**Drivers of Poverty among Agricultural Households: Insights and Policy Implications from the Ghana Living Standard Survey**

**Abstract**

This study explores the multifaceted determinants of poverty among agricultural households in Ghana, utilizing data from the Ghana Living Standards Survey encompassing approximately 4,670 self-employed agricultural households. The analysis reveals that demographic characteristics, asset ownership, cropping systems, and spatial variations significantly influence poverty incidence. Key findings indicate that older household heads are less likely to be impoverished due to more robust social networks and better access to informal credit. In contrast, younger agricultural households face higher poverty rates due to weaker social capital and limited financial resources. Education is inversely related to poverty, emphasizing the importance of enhancing educational access in rural areas. The relationship between household size and poverty is complex; larger households generally experience higher poverty rates, but this effect diminishes when additional members contribute to the labour force. Contrary to expectations, having a bank account is associated with a higher likelihood of poverty, potentially due to debt accumulation from poor financial management. Market dynamics further impact poverty, with direct sales to consumers or market traders leading to higher poverty rates due to exploitative pricing, exacerbated by poor road networks. Spatially, poverty is more severe in rural areas and specific regions like the Upper West, Northern, and Upper East, attributed to adverse climatic conditions and inadequate infrastructure. Policy recommendations include integrating financial literacy with financial inclusion, improving rural education, developing infrastructure, promoting cooperative buying mechanisms, and targeting irrigation projects to mitigate climatic challenges. Future research should reexamine these factors with fresh data, especially post-COVID-19, to adapt and validate these findings in the evolving economic landscape.

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**Introduction**

The development literature has keenly focused on the role of agriculture in national and rural development across the globe, albeit fragmented. For instance, the dual economy models, inspired by Lewis (1954), portrayed agriculture as a backward, unproductive subsistence sector, suggesting that labour and resources should be transferred from agriculture to develop a dynamic, productive industrial sector. Consequently, early development economics literature largely supported an industrialization strategy. Opposing views to this suggests the positive contributions of agriculture to growth in other sectors, implying that investments and policy reforms in agriculture might actually yield faster overall economic growth, even though agriculture itself might grow at a slower pace than non-agriculture sectors (Johnston & Mellor, 1961; Schultz, 1964). Contemporarily, increasing agricultural production has been a topical issue among scientists and development practitioners over the past years (Girabi & Mwakaje, 2013; Maskay & Adhikari, 2013). Concerns arising from the need to increase agricultural production are linked to feeding the world’s rapid population growth, which is projected to hit 9 billion by 2050 (Béné et al., 2015; Engelman, 2016).

Indeed, what seems a contemporary problem is linked to Malthus’ population theory, which argued that while food production is increasing at an arithmetic rate, the human population, on the other hand, is growing at an exponential rate (Drysdale, 1889; Flew, 1957; Unat, 2020). The theory fundamentally posits that food production will not keep pace with the rapidly increasing human population, inevitably resulting in social issues such as famine, war, and other catastrophic events. Aligning with the adage “a hungry man is an angry man,” the theory suggests that people will take any necessary actions to survive when faced with hunger. This has spurred several ambitious global and international policy frameworks to improve agricultural production to either achieve food security or as a food security buffer strategy. To this, the world saw the introduction of the United Nations Millennium Development Goals (MDGs) policy framework in 2000, where the first goal was to “Eradicate Extreme poverty and hunger.” Revising the MDGs led to the introduction of the 17 interconnected Sustainable Development Goals (SDGs), where agriculture plays a pivotal role. Enhancing agricultural production, for instance, contributes directly to achieving zero hunger (SDG2), no poverty (SDG1), reducing inequalities (SDG10), and taking climate action (SDG13). These improvements arguably support peace, justice, and strong institutions (SDG16) and foster long-term partnerships. That is, agriculture provides life and livelihoods for most people in developing countries and, by so doing, serves as a promising pathway out of poverty (Kuuwill & Kimengsi, 2024; Oseni et al., 2014).

While agricultural activities are vehemently argued to play a crucial role in national and rural development and poverty reduction (Anderberg, 2020; Christiaensen & Martin, 2018; Mkwambisi et al., 2011), questions linking why the agricultural sector arguably sounds synonymous with poverty in developing regions are less explored (Agyepong et al., 2024; Kuuwill et al., 2022, 2024). For instance, Palmer‐Jones & Sen (2006) found in their studies that although agriculture reduces poverty, most agricultural households in Bangladesh are in extreme poverty due to a lack of access to irrigation. In another development, Jan et al. (2008) found that the agricultural sector, employing about 42% of the population in India, predominantly comprises poor subsistence and smallholder farmers. The study highlights high dependency ratio and land tenure issues as the principal factors driving poverty in India’s agricultural sector. Further empirical studies using the Multilevel logistic regression analysis uncovered that poverty is more pronounced among agricultural households in the Mahanadi Delta of India (Berchoux et al., 2020). Factors accounting for this include inadequate road infrastructure and limited market access, hindering agricultural productivity and exacerbated by household-level financial and human capital constraints (ibid).

In the rural mountain communities of Nepal, Gentle & Maraseni (2012) found that although the agricultural sector employs the majority of the population, the sector is marked by extreme poverty. The study attributes this to high dependence on rain-fed agricultural systems and climate change, affecting agricultural productivity. Nguyen Hung et al. (2013) identified market constraints as the major factor intensifying poverty among agricultural households in Vietnam, causing most farmers to diversify into non-agricultural activities. In Brazil, Fuchigami et al. (2021) iterated that poverty among rural smallholder farmers is perpetuated by a lack of stable income due to inconsistent access to the market. In effect, this causes several post-harvest losses among farmers, the results being income reduction and poverty intensification. In a different account, Latawiec et al. (2017) found challenges in land access and lack of credit facilities to embark on commercial agriculture as the significant challenges facing the agricultural sector of Brazil, leading to subsistent agriculture and high poverty incidence.

Despite agriculture employing over 40-60% of Africa’s population, agricultural households remain closely associated, if not identical, with poverty-stricken households (Osabohien et al., 2019; Oseni et al., 2014). In this light, Eyasu (2020) uses the FGT index and quantile regression to examine the factors contributing to poverty among agricultural households in Ethiopia. The study identified family size, total land ownership, distance to market, non-off-farm income, and bad health status as the prominent factors contributing to poverty among agricultural households in the country. Okunola & Ojo (2019) found that 49% of the poor Nigerian population segment are agricultural households, with factors contributing to this including age, marital status and household size. Nevertheless, the study also highlighted that gender, farming experience, years of education, and total income increase the probability of poor agricultural households moving out of poverty. Studies also found in Kenya that household size, distance to the nearest market and household size are the significant factors determining poverty among agropastoral communities (Elhadi et al., 2012). Similar evidence exists in Tanzania and South Africa, among other African countries (Pauw & Thurlow, 2011; Yobe et al., 2019).

In the Ghanaian context, agriculture is described as the backbone of the country’s economy, employing about 40% of the population (GSS, 2021). Ghana is recognized as one of the largest producers of cocoa, with its arable land supporting the cultivation of staple crops such as maize, millet, yam, and cashews. Therefore, it is scientifically and economically reasonable to expect poverty among Ghanaian farmer households to differ from the trends observed in neighbouring African countries. Nevertheless, poverty among Ghanaian farmers seems comparable to or exceeds that observed in neighbouring African countries. This is evidenced by the fact that over 42% of the country’s poverty incidence is recorded among agricultural households (GSS, 2021), making agricultural households the image of poverty in the country. While fragmented accounts exist in the literature examining the factors driving poverty among agricultural households (Abdulai, 2021; Dagunga et al., 2020; Dwomoh et al., 2023), a critical examination reveals that these studies, like those in other African countries and other parts of the world, are conducted within specific regions or geographical areas. This spatial limitation not only restricts a comprehensive assessment of the factors driving poverty among agricultural households but also undermines the robustness of the findings, possibly leading to reductionist policy interventions. Further, market dynamics in agricultural communities perpetuating poverty among agricultural households need to be continuously studied.

This validates the need for a continuous examination of the topic. Against the backdrop established, we examined the factors driving poverty among agricultural households in Ghana, taking into consideration (1) agricultural households’ demographic characteristics, (2) asset holdings and market dynamics in agricultural communities and (3) spatial determinants of poverty among agricultural households. By uncovering the nuanced dynamics contributing to poverty nationally, our findings offer valuable insights for policymakers aiming to formulate holistic targeted interventions and strategies to alleviate poverty and promote sustainable development in the agricultural sector. Moreover, our research contributes to the broader discourse on poverty alleviation and agricultural development, enhancing understanding of the complex relationship between agriculture and poverty in developing regions, learning from the case of Ghana.

**Methodology**

**Data**

The study uses data from the seventh round of the Ghana Living Standard Survey (GLSS 2016/17) conducted by the Ghana Statistical Service. The GLSS provides crucial information on various socioeconomic indicators such as poverty, employment, education, and other related topics for households in Ghana. It covered a total of 14,009 households across all regions in Ghana. This research focused on agricultural households, specifically those whose heads are engaged in the agricultural sector and for whom agriculture is the main source of livelihood. There were 4,670 agricultural households in the dataset. We excluded 58 households, including those in Accra (7 households) and those with non-Ghanaian heads (51 households), reducing our sample size to 4,612. Accra was excluded because there were only 7 agricultural households in Accra, and none of these households were classified as poor, making it non-representative of the typical agricultural sector. Non-Ghanaian households were excluded to maintain the focus on the socioeconomic dynamics specific to Ghanaian agricultural households, ensuring cultural and contextual relevance and uniformity in the analysis. The dependent variable under consideration in this study is the binary poverty status, which determines whether a household is classified as poor or non-poor. The study encompasses five groups of potential factors associated with poverty: demographic characteristics of the household head, household traits, asset ownership and financial access, agricultural activities, and geographic and environmental considerations. Additional details about the variables used in the study can be found in Table 1.

Table 1: Description of Variables

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | | Mean | Description | |
| Dependent Variable | |  |  | |
| Poor | | 0.427 | 1 if the household is poor and 0 if non-poor | |
| Demographics of household head | |  |  | |
| Female | | 0.200 | 1 if the household head is female and 0 if male | |
| Age | | 49.1 | Numerical age of the household head | |
| Marital Status | |  | Married\*, Never Married, Consensual Union, Separated, Divorced. | |
| Educational Level | |  | No education\*, Primary, Secondary, Voc/Tech/Teacher (VTT), Tertiary | |
| Household Characteristics | |  |  | |
| Household size | | 6.88 | Number of household members | |
| Household size squared | | 62.18 |  | |
| Tenure | |  | Owner\*, Renting, Rent-free, Perching and Squatting. | |
| Asset Ownership and Financial Access | |  |  | |
| Has bank account | | 0.638 | 1 if the household head has a bank account and 0 otherwise | |
| Owns motorcycle | | 0.169 | 1 if the household head owns a motorcycle and 0 otherwise | |
| Owns land | | 0.178 | 1 if the household head owns a land and 0 otherwise | |
| Owns car | | 0.019 | 1 if the household head owns a car and 0 otherwise | |
| Agricultural Activities and Resources | |  |  | |
| Agric equipment owned | | 2.094 | Number of agricultural equipment owned by the household head | |
| Has farm workers | | 0.417 | 1 if the household head hires farm workers and 0 otherwise | |
| Farm size | | 7.117 | Size of the farm in acres | |
| Cropping system | |  | Monocropping\*, mixed cropping, a combination of mono and mixed cropping, others | |
| Outlet for sale | |  | No selling\*, consumers, pre-harvest contractors, farm gate buyers, market traders, state trading organizations, cooperatives, multiple outlets, others | |
| Geographic Variables | |  |  | |
| Urban | | 0.162 | 1 if the household is in an urban area and 0 if it is a rural | |
| Region | |  | Western\*, Central, Greater Accra, Volta, Eastern, Ashanti, Brong Ahafo, Northern, Upper East, Upper West | |
| \*Denotes the reference group |  | | |  |

**Empirical Strategy**

We employ logistic regression to examine the drivers of poverty among self-employed agricultural households. We assess the poverty effects of five factors: household head demographic characteristics, household characteristics, asset ownership and financial access, agricultural activities and resource and geographic factors. The logistic regression model generally takes on the following form:

Where represents whether the household is poor or non-poor for household i; is a vector of the factors that affect poverty; is the intercept term; is the coefficient of the determinants of poverty, hence the coefficient of interest for this study. With specification (1), we estimate a logistic regression model where we regress poverty status on the socio-demographic and agricultural characteristics of the households. We report the results in odds ratios and also present the average marginal effects in Table 2.

**Results**

**Descriptive Statistics**

Approximately 23.4% of Ghanaian households were living below the national poverty line of GHS 1,314 per adult equivalent per year (or approximately US$2.22 per day per capita, based on 2011 PPP). As shown in Figure 1, there is considerable disparity in poverty incidence across different employment sectors in Ghana. Notably, the poverty incidence is highest among those in the self-employed agricultural industry, with a rate of 42.7%. This rate is about 19.3 percentage points higher than the national poverty incidence rate and about four to nine times higher than any other employed group. This figure is particularly compelling and concerning because this sector employs Ghana’s largest proportion of workers (33.8% in 2016, according to the GLSS 2016/2017). This highlights the critical issue of poverty concentration within a sector that is described as the backbone of the national economy, sustaining a significant portion of the Ghanaian workforce, indicating a pressing need to study the factors determining poverty among this group.

Figure 1: Poverty Incidence by employment status in Ghana

**Agricultural Households Demographic Characteristics and Poverty in Ghana**

Regarding household demographics, we examine the effect of agricultural household head’s sex, age, marital status, and educational level on poverty. As reported in Table 2, household heads’ age and educational level are the only significant demographic determinants of poverty among self-employed agricultural households. The age of the household head has a significant negative association with the incidence of poverty, such that an additional year reduces the likelihood of a household being poor by 0.14%, on average. Household heads’ education levels also have a significant negative association with the incidence of poverty. The results show that, compared to those without education, the likelihood of a household being poor is 45.7%, 36.7%, and 49.7% lower for those with basic, middle, and secondary-level education, respectively. Additionally, those with vocational, technical, or teacher training level education are 57% less likely to be poor than those without education. These relationships have statistical significance at levels between 1% and 10%. Female-headed households and those who have never married or are in a consensual union (compared to those who are married) are also less likely to be poor, although these associations are not statistically significant. The results show that household size and house ownership type (tenure) are significant determinants of poverty. Household size is positively associated with poverty, such that an additional household member increases the likelihood of the household being poor by 7.4%, on average. Furthermore, the squared term for household size indicates a nonlinear relationship, meaning that as the household becomes larger, the rate at which poverty increases slows down.

**Market access, assets holding and poverty incidence**

Compared to those who own their homes, the likelihood of being poor is 41.9% and 40.1% lower for those renting and those with rent-free arrangements, respectively. This relationship is statistically significant at the 5% level. However, for those who are perching, the likelihood of being poor is higher, although this is not statistically significant. The likelihood of being poor is 51.4% higher for households whose head has a bank account compared to those without, and this relationship is significant at the 1% level. Asset ownership has a significant negative association with the incidence of poverty. For household heads who own a motorcycle, land, or a car, the likelihood of being poor is about 40.5% to 98.6% lower compared to those who do not own such assets.The results show that a unit increase in the number of agricultural equipment owned by the household (or head) significantly reduces the likelihood of being poor by 1.3%, on average, at the 5% level. Additionally, having farm workers has a negative and significant association with the likelihood of being poor, significant at the 1% level. Farm size is also negatively and significantly associated with the likelihood of being poor. An increase in farm size by one acre is associated with a 0.3% reduction in the likelihood of being poor. Furthermore, those who practice a mixed cropping system are 30.2% less likely to be poor than those who practice monocropping.The outlet for the sale of agricultural produce also has a significant association with the incidence of poverty. Direct sales to consumers and market traders are the two sale channels with statistically significant effects on poverty. Selling directly to consumers or market traders (compared to not selling) is associated with a higher likelihood of being poor, significant at the 1% and 5% levels, respectively. In contrast, selling to a state trading organization or pre-harvest contractors is associated with a lower likelihood of being poor, although this effect is not statistically significant.

**Spatial determinants of poverty among agricultural households in Ghana**

The results show that the geographical location of the household is an important determinant of poverty among agricultural households. Compared to rural dwellers, those in urban areas are, on average, 50.6% less likely to be poor. The findings also reveal disparities in poverty incidence across different Ghana regions. Compared to the Western region, the likelihood of being poor is higher for households in the Upper West, Northern, Upper East, Volta, and Brong Ahafo regions. The odds of being poor are about 1.4 to 8 times higher in these regions compared to the Western region, with the Upper West region having the highest poverty incidence. In contrast, the likelihood of being poor is lower for households in the Greater Accra, Eastern, Central, and Ashanti regions, with Greater Accra having the lowest poverty incidence. These regional effects are statistically significant.

Table 2: Regression Results of determinants of poverty among agricultural households

|  |  |  |
| --- | --- | --- |
|  | (1)  Logit  Model  (Odd ratio) | (2)  Average Marginal Effect  (dy/dx) |
| Demographics of household head |  |  |
| Female | 0.775 | -0.043 |
|  | (0.130) | (0.028) |
| Age | 0.992 | -0.0014 |
|  | (0.004)\*\* | (0.000)\*\* |
| Marital Status (Married): |  |  |
| Consensual Union | 0.925 | -0.013 |
|  | (0.170) | (0.031) |
| Separated | 1.148 | 0.023 |
|  | (0.336) | (0.049) |
| Divorced | 1.384 | 0.054 |
|  | (0.431) | (0.052) |
| Widowed | 1.166 | 0.025 |
|  | (0.266) | (0.038) |
| Never married | 0.740 | -0.049 |
|  | (0.228) | (0.051) |
| Educational Level (No Education): |  |  |
| Basic | 0.543 | -0.102 |
|  | (0.100)\*\*\* | (0.030)\*\*\* |
| Middle | 0.633 | -0.076 |
|  | (0.107)\*\*\* | (0.028)\*\*\* |
| Secondary | 0.503 | -0.114 |
|  | (0.157)\*\* | (0.052)\*\* |
| Voc/Tech/Teacher | 0.430 | -0.140 |
|  | (0.200)\* | (0.077)\* |
| Household Characteristics |  |  |
| Household size | 1.549 | 0.074 |
|  | (0.083)\*\*\* | (0.009)\*\*\* |
| Household size squared | 0.987 | -0.002 |
|  | (0.003)\*\*\* | (0.001)\*\*\* |
| Tenure (Owning): |  |  |
| Renting | 0.581 | -0.092 |
|  | (0.137)\*\* | (0.039)\*\* |
| Rent-free | 0.599 | -0.086 |
|  | (0.077)\*\*\* | (0.022)\*\*\* |
| Perching | 2.979 | 0.186 |
|  | (3.876) | (0.212) |
| Asset Ownership and Financial Access |  |  |
| Has bank account | 1.514 | 0.069 |
|  | (0.171)\*\*\* | (0.019)\*\*\* |
| Owns motorcycle | 0.522 | -0.109 |
|  | (0.095)\*\*\* | (0.029)\*\*\* |
| Owns land | 0.595 | -0.089 |
|  | (0.087)\*\*\* | (0.024)\*\*\* |
| Owns car | 0.014 | -0.712 |
|  | (0.015)\*\*\* | (0.177)\*\*\* |
| Agricultural Activities and Resources |  |  |
| Agric equipment owned | 0.923 | -0.013 |
|  | (0.037)\*\* | (0.007)\*\* |
| Has farm workers | 0.576 | -0.092 |
|  | (0.066)\*\*\* | (0.019)\*\*\* |
| Farm size (acres) | 0.980 | -0.003 |
|  | (0.010)\*\* | (0.002)\*\* |
| Cropping System (Monocropping): |  |  |
| Mixed cropping | 0.698 | -0.045 |
|  | (0.143)\* | (0.024)\* |
| Mono & Mixed | 0.876 | -0.022 |
|  | (0.129) | (0.024) |
| Others | 1.120 | 0.019 |
|  | (0.258) | (0.038) |
| Outlet for sale (None): |  |  |
| Consumers | 2.111 | 0.124 |
|  | (0.582)\*\*\* | (0.046)\*\*\* |
| Pre-harvest contractor | 0.400 | -0.153 |
|  | (0.280) | (0.116) |
| Farm gate buyer | 1.424 | 0.059 |
|  | (0.342) | (0.040) |
| Market trader | 1.393 | 0.055 |
|  | (0.208)\*\* | (0.025)\*\* |
| State trading organization | 0.761 | -0.046 |
|  | (0.208) | (0.046) |
| Cooperative | 1.298 | 0.044 |
|  | (0.582) | (0.075) |
| Others | 2.339 | 0.142 |
|  | (1.513) | (0.108) |
| Multiple outlets | 1.147 | 0.023 |
|  | (0.214) | (0.031) |
| Geographic Variables |  |  |
| Urban | 0.494 | -0.118 |
|  | (0.093)\*\*\* | (0.031)\*\*\* |
| Region (Western): |  |  |
| Central | 0.607 | -0.087 |
|  | (0.146)\*\* | (0.042)\*\* |
| Greater Accra | 0.291 | -0.190 |
|  | (0.325) | (0.133) |
| Volta | 2.134 | 0.147 |
|  | (0.503)\*\*\* | (0.045)\*\*\* |
| Eastern | 0.557 | -0.101 |
|  | (0.130)\*\* | (0.040)\*\* |
| Ashanti | 0.849 | -0.029 |
|  | (0.206) | (0.044) |
| Brong Ahafo | 1.425 | 0.067 |
|  | (0.299)\* | (0.040)\* |
| Northern | 4.253 | 0.279 |
|  | (0.960)\*\*\* | (0.043)\*\*\* |
| Upper East | 3.017 | 0.215 |
|  | (0.711)\*\*\* | (0.045)\*\*\* |
| Upper West | 8.187 | 0.388 |
|  | (1.882)\*\*\* | (0.041)\*\*\* |
| Constant | 0.192 |  |
|  | (0.745)\*\*\* |  |
| N | 4,549 |  |
| \* p<0.1; \*\* p<0.05; \*\*\* p<0.01 Standard errors in parenthesis. |  |  |

**Discussion**

**Agricultural households demographic characteristics, asset holding and poverty incidence in Ghana**

The data obtained and analyzed revealed that demographic characteristics such as the age of a household head, educational level, household size and property ownership significantly influence the likelihood of poverty incidence among agricultural households in Ghana. These findings support the structural poverty and social capital theory, which indicates that poverty is influenced by structural and social factors determining opportunity and resource access within the society and economy (Addae-Korankye, 2019; Brady, 2006). In the case of Ghana, we argue that age, education level, household size, and property ownership are critical social and proxy structural factors influencing agricultural households’ access to resources or opportunities. Like its neighbouring African countries, many rural parts of Ghana are predominated by informal credit or microcredit arrangements. With no solid household database, credit is usually accessed based on trust and community networks as collateral against moral hazard (Kuuwill et al., 2024; Okello et al., 2018). Hence, we argue that older household heads may have sufficiently built trust with a solid network based in their communities, influencing their access to informal credits, which likely reduces the incidence of poverty since they can increase their farm sizes, buy agricultural equipment and hire farm workers which are significantly negatively associated with poverty. This may explain why poverty is more pronounced among agricultural households in Ghana, since the youth involved in agriculture often lack strong social networks and trust that influence credit access, thereby limiting their ability to farm on large scales, purchase productivity boosting equipment and hire on-farm labourers. Our findings are consistent with Gani & Adeoti (2011), who found that poverty among rural farmers in the Taraba State of Nigeria decreases as the age of the farmer’s household head increases. On the contrary, Okunola & Ojo (2019) found a positive relationship between the age of a farmer household head and poverty incidence in the Ondo State of Nigeria due to a reduction in farm size and productivity associated with old-aged farmer households.

Unsurprisingly, the educational level of agricultural households is inversely related to poverty incidence, suggesting that education has a poverty-remediating force for agricultural households. A possible explanation is that education equips farmer households for active cost and benefit analysis in their agricultural activities, reducing the incidence of loss, which drags most households to poverty. Secondly, households with secondary or teacher training in college education usually work as teachers in private or government schools and other civil servant positions in most rural areas, next to their agricultural activities. Besides the alternative livelihood provision of education, working as civil servants usually serves as collateral security for credit access, which helps them boost their agricultural activities and escape the poverty trap. This possibly explains why most agricultural households are synonymous with poverty-stricken households since most of them lack education and, consequently, the benefit of it, as argued. Hence, improving educational access among agricultural households, particularly those in rural areas, will potentially reduce poverty and enhance agricultural production, food security and economic growth. This finding agrees with Agyepong et al. (2024), who found that education reduces poverty among the Ghanaian population. Civil servants prefer living in rental houses in rural areas since they can be posted to different parts of the country at any time. Since their secured monthly salary serves as a security based on which they can access credit or raise capital necessary to improve their agricultural activities, it is not surprising our results show that those living in rented homes in agricultural communities are less likely to be poor than homeowners in agricultural communities.

Our argument is justified as our results further show that those who are perching are more vulnerable to poverty compared with homeowners. This is because homeowners have high chances of credit access, compared with those perching, making poverty less chronic among homeowners than perchers. Against this background, we argue that agricultural households in Ghana are synonymous to poverty-striken households since most lack education and do not work in the civil service and also do not own homes against which value can serve as collateral for credit. Household size is positively related to the incidence of poverty among agricultural households. However, the results highlight that. Poverty incidence slows down at a certain threshold as the household size increases. This is quite surprising because the literature examining poverty argues unapologetically that larger household sizes perpetuate poverty among rural households in rural Africa (Meyer & Nishimwe-Niyimbanira, 2016; Oseni et al., 2014; Sekhampu, 2013). We argue that while poverty may be pronounced among large agricultural households, we present that agriculture in Africa is labour-intensive. Hence, the incidence of poverty will likely slow at the threshold where a majority of the household members are no longer in the dependent category, boosting the labour capacity of the household. Deductively, the poverty of most agricultural households in Ghana and the rest of Africa may not be the issue of larger household sizes but a problem of production capacity, calling for the mechanization or commercialization of agriculture using capital equipment. This explains why agricultural households with capital inputs such as tractors and cars are less likely to be poor than their counterparts since they can farm on a large scale and also improve productivity. Following this, it is logical that most people, especially Ghanaian youth, liken farming to a poverty trap since most lack the equipment and labour-intensive capacities needed to enhance agricultural production and productivity.

Further, our results reveal a counterintuitive finding: having a bank account is associated with a higher likelihood of poverty among agricultural households. One might expect bank accounts to correlate with increased access to credit through bank accounts, argued as a pathway towards improving agricultural productivity and reducing poverty in developing countries (Hoai, 2020; Kimengsi et al., 2020; Nakano & Magezi, 2020). We, however, present that this can be a double-edged sword. While such may provide the necessary capital for investments, if not managed well, it can lead to accumulating debt, financial stress, and deeper poverty due to poor financial management, high interest rates, or excessive borrowing. This is most likely in Ghana, like the rest of developing countries where agriculture is predominantly rain-fed (Derbile et al., 2022; Djido et al., 2021). Against precarious climatic conditions and intermittent droughts during the cropping season, agricultural households may increasingly accumulate debts due to crop failure, intensifying poverty. We, therefore, submit that skill training and alternative livelihood schemes provision should accompany credit facilities, the absence of which has impoverished agricultural households in Ghana.

**Market dynamics and spatial determinants of poverty in agricultural households in Ghana**

The outlet for the sale of agricultural produce also has a significant association with the incidence of poverty. For example, while direct sales to consumers or market traders increase the likelihood of poverty, selling to cooperatives or pre-harvest contractors is associated with a lower possibility of being poor. We submit that traders who buy from the villages and retail in the cities determine the market prices of agricultural produce in most rural parts of Ghana. This is due to the lack of competition on the part of the traders to buy but intense competition on the part of farmers to sell their products to the few traders who go to their villages or stand the lousy alternative of post-harvest losses. Given the lousy alternative, most farmers accept unreasonably lower prices from traders who make supernormal profits retailing in the cities at the expense of farmers who produce the food crops. A structural deficit giving rise to this is the poor road networks to most agricultural communities, leading to cheap pricing by the few traders who risk going to such communities. This impoverishes agricultural households, making them the synonymous banner of poverty-stricken households in Ghana and most African countries. Our findings agree with Nakamura et al. (2020), who found that poor road networks leading to rural communities in Ethiopia are significant factors driving poverty among agricultural households. In a World Bank Policy Paper, Berg et al. (2016) also posited a similar argument where poor road infrastructure is a precursor of poverty among rural households in sub-Saharan Africa. While we argue for establishing comparative buying mechanisms in rural communities in the short run, a good road network can offer a good poverty reduction dividend for agricultural households in the long run. It will likely increase competition where prices close to the true value of farm products are offered as many buyers access rural communities.

Spatially, our results show that poverty is more visible among agricultural households in rural areas than urban areas, substantiating our earlier argument on less competitive market prices offered by the few traders who risk travelling to rural communities to buy and retail in bigger cities. Regionally, poverty is pronounced among farmers in other regions of Ghana compared to farmers in the Western region. We attribute this to the fact that most farmers in the Western region engage in cocoa farming, which is being sold to cooperatives that offer reasonable prices compared to most areas where corporative buying is lacking for staple food crops. Poverty is more severe among agricultural households in Ghana’s Upper West, Northern and Upper East regions. While road networks may play a role, volatile climatic conditions result in frequent drought, unimodal rainfall patterns and one cropping season in these regions (Antwi-Agyei et al., 2012; Quaye-Ballard et al., 2020). As a result, agricultural households may have marginal access to loans due to a repetitive history of crop failure over the decades and may have accumulated debt. Also, the food insecurity in these regions means most agricultural households may prefer keeping their produce to explore financial gains since droughts, leading to severe hunger, are frequent in these regions. Hence, the severe poverty incidence among agricultural households in these regions, like other parts, makes such households undoubtedly synonymous with poverty-stricken households if one is to profile poverty in Ghana. While irrigation is usually argued as the way forward for agricultural households in Ghana, like other African countries, we argue that such policies should precisely target regions with relatively precarious climate conditions in poverty-alleviating programs. In the short run, significant and inversely related to poverty, mixed cropping should be encouraged among agricultural households, especially in these regions. That is, education on combining drought-resistant crops with other staple food crop species could reduce poverty incidence in these regions. In the long run, we advocate that Ghana’s northern, upper east and upper west should be the destinations for irrigation projects that aim to alleviate poverty through agricultural activities.

**Conclusion and Future Directions**

We shed light on the various factors contributing to poverty among agricultural households in Ghana, rendering them synonymous with poverty-stricken households. Our findings reveal that demographic factors such as the age of the household head, educational level, household size, asset ownership, cropping system and spatial variations significantly influence the likelihood of poverty. Specifically, older household heads tend to have lower poverty incidence due to more robust social networks and better access to informal credit. Conversely, younger agricultural households struggle with poverty due to weaker social capital and limited access to financial resources. The inverse relationship between education and poverty underscores the importance of enhancing educational access in rural areas to promote economic growth and food security. Additionally, household size has a complex relationship with poverty; while larger households generally face higher poverty rates, the effect diminishes when additional household members contribute to the labour force, highlighting the labour-intensive nature of agriculture in Ghana. Hence, policy targeting poverty reduction through population reduction should be revised since poverty in rural Ghana, like other African countries, is a problem of low productivity emanating from the lack of credit access and capital-intensive equipment in the agricultural sector. Hence, combining financial inclusion and agricultural mechanization with Africa’s youthful population can reduce poverty and ensure food security, leveraging the continent’s fertile soil and favourable climate for global agricultural growth. Nevertheless, Financial inclusion presents a paradoxical scenario. While bank accounts are typically associated with improved financial management and access to credit, our findings suggest that having a bank account is linked to a higher likelihood of poverty among agricultural households. This counterintuitive result points to the potential risks of credit default, leading to debt accumulation when crops fail. Thus, mere access to financial services without accompanying financial literacy, skill training and risk management can exacerbate poverty. Also, market dynamics play a crucial role in shaping poverty outcomes. Agricultural households that sell directly to consumers or market traders face higher poverty rates due to exploitative pricing and a lack of competitive markets. Poor road networks compound this issue by limiting market access and enabling traders to dictate unfavourable prices. Spatially, agricultural households in rural areas and specific regions such as the Upper West, Northern, and Upper East are more vulnerable to poverty due to adverse climatic conditions, poor infrastructure, and limited access to credit. Based on our findings, we propose that adapting microcredit and improving access to education in rural areas is paramount. That is, policies targeting financial inclusion should be complemented with financial literacy, quality education, and vocational training tailored to agricultural practices. This will equip agricultural households with the knowledge and skills to effectively enhance productivity. Additionally, establishing cooperative buying mechanisms and market linkages can help farmers secure fair prices for their produce. Diversifying agricultural activities such as mixed cropping should also be encouraged among farmer households. Also, agricultural communities should strengthen social networks that will facilitate group lending or borrowing. Developing better road networks and transportation infrastructure in the long run is crucial to enhance market access for agricultural households. This will enable competitive pricing and reduce traders’ exploitative practices for agricultural produce. While we encourage commercializing the agricultural sector, irrigation projects should be strategically targeted at regions with precarious climatic conditions, such as the Northern, Upper East, and Upper West regions. These projects can mitigate the adverse effects of droughts and unimodal rainfall patterns, enhancing agricultural productivity and reducing poverty. Future research should employ fresh nationwide data to reexamine this topic since the COVID-19 pandemic, doubling as an economic shock, may have introduced new dynamics. Further research on the impact of cooperative buying mechanisms on agricultural household poverty reduction is needed to validate our argument.

**Authors contribution**

LA: Data curation, methodology, data analysis and interpretation, AK: Introduction, discussion, conclusion and future direction. All authors reviewed the manuscript.

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The authors declare no conflict of interest.

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**Appendix 1: Test for Multicollinearity**

|  |  |  |
| --- | --- | --- |
| **Variable** | **VIF** | **1/VIF** |
| Female | 2.02 | 0.494875 |
| Age | 1.41 | 0.711679 |
| Consensual Union | 1.21 | 0.825898 |
| Separated | 1.16 | 0.86534 |
| Divorced | 1.38 | 0.723337 |
| Widowed | 1.74 | 0.573456 |
| Never married | 1.12 | 0.894614 |
| Education Level: |  |  |
| Basic | 1.26 | 0.794006 |
| Middle | 1.34 | 0.746821 |
| Secondary | 1.1 | 0.908935 |
| Voc/Tech/Teacher | 1.04 | 0.964202 |
| Tertiary | 1.02 | 0.982414 |
| Household Size | 9.72 | 0.102929 |
| Household Size Squared | 9.09 | 0.109992 |
| Tenure: |  |  |
| Renting | 1.15 | 0.866883 |
| Rent-free | 1.16 | 0.859788 |
| Perching | 1.01 | 0.993248 |
| Squatting | 1.01 | 0.991094 |
| Has bank account | 1.2 | 0.833513 |
| Owns motorcycle | 1.3 | 0.76787 |
| Owns land | 1.05 | 0.948999 |
| Owns car | 1.1 | 0.912768 |
| Agric equipment owned | 1.26 | 0.794528 |
| Has farm workers | 1.3 | 0.768664 |
| Farmsize | 1.44 | 0.69257 |
| Cropping System |  |  |
| Mixed cropping | 3.54 | 0.28231 |
| Mono & Mixed | 3.73 | 0.267779 |
| Others | 4.19 | 0.238944 |
| Outlet for sale: |  |  |
| Consumers | 1.28 | 0.780778 |
| Pre-harvest contractor | 1.07 | 0.930858 |
| Farm gate buyer | 1.32 | 0.758903 |
| Market trader | 2.08 | 0.481723 |
| State trading organization | 1.35 | 0.741072 |
| Cooperative | 1.15 | 0.866878 |
| Others | 1.09 | 0.917523 |
| Multiple outlets | 1.94 | 0.515106 |
| Urban | 1.13 | 0.888722 |
| Region: |  |  |
| Central | 1.68 | 0.59454 |
| Greater Accra | 1.16 | 0.861628 |
| Volta | 1.91 | 0.522332 |
| Eastern | 1.92 | 0.521662 |
| Ashanti | 1.9 | 0.527291 |
| Brong Ahafo | 2.03 | 0.49343 |
| Northern | 2.72 | 0.367529 |
| Upper West | 1.59 | 0.629352 |
| Upper East | 1.42 | 0.706583 |
| **Mean VIF** | **1.91** |  |