultaneously, an innovative culture fosters creativity, knowledge sharing, adaptability, and employee engagement, creating an enabling environment for the successful adoption and diffusion of

sustainable technologies. The synergy between these two factors strengthens organizational resilience and supports the achievement of economic, social, and environmental sustainability objectives. Therefore, agribusiness organizations that strategically invest in continuous innovation and nurture a culture that embraces change are better positioned to respond to emerging challenges, improve productivity, and contribute meaningfully to sustainable agricultural development and food security in Nigeria and other developing economies.

**Recommendations**

For agribusinesses to achieve long-term sustainability, managers and policymakers should promote continuous incremental innovation through the adoption of cost-effective digital technologies, precision farming tools, and data-driven decision-making systems. Agribusiness firms should also cultivate an innovative organizational culture that encourages employee creativity, knowledge sharing, experimentation, and continuous learning. Furthermore, government agencies and industry stakeholders should strengthen research–industry collaborations, provide innovation funding, and enhance technological infrastructure to facilitate sustainable production practices. These measures will improve resource efficiency, environmental stewardship, operational resilience, and competitive advantage, thereby fostering sustainable agribusiness development and food security in Nigeria.

**Suggestions for Further Studies**

To further explore the relationship between innovative culture and sustainability in agribusiness, future research should consider:

i. Longitudinal Studies- Examining how these relationships evolve for deeper causal insights.
ii. Comparative Regional Studies- Expanding research beyond Nigeria to assess global applicability.
iii. Sector-Specific Analysis - Investigating innovation and sustainability in distinct agribusiness sectors.
iv. Leadership and Management Impact- Studying how leadership styles and organisational structures influence innovation and sustainability.
v. Policy Influence - Assessing the role of government policies and regulations in fostering innovative and sustainable practices.

**Implications to Theory, Policy, and Practice**

The integration of incremental innovation and an innovative culture within agribusiness have significant implications for theory, policy, and practice in fostering sustainability. Theoretically, it extends innovation diffusion and dynamic capability perspectives by demonstrating how continuous, small-scale technological improvements enhance long-term sustainability outcomes in agricultural systems. From a policy standpoint, it underscores the need for targeted incentives, such as subsidies, digital infrastructure investment, and capacity-

building programmes, to encourage widespread adoption of sustainable technologies among agribusiness actors. In practice, it highlights the importance of fostering organisational learning, farmer engagement, and collaborative networks to accelerate the diffusion of precision agriculture, data-driven decision-making, and climate-smart practices. Collectively, these implications suggest that sustainable agribusiness transformation is most effectively achieved through adaptive, iterative innovation processes embedded in supportive institutional and cultural environments that promote continuous improvement and technological responsiveness.

## REFERENCES


Abbasi, N. M. (2025). Organic Farming and Soil Health: Strategies for Long Term Agricultural Sustainability. *Agricultural Innovation and Sustain Ability Journal E-ISSN 3051-0325*, *1*(01), 25-32.

Adams, A. S., & Kehinde, A. L. (2025). Circularity potentials of the oil palm processing enterprises and evaluation of economic participation by youth in Osun State: A review. *Analele Universitatii" Constantin Brancusi" din Targu Jiu. Serie Litere si Stiinte Sociale*, (2), 205-220.

Adebayo, T., & Olusegun, A. (2024). *Incremental innovation and sustainable agribusiness performance*. *Journal of Agribusiness and Sustainability*, 18(2), 45–59.

Akinola, G. A., Fagbenle, O. I., & Ogunde, A. O. (2024). Assessing the level of implementation of cost reduction techniques on educational building projects in public tertiary institutions in Southwestern Nigeria. In *E3S Web of Conferences* (Vol. 589, p. 03010). EDP Sciences.

Chen, Y., & Huang, L. (2023). Innovative culture and Organisational sustainability in agricultural enterprises. *Sustainability*, 15(11), 8421. https://doi.org/10.3390/su15118421

Damke, L. I., Gomes, C. M., Kneipp, J. M., Godoy, T. P., & Motke, F. D. (2021). Sustainable management practices and innovation capacity in family agribusinesses. *Environmental Quality Management*, *30*(4), 5-20.

Dwivedi, Y. K., Hughes, L., Wang, Y., Alalwan, A. A., Ahn, S. J., Balakrishnan, J., ... & Wirtz, J. (2023). Metaverse marketing: How the metaverse will shape the future of consumer research and practice. *Psychology & Marketing*, *40*(4), 750-776.

Food and Agriculture Organisation (FAO). (2024). *The state of food and agriculture 2024*. Rome: FAO.

Food and Agriculture Organisation (FAO) (2023). *The state of food and agriculture 2023*. Food and Agriculture Organisation of the United Nations. https://www.fao.org

Greenhalgh, T., Fisman, D., Cane, D. J., Oliver, M., & Macintyre, C. R. (2022). Adapt or die: how the pandemic made the shift from EBM to EBM+ more urgent. *BMJ Evidence-Based Medicine*, *27*(5), 253-260.

Kumar, R., Adeyemi, N. O., Chattaraj, S., Alloun, W., Thamarsha, A. K. A. N. W. M. R. K., Anđelković, S., ... & Gautam, P. (2025). Antimicrobial resistance in Salmonella: One Health perspective on global food safety challenges. *Science in One Health*, *4*, 100117.

Lavanya, N., & Kumar, G. K. (2026). Climate-Smart Agriculture: Adopting to a Changing Environment. *Agricultural Automation with IoT: A Pathway to Sustainable Development*, 11-30.

Mukaila, R., & Enete, A. A. (2025). Achieving sustainable food security: does urban household garden agriculture matter?. *Environment, Development and Sustainability*, 1-18.

Mustofa, M. S., Mulyono, K. B., & Fatimah, N. (2026). Decoding innovation configurations for agribusiness performance: Indonesian evidence. *Cogent Business & Management*, *13*(1), 2619666.

OECD. (2024). *Innovation, agricultural productivity and sustainability*. Organisation for Economic Co-operation and Development. https://www.oecd.org

OECD. (2023). *Innovation, agricultural productivity and sustainability in agriculture and food systems*. Paris: OECD Publishing.

OECD (Organisation for Economic Co-operation and Development) (2022). Agricultural policy reform and technological innovation: Ensuring a sustainable future for agriculture. Paris: OECD Publishing.

Ojo, S. O., Ogunwuyi, A. O., & Adebisi, T. (2020). Agricultural technology adoption and farm performance in Nigeria: A gender analysis. *Agricultural Economics*, 51(3), 453-468.

Okolo-Obasi, N. E. V., Nwanmuoh, E. E., Ikpo, K. P., Ojieze-Nwachineke, J. I., Nwankwo, C. O., Obeke, C. B., ... & Chukwu, D. A. V. (2025). Climate Change, Crop Protection Products, and Cocoyam Value Chain among Rural Women Farmers in Nigeria: A Study of South-East Region. *African Journal of Agricultural Science and Food Research*, *18*(1), 58-84.

Patel, D. K., Sharma, V. K., Sharma, H. O., & Kumar, P. (2024). Application of AI in Material Science to Accelerate Material Innovation. In *Artificial Intelligence in Material Science* (pp. 198-207). CRC Press.

Rogers, E. M. 2003. Diffusion of Innovations (5th Edition). New York: Free Press.

Rogers, E. M. (1962). Diffusion of innovations. First edition. New York. Free Press.

Rushchitskaya, O., Kulikova, E., Kot, E., & Kruzhkova, T. (2024). Sustainable practices and technological innovations transforming agribusiness dynamics. In *E3S web of conferences* (Vol. 542, p. 03003). EDP Sciences.

Setyowati, N., & Wida Riptanti, E. (2023). Creating an innovative culture in agribusiness of micro, small and medium-sized enterprises. *Agricultural and Resource Economics: International Scientific E-Journal*, *9*(2), 205-222.

Smith, R. (2026). Environmental Resilience and Agricultural Best Practices. In *Urban Food Security in a Crisis Prone World: The Urban, Water, and Food Nexus* (pp. 37-57). Cham: Springer Nature Switzerland.

UNEP (2020). United Nations Environment Programme. Available at: https://www.unenvironment.org/. Accessed 28 Oct 2020.

Verma, K. K., Song, X. P., Kumari, A., Jagadesh, M., Singh, S. K., Bhatt, R., ... & Li, Y. R. (2025). Climate change adaptation: challenges for agricultural sustainability. *Plant, Cell & Environment*, *48*(4), 2522-2533.

Tripathi, S., Shukla, A. K., & Singh, S. K. (2023). Social Inclusion and Sustainable Development in India: Science, Technology, and Innovation Policy and Governance. *MKSE Publication, Lucknow*.

World Bank. (2024). *Digital transformation and sustainability in agribusiness*. World Bank Group. https://www.worldbank.org

UNECA. (2021). Africa regional review of progress in implementing the outcomes of the World Summit on Sustainable Development. *United Nations Economic Commission for Africa*.

United Nations. (2019). Transforming our world: The 2030 Agenda for Sustainable Development. *United Nations*.

Willer, H., and Lernoud, J. (2021). "Current statistics on organic agriculture worldwide: area, operators and market," in The World of Organic Agriculture Statistics and Emerging Trends 2021 (Bonn, Germany: Research Institute of Organic Agriculture FiBL, Frick, and IFOAM—Organics International), 36–128.

World Bank. (2024). South-West, farming systems research and extension. International Institute of Tropical Agriculture (IITA). https://iart.gov.ng/IT/South-West,-farming-systems-research-and-extension/

World Bank (2023). World Development Report 2023: Mind Over Matter: The State of Digital Agriculture. World Bank.

World Bank. (2020). *Agribusiness and innovation for sustainable development*. Washington, DC: World Bank.

Zartha Sossa, J. W., Gutiérrez Posada, N., Zuluaga Monsalve, A. M., Botero Montoya, L. H., Gutiérrez Cano, L. F., González Candia, J., ... & Escobar Mora, N. J. (2025). Sustainable Innovation Management Model (MGI) for Plantain Agro-industrial Chain. *Sustainability*, *17*(4), 1716.