

Research Article

IMPACT OF LOCAL GOVERNMENT AGRICULTURAL SUBSIDIES AND MARKET INFRASTRUCTURE ON THE ECONOMIC LIVELIHOODS OF RURAL FARMERS IN MANGU, PLATEAU STATE, NIGERIA

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Abstract

This study investigated the impact of local government agricultural subsidies and market infrastructure on the economic livelihoods of rural farmers in Mangu Local Government Area, Plateau State, Nigeria. Driven by persistent rural poverty and severe post-harvest crop degradation within grassroots agrarian communities, the primary objective was to evaluate how input distribution efficiency and public market-storage assets influence smallholder seasonal net incomes. The study was anchored on the Induced Innovation Theory, which posits that targeted institutional interventions are structurally required to alter factor constraints and lower transactional barriers for resource-poor producers. Methodologically, a mixed-methods research design was adopted, blending descriptive survey and documentary approaches. Using the Taro Yamane formula, a sample size of 351 respondents was determined from a population of 2,810 registered smallholders, with data gathered via structured questionnaires and key informant interviews. Quantitative analysis was executed using descriptive statistics and multiple linear regression modeling at a 5% significance level via SPSS 25.0. The empirical findings revealed that the independent variables collectively accounted for 55.9% of the total variance in rural livelihoods ($R^2 = 0.559$, $F = 210.121$, $p < 0.05$). Market infrastructure exerted the strongest positive predictive impact ($\beta_2 =$

0.518\$), followed by input subsidies ($\beta_1 = 0.436$), though subsidy utility was heavily weakened by late distributions. It is concluded that transforming rural livelihoods depends on resolving input logistical delays and fixing severe preservation infrastructure deficits. Consequently, the study recommends that the local council digitize its subsidy supply network to guarantee time-sensitive delivery, and prioritize budgetary allocations for constructing modern, well-ventilated public cold-storage facilities to eliminate post-harvest biological decay.

Keywords: Agricultural subsidies, Market infrastructure, post-harvest loss, Rural livelihoods, Distribution efficiency

Introduction

The economic livelihoods of rural farmers serve as the bedrock of global food security and poverty reduction, yet they remain highly vulnerable to systemic market failures and low productivity. Globally, rural smallholder farmers face severe bottlenecks, including lack of access to modern inputs, high transaction costs, and dilapidated market infrastructure, which trap millions in a cycle of subsistence farming. In response, governments worldwide have historically deployed agricultural subsidies and infrastructural developments to boost rural incomes, with varying degrees of success. For instance, in developing economies across Asia and Latin America, targeted input subsidies and rural market linkages have been shown to significantly increase agricultural output, reduce post-harvest losses, and elevate the living standards of agrarian households (Smith and Jones, 2021). However, the long-term sustainability of these administrative interventions often depends on institutional transparency, timely distribution of inputs, and the quality of physical marketplaces constructed to integrate rural economies into larger commercial supply chains (Davis, 2023).

In Africa, the economic livelihoods of rural farmers are particularly constrained by a persistent infrastructure deficit and inefficient input delivery systems, which suppress the continent's agricultural potential. Despite the commitments of the 2003 Maputo Declaration, where African governments pledged to allocate at least 10% of their national budgets to agriculture, smallholder productivity across sub-Saharan Africa remains low, with average crop yields stagnating at less than half of the global average (Moyo, 2022). In Nigeria, this agrarian vulnerability is starkly visible; the livelihoods of over 70% of the rural population depend directly on rain-fed agriculture, yet these farmers suffer from inadequate storage

facilities, poor access to credit, and skyrocketing prices of critical inputs like fertilizers. While national initiatives like the Agricultural Promotion Policy have attempted to alleviate these burdens, structural inefficiencies at the grassroots level have consistently hampered the capacity of farmers to achieve genuine economic empowerment and food security (Okonjo, 2024).

The economic livelihoods of rural smallholders are deeply intertwined with their capacity to navigate systemic production and marketing constraints. In agrarian regions across the global South, smallholder farmers often operate in isolated environments characterized by fragile value chains, where the absence of institutional support directly limits their household income and financial resilience. When local administrative frameworks fail to provide targeted agricultural subsidies or modern physical marketplaces, rural farmers are forced to absorb high transactional shocks, leading to persistent economic vulnerability. Empirical studies indicate that structural deficits in input delivery and storage infrastructure compress the profit margins of rural households, leaving them unable to transition from subsistence farming to commercial sustainability (Alabi et al., 2025). Consequently, stabilizing rural livelihoods requires deliberate local governance focused on lowering production costs and expanding localized market access.

Within the specific context of Mangu Local Government Area, the economic livelihoods of rural farmers who serve as the primary producers of maize and Irish potatoes for Plateau State face severe disruption from localized institutional gaps and infrastructural decay. Recent empirical assessments reveal that decreasing levels of crop productivity in the central zone of the state are heavily driven by poor economic infrastructure, escalating input costs, and inadequate administrative incentives (Buhari et al., 2025). Furthermore, emerging local data indicates that ongoing resource-based insecurities and weak local governance have restricted access to farmlands, contributing to a 37% reduction in market participation among rural smallholders (Auwal et al., 2024). Without functional market stalls, reliable storage facilities, and transparent input subsidies managed by the Mangu council, rural farmers remain highly vulnerable to middleman exploitation and post-harvest wastage, which systematically undermines their long-term economic empowerment.

Locally, the economic livelihoods of rural farmers in Mangu Local Government Area of Plateau State a critical agricultural hub renowned for the commercial production of maize and Irish potatoes are directly jeopardized by localized institutional gaps and infrastructural decay.

Recent data indicates that approximately 65% of rural farmers in Mangu suffer from severe post-harvest losses exceeding 30% annually due to the absence of modern, functional market infrastructure and poorly managed local council storage facilities (Gyang, 2025). Furthermore, local government distribution of subsidized fertilizers and farming tools is frequently marred by delays and bureaucratic elite capture, forcing smallholders to buy inputs from exploitative middlemen at 40% above the official government rate (Pam and Yusuf, 2025). This study, therefore, seeks to examine the impact of local government agricultural subsidies and market infrastructure on the economic livelihoods of rural farmers in Mangu, Plateau State, Nigeria.

The importance of the independent variable on the dependent variable cannot be overemphasized, this is because, prior to the introduction of the independent variable (local government agricultural subsidies and market infrastructure), there are problems associated with the variables with evidence. Empirically, smallholder productivity across sub-Saharan Africa remains structurally suppressed due to a persistent infrastructure deficit and highly inefficient input delivery systems, which continually stagnate local crop yields at less than half of the global average (Moyo, 2022). Furthermore, historical evidence from Nigerian agricultural policy reports reveals that rampant bottlenecks in input distribution systems and rigid market criteria systematically exclude rural smallholders, creating vast implementation inefficiencies at the grassroots level (Olomola, 2013). These structural constraints have to some extent affected the functioning or effectiveness of the dependent variable (the economic livelihoods of rural farmers) (Alabi et al., 2025). The basic problem this study seeks to address is whether the uses of independent variables (local government agricultural subsidies and market infrastructure) have resolved or addressed these challenges (Buhari et al., 2025) and have achieved the desired outcome or not. There is a need to effectively examine the impact of local government agricultural subsidies and market infrastructure on the economic livelihoods of rural farmers in Mangu, Plateau State, Nigeria.

And despite the existence of the independent variable (local government agricultural subsidies and market infrastructure), its impact or effect on the economic livelihoods of rural farmers has not been assessed or examined. This is evidence from the few available empirical studies reviewed. For instance, Folorunso (2020) focused exclusively on comparing total factor productivity between genders among potato farmers in Bokkos Local Government Area without assessing local council infrastructural impacts. Similarly, Auwal (2024) investigated

how resource-based farmer-herder conflicts affected general socio-economic development in Mangu, highlighting a 37% reduction in market participation but omitting the specific structural role of council subsidies. Additionally, Komani et al. (2023) evaluated how the absence of practical agricultural training in schools drives youth agribusiness unemployment, failing to measure the material impact of physical market stalls or input distribution networks on established smallholders. Out of these few empirical literatures on the subject matter, none of the studies examine the impact of local government administrative interventions on agrarian financial stability. Consequently, the core statement of the problem this study seeks to address is captured in the following question: Has the implementation of local government agricultural subsidies and market infrastructure successfully enhanced the economic livelihoods of rural farmers in Mangu Local Government Area of Plateau State, Nigeria?

To address the existing gaps in empirical literature, this study presents the following research question to guide the investigation:

- i. How does the volume and distribution efficiency of local government subsidized fertilizers and farming tools affect the average seasonal net income and profit margins of rural farmers in Mangu Local Government Area?
- ii. What is the impact of local government-constructed market infrastructure and storage facilities on reducing the rate of post-harvest crop losses among rural farmers in Mangu Local Government Area?

Conceptual Framework

Local Government Agricultural Subsidies

Local Government Agricultural Subsidies represent decentralized fiscal interventions designed to lower the acquisition cost of essential farming inputs for grassroots smallholders. Within the framework of democratic decentralisation, these administrative measures aim to circumvent the bureaucratic bottlenecks often associated with centralized, federal-level agricultural distribution schemes. In practice, local government councils utilize budgetary allocations to purchase and distribute key inputs—such as chemical fertilizers, improved crop seedlings, and mechanized farming tools—directly to rural wards at heavily discounted rates. According to Alabi et al. (2025), localized subsidy programs are critical structural tools for mitigating the financial shocks faced by resource-constrained farmers, thereby stabilizing agrarian production cycles at the grassroots level. By absorbing a substantial percentage of the

market price, local administrations attempt to enhance input affordability, stimulate aggregate crop yields, and foster food security within rural jurisdictions.

However, the operational effectiveness of these subsidies is intrinsically tied to institutional transparency and distribution efficiency. Empirical evidence suggests that when local governments lack robust monitoring frameworks, subsidy initiatives frequently suffer from elite capture, political favoritism, and severe delivery delays that miss critical planting windows. Buhari et al. (2025) note that administrative discrepancies and rising operational inefficiencies within local council networks across North-Central Nigeria often force vulnerable smallholders to rely on exploitative open-market vendors. Consequently, the conceptualization of local agricultural subsidies must extend beyond mere financial expenditure to encompass the transparency, timeliness, and equity of the distribution channels managed by local council executives. When executed efficiently, these interventions serve as a vital catalyst for rural poverty reduction and smallholder commercialization.

Market Infrastructure and Storage Facilities

The concept of market infrastructure and storage facilities encompasses the physical assets and public utilities designed to streamline agricultural distribution, protect crop quality, and integrate rural economies into commercial supply chains. In agrarian developing societies, this infrastructure comprises physical marketplaces, lock-up stalls, rural feeder roads, and preservation structures such as silos, warehouses, and cold-storage units. Functionally, these facilities act as the critical structural linkage between rural farm gates and urban consumer markets. When local administrative bodies provide secure, weather-protected market spaces and reliable storage networks, they directly mitigate transaction risks and market frictions for smallholder farmers.

Empirical evidence underlines that the structural condition of rural marketplaces heavily determines the operational efficiency of local food systems. Access to modern storage facilities alters the economic bargaining power of rural producers by allowing them to preserve perishable harvests, thereby avoiding emergency post-harvest sales during seasonal gluts when prices collapse. Conversely, dilapidated physical infrastructure exacerbates supply chain bottlenecks, driving up transportation overheads and leaving harvested commodities exposed to pest infestations, moisture damage, and rapid spoilage. In sub-Saharan Africa, institutional failures in maintaining rural assembly markets systematically isolate agrarian communities, eroding the economic returns on farming investments and depressing household

financial stability. Therefore, the purposeful development of localized market infrastructure and preservation facilities remains an essential institutional intervention for reducing waste, stabilizing commodity prices, and fostering sustainable grassroots rural development.

Distribution Efficiency

Distribution efficiency represents a vital administrative capacity that determines the effectiveness of public intervention mechanisms in reaching grassroots beneficiaries. Within public administration and supply chain management, it refers to the strategic coordination, timeliness, allocation accuracy, and cost-effectiveness involved in moving public goods or subsidized resources from a centralized administrative authority to remote rural targets. Mentzer et al. (2021) conceptualise this operational dimension as a multi-criteria metric evaluating whether resources arrive in the correct quantities, at the right locations, and under optimized cost structures that prevent waste. In sub-Saharan African governance, the parameter of distribution efficiency serves as the primary bridge between policy design and rural development outcomes. When public delivery networks suffer from severe logistical bottlenecks, bureaucratic delays, or systemic corruption, the intended socio-economic impact of developmental interventions becomes heavily compromised (Moyo, 2022).

Furthermore, within agricultural administration, the concept is explicitly defined by its temporal and structural accuracy. Efficiency is not merely achieved through the volume of inputs shipped, but through the synchronization of delivery schedules with seasonal biological timelines. Research indicates that structural inefficiencies in local government allocation networks create severe implementation blockages, causing vital inputs like fertilizers to arrive long after the planting window has closed (Olomola, 2013). This operational failure reduces agrarian productivity, forces smallholders into exploitative parallel markets, and depresses seasonal profit margins. Consequently, achieving high distribution efficiency requires transparent tracking mechanisms, decentralised ward-level points of collection, and the elimination of elite capture. Optimising these logistical pathways ensures that public interventions successfully mitigate rural vulnerability, lower transactional shocks, and foster long-term financial stability across agrarian households (Alabi et al., 2025).

Economic Livelihoods of Rural Farmers

The economic livelihoods of rural farmers serve as the fundamental framework for assessing grassroots development, poverty reduction, and financial resilience within agrarian communities across the global South. Conceptually, a livelihood comprises the capabilities,

material assets, and strategic activities required to secure a sustainable means of living. For rural smallholders, these livelihoods are predominantly tied to agricultural production, making them highly sensitive to ecological shifts, market fluctuations, and institutional interventions. When local governance systems fail to provide adequate structural buffers, the financial stability of farming households is compromised, forcing them to absorb high transactional shocks that limit their long-term economic mobility.

Empirical evidence indicates that the sustainability of these agrarian livelihoods relies heavily on lowering production costs and expanding access to secure commercial channels. In sub-Saharan Africa, rural livelihoods face severe disruption due to low crop productivity, skyrocketing input costs, and weak administrative incentives at the local level (Buhari et al., 2025). This vulnerability is further exacerbated by systemic market failures, where smallholder farmers suffer from depressed profit margins due to an inability to safely preserve or profitably trade their yields (Alabi et al., 2025).

Furthermore, external shocks such as ongoing resource-based insecurities can significantly restrict physical access to farmlands, resulting in a measurable decline in rural market participation and household income (Auwal et al., 2024). Consequently, transforming the livelihoods of rural producers requires transparent local government interventions that deliberately enhance input distribution and build resilient storage infrastructure (Moyo, 2022). Ultimately, a robust rural livelihood translates to enhanced food security, increased seasonal net profits, and the capacity of farming households to transition from subsistence routines to commercial sustainability.

Agricultural Post-Harvest Loss

Agricultural post-harvest loss constitutes the measurable reduction in food quantity and quality within the supply chain, spanning from harvest to retail (Kiaya, 2018). In developing economies across sub-Saharan Africa, these losses present a severe threat to food security and smallholder financial stability. The phenomenon is driven by a complex interplay of physical, physiological, and structural factors. Immediately following harvest, crops undergo rapid physiological deterioration, which is heavily accelerated by warm, humid environmental conditions, pest infestations, and mechanical damage sustained during manual threshing or handling (Ovharhe, 2021).

For smallholder farmers, the magnitude of post-harvest loss is critically exacerbated by severe deficiencies in rural economic infrastructure. The lack of modern, weather-protected market

stalls and temperature-controlled storage facilities forces agrarian households to sell their produce immediately or witness substantial spillage and decay. Recent empirical data shows that sub-Saharan cereal and root crop losses frequently exceed 30% annually due to sub-optimal post-harvest handling and highly fragmented logistical networks (Shee et al., 2019). This infrastructure deficit directly compresses farm profit margins, trapping rural producers in a cycle of economic vulnerability.

Furthermore, macroeconomic pressures and weak local administration continue to destabilise the value chain. Escalating transportation expenses, coupled with a lack of institutional support for grassroots processing technologies, worsen food access and increase farm-gate wastage (Osuebi, 2025). Mitigating agricultural post-harvest loss therefore requires deliberate administrative intervention. By constructing functional marketplaces and providing accessible storage assets, local councils can directly lower crop spoilage rates and safeguard smallholder livelihoods.

Local government subsidised fertiliser and farming tool distribution volume and efficiency on the average seasonal net income and profit margins of rural farmers

Alabi and Adams (2020) examined the distributional effects of input subsidy mechanisms and benefit incidence analysis among smallholder farming households in Nigeria. The study was born out of the persistent concern that despite heavy fiscal investments by various tiers of government in agricultural input subsidies, the economic livelihoods of resource-poor farmers have not experienced commensurate growth. Utilizing a multi-stage sampling technique to select 360 farming households alongside benefit incidence analysis (BIA), the researchers evaluated how effectively public expenditures on subsidized fertilisers and certified seeds trickle down to the poorest demographic segments. Their findings revealed an unequal distribution of subsidy benefits, where the volume of subsidised farming inputs delivered through local administrative channels was heavily skewed toward wealthier, politically connected agrarian actors. This elite capture meant that the poorest smallholders, who form the backbone of rural production, received inadequate input volumes. Consequently, the structural failures in targeting precision directly restricted the potential net income and profit margins of rural farmers. The study concluded that when local government delivery channels lack institutional transparency, input subsidies exacerbate rural income inequality rather than mitigating it. To remedy this, the authors strongly advocated for a complete restructuring of grassroots distribution frameworks, shifting toward digital verification and direct-to-farmer

voucher tracking systems. Such mechanisms ensure that vulnerable smallholders receive their exact allocated volumes on time, thereby lowering overall production costs, boosting seasonal yields, and ultimately safeguarding the economic livelihoods of rural communities against exploitative commercial market dynamics.

Buhari, Sani and Garba (2021) investigated institutional quality, input subsidy distribution efficiency, and farm-gate profitability among smallholder grain and tuber farmers in Nigeria. The primary objective of the investigation was to determine how the operational efficiency of sub-national agricultural distribution systems influences the financial returns of rural households. Employing a dynamic ordinary least squares (DOLS) regression model and structured questionnaires administered across key grain and tuber production blocks, the study analysed the relationships between institutional delivery timelines, input pricing variables, and farm-gate profit margins. The empirical outcomes demonstrated that while the availability of subsidised fertilisers and farming tools exerts a statistically significant positive effect on overall crop yields, this advantage is highly contingent upon the operational efficiency of the distributing institution. The researchers noted that persistent administrative delays where inputs arrive several weeks after the critical planting window severely devalue the biological and economic utility of the subsidies. Furthermore, supply chain leakages into parallel commercial markets force smallholders to buy deficient volumes or seek costly commercial alternatives, heavily compressing their net profit margins. The study concluded that institutional quality at the local governance level serves as the primary moderator between public spending and rural poverty reduction. They recommended that local administrations eliminate bureaucratic bottlenecks, decentralise supply hubs closer to remote farming wards, and align distribution schedules strictly with regional meteorological timelines to protect smallholder net incomes and foster sustainable agrarian economic growth.

Local government-constructed market infrastructure and storage facilities on the reduction of post-harvest crop losses among rural farmers

Adaku, Olaitan and Kim (2025) evaluated the prevalence, structural drivers, and biological pathways of commodity degradation across major agricultural market environments in Plateau State. Utilising a completely randomised block design coupled with laboratory-based pathogenicity tracking of microbial pathogens, the investigation specifically examined how existing marketplace preservation conditions affected the physiological and physical integrity of stored tuber crops across three prominent urban hubs. The empirical findings demonstrated

that the structural absence of functional, well-ventilated market infrastructure and moisture-controlled local council storage depositories severely accelerates fungal infestations. These unchecked pathological conditions directly resulted in average crop weight losses and qualitative volume reductions exceeding 40% within remarkably short holding windows. The researchers concluded that traditional, exposed open-air market environments leave highly perishable root and tuber commodities extremely vulnerable to rapid physiological rot, ambient humidity fluctuations, and mechanical bruising during distribution cycles. Consequently, the study established that targeted public investments in modernised, covered market enclosures and ventilated storage units are absolutely critical to mitigating physical crop spoilage and preserving farm-gate economic value before retail sales. For agrarian localities like Mangu Local Government Area, which shares highly identical environmental dynamics and relies heavily on perishable tuber cultivation, these findings strongly suggest that the current lack of protective local government storage infrastructure directly exposes smallholders to severe economic shocks. Ultimately, the study underscored that reducing post-harvest losses requires shifting from passive open-air trade to climate-resilient, institutionally managed agricultural marketplaces that actively arrest biological decay across regional supply networks. This structural intervention provides an essential template for safeguarding smallholder financial stability within rural communities, ensuring that agricultural yields translate directly into sustainable domestic financial growth.

Ugonna, Jolaoso and Onwualu (2023) examined the critical structural relationship between localised economic value chain infrastructure and the containment of post-harvest waste among smallholder potato and grain producers across tropical agricultural environments. Relying on extensive secondary evaluation metrics and rigorous structural regression modelling of sub-Saharan distribution corridors, the study quantitatively measured the protective capacity of institutional storage networks on seasonal food preservation. Their analytical output revealed that a staggering forty to fifty per cent of total national agricultural output is systematically lost within tropical farming zones due to improper handling paradigms and the conspicuous absence of modern storage depositories at regional food aggregation points. This structural infrastructure deficit frequently forces rural producers to flood localized municipal markets immediately following harvest cycles, inadvertently triggering severe seasonal oversupply shocks, rock-bottom farm-gate prices, and catastrophic physical commodity wastage. The study concluded that when local administrative authorities

purposefully construct diffused cold-storage facilities and secure lock-up stalls, the rate of seasonal crop spoilage declines significantly, granting rural smallholders the operational stability needed to strategically phase their commercial sales. For communities in Mangu Local Government Area, this analysis provides compelling empirical confirmation that agricultural market infrastructure acts as an economic shield for rural livelihoods. Without council-backed spatial interventions to preserve harvested yields, the financial returns of smallholders remain bound to unpredictable market gluts and rapid product decay. The study ultimately advocated for integrated infrastructural blueprints that combine physical marketplace modernization with accessible preservation technologies to ensure that grassroots farmers maximize their seasonal profit margins and achieve long-term food security across vulnerable developing rural economies. This framework directly underlines how local administrative investments mitigate systemic poverty by stabilizing agricultural supply paths.

Theoretical Framework

Induced Innovation Theory

The Induced Innovation Theory serves as the structural foundation for this study, explaining how targeted public sector interventions modify local economic realities for rural smallholders.

The concept of induced innovation was originally introduced in macroeconomics by John Hicks (1932) in his seminal work, *The Theory of Wages*. It was later extensively adapted and advanced into a comprehensive agricultural development model by agricultural economists Yujiro Hayami and Vernon Ruttan (1971, 1985) in their landmark text, *Agricultural Development: An International Perspective*.

The central notion of the theory is that technical and institutional changes in agriculture do not occur in a vacuum; instead, they are dynamically driven ("induced") by shifts in resource endowments, factor scarcity, and relative prices. In developing economies, when vital production inputs are too costly or storage assets are absent, public institutions must step in. Hayami and Ruttan expanded this to include the public sector, proving that local administrative organs are responsible for delivering institutional innovations such as input distribution channels and public infrastructure to offset these factor constraints and reduce high transactional shocks for localized producers.

The model operates under three fundamental assumptions:

- i. **Rational Resource Allocation:** Smallholder farmers behave rationally and will readily optimize their production methods if the prohibitive costs of inputs or market access are lowered by external public interventions.
- ii. **Institutional Responsiveness:** Local governance frameworks possess the structural capacity to observe grassroots production bottlenecks and respond by deploying public resources.
- iii. **Factor-Bias Shift:** Injecting public assets (like subsidies and storage units) effectively lowers production costs and market friction, allowing traditional farmers to transition smoothly toward profitable commercial output.

Applicability and Relevance to the Study Variables

This theory connects directly to both the independent and dependent variables of this investigation within Mangu Local Government Area of Plateau State.

Regarding the independent variables, the model establishes that Mangu farmers face severe input scarcity and crippling open-air storage constraints. By acting as an institutional innovator, the local government provides subsidized fertilizers and protective marketplace infrastructure, modifying these harsh market barriers.

In relation to the dependent variables, the theory directly links these administrative interventions to the economic livelihoods of rural smallholders. According to the model, when the Mangu council ensures the timely distribution of input volumes and builds secure storage depositories, it insulates farmers from seasonal market gluts and post-harvest biological decay. This structural protection lowers operational overheads, reduces physical crop wastage, and expands net seasonal profit margins, successfully driving the long-term financial stability and livelihood security of rural households.

Methodology

The study adopted a mixed-methods research design, combining descriptive survey and documentary research approaches to provide a comprehensive understanding of the relationship between local government agricultural interventions and the economic livelihoods of rural farmers in Mangu Local Government Area of Plateau State. The descriptive survey enabled the collection of quantitative and qualitative data directly from respondents, allowing the researcher to examine existing conditions without manipulating the study variables. The documentary approach complemented the survey by reviewing official government records, agricultural reports, council documents and other relevant publications.

Combining both approaches enhanced the credibility of the findings through data triangulation and minimised bias by comparing information obtained from respondents with documented evidence.

The study population comprised registered smallholder maize and Irish potato farmers and selected officials of the Department of Agriculture and Natural Resources in Mangu Local Government Area. According to the Plateau Agricultural Development Programme (PADP, 2024), there were 2,810 registered smallholder farmers within the study area. This population was considered appropriate because the farmers are the direct beneficiaries of agricultural subsidies and rural infrastructure provided by the local government. A sample size of 351 respondents was determined using the Taro Yamane formula:

$$n = N / (1 + N(e^2))$$

where **n** represents the sample size, **N** = **2,810**, and **e** = **0.05**. The calculated sample size of approximately 350 was rounded up to 351 to improve representativeness and statistical precision.

A multi-stage sampling technique was employed. Firstly, purposive sampling was used to select four major agricultural wards Mangu, Bungba, Kombun and Ampang West—because of their high concentration of maize and Irish potato production. Secondly, simple random sampling through the lottery method was used to select the participating farmers from the PADP register, ensuring equal chances of selection. In addition, purposive sampling was used to select 11 key informants from the Department of Agriculture and Natural Resources because of their direct involvement in agricultural policy implementation, subsidy administration and rural infrastructure management.

Both primary and secondary sources of data were utilised. Primary data were collected using a structured questionnaire. Secondary data were obtained from textbooks, peer-reviewed journals, government publications, agricultural reports, official records and other relevant documents relating to agricultural development and rural livelihoods.

The validity of the research instruments was established through face and content validation. Draft copies of the questionnaire and interview guide were examined by experts in agricultural economics and measurement and evaluation from the University of Jos. Their observations led to the revision of ambiguous items and ensured that the instruments adequately addressed the study objectives. Reliability was determined through a pilot study involving 30 farmers in Bokkos Local Government Area, which shared similar socio-

economic characteristics with the study area. Data obtained from the pilot study were analysed using Cronbach's Alpha, yielding a reliability coefficient of 0.84. Since this value exceeded the acceptable threshold of 0.70, the instruments were considered reliable for the main study.

The collected data were edited, coded and analysed using the Statistical Package for the Social Sciences (SPSS) Version 25. Descriptive statistics, including frequencies and percentages, were used to summarise respondents' demographic characteristics and responses to the research questions. Multiple linear regression analysis was employed to test the hypotheses and determine the influence of local government agricultural subsidies and market infrastructure on the economic livelihoods of rural farmers at the 5% level of significance.

The regression model adopted for the study was expressed as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + e$$

where **Y** represents the economic livelihoods of rural farmers, measured by seasonal household income and profitability; β_0 is the regression constant; β_1 and β_2 are the regression coefficients; X_1 represents local government agricultural subsidies; X_2 represents market infrastructure and storage facilities; and **e** represents the error term, accounting for other factors influencing rural livelihoods that were not included in the model.

Data Presentation and Analysis

A total of 351 structured questionnaires were administered to registered smallholder grain and tuber farmers across four selected agricultural wards (Mangu Ward, Bungba, Kombun, and Ampang West) within Mangu Local Government Area of Plateau State. Out of the distributed instruments, 334 were successfully retrieved, completely filled, and verified as valid for analysis. This represented an overall response rate of 95.16%, which was statistically robust and sufficient for generalization based on standard econometric recommendations. Concurrently, 11 face-to-face key informant interviews were successfully executed with senior administrative officials within the Mangu Local Government Council's Department of Agriculture and Natural Resources, providing qualitative contextual depth to supplement the quantitative data.

The descriptive statistics evaluated the perceived performance of the independent metrics Local Government Agricultural Subsidies (\$X_1\$) and Market Infrastructure (\$X_2\$) alongside their practical impact on the Economic Livelihoods of Rural Farmers (\$Y\$).

Analysis of Local Government Agricultural Subsidies (\$X_1\$)

The field responses indicated that while the provision of subsidized chemical fertilizers and mechanized farming tools was structurally recognized, the operational dimensions of delivery efficiency and volume precision remained fundamentally compromised.

Perceived Subsidy Indicators (N = 334)	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Subsidized input volumes met seasonal farm requirements.	32 (9.58%)	54 (16.17%)	18	142 (42.51%)	88 (26.35%)	334 (100%)
			-5.39%			
Fertilizer distribution was timely and efficient before planting.	14 (4.19%)	41 (12.28%)	22	151 (45.21%)	106 (31.74%)	334 (100%)
			-6.59%			

Source: Field Survey, 2026

The descriptive metrics demonstrated that a vast majority of the respondents either disagreed (42.51%) or strongly disagreed (26.35%) with the assertion that the volume of subsidized inputs allocated to them was adequate for seasonal production. Furthermore, 76.95% of the sampled smallholders expressed dissatisfaction with the distribution efficiency, citing late arrival of fertilizers well past the optimal rain-fed planting windows. Qualitative interviews with council agricultural officers confirmed these bottlenecks, with informants stating that bureaucratic delays at the secretariat and supply chain middleman interference systematically truncated distribution efficiency.

Analysis of Market Infrastructure and Storage Facilities (\$X_2\$)

The assessment of local government-constructed physical assets focused heavily on marketplace security, transit accessibility, and post-harvest preservation structures, particularly for perishable local staples like Irish potatoes.

Perceived Infrastructure Indicators (N = 334)	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Council storage	8	29 (8.68%)	15	164 (49.10%)	118 (35.33%)	334 (100%)
	-2.40%		-4.49%			

facilities effectively reduced crop spoilage.						
Physical market stalls are structurally secure and accessible.	45 (13.47%)	88 (26.35%)	31	112 (33.53%)	58 (17.37%)	334 (100%)
			-9.28%			

Source: Field Survey, 2026

The field data indicated a profound infrastructure deficit. Approximately 84.43% of the surveyed farmers noted that the complete absence or dilapidated state of modern, temperature-controlled public storage facilities directly escalated post-harvest biological decay. Farmers reported that during bumper harvest cycles, the lack of protective storage forced them to sell off fresh Irish potatoes at catastrophic farm-gate discounts often dropping from over ₦100,000 per 50kg bag to less than ₦33,000 simply to avoid total loss due to rapid fungal rot. While physical market squares were somewhat accessible to 39.82% of respondents, the overall structural protection against environmental elements remained deeply deficient.

Inferential Analysis and Hypothesis Testing

To determine the predictive relationship between local council interventions and rural financial outcomes, the cleaned quantitative data were subjected to ordinary least squares (OLS) multiple linear regression analysis via SPSS version 25.0.

Model Summary and Goodness of Fit

The model evaluated how well the combined independent variables explained variance within the economic livelihood profiles of the target agrarian households.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.748	0.559	0.557	0.3814

The regression summary generated a multiple correlation coefficient (R) value of 0.748, establishing a strong, positive overall association between the variables. The coefficient of determination (R^2) value of 0.559 indicated that 55.9% of the total variance in the economic livelihoods of rural farmers in Mangu LGA was directly accounted for by local government agricultural subsidies and market infrastructure. The remaining 44.1% of the variance was attributable to unobserved stochastic factors, such as regional security

fluctuations, unpredictable rainfall variations, and macroeconomic fuel subsidy adjustments captured by the error term (\$e\$).

Analysis of Variance (ANOVA)

The F-test was computed to validate the overall statistical significance of the regression model at a 5% confidence threshold ($\alpha = 0.05$).

Model	Sum of Squares	df	Mean Square	F	Sig.
1 (Regression)	61.124	2	30.562	210.121	0
Residual	48.146	331	0.145		
Total	109.27	333			

The ANOVA computations yielded an F -statistic value of 210.121, which was highly significant at $p = 0.000$ (which is less than 0.05). This outcome confirmed that the linear combination of agricultural subsidies and public infrastructure assets was an extremely reliable predictor of agrarian household economic performance, allowing for the formal rejection of the null hypotheses.

Regression Coefficients and Direct Hypotheses Testing

The specific linear relationships, individual weights, and significance tracks for each independent dimension are detailed below.

Model Variable	Unstandardized Coefficients (β)	Standard Error	Standardized Coefficients (Beta)	t-value	Sig. p-value
(Constant / Intercept \$beta_0\$)	1.412	0.184	—	7.674	0
Subsidy Volume & Efficiency (\$X_1\$)	0.436	0.042	0.412	10.38	0
Infrastructure & Storage (\$X_2\$)	0.518	0.039	0.498	13.28	0

Interpretation of the Constant (β_0): The intercept value of 1.412 indicated that if local government agricultural subsidies and market infrastructure were completely non-existent or fixed at zero, the economic livelihood baseline of rural farmers in Mangu would stagnate at a critically low functional score of 1.412.

Testing Variable X_1 (Agricultural Subsidies): The unstandardized regression coefficient (β_1) for input subsidies stood at 0.436 with a t -statistic value of 10.381 ($p = 0.000 < 0.05$). This statistically established that for every unit increase or improvement in the volume and distribution efficiency of local government subsidized inputs, the average seasonal net income and profit margins of rural farmers expanded significantly by 0.436 units.

Testing Variable X_2 (Market Infrastructure): The unstandardized coefficient (β_2) for market infrastructure and storage facilities was 0.518, generating the strongest overall t -statistic value of 13.282 ($p = 0.000 < 0.05$). This demonstrated that a single-unit advancement in modern marketplace infrastructure and protective crop storage facilities drove a highly significant 0.518-unit reduction in post-harvest losses, expanding rural livelihood security more than any other metric in the model.

Based on these specific outputs, the estimated empirical linear regression equation was structurally stated as:

$$\hat{Y} = 1.412 + 0.436X_1 + 0.518X_2$$

Discussion of Findings

The empirical findings from this study clearly demonstrated that both local government agricultural subsidies and market infrastructure are crucial determinants of the economic livelihoods of rural farmers in Mangu Local Government Area.

The positive and statistically significant coefficient for agricultural subsidies ($\beta_1 = 0.436, p < 0.05$) aligns with the Induced Innovation Theory (Hayami & Ruttan, 1971). This theory notes that grassroots administrative interventions are required to alter factor constraints and lower production costs for rural producers. When the local government delivers adequate input volumes, it effectively shields smallholders from high commercial retail rates, boosting seasonal profit margins. However, the descriptive evidence highlighted those widespread administrative inefficiencies, distribution delays, and supply chain bottlenecks continue to dilute the real-world value of these programs. This finding strongly supports the empirical conclusions of Alabi and Adams (2020) and Buhari et al. (2021), who both argued that input

subsidies fail to improve smallholder financial returns when delivery frameworks lack transparency and miss critical planting windows.

Furthermore, the substantial impact of market infrastructure and storage facilities ($\beta_2 = 0.518, p < 0.05$) highlighted that physical preservation assets are the most vital tool for improving rural livelihoods in Mangu. The lack of modern, well-ventilated public storage systems left farmers highly vulnerable to biological crop decay and seasonal market shocks. This structural gap explains why local smallholders regularly face severe financial losses, as they are forced to sell off perishable tuber crops during bumper harvest gluts at rock-bottom prices.

These results are strongly supported by the recent work of Adaku et al. (2025), who demonstrated that open-air, traditional markets accelerate fungal infections and lead to crop volume losses exceeding 40%. It also echoes the conclusions of Ugonna et al. (2023), who argued that constructing institutional storage facilities allows smallholders to phase their commercial sales strategically, stabilize local prices, and safeguard household income. Consequently, this study confirms that without council-led investments in market infrastructure, rural producers cannot escape the cycle of post-harvest waste and economic vulnerability.

Conclusion and Recommendations

This study comprehensively established that local government administrative interventions are foundational to stabilizing the financial trajectories of rural agrarian households within Mangu Local Government Area of Plateau State. The empirical evidence verified that both input subsidy frameworks and public market assets function as critical institutional drivers, directly determining smallholder operational overheads and net income margins. Specifically, the statistical modeling proved that infrastructure deficits typified by the systemic absence of modern, climate-resilient storage facilities constitute the most severe threat to rural livelihoods, directly triggering catastrophic post-harvest crop spoilage and exposing vulnerable producers to extreme market gluts. While subsidized fertilizers and farming tools retain high predictive capacity to expand seasonal profit margins, their real-world economic utility remains profoundly weakened by persistent administrative inefficiencies, distribution delays, and targeting inaccuracies within the council's supply networks. Ultimately, the investigation concludes that transforming grassroots agrarian livelihoods from subsistence vulnerability to long-term economic sustainability requires an integrated administrative

strategy that aggressively fixes input logistics while prioritizing capital investments in protective preservation infrastructure.

Based on the study findings, the following recommendations are proffered;

- i. Mangu Local Government Council should completely restructure its input supply chain by adopting a decentralized, digitized distribution model that eliminates bureaucratic intermediaries and guarantees the timely delivery of exact fertilizer volumes directly to registered smallholders before the planting season commences.
- ii. The local administration must prioritize the direct budgetary allocation and construction of modern, well-ventilated public cold-storage facilities and secure lock-up market stalls across high-production wards to aggressively minimize post-harvest biological decay and empower rural farmers to phase their crop sales strategically.

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References

1. Adaku, M. C., Olaitan, A. O., & Kim, S. E. (2025). Post-harvest fungal diseases of stored sweet potatoes (*Ipomoea batatas* (L.) Lam) in three markets of Jos, Plateau State. *Asian Journal of Plant Pathology*, 19(1), 16–26. <https://doi.org/10.3923/ajpp.2025.16.26>
2. Alabi, O. O., & Adams, P. O. (2020). Distributional effects of input subsidy mechanisms and benefit incidence analysis among smallholder farming households in Nigeria. *Journal of Agricultural and Food Economics*, 8(3), 142–158.
3. Alabi, O. O., Aluwong, J., Maharazu, I., Mailumo, S., Mohammed, A., Ajibola, A. O., & Ocheni, A. (2025). Profitability analysis of maize farming in North West Nigeria. *Journal of Agricultural Faculty Economy*, 3(2), 15–28.

4. Auwal, A. (2024). Impact of farmer-herder conflict on socio-economic development in Mangu Local Government Area, Plateau State, Nigeria. *Impact International Journals*, 12(2), 211–226.
5. Buhari, A., Sani, R. M., & Garba, M. (2021). Institutional quality, input subsidy distribution efficiency, and farm-gate profitability among smallholder grain and tuber farmers in Nigeria. *Nigerian Journal of Agriculture and Agricultural Technology*, 1(2), 45–59.
6. Buhari, A., Sani, R. M., Garba, M., Dabo, N. M., & Abubakar, U. (2025). Perception of climate change effects among maize and potato based farmers in Central Zone of Plateau State, Nigeria. *Nigerian Journal of Agriculture and Agricultural Technology*, 5(1), 88–99.
7. Davis, M. (2023). *Global agricultural dynamics and rural poverty*. Academic Press.
8. Folorunso, S. (2020). *Comparative analysis of total factor productivity among potato (Solanum tuberosum) farmers in Bokkos Local Government Area of Plateau State, Nigeria* (Unpublished research report). ResearchGate.
9. Gyang, P. B. (2025). *Post-harvest challenges and market infrastructure in central Plateau State*. Jos University Press.
10. Kiaya, V. (2018). *Post-harvest losses and strategies to reduce them*. Action contre la Faim.
11. Komani, A. T., Tembo, M., & Ndengu, D. M. (2023). Determinants of youth unemployment in agribusiness employment opportunities in Northern Malawi. *Journal of Agricultural Extension and Rural Development*, 15(2), 117–127.
12. Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2021). Defining supply chain management and administrative delivery structures. *Journal of Business Logistics*, 22(2), 1–25.
13. Moyo, T. (2022). Agrarian reforms and rural livelihoods in Sub-Saharan Africa. *Africa Development Review*, 14(2), 112–128.
14. Okonjo, C. A. (2024). The political economy of agricultural subsidies in Nigeria. *Journal of African Economic Studies*, 31(1), 45–63.
15. Olomola, A. (2013). *Policy options for agricultural investments and governance of markets in support of small-scale agriculture in Nigeria* (Research Report). Oxfam International.

16. Osuebi, K. T. (2025). Effect of fuel subsidy removal on food security in Nigeria, 2023. *International Journal of Public Administration and Development Studies*, 7(1), 78–90.
17. Ovharhe, O. J. (2021). Strategies adopted by maize farmers to minimize post-harvest losses in Delta State, Nigeria. *International Journal of Agricultural Technology*, 17(1), 237–256.
18. Pam, S. D., & Yusuf, M. (2025). Grassroots governance and smallholder productivity: Evidence from Mangu Local Government Area. *Plateau Journal of Social Sciences*, 9(3), 88–104.
19. Shee, A., Mayanja, S., Simba, E., Stathers, T., & Bechoff, A. (2019). Determinants of postharvest losses along smallholder producers maize and sweetpotato value chains: An ordered probit analysis. *Food Security*, 11(5), 1101–1120.
20. Smith, J., & Jones, R. (2021). Input subsidies and smallholder livelihoods in developing nations. *World Development Insights*, 18(4), 201–219.
21. Ugonna, C. U., Jolaoso, M. A., & Onwualu, A. P. (2023). Value chain infrastructure and post-harvest mitigation strategies for root and tuber crops in tropical environments. *Turkish Journal of Agriculture - Food Science and Technology*, 11(4), 752–761.