FACTORS AFFECTING SMALLHOLDER FARMERS PARTICIPATION IN SESAME SEED MARKETING IN DOMA LOCAL GOVERNMENT AREA, NASARAWA STATE

Abstract

The study analyzed the factors affecting Smallholder Farmers' Participation in Sesame Seed marketing in Doma LGA, Nasarawa State. A total of 100 respondents were randomly sampled. Data analysis was performed~~,~~ using quantitative methodologies. The findings showed that multiple factors affect the marketing participation of smallholder sesame seed farmers, factors include the total produce of rice, price of rice, membership of farmer organization, road conditions, and access to market information. Also, the ~~socio-demographic~~ socio-demographic variables such as sex, age, and educational attainment affect farmers' participation in the sesame seed market in Doma Local Government Area.~~,~~ Hypotheses testing ~~from the application of hypotheses~~ particularly used the Pearson correlation approach to deduce the outcome. Five policy recommendations were enumerated ~~include~~ including improving market management, encouraging innovation, strengthening dialogue, building business sector capacity, and improving infrastructure and management.

Keywords: S~~s~~mallholder, farmers, determinant factors, marketing, sesame seeds, economy

1.0 Introduction

~~The~~ Farmers' participation ~~of farmers~~ in the market is a significant factor that both contributes to and results from economic development. It serves as a primary means for rural individuals to ensure greater income and enhance food security (Reardon & Barrett, 2000). The presence of markets and enhanced market accessibility are crucial for small-scale farmers as they can foster agricultural and economic growth. The importance of improved market access cannot be overstated in augmenting small-scale market participation and the scope of their participation, all other things being equal (Key et al., 2000; Timmer & Timmer, 1974).

Smallholder agriculture, as one of the foremost economic activities globally, serves as the primary source of income and employment for 70% of individuals, residing in rural areas, who are classified as impoverished (Dorosh, 2003; Poole, 2017). These farmers are integral in

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promoting food security, establishing equitable income distribution, and generating opportunities for economic expansion. Nonetheless, smallholder farmers confront obstacles concerning limited physical access to markets and insufficient market information. Those who cultivate traditional food crops tend to rely upon these constraints and on. ~~On~~ informal markets due to weak or lack of linkages with formal markets (Magingxa et al., 2003).

Small-scale farmers have the potential to augment their earnings through an expansion of their market sales ratio. Nevertheless, the magnitude of smallholder farmer involvement in the sesame seed market remains low owing to an array of constraints. Essentially, a majority of small-scale farmers are situated in remote areas with scant transport and market infrastructures, thereby resulting in elevated transaction costs (Torero, 2011). Furthermore, these farmers lack dependable market information and information concerning prospective exchange partners. On account of their minimal surpluses in production, smallholders are also generally exposed to a greater degree of risk and transaction costs (Alene et al., 2008). A majority of rural farmers sell their produce mainly at their farm gate and in village markets. The determinants of their decisions regarding the quantity of output to sell are mainly influenced by marketing information, produce prices, and distance to the market (Omiti et al., 2009).

Economic liberalization has opened up new avenues for smallholder farmers to broaden their horizons and expand the range of their agricultural products, thereby allowing them to sell their excess produce in nearby markets (Asfaw et al., 2010). Albeit, the smallholder farmers' Achilles' heel is their lack of marketing expertise, which often leads to the sale of their crops at lower rates at their farm gate or in local markets (Gyau et al., 2016). In addition, the limited access to reliable markets for their produce and the scarcity of inputs for their crops remain significant challenges for smallholders. Countries that have a significant proportion of smallholder farmers are identified as low-income nations (Al Hassan et al., 2006). In both South Asia and Sub-Saharan Africa, more than 60% of agricultural households possess less than 1 ha of farmland, with over 80% of such households having less than 2 ha of farmland. Hence, it is imperative to undertake measures that augment the economic pursuits of smallholder farmers, thus enhancing their competitiveness (Lowder et al., 2016). Nigeria, situated in Sub-Saharan Africa (SSA) and identified as an underdeveloped nation by the United Nations, is predominantly comprised of smallholder farmers, whom are involved in Sesame cultivation in Nigeria, in a land area that

spans over 80,000 hectares across the majority of Northern States for both food and oil purposes (AshaoluO.F. et al., 2010). Notably, Benue and Nasarawa States boast the highest annual sesame outputs, producing no less than an average of 40,000 metric tons each per annum, with a substantial number of small-scale farms that do not exceed 5 ha. As such, a comprehensive investigation of the market participation of sesame seed farmers in Nasarawa, Nigeria can provide valuable insights for countries grappling with similar circumstances and characteristics (Umar, et al., 2010).

Nigeria is an archetypal agricultural nation that boasts moderate natural resources, which have served as the foundation for agricultural production (Luka et al., 2021). As of 2022, the population was estimated to have approximately increased by 5.26 million, with a significant majority of 47% residing in rural areas, where their livelihoods primarily depend on the agriculture, livestock, and fishery sectors (World Bank, 2023). Given the growing population, the agricultural sector is vital for ensuring food security, while also contributing substantially to export earnings, as evidenced by its 40.6% contribution to GDP, 23.5% to total export earnings, and employment of 34.85% of the labor force in 2018-2021. Moreover, in the same period, Nigeria''s total cultivated area was measured to be 35.32 million ha, with sesame seed cultivation accounting for 34% of the total area (World Bank, 2023).

Sesame cultivation in Nigeria spans over 80,000 hectares across the majority of Northern States for both food and oil purposes. Notably, Benue and Nasarawa States boast the highest annual sesame outputs, producing no less than an average of 40,000 metric tons each per annum (Umar, et al., 2010). The global demand for sesame seed from Nigeria as a raw export commodity has experienced a recent increase, reaching a total of 3.3 million tons. Nasarawa State considers sesame as one of its major cash crops, particularly among rural smallholder farmers due to the favorable local and international markets for its oil and seed. The product has already garnered patronage from buyers in China and other Asian countries. In Nasarawa state, Doma Local Government Area stands as the principal producer of sesame (Umar, Okoye, & Agwale, 2011)H. S. et al., 2012).

The primary intention of this study was to examine and assess the factors that impinge on the vending of sesame seed by smallholder farmers in Doma Local Government Area, Nasarawa state, Nigeria. The study was purposed with specific objectives including an exploration and

examination of demographics; the socioeconomic attributes of smallholder sesame seed agriculturists in the study area; as well as the factors that influence smallholder farmers'' involvement in sesame seed marketing and the determinants leading to that in the study area.

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2.0 Methodology

The present study concerns itself with the description of the study area, Doma Local Government Area, which is located in the North Central region of Nigeria, specifically in the middle belt of savanna ecological zone. The area spans between latitude 080 .33N and longitude 080 .32E, and its altitude is about 181.53m above sea level. The mean temperature ranges between 22.7^{0} 0C and 36.8^{0} 0C, and the average annual rainfall is 1288 mm. In terms of soil texture, the area is predominantly sandy-loam. The populace of the area is estimated to be around 139,607 inhabitants, and agricultural activities are the major occupation. The area is well-known for the cultivation of crops such as Cassava, Yam, Sesame, Rice, Maize, Millet, Groundnut, and Cowpea, while tree crops such as Mango, Cashew, Citrus, and Guava are also abundant. The Doma Local Government Area is made up of several districts, including Alagye, Akwashi, Akpata, Madaki, Doka, Akpanaja, Galadima Sabongari, Sarkin Ddawalai, Rukubi Mmadauci, and Tsarkin Mmadauci.

The sampled farmers were drawn in a multi--stage random sampling procedure. The initial phase of the sampling process comprised of a random selection of six (6) districts which collectively constitute the Local Government Area. At the third phase, a set of ten agricultural communities, specifically recognized for their cultivation of sesame seed, were purposively selected from the catalog of sesame seed-generating communities within the local government area. In the concluding phase of the sampling procedure, a purposive selection of 10 farmers who were engaged in sesame seed production during the 2021/2022 cropping season, from each of the ten villages. The purposive selection of identified communities and farmers who cultivate sesame seeds was imperative, due to the fact that not all communities or farmers in the selected study area were involved in the cultivation of sesame seeds. Nevertheless, our analysis was deemed adequate as a total of one hundred (100) questionnaires were administered.

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2.1 Reliability

To assess the reliability of the sample size, and according to Hashem et al. (2022) and Younis et al. (2022), using Hardwick Research's (2022) published resources on the subject provides a statistically significant reliability figure. Table 1 shows that in the case of a general population of farmers of around 10,000 [let's say], a sample of 100 farmers, and a confidence level of 95% [α=5%], an adequate reliability error of about 10% is obtained (see Table 1). However, the resultant sample size of 100 would be ±9.8% at the 95% confidence level. The obtained number is interpreted that in 91.2 out of 100 repetitions of the survey the results will not vary more than ± 9.8%. Such reliability is appropriate for this exploratory study.

Table 1: Sample reliability at 95% confidence

Statistical Reliability at the 95% Confidence Level (50/50% proportion characteristic)							
	Population						
Sample Size	100	500	1000	5000	10000	100000	1 Mill+
30	±14.7%	±17.1%	±17.3%	±17.6%	±17.7%	±17.8%	±17.9%
50	±9.7%	±13.1%	±13.5%	±13.8%	±13.9%	±14.0%	±14.1%
75	±5.6%	±10.4%	±10.9%	±11.3%	±11.4%	±11.5%	±11.6%
100		±8.8%	±9.3%	±9.7%	±9.8%	±9.9%	±10.0%

Source: Hardwick Research, 2022.

2.2 Descriptive analysis

Hejase & Hejase (2011) contend that giving data meaning leads to useful information. Furthermore, according to Hejase and Hejase (2013), "descriptive statistics deals with describing a collection of data by condensing the amounts of data into simple representative numerical quantities or plots that can provide a better understanding of the collected data" (p. 272). Therefore, the primary data were coded and analyzed using a Microsoft Excel package. Descriptive statistics included frequencies and percentages presented in tables for simplicity. Moreover, the study made use of Pearson's correlation analysis to study the relationship between variables.

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32.0 Results

3.1 Demographic analysis

The data pertaining to the demographic variables ~~is~~ are presented in ~~the table below as~~ Table 2~~1~~. The ~~characteristics of the~~ respondents' demographic characteristics include gender, age, ~~and~~ education, and income. As per the data, males constitute 68% of the ~~sex~~ population, while females make up 32%. This could be an indication that men are more inclined towards participating in the study or are more involved in the sesame seed production in the area. The data collected reveal~~s~~ that the age of the respondents ranges from 20 to 25 years for 14% of the respondents, 30 to 35 years for 36%, 40 to 45 years for 34%, 50 to 55 years for 10%, and 60 years and above for 6%. In terms of educational attainment, the data show~~s~~ that, 21% of the respondents have no formal education, 11% of the respondents attain primary education, 30% attain secondary education while, 38% of the respondents attain tertiary education. This implies the almost 70% of the respondents have attained one form of formal education. On their household income, the result revealed that, 27% of the respondents earned between ~~₦~~50,000-~~₦~~100,000, 32% earned between ~~₦~~150,000-~~₦~~200,000, 22% earned between ~~₦~~250,000-~~₦~~300,000, 6% earned between ~~₦~~350,000-~~₦~~400,000, 6% earned between ~~₦~~450,000-~~₦~~500,000, and lastly 7% earned between ~~₦~~550,000-~~₦~~600,000

Table 2~~1~~. Socio-demographic characteristics of the respondents

Variable	=100	%
Sex		
Female	32	32%
Male	68	68%
Age		
20-25 years old	14	14%
30-35 years old	36	36%
40-45 years old	34	34%
50-55 years old	10	10%
60 years old and above	6	6
Education		
no formal education	21	21
primary education	11	11
secondary education	30	30
tertiary education	38	38
Household Income		

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₦50,000-₦100,000	27	27
₦150,000-₦200,000	32	32
₦250,000-₦300,000	22	22
₦350,000-₦400,000	6	6
₦450,000-₦500,000	6	6
₦550,000-₦600,000	7	7

Source, Field Survey 2022

Table 3:2 Ffactors affecting smallholder participation in sesame seed marketing using Pearson's Correlations

Dependent variable			
Smallholder Participant in the Market			
Independent Variables	**N**	**Df**	**RP**
Total production of sesame seed	100	98	.491
Road conditions	100	98	.428
Access to market information	100	98	.704
Member to farmer organization	100	98	.769
Price of sesame seed per kilo	100	98	.565

**. Correlation is significant at the .01 level.

3.22.1 Justification for Inclusion of Hypothesized Variables

2.1.23.2.1 Total production of sesame seed

The measurement of determination in smallholder marketing participation was established through the use of total sesame seed production as a proxy measure. This measurement was obtained as a continuous variable. The aforementioned tableTable 3 denotes an *P R* value of .491, which is approximately .501, thereby demonstrating a statistically significant (p <1%) moderate correlation between the production of sesame seed and smallholder participation in the market.

2.1.33.2.2 Road condition

Road condition was utilized as a surrogate metric of determination in the context of smallholder marketing participation, with road condition being regarded as an independent variable. Based on the tabulated data, which displays an pR value of .428, it is evident that a statistically significant (p <1%) correlation exists between road condition and smallholder participation in the market. However, it is notable that this correlation is comparatively weakalso moderate.

2.1.43.2.3 Access to market information

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Access to market information was utilized as a proxy measure to ascertain the level of determination of smallholder marketing participation. This measure was captured as a continuous variable, with ~~the table above~~Table 3 showcasing an ~~p-~~R-value of .704. This indicates a strong correlation between access to market information and smallholder participation in the market.

~~2.1.5~~3.2.4 Member to farmer organization

The utilization of membership in farmer organizations has been employed as a proxy measure in assessing the level of smallholder marketing participation. The membership status in farmer organizations has been quantified as a continuous variable. Based on the analysis presented in ~~the aforementioned table~~Table 3, which displays an R~~p~~ value of .769, it can be inferred that there exists a statistically significant strong correlation between membership in farmer organizations and smallholder participation in the market.

~~2.1.6~~3.2.5 Price of sesame seed per kilo

The determination of smallholder marketing participation was gauged through employment of the price of sesame seed per kilo as a proxy measure. This variable was captured as a continuous metric. The ~~p-~~R value of 0.565, as depicted in ~~the aforementioned table~~Table 3, denotes a ~~robust~~ moderate, statistically significant, and affirmative correlation between the price of sesame seed per kilo and smallholder involvement in the market.

Table ~~3~~ 4: Demographic characteristics and its influence on smallholder farmers participation in sesame seed marketing in Doma Local Government Area of Nasarawa State Nigeria using Pearson's Correlations

	Dependent variable		
	Smallholder Participant in the Market		
Independent Variables	**N**	**Df**	**~~P~~R**
Sex of Respondents	100	98	.491
Age of Respondents	100	98	.428
Educational attainment of Respondent	100	98	.704

**. Correlation is significant at the .01 level.

~~The~~ Table 4 results revealed if there is a correlation between the demographic characteristics and smallholder participation in sesame seed marketing. The results show that, sex of the respondents with an ~~P-~~R value of .491 approximately .5~~0~~1 has a moderate, statistically significant, and positive association with smallholder farmers marker participation. Indicating that, from ~~the~~

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~~table~~Table 1 ~~one~~, 68% of male respondents participated in sesame seed marketing as compared to 38% participant from the female.

In terms of the age, the result shows, with an R ~~P~~ value of .428 there is a ~~weak~~ moderate, statistically significant, and positive correlation between the age of the respondents and market participation by smallholder farmers. Also, the results revealed that, educational attainment of the respondents have a strong positive correlation with market participation with an R ~~P~~ value of .704

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Discussion

Table 1 ~~one (1)~~ evaluated the socio-demographic data, and the findings show that ~~(~~68%~~)~~ of the sesame seed production is a male-dominated production, as confirmed by Umar~~,~~ et al., (2010)~~.,~~ ~~male labour contribution to sesame seed production constitute the majority.~~ The majority (68%) of respondents are formally educated in secondary and tertiary education as against~~,~~ Ashaolu~~O.F.~~ et al.~~,~~ (2010) ~~that~~ who ~~cited~~ posited that, farmers in D~~d~~oma had not more than primary education. Thus, education is known to play a significant role and with the level of the farmers literacy they can understand information favorably~~e~~ for their market participation. In terms of the age category of the farmers, the majority of the farmers (84%) are between the ages of 20-45 years old. This implies that most of the farmers fall within the active farming age bracket, confirming the works of (Ashaolu~~O.F.~~ et al., 2010).

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Furthermore, the household income of the farmers, the majority (32%) of the farmers earns ~~₦~~150,000-~~₦~~200,000 monthly. This i~~I~~mplies that, a majority of the smallholder earns ~~₦~~5000 daily ~~that~~ or about $6 a day, another significant number (27%) of the farmers, earns between ~~₦~~50,000-~~₦~~100,000, which implies that the majority of the farmers earns an average~~ly~~ ~~₦~~75,000 in a month, meaning they earn 3 dollars in a day, another significant number (22%) of the farmers earns between ~~₦~~250,000-~~₦~~300,000. This implies that, a notable number of farmers earn on average ~~₦~~275,000 monthly, indicating earning about ~~₦~~9,500 (11 dollars) in a day. The ~~rest~~ remaining farmers, an insignificant proportion earns between ~~₦~~350,000-~~₦~~600,000

Table 3~~(2)~~ evaluated the justification of the hypothesized variable.

As per the findings presented in Table 3~~2~~, a positive correlation has been observed between the overall production of sesame seed by smallholder farmers and their participation in the market.

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This confirms with Kyaw et al.~~,~~ (2018) who opine that the cultivation of sesame seed by smallholder farmers has a significant impact on their market involvement. This assertion aligns with the findings of the present investigation, as the aggregate output of sesame seeds by smallholder farmers in the Doma Local Government Area has a direct bearing on their degree of participation in the market.

Table 3~~2~~ shows~~,~~ ~~the findings indicate~~ a positive correlation between the state of the roads and the level of involvement of farmers in the marketing of sesame seeds. Getahun et al.~~,~~ (2017) found that, the proximity to the main road is directly proportional to the level of accessibility the farmers have to market information and transportation. A study conducted on the commercialization of smallholders in Ethiopia has revealed that being close to an all-weather road encourages market orientation as it reduces marketing costs. Consequently, it can be inferred that access to roads is a crucial factor that has a positive impact on both the volume of rice sold and the decision to participate in the market among smallholder farmers in Doma Local Government Area of Nasarawa State.

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The correlation between market participation among smallholder farmers and access to market information has been evidenced by the hypothesis table employing ~~the~~ Pearson's R correlation corfficient~~r~~. The importance of access to market information lies in its ability to enable farmers to arrive at more appropriate decisions regarding the market to sell their commodity to and the optimal time to do so. Comprehensive market information is critical for farmers to make informed decisions on the amount of product to be marketed and the price to receive. Thus, the present study posits that access to market information has a positive influence on the decision of farmers to participate in the market.

Based on the results, the variable of membership in a farmer organization exhibits a robust correlation with the level of participation by farmers in the marketing of sesame seeds. Asserting this., ~~S.~~ Bahta~~.~~ (2012) has determined that membership in a farmers'' organization can have a significant impact on the level of market participation among households. This is primarily due to the fact that such membership can bolster the production and marketing capabilities of farmers. For our own study, we have made the assumption that membership in a farmer organization has a positive effect on both the likelihood of market participation and the amount of sesame seed sold among smallholder farmers in the Doma Local Government Area.

The variability of the price of sesame seed per kilogram indicates a positive correlation with the l~~L~~evel of participation of farmers in the marketing of sesame seed. It has been observed that farmers who receive a higher market price for their sesame seed production tend to increase their output, resulting in a surplus in the market. According to Komarek~~,~~ (2010), i~~I~~t was determined that the output price had a positive impact on both the likelihood and degree of market involvement among banana cultivators in Uganda. Omiti et al.'s~~,~~ (2009)~~, The~~ findings ~~of the study~~ revealed that the output price had a significant and affirmative effect on the level of market involvement among maize and kale producers in the peri-urban regions of Kenya. Consequently, it can be inferred that the prices of sesame seeds played a crucial role in positively impacting the decision-making process of smallholder farmers in the Doma Local Government Area, leading to an increased volume of sesame seeds sold in the market.

The educational attainment of the respondents was obtained as a continuous measure, denoting the total number of years spent in formal education. Prior studies have observed that the educational level of the respondent is a significant determinant of market participation, given that respondents with elevated levels of education are likely to possess superior bargaining skills and information-gathering abilities compared to their less-educated counterparts~~.~~ (Lubungu et al., 2012). Thus, it can be inferred that the educational attainment of smallholder farmers may exert a favorable influence on their decision to engage in market activities as well as the quantity of their market transactions.

The ~~utilization of the age of the~~ respondents' age was employed as a means of correlation within the realm of marketing. The ~~age of the~~ participants' age was obtained as a continuous variable. Olwande et al. (2012) revealed that the ~~age of the~~ participants' age had a negative effect on their inclination to engage in market activities in Kenya. Based on this substantiated evidence, it was posited that there exists a positive correlation between the age of the respondents and the probability of market participation, as well as the determination of the quantity of sesame seeds to be transported to the market by smallholder farmers.

The ~~gender of the~~ participants' gender was utilized as a measure of correlation in market involvement among the respondents, and was recorded as an independent variable. The results indicate a positive association between the ~~gender of~~ farmers' gender and market participation among small-scale farmers in the research area.

Conclusions and Policy Recommendation

Summary of Results and Conclusion

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The promotion of agricultural products is a critical element in realizing the overarching goals of sustainable agriculture, poverty alleviation, and food security, particularly among rural small-scale farmers. A conducted study revealed that smallholder sesame seed farmers are hindered in their market engagement by factors such as socioeconomic, institutional, technological, and market-related challenges. Among the factors that impacted smallholder involvement in the sesame seed market were education level, sesame seed production, road quality, and access to market information. It is essential to equip smallholder sesame seed farmers, particularly those with limited education, with marketing know-how and skills through training programs provided by extension services. Furthermore, alleviating market entry and participation difficulties confronting smallholders in the sesame seed market would augment rural income and the livelihood of rural farmers, thereby ultimately enhancing the sesame seed industry.

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The findings of the study indicate that the decision of smallholder farmers to enter the market is significantly influenced by their socio-demographic characteristics and farmer endowments. The volume of produce sold in the market is also affected by a range of factors such as the total produce of rice, price of rice, membership of farmer organization, road condition, and access to market information. Given the direct link between sesame production and the farmers' income, it is imperative to enhance the productivity of sesame. Apart from demographic factors~~,~~ (including sex, age~~, and~~ education level, and income), this study stands out from previous studies by incorporating both market and management factors. The study's outcome demonstrates that most of these variables are crucial determinants of market participation. Further investigation is necessitated by the aforementioned discoveries, with a more comprehensive exploration of the correlation among market involvement, the volume of merchandise sold, and the assurance of sustenance for households being imperative.

Recommendation

The primary objective of this investigation was to scrutinize and assess the variables that impact the vending of sesame seed by smallholder cultivators in Doma Local Government Area, located in the Nasarawa state of Nigeria. The precise aims of this study were to scrutinize and analyze

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the demographics and socioeconomic features of smallholder sesame seed farmers in the research region, as well as the factors that influence smallholder farmers to take part in sesame seed marketing and the decision-making processes associated with it.

Furthermore, it is imperative that the government directs its attention towards the implementation of follow-up initiatives in the sesame seed marketing policy. This entails not only facilitating accessibility to markets for smallholder sesame seed farmers, but also fostering the growth of sesame seed sales and the market participation of farmers. To achieve this objective, the provision of institutional and agricultural technological innovation support is essential. On a wider scale, both the central and local governments must exert concerted efforts to bolster investments in public amenities such as upgraded roadways, irrigation schemes, telecommunications, and markets for agricultural inputs and outputs.

The findings derived from this study lend support to the United Nations' 2030 Agenda for Sustainable Development. Specifically, Goal 2.3 endeavors to augment the earnings of smallholder farmers by 2030 by means of imparting information and participation in market activities [40]. Based on the outcomes of this study, a set of five policy recommendations can be proposed to realize the objectives of the United Nations'' 2030 Agenda for Sustainable Development: (1) Enhancing the management, regulation, and dissemination of information on market trends; (2) Encouraging innovation in relation to novel commercialization platforms; (3) Strengthening the official channels of dialogue between the government and private sector; (4) Building the capacity of the business sector via technical services; and (5) Improving the infrastructure, equipment, and management of agriculture.

This study proposes potential avenues for the Nasarawa government and Doma local governments to enhance the involvement of smallholder sesame seed farmers in the market and augment their income. From a public sector standpoint, it is imperative to not only devise equitable policies for small-scale farmers, but to also effectively execute and manage them in order to foster agricultural progress. Ideally, this would contribute to the alleviation of poverty, promotion of food security, and advancement of economic development in Doma Local Government Area, Nasarawa State, and Nigeria as a whole. In recent years, the agricultural industry has encountered novel situations such as the emergence of new varieties and the rapid expansion of information and communications technology (ICT) and the Internet of Things

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(IoOT). In contemporary times, there is a growing need to shift the attention towards the degree to which value augmentation can be achieved, as opposed to merely bolstering production levels. In forthcoming investigations, it is imperative to scrutinize the ramifications of technological advancements on farmers'' engagement with the market, an aspect that was not encompassed in the present inquiry, alongside the pioneering elements that have an impact on value augmentation.

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Al Hassan, R., Sarpong. B, D., & Akwasi, M.-B. (2006). *Linking smallholders to markets | IFPRI : International Food Policy Research Institute*. IFPRI. https://www.ifpri.org/publication/linking-smallholders-markets

Alene, A. D., Manyong, V. M., Omanya, G., Mignouna, H. D., Bokanga, M., & Odhiambo, G. (2008). Smallholder market participation under transactions costs: Maize supply and fertilizer demand in Kenya. *Food Policy*, *33*(4), Article 4. https://doi.org/10.1016/j.foodpol.2007.12.001

Asfaw, S., Shiferaw, B., Simtowe, F., Muricho, G., Abate, T., & Ferede, S. (2010). *Socio-economic Assessment of Legume Production, Farmer Technology Choice, Market Linkages, Institutions and Poverty in Rural Ethiopia* (No. 3). Institutions, Markets, Policy and Impacts.

Ashaolu, O.F., Momoh, S., Ayinde, I.A., & Ugalahi, U.B. (2010). ANALYSIS OF RESOURCE-USE EFFICIENCY IN BENISEED PRODUCTION IN OBI AND DOMA LOCAL GOVERNMENT AREAS OF NASSARAWA STATE, NIGERIA. *Journal of Humanities, Social Sciences and Creative Arts*, *5*(1), 79–90.

Bahta, S. (2012). Policy options for improving market participation and sales of smallholder crop producers: A case study of the Free State Province of South Africa. *AFRICAN JOURNAL OF AGRICULTURAL RESEEARCH*, *7*(24). https://doi.org/10.5897/AJAR11.631

Dorosh, P. (2003). Growth Linkages, Price Effects and Income Distribution in Sub-Saharan Africa. *Journal of African Economics*, *12*(2), 207–235. https://doi.org/10.1093/jae/12.2.207

Getahun, K., Eskinder, Y., & Desalegn, A. (2017). Determinants of smallholder market participation among banana growers in bench Maji Zone, Southwest Ethiopia. *International Journal of Agricultural Policy and Research*, *5*(11), 171–177.

Gyau, A., Mbugua, M., & Oduol, J. (2016). Determinants of participation and intensity of participation in collective action: Evidence from smallholder avocado farmers in Kenya. *Journal on Chain and Network Science*, *16*(2), Article 2. https://doi.org/10.3920/JCNS2015.0011

Hejase, A.J., & Hejase, H.J. (2011). *Foundations of Management Information Systems*. (1st Ed.) Beirut: Sader Publishers.

Hejase, A.J., & Hejase, H.J. (2013). *Research Methods, A Practical Approach for Business Students*. (2nd Ed.) Philadelphia, PA: Massadir Inc.

H. S., U., C. U., O., & d A., O. A. (2012). PRODUCTIVITY ANALYSIS OF SESAME (Sesamum indicum L.) PRODUCTION UNDER ORGANIC AND INORGANIC FERTILIZERS APPLICATIONS IN DOMA LOCAL GOVERNMENT AREA, NASARAWA STATE, NIGERIA. *Tropical and Subtropical Agroecosystems*, *14*, 405–411.

Key, N., Sadoulet, E., & Janvry, A. D. (2000). Transactions Costs and Agricultural Household Supply Response. *American Journal of Agricultural Economics*, *82*(2), Article 2. https://doi.org/10.1111/0002-9092.00022

Komarek, A. (2010). The determinants of banana market commercialisation in Western Uganda - . *African Journal of Agricultural Research*, *5*(9), 775–784.

Kyaw, N., Ahn, S., & Lee, S. (2018). Analysis of the Factors Influencing Market Participation among Smallholder Rice Farmers in Magway Region, Central Dry Zone of Myanmar. *Sustainability*, *10*(12), Article 12. https://doi.org/10.3390/su10124441

Lowder, S. K., Skoet, J., & Raney, T. (2016). The Number, Size, and Distribution of Farms, Smallholder Farms, and Family Farms Worldwide. *World Development*, *87*, 16–29. https://doi.org/10.1016/j.worlddev.2015.10.041

Lubungu, M., Chapoto, A., & Tembo, G. (2012). *Smallholder Farmers Participation in Livestock Markets: The Case of Zambian Farmers* (Working Paper No. 66). Indaba Agricultural Policy Research Institute (IAPRI).

Luka, anthony, olubenga, omotayo, A., Ebukiba, S., Elizabeth, & vandi, G. (2021). Factors Influencing Output of Rice Produced and Choice of Marketing Outlets Among Smallholder Farming Households, Abuja, Nigeria. *Sarhad Journal of Agriculture*, *37*(1), Article 1. https://doi.org/I | http://dx.doi.org/10.17582/journal.sja/2021/37.1.262.277

Magingxa, L. L., Kamara, A. B., Magingxa, L. L., & Kamara, A. B. (2003). INSTITUTIONAL PERSPECTIVES OF ENHANCING SMALLHOLDER MARKET ACCESS IN SOUTH AFRICA. *41st Annual Conference of the Agricultural Economics Association of South Africa, CSIR Conference Centre, Pretoria, 2 October 2003*. https://doi.org/10.22004/AG.ECON.19077

O.F., A., S., M., I.A, A., & U.B., U. (2010). ANALYSIS OF RESOURCE USE EFFICIENCY IN BENISEED PRODUCTION IN OBI AND DOMA LOCAL GOVERNMENT AREAS OF NASSARAWA STATE, NIGERIA. *Journal of Humanities, Social Sciences and Creative Arts*, *5*(1), 79–90.

Olwande, J., Mathenge, M. K., Olwande, J., & Mathenge, M. K. (2012). *Market Participation among Poor Rural Households in Kenya*. https://doi.org/10.22004/AG.ECON.126711

Omiti, J. M., Otieno, D. J., Nyanamba, T. O., McCullough, E. B., Omiti, J. M., Otieno, D. J., Nyanamba, T. O., & McCullough, E. B. (2009). *Factors influencing the intensity of market participation by smallholder farmers: A case study of rural and peri-urban areas of Kenya*. https://doi.org/10.22004/AG.ECON.56958

Poole, N. (2017). *Smallholder Agriculture and Market Participation*. Practical Action Publishing. https://doi.org/10.3362/9781780449401

Reardon, T., & Barrett, C. B. (2000). Agroindustrialization, globalization, and international development: An overview of issues, patterns, and determinants. *Agricultural Economics*, *23*(3), 195–205. https://doi.org/10.1111/j.1574-0862.2000.tb00272.x

~~S. Bahta. (2012). Policy options for improving market participation and sales of smallholder crop producers: A case study of the Free State Province of South Africa. *AFRICAN JOURNAL OF AGRICULTURAL RESEEARCH*, *7*(24). https://doi.org/10.5897/AJAR11.631~~

Timmer, C. P., & Timmer, C. P. (1974). *A Model of Rice Marketing Margins in Indonesia*. *13*(2), 1–24. https://doi.org/10.22004/AG.ECON.135343

Torero, M. (2011, January 24). A framework for Linking Small Farmers to Markets—IFAD. *Conference on New Directions for Smallholder Agriculture*. Enabling poor rural people to overcome poverty, Rome, Italy. https://www.yumpu.com/en/document/view/9309812/a-framework-for-linking-small-farmers-to-markets-ifad

Umar, H. S., Luka, E. G.~~, L.~~, & Rahman, S.A.~~, R.~~ (2010). Gender Based Analysis of Labour Productivity In Sesame Production In Doma Local Government Area of Nasarawa State, Nigeria. *Production Agriculture and Technology*, *6*(2), 61–68.

Umar, H.S., Okoye, C.U., & Agwale, A.O. (2011). Productivity analysis of sesame (Sesamum indicum L.) production under organic and inorganic fertilizers applications in Doma local government area, Nasarawa State, Nigeria. *Tropical and Subtropical Agroecosystems*, *14*, 405-411.

World, Bank. (2023). *Agriculture Overview: Development news, research, data | World Bank*. Agriculture and Food. https://www.worldbank.org/en/topic/agriculture/overview

Hardwick Research (2022). Determining Sample Size. Hardwick Research Re-sources. Retrieved from: https://www.hardwickresearch.com/resourc-es/determining-sample-size/ H

Hashem, M., Sfeir, E., Hejase, H. J., & Hejase, A. J. (2022). Effect of Online Training on Employee Engagement during the COVID-19 Era. *Asian Business Research*, 7(5), 10-40. https://doi.org/10.20849/abr.v7i5.1294

Younis, J. A., Hejase, H. J., Dalal, H. R., Hejase, A. J., & Frimousse, S. (2022). Leaderships' Role in Managing Crisis in the Lebanese Health Sector: An Assessment of Influencing Factors. *Research in Health Science*, 7(3), 54-97.

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