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# ROAD'S IMPACT ON FARMERS' ACCESSIBILTY TO CREDIT FACILITIES, AGRO-CHEMICALS AND LABOUR IN A PART OF KWARA STATE, NIGERIA

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## ABSTRACT

Roads are vital for transporting farm inputs and outputs in developing countries, yet their specific impact on inputs remains underexplored. This study investigated road types to rural settlements and their influence on farmers' access to credit, agro-chemicals, and labour in Kwara State, Nigeria. Using multi-stage sampling, data were collected from 1,373 farmers across thirty-six settlements and analysed with descriptive and inferential statistics. Findings revealed that 55.6% of settlements were linked by untarred roads. Access to farm labour was influenced by road conditions, with 43.4% strongly agreeing, though 30.2% disagreed that roads reduced labour costs. Regarding credit, 40.1% agreed roads aided access, yet 73.95% reported absence of banks in their settlements. For agro-chemicals, 61.2% disagreed that roads improved access, while 42.4% agreed roads lowered costs. Statistical tests showed significant variation in access to herbicides and agro-chemicals ($F=17.66$, $p=0.000$), but no significant differences in access to labour ($F=0.62$, $p=0.430$) or credit facilities ($F=0.143$, $p=0.706$) between tarred and untarred road settlements. The study concludes that poor road infrastructure limits farmers' access to essential inputs and recommends improving rural roads and transport services to enhance agricultural productivity.

***Keywords:*** *Crop production, Farm Inputs; Rural settlements and Transport characteristics*.

## INTRODUCTION

Efficient transport infrastructure is fundamental to agricultural development because it facilitates the movement of farm inputs to production areas and agricultural outputs to markets. Good road networks improve farmers' access to fertilisers, improved seeds, agrochemicals, farm machinery, extension services, and markets, thereby enhancing agricultural productivity and rural incomes (Starkey & Hine, 2014; Salami & Toriola, 2023; Akello, 2024; Udoinyan, 2024). Conversely, poor road infrastructure constrains input distribution, increases transportation costs, delays farming operations, and reduces productivity (Olabosinde, 2024; John & Oyidi, 2025). Evidence from Ethiopia, India, and Nicaragua demonstrates that road development improves fertiliser access and agricultural productivity, whereas inadequate rural roads continue to hinder timely input delivery in many parts of Nigeria (Starkey & Hine, 2014; Olabosinde, 2024; John & Oyidi, 2025). Improved rural roads also reduce post-harvest losses, strengthen market access, and enhance farmers' competitiveness (Amah et al., 2025; Akello, 2024; Utuk et al., 2024).

Access to essential farm inputs is central to sustainable agricultural production. Agrochemicals improve soil fertility, control weeds and pests, and increase crop yields, while agricultural credit enables farmers to purchase modern inputs and adopt improved technologies. Adequate farm labour ensures timely land preparation, planting, weeding, fertiliser application, and harvesting. However, poor rural roads often restrict access to suppliers, financial institutions, and labour markets, resulting

in delayed operations, higher production costs, reduced input utilisation, and lower productivity. Improved rural roads therefore promote agricultural input accessibility, commercialisation, productivity, and rural development (Salami & Toriola, 2023; Akello, 2024; Olabosinde, 2024; Utuk et al., 2024; Amah et al., 2025; John & Oyidi, 2025).

The road subsector accounts for about 90% of agricultural freight movement in many developing countries (Udoinyan, 2024). Nevertheless, most roads linking farming communities remain poorly maintained (Blimpo et al., 2013). Earlier studies described rural roads in Nigeria as dusty, rugged, and poorly bridged (Ogunsanya, 1983; Ojetola & Ogunsanya, 1993; Ogunsanya, 2002). More recently, Olorunfemi (2024) reported that over 80% of rural roads in Nigeria are in poor condition, perpetuating rural isolation, low productivity, and food insecurity.

Despite the recognised importance of rural roads, many farming communities continue to experience inadequate road infrastructure that limits access to agrochemicals, agricultural credit, and farm labour. Although previous studies have examined rural transportation and agricultural development, relatively few have simultaneously investigated how road conditions influence farmers' access to these three critical agricultural inputs within rural settlements in Kwara South Senatorial District, Nigeria

Accordingly, this study addressed the following research questions: What are the conditions of roads leading to selected settlements? How do road conditions influence farmers' access to agrochemicals, credit facilities, and farm labour in the study area? Specifically, the study aimed to identify the conditions of roads leading to selected settlements and assess the influence of road conditions on farmers' access to agrochemicals, credit facilities, and farm labour in selected settlements within Kwara South Senatorial District, Kwara State, Nigeria. The remainder of this paper is organised into the following sections: the literature review, the study area, the methodology, the presentation and discussion of results, the conclusion, and the implications of the study.

## LITERATURE REVIEW

Road transport is fundamental to agricultural development because it facilitates the movement of farm inputs to production areas and agricultural outputs to markets, thereby improving production efficiency and rural livelihoods (Cox, 1972; Perić et al., 2001). Well-maintained rural roads strengthen connectivity between farming communities and urban centres, improve access to fertilisers, improved seeds, agrochemicals, extension services, farm machinery, and markets, reduce transportation costs, expand marketing opportunities, and increase agricultural productivity and household incomes (Jacoby & Minten, 2009; Inoni, 2009; Sangwan, 2010; Tunde & Adeniyi, 2012; Emiran & Hou, 2013; Lokesha & Mahesha, 2016). Consequently, access to agrochemicals, agricultural credit, and farm labour remains essential for improving productivity and rural livelihoods (Salami & Toriola, 2023; Akello, 2024; Udoinyan, 2024). Conversely, poor rural roads restrict access to these inputs, increase transportation costs, delay farming operations, and reduce agricultural productivity (Blimpo et al., 2013; Olabosinde, 2024; John & Oyidi, 2025; Amah et al., 2025).

Road conditions directly influence the accessibility, availability, and affordability of agricultural inputs. Poor road surfaces, long travel distances, and high vehicle operating costs increase agrochemical prices and discourage suppliers from serving remote farming communities (Aderamo, 2010; World Bank, 2018). Consequently, farmers often experience delayed delivery of fertilisers, herbicides, pesticides, and improved seeds. Evidence from Kaduna State indicates that road rehabilitation reduced agrochemical delivery costs by about 20%, thereby improving farmers' access

to production inputs and agricultural productivity (Abumere et al., 2002; Ogunleye & Akinyele, 2019).

Accessibility, commonly measured by travel time, transport cost, and distance (Creghtney, 1993; Rodrigue, 2013), is strongly influenced by seasonal conditions. Earth-surfaced rural roads become difficult to navigate during the rainy season, increasing transport costs and restricting mobility (van de Walle, 2002; Ipingbemi, 2010; Giner et al., 2015; Aboyeji, 2021). Seasonal road deterioration further isolates rural communities and disrupts the movement of agricultural inputs and outputs. High transport fares have also been linked to imbalances between inbound and outbound passenger and freight traffic (Ojekunle et al., 2019; Fasina et al., 2020). Recent reports by the National Bureau of Statistics (NBS, 2025) indicate that rising transportation costs continue to deepen rural poverty, while Ogwo (2026) associated poor rural roads with persistently high transport fares.

Road quality also determines farmers' access to agricultural credit and labour. Improved roads reduce travel time and transaction costs, making financial institutions more accessible (ILO, 2015). Conversely, poor roads discourage banks from extending services to remote communities, thereby limiting farmers' access to agricultural credit (Abumere et al., 2002; Aderamo, 2010; World Bank, 2018). Similarly, poor road conditions discourage seasonal labour migration, creating labour shortages, delaying farming operations, and reducing productivity, whereas improved roads enhance labour mobility and farm efficiency (ILO, 2015; Bhatt, 2017). Studies from Kaduna, Ghana, and Kenya further demonstrate that road rehabilitation increased labour availability, improved access to financial services, and enhanced agricultural productivity (Ogunleye & Akinyele, 2019; Agyeman, 2014; World Bank, 2016).

The distribution of agrochemicals is particularly sensitive to road conditions across Sub-Saharan Africa. Poor roads delay deliveries and reduce the timely application of fertilisers, herbicides, and pesticides, while farmers in remote Nigerian communities often pay higher prices because of transport inefficiencies (Isah & Ogundele, 2025). Conversely, improved rural roads reduce transaction costs, encourage agro-dealers to expand distribution networks, and increase adoption of modern agricultural inputs. Similar evidence from Ghana showed that feeder-road rehabilitation significantly increased fertiliser adoption among smallholder farmers (World Bank, 2024; J-PAL, 2025; Gebresilasse, 2023).

Road infrastructure also influences labour accessibility and agricultural credit. Poor roads discourage seasonal labour migration to farming communities, creating labour shortages during peak farming periods, whereas improved connectivity facilitates labour mobility, lowers transportation costs, and supports timely farm operations (Kwara State Ministry of Communication, 2025). Regionally, CGIAR (2024) reported that rural road development in West Africa enhanced labour availability and mechanisation, while globally improved connectivity strengthened rural labour markets (Porter, 2014). Better road connectivity has also expanded microfinance penetration and investment in agricultural inputs (J-PAL, 2025). In Nigeria, the Rural Access and Agricultural Marketing Project (RAAMP) improved fertiliser and agrochemical distribution, although poor maintenance and seasonal flooding continue to increase transportation costs (World Bank, 2024; Isah & Ogundele, 2025). Road improvements have likewise expanded access to microfinance institutions and facilitated seasonal labour inflows into farming communities (Akunna, 2015; Kwara State Ministry of Communication, 2025).

Comparable experiences have been reported across Africa. In Ghana, feeder-road rehabilitation increased fertiliser adoption, strengthened rural credit schemes, and encouraged seasonal labour migration (Gebresilasse, 2023; IFAD, 2024). Similar patterns have been documented in Uganda and

Tanzania, where proximity to all-weather roads influences farmers' participation in input markets. Farmers located farther from reliable road networks generally experience higher agrochemical prices, limited access to agricultural credit, restricted labour mobility, and lower agricultural productivity.

Nigeria has implemented several programmes to improve rural accessibility and agricultural development. Earlier Agricultural Development Programmes (ADPs) strengthened extension services and food production but were constrained by inadequate funding and weak institutional support (Iyagbo & Anyanwu, 2012). Likewise, the Directorate for Food, Roads and Rural Infrastructure (DFRRI) improved rural roads and banking services but achieved only limited long-term success because of poor planning, corruption, and inadequate maintenance (Ajadi, 2010). Rural banking and microfinance initiatives also recorded limited success in settlements connected by poor roads because of inadequate financial outreach and weak loan recovery (Ugwuanyi & Chukwmeka, 2013).

Despite the widely recognised contribution of transport infrastructure to agricultural development, evidence from Nigeria continues to show that poor rural roads increase transportation costs, reduce market accessibility, and aggravate food insecurity (Olorunfemi & Adenigbo, 2017). Previous studies have primarily examined transport, agricultural productivity, food security, and rural development (Olsson, 2008; Ajiboye & Afolayan, 2009; Aggarwal, 2018; Yaro et al., 2014). More recent research investigated the effects of transport on crop, cassava, and cashew production (Aboyeji, 2021; Aboyeji & Aguda, 2024a, 2024b). However, empirical evidence on how road conditions simultaneously influence farmers' access to agrochemicals, agricultural credit, and farm labour remains limited. Although recent interdisciplinary studies acknowledge that improved roads enhance access to agricultural inputs and markets, these benefits remain uneven because of governance and institutional constraints (Biber-Freudenberger et al., 2025). This study therefore addresses this important knowledge gap by examining how road conditions influence these critical agricultural inputs, thereby providing evidence to support more integrated transport and agricultural development policies. Specifically, this study investigates the influence roads have on farmers' accessibility to selected inputs (labour, credit facilities, and agro-chemicals) in Kwara South Senatorial District, Kwara State, Nigeria. The study stated this hypothesis as:

> $H_o$: There is no significant relationship between road quality and access to selected farm inputs
> $H_1$: There is a significant relationship between road quality and access to selected farm inputs

## MATERIAL AND METHOD

### Study Area

Kwara South Senatorial District, Kwara State is located between Latitude 8º 0' 7" N - 9º 4' 29" N and Longitude 4º 29' 48" E - 5º 32' 37" E (Figure 1). The area consists of seven Local government areas; Ekiti, Ifelodun, Irepodun, Isin, Offa, Oke Ero and Oyun with populations of about 48212, 197208, 173539,47,880, 158181, 48550 and Oyun 71004, respectively. The climate of the study area is tropical, characterised by wet and dry season with an intervening harmattan from December to January. The wet season start in late March/early and lasts till late October/early November. Annual rainfall ranges from 1000 mm to 1500 mm, and mean temperature ranges from 25º C to 30º C (Oyegun, 1983; Olaniran, 2002; Olanrewaju, 2009).

The study area is in the transitional zone of climate and vegetation; as such, the area has neither extreme drought nor rainfall. The vegetation type largely consists of guinea and derived savanna **(**Oyegun, 1983**)**. Typical trees include acacia, locust beans and shear butter trees. Some

scattered trees, including *Milicia excels* are found in the wetter part of the regions which gives room for some lumbering and saw milling activities in some of the communities.

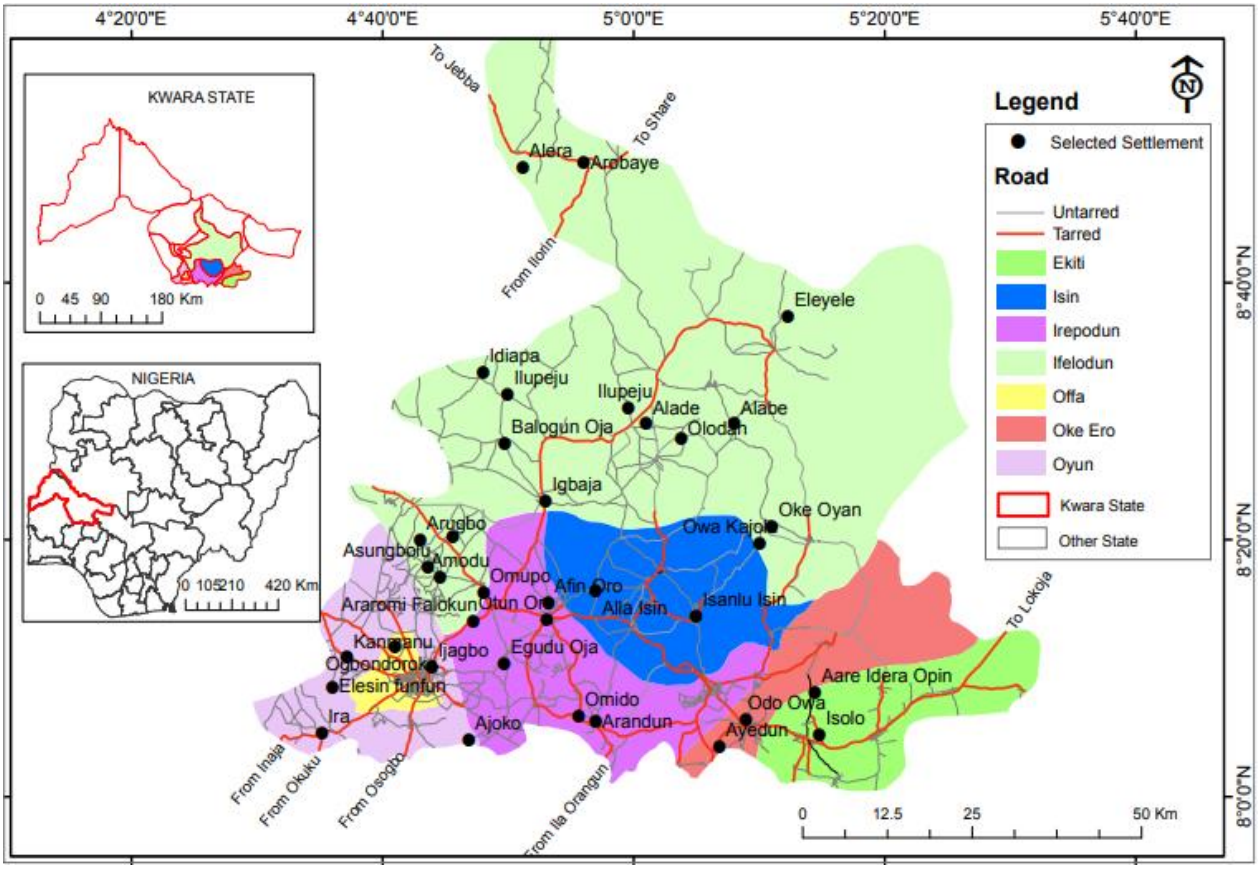


**Figure 1.** The study area, Kwara South Senatorial District in Kwara state, Nigeria (*Digitised from the Office of the Surveyor General of the Federation*
**Author:** 2024

Road transport is the dominant means of transportation in the study area, while poor road quality and low traffic have encouraged widespread motorcycle use. Kwara South Senatorial District was selected because of its extensive land area and diverse agricultural production (KSG, 2007). Major crops include tubers, cereals, cassava, vegetables, and increasingly cashew, valued for its high economic returns, drought tolerance, and adaptability to local soils. Cocoa and oil palm are concentrated in the wetter parts of Oke Ero, Isin, and Irepodun LGAs, while livestock farming and nomadism also contribute to rural livelihoods. The proximity of the National Centre for Agricultural Mechanization (NCAM) and the Agricultural and Rural Management Training Institute (ARMTI) supports agricultural mechanisation, rural development, food security, and income generation.

**Materials and method**

The study's data was obtained from primary and secondary sources. Multi-stage sampling procedures were used for the selection of settlements and respondents for this study. The first step was the arrangement of all the settlements in each of the seven Local Government Areas (LGAs) in Kwara South Senatorial District in the order of their population size (using projected 2016 population); which resulted in the emergence of 309 rural settlements. The rural settlements were categorized into three population groups; A (less than 6501), B (6501-13000) and C (13001-19,999). The second step was the choice of a sample size of 10%, 30% and 45% of the rural settlements from population group A, B and C, respectively; which permitted the choice of at least a settlement from

each of the population groups since there were only 12 and 4 settlements, respectively in population group B and C, respectively. Eventually, a total of 30, 4, and 2 settlements were selected from population Groups A, B, and C, respectively. The number of households in each selected settlement was estimated by projecting the 1991 population to the study year. The 1991 Population Census was adopted because it is the only official population dataset that provides population figures for every individual settlement within the study area. More recent population data are available only at the Local Government Area and state levels and, therefore, do not provide the settlement-level population figures required for this study. The projected population for each settlement was subsequently divided by an average household size of five persons, consistent with the national average household size reported for Nigeria (National Population Commission, 2014), to estimate the number of households. Population projection was undertaken using the annual rural population growth rate of 1.03%, as reported by the World Bank (2016), to obtain a more realistic estimate of the current population and household distribution across the selected settlements.

10% of sample householdswere taken from settlements in Group A with population less than 6501 people; Ogunsanya (1983) and Olawole (2013) used the sample proportion and suggested its relevance for rural study. The selection of 10% of the population was justified for its ability to avoid selection of large samples that may be uneconomical due to time and financial constraints for the research. On the other hand, a sample of 5% of households each was selected from settlements in population group B (6,501-13,000) and C (13,001-19,999) to give room for representations of all groups in each LGA, particularly because settlements with high population are scant in the study area. All households in each of the selected settlements were listed and numbered to achieve objectivity in households' selection of the sampled settlements. Additionally, a simple random sampling technique was used for the selection of the first sample, while systematic sampling was used to select subsequent samples in the list at regular intervals of "K", until the required number of households is completed. The interval "K" was obtained through the division of the total households listed per settlement by the value obtained from either the 10% or 5% of sample household size per settlement. Finally, the samples from each LGA are Ekiti (36), Ifelodun (407), Irepodun (327), Isin (113), Offa (6), Oke-Ero (263), and Oyun (221). A total of 1,373 questionnaires were administered to household heads with at least two years of crop farming experience to ensure reliable information. Data analysis employed both descriptive statistics (percentages, tables, charts) and inferential statistics, specifically Levene's test for homogeneity of variance. Interpretation was based on road quality, comparing settlements connected by tarred versus untarred roads (Olawole, 2013). This methodological approach ensures robust insights into how road infrastructure affects farming communities.

## RESULTS AND DISCUSSION

### Types of Roads to Selected Settlements

Field observations revealed that 55.6% of the selected settlements were connected by untarred roads, underscoring the predominance of poor rural infrastructure in Nigeria (Figure 2). Such road conditions negatively affect agricultural activities and rural livelihoods through high transport fares, delays, and unreliable services (Ajiboye & Olaogun, 2006; Porter, 2014). Predominant untarred roads reflect systemic issues including project discontinuity, corruption, poor governance, and political clientelism (Fayinka, 2004; Akunna, 2015; Spearling & Claussen, 2004; Estache & Limi, 2009; Lall et al., 2009; Burgess et al., 2015; Adewole, 2015). The poor roads hinder timely access to farm inputs and reduce agricultural efficiency.

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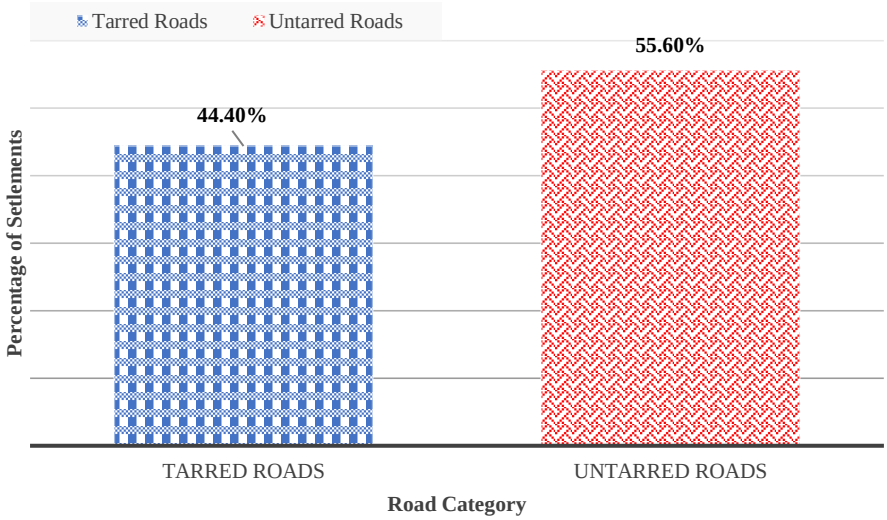


**Figure 2**: Percentages of settlements connected with Tarred and Untarred roads Category
**Source:** Author's Research, 2021

The distribution of tarred and untarred roads across LGAs was uneven. In Offa, Irepodun, Isin, Ekiti, Oyun, and Ifelodun, 100%, 76.5%, 50%, 50%, 40%, and 28.6% of sampled settlements were connected by untarred roads, while Oke-Ero had 100% tarred road connections (Figure 3). Studies have linked poor road quality with poor accessibility and high transport' fares (Ipingbemi, 2010; Kassali et al., 2012; Tunde & Adeniyi, 2012; Yaro et al., 2014). Poor roads increase vehicle operating costs with negative impacts on evacuation of farm input and output thereby undermining agricultural productivity (Teravaninthorn & Raaballan, 2008; Paul et al., 2009; Macchi et al., 2010; Ipingbemi, 2010; Jacoby & Minten, 2009; Inoni, 2009; Suri, 2009; Sangwan, 2010; Tunde & Adeniyi, 2012; Emiran & Hou, 2013; Lokesha & Mahesha, 2016). Wet season worsens untarred roads, making them slippery and muddy, thereby raising fares (Hine & Ellis, 2001). High fares reduce farmer mobility and profits (Gollin & Rogerson, 2014; Aboyeji, 2021).

**Figure 3:** Distribution of tarred and untarred roads in selected settlement across local government areas, Kwara South Senatorial District, Kwara State.

**Source:** Author' Survey

**Road type and accessibility to farm labourers**

The results revealed that 43.4% and 35.6% of respondents strongly agreed and agreed, respectively, that roads enable easy access to farm labourers, while 5.3% strongly disagreed and 14.3% disagreed (Figure 4). Distribution varied sharply between settlements connected by tarred and untarred roads. Only 0.7% of respondents in tarred-road settlements strongly disagreed, compared to 27.4% in untarred-road settlements. Similarly, 5.6% in tarred-road and 56.1% of respondents in untarred-roads' settlements disagreed. This corroborates earlier findings that poor roads impede labour accessibility, causing shortages, delays, and reduced productivity (Aderamo, 2010; World Bank, 2018; Abumere, Okafor, & Oluwanisola, 2002). Conversely, 42.1% of tarred-road respondents agreed, compared to only 4.6% in untarred-road settlements. Likewise, 50.4% of tarred-road respondents strongly agreed, against just 10.1% in untarred-road settlements. Clearly, tarred roads enhance labour accessibility, while untarred roads hinder it. Previous studies linked well-maintained roads with timely planting, efficient farm operations, and higher yields (ILO, 2015; Bhatt, 2017; Ogunleye & Akinyele, 2019).

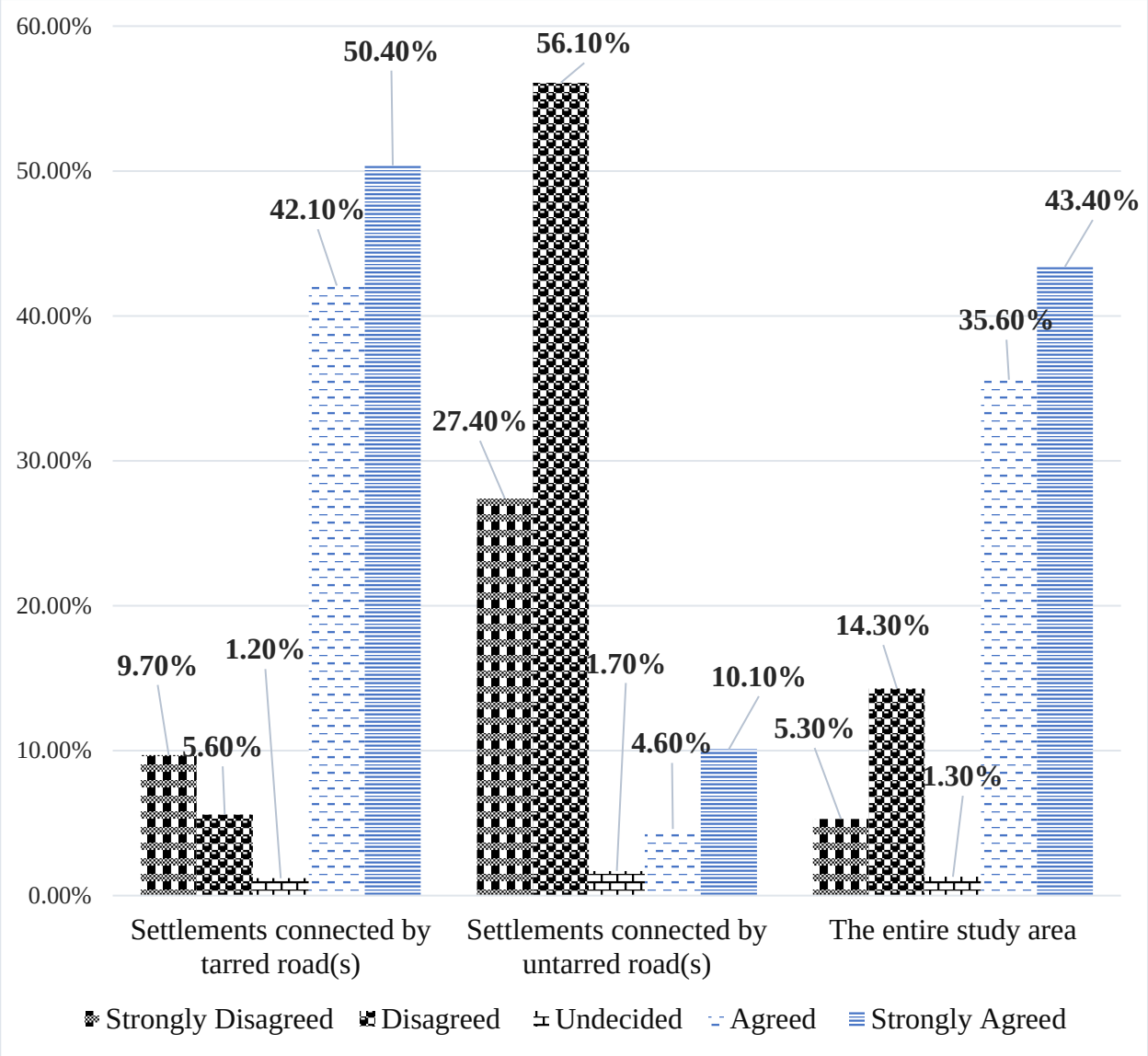


**Figure 4:** The road causes easy access to farm labourer
**Source:** Author' Survey

Analysis on a local government basis revealed that 86.1%, 79.6%, and 57.5% strongly agreed in Ekiti, Oyun and Irepodun respectively, while 63.9% agreed in Oke-ero that road to their settlement promotes accessibility to farm labour. The very high proportion of positive responses in Ekiti and Oke-ero was because selected settlements in the area were connected by tarred roads. However, Offa stands out negatively, with 66.7% disagreement and 33.3% agreement while Isin shows mixed responses, with 51.3% disagreement because sampled settlements were connected by both tarred and untarred roads**.** Overall**,** about 79% (Agreed + Strongly Agreed) believe roads improve access to farm labourers, though some LGAs (Offa, Isin) remain underserved.

**Table 1: Road and Access to Farm Labourers Across LGAs**:

| Response Category | Ekiti | Ifelodun | Irepodun | Isin | Offa | Oke-Ero | Oyun | Overall Total |
|---|---|---|---|---|---|---|---|---|
| **Strongly Disagreed** | 0.0 | 12.8 | 1.8 | 6.2 | 0.0 | 1.1 | 2.3 | 5.3 |
| **Disagreed** | 0.0 | 20.4 | 8.3 | 51.3 | 66.7 | 4.2 | 6.3 | 14.3 |
| **Undecided** | 2.8 | 1.2 | 0.9 | 5.3 | 0.0 | 0.8 | 0.9 | 1.3 |
| **Agreed** | 13.9 | 45.9 | 31.5 | 1.8 | 0.0 | 63.9 | 10.9 | 35.6 |
| **Strongly Agreed** | 86.1 | 19.7 | 57.5 | 35.4 | 33.3 | 30.0 | 79.6 | 43.4 |

**Source:** Author' Survey

## Road and cost of farm labour

The survey revealed mixed perceptions regarding the influence of road infrastructure on farm labour costs. Overall, 16.2% of respondents strongly agreed and 25.1% agreed that roads to their settlements reduced farm labour costs, while 30.2% disagreed, 16.3% strongly disagreed, and 12.3% provided no response (Figure 5). These findings indicate that many farmers did not perceive existing road conditions as sufficient to lower labour costs.

Cross-tabulation further highlighted differences between settlements connected by tarred and untarred roads. Among respondents in untarred-road settlements, 40.1% strongly disagreed compared with 11.2% in tarred-road settlements. Likewise, 20.2% of respondents in untarred-road settlements, compared with 48.5% in tarred-road settlements, disagreed that roads reduced labour costs. Conversely, agreement was higher in settlements connected by tarred roads, where 14.1% agreed and 18.9% strongly agreed, compared with only 3.8% each in untarred-road settlements (Figure 5). The results suggest that better-quality roads are generally associated with lower perceived farm labour costs.

These findings are consistent with earlier studies linking untarred roads to rural–urban migration, constrained labour supply, and higher rural labour costs (Chemonic, 2003; Shaib et al., 2010; Aworemi et al., 2011). Recent evidence similarly associates improved rural roads with higher household income, increased consumption, poverty reduction, and lower transaction costs, whereas poor roads reinforce labour scarcity and migration pressures (Jamiu et al., 2024; Ezeudu & Fadeyi, 2024). Persistent underinvestment in rural infrastructure therefore perpetuates community isolation, poverty, and wage disparities (Onyebuchi, 2024).

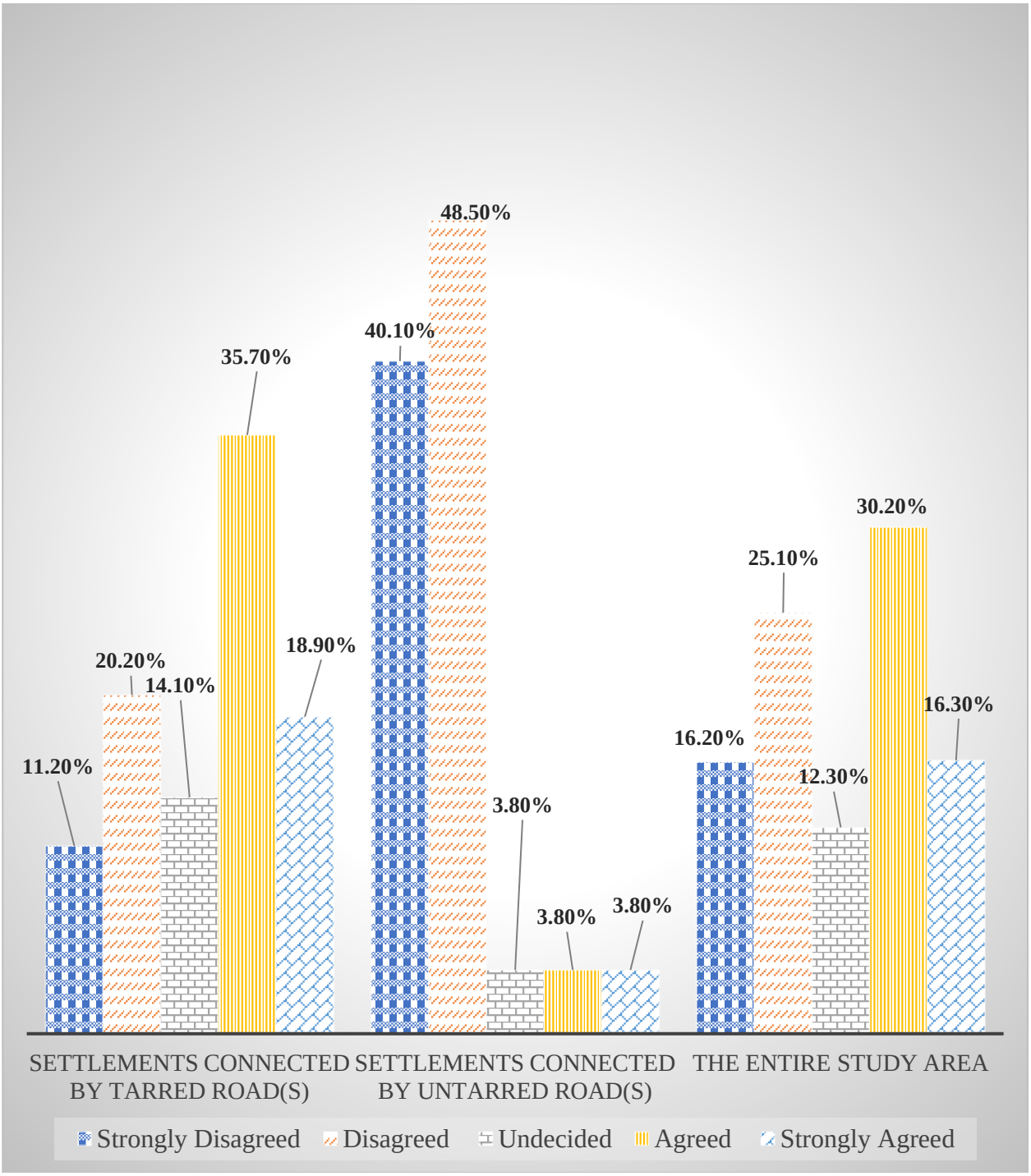


**Figure 5:** The road Influences Low Cost of Farm Labour
**Source:** Author' Survey

A local government–based analysis revealed significant variations in perceptions of road influence on farm labour costs across Kwara South. In Oyun LGA, 29.4% of respondents strongly agreed that road quality reduces labour costs, with 92.8% drawn from tarred-road settlements. Similarly, in Ekiti LGA, 58.3% agreed, supported by 88.9% of respondents from tarred-road settlements (Aboyeji, 2021). Cost comparisons further illustrate this disparity: in Ira (Oyun), employing labourers to construct 200 heaps for maize/guinea corn cultivation cost ₦1,500, while in Ajooko-Budo aarin, the same task cost between ₦2,000 and ₦2,500. Conversely, 21.9% of respondents in Ifelodun strongly disagreed that road quality lowers labour costs, while 66.7% in Offa

disagreed, underscoring the uneven impacts of road infrastructure. These findings highlight how road quality directly shapes farm labour pricing, with tarred roads reducing costs and untarred roads inflating them. This ultimately determines labour affordability and productivity.

**Table 2: Road and Access to Farm Labour Across LGAs**

| Response Category | Ekiti | Ifelodun | Irepodun | Isin | Offa | Oke-Ero | Oyun | Overall Total |
|---|---|---|---|---|---|---|---|---|
| **Strongly Disagreed** | 0.0 | 21.9 | 17.4 | 18.6 | 0.0 | 14.8 | 6.8 | 16.3 |
| **Disagreed** | 13.9 | 31.0 | 9.5 | 55.8 | 66.7 | 14.8 | 34.4 | 25.1 |
| **Undecided** | 0.0 | 2.7 | 8.9 | 14.2 | 16.7 | 35.0 | 9.0 | 12.3 |
| **Agreed** | 58.3 | 35.6 | 37.6 | 0.9 | 0.0 | 30.0 | 20.4 | 30.2 |
| **Strongly Agreed** | 27.8 | 8.8 | 26.6 | 10.6 | 16.7 | 5.3 | 29.4 | 16.3 |

**Source:** Author' Survey

## Road and Access to Agro-chemicals

The survey presented in Figure 6 showed that only 1.7% strongly agreed and 3.4% agreed that roads improved accessibility, while a large majority (32.9% strongly disagreed and 61.2% disagreed) felt roads did not help access to agro-chemicals. However, when comparing settlements by road type, a clear difference emerges. For instance, in settlements connected by tarred roads**,** 38.1% strongly agreed and 51.8% agreed that roads enhanced access, with only 1.5% strongly disagreeing and 7.7% disagreeing. Whereas, in settlements connected by untarred roads, just 1.7% strongly agreed and 3.4% agreed, while 32.9% strongly disagreed and 61.2% disagreed. This contrast highlights that road quality decides the level of farmers' access to obtain agro-chemicals. Aggarwal (2014)'s earlier studies in India showed that settlements with better road infrastructure had improved access to herbicides and other inputs.

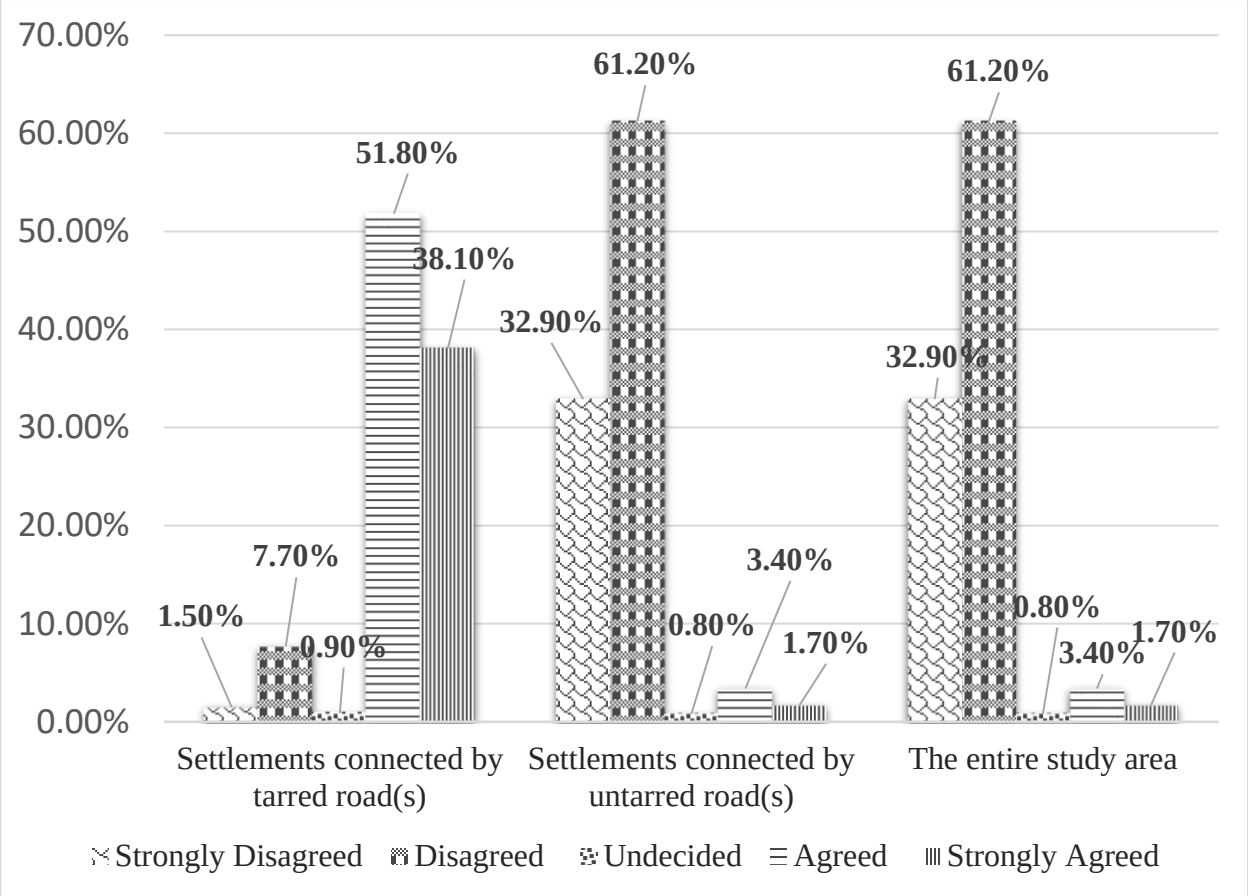


**Figure 6:** Road and Access to Agro-chemicals
**Source:** Author' Survey

Further analysis on local government basis revealed that the highest proportion (61.1%) of those who strongly agreed was from Ekiti LGA, the highest proportion (74.5%) of those who agreed that roads promote easy access to agro-chemicals was from Oke-ero LGA (Table 3). This might not be undetached from the good condition of the road to most settlements in the area. In contrast, the highest proportion (11.5%) of those who strongly disagreed that road promote easy access to agro-chemicals was from Isin LGA and, the highest proportion (83.3%) of those who disagreed was from Offa LGA. Inferably, a majority perceived better access to agro-chemicals in settlements connected by tarred road than in settlement connected by untarred road in the area.

**Table 3: Road and Access to Agro-Chemicals Across LGAs**:

| Response Category | Ekiti | Ifelodun | Irepodun | Isin | Offa | Oke-Ero | Oyun | Overall Total |
|---|---|---|---|---|---|---|---|---|
| **Strongly Disagreed** | 0.0 | 10.6 | 7.6 | 11.5 | 0.0 | 2.3 | 3.6 | 6.9 |
| **Disagreed** | 30.6 | 25.8 | 2.8 | 69.0 | 83.3 | 1.1 | 9.5 | 16.9 |
| **Undecided** | 0.0 | 0.5 | 0.6 | 4.4 | 0.0 | 0.0 | 1.4 | 0.9 |
| **Agreed** | 8.3 | 50.4 | 41.3 | 1.8 | 0.0 | 74.5 | 25.3 | 43.5 |
| **Strongly Agreed** | 61.1 | 12.8 | 47.7 | 13.3 | 16.7 | 22.1 | 60.2 | 31.8 |

**Source:** Author' Survey

**Road and Cost of agro-chemicals**

Further analysis by LGA showed that Ekiti (61.1%) had the highest proportion strongly agreeing that roads reduce agro-chemical costs, while Oke Ero (73.8%) had the highest proportion agreeing. Conversely, Isin (16.8%) recorded the highest strong disagreement, and Offa (100%) the highest disagreement (Figure 7). Poor road quality was found to raise herbicide and fertiliser costs, affirming earlier evidence that Sub-Saharan African farmers pay three times more for fertiliser than peers in Brazil, India, China, and Thailand due to poor roads (Binswanger-Mkhize & McCall, 2010). Recently fertiliser cost ₦5,000 in Isolo Opin on tarred-road but ₦5,500 in Aare Idera Opin on untarred-road, only 7 km apart (Aboyeji, 2021). Recent studies confirm that road networks reduce input costs and enhance competitiveness (Akello, 2024). However, poor implementation and maintenance of rural road projects often undermine these benefits (Olorunfemi, 2024). Also, deplorable rural roads accounted for higher agro-input prices, reduction in farmers' output, commercialisation, income and food security in Sub-Saharan Africa (Food Security Research Group, 2024).

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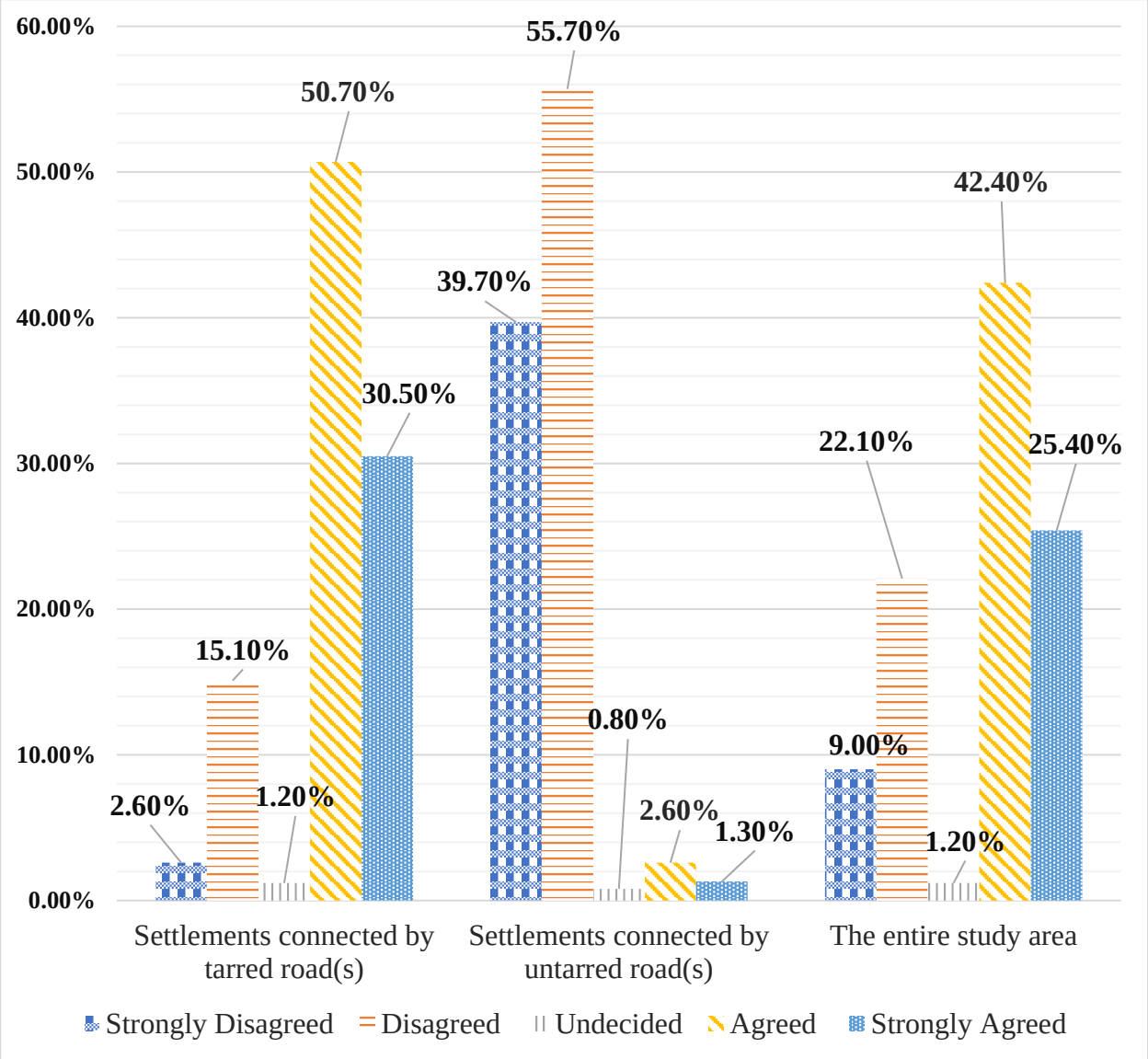


**Figure 7:** Road and Cost of Agro-chemicals
**Source:** Author' Survey

Analysis across LGAs revealed marked differences in farmers' perceptions of road influence on agrochemical costs. Ekiti recorded the highest proportion strongly agreeing (61.1%), while Oke Ero had the highest agreement (73.8%). Conversely, Isin (16.8%) and Offa (100%) exhibited the strongest disagreement, indicating poorer access and higher agrochemical costs (Table 4). The findings confirm that poor road quality increases herbicide and fertiliser prices, consistent with evidence that Sub-Saharan African farmers pay up to three times more for agricultural inputs than farmers in Brazil, India, China, and Thailand (Binswanger-Mkhize & McCall, 2010). Similar patterns were reported in Kwara State (Aboyeji, 2021) and support studies linking road infrastructure with agricultural productivity and competitiveness (Utuk, Eduno, & Okon, 2024; Akello, 2024; Food Security Research Group, 2024; Olorunfemi, 2024).

**Table 4: Road and cost of Agro chemicals across LGAs**

| Response Category | Ekiti | Ifelodun | Irepodun | Isin | Offa | Oke-Ero | Oyun | Overall Total |
|---|---|---|---|---|---|---|---|---|
| **Strongly Disagreed** | 0.0 | 14.3 | 10.4 | 16.8 | 0.0 | 1.1 | 4.1 | 9.0 |
| **Disagreed** | 36.1 | 26.0 | 7.6 | 67.3 | 100.0 | 15.6 | 16.3 | 22.1 |
| **Undecided** | 0.0 | 0.7 | 0.6 | 4.4 | 0.0 | 1.1 | 1.4 | 1.2 |
| **Agreed** | 2.8 | 38.3 | 47.7 | 0.9 | 0.0 | 73.8 | 33.5 | 42.4 |
| **Strongly Agreed** | 61.1 | 20.6 | 33.6 | 10.6 | 0.0 | 8.4 | 44.8 | 25.4 |

**Source:** Author' Survey

### Road and accessibility to credit facilities

The survey revealed that 68% of respondents agreed or strongly agreed that road infrastructure improved their access to credit facilities, whereas 28.7% disagreed. Farmers in settlements connected by tarred roads reported substantially higher agreement than those in untarred settlements, highlighting the importance of road quality for financial accessibility (Figure 8). Poor road conditions increase transaction costs for both farmers and financial institutions, discouraging banks from extending services to remote communities (Aderamo, 2010; World Bank, 2018; Abumere, Okafor, & Oluwanisola, 2002). Conversely, improved roads encourage banks to establish rural branches, strengthen farmer–bank linkages, and enhance agricultural productivity (World Bank, 2016; ILO, 2015; Ogunleye & Akinyele, 2019). The findings demonstrate that roads are not only transport infrastructure but also critical enablers of financial inclusion, although land availability and climate variability also influence agricultural outcomes (Utuk, Eduno, & Okon, 2024; Olorunfemi, 2024).

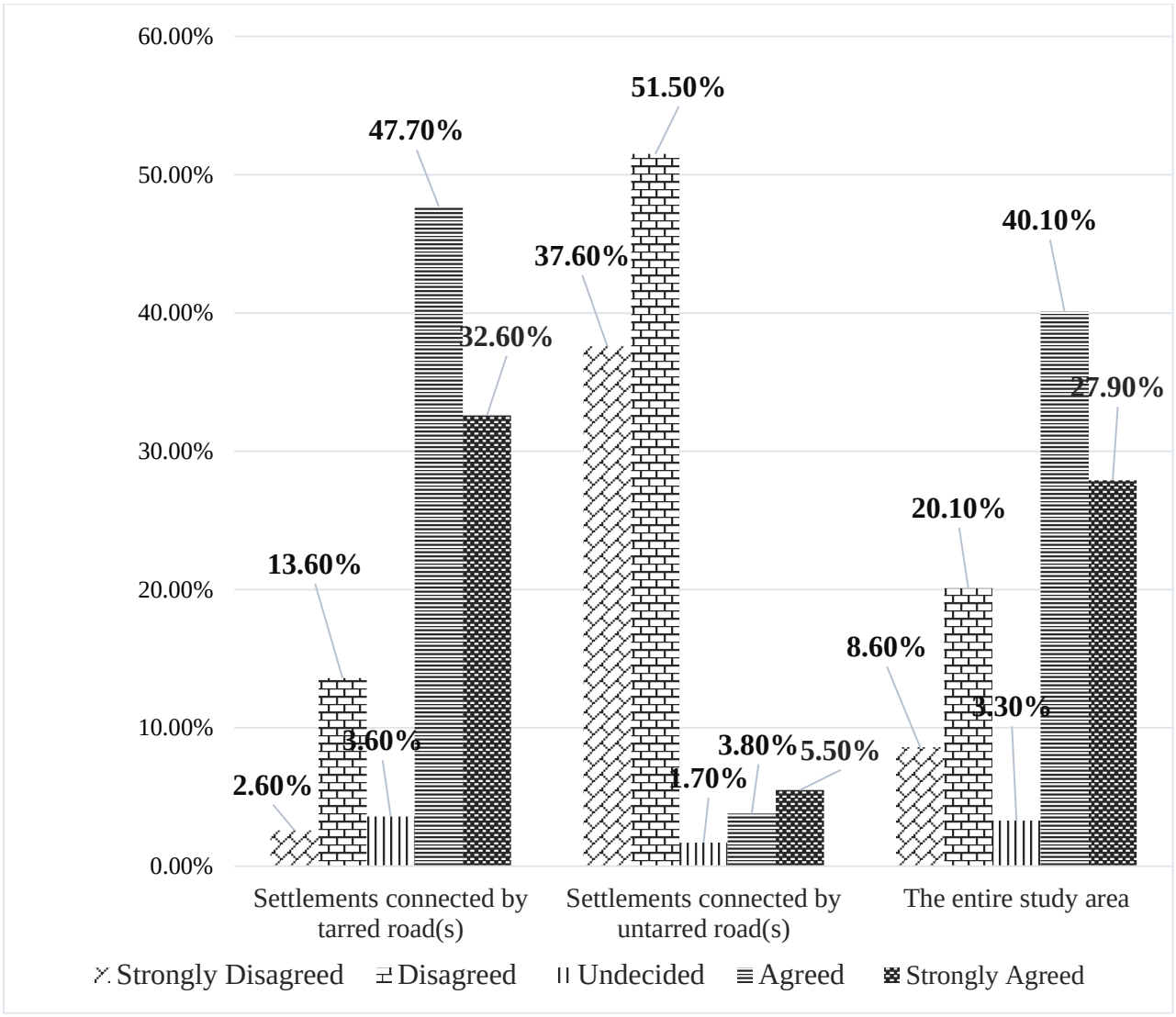


**Figure 8:** Road and Accessibility to Credit Facilities (bank loan)
**Source:** Author' Survey

Analysis across local government areas (Table 5) shows contrasts in farmers' perceptions of road access to credit facilities. In Isin (72.6%) and Offa (66.7%), most respondents strongly disagreed, reflecting poor access, while Ekiti and Oke Ero showed strong positive responses above 85%. Oyun recorded the highest "Strongly Agreed" (41.6%), suggesting relatively better access due to improved road quality. Overall, about 70% of respondents believed roads enhance access to credit, though disparities across LGAs remain stark. These findings align with evidence that poor road quality impedes access to credit and inputs, constraining rural development (Aderamo, 2010; World Bank, 2018).

**Table 5:** Road and Access to Credit Facilities Across LGAs

| Response Category | Ekiti | Ifelodun | Irepodun | Isin | Offa | Oke-Ero | Oyun | Overall Total |
|---|---|---|---|---|---|---|---|---|
| **Strongly Disagreed** | 2.8 | 18.2 | 2.8 | 10.6 | 16.7 | 3.4 | 5.4 | 8.6 |
| **Disagreed** | 8.3 | 18.2 | 15.0 | 72.6 | 66.7 | 11.8 | 14.9 | 20.1 |
| **Undecided** | 0.0 | 1.0 | 7.3 | 4.4 | 16.7 | 0.8 | 4.1 | 3.3 |
| **Agreed** | 52.8 | 36.9 | 50.0 | 4.4 | 0.0 | 51.7 | 33.9 | 40.1 |
| **Strongly Agreed** | 36.1 | 25.8 | 24.2 | 8.0 | 0.0 | 32.3 | 41.6 | 29.7 |

**Source:** Author' Survey

**Perception on presence or absence of banking services**

The survey presented in Table 6 revealed that most farming settlements in Kwara South lack banking facilities. Only 26.20% of respondents in the survey confirmed presence of banks. While 100% of respondents in settlements connected by untarred roads reported absence of banks, only 68.3% reported absence of banks.

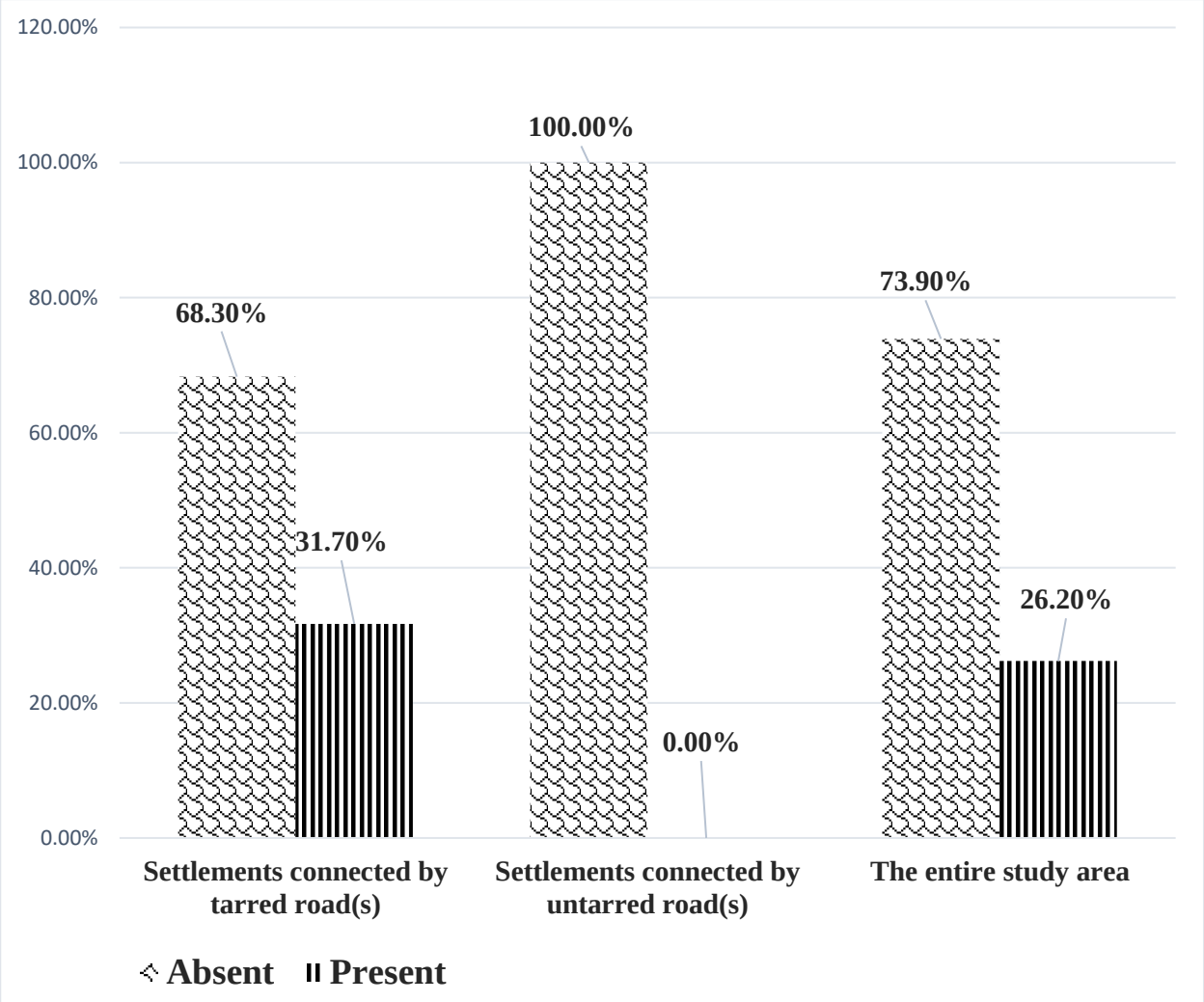


**Figure 9**: Perception of People on Presence or Absence of Banking Services
**Source:** Author' Survey

A local government-based analysis revealed that 26.8% of settlements had banks, with Oyun (49.8%) and Ekiti (47.2%) attributing better access to improved road connectivity. Conversely, Offa LGA 100% absence of banks is associated with poor road conditions (Table 6). This limited access to credit facilities force farmers to incur higher transport costs and longer travel times, depriving farmers' access to formal credit markets and constraining agricultural productivity (Agyeman, 2014).

**Table 6: Presence and Absence of Banks across LGAs**:

| | Ekiti | Ifelodun | Irepodun | Isin | Offa | Oke-Ero | Oyun | Overall Total |
|---|---|---|---|---|---|---|---|---|
| **Absence of bank (%)** | 52.8 | 66.6 | 73.4 | 95.6 | 100.0 | 95.1 | 50.2 | 73.2 |
| **Presence of bank (%)** | 47.2 | 33.4 | 26.6 | 4.4 | 0.0 | 4.9 | 49.8 | 26.8 |

**Source:** Author' survey

## Hypothesis Testing

The hypothesis testing the impact of road on farmers' access to agro-chemicals, labour, and credit facilities was tested using a two-sample Student's t-test with pooled variance estimates. This independent t-test compared mean accessibility levels between settlements connected by tarred and untarred roads, while also checking equality of variances through Levene's test to achieve robustness of results. The findings reveal the significant differences existing in farmers' access to inputs across the two settlement categories (Table 7).

**Table 7:** The results of the independent t-test on the impacts of transport on accessibility to farm inputs between settlements connected by tarred roads and settlements connected by untarred roads

| | Road Type | N | Mean | Std. Dev. | Std. Error | Mean Diff. | F-value | Sig (Levene) | T | Df | Sig (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Access to Farm Labour** | Tarred | 1136 | 4.40 | 0.737 | 0.022 | 1.455 | 0.62 | 0.430 | 26.63 | 1371 | 0.000 |
| | Untarred | 237 | 2.94 | 0.891 | 0.058 | | | | 23.53 | 306.86 | 0.000 |
| **Access to Credit Facilities** | Tarred | 1136 | 4.03 | 0.942 | 0.028 | 1.292 | 0.143 | 0.706 | 19.69 | 1371 | 0.000 |
| | Untarred | 237 | 2.74 | 0.797 | 0.052 | | | | 21.97 | 387.04 | 0.000 |
| **Access to Agro-Chemicals** | Tarred | 1136 | 4.24 | 0.724 | 0.021 | 1.401 | 17.66 | 0.000* | 27.70 | 1371 | 0.000 |
| | Untarred | 237 | 2.84 | 0.624 | 0.041 | | | | 30.53 | 381.02 | 0.000 |

Note (*) is significant at $p<0.05$
**Source:** Author' computation

The analysis revealed that farmers' accessibility to farm labour did not differ significantly between settlements connected by tarred and untarred roads ($F = 0.62$, $p = 0.430$). Because the probability value exceeded the 0.05 significance threshold, the null hypothesis was accepted, indicating that road type had no statistically significant influence on farmers' access to farm labour.

Similarly, no statistically significant variation existed in farmers' accessibility to agricultural credit facilities (bank loans) between settlements served by tarred and untarred roads ($F = 0.143$, $p = 0.706$). Since the probability value was greater than 0.05, the null hypothesis was accepted, demonstrating that road conditions did not significantly influence farmers' access to credit.

In contrast, accessibility to agrochemicals differed significantly between settlements connected by tarred roads and those linked by untarred roads ($F = 17.66$, $p < 0.001$). This finding indicates that road conditions exert a statistically significant influence on farmers' access to herbicides and other agrochemicals. Consequently, the null hypothesis was rejected, while the alternative hypothesis was accepted.

Overall, the findings indicate that although road conditions do not significantly affect farmers' access to farm labour or agricultural credit, they play a crucial role in determining access to agrochemicals. Improved rural road infrastructure is therefore more likely to enhance the timely distribution and availability of agrochemicals than to influence access to labour or credit facilities.

## CONCLUSION AND RECOMMENDATION

This study examined the influence of road infrastructure on farmers' access to agricultural inputs in selected rural settlements of Kwara South Senatorial District, Nigeria. The findings revealed that 55.6% of the sampled settlements were connected by untarred roads, reflecting the predominance of poor rural transport infrastructure. Although descriptive evidence suggested that road conditions affected farmers' access to farm labour and agricultural credit, inferential analysis showed no statistically significant differences in accessibility to farm labour ($F = 0.62$, $p = 0.430$) or agricultural credit facilities ($F = 0.143$, $p = 0.706$) between settlements served by tarred and untarred roads. In contrast, accessibility to agrochemicals differed significantly ($F = 17.66$, $p < 0.001$), demonstrating that road infrastructure plays a critical role in improving the timely availability and affordability of agrochemicals. These findings corroborate previous studies linking improved rural roads with enhanced agricultural input distribution and productivity (Salami & Toriola, 2023; Olabosinde, 2024; John & Oyidi, 2025).

The study recommends prioritising the rehabilitation and routine maintenance of rural feeder roads serving major farming communities to improve access to agrochemicals and strengthen agricultural productivity. Government should integrate rural road development with agricultural programmes to enhance agro-input distribution and reduce transportation costs, consistent with recent evidence (Salami & Toriola, 2023; Amah et al., 2025). It also recommends establishing a dedicated Rural Roads Maintenance Fund through government, private-sector, and community partnerships. Furthermore, GIS, GPS, remote sensing, and mobile-based monitoring systems should support road maintenance planning, while future studies should examine the combined effects of road quality, transport services, and market accessibility on agricultural productivity across different agro-ecological zones.

**CRediT Author Statement: Olurotimi Joseph Aboyeji:** Conceptualization, Methodology; Data curation, Writing – original draft; **Akinola Samuel Aguda:** Supervision; Review & editing.

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