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Determinants of Smallholder Farmers' Participation in Cashew Nut Production in Lindi and Mtwara Regions, Tanzania

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Abstract

Cashew nut is one of the main sources of income for smallholder farmers in Mtwara and Lindi Regions. It contributes almost 7.1 % of Tanzania's GDP and hires more than 2.1 million people along its value chain. However, despite its importance, the determinants of smallholder farmers' participation in cashew nut production are yet to be established. This paper, therefore, attempts to establish factors influencing small holder farmers' participation in cashew nut production. A cross-sectional research design which utilized a mixed methods approach was used for collection and analysis of data. Multistage sampling was applied to select a sample of 384 respondents from whom quantitative data were collected using a structured questionnaire. Moreover, focus group discussions and key informant interviews were employed in collecting qualitative data. Descriptive statistics and binary logistic regression were applied for analysis of quantitative data while content analysis was used in the analysis of qualitative data. It was found that, out of fifteen variables that were tested at $p < 0.05$, fourteen were significant. Household size, access to extension service, and access to market information were significantly positive while age, sex and co-operative membership were significantly negative. For non-participation in cashew nut production, it was found that, out of fifteen variables that were studied, eight were significant. That is age, sex, education, income, farm ownership status, farm size, price and co-operative membership. Gender discriminating practices and less participation of young people in the cashew nut business are clearly evident in the cashew nut value chain. Further, access to market information, extension services and membership to cooperatives are critical determinants of participation in cashew nut production. It is recommended that leaders should increase smallholder farmers' access to extension services, market information and encourage them to join co-operatives. Policy actions should be directed to farmers to upgrade their socio-economic characteristics by ensuring more women and youth are involved in cashew value chain.

Keywords: Small holder farmers, Participation, Cashew nut production, Factors, Tanzania

1. Introduction

Tanzania's socioeconomic development goals and the welfare of smallholder farmers are both strongly supported by agriculture (Sanyang and Kuyateh, 2018; Chongela, 2015). Agriculture

contributes an estimated 29.1% of the country's GDP (Delloitte, 2017; URT, 2019), making it one of the main economic activities of the people and sources of foreign exchange earnings. Agricultural exports provide income for roughly 73% of those who live in rural areas and employ about 65% of the total population (NBS, 2017; FAO, 2015). While this is true, agricultural production is affected by inadequate access to farm inputs (McArthur and McCord, 2017). This was partly attributed by liberalization policies which were initiated in Tanzania in the 1990s. Overall, enhancement of agricultural production necessitates that farmers acquire inputs, apply novel technologies, get access to extension services and markets which, in turn, depend on the level of income generated from agricultural production (Wineman *et al.,* 2020).

Consequently, availing smallholder farmers with factor inputs as well as profitable markets is likely to facilitate commercializing agricultural production. Debatably, underneath conducive marketing, socio-economic and social capital factors will be enhanced, since they inspire farmers to increase production. Cashew nut production is among the major sources of improving smallholder farmers' welfare. Increase in cashew nut production enables extra production which in turn leads to additional income. With adequate income and increased money supply in the surroundings, smallholder cashew nut farmers will require goods and services and engage in non-farm activities including microenterprises (Wineman et al., 2020). Thus, cashew nut production is considered as an instrument that also creates non-farm income prospects (Larson *et al.,* 2016). This is because it generates superior multiplier effects compared to other sectors in the area.

Tanzania produces an average of 313,000 tons of cashew nuts annually, ranking second in Africa, only after Ivory Coast's 770,000 tons annual production. It ranks as the fourth-largest producer in the world with a 7.2% worldwide market share (FAOSTAT, 2019; CBT, 2019; Ibrahim, 2015). Cashew nut in Tanzania contributes to roughly 7.1% of GDP, employs more than 2.1 million people along its value chain, and provides a foundation of income for smallholder farmers, mainly in Mtwara, Lindi, and Ruvuma Regions (World Bank, 2017). Additionally, as regards export value, cashew nut is the third major export crop after tobacco and coffee, representing about 10% of the total agricultural exports (CBT, 2019; URT, 2015). Cashew nut business is not only advantageous to the whole economy in terms of foreign exchange, but also the crop creates employment and income for farmers, thereby enhancing their welfare. In Tanzania, the reported amounts of cashew nut produced in 2016, 2017 and 2018 were 155 245, 265 237 and 313 000 tons respectively. In 2018, the crop contributed 7.1% to the GDP (URT, 2019).

Even though, in aggregate terms, cash nut production in Tanzania is increasing yearly, cashew nut productivity at the smallholder farmers' level is low. The mean productivity in Lindi and Mtwara Regions is 0.38 tons/hectare which is low compared to the national average, which is 0.8 tons/hectare (CBT, 2019; Ibrahim, 2015). This may impinge on smallholder farmers' welfare. On the other hand, the government aims to increase the national cashew nut production from 313 000 tons in 2021 to about 1,000,000 tons in 2025 (Cashew nut Board of Tanzania (CBT), 2020). The low productivity of cashew nut in Lindi and Mtwara Tanzania indicates significant drawbacks to production transformation.

During the farming season 2017/2018, the total area planted with cashew nuts in Tanzania Mainland was 695,683 ha. Mtwara Region (327,281 ha; 47.0%), had the biggest area on which cashew nuts were planted, followed by Lindi (207,951 ha. 29.9%) and Pwani (91,815 ha; 13.2 %). The total harvested area was 574, 072 ha (82.5 % of total grown area). Mtwara Region (308,835

ha; 53.8 %) had the largest harvested area, followed by Lindi (185,065 ha; 32.2 %) and Pwani (49,908 ha; 8.7 %). The sum production of cashew nuts was 313,826.386 with Mtwara Region (195,481 tons; 62.2 %) leading in production, followed by Lindi (126,353 tons; 32.6 %) and Pwani (58,337 tons; 1.5 %) as shown in Fig. 1.

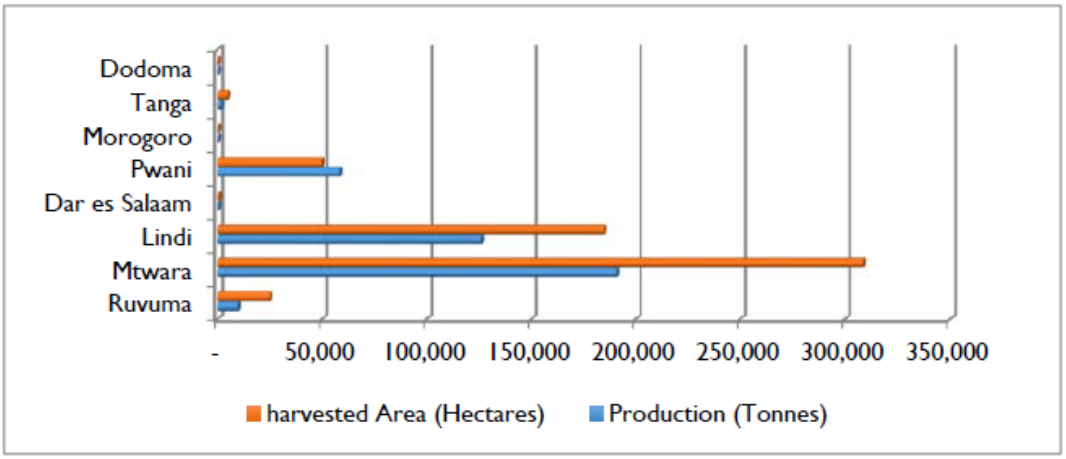

Figure 1: Harvested area (hectares) and production (tons) of cashew nut by region
Source: CBT, 2020

Cognizant of the low productivity of cashew nut, the Tanzanian government (GOT) has, from time to time, created and implemented new policies, initiatives, and institutions to rescue the situation. One of the crucial enablers of cashew nut production is the Naliendele Agricultural Research Institute (NARI), which was founded in 1970. The NARI conducts research on improved agricultural quality and yield. To improve cashew nut quality in marketing and export, the GOT formed the Cashew nut Board of Tanzania (CBT) in 1993. The Government also formed the Cashew Nut Industry Act of 2009 and the Warehouse Receipt Act No. 10 of 2005, which govern production, grading, processing, marketing, and selling of cashew nuts (Akyoo, and Mpenda, 2014). For the cashew nut crop to continue to benefit the nation and smallholder farmers, the GOT also places additional emphasis on ensuring that cooperatives play a vital role among the organizations that help farmers access farm inputs, markets, and fair prices. With the help of these initiatives, smallholder farmers were able to increase their production from 155,244.645 tons in 2015/16 to 313,826.386 tons in 2017/18. Moreover, the average price per kilogram rose from TZS 2,360 in 2015/16 to TZS 3,000 in 2017/18 (CBT, 2019; URT, 2019).

Despite the government's concerted efforts to improve well-being in Mtwara and Lindi Regions through improving cashew nut businesses, the wellbeing of the inhabitants in the regions is still poor (THDR, 2017). These areas are in the middle tercile, with 47% and 49% of the population, respectively, experiencing multidimensional poverty (NBS, 2017). The youth, elderly, and women are more vulnerable to poverty in the regions, where basic needs poverty incidence is 26.4%, which is greater than the national basic requirements poverty incidence of the nation (URT, 2018). This situation lowers smallholder farmers' participation in cashew nut production because cashew production is a complex activity with intense pressures in terms of demographic characteristics, farm assets, social capital, market accessibility and financial factors. The mentioned factors are among the barriers to smallholder farmer's participation in cashew nut production, leading farmers to shifting to short-term household income sources outside of agriculture such as casual labour, transportation, traditional dancing, and petty trading which cannot sustain their welfare (Bila *et al.,* 2015). Thus, despite the fact that the potential for

business in cashew nut is growing, especially in the Lindi and Mtwara Regions where 65% of smallholder farmers depend on the crop as one of the main sources of income, a number of difficulties and risks occasionally create barriers to successful participation in cashew nut production.

Most of the previous research undertakings that examined smallholder farmers participation focused on other areas that are not related to cashew nut production. For instance, Muroiwa, Mushunje, and Musitini (2018) investigated factors influencing smallholder farmer participation in tobacco contract farming arrangements on the Mount Darwin District of Zimbabwe, while Mchopa, Jeckoniah, Israel, and Changalima (2020) assessed socio-economic determinants of participation in sunflower value chain among smallholder farmers in Iramba District of Tanzania. Ziyadhuma (2015) analysed factors affecting Zimbabwe's smallholder farmers' participation in tobacco contract farming and effects on the country's land productivity and Lukurugu et al. (2022) examined determinants of adoption of enhanced cashew production technologies among smallholder farmers in Mtwara region. Little emphasis has been paid to the factors that motivate smallholder farmers to engage in cashew nut farming. This raises a genuine question regarding the factors influencing smallholder farmers' participating in cashew nut production in Tanzania and specifically in Lindi and Mtwara Regions.

The objective of this study, therefore, was to assess determinants of smallholder farmers' participation in cashew nut production. Specifically, this paper assesses the influence of farmers' socio-economic characteristics, farm characteristics, market characteristics, social and capital on farmers' participation in cashew nut production in Lindi and Mtwara Regions, Tanzania. Shedding light on constructs that determine farmers' participation in cashew nut production is vital for generating information which may help in designing policies and strategies that could support farmers to be involved in high-scale commercial production and thus improve their welfare.

2. Review of Literature

2.1 Theoretical framework

The Arnstein's (1969) Ladder of Participation Theory underpinned the study on which this paper is based. The theory states that there are diverse levels of participation, starting from manipulation or therapy of citizens, through the consultation and finally to genuine participation, i.e. the levels of partnership and citizen control. The idea was further credited by the World Bank by appreciating that lack of participation is the major failure of numerous development efforts in Sub Saharan Africa (Qin et al., 2019). Without public participation, there is visibly no partnership, no advancement and no projects. Similarly, other academicians have provided a typology of participation (Abildgaard et al., 2020), which is not directly tied to agricultural production. Therefore, this unpacks determinants of farmers' involvement in agricultural production, in this case based on Arnstein models. Arnstein (1969) scrutinised the innumerable participation plans which functioned in 1960s and noted that almost all were inadequate to substantially influence normal people to alter or modify their intentions and initiatives.

Programmatic goals in Arnstein's theory can range from minimal levels of participant "manipulation" to high levels of manipulation", full control of decision-making mechanisms by public, population, consumers or small holder farmers (Abildgaard et al., 2020). Table 1 shows six broad classes or stages of participation. The 6 stairs are branded into 3 classes. The top of the

stairs signifies authentic involvement. The following grouping includes 3 grades of tokenism that permit the members, in this case smallholder farmers, to speak and be heard. At the stage of symbolic involvement, members receive some form of power, but it is still a type of tokenism as the conventional holder of power remains with the right to choose (Arnstein, 1969). It is the impression of a voice without having the voice itself.

Table 1: Levels of participation

Levels of participation	Types	Characteristics
Genuine participation	Empowerment	Farmers may straight get in touch with explorer and expand agriculture by themselves (Arnstein, 1969).
Symbolic participation	Partnership	Certain degrees of farmers control in agricultural advancement, (Arnstein, 1969).
	Interaction	Farmers have higher participation in this stage. The rights of farmers are appreciated and recognized in practice at local level (Arnstein, 1969).
	Consultation	Officials recognize some thoughts from the farmers that benefit their project, (Arnstein, 1969).
	Informing	The founders manage the projects devoid of listening to farmers' thoughts, (Arnstein, 1969).
Nonparticipation	Manipulation	Farming is normally developed by some influential landlords or government with no or any conversation with the farmers, (Arnstein, 1969).

The two lowest stairs of the ladder stand for those who are not involved. In this stage, farmers are authorized to engage but are denied any chance to alter programmes tailored to suit their wants and, consequently, this maintains the *status quo* in power relations (Olubunmi, 2017). While Arnstein's (1969) talks about the ladder of participation, it is quiet on the intention of farmers' participation in economic activities. Therefore, the Participating Behaviour Theory by McClusky (1963) was added. The participating behaviour theory is about to understand intention of smallholder farmers to participate in economic production. The basic assumption is that an adult is faced with the need to grow and change, and this requires effort to participate in economic activities so as to earn a living. However, this is dependent on factors such as age, income, availability of extension services, etc. Therefore, participation is made-up of efforts that farmers make for attaining basic living conditions.

2.2 Empirical literature

There are number of snags that make full participation impossible. Farmers' participation in agricultural production, and specifically cashew nut production, is constrained with some limitations. Empirical literature (da Silva, 2020; Okeyo, 2020; Qin et al., 2019; Mazibuko, Balarane, Antwi & Yeki, 2018 and Mchopa et al., 2020) show that smallholder farmers' participation is affected by a numerous factors among which are socio-economic factors such as age, gender, education level and household size. These studies reveal that male smallholder farmers are more likely to participate in agricultural production than their female counterparts and better educated household heads are more likely to participate than their counterparts. However, the size and direction of these variables' effects vary depending on the region. Besides, there is scant empirical research on cashew nuts, particularly in Lindi and Mtwara Region, which makes this study necessary. Thus, the following null hypothesis was tested:

"*H_o: Socio-economic characteristics of a farmers (Age, sex, marital status, education level and income) have no positive relationship with smallholder farmers' participation in cashew nut production"*.

Previous studies maintained that larger farm sizes are often associated with decision to decide to participate or not. Khoza *et al*. (2019) and Hichaambwa et al. (2015) revealed that large farm size is associated with smallholder farmers' decision to participate in farming. On the other side, farm ownership status determines smallholder farmers' decision to participate, as pointed out by Ng'atigwa et al. (2023) that those who own land are more likely to participate than those who do not. These studies were done in one region, employed logit regression, and used only quantitative methods of data collation and analysis; hence they were inadequate to make inferences about the entire population and generalization of the findings to the whole of Tanzania. Based on that, for the research on which this paper is based, it is hypothesized that:
"H_o: Farm characteristics (farm ownership status, farm size, availability of extension services) have no positive relationship with smallholder farmers' participation in cashew nut production"

Market characteristics factors also play an important role but have been reported to have mixed effects on participation. Empirical studies examined this by the use of diverse indicators including hours to the nearest town centre, distance to nearest tarmac road, and access to marketing information and price. Abera et al. (2011), however, found no significant relationship between access to information and participation. Mansaray et al. (2019) provide strong evidence of positive effect of distance to market on participation while Khatiwada et al. (2017) report negative effects, thus bringing to the fore inconsistent evidence about the relationship between market characteristics and stallholders farmers' participation. Therefore, for the research on which this paper is based, it was hypothesized that:
"H_o: Market characteristics (hours to the near town centre, distance to nearest tarmac road, access to marketing information, and price have no positive relationship with smallholder farmers' participation in cashew nut production".

Being a co-operative member also induces farmers to participate in cashew nut production. This was evidenced by studies done by Cholobi (2023) and Magese (2020) which showed that members recognize the importance of co-operatives on production and the market. The farmers stated that their ability to access previously inaccessible financial tools had improved their agricultural production. The co-operative movement growth has led to an increase in service provision and necessitated credit availability and thus enabled farmers to access credit without collateral and invest. In Lindi and Mtwara Region in Tanzania, numerous challenges exist, in a highly centralized system; officials make choices; and planners assume that farmers are stupid and uninformed and won't participate as they lack knowledge to participate or decide if they want to engage in cashew nut production or otherwise. Unawareness was the utmost barrier to farmers' involvement, although the lack of knowledge was not limited to farmers, but also affected bureaucracy. Dynamic involvement is then often restrained by absence of information and knowledge.
Knowledge of the decision-making processes is vital if farmers are to be active in agricultural production. Mchopa et al. (2020) also showed some of blockades of participation in agricultural production. These fences comprise absence of knowledge, people' inability to participate, lack of effectual and dependable state institutions, insufficient focus on developing human resources, reliance on government, and lack of extension services. Though contributions from the theory

and empirical studies show that these are factors that limit participation, it was not known whether the factors also applied to cashew nut production in Lindi and Mtwara Regions. Furthermore, to the best of the researcher's knowledge, factors influencing smallholder farmers to participate in cashew nut production have not previously been studied; hence this study was timely to fill in that gap knowledge gap. In operationalizing the objective of this study, it was hypothesised that:

"H_o: Social capital (being a cooperative member) has no positive relationship with smallholder farmers' participation in cashew nut production"

3.0 Methodology

3.1 Research design

The study applied a cross-sectional design since it permits the data to be gathered at a single point in time and is useful for description purposes as well as for set up connections among parameters (Mayala, Katundu, and Msuya, 2019; Mashenene and Kumburu, 2020).

3.2 Study area

The study was carried out in the Mtwara and Lindi Regions of Tanzania. Mtwara is Tanzania's most south-eastern region, bordering with Lindi Region to the north, the Indian Ocean to the east, Mozambique to the south across the Ruvuma River, and Ruvuma Region to the west (URT, 2018). The area is 16 720 square kilometres in size and is administratively divided into 5 districts and 98 wards. On the other hand, Lindi Region shares borders with Pwani Region to the north, the Indian Ocean to the east, Mtwara Region to the south, Ruvuma Region to the south-west, and Morogoro Region to the west (URT, 2019). Lindi Region has a size of 67,000 square kilometres, a population of 1,194, 028 as per the 2022 national population and housing census, and is divided into 142 Wards and five (5) districts (URT *et al*., 2022). The two regions have, over the years successfully produced cashew nuts through farming, which is a significant economic activity. General trade, office work, building construction, manufacturing, mining, and cattle rearing are among the most important economic activities in the area. The two locations were specifically selected since they are Tanzania's main cashew nut growers and produce 80–90% of the country's sold cashew nuts (CBT, 2019).**).**

3.3 Sample size and sampling techniques

The sample size was of 384 respondents and was considered optimum in accordance with Daniel's (2009) algorithm. The formula was used because it allows for the inclusion of both participants (p) and non-participants (1-p) when determining sample size.

Sample size (n) = $\frac{Z^2 x(p) x(q)}{d^2}$ ……1

Where:

Z = value for the selected alpha of 0.25 in each tail = 1.96 which corresponds to the 95% confidence interval, with the value of 1.96),

p = The expected proportion of the target population with a certain attribute (50%),

q =1 - p (population thought to not have specific traits (50%), and

d = A 0.05 error margin. Therefore, the sample, n, was:

$$\frac{(1.96)^2 x[0.5(1-0.5]}{(0.05^2)} = 384$$

Out of the 384 cashew nut smallholder farmers sampled, 128 were non-participants while 256 were participants. The response rate was 100% that was sensible as commented by Babbie (2010) that a response rate of 70% and above is very good. The use of multistage sampling was made. Since the population constituted a heterogeneous group, i.e. those involved in cashew nut business and those who were not, this approach is desired because dependable information could be obtained from the same sample size if the population was stratified rather than from the whole, but also contrast amid the dual clusters are easy as a separate but similar survey was done in each group (Ahmed *et al.,* 2016).

In Mtwara Region, Tandahimba, Newala, and Masasi districts were selected. Twelve (12) wards out of 22 were selected in Tandahimba District; 12 wards out 20 were selected in Newala; and in Masasi District 15 wards were selected out of 28. In Lindi Region, Nachingwea, Ruangwa, and Liwale Districts were selected. In Nachingwea District, 15 wards were selected out of 32 wards; in Ruagwa District, 11 wards were selected out of 21; and, in Liwale District 11 wards were selected out of 20. The selection was necessary to allow the study results to be representative of cashew farmers in the two regions and to be reliable, capturing the essential characteristics and variations within each district. Using random numbers, hamlets were chosen randomly from Ward Executive Officers' (WEOs') lists in each ward, and then the homes within each hamlet were labelled as participants or non-participants. Hamlets' target smallholder farmers were arbitrarily selected, based on WEO's household lists. Every tenth family was picked to represent a smallholder farmer after the starting household was randomly selected (Kumburu, Kessy and Mbwambo, 2019). Lastly, each household's individual respondents were purposefully chosen, focusing on both participants and non-participants.

3.4 Data sources, types, collection methods and tools

Smallholder farmers served as the major data sources, although secondary data came from a variety of documents, including weekly and quarterly reports, daily sales records, credit sales records, receipt books, and cashbooks. Different types of information was gathered, including the socio-demographic profiles of respondents, which included information on their age, sex, marital status, family size, composition, and household land area. These kinds of information are essential because they provide preliminary data that subsequently inform and enhance findings obtained.

The second set of data gathered focused on the factors that affect participation in cashew nut production. These facts were essential to the study because they would reveal why farmers were engaged in the cashew nut sector and whether their demands were met. Due to the mixed methods approach used in this study, it was crucial to use both qualitative and quantitative data collection instruments to guarantee the robustness and reliability of the data. To acquire quantitative data, a structured questionnaire that had been pre-tested and amended appropriately was used in the household survey method. Focus group discussions and Key Informant Interviews (KIIs) were used to gather qualitative data (FGDs). A total of 6 KIIs were organized, one in each district containing purposively selected technical official personnel based on their acquaintance on cashew production. Furthermore, 6 FGDs constituting 8 randomly

selected farmers were arranged one in each district, household position, gender and age were among criteria in selecting participants so as to reflect diverse opinion.

3.5 Data analysis

Data were analysed both qualitatively and quantitatively. Content analysis was used to analyse qualitative data from key informant interviews and focus group discussions. Striking and frequent topics, ideas, or expressions from the transcriptions related to socio-economic, farm, market and social capital characteristics were identified. This was done in order to organise the information into common themes that emerged in responses to deal with specific items. The themes were arranged into rational groupings which summarised key results. Qualitative information was consolidated with the quantitative information to derive conclusions. Quantitatively, descriptive statistics (means and standard deviations) were employed in the examination of the preliminary information while binary logistic regression was employed to determine influence of various variables on the chances of participation in cashew nut production. The dependent variable (participation) was a dummy variable whereby Y = 1 if participating, and Y = 0 if not participating in cashew nut production. Since all assumptions of binary logistic regression, including the dependent variable being a dummy variable were considered, the binary logit model was appropriate and took the following form:

$$In\left[\frac{p_i}{1-p_i}\right] = L_i = \beta_0 + \beta_i{}'\chi_i \quad \text{.....2}$$

Where:
p_i = the probability of the binary outcome being 1
$1 - p_i$= the probability of the binary outcome being 0
X_i = vectors of independent variables,
β' = vectors of their respective coefficients,
Y = Dependent variable (Binary: Y = 1 if participating, Y = 0 if not participating in cashew nut production)

Table 2: Definition of Model Variables

Variable	Definition	Unit of Measurement
Dependent variable		
Participation	Probability of participation	Binary: Y = 1 if participating, Y = 0 if not participating
Independent variables		
Farmers socio-economic characteristics		
Age	Age	Years since birth
Sex	a household's head's sex	1=male, 0=female
MMS	Status of marriage	1= married, 0 =Otherwise
EDU	Education	years of school
HHS	Household size	number of members
INC	Income	Amount of money in TZS
Farm characteristics		
FOS	Farm ownership status	1= if owned, 0=Otherwise
FMS	Farm size	Number of ha
EXT	Availability of extension service	1= if available, 0=Otherwise
FIP	Access to farm inputs	1= If accessed, 0=Otherwise
Market characteristics		
HNT	Hour to near town centre	Number of hours
DIS	Distance to nearest tarmac road in km	Number of kilometres
ACI	Access to marketing information	1= if accessing, 0 = Otherwise
PRI	Cashew nut price	Amount of Money in TZS
Social capital characteristics		
COPM	Co-operative membership	1 = if a member, 0 = Otherwise

4. Findings and Discussion

4.1 Socio-economic characteristics of small holder farmers

Table 1 presents the socio-economic characteristics of the respondents. With respect to age, the mean age was 35.94 and 47.67 years for participants and non-participants, respectively. This shows that both participants and non-participants were adults. This might be attributed to the fact that, as one ages responsibilities increase, thus one is forced to engage in economic activities so that they can sufficiently provide for their families. Not only that, but relatively older people are normally energetic and are capable of owning land; thus, they are likely to engage in cashew nut production which is labour intensive. This is in line with findings of a study done by Lukurugu *et al.* (2022) who found that the common age group in cashew production ranged from 35 to 60 years.

Concerning education, on average the years spent in school were 4.89 and 5.90 for participants and non-participant, respectively. This means that the majority of the participants were primary school dropouts while having primary education was important to perform work because with lower education livelihood options are minimal. Concerning household size, the mean household size for participants was 5.03 while for non-participants it was 3.83. This means that household sizes for non-participants were smaller than those of their counterparts. This may be attributed to the fact that the source of labour for cashew nut production was mainly drawn from relatives living under the same roof with the cashew nut trees owners. The finding that household labour is important for agriculture at the household labour was observed by Kayunze (2000).

On the aspect of income, on average, monthly income was TZS 456 750 and TZS 417 839 for participants and non-participants, respectively. This indicates that participants earned more compared to non-participants. This might be attributed to the fact that cashew nut produced in

Tanzania is highly demanded in international markets and thus consumer pay premium price compared to other intercropped crops such as sesame, maize, cassava, pigeon peas, cowpeas, and groundnuts in the studied areas (Lukurugu *et al.,* 2022). Details are given in Table 2.

The findings Table 2 show that the mean farm size was 2.99 ha among participants and 3.01 ha among non-participants**.** Although the mean farm sizes differed between the two groups, farmers in both groups were small scale producers. This corroborates findings by Dubbert (2019) who noted that about 88% of cashew farmers in Ghana were smallholders, with farms ranging in size from 0.8 to 3 ha. Furthermore, on the aspect of hours to town, it was found that the mean time among participants was 5 hours while among non-participants it was 4 hours. Finally, the results show that the mean distance to the nearest tarmac road was 8 km for participants and non-participants. This implies that the majority of the cashew nut smallholder farmers involved in the study lived in rural areas with poor road facilities. This is supported by findings by Dubbert (2019) who found that smallholder farmers were residing at places where the travel from there by reliable transport means to nearest towns took almost 10 hours.

Table 3: Socio-economic Characteristics of small holder farmers in Lindi and Mtwara Regions

Variables	Types of Respondents									
	Participants					Non-Participants				
	N	Min	Max	Mean	Std. Dev.	N	Min	Max	Mean	Std. Dev.
Age of a farmer	128	22	63	35.94	9.396	256	23	83	47.67	11.898
Education level	128	0	16	4.89	3.115	256	0	15	5.90	3.409
Household size	128	1	13	5.03	2.023	256	0	10	3.83	2.036
Income	128	10,000	6,000,000	456,750	581,070	256	16,667	457854	417839	461,070
Farm size (acres)	128	1	5	2.99	.946	256	1	6	3.01	.970
Hours to nearest town	128	2.00	9.00	5.0	1.38795	256	1.00	5.00	4.0	0.97585
Distance to tarmac road	128	1	25	7.71	7.664	256	1	30	8.39	8.075

4.2 Determinants for Participation of smallholder farmers in Cashew nut Production

Binary logistic regression was applied to determine influence of various factors on smallholder farmers' participation in cashew nut production. The participation likelihood was treated as follows: participation =1, non-participation = 0. The findings in Table 4 show that the Omnibus test of model coefficients was statistically significant at p = 0.000, with a Chi-square of 126.633 among participants and a Chi-square of 50.478 (p = 0.000) among non-participants. The significant p-values mean that the model was suitable to the data, and that among the predictor variables at least one was significantly related to the response variable (Mangasini, 2015; Mchopa *et al*., 2020).

The models also produced a Cox and Snell R-Square of 0.611 and a Nagelkerke R-Square (R^2) of 0.823 for participants and a Cox and Snell R-Square of 0.556 and a Nagelkerke R-Square (R^2) of 0.831 for non-participants meaning the models had explanatory power to predict the results and

were sufficient for social science studies which are conducted in uncontrolled environment. Furthermore, the disparities were attributed to unaccounted variables or model innate faults.

Table 4: Factors Influencing Participation in Cashew nut production among small holder farmers in Lindi and Mtwara Regions

Variables	Participants						Non-Participants					
	β	S.E.	Wald	df	Sig.	Exp(B)	β	S.E.	Wald	df	Sig.	Exp(B)
Farmer's characteristics												
Age of a farmer	0.421	0.13	3.24	1	0.001	1.523	0.20	0.06	11.30	1	0.001	1.226
Sex of household head	0.567	0.16	3.54	1	0.000	1.763	1.57	0.35	19.87	1	0.000	4.798
Marital status	0.766	0.13	5.89	1	0.000	2.151	-0.49	0.82	0.35	1	0.552	0.615
Education level	0.732	0.18	4.07	1	0.000	2.079	2.23	0.84	7.10	1	0.008	9.310
Household size	0.754	0.19	3.97	1	0.000	2.125	-1.55	0.70	4.92	1	0.276	0.212
Income	0.883	0.15	5.89	1	0.000	2.418	-2.60	0.98	7.05	1	0.008	0.075
Farm characts.												
Farm ownership status	0.606	0.37	1.64	1	0.640	1.833	-0.94	0.83	1.31	1	0.027	0.389
Farm size	0.982	0.17	5.78	1	0.000	2.669	-0.74	0.76	0.94	1	0.008	0.477
Availability of extension services	0.483	0.18	2.68	1	0.000	1.623	-0.39	0.77	0.27	1	0.253	0.677
Access to farm inputs	0.601	0.319	5.321	1	0.013	1.824	0.247	0.190	4.776	1	0.016	1.280
Market characts.												
Hours to nearest town centre	-0.552	0.17	3.25	1	0.000	1.736	1.03	0.90	1.30	1	0.332	2.793
Distance to nearest tarmac road	-0.536	0.17	3.15	1	0.000	1.709	-3.18	0.91	12.26	1	0.613	0.677
Access to market information	0.778	0.18	4.32	1	0.000	2.114	1.98	0.87	5.11	1	0.254	2.793
Price	0.632	0.19	3.33	1	0.000	1.881	0.37	0.73	0.45	1	0.000	7.099
Social capital characts.												
Co-op membership	0.713	0.26	2.74	1	0.000	1.188	0.54	0.80	0.25	1	0.024	0.042
Relation with Village government	0.447	0.11	4.06	1	0.000	1.563	0.37	0.73	0.47	1	0.502	1.710
Constant	0.552	0.11	5.02	1	0.000	1.736	-8.12	2.39	11.57	1	0.617	0.000
Omnibus Tests of Model Coefficients (Chi-square= 126.633; Sig.= 0.000); Log likelihood = 55.502[a]; Cox & Snell R Square = .611; Nagelkerke R Square = 0.823 Hosmer and Lemeshow test(Chi-square = 5.402; Sig.= 0 .714)							Omnibus Tests of Model Coefficients (Chi-square = 50.478; Sig. = 0.000); Log likelihood = 257.888; Cox & Snell R Square = .556; Nagelkerke R Square = 0.831; Hosmer and Lemeshow test (Chi-square = 3.587; Sig.= 0.802)					

For participants in cashew nut production, the results of the binary regression indicated that, out of 16 predictor variables, 15 variables (age of a farmer, sex of household head, marital status, education level of a farmer, household size, income of a farmer, farm size of a farmer, availability of extension services, access to farm inputs, access to market information, price, co-operative membership, and relation with village government) had significant positive influence ($p \leq 0.05$) on smallholder farmers' participation in cashew nut production. On the other hand, farm ownership status had insignificant positive influence ($p > 0.05$), and two variables (hours to nearest town centre and distance to nearest tarmac road) negative significant influence ($p \leq 0.05$).

For non-participants, six (6) predictor variables (age of a farmer, sex of household head, education level of a farmer, access to farm inputs, price, and co-operative membership) had positive significant influence ($p \leq 0.05$) on smallholder farmers' participation in cashew nut production. On the other hand, three predictor variables (hours to nearest town centre, access to market information, and relation with village government) had positive significant influence ($p > 0.05$) on smallholder farmers' participation in cashew nut production. Three predictor variables

out of 16 (income of a farmer, farm ownership status, and farm size of a farmer) had negative significant influence on ($p \leq 0.05$) on smallholder farmers' participation in cashew nut production. Four predictor variables (marital status, household size, availability of extension services, and distance to nearest tarmac road) out of 16 had negative significant influence ($p > 0.05$) on smallholder farmers' participation in cashew nut production.

From Arnstein's ladder of participation theory, programmatic aim might vary from minimal "manipulation" of participants to "maximum", total control of decision-making processes. Thus, when smallholder farmers reach the high level of the stairs signifies authentic involvement. This is so because grouping includes 3 grades of tokenism that permit smallholder farmers to be listened to and to have a say. At the stage of symbolic participation, members receive a certain kind of power though it is still a type of tokenism as the conventional holder of power remains with the liberty to choose; it is, therefore, an impression of having a voice but without the voice itself. The two lowest stairs of the ladder represent non-participation. Thus, farmers' participation increases as they climb the ladder as they are given ability to alter programmes to suit individual demands as well as snags that make full participation impossible such as lack of ownership of land, money, expertise, and knowledge and lack of information. Specific results for each variable are discussed here under.

The Wald criterion showed that age which was evaluated at $p < 0.05$ was a significant contributor to smallholder farmer participation in cashew nut production. The statistics showed that the outcomes for participants were significant at Wald 3. 24; Exp ($\boldsymbol{\beta}$) = 1.523 and $\boldsymbol{\beta} = 0.421$ ($p < 0.001$) and Wald 11.30; Exp ($\boldsymbol{\beta}$) = 1.226 and $\boldsymbol{\beta} = 0.20$ ($p < 0.001$) for non-participants. The positive signs ($\boldsymbol{\beta} = 0.421$) for participants and ($\boldsymbol{\beta} = 0.20$) for non-participants point out that increase in age by one year was likely to increase participation in cashew nut production by 42% and 20% among participants and non-participants, respectively. The possible explanation is the fact that as one ages responsibilities increase; thus they are forced to engage in economic activities so that they can sufficiently provide for their families. This concurs with a study done by Mchopa et al. (2020) who found that more aged people were likely to engage in agricultural production.

Binary logistic regression analysis was also conducted to predict how sex predicted participation. The outcomes were statistically noteworthy at Wald criterion of 3.54 and 11.30, Exp ($\boldsymbol{\beta}$) = 1.763 and 4.98, $\boldsymbol{\beta}$ = 1.567 and 1.57 and ($p < 0.000$) and ($p < 0.000$) among participants and non-participants, respectively. The positive $\boldsymbol{\beta} = 0.567$ and 1.57 for participants and non-participants, respectively, indicate that female headed households were less likely to participate in cashew nut and other crops production and that male headed households were more likely to participate in cashew nut production and other crops. The possible explanation for this is that, in agricultural production, men are more likely to participate compared to female who are engaged in off-farm activities. This is attributed to the fact that women normally encounter gendered constraints in cashew nut farming. This is supported by Gebre *et al*. (2021) who concluded that female-headed households are exposed to severe labour restrictions compared to male-headed households since they have fewer members but more dependants.

Statistics showed that the outcomes were significant at Wald criterion of 5.89, Exp ($\boldsymbol{\beta}$) = 2.151, $\boldsymbol{\beta}$ = 0.766 and ($p < 0.000$) for marital status among participants and Wald criterion of 0.35, Exp ($\boldsymbol{\beta}$) = 0.615, $\boldsymbol{\beta}$ = -0.49 and ($p < 0.0552$) for marital status among non-participants. The positive $\boldsymbol{\beta}$ = 0.76 for participants indicate that marital status was more likely to induce one to participate in

cashew nut production and that married households participated more in cashew nut production. The possible explanation for this is that the fact that, as couples settle, family responsibilities increase such as expenses for children's schooling, food and medical bills. Therefore they ought to participate more in income-generating activities like cashew nut production in the research areas so that they can provide for their families.

It was found that education level of farmers significantly predicted participation in cashew nut production. This outcomes was examined at $p < 0.05$ and produced results at Wald = 4.07 and 7.10; Exp (**β**) = 2.079 and 9.310; and **β** = 0.32 an 2.23 and ($p < 0.000$) and ($p < 0.008$) among participants and non-participants, respectively. The positive (**β**) values for participants and non-participants indicate that increase in education increased the likelihood of participating in cashew nut and other crops production by 32% an 2% respectively. These results imply that farmers with higher education were more likely to participate in cashew nut production as education level enabled them to access and analyse information. The results from quantitative analysis corroborate results of focus group discussions whereby the discussants agreed as follows:

> "*We have the ability to access information, especially which originates from the print and electronic media because our education enables us to do so*".

The results are also in line with Arnstein's (1969) ladder of participation theory that as one moves up the ladder his education level and empowerment increase and thus he can influence decisions including participation in cashew nut production. These arguments are also supported by Afful and Mafsikaneng (2018) who found that educated farmers are not only progressive in the adoption processes, but also again affluent in terms of utilizing business practices, compared to their counterparts.

Household size strongly influenced the likelihood of participation in cashew nut production. This results was examined at $p < 0.05$ and produced results at Wald = 3.97; Exp (**β**) = 2.125; and **β** = 0.754 and ($p < 0.000$) among participants and Wald = 4.92; Exp (**β**) = 2. 212; and **β** = -1.55 and ($p < .0276$) among non-participants. The positive (**β**) value for participants indicates that large family size increases the likelihood of engaging in cashew nut production. The likely clarification is the fact that large household size counts in supplying sources of labour in cashew nut farming activities.

The positive coefficient of household size was not anticipated, as numerous previous studies have noted a negative effect of household size on the level of participation in agricultural production. The studies elucidated that an upsurge in household members makes farmers farm more for household needs. Hlatshwayo, Ngidi, Ojo, Modi, Mabhaudhi, and Slotow (2021) showed that big household size is labour incompetent and produces less yield for sale. However, Machimu (2016) and Kayunze (2000) found positive outcomes, demonstrating that the majority of smallholder farmers utilize family labour for agricultural activities; consequently, an upsurge in household size might lead to rise in farm size farmed, so raising the quantity of yield to sell. This was also affirmed during an FGD whereby in which the discussants agreed as follows:

> "*The number of people in a house matters in cashew nut production because the same people in the household offer labour. Thus, households with more members with good productive age, let's say 18 to 45 years, are more likely to produce, harvest more, sell more and earn more income which is useful in fulfilling household needs*

> *and thus improved welfare, compared to those who do not have large household size*" *(A male participant from Nachingwea on December 2021).*

The influence of income was evaluated at $p < 0.05$ and found to significantly contribute to participation in cashew nut production. The outcomes were statistically significant with Wald statistics of 5.89 and 7.05; Exp (**β**) of 2.418 and 0.075, β = 0.883 and -2.60 and (p < .000) and (p < .008), respectively, among participants and non-participants. The positive value (**β** = 0.883) for participants indicated that increase in income was likely to induce more farmers to participate in cashew nut production by 88%. This implies that income provides farmers with mechanisms that enable them to acquire farming inputs such as pesticides and fertilizers. Since cashew nut farming is capital intensive, only households with reliable income are likely to participate in producing it as they are sure of covering costs of production to realize profitable returns. This is supported Arnstein's (1969) ladder of participation theory that as one moves up the ladder up to the level of genuine participation he tends to be empowered and thus he tends to have adequate capital, skills, knowledge and resources to fully drive their participation in agricultural production. The negative value (**β** = -2.60) for non-participants indicates that a unit decrease in income by one unit resulted in increase in sesame production by 2.6%.

It was found that the Wald statistic for farm size, which was measured at $p < 0.05$, was a significant contributor to smallholder farmers' participation in cashew nut production. The results were statistically significant at Wald 5.78; Exp (**β**) = 2.669 and **β** = 0. 982 ($p < 0.001$) and Wald 1.31; Exp (**β**) = 0.389 and **β** = -0.94 ($p < 0.027$) among participants and non-participants, respectively. The positive sign (**β** = 0.982) for participants indicates that increase in farm size by one acre was likely to increase participation in cashew nut production by 98%. The possible explanation of this is that, as the land size increases, desire to produce more increases in expectation of bumper harvest. This was supported by FGD results as follows:

> "*In the past some of us only used to grow legumes such as beans and pulses because our land sizes were too small to engage in cashew nut production because the nature of plant itself requires huge land, but after we inherited land from our late parents, we started being engaged in cashew nut production" (A female participant from Liwale on December 2021).*

The negative sign **β** = -0.74 for non-participants implies that decrease in land size by one unit would result in increase in sesame production by 0.74% as nature of sesame farming does not require large land size as cashew nut production.

Access to extension services was another element that significantly influenced participation in cashew nut production and was tested at $p < 0.05$. The outcomes had statistically significant and non-statistically significant results among participants and non-participants, respectively. The statistics were Wald = 2.68; Exp (**β**) = 1.623 and **β** = 0.483 (p < .000) and Wald = 0.27; Exp (**β**) = 0.677 and **β** = -0.39 ($p < 0.253$) among participants and non-participants, respectively. The positive value (**β** = 0.483) for participants indicates that increase in extension service was likely to induce more farmers to participate in cashew nut production by 48%. This implies that extension services provide farmers mechanisms that enable them to acquire knowledge and skills that can be applied on the farms and by which they intelligently farm and efficiently manage farms in terms of distance from tree to tree, pesticides to use, fertilizers to apply as well as post-harvest services. This is supported by results of a study conducted by Afful and Mafsikaneng (2018) who

found that income of a farmer, especially that earned from both on farm and off farm activities, induces the farmer to engage in cashew nut production. This assertation is in line with one that suitable farmers' backing services for smallholder cashew nut farmers can significantly contribute to increasing agricultural productivity. This was also affirmed during a KII with one government official who said:

> *"Normally, we provide extension services to practising farmers so that they adopt improved cashew nut farming techniques because we have experience whereby those who inherit farms abandon them due to not knowing what to do on them. Again, through extension services, we have attracted new entrants into the cashew nut businesses because they are now knowledgeable*." (*KII with co-operative officer, Tandahimba, 18th, September 2021)*

Logistic regression analysis was also conducted to predict how hours to travel to the nearest town centre predicted participation. According to the Wald criterion of 3.25, Exp (**β**) = 1.736, **β** = -0.552, and (p .000), the results were statistically significant for participants. Also, the Wald criterion of 1.03, Exp (**β**) = 2.793, **β** = 1.03, and (p 0.332) was statistically significant among non-participants. The negative B = - 0.552 for the number of hours it took to reach the nearest town indicates that the less the time it took the more likely it was for participants to participate in cashew nut production. This implies that the further the distance to the market the less likely it was for farmers to participation in cashew nut production. This finding was supported by results of an FGD in which the participant reported that:

> "*The fact that we are located far from big towns, and we do our farming in a distant area makes us miss a lot of opportunities and information which could enable us engage in cashew production*" (A female participant from Liwale in December 2021).

This is supported by findings by Khoza *et al.* (2018) that the farther the distance to marketplaces, the less likely it is for farmers to participate in production**.**

The Wald criterion demonstrated that distance to the tarmac road had a significant contribution to farmers' decision to participate in cashew nut production. The results were validated at $p < 0.05$ and generated statistically significant results of Wald = 3.15; Exp (**β**) = 1.709; **β** = 0.536 (p = 0.000) for participants while for non-participants the results were non-statistically significant: Wald =12.26; Exp (**β**) = 0.677; **β** = -3.18 ($p < 0.613$). The negative sign (**β** = -0.536) for participants reveals that decrease in the time to reach the nearest tarred/paved road by one kilometre increased the probability of participation in cashew nut production by 53% due to the fact that cashew nuts are heavy products which require assurance to reach the market place on time; without reliable road transport there is hardly any incentive for one to engage in cashew nut production. These results are in line with findings by Nwafor, Ogundeji and van der Westhuizen (2020) who found that increase in hours to reach the nearest urban centre by one hour and increasing the distance to the nearest tarred/paved road by ten kilometres decreased the probability of participation in production by 0.5 and 0.1 percentage respectively.

The Wald criterion demonstrated that access to market information made a significant contribution to farmers' decision to participate. The findings were tested at $p < 0.05$ and found to be statistically significant: Wald = 4.32; Exp (**β**) = 2.114; **β** = 0.778 ($p < 0.000$) among

participants but non-statistically significant among non-participants: Wald = 5.11; Exp (**β**) = 2.793; **β** = 1.98 (p < 0.254). The positive sign (**β** = 0.778) for participants reveals that increase in access to market information was likely to influence participation by 77%. This is to say that access to market information and decrease fixed transaction costs. Thus, farmers who had access to information about the requirements of the export market were more likely to be involved in cashew nut production. Similar results were obtained during an FGD where the participants reported the following:

> *"Lack of access to market information is constraining us towards engaging in massive production. Most of farmers here do not have access to market information, and we are unlikely to participate in cashew nut production because we don't know what is happening in the markets*".

This result is in line with the findings by Nwafor, Ogundeji, and van der Westhuizen (2020) who found that access to market information contributed to increasing farmers' tendency of getting advanced prices for their cashew nuts sales, and thus they participate more in producing it.
The aspect of how previous year's price predicted participation in cashew nut production was tested at p < 0.05. The outcomes showed that price was a strong determinant of participation in cashew nut production. The Wald criteria were 3.33 and 0.45; Exp (**β**) were 1.881 and 7.099; and **β** values were 0.632 and 0.37 (p 0.000) and (p 0.000) among participants and non-participants, respectively. The outcomes were statistically significant for both participants and non-participants. The positive signs (**β** = 0.632) and (**β** = 0.37) for participants and non-participants, respectively, reveal that increase in the previous year's price was likely to increase participation in cashew nut farming by 63% and other crops such as sesame by 37%. This implies that if cashew nut or sesame was sold at a high price in one year, the probability that more farmers would be involved in the production of the crop in the subsequent year would be high. This is supported by the results of a study conducted by Akrong and Irungu (2021) who noted that previous year's price significantly influences farmers' participation in production.

It was also important to establish how co-operative membership predicted participation in cashew nut production at p < 0.05. According to the findings, such membership was a powerful predictor: Wald criteria = 2.74 and 0.25, Exp (**β**) = 1.188 and 0.042, and β -values = 0.713 and 0.54 (p 0.000) and (p 0.042), respectively, among participants and non-participants. The outcomes were statistically significant for both participants and non-participants. The positive symbols (**β** = 0.713) and (**β** = 0.54) indicates that increase in co-operative membership was likely to increase participation in cashew nut farming by 71% and in sesame farming and other crops by 54%. This implies that as co-operative membership increased in the study area, so cashew nut and other crops productivity also increased. This is because engagement in co-operatives aid farmers to mobilize resources and capabilities, share market information, enhance their bargaining power, and lower costs through economies of scale. This is supported by results of a study by Akrong and Irungu (2021) which found that being a member of a co-operative institution increased chances of participation in agricultural production.

5. Conclusions, Managerial Implications and Recommendations

The study examined the factors that influence smallholder farmers' participation in cashew nut businesses. The paper concludes that socio- economic characteristics are most likely to influence farmers participating in cashew nut production. The study also concludes that farm

characteristics influence smallholder farmers' participation in cashew nut production. On the other hand, small holders' possession of social capital in terms of being a co-operative member and good relationship with village government were strong predictors to participation in cashew nut businesses as they assure farmers of the certainty in terms of mobilizing resources, getting market information, enhancing their bargaining power, and lowering costs through economies of scale.

It is thus recommended that the government, through the Ministry of Agriculture should facilitate smallholder farmers' income generation efforts by offering them competitive indicative prices. This will make cashew nut a more attractive crop to many people and to the youth and help create self-employment for the jobless and at the same time increase production of the crop. Further, agricultural extension officers need to focus not only on technical aspects of cashew nut production, but also on disseminating relevant knowledge and information regarding pricing, market available as well as norms and standards that most smallholder farmers are not aware of. The government, through the Ministry of Works, is further urged to create enabling environment by building tarmac roads to facilitate transportation of cashew nuts from rural areas of production to marketplaces. They should also consider construction of processing plants in Mtwara and Lindi as a strategy of lowering costs of transportation and storage; this will also discourage exportation of unprocessed cashew nuts. Local leaders should encourage farmers to join co-operative for cashew nut production to enable small-holder farmers have collective power that will enable them mobilize resources and capabilities, share market information, enhance their price bargaining power and lower costs through economies of scale. On the other hand, policy actions should be directed towards farmers to upgrade their socio-economic characteristics by ensuring more women and youth are involved in cashew nut production.

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