



EFFECT OF AGRIBUSINESS ON IRISH POTATO FARMER'S INCOME: EVIDENCE FROM MANGU L.G.A OF PLATEAU STATE

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Abstract

Agriculture is key to achieving food security, it is important to recognize the contribution of agribusiness in boosting yield, productivity and improving farmers' income in an economy. The study examines the effect of agribusiness on Irish potato farmers' income in Mangu LGA of plateau state. The study adopted the binary probit regression and Average Treatment on Treated (ATT) method of analysis to evaluate the effect of agribusiness on Irish potato farmers' income. The finding showed that the coefficient of ATT is positive and t-statistics (2.35) is greater than two (2), which clearly demonstrates that benefiting from agribusiness have a significant positive effect on Irish potato farmers income in the local government area at 5% level of significant. The study concluded that adopting agribusiness in potato production will significantly increase yield that will be sold for more income to the farmer. The study recommends that the local government council chairman through the department of agriculture in the LGA should collaborate with Plateau State ministry of industry and commerce to create an avenue where Irish potato can be commercialized not only in the domestic market but at the international market for higher bargaining power and income to potato farmers.

Keywords: Agribusiness, Income, Average Treatment on Treated (ATT)

1. Introduction

Agriculture has long been recognized as a key sector for poverty alleviation and rural development, globally an estimated 2.5 billion people depend on agriculture with majority being smallholder's farmers in rural areas relying on farming for livelihood. Agriculture is the backbone of every developing economy including Nigeria, employing more than 80% of the country's workforce (Taiwo, 2023). Awadhesh, Mahesh, Milind, Sunil, Shakuli and Wajid (2024) noted that a 1% increase in agriculture in agricultural productivity will lead to a 0.6-1.2% reduction in poverty, this is because higher yields and better prices for crops translate into higher incomes for famers allowing them to meet their basic needs. However, farmers are often poor and have low incomes and agricultural activities are organized and implemented by family farm. They are confronted by continued population growth, economic

liberalization, globalization and declining production condition which accounted for weak negotiation and bargaining power in the market transactions and other business activities (Qianying etal 2020). Yashasvie, Abhay and Deepak (2023) noted that farmers faced problem in accessing the markets due to the existence of small-scale farming system and market imperfection, access to credit and certified inputs and also new production techniques therefor, the modernization of agriculture is essential to increase productivity in order to meet the need of this population.

Agribusiness is the modernization and commercialization of agriculture, which entails market orientation of agricultural production and marketing process. It is the industry that involves the production, processing, distribution, and marketing of agricultural products, it is a broad term that encompasses a wide

range of business from farmers to input suppliers to processors to distributors and to retailers. Agribusiness is a major contributor to the global economy, it accounts for over 10% of global GDP (Yashavsvi, etal 2023). The agribusiness sector is important in providing food and other products for people around the world, it also creates jobs and generates economic activities. The agricultural sector has become increasingly important for economies all over the world, nations are looking for new and innovative ways to utilize their farmland and reap the benefits. This has led businesses within the industry to develop new production, processing and distribution methods that involve integrating with other companies to improve overall efficiency.

Samson and Nteboheng (2021) noted that agribusiness is a key means to promote farmers income and an important prerequisite for solving farmers problem, it has the absolute advantages in terms of information access and transaction cost, it encourages the formation of cooperatives, farmer's producers organization and agribusiness clusters where farmers can collaborate and pool their resources through collective market procurement of inputs, join investment in infrastructure, farmers gain greater bargaining power and access to markets. The agribusiness sector is a major contributor to the Nigerian economy, it accounting for over 25% of its GDP in 2020, Taiwo (2023).

Furthermore, Atayi, Ilugbusi, Nkire and Akanmu, (2021) added that agribusiness enhance productivity of farmers by providing access to technology, credit and training that increase yield that improve income. Higher productivity in agriculture stimulates higher wages and income opportunities for farmers as they produce more output at a lower cost, agribusiness entails the supply of farm input which boosts productivity and yield, these enable farmers to produce excess output and have competitive advantage in the wider market for more income. Irish potato is one agricultural output produce in Mangu Local Government Area (LGA) of Plateau State with great potential of generating huge income to farmers to improve their standard of living (Panwal, 2018).

Irish potato is a staple crop in Mangu LGA which its productivity needs to be increased tremendously because of it multiple benefits. It's the world's fourth largest food crop in terms of production after maize, rice and wheat. Irish potato is an annual crop that contains high nutritional value. It provides a reliable source of income, food and employment to many. Given the importance of Irish potato, it is one realistic venture for food security and revenue generation to farmers in the local government area (Ogheneuemu & Dominic, 2020). In addition, to increase farmers income, the Nigerian government has launched a number of programmes, including the Anchor Borrowers Programme(ABP) aimed to increase farmers income from 20% - 30% but has failed due to political interference, logistics and administrative problems and in Plateau State, the government introduced the Plateau State Potato Value Chain (PS-PVCP) and rebranding the crop as plateau potato to boost its market value for greater income but this equally failed to increase income due to its inability to provide modern input such as tractors and fertilizer to boost productivity that will be sold for more income. However, with the important role of Irish potato in improving farmer's income, rural farmers in Mangu LGA have continue to experience weak negotiation and bargaining power in the market transaction with low income. Irish potato farmers are still wallowing in object poverty battling with low productivity, low output that accounts for low income (Panwal, 2018).

In addition, the choice of Irish potato among other crops is due to the fact that the crop has the capability of generating greater profit due to short time of production, Sinani (2024) noted that the crop has shorter producing period of 3 months as compare to maize that requires 4 to 5 months, this rapid maturity period provide advantage to increase production that would be sold to generate more income. More so, the crop has the ability to provide food security with its richness in minerals and vitamin, such a profitable crop has been neglected and giving less attention.

Lastly, this research differs from prior studies in that it examines the effect of agribusiness on Irish potato farmers income in Mangu LGA of plateau state (knowledge gap) unlike other studies who investigates on Small-Scale Irish Potato Farmers Income in Plateau State by Hudu, Ahmad, Yusuf, Saleh and Abdullahi (2018), Ogheneruemu and Dominic (2020) examines Irish-potato farming in plateau state, Nigeria: a profitability analysis and Asfaw (2022) conducted a research on determinants of farmer's potato income, all the authors above have not provided what will increase or determine farmers income but this research aim to close this gap. Moreso, the study closes a methodological gap by employing the Average Treatment on Treated effect (ATT) which none of the reviewed studies have used, this enriches the existing literature. Combining Probit regression and ATT provides a robust result which none of the reviewed authors have used.

It is against this backdrop that this study seeks to examine the effect of agribusiness on Irish potato farmer's income in Mangu LGA of Plateau State. The second section reviews the theoretical and the conceptualization framework and existing based literature. The third section presents the methodology of the study while the fourth section present the result and discussion as the fifth section concluded and offer recommendations

Hypothesis of the Study

Ho: Ho: Agribusiness has no significant effect on Irish potato farmer's income in Mangu LGA. of Plateau State.

2. Literature Review

2.1 Conceptual Clarification

2.1.1 Agribusiness

Fabricio, Paiva and Karim (2022) defined agribusiness as a complete value chain in agriculture from the raw materials and resources necessary to create a biological product to distributors and retailers that get products to consumers. This implies that the production of agricultural output from its inception including the

implements use for production at various stages add value to the output till it reaches the final consumer. Agribusiness is not limited to only crop farming alone, it encompasses abroad spectrum through the agribusiness system which include input supplies, value addition, marketing, entrepreneurship, micro financing and extension.

Clement and Adzor (2020) noted that agribusiness is the entire agricultural activities that include the production, supply of inputs, processing, transporting and marketing of agricultural and related products, Afolabi (2020) added that the chain involved in agribusiness (inputs supply, production, harvesting, processing, transporting and marketing) adds value to the products and thereby increases the net profit. Furthermore, Eko (2019) defined agribusiness as all enterprises derived from and around agricultural production (food production, seed supply, agrichemicals and farm machinery), distribution, processing, marketing and retail sales.

Narendran and Ranganathan (2019) denote that "agribusiness is the collective business activities that are performed from farm to fork". It covers the supply of agricultural output, the production and transformation of agricultural products and their distribution to final consumer. It's one of the main generators of employment and income, although agriculture producers are central to agriculture, agribusiness ecosystem enhances and adds value to its products to deliver compelling value to the end consumers. Agribusiness involves three sectors which are the input sector, farm sector and product sector. Mudiwa (2017) defined agribusiness as the commercialization of agriculture, which refers to market orientation of agricultural production and marketing process. This entails that agribusiness also see to the transition of agriculture from subsistence to commercial level. It is a system that is made up of thousands of businesses ranging from the small producers to large corporations. Agribusiness has to do with management that derives and directs the firm, farms and food companies which come together in the whole agribusiness system.

Sunday and Chinedu-Eze (2016) defined agribusiness as the coordinating science of supplying agricultural production inputs and subsequently producing, processing, and distributing food and fibre. In addition, Ravindra and Sweta (2015) opined that the concept of agribusiness includes all farms and firms involved in producing, harvesting, packing, processing, preserving, distributing, marketing, and disposing of food and nonfood agricultural products. Those activities could be classified into the following categories: agriculture, processing, trade and transport, food services, hotels, and inputs.

This study adopted the definition as put forward by Afolabi (2020), this definition sees farming as a business which Irish potato farmers in Mangu Local Government Area of Plateau State will transform Irish potato farming into a modernize farming where the chain of activities around potato production to processing and marketing will add value to the crop and guarantee net profit to farmers.

2.1.2 Income

Income consists of improvements in a company's financial position, either through growth in assets or the discharge of liabilities, resulting from the normal revenue-generating activities of the business (Financial Accounting Standards Board, 2023). John (2017) noted that income is the basis for assigning tax burden for distribution, transfers and for broader normative issues of inequality and justice. According to International Accounting Standards Board (2018) they described income as an increase in a company's net assets during a reporting period that arises either from growth in assets or from reductions in liabilities, provided that these changes are not due to investments or contributions made by shareholders. Josef (2014) opined that income is the money received in exchange for labour or products. Its definition varies based on context such as taxation, financial accounting or economic analysis. Furthermore, income is the increase in wealth (savings) plus consumer spending over a period of time such as a year Carrera and Beaumont (2011). Goodwin and Featherstone (2003) maintained that the concept income can be seen as a reward that the

owners of a fixed factors of production receive as a result of allowing their land, capital and labour to take part in production. In addition, income is the flow of resources that households receive that may be spent on consumption and on saving (Simons, 1938). Hicks (1939) noted that income represents the highest level of consumption a person can sustain over a period while preserving their capital intact, ensuring their economic well-being is unchanged by the end of that period. Lastly, Haig (1921) defines income as the sum of an individual's consumption during a given period and the change in their net worth that is assets minus liabilities over that same period.

2.2 Theoretical Framework

Classical Theory of Entrepreneurship

The classical theory was propounded by Adam Smith 1776 and also propagated by the likes of Ricardo the theory upholds the virtues of free trade, specialization and competition. The theory was the result of Britain's industrial revolution which took place in the mid-1700 and lasted until the 1830s. The classical movement described the directing role of the entrepreneur in the context of production and distribution of goods in a competitive market place. Classical theorists articulated three models of production they are land, capital and labour. The applicability of the classical theory to the current research work is in the aspects of upholding the directing role of entrepreneurship in enhancing agricultural production or productivity, distribution and competitiveness in the market as put forward by the theory.

Profit-maximizing Peasant Theory

The Profit-maximizing Peasant Theory was put forward by Schultz in 1964. Schultz attempts to explain how farm households in developing countries are poor but yet very efficient. He describes the peasant production mode as profit-maximization behavior, but that farmers lack access to new profitable inputs and the knowledge to use them. Schultz further noted that efficiency is defined in a context of perfect competition, that where producers all apply the same prices, workers are paid according to the value of their marginal product,

inefficient firms go out of business, and entrepreneurs display non diminishing marginal utility of money income.

This study is anchor on both the reviewed theories to examine the effect of agribusiness on Irish potato farmer's income in Mangu LGA of Plateau State. The profit-maximization peasant theory is relevant in the Nigerian context as a developing economy. It explains that farmer aim to maximize returns but are constrained by limited access to modern agricultural outputs such as machinery and improved technologies. In Mangu LGA, Irish potato farmers remain poor largely because they lack these productive enhancing resources, which limits output, competitiveness and income generation. The classical theory further emphasis the adoption of modern way of farming to enhance efficiency and market competitiveness. Adopting improved technologies and techniques will increase Irish potato production, strengthen market competitiveness and significantly raise farmer's income in Mangu LGA of plateau state.

2.2 Empirical Review

Asfaw (2022) conducted research on determinants of farmer's potato income in Kofale district, Ethiopia. The study has the primary aim of examining smallholder farmers' income and reduce rural poverty in Kofale. Using multiple linear regression (OLS) the result indicated that the potato supply to market is significantly affected by family size and amount of potato produced, frequency of extension contact and access to market information affect it positively, it therefore concluded that extension workers have greater role in educating famers so as to boast production for higher marketability and improvement of farmers income, it recommended that government, stakeholders and concerned bodies need to focus on facilitating increase productivity of potatoes, strengthen extension service and disseminate market information to producers so as to improve potato production and income. The study failed to look at factors such as agribusiness to influence higher income in potato venture.

A related study made by Ogheneruemu and Dominic (2020) on Irish-potato farming in plateau state, Nigeria: a profitability analysis. The study has the main aim of examining income of potato farmers gain from the profit made from selling Irish potato, using probit regression model the result indicated that Irish potato farming is profitable with most (53.97%) farmers at high income level. The study concluded that increasing agrochemicals, reducing farm size and labour and being a male farmer will improve profitability level of Irish potato farms. The study recommended that increased use of agrochemicals and more efficient use of labour and farm land be encouraged among potato farmers so as to increase their income level. The study restricted potato production to only male farmers neglecting their female counterpart who also contribute significantly in potato production which equally increase income and also neglect the use of tractor in potato production that will subsequently generate more income to famer, this study seeks to fill this gap via agribusiness.

Study of income comparison on potato farmers between panenmart's partners and non-partner, Amran, Hussain and Andi (2020). Using the independent sample test the result showed that there is no significant difference between the income of partners and non-partners farmers, the study brings to light income generated by potato farmers however, it fails to look at the variable that led to income of potato farmers which the current work seeks to address.

Research conducted by Hudu, Ahmad, Yusuf, Saleh and Abdullahi (2018) on the analysis of Small-Scale Irish Potato Farmers Income in Plateau State. Using Gross Margin Analysis for data analysis, the result revealed that the production of Irish potato was found to be profitable with a mean income of N48, 400 per ha and returns on investment (ROI) of N1.34 and the study concludes that Irish potato production is a profitable enterprise. The study therefore recommended that policy makers and all stakeholders in the Irish potato value chain should device motivational package that will encourage youths to participate in farming and also

more extension specialists, the study failed to point out what lead to the increased income in Irish potato enterprise which the current study intent to fill with examining the effects of agribusiness n potato farmers.

Examining the economic analysis of farm income distribution on potato specialized farms in Agra District of Uttar Pradesh, Virendra, Chaurasia and Sharma (2002) using the Gini concentration ratio of Lorenz curve the result revealed that the income pattern of the potato specialized farmers was quite different from one farm size-group to the other. The small farmers earned a considerable share of their income from other sources, the study strongly recommended for small farmers to earn more income from Irish potato they will have to expand productivity through using quality seeds fertilizer, plant protection chemicals and other requisite technical know-how. The study gives understanding to income of potato farmers however, the current study will fill the gap in location where the studies are carried out, the study was carried out in India which is more developed than Nigeria.

3. Methodology

This study's empirical analysis is based on primary data obtained from the field for the year 2025. The instrument used for generating data for the research work is the questionnaire and a total of three hundred and sixty-four (364) respondents were selected using purposive sampling technique for the study. the choice of Mangu LGA of Plateau State was influence by the fact that the local government area (Mangu), having the

largest commercial market on the plateau state but yet farmers continue to suffer low price and lower income as compared to other agricultural outputs such as maize in the local government.

3.1 Model Specification

To estimate the effect of agribusiness on Irish potato farmers income in Mangu LGA, this paper utilized the Average Treatment on Treated (ATT). The model is specify as follows:

$$t = \sum(\phi_{1i} - \phi_{0i} / \beta = 1) = \sum(E(\phi_{1i} - \phi_{0i} / \beta) = 1, P_X) \dots (1)$$

$$\rightarrow t = \sum(E(\phi_{1i} / \beta) = 1, P_{(X)}) - E(\phi_{0i} / \beta) = 0, P_{(X)} / \beta = 1. (2)$$

Where ϕ_{1i} = Estimated outcome when a respondent is a potato farmer (Treatment groups)

ϕ_{0i} = Estimated outcome when respondent is not potato farmer (Control groups).

3.2 Test of Validity

Validity test is a fundamental test in primary study as it proposes the extent to which the instrument measures the critical components of the instrument being scrutinized. In this study, it was achieved using content validity index (CVI) outlined by Amin (2005) and stated thus: CVI =

$$\text{Number of items declared valid}$$

$$/ \text{Total number of items in the questionnaire construct} \dots \dots \dots 3$$

the result is presented on table 1

Table 1: Result of the Validity Test

S/N	Experts	Number of valid items	Number of Items	CVI	Remark
1	Assessor 1	324	340	0.98	
2	Assessor 2	302	310	0.90	
3	Assessor 3	306	320	0.93	
4	Assessor 4	311	325	0.97	
	Overall			0.95	Acceptable

Source: Extracts from Eviews

The findings from table 1 showed the content validity index (CVI) of the study is 0.95. This value is considered valid given the benchmark of 0.7 suggested by Lawshe (1975).

Test of Reliability

Reliability test is another important measure of the quality of the measurement of the instrument. Therefore, a measuring instrument is assumed to be reliable if the results provide by the instrument are consistent with the set of variables it planned to measure. In this study, reliability test was achieved

using Alpha Crunch method given by the formular: $R = \frac{Nr}{1 + r(N-1)}$

Where R = Alpha crunch method, N = Number of items in the scale, r = the mean of the inter item correlation. The reliability test value lies between 0 and 1. The value of 0 signifies no reliability and 1 suggests very high reliability. Nevertheless, to Hinton, Brownlow, McMurray and Cozens (2005), reliability test value above 0.75 is generally accepted as highly reliable. The test of reliability for this study is presented on table 2.

Table 2 Result of Reliability Test

S/N	Question construct	Reliability test	Number of items	Remark
1	Agribusiness and Irish potato farmer's productivity	0.89	12	Reliable
2	Agribusiness and Irish potato farmer's competitiveness	0.84	5	Reliable
3	Agribusiness and Irish potato farmer's income	0.88	5	Reliable
	Overall average	0.87	22	Reliable

Source: Extracts from Eviews

The findings from table 2 shows that on average, Alpha crunch test of reliability carried out on twenty-two (22) items of the questionnaire's construct is 0.87. The finding implies that the instrument for data collection is not only reliable but robust enough for estimations.

4. Results and Discussion

To achieve our objective, binary probit regression, propensity score matching and average treatment effect on treated were utilized. These were found appropriate because while binary probit regression reveals which of the agribusiness variable or variables are most influential in affecting Irish potatoes farmers' competitiveness and income, propensity score matching was utilized to group the respondents or participants into treatment group (Irish potatoes farmers benefiting from agribusiness facilities) and control group (Irish potatoes farmers not benefiting from agribusiness facilities). However, for farmers to experience improvement in their quality of life, the income of the

Irish potatoes farmer who benefited from agribusiness facilities must improve. Thus, the imperative of estimating the average treatment effect on treated (ATT). This is because while the positive sign of the ATT shows improvement in farmers quality of life as a result of improvement in income, the size of the coefficient of ATT shows the extent of the improvement.

Also, the pre – condition for propensity score matching is the estimation of the binary probit model. Thus, the binary probit regression was employed to first determine the component of agribusiness facilities influencing Irish farmers' income in Mangu L.G.A. It is when this is done that the propensity score matching was applied to estimate the effect of various agribusiness facilities on Irish potatoes farmers' income. The result of the binary probit model is presented on table 3

Table 3: Results of binary probit regression on the effect of agribusiness on Irish farmer's competition and income.

Dependent var (competition and income)	Competition	Income
Increased Irish potatoes output	0.527** (0.004)	0.931* (0.001)
Improved quality of Irish potatoes output	0.373* (0.001)	0.398** (0.003)
Improved variety of Irish potatoes seedling	0.470** (0.004)	0.273** (0.003)
Improvement in income	0.683* (0.001)	0.269** (0.003)

Source: Extracts from Eviews probability values in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The findings from table 3 revealed positive effect of agribusiness indicators and Irish potato farmer's income. This suggests that improvement in agribusiness have the likelihood of enhancing the competitiveness and income of the Irish potatoes' farmers. Also, the findings from the binary probit revealed that income of Irish potatoes farmers are the most affected by agribusiness. Therefore, since the binary probit regression suggests an improvement in the income of Irish potatoes farmers, the condition for conducting the average treatment effect on treated is being satisfied. As stated in the methodology the first step in applying the propensity score matching approach is to apply the binary probit regression to estimate the agribusiness indicators that is influential in affecting income of Irish potato farmers. This is followed by the application of propensity score matching to estimate the effect on income by applying an appropriate matching technique.

Given the above, to estimate the observed difference in Irish potatoes farmers' quality of life after engaging Irish potatoes farming, the study utilized propensity

score matching with Kernel nearest neighbor matching and bootstrapped standard error. This is found appropriate because in the absence of baseline data, the propensity score matching becomes the most appropriate tool to estimating the observed difference in the wellbeing of Irish potatoes farmers after engaging in the farming. The Kernel nearest neighbor ensures that both the treatment and control groups have similarity in terms of the probability of experiencing improved income from the agribusiness activities. Therefore, what accounts for wellbeing differential between the treatment and control groups is the enhanced income obtained from engaging in Irish potatoes farming. This necessitates the use of Average Treatment Effect on the treated (ATT) or difference in difference. It is also important to note that in the context of this study, the numbers of treated and controls are the nearest neighbor matches. Thus, while the ATT measures the wellbeing effect, the t – statistics measures the extent of the statistical significance of such effect. The result of ATT is shown on table 4

Table 4: Result of ATT Estimation

No. of treatment	No. of control	ATT	Std error	t-statistics
345	15	3708	1578.9	2.35

Source: Extracts from Eviews:*** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$

The result on table 4 shows that given that the coefficient of ATT is positive and the t – statistics (2.35) is greater than two (2), it clearly demonstrates that

benefiting from agribusiness have significant positive effect on Irish potatoes farmers income at 5% level of significance.

Testing of the hypothesis

To test hypothesis which states that agribusiness has no effect on Irish potatoes income the t – statistics value of the average treatment effect on treated was utilized. Thus, owing that the t – statistics value of the 2.35 is greater than 2, following the rule of thumb the study is inclined to reject the null hypothesis that agribusiness has no effect on Irish potatoes farmer's income and accept the alternative hypothesis that agribusiness has effect on Irish potatoes farmers income in Mangu L.G.A of plateau state.

5. Conclusion and Recommendations

The study examined the effect of agribusiness on Irish potato farmer's income in Mangu LGA showing how agribusiness and farmer's income interact. The findings emphasize the importance of agribusiness in enhancing Irish potato farmer's income in Mangu LGA of Plateau State. The numerous significances of agribusiness in increasing productivity, access to market, improve bargaining power and market competitiveness account for higher income by the farmers in the LGA. More so, the favourable climate in Mangu LGA supports Irish potato production so, adopting agribusiness, farmers

will witness higher productivity that stimulates higher wages and income opportunities for them as they produce more output at a lower cost. This is shown in the result to have a positive significant effect on farmer's income.

Finally, since agribusiness has a positive effect on Irish potato farmer's income in Mangu LGA, the implication of this result is that the local government council chairman through the department of agriculture in the LGA should collaborate with Plateau State ministry of industry and commerce to create an avenue where Irish potato can be commercialize not only in the domestic market but at the international market for higher bargaining power. Lastly, soft loans and grants be provided to farmers with long term payment duration to enable them access modern farm implement, this will improve potato yield that will be sold for greater income and also, the plateau state government should collaborate with the bank of industry to provide firms that will process Irish potato output into finish or semi-finish goods this will add value and generate more income to farmers.

Reference

- Afolabi, A. (2020). The effect of entrepreneurship on economy growth and development in Nigeria. *International Journal of Development and Economic Sustainability*, 3(2), 49-51.
- Awadhesh K.S., Mahesh P., Milind D.J., Sunil K., Shakuli K. and Wajid H. (2024). The Role of Agriculture in Poverty Alleviation in Rural Development. *Journal of Scientific Research and Reports*, 30(8), 530-531.
- Asfaw, N.S. (2022). Determinants of Farmers' Potato Marketing in Kofale District, West Arsi Zone, Oromia Regional State, Ethiopia. *International Journal of Business and Economics Research*, 11(3), 140-146.
- Amran F.D., Husain, T.K. & Andi A.A. (2020). Study of Income Comparison on Potato Farmers between Panenmart's Partner and Non-Partner. *Journal of Indonesian Applied Economics*, 8 (2), 1-9.
- Atayi, A.V., Ilugbusi, B.S., Nkire, N. L. & Akanmu, A.A.(2021). Entrepreneurship, Agricultural Value-Chain and Exports in Nigeria. *United International Journal for Research & Technology*, 2 (8), 1-4.
- Carrera S. & Beaumont J. (2011). Income and Wealth. *Social Trend*, (41) office for National Statistics <https://doi.org/10.1057/st.2011.10>
- Clement C. M., & Adzor, I. (2020). Entrepreneurship through Agriculture in Nigeria. *Journal of Business and Management Research*, 9(1), 35-37.
- Eko, P. (2019). The reliability of entrepreneurial productivity as driver of economic growth and employment. *International Journal of Entrepreneurship*, 23(4), 1-11.
- Fabricio O.L., Paiva E.L. & Karim M.T. (2022). Agribusiness capabilities and performance: a systematic literature review and research agenda.

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- Financial Accounting Standards Board (2023). Accounting Standards Update No.2023-03: Presentation of Financial Statements (Topic 205) and related updates. Norwalk, CT: Financial Accounting Foundation.
- Goodwill B. & Featherstone A. (2003) Modelling Change in the Demand for a crop insurance during the 1990s. *agricultural finance review*, 63 (2) 109-111.
- Haig, R. (1921). The federal income tax: A series of lectures delivered at Columbia University in december, 1920. New York; Columbia University Press
- Hicks J. R. (1939). Value and capital: An inquiry into some fundamental principles of economic theory. Oxford, England: Clarendon Press
- Hudu, M. I., Ahmad, M. M., Yusuf, M., Saleh, I., & Abdullahi, A.Y. (2018). Analysis of Small-Scale Irish Potato Farmers Income in Plateau State. Sustainable Strategies for Enhancing Food Security & Livelihoods in Nigeria". 52nd Annual Conference of Agricultural Society of Nigeria. 22-26 October 2018. ARCN, Abuja.
- John R. (2017). The Concept of Income. Publishers Elite publishing House advance in agricultural economics.
- Josef (2014). Approach to Income and Expenses. IFRS Foundation
<https://www.ifrs.org/conent/dam/ifrs/meetings/2014/may/iasb/conceptual>
- Narendran, K., & Ranganathan, T.T. (2019). Agripreneurship for Rural Youth International. *Journal in Management and Social Science*, 3(8), 5-8.
- Ogheneruemu, O., & Dominic, M.G. (2020). Irish-Potato farming in Plateau State, Nigeria: a profitability analysis. *Covenant Journal of Business & Social Sciences*, 11(1), 1-13.
- Panwal, E.F. (2018). Resource Use and Productivity among Rain-Fed and Irrigated Irish Potato Producers in Plateau State, Nigeria. *Journal of Agriculture and Sustainability*, 11(1), 1-10.
- Ravindra, T., & Sweta, A. (2015). Rural development through Agripreneurship: A study of farmers in Uttar Pradesh. *Global journal of advance research*, 2(2), 535-537.
- Taiwo, O. (2023). The role of agribusiness in economic growth in Africa. *Journal of Agriculture Economics*. 45(3), 214-216.
- Samson N. A. & Nteboheng P.M. (2021). An Agentive View of the Determinants of Successful Agribusinesses at a Rural Community in the Eastern Cape Province of South Africa. *Academy of Strategic Management Journal*, 20(6), 1-8.
- Simon, H. (1938). Personal Income Taxation: the definition of income as a problem of fiscal policy. University of Chicago Press.
- Sunday C.E. & Chinedu-Eze V. (2016). Agripreneurship Curriculum in Nigerian Higher Institutions. *International Journal of Small Business and Entrepreneurship Research*. 4(6), 54-57.
- Mudiwa, B. (2017). Theories of Smallholder Agribusiness Entrepreneurship in the African Context: A Critical Review. *International Journal of Arts and Humanities*, 6(1), 225-226.
- Qianying Y., Haiyang C., Ling C., Wenjun Z. & Xinhai W. (2023). The phased impact of Agribusiness size on farmers income: Evidence from China. *Australia Journal of Resources and Agricultural Economics*. 34(1) 1467-1469.
- Virendra S., Chaurasia S. & Sharma J. (2002). An Economic Analysis of Farm income Distribution on Potato Specialised Farm in Agra District Uttar Pradesh. *Indian journal of Agricultural Economics* 57 (4) 742-744.
- Yashasvi R. Abhay G. & Deepak K. (2023). Impact of Agribusiness in Doubling Farmers Income. <https://www.researchgate.net/publication/372401398> DOI: 10.4324/9781003490111-7

Appendix

AGRIBUSINESS AND IRISH POTATO FARMER'S COMPETITIVENESS, INCOME AND WELLBEINGIN MANGU LGA

Questions	Strongly Agree	Agree	Strongly Disagree	Disagree	Undecided
Agribusiness has increased my Irish potatoes output					
Agribusiness has improved the quality of Irish potatoes output					
Agribusiness has made my access to improved variety of Irish potatoes seedling possible					
Agribusiness has improved my income					
Agribusiness has improved my quality of life					

ATT estimation with the Kernel Matching method Bootstrapped standard errors

n.treat. n.contr. ATT Std.Err. t
 345 15 3708.112 1578.878 2.349

componentnormalization:sumofsquares(column)=1

	Comp1	Comp2	Comp3			
BA4_1	.0564	-.2715	.1315	BA4_9	-.0304	0.0359
BA4_2	.1124	-.2419	.1648	BA4_10	0.0796	0.0638
BA4_3	.3572	-.02424	.002406	BA4_11	-.02172	0.3027
BA4_4	.2879	-.1216	.2322	BA4_12	-.02381	0.4310
BA4_5	.2931	-.05603	.1466	BA4_13	0.0141	0.2367
BA4_6	.3031	-.07991	.3094	BA4_14	-.01376	0.1731
BA4_7	.4826	.2365	-.2176	BA4_15	-.0308	0.2429
BA4_8	.4519	.2542	-.2706	BA4_16	-.01660	-.05427
BA4_9	-.03035	.03588	.5247			
BA4_10	.07961	.06375	.307			
BA4_11	-.2172	.3027	-.05479			
BA4_12	-.2381	.431	-.004964			
BA4_13	.01412	.2367	.1073			
BA4_14	-.1376	.1731	.4732			
BA4_15	-.03077	.2429	.007999			
BA4_16	-.166	-.5427	-.2361			

.predictpc1pc2pc3,score

Scoringcoefficients

sumofsquares(column-loading)=1

Variable	Comp1	Comp2	Comp3
BA4_1	0.0564	-0.2715	0.1315
BA4_2	0.1124	-0.2419	0.1648
BA4_3	0.3572	-0.0242	0.0024
BA4_4	0.2879	-0.1216	0.2322
BA4_5	0.2931	-0.0560	0.1466
BA4_6	0.3031	-0.0799	0.3094
BA4_7	0.4826	0.2365	-0.2176
BA4_8	0.4519	0.2542	-0.2706

BA4_1	0.2948
BA4_2	0.3597
BA4_3	0.5678
BA4_4	0.6569
BA4_5	0.4572
BA4_6	0.6380
BA4_7	0.6075
BA4_8	0.4722
BA4_9	0.4603
BA4_10	0.5382
BA4_11	0.3850
BA4_12	0.3817
BA4_13	0.5796
BA4_14	0.4520
BA4_15	0.3256
BA4_16	0.3482
Overall	0.4541