

Assessment of the Effect of the COVID-19 Pandemic on Gender Roles among Maize Farmers in Ido Local Government Area of Oyo State, Nigeria

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Abstract: The study investigated the effects of the COVID-19 pandemic on gender roles among Maize Farmers in the Ido Local Government Area of Oyo State, Nigeria. A multistage sampling procedure was used to select 120 respondents. Data on respondents' socioeconomic characteristics, the effect of COVID-19 on maize production, assessment of gender roles, and constraints of the farmers were collected using an interview schedule; analysed using percentages, Chi-square, PPMC, and T-test at $\alpha 0.05$. The result showed that most of the respondents were male (73.0%) with a mean age of 42.0 ± 10.0 years. Both genders were engaged in fertilizer application (100.0%) and maize processing (100.0%). The most rated effect of COVID-19 on maize production was the lack of market for the produce (92.5%), with a high level of effect for 59.2% respondents. Assessment of COVID-19 on gender roles was diversification of livelihood (67.5%), with a high level of effect of gender roles for 67.5%. The most common constraint encountered was insufficient funds (1.73); with a high level of constraints for 65.0% of the respondents. A significant relationship existed between respondents' sex ($\chi^2=15.078$) and age ($r=-0.244$), and assessment of COVID-19 on gender roles in maize production. However, a significant difference existed ($F=7.166$) in the effect of COVID-19 among female (4.1644) than male (3.5532) maize farmers. Respondents should pull their resources together to access funds for their agricultural activities, especially during the pandemic.

Keywords: Livelihood diversification, Maize Production, COVID-19 emergency, Maize processing

1. Introduction

Agriculture has been the main source of livelihood and economic development in rural communities of Nigeria; nationally, it has contributed about 23 percent to the GDP and supplied about 70 percent of the labour force (FAO, 2025). The employment offered by the sector, even to the rural dwellers, ranges from the rearing of livestock and cultivation of crops by both males and females across the value chain (FAO, 2024). Studies have shown that cassava and Maize are crops mainly grown by subsistence farmers and have immensely enhanced the economic, food, and nutrition security of rural households, targeting the first and second SDG goals (FAO, 2024; ATBU, 2022). However, maize is one

of the arable cereals that is desired and grown by both genders in over three-quarters of the rural households in sub-Saharan Africa including Nigeria being the cereal basket of the world (Jill et al., 2021); and is cultivated twice a year (dry and wet season). Another advantage that makes the crop widely grown in rural communities is its ability to be intercropped with tuber (cassava, sweet potatoes), vegetable (Pepper, Tomatoe, Amaranthus among others), and leguminous (Groundnut, soybeans) crops (Sagar et al., 2020; Amira et al., 2023). The choice and desire of the farmers to cultivate Maize might be economic and nutrition security driven using available resources. (Kamara et al., 2020).

Therefore, for the successful and effective production of Maize by rural households, males and females must

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be efficient in playing their roles across its value chain as informed by the level of access and control over the scarce resources of production like land, labour, and capital (Gebre, Isoda, Rahut, Amekawa, Nomura, 2021; Amah, et al. 2020). The role played by both genders in maize production varies but includes activities of land preparation (clearing, burning, stumping, and ridging), planting, post-planting operation (weeding, pest and disease control, harvesting), storage, processing, and marketing (Solomon & Rodney, 2019; Jill et al., 2021).

According to Kamara et al, (2020), the challenges faced by maize farmers in rural communities include insufficient access to agro-maize input such as certified seed, purchase of fertilizer, herbicides, and other Agro-chemicals at subsidy rates, inadequate access to credit facilities, land degradation, the gender gap in technology adoption, land tenure system, transportation, poor farm gate price, scarcity of paid labourers, pest and disease infestations, poor marketing information, climate change impact like draught and the dawn of COVID-19 pandemic among others, which has caused a lot of backdrops for Maize farmers (FAO, 2024; Adeniyi, Adetunji, Olumoyegun, Fanifosi and Odozi, 2021).

However, the advent of COVID-19 obstructed the national and global development of the agricultural sector as the sector in Nigeria has suffered up to 13.1 percent loss in output (USD 1.2 billion) (Andam, Edeh, Oboh, Pauw, and Thurlow, 2020). There was a global disruption of human lives and economic activities, including the rearing of animals and the cultivation of crops. The rapid global effects of the pandemic made millions of people vulnerable to food insecurity and malnutrition (OECD, 2020). The incidence also resulted in rural households losing up to 33 percent of their incomes at the farm gate due to restrictions on movement. It also leads to extra difficulties in sourcing maize production inputs due to additional limitations on the movement of people and goods. The pandemic equally affected the availability of key intermediate inputs for maize farmers in rural communities (Farm Policy News, 2020). Akin to this was the inability of maize farmers to spend enough time growing and processing the maize, as they were more often engaged in social and community activities than in cultivating maize which was a major staple food of a rural household, due to several lockdown policies (Andam et al., 2020). Hence, the study investigated the effect of the COVID-19 pandemic on gender roles among Maize Farmers in Ido Local Government Area of Oyo State, Nigeria. Specifically, the study described the socio-economic characteristics, identified roles of men and women in maize cultivation, examined the effect of COVID-19 on Maize cultivation, investigated

constraints to Maize cultivation, and assessed the effect of the COVID-19 pandemic on gender roles of maize farmers in the study area. The study hypothesised the significant relationship between the selected variables and assessment of the COVID-19 pandemic on gender roles; and the significant differences between the effects of COVID-19 among male and female respondents in the study area.

2. Methodology

The study area for this study was Ido Local Government Area of Oyo State, with the study population being all Maize farmers in the study area. The Local government is comprised of ten wards, and the basic occupation of the people is farming, especially the cultivation of arable crops such as maize, rice, cassava, and vegetables. A multistage sampling procedure was used to select respondents for this study. At stage one, a simple random sampling technique was used to select 40% of the 10 wards in the study area to give four wards: Aba Emo/Ilaju/Alako; Bakate/Idi-Aya; Apete/Ayegun/Awotan; and Omi Adio/Omi Onigbagbo. The second stage involved the simple random selection of three villages in each ward. The third stage involved the generation of a Maize farmers' list in each of the selected villages, while the fourth stage involved the systematic proportionate random selection of the 10 Maize farmers in each of the selected villages, giving the sample size of 120 respondents. Data collected with a structured interview schedule and were further analysed using descriptive (Percentage, Mean and Rank), and inferential statistics (PPMC, Chi-square, and t-test) at α 0.05. Specific roles of Men and Women were measured with 13 possible roles, with a response of yes (1) and No (0), and were ranked with the percentage. Respondents' effect of COVID-19 on Maize production was captured with eight possible effects with a response option of yes (1) and No (0). The minimum (0.00), maximum (7.00), and the mean (3.83 ± 1.23) scores of effects of COVID-19 on Maize production were obtained. The statements were ranked with the percentages, with the mean index used to categorise them into high and low effect using the below and above the mean criteria. Respondents' constraints to Maize Cultivation were captured with 15 constraints with options of very severe (2), severe (1), and not a constraint (0). The minimum (0.00), maximum (20.00), and the mean (14.67 ± 2.89) scores of constraints to Maize cultivation were obtained. The mean score was used to rank the constraints in order of severity. An index of the constraints was used to categorise the respondents into high and low constraints using the above and

below means criterion. Respondents' assessment of the COVID-19 pandemic on maize production gender role was captured using 11 possible effects, with response options of Yes (1) and No (0), and was ranked with the percentages. The minimum (2.00), maximum (7.00), and the mean (3.93 ± 1.01) scores of assessments of COVID-19 on gender roles in maize production were obtained. The mean index of the variable was used to categorise the respondents into high and low using the above and below the mean criteria. Respondents' socioeconomic characteristics, like age, sex, level of education, contact with extension agents, and monthly income, among others, were measured accordingly.

3. Results and Discussion

3.1. Socio-economic characteristics of the respondents

The result in Table 1 indicates that most of the respondents were female (60.8%) and had monthly (93%) contact with extension agents, with a mean age and income of 42 ± 10 years and $40,000 \pm 10,000$, respectively. This implies that the majority of respondents engaged in maize production in the study area were female, possibly due to

the ease of cultivation. Meanwhile, the result of monthly contact with extension agents shows that extension service delivery is active in the study area. The mean age (42 ± 10 years) suggests that the respondents were relatively young, which could positively influence their involvement in maize cultivation; this finding supports the study by Amah et al. (2020). In contrast, the mean income ($40,000 \pm 10,000$) indicates that their income was higher than the then minimum wage (30,000 naira) in Nigeria, which could help them acquire inputs for maize cultivation. However, their average income is lower than the global expected US\$1,218 per month stated by Velocity Global (2024).

Table 1 shows that most (87.5%) of the respondents were married with a mean household size of 6 ± 2 persons, which implies that most of the respondents with family responsibilities had a large household size, which might indicate the availability of family labour, which could reduce the cost of hired labour. This is in line with the study report of Adebayo, Adeniyi, and Emmanuel (2022), who also found that respondents in a farming community were mostly married with a large family size. The result of the level of education in Table 1 shows that most (72.5%) of the respondents were literate with one

Table 1: Socio-economic characteristics of the respondents

Variables	Frequency	Percentage	Mean	SD
Age			42	10
26-35	34	28.3		
36-45	38	31.7		
46-55	28	23.3		
56-65	20	16.7		
Sex				
Male	47	39.2		
Female	73	60.8		
Marital status				
Single	06	5.0		
Married	105	87.5		
Widow	09	7.5		
Level of education				
No formal education	33	27.5		
Primary education	58	48.3		
Secondary education	29	24.2		
Household size			6	2
2-3	07	5.8		
4-5	47	39.2		
6-8	66	55.0		
Monthly income			40,000	10,000
20,000-30,000	30	25.0		
30,001-40,001	46	38.3		
40,002-50,002	42	35.0		
50,003-60,000	02	1.7		
Social association				
Yes	115	95.8		
No	05	4.2		
Contact with the extension agent				
Yearly	02	1.7		
Monthly	112	93.3		
Weekly	06	5.0		

Source: Field survey, 2021

form of education, which provides an understanding of management practices that can enhance the production of maize, and also gives them a better opportunity to understand. This is in tandem with the findings of Gebre et al (2021), who found that education is significant to Maize productivity.

3.2. *Specific roles of men and women in maize cultivation*

Results in Table 2 show that the most pre-planting operation involved by the respondents was land clearing (63.8% and 60.3% for male and female farmers, respectively), which was ranked 9th overall position for both genders. The reason for this may not be far-fetched as the land for cultivating maize must be well cleared for proper growth and development of maize; while the least pre-planting operation (Bush burning; 14th position) by both genders (10.6% & 11.0% for males and females' respondents) which signify the unpopular practice of bush burning in Maize cultivation (Kamara et al, 2020). However, the result in Table 2 further reveals that males (100%) were more involved in maize planting activity than females (95.5%), with 1st and 7th positions for males and females, respectively. This corroborates the assertion of Gebre et al (2021) and Jill et al (2021) that gender disparity that existed in maize production excluded the planting operation. The post-planting operations that were mostly involved by both genders were fertilizer application (100%), harvesting (100%), and Maize processing (100%), as shown in Table 2. This confirms that these activities were mainly carried out by the respondents without using any labourers, which might be because of the lockdown policy of the COVID-19 pandemic (Andam et al, 2020) or might be with the motives of using family labour. It is worth noting that both marketing (100%) and weeding (100%) operations were carried out by all the male respondents in equal proportions; while supplying (100%) and thinning (100%) operations were duly carried on by the female gender, as found out in the research carried out by Amah et al (2020). However, the least post-planting operation carried out in maize production by Males were thinning (97.9%) and supplying (97.9%); while marketing (94.5%) was the least post-planting operation by female maize growers. Surprisingly, the least activities carried out by females (marketing; 94.5%) was expected to be the first, as women have been associated with marketing of agricultural produce in developing nations (Kefas, Gotulgotam, and Uchechukwu, 2024). However, the reason for this might have been due to the influence of the lockdown of the Covid-19 pandemic

that generally restricted people's movement (Adeniyi et al, 2021). This result was corroborated by the result in Table 3, where poor patronage (95.0%) and lack of market (92.5%) were the main effects of the pandemic on maize production during COVID-19.

3.3. *Effects of Covid-19 on Maize production*

The results in Table 3 reveal that the most severe effect of COVID-19 on Maize production was poor patronage and a lack of market. This indicates the lockdown in the study area prevented people from free movement to buy or sell their produce (OECD, 2020). This finding was corroborated by the assertion of Adeniyi et al, (2021) in which poultry farmers confirm their inability to get farm input like maize for their enterprise. However, the least of the effects, as indicated, was spoilage of farm produce, which was experienced by 20.8% of the respondents. This shows that 79.2% of the respondents were able to preserve or process their maize, which is a means to mitigate against poor patronage (1st) and a lack of market experience (2nd) among the effects of the pandemic on maize production. This was corroborated by the outcome of this study, as revealed in Table 2, that all (100%) of the respondents' endeavour to process their Maize. The result in Table 2 further reveals that low yield ranked 5th, which might be because the farmers were not able to access the farm input needed to boost the yield as a result of the lockdown policy (Adeniyi et al, 2021). It is worth noting that there was a high (59.2%) effect of COVID-19 on maize production. This indicated that the respondents were moderately affected by the emergence of COVID-19 on their maize production, though some of the respondents were able to positively mitigate the effect. This is in line with the study of Adeniyi et al (2021) that rural dwellers develop coping strategies during emergencies.

3.4. *Constraints to Maize Production*

The study's result in Table 4 shows that lack of funds was the highest-ranked constraint encountered by the respondents, this was followed by lack of adequate input for cultivating maize, with pandemic-induced malnutrition (0.10) being the least. This indicates that maize farmers faced some challenges contending with production during the COVID-19 pandemic. It should be noted that some of the constraints, which are Covid-19 pandemic induces which, include a lack of good market (1.19), low market value (1.05), and reduced working hours in the farm (0.81), frequent illness due to pandemic (0.26), insufficient access to good seed (0.19), poor nutrition due to pandemic (0.10),

Table 2: Specific roles of men and women in maize cultivation

Gender role	Male	Rank	Female	Rank
Pre-planting operations				
Land clearing	63.8	9 th	60.3	9 th
Bush burning	10.6	14 th	11.0	14 th
Stumping	21.3	12 th	34.2	11 th
Harrowing	38.3	11 th	15.1	13 th
Ridge making	21.3	12 th	45.2	10 th
Planting operation				
Planting	100.0	1 st	95.5	7 th
Post planting operation				
Fertilizer application	100.0	1 st	100.0	1 st
Thinning	97.9	7 th	100.0	1 st
Supplying	97.9	7 th	100.0	1 st
Weeding	100.0	1 st	95.9	6 th
Harvesting	100.0	1 st	100.0	1 st
Marketing	100.0	1 st	94.5	8 th
Maize processing	100.0	1 st	100.0	1 st

Source: Field survey, 2021

Table 3: Effects of COVID-19 on Maize production

Effects of COVID-19 on Maize Production	Percentage
Poor patronage	95.0
Lack of market	92.5
Increase in market and Farm prices	40.8
Inability to cultivate due to the lockdown	39.2
Low yield	36.7
Low desire to cultivate maize	33.3
Loss of farm produce	24.2
Spoilage of farm produce	20.8
Level	%
Low	40.8
High	59.2

Source: Field survey, 2021

and lack of labour (0.15). This finding is corroborated by the assertion of Andam et al (2020) that direct economic activity restrictions during the COVID-19 pandemic have negative effects on the agri-food system. The constraints were high for 61.9% of the respondents in the study area.

Table 4: Constraints to Maize Production

Constraints faced by maize farmers in the study area	Mean
Lack of funding	1.73
Inadequate input	1.67
Climatic fluctuation	1.61
Weed infestation	1.58
Lack of storage facility	1.37
Lack of a good market	1.19
Low fertility	1.08

Constraints faced by maize farmers in the study area	Mean
Pests and diseases	1.05
Low market value	1.05
Reduce the time of working on the farm	0.81
Soil degradation	0.76
Frequent illness due to the pandemic	0.26
Insufficient access to good seed	0.19
Lack of labour force	0.15
Poor nutrition due to the pandemic	0.10
Level	%
Low	38.3
High	61.7

Source: Field survey, 2021

3.5. *Gender assessment of the COVID-19 Pandemic effect on Maize production roles*

The result in Table 5 shows that most (67.5%) of the female maize farmers were able to diversify into other things than males during COVID-19. This is followed by the fact that more males than females were involved in maize cultivation activities during the pandemic (64.2%), with the female respondents spending less time on the maize farm during Covid-19 (50.8%) than males, being the third assessment of the respondents on maize production during the Covid-19 pandemic. This suggests that women, more than men, adopted adaptive livelihood strategies in response to the disruptions caused by COVID-19, as they were able to embark on more income-generating activities than men during emergencies. Hence, diversification may have served as a coping mechanism to mitigate the economic shocks associated with reduced agricultural productivity and market instability. This aligns with the findings of Hassan et al. (2021), who noted that women in agrarian communities often assume more flexible and diversified roles during crises to stabilise household income for meeting the economic responsibilities in their homes. This result was in tandem with the study report of Adeniyi et al (2021), who assert that respondents in rural communities, especially women, diversify into other viable livelihoods to mitigate the effects of COVID-19 for meeting household expenses.

The result in Table 5 further indicates that the male gender role that ranked 1st (though 2nd overall ranked result) on the male roles reflects structural gender norms where men are expected to engage in physically demanding and primary agricultural tasks, as males were more prone to expanding their maize plot than their female counterparts during the pandemic (Akinola et al., 2022). It may also indicate that men had fewer opportunities or willingness to diversify, thereby reinforcing the traditional gendered division of labour within rural farming households. Furthermore, the observation that female respondents spent less time on the maize farm (50.8%) compared to their male counterparts suggests increased domestic and caregiving responsibilities placed on women during the pandemic. This finding corroborates past studies, such as that of Doss et al. (2021), which highlighted that the burden of unpaid care work on women increased significantly during health emergencies, often at the expense of productive labour. However, the result in Table 5 further reveals that the least effect of COVID-19 on gender roles in maize production was the fact that male respondents spend more time with their family

than before. This suggests a positive outcome in terms of familial bonding, as lockdown has made men stay at home than it was before the COVID-19 pandemic. This may also reflect reduced economic engagement due to lockdowns or mobility restrictions. Similar patterns were observed by Adedoyin et al. (2023), who reported that the COVID-19 pandemic altered family dynamics, particularly among rural households where male farmers faced disrupted access to input markets and extension services.

The result in Table 5 further shows that more (67.5%) of the respondents had a high effect of COVID-19 on maize production. This indicates that both genders felt the impact of COVID-19 on their maize production during the pandemic.

4. Results of hypotheses testing

4.1. *Relationship between Some Selected Variables and Gender Assessment of the COVID-19 Pandemic Effect on Maize Production Roles*

The result in Table 6 shows the existence of a significant relationship between respondents' age ($r=-0.244$), monthly income ($r=-0.236$, $p=0.010$), sex (15.078), and the effect of the COVID-19 pandemic on gender roles in the study area. This indicates that respondents' age, sex, and monthly income significantly influenced how the pandemic affected maize production. The negative correlation for age suggests that younger respondents experienced a lesser effect of the pandemic on maize production compared to older ones. This may be because younger farmers had better access to timely and adequate information regarding the impact of COVID-19 on agricultural production. These findings are consistent with Gebre et al. (2021), who reported that age significantly influenced gender differences in maize production. Similarly, the negative relationship between monthly income and the effect of the pandemic implies that lower-income earners were more adversely affected compared to higher-income respondents. This could be attributed to the fact that low-income farmers relied more heavily on proceeds from maize production and were, therefore, more engaged in production activities during the COVID-19 lockdown period. Conversely, higher-income earners might have diversified income sources and were less dependent on maize production, leading to reduced engagement during the pandemic. Furthermore, the significant association of sex indicates that the predominance of female respondents contributed to the observed variations in gender roles during maize production amid the pandemic. In contrast, the results

Table 5: Gender Assessment of the COVID-19 Pandemic Effect on Maize Production Roles

Gender Assessment of Covid 19 Pandemic Effect on Maize Production Roles	(%)
Effects on Male roles during the pandemic	
The COVID-19 pandemic led to more involvement of males than females in Maize cultivation	64.2
Males engaged more in community activities than in cultivating maize during the pandemic	34.2
Males cultivated more maize plots during COVID-19	26.7
Male maize farmers spend more time with their families than before	5.8
Effects on Female Roles during the pandemic	
Female maize farmers were able to diversify into other things during COVID-19	67.5
Females spent less time on the maize farm during the COVID-19 pandemic	50.8
Females were unable to process my maize produce during COVID-19	38.3
The Covid-19 pandemic has more involvement of females than males in harvesting	33.3
Female maize farmers do not make more profit from maize cultivation during COVID-19	15.8
Females got more involved in social activities than in maize cultivation	9.2
Females were less able to market maize produce during the Covid-19 pandemic than males	6.7
Level	%
Low	32.5
High	67.5

Source: Field survey, 2021

Table 6: Relationship between respondents' socioeconomic characteristics and the effect of the COVID-19 pandemic on gender roles in Maize production

Variables	r-value	
Age	-0.244*	
Household size	0.018	
Monthly income	-0.236*	
Variables	χ^2 –value	Df
Sex	15.078*	1
Marital status	2.921	2
Religion	6.807*	2
Level of education	4.035	2
Member of social association	0.372	1
Contact with an extension agent	3.272	2

Source: Field Survey, 2021

* $P \leq 0.05$ level

t-test result of significant difference in the effect of COVID-19 among male and female maize farmers

Table 7: t-test result of significant difference in the effect of Covid-19 among male and female maize farmers

	N	Mean	Std. Deviation	F	P-value
Male	47	3.5532	1.09958	7.166	0.008
Female	73	4.1644	0.86625		

Source: Field survey, 2021

show no significant relationship between household size ($r = 0.018$), marital status ($\chi^2 = 2.921$), level of education ($\chi^2 = 4.035$), number of social associations ($\chi^2 = 0.372$), and contact with extension agents ($\chi^2 = 3.272$) and the effect of COVID-19 on gender roles. This finding contradicts the report by Gebre et al. (2021), who found these variables to be significant in a similar gender-based

study on maize production. Therefore, in this study area, household size, marital status, level of education, social association membership, and contact with extension agents did not influence how the pandemic affected gender roles in maize production.

The result in Table 7 shows a significant difference ($F=7.166$, $p=0.008$) between the effect of the Covid-19 pandemic among male and female maize farmers in the

study area. This implies that males and females have different effects of COVID-19 on Maize production in the study area.

The result in Table 7 further shows that females (4.1644) had a greater effect of the pandemic on maize production than their male (3.5532) counterparts. This outcome might be due to the assertion of Gebre et al (2021) that there exists an unequal opportunity among male and female maize producers over productive resources, as it favours males over females. In addition, Jilli et al (2021) affirm a lower adoption of technology by female maize growers, which might be responsible for the difference in their perception.

Conclusion and Recommendations

Respondents' characteristics, such as sex (direct influence) and age and income (inverse influence), affect their gender roles in maize production during the COVID-19 pandemic. The pandemic's impact was most significant during the marketing stage, while limited funds and input purchases greatly threatened maize production in this period. Women constituted the larger share of maize cultivators, with the pandemic having a greater effect on their involvement in maize production. Despite differing impacts and roles played by men and women during the pandemic, both genders were primarily involved in post-planting operations in maize farming. The study recommends that respondents form cooperative groups to pool resources for joint maize marketing, better funding of their enterprises, and bulk purchasing of farm inputs, especially during emergencies. Additionally, extension activities and government intervention policies for maize farmers should focus on enhancing farmers' knowledge of strategies to mitigate the negative effects of COVID-19 on maize production and to develop coping mechanisms during emergencies.

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