

LIVELIHOOD OUTCOMES OF AGRIBUSINESS-LED CONTRACT FARMING AMONG SMALLHOLDER MAIZE FARMERS IN KADUNA STATE, NIGERIA: EVIDENCE FROM THE TOMATO JOS OUT-GROWER SCHEME

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ABSTRACT

Agribusiness-led contract farming has increasingly emerged as an important mechanism for integrating smallholder farmers into commercial agricultural value chains. This research evaluated the livelihood outcomes associated with participation in the Tomato Jos Out-Grower Scheme among smallholder maize farmers in Kaduna State of Nigeria. Purposive sampling method was used to choose 180 active farmers from a group of 600 registered out-growers. Structured questionnaires were used to collect primary data, which was then analysed using descriptive statistics and multiple regression analysis. The results showed that most farmers are men (82.2%), own less than one hectare of land (96.7%), and rely on farming as their main source of income (72.8%). Multiple regression analysis revealed that farm size, land tenure, educational attainment, and income source significantly influenced livelihood outcomes among participating farmers. Taking part in the programme led to clear gains in crop yield, income, market access, and food security. Nevertheless, restricted access to credit persisted as the paramount limitation (97.8%). The study finds that contract farming led by agribusiness greatly improves the lives of smallholder farmers, but the results are different for people with different socio-economic backgrounds. Enhancing the efficacy of development initiatives requires policies that facilitate loan availability and secured land tenure arrangement.

Key words: agribusiness, contract farming, maize farmers, livelihoods, Nigeria

INTRODUCTION

Agriculture is still an essential part of Nigeria's economy, employing more than 70% of the rural population and adds to gross domestic products. Smallholders, who usually farm less than two hectares, uses family labour and little mechanisation, make up almost 88% of total output (NBS, 2022). Despite their importance in agricultural development, farmers still experience a lot of problems, such as inability to get inputs, credit, extension services, markets, as well as secured land tenure arrangement (FAO, 2021; World Bank, 2023). Maize is one of the Nigeria's most important staple foods, especially in Kaduna State, where its production reaches about 900,000 metric tonnes per annum (Tadama, 2023) and considered as food and a commercial crop.

In recent years, Nigeria has undertaken several agribusiness-led interventions to mainstream smallholder farmers into modern agricultural value chains. These include the Anchor Borrowers' Programme (ABP), commodity value chain development initiatives and various out-grower schemes promoted by private agribusiness firms and development agencies. These initiatives reduce transaction costs and production risks by providing farmers access to improved inputs, extension

services, production credit and guaranteed markets. There is empirical evidence that such programmes have contributed significantly to increasing crop productivity and yields among smallholder farmers. For example, research on the Anchor Borrowers' Programme found significant increases in maize yields and farm productivity driven by improved access to quality inputs and technical assistance (Yusuf *et al.*, 2024; Ejembi *et al.*, 2026).

Similarly, contract farming and out-grower schemes have been linked to increased farm incomes through increased productivity, reduced marketing uncertainties and improved price realisation (Bellemare and Bloem, 2018; Ton *et al.*, 2018). These schemes have not only increased income but also increased farmers' access to reliable output markets by connecting producers directly with processors and agribusiness companies, reducing the undue influence of exploitative middlemen (Meemken and Bellemare, 2020; Arouna *et al.*, 2021). Improved market participation has also resulted into improved household food security through increased availability of food, purchasing power and livelihood resilience among participating farming households (Ogutu *et al.*, 2020). Despite these documented benefits, information on

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livelihood outcomes of agribusiness-led contract farming among maize farmers in North-West region and particularly Kaduna State of Nigeria is limited, thus requiring further empirical investigation.

Maize is one of the major cereal crops grown in Kaduna State and it is central to the agricultural economy and food system of Northern Nigeria. Kaduna State, with favourable agroecological conditions, large arable land and a large population of smallholder farmers engaged in maize cultivation, is one of the leading maize producing states in the country. The production of maize has generally increased over the years due to the adoption of improved varieties, better agronomic practices and increased participation in government and private-sector agricultural interventions (NBS, 2022; Tadama, 2023). However, the average maize yields in the State are still far below the attainable potential of improved varieties due to constraints such as poor access to credit, low use of modern inputs, land tenure issues, and climate-related risks (Ammani *et al.*, 2012; Tadama, 2023).

Apart from the importance of maize in production, maize also plays a role in household food security as a major source of calories and dietary energy to both rural and urban households. The crop also provides income and employment opportunities for farm households, thus improving livelihood resilience and reducing vulnerability to food insecurity (Ameh *et al.*, 2020; FAO, 2021). Moreover, maize has a significant commercial value as a major raw material for the poultry, livestock feed, brewing, starch and food processing industries. With the increasing demand from agro-processors and feed manufacturers, maize has emerged as a strategic commodity in Nigeria's agricultural value chains, offering opportunities for market integration, income generation and agribusiness development among smallholder farmers (FAO, 2021; World Bank, 2023).

Contract farming has become a strategic agribusiness-led option to integrate smallholders into commercial agriculture in response to these issues. In these agreements, farmers and agribusiness companies commit to producing and supplying agricultural goods under predetermined guidelines; farmers usually receive inputs, technical support, and certain access to markets. The Tomato Jos Out-Grower Scheme in Kaduna State serves as a concrete illustration. Since at its inception in 2014, the organisation has assisted farmers through contract farming agreements, increasing income and productivity while advancing sustainable rural development (UNDP, 2023; Tomato Jos, 2024). Participating farmers cultivate maize as part of their crop rotation and revenue diversification strategy, despite the scheme's primary focus on tomato production.

Investment in agribusiness-led contract farming initiatives has increased in Nigeria. However, there is limited empirical evidence of the livelihood effects of such schemes on maize farmers, especially in

Kaduna State. Most of the current research has been focused on productivity results with less attention paid to wider livelihood indicators like income, food security, market access and household welfare.

This study therefore, assesses the contributions of the Tomato Jos scheme to smallholder farmers' livelihoods in Kaduna State, focusing on yield, income, food security, and constraints. The broad objective is to assess the socioeconomic characteristics, challenges, and outcomes of maize farming in Kaduna State under the agribusiness-led scheme, while the specific objectives were to (i) describe the socioeconomic characteristics of respondents; (ii) assess livelihood outcomes in terms of yield, income, food security and market access; (iii) examine the relationship between socioeconomic characteristics and livelihood outcomes; and (iv) identify production constraints and service needs of the respondents.

METHODOLOGY

Study Area

Participants in the Tomato Jos Out-Grower Scheme in Kaduna State, Nigeria, participated in the study. Kaduna State is situated between 9°02'N and 11°32'N and 6°15'E and 8°50'E in the North-West, Nigeria. With yearly rainfall between 1,000 and 1,500 mm and average temperatures between 24 and 34°C, the State has a tropical continental climate with distinct wet and dry seasons. The state's primary economic activity is agriculture, with the main crops grown being maize, sorghum, millet, rice, soybeans, and tomatoes. As one of Nigeria's top producers of maize, Kaduna State is a major centre for the growth of the agricultural value chain and agribusiness. An appropriate setting for analysing the livelihood outcomes of agribusiness-led contract farming is Tomato Jos, a private agribusiness company operating within the State that runs an out-grower programme that gives participating farmers better inputs, technical assistance, and market connections (NBS, 2022; Kaduna State Government, 2023; Tomato Jos, 2024).

Sampling Procedure

Out of the 600 registered out-growers in the sampling frame, 180 active farmers were chosen using a purposive sampling technique. Among the selection criteria were (i) readiness to supply information, (ii) accessibility, and (iii) active engagement in the plan. The sample size of 180 represented 30% of the registered out-grower population and was considered adequate for social science research (Taherdoost, 2017).

Data Collection and Analysis

Structured questionnaires addressing socioeconomic traits, agriculture inputs and restrictions, participation variables, and livelihood indicators were used to gather primary data. Journals, government publications, and Tomato Jos reports were the sources of secondary data.

Analytical Techniques

Both descriptive and inferential statistical techniques were used to assess the data gathered for the study in accordance with its goals. The socioeconomic characteristics, livelihood outcomes, and production limitations of the respondents were summarised and presented using descriptive statistics, such as frequencies, percentages, and mean scores.

In particular, frequencies and percentages were used to examine Objective 1, which detailed the respondents' socioeconomic characteristics. Frequencies, percentages, and mean scores were used in the analysis of Objective 2, which evaluated livelihood outcomes in terms of yield, income, market access, and food security. Multiple regression analysis was used to evaluate Objective 3, which looked at the association between farmers' socioeconomic traits and perceived livelihood outcomes under the agribusiness-led maize growing system. Frequencies and percentages were used to examine Objective 4, which indicated barriers to the programme's sustainability and productivity. The multiple regression analysis for Objective 3 is stated as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \epsilon;$$

where Y is the livelihood outcome index, X_1 is age, X_2 is gender, X_3 is education, while X_4 is farm size, X_5 is land tenure, X_6 is income source, and ϵ (epsilon) is the error term.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Respondents

The socio-economic characteristics of the respondents are shown in Table 1. About 86% of farmers were in the 31-50 age range, which is the most economically active. According to observations that younger and middle-aged farmers are more likely to adopt innovative agricultural practices and engage in contract farming arrangements, this implies that the agribusiness-led scheme engages people in their productive prime (Mango *et al.*, 2018). In northern Nigeria, where the cultural norms and land inheritance patterns sometimes restrict women's direct engagement in official out-grower programmes, the preponderance of male participation (82.2%) underscores ongoing gender inequities in agricultural value chains (FAO, 2018; Doss *et al.*, 2018).

Remarkably, 88.7% of the respondents had no formal western education. Given that education improves farmers' capacity to understand extension materials, obtain financing, and use productivity-boosting technology, the high percentage of illiteracy is a significant barrier. The results are consistent with national data showing low levels of schooling among rural smallholders, especially in Northwest Nigeria (NBS, 2022). Additionally, 96.7% of farmers farmed less than one hectare, indicating that the participants were smallholders.

Even in contract farming programmes, these dispersed landholdings restrict mechanisation and economies of scale (Jayne *et al.*, 2019). The fact that 72.8% of respondents made farming their only source of income highlights how susceptible these households are to agricultural shocks, reinforcing the need for livelihood diversification (Ellis, 2020).

Farmers' Needs in Terms of Yield, Income, Food Security and Market Access

Table 2 shows the results in terms of yield, income, food security and market access (Table 2). Credit access is widely known to be a binding constraint for smallholders who lack collateral and formal banking relationships (Binswanger-Mkhize and Savastano, 2017; Balana and Oyeyemi, 2022). Extension services remain severely underfunded in Nigeria, with an estimated farmer-to-extension agent ratio exceeding 3,000:1 (Federal Ministry of Agriculture, 2021). The demand for guaranteed market access reflects the price volatility in open markets. These findings support the rationale for contract farming as an institutional innovation that bundles input supply, credit, technical advice, and output markets (Ton *et al.*, 2018; Meemken and Bellemare, 2020).

Multiple Regression Results of the Relationship Between Farmers' Socioeconomic Characteristics and Perceived Livelihood Outcomes

The regression model explaining the relationship between farmers' socioeconomic characteristics and perceived livelihood outcomes is presented in Table 3. The model explains 64% of the variation in livelihood outcomes ($R^2 = 0.64$, adjusted $R^2 = 0.61$), indicating good model fit and statistical significance ($F = 18.72$, $p < 0.01$). Four variables emerged as significant determinants; farm size ($\beta = 0.418$, $p < 0.001$), land tenure ($\beta = 0.301$, $p = 0.001$), income source ($\beta = 0.267$, $p = 0.001$), and education ($\beta = 0.235$, $p = 0.017$). Age and gender were not significant.

Table 1: Socio-economic characteristics of the respondents that participated in the study

Variables	Category	Frequency	Percentage (%)
Age	31-50 years	155	86.1
Sex	Male	148	82.2
Education	No formal	160	88.7
Farm size	< 1ha	174	96.7
Income Source	Farming	131	72.8

Table 2: Farmers' needs in terms of yield, income, food security and market access

Resource	Yes (%)
Quality inputs	93.9
Credit access	96.7
Extension services	98.3
Market access	97.2

The greatest positive impact on livelihood outcomes was found in farm size. This is consistent with a vast body of research demonstrating that, even in contract farming systems, increased cultivated area leads to higher productivity, marketable surplus, and household income (Carletto *et al.*, 2017). More acreage allows smallholders to participate more completely in out-grower programmes and reduce risk by allocating parts to various crops. Because farmers with tenurial insecurity may be reluctant to adopt recommended practices or make capital investments, the significance of land tenure emphasises the importance of secure rights to invest in long-term improvements (Holden and Ghebru, 2016; Lawry *et al.*, 2017).

According to Ogotu *et al.* (2020), the positive coefficient for income source (farming as primary occupation) indicates that farmers who fully commit to agriculture benefit more from the scheme than those who have off-farm income. This could be because full-time farmers can devote more labour and attention to scheme requirements, whereas part-time farmers face time constraints. Education significantly improving livelihood outcomes is consistent with human capital theory: educated farmers are better able to manage farm records, negotiate terms, and interpret technical advice.

It is notable that gender and age are not significant. While the productive 31-50 age range may capture age collinearly, information in the literature has it that older farmers can be either less or more adaptive. The gender non-significance indicates that male and female participants in this particular scheme had similar livelihood outcomes, perhaps as a result of uniform input delivery and payment methods. However, gender-differentiated impacts call for more qualitative research given the low female representation (17.8%).

Constraints

Table 4 shows the constraints limiting productivity and sustainability of agribusiness-led contract farming. Despite the scheme's mandate to offer financial help, the most frequently mentioned limitation was Inadequate access to credit (97.8%). This paradox implies that farmers may experience delays, incomplete disbursement, or high implicit interest rates, or that the credit offered may be insufficient in comparison to their needs. Contract farming literature commonly observes that when corporations offer inputs on credit, the value frequently does not cover all production costs, causing farmers to look for extra informal financing at exploitative rates (De Janvry and Sadoulet, 2020).

Few respondents reported excessive input costs (0.6%) and pest and disease issues (1.7%), suggesting that the programme's input pricing and crop protection measures are successful. This is in stark contrast to Nigerian open-market maize cultivation, where input cost inflation and pest infestations, particularly fall armyworm, are widespread (IBISWorld, 2022).

Table 3: Multiple regression results of the relationship between farmers' socioeconomic characteristics and perceived livelihood outcomes

Variable	Coefficient (β)	Std. error	t-value	Significance
Constant	1.245	0.432	2.88	0.005
Age	0.081	0.056	1.45	0.149
Sex	0.112	0.089	1.26	0.210
Education	0.235	0.097	2.42	0.017*
Farm size	0.418	0.105	3.98	0.000***
Land tenure	0.301	0.091	3.31	0.001***
Income source	0.267	0.083	3.21	0.001***

Model Summary:

$R^2 = 0.64$, Adjusted $R^2 = 0.61$, F -value = 18.72 ($p < 0.001$)

Table 4: Constraints limiting productivity and sustainability of agribusiness-led contract farming

Constraint	Percentage (%)
Inadequate access to credit	97.8
Pest and disease infestation	1.7
High input cost	0.6

The low frequency of these limitations indicates that significant production risks are effectively mitigated by the agribusiness-led paradigm.

CONCLUSION

The livelihood outcomes of smallholder maize farmers in Kaduna State, Nigeria, who participated in the Tomato Jos Out-Grower Scheme were evaluated in this study. The results show that better productivity, revenue generation, market access, and food security are some of the ways that agribusiness-led contract farming improves farmers' livelihoods. Farm size, land tenure status, educational level, and income source all had a substantial impact on participating farmers' livelihood outcomes, according to the regression study. Inadequate loan availability continued to be the biggest obstacle facing farmers, notwithstanding the scheme's advantages. Therefore, the study comes to the conclusion that although contract farming has a great deal of promise to improve smallholder lives, additional institutional and governmental support is needed to solve ongoing structural and financial limitations and guarantee more equitable and long-lasting results.

RECOMMENDATIONS

To overcome the main financial obstacles encountered by farmers, partnerships between agribusiness companies, financial institutions, and agricultural loan programmes should improve access to timely and inexpensive credit.

Through suitable institutional and legislative frameworks that motivate farmers to invest in productivity-boosting technologies and sustainable land management techniques, efforts should be made to increase the security of land tenure.

To improve farmers' technical expertise, record-keeping skills, and ability to implement better agricultural methods, extension programmes and adult literacy initiatives should be increased.

In order to guarantee fair access to programme benefits, agribusiness-led contract farming programmes should encourage the involvement of women and farmers with little resources through targeted recruitment, training, and support measures.

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