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Agricultural involvement amongst smallholders of South Africa: Evidence from GHS 2015 and GHS 2018.

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Abstract: The smallholding is central to livelihood diversifications that drive economic growth in non-metropolitan settlements. This gained recognition in the Zero Hunger Challenge, Agenda 2063, SDGs, and NDP 2030 for South Africa. Agricultural support programmes must be well-defined and transparent to rural communities. Subsequently, for smallholders to enact their role, there should be a clear reflection of the constraints they encounter. This study sought to ascertain factors influencing the agricultural involvement of smallholders heading households in rural settlements of South Africa. The secondary data from the 2015 and 2018 General Household Survey (GHS) were utilized and retrieved from the Statistics South Africa website. SPSS software version 28 and Microsoft Excel were exploited for data analysis using the Chi-square test and binary logistic regression. The findings established that younger household heads are more agriculturally involved and do not have tertiary education to market occupations, particularly in the off-farm sector, where food production is their source of livelihood. This study shows that socioeconomic and sociodemographic characteristics play a significant role in determining agricultural involvement. Accordingly, it contends that constraints faced by small-scale food producers are urgently revisited to ensure adequate farm resources' accessibility and support, especially for the poor youth in rural areas.

Keywords: rural households, food security, rural development, subsistence, livelihoods, income generation, rural youth, food production, farming support, household headship.

1. Introduction

The South African agricultural sector has undergone several revolution phases since 1994, with a foremost focus on subsistence farming. Small-scale farming (inclusive of small-scale commercial farmers practicing food production from small land hectares and primarily for the market [1, 2]) has been eye-catching such that studies emphasize its vitality for extensive economic enhancement for populations concentrated in rural settlements [3-5]. This gained recognition in the Zero Hunger Challenge, Agenda 2063, SDGs, and National Development Plan 2030. South Africa is encountering challenges from various issues, such as agricultural transformations, which, to a certain degree, are directly and indirectly driven by a growing population of 62 million, thus affecting other resources. These challenges place tremendous pressure on food security and livelihood diversification. However, research into involvements regarding subsistence food production in South Africa is limited, with there being a need for more qualitative and quantitative evidence addressing sociodemographic, socioeconomic, and locational factors of smallholders who are agriculturally involved. This study aims to ascertain the factors determining agricultural involvement in food production among small-scale farmers throughout nine South African provinces.

Small-scale farmers are essential drivers of many African economies [6]. According to [7], detached from safeguarding household food security, small-scale food production can further be a basis of livelihood among the rural poor. Correspondingly, small-scale farmers are capable of steering and driving rural development, which is equitable, productive,

and maintainable [8, 6]. [9] Understanding the smallholding sector established how national and provincial governments were devoted to offering support to sustain the small-scale farming sector through several interventions incorporating food insecurity eliminations and land reform programmes. Along these lines, female and youth agriculturists are at the center of policy undertakings and development programmes [10]. Sadly, the rural communities in the outskirts limit their accessibility to suitable official markets and job prospects. Consequently, rural survivalists depend on agricultural production for their livelihood purposes. Moreover, agencies and alternative stakeholders working jointly with the government need farmers to harvest food for their homes and generate employment for rural dwellers [11].

South Africa has the second-largest economy on the continent. In 2018 the GDP was US$366 billion, of which the farming sector contributed around US$2.1 billion as a stand-alone. Conversely, the relationship concerning agricultural involvement by the smallholder farmers in South Africa remains one of the major limiting factors for agricultural development. Roughly, 3 million households are infused to small-scale food production in South Africa, along with 35,000 commercial farming units [12-13]. However, due to the refinements that the South African agricultural system underwent, approximately 11% of the population faced hunger in 2018 [14]. There are inadequacies and shortfalls in the farming value chain, predominantly for emerging farmers located in rural units. More so, land constraints are amongst the inadequacies that threaten the agricultural value chain in South Africa.

In sub-Saharan Africa, approximately two-thirds of the population live in rural areas and rely on farming for their livelihood; close to half are exposed to severe poverty, receiving earnings of less than $1 per day, and one-third are malnourished [15]. Likewise, it is commonly known that food production in sub-Saharan Africa (SSA) has been underachieving since independence [16]. Accordingly, food insecurity has been a continuing setback, with nearly 30% of SSA's population coexisting with food shortage [17]. Thus, subsistence food production to guarantee food security has been a policy motivation for many African countries. Specifically, in South Africa, the channels that rural smallholders can consolidate for relevant diversification information are blurred.

Since farm resources are stressed, they are central indicators to motivate agricultural involvement. Furthermost of this impoverishment and starvation is rural [18]. The probable root cause is the inadequate food production and income generation from smallholding farming. Low farm productivity in South Africa could be due to several causes; shrinking plots of land take precedence because it is expected that South African smallholding concurrently exists with land deprivations, which makes it hard for smallholders to be as productive to ensure household food provision, beyond household level it will be challenging to produce to that degree. Correspondingly, the use of traditional crop varieties might require agriculturalists to educate rural survivalists involved in farming on how to go about them, scarce and unreliable water supply, crop fatalities from pests and bugs, unequal land-distribution patterns, inefficient and informal markets, and reduced on-farm and transportation infrastructures. Nevertheless, poor rural families in South Africa have few good off-farm-dependent livelihood selections [18].

In sub-Saharan Africa, South Africa is befalling within the SSA region. Small-scale agriculture has been and will continue to be of supreme prominence for the foreseeable future among rural families [19]. For a long time, farming has been a central activity for several rural households, hence their primary source of livelihood. Therefore, the researcher saw it fit to conduct a study to explore the dynamics influential to agricultural involvement among small-scale farmers across nine provinces of South Africa.

2. Literature review

According to [11], smallholder farmers are defined "as those who produce for household consumption and markets, subsequently earning ongoing revenue from their farming businesses, which creates a source of income for the family. The farmers have the potential to expand their operations and to become commercial farmers but need access to comprehensive support (technical, financial, and managerial instruments)". Hence, households involved in agriculture in South Africa's non-metropolitan areas usually practice diverse livelihood approaches by manipulating the accessible natural, physical, social, and economic capital offered to them, and all these mentioned, to a certain degree, are reliant on socio-economic settings. Smallholders have a low asset base operating less than 2 ha of cropland [20-21]. Studies have shown that small-scale subsistence production rigorously drives the economy. It is thus essential to endorse agricultural involvements, especially by young youth, for the poor regardless of age and other intersecting demographic factors and erstwhile disadvantaged groups. Henceforth, the study aimed to promote access to physical resources

needed for on-farm productivity by government and alternative stakeholders and private agricultural agencies, particularly for the underprivileged and vulnerable groups.

South African agriculture is made up of two categories of farmers: the large-scale commercial (mainly white) farmers and the subsistence farmers in the former homeland areas. This contrasts with the situation in many other countries where one would find a whole range of farm sizes, ranging from the minimal (often subsistence) farmer to the extensive farmer/agribusiness type. In South Africa, the "small-scale farmer" concept is usually value-laden, is viewed negatively and creates wrong impressions [22]. Thus, Smallholder farmers in contemporary South Africa cannot reproduce themselves outside of commodity circuits, i.e., of markets for agricultural inputs, outputs, and consumer goods, even when production involves family labour without hired wage labour, for a large proportion of output is used for home consumption. Cash is needed to purchase many other goods for production and consumption. If there's a cash deficit from marketed farm produce to cater for these needs, family members will have to take part in other forms of livelihood besides farming, such as wage labour, crafts, or petty trading, to achieve their simple reproduction.

The support for smallholdings in South Africa commenced in the 1980s by the Development Bank of Southern Africa (DBSA) to deal with constraints that farmers in the homeland areas encountered [22]. This undertaking, termed the Farmers Support Programme (FSP), existed as an instrument that the government established in the direction of supporting and endowing assistance to small-scale food producers in rural areas to expand their farm productivity levels, curb food insecurity and income generation by utilizing all-inclusive farming support [23-24]. Nevertheless, the FSPs need to be reintroduced considering the evolving youth in non-metropolitan areas that may not be as aware of their existence. This could reduce the unemployment and crime most young adults are drawn to and affected by. The central question is how to support smallholders accordingly so they can partake unfailingly in profitable markets.

2.1 Constraints faced by smallholders.

High transaction costs delay smallholders' commercialization. Various scholars have explored that most small-scale farmers are situated in rural or non-metropolitan settlements, which tend to be distant from markets of agricultural products [18]. According to [25], transaction costs perfectly designate the access impediments to market partaking for smallholders who are underprivileged in terms of resources. Hitherto, this difficulty has been coexisting with small-scale food producers such that it does not make it easy for small-scale farmers to prevail within the farming arena if they are challenged with high transaction costs.

Poor infrastructure continues to impede agricultural activities in South Africa. The key challenges are a lack of agricultural infrastructure, such as fencing and equipment, and inadequate and poor market facilities and transportation systems, including road and rail conditions. The road transport system, which is the most important for market development in distributing outputs to and from farms, is the most crucial infrastructural bottleneck facing agricultural development [26]. As a result of the poor rural road network, smallholder farmers rely on inefficient forms of transportation [27], including the use of animals. Underdeveloped roads and other key physical infrastructure often lead to high transport costs for agricultural products to the market and farm inputs, lowering farmers' competitiveness. Besides, electricity in rural areas is expensive and often unavailable, reducing investment in cold storage facilities, irrigation systems and equipment for processing farm produce. Lack of storage and processing facilities constrains the marketability of perishable goods such as dairy products and vegetables. These infrastructural and logistic constraints are also impediments to trading [26].

The deficiency of dependable markets is one of the foremost constrictions that challenge small-scale food producers. Most of these agriculturalists receive cheap value for their produced commodities, so they are left with no choice but to end up retailing them at their farm gates or local marketplaces. Nevertheless, these farmers might obtain much higher prices by selling their goods and acquiring knowledge and marketing skills, along with little recognition of opportunities for product diversification or the parameters concerning market research and product development [7].

Due to low capability in production factors, encompassing land, water and capital resources, the mainstream subsistence farmers harvest lower amounts of farm foodstuffs that are equally of poor quality, which leads to their products not being accepted by crop markets. Growing concentration in the food value chain is a universal trend caused by progressively demanding consumers and worries concerning food safety. This will likely make it extremely hard for

small-scale farmers to enter high-value marketplaces, given their commodities' low quantity and poor quality [7]. This study adds to the importance of designing laws and policies that promote and ensure that smallholders are endowed with the resources needed to safeguard food security at the household level and abroad to diversify for income purposes. The cost of living keeps rising in South Africa, which requires that factors affecting agricultural involvement be disseminated nationally to ensure rigorous policies that reduce unemployment altogether. In addition, there is still scanty literature on smallholders existing in both metropolitan areas and non-metropolitan to observe the resource accessibility and shortcomings between these two settlement types.

3. Materials and Methods

This comparative research paper manipulated the GHS data of 2015 and 2018 to detect structural changes. Data were requested from Statistics South Africa (2015, 2018). Congruently, general household surveys are invented to publicize statistics and information regarding trends and demographic and socio-economic data levels, incorporating attainability to facilities and services. Moreover, the GHS data made exploring the topic under study achievable, such that all envisaged variables were present. Likewise, it presented large-scale data representative of the entire country of South Africa. Data analyses were carried out using Statistical Package for the Social Sciences (SPSS). This study engaged a multi-stage design, which is established on a stratified design with probability proportional to selected size of the primary sampling units (PSUs) at the first stage and sampling of dwelling units (DUs) with systematic sampling at the second stage. After allocating the sample to the provinces, the sample was stratified further by geography (primary stratification) and population attributes using data from the 2011 census (secondary stratification).

The study made use of eight envisaged variables by the researcher. The dependent variable used in this study is agricultural involvement. Furthermore, the independent variables were age, population group, marital status, household headship, educational level, employment status, province, and geographic type. GHS data files from 2015 and 2018 by Statistics South Africa were big, necessitating the manipulation of SPSS version 28 to analyse the data. Descriptive statistics during univariate analysis were manipulated to express the participants' characteristics and for population analysis using a frequency table. Furthermore, bivariate analysis was performed using cross-tabulation to underscore the patterns of percentages of agriculturally involved participants. The Chi-square test was also employed to ascertain the relationship between small-scale farmers' sociodemographic and socio-economic characteristics and agricultural activities. More so, binary logistic regression was carried out to distinguish the factors contributing to agricultural involvement in South Africa. Thus, the dependent variable was already dichotomized from the data set into two: those who are agriculturally involved and those who are not.

GHS data had two separate files, a PERSON file and a HOUSE file, combined using syntax in SPSS. The separate files were merged so that every person within the household could have information regarding their agricultural involvement. Considering the study aims to explore a relationship between agricultural involvements for subsistence food production by smallholders, it was unworkable to carry out data analysis in the form that the data was documented. The household information was duplicated to the individual level to ascertain every male or female's socio-economic, sociodemographic, and locational variables. After that, in the rear of the person file and house file merging, small-scale farmers were designated by dichotomizing the "Yes" for agricultural involvement and "No" for non-agricultural involvement. Only those who answered "Yes" were considered to be fit for the objective of this study, which is being infused into agricultural activities. In addition, this study used "gender" as a control variable to observe if there are any disparities between males and their counterparts concerning small-scale agriculture to practice food production. This paper did not need ethical clearance given that the Department of Statistics South Africa conducted it during the survey, and no individual-level data were accumulated throughout the retrieval.

4. Results

4.1. Characteristics of the respondents

The study focused on agricultural involvement among small-scale farmers in South Africa. Table 1 below summarises the characteristics of smallholders surveyed across all nine provinces. The survey encompassed a cross-section of the apparent farming population throughout South Africa. Of the 74 449 sampled population, 52,4% were females, and 47,6% were males in 2015. On the subsequent data point of 71 137 interviewed, 52,6% were females and males were embodied by 47,4%.

Concerning the age distribution, a high percentage was reported between the ages of 12-22 years (2015: 26,7%, n= 14 938 & 2018: 26,1%, n= 14 048). This was nearly followed by participants between the ages of 23-33 years (2015: 24,5%, n= 13 692 & 2018: 23,7%, n= 12 773), 34-44 years (2015: 18,4%, n= 10 258 & 2018: 18,6%, n= 10 044), and the 67 years and above reported the lowest amongst all the age groups (2015: 6,6%%, n = 3 712 & 2018: 7,3%, n= 3 911). Most participants (2015: 82,3%, n = 61 241 & 2018: 83,7%, n= 59 541) across the country were black/African, followed by coloured, who reported for (2015: 9.3%, n = 6 960 & 2018: 9,2%, n= 6 538), and whites, who accounted for (2015: 6,3%, n = 4 657 & 2018: 5,4%, n= 3 840). Nevertheless, the smallest percentage fell among participants who were Indian/Asian reported (2015: 2.1%, n = 1 591 & 2018: 1,7%, n= 1 218) of the sampled population.

The results show that most of the sampled population concerning two data set points were single, which accounted for (2015: 66,2%, n= 49 182 & 2018: 67,0%, n= 47 555). Followed by the married (2015: 26,7%, n= 19 836 & 2018: 26,0%, n= 18 445). However, amongst all marital clusters, a smaller percentage was reported among the separated but still legally married (2015: 0,6%, n= 444 & 2018: 0,6%, n= 420). Moreover, the male-headed households (2015: 54,2%, n= 40 337 & 2018: 52,8%, n= 37 573) surpassed female headed households (2015: 45,8%, n= 34 112 & 2018: 47,2%, n= 33 564).

Regarding educational level, the findings show that most participants possessed secondary education (2015: 46,2%, n= 33 641 & 2018: 48,3%, n= 33 746). They were followed by primary education possessors who accounted (2015: 28,4%, n= 20 979 & 2018: 28,1%, n= 19 627). However, some of the sampled participants had no schooling (2015: 16,4%, n= 11 925 & 2018: 15,5%, n= 10 841), and the tertiary education holders reported lowest figures compared to other educational categories (2015: 8,5%, n= 6 202 & 2018: 8,1%, n= 5 654). The results further specified the sampled population according to economic status, such that the majority befell among the economically inactive population (2015: 46,1%, n= 23 913 & 2018: 45,3%, n= 22 509). Subsequently, most of the participants were employed (2015: 41,6%, n= 21 576 & 2018: 40,9%, n= 20 310), as linked with the unemployed population that constituted (2015: 12,4%, n= 6 430 & 2018: 13,8%, n= 6 838).

In terms of the province, most of the population was concentrated in Gauteng (2015: 21,8%, n= 16 222 & 2018: 22,0%, n= 15 623). Closely followed by KwaZulu-Natal which constituted (2015: 18,2%, n= 13 582 & 2018: 18,1%, n= 12 873), Eastern Cape accounted (2015: 13,8%, n= 10 258 & 2018: 13,4%, n= 9 542). The Free State seemingly is the province with the least of the sampled population (2015: 5,9%, n= 4 409 & 2018: 5,8%, n= 4 095). Under settlement type, most of the population, more than half (2015: 61,2%, n= 45 568 & 2018: 61,3%, n= 43 591) comprised urban dwellers. The remainder of the population was from rural dwellings, which constituted (2015: 38,8%, n= 28 881 & 2018: 38,7%, n= 27 546).

Table 1. The characteristics of the participants of the study

	2015		2018	
	Frequency (n)	**Percent (%)**	**Frequency(n)**	**Percent (%)**
Gender				
Males	35 438	47.6	33 695	47,4
Females	39 011	52.4	37 442	52,6
Total	74 449	100.0	71 137	100.0
Age groups				
12-22 years	14 938	26,7	14 048	26,1
23-33 years	13 692	24,5	12 773	23,7
34-44 years	10 258	18,4	10 044	18,6
45-55 years	7 979	14,3	7 643	14,2
56-66 years	5 300	9,5	5 478	10,2
67+	3 712	6,6	3 911	7,3
Total	74 449	100.0	71 137	100.0
Population groups				
Black/African	61 241	82,3	59 541	83,7
Coloured	6 960	9,3	6 538	9,2

Indian/Asian	1 591	2,1	1 218	1,7
White	4 657	6,3	3 840	5,4
Total	74 449	100.0	71 137	100.0
Marital status				
Married	19 836	26,7	18 445	26,0
Divorced	1 022	1,4	969	1,4
Separated, BLM	444	0,6	420	0.6
Widowed	3 846	5,2	3 629	5,1
Single	49 182	66,2	47 555	67,0
Total	74 449	100.0	71 137	100.0
Household headship				
Headed by male	40 337	54,2	37 573	52,8
Headed by female	34 112	45,8	33 564	47,2
Total	74 449	100.0	71 137	100.0
Educational level				
No Schooling	11 925	16,4	10 841	15,5
Primary	20 979	28,4	19 627	28,1
Secondary	33 641	46,2	33 746	48,3
Tertiary	6 202	8,5	5 654	8,1
Total	74 449	100.0	71 137	100.0
Employment status				
Employed	21 576	41,6	20 310	40,9
Unemployed	6 430	12,4	6 838	13,8
Not economically active	23 913	46,1	22 509	45,3
Total	74 499	100.0	71 137	100.0
Province				
Western Cape	7 139	9,6	6 920	9,7
Eastern Cape	10 258	13,8	9 542	13,4
Northern Cape	3 484	4,7	3 339	4,7
Free State	4 409	5,9	4 095	5,8
KwaZulu-Natal	13 582	18,2	12 873	18,1
North-West	4 807	6,5	4 366	6,1
Gauteng	16 222	21,8	15 623	22,0
Mpumalanga	6 141	8,2	6 064	8,5
Limpopo	8 407	11,3	8 315	11,7
Total	74 449	100.0	71 137	100.0
Geographic type				
Urban	45 568	61,2	43 591	61,3
Non-Urban	28 881	38,8	27 546	38,7
Total	74 449	100.0	71 137	100.0

[1] Source: Author's own calculations from 2015 & 2018 General Household Survey

NB: Ref: Separated, BLM= Separated, but still legally married.

4.2. Smallholders' characteristics and agricultural involvement

Table 2 shows agricultural involvement according to age groups. From the data, it is evident that the majority (39,6%) of the agriculturally involved are young males (12-22 yrs.), followed by (19,1%) males (23-33 yrs.) and (7,3%) who are Upper middle (67 yrs. and above) in 2015. The corresponding figures for females are 28,5% and 18,7%, respectively. Correspondingly, in 2018, males were more agriculturally involved than their counterparts where, 38,4% was reported among males (12-22 yrs.), followed by (18,8%) among males aged 23-33. The corresponding figures to their counterparts were 27,7% and 18,2% respectively. From this, it is evident that most of the respondents were in the age group of 12 years to 55 years and were actively involved in farming. A Chi-square test statistic displayed a significant relationship between agricultural involvement and age, provided the p-value= 0.000<0.05. Additionally, the Phi and Cramer's V (0.131; 0.129) were employed to measure the strength of the association, and findings showed a moderate relationship (within this context, meaning there is an adequate and balanced alliance amongst the variables).

This piece presents results on smallholders disseminated according to racial groups. Table 2 summarizes smallholder farmers' agricultural involvement in the sample. Results reveal that concerning the population group in the sample, smallholders mostly indulge in agricultural engagements as follows: Black (95,1%), White (2,5%), Coloured (2,1%), and Asian (0,3%) for female small-scale farmers in 2015. The 2015 corresponding figures for their counterparts are as follows: Black (94,3%), White (2,8%), Coloured (2,3%), and Asian (0,5%). In 2018, Black (95,9%), White (2,1%), Coloured (1,8%), and Asian (0,3%) for females encompassed in agricultural activities, followed by male Black (95,5%), White (2,4%), Coloured (1,9%), and Asian (0,2%). It is evident from the results that the black community of farmers is more involved in farming for food production than other racial groups. The Chi-square test statistic relationship concerning agricultural involvement and racial groups denoted significance with a p-value of 0.000<0.05. The Phi and Cramer's V respectively (0.192, 0.185) tests were manipulated and showed a moderate correlation.

These findings reveal that unmarried smallholder farmers are more disposed to be agriculturally involved than married, widowed, divorced, single, and still legally married. The results as such correspond for both 2015 and 2018. The dominance of single smallholders for agricultural purposes may be explained by singles' leisure time compared to married individuals. In this manner, amongst marital responsibilities is rearing children and raising them, which is not the case with the agriculturalists who are single and young. Nevertheless, cohabitation has modified this view. The chi-square test statistic was cast off to measure the relationship between agricultural involvement and marital status. The findings exhibited a p-value of 0.000<0.05. Meanwhile, the p-value of 0.000 is less than the cut-off value of 0.05, indicating a positive relationship between being agriculturally involved and marital status. Furthermore, Phi and V tests showed 0.084 and 0.076, which signify a weak relationship.

Residing in any of the provinces, namely Kwa-Zulu Natal, Limpopo, or Eastern Cape, heightens the prospects of being agriculturally involved compared to staying in other provinces of South Africa. The study results show that these provinces are the leading in terms of being pastoral and exposed to smallholding food production (table 2). On the contrary, residing in the Western Cape lessens the chances of agricultural undertakings. The findings designate an association between being agriculturally involved and residing in either of the provinces of South Africa on the condition that p=.000<0.05. Moreover, the Phi and Cramer's V indicated a strong relationship of 0.407 and 0.385 respectively.

Table 2. The relationship between smallholders' characteristics and agricultural involvement

Agricultural Involvement		**2015**		**2018**	
		n (%)	**n (%)**	**n (%)**	**n (%)**
	Age groups	AI	NAI	AI	NAI
	12-22 years	2311 (39,6)	5173 (25,6)	2003 (38,4)	4994 (25,3)

Males	23-33 years	1118 (19,1)	5466 (27,1)	978 (18,8)	5122 (26,0)
	34-44 years	748 (12,8)	4091 (20,3)	668 (12,8)	4145 (21,0)
	45-55 years	685 (11,7)	2842 (14,1)	560 (10,7)	2751 (14,0)
	56-66 years	556 (9,5)	1705 (8,4)	577 (11,1)	1711 (8,7)
	67+	424 (7,3)	909 (4,5)	429 (8,2)	995 (5,0)
	Total	5842 (100.0)	20186 (100.0)	5215 (100.0)	19718 (100.0)
	12-22 years	2085 (28,5)	5323 (23,8)	1861 (27,7)	5115 (23,3)
Females	23-33 years	1371 (18,7)	5673 (25,4)	1222 (18,2)	5371 (24,5)
	34-44 years	1089 (14,9)	4281 (19,2)	973 (14,5)	4195 (19,1)
	45-55 years	1071 (14,6)	3359 (15,0)	975 (14,5)	3316 (15,1)
	56-66 years	868 (11,9)	2151 (9,6)	896 (13,3)	2263 (10,3)
	67+	839 (11,5)	1532 (6,9)	803 (11,9)	1668 (7,6)
	Total	7323(100.0)	22319 (100.0)	6730 (100.0)	21928 (100.0)
	Population groups				
	Black/African	8232 (94,3)	20728 (78,0)	7467 (95,5)	20542 (80.0)
Males	Coloured	203 (2,3)	3062 (11,5)	148 (1,9)	2921 (11,4)
	Indian/Asian	46 (0,5)	770 (2,9)	19 (0,2)	593 (2,3)
	White	244 (2,8)	2009 (7,6)	186 (2,4)	1636 (6,4)
	Total	8725 (100.0)	26569 (100.0)	7820 (100.0)	25692 (100.0)
	Black/African	9572 (95,1)	22455 (78,0)	8771 (95,9)	22413 (79,8)
Females	Coloured	214 (2,1)	3473 (12,1)	161 (1,8)	3295 (11,7)
	Indian/Asian	32 (0,3)	733 (2,5)	23 (0,3)	583 (2,1)
	White	248 (2,5)	2130 (7,4)	190 (2,1)	1792 (6,4)
	Total	10066 (100.0)	2378 (100.0)	9145 (100.0)	28083 (100.0)
	Marital status				
Males	Married	1790 (20,5)	7978 (30,1)	1588 (20,3)	7486 (29,2)
	Divorced	59 (0,7)	288 (1,1)	66 (0,8)	253 (1,0)
	Separated, BLM	46 (0,5)	125 (0,5)	44 (0,6)	131 (0,5)
	Widowed	160 (1,8)	427 (1,6)	121(1,5)	399 (1,6)
	Single	6657 (76,4)	17703 (66,8)	5991(76,7)	17374 (67,8)
	Total	8712 (100.0)	26521 (100.0)	7810 (100.0)	25643 (100.0)
Females	Married	2198 (21,9)	7806 (27,2)	1946 (21,3)	7317 (26,1)
	Divorced	116 (1,2)	551 (1,9)	107 (1,2)	537 (1,9)
	Separated, BLM	71 (0,7)	200 (0,7)	59 (0,6)	183 (0,7)
	Widowed	1129 (11,2)	2118 (7,4)	1029 (11,3)	2064 (7,4)
	Single	6538 (65,0)	18072 (62,9)	5989 (65,6)	17937 (64,0)
	Total	10052 (100.0)	28747 (100.0)	9130 (100.0)	28038 (100.0)
	Province				

Males	Western Cape	163 (1,9)	3276 (12,3)	86 (1,1)	3248 (12,6)
	Eastern Cape	2133 (24,4)	2603 (9,8)	1877 (24,0)	2547 (9,9)
	Northern Cape	254 (2,9)	1371 (5,2)	176 (2,3)	1360 (5,3)
	Free State	416 (4,8)	1633 (6,1)	398 (5,1)	1474 (5,7)
	KwaZulu-Natal	1978 (22,7)	4426 (16,7)	1899 (24,3)	4093 (15,9)
	North-West	371 (4,3)	1946 (7,3)	268 (3,4)	1832 (7,1)
	Gauteng	323 (3,7)	7649 (28,8)	383 (4,9)	7216 (28,1)
	Mpumalanga	1096 (12,6)	1790 (6,7)	962 (12,3)	1888 (7,3)
	Limpopo	1991 (22,8)	1875 (7,1)	1771 (22,6)	2034 (7,9)
	Total	8725 (100.0)	26569 (100.0)	7820 (100.0)	25692 (100.0)
Females	Western Cape	161 (1,6)	3530 (12,3)	81 (0,9)	3484 (12,4)
	Eastern Cape	2429 (24,1)	3061 (10,6)	2053 (22,4)	3023 (10,8)
	Northern Cape	275 (2,7)	1583 (5,5)	190 (2,1)	1611 (5,7)
	Free State	533 (5,3)	1809 (6,3)	478 (5,2)	1704 (6,1)
	KwaZulu-Natal	2204 (21,9)	4932 (17,1)	2244 (24,5)	4598 (16,4)
	North-West	380 (3,8)	2085 (7,2)	296 (3,2)	1930 (6,9)
	Gauteng	333 (3,3)	7804 (27,1)	425 (4,6)	7439 (26,5)
	Mpumalanga	1244 (12,4)	1967 (6,8)	1138 (12,4)	2052 (7,3)
	Limpopo	2507 (24,9)	2020 (7,0)	2240 (24,5)	2242 (8,0)
	Total	10066 (100.0)	28791 (100.0)	9145 (100.0)	28083 (100.0)

[1] Source: Author's own calculations from 2015 & 2018 General Household Survey

Ref: AI = Agriculturally Involved, **NAI=** Not Agriculturally Involved

NB: Ref: Separated, BLM= Separated, but still legally married.

Gender disparity is a burning issue in almost all sectors in South Africa. The study findings reveal that female-headed households are more agriculturally involved in livelihood food production than their counterparts. In 2015, females (52,7%) and males (47,3%) reported as such to be agriculturally involved. Comparatively in 2018, the corresponding figures are 54,6% and 45,4%, respectively (see figure 1). Female-headed households signify a diverse group with distinctive reasons for having women as household heads, and they face several limitations that influence their access to resources for generating income. According to Ellis (1998), women are responsible for looking after their families and supplying food.

Along with this conception, male-headed families have been the fitting assumption that a male is the sole decision-maker in the household and that additional family members share his interests and obey his rulings. Neither assumption is correct, as this research has discovered. Women heading households has been customary in most African societies and has developed recently in many others due to economic stresses and workforce migration. The chi-square test statistic established a significant relationship between agricultural involvement and household headship. To examine the strength of the association, Phi and Cramer's V were used respectively - 0.081 and 0.081, and Phi's coefficient showed a negative weak association, whilst Cramer's V displayed a positive weak association by 2015. By 2018, Phi's coefficient presented a negative weak association with -0.083, while Cramer's was 0.083.

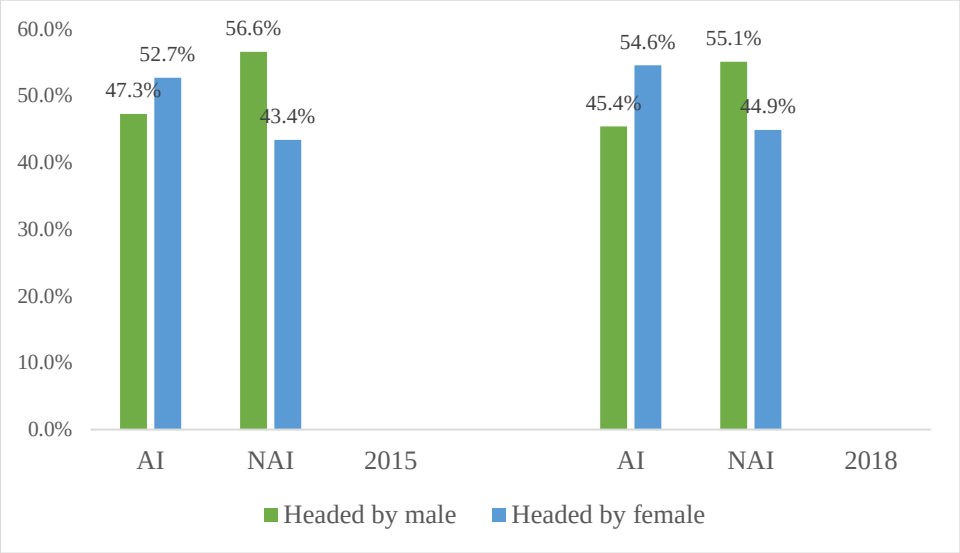

Figure 1: The distribution of agricultural involvement by household headship

Ref: AI = Agriculturally Involved, **NAI**= Not Agriculturally Involved

[1] Source: Author's own calculations from 2015 & 2018 General Household Survey

This section presents the results of smallholders involved in food production according to educational level. Male farmers drawn from Figure 2 in 2015 show that the highest number of the farmers who are agriculturally involved attained primary education (39,6%) and their counterparts (38,5%), however, possessing secondary education. Correspondingly to 2018, amongst male agriculturalists, a majority had primary education (38,2%), whereas female smallholders (40,1%) acquired secondary education. Of note, tertiary education holders are unlikely to be infused with agricultural activities. This notion could be due to expositions to off-farm occupations that pay them adequate earnings to afford basic needs and live a standard life. Migration is no longer limited to wage labour. According to [28], one reason for mobility is to embrace education. It is no longer just men's work; well-bodied men's work is impacted by migration. Along these lines, women work, and young girls and boys are also impacted. Noteworthy, education has an effect in determining one's involvement in agricultural undertakings. Therefore, to tertiary education holders, farming could be done as a leisure activity, alternatively as a diversification for extra food in the household without having to depend entirely on small-scale food production. The results exhibited a p-value of 0.000, denoting a significant relationship between agricultural involvement and educational attainment. Overmuch, the strength of the relationship measured by Phi and Cramer's tests, values of 0.144 and 0.152, respectively, correlated for both in 2015 and 2018, showing a moderate association.

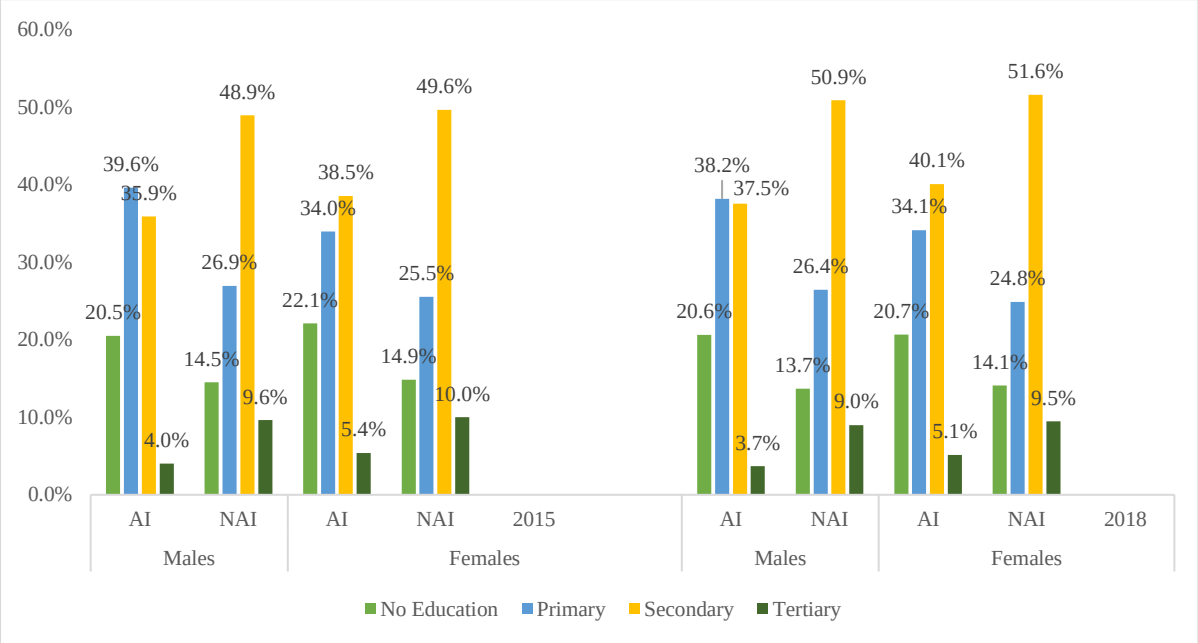

Figure 2: The distribution of agricultural involvement by highest level of education and gender

Ref: AI = Agriculturally Involved, **NAI=** Not Agriculturally Involved

[1] Source: Author's own calculations from 2015 & 2018 General Household Survey

Of the total number of economically active people, about 28,9% of males who are agriculturally involved are employed (as shown in Figure 3 below), whilst their counterparts reported 22,9%. The corresponding figures for the unemployed, 12,2% and 9,7% congruent by 2015. In 2018, males (29,3%) and females (22,9%) were reportedly simultaneously employed and agriculturally involved. On the other hand, males (14,4%) and females (11,2%) were reported to be rather agriculturally involved but jobless. The economically inactive population are those unreachable for work. This division includes full-time students, homemakers, pensioners, and those unable or unwilling to work [29]. This type of assortment could explain why there is such a large number of people who are not economically active.

Nevertheless, based on the definition of "not economically active", the reluctance to work could also mean an interest to endeavour and diversify into self-employment in livelihood agriculture. As it is, smallholders' work and their access to wages have controlling and direct impacts on family well-being. The Chi-square test statistic exhibited a significance level of 0.000. To measure the strength of the relationship, the Phi and Cramer's V showed a moderate relationship with 0.198 and 0.171, respectively.

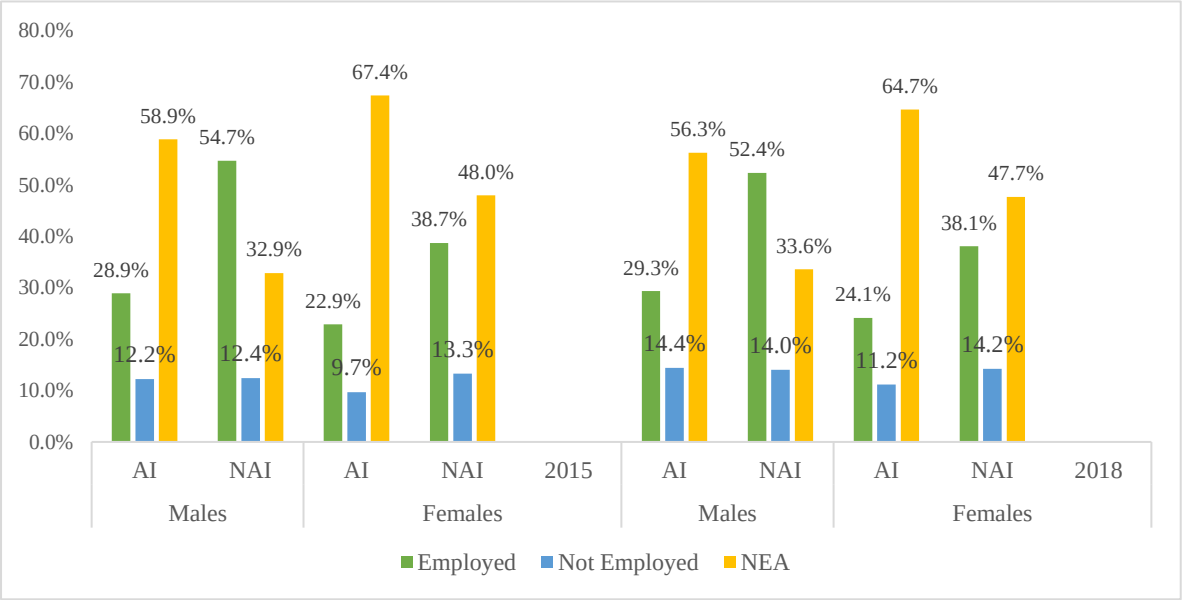

Figure 3: The distribution of agricultural involvement by employment status and gender

Ref: AI = Agriculturally Involved, **NAI**= Not Agriculturally Involved

[1] Source: Author's own calculations from 2015 & 2018 General Household Survey

The study findings depict that most women residing in rural areas are more agriculturally involved than those in urban areas in Figure 4. Regarding women, 81,6% and 82,0%, respectively, for 2015 and 2018 were reported to be agriculturally incorporated. The corresponding figures for their counterparts are 80,8% and 81,4% for both years. The life stage of the household, counting the numbers and children's ages, is also an influential determining factor of women's economic involvement. Overall, findings exhibited a p=0.000<0.05, denoting a positive relationship between agricultural involvement and geographic type. Concerning Phi and Cramer's V tests, Phi's coefficients showed a weak negative relationship of -0.507 and -0.495, respectively. On the other hand, Cramer's V coefficients indicated a moderate positive association for both years with a value of 0.507.

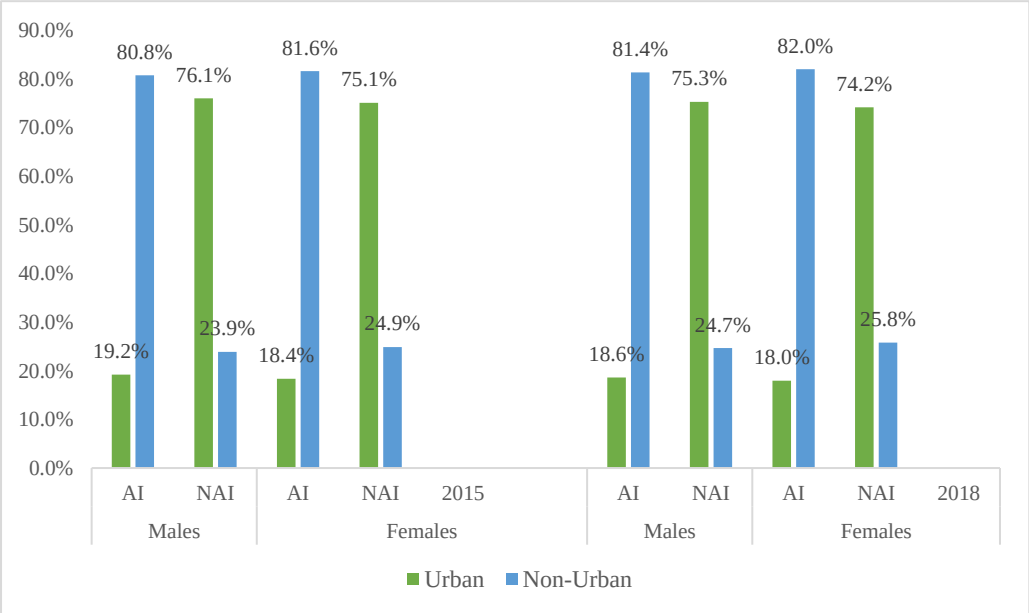

Figure 4: The distribution of agricultural involvement by geographic type and gender

Ref: AI = Agriculturally Involved, **NAI**= Not Agriculturally Involved

[1] Source: Author's own calculations from 2015 & 2018 General Household Survey

4.3. Binary Logistic Regression

4.3.1. The factors associated with agricultural involvement among smallholder farmers in South Africa

The leading determinants influencing agricultural involvement among small-scale South African farmers were measured by binary logistic regression manipulation. The findings show that the omnibus test of the model coefficient was statistically significant with p=0.000. Additionally, the outcome from logistic regression shows that for 2015, age was significant with agricultural involvement. The finding in 2015 exposed that being a smallholder between the 23-33 and 34-44 age groups increases the possibility of participating in agricultural activities by 1,260 and 1,229 times, respectively than being 67 years old and above. Observations in 2018 depict that the study further discovered that this variable was also significant, with 1,287 and 1,238 times higher than being 67 years old and above.

Regarding population group, the results of 2015 indicate that being coloured or Indian/Asian contributes 1,611 and 2,233 times more to being agriculturally involved than being a white subsistence farmer, respectively. Henceforward, in 2018, a similar variable was also significant. The findings depict that being coloured or Indian/Asian increases the chances of participating in agricultural undertakings by 1,609 and 3,107 times than being white. These are surprising results to the same extent one presumes Africans/Blacks to be involved in agriculture for livelihood.

Marital status was among the significant variables. The findings in 2015 specify that being married decreases the chances of being involved in agricultural activities 0.876 times more than being single. Furthermore, the findings in 2018 also show that the variable was significant, that being married contributes to a lesser chance of being involved in agricultural activities by 0.832 times than being single. Nevertheless, the work of [30-31] emphasized that level of education is a determining factor that contributes to the involvement in agricultural activities. The study results revealed that having primary and secondary education and being a smallholder increases the probability of taking part in agricultural activities 1,146 and 1,305 times, respectively than smallholders with tertiary education. In 2018, nevertheless, the study indicated that being a small-scale farmer with secondary education increases the chances of participating in agricultural activities by 1, 174 times than having tertiary education.

Employment status was significant, as it is indicated by this study in 2015 that both being a small-scale farmer, employed or unemployed, increases the chances of participating in agricultural activities by 1,312 and 1,170, respectively, times higher than those economically inactive small-scale farmers in South Africa.

In 2018, however, the findings show that the omnibus test of the model coefficient was also statistically significant with p=0.000<0.05 and with -2 Log-likelihood. Even though Hosmer Lemeshow was low at p= 0.00<0.05, the data was still found to be fit for the model since the model coefficient was statistically significant. The study ascertained that being employed as a small-scale farmer increases the chances of partaking in agricultural activities by 1,226 times than those who are not economically active small-scale farmers. The other provinces were significant when compared to Limpopo province.

Moreover, the 2015 data set findings discovered that being a small-scale farmer residing in any province within South Africa increases the chances of being involved in agricultural activities compared to those in Limpopo. However, only the province of Free State was not significant in 2018. The geographic type was significant for both 2015 and 2018. It shows that being a small-scale farmer residing in an urban area increases the chances of participating in agriculture by 7,343 and 7,808 times than in rural areas. These are controversial results because more small-scale farmers in rural areas are expected to be involved in agricultural activities. [32] Emphasize that subsistence farming is found in urban areas, with high expectation in rural areas.

Table 3. The factors associated with agricultural involvement among small-scale farmers in South Africa

Agricultural Involvement	**2015**	**2018**	
Characteristics	**Exp(B)**		**Difference in odds ratios (2018-2015)**

	B	Wald	Sig.		B	Wald	Sig.	Exp(B)	
Age groups		51,712	0,000			69,218	0.000		
12-22 years	0,02	0,047	0,829	1,015	-0,023	0,107	0,743	0,977	-0,038
23-33 years	0,231	11,184	0,001	1,260	0,252	13,488	0,000	1,287	0,027
34-44 years	0,206	9,204	0,002	1,229	0,214	10,014	0,002	1,238	0,009
45-55 years	-0,008	0,016	0,901	0,992	0,044	0,455	0,500	1,045	0,053
56-66 years	0,005	0,006	0,941	1,005	0,081	1,788	0,181	0,922	-0,083
67+@									
Population groups		61,618	0.000			53,859	0.000		
Black/African	0,030	0,169	0,681	1,031	0,114	2,194	0,139	1,120	0,089
Coloured	0,477	24,155	0,000	1,611	0,475	20,146	0,000	1,609	-0,002
Indian/Asian	0,803	24,397	0,000	2,233	1,134	34,135	0,000	3,107	0,874
White@									
Marital status		20,832	0.000			35,622	0.000		
Married	-0,132	12,145	0,000	0,876	-0,184	22,527	0,000	0,832	-0,044
Divorced	-0,073	0,422	0,516	0,929	-0,147	1,768	0,184	0,863	-0,067
Separated, BLM	0,119	0,701	0,402	1,126	-0,009	0,004	0,950	0,991	-0,135
Widowed	0,075	1,573	0,210	1,078	0,096	2,466	0,116	1,101	0,023
Single@									
Household head-ship									
Headed by male	-0,04	1,700	0,192	0,961	0,009	0,075	0,784	1,009	0,048
Headed by female@									
Educational level		43,871	0.000			33,631	0.000		
No schooling	0,050	0,474	0,491	1,051	-0,085	1,277	0,258	0,918	-0,133
Primary	0,136	5,684	0,017	1,146	-0,010	0,028	0,867	0,990	-0,156
Secondary	0,267	29,130	0,000	1,305	0,160	9,542	0,002	1,174	-0,131
Tertiary @									
Employment status		53,727	0.000			29,390	0.000		
Employed	0,271	51,888	0,000	1,312	0,204	27,561	0,000	1,226	-0,086
Unemployed	0,157	12,168	0,000	1,170	0,018	0,168	0,681	1,018	-0,152
Not economically active@									
Province		1678,546	0.000			1239,353	0.000		
Western Cape	1,330	234,020	0,000	3,780	1,687	253,201	0,000	5,404	1,624
Eastern Cape	-0,084	3,614	0,057	0,920	-0,168	14,019	0,000	0,845	-0,075
Northern Cape	0,854	128,520	0,000	2,349	1,031	154,816	0,000	2,804	0,455
Free State	0,176	7,865	0,005	1,192	-0,100	2,376	0,123	0,905	-0,288

KwaZulu-Natal	0,596	205,395	0,000	1,814	0,228	29,308	0,000	1,256	-0,558
North-West	1,610	661,958	0,000	5,002	1,520	492,110	0,000	4,571	-0,431
Gauteng	1,663	635,732	0,000	5,278	0,982	254,533	0,000	2,669	-2,609
Mpumalanga	0,312	39,954	0,000	1,366	0,228	21,516	0,000	1,256	-0,110
Limpopo@									
Geographic type									
Urban	1,994	3505,273	0,000	7,343	2,055	3389,210	0.000	7,808	0,465
Non-urban@									
Constant	-24,240				-24,000				
		0.000	0,995	0.000		0.000	0,996	0,000	-

[1] Source: Author's own calculations from 2015 & 2018 General Household Survey

NB: Ref: Separated, BLM= Separated, but still legally married.

5. Discussion

This section comprehensively discusses factors contributing to agricultural involvement among smallholders across South African Provinces. The assortment of sociodemographic, socioeconomic, and locational factors has provided vital insights and perspectives. The predominant ascertained factor is the structural changes between 2015 and 2018 using gender as a "control" variable to make it easier to observe gender disparities, owing to past diversification economic effects that have shaped the smallholding sector.

Considering all the factors applied in this study, the most critical findings from the researcher's assessment are deliberated along these lines: Province, geographic type, and education levels successfully provided significant primary reasons to pursue farming for food and crop production, inasmuch the use of stock keeping as a primary source of food consumption. The findings revealed that being a smallholder living in any South African province upsurges the chances of being agriculturally involved compared to residing in Limpopo. The findings were shocking given that Limpopo province is assumed to have more small-scale farmers who produce fresh products from the farm for food security [33]. According to [34], approximately 519 000 are smallholders in Limpopo, with 28% of those smallholders being female, the study findings showed that there are more female-headed households in South Africa. Therefore, these women smallholders carry the responsibility of providing for their dependents.

To the aforementioned, female smallholders are consistently agriculturally involved across all age groups, even to older ages. Meanwhile, males reported significant percentages of being more involved in agricultural activities than their counterparts. However, agricultural involvement is selective of males at younger ages but decreases with age. This could be due to men migrating to distant regions to seek jobs and occupation prospects in off-farm involvements unless many passed on in their middle ages.

Moreover, the study findings showed that residing in South Africa and being Indian/Asian increases the prospects of being agriculturally involved over being black, coloured, or white. The finding was controversial, provided they reported lower figures than other racial groups, showing disinterest in agricultural involvement. African/Black to be more involved in agriculture for livelihood over other racial groups. However, a well-defined population statistic of Indian smallholders regarding the type of farming they practice and reasons for farming is not readily available in South Africa.

Education is an essential factor that directly affects agricultural involvement [30-31]. The findings revealed that educational level plays a significant role in being agriculturally infused. The study findings showed that smallholders with primary or secondary education are more likely to practise agricultural-related activities. This finding corroborated the community survey by [35], where 56,3% were agricultural households with between Grade 1 and Grade 11 education. On the other hand, tertiary education holders in agriculture are less pronounced. Undoubtedly, most of them could be

in off-farm occupations to generate income to survive. Those who practice farming could use it as a leisure or hobby activity and other diversification reasons but not solely on primary basis to derive livelihood. The findings correlated with [36] that in South Africa, most smallholders are old and not as educated, and the tertiary education holders reported lower percentages.

The group of never-married heads, among both female-and-male-headed households, are more agriculturally involved than the married, divorced, separated, but still legally married and the widowed. Single smallholders too, are burdened with feeding their dependents, especially in traditional families where the eldest has to head the family when the parents are absent. Even in some cases, parents may be present. However, if they no longer have the power and strength to farm, their children, who are still under their control and roof, are encouraged to step in and undertake small-scale food production for livelihood purposes.

In non-urban areas, farming is done predominantly to produce food for survival [37]. The study's findings showed that the smallholders in urban areas are more likely to be agriculturally involved than those in rural areas, which was quite controversial. It could mean that urban dwellers have farming interests as much. However, the land is quite expensive to buy to practice farming. While in rural areas, dwellers are rich in land [28], and it is an indispensable asset to generate livelihoods.

6. Conclusions

This study explored the sociodemographic and socioeconomic dynamics influencing agricultural involvement among small-scale farmers within South Africa. This study finds that young people are agriculturally involved as a diversification strategy. Owing to the land reform Programme shortfalls, it is taking longer than expected. In the meantime, young people may be endowed with farming resources by identifying smallholders' needs as a collective. In assessing South Africa's huge unemployment problem, the government has emphasized and ascertained that the fundamental intent of having a smallholding sector is to expand the formation of livelihoods. Such effort should be to detect the sector's capability to contribute to labour absorption and poverty lessening, predominantly in the poor areas of the former Bantustans, where self-employment prospects are tremendously needed, that will help the small-scale farming sector to accomplish and enact more of its role in economic growth.

Another finding worth considering is that across the provinces of South Africa, there are more female-headed households than male-headed households, where females are left with the burden of feeding and providing for their families daily. Women should always be integrated into development programmes whenever policies are formulated and evaluated. It has been exhibited that they are a minority that should be empowered in all spheres that might increase their social status and economic welfare. Considering these findings, the government and policymakers should review their farm-related policies on farm resource allocation and modify policies that will favour the conditions under which smallholder farmers exist and work. A follow-up by the government on policy execution so that openness to markets and sales of crops can improve henceforward, as the findings have shown that only a few farmers possess higher education that could emancipate them to be entrants to off-farm employment. Then again, those who can farm consistently should be at the centre of policy executions that will change South Africa for better.

7. Limitations

The secondary data used in this study were collected in 2015 and 2018; thus, current primary data are needed to understand how the situation has changed since the country is still recovering from the manifestations of the COVID-19 pandemic. There is a need to observe the structural changes for the pre-covid and post-covid eras. This study was conducted to establish the extent of smallholder farmers' involvement in the market. The GHS data set does not provide enough market-related variables to see how smallholders market their products inasmuch as their entrance to distant high-value markets is concerned. The variable pertaining to on-farm resources is also absent, making it impossible to study and cover various farm-related issues. Hence, the Department of Statistics South Africa should consider including such themes in future GHS questionnaires. Further studies could be done to assess the effect of farmers' agricultural participation on household food and nutrition security and also on income diversifications.

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