

The Impact of Sustainable Finance and Agriculture Growth on Poverty Alleviation: The Role of Digital Agriculture in Vietnam

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Introduction

Poverty is a state in which individuals or communities lack the necessary financial resources and essentials to meet basic human living standards. Despite their potential to meet their basic needs, they lack the necessary capabilities. Individuals or households experiencing poverty face inadequate housing and clothing, subsist on insufficient and unhealthy food, and lack access to clean water. Lack of access to social services, such as medical attention and education facilities, is a pressing issue (Maulu et al., 2021). Poverty frequently leads to various societal issues, such as social discrimination, racism, injustice, increased crime rates, diminished human potential, unequal allocation of natural resources, higher disease and mortality rates, and reduced human capital development. Hence, poverty poses a significant obstacle to the advancement of the economy, political stability, social harmony, and the well-being of individuals (Singh & Chudasama, 2020). Addressing poverty is a crucial concern for community and economic regulators. It involves eradicating poverty at its core, preventing its widespread occurrence, and reducing the number of

The challenges posed by high population and poverty levels require the focused attention of researchers and policymakers. This article examines the effects of sustainable finance, agricultural growth, and digital agriculture on poverty reduction in Vietnam. The study used population growth as the control variable in order to make predictions about poverty alleviation. The article utilised secondary data obtained from reputable sources like the World Development Indicators (WDI) and the Organisation for Economic Cooperation and Development (OECD), spanning the years 1991 to 2022. The article employed the dynamic autoregressive distributed lag (DARDL) model to analyse the relationship between various constructs. The findings indicate that sustainable finance, agriculture growth, and digital agriculture are positively correlated with poverty alleviation in Vietnam, while population growth shows a negative correlation. The study offers guidance to regulators on how to address poverty through sustainable finance, agricultural growth, and digital agriculture.

Keywords: sustainable finance, agriculture growth, digital agriculture, population growth, poverty alleviation

people living in poverty. By addressing poverty, communities can be protected from social problems, economic progress can be maintained, and individuals can experience a harmonious and prosperous existence (Bruckner et al., 2022).

Poverty stems from various factors, such as unemployment, inadequate income, climate change, insufficient access to necessities, and limited natural resources (Nawawi et al., 2020). Therefore, implementing strategies such as sustainable finance, agricultural irrigation land, agricultural raw material exports, agricultural growth, and digital agriculture can prove to be impactful in addressing poverty. Sustainable finance involves incorporating social, environmental, and governance factors into financing decisions, whether through investments or credit. Financial institutions and other investors can incentivize customer firms to prioritise environmental and social responsibility by providing funds with conditions that promote sustainability. This encourages these firms to conduct their operations in a way that minimises negative impacts on the environment and

promotes social well-being. Therefore, climate change is reduced, natural resources are improved, and economic development becomes sustainable, ultimately leading to poverty alleviation (Su et al., 2021).

The increase in agricultural irrigation land, agricultural raw material exports, and overall agricultural growth are what are driving the expansion of agricultural activities within nations. The agricultural sector, whether independently or through economic expansion, generates job prospects, enhances income levels, and caters to human necessities. According to Xiao et al. (2022), poverty alleviation is a direct result of this phenomenon. Digital agriculture involves the utilisation of digital technologies to carry out various agricultural processes. It enhances agricultural operations, enhances the quality of agricultural products, and promotes the growth of agriculture and agribusiness. Improving the living standard of the people and alleviating poverty are potential outcomes in this situation (Huang & Tsai, 2021).

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The poverty rate in the country has declined significantly over the years, dropping from 58% in 1993 to 28.9% in 2002, 14.5% in 2008, and approximately 12% in 2011. Based on statistical estimates, it has been observed that approximately 28 million individuals have successfully escaped poverty within a span of two decades. Based on statistical analysis, it has been observed that approximately 28 million individuals have successfully escaped poverty within a span of two decades. According to the 2014 Global Hunger Index (GHI) report, Vietnam is ranked 15th out of 81 countries grappling with the problem of hunger. By 2016, a small percentage of the population, 5.7%, was living below the poverty line. However, by 2019, the unemployment rate had been successfully reduced to 2.0%. The proportion of people living in slum areas decreased significantly, from 60.5% in 1992 to 13.8% in 2018 (Thanh Binh & Ha, 2019).

However, there is still significant progress needed in addressing the pressing issues of hunger, poverty, and the well-being of marginalised communities, such as people of

colour, disabled individuals, the elderly, and those at risk of crime (Nguyen et al., 2020). This study explores the relationship between various factors and poverty alleviation in Vietnam. It focuses on sustainable finance, agriculture, irrigation land, agricultural raw material exports, agricultural growth, and digital agriculture. The study also considers population growth as a control variable.

The current article provides valuable insights and stands out from the rest in the field of literature. In previous studies, researchers have examined the issue of poverty and explored the impact of sustainable finance, agricultural growth, and population growth on poverty reduction. Unfortunately, there is currently no comprehensive study that analyses the impact of sustainable finance, agricultural growth, and population growth on poverty alleviation. This study emphasises the significance of sustainable finance, agricultural growth, and population growth in assessing poverty alleviation. Furthermore, numerous studies have investigated the impact of agricultural sector growth on poverty alleviation, considering its crucial role in providing essential human needs. The current study examines the impact of the agricultural sector's growth on poverty alleviation by analysing variables such as agriculture irrigation land, agricultural raw material exports, agricultural growth, and digital agriculture. Therefore, it offers a valuable contribution to the field of literature. Additionally, this article provides a comprehensive analysis of sustainable finance, agricultural growth, and the impact of digital agriculture on poverty alleviation in Vietnam.

This study consists of five sections. The second part provides a literature review that examines the connections between sustainable finance, agriculture, irrigation land, agricultural raw material exports, agricultural growth, digital agriculture, population growth, and poverty alleviation. In the third section, a brief overview of the research methodology is provided. In the following section, research findings are extracted using analytical techniques. Ultimately, the findings are examined, the implications for further research are explored, a conclusion is drawn, and any limitations are acknowledged.

Literature Review

Numerous studies have explored the correlation between sustainable finance, agriculture, irrigation land, agricultural raw material exports, agricultural growth, and digital agriculture with poverty alleviation. However, the authors hold contrasting perspectives on these relationships. This section provides an overview of relevant studies to shed light on the relationship between the factors mentioned earlier.

Sustainable finance ensures that investments and credits are directed towards programmes that promote social well-being, environmental preservation, and the regulation of economic activities. Firms prioritise sustainable finance,

stakeholder well-being, environmental protection, natural resource preservation, and job creation. As a result, individuals may experience an improvement in their socioeconomic status, potentially surpassing the poverty threshold (Mhlanga et al., 2020). Lee et al. (2023) conducted a study to look at the connections between sustainable finance, digital financial inclusion, and poverty reduction. Data on sustainable finance, digital financial inclusion, and poverty alleviation in China from 2011 to 2019 were obtained at the provincial level. A heterogeneity analysis was conducted using quantile regression. The study suggests that when sustainable finance is allocated to disadvantaged clients, they are more inclined to implement socially responsible initiatives that enhance financial well-being and address their needs.

Sustainable finance plays a crucial role in addressing poverty. In their study, Jiang et al. (2020) examine the impact of sustainable finance on poverty alleviation. The authors of this study selected 18 indicators from three dimensions—social, environmental, financial, and economic development—to measure the sustainable finance development index of China's 25 provinces and municipalities from 2004 to 2017. They applied the improved entropy method based on relevant theories regarding sustainable finance and poverty alleviation. The study suggests that sustainable finance enables business firms to regulate their practices in order to create a healthy working environment for employees. As a result, their medical conditions are managed, their ability to work effectively is enhanced, and their income is increased. As a result, the employees are spared from experiencing financial hardship.

The agricultural sector plays a crucial role in providing essential resources such as food, clothing, employment, and raw materials for a country's population. However, the effectiveness of agricultural practices relies on the availability of land that can generate natural resources. The presence of irrigation infrastructure, such as pipes, canals, sprinklers, or other man-made systems, can significantly enhance the productivity and quality of agricultural land. Expanding the area of irrigation land allows for increased agricultural activities. People can be confident in their access to both food and non-food items, according to a study by Zhang et al. (2020). In their study, Zhang et al. (2021) investigate the impact of an agriculture irrigation scheme on poverty alleviation in Tanzania.

For the research, a combination of qualitative and quantitative methods was employed. Data was collected using structured questionnaires. Data was collected through focus group discussions (FGDs) and open-ended interviews. In-depth interviews were conducted with six key informants (KIs). The data was analysed using SPSS version 16 to obtain descriptive statistics, such as percentages, frequencies, means, and differences. The findings suggest that implementing a successful irrigation scheme and expanding agricultural irrigation land can enhance land quality and promote productivity. The

increase in agricultural output enhances overall economic productivity while reducing people's accessibility. As a result, poverty levels have declined. In their study, Wang & Li (2019) examine the relationship between agriculture, irrigation land, and poverty alleviation. The study focused on the project of improving agricultural land and reducing poverty in the agro-pastoral transition zone of the northern city. The study provides a clear explanation of how expanding agricultural irrigation land can effectively alleviate poverty within the country.

Agricultural firms engage in the trading of agricultural commodities at both domestic and global scales, like other sectors of the economy. Exports of agricultural raw materials contribute significantly to meeting foreign agricultural demands and generate substantial foreign exchange for domestic firms. The enhanced financial situation resulting from the export of agricultural raw materials enables firms to boost agricultural productivity, leading to significant business expansion. This fulfils the domestic requirements and provides opportunities for citizens to achieve economic benefits through agricultural development. According to Guo & Wang (2021), it leads to a reduction in poverty within the nation. The study by Sikandar et al. (2021) looks at the connections between agriculture raw material exports, foreign capital inflows, agriculture growth, and poverty reduction. Fourteen developing states were chosen to gather global data on agriculture raw material exports, foreign capital inflows, agriculture growth, and poverty alleviation.

Data for these countries from 1990–2018 was collected using the databases of the World Bank's World Development Indicators and the Pen World Table. The findings indicate that exporting agricultural raw materials leads to a significant influx of foreign capital, thereby increasing the potential for agricultural development. Enhancing agricultural growth is crucial for addressing the needs of impoverished individuals and alleviating poverty. Osabohien et al. (2019) conducted a study to examine the connections between agricultural raw material exports, agricultural development, employment creation, and poverty reduction. Data on agriculture raw material exports, agriculture development, employment generation, and poverty alleviation were gathered from West African countries over a period of 17 years, from 2000 to 2016. An econometric technique called the Generalised Method of Moments (GMM) was employed to analyse the data and derive outcomes. The findings suggest a positive correlation between the rise in exports of agricultural raw materials and accelerated agricultural growth, leading to a decrease in poverty levels.

Agriculture plays a crucial role in any economy. This source plays a crucial role in the production of natural resources, which are essential for food consumption, food processing, and supporting various industries by providing infrastructure and raw materials. The expansion of the agriculture sector addresses food shortages and helps alleviate housing and clothing challenges, thereby

contributing to economic stability. The growth of agriculture also leads to job creation, either through increased agricultural practices or through the expansion of agro-based industries. Therefore, the rapid expansion of agriculture can lead to a decrease in poverty (Madi et al., 2020). In their study, Bathla et al. (2020) examined the relationship between agricultural growth and poverty alleviation. This study utilised state-level data and nationally representative data for the analysis. An analysis of public expenditures in economic and social services, government intervention in agriculture, public investment, and input subsidies is used to measure the impact on agricultural productivity.

The study suggests that in nations where the government allocates a portion of its tax revenue towards supporting agricultural development and providing economic and social services, there has been a rise in agricultural productivity, and efforts have been made to enhance the quality of agricultural products. It contributes to the availability of resources and products for public use, meeting basic needs, and improving living standards. Therefore, it is plausible to expect a significant reduction in poverty. Heger et al. (2020) examine the relationship between agricultural growth, irrigation, soil fertility, vegetation quality, and poverty reduction. The authors utilised a unique global panel dataset that connects land ecosystem measurements with poverty statistics derived from surveys and censuses. The study utilised quasi-experimental methods to assess the impact of land improvements on poverty reduction. The study suggests that the rise in agricultural growth enhances agricultural strategies, production, and the supply of agricultural products to the public. It contributes to the reduction of poverty.

Today, organisations across various economic sectors utilise digital technologies and procedures to carry out a multitude of functions. In the field of agriculture, digital technologies are being employed to streamline agricultural practices. These technologies effectively address agricultural challenges and significantly enhance productivity in the field. Meeting the basic needs of individuals is crucial to preventing poverty (Chao et al., 2021). In a recent study conducted by Jinyi & Chunyang (2020), the focus was on analysing the impact of digital agriculture and digital inclusive finance on poverty alleviation in rural areas. The analysis of digital agriculture, digital inclusive finance, and poverty alleviation in China included all 31 provinces as the study sample. The study analysed panel data from 31 provinces across the years 2011 to 2015. The study asserts that the implementation of digital systems in all stages of crop production and animal breeding can lead to significant growth in the agriculture sector and contribute to poverty alleviation.

In their recent study, Lajoie-O'Malley et al. (2020) explore the interconnectedness of digital agriculture, sustainable food systems, and poverty alleviation. Authors searched

FAO (FAO.org/documents), World Bank (Open Knowledge Repository), and OECD (OECD iLibrary) document repositories to collect information for digital agriculture, sustainable food systems, and poverty rates. The study highlights the positive impact of digital agriculture on poverty reduction through agricultural growth. A recent article by Porciello et al. (2022) explores the connection between digital agricultural services, agricultural awareness, and poverty alleviation in lower and middle-income countries. A scoping review was conducted using a methodology aligned with the widely recognised PRISMA-ScR. Agriculture firms that utilise digital technologies have shown improved performance and have made significant contributions to poverty alleviation.

Initiatives such as sustainable finance, agriculture irrigation land, agricultural raw material exports, agricultural growth, and digital agriculture have been implemented to address poverty in the region. Certain factors, such as population growth, have detrimental effects on the environment, strain resources, and hinder economic growth. Consequently, poverty within the region increases or poses obstacles to poverty alleviation (Van Le et al., 2022). In Sargison's (2020) study, the focus was on the relationship between population growth and poverty alleviation. The study indicates that every country possesses a finite number of natural resources or a restricted capacity to generate additional resources. It effortlessly fulfils the essential requirements of a particular demographic. If the population growth rate continues at its current pace, the demand for resources to meet basic human needs will rise accordingly, often surpassing the available supply.

Insufficient resource supply leads to individuals experiencing poverty as they struggle to meet their basic needs. Therefore, the unregulated expansion of the population hinders efforts to alleviate poverty. The article by Erlando et al. (2020) explores the impact of population growth on poverty alleviation. When the population experiences rapid growth, there is an increase in the number of children or infants within the population. In this scenario, there is a significant imbalance between unproductive expenditures and poverty alleviation.

Research Methods

This article examines the effects of sustainable finance, agricultural growth, population growth, and digital agriculture on poverty reduction in Vietnam. The article utilised secondary data obtained from reputable sources such as WDI and the OECD, spanning the years 1991 to 2022. The article established the equation given below:

$$PVA_t = \alpha_0 + \beta_1 SF_t + \beta_2 AIL_t + \beta_3 ARME_{it} + \beta_4 AG_t + \beta_5 DA_t + \beta_6 PG_t + e_t \quad (1)$$

Where;

PVA = Poverty Alleviation

t = Time Period

SF = Sustainable Finance
 AIL = Agricultural Irrigation Land
 ARME = Agricultural Raw Material Exports
 AG = Agricultural Growth
 DA = Digital Agriculture
 PG = Population Growth

The article focused on poverty alleviation, specifically measuring it with the poverty head count ratio at the national level as a dependent variable. Furthermore, the article employed three distinct variables to analyse the subject matter. These variables included sustainable finance, which was measured using the global green finance development

index. Additionally, agricultural growth was measured by examining the percentage of agricultural irrigation land in relation to total agricultural land, as well as the percentage of agricultural raw material exports in relation to manufactured exports. Lastly, the variable of digital agriculture was assessed by examining the percentage of high-technology exports in relation to manufactured exports. Additionally, the article incorporated a control variable called population growth, which was measured as the annual percentage change in population. The measurements and variables are provided in Table 1.

Table 1: Variables and Measurements.

S#	Variables	Measurement	Sources
01	Poverty Alleviation	Poverty head count ratio at national poverty (% of population)	WDI
02	Sustainable Finance	Global green finance development index	OECD
03	Agricultural Growth	Agricultural irrigation land (% of total agricultural land)	WDI
		Agricultural raw material exports (% of manufactured exports)	WDI
		Agricultural, forestry and fishing, value added (annual % growth)	WDI
06	Digital Agriculture	High-technology exports (% of manufactured exports)	WDI
07	Population Growth	Population growth (annual %)	WDI

The article utilised descriptive statistics to analyse the specific details of the variables. Furthermore, the article also analyses the correlation by utilising a correlation matrix. In addition, the article examines the presence of a unit root by employing the PP and ADF and the equation given below:

$$d(Y_t) = \alpha_0 + \beta t + \gamma Y_{t-1} + d(Y_t(-1)) + \epsilon_t \quad (2)$$

Furthermore, the article employed the approach proposed by Westerlund & Edgerton (2008) to analyse the co-integration within the mode. The equations are given below:

$$LM_\varphi(i) = T\hat{\varphi}_i(\hat{r}_i/\hat{\sigma}_i) \quad (3)$$

$$LM_\tau(i) = \hat{\varphi}_i/SE(\hat{\varphi}_i) \quad (4)$$

In addition, the article employed the ARDL model to analyse the relationship between the constructs. This method examines the associations in both the long and short term (Nazir et al., 2018). This method effectively mitigates the adverse impacts of heteroscedasticity and autocorrelation on the outcomes (Zaidi & Saidi, 2018). The equation is given below:

$$\Delta PVA_t = \alpha_0 + \sum \delta_1 \Delta PVA_{t-1} + \sum \delta_2 \Delta SF_{t-1} + \sum \delta_3 \Delta AIL_{t-1} + \sum \delta_4 \Delta ARME_{t-1} + \sum \delta_5 \Delta AG_{t-1} + \sum \delta_6 \Delta DA_{t-1} + \sum \delta_7 \Delta PG_{t-1} + \varphi_1 PVA_{t-1} + \varphi_2 SF_{t-1} + \varphi_3 AIL_{t-1} + \varphi_4 ARME_{t-1} + \varphi_5 AG_{t-1} + \varphi_6 DA_{t-1} + \varphi_7 PG_{t-1} + \epsilon_t \quad (5)$$

The article employed the DARDL model to analyse the relationship between various constructs. This approach effectively addresses the limitations of conventional ARDL. Jordan & Philips (2018) recently developed this approach for time series data. The DARDL equation is given below:

$$\Delta PVA_t = \alpha_0 + \sum \delta_1 \Delta PVA_{t-1} + \sum \delta_2 \Delta SF_t + \sum \delta_3 \Delta SF_{t-1} + \sum \delta_4 \Delta AIL_t + \sum \delta_5 \Delta AIL_{t-1} +$$

$$\sum \delta_6 \Delta ARME_t + \sum \delta_7 \Delta ARME_{t-1} + \sum \delta_8 \Delta AG_t + \sum \delta_9 \Delta AG_{t-1} + \sum \delta_{10} \Delta DA_t + \sum \delta_{11} \Delta DA_{t-1} + \sum \delta_{12} \Delta PG_t + \sum \delta_{13} \Delta PG_{t-1} + \epsilon_t \quad (6)$$

Research Findings

The article utilised descriptive statistics to analyse the specific details of the variables. The results indicate that the mean value of PVA was 8.446, SF was 75.352, AIL was 24.259, and ARME was 2.429. Furthermore, the findings indicate that the mean AG value was 19.883, DA was 1.198, and PG was 3.557. These results are given in Table 2.

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
PVA	32	8.446	1.774	2.480	9.201
SF	32	75.352	24.329	35.47	111.819
AIL	32	24.259	2.000	21.109	27.571
ARME	32	2.429	0.839	1.300	4.357
AG	32	19.883	15.302	8.678	53.689
DA	32	1.198	0.374	0.735	2.138
PG	32	3.557	1.187	0.486	6.878

Furthermore, the article analyses the correlation by utilising a correlation matrix. The findings indicate that sustainable finance, agriculture growth, and digital agriculture are linked to poverty alleviation in Vietnam. The results of the study indicated that population growth in Vietnam has a negative correlation with poverty alleviation and a positive correlation with poverty head count. The results are given in Table 3.

Table 3: Correlation Matrix

Variables	PVA	SF	AIL	ARME	AG	DA	PG
PVA	1.000						
SF	-0.590	1.000					
AIL	-0.638	0.996	1.000				
ARME	-0.221	0.255	0.232	1.000			
AG	-0.766	0.863	0.873	-0.147	1.000		
DA	-0.404	-0.824	-0.824	-0.442	-0.516	1.000	
PG	0.114	-0.432	-0.423	-0.161	-0.358	0.267	1.000

In addition, the article examines the presence of a unit root using the PP and ADF tests. The results suggest that PVA, SF, AIL, DA, and PG do not exhibit a unit root at this level, while ARME and AG do not exhibit a unit root at the first difference. These results are given in Table 4.

Table 4: Unit Root Test

Series	ADF		PP	
	Level	First difference	Level	First difference
PVA	-4.092***	-----	-4.328***	-----
SF	-3.288***	-----	-3.983***	-----
AIL	-3.102***	-----	-4.327***	-----
ARME	-----	-6.595***	-----	-3.212***
AG	-----	-5.901***	-----	-4.397***
DA	-3.299***	-----	-3.222***	-----
PG	-4.336***	-----	-3.191***	-----

Furthermore, the article employed the approach proposed by Westerlund & Edgerton (2008) to analyse the co-integration in the model. The findings indicate that the p-values are below the threshold of 0.05, suggesting the presence of co-integration. These results are given in Table 5.

Table 5: Co-integration Test

Model	No Shift		Mean Shift		Regime Shift	
	Test Stat	p-value	Test Stat	p-value	Test Stat	p-value
LM _r	-5.499	0.000	-4.333	0.000	-5.445	0.000
LM _φ	-5.444	0.000	-4.320	0.000	-5.876	0.000

The article employed the DARDL model to analyse the relationship between various constructs. The findings indicate that sustainable finance, agriculture growth, and digital agriculture are linked to poverty alleviation in Vietnam. The results of the study indicated that population growth in Vietnam is negatively correlated with poverty alleviation and positively correlated with poverty headcount. These results are given in Table 6.

Table 6: Dynamic ARDL Model

Variable	Coefficient	t-Statistic	Prob.
ECT	-0.432***	-3.201	0.003
SF _{t-1}	-1.291**	-2.101	0.032
SF	-1.281***	-5.491	0.000
AIL _{t-1}	-4.382***	-3.901	0.000
AIL	-0.657***	-3.099	0.005
ARME _{t-1}	-0.474***	-4.019	0.000
ARME	-0.654***	-3.091	0.000
AG _{t-1}	-2.019**	-2.001	0.043
AG	-0.463**	-2.003	0.041
DA _{t-1}	-1.928***	-5.593	0.000
DA	-1.356***	-5.402	0.000
PG _{t-1}	0.657***	3.291	0.001
PG	0.741***	4.333	0.000
Cons	3.289***	5.494	0.000

R square = 63.289

Stimulation = 5000

Discussions

The findings indicate a positive correlation between sustainable finance and poverty alleviation. The findings of Nugroho et al. (2019) support the notion that when financial institutions in a country implement policies to offer sustainable finance to their clients, commercial entities can enhance their affordability and engage in

sustainable activities. The outcome is a rise in both the production of goods and the overall national income. This is the reason for the decrease in the poverty line. The results of this study are consistent with research by Tamanni & Haji Besar (2019), which looks at the relationship between sustainable finance and poverty reduction. The study suggests that the implementation of sustainable finance enables business organisations to adopt environmentally friendly practices, address environmental challenges, and maintain their economic contributions to the country. It is possible to exert control over poverty in this scenario.

The findings indicate a positive correlation between agricultural irrigation land and poverty alleviation. The findings of Yang & Zhong (2022) provide support for the idea that agricultural firms can increase agricultural land use by successfully acquiring a larger area for irrigation. Large-scale agricultural projects require extensive land utilisation. As agriculture expands, it leads to an increase in people's income levels and contributes to poverty alleviation. The results of this study are consistent with those of Liu & Wang's (2019) research, which shows that an increase in agricultural irrigation land leads to an increase in agricultural activities and a rise in employment opportunities. The outcome is the alleviation of poverty. The findings indicate that exports of agricultural raw materials are linked to the reduction of poverty. The findings of Hayat et al. (2019) provide evidence that the growth in agricultural raw material exports has a positive impact on both international trade and domestic agrarian production, leading to increased financial resources from foreign economies. In this scenario, individuals can effectively address financial challenges and experience the benefits of poverty alleviation. The results are consistent with research by Nambiar (2019), which shows that an increase in agricultural raw material exports causes growth in the domestic agricultural sector. The result is an increase in job prospects and a reduction in poverty.

The findings indicate that there is a direct correlation between agricultural growth and the reduction of poverty. The findings of Arsyad et al. (2020) provide support for the relationship between agricultural growth and poverty alleviation. The study emphasises that increased agricultural growth leads to expanded activities in various agricultural departments and a rise in employment opportunities. This contributes to the reduction of poverty within the nation. The findings support Omodero's (2019) research, which suggests a positive relationship between agricultural growth and both food production and food processing. The growing availability of food helps alleviate poverty within the country.

The findings indicate a clear correlation between digital agriculture and the reduction of poverty. The findings are consistent with research by Chao et al. (2021), which claims that the integration of digital agriculture by agricultural companies facilitates the expansion of agricultural operations, improves product quality, and generates significant revenue from sales. Firms in a

stronger financial position can offer their employees an improved quality of life. Therefore, the implementation of digital agriculture plays a significant role in reducing poverty. The research by Fabregas et al. (2019) supports the findings of this study. The authors argue that the adoption of digital technologies in agricultural practices by firms can enhance outcomes and boost productivity for domestic and economic purposes. Therefore, poverty is reduced.

The findings indicate that there is a correlation between population growth and poverty reduction. The findings of Nabi et al. (2020) provide support for the notion that a rapid increase in population necessitates an increased demand for essential human needs and employment prospects. Insufficient resources within the country are unable to meet the growing demands, resulting in a rise in poverty rates. The findings are consistent with research by Desta (2021), which contends that an increase in population causes a decline in per capita national income and an expansion of poverty across different regions.

Implications

The current study holds immense importance for researchers, as it guides them in their academic pursuits due to its valuable literary contributions. This study investigates the effects of sustainable finance, agriculture irrigation land, agricultural raw material exports, agriculture growth, and digital agriculture on poverty alleviation. The study also examines the role of population growth as a control variable in poverty alleviation. This study examines the impact of sustainable finance, agriculture irrigation land, agricultural raw material exports, agriculture growth, and digital agriculture on poverty alleviation in Vietnam.

This article holds great importance for economies as it tackles the pressing issue of poverty, a significant social and economic challenge. The study provides guidance to the country's regulators on addressing poverty. The study proposes that the government should actively promote sustainable finance and ensure its accessibility to the population, thereby enabling poverty alleviation. The study suggests that increasing agricultural irrigation land could help reduce poverty in the country. The paper proposes a solution for economists to focus on increasing agricultural raw material exports to reduce poverty. The study proposes that economists and regulators from different countries should collaborate to promote agricultural growth, which can contribute to poverty alleviation. The study suggests that promoting digital agriculture is beneficial for the agriculture sector. It has the potential to mitigate poverty. Furthermore, the study suggests that effective population control is crucial to reducing poverty levels within the country. The study offers guidance to regulators on how to address poverty through sustainable finance, agricultural growth, and digital agriculture.

Conclusion

The study aimed to analyse the effectiveness of sustainable finance, agriculture irrigation land, agricultural raw material exports, agriculture growth, and digital agriculture in poverty alleviation. It also examined the impact of population growth in this context. The statistics of Vietnam were utilised to collect information on the selected variables and conduct analysis. The research findings indicate a strong correlation between sustainable finance, agriculture irrigation land, agricultural raw material exports, agriculture growth, and digital agriculture with poverty alleviation. The study highlights the positive correlation between financial institutions offering sustainable finance and the resulting sustainable economic development and poverty alleviation in the country. The findings also indicate that expanding the area of land used for agriculture irrigation has a positive impact on the productivity of agriculture and agribusinesses, ultimately resulting in a decrease in poverty levels.

The study findings suggest that the rise in exports of agricultural raw materials contributes to the inflow of foreign income. In the end, economic growth is increasing, and poverty is being reduced. The findings indicate that agricultural growth plays a significant role in meeting essential human needs, generating employment opportunities, and stimulating economic development. Therefore, it is feasible to alleviate poverty. The findings indicate that the increasing adoption of digital technology in agriculture has resulted in expanded agricultural practices and economic benefits for individuals, ultimately contributing to poverty reduction. The research findings indicate that population growth has a detrimental effect on efforts to alleviate poverty. As the population grows, the available resources within a country become insufficient to adequately meet the needs of its inhabitants, resulting in a rise in poverty levels.

Limitations

This study has limitations. Future researchers may overcome these constraints. The study only addresses agriculture's poverty-reduction potential. The text does not address other economic sectors or socially beneficial programmes, which are crucial for economic growth and poverty reduction. Thus, the study's findings may not solve poverty. Future academics will likely consider how sustainability programmes reduce poverty across all economic sectors. Many undeveloped and developing nations still struggle with poverty. The global impact of this issue on economic progress and individual welfare is well known. This study on poverty alleviation in Vietnam is narrowly applicable. Future researchers must collect data from multiple countries to boost their credibility.

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