BOTSWANA
POPULATION & HOUSING CENSUS 2022:
ANALYTICAL REPORT

VOLUME 4

TRANSPORT AND ICT, AGRICULTURE AND LAND OWNERSHIP

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Botswana Population and Housing Census 2022: Analytical Report

Volume 4

Transport and ICT, Agriculture and Land Ownership

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Private Bag 0024, Gaborone

Phone: (267)367 1300,

Email: info@statsbots.org.bw
Website: www.statsbots.org.bw

Contact:

Census and Demographic Analysis Unit

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PREFACE

The 2022 Population and Housing Census (PHC) represents a significant milestone in the conduct of Botswana's decennial Population and Housing Censuses. Its undertaking provides a comprehensive snapshot of the nation's demographic, social, and economic landscape. The data collected through this census offers invaluable insights into the country's evolving population dynamics, household characteristics, and socio-economic trends.

These thematic volume follows a series of reports earmarked as products of the 2022 Population and housing Census. Due to the rich resource of the census data, there is need to further delve into deeper analysis. This report presents a detailed thematic analysis of the 2022 PHC data. It delves into a range of critical areas, including population distribution and growth, household composition, education, employment, health, transport, agriculture and housing. By examining these key themes, the report aims to inform policymakers, researchers, and other stakeholders in their efforts to address national development challenges and opportunities. The analysis presented in this report is based on rigorous data processing and statistical techniques. Every effort has been made to ensure the accuracy and reliability of the findings. However, it is important to note that data collection and analysis processes are subject to potential limitations, such as sampling error, non-response bias, and data quality issues.

The analysis of the 2022 PHC has been organized into six thematic volumes:

Volume 1: Demographic and Social Characteristics, Registration, Youth and Elderly, Education
Volume 2: Household Characteristics, Economic Activity
Volume 3: Gender, Disability, Nuptiality, Migration, and Urbanization
Volume 4: Transport and ICT, Agriculture and Land Ownership
Volume 5: Fertility, Mortality and Household Energy Use
Volume 6: Employment (Occupation and Industry)

I express my sincere gratitude to the dedicated team of professionals/analysts who contributed to the successful analysis implementation of the 2022 PHC. Their hard work and commitment have made this comprehensive analysis possible. We also acknowledge the support of our development partners, particularly the United Nations Population Fund (UNFPA) and United Nations Development Fund (UNDP), whose technical assistance was instrumental in the conduct of the census.

We trust that these thematic volumes report will serve as a valuable resource for understanding Botswana's demographic and socio-economic landscape.

Dr Lucky Mokgatlhe
Ag Statistician General
June 2025

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MODES OF TRANSPORT USED BY BOTSWANA POPULATION

By

Dr Burton S. Mguni and Kebotsemang Malukie Daniel

EXECUTIVE SUMMARY

The Republic of Botswana has subscribed to international and regional agendas that cover the transport sector. These include for example Agenda 2030, Agenda 2063 and the SADC protocol on Transport, Communications and Meteorology. Transport is a critical component of development of any country and thus Botswana like many developing countries has over the years included new transport developments, maintenance and improvements in its National Development plans

The discussion on this paper is focused on analysis of 2022 PHC data to assess the extent to which various which modes of transporting persons are used in Botswana.

SPSS V25 was implored in the analysis. The tabulation plan was drawn based on the data obtained from responses to question A50B from the 2022. The tabulation plan entailed producing descriptive statistics that are presented using both charts and tables for elaborative purposes.

The responses to the question on transport were analysed separately as well when taking into account responses to other questions covering variables of interest such as ; age, sex, district, relationship, educational attainment, marital status, economic activity as well as disability.

The results show that road based public transport, both buses and taxis which recorded use by 25 percent of the populace are the predominant modes of transport of people. It is worth noting that many of the users of these two modes of transport are members of the young segment of the population which includes school going persons. The policy recommendations based on the results entail in the main general development and improvement on the existing road infrastructure because it's predominant use.

1.0 INTRODUCTION

Transport plays a very important role in people's everyday life and economic activities as its availability and usage has a direct bearing on the quality of life for people in any country. This is why transport is a key component of the national development plans and strategies of the country and many of the international, regional development agenda that this country subscribes to.

The main aim of this paper is to provide additional information to the transport profile of Botswana through analysis of data collected from the 2022 Population and Housing Census through the question aimed at soliciting information about the main mode of transport among the populace. The target population was persons who were 5 years and above at the time of the 2022 PHC exercise.

2.0 LITERATURE REVIEW

Chen (Chen 2021) in his bibliometric and visualization analysis of development of socially sustainable transport research, stated that, the transport sector plays an important role as a dynamic network linking social, economic, and environmental dimensions. In line with this observation, efforts aimed at achieving socially sustainable development generally include national and multinational transportation policies and strategies as key components.

An important example of this, is the inclusion in the Sustainable Development Goals (SDGs) of SDG 9 which is aimed at building resilient infrastructure, promoting sustainable industrialization and fostering innovation. Further on the 2030 Agenda for Sustainable Development, sustainable transport is mainstreamed across several SDGs and targets, especially those related to food security, health, energy, economic growth, infrastructure, and cities and human settlements. It is safe say, even from simple observation over time, that Botswana is progressing well as regards progress to achieving this goal because the country has seen significant mushrooming and improvement of road networks, aviation, ferries, cross border bridges financed from own revenue and through international and regional financial support and assistance of development partners and other funding organisations. Further, in relation to multinational transport strategies, Botswana is a signatory to the SADC Protocol on transport, communications and meteorology systems whose objective is, in relation to transport, to establish across the region transport sectors which provide efficient, cost effective and fully integrated infrastructure operations.

The assessment done in 2001, indicated that the road infrastructure in Southern Africa is comparatively strong. Botswana, Lesotho, and Namibia have particularly good road standards; similarly, two-thirds of the road network of South Africa and Zimbabwe remain in good condition. In the plans for development, although current road capacity is sufficient throughout most of the SADC region, projections for 2027 indicate that the network needs expansion. In particular, the Regional Trunk Road Network requires rehabilitation after much overloading and infrequent maintenance.

As described in the 2012 Regional Infrastructure Development Master Plan, SADC has established 72 projects for road infrastructure and transport over the next 25 years, mostly concentrated around the three high-priority corridors that link production points with ports : the North-South Corridor, the Maputo Corridor, and the Dar-es-Salaam Corridor. By 2027, the following road projects are anticipated for operation. Those that affect Botswana are Kazungula Bridge as well as Nata-Kazungula road upgrading.

Along with the current network of road infrastructure, these additional road projects should institute a system that connects landlocked Member States with major centres of population and economic activity to ports, while remaining cost effective to operate.

NDP XI as the national agenda, has deliberately included road projects to improve transport in general. In Vision 2036 , Vision Pillar 1(Sustainable Economic Development) encompasses the transport sector, to ensure inclusiveness and benefits to all its populace. The Agenda 2063, has Goal 6 - Blue/ ocean economy for accelerated economic growth (Ports Operations and Marine Transport) which speaks of exploiting the vast potential of Africa's blue/ocean economy and this included matters relating to transport.

3.0 METHODOLOGY

The information that is used in this paper is derived from PHC 2022 data specifically that obtained through question (A50b). This was the only question that was in relation to transport during PHC 2022 exercise. The question requested the respondent to state the transport mode they regularly and frequently use on the day to day activities of their lives. The pre-coded responses were as shown the table below.

TABLE 3.0 QUESTION A50B MAIN MODE OF TRANSPORT RESPONSES

QUESTION A50B	WHAT IS THE RESPONDENT'S MAIN MODE OF TRANSPORT?
1	Own vehicle
2	Family vehicle
3	Public taxi
4	Public bus/combi
5	Train
6	Aircraft
7	Canoe/boat
8	Bicycle
9	Donkey cart
10	None

SPSS V25 was implored in analysis. The tabulation plan was drawn based on what question A50B from the 2022 PHC data can provide. This tabulation plan entailed producing descriptive statistics that would then be presented using both charts and tables for purposes of speaking to and sharing the results.

The responses to the question on transport were analysed separately as well when taking into account responses to other questions covering various variables that can be used for disaggregation such as ; age, sex, district, relationship, educational attainment, marital status, economic activity as well as disability.

4.0 DATA ANALYSIS AND PRESENTATION OF RESULTS

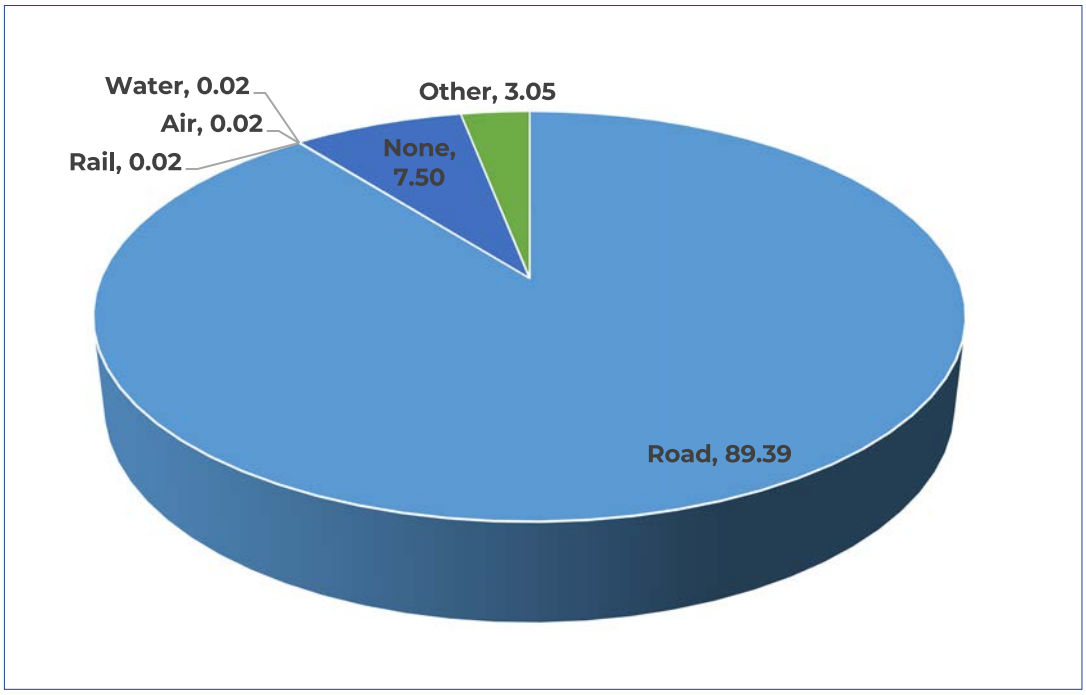
4.1 Level of Usage of Various Types of Transport

Transport is an important driver of the economy. It is therefore important for planning and socio-economic decision making to know the national profile on modes of transport of transport that are used on regular basis used by the population.

The question on transport in 2022 PHC questionnaire sought determine what modes of transport were being used by members of the population.

The obtained results as captured in **Figure 4.1** show that 89.39 percent of the people in Botswana predominantly use road based modes of transport. This is followed by 7.5 percent who said they were pedestrians. The results on the other types of transport covering rail, water and air based transportation came out as having insignificant number of users. As all these fell below .1 percent of the population. The results on the latter modes of transport do make sense in the context of Botswana given the nature of the question that was asked. The question was with regards to frequent or even the daily use of transport, of which the trio modes of transport have unlikely occurrence due to the lack of water bodies in many parts of the country and the almost non-existence of daily commuting rail and air routes.

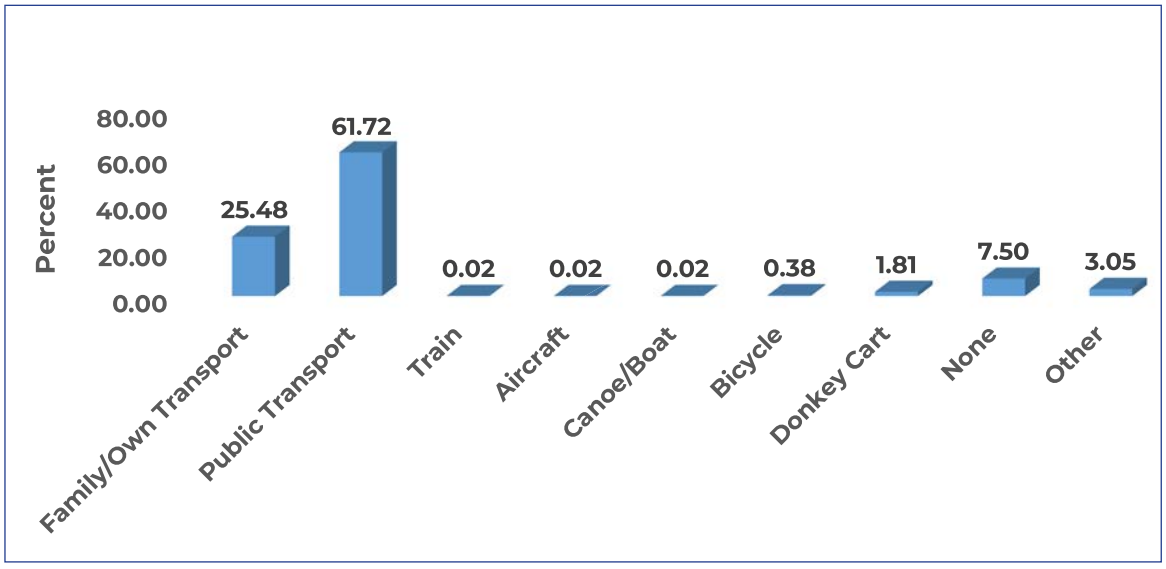
FIGURE 4.1: POPULATION DISTRIBUTION BY TYPE OF TRANSPORT



4.2 Transport usage by Mode of Transport

As stated in the above section road is the infrastructure that supports the modal form of transport. The breakdown on the population's extent of usage on selected categories of road based transport modes as well as other modes of transport is given in **figure 4.2** below. It is shown there that 61.72 percent use public transport (taxis and buses), followed by 25.48 percent who use family or own vehicle, while 7.50 percent are pedestrians. A noticeable 1.81 percent use donkey carts. The train, aircraft and canoe/boat modes of transport results show insignificant usage proportions as was stated in the previous section.

FIGURE 4.2: MODE OF TRANSPORT TYPE



4.3 Disaggregation on the Mode of transport used

The disaggregation on the mode of transport used based on demographic characteristics such as age, place of residence and sex was explored.

4.3.1 Mode of transport by sex

SDG 5 seeks to achieve gender equality and empower all women and girls. As shown in **table 4.3.1,** the results point to greater use of public transport by females at 54.3 percent as compared to their counterparts at 45.7 percent. Relatively more males at 52.3 percent use their own or family vehicles as compared 47.7 percent for female. The results show that there is gender parity as regards walking. The use of motorcycle and bicycle has not gained any popularity with females as the results show that 90.2 percent of the users of this mode of transport were males. The reason for this disparity cannot be deduced from the available data that was accessed but it is possibly linked to perceptions on the safety risks of these two modes of transport.

TABLE 4.3.1: POPULATION DISTRIBUTION BY MODE OF TRANSPORT BY SEX

TYPE OF TRANSPORT	SEX		
	MALE (%)	FEMALE (%)	TOTAL
Own /family vehicle	52.3	47.7	100
Public transport	45.7	54.3	100
Bicycle/Motorcycle	90.2	9.8	100
Donkey cart	60.2	39.8	100
None	50.4	49.6	100
Other	55.5	44.5	100
Total	**48.5**	**51.5**	**100**

4.3.2 Mode of transport by place of residence

The SDG 11 aims to make cities and human settlements inclusive, safe, resilient and sustainable. Agenda 2030 also recognise the cross-cutting nature of urban issues, which have an impact on a number of other SDGs.

In 2008, the global urban population outnumbered the rural population. This milestone marked the advent of a new 'urban millennium' as it expected that two-thirds of the world population will be living in urban areas by 2050.

As shown in **table 4.3.2** below, the use of public transport is more prevalent in the urban villages at 48.8 percent as compared to towns and rural areas at 33.8 and 17.4 percent respectively. The use of donkey cart is prominent in the rural areas as 91.9 percent of the users of this mode of transport are located there.

The use of family or own vehicles is highest in urban villages at 49.4 percent, followed by towns at 30.4 percent and lastly rural areas at 20.2 percent. As regards the use of bicycle this is most prevalent in the rural areas which accommodated 66 percent of such users.

TABLE 4.3.2 : POPULATION DISTRIBUTION BY MODE OF TRANSPORT AND PLACE OF RESIDENCE

MODE OF TRANSPORT	PLACE OF RESIDENCE			
	TOWN (%)	URBAN VILLAGE (%)	RURAL (%)	TOTAL
Family/Own Transport	30.4	49.4	20.2	100
Public Transport	17.4	48.8	33.8	100
Bicycle	6.3	27.7	66	100
Donkey Cart	0.2	7.9	91.9	100
None	11	46.6	42.4	100
Other	11.7	39.3	49	100
Total	**19.7**	**47.7**	**32.6**	**100**

4.3.3 Mode of transport Usage by District

Following the analysis by place of residence in **Section 4.3.2**, the disaggregation by District is presented in **Table 4.3.3.1** below. Family owned or own vehicle usage is mostly common in Gaborone and Kweneng East District with 4.7 and 3.7 percent respectively. The rest of the Districts came out to be at less than 2 percent in general. As regards to the use of public transport, Kweneng East District came out to be highest in usage at 9.6 percent, followed by Serowe and Gaborone at 5.7 and 5.6 percent respectively. Most of the rest of the districts have lower levels of useage. Most of the Districts are on average usage of 3 percent for public transport.

TABLE 4.3.3.1 : POPULATION DISTRIBUTION BY TYPE OF TRANSPORT AND DISTRICTS (%)

DISTRICTS	OWN/FAMILY VEHICLE	PUBLIC TRANSPORT	BICYCLE/ MOTOCYCLE	DONKEY CART	NONE	OTHER
Gaborone	4.7	5.6	0.0	0.0	0.4	0.2
Francistown	1.3	2.8	0.0	0.0	0.2	0.1
Lobatse	0.4	0.8	0.0	0.0	0.1	0.0
Selibe Phikwe	0.6	1.0	0.0	0.0	0.1	0.0
Orapa	0.3	0.1	0.0	0.0	0.0	0.0
Jwaneng	0.4	0.3	0.0	0.0	0.0	0.0
Sowa	0.1	0.1	0.0	0.0	0.0	0.0
Southern	1.2	4.0	0.0	0.1	0.4	0.2
Barolong	0.4	1.8	0.0	0.1	0.1	0.0
Ngwaketse West	0.1	0.5	0.0	0.1	0.2	0.1
South East	1.6	3.1	0.0	0.0	0.1	0.1
Kweneng East	3.7	9.6	0.0	0.2	0.7	0.2
Kweneng West	0.4	1.5	0.0	0.2	0.3	0.1
Kgatleng	1.4	3.6	0.0	0.0	0.2	0.1
Serowe	1.7	5.7	0.1	0.2	0.6	0.3
Palapye	1.0	3.4	0.1	0.2	0.7	0.2
Mahalapye	0.6	1.9	0.0	0.2	0.3	0.1
Boteti	0.7	1.8	0.0	0.1	0.3	0.2
Tutume	1.3	4.4	0.1	0.1	0.8	0.3
North East	0.7	2.0	0.0	0.0	0.1	0.1
Ngamiland East	1.2	3.1	0.0	0.1	0.4	0.3
Ngamiland West	0.3	1.8	0.0	0.1	0.5	0.2
Chobe	0.3	0.8	0.0	0.0	0.1	0.0
Delta	0.0	0.0	0.0	0.0	0.0	0.0
Ghanzi	0.5	0.9	0.0	0.1	0.5	0.2
CKGR	0.0	0.0	0.0	0.0	0.0	0.0
Kgalagadi South	0.4	0.7	0.0	0.1	0.3	0.0
Kgalagadi North	0.2	0.4	0.0	0.0	0.2	0.1
Total	**25.5**	**62.0**	**0.3**	**1.9**	**7.6**	**3.1**

The results on the mode of transport by district are further presented in **table 4.3.3.2** as a proportion of the 2022 PHC district populations. This is intended to facilitate for clearer standardised "per capita" comparison of the districts.

The results further depict that in overall, 38 percent of the population predominantly use public bus or combi, Kweneng East District leading with 6.4 percent, followed by Gaborone with 4.4 percent, while Central Tutume with 2.9 percent and Delta and CKGR have not recorded any usage of the same. After the public bus/combi, public taxi has significantly showed to be the next preferred mode of transport indicated by 24 percent of the population. Kweneng East continue scoring high by 3.2 percent of its District indicating that they use public taxi. The other dominating Districts in stating use of own vehicle as a mode of transport is Gaborone standing at 2.9 percent and Kweneng East District at it again with 2.1 percent. In these Districts inhabitants showed that they mostly use their own vehicles. The rest of the Districts have recorded an average of 0.3 percent in the category of using own vehicle.

TABLE 4.3.3.2 : TRANSPORT USAGE POPULATION PROPORTIONS PER DISTRICT (%)

DISTRICTS	OWN VEHICLE	FAMILY VEHICLE	PUBLIC TAXI	PUBLIC BUS/COMBI	DONKEY CART	NONE	OTHER	TOTAL
Gaborone	2.9	1.8	1.3	4.4	0.0	0.4	0.2	11
Francistown	0.8	0.6	2.3	0.5	0.0	0.2	0.1	4
Lobatse	0.2	0.2	0.7	0.1	0.0	0.1	0.0	1
Selibe Phikwe	0.3	0.3	0.9	0.1	0.0	0.1	0.0	2
Orapa	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0
Jwaneng	0.3	0.2	0.1	0.2	0.0	0.0	0.0	1
Sowa	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0
Southern	0.6	0.6	1.7	2.3	0.1	0.4	0.2	6
Barolong	0.2	0.2	0.2	1.6	0.1	0.1	0.0	3
Ngwaketse West	0.1	0.1	0.0	0.5	0.1	0.2	0.1	1
South east	1.0	0.6	0.6	2.5	0.0	0.1	0.1	5
Kweneng East	2.1	1.6	3.2	6.4	0.2	0.7	0.2	14
Kweneng West	0.2	0.2	0.2	1.3	0.2	0.3	0.1	2
Kgatleng	0.8	0.6	1.1	2.5	0.0	0.2	0.1	5
Central Serowe -Palapye	0.9	0.8	3.0	2.7	0.2	0.6	0.3	9
Central Mahalapye	0.5	0.5	1.5	1.9	0.2	0.7	0.2	6
Central Bobonong	0.3	0.3	0.5	1.4	0.2	0.3	0.1	3
Central Boteti	0.3	0.4	0.8	1.0	0.1	0.3	0.2	3
Central Tutume	0.6	0.6	1.5	2.9	0.1	0.8	0.3	7
North east	0.4	0.3	0.1	1.9	0.0	0.1	0.1	3
Ngamiland east	0.6	0.6	2.3	0.8	0.1	0.4	0.3	5
Ngamiland west	0.2	0.2	0.4	1.4	0.1	0.5	0.2	3
Chobe	0.2	0.1	0.5	0.3	0.0	0.1	0.0	1
Delta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Ghanzi	0.3	0.3	0.3	0.6	0.1	0.5	0.2	2
CKGR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Kgalagadi south	0.1	0.2	0.2	0.5	0.1	0.3	0.0	2
Kgalagadi north	0.1	0.1	0.2	0.2	0.0	0.2	0.1	1
Total	**14.0**	**11.0**	**24.0**	**38.0**	**2.0**	**8.0**	**3.0**	**100**

4.3.4 Mode of transport by Age-group

The SDG 10 is focused on empowering and promoting the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status. SDGs are inclusive and wholly encompassing, in an endeveour not to leave anyone behind across all demographic characteristics.

In this connection, analysis on the mode of transport was done on differing age categories to asses any possible potential comparatively negative results for any age category. The categories that were set are ; children for ages 5 to 14 years (for the purpose of this paper only), youth for ages 15 to 39 years, adult for ages 40 to 64 years and elderly 65 years and over. The results in **Figure 4.3.4** indicate consistency with the previous analysis, as public transport dominates in transport usage, which also shows across ages. Youth, children and adults progressively use public transport indicated by 66.7 percent, 64.2 percent and 50.4 percent respectively. Comparably, the results of transport usage for the variable of "own or family vehicle", adults lead in this variable by showing that 38.5 percent own vehicles or use family vehicles.

This is followed by 22.0 percent of youth and children come behind with 19.5 percent assuming that it is because of the tender age that forbids them from driving. In the turnout of events, majority of the sector of the population that are pedestrians are children with 11.4 percent, 6.5 percent are youth and 5.45 are adults. This talks to the previous results that show that fewer adults comparably to other age-groups use public transport, adults own vehicles and less are pedestrians. The use of donkeys as a mode of transport increase as age increases, where 1.1 percent, 1.5 percent, 2.3 percent are for children, youth and adults in the donkey use. There is relatively minimal use of bicycle, the results depict 0.3 percent for youth and 0.7 percent for adults.

FIGURE 4.3.4: USAGE OF TRANSPORT BY MODE AND AGE

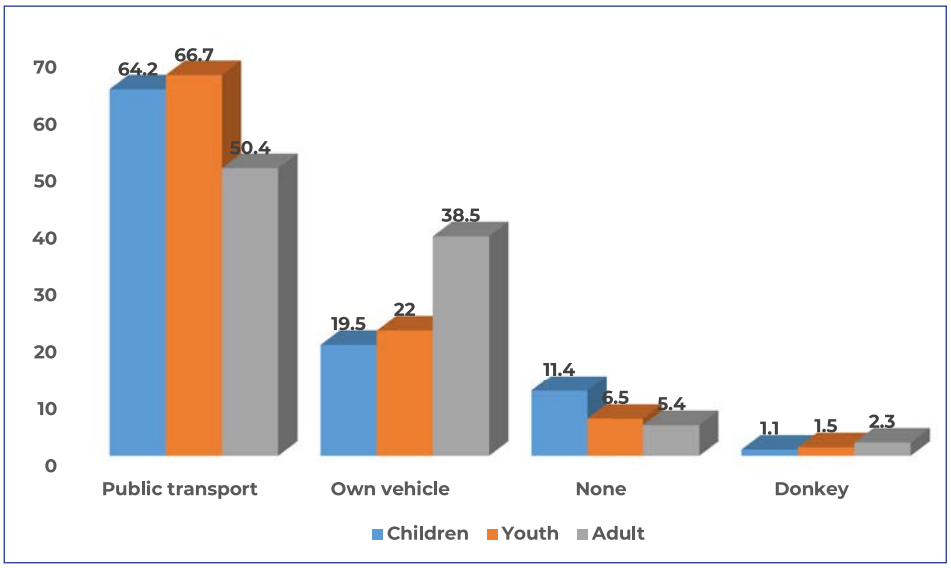


TABLE 4.2.14 TRANSPORT TYPE USAGE BY AGE (%)

AGE GROUP	FAMILY/OWN TRANSPORT	PUBLIC TRANSPORT	BICYCLE	DONKEY CART	NONE	OTHER
5-9	20.2	63.2	0.0	1.2	11.6	3.7
10-14	18.7	65.3	0.0	1.1	11.2	3.6
Children Total	**19.5**	**64.2**	**0.0**	**1.1**	**11.4**	**3.7**
15-19	15.1	72.0	0.1	1.3	8.3	3.0
20-24	12.1	76.2	0.2	1.5	6.9	3.0
25-29	19.3	69.5	0.3	1.5	6.3	3.1
30-34	28.5	60.8	0.4	1.5	5.8	3.0
35-39	35.2	54.6	0.4	1.6	5.4	2.8
Youth Total	**22.0**	**66.7**	**0.3**	**1.5**	**6.5**	**3.0**
40-44	38.9	51.0	0.5	1.8	5.1	2.7
45-49	40.3	49.3	0.5	2.1	5.2	2.6
50-54	40.4	48.7	0.6	2.3	5.3	2.7
55-59	36.5	50.8	0.9	3.0	5.9	2.7
60-64	33.0	53.1	1.2	3.6	6.3	2.7
Adult Total	**38.5**	**50.4**	**0.7**	**2.3**	**5.4**	**2.7**
65-69	4.0	56.4	1.5	4.5	6.6	2.7
70-74	22.8	60.0	1.6	5.2	7.4	3.0
75-79	19.3	63.2	1.4	4.9	8.2	3.0
80-84	18.1	64.1	1.0	4.9	9.1	2.8
85-89	19.2	63.4	0.6	3.9	10.2	2.6
90-94	18.0	61.8	0.4	3.6	13.2	2.9
90+	19.2	59.4	0.1	2.8	15.3	3.2
Elderly Total	**23.0**	**60.0**	**1.3**	**4.7**	**8.1**	**2.9**

4.3.5 Usage of Transport by Marital status and sex

Disaggregation of the mode of transport usage by marital status was also done. Results as presented in **Table 4.3.5** , indicate that among the married, more females at 37.2 percent use public transport as compared to their male counterparts at 28.2 percent. It is evident that married males coming out at 63.9 percent own or use family vehicles contrary to the 56.5 percent of female counterparts. Empirically, a high percentage of divorced and widowed females use public transport with 51.7 percent and 64.7 percent respectively. In almost all the marital status categories, females are the ones who record the highest use of public transport as compared to their male contreparts. Naturally this translates to comparatively less females owning vehicles, regardless of their marital status. Generally as reagrds being a pedestrial there is a higher proportion of females across all the marital status categories

TABLE 4.3.5: MODE OF TRANSPORT USAGE BY MARITAL STATUS AND SEX

TYPE OF TRANSPORT	MARITAL STATUS													
	MARRIED		NEVER MARRIED		LIVING TOGETHER		SEPARATED		DIVORCED		WIDOWED		NOT STATED	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Family/Own Transport	63.9	56.5	20	16.8	27.8	18.7	34.3	20.5	55.8	42.3	40.4	23.5	27.4	22.3
Public Transport	28.2	37.2	65.1	71.9	54.8	67.2	51.8	69.5	35.4	51.7	44.9	64.7	67.4	69.9
Bicycle	1.2	0.2	0.6	0	1.3	0.1	1.6	0.1	1.2	0.1	2.6	0.2	0	0
Donkey Cart	2.2	1.7	2.2	1.1	4.6	3.3	2.8	0.8	1.3	0.6	3.5	2.4	0	1
None	2.5	3.1	8.5	7.5	6.8	7.3	4.8	6.4	3.8	3.8	5.7	6.7	2.1	3.9
Other	2	1.3	3.7	2.7	4.6	3.4	4.7	2.6	2.4	1.4	2.8	2.5	2.1	2.9
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

4.3.6 Usage of Transport by Education status

Consistently from the previous analysis, public transport has been faring well in providing transport for the population. Results show persons who are still going to school 66 percent of them use public transport, 19.6 percent use family vehicles, while 10.2 percent walk to school. Among those who have completed school 59 percent use public transport, 31.6 percent use family car, while 5.25 percent go on foot. Those who discontinued and never attended school, predominantly use public transport, with 64.4 percent and 63 percent respectively. Quite a significant number over 10 percent are pedestrians in this indicator.

TABLE 4.3.6: POPULATION DISTRIBUTION BY TYPE OF TRANSPORT BY EDUCATION ATTAINMENT

TYPE OF TRANSPORT	EVER ATTENDED SCHOOL					TOTAL
	STILL AT SCHOOL	COMPLETED SCHOOL	DISCONTINUED	NEVER ATTENDED	NOT STATED	
Family/Own	19.6	31.6	13.4	12.0	17.7	**25.5**
Public Transport	66.0	59.0	64.4	63.0	69.6	**61.7**
Bicycle	0.0	0.4	1.1	1.3	0.1	**0.4**
Donkey Cart	0.8	1.3	5.2	6.5	1.4	**1.8**
None	10.2	5.2	10.5	12.2	7.9	**7.5**
Other	3.3	2.4	5.3	5.0	3.2	**3.0**
Total	**100**	**100**	**100**	**100**	**100**	100

4.3.7 Main Mode of Transport by Sex and employment status

Sustainable Development Goal 8 which aims to "promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all". Decent work, employment creation, social protection, rights at work and social dialogue represent integral elements of the new 2030 Agenda for Sustainable Development.

The results in Table 4.3.7 depicts that 32.7 percent males and 23.8 percent females who reported to be working at the time of Census own or use family vehicles, the proportions are obviously more than those who said they were not working. The working class both male and female on average of 17 percent use public transport and 30 percent for both sexes not working use public transport which makes true sense. More of both male and female who are unemployed use donkey carts at 35.3 percent and 27.6 percent compared to those

who are working. Similarly those who are not working in both sexes are pedestrians, and are more than those who are working at 33.9 percent and 36.8 percent respectively.

use public transport and 30 percent for both sexes not working use public transport which makes true sense. More of both male and female who are unemployed use donkey carts at 35.3 percent and 27.6 percent compared to those who are working. Similarly those who are not working in both sexes are pedestrians, and are more than those who are working at 33.9 percent and 36.8 percent respectively.

TABLE 4.3.7 : USAGE OF TRANSPORT BY SEX AND EMPLOYMENT STATUS

TYPE OF TRANSPORT	MALE			FEMALE			TOTAL
	YES	NO	NOT STATED	YES	NO	NOT STATED	
Family/Own Transport	32.7	19.9	0.0	23.8	23.5	0.0	**100**
Public Transport	16.4	28.3	0.1	17.7	37.4	0.1	**100**
Bicycle	51.4	39.2	0.0	4.3	5.1	0.0	**100**
Donkey Cart	25.8	35.3	0.0	11.2	27.6	0.0	**100**
None	16.2	33.9	0.1	13.0	36.8	0.1	**100**
Other	27.5	29.4	0.1	14.1	28.9	0.0	**100**

4.3.8 Type of Transport by Disability

Washington Group Short Set of Questions on Disability assist in identifying persons who are at greater risk than the general population of experiencing restrictions in performing complex activities. Disability serves as an umbrella term for impairments, activity limitations or participation restrictions (ICF, 2005). Countries are expected to follow the initiative, Botswana is not an exception. Censuses can be used to obtain data on selected aspects of disability like it was done in 2022 PHC.

The results show that across any form of disability, People with Disability (PWDs) commonly use public transport. The two types of transport, both taxis and buses combined in each type of disability scored more than 50 percent on average. To the other discovery, in all forms of disability, there are on average 7 percent of PWDs who are pedestrians.

TABLE 4.3.8 : TYPE OF TRANSPORT BY DISABILITY

TYPE OF TRANSPORT	SEEING		HEARING		COMMUNICATING		WALKING		SELF-CARE	
	WITHOUT DISABILITY	WITH DISABILITY	WITHOUT DISABILITY	WITH DISABILITY	WITHOUT DISABILITY	WITH DISABILITY	WITHOUT DISABILITY	WITH DISABILITY	WITHOUT DISABILITY	WITH DISABILITY
Own Vehicle	13.8	17.4	14.3	9.2	14.2	5.4	14.3	9.3	14.3	5.8
Family Vehicle	11.6	9.1	11.5	8.3	11.4	11.5	11.4	10.1	11.4	12.2
Public Taxi	23.8	20.9	23.6	21.5	23.5	22.3	23.6	22.0	23.5	22.6
Public Bus/Combi	38.2	38.0	38.1	42.0	38.2	40.7	38.1	40.2	38.2	39.2
Bicycle/Motorcycle	0.4	0.6	0.4	0.8	0.4	0.4	0.4	0.7	0.4	0.3
Donkey cart	1.7	3.1	1.7	4.2	1.8	3.1	1.7	4.4	1.8	3.2
None	7.5	7.6	7.4	10.1	7.4	12.4	7.4	9.7	7.4	13.1
Other	3.0	3.2	3.0	3.8	3.0	4.1	3.0	3.5	3.0	3.7
TOTAL (%)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

5.0 SUMMARY ON MAIN FINDINGS

The results show that the main mode of transport for the population is public transport comprising of buses and taxis which was 38.2 and 23.5 percent respectively. The other important result is that, around a quarter (25.5 %) of the population uses own or family car.

The results show that other modes of public transport such as trains and aircraft have virtually no measurable use by members of the public.

The data obtained from this census data is not adequate to provide full information on the SDG indicator 9.1.2 which defined as "passenger and freight volumes by mode of transport" but does provides an indication on passenger volumes in terms of the proportion of the population using transport modes of buses/combis and taxis at 61 percent and own or family vehicles at 25.5 percent. In the same vein, the 2022 PHC have displayed scanty data to adequately speak to use by people with disability that making it difficult to build sufficient evidence to inform policy recommendations.

As the results show that a quarter of the populace predominantly use public transport, there should be deliberate national agenda on transport sector, whose aim is to improve existing ones infrastructure and related services as well introduction of further new developments. These entail, safe roads and modern public transport systems. This is supported by the significant number of young population using public transport as the modal transport.

Across any form of disability, People with Disability (PWDs) commonly use public transport. The two types of transport, both taxis and buses combined in each type of disability scored more than 50 percent on average. It is important to note that across in all forms of disability, there is an average 7 percent of PWDs who are pedestrians.

6.0 RECOMMENDATIONS

- The question on transport be included in the next PHC to inform on trends and gain further information on this important driver of socio-economic development.

- Priority as regards to road infrastructure should be deliberate towards improving roads and making them safe to be used taking into account that population groups that need greater protection and care such as school going children and PWDs predominantly use road as the mode of transport.

- More extensive plans should be considered by all transport facilitators and providers for addition to road transport of other means of public transport such as rail for example so as to diversify the modes of transport used.

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ICT PENETRATION LEVEL IN BOTSWANA

By

Albert Madusise

EXECUTIVE SUMMARY

The purpose of the study was to find the level of ICT penetration and challenges faced in accessing internet. Information and communication technologies (ICT) have become important for individuals, companies, and governments. In this paper, the 2022 Botswana population and housing census ICT data were analysed.

The quantitative methodology approach was used for analysis. The variables used in the analysis were; the use of a computer, use of a mobile phone in the last 3 months, use of internet in the last 3 months, internet connectivity, internet access, and reasons for not accessing the internet. The analysis focused on the whole population, districts, and age groups. The chi-square was used to test the association between the age groups and internet connectivity. The frequency tables, graphs, cross-tabulations, and chi-square results were used to discuss the data.

The results showed that 31.7 percent of the population aged five (5) years and over were using computers, and 77 percent were using mobile phones. The data showed that 57.9 percent of the population had used the internet and 42.1 percent had not used the internet. Mining towns like Orapa and Jwaneng had the highest number of users of the internet. Estimates of the type of internet accessed were mainly on mobile internet was 68.1 percent of the population, fixed wireless was 24.1 percent, ASDL was 5.8 percent, satellite broadband was 1.0 percent and fibre was 1.0percent. The challenges of accessing the internet were due to the cost of the equipment being too high 23.8 percent, lack of knowledge with 18.6 percent, not needing the internet 15.3 percent, and having internet access somewhere 9.3 percent. The government needs to introduce free Wi-Fi, to help a significant number of respondents who were accessing internet somewhere. The age group 25 to 39 years was among of the majority of the population who were able to connect to the internet as they were the group actively engaged in employment. The chi-square showed that there was a significant association between age group and internet connectivity.

The findings showed that although there was good access to ICT in mining towns, the ICT penetration was very low in rural districts. The majority of the population did not access the satellite broadband and fibre-to-home. The government, internet service providers and financial institutions are recommended to find ways of collaborating to assist the population where the ICT penetration was low

1. INTRODUCTION

1.1 CONTEXT

This paper aims to examine the level of ICT penetration in Botswana. The use of ICT is important to solve problems in healthcare, education, agriculture, environment, infrastructure, and finance. With Botswana moving towards a knowledge-based economy, especially in the rapid technological advancement, the country has shifted to skills focusing on the fourth industrial revolution. The revolution involves the use of technologies in the internet of Things (IoT), cloud computing, big data, robotics, and Artificial intelligence. The integration of the technologies has also led to digital banking, especially after COVID-19 when people were using online transactions during and after the pandemic.

In Botswana, the Ministry of communication, knowledge and technology is responsible for ICT. The ministry's mandate is to connect and network communities through safe, secure, and accessible transport communication infrastructure. Botswana's internet providers are Botswana Telecommunications Corporation (BTC), Broadband Botswana Internet (BBi), Jenny Internet Botswana, Mascom, Orange Botswana, Abari Communications Botswana, and Zebra Net. The major three mobile networks in Botswana are; Mascom, Orange, and Bemobile provide mobile money. The networks support financial transactions where Mascom is through Myzaka, Orange through Orange Money, Bemobile through Smega and all three networks support Poso Money. All the mobile transactions help the unbanked population to do their transactions with ICT.

Since the inception of e-government in 2012, Botswana has made many improvements from paper systems to electronic systems by using ICT. According to Samboma (2019), the government of Botswana in 2013 placed e-government initiates, which were ICT-driven to improve service delivery. Other areas aimed for service delivery improvement were the national identity card-OMANG, vital statistics registration (birth, marriage, death, etc.), and government core services (HR, finance, procurement, project management, and knowledge management (Samboma, 2019). ICT is important in an economy for payment on digital channels using mobile money and internet banking such as payment of airtime, electricity, and water bills that need good coverage of the internet. The introduction of the GABS (Government Accounting and Budgeting Systems) needs good coverage of ICT in Botswana to function well in the country.

Although ICT has been introduced in Botswana, some challenges come with it to reach the population. According to Samboma (2019), the debates around e-government came because of complaints from different stakeholders that e-government is not meeting their expectations. Mogotlhawane and Underwood (2013) state that the high cost of hardware and internet access charges were an obstacle to the public. Mogotlhawane and Underwood (2013) point out that all major newspapers were accessed through the internet and could not be accessed by people without the internet.

1.2 PROBLEM STATEMENT

Despite increasing ICT penetration in the world as a driver in economic development, part of the population and districts in Botswana lack access to it. Mogotlhawane and Underwood (2013) point out that although ICT is available in cities like Gaborone, it is still beyond the reach of the majority of people who do not have disposable income. Qiu (2019) points out that majority of people in Botswana reported not being connected to efficient networks services such as hot spots, wireless infrastructure, and fixed broadband lines. Mogotlhawane and Underwood (2013) points out that costs of using ICT, remains the biggest problem that prevents members of the public from using the technology.

1.3 SIGNIFICANCE OF THE STUDY

The results of the study provide information to policymakers to identify districts where the ICT penetration level was low. The government will identify the areas that need improvement in terms

of ICT infrastructure. The internet service providers will be able to identify districts where the internet connection was very low. This will enable the internet service providers where they need to boost their network or increase coverage.

The results of the study will help to detect the districts where the internet connectivity was not reached and this will assist it detecting the population that was not benefiting from e-learning. Financial institutions like banks will be able to identify the population not reached in the use of online and mobile banking and improve their services in the population not accessing internet. The researchers will advance more research on the effects of lack of internet access on other sectors like mining and tourism using the population, which the ICT penetration was low.

1.4 OBJECTIVE OF THE ANALYSIS

The objectives of the analysis were to:

(a) determine the level of ICT penetration in Botswana and districts.
(b) identify the major type of internet access in Botswana.
(c) determine the main age group which accesses the internet and uses ICT.
(d) find challenges facing ICT penetration in Botswana.

1.5 DEFINITIONS OF MAIN CONCEPTS

Internet connectivity refers to how people are hooked to the internet using telephones, broadband, and wireless devices.

Use of the internet refers to connecting to the internet and checking mail, downloading, social media, etc.

Internet access is a facility or service that provides connectivity for a computer, a computer network, or other network device to the Internet.

LITERATURE REVIEW

ICT is one driver of economic growth in developing countries. The 2030 agenda for sustainable development goals focuses on achieving the ICT penetration levels in different countries. Goal 5(b) focuses on the use of enabling technology, in particular information and communication, to promote the empowerment of women (UN, 2015). ICT is the backbone of most of the sectors to empower the nation. Goal 9(c) focuses on increasing access to information and communication technology and strives to provide universal and affordable access to the internet in least-developed countries by 2030. (UN, 2015) The ICT penetration is targeted by goal 17.8, which focuses on fully, operationalise the technology and innovation capacity-building mechanism for least developed countries by 2017 and enhancing the use of enabling technology, in particular information and communication technology. (UN, 2015)

Agenda 2063 focuses on accelerating the technological transformation with the development of ICT in the digital economy, (African Union Commission, 2015). The focus is also on connecting Africa through excellent infrastructure projects in ICT. The focus of the continent is on an integrated e-economy where every government, business, and citizen has access to reliable and affordable ICT services. The targets were to increase broadband penetration by 10percent by 2018; broadband connectivity by 20 percentage points, and provide access to ICT to children in schools and venture capital to young Africa. (African Union Commission, 2015)

The Maitlamo National policy for ICT development adopted by Botswana in 2007 focused on an innovation-driven economy. (Maitlamo National policy for ICT development, 2007). In Statistics Botswana (2022), the fixed telephone subscription had decreased by 2.3 percent in Q4 of 2022. Mobile cellular telephone subscriptions had increased by 0.8 percent in Q4 of 2022. The internet subscription increased by 3.6 percent in Q3. Mobile money subscriptions had increased by 1.3 percent in Q3. The

fixed-to-mobile telephone domestic calls traffic went down by 0.65 in Q4 of 2022. The mobile to fixed telephone domestic calls traffic had decreased by 1.1 percent in Q4. The outgoing international call traffic from fixed telephones had decreased by 8.2 percent. The mobile telephone increased by 0.8 percent in Q4 of 2022. The ICT sector made a contribution of 2.5 percent to the total GDP in Q4 of 2022. The ICT sector realised an annual growth rate of 4.6 percent, Statistics Botswana (2022). Therefore, ICT is important in the functioning of the economy.

As part of the DE4A (Digital Economy for Africa) initiative, the focus was to measure success against the goal of ensuring that every individual, business, and government is digitally enabled by 2030, World Bank Group (2022). The objective of the DE4A was to connect countries digitally through ICT by 2030. The priority areas were aimed at closing access gaps, making digitization worthwhile, improving the enabling environment, leveraging private sector resources, and overcoming geographic barriers, World Bank Group (2022)

The pillar of sustainable economic development in Vision 2036 focused on Botswana as an efficient economy, vibrant, innovative, and knowledge-based with leading-edge technology and infrastructure, Vision 2036(2016). This showed that the economy was focusing on improving technology in the country through ICT. Vision 2036(2016), states that ICT is a key contribution to economic growth and employment. Therefore, a country needs to understand the level of ICT penetration as it aids in economic growth and job creation.

METHODOLOGY

The quantitative approach was used in this study to analyse the 2022 population and housing census population data. The variables used in the analysis were; the use of a computer, use of mobile phone in the last 3 months, use of internet in the last 3 months, internet connectivity, internet access, and reasons for not accessing the internet. The analysis focused on the population aged five (5) years and over, districts, and age groups. SPSS version 27 was used to organise responses (data) into frequency tables, graphs, and cross-tabulations. The chi-square was used to test the association between the age groups and internet connectivity. The frequency tables, graphs, cross-tabulations, and chi-square results were used to discuss the data.

FINDINGS AND DISCUSSIONS

Use of a computer in the last 3 months

Figure 1 shows that 31.7 percent of the population had used computers in the last 3 months. Those who had not used computers were 68.3 percent. It shows that more people had not used computers as compared to the ones who used them.

FIGURE 1: PERCENTAGE USE OF COMPUTERS IN THE LAST 3 MONTHS

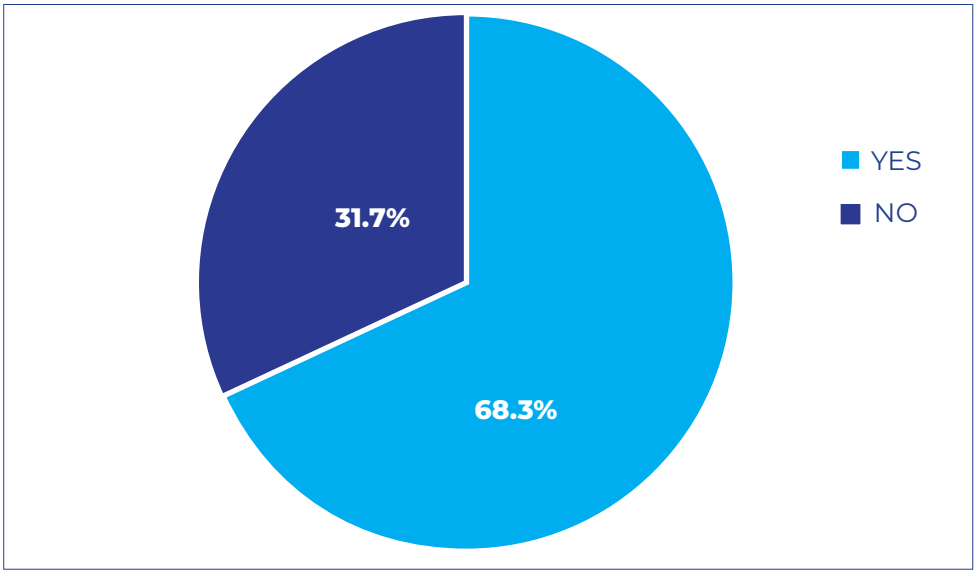


Table 1 shows the number of people who had used the computers in the different districts. The high percentage of the population using computers was from the following districts, Orapa with 76.7 percent followed by Gaborone with 63.3 percent, and Jwaneng 60.1 percent. The figures show that the two mining towns Orapa and Jwaneng had a high percentage of the population with computers. Districts that had the lowest use of computers were Ngwaketse West with 12.4 percent, followed by CKGR with 13.5 percent, and then Kweneng West with 13.6 percent.

TABLE 1: DISTRICT POPULATION AND PERCENTAGE USE OF COMPUTERS IN THE LAST 3 MONTHS

DISTRICT	YES	NO	TOTAL	% YES	% NO	TOTAL
Gaborone	137,693	79,672	**217,365**	63.3	36.7	**100.0**
Francistown	39,490	48,494	**87,984**	44.9	55.1	**100.0**
Lobatse	10,180	15,110	**25,290**	40.3	59.7	**100.0**
Selibe Phikwe	14,299	22,053	**36,352**	39.3	60.7	**100.0**
Orapa	5,781	1,757	**7,538**	76.7	23.3	**100.0**
Jwaneng	9,861	6,538	**16,399**	60.1	39.9	**100.0**
Sowa	1,423	1,363	**2,786**	51.1	48.9	**100.0**
Southern	26,171	91,745	**117,916**	22.2	77.8	**100.0**
Barolong	7,871	41,470	**49,341**	16.0	84.0	**100.0**
Ngwaketse West	2,437	17,201	**19,638**	12.4	87.6	**100.0**
South East	47,210	51,220	**98,430**	48.0	52.0	**100.0**
Kweneng East	90,324	194,792	**285,116**	31.7	68.3	**100.0**
Kweneng West	6,468	41,100	**47,568**	13.6	86.4	**100.0**
Kgatleng (Wards)	33,128	72,048	**105,176**	31.5	68.5	**100.0**
Central Serowe -Palapye	40,814	129,262	**170,076**	24.0	76.0	**100.0**
Central Mahalapye	19,438	90,720	**110,158**	17.6	82.4	**100.0**
Central Bobonong	12,450	50,861	**63,311**	19.7	80.3	**100.0**
Central Boteti	16,648	45,507	**62,155**	26.8	73.2	**100.0**
Central Tutume	24,329	113,908	**138,237**	17.6	82.4	**100.0**
North East	14,581	43,654	**58,235**	25.0	75.0	**100.0**
Ngamiland East	30,547	68,689	**99,236**	30.8	69.2	**100.0**
Ngamiland West	8,456	49,619	**58,075**	14.6	85.4	**100.0**
Chobe	9,287	15,197	**24,484**	37.9	62.1	**100.0**
Delta	721	1,660	**2,381**	30.3	69.7	**100.0**
Ghanzi	11,549	32,744	**44,293**	26.1	73.9	**100.0**
CKGR	53	339	**392**	13.5	86.5	**100.0**
Kgalagadi South	6,831	22,405	**29,236**	23.4	76.6	**100.0**
Kgalagadi North	4,898	14,638	**19,536**	25.1	74.9	**100.0**
TOTAL	**632,938**	**1,363,766**	**1,996,704**	**31.7**	**68.3**	**100.0**

Use of mobile phone in the last 3 months

Figure 2 shows the population that had used the mobile phones. The evidence from the bar graph shows that 77 percent had used mobile phones, while 23 percent of the population had not used mobile phones. Although the graph showed that the population that used the mobile phone was high, there was a significant population that had not used the mobile phone.

FIGURE 2: PERCENTAGE OF THE POPULATION USED MOBILE IN THE LAST 3 MONTHS

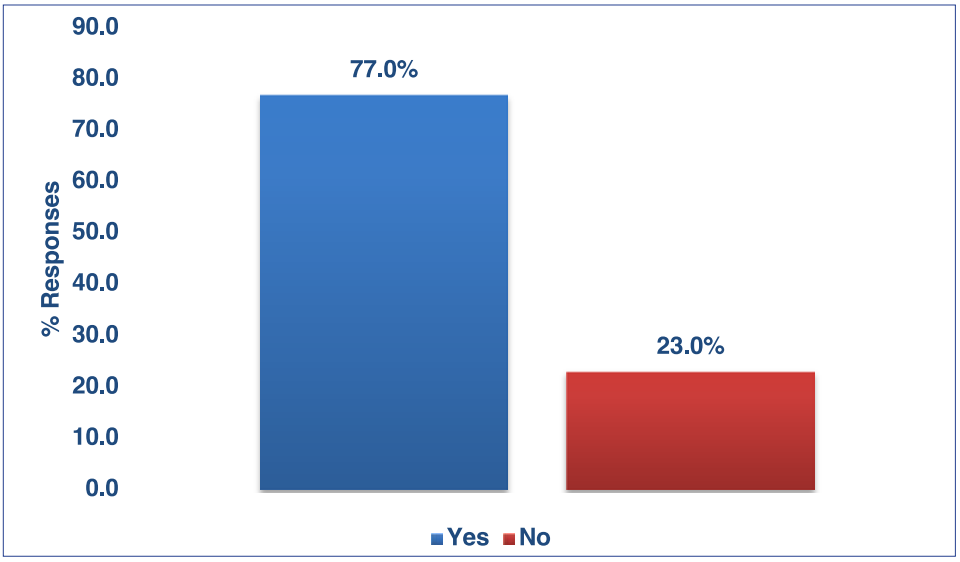


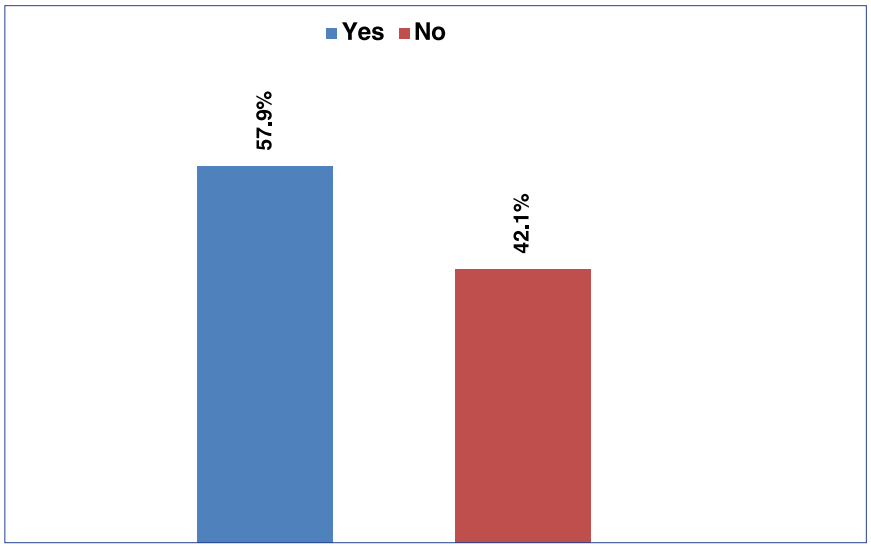
Table 2 shows that the highest number of the population that used the mobile phone was in Orapa district with 91.3 percent, followed by Gaborone with 90.5 percent and Jwaneng with 90.3 percent. More than 90 percent of the population in the two mining towns Orapa and Jwaneng showed that almost every household was using a mobile phone. The only district that had less than 50 percent of the population using a mobile phone was CKGR with 32.1 percent. However, the other districts had low use of mobile phones but the percentage was above 50 percent like Ngwaketse West 60.2 percent followed by Ngamiland West 60.6 percent

TABLE 2: DISTRICTS POPULATION AND PERCENTAGE USE OF MOBILE PHONES IN THE LAST 3 MONTHS

DISTRICT	YES	NO	TOTAL	% YES	% NO	TOTAL
Gaborone	196,896	20,669	**217,565**	90.5	9.5	**100.0**
Francistown	76,167	11,823	**87,990**	86.6	13.4	**100.0**
Lobatse	20,894	4,395	**25,289**	82.6	17.4	**100.0**
Selibe Phikwe	30,593	5,809	**36,402**	84.0	16.0	**100.0**
Orapa	6,880	659	**7,539**	91.3	8.7	**100.0**
Jwaneng	14,817	1,590	**16,407**	90.3	9.7	**100.0**
Sowa	2,289	497	**2,786**	82.2	17.8	**100.0**
Southern	87,676	30,253	**117,929**	74.3	25.7	**100.0**
Barolong	33,682	15,659	**49,341**	68.3	31.7	**100.0**
Ngwaketse West	11,826	7,809	**19,635**	60.2	39.8	**100.0**
South East	84,322	14,118	**98,440**	85.7	14.3	**100.0**
Kweneng East	225,358	59,982	**285,340**	79.0	21.0	**100.0**
Kweneng West	29,963	17,621	**47,584**	63.0	37.0	**100.0**
Kgatleng (Wards)	84,837	20,406	**105,243**	80.6	19.4	**100.0**
Central Serowe –Palapye	125,906	44,206	**170,112**	74.0	26.0	**100.0**
Central Mahalapye	76,835	33,345	**110,180**	69.7	30.3	**100.0**
Central Bobonong	48,650	14,811	**63,461**	76.7	23.3	**100.0**
Central Boteti	44,886	17,274	**62,160**	72.2	27.8	**100.0**
Central Tutume	92,355	45,909	**138,264**	66.8	33.2	**100.0**
North East	44,116	14,121	**58,237**	75.8	24.2	**100.0**
Ngamiland East	77,796	21,559	**99,355**	78.3	21.7	**100.0**
Ngamiland West	35,297	22,943	**58,240**	60.6	39.4	**100.0**
Chobe	19,497	4,985	**24,482**	79.6	20.4	**100.0**
Delta	2,088	293	**2,381**	87.7	12.3	**100.0**
Ghanzi	30,759	13,548	**44,307**	69.4	30.6	**100.0**
CKGR	126	266	**392**	32.1	67.9	**100.0**
Kgalagadi South	19,759	9,479	**29,238**	67.6	32.4	**100.0**
Kgalagadi North	13,456	6,091	**19,547**	68.8	31.2	**100.0**
TOTAL	**1,537,726**	**460,120**	**1,997,846**	**77.0**	**23.0**	**100.0**

Use of the Internet in the last 3 months

FIGURE 3: Percentage of the population that used the internet in the last 3 months



In **Figure 3**, the graph shows that 57.9 percent of the population had used the internet. The results showed that 42.1 percent had not used the internet and therefore there was a need to check why the population was not connecting to the internet.

TABLE 3: DISTRICTS POPULATION AND PERCENTAGE USE OF INTERNET IN THE LAST 3 MONTHS

DISTRICT	YES	NO	TOTAL	% YES	% NO	TOTAL
Gaborone	167,547	32,457	**200,004**	83.8	16.2	**100.0**
Francistown	54,933	22,290	**77,223**	71.1	28.9	**100.0**
Lobatse	13,546	7,688	**21,234**	63.8	36.2	**100.0**
Selibe Phikwe	20,853	10,168	**31,021**	67.2	32.8	**100.0**
Orapa	6,793	389	**7,182**	94.6	5.4	**100.0**
Jwaneng	12,335	2,712	**15,047**	82.0	18.0	**100.0**
Sowa	1,938	432	**2,370**	81.8	18.2	**100.0**
Southern	41,263	47,805	**89,068**	46.3	53.7	**100.0**
Barolong	14,136	20,044	**34,180**	41.4	58.6	**100.0**
Ngwaketse West	3,929	8,317	**12,246**	32.1	67.9	**100.0**
South East	63,288	22,364	**85,652**	73.9	26.1	**100.0**
Kweneng East	131,241	97,118	**228,359**	57.5	42.5	**100.0**
Kweneng West	10,080	20,359	**30,439**	33.1	66.9	**100.0**
Kgatleng (Wards)	50,651	35,412	**86,063**	58.9	41.1	**100.0**
Central Serowe –Palapye	62,056	65,483	**127,539**	48.7	51.3	**100.0**
Central Mahalapye	31,879	45,776	**77,655**	41.1	58.9	**100.0**
Central Bobonong	20,364	28,757	**49,121**	41.5	58.5	**100.0**
Central Boteti	24,147	21,406	**45,553**	53.0	47.0	**100.0**
Central Tutume	41,099	52,907	**94,006**	43.7	56.3	**100.0**
North East	21,832	23,002	**44,834**	48.7	51.3	**100.0**
Ngamiland East	47,244	31,470	**78,714**	60.0	40.0	**100.0**
Ngamiland West	14,719	21,209	**35,928**	41.0	59.0	**100.0**
Chobe	13,956	5,917	**19,873**	70.2	29.8	**100.0**
Delta	2,088	293	**2,381**	87.7	12.3	**100.0**
Ghanzi	30,759	13,548	**44,307**	69.4	30.6	**100.0**
CKGR	126	266	**392**	32.1	67.9	**100.0**
Kgalagadi South	19,759	9,479	**29,238**	67.6	32.4	**100.0**
Kgalagadi North	13,456	6,091	**19,547**	68.8	31.2	**100.0**
TOTAL	**1,537,726**	**460,120**	**1,997,846**	**77.0**	**23.0**	**100.0**

Table 3 shows that Orapa district had the highest use of the internet with 94.6 percent of the district, followed by Gaborone with 83.8 percent and Jwaneng with 82.0 percent. The two mining towns Orapa and Jwaneng had high use of the internet, which agrees with the results of **Table 2** that the two towns also had high use of mobile phones. The lowest use of the internet was in Ngwaketse West with 32.1 percent of the district, followed by Kweneng West with 33.1 percent, and Ngamiland West with 41.0percent.

Internet connection

FIGURE 4: Percentage of population connectivity of internet

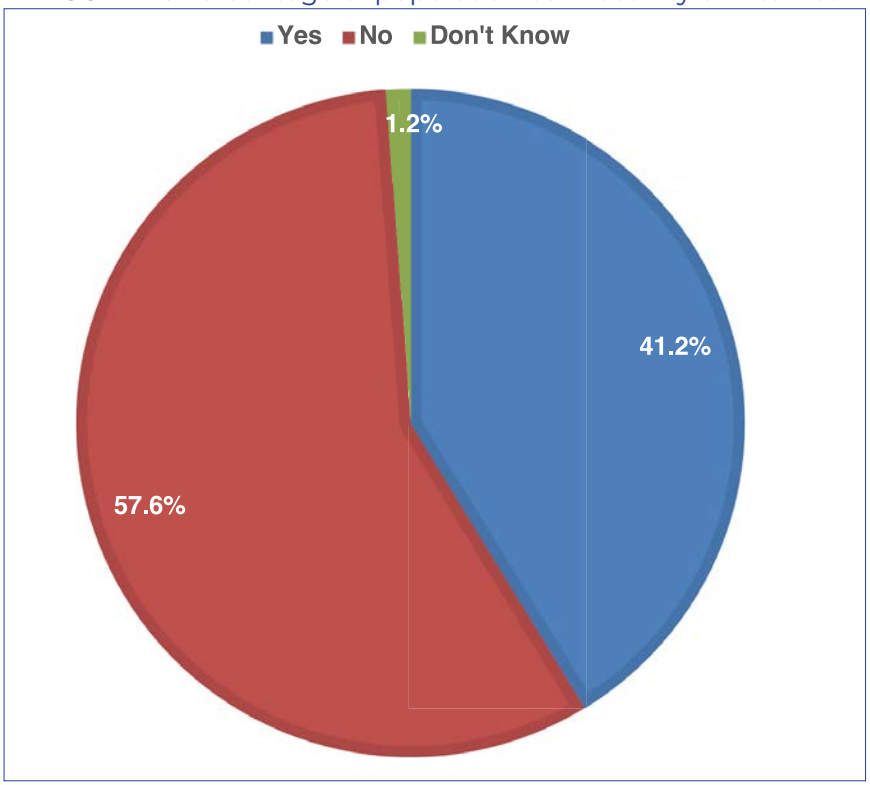


Figure 4 shows the percentage of the population that connected to the internet was 41.2 percent, the percentage that did not connect to the internet was 57.6 percent and 1.2 percent did not know. Based on the evidence in the graph, there is a need for ICT literacy so that the population understands what connectivity of the internet means.

TABLE 4: DISTRICT POPULATION AND PERCENTAGE OF INTERNET CONNECTIVITY

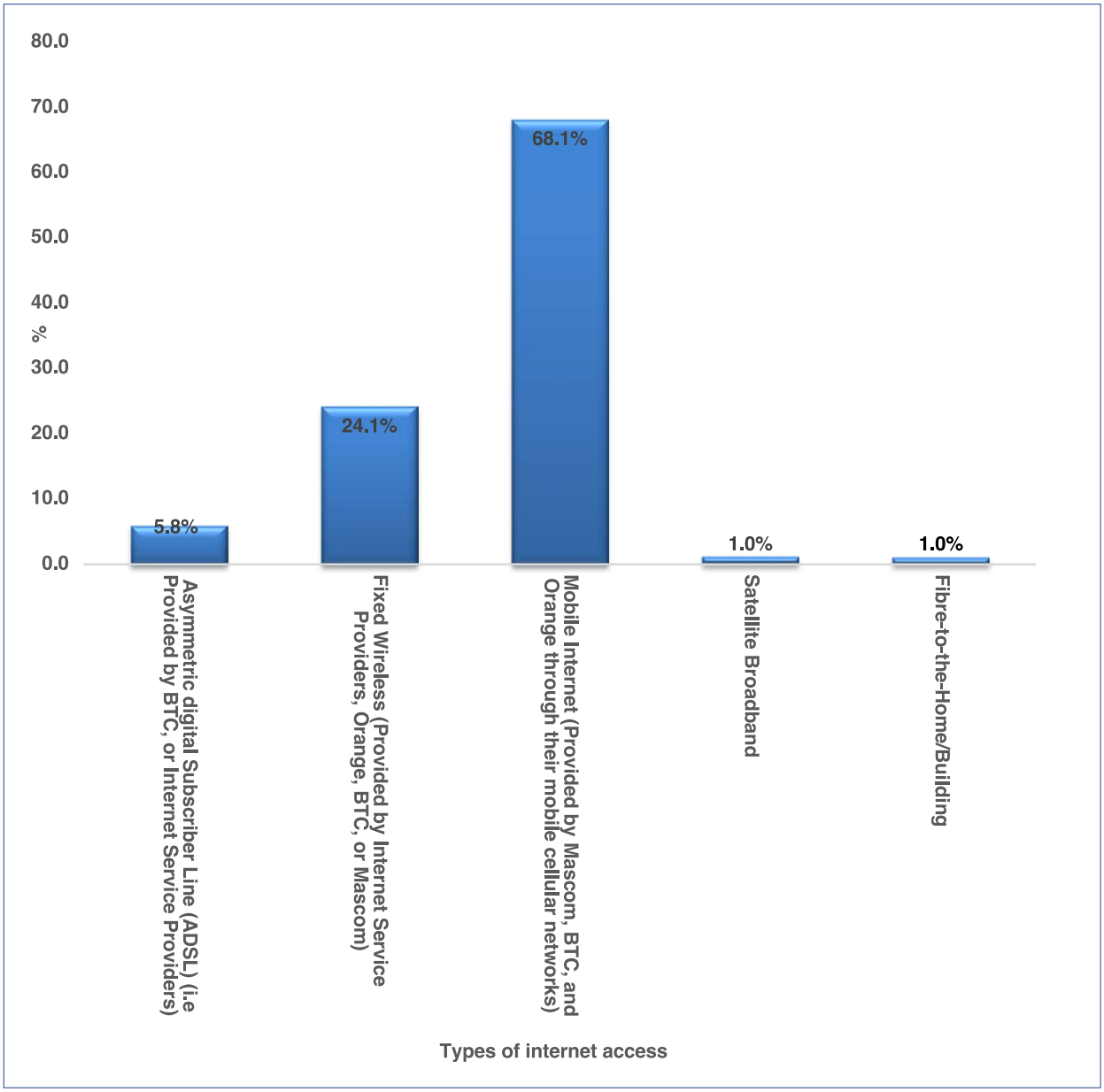
DISTRICT	YES	NO	DON'T KNOW	TOTAL	% YES	% NO	DON'T KNOW	TOTAL
Gaborone	52,314	29,832	260	**82,406**	63.5	36.2	0.3	**100.0**
Francistown	17,480	16,116	213	**33,809**	51.7	47.7	0.6	**100.0**
Lobatse	2,691	7,119	29	**9,839**	27.4	72.4	0.3	**100.0**
Selibe Phikwe	7,260	5,997	70	**13,327**	54.5	45.0	0.5	**100.0**
Orapa	2,687	355	5	**3,047**	88.2	11.7	0.2	**100.0**
Jwaneng	4,103	2,448	34	**6,585**	62.3	37.2	0.5	**100.0**
Sowa	689	416	1	**1,106**	62.3	37.6	0.1	**100.0**
Southern	12,791	24,553	462	**37,806**	33.8	64.9	1.2	**100.0**
Barolong	3,863	12,336	299	**16,498**	23.4	74.8	1.8	**100.0**
Ngwaketse West	1,278	5,080	230	**6,588**	19.4	77.1	3.5	**100.0**
South East	22,386	13,747	190	**36,323**	61.6	37.8	0.5	**100.0**
Kweneng East	40,545	58,569	1,594	**100,708**	40.3	58.2	1.6	**100.0**
Kweneng West	3,552	11,978	390	**15,920**	22.3	75.2	2.4	**100.0**
Kgatleng (Wards)	16,710	19,523	304	**36,537**	45.7	53.4	0.8	**100.0**
Central Serowe -Palapye	19,163	37,049	771	**56,983**	33.6	65.0	1.4	**100.0**
Central Mahalapye	10,592	25,481	608	**36,681**	28.9	69.5	1.7	**100.0**
Central Bobonong	6,360	15,547	303	**22,210**	28.6	70.0	1.4	**100.0**
Central Boteti	6,872	14,064	322	**21,258**	32.3	66.2	1.5	**100.0**
Central Tutume	12,430	33,160	1,036	**46,626**	26.7	71.1	2.2	**100.0**
North East	7,897	12,901	112	**20,910**	37.8	61.7	0.5	**100.0**
Ngamiland East	13,733	17,363	479	**31,575**	43.5	55.0	1.5	**100.0**
Ngamiland West	5,205	12,345	370	**17,920**	29.0	68.9	2.1	**100.0**
Chobe	5,714	4,377	32	**10,123**	56.4	43.2	0.3	**100.0**
Delta	40	135	15	**190**	21.1	71.1	7.9	**100.0**
Ghanzi	5,000	9,996	135	**15,131**	33.0	66.1	0.9	**100.0**
CKGR	4	80	-	**84**	4.8	95.2	0.0	**100.0**
Kgalagadi South	3,274	6,424	46	**9,744**	33.6	65.9	0.5	**100.0**
Kgalagadi North	2,893	4,249	26	**7,168**	40.4	59.3	0.4	**100.0**
TOTAL	**287,526**	**401,240**	**8,336**	**697,102**	**41.2**	**57.6**	**1.2**	**100.0**

Table 4 shows the percentage of population connectivity in each district. The highest responses of internet connectivity were in Orapa district with 88.2 percent, followed by Gaborone with 63.5 percent, and Jwaneng and Sowa with 62.3 percent. The data shows that the three mining towns, Orapa, Jwaneng, and Sowa had the highest responses of internet connectivity. The lowest internet connectivity was in the CKGR district with 4.8 percent, followed by Ngwaketse West with 19.4 percent, and Delta with 21.1 percent. The districts where the respondents did not know about internet connectivity were Delta with 7.9 percent of the population, Ngwaketse West 3.5 percent, and Kweneng West 2.4 percent.

Types of Internet access

Figure 5 shows the response from the population on the type of internet they accessed.

FIGURE 5: Type of internet accessed



The highest type of internet accessed was Mobile internet (Provided by Mascom, BTC, and Orange through their mobile cellular networks) with 68.1 percent, followed by fixed wireless (Provided by internet service providers, Orange, BTC, or Mascom) with 24.1 percent and Asymmetric digital subscriber line (ADSL) (i.e. provided by BTC or internet service providers) with 5.8 percent. The graph shows that the majority of the responses were able to access the mobile internet. The satellite broadband and fibre-to-the-home/building internet were accessible by few responses with a percentage of 1percent for both types.

TABLE 5: PERCENTAGE OF DISTRICT TYPE OF INTERNET ACCESSED

DISTRICT	ASYMMETRIC DIGITAL S UBSCRIBER LINE (ADSL) (I.E PROVIDED BY BTC, OR INTERNET SERVICE PROVIDERS)	FIXED WIRELESS (PROVIDED BY INTERNET SERVICE PROVIDERS, ORANGE, BTC, OR MASCOM)	MOBILE INTERNET (PROVIDED BY MASCOM, BTC, AND ORANGE THROUGH THEIR MOBILE CELLULAR NETWORKS)	SATELLITE BROADBAND	FIBRE-TO-THE-HOME/BUILDING	TOTAL
Gaborone	10.8	40.0	42.4	2.3	4.4	**100.0**
Francistown	6.9	23.8	67.7	1.3	0.3	**100.0**
Lobatse	10.1	38.1	51.1	0.6	0.1	**100.0**
Selibe Phikwe	4.7	20.7	74.2	0.5	0.0	**100.0**
Orapa	9.5	58.7	30.6	0.7	0.5	**100.0**
Jwaneng	11.2	37.9	49.6	0.2	1.2	**100.0**
Sowa	9.9	28.7	58.8	2.6	0.0	**100.0**
Southern	2.4	12.0	84.8	0.6	0.1	**100.0**
Barolong	2.0	17.0	80.7	0.2	0.1	**100.0**
Ngwaketse West	1.1	14.2	84.5	0.2	0.1	**100.0**
South East	6.6	30.1	61.7	1.0	0.7	**100.0**
Kweneng East	4.9	22.2	71.9	0.7	0.3	**100.0**
Kweneng West	2.9	17.3	79.5	0.1	0.1	**100.0**
Kgatleng (Wards)	4.7	20.5	73.5	1.1	0.1	**100.0**
Central Serowe -Palapye	3.6	19.0	76.5	0.7	0.2	**100.0**
Central Mahalapye	3.2	12.9	83.6	0.3	0.1	**100.0**
Central Bobonong	2.3	13.9	82.8	0.6	0.3	**100.0**
Central Boteti	5.6	21.4	71.8	1.0	0.2	**100.0**
Central Tutume	3.2	17.0	78.9	0.7	0.1	**100.0**
North East	3.2	18.0	77.7	1.0	0.1	**100.0**
Ngamiland East	6.2	18.7	74.0	0.7	0.4	**100.0**
Ngamiland West	4.4	10.6	84.1	0.4	0.6	**100.0**
Chobe	3.1	18.3	78.0	0.5	0.1	**100.0**
Delta	0.0	7.7	92.3	0.0	0.0	**100.0**
Ghanzi	3.8	20.2	74.7	0.8	0.4	**100.0**
CKGR	0.0	0.0	0.0	100.0	0.0	**100.0**
Kgalagadi South	3.9	12.8	82.4	0.7	0.1	**100.0**
Kgalagadi North	4.2	7.2	87.6	0.9	0.1	**100.0**
TOTAL	**5.8**	**24.1**	**68.1**	**1.0**	**1.0**	100.0

Table 5 shows the district and type of internet accessed. The percentages show the proportion in each district and the type of internet accessed as compared to the other types. On the asymmetric digital subscriber line (ADSL), the district, which had the highest, was Jwaneng with 11.2 percent, followed by Gaborone with 10.8 percent and Lobatse at 10.1 percent. The lowest responses were in both CKGR and Delta with 0percent and Ngwaketse West at 1.1 percent. On the fixed wireless, Orapa had the highest of 58.7 percent, followed by Gaborone with 40 percent and Lobatse with 38.1

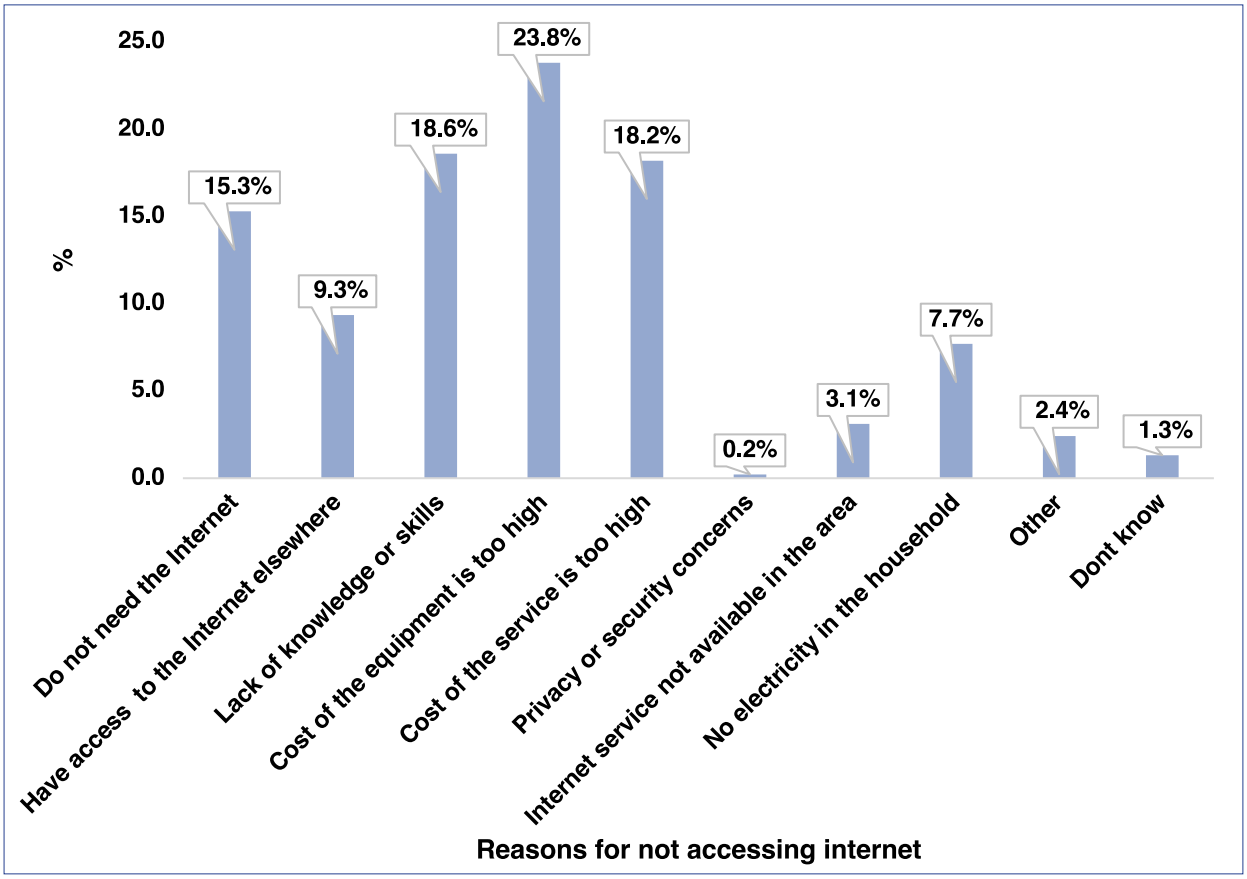
percent. The lowest was on CKGR with 0percent, Delta with 7.7 percent, and Kgalagadi North with 7.2 percent. Generally, most districts had high connectivity of mobile internet. The district with the highest population on a mobile internet connection was Delta district with 92.3 percent, Kgalagadi North 87.6 percent, and Southern 84.8 percent. The district that had the lowest mobile internet was CKGR with 0percent followed by Orapa with 30.6 percent, and Gaborone with 42.4 percent.

The Satellite broadband internet connectivity was high in Sowa with 2.6 percent, Gaborone 2.3 percent, and Francistown with 1.3 percent. The lowest connectivity on satellite broadband was Delta with 0percent, Kweneng West with 0.1 percent, the following Barolong, Ngwaketse West, and Jwaneng with 0.2 percent. On the fibre-to-the-home/building internet connection, all districts recorded less than 5percent as compared to the other types of internet connection. The highest was recorded in Gaborone with 4.4 percent, Jwaneng with 1.2 percent, and South east 0.7 percent. However, the lowest of 0percent were in Selibi-Phikwe, Sowa, and Delta.

Reasons for not accessing the internet

Figure 6 shows the reasons for not accessing the internet.

FIGURE 6: Reasons for not accessing the internet



The major reason for not accessing the internet was due to cost. The two costs were the cost of the equipment at 23.8 percent and the cost of service at 18.2 percent of the population. Lack of knowledge or skills with 18.6 percent. The other reasons for not accessing the internet were the respondents 'did not need the internet' 15.3 percent and those who 'had internet access somewhere' 9.3 percent, and no electricity 7.7 percent. The reasons that had low response were privacy or security concerns with 0.2 percent and internet service provider was not in the area with 3.1percent.

TABLE 6: PERCENTAGE SHOWING DISTRICTS AND REASONS FOR NOT CONNECTING TO THE INTERNET

DISTRICT	DO NOT NEED THE INTERNET	HAVE ACCESS TO THE INTERNET ELSEWHERE	LACK OF KNOWLEDGE OR SKILLS	COST OF THE EQUIPMENT IS TOO HIGH	COST OF THE SERVICE IS TOO HIGH	PRIVACY OR SECURITY CONCERNS	INTERNET SERVICE NOT AVAILABLE IN THE AREA	NO ELECTRICITY IN THE HOUSEHOLD	OTHER	DONT KNOW	TOTAL
Gaborone	13.4	14.8	5.6	22.6	33.8	0.3	0.2	4.8	3.4	1.1	**100.0**
Francistown	15.6	11.7	6.4	28.5	27.2	0.3	0.2	6.2	2.8	1.0	**100.0**
Lobatse	14.7	19.0	8.3	33.3	14.8	0.1	0.1	6.4	2.1	1.1	**100.0**
Selibe Phikwe	11.8	12.1	12.9	29.8	25.3	0.3	0.7	4.2	1.8	0.9	**100.0**
Orapa	11.1	15.9	15.9	15.3	28.7	0.6	0.6	0.0	10.3	1.7	**100.0**
Jwaneng	11.8	22.8	5.1	23.7	22.1	0.1	0.2	8.8	3.4	2.1	**100.0**
Sowa	11.4	20.2	4.0	23.8	36.0	0.2	0.5	0.0	3.6	0.2	**100.0**
Southern	14.7	8.6	22.8	22.1	15.7	0.2	4.0	8.4	2.5	1.0	**100.0**
Barolong	15.8	7.5	24.3	22.3	12.2	0.2	2.1	11.4	3.0	1.2	**100.0**
Ngwaketse West	13.6	6.5	25.3	20.4	11.2	0.1	3.7	14.2	3.1	2.0	**100.0**
South East	16.6	13.4	12.1	25.5	25.1	0.3	0.7	4.2	1.4	0.8	**100.0**
Kweneng East	13.7	9.8	15.0	28.3	21.7	0.2	2.0	5.8	2.1	1.4	**100.0**
Kweneng West	10.2	5.1	35.2	21.2	8.6	0.1	6.3	9.9	1.7	1.7	**100.0**
Kgatleng (Wards)	20.4	9.0	20.7	19.7	19.4	0.2	2.4	5.2	1.9	1.0	**100.0**
Central Serowe -Palapye	16.2	7.5	23.1	23.6	15.3	0.2	3.2	7.6	2.0	1.2	**100.0**
Central Mahalapye	17.6	6.6	25.2	18.7	15.8	0.1	3.7	9.2	1.9	1.2	**100.0**
Central Bobonong	18.8	6.3	24.9	20.9	14.7	0.2	3.6	6.9	2.1	1.7	**100.0**
Central Boteti	14.1	11.6	19.1	21.0	15.5	0.2	6.4	8.5	2.2	1.5	**100.0**
Central Tutume	17.3	6.3	21.0	21.8	14.1	0.3	4.5	10.6	2.6	1.6	**100.0**
North East	17.7	8.9	19.1	24.2	14.0	0.2	5.1	6.7	3.1	1.1	**100.0**
Ngamiland East	11.2	7.6	14.1	30.7	17.0	0.1	6.0	7.7	3.8	1.7	**100.0**
Ngamiland West	11.4	6.8	21.7	27.1	9.8	0.2	6.2	12.3	2.4	2.2	**100.0**
Chobe	19.7	15.4	11.7	22.9	16.4	1.3	2.1	5.2	4.3	0.9	**100.0**
Delta	3.7	0.0	11.8	3.7	2.2	0.0	33.8	41.9	1.5	1.5	**100.0**
Ghanzi	15.9	8.6	23.5	17.4	12.8	0.2	3.8	13.7	2.2	2.1	**100.0**
CKGR	45.0	5.0	0.0	1.3	0.0	0.0	48.8	0.0	0.0	0.0	**100.0**
Kgalagadi South	14.1	10.9	26.0	17.8	14.9	0.1	3.8	8.2	3.5	0.5	**100.0**
Kgalagadi North	17.5	8.0	27.5	21.4	11.9	0.4	1.7	9.4	1.4	0.8	**100.0**
TOTAL	**15.3**	**9.3**	**18.6**	**23.8**	**18.2**	**0.2**	**3.1**	**7.7**	**2.4**	**1.3**	**100.0**

Table 6 shows the districts and the reasons for not connecting to the internet. For those who responded that they did not need internet CKGR had 45.0 percent of the district population and Kgatleng (wards) 20.4 percent. Those who responded that they had internet access somewhere were from Jwaneng 22.8 percent and Sowa 20.2 percent. Lack of knowledge or skill they were 35.2 percent in Kweneng West and 27.5 percent in Kgalagadi North. The cost of equipment was too high with 33.3 percent for Lobatse and Ngamiland East with 30.7 percent. The cost of the service was too high; Sowa had 36.0 percent and Gaborone 33.8 percent. Of those who responded with the reason of privacy or security

concern, Chobe was 1.3 percent and Kgalagadi north 0.4 percent. The internet service was not available in the area; CKGR had 48.8 percent and Delta 33.8 percent. Of those who responded that there was no electricity in the household, Delta had 41.9 percent and Ngwaketse West 14.2 percent. The highest response for no internet service available with 48.8 percent in CKGR and do not need internet 45.0 percent in CKGR.

Age structure and internet connectivity

After analysing the internet connectivity, the percentage of the population that was unable to connect was 57.6 percent, which was high therefore there was a need to analyse the demographic indicator using age to identify the group contributing more to that percentage. **Table 7** shows the age group and internet connectivity of the population. The age group 30-34 years showed that they were able to connect to the internet with 48.4 percent. The next group was 25-29 years with 47.8 percent, followed by 35-39 years with 46.8 percent. In general, it shows that the working active group from 25 to 39 years had the highest connectivity on the internet. The age group 5-9 years had the highest of not connecting to internet with 85.7 percent followed by those above 100 years with 80.7 percent for not connecting to the internet. From the evidence, it showed that the inactive working group was contributing to the high percentage of the population not connecting to the internet. In the same view, Chinn and Fairlie (2006) point out that, the ages above 65 had a lower domain for technology use because of absence from the labour force.

TABLE 7: AGE GROUP AND INTERNET CONNECTIVITY

AGE GROUP	INTERNET CONNECTIVITY			TOTAL
	YES	NO	DON'T KNOW	
5-9	14.3%	85.7%		**100.0%**
10-14	38.7%	59.3%	2.1%	**100.0%**
15-19	39.6%	59.2%	1.3%	**100.0%**
20-24	46.6%	52.4%	1.0%	**100.0%**
25-29	47.8%	51.3%	0.9%	**100.0%**
30-34	48.4%	50.8%	0.8%	**100.0%**
35-39	46.8%	52.3%	0.9%	**100.0%**
40-44	45.6%	53.4%	1.0%	**100.0%**
45-49	43.5%	55.4%	1.1%	**100.0%**
50-54	41.4%	57.4%	1.2%	**100.0%**
55-59	37.1%	61.5%	1.4%	**100.0%**
60-64	31.6%	66.9%	1.5%	**100.0%**
65-69	28.0%	70.2%	1.8%	**100.0%**
70-74	24.5%	73.4%	2.1%	**100.0%**
75-79	22.9%	74.9%	2.2%	**100.0%**
80-84	21.3%	76.3%	2.4%	**100.0%**
85-89	21.1%	76.7%	2.2%	**100.0%**
90-94	18.8%	78.9%	2.4%	**100.0%**
95-99	18.9%	78.1%	3.0%	**100.0%**
100+	**16.7%**	**80.7%**	**2.6%**	**100.0%**

The data in **Table 7** showed that the age group had an association with internet connectivity as all age groups had higher percentage of not connecting to the internet than those who were able to connect. To test further if there was an association, a chi-square test of independence was done to test if there was an association between age group and internet connectivity at a significance level of a=0.05. The chi-square test was used because it is a test for association between two categorical variables. The hypothesis of the test;

H_0: There was no association between age group and internet connectivity
H_1: There was an association between age group and internet connectivity.
The following assumptions of chi-square were checked that they were satisfied in applying to the data;

a) Data is obtained from a random sample
b) Variables should be mutually exclusive
c) The expected frequency in each cell should be five or more in at least 80 percent of the cells
d) The data used in the analysis should consist of independent observation
e) The variables analysed must be categorical

The chi-square was run and the results are shown in **table 8**.

TABLE 8: CHI-SQUARE TEST ON AGE GROUP AND INTERNET CONNECTIVITY

CHI-SQUARE TESTS			
	VALUE	DF	ASYMPTOTIC SIGNIFICANCE (2-SIDED)
Pearson Chi-Square	19153.150[a]		0.000
Likelihood Ratio	19931.894	40	0.000
Linear-by-Linear Association	6032.649	1	0.000
N of Valid Cases	695476		

a. 7 cells (10.6%) have expected count less than 5. The minimum expected count is .05.

The p-value from the data was 0.000, which was below the significance level of α=0.05, the null hypothesis was rejected, and concluded that there was a significant association between the age group and internet connectivity. Although the association was identified on the variables, the chi-square has its limitations of not being able to determine the strength of the association.

POLICY IMPLICATIONS

a) The government should priorities equal access to the internet in areas where there is no internet by providing it in rural districts.
b) Policymakers should provide policies that promote mobile internet access to focus on digital banking so that people pay from any part of the country. This also promotes e-government payments and increased accessibility to financial institutions.
c) The government should increase free Wi-Fi hot spots, to cater for the cost of the service. Although the SmartBots village connectivity project was launched in Botswana to accelerate digital connectivity over 500 villages, the coverage has to be increased.

CONCLUSIONS AND RECOMMENDATIONS

The trends on the ICT penetration indicated that 77 percent of the population were using mobile phones and 31.7 percent were using computers. The districts with mines like Orapa had a good ICT penetration as shown by the use of the internet with 94.6 percent, the use of mobile phones at 91.3 percent, and internet connectivity at 88.2 percent. The increased use of ICT in mines helps in the economic development of automation and artificial intelligence. Mobile internet showed that it was the highest type of internet used. Mobile internet promotes economic development through digital payment in rural areas. Satellite broadband and the fibre-to-the-home/ building internet were the lowest type of internet used therefore the government needs to improve the coverage of the types of internet as they have fast internet connectivity. The major reasons for not connecting to the internet were due to the cost of equipment and service. Lack of skills also contributed to lack of internet access; therefore, the government can introduce youth programmes on ICT skills literacy. However, further research is required to identify the ICT skills gap.

The government is recommended to identify the infrastructure required to make internet accessible. The internet service providers need to increase internet coverage in areas with no internet access. Financial institutions have to find ways of accessing the unbanked population using ICT to improve service delivery.

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ICT, DIGITALIZATION AND THE PROSPECT OF A KNOWLEDGE-BASED ECONOMY IN BOTSWANA

By

Gabriel Faimau & Mokganedi Zara Botlhomilwe

INTRODUCTION

Botswana's economy has been considered one of the best-performing economies in Africa. Since its independence, Botswana's economy has been driven by its mining, agriculture, and tourism sectors. Revenue generated from diamond production and trading continues to be the backbone of the country's economy. The rise of economic demands and the fact that economic resources are limited led the country to realize the risk of being highly dependent on natural resources and the mineral sector. Economic diversification is viewed as a path to transform the economy. To diversify its economy, the Government of Botswana has actively driven the idea of transforming Botswana's economy from a natural resource-based economy to a knowledge-based economy. The concept of a "knowledge-based economy" was first introduced at a workshop of the Organization of Economic Cooperation and Development (OECD) in 1994 by Foray and Lundvall (1996). As a concept, a knowledge-based economy is generally defined as a system of production based on knowledge-intensive activities that revolve around the creation, transfer, and use of knowledge (Collinge & Staines, 2009). Within the context of a knowledge-based economy, natural resources continue to play a vital role in the country's economy but intellectual resources are embraced as the primary drivers of the economic transformation. At the heart of a knowledge-based economy is the importance of organized and innovative research and development that shapes the economy (Leydesdorff, 2010). In short, knowledge production has become the key characteristic of the modern economy.

Knowledge economy implies what scholars call the learning economy (Lundvall & Johnson, 1994). Economically relevant knowledge and learning assume four categories of knowledge: know-what, know-why, know-who and know-how. These categories of knowledge are related to one another because know-what is about mastering a particular subject and its associated facts, know-why refers to the scientific principles and laws of nature, know-who focuses on social relations that give a context to how knowledge operates, and know-how underlines the skills and capacity to apply knowledge at practical level (Lundvall & Johnson, 1994). Information Communication Technology (ICT) has been considered a key tool that plays a crucial role in achieving knowledge-based economic aspirations. According to the World Bank (Al-Busadi, 2014), ICT is a prerequisite for economic growth and one of the main pillars of a knowledge-based economy. Research continues to show that in the context of the modern economy, knowledge management depends on technologies, and for a strong knowledge-based economic development, the most influencing factors are closely connected with

the expansion of ICT and internet use (Bilan, Oliinyk, Mishchuk, & Skare, 2023) This paper provides an analysis of the current stage of ICT distribution in Botswana based on the 2022 Population and Housing Census data and its potential contribution to knowledge-based economic development in Botswana.

OBJECTIVES

This paper aims to establish the degree of access to and use of ICT, and how this has contributed to the prospect of digitalization in Botswana as the country strives towards a knowledge-based economy as a way of diversifying the country's economy. In particular, the paper has the following objectives:

1. To find out the state of digital infrastructure, access, and usage in Botswana.
2. To examine the distribution of ICT use by gender, locality type and marital status.
3. To interrogate the current digitalization state and its possible contribution to knowledge-based economic aspirations.

An Overview of the Digitalization Context in Botswana

The importance of ICT in the diversification of Botswana's economy is strategically placed under the first pillar of Botswana's Vision 2036 focusing on Sustainable Economic Development as it is believed that "…ICT is a key contributor to economic growth and employment" (Vision 2036 Presidential Task Team, 2016) For this reason, the Government of Botswana has over the years invested heavily in the development of digitalization in Botswana and the implementation of e-services, postal networks, and e-government projects, as stipulated in the National Development Plan (NDP) 10 and 11.

The term 'digitalization' was first used in 1971 in connection with computerization and computer-aided exploration of different social phenomena (Wachal, 1971). Digitalization is different from digitization. Digitization focuses on converting information from a physical format to a digital format. Digitalization goes beyond digitization because it refers to the process in which our social institutions and social relationships are influenced and shaped by digital communications and media infrastructures (Brennen & Kreiss, 2016). Digitalization facilitates various social changes and the circulation of culture, capital, goods, and people, which are dictated by the logic of digital communication and its media infrastructures (Gorensek & Kohont, 2019). In the context of economy and business, digitalization can be understood as the process of employing digital technologies and communication to improve business opportunities, landscapes, models, activities, processes, and products. As such, it is often argued that digitalization fosters innovation, enhances customer experiences, creates new avenues for growth and positions businesses competitively in the global digital era (Dieffenbacher, 2024). As a concept, digitalization consists of two related dimensions: digital connectivity and digital depth (Abdychev, et al., 2020). Digital connectivity refers to the availability of digital infrastructure that makes access and connection to the Internet for digital information sharing possible. Digital depth underlines the context of online and digital environments and can be understood as "the extent to which economic activities, transactions, and policies are becoming digital, including through more online, interconnected, and automated systems" (Abdychev, et al., 2020, p. 34).

The current Botswana Vision 2036 sets a transformational agenda with an aim to "transform Botswana from an upper middle-income country to a high-income country by 2023" (Vision 2036 Presidential Task Team, 2016, p. 1). To achieve this vision, the country emphasizes a conducive environment for a knowledge-based economy based on research, development, and innovation. With this intention, Botswana has invested extensively in the development of digital infrastructure in the last decade with over USD 32.3 million allocated for this development (Dunn, 2021). Digitalization is viewed as a transformational tool towards the realization of a knowledge-based economy. Botswana's first national Information, Communication and Technology (ICT) policy was launched in 2007. This policy provides a roadmap that aims at driving the social, economic, cultural and political transformation of Botswana. A year after the approval of the ICT policy by the National Assembly, the Botswana Innovation Hub (BIH)was established in 2008 as an innovative and networked organization with a mandate to promote technological innovation, entrepreneurship, and commercialization. In 2021, BIH was later rebranded to the Botswana Digital and Innovation Hub (BDIH) to reflect the country's efforts to accelerate its digital transformation strategy. The 2007 ICT policy also informed the establishment

of Kitsong Centres in 2010 as part of Botswana's rural telecommunications development program to offer access to ICT services to the rural communities (Joseph, 2014). In 2020, Botswana introduced VSAT (Very Small Aperture Terminal) technology for access to high-speed internet coverage in the country's settlements and rural areas. This was then followed by the launching of a digital connectivity project aiming at connecting public facilities across villages in the country in 2021 (Government of Botswana, 2021).

In terms of mobile phone distribution and access to the Internet, prior to the COVID-19 pandemic, Statistics Botswana reported that in 2019, 95.8 percent and 63.5 percent of households in Botswana had access to a mobile phone or cellular telephone, and the Internet respectively (Statistics Botswana, 2020). As for subscriptions, in the 3rd quarter of 2019, Botswana registered 3,840,018 mobile telephone subscriptions and 1,957,695 internet subscriptions (Statistics Botswana, 2019). As of the beginning of 2022, there were 4.05 million cellular mobile connections and 1.48 million internet users in Botswana (Datareportal, 2022). A recent Mobile Connectivity Index ranked Botswana number 3 in terms of overall mobile connectivity in the Southern African Development Community (SADC) countries and its score for consumer readiness, affordability, availability of infrastructure, and content and services is above average (World Bank Group, 2022). Botswana's digital infrastructure offers spaces for digital depth, particularly in the context of economic payment or transaction instruments (Tlhako, 2020). Although cash continues to be used as a transaction instrument, digital innovation has paved the way for innovative payment space and reshaped customers' paying behavior in terms of payment choices as technological and digital transformation offers faster and more convenient ways of business transactions. In the last decade, innovative financial technology has enabled banks in Botswana to adopt Internet banking systems and transactions through smart applications. This intervention allows customers to purchase goods from retailing entities and arrange the payment through an electronic funds transfer system (EFTs). The availability of the Internet banking system also provides innovative online banking as a real-time service platform that "allows customers to have control over their bank accounts at any time and any place" (Tlhako, 2020, p. 5) and engages in various business transactions at their convenience. Data from Datareportal (2022) shows that financial inclusion in Botswana is notable. As of February 2022, 44.8 percent of Botswana's population had an account with a financial institution. Among those with a bank account, 27.2 percent and 7.2 percent owned debit and credit cards, respectively. In the same period, 24.7 percent used online banking, 41.8 percent made or received digital payments, and 3.6 percent made a purchase on the Internet in the past year (Datareportal, 2022).

METHODS AND MATERIAL

This paper draws on data from Botswana's 2022 Population and Housing Census collected by Statistics Botswana. Our analysis focuses on ICT access and usage, with particular attention to the Internet, computer, and mobile phone variables. In addition, the analysis also includes demographic variables, such as gender, marital status, and locality type. The data was analyzed using SPSS Statistics for Windows version 22.

In terms of analysis, descriptive statistics is utilized to respond to the first and second objectives of the paper. Descriptive statistics is a basic technique of summarizing the data but the technique is particularly helpful as it addresses important questions relating to where the distribution is located, how the values are spread out, and what the data distribution looks like (Mordkoff, 2016). Using this basic technique, we first summarized the frequency of ICT use in Botswana. This was followed by an analysis of the distribution of ICT use based on indicators such as gender, locality type, and marital status. To respond to objective 3, we also utilized ICT data from Statistics Botswana for Q2 in 2023. This allows us to reflect on the state of digitalization and its possible contribution to the knowledge-based economy aspirations.

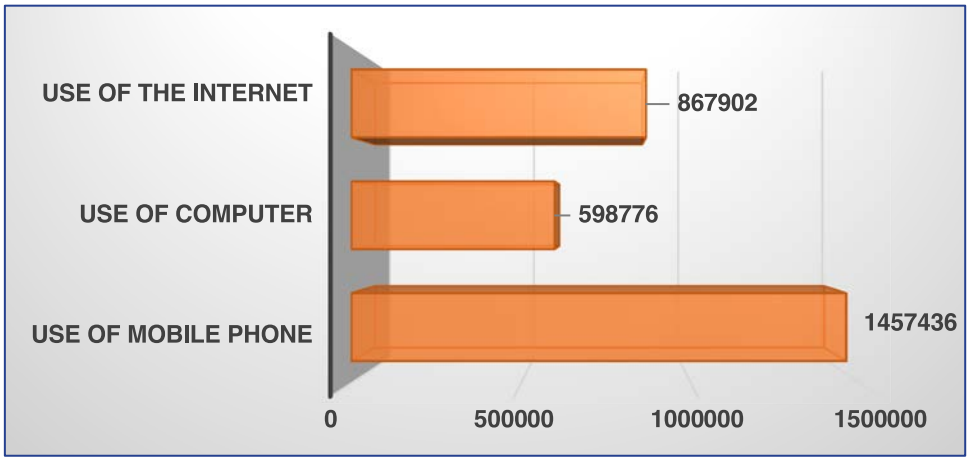
ANALYSIS

Frequency of ICT Use

Information and communications technology (ICT) is generally known as an umbrella term for the use of any communication device or application as well as the various services associated with them (Huth, Vishik, & Masucci, 2017). To determine the ICT use in Botswana, we analyzed the use of mobile

phones, computers, and the Internet in the last three months. Mobile phones continue to be the most popular ICT device in Botswana, as data shows that 98.6 percent (n=1477597) of people in Botswana use mobile phones **(Table 1 and chart 1)**. This means that only a small proportion of the population had not used a mobile phone. Although the census did not specify different types of Internet, the majority of people in Botswana (58.7%) identified themselves as Internet users, at least in the past three months by the time the census was conducted. Given the popularity of mobile phones, it is likely that the majority access the Internet through their mobile phones. Computers seem to be the least popular ICT device in Botswana, as more than 59 percent of the population indicated that they had not used a computer in the last three months by the time of the survey.

CHART 1: Use of ICT in the last 3 months



As the census focused on the digital infrastructure, little is known about the digital depth. This, however, is covered by the Botswana Information & Communication Technology Stats Brief Q2, 2023 released by Statistics Botswana. For mobile money subscriptions, for example, data from this report indicated that in Q2 2023, mobile money subscriptions went up by 3.3 percent, from 1,685,072 registered in Q1 2023 to 1,741,124. The data is comparable with the data for mobile phone use from the census. The same report indicated that within the same period, mobile internet subscriptions rose by 3.2 percent, from 2,768,010 in Q1 2023 to 2,857,761 (Statistics Botswana, 2024). Since mobile money relies on the use of a mobile phone, it can be assumed that mobile money is one of the most popular digital financial services in Botswana.

Distribution of ICT Use by Gender

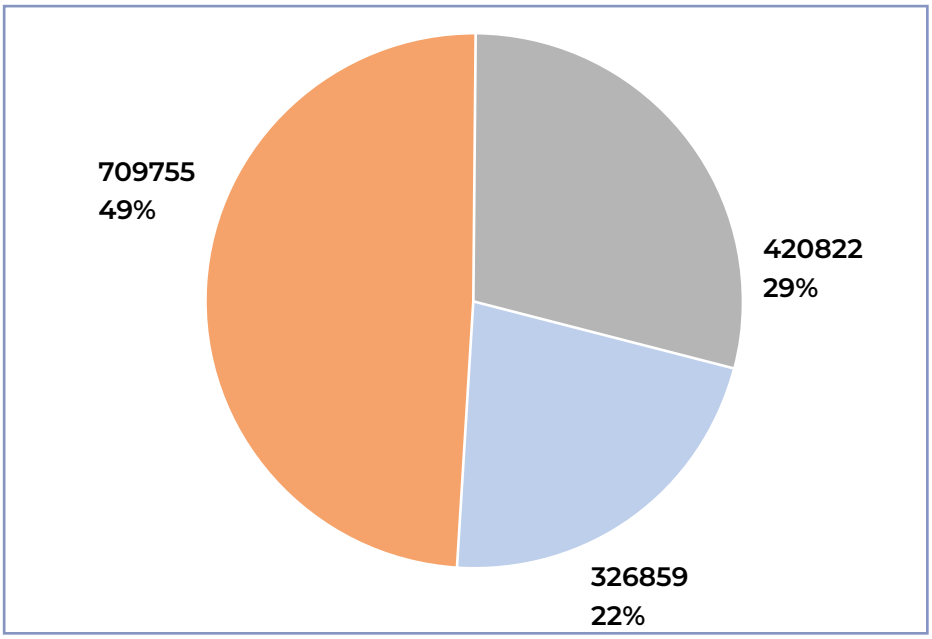
Regardless of gender, those who used a mobile phone (98.6%) and the Internet (58.7%) outnumbered those who had not used a mobile phone (1.4%) and the Internet (41.3%). The situation is different in terms of the use of a computer as 59.5 percent of the population had not used a computer in the last three months when the census was conducted. The high percentage of those who had not used a computer is also reflected in the distribution of computer use by gender, as data recorded 58.8 percent and 60.1 percent for male and female respondents, respectively.

Among the ICT users, the women outnumbered their male counterparts by 4.6 percent, 2.8 percent, and 4.4 percent when it comes to the use of mobile phones, computers, and the Internet in the last three months by the time of the census, respectively **(Table 2a)**. This result is different from previous studies with a claim that females tend to be more negative in their attitudes toward ICT use compared to their male counterparts (Dorup, 2004). There is a relatively equal distribution of mobile phone use by gender, as 98.5 percent of male and 98.8 percent of female participants indicated that they had used a mobile phone in the last three months by the time of the census. The same trend is observed in the distribution of Internet use by gender, with 58.8 percent of males and 58.7 percent of females indicating that they had used the Internet in the last three months **(Table 2b)**.

Distribution of ICT Use by Locality Type

The census categorizes locality types in Botswana into three categories: town, urban-village, and rural. Regarding the distribution of mobile phone use by locality type, most participants indicated that they lived in urban-villages (48.7%) followed by rural areas (28.9%), while 22. percent stated that they lived in towns (n=1457436) **(Table 3 and chart 2).** This is slightly different from the distribution of computer and Internet users, as data shows that the majority of computer and Internet users reside in urban-villages and towns. Given the availability of ICT and digital infrastructure in towns and urban villages, this result is expected.

CHART 2: Use of Mobile Phone by Locality Type



Distribution of ICT Use by Marital Status

Previous studies confirmed that marital status is one of the demographic factors that influences the use of ICT (Adepoju, 2017). The distribution of ICT use by marital status shows that the majority of mobile phone, computer, and Internet users are those who were never married. This accounts for 66.4 percent, 68 percent, and 65.9 percent, respectively. This is followed by those who indicated "married" as their marital status. This confirms previous study findings that showed higher use of ICT devices among the singles compared to other categories of the "marital status" variable (Taylor, Zhu, Dekkers, & Marshall, 2003).

The census had several categories for the "marital status" variable. This includes "married", "never married", "living together", "separated", "divorced", "widowed", "divorced but now living together", and "widowed but now living together." Those who indicated that they had used a mobile phone in the last three months dominated all categories of marital status. This result is different from the computer use as those who had not used a computer in the last three months dominated all categories of marital status variable.

Conclusions and Recommendations

Mobile phone continues to be the most popular ICT device in Botswana as 98.6 percent of the population use mobile phones. Similarly, the majority of people in Botswana (58.7%) identified themselves as Internet users. This confirms an effort to embrace technology as a means for global partnership and knowledge sharing as indicated in SDG 17, particularly indicators 17.6 and 17.8.1.

In terms of distribution of ICT use by gender, the majority of the mobile phone, computer, and internet users in Botswana are women. This distribution may be viewed as a strive to achieve gender equality as well as empower women and girls as stipulated in SDG 5, particularly indicator 5b.1. Data also shows that the majority of mobile phone users live in urban-villages and rural areas while computer and Internet users reside in urban-villages and towns. Based on the available data, it is fair to suggest that as a country, Botswana has relatively a strong record of digital infrastructure. The quest for a knowledge-based economy, however, depends on how the country capitalizes from its digital infrastructure. We therefore recommend the following:

- The contribution of the ICT sector to the economy of Botswana in Q2 2023 stood at 2.5 percent of the country's total GDP (Statistics Botswana, 2024, p. 9). Given the strong digital infrastructure that Botswana has, policy innovation is required to inform the improvement of the Internet price and ITC service quality and delivery that will, in turn, support the long-term vision of a knowledge-based economy.
- ICT policy reform should be followed by programs and initiatives that support big data management and digital economic and business ventures.

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AGRICULTURAL LAND OWNERSHIP, ACCESS, AND USE: POLICY IMPLICATIONS FOR BOTSWANA

By

Otisitswe Kebonye Tawana-Madziba

1. EXECUTIVE SUMMARY

Ownership and access to agricultural land are pivotal for Botswana's economic development, critical for enhancing food security, alleviating poverty, and generating income. Despite agriculture being a primary livelihood, a relatively small percentage of head of households, 53.0 percent (366,679), own land, and of these households 10.4 percent (38,308) were the youth (below 36 years) and 41.3 percent (151,543) owned agricultural land.

The study employed logistic regression to analyse factors influencing agricultural land ownership using 2022 Population and Housing Census data. It identified significant predictors such as age, marital status, gender, education, employment, and land tenure. Age was positively associated with land ownership, possibly due to delayed land allocations and eligibility criteria in Botswana. Marriage significantly increased the odds of agricultural land ownership, reflecting economic stability and pooled resources, while gender disparities indicated higher ownership odds for males. Higher education levels also correlated with increased ownership. Conversely, employment decreased ownership odds, attributed to full-time farming commitments.

Multinomial logistic regression extended these findings by examining different categories of land ownership and access. It confirmed age, marital status, gender, education, employment, and tenure system as significant predictors across varying degrees of land ownership and access. The tribal land tenure system significantly enhanced ownership and access likelihood to agricultural land.

Improving ownership and access to agricultural land is crucial for improving agricultural production and economic development, and this is aligned to the Vision 2026, Agenda 2063, United Nations Sustsianble Development Goals (SDGs), National Transformation Strategy (NTS) and the Transitional National Development Plan (TNDP). The study proposes gender-responsive policies, which are needed to address disparities in land ownership, ensuring equal opportunities for women. Tailoring policies to demographic specifics, such as adjusting land allocation age and supporting older farmers with modern farming practices, can further improve agricultural production. Strengthening implementation, monitoring, and evaluation of agricultural policies and programmes is essential to overcome current challenges and maximise sectoral contributions to Botswana's economic growth.

2. INTRODUCTION

Agriculture is one of the key drivers of economic growth and poverty reduction, particularly in rural areas of developing countries, by providing direct and indirect linkages with other sectors of the economy (Cateia et. al, 2023; Mbulawa, 2017). As such, access to and ownership of agricultural land are crucial for economic development, as they can enhance food security, alleviate poverty, and generate income (Mushunje, 2019; Udoekanem, Adoga, and Onwumere, 2014). Engaging in productive agricultural activities can increase household incomes, improve livelihoods, and create job opportunities. Botswana's Vision 2036 emphasises supporting the rural economy to boost productivity and competitiveness, directly benefiting rural residents by providing employment and income. However, low productivity in the agricultural sector in many developing countries, including Botswana, is in part due to underutilised agricultural land, climate change, lack of skills, inadequate farm labour, financial resources, lack of technology-driven methods of farming, among others (Matchaya, 2009; Government of Botswana, 2017).

Over the years, Botswana has implemented land reforms to improve agricultural productivity, conserve range resources, and reduce the wealth gap (Malope and Batisani, 2008). The Tribal Grazing Land Policy (TGLP) of 1975 aimed to improve rangeland management and commercialise cattle ranching by dividing land into communal, commercial, and reserve categories (Government of Botswana, 1975). However, TGLP increased the wealth gap instead as financially capable individuals benefitted more, and protective mechanisms for people living in poverty were not implemented (Peters, 1994; Segosebe, 1991). The 1991 National Policy on Agricultural Development (NPAD) sought to address the shortcoming of TGLP and improve agricultural production by providing a secure environment for producers, as the fencing component of the policy provided for extended determination of land for cattle ranching by allocating demarcated ranches to farmers in the grazing areas where there are boreholes (Government of Botswana, 1991a). NPAD advocated for quasi-privatisation of communal land to boost productivity and conserve a range of resources. The Land Policy Review of 2002 made recommendations that were aimed at improving land management and development prospects and to protect the rights of the people living in poverty. The recommendations empowered landholders of customary grants and common law leases to use the land for any purpose as long as its compliant with planning regulations or local bye laws, where they can sublet residential and arable land, and enter share cropping and share farming agreements (Adams et. Al., 2003).

In addition to the reforms and policies, various programmes have been introduced to develop the agriculture sector. The first major crop production programmes began with the Arable Land Development Programme (ALDEP) in 1979 to boost small farmers' grain production and reduce food imports (Government of Botswana, 1979). In 2002, the National Master Plan for Arable Agricultural and Dairy Development (NAMPAADD) aimed to improve food security and modernise small-scale farming (Government of Botswana, 2002). Livestock Management and Infrastructure Development (LIMID) Programme was implemented in 2007 with the aim to improve food security and poverty eradication. ALDEP was replaced in 2008 by the Integrated Support Programme for Arable Agriculture Development (ISPAAD) to address previous shortcomings, such as lack of draught power and extension services (Morapedi, 2016). ISPAAD also included support for access to water, seeds, fertilisers, credit, and infrastructure (Government of Botswana, 2008). In 2009, the Agricultural Infrastructure Development Initiative (AIDI) was implemented to provide infrastructure in the form of roads built for all weather conditions and drainage systems in high-potential areas, such as Pandamatenga farms (Government of Botswana, 2017). In 2023, Temo Letlotlo replaced ISPAAD to enhance productivity and reduce subsidy costs by forming clusters and supporting farmers with loans and grants (Government of Botswana, 2023). In April 2024, Thuo Letlotlo was launched, offering farmers funding opportunities for the breeding of livestock and facility construction, among others.

Despite the land reforms, policies and programmes developed and implemented over the years, the agricultural sector's contribution to GDP has been low, averaging 1.9 percent over the past decade (2014–2023) with an average value-added growth rate of 1.2 percent, reflecting a declining trend. Government expenditure on agriculture averaged 1.8 percent of the total consolidated fund over the last decade, but has been declining, possibly contributing to the sector's decelerating growth. However, the country seeks to significantly improve the agriculture sector by 2036, making it sustainable, technology-driven, and commercially viable (Government of Botswana, 2016). The Transitional National Development Plan (TNDP) also tilizatio the use of climate-smart technologies to

enhance agricultural output (Government of Botswana, 2023). The sector is identified as a priority sector in the National Transformation Strategy (NTS) which serves as a guiding framework for the development of the 12th National Development Plan (NDP 12).

Land is a key factor in agricultural production, serving as the physical space for crop production and livestock rearing. It is the primary resource needed for all agricultural activities. As such it is important to empirically analyse agricultural land ownership, access and usage to derive policy implications for the development of the agriculture sector.

This chapter aims to:

1. Assess current patterns of agricultural land ownership, access, and use, using the 2022 Population and Housing Census data.
2. Propose policy recommendations based on the findings of the study.

3. LITERATURE REVIEW

Access to land is critical to livelihoods in Africa, yet a larger proportion of the households does not own land and relies on small-scale subsistence farming. Using data from the 2014/2015 South African Living Conditions Survey, Mushunje (2019) established that, of the 22 630 households interviewed, only 3.21 percent had access to land. This low percentage underscores the strong political debate surrounding land reform policy in South Africa. Furthermore, of those with access to land, only 0.16 percent used their land for food production or agricultural activities. The main reasons why households with access to land did not engage in productive agriculture included lack of funds, agricultural expertise, labour, farming equipment, as well as water scarcity and the distance from their place of residence. However, the probit analysis showed that wealth increases the probability of access to land or ownership, exhibiting a positive relationship. In Nigeria, access to land was found to be high among older household heads, while tilization declined with age (Udoekanem, Adoga, and Onwumere, 2014). The study further revealed that an average of 23.1 percent of the households owns land, with excessive bureaucracy and high cost of land registration cited as major obstacles.

Daudu et. Al. (2022) investigated the impact of land access and ownership on farm production across genders in Southwest Nigeria, and established gender differences between them. Generally, the study established that about 56.7 percent of households led by males and 46.4 percent led by females acquired land through family inheritance. The study used the farm yield of household heads as an indicator to estimate the impact of land access and land ownership. There was a significant difference in farm yield between households led by males and females, mainly due to differences in their access to and ownership of land. Furthermore, the study found considerable improvement in farm yield for households led by males compared to those led by females. Marital status, level of education, access to credit, and membership of association were all found to have a positive and statistically significant relationship with both male and female headed households. Etowa and Nwiido (2018) employed logistic regression to analyse the effects of land access on land use choice in Nigeria. They found that the size of land accessed had no significant effect on how it was utilised. Having the rights to land use was six times more likely to result in land use for agriculture than having land ownership. Access to credit was also found to increase the probability of land use for agriculture by 24 times, with short payback period having an offsetting effect on land use. Top constraints to agriculture land access perceived by the surveyed households were cited as cost of the land, land speculation and conflict of interest by the landlord. Mdoda and Gidi (2023) found that in rural Eastern Cape province of South Africa, using logit regression established that about 17 percent of farmers who owned land, but did not utilise it due to challenges of lack of funds, water availability and farming equipment. The Propensity Score Matching methodology revealed that fully owned small-sized farms achieved higher agricultural production than leased large-sized farms, which implies that ownership fared relatively better in terms of productivity.

There is limited empirical research on agricultural land ownership, access, or use in Botswana. However, Mbulawa (2017) analysed factors contributing to agricultural productivity and impact on economic growth. He employed a vector error correction model and established that, in the long-run, agricultural productivity is driven mainly by expansion in infrastructure and physical capital, which includes

improvements on land, the purchase of plant and machinery, and the construction of roads and railway networks. The study further established a short-run unidirectional causal relationship from agricultural productivity to economic growth, suggesting that an increase in agricultural productivity will result in high growth in the short-term.

4. METHODOLOGY

Data and Sampling Procedure

The study used the 2022 PHC data collected country-wide by Statistics Botswana. The data was collected using a well-designed survey questionnaire which was administered by trained enumerators. The total number of head of households surveyed were 695, 703 households.

Logistic Regression

The study adopted the logistic regression model to analyse factors influencing agricultural land ownership, access and use, using the 2022 PHC data. The binary logistic regression analysis was selected mainly because of its relevance and suitability with dichotomous variable – a nominal variable with only two categories or levels. Agricultural land ownership is assumed to be based on decisions to maximise utility (Akinyemi and Mushunje, 2019; Bekele and Paulos, 2017). Mdoda and Gidi (2023) particularly employed the binary logistic model where one (1) was when a farmer owned the land, and zero (0) when he/she did not own land. Their study had two choices being, "landowners" and "not landowners". Thus, this study employs a multiple logistic regression model, where Y=1 represents ownership of agricultural land, and =0 indicates no land ownership. The probability p that Y=1, representing a dualistic probabilistic association as defined by Wooldridge (2009), is expressed by the following equations:

$$p(Y=1)= \frac{e^{\beta i}}{(1+e^{\beta i})} = \frac{1}{1+e-\beta i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(4.1)$$

For a non-event (not owning agricultural land) cumulative logistic distribution, which represents the probability [1 – p (Y=0)], which is:

$$1-p(Y=0)= \frac{e^{-\beta i}}{1+e^{-\beta i}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(4.2)$$

Therefore, by dividing equation (4.1) with equation (4.2) the result is the odds-ratio in binary response, which can be specified as follows:

$$\frac{p\,(Y=1)}{1-p(Y=} = \frac{\frac{1}{1+e^{-\beta i}}}{\frac{e^{-\beta i}}{1+e^{-\beta i}}} = \frac{1}{1\,e^{-\beta i}} = e^{\beta i} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(4.3)$$

Equation (4.3) is the odd ratio in favour of agricultural land ownership, which is simply the ratio of the probability that a household will own agricultural land to the probability that it will not own agricultural land.

The multiple logistic regression model for this study is therefore, specified as follows:

$$Y^{i}=\beta_0 + \beta_1\,age+\beta_2\,gender+\beta_3\,marital\_status+\beta_4\,education+\beta_5\,employment+\beta_6\,land\_tenure+\beta_7\,agric\_practice+\varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots(4.4)$$

Where Y_i=1 if a household owns agricultural land and Y_i=0 if a household does not own agricultural land, β_1 is regression parameters, and ε_i is the error term. The logistic regression was estimated by

Maximum Likelihood technique to estimate the parameters of the model.

For robust analysis, a multinomial logistic regression was undertaken to analyse the factors that influence both agricultural land ownership and access (Chapter 5).

A description of independent variables is shown in **Table 1** below.

TABLE 1: DESCRIPTION OF INDEPENDENT VARIABLES

VARIABLE	DESCRIPTION	CONTINUOUS VARIABLES		DUMMY VARIABLES
		MEAN	STD. DEV.	PERCENTAGES
Age of Household Head	Years	46.5	16.1	
Gender	1=Male, 0=Female			"1= 54.0 0= 45.0"
Marital Status	1=Married, 0=Otherwise			"1=24.6 0=75.4"
"Highest Education"	1=Higher Education (secondary or higher), 0=Otherwise			"1=66.7 0=33.3"
Employment	1= employed (includes self-employed), 0=Otherwise			"1=54.5 0= 45.5"
Land tenure	1= tribal, 0=Otherwise			"1=82.7 0=17.3"

5. FINDINGS AND DISCUSSIONS

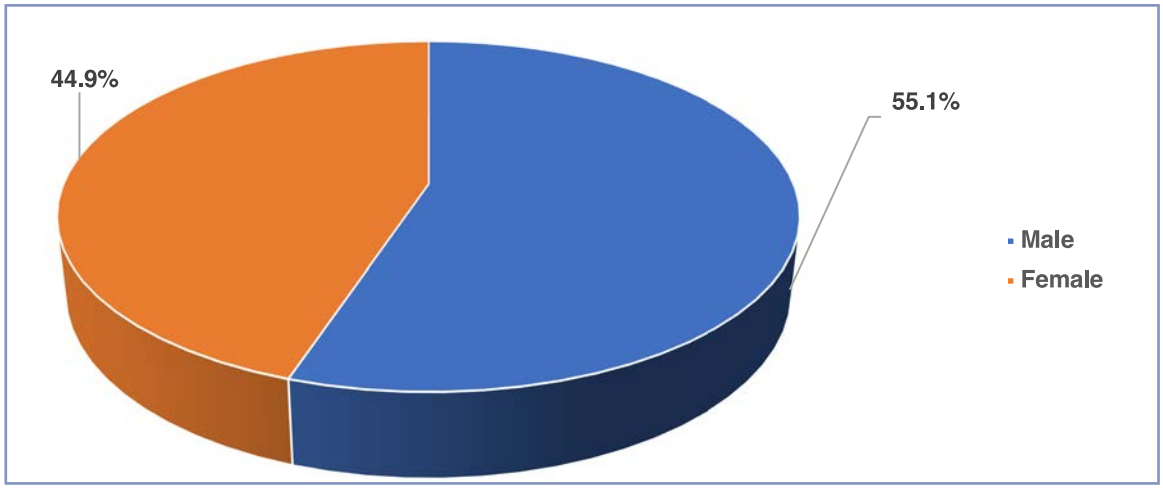
5.1. Descriptive Statistics

Agricultural Land Ownership

Among the 695,703 surveyed head of households, 366,679 (53.0 percent) reported owning land. Among these households owning land, 38,308 (10.4 percent) were the youth (below 36 years). The data can be interpreted to suggest that a relatively small proportion of youth households own land. Similarly, a relatively small proportion of total surveyed households,151,543 (41.3 percent) reported owning agricultural land, especially given that majority of households in Botswana sustain their households through agricultural activities. Among these households who owned agricultural land, only 8,418 (5.6 percent) were the youth (below 36 years). These findings are consistent with studies conducted in other African countries, which highlight a substantial portion of citizens lacking ownership of agricultural land (Udoekanem, Adoga, and Onwumere, 2014; Mushunje, 2019).

Among households owning agricultural land, 55.1 percent were male, while 44.9 percent were female (Figure 1). Given that the 2022 Population and Housing census yields a national sex ratio of 95 males for every 100 females, this suggests gender disparity in agricultural land ownership.

FIGURE 1: Agricultural Land Ownership By Sex



In terms of agricultural land use, 69.1 percent of households owning agricultural land were engaged in livestock production, comprising those who solely own livestock (47.5 percent) and those who own and look after livestock (21.6 percent), as shown in Figure 2. Conversely, 48.5 percent were engaged in crop production, with 32.4 percent involved in planting crops and an additional 16.1 percent who both planted and looked after the crops. A relatively higher percentage of households engaged in livestock production suggests a significant reliance on livestock as a primary agricultural activity. On the other hand, a relatively lower percentage of households engaged in crop production might indicate challenges or limitations such as access to water, land quality, or market conditions. Although this is not captured in the PHC data, it is worth noting that the horticulture importation ban, in effect since January 2022, may positively impact crop production in future, following a higher output of horticultural produce in the country.

FIGURE 2: Livestock and crop production among agricultural landowners

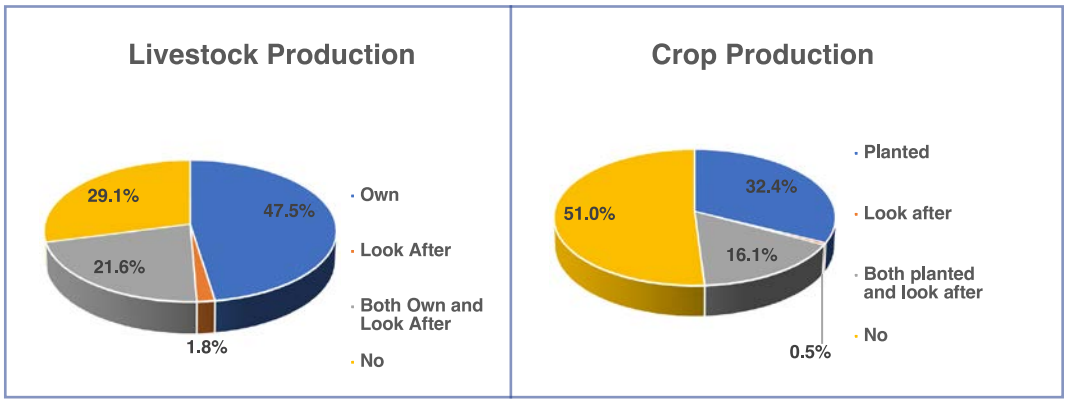
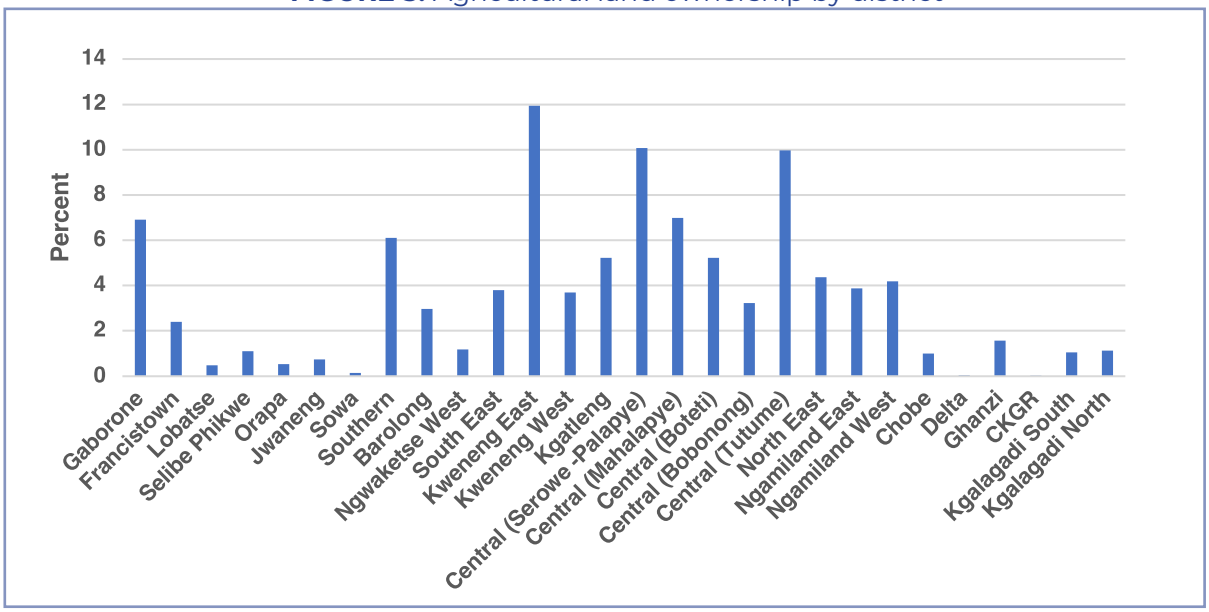


Figure 3 below depicts that agricultural land ownership is highest in Kweneng East (11.9 percent), Central (Serowe – Palapye) at 10.1 percent, and Central (Tutume) at 10.0 percent. This increased ownership suggests potential for agricultural production and the maintenance of livelihoods.

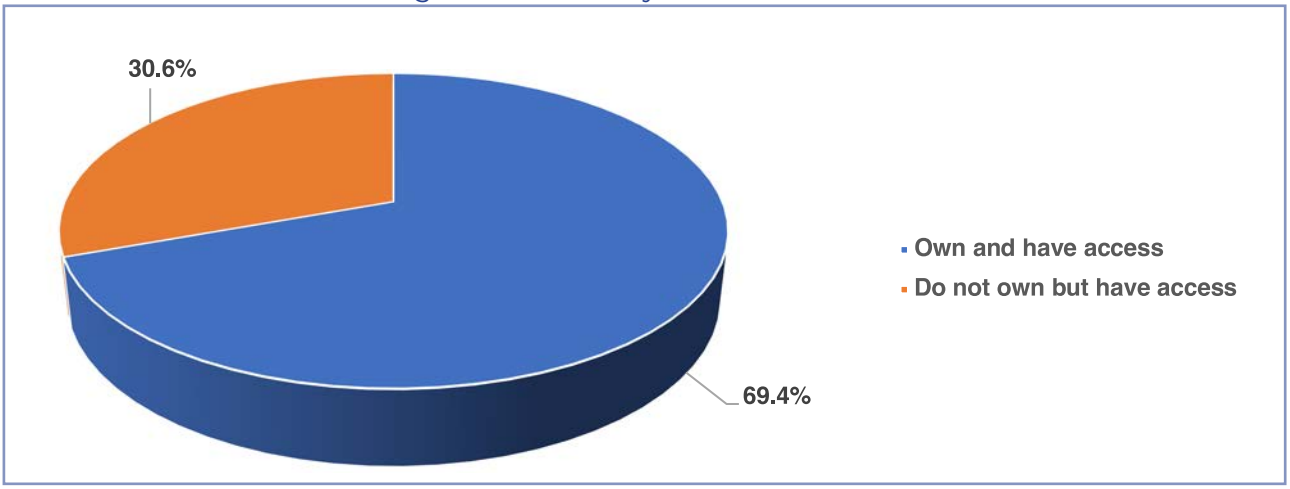
FIGURE 3: Agricultural land ownership by district



Agricultural Land Access

Among the total surveyed households, 246,476 (35.4 percent) reported having access to agricultural land for planting. Of those with access, 55, 399 (30.6 percent) did not own the land. Among these households, access could be through various means, such as agreements with relatives, leasing, renting, sharecropping, communal arrangements, or other informal agreements.

FIGURE 4: Access to agricultural land by landowners and non-landowners



In terms of land use, the results indicate a higher proportion of households engaged in crop production among those with access to agricultural land (56.0 percent). This suggests that additional households with access but not ownership of land (30.6 percent as shown in **Figure 4**) were primarily involved in crop production. The proportion engaged in livestock production remained relatively consistent at 66.7 percent. However, its important to interpret these findings cautiously due to how the survey question was formulated, as it specifically referred to access to agricultural land for planting.

5.2. Logistic Regression Results

To ensure the accuracy of coefficient estimates and correct model specification, a multicollinearity test was performed. Multicollinearity occurs when two or more independent variables in a regression model are highly linearly related. Variable Inflation Factor (VIF) is often used to test the existence of multicollinearity among continuous variables. However, in this case, almost all variables except for age are binary. Therefore, a correlation matrix was used to test for multicollinearity between independent variables. Correlation coefficients with absolute values above 0.7 indicate a high correlation between two independent variables. The correlation matrix in **Table 2** was produced using STATA 19 and shows no multicollinearity among independent binary variables, which suggests that coefficients and standard errors are reliable.

TABLE 2: MULTICOLLINEARITY OF INDEPENDENT BINARY VARIABLES

	MARITAL STATUS	GENDER	HIGHEST EDUCATION	EMPLOYMENT	LAND TENURE
Marital status	1.0000				
Gender	0.2117	1.0000			
Highest Education	-0.0223	0.0564	1.0000		
Employment	0.0492	0.1319	0.3324	1.0000	
Land Tenure	0.1204	0.0035	-0.1825	-0.1213	1.0000

Agricultural Land Ownership

The study used logistic regression to determine the factors that influence agricultural land ownership among households who reported owning any land (366,679). The likelihood ratio Chi-square, which evaluates how well the model fits the observed data based on predicted probabilities, yielded a significant result (LR chi2 of 114,596.35, with a p-value of 0.0), indicating that the model is statistically significant, and the independent variables collectively contribute to predicting agricultural land

ownership. In logistic regression, the Pseudo R2 is a measure of the model's explanatory power, similar to the R2 in linear regression but interpreted differently as it does not directly represent the proportion of variance explained by the model. Instead, it provides a measure of the model's goodness of fit relative to a null model with no predictors. The model has a Pseudo R2 of 0.23 and falls within the range of a moderate to strong relationship, indicating that the model has a good fit to the data in the context of social sciences or economics. All independent variables have p-values (P>|z|) less than 0.01, indicating that they are statistically significant at the 1 percent level **(see Table 3)**. Furthermore, an odds ratio greater than 1 indicates a positive relationship, while an odds ratio less than 1 indicates a negative relationship.

TABLE 3: LOGISTIC REGRESSION OUTPUT

AGRICULTURAL LAND OWNERSHIP	ODDS RATIO
Age	1.03896
Marital status	1.56290
Gender	1.33738
Highest education	1.08592
Employment	0.83230
Land tenure	7.56496
Constant	0.02831
Number of obs.	366.681
LR chi2 (7)	114596.4
Prob>chi2	0.00
Pseudo R2	0.23

Note: *** significant at 1%, ** significant at 5 % and * significant at 10% Source: Survey results using STATA, 2019

The logistic regression results indicate that with each additional year of age, the odds of owning agricultural land increase by approximately 3.9 percent. This means as age increases, one is likely to own agricultural land. This may be explained by the delayed land allocations by landboards, which often take years after the submission of an application. In addition, land in Botswana land is allocated when one is 18 years and older, which could be considered late given that identify card (Omang) is issued at 16 years of age and the youth range is defined as 15 – 35 years of age. Other contributing factors could include accumulated wealth and savings, inheritance, and improved access to credit. These results are consistent with those of Akinyemi and Mushunje (2019) and Mododa and Gidi (2023), which indicate that an increase in farmers' age increases the likelihood of land ownership and its subsequent use.

Being married increases the odds of owning agricultural land by about 56.2 percent relative to unmarried households. Marriage may provide economic stability and pooled resources, which aid in land ownership. This is consistent with the results from the 2019 Annual Agricultural Survey Report, which established that majority of farm holders (40.1 percent) were married, while 24.5 percent were never married, and 16.3 percent were living together (Statistics Botswana, 2019). The results also indicate that males have approximately 33.7 percent higher odds of owning agricultural land compared to females. These findings are consistent with those of Daudu et al. (2022), who reported that households headed by men have more opportunities to access or own land than those led by women.

Higher education levels increase the odds of owning agricultural land by about 8.6 percent, indicating that education impacts land ownership. Educated farmers have greater chances of owning agricultural land due to their ability to understand it as an invaluable asset, and comprehension of land policies and reforms, thereby enhancing agricultural productivity through better analysis of agricultural information and use of modern innovation. These results are in line with the findings of Mododa and Gidi (2023), which indicate that each additional year of schooling increases farmers' likelihood of land ownership.

The logistic regression model output further indicated that being employed decreases the odds of owning agricultural land by about 16.7 percent. These findings are consistent with the results from the 2019 Annual Agricultural Survey Report, which established that most farm holders (79.9 percent) are full-time farmers and 73.1 percent of fam holders reside within their holdings. This suggests that the majority of farm holders are traditional farmers and focus their effort on farming rather than on other forms of employment. On the other hand, the results showed that tribal land tenue system greatly increases the odds of owning agricultural land by over seven times. With the new Tribal Land Act No.1 of 2018 which compels tribal landowners to hold title deeds, provides a more secure tenure system that could promote long-term investments and the sustainable use of agricultural land.

5.3 Multinomial Logistic Regression

Agricultural Land Ownership and Access

Access to agricultural land provides households who do not own land the opportunity to engage in farming activities. As indicated earlier, this represents 30.6 percent of the households who reported having access to land. Interestingly, households who own land may also not have access to their land and could be due to various reasons, such as inheritance issues, land ownership disputes or conflicts, and renting or leasing of land.

A multinomial logistic regression was undertaken to analyse the factors that influence both agricultural land ownership and access. The dependent variable is categorical, with 'access and own' assigned a value of one (1), 'access but don't own' assigned a value of two (2) (the base outcome), and 'don't have access but own' assigned a value of three (3). The regression was conducted on variables of interest to enable robust comparisons, and data was from 121,830 households **(Table 4)**.

TABLE 4: MULTINOMIAL LOGISTIC REGRESSION OUTPUT

	LAND OWNERSHIP AND ACCESS	COEFFICIENT
	Age	0.07187
	Marital status	0.64262
Access and own	Gender	0.13676
	Highest education	0.36827
	Land tenure	0.11272
	Employed	0.10618
	Cons.	-4.40538
Access but don't own	Base Outcome	Base Outcome
Don't have access but own	Age	0.05668
	Marital status	0.46770
	Gender	0.09731
	Highest education	0.55162
	Land tenure	-7.4185
	Employed	0.14189
	Cons.	-3.1840
	Number of obs.	121.83
	LR chi2 (6)	67,105.1
	Prob>chi2	0.00
	Pseudo R2	0.29

The multinomial logistic regression results are largely consistent with results from the logistic regression analysis in **Table 3**. The findings indicate that as age increases by one year, the log-odds[2] of accessing and owning agricultural land relative to not owning land increase, as well as owning without access, but with a stronger effect on the former (0.07 compared to 0.06). Being married significantly increases the likelihood of both owning and accessing land (0.64) and owning without access (0.09) compared to having access without ownership. Similarly, being male has a positive and significant impact on owning agricultural land with access (0.14) and without access (0.09) relative to accessing land without owning it.

Education significantly increases the likelihood of both owning and accessing land (0.37) and owning without access (0.55). Being employed also increases the likelihood of both outcomes relative to having access to land without ownership. The tribal tenure system increases the log-odds of accessing and owning land by about 0.11, while it decreases the log-odds of owning land without access by 7.41, indicating a strong association. This may be expected, as the tribal land tenure system often comes with communal support and established mechanisms to ensure that landowners can use their land. Furthermore, the strong governance and customary practices associated with tribal land tenure can reduce the likelihood of disputes and other barriers to land access.

6. POLICY IMPLICATIONS AND RECOMMENDATIONS

Improve ownership and access to agricultural land

Based on the findings of the study, a significant portion of the surveyed households lacks ownership and access to agricultural land, which is essential for agricultural production and economic development. Improving ownership and access to agricultural land is also critical for achieving multiple SDGs. Specifically, it contributes to:

- **SDG Goal 1:** Ending poverty in all its forms everywhere, as land ownership can significantly boost household income and economic stability.
- **SDG Goal 2:** Ending hunger, achieving food security, improving nutrition, and promoting sustainable agriculture.
- **SDG Goal 8:** Promoting sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all, as land access can drive income generation and employment opportunities.

Promote Livestock and Crop Production

The results indicate a significant proportion of households engaged in livestock production, highlighting the need for increased support to enhance yields in the sub-sector. Programmes such as Thuo Letlotlo, when effectively implemented, monitored, and evaluated could bear fruitful results and improve the agricultural sector while supporting livelihoods. Conversely, a lower proportion of households engaged in crop production, as such underscoring the necessity of policies and programmes to address challenges faced by crop producers. These challenges may include water availability, land quality improvement and soil fertility enhancement, and drought mitigation. While the data did not explicitly reveal integration, adoption of such an approach could enhance resilience, optimise land use and improve overall agricultural productivity. Temo Letlotlo promises to deliver on enhancing crop diversification and improving the use of climate smart technologies, and when fully utilised and optimized could yield fruitful results.

Adopt a more targeted approach to policies and programmes

[2]Log-odds ratios can be interpreted as percentages by converting them to odds ratios.
Where: percentage change=($e^{coefficient}$-1) x 100

- **Gender-responsive policies:** Gender disparity in land ownership and access is notable, with men having higher odds of owning and accessing agricultural land compared to women. This gender disparity suggests potential barriers for women to own and access land. Gender-responsive policies could focus on providing targeted support to ensure women have equal opportunities for land ownership. This is consistent with the 2019 Annual Agricultural Survey Report by Statistics Botswana, which recommended affirmative action is to support women in livestock farming.

- **Demographic-specific:** Given that the odds of owning agricultural land increases with age, this suggests that younger individuals face barriers to land ownership. This is further confirmed by the descriptive statistics, which show that a relatively small proportion of households who own any land, including agricultural land, are youth. The land policy could be adjusted to facilitate earlier access to land, potentially lowering the minimum age for land allocation to align with the issuance of identify cards at 16. On the other hand, agricultural programmes could be customised to meet the specific needs and challenges of older farmers, who mostly possess agricultural land, in order to improve their land utilisation and production output. This could include facilitating adoption of modern farming practices and use of climate smart technologies.

Intensified implementation, monitoring and evaluation of policies, projects, programmes and strategies

One of the critical challenges hindering Botswana's development is the insufficient implementation and monitoring and evaluation (M&E) of policies, projects, and programmes (Government of Botswana, 2017; Government of Botswana, 2023). Despite the policies and programmes developed over the years to improve the the agriculture sector, its contribution of GDP has low and on a declining trajectory. This could be explained by lack of robust M&E which can result in ineffective policies, projects and programmes that fail to yield expected outcomes, thereby not addressing needs and challenges of agricultural landholders. This can also lead to reduced participation and a loss of confidence in agricultural programmes and initiatives. Therefore, any agricultural policy, project, programme or strategy needs to be developed with a comprehensive implementation and M&E plan, accompanied by regular progress reporting to improve the effectiveness and output of the agriculture sector.

7. CONCLUSION

Access to, and ownership of agricultural land play pivotal roles in Botswana's economic development, contributing to food security, poverty alleviation, and income generation. Despite past land policy reforms and agriculture-focused programmes, the sector's contribution to GDP has been relatively small and on a declining trend over the past decade (2014 – 2023). There is, therefore, a need for targeted policies to address the disparities that exist in agricultural land ownership and use, as well as to capitalise on the needs and strengths of different demographics, including both women and men, as well as young and older farmers. Further research beyond this study is needed to investigate land utilisation and agricultural productivity among agricultural landowners in Botswana.

ANALYSIS OF ACCESS AND UTILIZATION OF AGRICULTURAL LAND OF YOUTH AND WOMEN FOR SUSTAINABLE LIVELIHOODS

Moatlhodi Kgosimore, Ruth Kauthengwa, Ndiye Nko

EXECUTIVE SUMMARY

Background: Access to land ownership is one area where significant progress has been made directing positive implications towards addressing gender disparities in the Botswana's agricultural sector. This resulted from legal reforms on inheritance and marital laws made by government. Capacitation of smallholder farmers to commercialise agriculture has been identified a critical area for transformation of livelihoods. The aim of this study is to assess levels of access to land ownership and utilisation for agricultural production. The study explores trends on progress towards achievement sustainable development goals indicators, particularly proportions of households owning agriculture land, gender and age distribution on participation in agricultural activities.

Methodology: This paper utilises the 2022 Botswana Population and Housing Census (PHC) data to establish access to land ownership and level of utilization of land by men, women and youth for agricultural purposes. Statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) to estimate levels of access to ownership and utilization of agricultural land by gender and household, with focus on women and youth participation. The study computes the proportion of household heads owning land and utilizing it for agricultural activities by gender and age and link the results to sustainable development goal indicators.

Results: The study revealed that 35.4 percent of households have access to land ownership, while 64.6 percent have no access to land particularly for agricultural activities. Those with access to land ownership indicated that they mainly acquired land through landboards (59.8%), followed by relatives (13.5%) and inheritance (13.4%). A total of 279,945 households were engaged in livestock production, with 70.2 percent engaged in goats' production, 56.1 percent in cattle production while 43 percent were in poultry production.

Conclusions: The paper assessed the level of access to ownership and utilization of land for agricultural purposes. Two-folds of the households owned land for livestock care compared with crop production. In livestock care goat production has gained compared with cattle production which for years has been the mainstay for economic activity in the country. Sorghum on the other is gradually losing its position as the staple food. Men continue to dominate the agricultural sector in almost all the sectors. However, women participation has demonstrated growth. Youth participation even though low has shown an upward trend. The paper generated evidence of inadequate access to land ownership for crop planting (35%). Landboards have been identified as the main custodians and distributors of land (60%). The results shed insight on the impact of government interventions developed to promote agricultural productivity to reduce hunger and alleviate poverty. The study further revealed that household participation in agriculture was mainly to make agricultural produce for household use (subsistence).

Recommendations:

a) Frameworks (guidelines) for improved access to land ownership by women and youth should be developed and implemented.

b) Established women and youth empower programmes should be implemented to increase their participation in the economy.

c) The salient of self-allocation of land should be monitored.

1. INTRODUCTION

Botswana's land mass covers an area of approximately 578 000 km which is densely populated on the east and sparsely inhabited on the west. The country is well endowed with forests, wildlife, rangeland, veld products and mineral resources but has limited land suitable for arable agriculture (Botswana Land Policy, 2015). Land use has evolved overtime from traditional system of residential, pastoral and arable to contemporary uses such as multi residential developments, integrated farming, game farming and agro-tourism. Social dynamics of access to land and livelihoods, particularly among the youth has emerged due to increasing competing demands for land and youth employment challenges (Moreda, 2023). Livelihood involves capabilities, assets, and activities required to cope with stress, recover, and provide sustainable livelihood opportunities for present and future generations (Molosi-France & Dipholo, 2020). Despite government's interventions to address these challenges by empowering the youth and women, access to land has remained a challenge. Social transformation in gender relations has improved access to agricultural resources targeting poverty alleviation (World Bank, 2019). Inequalities and power imbalances have reversed agrifood systems' ability to reduce poverty and deliver sustainable and equitable livelihoods and food security for all (FAO, 2022). This study analyses the 2022 population and housing census data to determine the disparities in acquisition and utilization of agricultural land between men, women, and youth.

Land is a natural resource, essential for ensuring that women and youths are part of the community providing opportunities for improved livelihoods. Differences in access to livelihood resources between men, women and youth provides different livelihood options, adaptation, coping and mitigation strategies (Kwatiwada et al, 2018). Across Africa, land remains a crucial economic resource, positioning itself as a key factor in the formation of and base for individual and group identity and social relationships, constituting the cultural, economic, political and social fabric of rural people (Tsegaye Moreda, 2023). Botswana has significantly made progress in accessing land ownership and making direct positive implications towards addressing gender inequalities in the agricultural sector. This has been made possible by legal reforms on inheritance and marital laws (FAO, 2018). The report established the need for capacitating smallholder farmers to commercialise agriculture.

The agriculture sector remains a significant source of livelihoods for Botswana's population, especially in rural areas. Livestock accounts for the majority (80%) of income from agriculture, compared to the 20 percent from crops. Women are central to food production and food security in rural Botswana, investing more time and resources than men. Few people are formally employed in agriculture, and most formal employees are men (Euromonitor International, 2023). Botswana has amended legal frameworks (Deeds Registry and the Married Persons Property Acts, 2014) to promote access to and control over production resources including land. Botswana's Land reforms were undertaken with primary objectives of increasing agricultural productivity, natural resources conservation and improving social equity among the rural community (Malope & Batisani, 2008). Thus, gender-sensitive programmes which promote efficiency, inclusivity, resilience, and sustainability of agrifood systems aligned to Agenda 2030 for sustainable development goals were developed. These changes have resulted in number of women who own land in Botswana increasing over the years translating to 49.3 percent of women owning land by 2014. The number of women and men who own land varies across age groups, for example in the age group 25-29 there are more men (687) owning land than women (184); yet in the age group 50-54 more women own land (4,941) than men (3,895) (SADC Factsheet, 2018). Studies also show that regarding livestock production, women are largely underrepresented as compared to their male counterparts with 28,874 of cattle owners being men while 9,587 are women (Botswana Agriculture Census, 2015).

The Agricultural sector in Botswana covers both crops and livestock production and is dominated by traditional farming (UNDP, 2012). The livestock subsector employs 15.3 percent of the total labour force in Botswana (Statistics Botswana, 2013) and provides income, employment, draught power and, most relevant to CA, organic manure (Nsoso et al., 2010). This sector focuses on cattle, sheep and goats production systems. The crop sector generally dominated by women utilizes food-related labour-saving

technologies. Majority of females (58%) own arable land than males (42%). However, agriculture has failed to cushion many Batswana from severe poverty, with 18.4 percent of the population living below the poverty line (FAO, 2018). The proportion of female-headed households living in poverty is higher than that of male-headed households, 33 percent and 27 percent, respectively. The government of Botswana developed strong poverty reduction initiatives (policies) to reduce poverty and promote women's economic empowerment, leading to more women beneficiaries than men. Despite these efforts, unemployment remained higher among women (21.4%) than men (14.5%) (FAO, 2018). Youth participation in agriculture is low in Botswana, and their access to productive resources, such as land, is also limited (FAO, 2018).

1.1 Aim and Objectives

The aim of this study is to assess disparities in access and utilization of land for agricultural activities between men, women, and youth. The objectives of the study were to:

a) Determine gender specific access to land for agricultural use.
b) Determine age specific access to ownership and control over land for agricultural use.
c) Assess distribution of land ownership for agricultural land across the country.
d) Establish patterns of land tenure for the agricultural sector.

1.2 Significance of the study

This report assesses patterns of access to land ownership and utilization for agricultural activities. The goal is to contribute to improved access to land and control for effective participation in agricultural activities contributing to the attainment of SDGs pillars, Vision 2036 targets and other developmental frameworks.

1.3 Definitions and concepts

- Land acquisition is the process of allocating land to owners following national legal frameworks.
- Household is a group of individuals living together in one roof sharing resources.

2. LITERATURE REVIEW

Social dynamics of access to land and livelihoods across Africa, particularly among the youth has emerged because of increasing competing demands for land and youth employment challenges (Moreda, 2023). Social transformation in gender relations has improved access to agricultural resources targeted at alleviation of poverty (World Bank, 2019). Inequality and power imbalances have reversed agrifood systems' ability to reduce poverty and deliver sustainable and equitable livelihoods and food security for all (FAO, 2022). According to Molosi-France & Dipholo, 2020, Botswana has adopted sustainable livelihood approach (SLA), a model that involves capabilities, assets, and activities required to cope with stress, recover, and provide sustainable livelihood opportunities for present and future generations. Botswana's Land reforms were undertaken with primary objectives of increasing agricultural productivity, natural resources conservation and improving social equity among the rural community (Malope & Batisani, 2008). Chigbu (2020) provided a model for relationship between land, women, youths and land tools or methods. In the study Chigbu outlined thirteen (13) lessons for access and utilization of land to improve livelihoods of communities.

3. METHODOLOGY

The methodology utilized the 2022 Population and Housing Census data. Statistical analysis was carried out using SPSS to estimate levels of access and utilization of agricultural land by gender and household, with emphasis on women and youth participation. Descriptive analysis methods have been carried out and findings presented in tables and graphs. The variables analysed were land access, system land tenure, types of livestock, types of crops, ownership, agricultural activities, age category and gender. The Statistical Package for Social Sciences (IBM SPSS Statistics Ver 28.0.0.0 (190)) was used in the analysis to generate descriptive statistics. The results were presented in tabular and/

or chart forms as frequencies and percentages based on the responses. Key indicators which were derived from this data include the following: proportion having access of agricultural land by age and gender, proportion of households engaged in livestock production, proportion of households engaged in crop planting, gender specific indicators, proportion of households who have access to land ownership and linkage of indicators with corresponding sustainable development goals indicators (5.a.1) to their track progress accounting for gender and age categories. The variables analysed were land access, systems of land tenure, types of livestock owned, types of crops planted, characterisation of ownership, agricultural activities, age category and gender.

4. FINDINGS AND DISCUSSIONS

The study revealed that 697,245 households responded to the questionnaire. The presented results (percentages and totals) are based on respondents. A total of 41,407 comprising 57.4 percent males and 42.6 percent females indicated that they were engaged in agricultural activities. Crop production and livestock care dominated the agricultural activities attaining (30.8%) and (31.6%) respectively (see Figure 1). The study also revealed that women dominated crop production activity at 64.9 percent, while men dominate livestock care (84.0), fish farming (73.3%), tree farming (57.1%) as well as mixed farming (59.4%). Women's participation in agriculture is to maintain households (56.2%). Youth participation in agricultural activities accounts for 16 percent against the elderly who accounted for 84 percent. These results are a clear indication that agriculture in Botswana remains an elderly activity and a risk factor to food and nutrition security.

4.1 Acquisition of land for agriculture

A total of 697,227 households responded to the questionnaire regarding the acquisition of land for agricultural activities. Knowledge levels of acquisition of land by gender, age and geographical spread is paramount, particularly for utilization in agricultural activities. **Table 1** below presents the level of household access to land ownership in the country. Thirty-five percent (35.4%) of households

TABLE 1: ACCESS TO LAND FOR PLANTING

RESPONSE	FREQUENCY	PERCENTAGE
YES	246,920	35.4
NO	450,307	64.6
TOTAL	**697,227**	**100.0**

Table 2 presents ways of acquisition of land in Botswana. It worth noting that majority of land parcel is tribal and landboards are the main custodians **(Table 3)**. As a result, majority of the households (59.8%) indicated having direct acquisition land through Landboards, followed by relatives (at 13.5%) and inheritance (at 13.4%). Tribal land is administrated and allocated through landboards. The census data also revealed a persistent trend of self-allocation of land of about 3.0 percent in 2011 population census which was also reported in the 2022 population census. This poses a risk of squatting in the country.

TABLE 2: DISTRIBUTION OF TYPES OF LAND ACQUISITION

TYPE OF ACQUISITION	FREQUENCY	PERCENTAGE
Landboard	148,574	59.8
Tribal	8,274	3.3
Inheritance	33,237	13.4
Purchased	9,175	3.7
Lease	3,186	1.3
Employer	2,121	0.9
Relative	33,449	13.5
Self-Allocated	7,370	3.0
Other	2,897	1.2
TOTAL	**248,283**	**100.0**

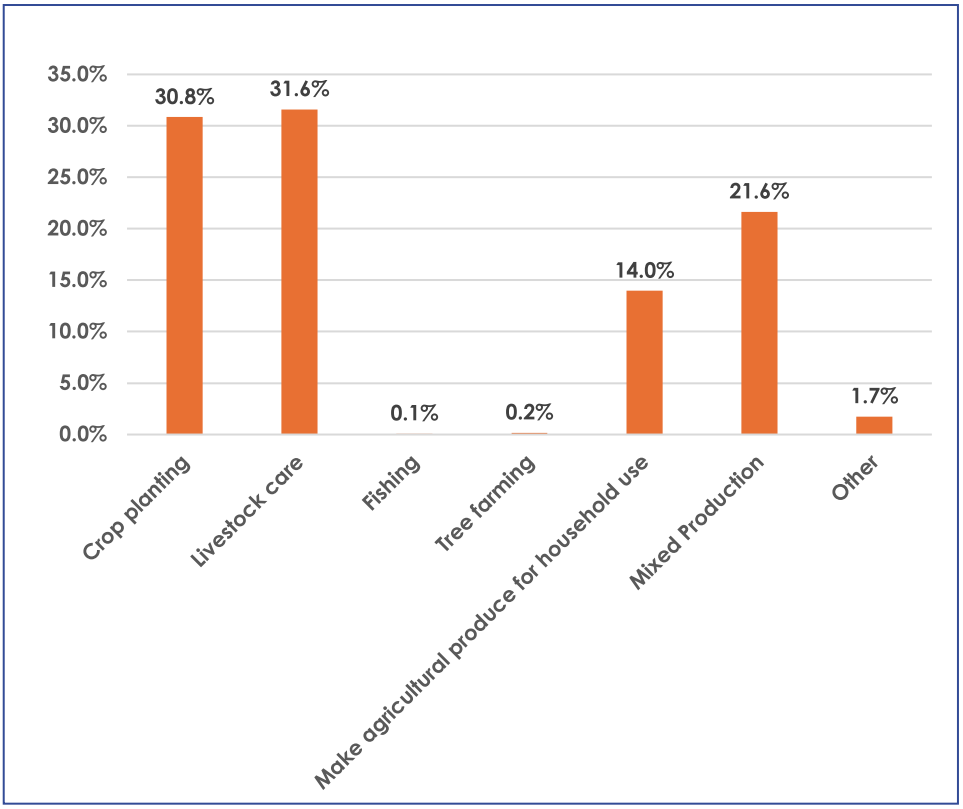
Botswana has three (3) systems of land tenure namely tribal, freehold and state land. Majority of households reside in tribal land (82.7%), while the remain land is distributed into freehold system (13.3%) and state land at 4.0 percent **(Table 3)**. An increase in tribal has been observed over the years having increased from 71 percent in 2015 to 82 percent in the 2022 population and housing census.

TABLE 3: SYSTEM OF LAND

TENURE SYSTEM	FREQUENCY	PERCENT
Tribal Land	204,685	82.7
Freehold	32,887	13.3
State Land	9,813	4.0
TOTAL	247385	100.0

This paper focused on use of acquired land for agricultural activities. **Figure 1** below presents agricultural activities which households were engaged in for their livelihoods. Households highlighted livestock care (31.6%) and crop production (30.8%) as the main activities engaged in. Mixed production also is highly practiced in Botswana (21.6%) and a good number of households made agricultural produce for household use (subsistence). Other emerging agricultural activities reported included fishing and tree planting. Unspecified activities, which dominate fishing and tree planting were also observed. Even, proportions are relatively low, evidence of diversified use of acquired land was noted **(Figure 1).**

FIGURE 1: Agricultural activities households were engaged in



The 2021 and 2022 results yielded similar results despite implementation of some key legal instruments. Significant changes were increase acquisition of tribal land and reduction in state land and freehold which could be attributed to reforms in the land use policy advocating increased agricultural productivity and promotion of rural development.

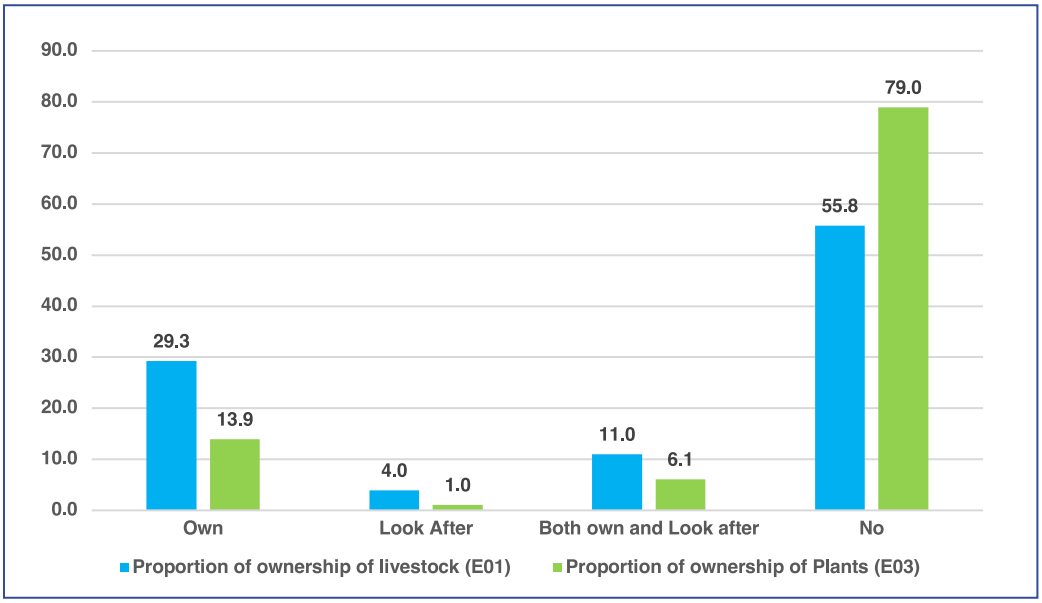
4.2 Ownership of livestock and plants

A total of 695703 and 695690 households responded to the question of ownership of livestock and crop planting respectively. Twenty-nine percent (29%) reported ownership of livestock while thirteen percent (13.0%) planted different crops. Maize, watermelons, beans, sweet reed and sorghum dominated the type of crops commonly planted by households. At least 45 percent indicated that they participated in livestock care either through ownership of livestock (29.3) or looking after livestock (4.0%) or both at 11 percent. A total of 136,088 were engaged in planting of crops. At least 21 percent indicated that acquired land was utilized for activities related to agriculture, with 13.9 percent practicing crop planting. About 1.0 percent looked after cropping land while 6.1 percent indicated ownership and looking after land (**Fig. 2)**. A large proportion of households did not participate in agricultural activities. For instance, 79 percent indicated that there were not engaged in crop planting ownership, while 55.8 percent were not engaged in livestock ownership (Figure 2).

4.3 Access to land ownership for livestock production

A total of 279,945 households indicated that they were engaged in livestock care. Among households engaged in livestock care, majority of households (at least 70.2%) were engaged in goats' production, 56.1 percent were in cattle production while poultry production (43%). The shift from cattle to goats' production could be attributed to government initiatives promoting small-stock production and less labour intensiveness of small stock production **(Figure 2)**.

FIGURE 2: Distributions of ownership of livestock and plants



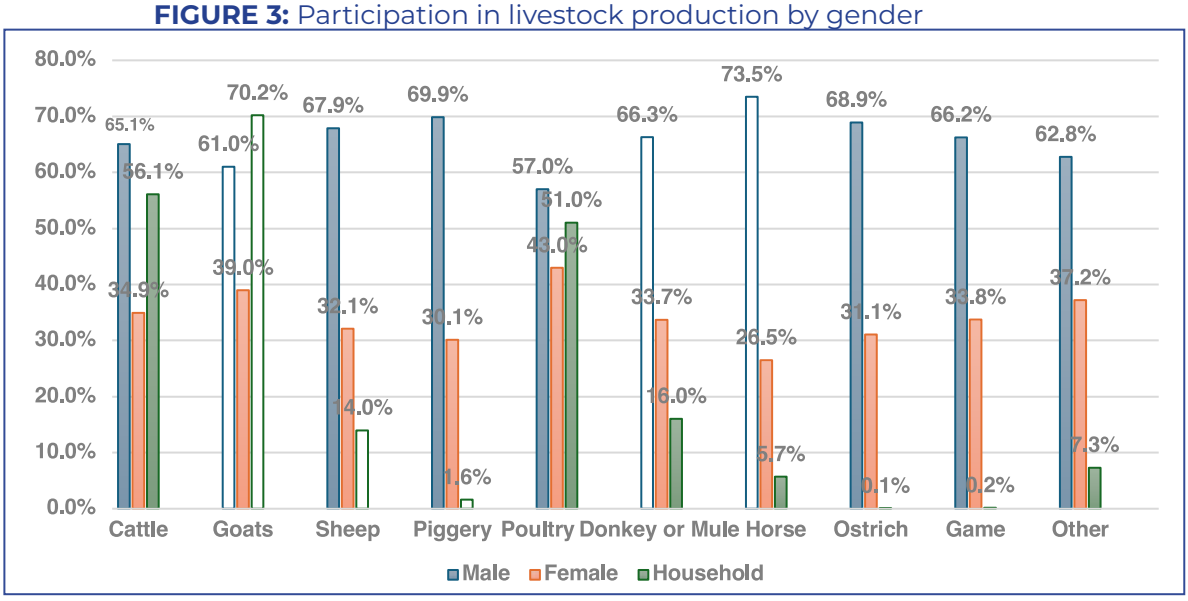
4.4 Gender-specific engagement in crop planting and livestock ownership

Table 4 showed that the men dominated planting of crops. The main crops planted included maize, sorghum, millet, groundnuts, watermelons, sunflower, beans, sweet reed and wheat. The results revealed that fewer households planted sorghum than those growing maize, beans, sunflower, wheat and watermelons. This trend may lead to sorghum losing its position as a stable food in the long run. The popularity gained from planting such crops watermelons could be attributed to transformation of crop planting from subsistence to income generation.

TABLE 4: DISTRIBUTION OF DIFFERENT CROPS PLANTED BY HOUSEHOLDS

TYPE OF CROPS	GENDER		TOTAL
	MALE	FEMALE	
SORGHUM	29,381	26,132	**55,513**
	52.9%	47.%	
MAIZE	70,778	56,500	**127,278**
	55.6%	44.4%	
BEAN OR PULSE	52,593	44,356	**96,949**
	54.2%	45.8%	
MILLET	9,311	9,292	**18,603**
	50.1%	49.9%	
SUNFLOWER	6,962	4,844	**11,806**
	59.0%	41.0%	
GROUNDNUTS	16,448	15,218	**31,666**
	51.9%	48.1%	
WATERMELONS	53,941	44,177	**98,118**
	55.0%	45.0%	
MELONS	21,003	17,734	**38,737**
	54.2%	45.8%	
SWEET REED	40,107	33,312	**73,419**
	54.6%	45.4%	
WHEAT	1,199	946	**2,145**
	55.9%	44.1%	
TOTALS	**75,502**	**60,586**	**136,088**

FIGURE 3: Participation in livestock production by gender



4.5 Ownership of livestock and crop planting by age

The Census data was disintegrated into age categories to establish the level of youth participation in the agricultural activities **(Table 7, 8, 10)**. The youth cohort (12–35 years of age) dominated the agricultural activities. The results showed 63.2 percent of the youth were engaged in cattle production system, with 70.7 percent engaged in the goat production. These results were relatively comparable to the elderly population (above 35 years) which recorded above 50 percent and 68 percent for cattle and goats production systems respectively.

4.6 Access to land ownership for crop planting and livestock production by locality

A total of 279,945 households indicated they were engaged in livestock production. Among households engaged in livestock care, 70.2 percent were into goats' production, 56.1 percent were in cattle production while poultry production (43%). The shift to goats production could be attributed to government initiatives promoting small-stock production and less labour intensiveness of small stock production (Figure 2). Rural dwellers dominated agricultural activities (both planting and livestock production).

TABLE 5: DISTRIBUTION OF HOUSEHOLDS ENGAGED IN CROP PLANTING BY LOCALITY

LOCALITY	PLANTED	LOOK AFTER	BOTH PLANT AND LOOK AFTER	NO
URBAN	8.8%	0.2%	0.8%	90.2%
URBAN VILLAGE	11.9%	0.2%	3.3%	84.7%
RURAL	19.8%	2.6%	13.0%	64.6%
AVERAGE	**13.9%**	**1.0%**	**6.1%**	**79.0%**

TABLE 6: DISTRIBUTION OF LIVESTOCK OWNERSHIP BY LOCALITY

LOCALITY	OWN	LOOK AFTER	BOTH OWN AND LOOK AFTER	NO	TOTALS
URBAN	25.4%	0.3%	1.6%	72.7%	**149.892**
URBAN VILLAGE	29.9%	0.6%	6.4%	63.1%	**306.985**
RURAL	30.9%	10.6%	22.7%	35.8%	**238.826**
AVERAGE	**29.3%**	**4.0%**	**11.0%**	**55.8%**	**695.703**

The results depicted in Tables 5 and 6 showed the distribution of agricultural actiivities by locality.

The districts Kweneng east, Central Tutume, Central Serowe-Palapye, Central Mahalapye, Gaborone and Southern were identified as potential hubs for crop planting **(Table 10)**. The low participation in crop planting (21%) presents a potential risk for food and nutrition security. Similarly, a high proportion (44.2%) of livestock care has implications of pointing to red flags towards risks of protein security and consequently a potential risk for nutrition security.

5. POLICY IMPLICATIONS

The study sheds insight on access and optimal utilisation of agricultural land to contribute to food security and monitor progress on land allocation policy to women and youth and their participation in the economy. The study provides a measure of attainment of the country's domesticated development goals 1 and 5 addressing reduction in hunger and alleviate poverty as well as closing gaps in gender inequalities and youth involvement in the agricultural production systems. The paper advocates for equal rights to economic resources and access to basic services, ownership and control over land and other forms of property, inheritance and natural resources. This paper updates baseline information on the proportion of households or population with ownership or secure rights over agricultural land by gender and age.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The paper assessed the level of access to ownership and utilization of land for agricultural purposes. Two-folds of the households owned land for livestock care compared to crop production. Goat

production has increased compared to cattle production which for years has been the mainstay for economic activity in the country. The study recorded a low number of households engaged in sorghum production. Implications of this result is reduction in sorghum production. Men continue to dominate the agricultural sector in all the areas. However, women participation has demonstrated growth. Youth participation estimated at 16 percent has shown an upward trend. The paper generated evidence of inadequate access to land ownership for agricultural activities. Tribal land remains the most common land tenure and is mainly administered by landboards. Other than landboards direct acquisition of land could be though inheritance, relatives, purchase and lease. Thees results shed insight on the impact of government interventions developed to promote agricultural productivity to reduce hunger and alleviate poverty. The study further revealed that household participation in agriculture was mainly to make agricultural produce for household use (subsistence).

6.2 Recommendations

6.2.1 The persistent low level self-allocation of land should be monitored and addressed to prevent risks of escalation.

6.2.2 The country should strengthen the implementation of the developed legal frameworks such as "Deeds Registry and the Married Persons Property Acts, 2014" to improve access to land by women and youth.

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APPENDICES

TABLE 7: ENGAGEMENT IN LIVESTOCK OWNERSHIP BY GENDER AND HOUSEHOLD

	MALE		FEMALE			
TYPE OF ANIMALS	NUMBER	PERCENTAGE	NUMBER	PERCENTAGE	TOTAL	PERCENTAGE
CATTLE	102,183	65.1%	54,882	34.9%	**157,065**	56.1%
GOATS	119,926	61.0%	76,622	39.0%	**196,548**	70.2%
SHEEP	26,540	67.9%	12,556	32.1%	**39,096**	14.0%
PIGGERY	3,171	69.9%	1,368	30.1%	**4,539**	1.6%
POULTRY	81,454	57.0%	61,422	43.0%	**142,876**	51.0%
DONKEY OR MULE	29,766	66.3%	15,131	33.7%	**44,897**	16.0%
HORSE	11,767	73.5%	4,242	26,5%	**16,009**	5.7%
OSTRICH	184	68.9%	83	31.1%	**267**	0.1%
GAME	316	66.2%	161	33.8%	**477**	0.2%
OTHER	12,836	62.8%	7,610	37.2%	**20,446**	7.3%
TOTAL	**166,144**		**113,810**		**279,954**	

TABLE 8: LIVESTOCK CARE BY AGE

AGE CATEGORY	ANIMALS									
	CATTLE	GOATS	SHEEP	PIGGERY	POULTRY	DONKEY OR MULE	HORSE	OSTRICH	GAME	OTHER
12-14	170	192	41	6	154	51	17	1	2	17
	63.20%	71.40%	15.20%	2.20%	57.20%	19.00%	6.30%	0.40%	0.70%	6.30%
15-19	1.216	1.552	311	48	1.117	505	208	2	3	187
	55.40%	70.70%	14.20%	2.20%	50.90%	23.00%	9.50%	0.10%	0.10%	8.50%
20-24	3.802	5.085	845	119	3.288	1.357	563	10	9	579
	50.70%	67.80%	11.30%	1.60%	43.90%	18.10%	7.50%	0.10%	0.10%	7.70%
25-29	7.496	10.293	1.739	280	6.393	2.429	1.015	19	24	1.124
	49.30%	67.70%	11.40%	1.80%	42.10%	16.00%	6.70%	0.10%	0.20%	7.40%
30-34	11.37	15.379	2.67	462	9.914	3.187	1.393	20	44	1.719
	50.00%	67.70%	11.70%	2.00%	43.60%	14.00%	6.10%	0.10%	0.20%	7.60%
35-39	16.82	22.092	4.055	624	15.3	4.224	1.829	23	58	2.427
	52.10%	68.40%	12.50%	1.90%	47.40%	13.10%	5.70%	0.10%	0.20%	7.50%
40-45	18.587	23.703	4.733	617	16.942	4.526	1.881	38	74	2.64
	54.10%	69.00%	13.80%	1.80%	49.30%	13.20%	5.50%	0.10%	0.20%	7.70%
45-49	18.096	22.879	4.885	582	16.645	4.294	1.737	32	44	2.396
	55.30%	69.90%	14.90%	1.80%	50.90%	13.10%	5.30%	0.10%	0.10%	7.30%
50-54	15.987	19.843	4.255	496	14.53	3.766	1.648	37	55	1.973
	57.20%	70.90%	15.20%	1.80%	51.90%	13.50%	5.90%	0.10%	0.20%	7.10%
55-59	14.755	18.264	4.012	400	13.667	3.996	1.521	25	38	1.802
	57.70%	71.40%	15.70%	1.60%	53.40%	15.60%	5.90%	0.10%	0.10%	7.00%
60-64	13.864	16.791	3.625	351	13.069	4.216	1.254	26	35	1.752
	60.00%	72.60%	15.70%	1.50%	56.50%	18.20%	5.40%	0.10%	0.20%	7.60%
65-69	12315	14604	2961	257	11462	4081	1042	16	34	14.64
	61.80%	73.30%	14.90%	1.30%	57.50%	20.50%	5.20%	0.10%	0.20%	7.30%
70-74	8.672	10.12	2.025	129	8.004	3.168	732	7	22	947
	62.70%	73.10%	14.60%	0.90%	57.80%	22.90%	5.30%	0.10%	0.20%	6.80%
75-79	5.748	6.56	1.302	71	5.182	2116	499	3	15	618
	63.20%	72.20%	14.30%	0.80%	57.00%	23.30%	5.50%	0.00%	0.20%	6.80%
80-84	4.124	4.728	893	51	3.665	1629	355	3	13	406
	62.60%	71.70%	13.50%	0.80%	55.60%	24.70%	5.40%	0.00%	0.20%	6.20%
85-89	2.216	2.43	435	23	1.956	746	153	2	4	247
	62.70%	68.70%	12.30%	0.70%	55.30%	21.10%	4.30%	0.10%	0.10%	7.00%
90-94	1.24	1.394	190	10	1.099	439	103	1	1	99
	60.00%	67.50%	9.20%	0.50%	53.20%	21.30%	5.00%	0.00%	0.00%	4.80%
95-99	384	427	72	3	319	107	36	1	0	35
	61.40%	68.30%	11.50%	0.50%	51.00%	17.10%	5.80%	0.20%	0.00%	5.60%
100+	139	156	24	3	135	50	18	1	0	13
	59.90%	67.20%	10.30%	1.30%	58.20%	21.60%	7.80%	0.40%	0.00%	5.60%
NOT STATED	57	48	19	6	28	7	5	0	2	1
	83.80%	70.60%	27.90%	8.80%	41.20%	10.30%	7.40%	0.00%	2.90%	1.50%

TABLE 9: LIVESTOCK CARE BY AGE CATEGORY

CATEGORY	CROP PRODUCTION	LIVESTOCK CARE	FISHING	TREE FARMING	MAKING AGRICULTURAL PRODUCE FOR HOUSEHOLD USE	MIXED PRODUCTION	OTHER	TOTAL
YOUTH	1,691	3,157	9	13	681	986	243	**6,780**
ELDERLY	11,081	9,926	21	50	5,103	7,972	474	**34,627**
TOTAL	**12,772**	**13,083**	**30**	**63**	**5,784**	**8,958**	**717**	**41,407**

TABLE 10: DISTRIBUTION OF CROP PLANTING BY DISTRICT

DISTRICT	PLANTED	LOOK AFTER	BOTH PLANT AND LOOK AFTER	NO	TOTAL
KWENENG EAST	11,761	933	4,011	84,301	**101,006**
CENTRAL TUTUME	10,193	862	4,348	31,026	**46,429**
CENTRAL SEROWE -PALAPYE	9,352	899	4,579	41,956	**56,786**
CENTRAL MAHALAPYE	6,993	486	5,289	23,745	**36,513**
GABORONE	6,430	121	517	75,123	**82,191**
SOUTHERN	6,148	514	2,779	28,222	**37,663**
CENTRAL BOBONONG	5,914	240	2,602	13,325	**22,081**
KGATLENG (Wards)	4,673	885	1,898	28,921	**36,377**
NGAMILAND EAST	4,563	133	1,809	25,055	**31,560**
NGAMILAND WEST	3,926	93	2,467	11,260	**17,746**
NORTH EAST	3,603	240	2,719	14,253	**20,815**
CENTRAL BOTETI	3,352	174	1,197	16,480	**21,203**
BAROLONG	3,201	220	1,087	11,914	**16,422**
FRANCISTOWN	2,943	67	385	30,528	**33,923**
SOUTH EAST	2,812	186	1,135	32,049	**36,182**
KWENENG WEST	2,683	583	2,842	9,747	**15,855**
SELIBE PHIKWE	1,558	14	201	11,496	**13,269**
GHANZI	1,233	163	604	13,432	**15,432**
NGWAKETSE WEST	1,106	116	875	4,458	**6,555**
CHOBE	1,030	99	272	8,661	**10,062**
JWANENG	924	22	73	5,551	**6,570**
LOBATSE	649	23	41	9088	**9,801**
ORAPA	524	2	20	2,491	**3,037**
KGALAGADI NORTH	501	26	279	6,325	**7,131**
KGALAGADI SOUTH	499	50	336	8,824	**9,709**
SOWA	189	0	3	908	**1100**
DELTA	95	0	16	79	**190**
CKGR	23	0	2	57	**82**

ANALYSIS OF BUSINESS LAND IN BOTSWANA FINDINGS FROM THE 2022 POPULATION AND HOUSING CENSUS

By

Wilford Molefe, Zibo Albert and Ruth Kauthengwa

EXECUTIVE SUMMARY

According to the 2022 Population and Housing census, Botswana has a population of 2,359,609 million people, with 48.8 percent males and 51.2 percent females. Out of the 2.3 million people, 1,500,290 people are 18 years and above and this is the population eligible for question on land acquisition. The results indicates that 35.8 percent of the population aged 18 and older own land of three types (agriculture, residential, and business) on an individual basis. Within the 35.8 percent female accounted for 19.6 percent and males 16.2 percent respectively.

Among the Botswana population 6.9 percent indicated that they own business land, with male accounting for 52.7 percent and female 47.5 percent. Furthermore, from the ones who owns business land, 74 percent own it individually and has been registered, whereas 19 percent jointly own registered business land and 7 percent indicated they do not have no certificates. The leading district were Kweneng East with 13.1 percent followed by Gaborone with 12.8 percent. Central Tutume accounted for 7.5 percent and Kgatleng 6.9 percent respectively. The 2022 Botswana Population and Housing Census data was used. Census data included a question on land ownership, and the associated rights. The question was directed to individual household members aged eighteen years and above. The most knowledgeable person (usually the head of the household) responded on behalf of all other household members.

1. INTRODUCTION

Land is an important resource, the very base on which the nation stands. It has the potential to play role in poverty reduction, environmental management, social reconstruction and enhancing economic opportunities, promoting conflict resolution, strengthening governance and driving agricultural modernization (World Bank, 2019). Hence countries all over the world has domesticated SDGs indicators on land with the aim to ensure that in 2030 all men and women, particularly the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, and natural resources. Moreover, the way in which the land is administered is fundamental for the socio-economic development of the country. Therefore increasing importance of land from the world's growing population has driven demand for strengthening tenure security for all.

In Botswana, before independence land was administered by traditional chiefs, or Dikgosi, whereas after independence the system changed and land is allocated according to different land tenure (Republic of Botswana, 2015). Currently in Botswana, the land is categorized into three types of land tenure systems of administration namely: tribal land, freehold and state land. Tribal land is allocated under customary law through the Tribal Land Act of 1968 by statutory bodies known as land boards. Tribal land is allocated for residential, commercial, civic, industrial and agricultural uses. The holders of tribal land rights are given certificates that provide owners perpetual and exclusive tribal land rights, except in communal grazing areas where there are no defined property rights to grazing resources. As for freehold land, owners have title to the land they hold under leasehold, normally 99 years renewable. This land title gives owners security of tenure, as they are free to sell at the prevailing market price without consent of the land authorities. State land is allocated under the State Land Act for residential, civic, commercial and industrial uses in urban areas through fixed period state grants (FPSGs).

Botswana's total land area is approximately 582, 000km2. The tribal land comprise of 71 percent, State land (25%) and freehold land (4%) (Republic of Botswana, 2015). In 2019, the Government of Botswana revised the Land Policy with the aim of improving land management and addressing emerging land issues. In addition to the revised policy, the Government of Botswana also domesticated Sustainable Development Goals (SDGs). The indicator 1.4.2 of SDGs measures a proportion of the total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and by type of tenure. Furthermore, the Vision 2036 under Pillar 3: Sustainable Environment, through sustainable land use management, notes that land is a finite resource, and its management regime affects the well-being of all ecosystems such as humans, forests, wetlands, and wildlife species. Indicator 1.4.2 of the SDGs covers all types of land use such as residential, commercial, agricultural, forestry, grazing, and wetlands based on standard land-use classification in both rural and urban areas. Furthermore, the indicator states that an individual can hold land in his /her name, jointly with other individuals as a member of household, or collectively as a member of a group, cooperative or other type of association.

In Botswana, the main uses of land are for residential, agricultural, commercial, industrial, civic, community and recreational activities (NDP 10). Business land are mainly categorized under investment, commercial and industrial plots. Business land falls in all the three types of land tenure. Business land is used as premises of business operations, rental and for selling to generate income. In both rural and urban areas, if rented or sold, land can generate income. Therefore business land is very important in the economy of the country. Business land ownership give confidence to individuals and businesses to invest in land. Companies often use business land or property titles as collateral to finance operational costs as well as to expand existing businesses or open news ones, thus creating more jobs. Hence enabling governments to collect more taxes in property & income tax which are necessary to finance the provision of infrastructure and services to citizens. Availability of business land can boost economic opportunities of the country by luring more investors in the country.

According to Botswana Land Policy (2019), business land is allocated to citizens and non-citizens through open competitive public tender and some plots are being leased or sold at market price in a transparent manner. Therefore in this case the price of the land is a restricting factor and only those with financial resources can apply. As a result, this study will use the 2022 Population & Housing Census data to interrogate if Batswana own business lands.

1.1. Objectives of the study

- To assess business land ownership among the population of Botswana at the individual level;
- To evaluate gender disparity in business land ownership among Botswana population. SDG indicator; 1.4.2: proportion of the total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and by type of tenure.

2. LITERATURE REVIEW

Land is a key economic resources inseparably linked to access to, use of and control over economic and productive resources and livelihoods (World Bank, 2019). In rural and peri-urban areas agriculture land is a key input for agricultural production whereas in urban, peri-urban and rural areas business land is used as premises of business operations, rental and for selling to generate income. In both rural and urban areas, business land if rented or sold, land can generate income. According to Carletto et al. (2015) access, ownership and/or control of land is critical for poverty reduction, food security, fostering of gender equality and inclusiveness, and reduction of land degradation, amongst other sustainable development objectives.

According to World Bank (2019), secure land rights and efficient land registration institutions are cornerstone of any modern economy. Data on land ownership makes it easier to show wealth gaps between different groups by demographic characteristics (Ambler et al., 2019; Annan et al., 2021; Doss et al.). A mere 30 percent of global population has legally registered rights to their land and homes (World Bank 2019). In Botswana, the government has since 2009 embarked on the Land Administration Processes, Capacity and Systems (LAPCAS) which is aimed at ensuring that all land in the country is registrable (Malatsi & Finnstrom, 2011; Tembo, Kampamba, & Nkwae, 2014). The LAPCAS project was aimed principally at surveying tribal plots to cadastral standard in order to ensure that such plots could be registrable at the Deeds Registry. Following the completion of LAPCAS, in 2023 the Government of Botswana launched the registration of Customary Land Grants and issuance of Secure Land Title (SLT). The SLT replaces the old Customary Land grant certificate that was issued by the Land boards. With SLT Batswana are now directly using the Secure Land Title as security or collateral to access financial assistance from financial institutions and it is a major step in unlocking economic potential of the Tribal Land. Furthermore, the benefits of compulsory registration of all Tribal Grants at Deeds Registry are digitization of land records enhanced security of title records, easy access to plot ownership online, and provision of certainty and clarity on plot ownership as it will be easier to ascertain who owns which particular plot and where. The Secure Land Title (SLT) will also bring along a special security features that will reduce instances of fraud and forgery that were prevalent with our old certificate.

According to Botswana Land Policy (2019), business land is allocated to citizens and non-citizens through open competitive public tender and some plots are being leased or sold at market price in a transparent manner.

The Botswana land policy revised in 2019, main areas of focus included maximising economic value through efficient land use, enforcing strict adherence to land use regulations, and addressing the increasing requests from individuals and businesses to convert portions of their commercial agricultural land, cultivated fields, and residential plots for alternative uses in order to improve land utilization efficiency. Furthermore, the Botswana land policy declared the whole country a planning area, which necessitated that all land allocations should be planned and demarcated.

Furthermore Section 59 of the Land Policy focuses on the business land which include mainly investment, commercial and industrial plots. Section 59 further states that to ensure transparency

and development of land as well as to facilitate achievement of economic diversification and industry development objectives, investment land is accessible through open competitive public tender. Commercial, industrial and Civic and Community plots are leased or sold at market price in a transparent manner. Preference on plot allocations in local centres are given to citizen consortia. Non-Citizens are also allocated commercial, industrial and civic and community plots in accordance with prevailing legislation and guidelines.

However, to inform policy making, the government of Botswana conducted the 2022 Botswana Population and Housing in March/April 2022 and land indicators were part of the census. Therefore this paper analysis business land ownership using the 2022 Botswana Population and Housing Census Data.

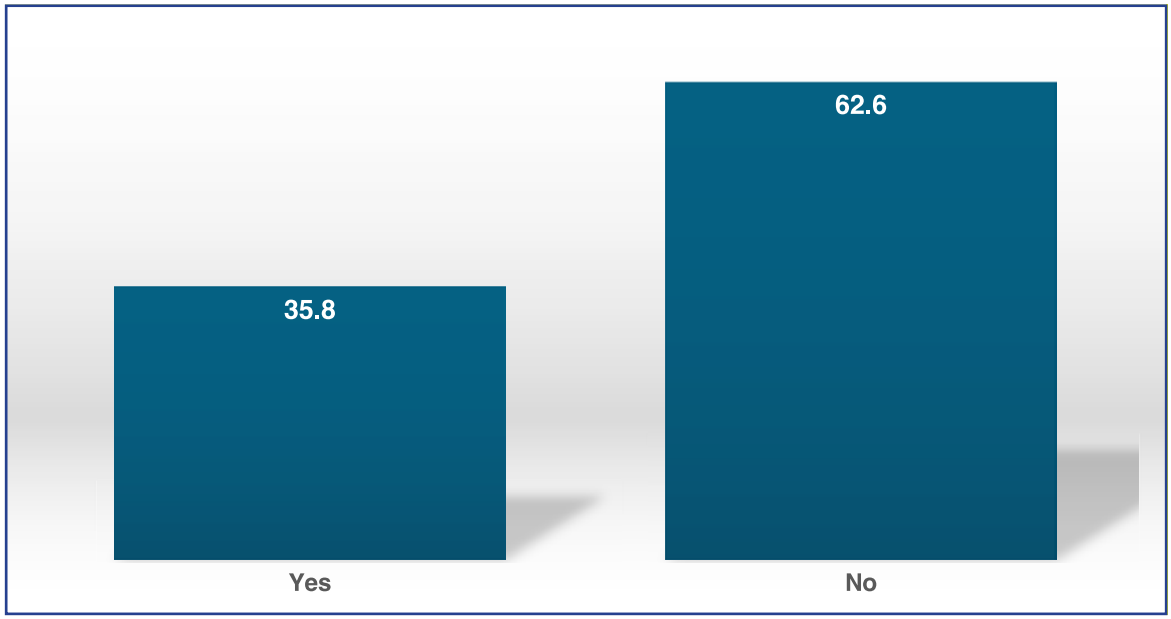
3. METHODOLOGY

The chapter will make use of the 2022 Botswana Population and Housing Census data. Census data included a question on land ownership, and the associated rights. The question was directed to individual household members aged eighteen years and above. The most knowledgeable person (usually the head of the household) responded on behalf of all other household members. An individual is defined as a landowner whether they own land solely or jointly with someone inside or outside the household. Households may have multiple landowners or may own multiple plots of land with different owners identified for each plot. This differs with the data on household level ownership where all of the household plots comprise one person and identifies to a single person who is the head. All private households enumerated across the country using administrative districts as used by Statistics Botswana.

Specifically, this chapter will use the 2022 Population & Housing Census data to interrogate if Botswana population own business lands. Comprehensive statistics on the number of business land owned by Botswana population either individually or jointly with someone else will be interrogated and if those individuals having business lands have legally recognized documentation or not. Data analysis on the above study variable and with respect to classificatory variables via (a) sex (b) district, (c) level of education, (d) age, and (e) marital status, will be carried out using descriptive statistical methods and the outcomes to be presented in the form of Tables, diagrams, and Charts. Using statistical software such as SPSS, R, or Stata, we will perform basic descriptive measures such as frequencies and cross tabulation and utilize graphical displays to aid in the analysis.

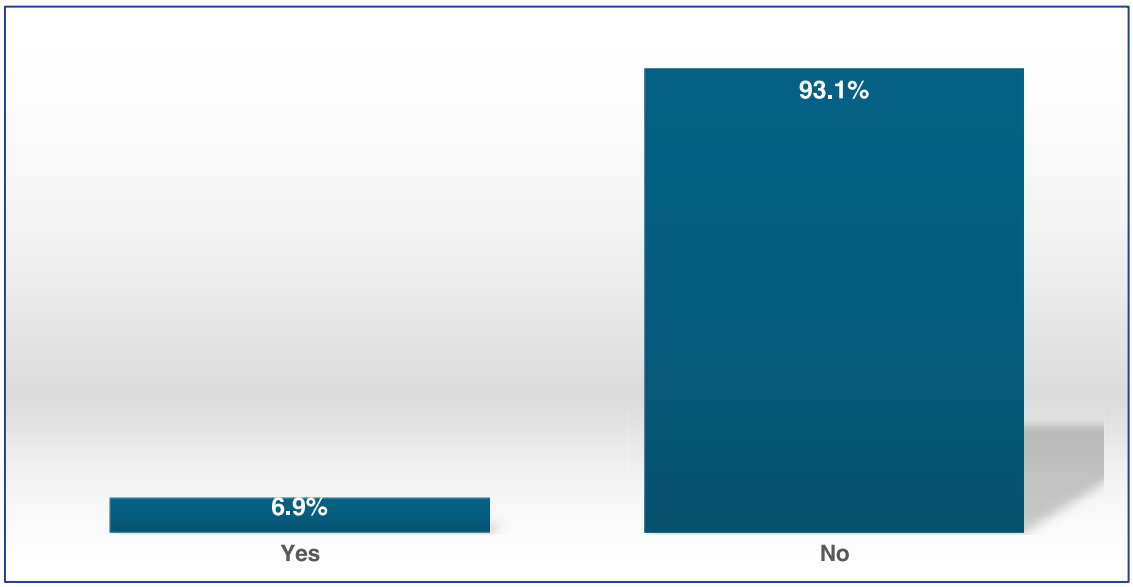
4. FINDINGS AND DISCUSSIONS

FIGURE 1: Percentage distribution of Individual that own land



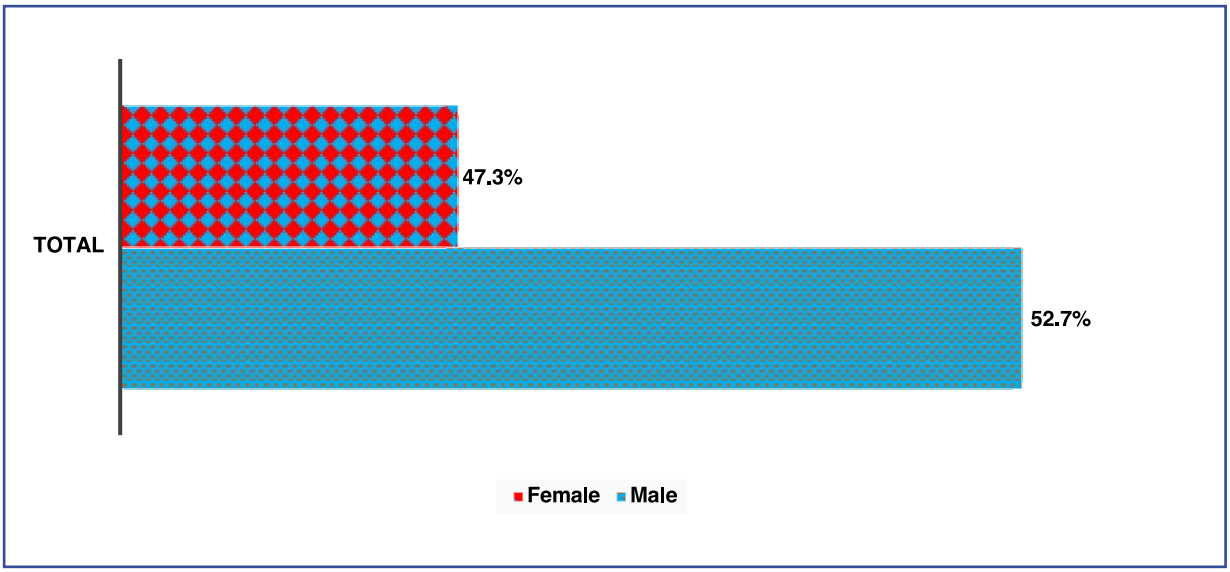
Population of individuals who are 18 years and above were asked if they owned agricultural, residential, or business land. Out of 1, 436, 390 individuals, less than half thus 35.8 percent (514,078 individuals) indicated that they have land, as shown in **Figure 1**. Males represent 16.2 percent and females 19.6 percent among those who owned land. Furthermore 62.6 percent (899,624 individuals) stated that they do not own land.

FIGURE 2: Percentage distribution of Individual that own business land



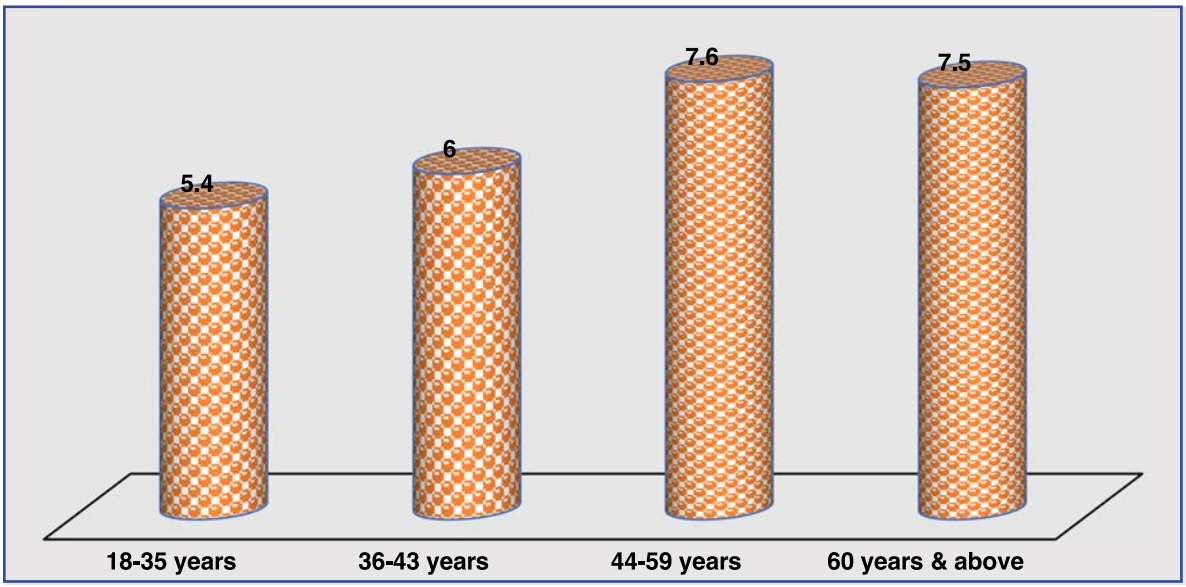
Figures 2 indicates that 6.9 percent (35,541) of individuals said they have business land and 93.1percent (476,861) said they do not own business land. From the ones who owns business land, 74 percent own it individually and has been registered, whereas 19 percent jointly own business land and it has been registered. 7 percent indicated they do not have no certificates **(See Table 2)**.

FIGURE 3: Percentage distribution of Individual that own business land by Sex



The data presented in **Figure 3** illustrates the distribution of business land ownership by sex. The proportion of male business landowners from the total population owning business land stands at 52.7 percent. As for the female their proportion is at 47.3 percent **(See Table 3).**

FIGURE 4: Percentage distribution of Individual that own business land by Age



The data indicates that youth (18-35 years) that own business land are 5.4 percent, followed by 36-43 years group with 6 percent. The elders over 60 years and above accounted for 7.5 percent of business land owners. The age group of 44-59 years reported the highest with 7.6 percent, this is the majority of working class **(See Table 4).**

FIGURE 5: Percentage distribution of Individual by District

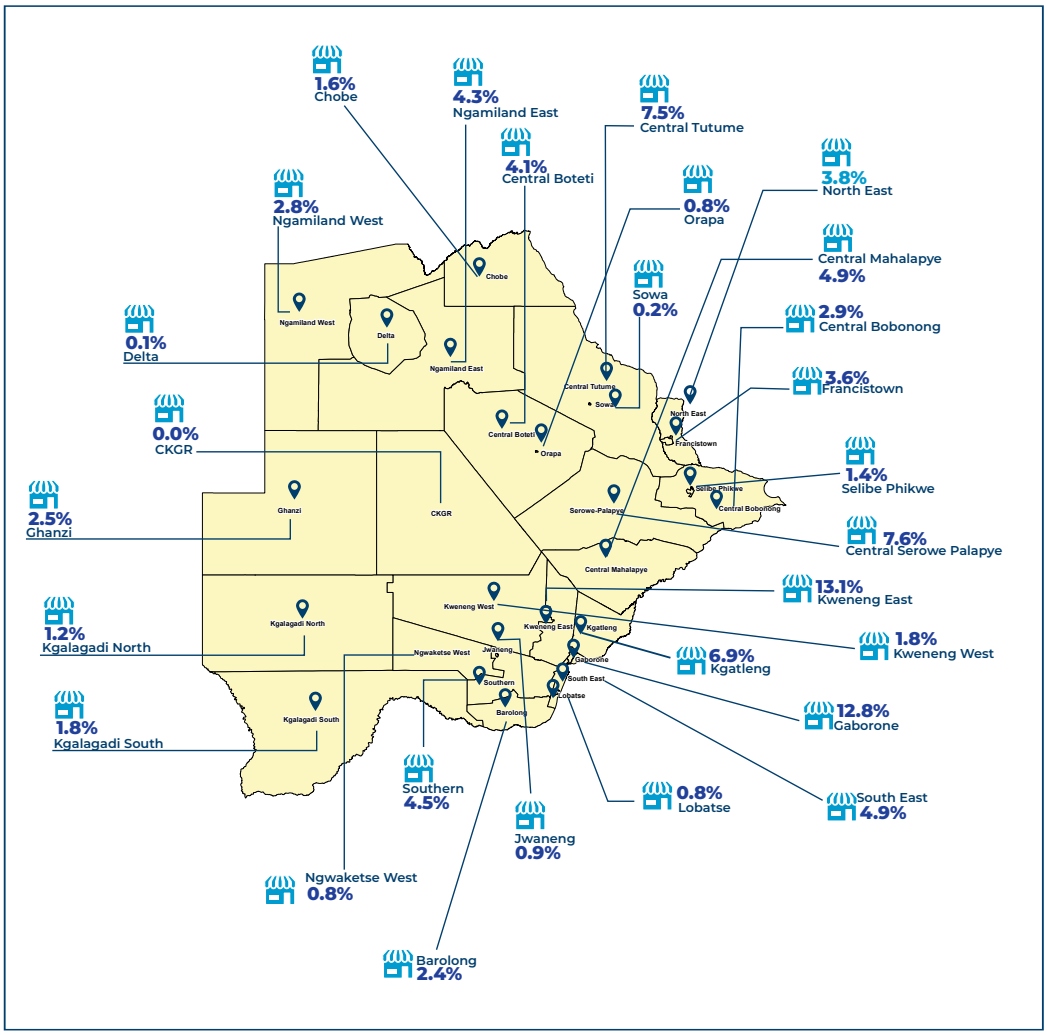
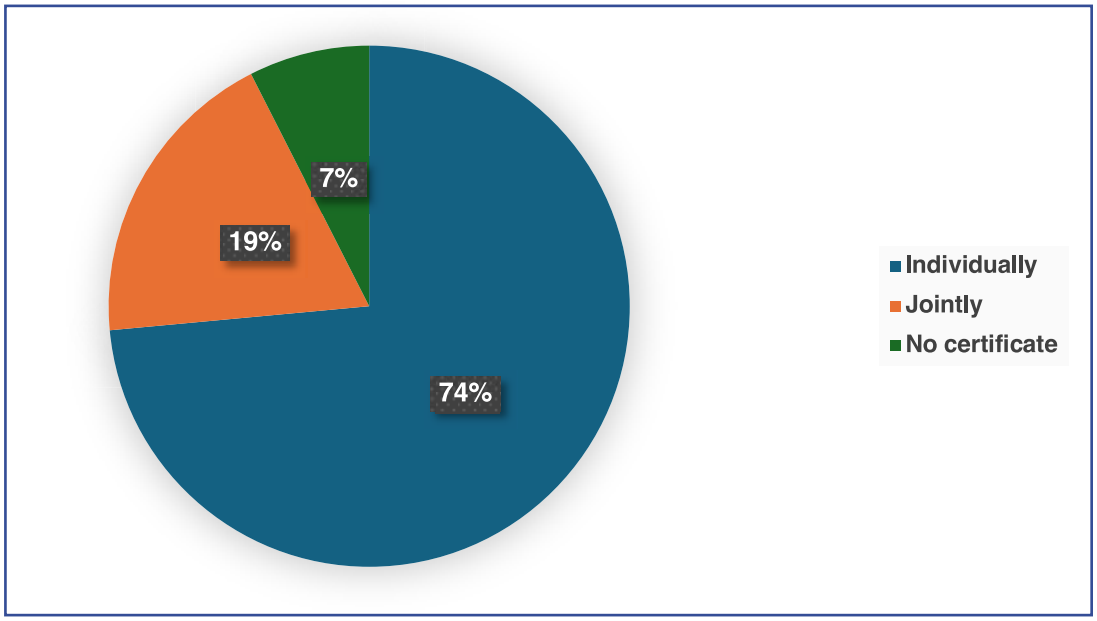


FIGURE 6: Percentage distribution of Individuals owning business land by Marital Status

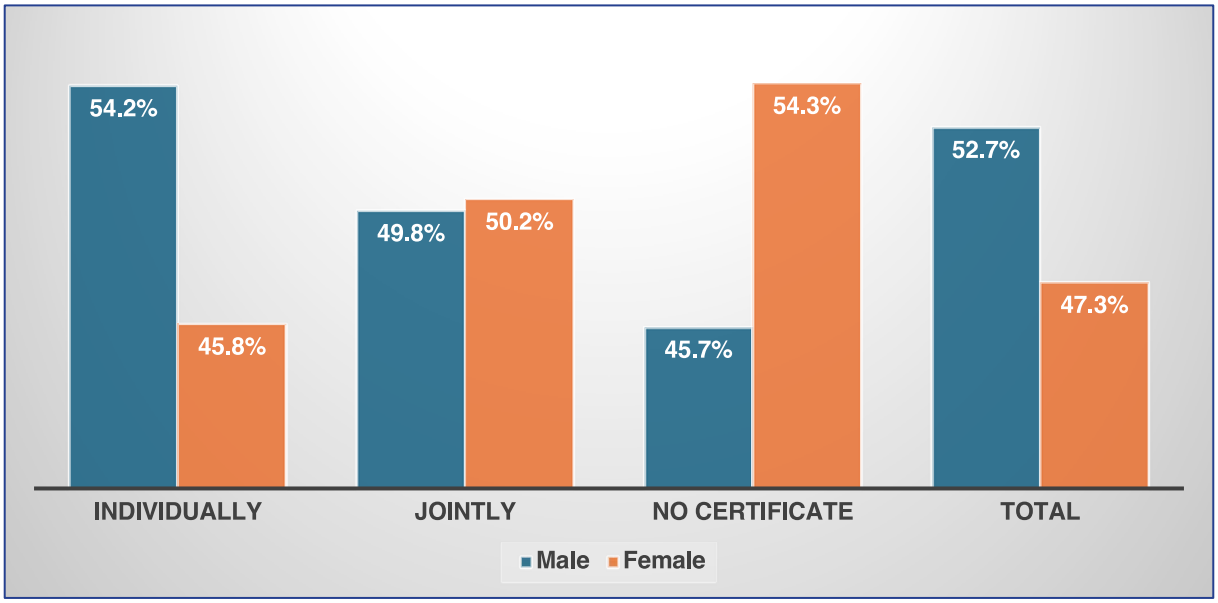
The majority of business land is owned by married individuals at 10.6 percent, followed by divorced, separated and widowed individuals at 10.1 percent and 6.7 percent respectively. The single and living together contributed 4.7 percent and 3.7 percent to business land ownership.

FIGURE 7: Percentage distribution of Individual that own business land by type



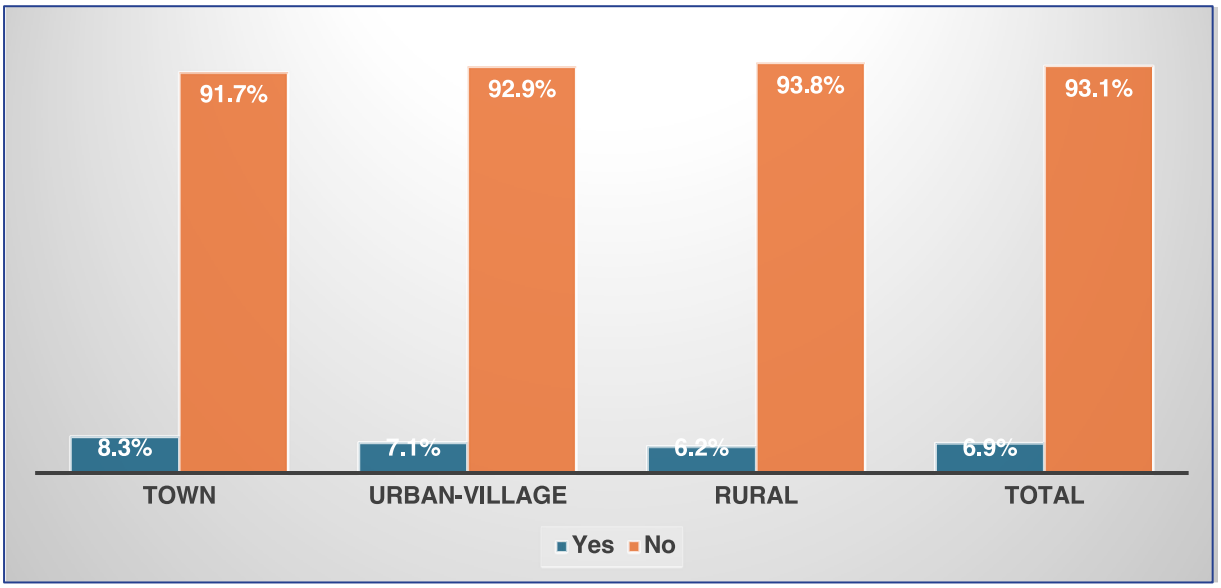
At the individual level, business land ownership accounts for 6.9 percent. From the ones who owns business land, 74 percent own it individually and has been registered, whereas 19 percent jointly own business land and it has been registered. 7 percent not registered and indicated they do not have certificates.

FIGURE 8: Percentage distribution of Individuals owning business land by Sex and type of ownership



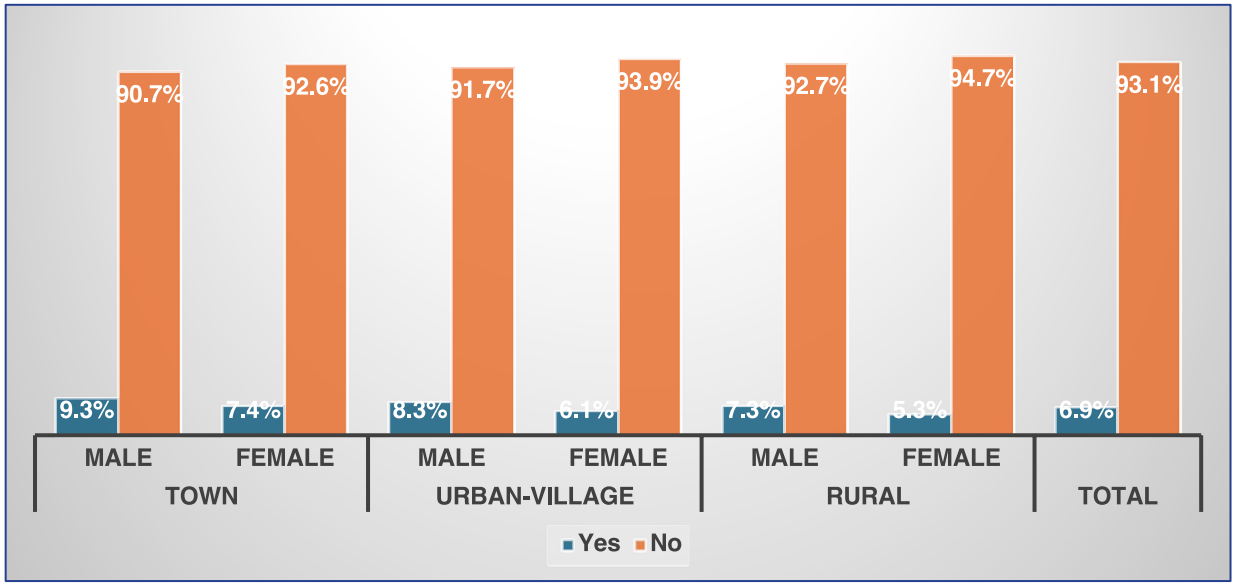
Ownership of business land by sex divide shows that there are more male-headed households who own land individually and with certifications **(see Figure 8)**. For those households where there is no certification, females are in the majority at 54.3 percent. Those with joint-ownership, there is very little difference between men and women as shown in Figure 8.

FIGURE 9: Percentage distribution of Individual owning business land by locality



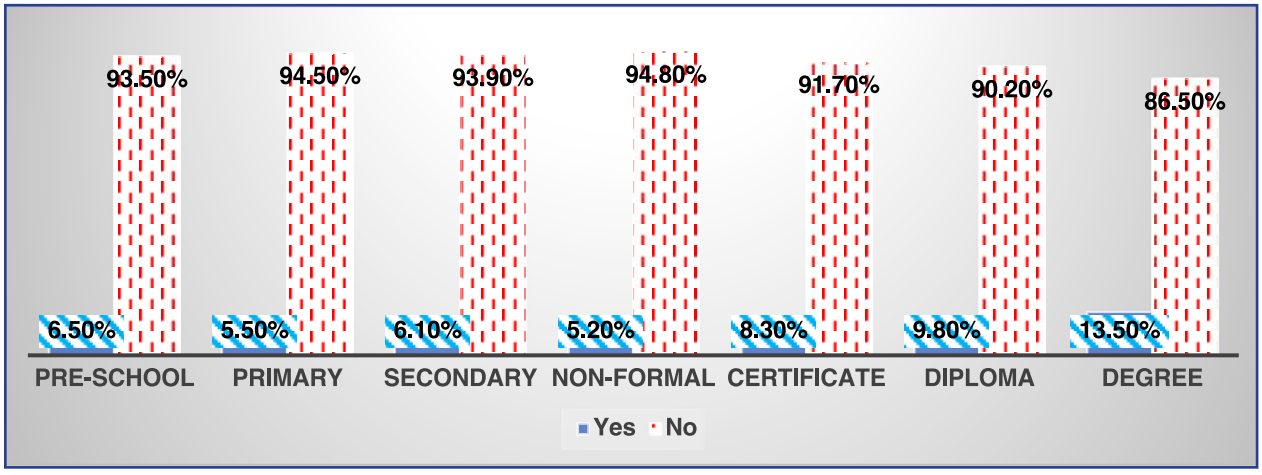
With respect to ownership of business land by locality, the percentage of ownership is similar across and much lower **(see Figure 9)**.

FIGURE 10: Percentage distribution of Individual owning business by Sex and locality



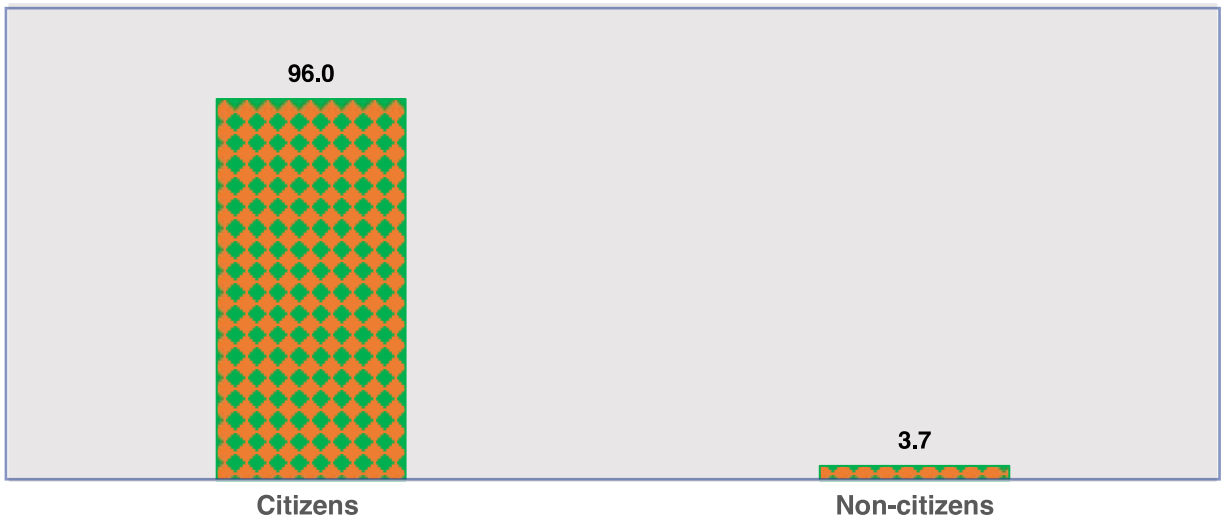
Comparing household head gender disparities of ownership of land by locality in **figure 10** shows that there slightly more male-headed households in towns owning land at 9.3 percent versus 7.4 percent for female-headed households.

FIGURE 11: Percentage distribution of Individual owning business land by Educational Attainment



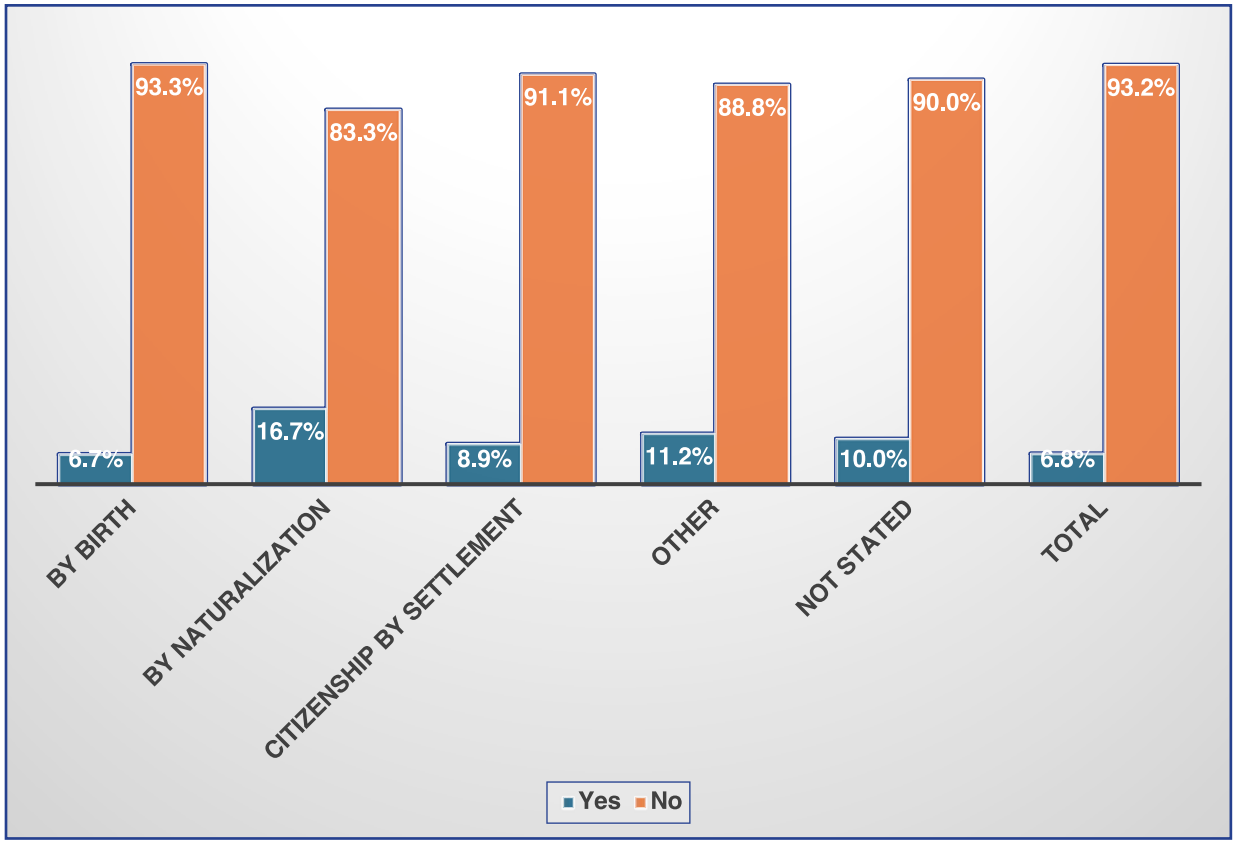
In **Figure 11** business land ownership is disaggregated by education attainment of the head of households. There appears to be an increasing trend in the percentages of business land ownership by increasing education levels. At degree level, the proportion of households with ownership of land is higher than at the lower levels.

FIGURE 12: Percentage distribution of Individual owning business land by Citizenship



The data indicates that 96.0 percent citizens own business land whereas 3.7 percent of business land is held by non-citizens.

FIGURE 13: Percentage distribution of Individual owning business land by Citizenship Acquisition



Furthermore, Business land ownership was also disaggregated by citizenship. **Figure 13** shows that the lowest percentage of individual who are citizen by birth 6.7 percent has business land. The results also show that the highest percentage of individual who own business land are a citizen by naturalization.

FIGURE 14: Percentage distribution of Individual owning business lady by locality and type of ownership

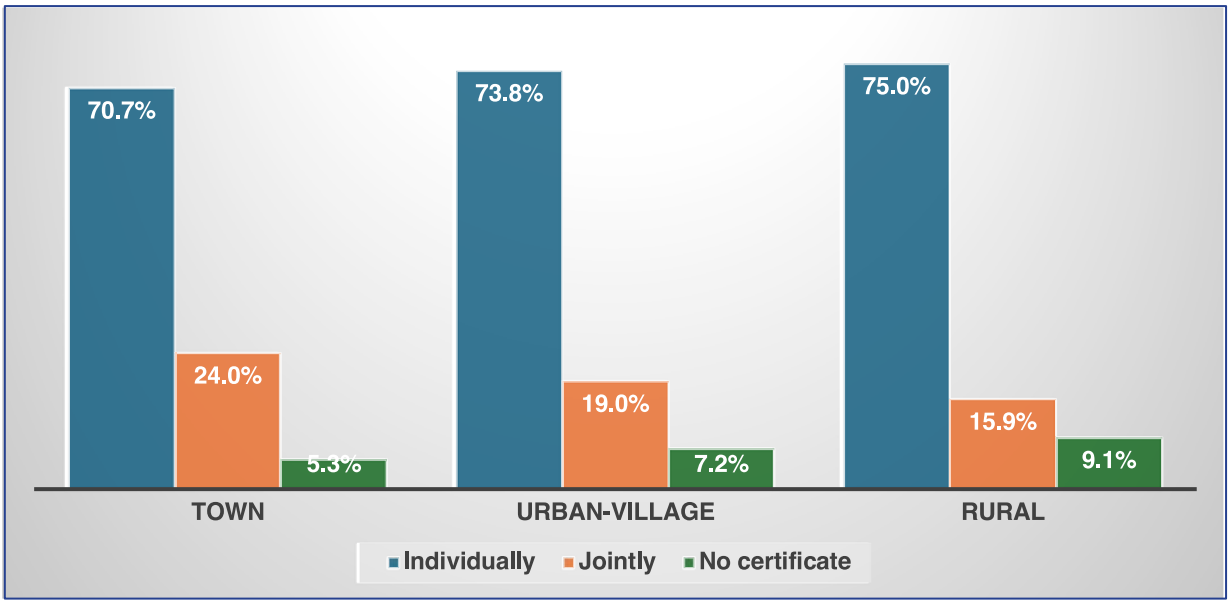
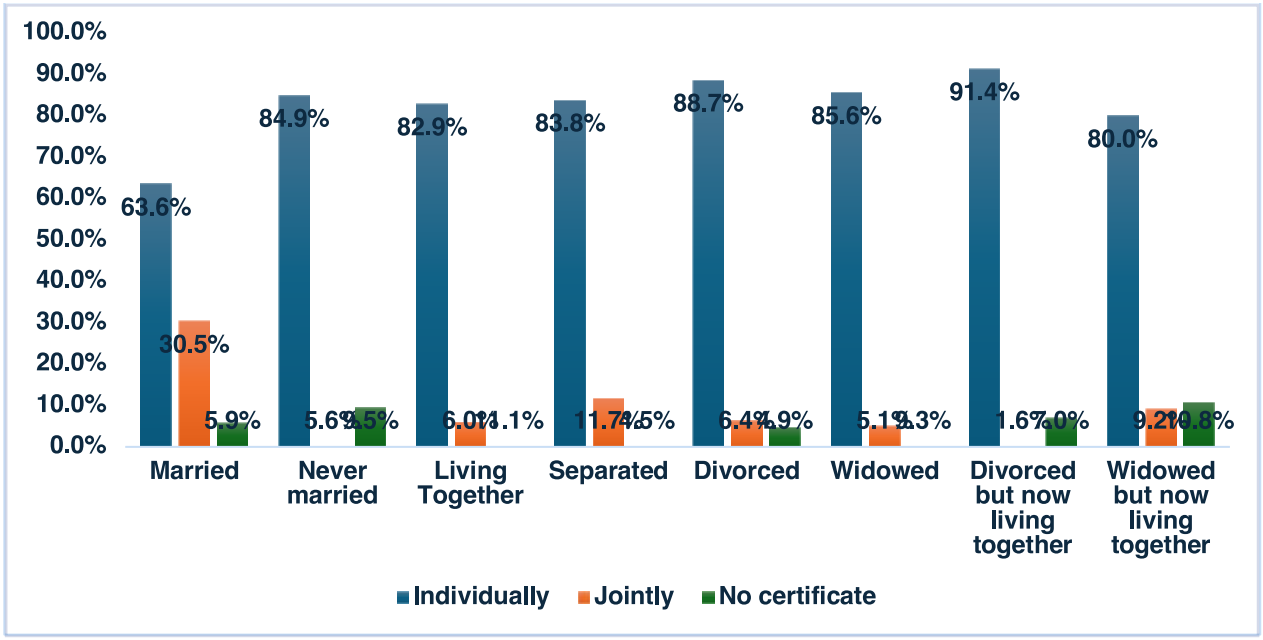


Figure 14 shows type of ownership as in certificated individually or jointly and not certificated by locality type. The results show that in rural areas, exactly three-quarters of ownership of business land is individual and 15.9 percent of the ownership is joint ownership. This pattern is similar to ownership of business land in urban villages. In the town areas the percentage of joint ownership of business land is almost one-quarter.

FIGURE 15: Percentage Distribution of Individual owning business land by marital status and type of ownership



In **figure 15**, ownership of business land is disaggregated by marital status. For the married head of households, nearly two-thirds (63.6%) own business land individually. For the other categories of marital status, more than 80 percent of households own business land individually.

5. POLICY IMPLICATIONS

According to Botswana Land Policy (2019), business land is allocated to citizens and non-citizens through open competitive public tender and some plots are being leased or sold at market price in a transparent manner. As a result this disadvantages many individuals who do not have financial power. Furthermore some can even miss the adverts for such land. Therefore the government should just allow people to apply for business land and during its availability then an interview be done for those with viable business ideas.

Sustainable Development Goals (SDGs) indicator 1.4.2 of SDGs measures a proportion of the total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and by type of tenure. In Botswana the government has done well in executing this indicator. The LAPCAS ensured that most of the land is registered and the government has started the issuance of Secure Land Title. Therefore the results of this study indicate that majority of the business land thus 74.2 percent has legally recognized documentation.

The results indicate that 52.7 percent of males own business land compared to 47.3 percent of females. This might be attributed to notable change to the land policy which deleted a clause which provided that only one spouse could apply for land. The removal of this clause in the revised Land Policy of 2019 means that individually spouses have the right to apply land. Therefore this might had an impact on the number of women who applied for business land since in the past majority of married woman were depending on their husbands.

Vision 2036 pillar on Human Social Development seeks to create an inclusive society that provides equal opportunities to all citizens, leaving no one behind. By allocating business land through competitive public tender and some being sold at market price leaves behind those who do not have financial power and uneducated individuals.

6. CONCLUSION AND RECOMMENDATIONS

The results of the study shows that business land in Botswana is owned by only few individually in the country. As a result, these hinders investments and result into low productivity and low revenues for social economic development since business land is a fundamental pillar of the economy. As a result it is recommended that the government should speed up allocation of business land, just like they did for residential plot were strategies like 100 thousand plots were targeted for one financial year country wide.

Government should just allow people to apply for business land just like residential land and during its availability then an interview be done for those with viable business ideas.

The Ministry of Land to work with organization such as Local Entrepreneurship Authority (LEA) and Citizen Entrepreneurial Development Agency (CEDA) so that Batswana with viable business ideas be given land or leased to them without any difficulties or tendering process just like the investors who are brought into the country by Botswana Investment Trade Centre (BITC).

A further study is recommended to find out which sectors in the economy are having business land and in which districts because with PHC individuals were asked if they have business land. However there was no follow up questions on usage and where those business plots are located.

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APPENDICES

TABLE 1: PERCENTAGE DISTRIBUTION OF INDIVIDUAL OWNING LAND

INDIVIDUAL OWNING LAND	DISTRIBUTION	PERCENTAGE DISTRIBUTION
Yes	514,078	35.8
No	899,624	62.6
Not Stated	22,688	1.6
TOTAL	**1,4363,90**	**100.0**
Missing	63,900	
TOTAL	**1,500,290**	

TABLE 2: PERCENTAGE DISTRIBUTION OF INDIVIDUAL OWNING BUSINESS LAND

INDIVIDUAL OWNING BUSINESS LAND	DISTRIBUTION	PERCENT DISTRIBUTION
Yes	35,541	6.9
No	476,861	93.1
TOTAL	**512,402**	**100.0**
NOT STATED	1,676	
TOTAL	**1,500,290**	

TABLE 3: PERCENTAGE DISTRIBUTION OF INDIVIDUAL OWNING BUSINESS LAND BY SEX

OWN ANY BUSINESS LAND	MALE	FEMALE	TOTAL
YES	18.720	16.821	**35.541**
	52.7%	47.3%	**100.0%**
NO	212.949	263.912	**476.861**
	44.7%	55.3%	**100.0%**
TOTAL	231.669	280.733	**512.402**
	45.2%	54.8%	**100.0%**

TABLE 4: PERCENTAGE DISTRIBUTION OF INDIVIDUAL OWNING BUSINESS LAND BY AGE

OWN ANY BUSINESS LAND	AGE				TOTAL
	18-35	36-43	44-59	60& ABOVE	
YES	3,959	6,809	14,034	10,739	**35,541**
	5.40%	6%	7.60%	7.50%	**100.00%**
NO	68,719	105,933	169,764	132,434	**476,850**
	94.50%	93.90%	92.30%	93%	**100.00%**
TOTAL	**72,678**	**112,742**	**183,798**	**143,173**	**512,391**
	14.10%	**22%**	**35.80%**	**27.90%**	**100.00%**

TABLE 5: Percentage distribution of Individual owning business land by District

DISTRICT	INDIVIDUAL OWNING OWN ANY BUSINESS LAND	PERCENTAGE
GABORONE	4,552	12.8
FRANCISTOWN	1,294	3.6
LOBATSE	290	0.8
SELIBE PHIKWE	481	1.4
ORAPA	299	0.8
JWANENG	306	0.9
SOWA	63	0.2
SOUTHERN	1,605	4.5
BAROLONG	864	2.4
NGWAKETSE WEST	302	0.8
SOUTH EAST	1,752	4.9
KWENENG EAST	4,640	13.1
KWENENG WEST	651	1.8
KGATLENG (Wards)	2,441	6.9
CENTRAL SEROWE –PALAPYE	2,687	7.6
CENTRAL MAHALAPYE	1,745	4.9
CENTRAL BOBONONG	1,046	2.9
CENTRAL BOTETI	1,467	4.1
CENTRAL TUTUME	2,673	7.5
NORTH EAST	1,345	3.8
NGAMILAND EAST	1,520	4.3
NGAMILAND WEST	984	2.8
CHOBE	576	1.6
DELTA	21	0.1
GHANZI	879	2.5
CKGR	4	0.0
KGALAGADI SOUTH	644	1.8
KGALAGADI NORTH	410	1.2
Total	**35,541**	**100.0**

TABLE 6: Percentage distribution of Individual owning business land by Sex and type of ownership

ACQUISITION OF BUSINESS CERTIFICATE OF TITLE DEED	GENDER OF HEAD OF HOUSEHOLD				
	MALE		FEMALE		TOTAL
Individually	14,074	54.2%	11,895	45.8%	**25,969**
Jointly	3,333	49.8%	3,357	50.2%	**6,690**
No certificate	1,202	45.7%	1,431	54.3%	**2,633**
TOTAL	**18,609**	**52.7%**	**16,683**	**47.3%**	**35,292**

TABLE 7: Percentage distribution of Individuals owning business land by locality

LOCALITY TYPE	OWN ANY BUSINESS LAND				
	YES		NO		TOTAL
Town	7,285	8.3%	80,152	91.7%	**87,437**
Urban-Village	15,980	7.1%	210,617	92.9%	**226,597**
Rural	12,276	6.2%	186,092	93.8%	**198,368**
TOTAL	**35,541**	**6.9%**	**476,861**	**93.1%**	**512,402**

TABLE 8: Percentage distribution of Individuals owning business land by Sex and locality

LOCALITY TYPE	SEX OF HOUSEHOLD HEAD	OWNERSHIP OF BUSINESS LAND				
		YES		NO		TOTAL
Town	Male	4,046	9.3%	39,660	90.7%	**43,706**
	Female	3,239	7.4%	40,492	92.6%	**43,731**
	Male	8,072	8.3%	89,460	91.7%	**97,532**
Urban-Village	Female	7,908	6.1%	121,157	93.9%	**129,065**
	Male	6,602	7.3%	83,829	92.7%	**90,431**
	Female	5,674	5.3%	102,263	94.7%	**107,937**
	TOTAL	**35,541**	**6.9%**	**476,861**	**93.1%**	**512,402**

TABLE 9: Percentage distribution of Individuals owning business land by citizenship

ACQUISITION OF CITIZENSHIP	OWN ANY BUSINESS LAND				
	YES		NO		TOTAL
By birth	33,204	6.7%	464,300	93.3%	**497,504**
By naturalization	709	16.7%	3,547	83.3%	**4,256**
Citizenship by settlement	83	8.9%	845	91.1%	**928**
Other	48	11.2%	379	88.8%	**427**
Not Stated	76	10.0%	682	90.0%	**758**
TOTAL	**34,120**	**6.8%**	**469,753**	**93.2%**	**503,873**

TABLE 10: Percentage distribution of Individuals owning business land by education

EDUCATION ATTAINMENT	OWN ANY BUSINESS LAND				
	YES		NO		TOTAL
Pre-school	54	6.5%	775	93.50%	**829**
Primary	6,331	5.5%	107,762	94.50%	**114,093**
Secondary	10,524	6.1%	162,973	93.90%	**173,497**
Non-formal	438	5.2%	8,037	94.80%	**8,475**
Certificate	2,234	8.3%	24,690	91.70%	**26,924**
Diploma	4,865	9.8%	44,962	90.20%	**49,827**
Degree	7,949	13.5%	50,760	86.50%	**58,709**
TOTAL	**32,395**	**7.5%**	**399,959**	**92.5%**	**432,354**

LAND OWNERSHIP IN BOTSWANA: A COMPREHENSIVE ANALYSIS OF THE 2022 POPULATION AND HOUSING CENSUS

By

Galekgatlhe Bailey Balekang, Kakanyo Fani Dintwa, Larona Thina Kaisara

EXECUTIVE SUMMARY

INTRODUCTION

This study explores the 2022 population and housing census with the objective of assessing the land rights owned by households within Botswana, aiming to gain insights into the distribution and utilisation of land resources among the population. The specific objectives include determining the land ownership status among household members based on the type of land use, and evaluating the documentation of land ownership according to demographic characteristics and census districts.

METHODOLOGY

The primary data used in this study was obtained from the 2022 Population and Housing Census conducted by Statistics Botswana. This study followed the quantitative analysis technique: descriptive statistics, with reference to frequencies, percentages, and cross-tabulations in order to explore land ownership and land use across districts. The latest version of SPSS was used as a core software for data analysis. The results are presented in the form of charts and tables.

Main Findings:

- **Land ownership by demographic characteristics and district:**

  The findings show that females have a higher land ownership rate (54.8%) compared to males (45.2%). There are notable age disparities in land ownership: only 14.3 percent of respondents aged 18-35 own land, whereas 35.8 percent of those aged 44-59 own land. The districts with the lowest land ownership rates are CKGR, Okavango Delta, Sowa, and Orapa, in ascending order. Generally, about 36 percent of the population own land irrespective of the type of land use while 64 percent does not own land.

- **Agriculture land ownership by district:**

  Sex differentials indicate that females (51.3%) have a higher percentage of agricultural land ownership compared to males (48.7%). Agricultural land ownership is highest in the Kweneng East district (12.2%). The lowest percentages of respondents owning agricultural land are in CKGR, Okavango Delta, and Sowa, in ascending order.

- **Residential land ownership by demographic characteristics and district:**

  The results indicate that over half (55%) of female respondents owned residential land compared to 44.7 percent of males. Additionally, 40.1 percent of respondents with primary education reported owning residential land, compared to 31.2 percent with tertiary education and 26.5 percent with non-formal education. Individuals without disabilities owned more residential land than those living with disabilities. District disparities were evident, with Gaborone, Central Serowe/ Palapye, and Central Tutume having the highest residential land ownership, in that order.

- **Business land ownership by demographic characteristics and district:**

  About 52.7 percent of the male respondents owned business land compared to 47.3 percent of their female counterparts. Similar disparities are observed across demographic characteristics. On the other hand, respondents aged 44 years and above owned more business land than those aged under 44 years. Ownership of business land is generally low across the districts. However, Kweneng East, Gaborone, and Central Serowe / Palapye districts recorded the highest percentage of ownership with 13.1 percent, 12.8 percent and 7.6 percent respectively.

- **Agricultural land ownership documentation classified by demographic characteristics and district**

  The results show that 90.3 percent of respondents in Kweneng West have certificates or title deeds for individually owned agricultural land, followed by 88.5 percent in Ngwaketse West and 88 percent in Jwaneng. CKGR has the lowest percentage, with only 28.4 percent having such documentation. Among females, 80.1 percent have individual certificates or title deeds for agricultural land, 14.8 percent have joint ownership, and 5.2 percent do not have certificates. For males, 79 percent have individual certificates or title deeds, 14.8 percent have joint ownership, and 6.0 percent do not have certificates.

- **Residential land ownership documentation classified by demographic characteristics and district:**

  There is a clear disparity in individual residential land ownership documentation between males and females, with 55.9 percent of females holding certificates or title deeds compared to 44.1 percent of males. Age differentials reveal that documentation is highest among the 44-59 age group. Additionally, 72.2 percent of people without disabilities have certificates or title deeds for individually owned residential land, whereas this is less common among people with disabilities

- **Business land ownership documentation by classified by district:**

  The results indicate that documentation for individually owned business land is more common among males (54.2%) than females (45.8%). Conversely, for jointly owned business land, a higher percentage of females (50.2%) hold documentation compared to males (49.8%). The 45-59 age group has the highest percentage of documentation for individually and jointly owned business land, as well as for those without certificates, compared to other age groups. Educational disparities are also evident, with individuals at the tertiary education level reporting the highest percentages of documentation for both individually (45.4%) and jointly (55.4%) owned business land.

Conclusion and Policy Implications:

The findings highlight the necessity for targeted policies and programs to address land ownership disparities and ensure equitable access across different social classes. It is crucial to formulate, implement, and monitor land policies, or revise existing ones, to respond to challenges stemming from global economic competitiveness, economic diversification, rural-urban migration, food security, poverty eradication, environmental sustainability, housing needs, and economic growth. Most importantly, these policies should aim to balance competing land use needs to achieve social, economic, and political harmony.

INTRODUCTION

The African Natural Resources Center (ANRC, 2019) opines that the African Union Member States have initiated and implemented various land reforms at different times, at unprecedented rates and on varying ideological differences, attitudes, opinions, and preferences ever since they gained independence from the colonial masters. ANRC (2019), points out that a general consensus emerges that irrespective of the interpretation or execution of these changes, the fundamental objective revolves around the preservation and assurance of land rights for all individuals.

The Food and Agriculture Organization (FAO, 2002) emphasizes the significant role that right to land plays in the life of an individual across various dimensions such as social, economic, and environmental factors. It is posited that by having secure rights to land, a person is not only able to ensure food security but also to generate capital for their means of support. This assertion finds additional reinforcement in the scholarly work of Clover and Eriksen (2008), who contend that the ability to access land carries with it a perceived political standing, a sense of prestige, and holds cultural and social significance. In order to safeguard the entitlements of individuals, particularly those who are in precarious situations, it becomes imperative to advocate for the establishment of secure land tenure systems.

According to the Botswana Land Policy of 2015, the concept of land ownership and its regulation stands as a necessary basis of societal structure, playing a vital role in shaping the economic, social, and political landscape of the country. In addition to its economic inferences, the concept of land ownership also yields significant contributions to the realm of civic engagement and political involvement. The Government of Botswana (2015) posits that land management issues encompass a variety of crucial facets such as access to land, security of tenure, protection of land rights, recognition of vulnerability among specific groups, alienation of land rights, as well as land administration processes, procedures, structures, and the functioning of the land market. It is emphasized in the Botswana Land Policy of 2015 that there is a dedicated focus on safeguarding the rights of vulnerable groups, enhancing security of tenure, improving land management across all tenures, devolving functions to Local and Land Authorities, strengthening institutional capacity, and ensuring efficient management of land information (GoB, 2015). Particularly susceptible demographics include women, migrants, tenants, and pastoralists, thereby underscoring the critical importance of safeguarding the rights of those who possess limited influence within societal frameworks, as elucidated in Toulmin's research in the year 2008.

PROBLEM STATEMENT

Fewer people in the world are able to own land while the rest suffer the consequences. The most affected are women, smallholder farmers, indigenous and rural communities and this widens the land ownership and access gap (Chancel et al., 2022). Like many of the sub-Saharan countries, Botswana is no exception. The Government of Botswana has formulated and implemented numerous national documents including policies and Acts (Botswana's Tribal Land Act of 2018, Botswana Land Policy of 2015, among others. These national documents were formulated with the intention of granting land rights under customary law, as well as dealing with emerging land management issues including access to land, security of tenure, and protection of land rights, and recognition of vulnerable groups. Despite these government efforts, land is still scarce, and it's owned by the few while the majority particularly vulnerable populace like women, people with disability, small hold farmers, and the poor

do not own land. Kampamba et al., (2019), indicates that allocation of land to individuals is always delayed under the pretext that there is shortage of funds for the provision of serviced land, rising costs of development, encroachment of agricultural land, lengthy acquisition process through process of expropriation as well as land speculation. The delay in land allocation has led to over 1 million applicants on the waiting list (Zorkin, Raphaka and Nilsson, 2017). Therefore, this study will provide up-to-date statistics on land ownership by demographic characteristics and district for decision making and planning. It is also evident that there is a lack of comprehensive datasets on socio-economic and demographic aspects of land related issues which are meant to inform decision making and planning. Surveys and censuses conducted by Statistics Botswana include limited indicators related to land management and ownership. Therefore, there is a need for a national survey specifically for investigating land management issues in Botswana. Even though this study provides the basis for provision of information on land management and ownership issues it can never be a substitute for fully fledged national survey.

Aim and Objectives of the Research

The current paper explores the 2022 population and housing census to assess land ownership among households in Botswana. Specifically, the research seeks to:

- Establish the status of household members' land ownership by demographic characteristics and district.
- Investigate the types of land use common among household members owning land.
- Assess the documentation of land ownership by type of land use, demographic characteristics and district.

LITERATURE REVIEW

Deininger (2004), highlights the importance of international policies such as Sustainable Development Goals (SDGs) that underscore the significance of land ownership in fostering sustainable growth, promoting good governance, and enhancing the well-being of rural and urban populations alike. The author further states such policies precisely advocate for the provision of secure land tenure to bolster the asset base of marginalized land rights holders, thereby incentivizing investments that contribute to sustainable economic development. Moreover, as highlighted by Huck (2022), the alignment of national policies with the objectives outlined in the Sustainable Development Goals is crucial to advance sustainable development globally.

According to Winters et al. (2018), the agenda for the Sustainable Development Goals (SDGs) mentions protected access to land as a key means of meeting SDG 2 linked to ending hunger, achieving food security and improved nutrition as well as promoting sustainable agriculture. With proof of ownership and reduced risk of appropriation, rural households with secure land tenure are expected to invest more in production and land conservation (Meinzen-Dick, et. al., 2009); have greater access to collateral-based credit (De Soto, 2011); rent and sell their land with more ease (Deininger, 2004); and experience less land-related conflict (Nuesiri, 2014). In addition, land tenure security is expected to contribute to women's empowerment when women's names are included on land titles (USAID, 2016).

In conjunction with the Sustainable Development Goals (SDGs), Akinola (2018) asserts that the ownership of land plays a pivotal role in the formulation and execution of the African Agenda for 2063 due to the influence of pre-colonial African traditions and cultural norms, which have historically blocked the land ownership of women, consequently impacting the productivity of agricultural activities and hindering the progress towards sustainable development on the continent. The African Union (2015) highlights that the comprehensive framework of the African Agenda for 2063 aims to tackle various challenges encountered by African nations, with a specific focus on addressing issues pertaining to land administration. This is achieved through the promotion of sustainable development practices and policies, fostering economic success, and supporting the continuous growth of communities. The African Agenda for 2063 envisions a future where Africa can surmount its developmental obstacles, particularly those related to land governance, by creating a conducive environment for economic expansion and sustainable development (African Union, 2015).

Following the attainment of independence in 1966, the Government of Botswana initiated determined land reform programs with the goal of rectifying historical injustices, stimulating economic growth, and promoting social unity (Government of Botswana, 2015). A significant achievement in Botswana's land reform efforts was the implementation of the Tribal Land Act in 1968, which aimed to organize customary land rights and establish Tribal Land Boards (TLBs) to oversee land distribution and administration in rural regions. Additionally, the Land Tenure Policy of 1975 introduced the concept of Tribal Land Tenure, recognizing customary land rights within designated tribal territories while also allowing for the allocation of individual land rights (Government of Botswana, 2019). These reforms represented a significant departure from the colonial legacy of land administration, emphasizing the recognition of customary land tenure systems and the empowerment of local communities in the management of their resources (Sapignoli and Hitchcock, 2013).

However, challenges such as land scarcity, population growth, and urbanization have posed ongoing dilemmas for land policy makers in Botswana, prompting continued efforts to adapt and refine existing land tenure frameworks. The Government of Botswana has responded to these dynamics through various policy interventions, including the National Policy on Tribal Land Development (NPTLD) and the Land Administration Procedures Capacity and Systems (LAPCAS) project, which was aimed at streamlining land administration processes, enhance land tenure security, access to land and promote sustainable land use practices (Government of Botswana, 2015; Government of Botswana, 2019).

The Government of Botswana (2016) has acknowledged that land is a finite resource and has made a commitment through Vision 2036 to ensure sustainable land use and management. This commitment involves balancing economic, social, and environmental needs to address potential conflicts regarding land use. Furthermore, the Vision 2036 outlines a plan to balance the current and future generations' land needs to ensure equity and equal benefits for all citizens (Government of Botswana, 2016).

METHODOLOGY

This study employed primary data from the 2022 Population and Housing Census. The 2022 PHC was conducted by Statistics Botswana. The 2022 PHC data provides wide-ranging information including data on main variables of focus for this study. They include land ownership, agricultural land ownership, residential land ownership, business land ownership, and land documentation ownership (residential, agricultural, and business), and demographic characteristics (sex, age, education, marital status, disability, and citizenship).

In conducting the analysis, the Statistical Package for the Social Sciences (SPSS) was utilized as the primary software tool for conducting data analysis. The descriptive outline of the main variables was done, and they include land ownership for residential, agricultural, and business use, as well as the land documentation ownership (individually owned, jointly owned, and no certificate). Cross-tabulations were used to investigate the distribution of the afore-mentioned variables by demographic characteristics and district.

The target population was selected based on the following criteria:

- Respondents aged 18 years old and above. This filtering was informed by the Customary Land rights of Botswana which clearly stipulates that all citizens of Botswana aged 18 years and over are eligible to apply for available tribal land in any tribal area in Botswana.
- Furthermore, the respondents who reported ownership of land were also selected for analysis.

The findings obtained from the analysis are effectively presented through the demonstration of charts and tables. The visual aids in the form of charts and tables serve to augment the clarity and understanding of the results derived from the data analysis process. Through the comprehensive application of SPSS and the presentation of results in visual formats, the study successfully conveys the outcomes of the data analysis in a clear and informative manner.

RESULTS AND DISCUSSIONS

This section presents significant findings concerning the ownership of land based on specific variables that have been carefully selected for analysis. The tables have been presented in the appendix.

LAND OWNERSHIP BY TYPE OF LAND USE

Figure 1 below depicts percentage distribution of land ownership in Botswana. It can be observed that 35.8 percent of respondents have confirmed that they own land compared to 62.6 percent who responded in the contrary, indicating a lower percentage of land ownership in Botswana. In addition, 1.6 percent of respondents did not state whether they own land or not.

FIGURE 1: Percentage Distribution of Land Ownership in Botswana

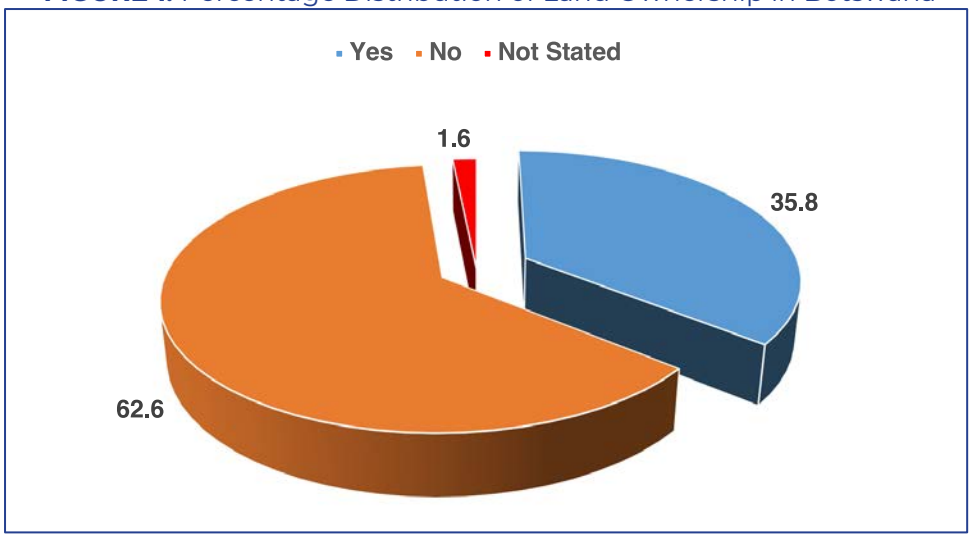


FIGURE 2: Percentage Distribution of Land Ownership by Type

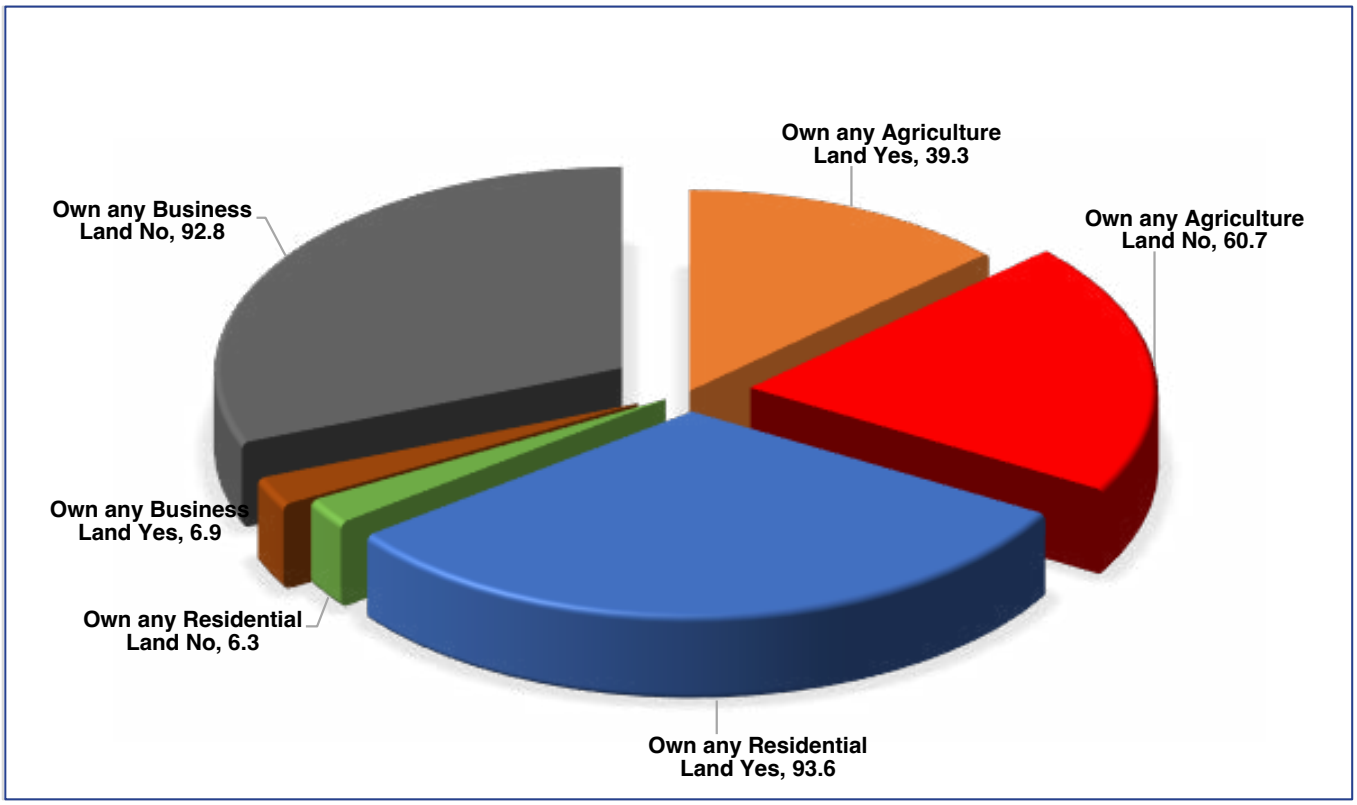


Figure 2 above shows percentage distribution of types of land ownership. Results from the figure show that majority (93.6%) of respondents owned residential land, while 39.3 percent owned agricultural land and 6.9 percent owned business land, highlighting low access to both agricultural and business land compared to residential land.

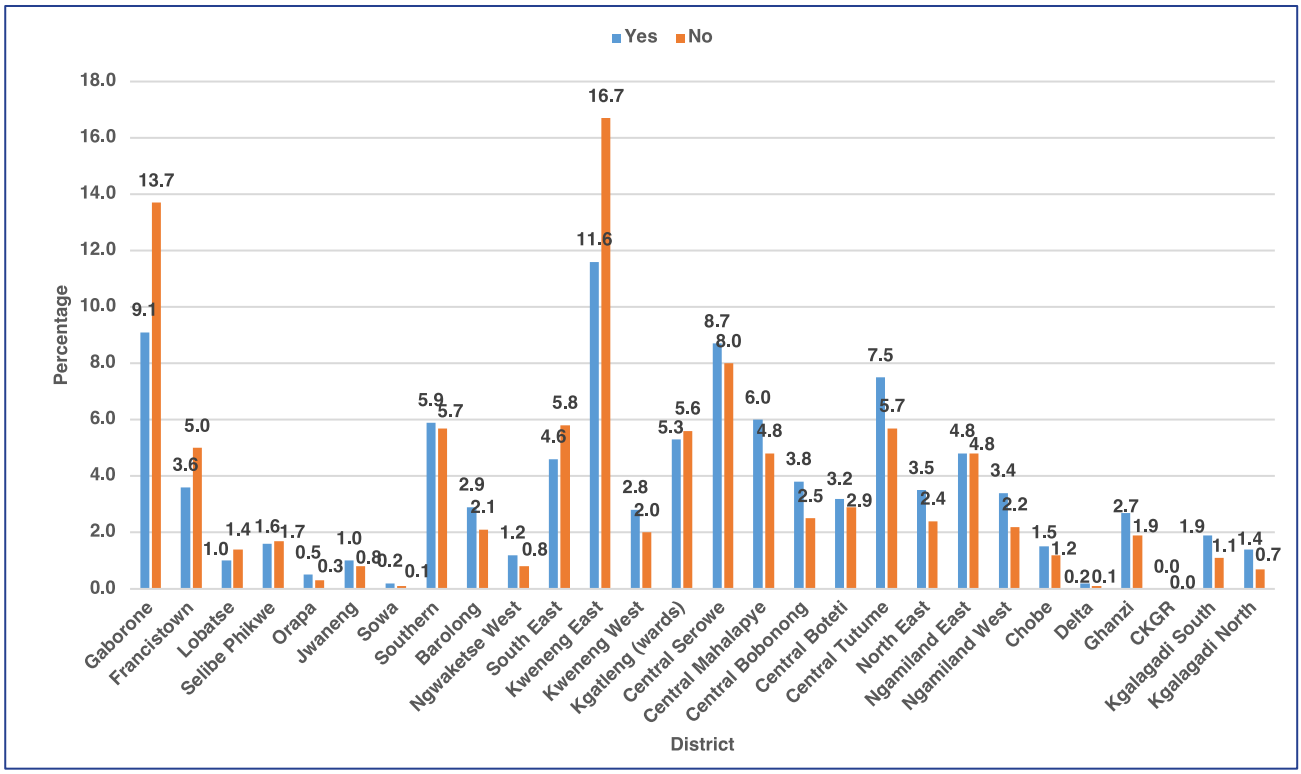
Land ownership by demographic characteristics

Table 1 presents land ownership categorised by sex, age, education, marital status, disability, and citizenship. Females have a higher land ownership rate (54.8%) compared to males (45.2%). Age-wise, land ownership is highest among individuals aged 44-59 years (35.8%), followed by those aged 60 and above (27.9%), 36-43 years (22%), and the lowest in the 18-35 age group (14.3%). This indicates that the elderly own land in large numbers compared to the youth. In terms of education, primary education holders reported the highest land ownership (40.2%), followed by tertiary education (31.3%), non-formal education (26.4%), and secondary education (2%). Marital status reveals that 43.6 percent of married respondents own land, compared to 34.8 percent of those never married and 11.6 percent of those living together, highlighting the importance of marriage as an economic reason for land ownership. Additionally, 72.5 percent of respondents without disabilities own land, significantly higher than the 27.5 percent living with disability.

Land ownership classified by district

The results from **Table 2** and **Figure 3** show that the highest land ownership is recorded in Kweneng East (11.6%), followed by Gaborone (9.1%), Central Serowe/Palapye (8.7%), and Central Tutume (7.5%), in that order **(see Figure 3)**.

FIGURE 3: Land Ownership by District

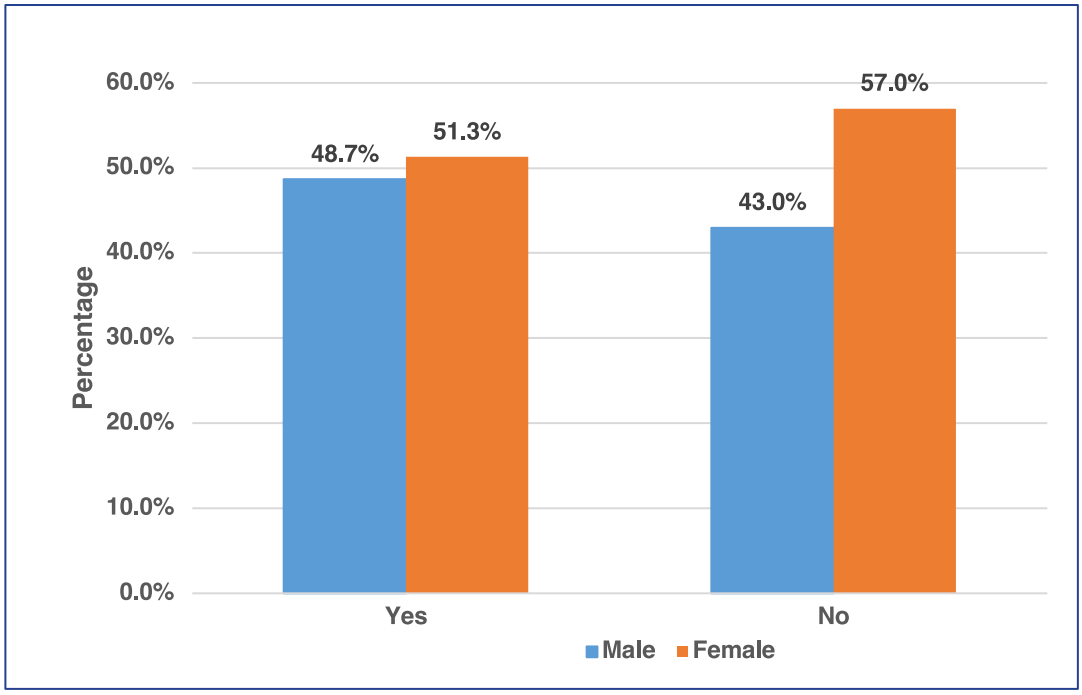


Agricultural land ownership classified by sex, age, educational level, marital status, disability, and citizenship

Table 3 presents agricultural land ownership by sex, age, education, marital status, disability and citizenship. Females have a higher percentage of agricultural land ownership (51.3%) compared to males (48.7%) **(Figure 4)**. With regard to age, agricultural land ownership is highest (42.9%) among individuals aged 60 years and above compared to 34 percent of those aged 44-49, 14.9 percent of those aged 36-43 years and the lowest in the 18-35 age group (8.2%). Additionally, more than one-

third (33.8%) of respondents with non-formal reported higher agricultural land ownership compared to 31.5 percent of those with primary and 31.2 percent of those with tertiary education. Marital status reveals that 44.1 percent of married respondents owned agricultural land compared to 33.2 percent of those never married and 11.2 percent of those who are widowed. On the other hand, the results show that more than half (66.2%) of respondents without disability owned agricultural land compared to 33.8 percent of those with disability. This glaring difference underscores the non-disabled and people living with disability disparity in access to agricultural land.

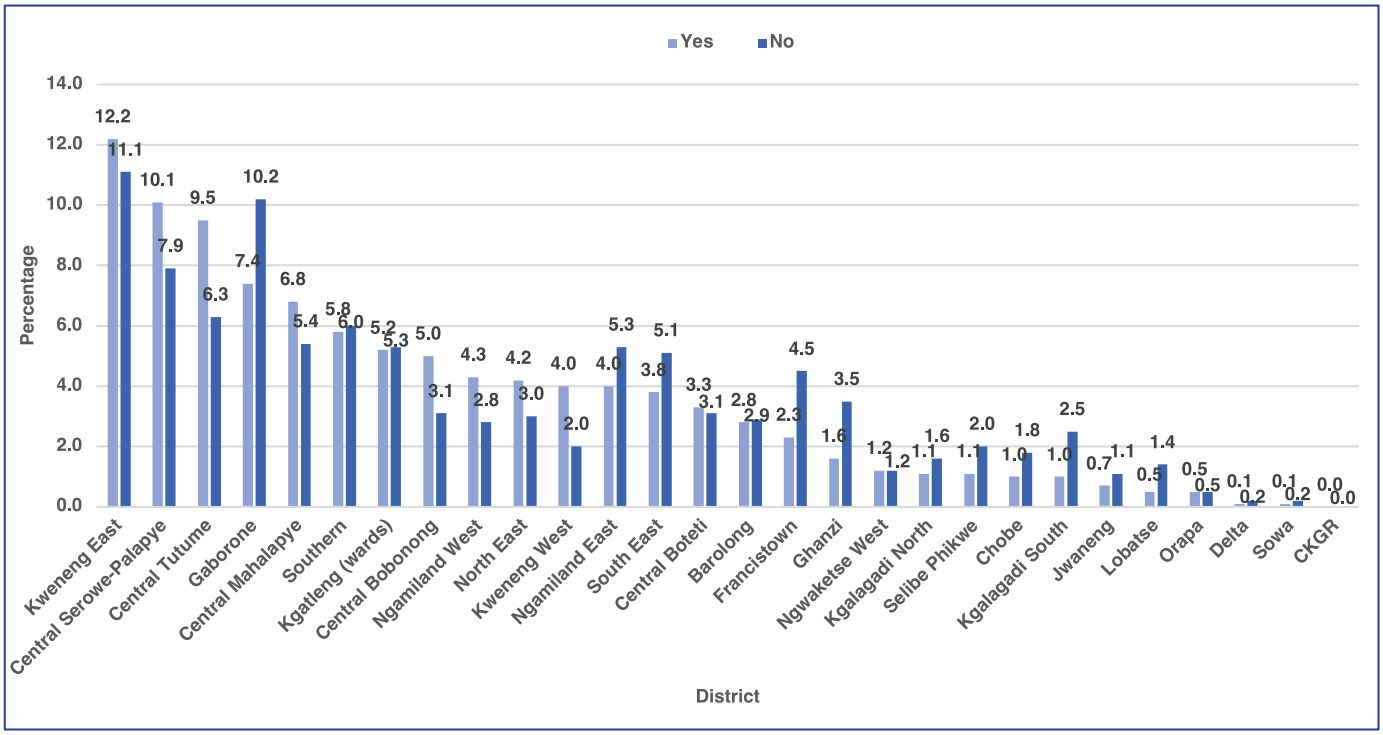
FIGURE 4: Agricultural Land Ownership by Sex



Agricultural land ownership classified by district

Table 4 and **Figure 5** reveal that the highest agricultural land ownership is in Kweneng East (12.2%) followed by Central Serowe/Palapye (10.1%), Central Tutume (9.5%), and Gaborone (7.4%).

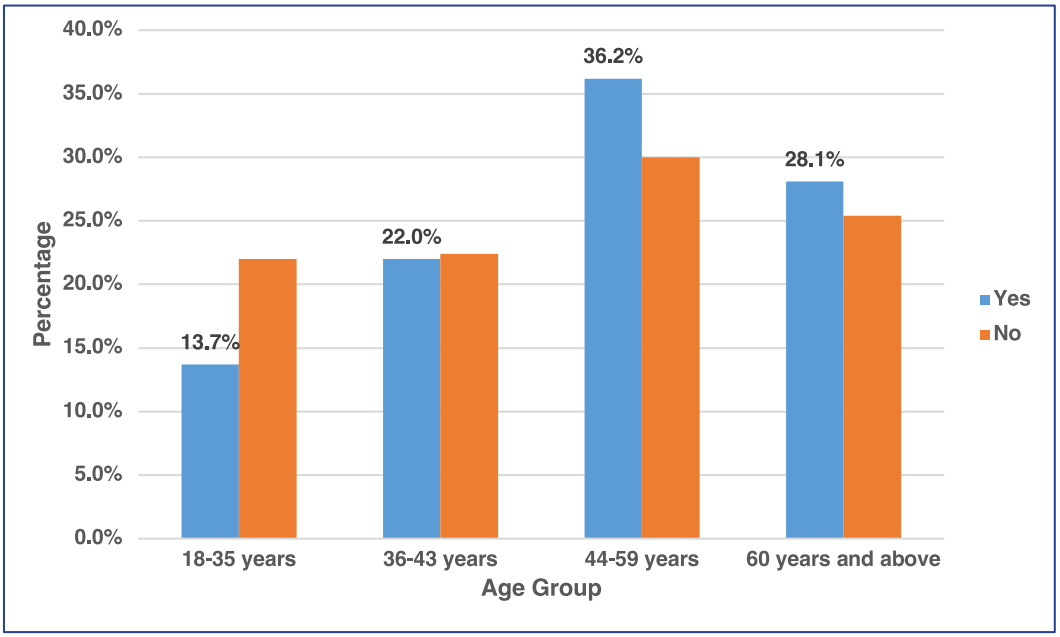
FIGURE 5: Agriculture Land Ownership classified by District



Residential land ownership classified by sex, age, educational level, marital status, disability, and citizenship

Table 5 presents residential land ownership by sex, age, education, marital status, disability and citizenship. The results show that more than half (55%) of respondents who are females owned residential land compared to males (44.7%). With regard to age, residential land ownership is highest (36.2%) among respondents aged 44-59 years compared to 28.1 percent of those aged 60 years and above, and 22 percent of those aged 36-43 years (Figure 6). The results also show that 40.1 percent of respondents with primary education reported residential land ownership compared to one-third (31.2%) of those with tertiary and 26.5 percent of those with non-formal education. Additionally, the results show that 43.4 percent of never married respondents owned residential land compared to 35 percent of those married and 11.4 percent of those living together. The majority (72.4%) of respondents without disability owned residential land compared to 27.6 percent of those with disability.

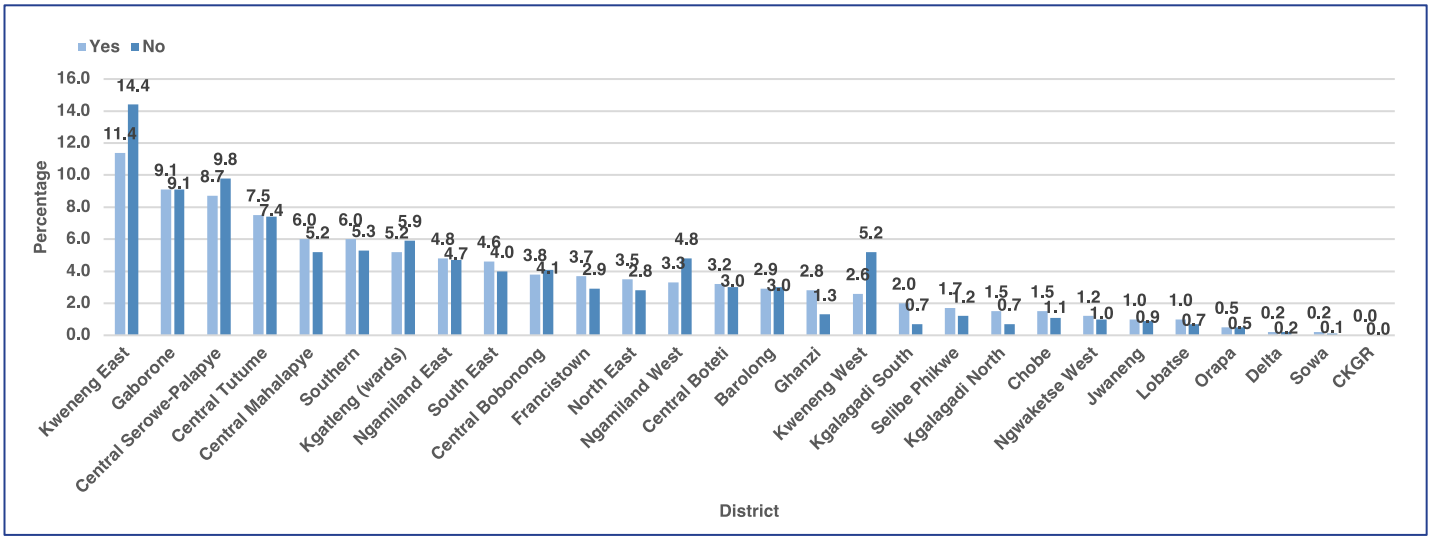
FIGURE 6: Residential Land Ownership by Age Group



Residential land ownership classified by district

The results from **Table 6** and **Figure 7** show that the highest residential ownership is recorded in Kweneng East (11.4%), followed by Gaborone (9.1%), Central Serowe/ Palapye (8.7%), and Central Tutume (7.5%).

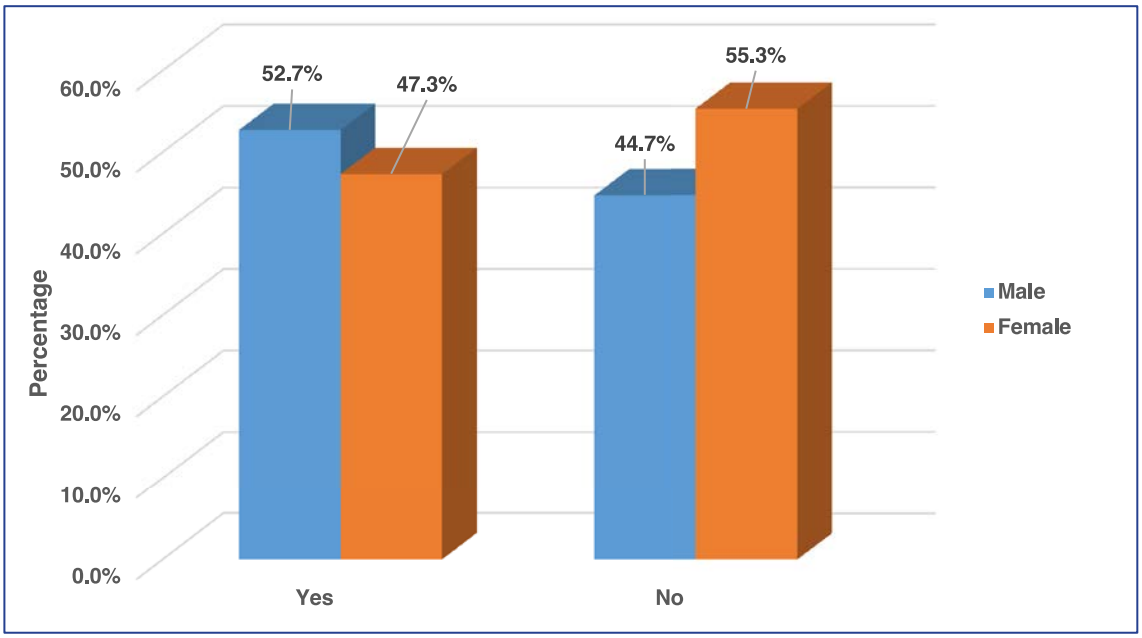
FIGURE 7: Residential Land Ownership by District



Business land ownership classified by sex, age, educational level, marital status, disability, and citizenship

Table 7 presents business land ownership by sex, age, education, marital status, disability and citizenship. Males have a higher percentage of business land ownership (52.7%) compared to females (47.3%) (Figure 8). With regard to age, business land ownership is highest (39.5%) among individuals aged 44-49 years compared to 30.2 percent of those aged 60 years and 19.2 percent of those aged 18-35 years. Additionally, more than two-fifth (46.5%) of respondents with tertiary education reported higher business land ownership compared to 32.5 percent of those with primary and 19.5 percent of those with non-formal education. Marital status reveals that 53.4 percent of married respondents owned business land compared to 29.5 percent of those never married and 6.9 percent of those who are widowed. On the other hand, the results show that the majority (74.8%) of respondents without disability owned business land compared to 25.2percent of those living with disability. Efforts to ensure equitable access to business land across all ages, levels of education, marital status, and disability, to mention but a few, are crucial to ensure growth of entrepreneurship and small and medium enterprises in Botswana.

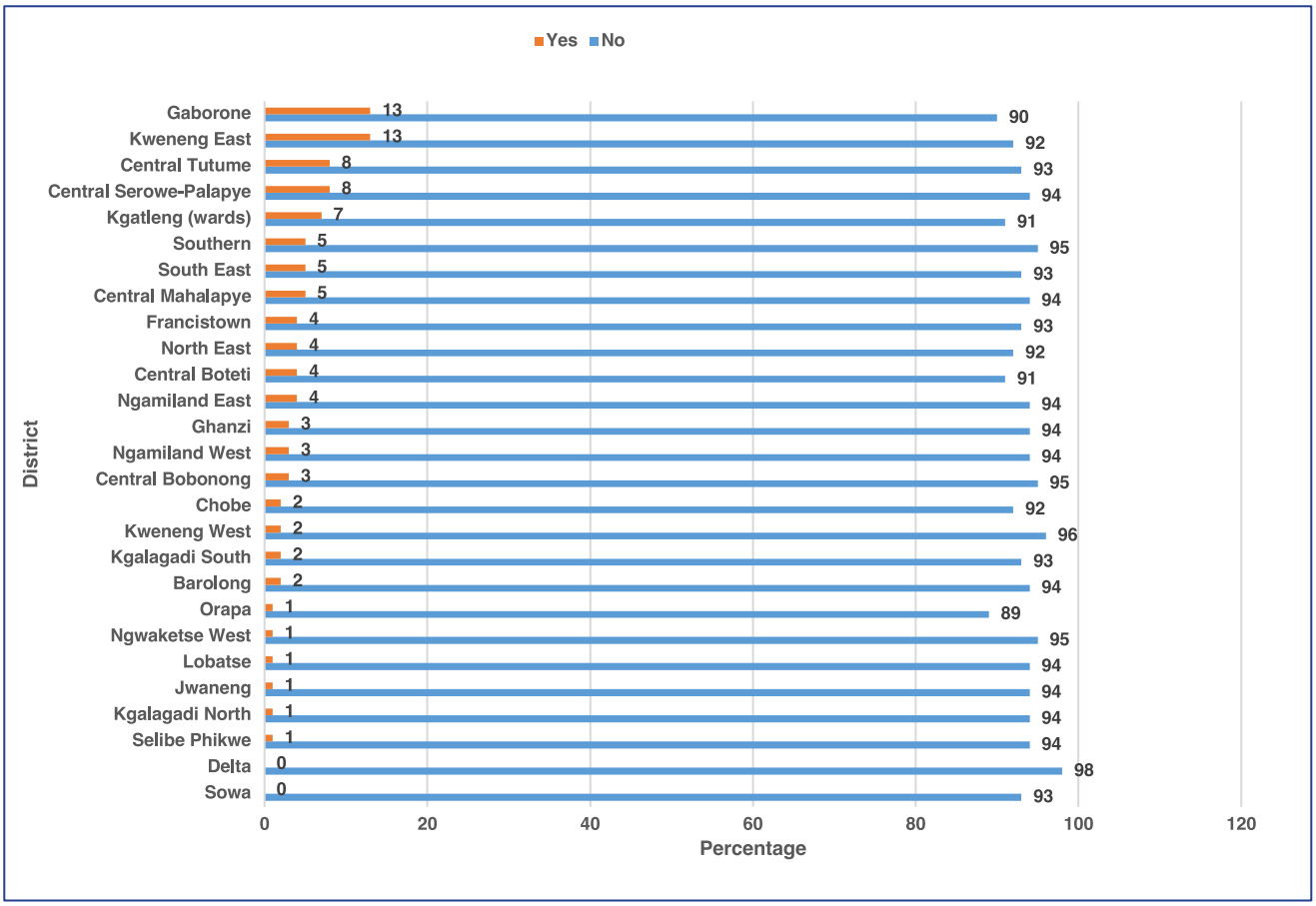
FIGURE 8: Business Land Ownership by Sex



Business land ownership classified by district

The results in **Table 8** show that the highest business land ownership is recorded in Kweneng East (13.1%), followed by Gaborone (12.8%), Central Serowe/Palapye (7.6%), Central Tutume (7.5%) and Kgatleng (6.9%) **(Figure 9)**.

FIGURE 9: Ownership of Business Land by District



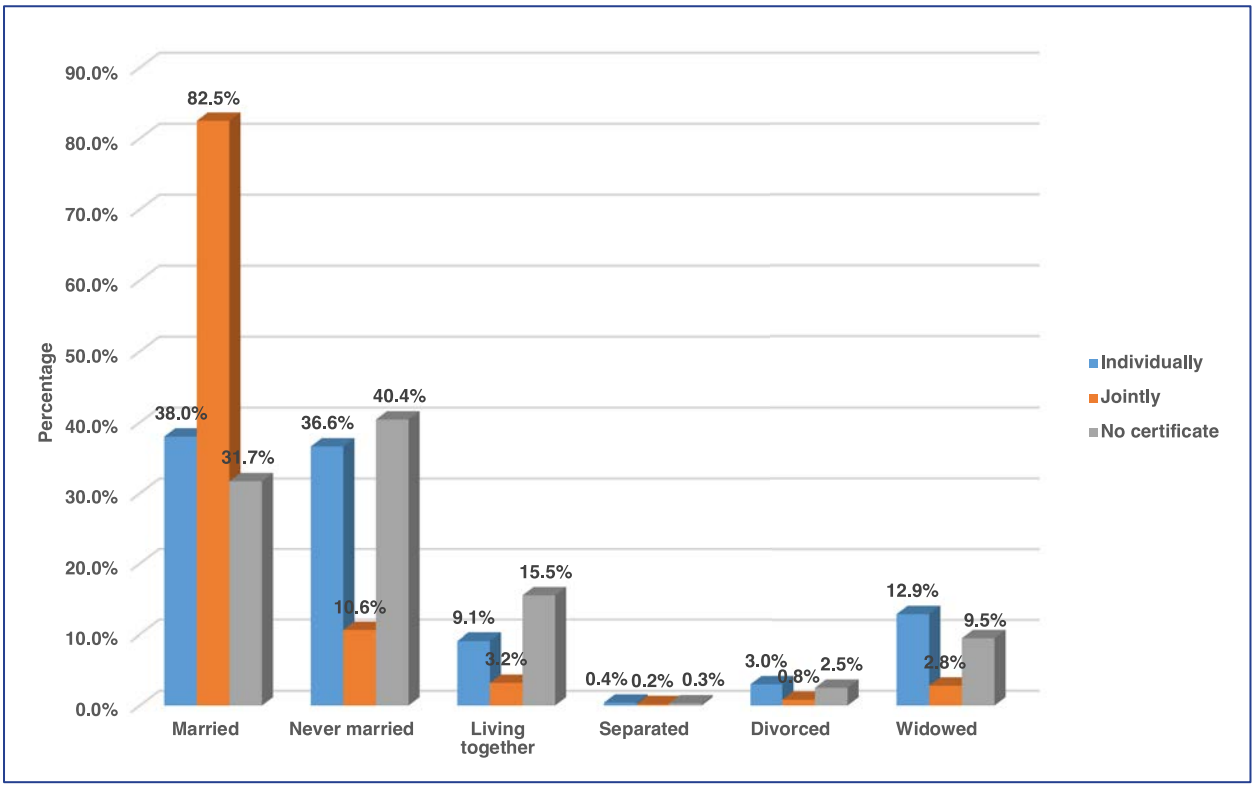
Agricultural land ownership documentation classified according to sex, age, educational level, marital status, disability, and citizenship

Table 9 reveals that 79.7 percent of respondents own agricultural land individually, 14.8 percent own agricultural land jointly, and 5.6 percent own land without a title deed or certificate. Documentation for individually owned agricultural land is more common among females (51.3%) than males (48.7%). Additionally, 53 percent of males own agricultural land without documentation compared to 47.5 percent of females.

With regards to age, the results show that 44.1 percent of respondents aged 60 years and above individually own agricultural land, followed by 33.8 percent of those aged 44-59 years, and 14.8 percent of those aged 36-43 years. Additionally, more than one-third (39.7%) of respondents aged 60 years and above have joint ownership of agricultural land, followed by 38.9 percent of those aged 44-59 years. Furthermore, almost 39 percent of respondents aged 60 years and above lack land ownership documentation, followed by 32.6 percent of those aged 44-59 years, and 16.1 percent of those aged 36-43 years. Figure 10 reveals that jointly owned agricultural land ownership is the highest among the married compared to other marital status. This might be attributed to the fact that majority of the couples in Botswana are married in community of property.

In respect to disability, 34.5 percent of respondents who own agricultural land individually reported having some form of disability, compared to 65.5 percent of those without any form of disability. Additionally, 70.1 percent of those without disabilities reported owning agricultural land jointly, compared to 29.9 percent of those with disabilities. Furthermore, 36.5 percent of individuals with some form of disability confirmed not having a certificate or title deed for their land, compared to 63.5 percent of those without disabilities who also lack the necessary land ownership documents.

FIGURE 10: Agricultural Land Ownership Documentation by Marital Status



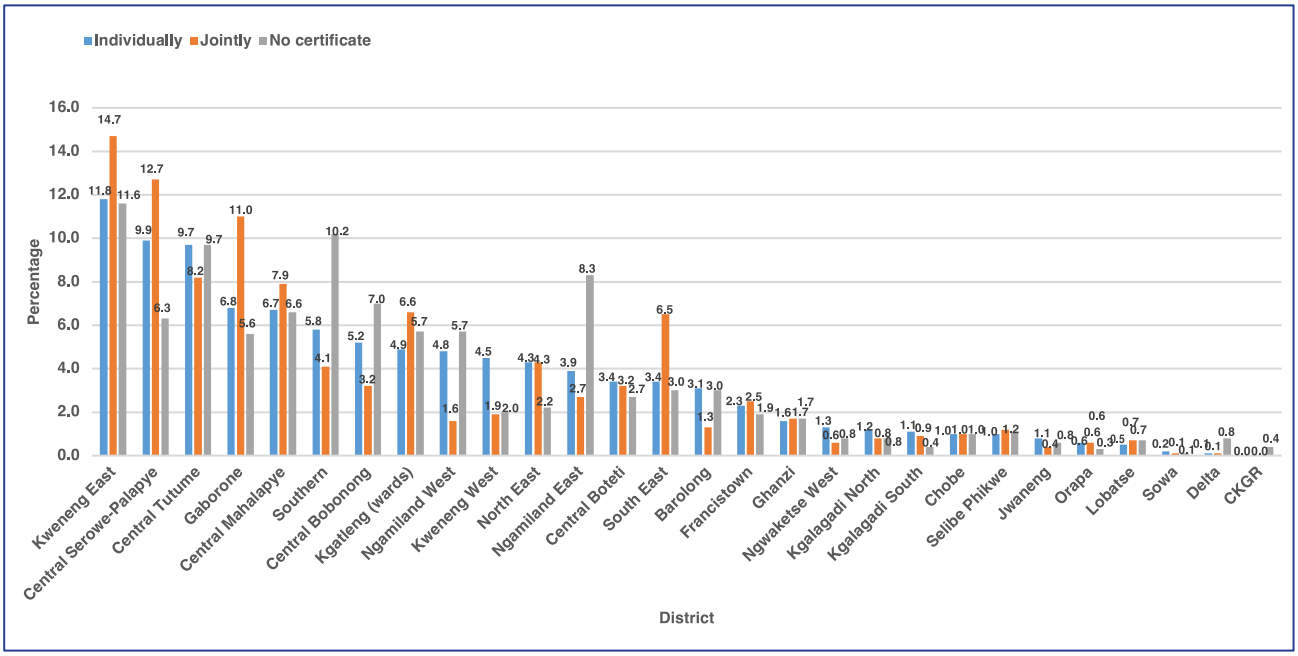
Agricultural land ownership documentation classified by district

Figure 11 shows that 11.8 percent of respondents in Kweneng East have certificates or title deeds for individually owned agricultural land, followed by 9.9 percent in Central Serowe/Palapye and 9.7 percent in Central Tutume. The districts with few people individually owning land designated for agriculture were Sowa (0.2%), Delta (0.1%) and CKGR (0.0 %).

In terms of the jointly owned agricultural land, Kweneng East remains the highest at 14.7% followed by Central Serowe/ Palapye and Gaborone at 12.7 percent and 11 percent respectively. The data indicates that there is higher jointly owned agricultural land compared to the individually owned.

The majority of respondents with ownership of agricultural land without certificate or title deed were recorded in Kweneng East, Southern and Central Tutume at 11.6 percent, 10.2 percent and 9.7 percent respectively. The districts with few people owning land without certificate/ title deed were Kgalagadi South and CKGR at 0.4 percent, Orapa at 0.3 percent and Sowa at 0.1 percent **(see Table 10).**

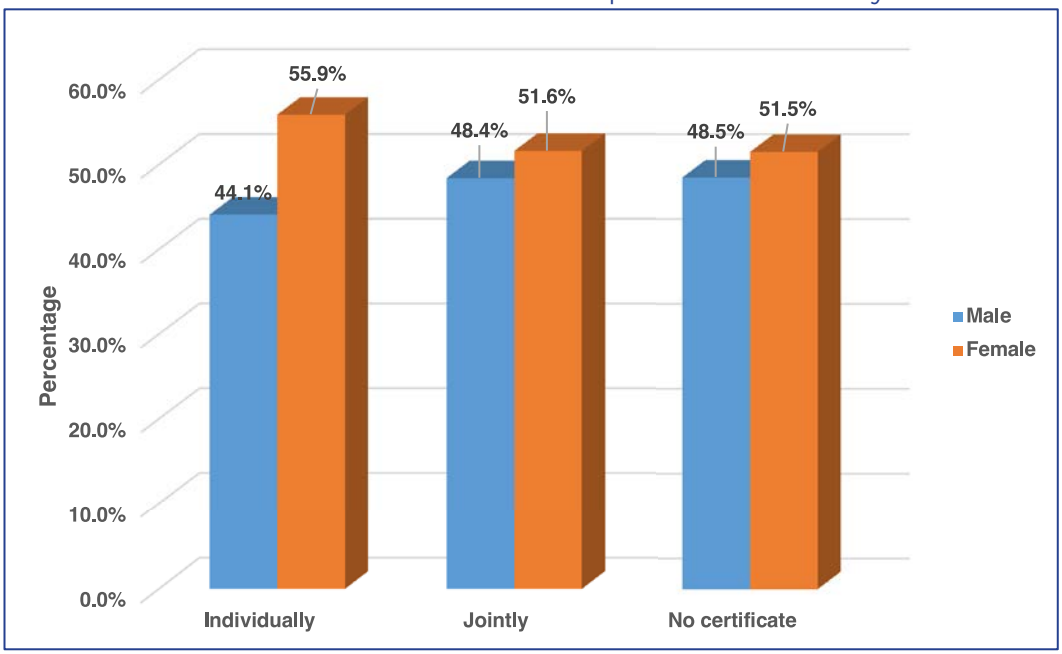
FIGURE 11: Agricultural land ownership documentation by District



Residential land ownership documentation classified by sex, age, educational level, marital status, disability, and citizenship

Table 11 presents the status of residential land ownership documentation (certificate or title deed) by demographic characteristics. There is a clear disparity between males and females holding a certificate or title deed for individually owned residential land, with females recording about 55.9 percent compared to their male counterparts (44.1%) (Figure 12). Age differentials reveal that documentation (certificate or title deed) for individually owned residential land is the highest in the age-group 44-59 years compared to the rest of the age-groups (36.2%), followed by those aged 60 years and above and 36-43 years with 28 percent and 22.4 percent respectively. In terms of documentation (certificate or title deed) for individually owned residential land by disability, the table depicts that about 27.8 percent of people living with disability reported holding a certificate or title deed for individually owned residential land while the opposite is true for people without disability. Generally, it is worth noting that jointly owned residential land is more common among females compared to males, as well as among the married and citizens as compared to non-citizens.

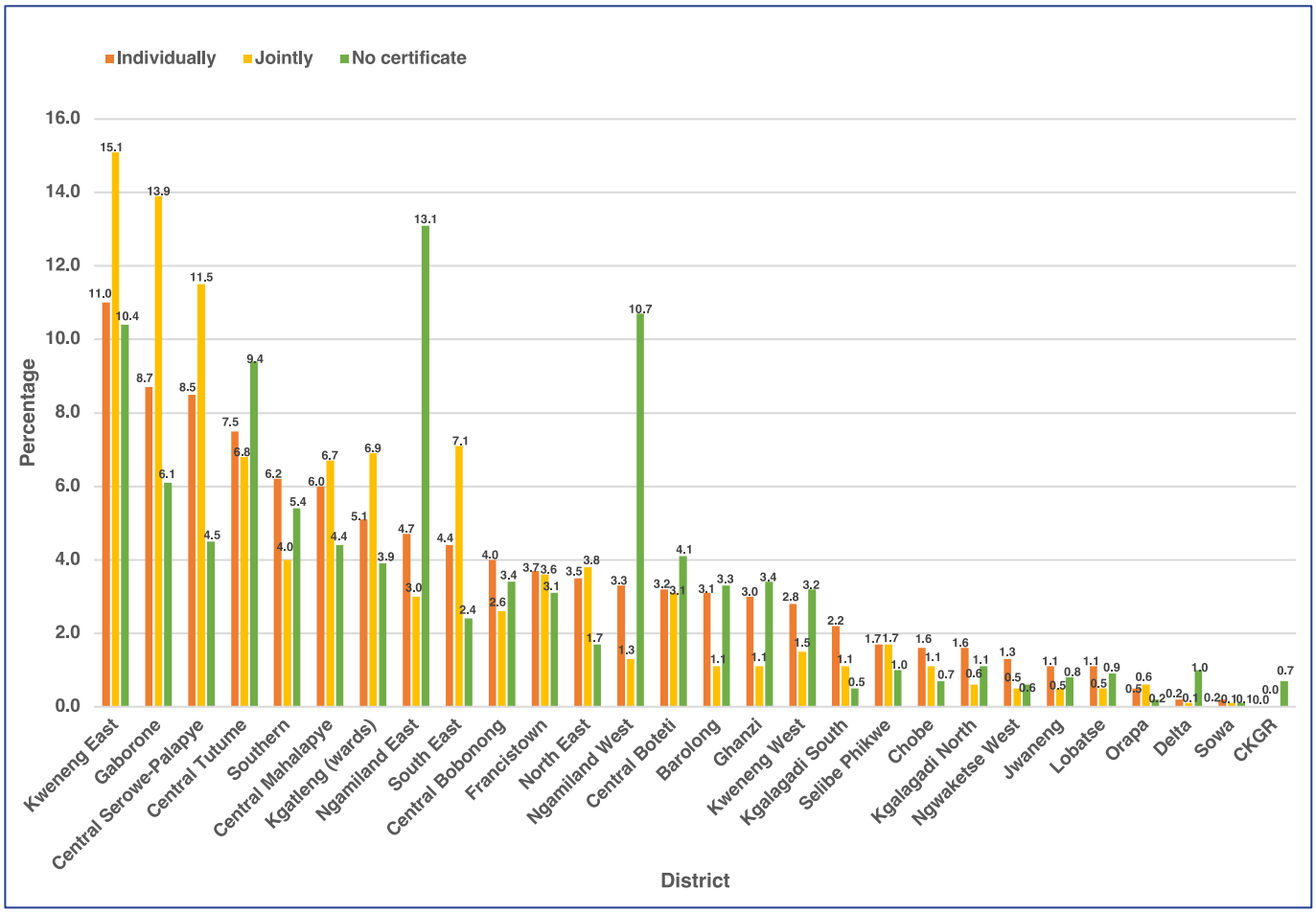
FIGURE 12: Residential Land Ownership Documentation by Sex



Residential land ownership documentation classified by district

District variances reveal that the documentation of individually owned residential ownership, be it having a certificate or title deed is high in Kweneng district (11.0%), followed by Gaborone (8.7%), Central Serowe Palapye (8.5%), and Central Tutume (7.5%) in that order **(see Table 12 and Figure 13)**. On the other hand, Gaborone district recorded the highest of percentage of respondents with documentation of jointly owned residential land with 13.9 percent compared to the rest of the districts. Lack of certificate or title deed is more evident in Ngamiland East and Ngamiland West with 13.7 percent and 10.7 percent respectively.

FIGURE 13: Residential Land Ownership Documentation by District



Business land ownership documentation classified by demographic characteristics

It is evident from **Table 13** that documentation of business land ownership, particularly individually owned, is higher among males with 54.2 percent compared to females with 45.8 percent. On the other hand, documentation (certificate or title deed) for jointly owned business land recorded the opposite with a higher percentage of females (50.2%) compared to their male (49.8) counterparts. The table further shows that, in terms of age differentials, the age-group 45-59 years recorded the highest percentage with documentation (certificate or title deed) for individually and jointly owned business land, as well as for no certificate compared to the rest of the age-groups. Likewise, the married had the highest proportion of business land ownership documentation, that is, for individually owned (46.4%), jointly owned (86.2%) and with no certificate (42.2%). Disparities exist between education levels, with tertiary level reporting the highest percentage with individually and jointly owned business land documentation at 45.4 percent and 55.4 percent respectively.
Business land ownership documentation classified by district

Table 14 depicts business land ownership documentation by district. Regarding both the individually and jointly owned business land ownership documentation, Kweneng East district recorded the percentage with 12.6 percent and 12.8 percent respectively. The second highest was Gaborone district with 11.8 percent for individually owned and 18.5 percent for jointly owned. On the contrary, the no certificate status was highly reported in Kweneng East and Gaborone with 18.0 percent and 8.5 percent respectively. This might be attributed to the fact that the two districts under discussion have the largest share of population compared to the rest of the districts.

CONCLUSION

The findings of this study shows some disparities in land ownership by demographic characteristics and across districts in Botswana. The land ownership disparities exist between youth and adults with adults owning more land than the youth. More than half of the population of Botswana do not own land irrespective of the type of land use (residential, agricultural and business). Land ownership varies between districts with the lowest ownership recorded in CKGR, Delta and Sowa districts. The highest ownership was recorded in the central and in Gaborone districts. The variation in terms of land ownership by land use is similar across the three types of land use (residential, agricultural and business). In terms of sex differentials, more females compared to their male counterparts. Most people without disability own more residential land compared to those living with disability. In terms of the type of ownership, the study reveals that individual land ownership is highest in adults compared to the youth. Similarly, individual ownership is highest among people with tertiary education, females, and the married. The findings emphasizes the need for targeted policies and programmes to close the aforesaid gaps and ensure equitable access among citizens of different class.

There is also a need to formulate, implement and monitor land policies or revise existing land policies for them be responsive to the challenges emanating from global economic competitiveness, need for economic diversification, rural urban migration; food security, poverty eradication, environmental sustainability, need for shelter; economic growth, and most importantly to create a balance between the competing land use needs for social, economic and political harmony. Therefore transition from communal land ownership to individual land rights brings economic benefits, including increased productivity and entrepreneurial opportunities. However, challenges such as land fragmentation and loss of communal grazing areas arise. A balanced approach recognizing both individual and communal land rights can help mitigate these challenges while driving economic growth. By acknowledging the importance of traditional practices and incorporating modern policies, Botswana strives to optimize its land ownership system for sustainable and inclusive development (Government of Botswana, 2019).

RECOMMENDATIONS

For Botswana to overcome emerging land management issues such access to land, security of tenure and protection of land rights particularly for the vulnerable groups such as people living with disability, racial minorities, people living in poverty among others, the study recommends the implementation of the following:

- Ensure equitable access to land by bridging the gap between vulnerable groups and other social groups to enable the vulnerable groups to benefit from occupying and utilizing land. This can help to achieve food security and poverty reduction particularly if land allocated for agriculture is used to improve livelihoods and build resilient food systems.

- Ensure enhancement of institutional capacity and efficient land information management. It also involves the creation of set of land indicators that have national application and global comparability, and therefore providing progress report towards attaining some indicators such as 1.4.2 and 5.a.1 in the Sustainable Development Goals (SDGs) agenda. Having indicators on land ownership and rights in the SDG framework is an opportunity to routinely generate comparable, sex-disaggregated data to support evidence-based decision making on responsible land governance for sustainable development.

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APPENDICES

TABLE 1: Land Ownership Classified By Sex, Age, Educational Level, Marital Status, Disability, And Citizenship

DEMOGRAPHIC CHARACTERISTICS	LAND OWNERSHIP STATUS	
	YES %	NO %
SEX:		
Male	45.2	49.1
Female	54.8	50.9
Total Count	**514**	**900**
AGE GROUP:		
18-35 years	14.3	64.8
36-43 years	22	17.7
44-59 years	35.8	13.1
60 years & above	27.9	4.4
Total Count	**514**	**900**
EDUCATION:		
None	0.2	0.1
Non-formal	26.4	11.4
Primary	40.2	63.9
Secondary	2	0.9
Tertiary	31.3	23.7
Total Count	**434**	**846**
MARITAL STATUS:		
Never married	34.8	12.4
Married	43.6	74.4
Living together	11.6	11.7
Separated	0.3	0.1
Divorced	2.5	0.6
Widowed	7.1	0.7
Total Count	**514**	**900**
DISABILITY:		
Have some form of disability	27.5	11.6
Have no disability	72.5	88.4
Total Count	**513**	**897**
CITIZENSHIP STATUS:		
Citizens	98.6	90.8
Non-citizens	1.4	9.2
Total Count	**512,830**	**895,256**

TABLE 2: Land Ownership Classified By District

DISTRICT	LAND OWNERSHIP STATUS	
	YES (%)	NO (%)
Gaborone	9.1	13.7
Francistown	3.6	5.0
Lobatse	1.0	1.4
Selibe-Phikwe	1.6	1.7
Orapa	0.5	0.3
Jwaneng	1	0.8
Sowa	0.2	0.1
Southern	5.9	5.7
Barolong	2.9	2.1
Ngwaketse West	1.2	0.8
South East	4.6	5.8
Kweneng East	11.6	16.7
Kweneng West	2.8	2
Kgatleng	5.3	5.6
Central Serowe Palapye	8.7	8.0
Central Mahalapye	6	4.8
Central Bobonong	3.8	2.5
Central Boteti	3.2	2.9
Central Tutume	7.5	5.7
North East	3.5	2.4
Ngamiland East	4.8	4.8
Ngamiland West	3.4	2.2
Chobe	1.5	1.2
Delta	0.2	0.1
Ghanzi	2.7	1.9
CKGR	0	0
Kgalagadi South	1.9	1.1
Kgalagadi North	1.4	0.7
TOTAL COUNT	**514**	**900**

TABLE 3: Agriculture land ownership classified by sex, age, educational level, marital status, disability, and citizenship

DEMOGRAPHIC CHARACTERISTICS	AGRICULTURE LAND OWNERSHIP STATUS	
	YES %	NO %
SEX:		
Male	48.7	43
Female	51.3	57
Total Count	**201.896**	**312.1**
AGE GROUP:		
18-35 years	8.2	18.2
36-43 years	14.9	26.6
44-59 years	34	37
60 years & above	42.9	18.2
Total Count	**201.896**	**312.1**
EDUCATION:		
None	0.3	0.1
Non-formal	33.8	22.1
Primary	31.5	45.1
Secondary	3.2	1.3
Tertiary	31.2	31.4
Total Count	**157.844**	**275.934**
MARITAL STATUS:		
Never married	33.2	50.4
Married	44.1	28.9
Living together	8.6	13.5
Separated	0.3	0.3
Divorced	2.6	2.5
Widowed	11.2	4.5
Total Count	**201.888**	**312.087**
DISABILITY:		
Have some form of disability	33.8	23.3
Have no disability	66.2	76.7
Total Count	201.493	311.595
CITIZENSHIP STATUS:		
Citizens	98.7	98.5
Non-citizens	1.3	1.5
TOTAL COUNT	**201.444**	**311.306**

TABLE 4: Agriculture land ownership classified by district

DISTRICT	AGRICULTURE LAND OWNERSHIP STATUS	
	YES (%)	NO (%)
Gaborone	7.4	10.2
Francistown	2.3	4.5
Lobatse	0.5	1.4
Selibe-Phikwe	1.1	2
Orapa	0.5	0.5
Jwaneng	0.7	1.1
Sowa	0.1	0.2
Southern	5.8	6.0
Barolong	2.8	2.9
Ngwaketse West	1.2	1.2
South East	3.8	5.1
Kweneng East	12.2	11.1
Kweneng West	4	2
Kgatleng	5.2	5.3
Central Serowe Palapye	10.1	7.9
Central Mahalapye	6.8	5.4
Central Bobonong	5	3.1
Central Boteti	3.3	3.1
Central Tutume	9.5	6.3
North East	4.2	3
Ngamiland East	4	5.3
Ngamiland West	4.3	2.8
Chobe	1.0	1.8
Delta	0.1	0.2
Ghanzi	1.6	3.5
CKGR	0	0
Kgalagadi South	1.0	2.5
Kgalagadi North	1.1	1.6
TOTAL COUNT	**201.896**	**312.1**

TABLE 5: Residential land ownership classified by sex, age, educational level, marital status, disability, and citizenship

DEMOGRAPHIC CHARACTERISTICS	RESIDENTIAL LAND OWNERSHIP STATUS	
	YES %	NO %
SEX:		
Male	44.7	53.3
Female	55.3	46.7
TOTAL COUNT	481	32
AGE GROUP:		
18-35 years	13.7	22.2
36-43 years	22	22.4
44-59 years	36.2	30
60 years & above	28.1	25.4
TOTAL COUNT	**481**	**32**
EDUCATION:		
None	0.2	0.2
Non-formal	26.5	23.9
Primary	40.1	41.2
Secondary	2	1.9
Tertiary	31.2	32.8
TOTAL COUNT	**406**	**27**
MARITAL STATUS:		
Never married	43.4	45.8
Married	35.0	33.2
Living together	11.4	13.6
Separated	0.3	0.4
Divorced	2.6	2.3
Widowed	7.3	4.7
TOTAL COUNT	**481**	**32**
DISABILITY:		
Have some form of disability	27.6	25.7
Have no disability	72.4	74.3
TOTAL COUNT	480	32
CITIZENSHIP STATUS:		
Citizens	98.7	97
Non-citizens	1.3	3
TOTAL COUNT	**480**	**32**

TABLE 6: Residential land ownership classified by district

DISTRICT	RESIDENTIAL LAND OWNERSHIP STATUS	
	Yes (%)	No (%)
Gaborone	9.1	9.1
Francistown	3.7	2.9
Lobatse	1.0	0.7
Selibe-Phikwe	1.7	1.2
Orapa	0.5	0.5
Jwaneng	1	0.9
Sowa	0.2	0.1
Southern	6.0	5.3
Barolong	2.9	3
Ngwaketse West	1.2	1.0
South East	4.6	4
Kweneng East	11.4	14.4
Kweneng West	2.6	5.2
Kgatleng	5.2	5.9
Central Serowe Palapye	8.7	9.8
Central Mahalapye	6	5.2
Central Bobonong	3.8	4.1
Central Boteti	3.2	3.0
Central Tutume	7.5	7.4
North East	3.5	2.8
Ngamiland East	4.8	4.7
Ngamiland West	3.3	4.8
Chobe	1.5	1.1
Delta	0.2	0.2
Ghanzi	2.8	1.3
CKGR	0	0
Kgalagadi South	2.0	0.7
Kgalagadi North	1.5	0.7
TOTAL COUNT	**480,968**	**32,258**

TABLE 7: Business land ownership classified by sex, age, educational level, marital status, disability, and citizenship

DEMOGRAPHIC CHARACTERISTICS	BUSINESS LAND OWNERSHIP STATUS	
	YES %	NO %
SEX:		
Male	52.7	44.7
Female	47.3	55.3
TOTAL COUNT	**35,541**	**476,861**
AGE GROUP:		
18-35 years	11.1	14.4
36-43 years	19.2	22.2
44-59 years	39.5	35.6
60 years & above	30.2	27.8
TOTAL COUNT	**35,541**	**476,861**
EDUCATION:		
None	0.2	0.2
Non-formal	19.5	26.9
Primary	32.5	40.7
Secondary	1.4	2
Tertiary	46.5	30.1
TOTAL COUNT	**32,395**	**399,959**
MARITAL STATUS:		
Never married	29.5	44.6
Married	53.4	33.5
Living together	6.2	12
Separated	0.3	0.3
Divorced	3.7	2.5
Widowed	6.9	7.1
TOTAL COUNT	**35,539**	**476,843**
DISABILITY:		
Have some form of disability	25.2	27.7
Have no disability	74.8	72.3
TOTAL COUNT	35,456	476,045
CITIZENSHIP STATUS:		
Citizens	96.3	98.8
Non-citizens	3.7	1.2
TOTAL COUNT	**35,432**	**475,734**

TABLE 8: Business land ownership classified by district

DISTRICT	BUSINESS LAND OWNERSHIP STATUS	
	Yes (%)	No (%)
Gaborone	12.8	90.3
Francistown	3.6	93.1
Lobatse	0.8	94.4
Selibe-Phikwe	1.4	94.2
Orapa	0.8	88.6
Jwaneng	0.9	94
Sowa	0.2	93
Southern	4.5	94.7
Barolong	2.4	94.2
Ngwaketse West	0.8	95.2
South East	4.9	92.6
Kweneng East	13.1	92.2
Kweneng West	1.8	95.5
Kgatleng	6.9	91.0
Central Serowe Palapye	7.6	94.0
Central Mahalapye	4.9	94.3
Central Bobonong	2.9	94.7
Central Boteti	4.1	91.0
Central Tutume	7.5	93.1
North East	3.8	92.4
Ngamiland East	4.3	93.8
Ngamiland West	2.8	94.4
Chobe	1.6	92.3
Delta	0.1	97.7
Ghanzi	2.5	93.7
CKGR	0.0	97.5
Kgalagadi South	1.8	93.4
Kgalagadi North	1.2	94.3
Total Count	**35,541**	**476,861**

TABLE 9: Agriculture land ownership documentation classified by sex, age, educational level, marital status, disability, and citizenship

DEMOGRAPHIC CHARACTERISTICS	AGRICULTURE LAND OWNERSHIP STATUS		
	INDIVIDUALLY %	JOINTLY %	NO CERTIFICATE %
SEX:			
Male	48.5	48.7	**52.5**
Female	51.5	51.3	**47.5**
TOTAL COUNT	**159,647**	**29,602**	**11,176**
AGE GROUP:			
18-35 years	7.8	6.6	**12.5**
36-43 years	14.8	14.7	**16.1**
44-59 years	33.3	38.9	**32.6**
60 years & above	44.1	39.7	**38.9**
TOTAL COUNT	**159,647**	**29,602**	**11,176**
EDUCATION:			
None	0.3	0.2	**0.5**
Non-formal	34.6	29.5	**37.3**
Primary	31.3	29.8	**36.1**
Secondary	3.4	2.2	**3.1**
Tertiary	30.4	38.2	**23**
TOTAL COUNT	**123,551**	**24,880**	**8,099**
MARITAL STATUS:			
Never married	36.6	10.6	**40.4**
Married	38	82.5	**31.7**
Living together	9.1	3.2	**15.5**
Separated	0.4	0.2	**0.3**
Divorced	3	0.8	**2.5**
Widowed	12.9	2.8	**9.5**
TOTAL COUNT	**159,641**	**29,601**	**11,175**
DISABILITY:			
Have some form of disability	34.5	29.9	**36.5**
Have no disability	65.5	70.1	**63.5**
TOTAL COUNT	159,333	29,533	**11,162**
CITIZENSHIP STATUS:			
Citizens	99	97.6	**97.8**
Non-citizens	1	2.4	**2.2**
TOTAL COUNT	**159,337**	**29,492**	**11,151**

TABLE 10: Agriculture land ownership documentation classified by district

DISTRICT	AGRICULTURE CERTIFICATE OR TITLE DEED STATUS		
	INDIVIDUALLY (%)	JOINTLY (%)	NO CERTIFICATE (%)
Gaborone	6.8	11	5.6
Francistown	2.3	2.5	1.9
Lobatse	0.5	0.3	0.7
Selibe-Phikwe	1	1.2	1.1
Orapa	0.6	0.6	0.3
Jwaneng	0.8	0.4	0.6
Sowa	0.2	0.1	0.1
Southern	5.8	4.1	10.2
Barolong	3.1	1.3	3
Ngwaketse West	1.3	0.6	0.8
South East	3.4	6.5	3
Kweneng East	11.8	14.7	11.6
Kweneng West	4.5	1.9	2
Kgatleng	4.9	6.6	5.7
Central Serowe Palapye	9.9	12.7	6.3
Central Mahalapye	6.7	7.9	6.6
Central Bobonong	5.2	3.2	7
Central Boteti	3.4	3.2	2.7
Central Tutume	9.7	8.2	9.7
North East	4.3	4.3	2.2
Ngamiland East	3.9	2.7	8.3
Ngamiland West	4.8	1.6	5.7
Chobe	1.0	1.0	1.0
Delta	0.1	0.1	0.8
Ghanzi	1.6	1.7	1.7
CKGR	0.0	0.0	0.4
Kgalagadi South	1.1	0.9	0.4
Kgalagadi North	1.2	0.8	0.8
TOTAL COUNT	**159,647**	**29,602**	**11,176**

TABLE 11: Residential land ownership documentation classified by sex, age, educational level, marital status, disability, and citizenship

DEMOGRAPHIC CHARACTERISTICS	RESIDENTIAL CERTIFICATE OR TITLE DEED STATUS		
	INDIVIDUALLY %	JOINTLY %	NO CERTIFICATE %
SEX:			
Male	44.1	48.4	**48.5**
Female	55.9	51.6	**51.5**
TOTAL COUNT	**416,884**	**48,248**	**14,201**
AGE GROUP:			
18-35 years	13.5	10.7	**26.7**
36-43 years	22.4	18.9	**21.5**
44-59 years	36.2	39.7	**28.4**
60 years & above	28	30.7	**23.3**
TOTAL COUNT	**416,884**	**48,248**	**14,201**
EDUCATION:			
None	0.2	0.2	**0.4**
Non-formal	26.8	24	**29.5**
Primary	40.6	33.8	**46.3**
Secondary	2	1.6	**2.2**
Tertiary	30.4	40.4	**21.6**
TOTAL COUNT	**351,970**	**42,138**	**10,869**
MARITAL STATUS:			
Never married	47.2	8.8	**49.9**
Married	29.6	86.1	**20.5**
Living together	12.1	2.4	**21.4**
Separated	0.3	0.2	**0.4**
Divorced	2.8	0.5	**1.9**
Widowed	8	2	**6**
TOTAL COUNT	**416,863**	**48,245**	**14,201**
DISABILITY:			
Have some form of disability	27.8	25.5	**29.8**
Have no disability	72.2	74.5	**70.2**
TOTAL COUNT	**416,185**	**48,155**	**14,173**
CITIZENSHIP STATUS:			
Citizens	99	96.2	**98.1**
Non-citizens	1	3.8	**1.9**
TOTAL COUNT	**415,984**	**48,088**	**14,161**

TABLE 12: Residential land ownership documentation classified by district

DISTRICT	RESIDENTIAL CERTIFICATE OR TITLE DEED STATUS		
	INDIVIDUALLY (%)	JOINTLY (%)	NO CERTIFICATE (%)
Gaborone	8.7	13.9	6.1
Francistown	3.7	3.6	3.1
Lobatse	1.1	0.5	0.9
Selibe-Phikwe	1.7	1.7	1.0
Orapa	0.5	0.6	0.1
Jwaneng	1.1	0.5	0.8
Sowa	0.2	0.1	0.1
Southern	6.2	4.0	5.4
Barolong	3.1	1.1	3.3
Ngwaketse West	1.3	0.5	0.6
South East	4.4	7..1	2.4
Kweneng East	11.0	15.1	10.4
Kweneng West	2.8	1.5	3.2
Kgatleng	5.1	6.9	3.9
Central Serowe Palapye	8.5	11.5	4.5
Central Mahalapye	6.0	6.7	4.4
Central Bobonong	4.0	2.6	3.4
Central Boteti	3.2	3.1	4.1
Central Tutume	7.5	6.8	9.4
North East	3.5	3.8	1.7
Ngamiland East	4.7	3.0	13.1
Ngamiland West	3.3	1.3	10.7
Chobe	1.6	1.1	0.7
Delta	0.2	0.1	1.0
Ghanzi	3.0	1.1	3.4
CKGR	0.0	0.0	0.7
Kgalagadi South	2.2	1.1	0.5
Kgalagadi North	1.6	0.6	1.1
TOTAL COUNT	**416,884**	**48,248**	**14,201**

TABLE 13: Business land ownership documentation classified by sex, age, educational level, marital status, disability, and citizenship

DEMOGRAPHIC CHARACTERISTICS	BUSINESS CERTIFICATE OR TITLE DEED STATUS		
	INDIVIDUALLY %	JOINTLY %	NO CERTIFICATE %
SEX:			
Male	54.2	49.8	**45.7**
Female	45.8	50.2	**54.3**
TOTAL COUNT	**25,969**	**6,690**	**2,633**
AGE GROUP:			
18-35 years	10.7	9.1	**16.5**
36-43 years	19.5	18.3	**17.9**
44-59 years	39.2	43.3	**34.4**
60 years & above	30.5	29.2	**31.2**
TOTAL COUNT	**25,969**	**6,690**	**2,633**
EDUCATION:			
None	0.2	0.1	**0.4**
Non-formal	19.8	15.9	**27.8**
Primary	33.3	27.5	**36.3**
Secondary	1.4	1.1	**2.1**
Tertiary	45.4	55.4	**33.5**
TOTAL COUNT	**23,666**	**6,325**	**2,172**
MARITAL STATUS:			
Never married	33.7	8.7	**37**
Married	46.4	86.2	**42.2**
Living together	7	2	**9.3**
Separated	0.4	0.2	**0.2**
Divorced	4.5	1.1	**2.6**
Widowed	8.1	1.9	**8.7**
TOTAL COUNT	**25,968**	**6,689**	**2,633**
DISABILITY:			
Have some form of disability	25.5	23.1	**28.5**
Have no disability	74.5	76.9	**71.5**
TOTAL COUNT	**25,911**	**6,673**	**2,625**
CITIZENSHIP STATUS:			
Citizens	97.2	92.3	**97.5**
Non-citizens	2.8	7.7	**2.5**
Total Count	**25,906**	**6,660**	**2,618**

TABLE 14: Business Land Ownership Documentation classified by District

DISTRICT	BUSINESS CERTIFICATE OR TITLE DEED STATUS		
	INDIVIDUALLY (%)	JOINTLY (%)	NO CERTIFICATE (%)
Gaborone	11.8	18.5	8.5
Francistown	3.6	4.3	2.9
Lobatse	0.9	0.7	0.5
Selibe-Phikwe	1.4	1	1.4
Orapa	0.9	1	0.3
Jwaneng	1.0	0.4	0.5
Sowa	0.2	0.1	0.3
Southern	4.7	3.2	6
Barolong	2.8	1.2	1.7
Ngwaketse West	1.0	0.5	0.7
South East	4.7	6.4	2.9
Kweneng East	12.6	12.8	18
Kweneng West	1.9	1.3	2.4
Kgatleng	6.9	7.3	6.2
Central Serowe Palapye	7.1	9.3	7.9
Central Mahalapye	4.8	5.1	6.1
Central Bobonong	3.1	2.1	3.4
Central Boteti	4.3	3.6	3.5
Central Tutume	7.9	5.6	9.3
North East	3.7	4.2	3.4
Ngamiland East	4.3	4.3	4.2
Ngamiland West	2.7	1.8	5.5
Chobe	1.8	1.4	0.7
Delta	0.1	0	0.1
Ghanzi	2.7	1.6	2.2
CKGR	0	0.0	0
Kgalagadi South	2.0	1.6	0.8
Kgalagadi North	1.3	0.7	0.8
Total Count	**25,969**	**6,690**	**2,633**

AGRICULTURAL ASSET OWNERSHIP AND WOMEN PARTICIPATION IN AGRICULTURE

Keneilwe Kgosikoma and
Boingotlo Sebolai

EXECUTIVE SUMMARY

Women play a pivotal and critical role in agriculture, but gender disparities are still evident. Women participation in the sector is impeded by many constraints including lack of access to productive resources. The Botswana Government has shown commitment to ensure gender equality and women empowerment through the enactment of the 2014 National Policy on Gender and Development. These gender mainstreaming efforts are addressed in the National Development Plan (NDP) 11 of 2017 to 2023, for more equitable access to resources, in line with the National Vision 2036 pillars for human and social development and sustainable economic development and the Sustainable Development Goal (SDG) 5 that aims to achieve gender equality and empower women and girls.

The paper uses the s2022 Botswana Population and Housing Census data to analyse asset ownership and women participation in agriculture. Descriptive and inferential statistics were used to analyse the data, and the results were presented in tables and graphs. The results indicate that female participation was lower than that of their male counterparts. Similarly, women asset endowment in terms of agricultural land ownership, title to secured agricultural land rights, participation in livestock and crop production activities, cash earnings from agricultural activities and employment in the agricultural sector, through ownership and/ or looking after agricultural assets was also lower than for their male counterparts. In terms of asset ownership, a greater proportion of male household heads owned assets that could be instrumental in agricultural production, compared to females, except for mobile phones. The gender disparities are still evident in the agricultural sector and there is need to promote equitable access and opportunities in the agricultural sector if the country is to attain SDG 5.a to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property. There is need for increased opportunities and market orientation, particularly for women, in the development and management of agricultural value chains.

INTRODUCTION

Women play a relevant and critical role in agriculture, particularly in developing countries where agriculture is the dominant economic activity for the rural majority. However, women participation in the sector is impeded by many constraints including lack of access to productive resources, lack of consistent market and transportation options, insufficient communication of available help and knowledge (Must and Horvoka, 2022) and daily workload/time-use and access to credit (Motaung et al., 2023). The Government of Botswana has shown commitment to ensure gender equality and women empowerment through the enactment of the 2014 National Policy on Gender and Development. These gender mainstreaming efforts are addressed in the National Development Plan (NDP) 11 of 2017 to 2023, for more equitable access to resources, in line with the Sustainable Development Goals (SDG) 5, and Vision 2036 pillars for human and social development and sustainable economic development. SDG 5 aims to achieve gender equality and empower women and girls.

According to Chhetri et al., 2021, reduced gender gap in access to productive resources and opportunities could improve agricultural productivity by 20 to 25 percent thus addressing the global objectives to end hunger and reduce poverty, and the national objective for a moral, tolerant, and inclusive society that provides opportunities for all.

Purpose of the Study

This study is necessitated by the critical importance to identify if there is a gender gap in asset ownership and agricultural participation in the country. This will provide an indication of whether there is gender inequality in the agricultural sector. According to UN-Women Policy Brief (2019), gender gaps in agricultural productivity are due to inequitable access to agricultural inputs, such as family labour, high-yield crops, pesticides, and fertilizer, and not because women are less efficient farmers. To improve food security, economic development, and poverty reduction in the country, it is thus crucial to assess the trends in asset ownership and women participation in agriculture.

Significance of the Study

The study findings could guide policy recommendations in terms of meeting local, regional, and global development agendas. The analyses can help assess how far the country is in attaining its gender mainstreaming agenda, and the regional and global interventions to "leave no one behind". According to UN Women Policy Brief No. 11 (2019), gender equality in the agricultural sector could raise crop production by up to 19 per cent, boost agricultural and overall GDP and lift hundreds of thousands of people out of poverty in the sub-Saharan Africa thus helping attain, not only Goal 5 to achieve gender equality and empower all women and girls for equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, but also Goals 1, 2 and 3, of no poverty, zero hunger, and improved health and well-being.

Objectives of the Study

This study thus proposes to assess women participation in agriculture and ownership of agricultural assets. The specific objectives are to determine:

1. The proportion of the population with ownership or secure rights over agricultural land by sex,
2. The share of women among owners or rights-bearers of agricultural land, by type of tenure, in proportion to total agricultural landowners.
3. The proportion of the population with income from agricultural activity, by sex.
4. The share of women with employment in agricultural activities.

Literature Review

Asamu et.al (2020) and Osabohien et. al (2021) reported that women are highly involved in agriculture ranging from entrepreneurs, labourers, and marketers. On the contrary factors such as women's role in society as mothers inadequate education and unequal access to loans contribute to gender inequality in agricultural production (Asamu et. al, 2020). The researchers concluded that gender inequality in agricultural production weakens the potential of women to drive the national agricultural vision. Padmaja et. al, 2023 found disparities in ownership of assets of production by rural women such as agricultural land, dwellings, and livestock. FAO (2011) reported that women tend to have lower access to agricultural productive resources than men owing to gender-specific constraints.

The researchers concluded that addressing the existing disparities in ownership could lead to women empowerment through increased involvement in decision-making. This would in turn lead to inclusive economic growth and greater social progress in communities. Dave (2014) highlighted the importance of women's involvement in agriculture though faced with constraints of ownership of production resources such as land and financial credit and, training and education in agriculture. Due to gender specific constraints, women tend to have limited access to productive resources in agriculture such as land ownership, financial services access, possession of education and agriculture related skills among others (FAO, 2011). Based on the Ministry of Agriculture Report (2008), Modesto (2016) reported that there were more women in agriculture than men in Botswana though only 36% of farm holders were women (Modesto (2016). This demonstrates that participation of women, their leadership, and decision-making in agriculture is a gendered issue.

According to Njobe (2015) women representation in agricultural landholders is only 15% worldwide and varies among countries ranging from 3% in Mali, 35% in Botswana and Malawi, and more than 50% in Cape Verde. These inequalities limit women's opportunities and negatively impact the food security and economic growth of the agricultural sector, hence the importance to close the gap (UNSD, 2021). Dave (2014) study concluded that appropriate policy interventions mitigating these constraints can contribute to ensuring food security, poverty reduction and gender equality. FAO (2011 and 2013) concluded that closing the gender gap in agriculture would generate increased yields on women's farms, raise the total agricultural output, especially in developing countries, and significantly reduce the number of people suffering from hunger in the world.

Methodology

This paper uses the 2022 Botswana Population and Housing Census data to analyse asset ownership and women participation in agriculture. Descriptive and inferential statistics were used to analyse the sub-population of households, from the Population and Housing Census of 2022 data, based on the census survey responses. The socio-economic variables included in the analyses are presented in **Table 1** below. Of the 695, 703 household heads, the majority were predominantly male (55.0%) aged between 35 and 39 years, with a mean age of 45.5 (SD = 16.06). The highest educational attainment for most household heads was secondary school, at almost 50% of all household respondents. Over 65% of the households participate in agricultural activities, though most of them do not own agricultural land. For those who own agricultural land, over 80% have individual secured land tenure.

TABLE 1: Socio-demographic characteristics of the households

VARIABLE	DESCRIPTION	FREQUENCY	PERCENTAGE
SEX	Male	382, 455	55.0
	Female	313, 248	45.0
AGE	14-10	776	0.1
	15-19	8, 838	1.3
	20-24	37, 817	5.4
	25-29	64, 390	9.3
	30-34	79, 399	11.4
	35-39	94, 244	13.6
	40-44	87, 780	12.6
	45-49	75, 509	10.9
	50-54	58, 926	8.5
	55-59	50, 049	7.2
	60-64	41, 981	6.0
	65-69	34, 000	4.9
	70-74	23, 198	3.3
	75-79	15, 363	2.2
	80-84	11, 369	1.6
	85-89	6, 329	0.9
	90-94	3, 788	0.5
	95-99	1, 233	0.2
	100+	456	0.07
	Not stated	204	0.03
HIGHEST EDUCATION	Preschool	992	0.2
	Nonformal primary	8, 802	1.5
	Primary school	128, 947	21.2
	Secondary school	286, 811	47.2
	Certificate	36, 987	6.1
	Diploma	64, 644	10.6
	Degree	62, 360	10.3
	Postgraduate degree	8, 983	1.5
	Other degree	9, 057	1.5
	Not stated	78	0.01
PARTICIPATION IN AGRICULTURE	Yes	315, 655	65.7
	No	380, 037	34.3
AGRICULTURAL LAND OWNERSHIP	Yes	151, 541	41.3
	No	215, 137	58.7
TYPE OF LAND TENURE	Individual	124, 248	82
	Joint	17, 967	11.9
	None	8, 879	5.9
MOBILE PHONE	Yes	645, 151	92.8
	No	49, 673	7.2
LOCALITY	Urban	456, 870	65.7
	Rural	238, 822	34.3

Findings and Discussions

Women Participation in Agriculture

The main agricultural activities were livestock care (32.8%), crop production (29.1%) and mixed farming (22.9%). The sector was dominated by male-headed households at 62.8%. The proportion of women-headed households was higher for crop production, making agricultural produce for household sale, and fishing activities, at 17.8%, 7% and 02%, respectively compared to 11.3%, o.7% and 0.05%, respectively for male-headed households. A relatively small proportion of female-headed households (4.4%) was engaged in livestock care compared to 28.4% of male-headed households. This may be attributed to the higher safety and security risks associated with livestock care, often at isolated cattle posts, predominantly cattle. Generally, the share of male-headed households was greater for all agricultural activities except for crop production, making agricultural produce for household sale, and fishing. This may be due to relatively lower labour and financial requirements in these activities.

TABLE 2: Main Agricultural Activity, by Sex

MAIN AGRICULTURAL ACTIVITY	GENDER			
	MALE		FEMALE	
	FREQUENCY	%	FREQUENCY	%
Crop Production	3, 100	11.3	4.896	17.8
Livestock Care	7, 794	28.4	1, 212	4.4
Fishing	13	0.05	5	0.2
Tree Farming	27	0.1	13	0.05
Making agricultural produce for household sale	1842	0.7	1, 920	7.0
Mixed farming	4297	15.6	2, 041	7.4
Other	236	0.9	141	0.5
Total	**17, 260**	**62.8**	**10, 228**	**37.2**

There was a significant difference in agricultural participation between males (mean = 3.198, standard deviation = 1.999) and females (mean = 2.956, standard deviation = 2.192); t (27, 490) = 9.389, p = 0.0000. The gender gap in the sector can be attributed to numerous factors pivoted around disparities in access to productive assets, such as land, financial resources, information and skills, and time to undertake income-generating activities due to gender norms that require women to carry out unpaid care work in the household (Buehren, 2023).

Only 23% of the households practice mixed farming, a potential climate risk mitigation strategy, which needs to be encouraged. There is minimal participation in non-traditional agricultural activities, such as fish farming and tree production, though the domestic consumption demand for these activities indicates that there is potential to increase participation and production.

FIGURE 1: Main purpose of products obtained from agricultural activities

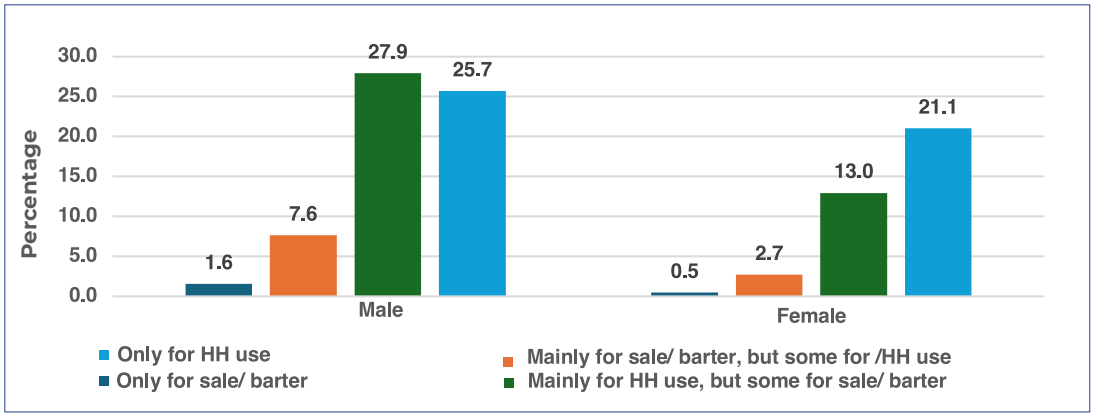
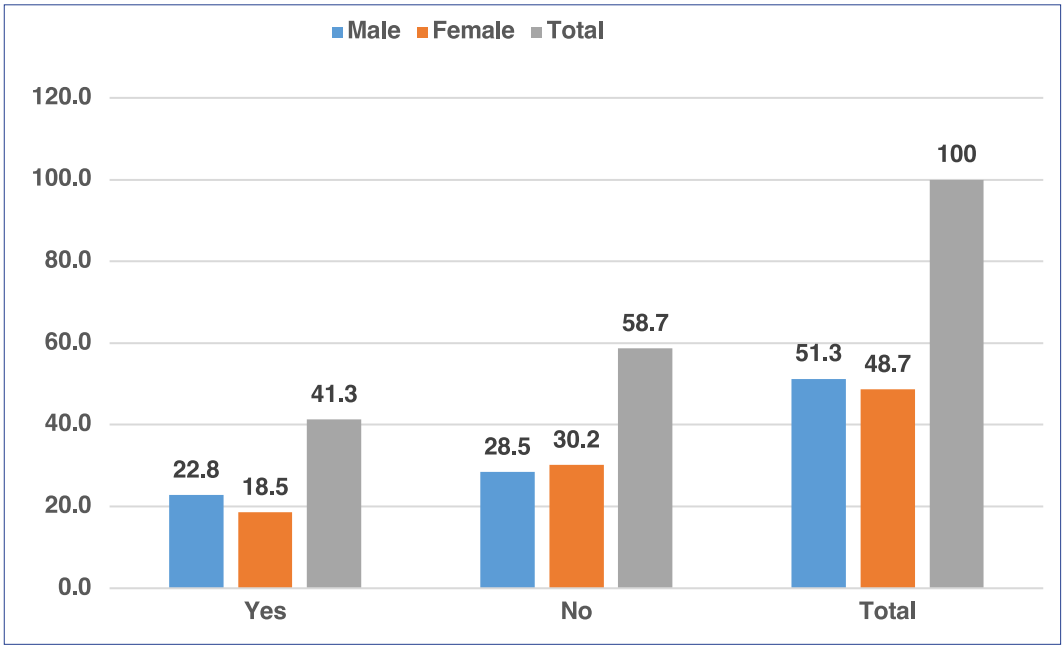


Figure 1 shows that the products from hou farming, livestock, and fishing activities are predominantly for household use at 46.8% (25.7% for male-headed households and 21.1% for female-headed households), followed by those mainly for household use, with some for sale/ barter at 40.9% (27.9% for male-headed households and 13% for female-headed households). There was relatively little emphasis on production for economic gain, with only 10.3% (7.6% for male-headed households and 2.7% for female-headed households) producing mainly for sale/ barter, with some for household use, and an even smaller proportion (2.1% overall – 1.6% for male-headed households and 0.5% for female-headed households) producing only for sale/ barter. The proportion of males to females is greater (62.8%) across the various started reasons for agricultural products targeted use. The results are indicative of the low levels of market orientation of many of the households, particularly for female headed households where almost all the products from agricultural and natural resources activities are solely for household use and/ or mainly for household use, with some for sale/barter.

Agricultural Land Ownership

The results in **Figure 2** indicate that a higher proportion of males (22.8%) own agricultural land relative to 18.5% of females. Results show a significant difference in ownership of agricultural land between males (mean = 1.556, standard deviation = 0.497) and females (mean = 1.619, standard deviation = 0.486); t (366, 679) = 9.389, p = 0.0000. However, this is a decrease from the 36% agricultural land under women ownership reported by Modesto (2016). The decrease may be attributed to sale of agricultural land due to insufficient resources for development, and the need for income generation. Equal access to agricultural inputs, and in particular, land, is considered critical to close gender gaps in agricultural productivity. Generally, there were more respondents without access to agricultural land, for both males, and females, though females made up a higher proportion of 30.2%, compared to 28.5% for males. On the contrary, males made up a higher proportion of those who own agricultural land at 22.8% relative to 18.5% for females.

FIGURE 2: Proportion of the population who own agricultural land, by sex



Of those, who own agricultural land, rights to the land were secured, with 94% of agricultural landowners having a certificate or title deed, either individually (82%) or jointly (12%) as presented in **Table 3** below. However, relatively more males - 43.4% for individual and 8.4% for joint, have secure land tenure, compared to females at 38.9% and 3.5%, for individual and joint land tenure, respectively. Secure land tenure is associated with increased productivity, and according to Olagunju et al., 2023, land ownership can increase crop yields, reduce production variability and risk.

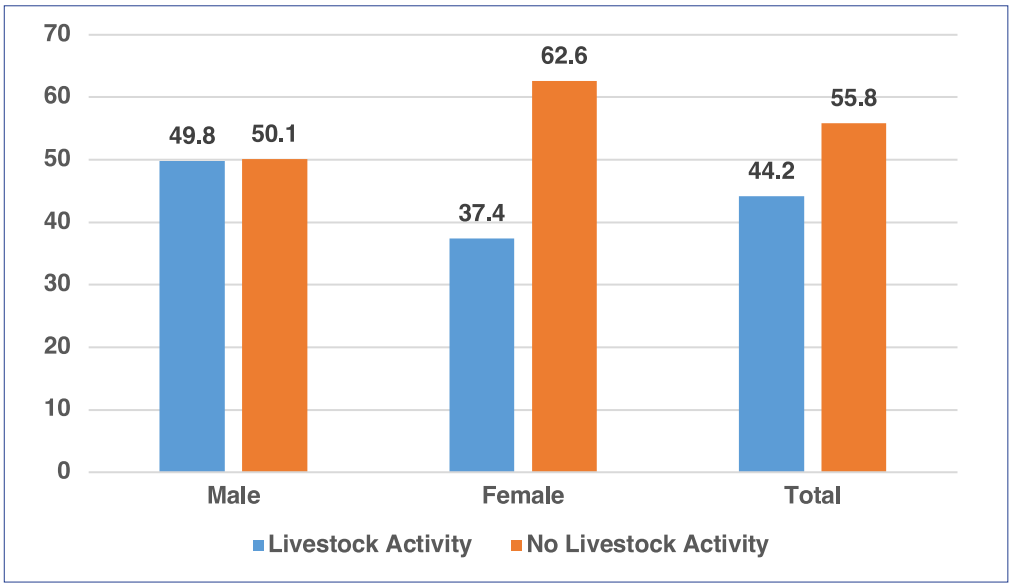
TABLE 3: The share of females among agricultural landowners by type of tenure

TYPE OF LAND TENURE	MALE		FEMALE		TOTAL	
	FREQUENCY	%	FREQUENCY	%	FREQUENCY	%
No certificate	5, 089	3,4	3, 790	2.5	8, 879	5.9
Individual	65, 525	43.4	58, 723	38.9	124, 248	82.2
Joint	12, 669	8.4	5, 298	3.5	17, 969	11.9
TOTAL	**83, 283**	**55.1**	**67, 811**	**44.9**	**151, 094**	**100.0**

Livestock Production

Livestock rearing is a critical livelihood alternative in Botswana. The predominant livestock owned was cattle, followed by goats, and sheep. Ownership is diversified with more than one livestock species kept by any given household. However, **Figure 3** below indicates that the majority of households (55.8%) are not involved in livestock rearing, that is, they neither own, take care of, and/or own and take care of livestock.

FIGURE 3: Economic gain from livestock activity, by sex



About the same proportion of male-headed households are involved, as those who are not involved, whereas a relatively larger proportion of female-headed households are not involved (62.6%) compared to 37.4% who are involved.

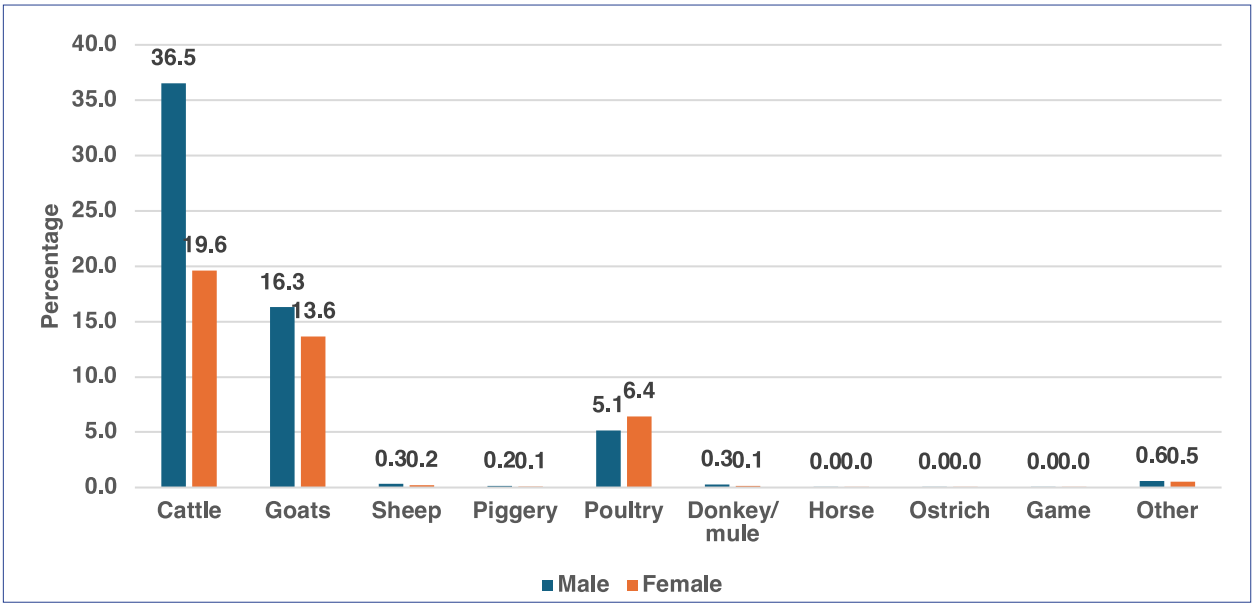
TABLE 4: Proportion Of The Population Owning Livestock, By Sex

LIVESTOCK OWNERSHIP	MALE	MALE	FEMALE	FEMALE	TOTAL	TOTAL
	FREQUENCY	%	FREQUENCY	%	FREQUENCY	%
Own Livestock	120,663	63.3	83,089	70.9	**203,752**	**66.2**
Look after	24,295	12.8	3,244	2.8	**27,539**	**9.0**
Both own and look after	45,550	23.9	30,791	26.3	**76,341**	**24,8**
TOTAL	**190,508**	**100.0**	**117,124**	**100.0**	**307,632**	**100.0**

For the households who either own, take care of, and/or own and take care of livestock, the majority own the livestock (66.2%), and the proportions are similar for both male and female-headed households at 63 and 71 percent, respectively. The next highest proportion was for those who own and take care of the livestock, also at similar proportions, of 24 and 26 percent, respectively, for male and female-headed households. More male-headed households (12.8%) were employed to

look after livestock compared to female-headed households (2.8%). This may be attributed to the engagement of women in unpaid care work at home and harsh working conditions in the livestock labour market, often in remote and isolated areas with very little security and access to feminine care products. The sector, however, has potential for unskilled employment and income generation.

FIGURE 3: Share of households with income from livestock production, by sex



The three main livestock kept were cattle, goats, and poultry. There were more male-headed households in cattle (36.5%) and goat production (16%), compared to women-headed households at 19.6% and 13.6%, respectively. There were slightly more female-headed households in poultry production (6.4%) than male-headed households (5.1%). Though there we negligible proportion of households that own sheep, pigs and donkey/mule, male-headed households comprised the higher proportion of livestock ownership for these.

Crop Production

Only about 21% of the respondents were involved in crop production, with the majority (79.0%) not engaged in planting and/or looking after crops. Though crop production has lower capital and labour requirements than livestock farming, and females may be more inclined to pursue it, there were more males (21.9%) involved in crop production compared to females (16.9%).

TABLE 5: Proportion of the population in crop production, by sex

	MALE		FEMALE		TOTAL	
ACTIVE IN CROP PRODUCTION	FREQ.	%	FREQ.	%	FREQ.	%
Yes	83,608	21.9	62,807	16.9	146,415	21.0
No	298,832	78.1	250,432	83.1	549,264	79.0
TOTAL	382,440	100.0	313,239	45.0	695,679	100.0

Table 6 below shows that the majority of those active in crop production planted crops (66.2%), followed by those who either owned and/or looked after planted crops, at about 30%. Only about 5% of these looked after crops only. The proportion of female-headed households was higher for those who either planted crops, and/or both owned and looked after crops at about 68% and 31%, respectively, compared to 65% and 28%, for male-headed households. However, male-headed households comprised a higher proportion of those who irked a living from crop production as 7%, compared to only about 5% for female-headed household looked after crops.

TABLE 6: Proportion of those active in crop production, by activity and sex

VARIABLE	MALE		FEMALE		TOTAL	
	FREQUENCY	PERCENT	FREQUENCY	PERCENT	FREQUENCY	PERCENT
Planted crops	54,485	65.2	42,393	67.5	96,878	66.2
Looked after crops	5,948	7.1	1,203	1.9	7,151	4.9
Both own and look after	23,175	27.7	19,211	30.6	42,386	28.9
TOTAL	**83,608**	**100.0**	**62,807**	**100.0**	**146,415**	**100.0**

Table 7 below shows that the predominant crops planted by households actively engaged in crop production are maize (55.1%) and sorghum (39.9%). For both crops, male-headed households comprise a higher proportion (about 32& for maise and 21% for sorghum) compared to their female-headed counterparts, at about 24% and 19%, respectively.

TABLE 7: Proportion of households active in crop production, by crops planted during the October 2020 to September 2021 planting season, and gender

CROPS PLANTED	MALE		FEMALE		TOTAL	
	FREQ	%	FREQ	%	FREQ	%
Sorghum	29,381	21.1	26132	18.8	55513	39.9
Maize	43,931	31.6	32761	23.5	76692	55.1
Beans/ pulses	1,165	0.8	979	0.7	2144	1.5
Millet	249	0.2	243	0.2	492	0.4
Sunflower	126	0.1	71	0.1	197	0.1
Groundnuts	104	0.1	75	0.1	179	0.1
Watermelons	421	0.3	240	0.2	661	0.5
Melons	45	0.0	34	0.0	79	0.1
Sweet reed	74	0.1	45	0.0	119	0.1
Wheat	6	0.0	6	0.0	12	0.0
Pumpkins	128	0.1	68	0.0	196	0.1
Lucerne	177	0.1	42	0.0	219	0.2
Fallow land	101	0.1	70	0.1	171	0.1
Other	1,721	1.2	807	0.6	2528	1.8
TOTAL	**77,629**	**55.8**	**61,573**	**44.2**	**139,202**	**100.0**

Agricultural Asset Ownership – Durables

Important agricultural durable assets included a car (27%), wheelbarrow (13%), and van or bakkie (12%). However, the most commonly owned asset was the cellular phone, owned by about 32% of all households. **Table 8** shows that for all agricultural assets, except, cellular phone, more male-headed households were endowed than females-headed households.

TABLE 8: Proportion of population who own assets, by sex

ASSET OWNED	MALE		FEMALE		TOTAL	
	FREQ	%	FREQ	%	FREQ	%
Van/ bakkie	58.233	8.4	22.583	3.3	80.816	11.6
Car	111.216	16.0	72.674	10.5	183.89	26.5
Tractor	1.443	0.2	650	0.1	2.093	0.3
Truck	1.613	0.2	687	0.1	2.3	0.3
Donkey cart	25.78	3.7	17.13	2.5	42.91	6.2
Bicycle	11.452	1.7	5.763	0.8	17.215	2.5
Trailer	562	0.1	472	0.1	1.034	0.1
Wheelbarrow	35.777	5.2	51.952	7.5	87.729	12.6
Fixed telephone	828	0.1	1.434	0.2	2.262	0.3
Computer	15.556	2.2	15.663	2.3	31.219	4.5
Cell phone	10.6702	15.4	113.441	16.4	220.143	31.7
Plough	336	0.0	332	0.0	668	0.1
Refrigerator	2.283	0.3	2.505	0.4	4.788	0.7
Radio	3.742	0.5	1.975	0.3	5.717	0.8
TV	213	0.0	268	0.0	481	0.1
Other	5.62	0.8	4.939	0.7	10.559	1.5
TOTAL	**381.356**	**55.0**	**312.468**	**45.0**	**693.824**	**100.0**

Except for mobile phone ownership, males make a greater proportion of the population who own durable assets. This has negative implication in terms of ability of females to access economic resources that may be utilised to generate employment and income in the agricultural sector. Access to information and communication technology is one of the means to empower women and girls as this can improve access to agricultural market and extension information and services. In 2002 the proportion of individuals who owned a mobile or cellular phone, by sex was 85.3%, the majority of which were females at 55.8%, and males at 44.2%. From the results the proportion of the population who own mobile phone has increased to 92.8%, predominantly females. Mobile phones can be a resource in agricultural information and extension services access, that could promote gender parity in the agricultural sector.

Policy Implications

The results indicate that the country is still lagging in terms of equal access to agricultural participation, and assets ownership. Though there may be reforms in place to give women equal rights to economic resources, it is evident that more concerted efforts are required for gender mainstreaming in the agricultural sector. In terms of land ownership, there was equal access to secure land tenure for both male and female headed households but there is need for targeted capacitation and market orientation, particularly for women, in agricultural value chain development and management. This will facilitate women empowerment in terms of access to requisite resources to develop the land resource for economic and social development. Development of agricultural and natural resources value chains could provide an alternative to primary agricultural production, as they may not require substantial financial and factor inputs.

Conclusions and Recommendations

Gender gaps in terms of participation and agricultural asset ownership are evident for all the variables analysed. There is, therefore, need for targeted women involved and empowerment towards participation in development of policies to promote engagement in the agricultural and natural resources value chains.

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ANALYSIS OF LIVESTOCK AND CROPS PLANTED BY HOUSEHOLDS IN BOTSWANA: FINDINGS FROM THE 2022 BOTSWANA POPULATION AND HOUSING CENSUS

By

Wilford Molefe and Ruth Kauthengwa

EXECUTIVE SUMMARY

According to the 2022 Population and Housing census, Botswana has a population of 2,359,609 million people, with 48.8% males and 51.2% females. Out of the 2.3 million people, 1,500,290 people are 18 years and above and this is the population eligible for question on land acquisition. The results indicates that 36.4% of the population aged 18 and older own land of three types (agriculture, residential, and business) on an individual basis.

Among the households in Botswana, 39.3% indicated that they own agricultural land, with 80% individually owned with certificate, 15% jointly owned with certificate and 5% with no certiciate. The distriction of agricultural activities show that crop planting and livestock care are at the top with 31% of persons engaged in these activities, followed by mixed production at 22% and those making agricultural produce for household use at 14%. The results also show that the majority of the agricultural produce is intened for household use only at 48.5% and 40.1% intened mainly for household use but with some for sale or bartering.

In terms of livestock ownership, over half (56%) of the total households do not have anyone who own or operate or look after livestock. The most common livestock owned being cattle, cattle and poultry. There are gender differentials in livestock ownership as those households that own cattle, almost two-thirds (65.1%) of the households are male-headed. Even for poultry 57% of the households are male-headed. There has been a decline in the number of livestock kept by households, more especially in poultry, cattle, donkey or mule, horses and game.

In terms of crops planted, an overwhelming majority 79% of households did not plant or look after crops. The most commonly planted crops are maize, water melons, beans or pulse and sweet reeds. We still observe gender differentials as with livestock ownership. The number of households that planted maize, beans or pulse, sweet reeds, sorghum and millet has decreased over the 2011 and 2022 census periods

1.0. INTRODUCTION

Botswana is a country located in Southern Africa, landlocked and nestled between Namibia in the west and north (Caprivi strip), Zambia in the north, Zimbabwe in the northeast, and South Africa in the southeast and south. Botswana is a semi-arid country with an average annual rainfall of approximately 416 mm in terms of climate. She is at high risk of climate impacts and extreme events such as frequent droughts due to its high temperatures causing high run-off and evaporation rates. The Kalahari Desert stretches into the nation and the dry weather leads to significant changes in temperature, posing challenges for crop cultivation. There are only a small number of crops that can thrive in the most ideal conditions in Botswana. The connection between rainfall and agriculture output is complex. Lack of moisture due to drought is mainly caused by elevated temperatures and insufficient rainfall, resulting in decreased crop production. Terrain, climate, soil characteristics, and soil moisture are environmental factors that impact crop agriculture. The specific crops can be cultivated in particular regions due to the presence of these four factors working together. Whereas, altering the maturity duration is not an answer in such situation as it will only result in a quicker product, not an increase in quantity.

Agricultural production in Botswana is dualistic in nature with commercial and communal or traditional production systems used in both crops and livestock. The distinction between the two production systems is based on land tenure and the use of modern technology and modern inputs. Farmers who are more integrated with the market and use modern commercial farming systems, generally have higher farm productivity. In the commercial sector, farms are fenced with defined property rights (freehold or leasehold land) to grazing resources and ploughing land. In the communal sector, the farms (especially cattle farms are not fenced) and there are no defined property rights to grazing resources (tribal land tenure system). Although the agricultural sector's contribution to gross domestic product (GDP) has fallen from following the discovery of minerals, particularly diamonds. However, the role of the agricultural sector is still important as a source of livelihood for the majority of the population living in the rural areas.

Botswana with a population of more than 2 million people, of whom nearly a fifth live below the poverty line. Poverty rates have been falling, but inequality remains high at 53.3%. Though this is an improvement (down from 60.5% in 2010), Botswana still has one of the highest rates of inequality in the world.

At a household level, the prevalence of severe food insecurity has been increasing in recent years, due in part to the frequency and intensity of droughts. With the additional pressure from COVID-19 in 2020-21, the incidence of food and nutrition insecurity is expected to increase.

Vision 2036 (2016) under Pillar 1: Sustainable Economic Development, recognizes that "many of our people live in rural areas where agricultural activities take place". It also notes that "if well supported and productivity and competitiveness were improved in the agricultural sector, it could have a direct positive impact on the livelihoods of many of these people through the provision of food and creation of employment. Agriculture also has the potential to contribute to government revenue generation and export earnings.

The Botswana Land Policy (2015) states that arable farming remains an important source of food, income, and employment for Batswana. The policy also recognizes that due to the shortage of arable land, the Land authorities will ensure that it is used efficiently and in effectively ensuring that:

1. There will be a limit of one agricultural holding allocation per eligible citizen.
2. Additional plots may be acquired through the private market, inheritance, or other legitimate channels recognized in law and policy.

The policy also stipulates that the rights to land are registered or documented in the form of Title Deeds, Leases, Licences, Cessions, Certificate of Rights, and Certificate of Customary Land Grants. The Title Deeds for freehold land and Fixed Period State Grant in state land, and Leases for ten years or more are registrable in the Deeds Registry. Certificate of Rights and Certificate of Customary Land Grants are not registrable.

The chapter presents analysis of agricultural land ownership in relation to livestock owned and crops planted. A basic descriptive analysis of agricultural land ownership, either individually or with someone else,the livestock owned and crops planted in Botswana.This is based on the results of the 2022 Botswana Population and Housing Census which was conducted in March/April 2022. We also highlight trends in agricultural land ownership and crop prodution.

2.0 LITERATURE REVIEW

The Ministry of Agriculture Development Food and Security is responsible and dedicated to the advancement of food security and the promotion of agricultural development. This is achieved through the promotion of locally produced goods, reduction of import costs, industry diversification, job creation, advocacy for the consumption of local foods, and the initiation of poverty eradication projects centred on agriculture. In recent years, the country has maintained relatively robust economic growth. However, agriculture has experienced a steady decline in contribution to GDP over the last 40 years, accounting now for only about two (2)percent. Despite the decline, the sector is still the mainstay of the rural economy. 30 percent of Botswana's population lives in rural areas and 70 percent of rural households depend on subsistence farming for their livelihoods, Statistics Botswana (2024)

With agriculture remaining the slowest growing economic sector during the NDP11 period (2017-23), the 2020 Economic Recovery and Transformation Plan acknowledges that raising agricultural productivity is essential for job creation, the adoption of new technologies, enhancing self-sufficiency, and improving the balance of payments. The plan identifies the establishment of commercial clusters as a strategic priority. Clusters refer to concentrations of producers, agri-businesses and institutions engaged in the same agricultural or agro-industrial sub-sector. Given Botswana's low population density, these are seen as key to driving commercialization and access to services and markets.

Botswana is a net importer of cereals and will be for the foreseeable future. Botswana is estimated to produce about 200,000 tons of cereals annually, which is only about 17 percent of domestic consumption. The negative net trade balance was USD 168 million in 2019. Despite the widespread household production of maize, sorghum, and vegetables, yields in the smallholder sector are very low, averaging as little as between 0.2 and 0.3 tons/ ha for maize and sorghum.

According to Statistics Botswana (2019), over the course of a 40-year period spanning from 1979 to 2019, the average crop yields for key staples such as sorghum, maize, and millet consistently remained below 300 kg per hectare. Consequently, there is a persistent shortfall in production, with only approximately 20 percent of the annual demand for basic grain, which equates to 300,000 tons, being fulfilled. In 2017, national cereal production totaled 20,985 metric tons (MT) (this excludes commercial production). While sorghum comprises 28.4 percent of national cereal production, maize follows (66.3 percent) and millet (5.2 percent). Botswana also produced 2348 MT of beans, 145 MT of groundnuts, and 78 MT of sunflowers in 2017.

The 2019 Annual Agriculture Survey report indicates that the traditional crop sector experienced a poor harvest compared to 2017. Sorghum production recorded a substantial reduction from 5,975 metric tons in 2017 to 826 metric tons (86.2 percent) in 2019. Maize production also experienced a huge reduction from 13,911 metric tons to staggering 987 metric tons (92.9) percent ,while millet production dropped from 1,099 metric tons to a 313 metric tons(71.5 percent)in 2017 and 2019 respectively. The beans or pulses also realized a significant reduction in production from 2,348 metric tons (75.2 percent) between 2017 and 2019 agricultural seasons.

As for the area planted and area harvested there was a decline for all crops in 2019 compared to 2017 except for millet which remained unchanged (Statistics Botswana, 2019). During 2019, the crop sector recorded substantially low yields compared to the 2017 cropping season, in terms of both yield per hectare planted and yield per hectare harvested. The yields per hectare planted for sorghum dropped from 251kg/ha in 2017 to 48kg/ha in 2019, while maize yield was 225kg/ha in 2017 but dropped to 25kg/ha in 2019. The millet yield reduced from 353kg/ha between 2017 and

2019 respectively, while the yield for pulses also showed a marked reduction from 86kg/ha to 31kg/ha between 2017 and 2019 survey years respectively. The results from 2019 annual agriculture survey indicates that the agricultural programs such as Integrated Support Programme for Arable Agriculture Development (ISPAAD), did not improve food security situation in this country due to operational and structural challenges. As a result, the government introduced another programme named Temo Letlotlo which is designed to promote national self-sufficiency in food production.

Botswana, which is semi-arid and subtropical, are perfect for raising cattle. In Botswana, the livestock sector is a major contributor to agricultural output, contributing 42 percent of agricultural value added in 2022. The sector is also a major contributor to agricultural exports, especially the beef sector. The livestock sector provides both backward and forward linkages to the rest of the economy. Despite numerous programmes and initiatives to support the development of the livestock industry, its performance has been unsatisfactory. This is because the livestock producers in Botswana are susceptible to risk because they rely on rainfall for the survival of animals. Risk is defined as exposure to adverse and extreme weather conditions, price uncertainty for livestock inputs and outputs, and animal disease outbreaks. However, natural farming practices and free-range cattle in Botswana produce the best-quality, full-flavored, lean beef.

Livestock production, mainly of beef, generates more than 80 percent of the income from agriculture. . Beef is by far Botswana's primary agricultural product for export. Meat and meat products are the only agricultural commodities for which Botswana is a net exporter: While most meat produced by smallholders is marketed locally, over 95 percent of beef produced by commercial farms is exported. The cattle population has been showing a decline with current estimated numbers at 1.7 million down from 2.2 million in 2004.

According to Statistics Botswana Annual Agriculture Survey report of 2019, the goats population increased from 1,200,000 in 2017 to 1,229,000 in 2019 and sheep population also increased from 234,621 to 242,911 between 2017 and 2019. The increase of small stock was attributable to government programmes such as LIMID and Poverty Eradication, as well as low mortality recorded in 2019 for both goats and sheep.

Despite numerous programmes and initiatives to support the development of the livestock industry, its performance has been unsatisfactory. However, the government continues to identify agriculture sector as one of the priority areas that could diversify and contribute meanfully to transformation of the economy from upper –middle to high income by 2036. Therefore there is need to develop livestock sub-sector to a sustainable, technology driven and commercially viable standard. As a result, the Government of Botswana through the Ministry of Agriculture (MoA), has designed a new initiative called Thuo Letlotlo Programme which its objective is to develop sustainable, inclusive and diversified livestock sector. The programme is intended to increase the national herd, improve their genetics, promote the export of beef and its by-products as well as beef value addition

There is need to enhance competitiveness in the livestock sub-sector and decrease the country's dependence on imported livestock products that can be feasibly produced domestically; also to impart skills and technologies in various animal science disciplines to make livestock production appealing and profitable to farmers, thereby generating employment opportunities, increasing rural incomes, and curbing rural-urban migration. This involves offering expert advice to livestock farmers on improving livestock and developing products through breeding, nutrition, housing, processing, and optimal use of rangelands. It also involves helping subsistence farmers transition their operations to commercial levels, while also enabling commercial farmers to enhance their management and technology application. On crop production government goal is to reduce import dependency and enhance competitiveness by assisting farmers in improving land management and technology utilization. It addresses pests of national significance and provides guidance on matters related to the conservation of agricultural resources.

3.0. METHODOLOGY

The methodology utilized in the analysis is exactly that already used in the 2022 Census data collection and specified in the Census Report. This paper uses the 2022 Botswana Population and Housing Census data to answer some pertinent questions on Agriculture in Botswana within the census period 2011. Specifically, the paper determined the following:

a) Distribution of Number of Households by Districts and Type of Livestock owned;
b) Distribution of Number of Households by Type of Locality
c) Distribution of the Number of Households By Districts and Type of Crops Planted.
d) Distribution of the Number of Households That Planted One or More Types of Crops by Type of Locality
e) The distribution of the number of livestock owned by the sex of the household head.
f) Distribution of Number of Households That Planted One or More Types of Crops by Type of Locality

4.0 ANALYSIS

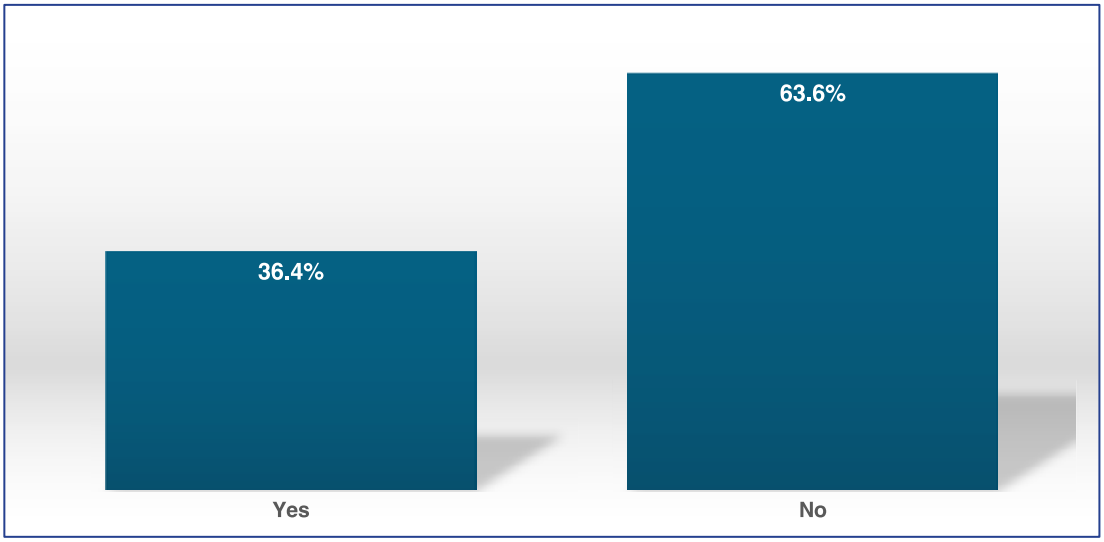
4.1. Household Agriculture

This section of the report deals with household Agriculture, namely, the types of crops planted and the types of livestock kept by the households studied. The analysis of crops planted, and livestock kept were carried out by filtering those households that own one or more livestock or planted one or more crops within the intercensal period. The analysis was performed on the heads of households using different criteria viz. (i) district (ii) locality (iii) sex of head of households.

Land Ownership in Botswana

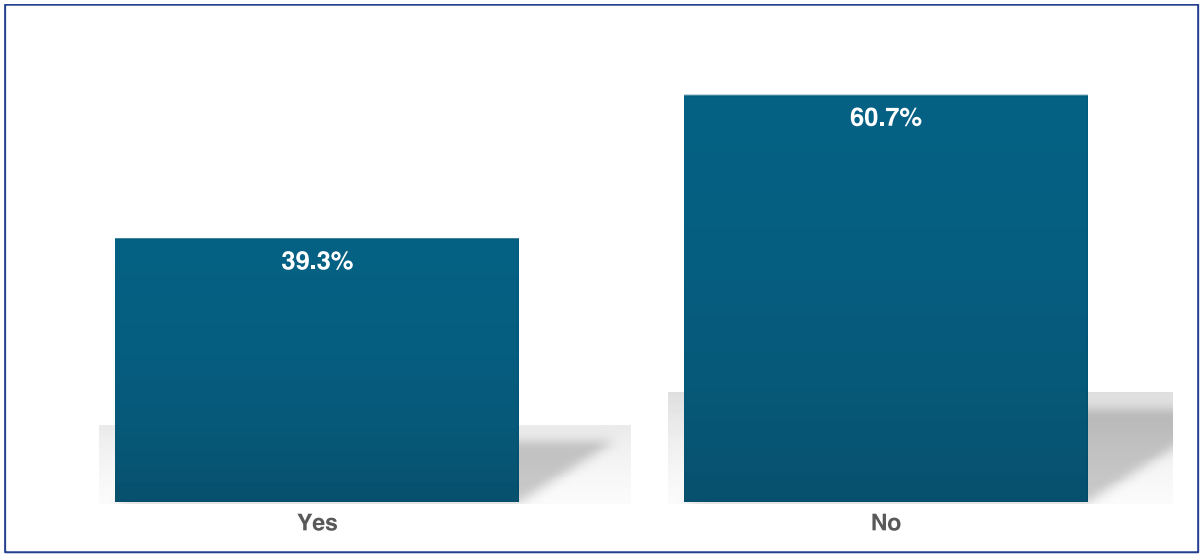
Batswana were asked if anyone in the household owned agricultural, residential, or business land. Out of 1, 413, 702 persons, less than half (36.4%) indicated that they did, see **Figure 1**. In terms of households, out of 691, 314 households, just over half (53%) indicated that they owned land.

FIGURE 1: Percentage distribution of individuals who own land



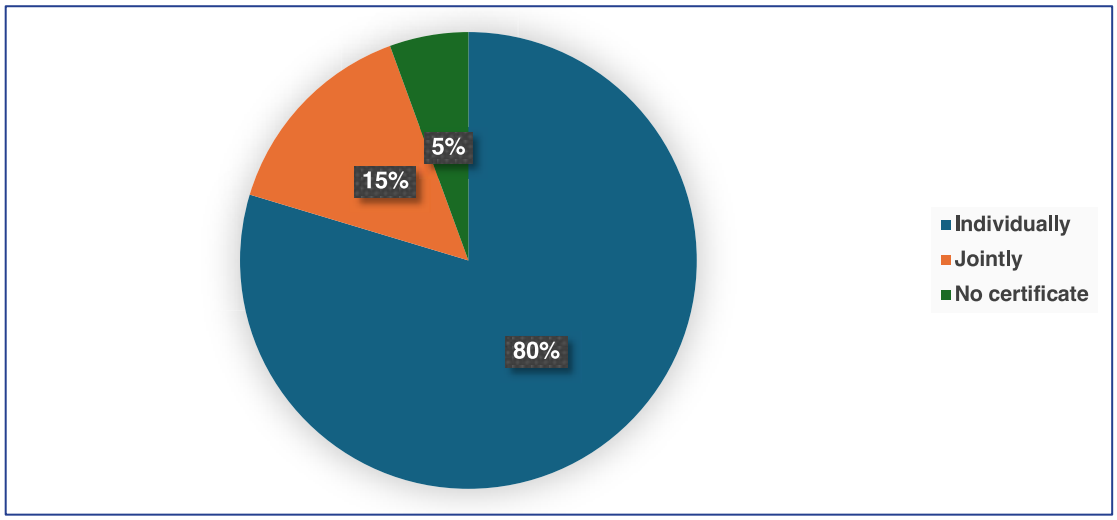
In terms of ownership of agricultural land, out of 513, 996 individuals, almost two-fifths (39.3%) indicated they owned it, see **Figure 2**. Out of the 366, 680 households, only 41.3% own agricultural land.

FIGURE 2: Percentage distribution of households that own agricultural land



In terms of the type of ownership of agricultural land, four-fifths of the households indicated the ownership was individual ownership, with 15% joint ownership and 5% having no certificate.

FIGURE 3: Percentage distribution of households that own agricultural land



On whether the ownership of the agricultural land in individual or jointly, a significant proportion (80%) own the land individually with only 15% who own the land jointly. In terms of households, 82.2% of households own the land individually.

Figure 4 shows the percentage distributions of persons by the agricultural activities they engage in. We observe that nearly one-third (31%) of the total persons engaged in crop planting and livestock care with 22% engaged in mixed production. This distribution does differ much from the distribution with respect to households as 29.1% of households engaged in crop planting, 32.8% in livestock care and 22.9% in mixed production.

FIGURE 4: Percentage distribution of persons by agricultural activities

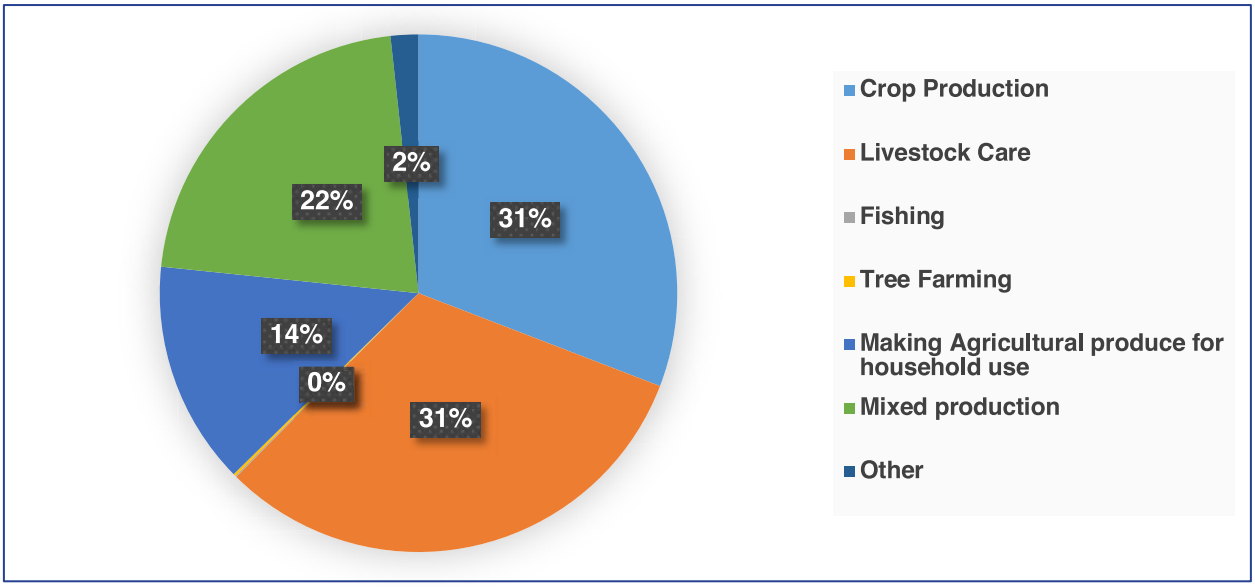
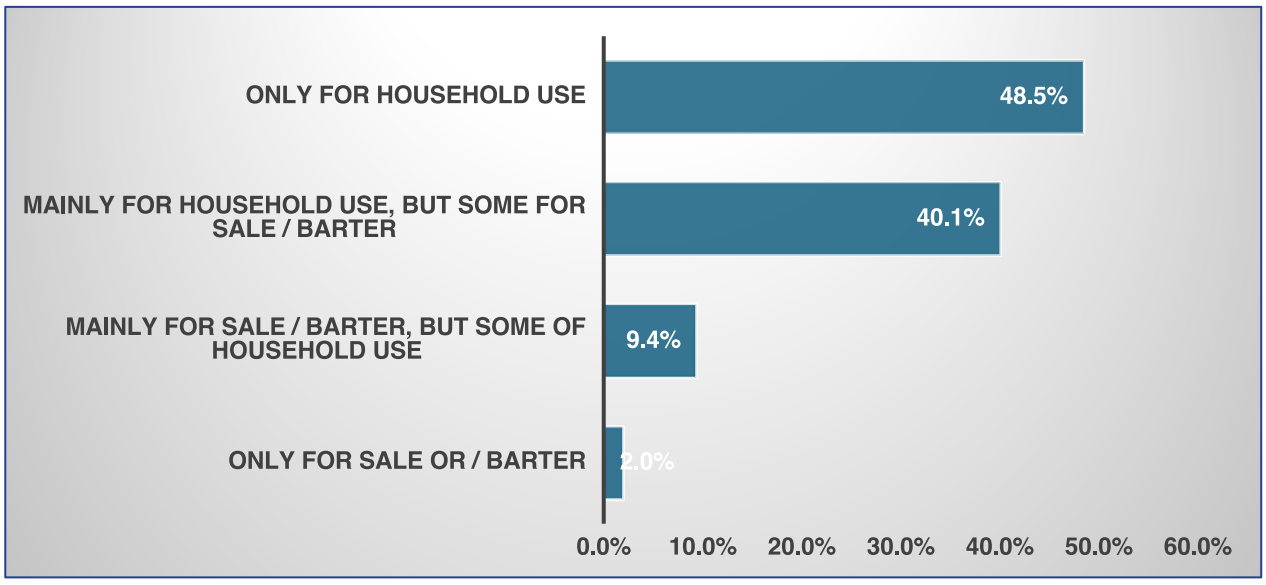


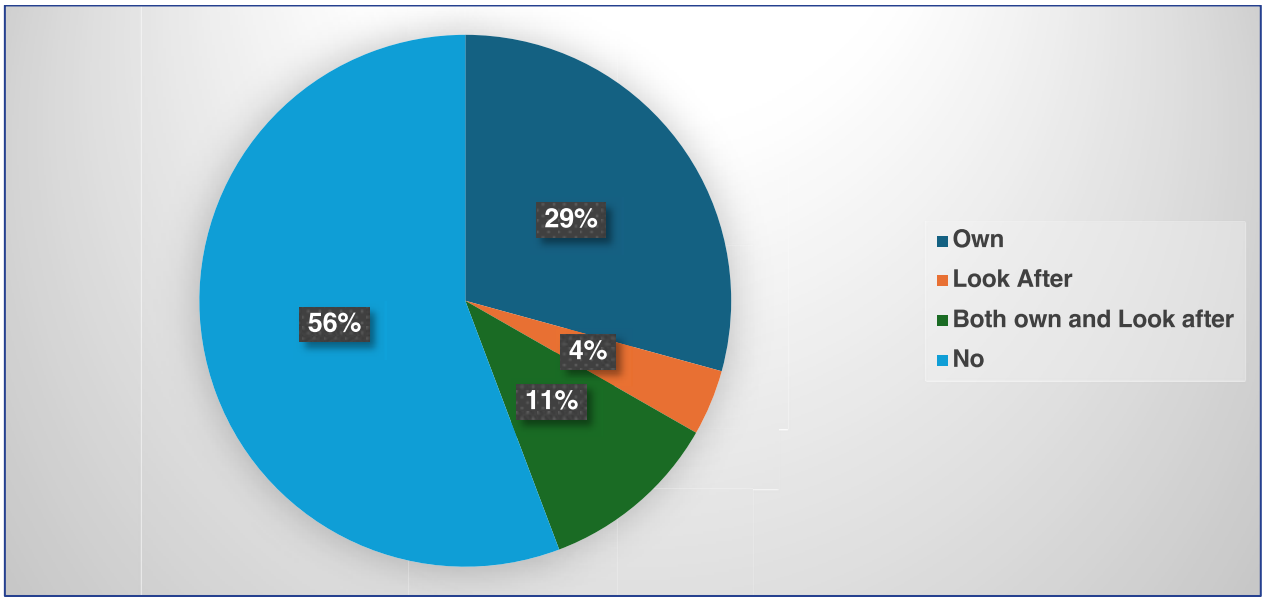
Figure 5 shows the intended use of the products obtained in household farming at the individual level. The results show that the majority is for household use at 48.5%, followed by mainly for household use, but with some for sale or bartering. At the household level, 46.8% of households report household use followed by mainly for household use, but with some for sale or bartering at 40.9%.

FIGURE 5: Percentage distribution of households by agricultural products intended use



4.2. Livestock Ownership

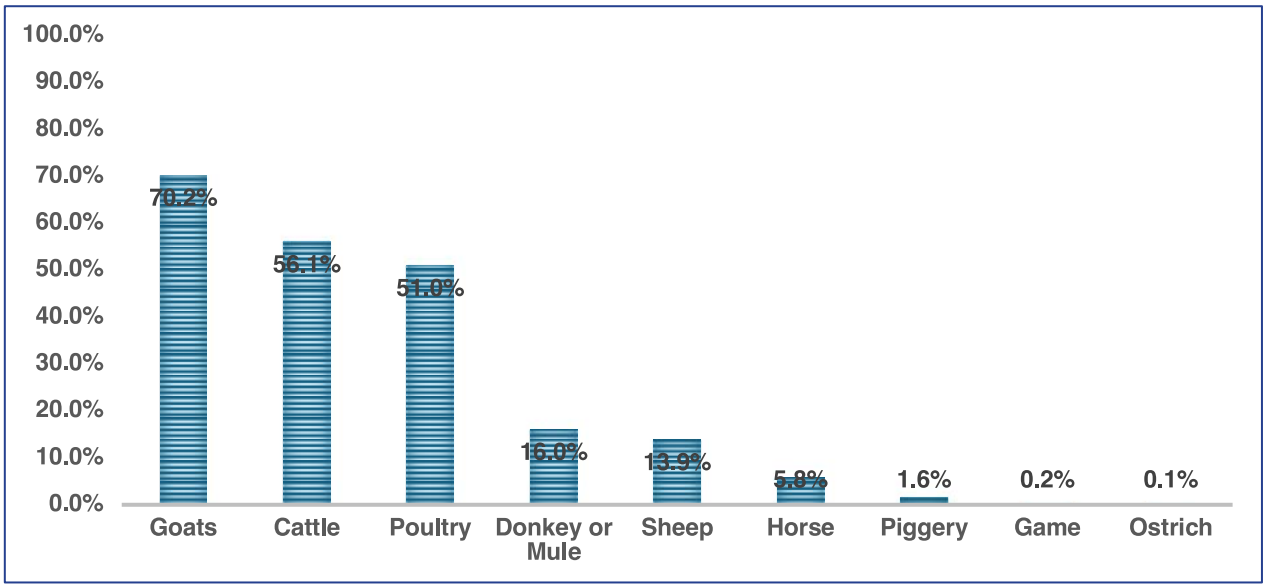
FIGURE 6: Percentage of households owning or operating or looking after livestock



4.2.1 Livestock ownership

The most common livestock owned in Botswana are goats, cattle and poultry. Livestock, especially cattle is often kept for socioeconomic and cultural reasons. Small livestock, e.g. goats, sheep, and poultry are usually kept as a source of quick cash in times of need. The households were asked to indicate which livestock they owned. The responses to this question have been summarized in **Figure 7**. The figure shows that nationally, 70.2% of the households in Botswana own goats. Cattle are the most commonly kept livestock by the households, followed by poultry, donkeys/ mules, and sheep with 56.1%, 51.0%, 16.0%, and 13.9% of the household's ownership, respective/ly

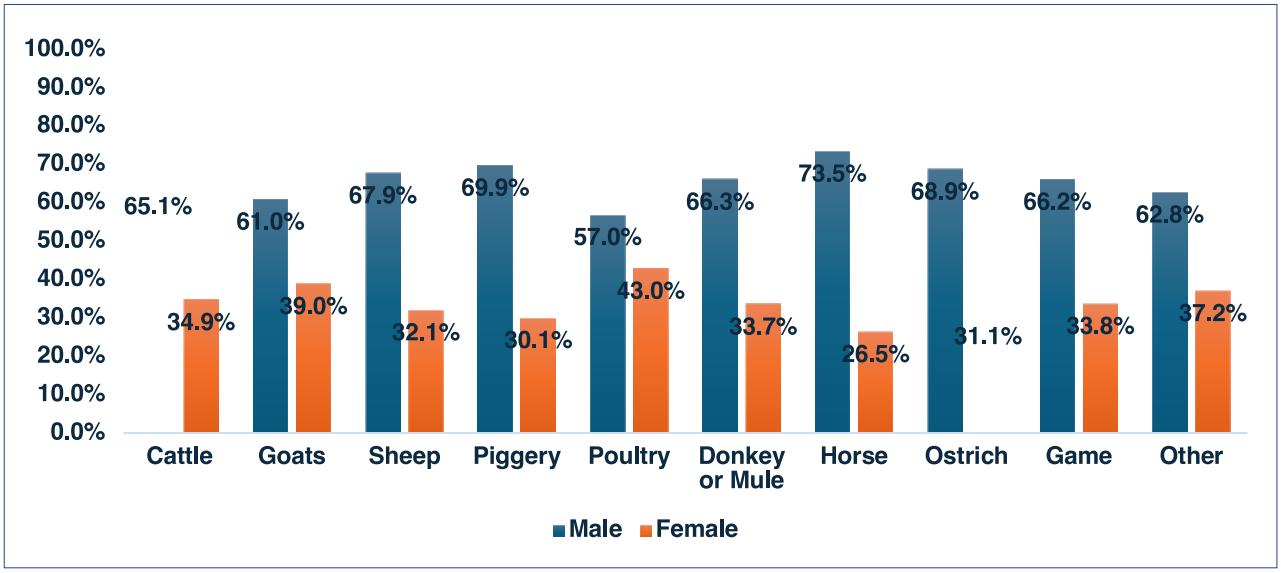
FIGURE 7: Percentage of households owning different livestock



4.2.2 Livestock ownership by sex of household head

Gender differentials are observed in the ownership of livestock. For example, of the households that own cattle, 65.1% are male-headed compared to 34.9% that are female-headed. Poultry which does not require grazing land, and is usually kept in the villages and lands is owned more by male-headed households (57.0%) compared with female headed households (43.0%).

FIGURE 8: Percentage of households owning different livestock by sex



In **Figure 9** we compare livestock ownership by the number of households between the 2011 and 2022 population and housing censuses. We observe that for poultry, cattle, donkey or mule, there has a dramatic drop in the number of households owning these livestock. For goats, sheep and piggery, we observe an increase in the number of households owning these. Figure 10 shows the percentage change in the number of households owning livestock.

FIGURE 9: Number of households owning livestock during the 2011 and 2022 censuses

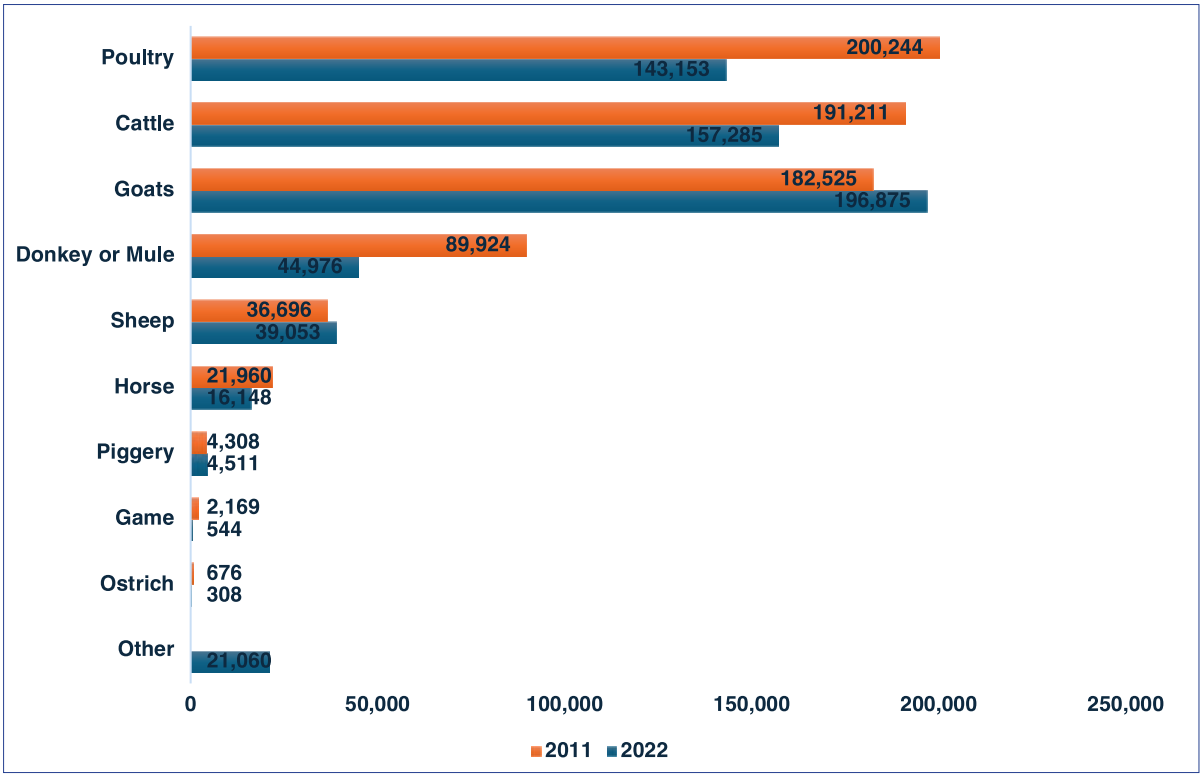


FIGURE 10: Percentage change in the number of livestock kept by households during the 2011 and 2022 censuses.

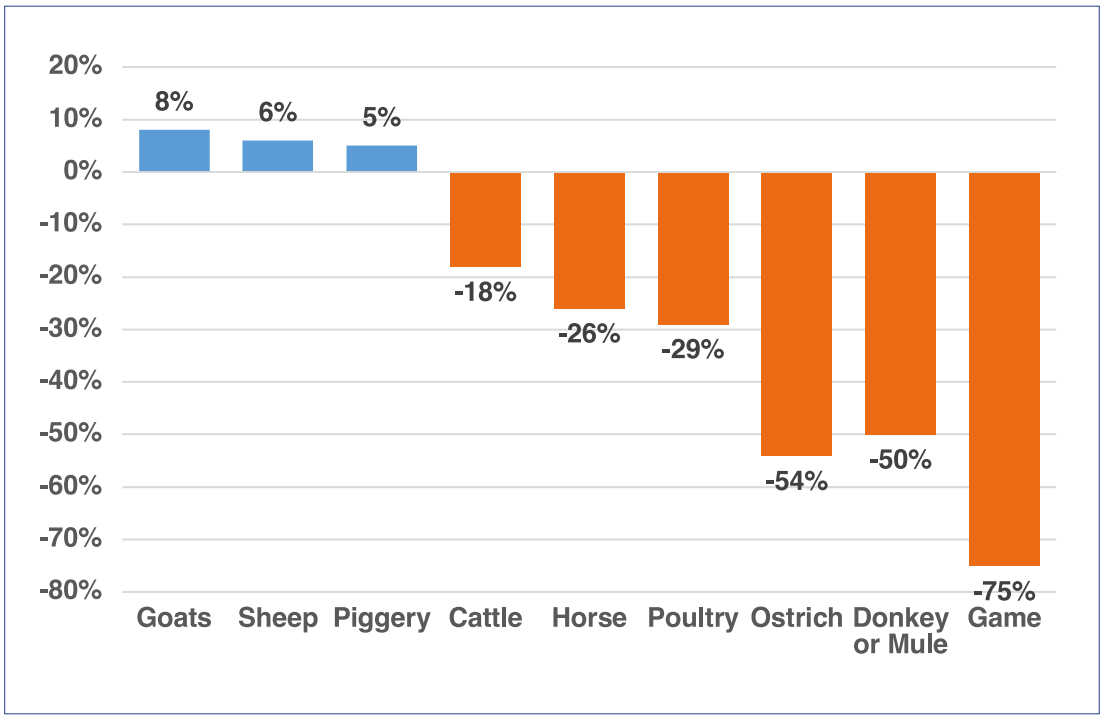
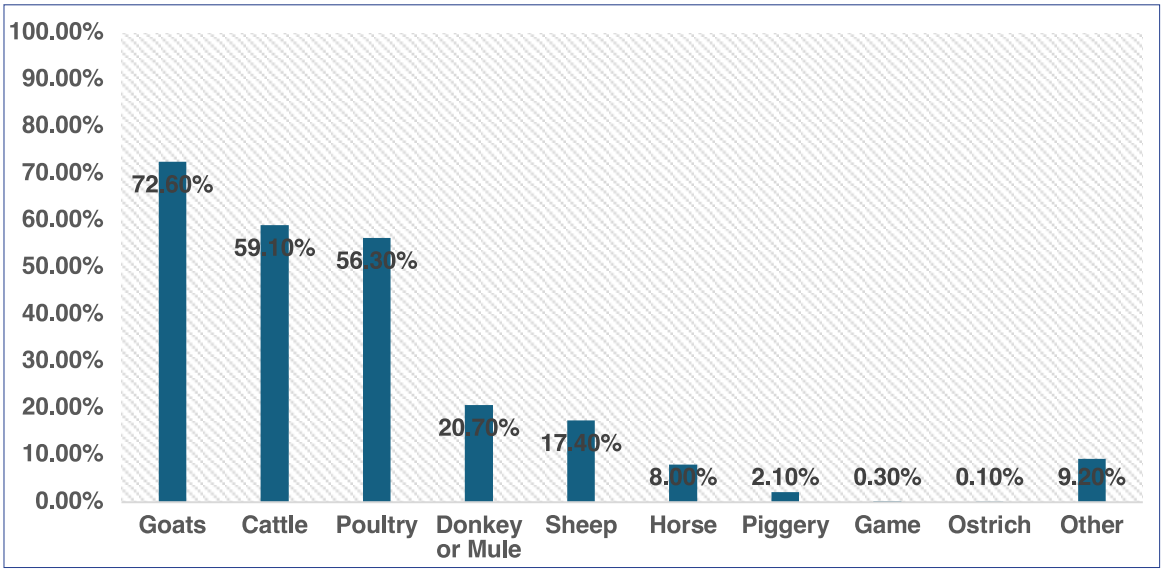


FIGURE 11: Percentage of households with a member who looked after livestock



4.2.3. Livestock ownership by district

The household ownership of livestock was classified by the type of livestock and district to examine the differentials between the districts as depicted in Table 1. The table shows that of the number of households that own at least one livestock in each district, the highest percentage ownership of cattle (75.1%) is from Ghanzi, followed by households from the North West (69.0%), Southern (57.0%), Kgatleng (56.3%), Kweneng (55.9%) and Kgalagadi (54.1%).

Goats are mostly kept by households in Kgalagadi (78.8%), Southern (76.3%), Kweneng (74.4%), North East (65.2%), and Kgatleng (65.6%). Poultry are mostly kept by households in North East, followed by Kgatleng (51.3%) and Southern (49.8%). For horses, Ghanzi stands out with 30.7% of households reporting keeping horses.

4.2.4 Livestock ownership by sex, marital status, and educational level of head of household

The results of the analysis **(Table 2)** reveal that the majority of households that own sheep (47.2%), piggery (45.5%), game (45.3%), ostrich (44.2%), cattle (41.2%), and horses (40.7%), are headed by the married, followed by households headed by the never-married people and those living together.

In terms of education, the majority of households that keep cattle (39.6%), the head had secondary education; whilst for goats 41.4% of the households the head had secondary education. For sheep, piggery, ostrich and game, the head was at tertiary level.

4.2.5. Livestock ownership by type of livestock and locality type

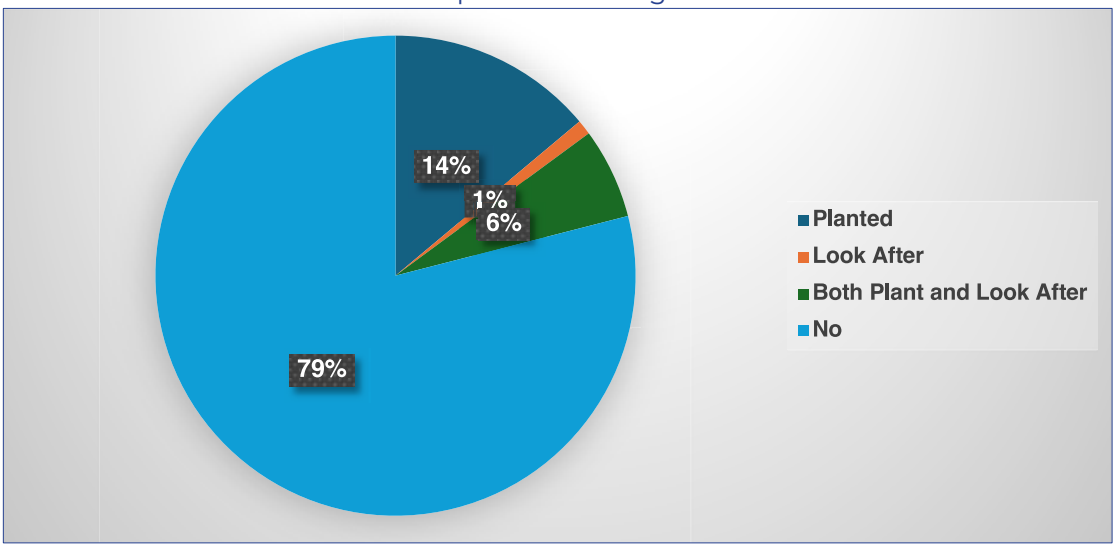
In **Table 3**, the numbers of households that own livestock are classified by the type of livestock ownership and locality type. The table reveals that 59.7% of the households that live in town own cattle, followed by 57.8% of the households in urban village and 53.3% of the households in the rural area. Goats are kept mostly by households in rural area (73.0%), 69.7% of the households in town and cities while 67.5% of the households in urban village. Poultry is mostly kept by households (59.6%) in rural area, 45.8% of households in urban villages and lastly 40.0% in towns and cities.

Between the two census periods, there has been a substantial decline in the number of households that owned livestock. For instance, while 191,211 households owned cattle in 2011, the number of households decreased to 157, 285 in 2022. Similar trends in the number of households that own poultry (200, 244 in 2011 and 143, 153 in 2022). However, there has been a marked increase in the number of households that kept goats with 182, 525 in 2011 compared to 196, 875 in 2022. This pattern is seen again in sheep where we observe a marginal increase from 36, 696 in 2011 compared to 39, 053 in 2022) **(see Figure 8)**.

4.3. Crops Planted

In **Figure 12** we show the percentage of households that planted or looked after crops during the last agricultural season. We see that an overwhelming majority of households did not plant or look after crops, with only 21% of households that either planted or looked after crops.

FIGURE 12: Percentage of households with a member who planted or looked after crops in the last agricultural season.



4.3.1 Crops Planted

Figure 13 shows the percentage of households that planted one or more crops. The percentages were generated from responses to a multiple response question which required the households to indicate which of the crops they planted. The figure reveals that the most commonly planted crops by the households were maize, watermelons, beans, sweet reeds, and sorghum. The percentage of households that planted the crops was respectively 91.5%, 70.5%, 69.7%, 52.8%, and 39.8%.

FIGURE 13: Percentage of households that planted crops during the last agricultural season.

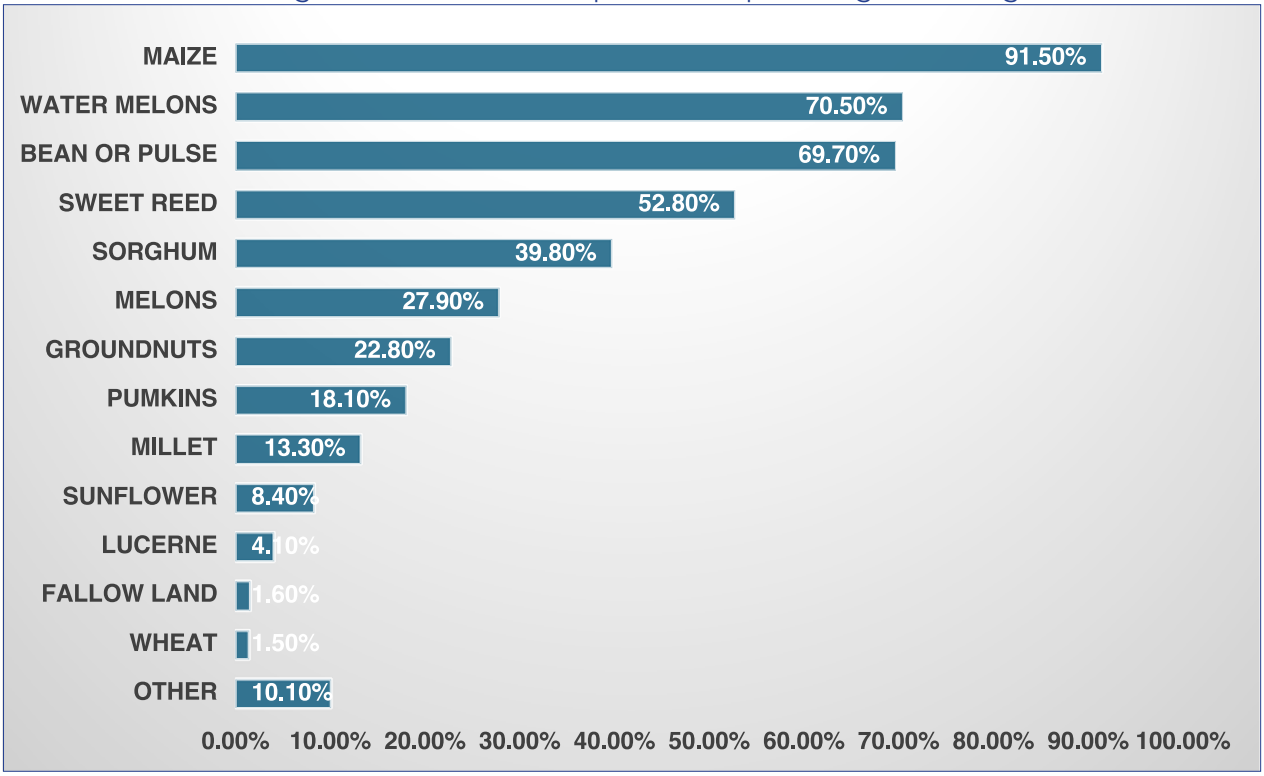
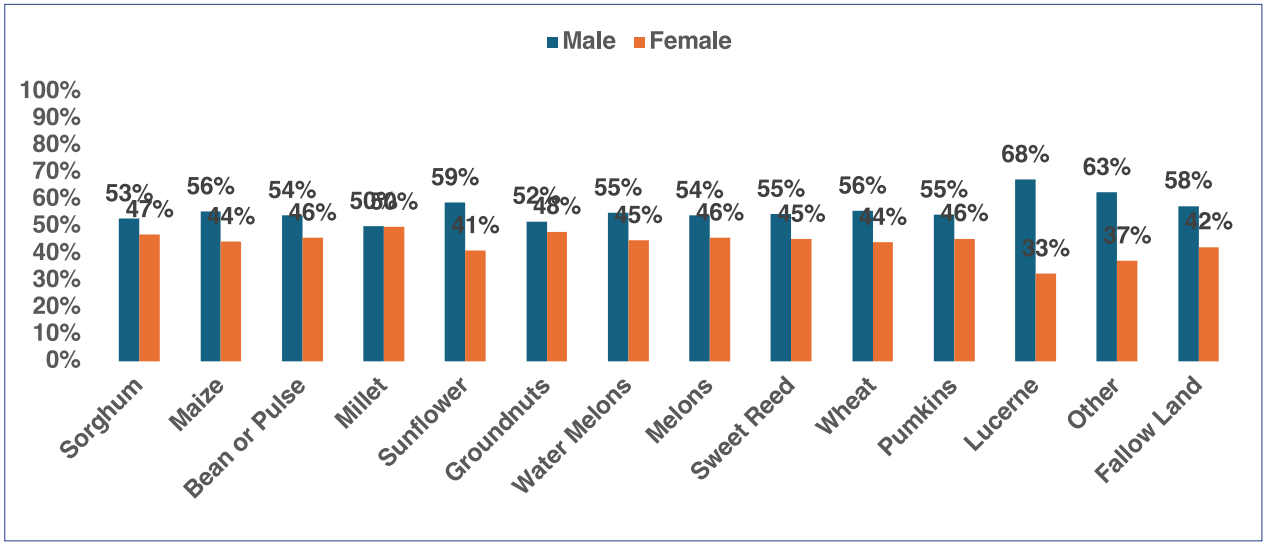


FIGURE 14: Percentage of households that planted crops during the last agricultural season by sex



4.3.2 Crop planting classified by sex, marital status and educational level of head of households

Table 4 shows the classification of households that planted crops by sex, marital status and educational level of head of households. The number of households headed by the never married were highest in the planting of most crops (sorghum 41.1%, wheat 40.4%, watermelon 39.8%, maize 39.3%, beans 38.6% and millet 37.3%). Households where the heads were married ranked highest in the percentage participation in growing the crops (lucerne 49.4%, and sunflower 40.4%), followed by the households where the heads were living together with their spouses.

In terms of education attainment, households in which the head had primary education were in the majority in millet 40.7% and groundnuts 38.0%. For those households where the head had secondary education, they were the majority in the following crops: maize 38.8%, sorghum 38.7%, beans 28.6%, lucerne 37.1%, sunflower 34.9%. The percentage of households where the head had tertiary education was highest for lucerne crop only at 42.7%. Households where the head was male was the majority for all the crops.

4.3.3 Crop planting by districts

A classification of the households by the type of crops planted and the district where the households are located is shown in Table 4. The table shows that a significantly high proportion of households in all the districts grew maize (Southern 97.0%, Central 91.1%, Ghanzi 90.7%, Kgatleng 97.0%, North East 89.3%). Sorghum is planted mostly in the North East and Central East districts at 76.2% and 55.3%, respectively.

Beans are also planted in most districts in significant percentages of households (Kgalagadi 83.1%, Ghanzi 76.7%, Southern 76.1%, North East 73.9%, Central 70.5%.

Groundnuts are mostly grown in the North East with 54.7% of households reporting this, followed by Kgatleng at 14.1%. Millet is also grown in most households in North East at 44.1% and all other districts with percentages of households in single-digits. Watermelons were also grown in significant percentages of households across several districts as follows: Central 78.8%, Kgalagadi 74.5%, Kgatleng 71.5%, North East 69.2%.

FIGURE 15: Percentage of households with a member who looked after crops during the last agricultural season.

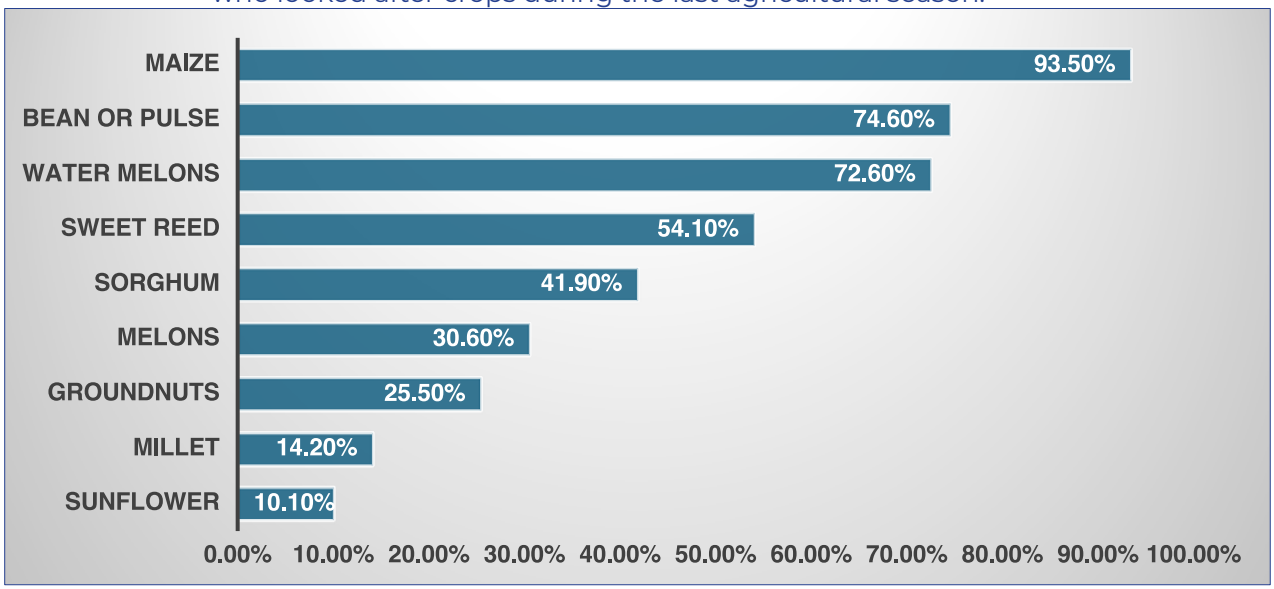


FIGURE 16: Number of households that planted crops during the 2011 and 2022 census agricultural season.

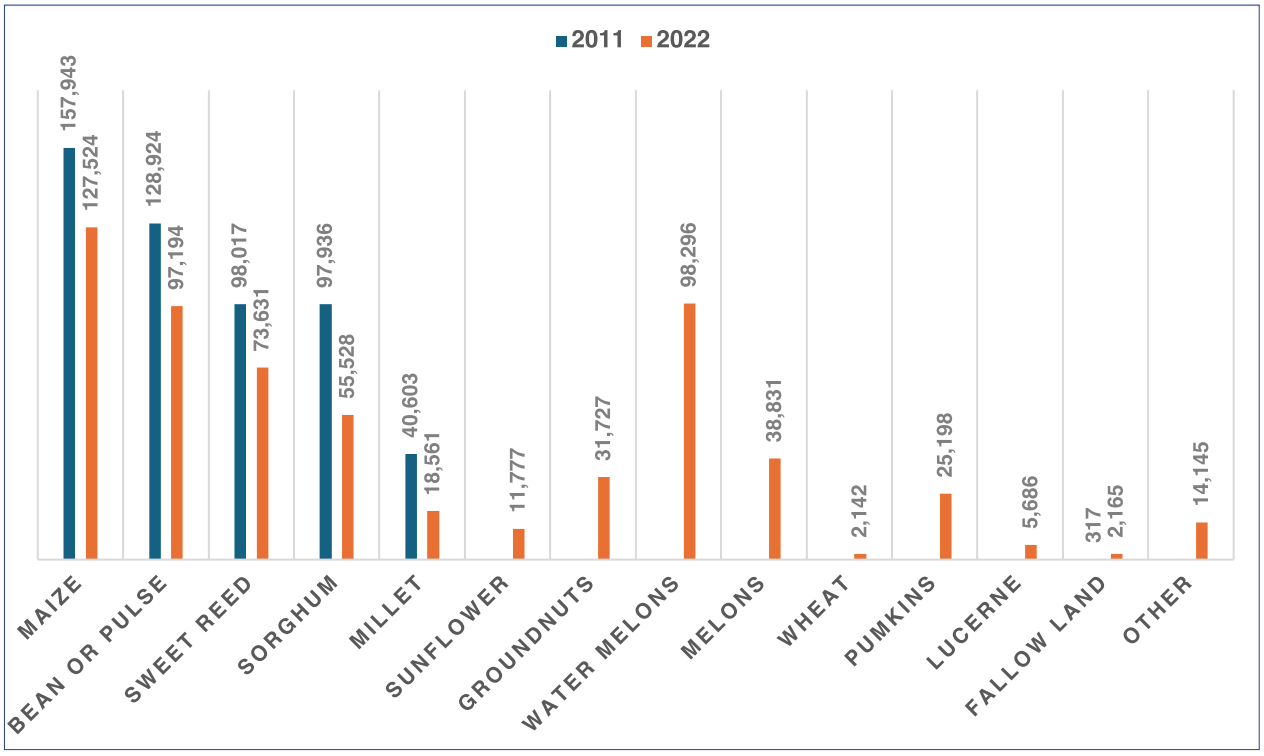
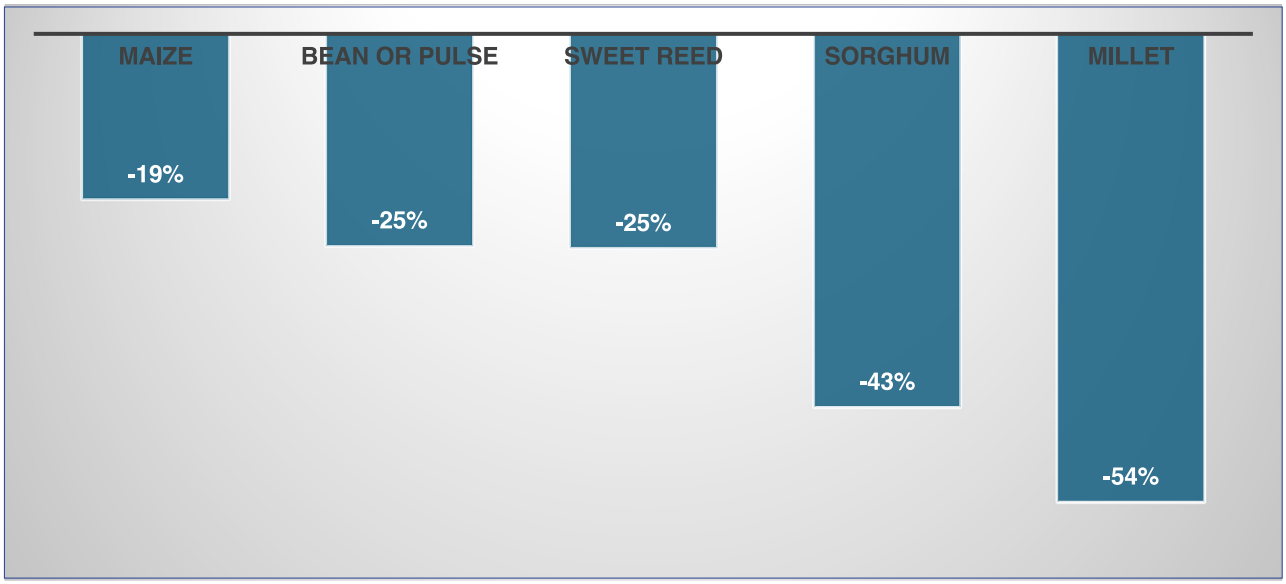


FIGURE 17: Percentage change in the number of households that planted crops during the 2011 and 2022 census agricultural season.



4.3.4 Crop planting by locality type

The classification of households that planted one or more crops by locality type and type of crops planted shows that areas classified as rural and urban villages are the topmost crop planting areas. For instance, maize is predominantly planted in households in rural and urban villages (92.4% and 91.1% respectively). Similar patterns of crop planting are observed for beans, watermelons, sweet reeds and sorghum **(Table 6).**

5.0 POLICY IMPLICATIONS

1. The Vision 2036 (2016) Pillar 1 of Sustainable Economic Development, recognizes that "many of our people live in rural areas where agricultural activities take place". It also notes that "if well supported and productivity and competitiveness were improved in the agricultural sector, it could have a direct positive impact on the livelihoods. The findings from the 2022 Population and Housing Census show that fewer households are engaged in both livestock keeping and planting of crops. The fewer households that are engaged in agriculture must be assisted anyhow and there must be a concerted effort to emphasize on output as opposed to input. The new Temo Letlotlo and Thuo Letlotlo initiatives have probably come at the right time.

2. The Botswana Land Policy (2015) states that arable farming remains an important source of food, income, and employment for Batswana. The policy also recognizes that due to the shortage of arable land, the Land authorities will ensure that it is used efficiently and in effectively. There has been a marked deline in the number of households who own livestock or grow crops. Thus, there is a need for the government to develop programs for arable agricultural development to improve small farmers' production through increased access to technology-transfer and treated wastewater for irrigation and application, livestock development through improved infrastructure and supply of inputs, and agricultural business development, which will focus on supply chains and production standards. This policy implication was noted in the 2011 Population and Housing Census report.

6.0 CONCLUSIONS

1. Goat is the most commonly kept livestock as majority of the households (72.6%) keep poultry. This is followed by the households that kept cattle (59.1%). The data revealed that the most commonly planted crops by the households in Botswana were maize, watermelons, beans, sweet reeds, and sorghum. The percentage of households that planted the crops was respectively 91.5%, 70.5%, 69.7%, 52.8%, and 39.8%.

2. There are differentials in the percentages of female and male headed households that own livestock or plant crops with generally over 50% of households owning livestock or planting a particular crop being male- headed (Table 2 and 4).

3. The rural and urban villages appear to be areas best suited to growing of crops and keeping of livestock. Provision of services such as access to electricity and water could enhance agricultural productivity.

4. predominantly, households that are headed by the never-married, were the ones that grew crops or kept livestock more than other households. Those households where the spouses are separated or divorced scarcely grew crops or kept livestock.

5. A trend that appears predominant in the results is that for households where the head has primary or non-formal education, there is less participation in either livestock keeping or growing of crops. This calls for greater awareness creation among the less-educated classes of the importance of livestock keeping and crop planting and their participation in agriculture.

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APPENDICES

TABLE 1: PERCENTAGE OF HOUSEHOLDS OWNING LIVESTOCK CLASSIFIED BY TYPE OF LIVESTOCK AND DISTRICT

DISTRICT	CATTLE %	GOATS %	SHEEP %	PIGGERY %	POULTRY %	DONKEY/ MULE %	HORSE %	OSTRICH %	GAME %	OTHER %	NUMBER OF HOUSEHOLDS
Gaborone	63.6%	71.7%	18.9%	2.8%	33.5%	5.3%	4.0%	0.2%	0.2%	5.6%	**20,072**
Francistown	53.3%	63.9%	10.2%	2.2%	46.6%	5.2%	2.6%	0.3%	0.3%	6.2%	**8,568**
Lobatse	50.8%	65.9%	15.6%	2.2%	38.8%	5.0%	2.7%	0.2%	0.1%	6.2%	**2,516**
Selibe Phikwe	53.1%	67.2%	10.7%	1.9%	52.5%	8.9%	1.6%	0.2%	0.2%	5.0%	**4,610**
Orapa	71.4%	80.1%	21.7%	3.9%	42.7%	8.4%	10.4%	0.1%	0.1%	8.7%	**1,460**
Jwaneng	63.6%	76.7%	22.8%	3.1%	43.7%	4.9%	6.2%	0.1%	0.1%	6.7%	**2,817**
Sowa	60.3%	68.7%	12.5%	2.1%	46.5%	6.6%	4.0%	0.0%	0.0%	7.6%	**473**
Barolong	47.2%	74.0%	19.8%	1.0%	58.2%	18.5%	2.4%	0.0%	0.1%	9.5%	**9,476**
Ngwaketse West	51.6%	74.1%	19.7%	0.7%	53.6%	32.6%	17.2%	0.1%	0.1%	7.2%	**3,535**
Southern	57.0%	76.3%	21.0%	1.1%	49.8%	15.0%	2.5%	0.0%	0.1%	7.8%	**18,069**
South East	47.8%	68.9%	13.0%	3.6%	40.4%	4.7%	2.6%	0.1%	0.2%	5.5%	**10,491**
Kweneng East	55.2%	73.6%	15.5%	1.7%	46.6%	12.2%	2.2%	0.1%	0.1%	6.6%	**33,534**
Kweneng West	58.6%	77.3%	13.5%	0.7%	57.0%	22.3%	12.2%	0.0%	0.1%	8.2%	**8,269**
Kweneng	55.9%	74.4%	15.1%	1.5%	48.6%	14.2%	4.2%	0.1%	0.1%	6.9%	**41,803**
Kgatleng (Wards)	56.3%	65.6%	11.0%	3.6%	51.3%	6.0%	1.6%	0.0%	0.3%	5.4%	**14,153**
Central Serowe -Palapye	54.9%	66.8%	10.4%	1.3%	58.2%	13.9%	1.4%	0.1%	0.2%	9.3%	**24,243**
Central Mahalapye	51.7%	74.2%	13.3%	0.9%	59.2%	20.0%	1.8%	0.1%	0.1%	7.4%	**18,733**
Central Bobonong	54.9%	78.4%	14.8%	1.4%	62.7%	30.6%	1.4%	0.1%	0.2%	10.7%	**13,315**
Central Boteti	65.2%	76.4%	11.8%	1.2%	47.5%	25.0%	20.7%	0.2%	0.1%	6.1%	**10,099**
Central Tutume	45.4%	66.2%	8.5%	1.2%	64.8%	13.6%	3.1%	0.1%	0.3%	6.4%	**23,023**
Central	52.9%	71.0%	11.3%	1.2%	59.6%	18.8%	4.1%	0.1%	0.2%	8.0%	**89,413**
North East	42.4%	65.2%	7.3%	1.5%	71.6%	14.2%	1.0%	0.1%	0.5%	11.0%	**10,796**
Ngamiland East	71.1%	67.4%	10.2%	1.3%	37.0%	27.5%	15.4%	0.1%	0.1%	10.0%	**14,299**
Ngamiland West	70.5%	47.9%	3.5%	0.3%	41.0%	38.6%	9.6%	0.1%	0.1%	6.0%	**7,779**
Chobe	57.1%	50.5%	4.4%	1.7%	45.9%	4.9%	2.3%	0.1%	0.2%	6.7%	**3,608**
North West	69.0%	59.1%	7.4%	1.0%	39.5%	27.7%	11.8%	0.1%	0.1%	8.3%	**25,686**
Delta	62.7%	64.0%	4.0%	1.3%	22.7%	12.0%	1.3%	0.0%	0.0%	5.3%	**75**
Ghanzi	75.6%	63.3%	17.7%	1.0%	48.3%	29.1%	30.6%	0.3%	0.4%	11.1%	**7,441**
CKGR	13.4%	82.1%	4.5%	0.0%	46.3%	71.6%	44.8%	0.0%	0.0%	7.5%	**67**
Ghanzi	75.1%	63.5%	17.6%	1.0%	48.3%	29.5%	30.7%	0.3%	0.4%	11.1%	**7,508**
Kgalagadi South	48.9%	80.1%	41.9%	1.0%	41.4%	27.5%	18.8%	0.1%	0.2%	5.9%	**4,955**
Kgalagadi North	60.6%	77.2%	17.1%	0.6%	47.5%	17.3%	26.3%	0.1%	0.1%	6.5%	**3,999**
Kgalagadi	54.1%	78.8%	30.8%	0.8%	44.1%	23.0%	22.2%	0.1%	0.2%	6.2%	**8954**
TOTAL	56.1%	70.2%	13.9%	1.6%	51.0%	16.0%	5.8%	0.1%	0.2%	7.5%	**280,475**
TOTAL (2022)	**157,285**	**196,875**	**39,053**	**4/,511**	**143,153**	**44,976**	**16,148**	**308**	**544**	**21,060**	**280,475**
TOTAL (2011)	**191,211**	**182,525**	**36,696**	**4,308**	**200,244**	**89,924**	**21,960**	**676**	**2,169**		

TABLE 2: OWNERSHIP OF LIVESTOCK CLASSIFIED BY SEX, MARITAL STATUS, AND EDUCATIONAL LEVEL OF HOUSEHOLD HEADS – 2022 CENSUS

DEMOGRAPHIC CHARACTERISTICS		CATTLE	GOATS	SHEEP	PIGGERY	POULTRY	DONKEY OR MULE	HORSE	OSTRICH	GAME	OTHER	TOTAL
SEX	Male	65.1%	61.0%	67.9%	69.9%	57.0%	66.3%	73.5%	68.9%	66.2%	62.8%	**59.3%**
	Female	34.9%	39.0%	32.1%	30.1%	43.0%	33.7%	26.5%	31.1%	33.8%	37.2%	**40.7%**
	TOTAL	**157,065**	**196,548**	**39,096**	**4,539**	**142,876**	**44,897**	**16,009**	**267**	**477**	**20,446**	**279,954**
MARITAL STATUS	Married	41.2%	36.5%	47.2%	45.5%	35.6%	34.3%	40.7%	44.2%	45.3%	35.5%	**33.9%**
	Never married	37.4%	41.1%	32.9%	35.8%	39.8%	38.8%	36.1%	39.0%	33.7%	39.6%	**43.0%**
	Living Together	10.6%	12.3%	9.9%	10.0%	13.5%	16.6%	14.3%	6.7%	9.9%	14.9%	**12.7%**
	Separated	0.3%	0.3%	0.2%	0.2%	0.3%	0.3%	0.3%	0.4%	0.4%	0.4%	**0.3%**
	Divorced	2.1%	2.0%	2.3%	3.2%	2.1%	1.3%	1.8%	3.7%	3.6%	2.0%	**2.1%**
	Widowed	7.8%	7.2%	6.7%	4.6%	8.2%	8.0%	6.0%	4.5%	5.9%	6.9%	**7.4%**
	Divorced but now living together	0.2%	0.2%	0.4%	0.2%	0.2%	0.2%	0.2%	0.4%	0.6%	0.3%	**0.2%**
	Widowed but now living together	0.2%	0.2%	0.2%	0.3%	0.3%	0.4%	0.3%	0.7%	0.4%	0.3%	**0.2%**
	Not Stated	0.1%	0.1%	0.2%	0.1%	0.0%	0.1%	0.3%	0.4%	0.2%	0.0%	**0.1%**
	TOTAL	**157,006**	**196,497**	**39,076**	**4,533**	**142,848**	**44,890**	**16,004**	**267**	**475**	**20,445**	**279,883**
EDUCATION	Primary	25.7%	27.0%	22.7%	13.4%	30.5%	38.4%	24.2%	14.2%	18.0%	26.6%	**27.0%**
	Secondary	39.6%	41.4%	36.6%	33.5%	41.2%	44.3%	44.8%	37.9%	37.2%	41.2%	**41.8%**
	Tertiary	32.6%	29.4%	38.7%	52.0%	25.6%	13.8%	29.1%	46.7%	43.4%	29.9%	**29.1%**
	Non Formal	2.0%	2.1%	1.8%	1.0%	2.4%	3.1%	1.7%	1.3%	1.4%	2.1%	**2.1%**
	TOTAL	**132,455**	**164,083**	**33,575**	**4,257**	**118,366**	**32,883**	**13,376**	**240**	**433**	**17,379**	**235,493**

TABLE 3: PERCENTAGE OF HOUSEHOLDS OWNING LIVESTOCK CLASSIFIED BY TYPES OF LIVESTOCK AND LOCALITY TYPE-2022 CENSUS

LOCALITY TYPE	CATTLE	GOATS	SHEEP	PIGGERY	POULTRY	DONKEY OR MULE	HORSE	OSTRICH	GAME	OTHER	NUMBER OF HOUSEHOLDS
TOWN	59.7%	69.7%	16.2%	2.6%	40.0%	5.8%	3.6%	0.1%	0.2%	5.8%	**40,435**
URBAN-VILLAGE	57.8%	67.5%	13.1%	1.8%	45.8%	10.1%	4.5%	0.1%	0.2%	6.1%	**116,604**
RURAL	53.3%	73.0%	14.1%	1.1%	59.6%	25.0%	7.6%	0.1%	0.2%	9.0%	**122,915**
TOTAL	**56.1%**	**70.2%**	**14.0%**	**1.6%**	**51.0%**	**16.0%**	**5.7%**	**0.1%**	**0.2%**	**7.3%**	**279,954**

TABLE 5: The percentage of households that planted different crops classified by districts and type of crops-2022 Census

DISTRICT	SORGHUM %	MAIZE %	BEAN OR PULSE %	MILLET %	SUNFLOWER %	GROUNDNUTS %	WATER MELONS %	MELONS %	SWEET REED %	WHEAT %	PUMPKINS %	LUCERNE %	FALLOW LAND %	OTHER %	NUMBER OF HOUSEHOLDS
Gaborone	35.7	86.1	55.1	8.5	8.6	17.7	63.6	22.2	44.1	2.0	15.0	6.9	1.6	18.5	**6,962**
Francistown	53.8	87.2	55.6	19.6	12.6	35.2	69.2	24.1	58.7	2.9	20.8	5.2	3.2	15.6	**3,330**
Lobatse	21.8	90.0	58.9	8.9	4.5	10.7	55.4	19.7	45.3	0.6	7.7	7.0	1.0	8.0	**689**
Selibe Phikwe	44.7	86.6	60.0	10.3	14.1	33.5	80.6	38.5	59.4	4.1	21.4	6.8	1.9	12.4	**1,770**
Orapa	39.9	91.2	48.3	8.4	11.7	17.0	72.0	26.3	46.3	0.9	25.6	10.8	0.2	13.9	**547**
Jwaneng	16.3	93.7	58.7	2.9	4.3	6.8	51.5	19.2	39.4	0.6	7.2	10.3	0.7	12.0	**998**
Sowa	56.3	82.3	56.8	20.8	12.0	26.0	71.4	9.9	42.7	2.1	14.1	4.7	2.6	27.1	**192**
Southern	8.4	97.0	76.1	1.6	4.1	4.6	56.6	26.6	54.4	1.5	14.1	3.1	0.9	8.2	**8,961**
Barolong	7.5	96.7	64.0	0.9	5.4	3.0	29.2	10.8	29.3	0.3	3.3	2.1	0.9	5.0	**4,308**
Ngwaketse West	8.6	98.0	83.1	1.7	2.6	11.5	56.5	35.6	53.7	0.4	3.7	2.7	0.3	5.1	**1,989**
South East	20.6	90.3	65.7	4.1	5.2	8.8	62.6	16.9	49.4	1.6	16.6	3.9	1.5	13.6	**3,968**
Kweneng East	26.2	93.3	73.1	4.5	5.9	11.8	70.0	25.2	54.0	1.5	12.6	3.8	0.8	9.4	**15,602**
Kweneng West	23.5	97.9	86.0	1.8	2.7	12.2	69.4	42.5	56.9	1.0	3.5	3.0	1.0	7.0	**5,540**
Kweneng	25.5	94.5	76.5	3.8	5.0	11.9	69.9	29.8	54.7	1.4	10.2	3.6	0.9	8.7	**21,142**
Kgatleng	24.6	90.6	69.3	4.3	5.7	14.1	71.5	17.8	41.0	1.0	9.4	6.1	1.0	13.5	**6,610**
Central Serowe -Palapye	52.6	90.7	69.4	7.2	11.7	24.3	75.8	36.1	56.7	1.5	16.3	4.6	1.7	9.0	**13,966**
Central Mahalapye	44.3	92.3	79.8	6.7	11.1	30.7	84.1	34.7	51.5	1.2	7.9	3.4	1.4	11.0	**12,317**
Central Bobonong	49.1	90.9	70.3	6.2	15.4	42.2	87.1	24.1	53.7	1.1	20.5	5.1	2.5	11.2	**8,560**
Central Boteti	28.1	95.3	65.3	6.5	5.1	12.7	83.1	31.1	59.6	2.2	42.7	3.9	1.1	7.2	**4,555**
Central Tutume	79.3	89.2	65.6	37.9	13.9	39.2	71.1	26.8	57.4	1.7	16.4	5.0	2.0	8.3	**14,605**
Central	55.3	91.1	70.5	15.2	12.2	31.7	78.8	30.9	55.5	1.5	17.3	4.5	1.8	9.5	**54,003**
North East	76.2	89.3	73.9	44.1	16.1	54.7	69.2	33.0	64.8	2.8	25.8	3.3	1.8	11.6	**6,338**
Ngamiland East	30.4	92.2	62.1	13.2	2.7	14.9	80.0	23.9	58.7	1.6	43.3	2.1	1.0	9.8	**6,355**
Ngamiland West	43.3	88.6	71.2	51.1	1.3	29.7	67.1	22.9	57.2	1.5	56.0	0.4	2.9	7.0	**6,433**
Chobe	44.0	76.1	36.0	10.0	5.8	10.9	36.7	9.0	34.3	1.2	16.1	1.2	3.4	12.5	**1,304**
Delta	18.2	98.2	35.5	5.5	0.0	18.2	65.5	5.5	35.5	0.0	35.5	4.5	0.0	4.5	**110**
North West	37.5	89.1	63.8	30.2	2.3	21.3	70.1	22.1	55.7	1.5	46.6	1.3	2.1	8.8	**14,092**
Ghanzi	23.5	90.6	76.5	9.2	4.2	8.3	65.8	44.1	31.4	1.4	13.7	2.3	2.8	11.2	**1,731**
CKGR	3.8	96.2	88.5	0.0	0.0	3.8	69.2	61.5	15.4	0.0	0.0	3.8	0.0	3.8	**26**
Ghanzi	23.2	90.7	76.7	9.0	4.1	8.3	65.9	44.3	31.1	1.4	13.5	2.3	2.8	11.1	**1,757**
Kgalagadi South	16.1	89.6	79.8	3.7	3.5	9.1	75.0	51.4	26.0	1.0	4.4	6.3	1.9	14.7	**837**
Kgalagadi North	22.0	87.2	86.6	6.4	3.3	8.3	73.9	62.2	41.5	2.2	2.3	7.5	1.1	10.8	**786**
Kgalagadi	19.0	88.4	83.1	5.0	3.4	8.7	74.5	56.6	33.5	1.5	3.4	6.9	1.5	12.8	**1,623**
% Of Total	**39.8**	**91.5**	**69.7**	**13.3**	**8.4**	**22.8**	**70.5**	**27.9**	**52.8**	**1.5**	**18.1**	**4.1**	**1.6**	**10.1**	**139,389**

TABLE 6: The Percentage Of Households That Planted Different Crops Classified By Locality Type And Type Of Crops-2011 Census

LOCALITY TYPE	SORGHUM %	MAIZE %	BEAN OR PULSE %	MILLET %	SUNFLOWER %	GROUNDNUTS %	WATER MELONS %	MELONS %	SWEET REED %	WHEAT %	PUMPKINS %	LUCERNE %	FALLOW LAND %	OTHER %
URBAN	39.4	87.3	56.0	11.1	9.8	22.6	66.1	24.3	49.1	2.3	16.6	6.8	1.9	16.1
URBAN VILLAGE	38.0	91.1	66.5	10.7	7.7	20.0	70.9	25.1	52.8	1.9	17.9	4.6	1.3	10.1
RURAL	41.1	92.4	74.0	15.4	8.7	24.4	71.0	30.1	53.4	1.2	18.5	3.3	1.7	9.1
TOTAL	**39.9**	**91.4**	**69.6**	**13.4**	**8.5**	**22.7**	**70.5**	**27.8**	**52.7**	**1.5**	**18.1**	**4.1**	**1.6**	**10.1**

Private Bag 0024
Gaborone
Tel: 3671300
Toll Free: 0800 600 200

Private Bag F193
Francistown
Tel. 241 5848

Private Bag 47
Maun
Tel: 371 5716

E-mail: info@statsbots.org.bw
Website: http://www.statsbots.org.bw

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