International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Effect of High-Value Crops on Households Economic Status in the Coffee-Banana Farming System of Uganda

Stephen Lwasa[1], Johnny Mugisha[2], and Dick Sserunkuuma[3]

[1]Department of Agriculture, Agribusiness, and Environmental Sciences, Bishop Stuart University
[2]Kabale University
[3]Department of Agribusiness and Natural Resource Economics, Makerere University

Abstract
Smallholder farmers in Uganda's coffee-banana farming system taking up production of Hot Pepper, French Beans and Okra as high-value crops. In this paper, we ascertain the roles that these crops play in wealth inequality reduction, and whether they are among the predictors of wealth and wealth intensity. Using household survey data collected from 522 households in the Coffee-Banana Farming System area, a wealth index is estimated and this is subjected to Gini coefficient analysis. Further, regression using robust and ordered logit models were undertaken with wealth as an dependent variable. Results depict that these crops do not reduce wealth inequality in the short-run, though they have a slight contribution to this development challenge. It is also evident that these crops are not among the determinants of wealth or wealth intensity. It is concluded that the contribution of the crops under study, to shifting smallholder farming households away from the poorly-endowed category is not significant in the short term production horizon.
Ethical Compliance: All procedures performed in studies involving human participants were in accordance with the ethical standards of the Uganda National Council of Science and Technology and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Keywords*:* wealth index, inequality, poorly-endowed, well-endowed

Introduction

It is paramount that agricultural, social, and policy-related research in any country is concerned with the economic well-being of the key economic players. In Uganda, more than 80% of the population is rural, with crop and livestock farming being the major activities. Farming households in Uganda's coffee-banana farming system are taking up the production of hot pepper, French beans, and okra as non-traditional horticultural export crops, with the hope of being better off than their counterparts who do not raise them. The economic well-being of rural dwellers, as evidenced by high poverty levels, is lower in rural areas (Spitzer and Twikirize, 2023; Kwizera *et al.,* (2023). Information about how farming households vary by economic status and the extent to which this relates to variables of interest is central to determining how to target the least endowed.

There is growing concern about inequality among households, locations, communities, and countries, and their likely impacts. For instance, there is increasing evidence of a strong relationship between income[1] inequality and crime rates (Vauclair and Bratanova, 2017) and Sugiharti *et al.,* (2023).

Marmot (2004) reported that high levels of income inequality can create political instability and social problems, and negatively affect economic growth over both short- and long-term periods. Furthermore, greater inequalities among different classes of people have ill-health implications. Wealth inequality can cause corruption and distort public investments (Wei et al., 2023). Unchecked inequality may also lead to the creation of more inequality (Kate et al., 2022). According to Campos et al., (2017), the rich become richer and acquire greater political power and influence, which may lead to the subversion of legal, regulatory, and political institutions. Przychodzen and Gómez-Bezares (2021) report that if the salary of the company head is outrageously high, yet grassroots workers are getting pay cuts, they will indirectly reject this by working less and not minding about product quality. Thus, it cannot be overemphasized that equality is the preferred position.

Economic well-being is an important social phenomenon that varies by society, culture, and village or, in general, is location-specific (Are e*t al*., 2016) . It is an important variable in social and economics-related research since it plays a significant role in the planning and execution of development programs. A household's well-being is variously related to component variables such as physical assets, economic status, education, occupation, social position, social participation, caste, muscle power, and political influence (Wani, 2019). Some of these components tend to go together.

In farming, household economic status dictates farmers' production decisions related to what to produce, how to produce, when to produce, how much to produce, and when to buy inputs and market products. In essence, labor availability; money to expend on purchasing inputs; savings and investment decisions; and types, amounts, and uses of crops grown are functions of household status. It also affects the number and variety of animals livestock farmers can keep, as well as their management tactics and use (Duguma and Janssens, 2016). Given the multitude of objectives to be achieved, a farmer's status also influences their ability to adapt to proposed agricultural technologies, innovations, and emerging crops.

Wealth and its distribution are important for understanding modern society. Wealth is an obvious indicator of position in the social structure and almost certainly a superior indicator compared to income-based measures, but is rarely incorporated in existing concepts or measures of social location (Pfeffer & Waitkus, 2021) and (Wang, 2022). Wealth is important not only because it generates income (Battisti et al., 2025) in a variety of forms, but also because it provides security (Beckert, 2024), freedom to maneuver resources, and economic and political power (Bessière et al., 2024) and (Beckert, 2024).

The measurement of wealth status in developing countries is challenging (Noam et al., 2021), albeit with a specific definition, and what constitutes wealthy and non-wealthy farmers depends heavily on local conceptions of the terms (Biewen et al., 2024). The traditional approach is to use standardized household interview surveys (UBoS, 2025) and Bako et al., (2022). These are based on the "gold standard" approach, which uses income and expenditure data to estimate household welfare status. Quantitative data can be collected from large, generalizable samples of households, examined using statistical methodology, and are comparable across time and/or place (Hargreaves *et al*., 2007a). However, the income/expenditure approach has been criticized because it is likely to be associated with the difficulty of obtaining accurate

[1] This variable has been used as a proxy for household livelihood or economic status indicator (Worrall *et al.* 2003), just like wealth indices (Córdova, 2008).

data from respondents. This could arise either because the respondents were unwilling to provide certain data (Ramírez-Pérez et al., 2024) or because the data may be highly biased (Dillon et al., 2025); Hlatshwayo et al., (2023), Respondents may tend to either underestimate or overestimate their income and/or expenditure because of recall, sensitive information, expectations of the interviewee, misinformation on household members not interviewed, and the dynamics between the interviewer and the respondent. These reasons, along with the fact that collecting detailed income and expenditure information may also be complex (Murphy *et al.,* 2023), time-consuming, and expensive, have led to attempts to develop more feasible approaches to estimating household well-being.

An alternative measure is the use of wealth, measured as household ownership of assets. This is reported to have a much lower non-response rate associated with household asset items than for the income and expenditure variables. However, the under-reporting or over-reporting problem might still be present when household assets are employed, as Hasanbasri et al., (2024) suggest. Initial efforts to use wealth as a well-being measure widely used single assets, such as ownership of radio or television (D'Ambrosio *et al.* 2020) or indices made up of multiple assets Paramashanti et al., 2022). Data aggregation is then achieved through simple counting and weighting of variables based on local consultation using Participatory Rural Appraisal (PRA) or Rapid Rural Appraisal (RRA). More recent approaches to data aggregation involve the application of statistical procedures, such as Principal Component Analysis (Mwansa, 2023), Noah et al., (2025), Jankowska and Hlavsa (2025), and Sarma et al, (2024). This approach assigns non-arbitrary weights that are replicable and systematic (Loske et al., 2025). It provides plausible and defensible weights (Hazarika et al., 2022) for an index of assets to serve as a proxy for wealth (Jhamb *et al.,* 2025; Ducille et al., 2025). The asset index method deals with "multivariate" information on asset ownership of every household (DelaTorre-Díaz and Rodriguez-Aguilar, 2021) and Benedek and Nagy, 2025).

In this study, it is hypothesized that emerging crops *viz:* hot pepper *(Capsicum annum),* French beans *(Phaseolus* spp*.),* and okra *(Abelmoschus esculentus)* play *a* significant role in defining farming households' wealth status and intensity. There is little empirical evidence on the contribution of these crops to farmers' welfare. It is also hypothesized that, besides the contribution of these crops, household wealth status depends on the age, education, and social status of the household head. These objectives were achieved through the application of a quantitative analytical procedure to the data collected through a household survey. First, the study classifies growers and non-growers of hot pepper, French beans, and okra into different wealth categories, characterizes them, and consequently investigates the likelihood of a household being in a particular wealth status. We then analyze whether there are any discernible inequalities between wealth categories. The different levels of growers (either a single crop, a combination of two of the crops, and a combination of the three crops) were then compared to examine how wealth ranking differs among them. Second, we estimate the wealth index based on the number of assets possessed by households. Finally, we use econometric modeling to identify the farm, family, and community covariates that predict the wealth status and intensity.

Materials and Methods

This study was conducted in banana-coffee farming system districts in Uganda (Kishaija, et al., 2025). The districts are Luwero, Masaka, Mpigi, Mukono, Rakai, and Wakiso. The statistical sample size was determined using a formula based on Arsham (2005). Multi-stage purposive sampling was used at the farming system and zone levels based on the production figures of the study crops, *viz:* hot pepper, French

beans, and okra. Purposive sampling was chosen because of its usefulness in quickly reaching the target sample quickly (Asrial *et al.,* 2023). This information was used to create a sampling frame from which the farmers were randomly selected. A total of 522 households with both growers and non-growers of the crops were selected for the study. The 253 households that represented growers had grown at least one of the French beans, okra, or hot pepper during the past three years, at the time of data collection. A total of 249 farming households of non-growers were selected randomly from within the same communities where growers were selected to avoid or reduce geographical and location-specific differences.

Primary data were collected by administering structured pre-tested questionnaires in face-to-face interviews covering farm activities and physical resources in the second season of 2017, first season of 2018, and second season of 2018. This quantitative approach was supplemented by qualitative approaches that included community and key informant interviews, focus group discussions, and observations made during village transect walks.

Primary data that were collected included; (i) Socio-demographic variables: Household head's and spouse's age, education attained, marital status, farming experience, household size, membership in farmer groups and position held in society, among others, (ii) Economic variables: crops grown (including the high-value crops under study), on and off-farm income, consumption expenditure, asset ownership, land tenure, holding and allocation to various activities, use of purchased inputs, total output, prices received for the target and other crops, (iii) Access and constraints to productive assets, knowledge and skills: access to and affordability of hired labour, hired labour by season and activity, contribution of family labour, access to production credit, access to inputs, present and past prices received, access to and type of advisory services and market information in respect of the high value crops, geographical location with respect to markets, major road, input and institutions, (iv) Decision-related variables included choice of enterprises, information sharing, factors considered for inclusion of the study crops and other crops and level of production.

Using the Gini coefficient, a summary statistic of the Lorenz curve, inequality among farmers' wealth was compared (De Luigi, et al., 2023). Wealth and income have been shown to be positively correlated (Wroński, 2021). The Gini coefficient was calculated as follows:

$$G = \frac{1}{\bar{x}n(n-1)} \sum_{i=1}^{n} (2i - n - 1)x_i$$

where the relevant data, which in this case are the wealth index, are ordered in ascending order, G is the coefficient, n is the number of observations in the sample, x is the wealth index of household i (i = 1,...,n), and $\bar{x}$ is the mean wealth (Hasell, 2023). The Gini coefficient ranges from zero (perfect equality) to unity (perfect inequality). The national average for Uganda is 0.42 (UNDP, 2022), up from 0.35 (UBoS, 2005). Optimal Gini coefficients are suggested to be 0.29 for European country and 0.45 (for countries such as China and the USA (Hasell, 2023). A Gini index of < 0.2 represents perfect income equality, 0.2–0.3 relative equality, 0.3–0.4 adequate equality, 0.4–0.5 big income gap, and income 0.5 represents a severe income gap. Therefore, the warning level for the Gini index is 0.4.

The wealth index was estimated using the Principal Component Analysis (PCA) method as was modified from Langyintuo and Mungoma (2008) and Córdova (2008), and used by Shaukat et al., 2020) and Karsai et al., (2024) and DelaTorre-Díaz et al., (2021) among others. This is based on the premise that physical,

natural, financial (Ramírez-Pérez et al., 2024) social, and human assets (figure 1) potentially contribute to household wealth, but their ownership varies between households. In using PCA, the first principal component of a set of variables is the linear index of all the variables that capture the largest amount of information that is common to all variables.

Suppose we have a set of M variables, $a*1h$ to $a*Mh$, representing the ownership of M assets by each household, h. Principal components begin by specifying each variable normalized by its mean and standard deviation. For example, $a_{1h} = (a^*_{1h} - a^*_1)/s^*_1$, where a^*_1 is the mean of a^*_{1h} across households and s^*_1 is the standard deviation. These selected variables are expressed as linear combinations of a set of underlying components for each household j:

$$\begin{aligned} &a_{1h} = v_{11}A_{1h} + v_{12}A_{2h} + \ldots + v_{1M}A_{Mh} \\ &\ldots \qquad\qquad \forall h = 1,\ldots,h \\ &a_{M1h} = v_{M1}Ai_{1h} + v_{M2}A_{2h} + \ldots + v_{MM}A_{Mh} \end{aligned} \tag{1}$$

As are the components and the vs the coefficients of each component for each variable (and do not vary across households). The solution to the problem is indeterminate because only the left-hand side of each line is observed. To overcome this indeterminacy, PCA finds the linear combination of the variables with maximum variance, usually the first principal component $A_{1h,}$ and then a second linear combination of the variables, orthogonal to the first, with maximal remaining variance. Technically, the procedure solves the equations $(\mathbf{R} - \lambda\mathbf{I})\mathbf{v}_n = 0$ for λ_n and $\mathbf{v}_n$, where $\mathbf{R}$ is the matrix of correlations between the scaled variables (as) and $\mathbf{v}_n$ is the vector of coefficients on the nth component for each variable. Solving the equation yields the eigenvalues (or characteristic roots) of $\mathbf{R}$, λn and their associated eigenvectors, $\mathbf{v}_n$. The final set of estimates is produced by scaling $\mathbf{v}_n$s, so the sum of their squares is equal to the total variance.

The "scoring factors" from the model are recovered by inverting the system implied by Equation (1), and yield a set of estimates for each of the K principal components:

$$\begin{aligned} &A_{1j} = f_{11}a_{1h} + f_{12}a_{2h} + \ldots + f_{1M}a_{Kh} \\ &\ldots \qquad\qquad \forall j = 1,\ldots,j \\ &A_{M1h} = f_{M1}a_{1h} + f_{M2}a_{2h} + \ldots + f_{MM}a_h \end{aligned} \tag{2}$$

Therefore, the first principal component, expressed in terms of the original (un-normalized) variables, is an index for each household based on the following expression:

$$A_{1h} = f_{11}(a_h - a^*_1)/(s^*_1) + \ldots + f_{1K}(a^*_{Kj} - a^*_K)/(s^*_K) \tag{3}$$

The assigned weights were then used to construct an overall 'wealth index' by applying the following formula:

$$WI_j = \sum_{i=1}^{m}[n_i(a_{hi} - x_i)]/sd_i \tag{4}$$

Figure 1. Access to key wealth assets

Human capital	**Natural capital**	**Physical capital**	**Financial capital**	**Social capital (Internal transfers)**
1) Household labor capacity based on Household size 2) A dummy for access to hired labor	3) Total farm land 4) Cultivated farm land	5) Total Livestock Units (accounting for cattle, pigs, goats and sheep) 6) A dummy for possession of a car 7) A dummy for possession of a motor cycle 8) A dummy for possession of a radio 9) A dummy for possession of a TV 10) A dummy for possession of a bicycle 11) A dummy for access to a phone 12) A dummy for type of house	13) A dummy for if ever accessed cash credit 14) A dummy for access to remittances and cash gifts	15) A dummy for membership to a farmer group 16) Number of close village associates
Wealth Index				

where $\boldsymbol{WI_j}$ is a standardized wealth index for each household, n_i represents the weights (scores) assigned to the (m) variables on the first principal component, $\mathbf{a_{hi}}$ is the value of each household for each of the m variables, $\mathbf{x_i}$ is the mean of each of the m variables, and $\boldsymbol{sd_i}$ the standard deviation.
A negative index ($-WI_j$) implies that relative to the communities' measure of wealth, the household is poorly endowed and hence worse off, while a positive index (WI_j) depicts a household that is well off. One advantage of PCA, apart from the objectivity of the weights, is that it estimates the contribution of each variable to the underlying index. This enables the ranking of indicators according to their importance in determining wealth (Filmer and Pritchett, 2001). In assigning weights, assets that are commonly owned, such as a radio or bicycle, receive a very low weight. This means that owning a radio or bicycle does little to increase one's wealth index score compared to a respondent who does not have a TV in the household. In sharp contrast, having a car weighs more heavily (Córdova, 2008).

To account for differences in asset sizes and values, those measured in absolute values, such as farm size and household size, need to be scaled from 0 to 1 before being used in the estimation of the wealth indices. The scaling was performed as follows:

$$i = \frac{x_l - x_{\min}}{x_{\max} - x_{\min}} \qquad (5)$$

where i is the index, x_l is the level, and x_{min} and x_{max} are the minimum and maximum values of x, respectively, obtained from the actual data collected. Once scaled (or normalized), the indicators can be added together without the element of distortion, which is introduced by widely differing value ranges (Langyintuo and Mungoma, 2008). The resulting wealth index was a continuous variable with distinct categories.

To estimate the determinants of wealth, a linear robust regression model is estimated as follows:

$$Y = \beta_o + \beta_i X_i + \varepsilon \qquad i = 1, 2 \ldots n$$

where Y is the wealth index, a continuous variable estimated as aforementioned; Xi represents a vector of covariates of farmers', household, and geographical location variables; $\boldsymbol{\beta}$ is a vector of parameters estimated; and ε is the error term that caters for covariates not included in the model.
The major covariates of the empirical model were whether a farmer raised hot pepper, French beans, or okra singly or in combinations of two or all three. Dummy variables (1 for growers and 0 for non-growers) were used to distinguish between farmer categories. The expected sign for the coefficients of these regressors is positive (+). The transformations made to these variables to normalize them and the respective *apriori* expected relationship between the outcome variable and covariates are indicated in Table 1.
The choice of robust regression was to produce estimators that are not unduly affected by small departures from the model assumptions. Robust regressions were designed to circumvent the limitations of traditional parametric and non-parametric methods. In particular, the least squares estimates for regression models are highly non-robust to outliers. In the presence of outliers, least-squares estimation is inefficient. Another reason for choosing a robust estimation was the strong suspicion of heteroskedasticity. To identify the determinants of wealth intensity, ordered logistic regression, an ordinal outcomes approach that maximizes

the log likelihood of the occurrence of an event, was adopted. The model assumes an order based on scales such that $0 < 1 < 2 < 3$, because of the polychotomous nature of the dependent variable. Values of 0, 1, 2 and 3 were assigned to household in the "very low," "low," "medium" and "high" wealth categories.

Table 1. Definition of variables and expected relationships between the covariates and wealth

Covariate	Units of measurement	Transformation made on data	Expected relationship
Grows only okra	Growers=1, Non-growers=0		Positive
Grows only hot pepper	Growers=1, Non-growers=0		Positive
Grows only French beans	Growers=1, Non-growers=0		Positive
Education of household head	Class completed (converted to years)	Square root	Positive
Age of the household head	Years	Square root	Positive
Distance to main market	Kilometers,	Square root	Negative
Holding community post	Holders=1, Non-holders=0		Positive
Household head's marital status	Married=1, other=0		Positive
Having participated in Government or NGO program	Participants=1, non-participants=0		Positive
Number of close village associates	Number	Square root	Positive
Household size	Number of children, head and spouse	Reciprocal of square root	Positive
Purchase of agricultural inputs	Yes=1, No=0		
Ever borrowed money	Yes=1, No=0		

The empirical model was built around the latent model:

$$y^* = \alpha_o + \sum \alpha_i X_i + \varepsilon \qquad (1)$$

Where y^* is unobservable, but we do observe:

$$y = 0 \quad if \quad y^* < 0$$
$$y = 1 \quad if \quad 0 \le y^* < \mu_1$$
$$y = 2 \quad if \quad \mu_1 \le y^* < \mu_2$$
$$\vdots$$
$$y = J \quad if \quad \mu_{J-1} < y^* \qquad (2)$$

where J is the number of categories (in this case, four). Xi is a vector of the explanatory individual, household, and regional variables estimated in the study, and ε is the disturbance term to capture the noise brought about by variables other than those specified that influence the dependent variable. The regressors were similar to those used in the wealth determinant model. In addition, distance to the nearest trading center (in kilometers with a positive expected relationship) and whether respondent purchases

inputs (a dummy variable with 1 for farmers who purchase inputs, 0 otherwise, with the expected relationship being positive) were included.

The ordered logit algorithm simultaneously estimated the parameter vectors for α and μ. The estimated μ values indicate the dividing lines between $Y = 0$ and 1 (μ_0), $Y = 1$ and 2 (μ_1), $Y = 2$ and 3 (μ_2), and so on, for the probability that an outcome is 0, 1, 2, or 3. Standard goodness-of-fit tests for logit models included *t* tests for the estimated coefficients, Chi-square, and likelihood ratio tests on the hypothesis that all variables are zero, and the McFadden pseudo R^2, which is an adjusted R^2 to fit the nonlinear logit procedure (Li and Zhang 2023). using SPSS version 18.0, for Windows, and STATA 15.

Results and discussions

Distribution of farming households by wealth categories

The discussion of the results on household typologies is based on two wealth groups, poorly- and well-endowed households, stratified on the premise of their wealth indices. Out of the total sample of 522 households that were interviewed the majority of the households (295) were poorly endowed. This accounted for 56.5% of the total study population. A comparison of the wealth categories by type and number of high-value crops revealed that, among those who grew only one of the crops, hot pepper farmers were predominant in the poorly endowed category (23.4% compared to 13.7%) (Table 2). Comparable results were also observed for those growing in okra only. The French beans had more farming households in the well-endowed category. Households growing a combination of both hot pepper and okra were double in number in the well-endowed wealth category compared to the poorly endowed wealth category. This is possibly due to the high investment required. Those who grew at least one high-value crop (irrespective of which one) were evenly distributed among the wealth categories (53.2% and 51.1%). As anticipated, households that grew all three crops were dominant in the well-endowed category.

Table 2. Distribution of farmers by wealth category and number of high-value crops grown

Type and number of high-value crop(s) grown	Wealth category (%)	
	Poorly-endowed (n=295)	Well-endowed (n=227)
Grow Okra only	9.8	7.5
Grow Hot pepper only	23.4	13.7
Grow French beans only	16.9	20.3
Grow both Pepper and Okra	7.5	14.5
Grow both Pepper and French beans	8.1	7.9
Grows all the three crops (Pepper, Okra and French beans in combination)	4.4	7.5
Grows at least any of the three crops (Pepper, Okra and French beans)	53.2	51.1

Source: Survey data

These results indicate no clear trend that favors any specific high-value crop being raised by any specific wealth status category. They can be raised by poor- and well-endowed households. This observation could be deeply rooted in the fact that the wealth index variable used in the analysis is a function of many

variables related to human, social, financial, physical, and natural capital, as described in earlier sections of this paper. In other words, as reported by (Targa and Yang, 2023), wealth is a stock that consists of all assets and funds accumulated over a period of time. Therefore, it seems to be a misnomer to hypothesize that the decision to raise these crops in the short to medium production periods would significantly impact household wealth or that they are raised by the well-to-do farmers. This could also be due to the small hectarages raised of these crops (mean of 0.09 ha for okra, 0.15 ha for french beans and 0.2 ha for hot pepper as compared to 1.75 and 2.25 hectares owned and accessed by the households studied) that are farmed by the majority of farmers irrespective of their wealth categories. Being a relatively new crop in the farming system area could also explain this finding.

Characteristics of the studied households by wealth category

Several household characteristics are statistically distinguishable between poorly and well-endowed farmers. For example, the results revealed that the age of the spouse was higher among those who were well-endowed (Table 3). More married respondents were in the well-endowed group of farmers. Respondents' periods of marriage, education, and farming experience of spouses were all significantly different between the two wealth categories, being higher for the former group. A higher wealth status has a positive and significant impact on the adoption of technologies (Destaw and Fenta, 2021), with a positive multiplier effect on the overall status. Well-endowed people spend more on school. This implies that, as Choi (2021) notes. and Galster and Wesselm 2019), wealth may be important in the reproduction of social inequality as it contributes substantially to children's educational attainment. Well-endowed households spend more on food, communication, transport costs, and total household expenses. This is anticipated as they have more funds to dispose of than poorly endowed households, as also observed by Al Wosibei, et al., (2024).and Gichuki et al., 2020). This is further evidenced by the significantly higher household income in the well-endowed household category.

Access to information was significantly higher in the well-endowed category than in the poorly endowed category. This is depicted by their higher levels of access to training, advice, demonstrations, and participation in NGO projects. Those who had previously participated in any government project did not differ significantly between the two categories. This further points to the nature, supervisory and monitoring capacities, and impacts that NGOs could have on household welfare. More farmers who grew okra were significantly better off than those who grew French beans and hot peppers. This trend was also observed among coffee and banana producers. Economic status, as depicted by the wealth index, was observed to be significantly higher among the well-endowed than among the poorly endowed.

Table 3. Selected characteristics of the studied households by wealth category

Characteristics	Poorly- endowed (n=295)	Well-endowed (n=227)	Pooled data (N=522)
I. Socio-demographic variables			
Age of Respondent (years)	37.6 (13.82)	38.4 (10.39)	37.91 (12.44)
Age of Spouse (years)	24.24 (19.17)	31.16** (15.37)	27.25 (17.94)
Married (proportion)	0.68 (0.47)	0.88** (0.33)	0.77 (0.42)
Respondent's marriage (years)	10.35 (11.47)	13.91** (10.47)	11.90 (11.18)
Education of respondent (years)	6.61 (3.74)	8.01** (2.96)	7.22 (3.49)
Spouse's farming experience (years)	6.90(10.03)	11.51** (10.25)	8.91 (10.37)

II. Annual Household expenditure and income (million Shs)			
School dues	0.72 (1.40)	1.17** (2.02)	0.92 (1.71)
Food	0.10 (0.30)	0.18* (0.46)	0.14 (0.38)
Communication	0.15 (0.27)	0.20* (0.31)	0.17 (0.29)
Transport	0.23 (0.44)	0.34* (0.60)	0.28 (0.52)
Total household expenditure	2.28 (2.45)	3.22** (3.16)	2.69 (2.82)
Total household income	2.68 (6.71)	9.73* (4.94)	5.75 (3.31)
III. Access to information			
Access to training, advice, demo (proportion)	0.28 (0.45)	0.37* (0.49)	0.32 (0.47)
Interaction with local area leaders (Member of Parliament and Chairpersons of Local Council 3 and 5 (proportion)	0.07 (0.26)	0.12 (0.32)	0.09 (0.29)
Participated in any Government Project (proportion)	0.12 (0.32)	0.17 (0.37)	0.14 (0.35)
Participated in any NGO Project (proportion)	0.08 (0.27)	0.16** (0.37)	0.11 (0.32)
IV. Production behaviour			
Grow French beans (Proportion)	0.27 (0.44)	0.34 (0.47)	0.30 (0.46)
Grow Hot pepper (Proportion)	0.38 (0.49)	0.36 0.48)	0.37 (0.48)
Grow Okra (Proportion)	0.21 (0.41)	0.28* (0.45)	0.24 (0.43)
Grow Coffee (Proportion)	0.17 (0.38)	0.31** (0.46)	0.23 (0.42)
Grow Bananas (Proportion)	0.21 (0.41)	0.33** (0.47)	0.26 (0.44)
Economic status (wealth index)	-0.53 (0.36)	0.69** (1.13)	0.00

NB: Figures in parentheses refer to standard deviations. **, * refer to 1 & 5% significance levels respectively.

Source: Survey data

Wealth inequality

The results reveal that there is no noticeable difference in terms of wealth inequality among growers of high-value crops. This is evidenced by the Gini coefficients, which are close to each other, *albeit* with a relative tendency towards wealth equality (Table 4) among growers compared to their counterparts.

Table 4. Gini coefficients of household wealth based on farmers' production status of Okra, Hot pepper and French beans

Farmers' HVCs production status	n	Gini-coefficient
At least grows okra	125	0.308
At least grows hot pepper	193	0.299
At least grows French beans	135	0.274
Grows only okra	46	0.313

Grows only hot pepper	100	0.281
Grows only French beans	96	0.238
Grows any two of okra, hot pepper & French beans	122	0.289
Grows all three crops (okra, hot Pepper & French Beans)	30	0.336
Grows any of okra, hot Pepper or French beans	249	0.236
Does not grow any of the High Value Crops	273	0.298

Source: Survey data

Among households that grow okra, hot pepper, or French beans (singly or in combination), results reveal that none of them reduce wealth inequality, (Beckert, 2024). as depicted by the Gini coefficients. Among single-crop-growing households, the Gini coefficients show a slight tendency towards wealth equality. Development-oriented policymakers prefer this situation preferred by development oriented policy makers (Huang et al., 2020). There is weak empirical evidence to show that growing at least one of the three crops could lead to a more equitable wealth distribution than not growing them. The Gini coefficients suggest that growing a combination of all three crops does not lead to reduced inequality. These results indicate that growing crops does not lead to a more equitable wealth distribution. However, it is worth noting that wealth inequality is lower among the study households than the national average which is 0.43 (UNDP, 2022). The implications of this could be rooted in the potential of hot peppers, French beans, and okra to improve wealth distribution if their potential is realized. Rural development agencies and policymakers must take this seriously.

Comparison of wealth among growers and non-growers of the high-value crops

Statistical comparison of the findings further indicates that in as much as households growing the study crops exhibited higher wealth indices, the differences were not significant (Table 5). It was only in the case of hot pepper non-growers who had a significantly higher wealth index than the growers category ($p<0.05$), and with the non-growers having a higher wealth index. These results further reaffirm that the growth of French beans, okra, or hot pepper is not likely to culminate in higher wealth, at least in the short- to medium-run production horizons. This does not imply that the production of these crops should not be encouraged, as households engaged in the production of all three crops had the highest wealth index among all categories (0.596). This implies that households that are better off are more likely to raise high-value crops than their counterparts, or that raising these crops makes them better off. This is likely to be due to the high-risk nature of high-value crops, which also require higher investment.

Table 5. Comparison of wealth indices of growers and non-growers of the study crops

Farmers' HVCs production status	**Sample size**	**Mean wealth indices**		**t-value**	**p-value**
		Growers	**Non-growers**		
At least grows okra	125	0.168	0.031	-0.852	0.395
At least grows hot pepper	193	0.019	-0.049	0.657	0.512
At least grows French beans	135	-0.009	-0.014	0.035	0.972
Grows only okra	46	-0.163	-0.018	0.852	0.396

Grows only hot pepper	100	-0.224	0.018	2.266	0.025
Grows only French beans	96	0.008	0.050	0.309	0.758
Grows any two of okra, hot pepper & French beans	92	0.064	-0.017	0.674	0.501
Grows all three crops (okra, hot Pepper & French Beans)	30	0.596	-0.219	1.813	0.075
Grows any of okra, hot Pepper or French beans	249	-0.006	0.019	0.272	0.785

Source: Survey data

Distribution of assets by wealth category

A comparison among wealth categories based on assets used in the PCA revealed that, as expected *a priori,* the well-endowed category had significantly more land accessible to them and also land cultivated ($p<0.01$ in both cases) than the poorly-endowed category (Table 6). This result agrees with the findings of Kuss et al. (2021)

Table 6. Comparison between the well and poorly endowed households based on wealth index variables

Wealth index variable	**Poorly-endowed (n=295)**	**Well-endowed (n=227)**	**Whole sample (n=522)**
I. Human capital			
Household labour capacity (Family labour)[a]	5.11 (3.09)	5.06 (3.09)	5.09 (3.08)
Proportion (household hires labour)	0.37 (0.48)	0.41 (0.49)	0.39 (0.49)
II. Natural capital			
Total land accessed (Hectares)	1.29 (1.47)	3.22** (8.66)	2.13 (5.89)
Cultivated area (Hectares)	0.86 (0.62)	1.79** (1.99)	1.27(1.47)
III. Physical capital			
Livestock Units (Index)[b]	1.51 (9.43)	3.37* (8.48)	2.32 (9.07)
Possession of a car (Proportion)	0.00 (0.00)	0.04** (0.20)	0.02 (0.13)
Proportion possessing a motorcycle	0.03 (0.18)	0.18** (0.39)	0.10 (0.30)
Proportion possessing a radio	0.72 (0.45)	0.94** (0.24)	0.81 (0.39)
Proportion possessing a television	0.00 (0.24)	0.06** (0.43)	0.11 (0.31)
Proportion possessing a bicycle	0.39 (0.49)	0.87** (0.33)	0.60 (0.49)
Proportion possessing a phone	0.45 (0.50)	0.46 (0.50)	0.46 (0.50)
Proportion of households with permanent residences	0.25 (0.43)	0.73** (0.45)	0.46 (0.50)
IV. Financial capital			
Proportion of households that borrow funds	0.18 (0.38)	0.26* (0.44)	0.21 (0.41)
Proportion of households with remittances	0.39 (0.49)	0.38 (0.49)	0.39 (0.49)
V. Social capital			

Proportion of households that are members in farmers groups	0.10 (0.30)	0.31** (0.46)	0. 19 (0.39)
Close village associates	2.13 (2.85)	5.60** (7.61)	3.64 (5.72)

Source: Survey data

NB: Figures in parentheses refer to standard deviation, ** and * refer to means or proportions that are statistically different between categories at 1% and 5% error probability.

[a] Man-equivalents were estimated using the approach of Langyintuo and Mungoma (2008); household members less than 9 years = 0, 9–15 years or above 49 years = 0.7, and 16–49 = 1.

[b]Livestock units represent an aggregate of different species and classes of livestock as follows: cattle, 1.0; goat, sheep, and pig, 0.1; chicken, duck, and rabbits, 0.04; turkey, 0.05. Adopted from Langyintuo and Mungoma (2008).

The magnitudes of well-endowed households are two and a half times higher than those of poorly endowed households. In terms of livestock units, well-endowed animals were still better off ($P<0.05$) than their counterparts. Similar results were observed for possession of other assets, including cars, motorcycles, televisions, radio, bicycles, and type of residential house ($p<0.05$). There is no significant difference between the two wealth categories with regard to phone ownership. This points to the rate at which communication technology is being adopted and its importance among both poorly and well-endowed categories.

The level of material possessions is related to information seeking (Lehr et al., (2021). The incidence of borrowing funds was significantly higher ($p<0.05$) among the well-endowed than the poorly-endowed. This points to the importance of externally sourced funds for the economic well-being of a household, as noted by Quartey (2006). Membership in farmer groups and the number of close village associates were also significantly different between the two wealth categories ($p<0.01$ in both cases).

Determinants of wealth among farmers of high-value crops

The regression results indicate that French beans and okra are not among the wealth determinants (Table 7). This implies that wealth accumulated over time. Hot pepper production has a significant negative relationship with wealth, implying that it does not contribute to an improved wealth status, nor is it raised only by the well-endowed. These results call for the rejection of the null hypothesis that the production of these crops improves the wealth status of families. Wealth accumulation is not contingent on the production of French beans, okra, and hot pepper in the short run.

Table 7. Variables that determine the wealth status of the studied households

Variable	Coefficient	Standard error	t-value	p-value
Grows French beans (dummy)	0.198	0.328	0.60	0.547
Grows Hot pepper (dummy)	-0.897	0.334	-2.69	0.007
Grows Okra (dummy)	0.139	0.357	0.39	0.697
Education of respondent (school years)	0.350	0.174	2.01	0.045
Age of the respondent (years)	0.394	0.138	2.86	0.004
Holding a post in the community (dummy)	1.318	0.372	3.54	0.000

Whether respondent is married (dummy)	0.804	0.331	2.42	0.016
Number of close village associates	0.359	0.112	3.21	0.001
Household size	0.841	0.986	0.85	0.394
Distance to main market (in kilometers)	0.116	0.072	1.60	0.110
Ever participated in NGO Agricultural project (dummy)	1.592	0.449	3.55	0.000
Ever borrowed money (dummy)	-0.4105516	0.340	-1.21	0.228
Constant	-4.887	1.355	-3.61	0.000

N=522, F (12,509)=8.46, Prob > F = 0.000

The education level of the respondent is one of the determinants of wealth among farmers. This conforms to the findings of Owoputi et al. (2022), who show that households with lower literacy levels are poorer. Abebe *et al.,* (2022) confirmed a positive correlation between wealth and education. Education enhances one's capacity to seek, receive, translate, understand, and use information. Information seeking is related to education (Kadian *et al*., 2000). In conformity with the findings of Pharm et al., (2024), the age of the household head is a significant determinant of wealth. This is due to the accumulation of wealth over years of work experience, which is related to one's age.

Holding posts in a community significantly improves wealth status. This is because of the increased extent of social interaction and access to crucial development-related information, as noted by Diaz-Serrano & Kallis (2022). This is further supported by the positive and significant influence of the number of close village associates on wealth. Marriage plays a role in wealth accumulation. This conforms to the findings of Rehm et al. (2022), which reveal a negative relationship between marriage and poverty. This variable implies that marriage imparts more responsibility and financial pressure on individuals, which forces married farmers to identify ways and means of staying afloat. Kapelle and Lersch, 2020) reported that a longer marital duration is likely to lead to greater wealth accumulation. Conversely, longer spells of divorce and widowhood are more likely to deplete resources. Farmer participation in any NGO program had a positively significant relationship with wealth, which stresses the role that these organizations play in improving farmers' welfare.

Table 8. Variables that determine the intensity of wealth among the studied households

Variable	Coefficient	Standard error	z-value	p-value
Grows French beans (dummy)	0.108	0.211	0.51	0.609
Grows Hot pepper (dummy)	-0.633	0.225	-2.81	0.005
Grows Okra (dummy)	0.226	0.224	1.01	0.313
Education of household head (years)	0.478	0.111	4.32	0.000
Age of the respondent (years)	-0.065	0.087	-0.75	0.453
Whether respondent is married (dummy)	1.011	0.206	4.90	0.000
Distance to nearest trading centre	-0.066	0.084	-0.79	0.428
Household size	-1.576	0.631	-2.50	0.012
Holding a post in the community (dummy)	0.567	0.227	2.50	0.013
Whether respondent purchases inputs	0.214	0.226	0.95	0.342

Number of close village associates	0.523	0.076	6.90	0.000
Ever participated in Government or NGO Agricultural project (dummy)	0.589	0.263	2.24	0.025
/cut1	0.276			
/cut2	1.658			
/cut3	3.033			

N = 522, LR $chi^2(12)$ = 163.54, Prob > chi^2 =0.000, Log likelihood = -641.87, Pseudo R^2 =0.113

The results of the ordered logistic model that depicts the intensity of wealth further indicate that French beans and okra do not increase the log odds of being in a higher wealth category (Table 8). Education significantly improves the ordered log-odds of being in the higher-wealth category. This is also the case with being married, holding a leadership post in a community, number of close village associates, and having participated in a government or NGO agricultural project. Household size reduces the ordered log odds of being in a higher-wealth category.

Cut 1 depicts the estimated cut-off used to differentiate very low wealth from low-, middle-, and high-wealth index values if the predictor variables are evaluated at zero. Subjects with a value of 0.276 or less on the underlying latent variable that gave rise to our wealth variable were classified as very low. Cuts 2 and 3 can be interpreted similarly, as they distinguish between higher levels of wealth.

Conclusion and policy implications

In general, well-endowed firms are better off in terms of natural, physical, financial, and social capital. There are significant differences in asset possession between the two categories, as evidenced by total land access, cultivated area, livestock units, cars, motorcycles, radio, television, bicycles, and phones. This indicates a better quality of life for the well-off category, as anticipated. Residential houses are of better quality for well-endowed houses compared to poorly endowed houses. More of the well-off have had access to borrowed funds and remittances. The well off tends to be more in farmer groups, and also to have closer village associates compared to their counterparts. The possession of these assets may not necessarily have led to higher wealth levels, but wealth also likely results in acquiring them. . The poorly endowed should be assisted by targeted government and private sector programs that will improve asset possession, collective action, and education, among other issues. Growing French beans, hot peppers, and okra did not lead to a significantly more equitable wealth distribution.

Increased public and private sector investment in formal and non-formal (e.g., adult literacy) education that allows farmers to decipher research and extension information will increase the probability of moving from the poorly endowed to the well-endowed category. Additionally, access to advisory services, training, and field demonstrations within farmers' vicinities by governments and NGOs can serve as appropriate education tools. Farmer empowerment is one pathway that helps farmers move towards the better-off category. It is therefore imperative to have more government-funded agricultural projects, which will call for increased budgetary allocation to the agricultural sector, and provision of a more enabling environment that will favor NGO operations will also increase the number of NGO agricultural projects.

The hypothesis that French beans, hot peppers, and okra are among the determinants of wealth or increase in wealth intensity can be rejected. However, there is weak evidence to suggest that these crops could contribute to wealth inequality reduction and that a longer time horizon could lead to the realization of

more significant wealth creation. Studies that analyze these crops over a longer time horizon will contribute further to this area. Farmers need to be encouraged to grow crops on higher scales to benefit from economies of scale if it is truly a policy goal of the Ugandan government to keep smallholders in the export market. Farmers must also be encouraged to interact more with each other and assume leadership roles in their societies to improve their wealth status.

References

1. Abebe, F., Zuo, A., Wheeler, S. A., Bjornlund, H., Chilundo, M., Kissoly, L., & Dube, T. (2022). The influences on farmers' planned and actual farm adaptation decisions: Evidence from small-scale irrigation schemes in South-Eastern Africa. Ecological Economics, 202, 107594
2. Al Wosibei, A. A. T., Alabdulwahed, M. F. M., Abdularhman, I. B. S., Saeedain, J. M. A., AlSadiq, M. A. A., Altalaliwah, A. S. H., ... & AlQattan, A. E. (2024). Critical Analysis of Healthcare Resource Distribution, Cost-Effectiveness, And Equity. Journal of Ecohumanism, 3(8), 5170-5178.
3. Arsham, H. (2005). Tight Bounding of Continuous Functions over Polyhedrons: A New Introduction to Exact Global Optimization. *International Journal of Pure and Applied Mathematics*/19(3):393-413.
4. Asrial, A., Syahrial, S., Kurniawan, D. A., Aldila, F. T., & Iqbal, M. (2023). Implementation of web-based character assessment on students' character outcomes: A review on perception and gender. JOTSE: Journal of Technology and Science Education, 13(1), 301-328
5. Bako, D., D'Orazio, M., Missiroli, S., Ssennono, V. F., Brunelli, C., Kilic, T., and Bolliger, F. (2022). Integrated sampling design for agricultural and socio-economic households surveys: Overview and application in Uganda Harmonized Integrated Survey. Statistical Journal of the IAOS, 38(1), 97-110.
6. Battisti, M., Gravina, A. F., Lavezzi, A. M., Maggio, G., & Tortorici, G. (2025). Wealth and the origins of the education take-off. Journal of Economic Growth, 1-48.
7. Beckert, J. (2024). Varieties of wealth: toward a comparative sociology of wealth inequality. Socio-Economic Review, 22(2), 475-499.
8. Benedek, B., & Nagy, B. Z. (2025). Asymmetries in factors influencing non-fungible tokens'(NFTs) returns. Financial Innovation, 11(1), 28.
9. Bessière, C., Pugliese, M., & Baslyk, V. (2024). Wealth: A Family Matter. Enfances, Familles, Générations, (46).
10. Biewen, M., Glaisner, S., & Kleimann, R. (2024). The shape of the wealth distribution and differences in wealth inequality across Euro area countries. The Journal of Economic Inequality, 1-25.
11. Campos, N. F., & Giovannoni, F. (2017). *Political institutions, lobbying and corruption. Journal of Institutional Economics, 13*(4), 917–939.
12. Choi, L. J. (2021). 'English is always proportional to one's wealth': English, English language education, and social reproduction in South Korea. Multilingua, 40(1), 87-106.
13. D'Ambrosio, C., Jäntti, M., & Lepinteur, A. (2020).Money and happiness: Income, wealth and subjective well-being. *Social Indicators Research, 148*(1), 47–66
14. De Luigi, C., Feldkircher, M., Poyntner, P., & Schuberth, H. (2023). Quantitative Easing and Wealth Inequality: The Asset Price Channel. Oxford Bulletin of Economics and Statistics, 85(3), 638-670.
15. DelaTorre-Díaz, L., & Rodriguez-Aguilar, R. (2021). An Asset Index proposal for households in Mexico applying the Mixed Principal Components Analysis methodology. In International Conference on Computer Science and Health Engineering (pp. 88-106). Cham: Springer International Publishing.

16. Destaw, F., & Fenta, M. M. (2021). Climate change adaptation strategies and their predictors amongst rural farmers in Ambassel district, Northern Ethiopia. Jàmbá: Journal of Disaster Risk Studies, 13(1), 1-11.
17. Diaz-Serrano, L., & Kallis, G. (2022). Political leaders with professional background in business and climate outcomes. Climatic Change, 172(1-2), 14.
18. Dillon, A., Lybbert, T. J., Michelson, H., & Rudder, J. (2025). Agricultural Input Markets in Sub-Saharan Africa: Theory and Evidence from the (Underappreciated) Supply Side. Annual Review of Resource Economics, 17.
19. Ducille, C., Bilsborrow, R., Singh, K., Hussey, J., & Jennings Mayo-Wilson, L. (2025). Association of remittances with skilled delivery in Uganda, 2019/2020. PLOS Global Public Health, 5(6), e0004769.
20. Duguma, B., & Janssens, G. P. J. (2016). Assessment of feed resources, feeding practices and coping strategies to feed scarcity by smallholder urban dairy producers in Jimma town, Ethiopia. SpringerPlus, 5, 1-10.
21. Galster, G., & Wessel, T. (2019). Reproduction of social inequality through housing: A three-generational study from Norway. Social science research, 78, 119-136.
22. Gichuki, C. N., Han, J., & Njagi, T. (2020). The impact of household wealth on adoption and compliance to GLOBAL GAP production standards: Evidence from smallholder farmers in Kenya. Agriculture, 10 (2), 50.
23. Hasanbasri, A., Kilic, T., Koolwal, G., & Moylan, H. (2025). Individual Wealth Inequality: Measurement and Evidence from Low-and Middle-Income Countries. Review of Income and Wealth, 71(1), e12705.
24. Hasell, J. (2023) - "Measuring inequality: What is the Gini coefficient?". Published online at OurWorldInData.org. Retrieved from: 'https://ourworldindata.org/what-is-the-gini-coefficient
25. Hazarika, S. N., Saikia, K., & Thakur, D. (2022). Characterization and selection of endophytic actinobacteria for growth and disease management of Tea (Camellia sinensis L.). Frontiers in Plant Science, 13, 989794.
26. Hlatshwayo, S. I., Slotow, R., & Ngidi, M. S. C. (2023). The role of smallholder farming on rural household dietary diversity. Agriculture, 13(3), 595.
27. Huang, M., Luo, D., Wang, Z., Cao, Y., Wang, H., Bi, F., & Yi, L. (2020). Equity and efficiency of maternal and child health resources allocation in Hunan Province, China. BMC health services research, 20(1), 1-10.
28. Jankowska, A., & Hlavsa, T. (2025). A comparative analysis of diversification of agricultural production among EU candidate countries and Eastern Partnership countries: An international perspective. PloS one, 20(3), e0314471.
29. Jhamb, P., Ferreira, S., Stephens, P., Sundaram, M., & Wilson, J. (2025). Shedding light on development: Leveraging the new nightlights data to measure economic progress. PloS one, 20(2)
30. Kapelle, N., & Lersch, P. M. (2020). The accumulation of wealth in marriage: Over-time change and within-couple inequalities. *European Sociological Review, 36*(4), 580–593
31. Karsai, M., Kertész, J., & Espín-Noboa, L. (2024). A Comparative Analysis of Wealth Index Predictions in Africa between three Multi-Source Inference Models. arXiv preprint arXiv:2408.01631.

32. Kate S., Accominotti, F., Burchardt, T., Hecht, K., Mann E., Mijs, J. (2022). Deliberating Inequality: A Blueprint for Studying the Social Formation of Beliefs about Economic Inequality Social Justice Research (2022) 35:379–400
33. Kishaija, N., Ocwa, A., Kuunya, R., Ssemugenze, B., & Heil, B. (2025). Climate change mitigation and livelihood components under smallholder coffee farming: a bibliographic and systematic review. Agriculture & Food Security, 14(1), 3.
34. Kuss, M. K., Gassmann, F., & Mugumya, F. (2021). How Inclusive are the Local Economic Impacts of Social Protection in Uganda?. The European Journal of Development Research, 1-23.
35. Kwizera, G., Mwirumubi, R., & Asiimwe, S. (2023). Contribution of Agricultural Transformation on Poverty Reduction in Rural Areas of Uganda. A Case of Kisoro District. International Journal of Agriculture, 8(2), 22–53. https://doi.org/10.47604/ija.2029
36. Langyintuo, A.S. and C. Mungoma (2008). The effect of household wealth on the adoption of improved maize varieties in Zambia. Food Policy 33: 550–559.
37. Lehr, A., Büttgen, M., & Bartsch, S. (2021). Don't jump on the bandwagon: Negative effects of Sharewashing. Schmalenbach Journal of Business Research, 73, 75-123.
38. Li, H., & Zhang, K. (2023). Forest fire prediction based on multi-sensor technology. Academic Journal of Computing & Information Science, 6(7), 84-87.
39. Loske, D., Klumpp, M., De Vries, J., Bührmann, A. D., Giese, J., & Lübke, J. (2025). The impact of writing direction on order-picking performance: Evidence on diversity and efficiency in operations management. Production and Operations Management, 34(3), 343-355.
40. Murphy, A., Palafox, B., Chifamba, J., Kruger, I. M., Ncube, B. J., Ncube, T. L., & Hanson, K. (2023). Comparing estimates of household expenditures between pictorial diaries and surveys in three low- and middle-income countries. PLoS global public health, 3(4),
41. Mwansa, F. (2023). Measuring Distribution of Wealth in Zambia Using Census Micro Data: An Application of Principal Component Analysis. International Journal of Economics and Financial Issues, 13(3), 126.
42. Noah, A., David, O., Grobler, W., Alabi, M., Soum, A., Ayache, A., Lemenkova, P., Vuković, P., Kljajić, N., Puškarić, A. and Ajisafe, O.G., (2025). Western Balkan Journal of Agricultural Economics and Rural Development. Western Balkan Journal of Agricultural Economics and Rural Development (WBJAERD), 7(1), pp.1-107.
43. Noam, A., Goldberg, P. K, and Jolliffe, D (2021). "Why Is Growth in Developing Countries So Hard to Measure?" Journal of Economic Perspectives, 35 (3): 215-
44. Owoputi, I., Booth, N., Luginaah, I., Nyantakyi-Frimpong, H., Shumba, L., Dakishoni, L., .& Kerr, R. B. (2022). Does Crop Diversity Influence Household Food Security and Women's Individual Dietary Diversity? A Cross-Sectional Study of Malawian Farmers in a Participatory Agroecology and Nutrition Project. Food and Nutrition Bulletin, 43(4), 395-411.
45. Paramashanti, B. A., Dibley, M. J., Alam, A., & Huda, T. M. (2022). Wealth-and education-related inequalities in minimum dietary diversity among Indonesian infants and young children: a decomposition analysis. Global health action, 15(1), 2040152.
a. Pfeffer, F. T., & Waitkus, N. (2021). *The wealth inequality of nations. American Sociological Review, 86*(4), 669–700.
46. Pham, T. T., Lang, N. D., Ho, C. M., & Vo, D. H. (2024). Educational attainment, household income and wealth accumulation in Vietnam. Social Indicators Research, 172(2), 635-671.

47. Przychodzen, W and Gómez-Bezares, F. (2021). CEO–Employee Pay Gap, Productivity and Value Creation. J. Risk Financial Manag., 14, 196. https://doi.org/10.3390/jrfm14050196
48. Ramírez-Pérez, H. X., DeLaTorre-Diaz, L., & Rivas-Aceves, S. (2024). How Financial Literacy Factors Influence Households' income and Expenses. International Journal of Economics and Finance Studies, 16(2), 302-326.
49. Rehm, M., Schneebaum, A., & Schuster, B. (2022). Intra-Couple Wealth Inequality: What's Socio-Demographics Got to Do with it?. European Journal of Population, 38(4), 681-720.
50. Sarma, P. K., Alam, M. J., Begum, I. A., & McKenzie, A. M. (2024). The effect of total factor productivity on the food security and livelihood vulnerability of farm households in Bangladesh. Frontiers in Sustainable Food Systems, 8, 1395897.
51. Shaukat, B., Javed, S. A., & Imran, W. (2020). Wealth index as substitute to income and consumption: assessment of household poverty determinants using demographic and health survey data. Journal of Poverty, 24(1), 24-44.
52. Spitzer, H. and Twikirize, J. (2023). Social innovations in rural communities in Africa's Great Lakes region. A social work perspective,Journal of Rural Studies, Volume 99,Pages 262-271ISSN 0743-0167
53. Sugiharti, L.; Purwono, R.; Esquivias, M.A.; Rohmawati, H. (2023). The Nexus between Crime Rates, Poverty, and Income Inequality: A Case Study of Indonesia. Economies, 11, 62. https://doi.org/10.3390/economies11020062
54. Targa, M., & Yang, L. (2023). The Impact of Communist Party Membership on Wealth Distribution and Accumulation in Urban China.
55. Uganda Bureau of Statistics (UBOS). (2025). Uganda National Household Survey 2023/24: Key Findings and Methodology. Kampala, Uganda.
56. United Nations Development Programme (2022). Socio-Economic Update of Uganda, Kampala, Uganda.
57. Vauclair, C.-M., & Bratanova, B. (2017). Income inequality and fear of crime across the European region. European Journal of Criminology, 14(2), 221–241. https://doi.org/10.1177/1477370816648993
58. Wang, Y. (2022). A conceptual framework of contemporary luxury consumption. International Journal of Research in Marketing,Volume 39, Issue 3, Pages 788-803,ISSN 0167-8116,https://doi.org/10.1016/j.ijresmar.2021.10.010.
59. Wani, R. T. (2019). Socioeconomic status scales-modified Kuppuswamy and Udai Pareekh's scale updated for 2019. J. Family Med Prim Care. 2019 Jun; 8(6): 1846–1849. doi: 10.4103/jfmpc.jfmpc_288_19
60. Wei, C., Dang, J., Liu, L., Li, C., Tan, X., & Gu, Z. (2023). Economic inequality breeds corrupt behaviour. *British Journal of Social Psychology, 62*(2), 949–971.
61. Wroński, M. (2021). Multidimensional inequality in the european union. The joint distribution of household income, wealth, and consumption. Economics and Sociology, 14(3), 205-219.