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**GENDER DISPARITY IN LAND AND LAND-RELATED MATTERS OF
HOUSEHOLD FARMERS IN NIGER STATE, NIGERIA**

***Ahmed, A., Lawal, A. F., Ndagi, I., Sule, B. A. and Adedeji, S. O.**

Department of Agricultural Economics and Extension Service, Ibrahim Badamasi
Babangida University, Lapai, Nigeria

***Corresponding e-mail:** abdulgafar@ibbu.edu.ng/+2347010007625

ABSTRACT

Underperformance in agriculture can be attributed, in part, to constraints faced by female farmers, who are integral resource in the sector. One of such constraints is access to agricultural land. Understanding the disparity in land and land-related matters cannot be overemphasized. This study test for gender disparities for interventions concerning gender equalities and female participation in agriculture. Two-stage sampling technique was used, involving random selection of three Local Government Areas from three ecological zones, followed by simple random selection of males, and purposive selection of female crop, fish and livestock farmers. Primary data were collected using well-structured questionnaire from 380 household farmers, with females 40.5% and male 59.5%. Analytical tools utilized include descriptive and t-test statistics. The findings revealed that the average age of the female and male farmers is 38.3 and 40 respectively; males have more years of formal education (11.6) than females (9.6), as well as years of farming experience, males (18.2) and females (11.4). More lands are owned than rented/borrowed; males have larger landholding (3.6ha) than females (1.3ha). Only 15.3% have land C-of-O, and fewer (14.5%) experienced land dispute. According to t-test analysis, gender disparity was only statistically significant in land size, and the scale of farm operated on land. Other land-related issues such as land dispute, land certification, and land ownership showed no statistically significant disparities. Therefore, the study recommends reducing inequalities in access to land for agriculture, and equitable distribution of other resources that can influence farm scale to improve female participation in farm management.

Keywords: Gender disparity, land, Household farmers, Niger State

INTRODUCTION

Nigeria has about 69.5 million hectares of agricultural land but only 50% is cultivated (World bank, 2020). The unutilized land is scattered throughout the nation. Niger State has the largest landmass in the country, but its agricultural land is largely untapped. The State is



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avored with vast stretches of arable land and favorable climate suitable for various crops that can be cultivated all year round (Niger State Bureau of Statistics, 2012). Despite this abundance, several obstacles continue to impede the state's agricultural development. These challenges have been highlighted by many studies over the years, including inadequate infrastructure, limited access to credit, and insufficient storage facilities (Abubakar and Sule 2019; Doss *et al.* 2015; Nuhu *et al.* 2014; International Food Policy Research Institute (IFPRI) 2009). Programs were initiated to boost agricultural growth in the State such as providing farmers with improved input technologies, agricultural training institutes, and research centers, as well as providing subsidies and relief to disaster-affected farmers, all these with goal to encourage the use of idle arable lands and increasing productivity. Very few of these programs captured the optimal manpower utilization by streamlining the need to reduce the gender gap amongst the farmers. Female participations in most of these programs are limited to the value chain activities.

Land, a key factor in agriculture is considered limited either in size, fertility, climatically or even geographically (e.g. topography, vegetation). Access to land is crucial to participation in agricultural activities especially crop and livestock farming. Land-related matters such as land tenure and ownership, land size, land productivity, land health (soil), certification, land disputes and conflict are all interconnected in playing pivotal role in contributing to livelihood and agricultural practices of household farmers. Over the decades, land for agriculture has been expanding consistently in Nigeria, a 2.25% decadal increase since 2001 to 2021 was recorded (FAOSTAT, 2023). The expansion is explained by the increasing demand for food as a result of income and population growth, as well as agricultural policies encouraging large scale farming. Increase in land for agriculture in Niger State has also seen its toll. However, huge portion of expansion in land for agriculture could be gender bias, given the limited participation of female as farm managers in the region over the years. The past decades have seen the lights of research repeatedly reporting gender differences in



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agriculture, and access to key agricultural inputs such as land (Oyebisi *et al.*, 2020; Umeoji and Okolo-Obasi, 2019; Abdullahi *et al.*, 2018; Ogunlela and Akarele, 2018; Oluwadare, 2018). The sex-disaggregated data on land ownership is still limited, but in Sub-Saharan Africa and Asia, nationally representative data show that women own substantially less land (Doss *et al.*, 2015; Kieran *et al.*, 2015).

Like many regions in Nigeria, gender disparity in land ownership remains a significant challenge. Substantial gender gaps in access and control continue to exist in regard to six key resources and inputs for agriculture: land, labor, credit, information, extension, and technology (World Bank, 2012; World Bank and IFPRI, 2010). In Nigeria, the patriarchal system is real, females are often having circumscribed access to land including lack of legal recognition of their land right, despite being active participants in agriculture (Ogunlela and Akarele, 2018). Nuhu *et al.* (2014) observed that some of the barriers that inhibit their participation in agricultural production generally include lack of land ownership-right; non-availability of credit and loans facilities; poor access to extension staff; and inadequate training and low standard of education. Gender norms and cultural practices limit women's ability to own and manage land, perpetuating gender inequality in the agricultural sector (Doss *et al.*, 2018). This inequality affects female's ability to generate income, access credit, and participate in decision-making processes, thus making them vulnerable to poverty and marginalization. While these researches highlight the challenges faced by females in access to land and other resources in the societies, NARP (1994) confirmed that relatively, some religion practices recognize female entitle to land. For instance, under the Islamic law, which applies in most of northern Nigeria, women are entitled to inherit half of the share of their male counterparts in the family. However, in most cases they end-up selling the inherited land (NARP, 1994).

Gender-disaggregated data on land-related matters is still limited. The study on gender disparity in land-related matters of household farmers is not only justified but also



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imperative for several reasons. Policy-makers, institutions, and development organizations can utilize this information to formulate targeted interventions that can address the concerns about gender inequalities in agriculture and improve land management. There is need to understand the gender disparity in land and land-related matters of household farmers, to foster gender inclusiveness, thereby tapping into dormant potential, encourage advancement of rural economies, boosting agricultural productivity, and consequentially promote sustainable agricultural development.

METHODOLOGY

Study area

Niger State is one of the 36 states in Nigeria situated in the North-central region of the country. It is the largest state in terms of landmass (76,469.9km²), endowed with vast agricultural land, which makes it one of the leading agricultural states in Nigeria. Agriculture provides employment and income for about 85% of the 5,556,247 people in the State. Niger State comprises of 25 Local Government Areas (LGAs) that are ecologically grouped into Zone 1, Zone 2 and Zone 3, each with its unique agricultural practices.

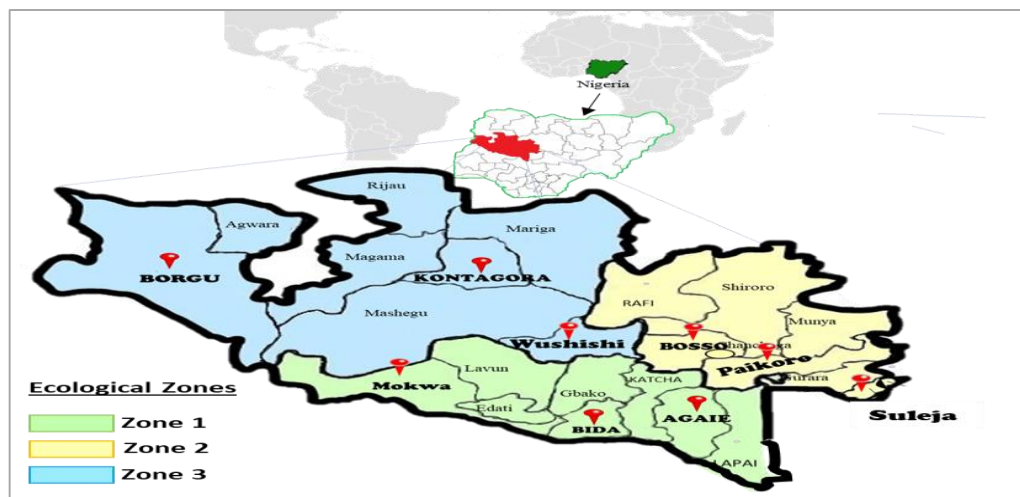


Figure 1: Map of Niger State showing study areas

Source: Field survey data, 2022



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Data collection and Sampling Technique

Two-stage sampling technique was utilized. At the first stage, three LGAs were randomly selected from the three ecological zones of the state (Zone-1: Agaie, Bida and Mokwa; Zone-2: Bosso, Paikoro; and Suleja; Zone-3: Borgu, Kontagora and Wushishi). This was followed by the second stage of purposively selection of crop, fish and livestock farmers in the LGAs. About 226 males were randomly selected and 154 females purposively selected, totaling to 380 respondents. The female farmers were purposively selected because of their limited number in the study area.

A well-structured questionnaire was administered using face-to-face interview in the collection of primary data from the 380 household farmers. The interviews were administered by extension agent from the Agricultural Development Program (ADP) and staff of the Agricultural Economics and Extension Services Department of IBB University. Basic demography information of the farmers such as age, marital status, education, years of farming experience and others were collected. Also acquired from the farmers are farm-related information such as farm product (crop, fish and livestock), size of land and other land-related matters.

Analytical Technique

Data were analyzed using descriptive statistics and t-test statistics. Descriptive statistics such as frequency distribution and percentages were used to describe the disparity in the demography of the farmers. Student's t-test statistics, on the other hand, was used to access whether the disparity between the mean result from the female and male is statistically significant, and then determine if the observed difference in sample mean is likely to be representative of a true difference in the population mean.



t-Test Statistics

To test for the gender differences in land and land related matters of household farmers in the study area, an unpaired t-test statistic (Armitage and Berry, 1994; Altman, 1991) was modified and applied. It is specified as:

$$t = \frac{\bar{x}_f - \bar{x}_m}{\sqrt{S^2 \left(\frac{1}{n_f} + \frac{1}{n_m} \right)}} \quad (I)$$

The “ S^2 ” (pooled sample variance) is computed as

$$S^2 = \frac{\sum_{i=1}^{n_f} (x_i - \bar{x}_f)^2 + \sum_{j=1}^{n_m} (x_j - \bar{x}_m)^2}{n_f + n_m - 2} \quad (Ia)$$

where, “ t ” is the Student t-quantile

\bar{x}_f and \bar{x}_m are the respective sample mean from female and male household farmers.

n_f and n_m are the respective sample sizes from female and male household farmers.

“ $n_f + n_m - 2$ ” is the degree of freedom.

The degree of freedom provides important information about the accuracy and reliability of the test result. A larger degree of freedom specifies that sample sizes of the female and male farmers are relatively large, indicating a more precise and reliable estimate of the population parameters, a relatively smaller degree of freedom would indicate otherwise.

After calculating the t-statistic, the probability (p-value) of seeing the t-statistic as extreme is determined. p-value from two-tailed t-test:

$$\text{p-value} = 2 * cdf_{t,d}(-[t_{score}]) \quad (II)$$

$cdf_{t,d}$ is the cumulative distribution function of t-Student distribution with degree of freedom (d). Decisions are made whether to reject or fail to reject H_0 based on the p-value.

The independent variables to be tested is gender (female and male) and the areas of comparison are the land related matters including size of land, land ownership, land disputes and conflict, land certification and scale of farm on land. Thus, the study hypothesized the



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followings: Null Hypothesis (H_0) – there is no significant difference in the land related matters between the female and male household farmers while the Alternative Hypothesis (H_1) states otherwise.

RESULT AND ANALYSIS

Demography of the farmers

Table 1: Demography of the farmers in the study area

		Total	Female	Male
Gender		380	154 (40.5%)	226 (59.5%)
Age	<i>Mean</i>	39.3	38.3	40
Education	<i>Mean (years)</i>	10.7	9.4	11.6
Farming experience	<i>Mean (years)</i>	15.4	11.4	18.2
Marital Status	Single	9.7%	2.1%	7.6%
	Married	86.8%	35%	51.8%
	Divorced	0.8%	0.8%	0 %
	Window(er)	2.6%	2.6%	0 %
Other Occupation	Daily wage	42.4%	21.1%	21.3%
	Salary employee	36.3%	13.1%	23.2%
	Pensioner	2.1%	1%	0.8%
	None	19.2%	5%	14.2%

Source: Field survey data, 2022

The demography of the household farmers is presented in Table 1. It shows the gender representation of 40.5% and 59.5% for female and male household farmers respectively. The average age of the total respondents is approximately 39 (female 38.3 years and male 40 years). This suggest that the sampled respondent consists of mixed age of both younger and older farmers. However, comparing genders shows that the female farmers are slightly younger than their male counterparts. The age gap between the genders might not be significant, but it could indicate that the agricultural sector is more attractive to males in their mid-40s, while the females in their mid-30s. Further investigation would be needed to understand the reasons behind the age-gap.



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The mean years of formal education of the total respondents is 10.7, where male farmers have more years of formal education (11.6 years) compared to the female (9.4 years). This suggest that most of the household farmers in the study area did not have junior secondary school certificate. Comparatively, the educational disparity could lead to potential differences in skills, knowledge and opportunities between the genders where the male farmers having a higher level might have advantage over the female farmers. It has been observed in IFPRI (2009) and Amaza *et al.* (2014) that lack of awareness due to low literacy rate hinders women's access to farm resources in Nigeria and thus affect their productivity.

The result in the Table 1 also shows that most of the household farmers are (86.8%) married, out of which 51.8% are males, and females 35%. There was no report of any male farmer that is divorced or is a widower in the study areas. On the status of having other jobs other than farming, about 42% of the farmers (female 21.1% and male 21.3%) embark on daily wages during their off seasons. The next occupation that more of the farmers are engaged in is a salary job; the result revealed that about 36.3% of the farmers have a salary earning job, out of this group, 13.1% are female and 23.2% are male. Only 19.2% of the farmers solely rely on farming as their source of income out of which 14.2% are male and the remaining 5% female.

Statistics on Land and Land-related Matters

Land is an essential finite resource that plays a vital role in shaping societies, economies and the systems all over the world. Its scarcity, in terms of fertility, geography, climate etc. ignited various policies, rules and regulations, in order to manage it resources, protect the environment, and conflict resolution. Access to land by gender is disproportionate among farmers (Doss *et al.*, 2015; Kieran *et al.*, 2015; Ogunlela & Akarele, 2018). To better understand the gender disparity in agricultural land and land-related matters in the study



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area, this section delves into the descriptive statistics that shed lights on various dimensions of land use, ownership, certification, disputes and conflict, and other farmland related issues.

Land Acquisition and Ownership

The respondents reported four (4) major methods in which they acquire land, including inheritance, purchase of land, borrowed and rented. The first two method of acquiring land for agriculture transfers possession to the new owner permanently while the last two methods temporarily (usually on a fixed tenure) give right to the user to access or have control over the land but not ownership. Statistics of the various means through which the female and male household farmers acquire their land is presented in Table 2. On another angle, the Table 2 also presents land ownership status where about 74% of the household farmers owned the land (i.e. percent of inheritance and bought), while the remaining 26% borrowed and rented the land for their agricultural activities.

Table 2: Land acquisition by farmers in the study area

	Freq	Percentage	Gender	Percentage
Inheritance	226	59.5%	Female	22.7%
			Male	36.8%
Bought	55	14.5%	Female	6.3%
			Male	8.2%
Borrowed	56	14.7%	Female	7.6%
			Male	7.1%
Rented	43	11.3%	Female	3.9%
			Male	7.4%

Source: Field survey data, 2022

The Table 2 shows the distribution of the farmers (male and female) on the various means they acquire land for agriculture. All the categories of land acquisitions favored the male farmers except the borrowing of land, where higher decimal percentage of the females was observed. Most of the farmers (59.5%) acquired land through inheritance: in this category of land acquisition, male dominates with 36.8% and the remaining 22.7% female. This result



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in Table 2 concurs with the findings in NARP (1994), postulating that women's access to land in Nigeria is mainly through their household membership as wives, daughters, or sisters (NARP, 1994). This trait was also observed in male group indicating that most of the land and farmland in the study area are not for sale but rather considered as family assets or collateral for loans.

About 14.5% of the total farmers bought their land from other land owners. The gender distribution in this category include female 6.3% and the males (8.2%) exhibiting a higher percentage. The difference could be as a result of limited access to financial resources, educational knowledge or skills to engage in land purchase for agricultural ventures. It could also be gender norms and cultural practices, where the seller may wish not to sell to female.

Temporary transfer of land to other users is the process in which land owners gives the renters/borrowers temporary right to use land for specified period. In most cases, the uses are restricted to use land for agricultural purposes. This temporary transfer can be available in two ways: borrowing and renting. The study confirmed that there was more land borrowed (14.7%) than rented (11.3%) by the household farmers for agricultural purposes. Borrowed lands are usually from land owners who are family members or close friends, granting favors to land users with little or no return. While for rented lands, a form of payment is expected. Figure 2 sheds light on the mode of payment for rented land.

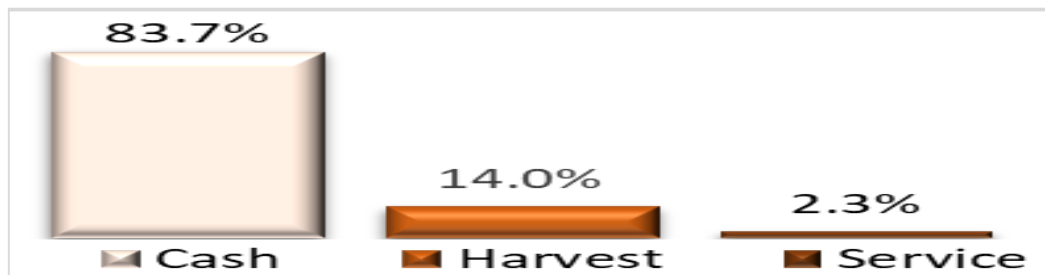


Figure 2: Mode of payment for rented land

Source: Field survey data, 2022



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The study observed that most of the respondents (83.7%) who rented land reported paying cash as mode of payment. This also indicated that land owners who leased out their land prefer cash as mode of payment. The implication of this finding would mean that the farmers may need cash-based transaction practices, i.e. maintaining sufficient cashflow to meet the payment of farming activities. Another common mode of settling payment for rent as observed is the use of farm harvest. About 14% of the household farmers reported using this mode. The implication of this mode of payment is that it provides relative relief or security to the farmers who might face challenges in generating cash. The least mode of settling payment for rented land confirmed in the study area was provision of a form of service(s) to the land owners. Only 2.3% of the farmers provided services as rent. An example of these services is providing farm-labor to the land owner's farm. The farmer who offer services as rent may have skills beyond their traditional farming activities which can potentially lead to a secondary income generation.

Land Size

Table 3: Average land size by gender according to Zones and farms

	Obs/Category	Mean	Std. Dev.	Min	Max
Total	380	2.8 ha	4.5152	0.02 ha	50 ha
Gender	<i>Female</i>	1.6 ha	2.2852	0.02 ha	15 ha
	<i>Male</i>	3.6 ha	5.3996	0.02 ha	50 ha
Zone	<i>Zone 1</i>	3.2 ha	5.5413	0.05 ha	37.2 ha
	<i>Zone 2</i>	1.4 ha	1.3426	0.05 ha	5 ha
	<i>Zone 3</i>	3.7 ha	5.0785	0.02 ha	50 ha
Farm	<i>Crop</i>	3.5 ha	5.1358	0.1 ha	50 ha
	<i>Fish</i>	1.8 ha	2.7232	0.02 ha	15 ha
	<i>Livestock</i>	1.1 ha	2.2341	0.02 ha	10 ha

Source: Field survey data, 2022

As shown in Table 3, the average land size of the total respondents in the study area is 2.8ha, with minimum of 0.02ha, maximum of 50ha, and a standard deviation of 4.5ha. The large standard deviation signifies significant variation in land size among the household farmers.



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The wide range of land sizes would suggest that there might be significant disparities in land distribution and ownership, and this inequality can impact agricultural productivity and livelihood of the farmers. By gender, the male household farmers have more than twice (3.6ha) the size of land than the female farmers (1.6ha). The significance of the disparity in land size between the genders is tested in Table 7. The Table 3 also reveals that Zone-3 household farmers' land size is the largest (3.7 ha) according to the result of the data, then followed by Zone-1 with 3.2ha, and Zone-2 with 1.4ha. The farmers in the study area were involved in three primary types of farming, which encompassed crop farming, fish farming, and livestock farming. As expected, crop farm maintained the largest share amongst the farms having an average of 3.5ha, followed by fish farm (1.8ha) and then livestock farm 1.1ha. The widest variation in land size among the farms is seen in crop farm (standard deviation 5.1ha), where some farmers operate farms as small as 0.1ha and others as large as 50ha.

Operating Farm Scale on Land

The scale at which the household farmers operate their farms differs from the size of land. It has been observed that some farmers with relatively small land operate larger farm scale compared to some with a relatively bigger land (see Table 4b). Thus, this study captures the scale of the farms operated by the household farmers as land-related matters. A uniform unit of measurement was required since different type of farms were operated, the study utilized the value of the products of the farms i.e. scale value (Naira) for comparison.

Table 4a: Farm scale (N000)

	Mean	standard deviation	Min	Max
Farm scale	4,531.2	14,900	31.5	162,000

Note: A Dollar (\$) to Naira (₦) = 448.06. Source: Field survey data 2022



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Table 4b: Land size versus farm scale

Land group	Land size (mean)	Farm scale (mean value ₦)
Very-small	0.2 ha	4,214,751
Small	1 ha	2,121,487
Medium	2.1 ha	4,863,103
Large	6.3 ha	6,392,290

Source: Field survey data, 2022

Table 4a presents the average farm scale value (4.53 million) with a 14.9 million standard deviation among the farmers. This deviation suggests that there is significant variation in the farm scale among farmers in the study area. Table 4b on the other hand, presents the land–farm scale statistics. Data on land size were grouped into four (4) categories and then the average mean value of the farm scale was calculated for each group. The average land size of the smallest group denoted as “Very-small” was 0.2 ha, has an average farm scale value of 4.2 million Naira, followed by the “Small” land group having an average size of 1ha, but compared to the “Very-small” group, this has a much smaller farm scale value (2.1 million). This could be as a result of leasing or lending out part of their land, financial constraint to scale up to optimal utilization of the land, or it could be that the lands are scattered in different location which can be difficult to operate. Another reason could be that the farm is a livestock farm which do not require the use of much space as required in crop farms. Therefore, having a bigger land do not necessary mean operating a large farm scale. The farm scale value of subsequent land groups (i.e. Medium and Large) increases with increase in the sizes of the land, which is contrary to the Very-small and Small land size groups.

Land Dispute

As suitable land become scarce, coupled with increasing demand for land for agricultural activities in response to increasing food demand, Niger State has witnessed deforestation, encroachment into protected game reserves (USAID and USGS 2015), communal land



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disputes and conflicts (Alfa and Jacob, 2014; Babayo *et al.*, 2013), and competing claims of possession or inability of parties to follow current land laws and regulations (Akinola & Alhaji, 2020). The household farmers of the study were asked if they experienced any land dispute. Their response is presented in percentage of the total respondents and according to gender distribution. This is depicted in Figure 3.

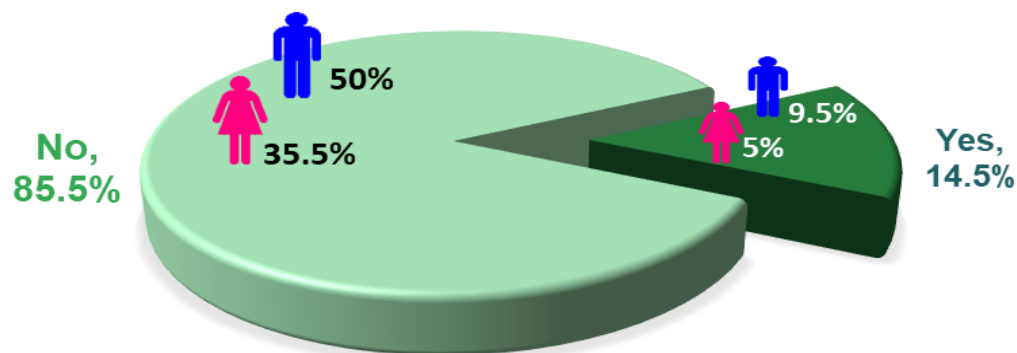


Figure 3: Land Dispute by Gender

Source: Field survey data, 2022

About 85.5% of the respondents reported not experiencing any form of land dispute in the study area (35.5% are female farmers and 50% male farmers). Only a small percentage, 14.5% of the household farmers experienced land dispute, in which 9.5% were males and 5% females. Not having proper documents to support land ownership are some of the reasons in which land claim cannot be proven, thereby making it difficult to resolve some land disputes. Certificate of Occupancy (C-of-O) is an official document given by the government to person who is recognized formally as land owner. The document provides the boundary identification and purpose for the land ownership. The certification of land is not only useful for ownership identification, dispute resolution or land boundary, but also a means through which government can manage land and its resources, protect environment, and infrastructural planning to meet development goals. A cross-relation of the farmers



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response to the land dispute with their C-of-O status (YES or NO) are presented in Table 5 to find out how land dispute and land certification interrelate.

Table 5: Land dispute and Land C-of-O status

Response		Land Dispute			
		No		Yes	
		<i>Freq</i>	<i>%</i>	<i>Freq</i>	<i>%</i>
Land C-of-O	No	170	60.5%	27	24.2%
	Yes	68	9.6%	16	5.7%

Source: Field survey data 2022

Out of the 380 respondents, 281 (170+68+27+16) responded on C-of-O status. Among these set of respondents, 60.5% reported not having C-of-O and no land dispute, 9.6% reported have their C-of-O and no land dispute. On the other hand, 24.2% of the respondents that are experiencing land dispute have no C-of-O while those with C-of-O, but still experienced land dispute was about 5.7%. This rare case of the latter usually occurs as consequence of improper land boundary demarcation, as most the lands are manually demarcated (without the use of GPS coordination) thereby encouraging land encroachment.

Proximity of farmland

Table 6: Average distance (km) of place of residence to farmland

Category		Mean	Std. Dev.	Min	Max
Distance to farm		3.4	4.4	0.1	30
Distance by farms	<i>Crop</i>	4.4	4.90	0.5	30
	<i>Fish</i>	1.6	1.50	0.1	6
	<i>Livestock</i>	1.4	1.8	0.1	10

Source: Field survey data, 2022

Analyzing the farmers land proximity to their place of residence provides more understanding on the characteristic their farms, agricultural versus urban-expansion development, residential health-safety versus agricultural practices especially the use of agrochemicals and livestock by-products. The proximity of farmland to residential areas



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could significantly affect agricultural practices and urban development plans. Table 6 presents the results on the average distance in kilometer between farmland and the farmers' place of residence. On average, the longest distance observed was 30km and the shortest distance is about 0.1km (i.e. about 100 meters). The distance among the different farm types (crop, fish and livestock) was also identified, and the shortest average distance was seen between livestock farm and the residential area. These farms in most cases have more female farmers' participation than the male farmers. Perhaps the easiness of the farms to be operated near homes made it more attractive to female farmers.

Gender Disparity in Land and Land-related Matters

Table 7 illustrates the result of the Student's t-test, comparing the mean score between the female and male household farmers on various land and land-related matters observed in the study area.

Table 7: Student's t-test: testing disparity in land and land-related matters

Subject	Gender	Mean	Std. Err.	Std. Dev.	t-value	Degree of freedom	Decision
LAND SIZE	Female	1.56	0.1841	2.285	- 4.963	325.735	REJECT Null Hypothesis
	Male	3.57	0.3592	5.400			
	Combined	2.76	0.2316	4.515			
	Difference	-2.00	0.4036				
	95% Confidence interval H_o : mean difference between female and male = 0						
H_a : mean difference $\neq 0$ P-value = 0.0000							
H_a : mean difference < 0 P-value = 0.0000							
H_a : mean difference > 0 P-value = 1.0000							

Subject	Region	Mean	Std. Err.	Std. Dev.	t-value	Degree of freedom	Decision
LAND OWNERSHIP	Female	0.7143	0.0365	0.4532	- 0.913	317.155	FAILED to Reject Null Hypothesis
	Male	0.7566	0.0286	0.4300			
	Combined	0.7395	0.0225	0.4395			
	Difference	-0.0423	0.0464				
	95% Confidence interval H_o : mean difference between female and male = 0						
H_a : mean difference $\neq 0$ P-value= 0.3620							
H_a : mean difference < 0 P-value = 0.1810							
H_a : mean difference > 0 P-value = 0.8190							



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Subject	Region	Mean	Std. Err.	Std. Dev.	t-value	Degree of freedom	Decision
LAND DISPUTES	Female	0.1234	0.0269	0.3299	- 0.995	350.261	FAILED to Reject Null Hypothesis
	Male	0.1593	0.0244	0.3668			
	Combined	0.1447	0.0181	0.3523			
	Difference	-0.0359	0.0361				
	95% Confidence interval H_o : mean difference between female and male = 0 H_a : mean difference $\neq 0$ P-value= 0.3203 H_a : mean difference < 0 P-value = 0.1601 H_a : mean difference > 0 P-value = 0.8399						
Subject	Region	Mean	Std. Err.	Std. Dev.	t-value	Degree of freedom	Decision
LAND CERTIFICATION	Female	0.2909	0.0435	0.4562	- 0.235	234.501	FAILED to Reject Null Hypothesis
	Male	0.3041	0.0352	0.4614			
	Combined	0.2989	0.0273	0.4586			
	Difference	-0.0132	0.0560				
	95% Confidence interval H_o : mean difference between female and male = 0 H_a : mean difference $\neq 0$ P-value= 0.8141 H_a : mean difference < 0 P-value = 0.4071 H_a : mean difference > 0 P-value = 0.5929						
Subject	Region	Mean	Std. Err.	Std. Dev.	t-value	Degree of freedom	Decision
OPERATING FARM SCALE ON LAND	Female	2,046,314	448,322.2	5,563,532	- 3.185	281.218	REJECT Null Hypothesis
	Male	6,224,421	1,232,764	1.85e+07			
	Combined	4,531,188	761,942.8	1.49e+07			
	Difference	-4,178,107	1,311,755				
	95% Confidence interval H_o : mean difference between female and male = 0 H_a : mean difference $\neq 0$ P-value= 0.0016 H_a : mean difference < 0 P-value = 0.0008 H_a : mean difference > 0 P-value = 0.9992						

Source: Field survey data, 2022.

The null hypothesis on land size assumes that there no gender disparity in land size between female and male household farmers. The result on land size in Table 7 revealed that the mean land size for female farmers is about 1.6ha, with standard deviation of 2.3ha. For male farmers, mean land size is 3.6ha, with standard deviation of about 5.4ha. The combined



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mean land size across both genders is about 2.8ha. The t-value is calculated as -4.963 , and the degree of freedom is about 325.7. The p-value for the two-tailed alternative hypothesis not equal to zero ($H_a \neq 0$) is 0.0000. For the one-tailed alternative hypothesis ($H_a < 0$) is 0.0000, and for the one-tailed alternative hypothesis ($H_a > 0$) is 1.0000. Based on these results, i.e. the significant t-value and the p-values that are below the standard 95% confidence interval (i.e. 0.05 significance level) for $H_a \neq 0$, the study suggests with confidence that the null hypothesis should be rejected. In other words, the t-test result indicates that there is statistically significant gender disparity in land size among the household farmers in the study area.

The null hypothesis on land ownership states that there is no gender disparity in land ownership of the household farmers in the study area. The land ownership t-test result presented in Table 7 showed a negative difference (-0.0423) between female and males, suggesting that the males own most of the land they use compared to the female farmers. The t-value is calculated as -0.913 , the degree of freedom is approximately 317.2. The p-value for the two-tailed alternative hypothesis not equal to zero ($H_a \neq 0$) is 0.3620. For the one-tailed alternative hypothesis ($H_a < 0$) is 0.1810, and for the alternative hypothesis ($H_a > 0$) is 0.8190. Based on these results and considering the significance level of 0.05, there is no enough evidence to reject the null hypothesis in favor of the alternative hypothesis. In other words, there no gender disparity in land ownership between female and male household farmers.

On the issue of land dispute, the null hypothesis states that there is no difference between the female and male household farmers who experienced land disputes in the study area. The t-test result on land dispute is presented in Table 7, where mean difference between female and male is -0.0359 in favor of male. The t-value is calculated as -0.995 , the degree of freedom is approximately 350.3. The p-value for the two-tailed alternative hypothesis not



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equal to zero ($H_a \neq 0$) is 0.3203. For the one-tailed alternative hypothesis ($H_a < 0$) is 0.1601, and for the alternative hypothesis ($H_a > 0$) is 0.8399. Considering the standard 0.05 significance level with these results, there is no enough evidence to reject the claim of the null hypothesis, which states that there is no difference between the female and male in land dispute experienced. In other words, the female and male farmers experience relatively same level of land dispute in the study area, or no gender disparity among the household farmers land dispute.

The certification of land i.e. lands with Certificate of Occupancy (C-of-O) was tested between the genders. The null hypothesis here states that there is no disparity on lands with C-of-O between the female and male farm managers in the study area. Although the mean difference (-0.0132) shows that males, compared to females have more C-of-O. The t-test -0.235 , degree of freedom of approximately 234.5, and with the p-value for the two-tailed alternative hypothesis not equal to zero ($H_a \neq 0$) stands at 0.8141. For the one-tailed alternative hypothesis ($H_a < 0$) stands at 0.4071, and for the alternative hypothesis ($H_a > 0$) equals 0.5929 as presented in Table 7, proved that the disparity is not statistically significant at 0.05 level of significance i.e. there is no sufficient evidence to reject the null hypothesis. In other words, there is no gender disparity among the farmers having land C-of-O in the study area.

As presented in Table 4b, having larger land does not necessarily reciprocate to operating large farm scale. Hence, a glance on farm scale operated on land is paramount to assessing optimal land utilization. The gender glance is presented in the t-test result in Table 7. The null hypothesis therefore, states that there is no disparity in the farm scale operated between the female and male household farmers in the study area. The mean difference between the genders showed a wider ratio gap (10:3) as compared to the gap in land size ratio 5:2 in favor of the male farmers. The t-value is calculated as -3.185 , and the degree of freedom is about 281.2. The p-value for the two-tailed alternative hypothesis not equal to zero ($H_a \neq 0$)



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is 0.0016. For the one-tailed alternative hypothesis ($H_a < 0$) is 0.0008, and for the alternative hypothesis ($H_a > 0$) is 0.9992. Considering the 0.05 significance level being less than the result of the p-values, the null hypothesis which states there is no disparity in the farm scale operated between female male household farmers should be rejected. In other words, there is statistically significant gender disparity in farm scale operated among the household farmers in the study area.

CONCLUSION AND RECOMMENDATIONS

In conclusion, gender disparity in land and land-related matters remained a significant challenge to the household farmers in Niger State. 380 household farmers with gender representation of female 40.5% and male 59.5% were interviewed, with the aim of accessing whether the gender disparity on land and land-related matters are statistically significant in the study area. The descriptive statistic result from the demography of the household farmers shows that the average age of the female farmers was slightly younger than their male counterparts. The average years of formal education of the females is about 2.2 years less than that of the males. A more gap was observed in the years of farming experience where the males have additional 6.8 years over the female farmers. Acquisition of land is pivotal in operating a farm, the descriptive statistics revealed that the major method by which land is acquired in the study area is via inheritance, this goes for both male and female farmers. Males on average, have more than double the land size of the female farmers. On land dispute, majority of the household farmers reported no land dispute. Likewise, majority reported that the land they use do not have Certificate of Occupancy (C-of-O). The operating farm scale on land was observed to not always correlating with land size, hence, the study captures the statistics on farm scale operated on land by the household farmers. The result revealed that the farm scale operated by the male farmers was greater compared to the difference in land size in favor of the male farmers. On accessing the statistically significance of gender disparity in land and land-related matters, only land size, and farm



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scale operated on land were statistically significant. Their t-test results suggest that there is significant gender disparity among the household farmers. Other land-related matters such as land dispute, land ownership, and land certification showed some level of gender disparities, but there was no enough evidence to reject their stated null hypothesis.

To address gender disparity in land and land-related matters, this study recommends stringent approach on two areas: reducing the inequalities in access to land for agriculture, which can promote gender inclusive development; and improving in the equitable distribution of other resources that can influence farm scale. While this study provides some insights of the disparities in land and some land-related matters between the female and male household farmers, there is need for an in-depth studies especially qualitative research, to help identify root causes of the disparities.

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