Sustainable Land and Food Security in Female-Led Agrarian Households of Tula, Nigeria

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Purpose - This study examined the nexus between land tenure security (LTS) and food security (FS) in female-led households of Tula agrarian settlements.

Design/Methodology – The study used a qualitative research design, which was based on the constructivist paradigm. The researchers conducted in-depth interviews with female household heads cutting across the three 'yaati' (villages) of Tula Baule. Analysis of data collected from the interviews was done employing transcriptions, creation of semantic networks and employing thematic content analysis.

Findings – The study revealed that all but few respondents believed that they had LTS based on “Feloh’s” (ancestral gods) supremacy without recourse to documentary evidence of ownership. Similarly, all but few participants do not have access to three square meal per day throughout the study period. The study also found a strong relationship between LTS and FS in the study area.

Practical Implication - It provides an empirical base to equip policymakers with valuable information for making policies relating to female’s access to land and food in agrarian settlements.

Originality/Value - This study is one of the first to empirically analyse in an eclectic context land and food security in female-led agrarian households of Tula, Nigeria.

Keywords: Access to land; female-led household; food sustainability; gender equality; land tenure; Tula.

1. INTRODUCTION

The nexus between land tenure security (LTS) and food security (FS) has been receiving attention from both academics and researchers in different climes (Lawal et al., 2019). The need for such studies in especially developing economies was observed to be more glaring in the face of the ongoing COVID-19 pandemic. The coronavirus pandemic appears to have posed a significant threat to FS in the world which is more amplified for female-led households of primarily agrarian settlements. In the developing economies, access to secured land is a crucial determining factor to FS and food sustainability at the household level (Holden & Ghebru, 2016; Lawal et al., 2019). The subjects of LTS and FS have been assessed as individual subjects and in relation to one another. It has also been evaluated with other
factors such as economic development, poverty, and agricultural productivity, among others, by previous studies such as Doken (2015) and Han et al. (2019). However, these studies did not focus on practical and sustainable options for the African female-led rural households, thereby creating a gap in the literature. To fill this gap, this paper examined how access to secured land affects and is affected by FS in female-led households of Tula agrarian settlements in Nigeria. Farmers in agrarian settlements of developing economies such as Tula are mostly subsistence farmers striving to provide for home consumption and not on a commercial scale. This explains why the study was focused on the household level. Furthermore, the paper addressed the problem of gender bias/inequality as regards access to and tenure security of farmlands for women.

According to the Food and Agricultural Organization [FAO], (2009), tenure rights were said to be a set of rules and norms that determines who can use what resource, under what conditions, and for how long. Agarwal's (1994) definition of tenure right (as cited in Dokken, 2015, p.107) states that "Tenure rights define to what extent a household or an individual can gain access to the benefit streams generated by land and provide a set of benefits that have a positive impact on livelihoods outcomes". LTS was seen by International Fund for Agricultural Development [IFAD], (2015, p.1) as "people’s ability to control and manage land, use it, dispose of its produce and engage in transactions, including transfers". Holden & Ghebru (2016) asserted that the significant sources of land tenure insecurity include land encroachment, land grabbing and land redistribution by the government. According to Chigbu (2019), women tend to have land rights that are weaker in comparison to their male counterpart. Even though in most agrarian settlements, women are usually saddled with the responsibility of providing food for their respective households through subsistence farming. The World Bank report (2011) revealed that globally, it was observed that female farmers do not have access to sufficient secured land for farming. This has motivated countries such as Vietnam, Peru, Rwanda, and Ethiopia, to implement specific measures geared towards mitigating the challenges of women’s access and rights to land to ascertain FS at the household level (Holden et al., 2011; Holden & Ghebru, 2016). This is because studies have provided empirical pieces of evidence that there is a correlation between access to secured land rights and improved agricultural productivity which consequently leads to FS (Petrescu-Mag, 2019; Keovilignavong & Suhardiman, 2020).

The FAO (2010, p.8) defines FS as “when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meet their dietary needs and food preferences for an active and healthy life”. The FAO report further explained that household FS is “the application of this concept to the family level, with individuals within households as the focus of concern”. It was observed that over two billion people have food insecurity worldwide, with Africa having the highest prevalence. This result vis a vis the Sustainable Development Goal (SDG) of achieving access to food and zero hunger for all people (SDG target 2.1) by the year 2030 is quite perplexing (FAO, 2019). The food insecurity index as indicated by FAO’ report for the year 2018 suggested that Africa has the highest level of food insecurity (52.59%) followed by Asia (22.8%) while Northern America and Europe had the least (8.0%). The report further revealed that food insecurity was observed to be higher in females than the male gender. Factors affecting FS include economic slowdowns and downturns, climatic conditions, conflicts, inflation, level of education, household income, employment, and family size among others (Frongillo et al., 2017; Smith et al., 2017; FAO,
The recent COVID-19 pandemic is likely to be another devastating factor that will affect global FS in the nearest future. The effect of FS on man includes negative health impact and psychosocial impact, among others.

Concerning FS, it is expected to be sustainable at all levels, especially at the household level. Sustainability can be generally defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Smith, 1998). The concept of sustainability is an all-encompassing concept, including but not limited to the environment, economy and man’s social life. The subject of sustainability in developing economies had been investigated by previous studies such as Okonkwo, (2013), Ahenkan & Kojo-Osei (2014), Deng et al. (2020) and Yi et al. (2020) among others. However, these studies did not focus on practical and sustainable options for the African female-led agrarian households concerning LTS and FS. From the studies mentioned above, the following facts related to sustainability were gleaned: In terms of population, Africa is adjudged to be the second largest continent in the world and sadly, the most impoverished region (Oladeji, 2014). There is a gross mismatch between population and available/sustainable FS in many African nations. The population explosion experienced merely is faster than food production and agricultural development. The United Nations Department of Economic and Social Affairs [UNDESA], (2012) reported that Africa has the lowest life expectancy at birth as well as the life expectancy of 54 years (for adults), which is the weakest in the world. Oladeji (2014) stated that over 50% of Africans leave below $1.2 per day. It was revealed that by 2030, Africa would need at least 50% more food, 45% more energy and 30% more water (United Nations, MDG report, 2011). All these are indicators that developing economies, most notably African nations are far from achieving sustainability for, especially food when compared to its counterpart (the developed countries). This calls for all stakeholders (comprising of the government, NGO’s, religious groups, corporate organisations as well as individuals) to put their hands on deck to ensure sustainability in respect of food access to achieve the SDG Goal target 2.1 globally.

This study aims to examine the relationship between LTS and FS from the perspective of African female-led households; using Tula agrarian settlements as a case study to provide information that could aid in achieving sustainable LTS and FS. The research questions for the study include are lands cultivated by female-led households in Tula agrarian settlements secured? What is the level of FS among the selected households? How can sustainable LTS and FS be achieved in the study area? The remaining part of the paper is structured as follows: After the introductory part, the literature review/theoretical framework was presented in section two (2); section three (3) presents the methodology adopted; while section four (4) presents results and discussions; the paper closes with a concluding remark.

2. LITERATURE REVIEW/THEORETICAL FRAMEWORK

Researchers and academics have investigated the nexus between LTS and FS all over the world with different findings. In Southeast Asia, a study was conducted in Laos, which indicated that there was a strong significant relationship between LTS and FS. The authors examined the perception of rural farm households as regards land and FS. It was found that there was a uni-directional causal linkage between LTS and FS in the study area (Keovilignavong & Suhardiman, 2020). However, the study did not consider female-led households. In China, Liu et al. (2020) investigated the relationship between protected
farmlands (through zoning regulations) and FS. Findings from the study suggested that protected farmlands through zoning regulations could increase food production by 2.96% should other factors such as irrigation efficiency, cropping system, climatic conditions and soil fertility remain favourable. The study only focused on zoning regulations as a yardstick for tenure security, gender was not considered as a primary focus. This present study extends the frontier of knowledge in this field by hitherto considering the female gender as participants for the study. In another earlier similar study conducted in the same country, Han et al. (2019) assessed the correlation between LTS and other variables such as FS, fertility choice, house purchase among others as it relates to women from twenty-eight provinces selected from rural China. The methodology employed involved the use of a Tobit model for the analysis of the data sets used in the study. Findings from the study revealed that the primary instrument for achieving LTS was the "formal title certificate" issued by the government. The authors further asserted that to increase female’s empowerment as it relates to land, viable and sustainable gender-friendly policies needs to be promulgated to narrow the gender gap. In Eastern Europe, Petrescu-Mag et al. (2019) investigated the relationship between agricultural land and FS. Non-parametric tests were conducted on the data sets used for the study. Findings indicated a strong correlation between agricultural land and FS in the study area. In Australia, it was found that FS was linked to productivism farming approaches which were endorsed by both government, farmers and the industry (Hamblin, 2009; Lawrence et al., 2013). In the US, the correlation between climate change and FS was examined by Bizikova et al. (2015). Findings from the study revealed that FS is impacted by climate change, land management and other critical infrastructure. Findings from the aforementioned studies cannot be generalized because of geographical locations, dynamics in the respective economies where the studies were domiciled, gender of participants and the methodologies adopted for each of the studies.

Vast literature focusing on emerging economies of primarily Africa also provided insight into the linkages between LTS and FS. The report provided by Kanayo et al. (2013) asserted that Africa is observed to be the most impoverished region in the world; this has constituted a great hindrance to the development of the region in terms of infrastructure, land-related issues, as well as FS. However, it should be noted that Africa has about fifty-four (54) countries with varying economic dynamics, hence, the above statement might not be true for some of the African countries. In some part of Africa, regardless that the female folk are more involved in farming to provide for the family than their male counterpart, women in most communities are denied access to secured lands. For example, Dokken (2015) examined the variance in access to land by male and female-led households in Ethiopia. Findings from the study revealed bias in land allocation process in favour of the male-led households. This scenario is not peculiar to Ethiopia, studies conducted by Odoemelam et al. (2013) revealed that 48% of women in Anambra engage in farming with limited access to secured land which consequently affects agricultural production in the study area. In another study conducted by Chigbu (2019), the author examined the role women played in impeding their access to land. Findings suggested that what was termed "brother complex" and "self-hurt" were the primary predictors of women’s lack of access to land in South-eastern part of Nigeria which gives undue advantage to their male counterpart. This agrees with similar studies conducted by Agarwal (2003), Deere et al. (2003), World Bank (2011) and Dabara et al. (2017) which provided similar results. In terms of the correlation between LTS and FS in Africa, Deininger & Jin (2006) found that LTS influences investment incentives in agricultural lands in Ethiopia.
This corroborates the findings of Chirwa (2008), which was conducted in Malawi. Holden & Ghebru (2016) also found a positive correlation between LTS and FS. The authors (Holden & Ghebru) further revealed that in Africa, LTS, as well as FS, were negatively impacted by social conflicts. Lawal et al. (2019) also found that land conflicts such as the Tula-Awak land contestations negatively impacted on food production in the study area. In Ghana, it was found that land management practices positively impacted on households of smallholder farmers in terms of food consumption and poverty alleviation (Issahaku & Abdulai, 2020).

In Nigeria, all land is vested in the government under the Land Use Act of 1974 (Ankeli et al., 2015a, 2015b; Dabara et al., 2012). Individuals are granted limited tenure rights to such land by the government either through the customary land tenure system or the statutory land tenure system (Ankeli et al., 2017a; Dabara et al., 2019). The FS and food sustainability agenda are possible in Nigeria. The natural blessings in terms of natural resources, human resources, and so on place Nigeria on the right pedestal for sustainable development in all ramifications. Some of the options available to Nigeria were pointed out by renowned scholars such as Dabara et al., (2016) and Oluwatayo & Ojo (2016) who argued that development in the agricultural sector is a crucial option for FS in Nigeria. For this to become a reality, all stakeholders must focus on addressing problems/challenges bedevilling the nation in terms of environmental, socio-political, and economic. Key among these challenges are the issues of abject poverty, gender bias policies and agricultural infrastructure deficit. The options and way forward for Nigeria will include mainly, revitalising the agricultural sector, which can play a crucial role in Nigerian sustainability agenda as well as promoting gender-friendly policies on access to farmland. This is necessary because it has been found that women are more involved in food production at household levels; and that there is a nexus between LTS and FS (Dokken, 2015). Similarly, in Nigeria, LTS was found to significantly impact on production in the Agricultural sector (Dabara et al., 2019). Other factors impacting on FS as observed by scholars include the size of a household, the size of family’s cultivable land, and the income level of the household’s head (Abu & Soom, 2016). The consensus observed in the literature concerning LTS and FS suggests that there is a causal linkage between the two variables. The explanation given is that farmers with lands that are accordingly secured are motivated to invest maximally with a resultant effect of increased food production. Quite the opposite is observed for unsecured lands. Table 1 presents a summary of land-related theories compiled by Hull et al. (2019).

This study combined two theories (hinged on Hull et al., 2019 conservative and democratic adaptation theories) which are relevant in explaining the relationship between the study’s key variables: First is the Komjathy & Nichols’ (2001) model of women access to land and housing. This model sees access to land by women as restricted to merely indirect use rights which are dependent on the women’s relationship with male relatives as their mothers, wives, sisters, or daughters. The second model is the Garry et al.’s (1996) liberal feminist paradigm which argues that women have been unfairly discriminated against on the grounds of their sex throughout the world. The theory preaches for equality of men and women in the societal systems through changes in the legal and political system to ensure that women are being represented on an equal level.
Table 1: Summary of land-related theories

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<th>Theory</th>
<th>Possible Indicators</th>
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| Conservative            | Preservation of customary tenure  
Broadly African view of land (as a patriarchal or male-controlled asset)  
Traditional leaders prominent in land administration |
| Democratic adaptation   | Respecting and clarifying existing, legitimate land rights  
Improving gender equity, accountability and democracy  
Building on existing customary practices |
| Hybrid adaptation       | Combination of statutory and customary arrangements  
Participatory approach: communities decide which rights are recorded |
| Incremental adaptation  | Titles are a long-term objective  
Extra-legal, off-register practices recognised as legitimate  
Spontaneous titling according to need |
| Incremental replacement | Titles are the desired end state  
Customary tenure provides sufficient tenure security  
Legal recognition of customary tenure and adjudication practices |
| Evolutionary replacement| Land rights spontaneously evolve towards individualisation  
Titles are required for tenure security |
| Collective replacement  | Nationalisation of all land/collective farming villages  
Equitable distribution of resources and services  
Democratisation of traditional leadership  
Improved productivity and self-reliance |
| Systematic titling      | Titles are required for tenure security  
Titling leads to economic development  
Customary tenure must be replaced |

Source: Hull et al., 2019

The motivation for this study borders on filling the identified gap in literature, which is the dearth of studies that focused on LTS and FS in female-led households in communities where agriculture is the primary occupation and means of sustenance. Furthermore, women tend to have land rights that are weaker in comparison to their male counterpart in the African context. Even though in most agrarian settlements, women are usually saddled with the responsibility of providing food for their respective households through subsistence farming. This becomes a source of concern because LTS is a significant determinant of land-related investments.

3. METHODOLOGY

The study area is Tula Baule in Kaltungo Local Government Area of Gombe State, Nigeria. It lies between latitude 9.8709°N and longitude 11.5134°E; it is located about 100 kilometres from Gombe, the state capital. It was the first headquarters of the Tangale-Waja Native Authority in the year 1915. Tula has vast fertile agricultural land for farming which is the principal occupation of its inhabitants. Tula Baule is made up of three Yaati (villages) namely: Yaa Bwadiye which have four Bintu (clans) comprising Biladira, Bilakwate, Kwallam and Bwatai. Yaa Balira has three Bintu, which are Lobuse, Luture and Lofine. The third Yaa is Yaa Dakitibe comprising of the Bintu Taule, Busem and Bilakwale. The respondents for this study were drawn from all the Yaati and Bintu, as mentioned. Each of the Bintu is made up of several Lo (hamlets) from where the research participants were purposively selected. The study
focused on LTS and FS at the household level rather than global, continental, national or regional levels. This is because the participants are all subsistence farmers whose primary intent of farming is to provide food for their immediate households and not for commercial purposes.

Figure 1: Map of Tula Homeland
Source: https://joshuaproject.net/people_groups/15623/NI

This study used the qualitative research design. The study was based on the constructivist paradigm in line with an earlier study conducted by Guba & Lincoln (1994). Furthermore, both the conservative and the democratic adaptation theories which are relevant in explaining the relationship between the study's key variables were used as the significant underpinning for the study (Hull et al., 2019). The researchers conducted in-depth interviews (audio-recorded) with female household heads in the three Yaati and ten Bintu of Tula Baule. The respondents were drawn from individual Lo. Female household heads who were ascertained to be the oldest in their respective Lo and had led their separate households for not less than five years were purposively selected to participate in the research work. Interviews of participants were concluded when a point of data saturation was reached (that is a point where no new information was received but a reoccurrence of the answers previously given by the prior interviewees). At this point, a total of nineteen participants across the three Yaati had been interviewed. From Yaa Bwadiye, three participants were selected from Biladira, and two from Bilakwate, Kwallam and Bwatai respectively. From Yaa Balira, two participants were selected
from Lobuse, Loture and Lofine, respectively. Furthermore, from Yaa Dakitibe 2 participants, each was also selected from Taule, Busem and Bilakwale.

The interviews were conducted in Tula language (that is the native language spoken by all the interviewees); this is because most of the participants do not understand the English language. The interviews were conducted between February and March 2020. All the interview sessions were duly recorded, and the responses of the respondents were subsequently translated to the English language and then transcribed using the Atlas.ti software. From the relevant details offered by the interviewees, the researchers were able to develop themes and patterns from the available data. Similarly, in line with previous studies such as Maxwell (2005), relevant quotes from the interviewees were included to substantiate the findings in the study.

The primary source of data for this study was one-on-one interviews conducted by the researchers with the participants. As a prelude to the interviews, the participants were duly informed of the purpose and procedure of the interview. They were also informed about the protection of their confidentiality. With the permission and consent of the interviewees, the sessions were audio-recorded using mobile phones; this was to ensure a complete and accurate transcript. A structured interview guide was used to elicit rich data that could subsequently be used in qualitative analysis. The open-ended questioning approach was used to encourage the participants to respond to the questions freely. Probing questions were sometimes used to make the participants elaborate and clarify issues. Most of the interview sessions lasted between 15 to 20 minutes. The questions asked borders on the level of LTS among female-led households of Tula agrarian settlement; the level of FS among the selected households, and the relationship between LTS and FS in the study area (see Appendix I).

Analysis of data collected from the field was done in three phases. Firstly, the translated audio recordings were transcribed verbatim using the Atlas.ti software, this was to enable the researchers to carry out accurate analysis and subsequently interpret the data obtained. The interview transcript was reviewed by the researchers to identify recurring regularities, as well as quotes and phrases that were relevant to the study. These transcripts were coded accordingly and categorised using the Atlas.ti software. Secondly, the researchers used the coding to establish relationships between and across the transcribed data by creating quotations and appropriate codes which were eventually linked accordingly. Thirdly, the researchers created semantic networks from the quotations and codes, which were thus, given appropriate interpretations and drawing out inferences from the analysed data employing thematic content analysis.

4. RESULTS AND DISCUSSION

Analysis and discussion of the data obtained for the study were done in four subsections. The first subsection addressed significant findings concerning LTS. The second subsection presented the results and discussion concerning FS. The third subsection discussed the issue of sustainable LTS and FS in the study area, while the fourth subsection presented and discussed data on the relationship between LTS and FS in the study area.
4.1 Level of LTS among female-led households of Tula

The first research question of the study, which concerns the level of LTS among female-led households of Tula agrarian settlement was addressed in the first subsection. Four LTS themes emerged from the interviews which were analysed using the Atlas.ti software. This was shown on the semantic networks in Figure 2; the four themes include the type of tenure system practised; means of land acquisition; availability of documentary evidence on land acquired; and perception of security of land by the participants.

From the participants’ responses, which was further depicted on the semantic networks in Figure 2, it was revealed that firstly, the dominant land tenure systems practised in the study area were mainly the customary and informal tenure systems. This finding is congruent with similar African based studies such as Lawal et al. (2019) and Dabara et al. (2019). Secondly, the participants identified three means by which they acquired their land, which include purchase, leasing and squatting. It was revealed that none of them acquired their land through direct inheritance (except for lands inherited by their husbands or male children). In the literature, it was observed that most African communities do not allow women to acquire land through inheritance. In studies such as Dokken (2015), Lawal et al.; Dabara et al., and Chigbu (2019), there is consensus that the girl child cannot inherit her fathers' land in the African context.

Similarly, a widow cannot inherit her late husband’s landed property. It will either be inherited by her male children or her male in-laws. It is easier for the female gender in such communities to access land through purchase, leasing or squatting as seen in this present study. Thirdly, it was revealed that most of the participants do not possess any written documentary evidence to support their claim of land ownership. When asked whether they felt their land was secured or not, surprisingly, most of the respondents answered in the affirmative regardless of documentary evidence. One of the participants have this to say

“The lands are secured because if anyone tries to take it, the elders and mai anguwa (clan head) will intervene”. (Interviewee number 5, February/March 2020).

She believes that the elders and clan-heads who are custodians of culture and traditions also plays a role in land security in the community. In a similar study Dabara et al. (2019, p.56) asserted that the feeling of LTS regardless of documentary pieces of evidence could be because “in such communities, contestation and conflicts over land ownership are minimal since almost everyone knows each other, and which land belongs to which family”. Another participant claims that the gods of land also plays a significant role in LTS in the community.

“We do not have the problem of tenure insecurity in this village. You cannot claim someone else's land. Except if you want Feloh (ancestral gods) to strike you dead or put sickness on you”. (Interviewee number 14, February/March 2020)

This present study suggests that the belief and fear of the Feloh (ancestral gods) contributed immensely to the feeling of LTS in the study area. Most of the interviewees believe that Feloh always metes out judgement to land trespassers. This contradicts the findings of some similar studies such as Cheng et al. (2018) and Han et al. (2019) where it was asserted that LTS was achieved through securing of formal title certificate.
4.2 Level of FS among female-led households of Tula

This subsection addressed the second research question of the study, which focused on the level of FS among the selected households of participants in the study area. Four FS themes emerged from the interviews which were depicted on the semantic networks in Figure 3. The four themes include food availability, food accessibility, food utilisation and food sustainability. However, this study focused on food access at the household level in line with similar studies (Ingawa, 2002; Babatunde et al., 2008). When the participants were asked whether their respective households had access to three square meal per day from January 2019 to December 2019 (the study period), most of the participants indicated that they did not. A few of them, however, revealed that they did have access to three square meal per day within the study period.

From the responses, it was observed that most of the participants do not have access to three square meals per day within the study period.

“Sometimes we eat three times a day, but most of the times its either once or twice a day”. (Interviewee number 3, February/March 2020)

“Most of us in this village live in poverty; we hardly have three square meal per day”. (Interviewee number 13, February/March 2020)

This finding agrees with Babatunde et al. (2008), where it was revealed that over 70% of Nigerians do not have access to three square meals per day. Similarly, Dabara et al. (2019) found that only 25.1% of respondents in a study conducted in Southwestern Nigeria had access to three square meals per day. This situation is quite pathetic; there is need for all stakeholders to put their hands on deck to ensure that the Sustainable Development Goal (SDG) of achieving access to food and zero hunger for all people (SDG target 2.1) by the year
2030 is achieved. However, very few of the respondents attested to the fact that they had access to 3 square meals per day. For example, one of the participants had this to say:

“Our family have access to three square meals per day, except when anyone does not feel like eating. Not because we do not have food but for any personal reason like sickness, or you do not like what was cooked or when you engage in fasting for religious purposes”. (Interviewee number 7, February/March 2020)

**Figure 3:** Semantic networks on food security among female-led households of Tula agrarian settlements

### 4.3 Sustainable Land and FS among female-led households of Tula

This subsection addressed the third research question of the study, which centred on sustainable land and FS among female-led households of Tula agrarian settlements. Nine sustainable land and FS security themes emerged from the interviews which were depicted on the semantic networks in Figure 4. The nine themes include promulgation of female-friendly laws and policies; provision of improved seeds/seedlings; modern method of farming; government intervention; provision of fertilizers; irrigation farming; provision of finance; labourers/human resources; and modern farming tools.
When asked what could be done to ensure sustainable LTS and FS in the study area, the participants provided the following suggestions. Some of the participants believed that if the female gender were given the same privileges as their male counterpart for a land inheritance, it would go a long way in mitigating the situation, hence leading to LTS.

“The custom that a woman cannot inherit land either from her father’s family or from her husband’s family should be abolished; this will give women a sense of land security which will encourage them to plant perennial crops and make other investments on such lands”. (Interviewee number 8, February/March 2020)

Another interviewee was of the opinion that widows should be protected from bad in-laws who usurp their rights by forcefully collecting their lands for selfish reasons.
“There should be strict laws and policies to protect widows from their in-laws who forcefully take away the lands left for them by their late husbands”. (Interviewee number 4, February/March 2020)

The participants indicated desire that the community leaders and the government should promulgate female-friendly land-related laws and policies. Others opined that provision of improved seeds/seedlings could lead to sustainable FS. All the participants are subsistence farmers who still use the traditional method of farming; it was suggested that the introduction of modern methods of farming could be a precursor to sustainable FS. Government interventions in the areas of finance, agricultural loans, provision of fertilizers, among others were some of the suggestions made by the participants. Some of the participants believe that introduction and encouragement in irrigation farming, as well as the provision of modern farming tools, will significantly mitigate the precarious situation experienced by the female-led households in the study area. It was suggested that financial intervention for particularly female affected households should be made available in terms of soft loans and interest-free loans. Removing gender inequalities and discrimination as well as the introduction of modern agriculture will improve FS in especially female households of emerging economies.

4.4 The Relationship between LTS and FS in Tula

This section addressed the fourth research question of the study, which determined the relationship between LTS and FS in the study area. The responses of participants suggested a relationship between LTS and FS in the study area. Some of the participants ascertained that they could not plant trees or perennial crops because of the uncertainties associated with their farmlands (for example, they are not sure if the family will allocate the same piece of family land to them for cultivation the next farming season). Others (especially widows) showed fears that their male in-laws might forcefully take the family farmland from them, which negatively impacts on their investment decisions on such lands. Studies such as Deininger & Jin (2006), Dokken (2015), Holden & Ghebru (2016), Lawal et al. (2019) and Dabara et al. (2019) also revealed that there is a strong correlation between LTS and FS. The implication is that for a sustainable FS, there is a need first to address the issue of LTS in all households.

5. CONCLUSION

This study examined the relationship between LTS and FS from the perspective of African female-led households in Tula, Nigeria. The study investigated whether lands cultivated by female-led households in Tula agrarian settlements are secured and whether such households have FS within the study period. The importance and significance of LTS and FS are well established in agrarian settlements of emerging economies of primarily African context. While a school of thought posited that possession of documentary evidence of ownership in the form of title registration provides LTS and consequently FS, another school of thought submitted that LTS could be achieved regardless of lack of title registration or documentary evidence. Findings from this study revealed that all but few respondents believed that they had LTS without recourse to documentary evidence of ownership. They believe that Feloh (ancestral gods) will mete out judgement to land trespassers; hence, the feeling of tenure security without recourse to written documentary evidence. This agrees with Abdulai &
Owusu-Ansah (2014), who asserted that documentary evidence of ownership was not necessarily linked to land tenure security in a study conducted in Ghana. However, it disagrees with the study conducted by Han et al. (2019) were documentary evidence in the form of formal land title certificates was the primary criteria for LTS. Similarly, all but few respondents do not have access to three square meals per day throughout the study period. The study also found a strong relationship between LTS and FS in the study area. This is congruent with findings from the literature in studies such as Dokken (2015), Holden & Ghebru (2016), Dabara et al. (2019) and Keovilignavong & Suhardiman (2020). The underlying dynamics between LTS and FS nexus has been consistent in literature which this study also highlighted. We believe that LTS for female-led agrarian households of Tula must be improved (through the eradication of female gender bias/inequality in the land allocation process in Tula) if the LTS and FS nexus is to be positively achieved sustainably.

The findings in this paper can plausibly be used for policy implications. The implication of this study for especially developing economies in Africa is that to ensure FS for especially agrarian households, farmers need to have LTS as this encourages investments in the secured land which consequently translates to availability and access to food for household consumption. The study also provided information that can be used by stakeholders such as the government, philanthropists, NGO's and concerned individuals in making informed decisions and policies that could lead to sustainable FS among, especially female-led households. It was recommended that governments and policymakers need to promulgate female gender-friendly policies to encourage and facilitate land ownership and access to females, thereby removing gender inequalities and discrimination in the land allocation process. Similarly, financial intervention for particularly female affected households should be made available in terms of soft loans, interest-free loans; and, the introduction of modern agriculture in agrarian settlements of primarily developing economies to enhance the possibility of their achieving the SDG goal of access to food and zero hunger for all people (SDG target 2.1) by the year 2030.

The study, however, has some limitations, it focussed on only female-led agrarian households, and its geographical coverage was limited to only Tula agrarian settlements. The implication of this is that the findings of this study cannot be generalised. This is because similar studies conducted on different geographical locations, gender, cultures etc may present different results. Hence it is recommended that for further studies, researchers can consider including all genders in the study as well as having a broader geographical coverage.

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## Appendix I: Research questions and interview guide questions

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Interview guide questions</th>
<th>Purpose of the question(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preliminaries</strong></td>
<td>To what Yaati (Village) do you belong?</td>
<td>To identify and select participants.</td>
</tr>
<tr>
<td></td>
<td>Which is your Bintu (Clan)?</td>
<td></td>
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<tr>
<td></td>
<td>To what Lo (Hamlet) do you belong?</td>
<td></td>
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<tr>
<td></td>
<td>Who is the oldest female household head in your Lo?</td>
<td></td>
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<tr>
<td></td>
<td>How long have you been the household head of your family?</td>
<td></td>
</tr>
<tr>
<td><strong>What is the level of LTS among female-led households of Tula agrarian settlement?</strong></td>
<td>What type of land tenure system do you practice?</td>
<td>To determine the level of LTS of the participants.</td>
</tr>
<tr>
<td></td>
<td>How did you acquire your land?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Do you have documentary evidence to prove ownership of your land?</td>
<td></td>
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<tr>
<td></td>
<td>How secured is your land?</td>
<td></td>
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<tr>
<td></td>
<td>What can you say in respect of your ability to control and manage land, use it, dispose of its produce and engage in transactions, including transfers?</td>
<td></td>
</tr>
<tr>
<td><strong>What is the level of FS among the selected households?</strong></td>
<td>What are your experiences with respect to food availability, access, utilisation and sustainability in 2019?</td>
<td>To determine the level of FS in participants’ household.</td>
</tr>
<tr>
<td></td>
<td>Do you at all times, have physical and economic access to sufficient, safe and nutritious food that meet your dietary needs and food preferences for an active and healthy life?</td>
<td></td>
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<tr>
<td></td>
<td>Do you always have access to three square meals a day (that meets the presiding question’s requirement) from January to December 2019?</td>
<td></td>
</tr>
<tr>
<td><strong>How can sustainable land and FS be achieved in the study area?</strong></td>
<td>What do you think can be done to attain and sustain land and food security in Tula community, especially among female-led households?</td>
<td>To identify and examine factors that could facilitate LTS and FS in the study area.</td>
</tr>
<tr>
<td><strong>Is there any relationship between LTS and FS in the study area?</strong></td>
<td>In your opinion, is there any relationship between LTS and FS?</td>
<td>To determine the relationship between LTS and FS in the study area.</td>
</tr>
</tbody>
</table>