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Comparative Analysis of Tomato Farmers' Socio-Economic Characteristics in Three Nigerian States

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ABSTRACT

The agricultural economy of Nigeria depends on tomato farming because it provides employment and ensures food security and supplies raw materials to agro-industrial operations. The socio-economic characteristics including gender together with age, marital status and educational level strongly affect both farming practices and productivity levels. The research examines the demographic features of tomato farmers in Kano and Oyo and Plateau states through survey responses from 310 participants. The survey results indicate that men control tomato farming since they comprise 91.61% of all farmers. The majority of farmers (69.67%) belong to the age group between 26 and 45 years old which shows that young and middle-aged people actively participate in farming. The majority of respondents (80.65%) are married which indicates that family support plays a crucial role in their farming activities. The educational background of farmers shows marked differences between states because Kano has the most uneducated farmers at 41.5% yet Oyo has the most farmers with tertiary education at 26.53%. These observed disparities reveal different levels of access to agricultural resources and training and extension services. The research shows that specific policy measures need to focus on enhancing farmer education while addressing gender inequalities and supporting young farmers to adopt contemporary agricultural methods.

1. Introduction

Agriculture remains Nigeria's economic foundation since it generates 23.78% of GDP while employing more than 70% of workers (FAO, 2022; Ugwukah, 2022). The cultivation of different crops functions as a fundamental base which enables both household income generation and food security maintenance while delivering unprocessed materials to agricultural processing industries. The economic value together with nutritional benefits and industrial applications make tomato farming stand out as a special crop among others. The crop serves as the main source that supplies both the domestic market and international export routes while providing jobs to millions throughout Nigeria. Nigeria maintains its position as the leading tomato producer in sub-Saharan Africa since it produces 2.3 million metric tons of tomatoes annually (Yusuf et al., 2023; Idris et al., 2025). The sector encounters major obstacles that

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prevent the achievement of its full potential despite producing such a large quantity of output. The sector encounters ongoing productivity challenges due to socio-economic barriers which include limited access to modern agricultural technology alongside poor infrastructure and insufficient resources such as quality seeds and irrigation systems and credit (Begna, 2020; Shitaye *et al.,* 2025). The combination of climate variability with inadequate market access and inefficient post-harvest management intensifies these challenges resulting in supply chain inefficiencies and high waste levels in tomato production (Sibomana *et al.,* 2018). This research examines the socio-economic characteristics of tomato farmers in these three States, focusing on gender, age, marital status and educational background. To develop policies that improve farmer welfare, increase productivity, and establish sustainable farming practices across Nigeria, the research examines how the different regions affect farming practices.

2. Literature Review

Tomato farming performance heavily depends on socio-economic factors that include education level, gender status as well as age and marital status. Education plays a vital role as it teaches farmers to adopt modern agricultural practices through technological tools, service extension services and funding opportunities (Amoussohoui *et al.,* 2023; Li *et al.,* 2024). A higher level of education increases farmers' ability to manage farm operations effectively, improves yield quality and resource utilization decisions. In addition, education enables farmers to access government's programs, agricultural loan facilities, and other institutional support which results in better productivity and financial security. Buehren (2023) explains that gender disparities play a major role in affecting agricultural performance in sub-Saharan Africa. The agricultural path remains challenging for women because they do not have access to land or capital nor do they have authority to make decisions at the household and community levels. These limitations restrict women from practising agriculture, hence, preventing them from employing new farming methods and building their agricultural enterprise. Moreso, the uneven distribution of resources between the genders limits agricultural productivity and the number of women in the agricultural sector (Kadzamira *et al.,* 2024; Onomu & Aliber, 2024). Age serves as an essential factor which determines how farming is practiced. Research evidence shows that younger farmers exhibit higher readiness to adopt modern technologies alongside innovative farming practices than older farmers, who stick more to traditional methods (FAO, 2022). Younger individuals possess better technological skills which enables them to connect with digital platforms to reach agricultural markets and implement contemporary farming techniques. The agricultural sector faces a critical challenge because younger workers choose different career paths outside farming which threatens to diminish the essential workforce required for maintaining innovative and sustainable farming practices. The marital status of farmers significantly impacts the agricultural production results. Farmers who are married get assistance from their family members and spouses which leads to both household workforce support and enhanced financial stability. When farmers are married, they receive additional support which results in higher productivity because they have more workers for farm tasks and stronger motivation to improve their agricultural operations in the long run (Pierotti *et al.,* 2022; Opoku-Acheampong *et al.,* 2024). Conversely, farmers who are single might face the challenge of lack of household support, thus affecting their growth and ability to adopt new farming technologies (Balana & Oyeyemi., 2022). This research focuses on Kano, Oyo, and Plateau States because these States have a significant impact on tomato farming in Nigeria and presents distinct ecological and cultural

characteristics. Kano State is in Northern Nigeria, and serves as a major tomato producer, however, Tafida & Ayuba (2020) reported that the State's low literacy levels, uncertain land ownership and climate-related problems lower farming productivity and agricultural practices. Farmers' financial struggles are made worse by the inadequate support for agricultural modernization in northern Nigeria, particularly in Kano State (Haruna & Eze, 2024). Agriculture dominates the local economy, with tomato cultivation covering about 44,020 hectares and contributing 7.5% to Nigeria's total tomato production (Plaisier et al., 2019). Other major crops include groundnuts, rice, cowpea, and various cereals. Oyo State, located within the southwest area of Nigeria and is notable for its highly developed, commercialized agricultural system. The region benefits from greater literacy rates, excellent access to extension services, and well-developed infrastructure, which makes it possible for farmers to embrace modern farming practices (Alawode, 2021). The educational advancements and improved extension services in this area make it an important site for studying how education affects agricultural productivity. Plateau State, located in North-central part of Nigeria has a temperate climate and fertile land with suitable conditions for agriculture. According to Onuwa & Folorunsho (2022), Plateau farmers suffer a variety of socio-economic challenges such as uneven educational achievement levels, restricted access to modern farming methods and unstable land ownership which limits their productivity. The region presents an essential case study to examine how natural agricultural advantages can work together with social and economic advancements to increase farm productivity.

3. Materials and Method

A cross-sectional survey design was used to collect primary data on the socio-economic characteristics of tomato farmers. Data was obtained from 310 respondents using a multi-stage sampling technique. In the first stage, Kano, Oyo, and Plateau States were purposively selected due to their significant contributions to tomato production in Nigeria.

In the second stage, Local Government Areas (LGAs) with high levels of tomato cultivation were identified for data collection.

In the third stage, respondents were randomly selected from farming communities within the chosen LGAs. Of the 310 respondents, 106 were from Kano, 49 from Oyo, and 155 from Plateau. Data was collected through face-to-face interviews to enhance response accuracy and reliability. Socio-economic variables, including gender, age, marital status, and education, were analyzed using descriptive statistics such as frequencies and percentages. In addition, the Chi-square test was employed to examine associations between categorical variables, following the approach of Franke et al. (2012).

This test assesses whether there is a significant difference between observed and expected frequencies across categories. The Chi-square statistics are given by:

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where:

χ2 = Chi-square value
O = Observed frequency
E = Expected frequency

4. Results and Discussion

The socio-demographic characteristics show that tomato farming is mostly practiced by males, accounting for 91.61% of farmers, compared to females (8.39%). The Chi-square analysis indicates that there is a significant gender disparity in all the three States. Kano has the highest gender gap with 99.1% being male farmers, as earlier reported by Adeboye *et al.* (2024). The result is also consistent with a study conducted by Awagu *et al.* (2014), which reported that vegetable farming in Kano State is gender-specific with 100% of the farmers being males. This may be attributed to the cultural and religion belief of the people of the State. On the other hand, Oyo has the highest number of female farmers (18.4%), which can be attributed to the variation in gender roles and socio-economic factors in the region. This study is not in total agreement with Binuomote (2021), who reported majority of the farmers in their study area (Lagos, Ogun and Plateau States) to be males, but with highest number of female farmers in Plateau State comprising of 31.3% of the total farmers.

The Chi-square value for Kano (Female) is very high (7.02) indicating that the women are very underrepresented in tomato farming. This finding agrees with Fashogbon *et al.* (2023), who identified various socio-cultural barriers such as accessing of land, capital and extension services that limit women from practicing agriculture. Also, Mwangi and Kariuki (2015) stated that males often have better access to technologies and information than their females' counterparts. The low involvement of women in tomato farming may also be due to time spent on childcare and house chores, as well as inadequate access to farm inputs and production resources. However, the high number of women recorded in Oyo may be due to the availability of economic opportunities, high literacy level, and agricultural support services, hence there is a need to formulate policies to increase the participation of women in the sector, especially in the northern region like Kano.

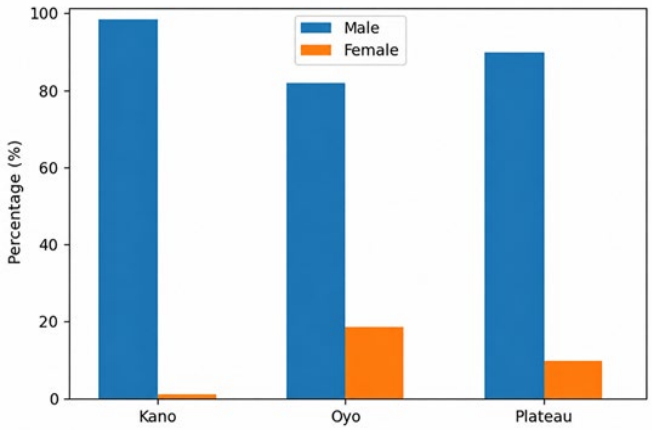

Figure 1: Gender Distribution of Tomato Farmers — Male and female distribution across Kano, Oyo, and Plateau States.

Source: Field survey data, 2024

Figure 2 shows the age distribution, with most tomato farmers (69.67%) between 26–45 years, comprising 35.16% aged 26–35 and 34.51% aged 36–45. It was observed that there was low participation of young farmers (15–25 years), who are just about 10.97%. This indicates that there is a trend where young people are not interested in farming.

This is also supported by the Chi-square results where Kano farmers and Oyo farmers (15–25 years) recorded a relatively low value of 0.96 and 0.32, respectively. This result shows that the young farmers do not differ significantly from the expected distribution. The low participation of the youths in farming may be due to the perception of the economy of farming being unstable, especially with the increasing problems of climate change and market access.

While the overall participation of young farmers is low, the higher Chi-square value for the 26-35 age group in Kano (4.38) indicates that this age group is more involved in farming in Kano compared to Oyo and Plateau States. These results agree with those obtained by Adeboye et al. (2024), where tomato farming was dominated by farmers within 26-35 years (38.7%), and is also consistent with studies carried out by Jabil and Abdu (2012) and Ogunwale et al. (2021). However, the study contradicts that of Haruna (2012) where older farmers dominated tomato farming, and Ibitoye et al. (2015) who reported that about 82.5% of the respondents were between 41-60 years. The observed variations in these studies may possibly be due to several factors in the different locations where the studies were carried out. Therefore, policymakers should focus on attracting youths into the sector by providing agricultural incentives, modern technologies, and specialized training programs aimed at increasing the attractiveness of the sector to the young people.

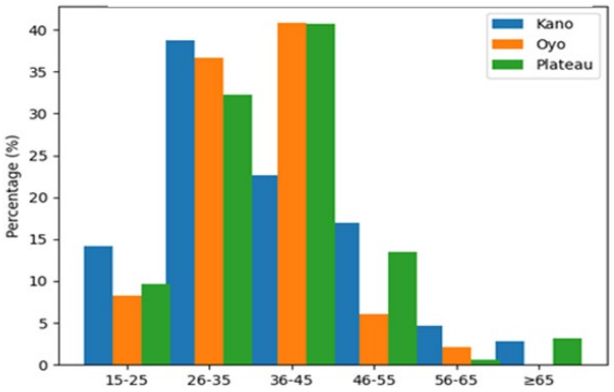

Figure 2: Age Distribution of Tomato Farmers

Source: Field survey data, 2024

Marital status of tomato farmers (Figure 3) shows that 80.65% of respondents are married. Kano had the highest proportion (86.8%), with a Chi-square value of 0.46, indicating a moderate deviation from the expected distribution. Similar findings were reported by Ajibade *et al.* (2021) and Adeboye *et al.* (2024) with 88% and 86.8%, respectively of the respondents being married. This may be attributed to the fact that the married have easy access to farmland, traditionally provided and owned by household heads (husbands) as reported by Gabriel et al. (2021).

The Chi-square results indicate that married farmers are more likely to be engaged in tomato farming, and the marital support is a source of financial stability and labor resources. The low Chi-square values for the single farmers in all three States imply that marital status is an important factor in supporting long-term agricultural investments. Thus, extension services as well as cooperatives should target married farmers particularly with programs that will enhance agricultural productivity and make farming a career for single people.

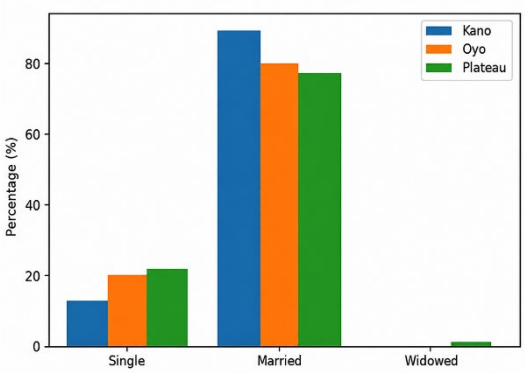

Figure 3: Marital Status of Tomato Farmers — Distribution of farmers by marital status across surveyed states

Source: Field survey data, 2024

Modern farming practices are also influenced by the education level of the farmers. It determines their ability to adopt new technologies, access markets and improve the management of their farms. Figure 4 reveals that there are considerable differences in the education levels of the three States. Kano has the highest percentage of farmers with no formal education (41.5%), followed by Jos (39.35%), while Oyo recorded the lowest percentage (8.16%). Oyo has the highest percentage of farmers with tertiary education (26.53%), implying that there is better access to education and extension services in southwestern Nigeria.

The Chi-square values for educational levels show significant differences, with Kano (No Formal Education) having a value of 1.18, indicating that there is a high proportion of farmers with little or no education. These findings agree with those reported by Adeboye et al. (2024), where 41.5% of the farmers in Kano State had no formal education. However, Gabriel *et al.* (2021) recorded 24% for farmers within Northwest zone with no formal education. The observed differences in these findings may be attributed to variation in the study area.

On the other hand, Oyo (Tertiary Education) has a value of 9.95, which is a high value indicating that there is a significant deviation from the expected distribution and that there is a higher level of formal education among the farmers in Oyo. These findings show that there is high possibility of farmers in Oyo adopting modern agricultural practices, as the level of education positively correlates with the adoption of improved farming techniques. This suggests that education improves farmers' managerial skills, including the effective use of agricultural inputs, by increasing their capacity to assess, understand, and process information about new technologies (Ajibade et al., 2021). This study agrees with that of Adewuyi and Adebayo (2021) which reported that farmers with high level of education are more likely to adopt modern agricultural practices than those with little or no formal education. The government should therefore increase the budget allocation in the education sector, and support extension services and digital literacy programs, to bridge the educational gaps in Kano and Plateau States in order to improve the productivity of the farmers.

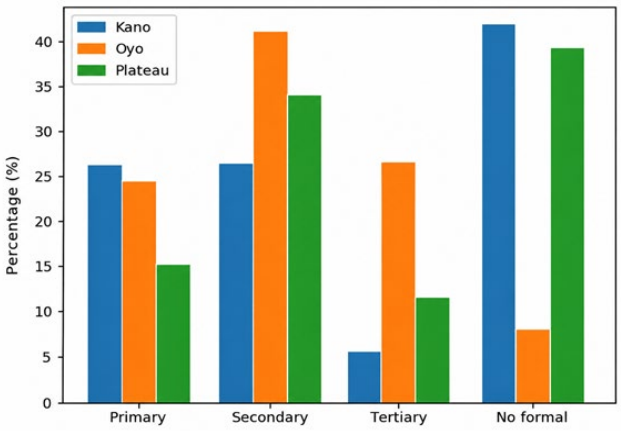

Figure 4: Distribution of farmers by educational level across surveyed states.

Source: Field survey data, 2024

5. Conclusions

The study examines socio-economic factors influencing Nigerian tomato cultivation with focus on Kano, Oyo and Plateau States. The data shows that gender-based differences, age brackets, marital status and educational attainment levels of farmers influence agricultural practices and production levels in these regions.

The workforce distribution in tomato farming shows that men represent 91.61% while Kano leads the gender imbalance with 99.1% male farmers and Oyo recorded the highest female presence at 18.4%. The study reveals that cultural and other socio-economic barriers restrict females from agricultural involvement mainly in northern Nigeria. Agricultural gender inclusivity serves as an essential factor to increase the number of female farmers participating in agriculture. Therefore, easy access to land, financial resources and agricultural training for women is essential for progress. In addition, agricultural policies should adopt gender-based approaches to increase female involvement and include every gender demographic. The combination of government and NGO support for microfinance initiatives aimed at women will help increase their involvement in tomato cultivation.

The distribution of farmers by age reveals that people between 20 and 54 years old constitute 69.67% of tomato farmers who operate the farms. Young farmers aged 15 to 25 years recorded 10.97%. The low participation rate of younger people in agriculture may be since younger people view farming as economically unstable. Thus, government should propose different programs which combine modern technology with youth training and economic incentives, so as to make farming more attractive, especially to young people. The involvement of youth in agriculture requires immediate promotion. Youths will stay in farming when agribusiness funding, mechanization programs and farm-to-market linkages provide them with sufficient incentives.

Farmers who are married show significant influence on their farming output levels according to marital status data. The study confirms previous findings which show that married farmers obtain financial stability, household labor support and farming dedication. In this study, married farmers make up 80.65% of the total farmers. Agricultural extension services with cooperatives need to implement programs that help married farmers enhance their productivity while creating programs to motivate

single farmers to consider tomato farming as an occupation. The research data shows considerable educational differences among the farmer population. Kano State leads with the largest percentage of uneducated farmers at 41.5%, whereas Oyo State has only 8.16% of its farmers without formal education. Tertiary education levels among farmers reach their peak in Oyo at 26.53% yet Kano demonstrates the lowest educational attainment with 41.5% of farmers having no formal education. The education level plays a vital role in adopting new technologies as well as farm management improvement and market access. The government should dedicate funding to establish farmer education programs and extension training and digital literacy programs to increase productivity levels.

The training of farmers represents an essential area that needs improvement. Agricultural policies need to focus on adult literacy programs along with digital farming workshops and hands-on training sessions because Kano and Plateau States demonstrate high levels of farmer illiteracy. The governments need to partner with universities along with agricultural institutes to deliver community-based training that teaches contemporary farming approaches. The growth of agricultural extension services represents an equally important requirement. The number of extension officers should increase particularly in rural areas and mobile-based agricultural information systems should receive funding for enhanced knowledge dissemination. Farmers face significant difficulties in obtaining financial support to conduct their operations. Farmers experience a barrier to credit access which hinders their ability to purchase necessary input while adopting new farming methods. The government needs to expand its agricultural credit schemes while financial institutions should create loan packages that are suitable for farmers with affordable interest rates and adaptable payment plans.

The different economic and social elements of the States require tailored agricultural policies for their specific regions. The educational requirements of uneducated farmers in Kano need specialized programs that teach farmers about agriculture. Oyo should use its gender-inclusive financing programs to benefit female participants, while Plateau should direct its interventions toward youths to sustain farming population stability. The findings of this study offer valuable information about tomato farmers' socio-demographic characteristics; however, researchers need to perform additional research on how these factors influence farm productivity and income production. A comprehensive understanding of tomato farming challenges in Nigeria would emerge from studying how socio-economic characteristics influence their methods of climate change adaptation, their access to markets and their post-harvest losses.

Farmers must address existing socio-economic barriers to achieve future success in tomato cultivation in Nigeria. Strategic policies that promote gender inclusion together with youth participation along with farmer education and financial accessibility will improve Nigeria's tomato production sector. In addition, the government must unite with agricultural stakeholders and researchers to create an inclusive farming environment that unites innovation with productivity.

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