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Green Human Resource Management Practices and Sustainable Performance in Vietnam's Agriculture: The Mediating Role of Green Innovation and Green Culture

Nguyen Nhung[*,a], **Mai Thuy**[a], **Nguyen Phung**[a]

[a] University of Finance and Accountancy, Vietnam

Abstract

The integration of economic development with environmental protection forms a crucial foundation for the sustainable development of society. In this context, Green Human Resource Management Practices (GHRM practices) activities play a bridging role in helping organizations improve sustainable performance while meeting the demands of customers, society, and environmental protection. This not only brings practical benefits to businesses in the agricultural sector but also significantly contributes to global sustainable development. Through a survey of 400 managers and staff in the agricultural sector of Vietnam and utilizing Smart PLS software for data analysis, the study demonstrates that Green Human Resource Management Practices positively impacts sustainable performance through two mediating factors: Green Innovation and Green Culture. These results provide an important practical basis to support managers and policymakers in the agricultural sector in building competitive advantages while creating long-term value for organizations and society. The findings offer actionable insights for implementing specific GHRM practices such as green recruitment, training, and performance assessment to enhance sustainable performance in Vietnam's agricultural context.

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* *Corresponding author*: Nguyen Nhung - University of Finance and Accountancy, Vietnam. E-mail: nguyenthihongnhung@tckt.edu.vn.

Introduction

The global economic context is facing unprecedented challenges related to climate change and environmental degradation, forcing industries to transition to sustainable development models (Popkova & Sergi, 2023). Among them, the agricultural sector, which is the foundation of food security and livelihoods for billions of people, is one of the largest pressures on ecosystems (FOOD & AFFORDABLE, 2022). In developing countries like Vietnam, agriculture not only plays a crucial economic role but also faces a dual challenge: it must enhance productivity to ensure growth while minimizing negative environmental impacts (Feng & Xu, 2025). Organic-oriented innovative behavior plays an important role in the agricultural sector (Lopes *et al.*, 2025).

This context demands a strategic change, not only in technology but also in the management of human resources-the core asset of every organization. Green Human Resource Management (GHRM) practices, an approach that integrates environmental goals into HRM activities, have emerged as a strategic tool to promote sustainable business performance (Amjad *et al.*, 2021). Empirical studies worldwide have demonstrated that GHRM practices positively impact environmental performance and overall organizational performance (Aloqaily & Al-Zaqeba, 2024). This mechanism of effect is often explained through mediating factors, where green innovation and green culture are considered the two most important pathways (Al-Alawneh *et al.*, 2024). A recent meta-analysis also confirms this consistent mediating role across various fields (Bindeeba *et al.*, 2025).

However, there is a noticeable lack of research on GHRM practices in the agricultural sector. Most existing empirical evidence comes from manufacturing and service industries in developed countries (Naseer *et al.*, 2023; Yong *et al.*, 2020). The agricultural sector, with its characteristics such as scale (primarily small and medium-sized enterprises), complex supply chains, and dependence on natural conditions, requires a distinct research perspective. Particularly in Vietnam, a country with an agricultural sector undergoing significant transformation, understanding how GHRM can promote sustainable performance through innovation and culture is an urgent yet underexplored requirement (Kaith & Sachdeva, 2024; Xie & Lau, 2023). To fill this research gap, our study poses two main questions: (1) Do green innovation and green culture play mediating roles in the relationship between GHRM practices and sustainable performance in Vietnamese agricultural enterprises? and (2) What theoretical foundations (Resource-Based View, Social Exchange Theory) can explain these relationships? By addressing these questions, the study not only contributes new empirical evidence to a relatively unexplored field but also provides important

managerial implications for policymakers and agricultural business management in Vietnam.

1. Literature Review and Theoretical Framework

1.1. *Sustainable performance in the agricultural sector*

Sustainable performance refers to an organization's ability to achieve long-term success by balancing economic growth, environmental protection, and social responsibility, thereby creating value for current and future stakeholders. Sustainable performance includes economic, social, and environmental effectiveness (Piwowar-Sulej & Iqbal, 2023). Specifically, economic effectiveness is reflected in an organization's ability to reduce costs related to purchasing materials, energy consumption, waste treatment, and fines for environmental incidents (Ekins *et al.*, 2016; Zhu *et al.*, 2008); social effectiveness refers to the organization's capacity to enhance community welfare, public health and safety, as well as occupational health and safety for employees (Paulraj, 2011); environmental effectiveness relates to reducing emissions, energy use, the use of hazardous materials, and complying with environmental standards (Laosirihongthong *et al.*, 2013).

In the agricultural sector, sustainable performance demonstrates the overall capacity of the agricultural system to maintain productivity and profitability while ensuring environmental integrity and promoting social development over the long term. This concept requires a balance between economic benefits and rational use of resources, minimizing adverse impacts on the ecological system, and improving rural livelihoods, thereby ensuring that agricultural activities not only meet current needs but also maintain the ability to serve the needs of future generations. Achieving sustainable performance is a pivotal factor for addressing emerging global challenges such as climate change, biodiversity loss, and food security (Muluneh, 2021).

1.2. *Theoretical Underpinnings*

This study is built on an integrated theoretical framework, primarily based on the Resource-Based View (RBV) and Social Exchange Theory (SET) to elucidate the complex relationships between GHRM practices, mediating variables, and sustainable performance.

According to the Resource-Based View (RBV), a company's sustainable competitive advantage arises from resources and capabilities that are valuable, rare, difficult to imitate, and non-substitutable (Taher, 2012). In

our context, GHRM practices is not merely a set of discrete activities but a strategic mechanism for building and developing "green human capital". This capital, which encompasses employees' knowledge, skills, and motivations regarding environmental issues, is an immensely valuable internal resource (Malik *et al.*, 2020). When companies invest in green recruitment, green training, and green rewards, they are cultivating a workforce capable of driving green innovation and fostering an environmentally supportive organizational culture (Mansoor *et al.*, 2021). These organizational capabilities (green innovation and culture) are challenging for competitors to replicate, thus creating sustainable competitive advantages and enhancing overall performance.

Meanwhile, Social Exchange Theory (SET) focuses on the reciprocal relationships between individuals and organizations (Cook *et al.*, 2013). SET posits that when employees perceive the organization's concern and investment in goals they value (e.g., environmental protection), they are likely to respond with positive attitudes and behaviors that extend beyond their normal job roles. Specifically, GHRM practices send a strong signal that the organization is committed to sustainability. In response, employees feel obligated to contribute to this common goal, reflected in higher engagement, readiness to participate in green innovation activities, and proactive adherence to and dissemination of the organization's green culture (Piwowar-Sulej & Iqbal, 2023). Therefore, SET provides a micro-level lens for interpreting the motivations that drive employees to become agents of sustainable change.

1.3. *Factors influencing Sustainable Performance in the agricultural sector*

1.3.1. GHRM practices

Green Human Resource Management (GHRM) practices encompass a set of policies and activities aimed at promoting resource efficiency, minimizing environmental impacts, and enhancing employee awareness and commitment to sustainable development goals (Renwick *et al.*, 2013; Jabbour & de Sousa Jabbour, 2016). These practices include green hiring, green training, and green performance assessment.

Firstly, green hiring is crucial for building an environmentally conscious workforce, improving organizational effectiveness (Mishra, 2017). Organizations should prioritize candidates with pro-environmental behaviors and assess their willingness to engage in ecological activities. This includes creating a green employer image through green job descriptions and interview guidelines, emphasizing environmental aspects throughout

recruitment (Al Kerdawy, 2019)a conceptual framework was proposed to list theoretical concepts of GHRM, CSEV and CSR to form hypotheses. Data were collected from 326 respondents occupying the highest managerial positions in the studied firms. Using a structural equation model (SEM. Additionally, fostering employee participation in green practices such as recycling is essential (Nasir *et al.*, 2023).

Secondly, green training involves ongoing education aligned with environmental management goals. Key aspects include knowledge management, raising environmental awareness, and implementing conservation practices. Green training is vital for developing human resource capacity and achieving sustainability objectives (Joshi & Dhar, 2020). Effective training programs should provide relevant resources and enhance employee engagement in green actions like waste management and energy saving (Imran *et al.*, 2021).

Finally, green performance assessment measures individual and organizational effectiveness based on environmental protection criteria. This assessment integrates environmental objectives into performance evaluation systems, promoting commitment to sustainable development (Anuradha & Srivastava, 2018). Studies show that GHRM practices positively influence sustainable performance by reducing waste and pollution (Mousa & Othman, 2020). GHRM practices enhance positive environmental outcomes and are essential for achieving sustainable performance, as emphasized by various researchers (Kramar, 2014; Bombiak & Marciniuk-Kluska, 2018; Ahmad, 2015). Managers, particularly in HR, play a crucial role in achieving environmental objectives by investing in training and rewarding environmentally-conscious employees (Malik *et al.*, 2020b). Green Human Resource Management (GHRM) is increasingly relevant in Vietnam's agricultural sector amid the shift toward sustainable and climate-resilient farming. Green hiring should prioritize candidates with experience in organic cultivation, water-saving irrigation (AWD), and integrated pest management (IPM), aligning with standards like the Sustainable Rice Platform (SRP). Green training must focus on practical techniques and environmental awareness, especially in rural areas where experiential learning is key. Performance assessment should incorporate environmental indicators such as reduced agrochemical use, waste sorting, and compliance with green production protocols. These practices strengthen workforce capacity and support Vietnam's agricultural sustainability goals. Based on this, the study proposes the hypothesis:

H_1: GHRM practices have a positive impact on sustainable performance in the agricultural sector.

1.3.2. Green Innovation

Green innovation involves developing and applying new products, services, processes, or management models to minimize environmental impacts, utilize resources efficiently, and promote sustainable development within organizations. It helps businesses comply with environmental regulations while enhancing ecological performance and social responsibility (Chen, 2008; Kraus *et al.*, 2020). Numerous studies have explored the impact of Green Human Resource Management (GHRM) practices on green innovation and its influence on sustainable performance in the agricultural sector.

Firstly, green innovation is recognized as a foundational approach for implementing GHRM practices, improving ecological performance, and promoting sustainability in agriculture (Ren *et al.*, 2018). Research indicates that GHRM practices enhance employees' knowledge and competencies, facilitating innovation in products and processes (Syafri *et al.*, 2021). Green recruitment improves organizations' ecological management profiles and encourages employee participation in environmental activities, leading to new ideas in environmental management (Renwick *et al.*, 2013). Additionally, green training helps employees identify environmental issues and engage in green activities to stimulate innovation (Ahmeda *et al.*, 2020). Green performance appraisal practices also align employee attitudes with the organization's environmental objectives (Guerci *et al.*, 2016). Studies show that human resource management systems significantly impact organizational innovation and process improvement (Liu *et al.*, 2022).

Secondly, successful green innovation enables agricultural organizations to enhance productivity, strengthen core competencies, and improve economic efficiency (Khurshid *et al.*, 2019). Organizations pursuing green innovation tend to achieve high efficiency by utilizing green processes and tools, creating practical value (Sun *et al.*, 2023). Zailani (2015) assert that green innovation benefits organizations while reducing environmental harm. It supports the use of eco-friendly materials and processes and implements sustainable industrial practices. Key features of green innovation include environmentally friendly technologies and practices that mitigate ecological impacts in agriculture, such as new agricultural equipment design and sustainable supply chains (Awan *et al.*, 2023). These advancements enhance environmental performance, operational efficiency, and cost savings.

Research by Asadi (2020) demonstrates that GHRM practices positively influence organizational sustainable performance through green innovation (Asadi *et al.*, 2020). Additionally, Kanan *et al.* (2023) confirm that green innovation mediates the relationship between GHRM practices and sustainable performance improvements (Kanan *et al.*, 2023). Green innovation in Vietnam's agricultural sector focuses on climate-adaptive crop

varieties, biological pesticides, precision farming technologies, and circular economy models. Farmers and agribusinesses are increasingly adopting drought- and salinity-resistant seeds, using bio-based inputs to reduce chemical dependency, and applying tools like soil sensors and drip irrigation to optimize resource use. Circular practices such as recycling agricultural waste into organic fertilizer or converting livestock waste into biogas are also gaining traction. These innovations help reduce environmental impact, improve productivity, and support the country's transition toward sustainable agriculture. Based on these findings, the study proposes the following hypotheses:

H_2: GHRM practices positively affect Green innovation.

H_3: Green Innovation positively affects Sustainable Performance in the agricultural sector.

H_4: Green innovation positively mediates the relationship between GHRM practices and sustainable performance.

1.3.3. Green Culture

Green Culture comprises a set of environmentally oriented values, beliefs, norms, and practices shared within an organization or community to foster pro-environmental behavior and sustainable development. It is reflected in organizations prioritizing environmental protection in decision-making, encouraging employee participation in green practices, and integrating sustainability principles into daily management (Yong *et al.*, 2020). Numerous studies have explored the impact of Green Human Resource Management (GHRM) practices on Green Culture and its role in enhancing sustainable performance in the agricultural sector.

Firstly, GHRM practices are vital for developing Green Culture within organizations. By embedding green criteria in recruitment, training, appraisal, and rewards, GHRM practices spread environmental values and norms among employees, fostering a shared commitment to sustainability. Renwick *et al.* (2016) showed that GHRM policies enhance environmental awareness and stimulate employee involvement in initiatives essential for establishing Green Culture. Pham *et al.* (2019) demonstrated that GHRM practices positively influence green behaviors and employee engagement with environmental goals, contributing to the development of Green Culture in Vietnamese manufacturing. Mousa and Othman (2020) noted that GHRM not only strengthens individual commitment to green values but also influences how organizations maintain Green Culture over time.

Secondly, Green Culture is recognized as a crucial driver of sustainable performance in modern organizations. When environmental values are

integrated into an organization's culture, businesses improve operational efficiency and promote sustainability across economic, social, and environmental dimensions. Hooi (2021) noted that Green Culture encourages the implementation of environmental initiatives, enhancing overall green performance and competitive advantages (Hooi *et al*., 2021). Ren (2021) confirmed that cultivating Green Culture enables companies to engage employees in environmental protection, leading to resource savings and emission reductions that directly support sustainable performance; fosters green innovation, allowing organizations to develop eco-friendly products and services for sustainable growth (Ren *et al*., 2022).

Green Culture also plays a crucial mediating role between GHRM practices and organizational sustainable performance. According to Ren (2021), it mediates the effect of GHRM practices on measurable outcomes like improved green performance and resource efficiency (Ren *et al*., 2022). Shahzad (2023) confirmed that GHRM practices positively impact sustainable performance only when a strong Green Culture is established (Shahzad *et al*., 2023)or more precisely, green HRM, has significantly transformed in recent years. Human resources are an important and valuable asset of a firm. In this research, green HRM is concentrated on the areas where HRM is held accountable for the company's sustainability initiatives. The research examines the effects of green HRM on organizational performance in China while considering the mediating roles of green innovation (GI. Additionally, Gazi (2024) emphasized that Green Culture enhances the effectiveness of GHRM practices on sustainable performance through increased value sharing and commitment to environmental goals (Gazi *et al*., 2024).

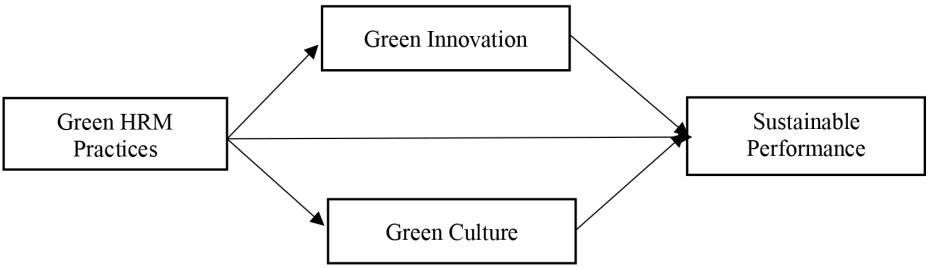
Green culture in Vietnam's agricultural sector is shaped by collective values, informal environmental norms, and community-based leadership. In rural areas, sustainable practices such as waste recycling, reduced chemical use, and ecological conservation are reinforced through social pressure and traditional customs. Informal regulations – rooted in local beliefs and peer influence – play a critical role in guiding environmentally responsible behavior. Cooperative leaders, farmer group heads, and village elders act as cultural facilitators, translating national sustainability goals into locally accepted actions. This bottom-up approach makes green culture a socially embedded force driving sustainable agriculture across Vietnam. Based on these arguments, this study proposes the following hypotheses:

H_5: GHRM practices positively affect Green Culture.

H_6: Green Culture positively affects Sustainable performance in the agricultural sector.

H_7: Green Culture positively mediates the relationship between GHRM practices and Sustainable Performance.

Figure 1 - The model of research



2. Materials and methods

This study utilizes a quantitative research method by employing questionnaires to survey managers and staff in the agricultural sector of Vietnam. The research follows a cross-sectional design to investigate the relationships between Green Human Resource Management Practices, Green Innovation, Green Culture, and Sustainable Performance.

2.1. *Sampling method and sample description*

To test the research hypotheses, this study employs the stratified random sampling method to ensure that the sample adequately represents different hierarchical levels and functional groups within agricultural enterprises in Vietnam (Neyman, 1992). The application of this method enhances external validity by collecting information from different subgroups within the population, while also ensuring the inclusion of participants who possess relevant knowledge and roles associated with the research topic.

A total of 400 questionnaires were distributed, of which 389 valid responses were received, resulting in a response rate of 97.25%. Among the 389 participants, 235 (60.4%) were male and 154 (39.6%) were female. Regarding age distribution, 42.7% of participants were between 25 and 34 years old, 38.3% were between 35 and 44 years old, and 19% were over 45 years old. In terms of work experience, 28.5% had 1 to 5 years of experience, 45.2% had 6 to 10 years of experience, and 26.3% had more than 10 years of experience in the agricultural sector. The breakdown of work positions reveals that 45% were managers and 55% were staff members. In terms of business types, the participation rates were as follows: cooperatives accounted for 29.3%, one-member limited liability companies accounted for 24.9%, two-or-more-member limited liability companies accounted for 19.0%, joint-stock companies accounted for 21.9%, and private enterprises accounted for 4.9%.

Table 1 - Descriptive Statistics of the Sample

Sample Information	Frequency	Percentage (%)
Gender		
Male	235	60.4
Female	154	39.6
Age		
25-34 years old	166	42.7
35-44 years old	149	38.3
Over 45 years old	74	19.0
Work Experience		
1-5 years	111	28.5
6-10 years	176	45.2
Over 10 years	102	26.3
Job Position		
Manager	175	45.0
Staff	214	55.0
Type of Business		
Cooperative	114	29.3
One-member Limited Company	97	24.9
Two-or-more-member Limited Company	74	19.0
Joint-stock Company	85	21.9
Private Enterprise	19	4.9

Source: Authors' data analysis results (2025).

2.2. *Data collection procedure*

Data were collected through direct distribution of questionnaires at agricultural enterprises. The data collection process took place over a period of 2 months (from March to April 2025). Each participant was provided with a questionnaire and had approximately 20-30 minutes to complete it. The questionnaires were then collected directly by the research team to ensure a high response rate and data quality.

2.3. *Measurement scales*

The study uses a 5-point Likert scale (from 1 = "Strongly disagree" to 5 = "Strongly agree") for all variables in the model. The measurement scales were developed based on previous studies and adapted to fit the research context (Appendix A).

2.4. *Data analysis*

Data were entered into Smart PLS 3.0 software for processing. The study employed Cronbach's alpha, Composite Reliability (CR), and outer loading coefficients to assess the reliability of the measurement scales. Subsequently, the authors used outer loading and Average Variance Extracted (AVE) to evaluate the convergent validity of the scales. To assess discriminant validity, the authors used the Fornell-Lacker criterion and the Heterotrait-Monotrait Ratio (HTMT).

To evaluate the structural model, the authors conducted the following steps: assessment of multicollinearity, evaluation of the fit of relationships, assessment of the coefficient of determination R^2, evaluation of effect size f^2, and assessment of the mediating role of variables. This comprehensive analytical approach ensures the robustness of the findings and the validity of the conclusions drawn from the data.

3. Results

3.1. *Research results*

3.1.1. Results of reliability and convergent validity testing of the measurement scales

The reliability of the measurement scales was assessed using Cronbach's Alpha, Composite Reliability (CR), and outer loading (J. F. Hair *et al.*, 2019). Composite Reliability must be greater than 0.7 for the scale to be considered reliable (Diamantopoulos *et al.*, 2012). The results in Table 2 show that all scales have Cronbach's Alpha coefficients greater than 0.8, composite reliability values greater than 0.7, and outer loading values for all observed variables greater than 0.4 (J. F. Hair, 2014). Therefore, the measurement scales in the model are highly reliable.

Table 2 - Results of reliability and convergent validity measurement

Constructs/ Items	Outer Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)	VIF
Green HRM Practices		0.902	0.920	0.561	
GHP1	0.761				1.892
GHP2	0.719				2.088
GHP3	0.725				1.948
GHP4	0.738				1.946
GHP5	0.813				2.869
GHP6	0.752				2.306
GHP7	0.749				2.062
GHP8	0.745				2.041
GHP9	0.735				2.355
Green Innovation		0.894	0.922	0.702	
GI1	0.804				2.047
GI2	0.874				2.758
GI3	0.845				2.359
GI4	0.834				2.391
GI5	0.831				2.174
Green Culture		0.889	0.915	0.644	
GC1	0.777				2.082
GC2	0.835				2.344
GC3	0.822				2.402
GC4	0.761				1.954
GC5	0.825				2.291
GC6	0.792				2.261
Sustainable Performance		0.923	0.934	0.543	
SP1	0.709				2.457
SP2	0.722				2.463
SP3	0.706				2.450
SP4	0.714				2.076
SP5	0.808				2.783
SP6	0.764				2.295

SP7	0.790	3.010
SP8	0.736	2.133
SP9	0.714	2.544
SP10	0.719	2.551
SP11	0.707	2.202
SP12	0.747	2.786

Source: Authors' data analysis results (2025).

To assess convergent validity, outer loading and Average Variance Extracted (AVE) were used. Outer loading values should generally be at least 0.7 for observed variables to be considered of good quality (J. Hair & Alamer, 2022)followed by a discussion of situations in which PLS-SEM should be the method of choice for structural equation modeling. It is argued that PLS-SEM is appropriate when complex models are analyzed, when prediction is the focus of the research – particularly out-of-sample prediction to support external validity, when data do not meet normal distribution assumptions, when formative constructs are included, and when higher-order constructs facilitate better understanding of theoretical models. The most up-to-date guidelines for applying PLS-SEM are provided, and step-by-step guidance is offered on how to apply the method using an R statistical package (i.e., SEMinR. Based on the results in Table 2, all observed variables have outer loading values greater than 0.7, and all AVE values in the model are greater than 0.5 (Subhaktiyasa, 2024). Therefore, the proposed measurement scales meet the requirements for convergent validity.

3.1.2. Discriminant validity

To assess discriminant validity, the authors used the Fornell–Lacker criterion and the Heterotrait-Monotrait Ratio (HTMT) (Henseler *et al.*, 2015). The Fornell-Lacker criterion is shown in Table 3. Table 3 shows that the square roots of AVE for each construct range from 0.661 to 0.838 and are all greater than the highest correlation value of that construct with any other construct in the model. In addition, the HTMT values in Table 4 range from 0.739 to 0.876 and are all less than 0.9. This demonstrates that the proposed measurement scales meet the requirements for discriminant validity.

Table 3 - Fornell-Larcker Criterion

	GC	GHP	GI	SP
GC	0.802			
GHP	0.757	0.749		
GI	0.661	0.788	0.838	
SP	0.765	0.777	0.755	0.737

Source: Authors' data analysis results (2025).

Table 4 - Heterotrait-Monotrait Ratio (HTMT)

	GC	GHP	GI	SP
GC				
GHP	0.841			
GI	0.739	0.876		
SP	0.841	0.849	0.830	

Source: Authors' data analysis results (2025).

3.1.3. Structural model and hypothesis testing

3.1.3.1. Assessment of multicollinearity

The structural model in this study includes multiple paths, necessitating the calculation of the variance inflation factor (VIF) for each sub-model. According to J. F. Hair *et al.* (2019), multicollinearity is not present when the VIF is less than or equal to 5. As indicated by the results in Table 2, all exogenous variables have VIF values below 5, which suggests that the research model's multicollinearity is within an acceptable range. Furthermore, if all VIFs in the inner model, resulting from a comprehensive collinearity test, are equal to or less than 3.3, the model can be deemed free of common method bias (Kock, 2015).

3.1.3.2. Assessment of the coefficient of determination R^2

R^2 analysis evaluates the coefficient of determination using total variance on independent constructs of the dependent constructs (J. F. Hair *et al.*, 2019). The R^2 values of this study's model are: Green Innovation = 0.621, Green Culture = 0.574, and Sustainable Performance = 0.713. These values indicate

that the model explains 62.1% of the variance in Green Innovation, 57.4% of the variance in Green Culture, and 71.3% of the variance in Sustainable Performance, suggesting a substantial explanatory power of the model.

Table 5 - R Square and R Square Adjusted

	R Square	R Square Adjusted
GC	0.574	0.573
GI	0.621	0.620
SP	0.713	0.711

Source: Authors' data analysis results (2025).

3.1.3.3. Assessment of effect size f²

Hair *et al.* (2019) used the f² coefficient to evaluate how important an independent variable is to a dependent variable when removed. Table 6 summarizes the f² effect size results when the authors split the structural model into sub-models with one dependent variable (SP, GC, GI) and several independent variables (J. F. Hair *et al.*, 2019).

Table 6 - Effect size f² results

Relationship	f² Value	Effect size
GHP → GC	1.346	Large
GHP → GI	1.641	Large
GHP → SP	0.062	Small
GC → SP	0.194	Medium
GI → SP	0.127	Small

Source: Authors' data analysis results (2025).

3.1.3.4. Assessment of the fit of relationships

Table 7 - Direct effect relationship results

	Path coefficient	T Statistics	P value
GC → SP	0.366	7.582	0.000
GHP → GC	0.757	28.590	0.000
GHP → GI	0.788	35.965	0.000
GHP → SP	0.253	4.732	0.000
GI → SP	0.314	6.150	0.000

Source: Authors' data analysis results (2025).

The summary results in Table 7 show that, at a 5% significance level corresponding to $t > 4.732$, all relationships in the model are significant ($p < 0.05$). This confirms that all the proposed direct relationships in the research model are statistically supported.

3.1.3.5. Assessment of the mediating role of variables (Assessment of indirect relationships)

To assess the mediating role of Green Innovation and Green Culture, the authors used the procedure of Hair *et al.* (2016), as shown in Table 8:

Table 8 - Indirect effect relationship results

	Path coefficient	Confidence Interval of the Indirect Effect		Result
		2.5%	**97.5%**	
GHP → GC → SP	0.277	0.208	0.356	Partial mediation (complementary)
GHP → GI → SP	0.247	0.172	0.339	Partial mediation (complementary)

Source: Authors' data analysis results (2025).

The results in Table 8 indicate that both Green Culture and Green Innovation serve as partial mediators (complementary) in the relationship between GHRM practices and Sustainable Performance. This means that

GHRM practices influence Sustainable Performance both directly and indirectly through these mediating variables.

3.1.3.6. Conclusion on research hypotheses

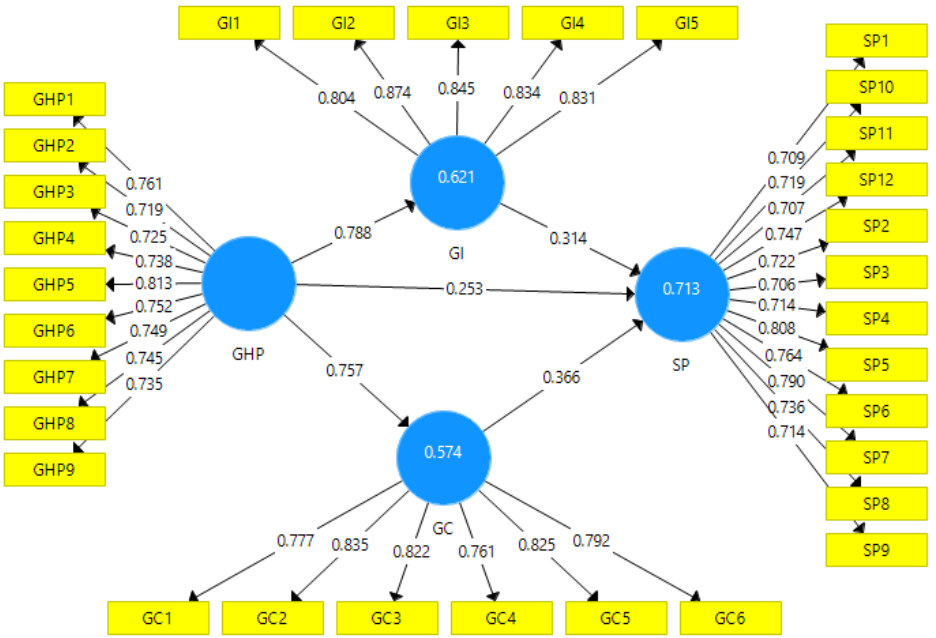
Based on the results of direct and indirect relationship assessments through path coefficients and the evaluation of the mediating roles of variables in the model above, the authors draw conclusions for the research hypotheses as shown in Table 9.

Table 9 - Conclusion on research hypotheses

Hypothesis	Statement	Conclusion
Direct relationships		
H1	GHRM practices have a positive impact on Sustainable Performance in the agricultural sector	Accepted
H2	GHRM practices positively affect Green Innovation	Accepted
H3	Green Innovation positively affects Sustainable Performance in the agricultural sector	Accepted
H5	GHRM practices positively affect Green Culture	Accepted
H6	Green Culture positively affects Sustainable Performance in the agricultural sector	Accepted
Mediating relationships		
H4	Green Innovation positively mediates the relationship between GHRM practices and Sustainable Performance	Accepted
H7	Green Culture positively mediates the relationship between GHRM practices and Sustainable Performance	Accepted

Source: Synthesized from research results.

Figure 2 - Model Evaluation Results



3.2. *Discussion*

Research results show that Green Human Resource Management practices are important factors influencing the Sustainable Performance of organizations in the agricultural sector. This demonstrates that integrating environmental factors into human resource management policies and practices not only raises awareness, attitudes, and behaviors of employees towards environmental protection but also directly contributes to improving the long-term performance of the organization across three aspects: economic, social, and environmental. This result is fully consistent with the findings of Shahzad (2023), showing that Green Human Resource Management plays an important role in promoting green work behavior and improving the sustainable performance of organizations in the modern context (Shahzad *et al.*, 2023).

Notably, the research also highlights the important mediating role of Green Innovation in the relationship between GHRM practices and Sustainable Performance. Green Innovation serves as a bridge, transforming green resources and awareness into environmentally friendly solutions, processes, and new products, helping organizations respond more effectively to

environmental challenges and modern market needs. This result is consistent with the findings of Shahzad (2023), Syafri (2021) and Liu (2022), all of which point out that GHRM practices not only have a direct positive impact but also indirectly promote Sustainable Performance through the spread of Green Innovation in organizations (Syafri *et al.*, 2021; Liu *et al.*, 2022). Domestic and international markets are increasingly demanding clean agricultural products that are traceable and environmentally friendly. At the same time, the Vietnamese government is actively promoting policies for green agricultural development – for example, the Strategy for Sustainable Agriculture Development to 2030. These factors create strong incentives for organizations to adopt Green Human Resource Management (GHRM) practices and green innovation in order to meet both market expectations and policy requirements.

In addition, green culture plays a key role in strengthening and enhancing the effectiveness of GHRM practices on the sustainable performance of organizations (Ren *et al.*, 2022). When green culture is disseminated and deeply rooted in the organization, it shapes values, norms, attitudes, and behaviors related to environmental issues, encouraging all employees to actively participate in environmental protection and sustainable development initiatives. This factor adds a new perspective to the research, enriching the contribution by illustrating how a strong green culture can amplify the positive impact of GHRM practices on sustainable outcomes (Kanan *et al.*, 2023). Green culture plays an extremely important role in the context of Vietnam, particularly in enhancing the effectiveness of Green Human Resource Management (GHRM) practices in the sustainable performance of organizations. In a country where agriculture accounts for a significant portion of the economy, developing a green culture not only contributes to the sustainable development of the agricultural sector but also protects the livelihoods of millions of farmers. This culture integrates traditional values that respect nature, encouraging communities to participate in environmental protection and sustainable development initiatives. Moreover, green culture promotes innovation in adopting sustainable farming methods, helping agricultural organizations adapt better to current environmental challenges. The Vietnamese government is also striving to implement supportive policies for sustainable development; therefore, a strong green culture within organizations will facilitate the achievement of these goals. Furthermore, optimizing production processes through green practices will improve organizational performance while minimizing waste and negative environmental impacts (Tuyết, n.d.). In summary, developing a green culture not only benefits individual organizations but also contributes to society as a whole, moving towards a more sustainable future for Vietnam.

Organizations can focus on integrating green criteria throughout HR processes-such as incorporating environmental objectives into recruitment, training, and evaluation systems. In Vietnam's agricultural context, implementing employee training programs on sustainable farming techniques, efficient water resource use, or reducing agricultural chemical use can bring significant benefits. For example, agricultural companies could develop training modules on organic farming methods or establish mentoring programs where experienced sustainable farmers guide newer employees. Similarly, performance evaluation systems can be designed to reward employees who propose and implement resource-saving solutions or waste reduction in agricultural production processes. One effective practice could be establishing "green performance metrics" that track specific environmental contributions alongside traditional productivity measures.

Promoting an organizational culture that values sustainability through training, recognition, and incentives for green initiatives can further reinforce these practices. In the agricultural sector, recognition and reward programs can focus on initiatives such as improving water-saving irrigation systems, processes for converting waste into organic fertilizer, or applying technology to reduce carbon emissions in agricultural supply chains. Agricultural businesses could implement monthly "Green Champion" awards for employees who develop innovative sustainable solutions, or create dedicated innovation funds that financially support employee-led environmental projects.

This study presents several important theoretical contributions. First, it extends the application of the Resource-Based View (RBV) to the agricultural sector, demonstrating that "green human capital" and organizational capabilities such as "green innovation" are strategic resources that can generate competitive advantages even within a traditional field. Second, by confirming the roles of mediating variables, the research clarifies the "black box" in the GHRM-performance relationship, providing evidence for the operational mechanisms of Social Exchange Theory (SET), where the organization's investment is "reciprocated" by employees through innovative behaviors and adherence to culture.

4. Conclusions

4.1. *Recommendations*

Based on the research findings, the author proposes several recommendations to enhance sustainability in the agricultural sector through green human resource management practices.

4.1.1. Policy Recommendations

First, it is necessary to build a strong and comprehensive legal framework to promote green human resource management practices in the agricultural sector. State management agencies need to issue policies and regulations that encourage agricultural businesses to apply green practices in human resource management, such as providing tax incentives, financial support, and other assistance for businesses implementing green human resource management initiatives.

Second, awareness and education about the importance of Green Human Resource Management in the agricultural sector need to be enhanced. Functional agencies need to organize communication campaigns, seminars, and training programs to raise awareness of businesses and employees about the importance of green human resource management for sustainable development in agriculture.

Third, promote research and development on Green Human Resource Management in the agricultural sector. Management agencies need to invest in research and development of effective green human resource management models and practices, suitable for the specific characteristics of the agricultural sector, while promoting knowledge and technology transfer between research organizations, universities, and businesses.

4.1.2. Recommendations for Businesses

For businesses, the author proposes three main recommendations:

First, integrate environmental factors into all aspects of human resource management. Agricultural businesses need to incorporate green criteria into recruitment, training, performance evaluation, and reward policies. Specifically, in the recruitment process, businesses can prioritize candidates with knowledge, skills, and positive attitudes towards environmental issues. In training, businesses need to organize training courses on environmental protection, sustainable use of resources, and green production techniques. For performance evaluation, businesses should develop evaluation criteria related to compliance with environmental regulations and contribution to the organization's sustainable goals.

Second, build and develop a green culture in the organization. Business leaders need to demonstrate a strong commitment to environmental issues, creating favorable conditions for the formation and spread of green culture in the organization. Businesses can organize activities to raise awareness about environmental protection, encourage employees to participate in green

initiatives, and recognize and reward outstanding contributions of employees to the organization's sustainable goals.

Third, invest in green innovation and application of technology in agricultural production. Businesses should encourage and support employees to propose and implement green innovation initiatives, invest in research and development of environmentally friendly solutions, processes, and products. Businesses can establish working groups specializing in green innovation, organize competitions to propose green initiatives, and provide necessary resources to realize innovative ideas.

4.1.3. Limitations and future research directions

Although the research objectives have been achieved, the study still has certain limitations. First, the study uses data from a single point in time, so it is difficult to assess the impact of green human resource management practices on sustainable performance over time. Second, the study focuses only on the agricultural sector in Vietnam, so the results may not be entirely suitable for other sectors or countries.

Based on the above limitations, the author proposes some future research directions as follows: (1) Conduct longitudinal research to assess the long-term impact of Green Human Resource Management practices on Sustainable Performance, (2) Expand the scope of research to other sectors beyond agriculture to compare and evaluate differences, (3) Research more deeply on cultural and organizational factors affecting the effectiveness of green human resource management practices.

4.2. *Conclusion*

The study confirms that Green Human Resource Management practices have a significant positive impact on Sustainable Performance in the agricultural sector, both directly and indirectly through the mediating roles of green innovation and green culture. Integrating environmental protection into HR policies not only enhances employees' awareness and behaviors but also contributes to improving the long-term effectiveness of organizations in economic, social, and environmental aspects. The findings provide important theoretical and practical implications for managers and policymakers in promoting sustainable agricultural development in Vietnam. In the context of increasing environmental challenges and global integration, the application of GHRM, Green Innovation, and Green Culture will be key factors helping the agricultural sector achieve sustainable growth and create lasting value for society.

Conflict of interest statement

The authors commit to declaring that there are no conflicts of interest related to the publication of this article.

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Appendix A

Table A - Measurement of variables

Items	Statements	Sources
Green HRM Practices (GHRM)		
GHP1	Green issues specified in job descriptions at companies and cooperatives	Renwick *et al.*, 2013; Correia *et al.*, 2024
GHP2	Green employer branding at companies and cooperatives (Green employer of choice)	
GHP3	Companies and cooperatives recruit employees who are green-aware	
GHP4	Training for green jobs and integrated training will create emotional involvement in HRM	
GHP5	Green knowledge management using the tacit knowledge of human resources in GHRM	
GHP6	Training workshops on green orientation for managers and employees at companies and cooperatives	
GHP7	Green performance indicators are included in green performance systems and appraisals	
GHP8	Managers set green targets, goals, and responsibilities	
GHP9	Managers set objectives for achieving green outcomes included in appraisals	
Green innovation (GI)		
GI1	Our companies/cooperatives competes in the market and always uses new technology	Asadi *et al.*., 2020; Correia *et al.*, 2024
GI2	Our companies/cooperatives uses materials that are easy to recycle, reuse, and decompose	
GI3	Our companies/cooperatives recovers the company's end-of-life products and recycling.	
GI4	Our companies/cooperatives uses cleaner or renewable technology to make savings (such as energy, water, and waste)	
GI5	Our companies/cooperatives redesigned production and operation processes to improve environmental efficiency	
Green culture (GC)		
GC1	Our companies/cooperatives makes a concerted effort to make every employee understand the importance of environmental preservation	Banerjee, 2002; Fraj *et al.*, 2011; Wang, 2019.

GC2	Our companies/cooperatives has a clear policy statement urging environmental awareness in every area	
GC3	Environmental preservation is a high priority activity in our companies/cooperatives	
GC4	Preserving the environment is a central corporate value in our companies/cooperatives	
GC5	Our companies/cooperatives links environmental objectives with our other corporate goals	
GC6	Our companies/cooperatives develops products and processes that minimize environment impact	
Sustainable Performance (SP)		
SP1	We have improved overall stakeholder welfare	Yusliza *et al.*, 2020; Correia *et al.*, 2024
SP2	Improvement in community health and safety	
SP3	It improved the occupational health and safety of employees	
SP4	Improved awareness and protection of the claims and rights of customers in the community served	
SP5	Improved compliance with environmental standards	
SP6	Reduction in energy consumption	
SP7	Reduction in material usage	
SP8	Reduction in the consumption of hazardous materials.	
SP9	Decrease in costs for materials purchasing	
SP10	Decrease in costs for energy consumption	
SP11	Decrease in fees for waste discharge	
SP12	Decrease in fines for environmental accidents	

Nguyen Nhung
Faculty of Business Administration, University of Finance and Accountancy
University of Finance and Accountancy, 02 Le Quy Don Street, Tu Nghia Commune, Quang Ngai Province, Vietnam
E-mail: nguyenthihongnhung@tckt.edu.vn
Phone number: 0906465689
ORCID: https://orcid.org/0009-0008-9662-3881
She holds a Master's degree in Business Administration. Her research interests include agricultural economics, quality management, brand management, and innovative entrepreneurship.

Mai Thuy
Faculty of Business Administration, University of Finance and Accountancy
University of Finance and Accountancy, 02 Le Quy Don Street, Tu Nghia Commune, Quang Ngai Province, Vietnam
E-mail: maithithanhthuy@tckt.edu.vn
Phone number: 0905264679
ORCID: https://orcid.org/0009-0007-4935-0924
She holds a Master's degree in Business Administration. Her research interests include agricultural economics, supply chain management, and risk management.

Nguyen Phung
Faculty of Business Administration, University of Finance and Accountancy
University of Finance and Accountancy, 02 Le Quy Don Street, Tu Nghia Commune, Quang Ngai Province, Vietnam
E-mail: nguyenthiphung@tckt.edu.vn
Phone number: 0939575445
ORCID: https://orcid.org/0009-0001-1830-119X
She holds a Master's degree in Business Administration. Her research interests include Innovative Startup, Consumer behavior.