

Agribusiness Risk Management in Nigeria - A Conceptual Analysis

Abolade Isaac AGBOLA¹ *, Sulaiman YUSUF², Tunde Oluwalaiye³

¹College of Management, Texila American University, Guyana, South America

²Department of Agricultural Economics, University of Ibadan, Nigeria

³Department of Economics, Babcock University, Ilishan, Nigeria

Abstract

The paper examines agribusiness risk management in Nigeria and discusses its role in transforming food production practices to attain food security and sustainable economic development. Risk is inherent in all the segments of the agricultural value chain. It is the responsibility of farmers to manage the adverse consequences of taking risks involved in food production, while financial institutions, governments, and donor agencies in developing nations play notable roles in ameliorating disasters considered beyond the control of the farmer. The reward for investing in agricultural business and bearing the risk is profit. The paper analysed the concept of agribusiness, various risks inherent in food production and ways to manage them effectively. It is recommended that the stakeholders in risk management, such as the farmer/producer, government, financial institutions, and donor agencies prevalent in developing nations, must work assiduously to identify, mitigate, transfer or cope with the risks in agribusiness to ensure food security in the country.

Keywords: *Agribusiness, Diversification, Flexibility, Insurance Risks, Uncertainties.*

Introduction

Agriculture will continue to be a predominant sector of the Nigerian economy. In the past five years, the agricultural sector contributed an average of 23% of the nation's Gross Domestic Product (GDP). Nigeria, with a land area of 92m hectares, out of which 34m hectares or 37 per cent are under cultivation, ought to be the food basket of sub-Saharan Africa. Only 9% of the vast sub-Saharan African land area is arable [1]. Nigeria is experiencing a food security crisis because of several factors, including a growing population of people to be fed, pervasive insecurity and violent clashes disrupting food production, climate change and declining agricultural productivity. Most of these factors are linked to the risks of doing agribusiness. The Global Security Index 2022 [2] ranked Nigeria 107 in the food security ranking of 113 nations.

Agriculture is the science or practice of farming [3], including cultivating the soil to grow crops and rearing animals to provide food, wool, and other products. It comprises preparing plant and animal products for people to use and their distribution to markets [4]. Davis and Goldberger [5] defined *Agribusiness* as the sum totality of all operations involved in production enterprises on the farm [6], the manufacturing and distribution of farm supplies, and the equalisation-dispersion services (such as storage, processing, standardisation, grading, packaging, transportation, and merchandising) of farm commodities and other items of trade from the farm-firm. Risks and uncertainties are inherent in the agricultural value chain's four components:[7] farm supplies, farm production, product processing, and product distribution to the consumers.

Agriculture is exposed to risks because it involves dealing with living plants and animals

[8], which depend heavily on nature. Because of nature's unpredictability, many natural disasters capable of taking investors out of business are associated with farming [9]. The scholars concluded that agricultural risks are usually multiple and could be characterised by high severity and frequency.

Farmers, in managing their agribusinesses, understand the existence of risks and uncertainties and have managed them in their own ways. Decision-making is the principal activity of management. Farmers, like other entrepreneurs, make a lot of decisions based on available information on input prices, output prices, output, yields and other technical matters. Many agricultural production decisions have outcomes that occur weeks, months, or years after the initial decisions. In most cases, the outcome deviates from the expectation due to the time lag between when the decisions were made, when the results came out, and the unpredictability of weather conditions. The decision for crop farmers includes what crops to plant, what seeding rate, and what fertiliser and cultural practices to apply. The outcome of the decisions will not be known until the crop is harvested in 90 -120 days for cereals such as maize and rice and 3-4 years for tree crops such as cocoa and cashew. The decision of a livestock farmer who wants to produce table eggs will include where to obtain the pullets, where to get the feed, how to house the chicks, how to rear the pullets till 5 to 6 months when they start laying eggs and how to handle the egg sales for 12months. The farmers cannot influence the biological processes in crop and livestock production or foretell their outcome perfectly. The risks and uncertainties in agribusiness were demonstrated by the disruption in the global food supply chains following the Ukraine-Russia conflict. Ukraine is one of Europe's food baskets. A paper [10] concluded that the Russian-Ukrainian conflict has adversely affected food supply chains, significantly affecting production, sourcing, manufacturing, processing, logistics, and

significant shifts in demand between nations reliant on imports from Ukraine.

Crop production and livestock rearing are major components of agribusiness, which are exposed to unpredictable adverse natural events such as weather conditions like floods, drought, disease and insect or pest damage that negatively impact production and farmers' income. Agribusiness is also exposed to various types of risks, including rising commodity prices, digitalisation, climate change, and shifting geopolitical and consumer habits.

Risk in agriculture and agribusiness comes with unexpected outcomes such as low prices, drought, and diseases. Risk management is reducing the possibility of unexpected outcomes or minimising their effects.

The paper aims to discuss the risks and uncertainties inherent in the agribusinesses. The study analysed the management strategies and tools available to mitigate the risks and foster increased productivity, which is crucial for attaining Nigeria's food security and economic development.

The following research questions were answered.

Why is agribusiness prone to risks and uncertainties?

What are the sources of risks and uncertainties in agribusiness?

What strategies and tools mitigate the risks and uncertainties?

Who are Nigeria's leading stakeholders in agribusiness risk management?

What is the role of Insurance in agribusiness risk management in Nigeria?

Sources of Risks and Uncertainties Inherent in Agribusiness

According to [11], risk and uncertainty are inescapable factors in agriculture which require careful management. Farmers face production risks from the weather, crop and livestock performance, pests and diseases, and institutional, personal, and business risks. The risks can be segmented into two: business and

financial risks. Business risk is the aggregate effect of production, market, institutional and personal risks. Financial risk [12] is the risk associated with financing the business. The sources of risk in agribusiness in Nigeria are diverse. They were classified into six categories for the purpose of this paper [13]. These are production, price, market, financial, personal and government.

Production risks are due to the unpredictable nature of weather and uncertainty about the performance of crops and livestock. The performance of crops and livestock depends on biological processes affected by weather, diseases, insects, weeds, metabolism, and genetics. These factors cannot be predicted with certainty.

Price variability is a major source of uncertainty in agriculture. Prices of farm output and some inputs applied during production may not be known at the time of decision-making. Farmers are exposed to unpredictable competitive markets for inputs and outputs. The price of agricultural produce varies yearly for reasons beyond the control of the individual producers. The supply of farm produce depends on farmers' production decisions, weather, and government policies. Consumer preferences influence the demand, the price of competing products, income, exchange rates, and the state of the general economy. Cost of production is another risk that could be significant. Input prices tend to be less variable than output prices due to the production time lag, adding to the uncertainty and the risk.

Market access, which may be limited by government policy, war, and poor rural roads and infrastructure, could be a source of risk. Marketing risks are, at times, referred to as price risk. The uncertainty about farm produce access to the market, commodity prices and the possibility of a price change would adversely affect a farmer. Globally, agricultural producers have little control over the market forces that drive commodity prices.

The farmer experiences financial risk when borrowed funds are a part of the business's capital. The risk exists because of uncertainty about future interest rates or cost of capital, the capacity of the lender to continue to provide the credit line, changes in the value of the assets used as collateral and the capacity of the business to continue to generate the cashflow to repay the interest and the principal loan. All these could lead to the activation of production, pricing, and marketing risks. The three types must be well considered while doing whole-farm budgeting and risk planning. Use of credit exposes the farmers to the risk of a rise in interest rate, unanticipated calling-in of loan by the lender as witnessed in Nigeria due to discontinuity of Central Bank of Nigeria Intervention funds following a change of government and lack of disbursement funds to allow drawdown of undrawn commitment to the borrower. Leveraging through borrowing enables farmers to scale their production and make more profit, which is the reward of taking the risk.

The personnel or managers and key employees could be the most irreplaceable assets on the farm. The risk that any one of them could suffer a sudden injury or illness is real. Major life crises like the owner's death or the divorce of a husband and wife owning a farm in a partnership may threaten the business's continued existence. The prolonged illness of one of the main actors may cause serious losses to production or substantially increase the cost of production. Negligence in using machinery or handling livestock could lead to significant losses.

Governments at various levels could be a source of risks for agriculture. Changes in government policies and rules that affect farm production could have far-reaching implications for farm output, income, and profitability. Farm production practices such as pesticide and herbicide application, storage procedures, commodity logistics, traceability and livestock tagging are increasingly regulated

to guarantee consumer health and food safety. Such regulations add to agribusiness risk, as non-compliance can lead to financial losses.

Farmers' attitudes to risk are threefold. The risk-averse are those who try to avoid risks. The risk-takers are those open to taking risks. The risk-neutral farmers are in between risk-averse and risk-taking positions. Factors affecting a farmer's risk appetite depend on age, equity or stake in the business, financial commitments, past financial experience, family responsibilities, familiarity with risky propositions, emotional health, and community attitude. In analysing the entrepreneurial cycle in agricultural project management conceptualisation and management [14], opined that the worst-case scenario for an agricultural entrepreneur whose farm business fails due to crop failure or disease outbreak on his poultry farm might include losing his home if pledged as collateral, change in lifestyle and loss of some liberty if declared bankrupt. If the farm business is successful, the rewards are many and could include wealth, fame, and recognition.

Agribusiness Risk Management Strategy

Risk management is *defined* as the process of identifying, monitoring, and managing potential risks to minimize the negative impact they may have on an organization. Agribusiness risk management strategies range from decisions to take on or avoid high-risk crops or livestock-based businesses, diversification of income sources, and the formal insurance policies put in place by businesses. The objective is to mitigate, transfer or cope with the identified risks. Choosing the most appropriate tool depends on various factors, such as type of risk, tool availability, and level of responsibility. [15] carried out a literature review of farmers' perceptions of, and responses to, agricultural risks and found that weather-related risk (55%), biosecurity threats (48%), and human risk (35%) are the significant risks perceived by farmers for their agricultural

enterprises. Others are the diversification of crop and animal production (28%) and pest disease monitoring and prevention (20%). The study concluded that access to information and formal low-interest loan systems are the main barriers to successful agricultural risk management.

In the book *Agricultural Finance - A Practical Guide for Lenders and Entrepreneurs* [14], the four layers of agricultural risk management were stated as farmers, financial institutions, government, and international donors. Farmers, through their savings and credit facilities, manage the more frequent but low-consequence risks from the outcome of their inappropriate decisions in the day-to-day management of the farm. Financial institutions such as insurance companies manage the less frequent but more severe risks that affect many farmers simultaneously (such as hailstone, locust swarm, and bird flu). The government and, at times, international donor agencies will handle the top-of-the-layer risk, which is characterized by low frequency but high severity, such as floods, droughts, disease epidemics and fire.

Risk management strategies in agribusiness can be classified into two main categories. These are.

1. Risk that is not shared or on-farm risk management strategies.
2. Risks that are shared with others or transferable.

The risk that is not shared or on-farm risk management strategies are collecting information for decision-making, avoiding or reducing exposure to risks, production risk, diversification and flexibility.

Risks that are shared with others or transferrable risk management strategies include financing and insurance.

Farmers make a lot of decisions in food production. Making risky decisions requires careful consideration of the various strategies available and the possible outcome of each.

[14] itemized the process of collecting information for decision-making as follows.

1. Identify an event that could be a possible source of risk.
2. Identify the possible outcome from the event, such as weather conditions or prices and their probabilities.'
3. List the alternative strategies available.
4. Quantify the consequences or results of each possible outcome for each strategy.
5. Estimate each strategy's risk and expected returns and evaluate their trade-offs.

Tools for Managing Risks

The four strategic approaches to risk management, as recommended by [13], are.

1. Reduce the variability of possible outcomes. Decrease the probability of bad results and increase the probability of good results.
2. Set a minimum income or price level for a fixed charge, usually the insurance premium.
3. Maintain flexibility in decision-making - Do not lock in decisions for long periods in case of a change in price or production figures.
4. Improve the risk-bearing ability of the business to cope with the consequences of adverse results.

The main risk management tools are production risk tools, diversification, flexibility, and insurance.

Production Risk Tools

Production risk is the possibility that the expected yield or output will be lower than the projection. Some evidence of production risks are variable crop yields, uncertain livestock production rates, and uneven product quality. The tools used to manage production risks are as follows.

1. Invest in stable enterprises within the agricultural value chain that produce stable income. The risk of rearing chicken production from day-old chicks differs from that of rearing

it from the point of lay birds. A risk-averse poultry entrepreneur will choose an egg production business from the point of lay, not from day-old chicks.

2. Use of technology to control the effects of weather on production. Irrigation will enable tree crops to survive the dry season and minimize the effect of climate change on crop yield. Greenhouse technology ensures water and nutrient supply through the growing period and eliminates insect and pest infestation. Livestock rearing in ranches will ward off farmer-herders clashes and rustling, which are major risks in sub-Saharan Africa.
3. Adherence with the improved cultural practices for cultivating crops, rearing livestock, harvesting, and storage transportation of farm produce.

Diversification

Diversification is a risk management strategy that creates a mix of various investments within a portfolio. A diversified portfolio contains a mix of distinct asset types and investment vehicles to limit exposure to any single asset or risk. In agribusiness, producing two or more commodities reduces income variability if all prices and yields are not low or high. It is the concept of reducing the risk of the overall return by selecting a mixture of enterprises with net returns with low or negative correlations. Little is gained if prices or yields of the enterprises tend to move up or down together. The less these values tend to move together, or the more they move in opposite directions, the more income variability will be reduced by diversification. When a highly variable enterprise is added to a stable one, the farm risk will be reduced. Diversification is more possible in crop production because crops growing in different seasons tend to have a

negative correlation, while those growing in the same season have a positive correlation. The yield correlation, pests and diseases among crops that grow in different seasons are lower. The production rates among different types of livestock are less closely correlated, and there is little correlation between crop yield and livestock performance. Fruits and vegetables are very good for diversifying major crop production. In the tropics, tree crops are combined with cereals and tuber crops to diversify their yield and income. Livestock like poultry can be combined with crops like maize and sorghum as part of a diversification strategy. Diversification plans can include investing in non-farm assets like stocks, bonds, fixed deposits, commercial papers or non-farm activities such as related businesses or jobs. It may entail giving up the benefits of specializing in one enterprise like broiler production to gain the benefits from less variability in net income.

Flexibility

Another risk management strategy adopted by farmers is flexibility. Farmers can demonstrate flexibility in areas of assets, products, markets, costs, and time. Asset flexibility means investing in assets that have multiple uses. A tractor can be acquired to till the land and transport the farm workers. Product flexibility exists when an enterprise produces a product with multiple uses. A maize farmer can sell its produce to livestock millers or sell green to consumers. Farm produce can be sold in local or international markets. Selling in international markets may entail further value addition, like drying to specified moisture content, to benefit from the flexibility of markets. Cost flexibility means organising production to keep fixed costs low and incurring higher variable costs where feasible. Using hired labour in place of permanent staff or using leased land to farm instead of purchasing land are examples of flexibility in risk management by lowering fixed costs. Time flexibility relates to the speed of adjustment of

agribusiness operations to manage business risks. Short, cycled activities like planting cereals with 90-120 days duration are more flexible than long-term activities like planting trees such as Cocoa and cashew crops. Investment in processing plants is a long-term project with limited flexibility. The investment should be well planned from the onset because it is difficult to vary the product lines once the plant is installed.

Insurance

Insurance products aim to help reduce production and financial risks. Insurance is a risk-sharing device that is based on accepting appropriate premiums from many clients to place the company in a position to compensate the few insured who suffered losses.

Agricultural insurance is a financial tool that is employed to mitigate the impact of unpreventable risks in agricultural production. Insurance is a form of risk management to hedge against a contingent loss, while agricultural insurance is a special line of property insurance applied to agricultural firms. As a specialised aspect of insurance, insurance companies operating in the market typically have a dedicated agribusiness unit or outsource the underwriting to agencies specialising in it.

Agricultural insurance covers crop insurance, livestock (cattle, sheep, and goat), piggery, fishery, greenhouse, etc. The Nigerian Agricultural Insurance Corporation (NAIC) largely handles agricultural insurance in Nigeria.

NAIC is a Federal Government-funded agency established in 1986 to provide insurance services to farmers at subsidized premiums. The farmer is charged 50% of the assessed premium, while the Federal and State Governments share the balance of 50% in the 35% and 15% ratio, respectively. NAIC is a government-subsidized insurance programme that may not reach all farmers because of the subsidy involved and would not be sustainable in the long run because, as time goes on,

limitations in government spending will creep in. Conventional insurance companies must be incentivized to venture into agricultural insurance to complement government efforts to stimulate more lending to agriculture. Agricultural insurance would help farmers restart their businesses after a disaster and eventually reposition them to meet their credit repayment obligation to the banks.

Agricultural insurance products are classified into three main groups, namely:

Indemnity-Based Agricultural Insurance:

The claim is based on the actual loss incurred by the farmer or policyholder, and the indemnity is determined at the level of the insured party. Indemnity-based products consist of named peril and multiple perils. Items named in the named peril are explicitly listed in the policy, e.g. day-old chicks till age 7 weeks for broiler rearing. Multiple perils would apply if risks, such as fire, theft and disease outbreaks, are insured together.

Index-Based Agricultural Insurance: The claim is based on the measurement of an objective and independent parameter that is highly correlated with the actual loss incurred by a farmer. In the parametric index, the claim is based solely on measuring a particular

parameter, such as rainfall, measured by a named meteorological station. The rainfall recorded relative to what is stated in the policy determines the claim to be paid to the farmer if losses occur due to inadequate rainfall during the cropping season. Under aggregate index insurance, claims are made based on an index obtained from the aggregate statistics of the farm production or yield in the neighborhood, which could be local government or state.

Crop Revenue Insurance:

Crop revenue insurance is based on revenue derived from the crop. Crop revenue is the product of crop yield and crop price. Crop revenue insurance is based on deviation from the mean revenue determined by the futures market. This policy is only feasible where there is a functioning commodity exchange market. It should, however, be noted that crop revenue insurance covers the price decline that occurs during the crop's growing season. It does not cover declines that may occur from one growing season to another.

Insurable Agricultural Perils

The perils farmers can procure insurance coverage for are listed below in Table 1.

Table 1. Insurable Agricultural Perils

Crops	Livestock	Forestry
Fire	Mortality due to	Fire
Windstorm	Accidents	Lightning
Excessive rainfall	Diseases	
Drought	Complications during delivery	Windstorm
Hail	Emergency slaughter on medical grounds	Optional Additional covers
Pests and diseases	Fire, Smoke, lightning	Flood and/or inundation
Drop in yield	Theft	Subsidence and landslide

Source: Author's compilation [14]

Livestock includes cattle (dairy and beef), sheep and goat poultry (Broilers and layers), pigs, horses, pets, dogs, and fish.

Insurance Clauses, Warranties, and Extensions

Below are some clauses, warranties, and extensions usually contained in insurance policies that must be properly scrutinised with the professional input of insurance brokers while procuring insurance policies for the farm.

Identification of Farmland and Property Insured Clause

The property covered by the policy is declared the only property of such description so situated and belonging to the Insured.

Diseases and Pests Extension

The policy extended must cover loss or damage caused by named diseases and pests.

Riot, Strike and Civil Commotion

The policy is extended to cover losses or damage resulting from riots, strikes, and civil commotion.

Excess Clause

In the event of any claim for which the insurer is liable, the insured shall be responsible for 10% of ₦250,000.00 of each and every claim approved for settlement, whichever is greater. The farmer must note this clause, especially in cash flow projection after the occurrence of a peril.

Long-Term Agreement

A discount of 7.5% is allowed off the net premium on the policy where the insured engaged themselves to continue the insurance policy or policies for the period of 5 years.

Bush Fire Extension

The policy is extended to include damage (by fire or otherwise) of or to the property insured directly caused by the burning, whether accidental or otherwise, of forest, bush or jungle and the clearing of lands by fire.

Malicious Damage Extension

The policy is extended to cover loss of or damage to the property insured directly caused by malicious acts of any person, such as pouring harmful chemicals into a fishpond.

Compliance with Risk Improvement Recommendations

The insured is expected to comply with the risk improvement recommendations stated in the policy. For example, all felled logs of rubber trees in the farm must be thoroughly evacuated from the farm before the commencement of replanting of new trees. The insurer will not be liable for any loss or damage in the insured plantations arising from fire damage aggravated by the non-evacuation of these felled trees. Agricultural farm insurance premiums range from 0.4 to 2.5%

A study of the connection between Insurance penetration in Nigeria and economic growth between 2004 and 2017 [16] revealed that non-life insurance penetration and insurance density had a negative impact on economic growth, while life insurance penetration and claims settlement had no significant impact. The scholar recommended an intensive campaign to deepen Insurance penetration in the country. A similar study was carried out on the nexus between agricultural insurance and agribusiness performance by [17] using a survey of 260 Small and medium agricultural businesses, out of which 40 were intensively analyzed. The research revealed that agricultural insurance was not significant in the performance of the selected agricultural business. Through regulation and the creation of incentives, the government must do much to deepen both regular life and non-life insurance and agricultural insurance in Nigeria.

Methods and Results

The paper is a qualitative analysis of risks inherent in agribusiness. The objective is to contribute to the discussions on agribusiness risks and their role in agricultural production practices, national food security and economic development. The paper identified the risks and uncertainties a farmer or entrepreneur experiences in agribusiness, producing crops and livestock for the consumer through an extensive literature review. The risk

management strategies and tools available for farmers to cope with or avoid the risks were discussed.

The results tallied expectations that agriculture and agribusiness are prone to risks and uncertainties because they involve living plants and animals, which are subject to the dictates of nature. The study identified the sources of risks and uncertainties in agribusiness, strategies, and tools for mitigating the risks, and the stakeholders: farmers/entrepreneurs in the value chain, financial institutions, governments, and donor agencies. The role of insurance, which is a veritable tool for transferring risks to third parties through premium payment, was also examined in the study.

Discussion and Conclusion

Agriculture is exposed to risks and uncertainties because it is a business associated with living plants and animals and highly depends on nature. Agribusiness involves making decisions based on available information on input prices, output, yield, and technical matters. The outcome of these decisions is uncertain. If not effectively handled, agribusiness risks can cause business failure, food chain disruption, and aggravation of food security crisis.

The paper explained the two broad strategies for managing risks faced in agribusiness: on-farm strategy or strategies to manage the risk with others. The risks can be segmented into two: business and financial risks. Business risk is the aggregate effect of production, market, institutional and personal risks. *Financial risk* is the risk associated with the way the business is financed. The paper discussed the strategic approach to managing risks and tools like production, diversification, flexibility, and insurance. The study revealed that Nigeria's conventional and agricultural insurance penetration is shallow, as procurement of agricultural insurance policies is only tied to bank credit. Policy measures must be put in

place to ensure farmers who use their resources also embrace insurance schemes to protect their capital in case of any unforeseen risks and uncertainties.

The key stakeholders in agribusiness risk management identified in the paper are the farmers/producers, financial institutions, government, and international donors crucial in developing nations like Nigeria. The stakeholders must work together to minimize agribusiness risks and uncertainties, essential for transforming food production practices. The farmer/producer is central in these processes as the beneficiary of rewards for taking risks. The country, however, needs to be food secure as this is essential for sustainable economic growth and development.

Recommendation

The paper has established that risk management is central to the transformation of agricultural production practices, enhancement of profitability of agribusiness, and achievement of national food security. The risks inherent in every segment of the agricultural value chain must be identified and evaluated for a coordinated approach to deploying resources by the entrepreneur to minimize, monitor, and control the probability or impact of unfortunate events or to maximize the realization of investment objectives. The stakeholders in risk management, such as the farmer/producer, government, financial institutions, and donor agencies prevalent in developing nations, must work assiduously to identify, mitigate, transfer or cope with the risks in agribusiness to ensure food security in the country.

Acknowledgement

This study has benefitted from the encouragement, support and goodwill of some individuals and organizations to whom we must show appreciation. We are grateful to Professor Sulaiman Yusuf of the University of Ibadan, Dr Tunde Oluwalaiye of Backcock, both my Guide and Co-guide, Professor Prof Ayodeji Dairo of

Ekiti State University, Nigeria, Dr Wasiu Yusuf of Nile University Abuja, Nigeria and Dr Bode Agunbiade of Mewar University Masaka Nasarawa State, Nigeria

Conflict of Interest

Reference

[1] Nigeria is at a critical juncture, charting a new course. Presentation by Shubham Chaudhuri. World Bank Director Nigeria at the Symposium on economic opportunity pathways to navigating post-reform challenges in Nigeria University of Ibadan August 16, 2023.

[2] GFSI, 2022, https://impact.economist.com/sustainability/project/food-security-index/reports/Economist_Impact_GFSI_2022_Global_Report_Sep_2022.pdf

[3] Erhun, M. O., 2019, A Legal Framework for Sustainable Agricultural Practice in Nigeria. <https://doi.org/10.3968/11307>

<https://docs.specollective.org/introduction/knowledge-base/applied-sciences/sustainable-agriculture>

[4] Agriculture | SEAGROW. <https://www.seagrow2u.com/agriculture-1>

[5] Goldberg, R. A., & Davis, J. H., 1957, A concept of agribusiness. *Harvard University, Boston*.

[6] Chidiebere-Mark, Nneka M., et al., 2014, "Factors Influencing the Disbursements of Loans from Selected Commercial Banks to Small-scale and Medium-scale Agro-based Enterprises in Imo State, Nigeria." *Agricultura Tropica Et Subtropica*, 2014, <https://doi.org/10.2478/ats-2014-0010>.

[7] Porter, M. E., 2001, The value chain and competitive advantage. *Understanding Business Processes*, 2, 50-66.

[8] Agriculture | SPEC. <https://docs.specollective.org/introduction/knowledge-base/applied-sciences/sustainable-agriculture>

[9] Amusat, A. S., Oyedokun, M. O., Omisope, E. T., & Egbetokun, O. A., 2023, Risk Management in Agricultural Business: Insurance as a Viable Option

I, Abolade Agbola, declare that there is no conflict of interest in the data collection, literature review, writing of the manuscript and its publication by the Journal.

in Nigeria. *Journal of Experimental Agriculture International*, 45(8), 49-53.

[10] Jagtap, Sandeep, Hana Trollman, Frank Trollman, Guillermo Garcia-Garcia, Carlos Parra-López, Linh Duong, Wayne Martindale et al., 2022, "The Russia-Ukraine conflict: Its implications for the global food supply chains." *Foods* 11, no. 14 (2022): 2098.

[11] Huirne, R. B., Meuwissen, M. P., Hardaker, J. B., & Anderson, J. R., 2000, Risk and risk management in agriculture: an overview and empirical results. *International Journal of Risk Assessment and Management*, 1(1-2), 125–136.

[12] Brealey, R. A., Myers, S. C., & Marcus, A. J., 2023, *Fundamentals of Corporate Finance*. McGraw-Hill.

[13] Kay, R. D., Edwards, W. M., & Duffy, P. A., 2023, *Farm Management*. McGraw Hill, 2012 Edition

[14] Agbola, A. I., 2014, Agricultural Finance: A practical guide for lenders and entrepreneurs. Published by the Chartered Institute of Bankers of Nigeria Press Limited Hardaker, J. B., Lien, G.,

[15] Duong, T. T., Brewer, T., Luck, J., & Zander, K., 2019, A global review of farmers' perceptions of agricultural risks and risk management strategies. *Agriculture*, 9(1), 10.

[16] Fadun, O. S., 2021, Nexus between insurance penetration and economic growth: Evidence from Nigeria. *Nigeria Journal of Risk and Insurance*, 11(1), 20–36.

[17] Stephen, O. B., Odum, E. E. B., & Matthew, A. O., 2021, Production Efficiencies of the Nigerian Agricultural Insurance Corporation (NAIC) Insured and Non-NAIC Insured Livestock Farmers in Kwara State, Nigeria. *Turkish Journal of Agriculture-Food Science and Technology*, 9(1), 50–55.