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# Demographic Influences on Farmers' Environmental Protection Behaviors in the Mekong Delta

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**Abstract**

This study examines the influence of demographic factors on farmers' environmental protection behaviors in the Mekong Delta, a region vital for Vietnam's ecological and agricultural sustainability. Focusing on gender, education, farm size, and agricultural experience, the study identifies key demographic determinants across agricultural production, technology investment, and daily life. A cross-sectional survey of 250 farmers from a Mekong Delta province was conducted using a structured questionnaire comprising six scales, which demonstrated acceptable reliability. Data were analyzed using descriptive statistics, t-tests, and ANOVA. Results revealed significant demographic differences: female farmers scored higher in agricultural production practices ($M = 3.02$, $SD = 0.76$) than males ($M = 2.78$, $SD = 0.71$, $p = 0.013$); farmers with higher education outperformed those with lower education in technology investment ($M = 3.21$ vs. $M = 2.70$, $p < 0.001$); small-scale farmers engaged more strongly in environmental behaviors ($p = 0.029$); and farmers with less than 10 years of experience reported better environmental practices ($p < 0.001$). The findings highlight the need for targeted policies and educational programs to address demographic disparities and promote sustainable farming practices, particularly among women, smaller-scale farmers, and less-experienced farmers. Future research should integrate economic and institutional factors to further enhance environmental stewardship in the Mekong Delta.

**Keywords:** Agriculture, Demographic Factors, Environmental Protection Behavior, Farmer, Mekong Delta.

## Introduction

Environmental protection behavior includes various actions to safeguard the environment, influenced by factors such as social capital, environmental risk perception, and awareness (1). Engaging in these activities enhances farmers' subjective well-being by improving their quality of life and social interactions (2). The Theory of Planned Behavior predicts specific environmental behaviors more effectively when models are specifically worded, although the improvement varies across contexts (3). In Chile, while environmental concern and awareness are high, pro-environmental actions often involve low-cost behaviors with minimal restrictions, with younger individuals from lower socioeconomic groups scoring lowest on such behaviors (4). If farmers fail to adopt environmentally sustainable practices, their activities can lead to serious environmental harm. The excessive use of fertilizers and pesticides depletes soil fertility and harms soil organisms, resulting in erosion and reduced land productivity (5, 6). Moreover, monoculture and chemical inputs reduce biodiversity, weaken ecosystems, and increase vulnerability to pests and diseases (7). These impacts highlight the urgent need for sustainable farming to protect both the environment and agricultural productivity. Environmental protection behavior in agriculture involves farmers adopting sustainable practices to mitigate environmental impacts. Participation in agri-environmental programs improves farmers' environmental awareness and waste management practices (8). Such behaviors also enhance farmers' subjective well-being by improving quality of life and social interactions (2). An integrated model combining the Theory of Planned Behavior and Protection Motivation Theory highlights key factors influencing environmental behavior, including perceived threat, subjective norms, attitudes,



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self-efficacy, and response efficacy (9). Environmental protection behavior in agriculture is vital for mitigating environmental degradation and enhancing farmers' well-being. These behaviors directly improve farmers' subjective well-being and quality of life (2). However, assessing such behaviors is challenging due to the unreliability of self-reporting caused by social desirability bias (10). Legal cognition significantly influences farmers' pro-environmental actions by shaping their intentions and moderating behavior (11). Addressing agricultural environmental issues requires a comprehensive framework that integrates environmental, behavioral, and policy dimensions, particularly in ecologically vulnerable regions of developing countries where cultural, economic, and behavioral factors contribute to the complexity (11-13). Environmental protection behavior in agriculture in the Mekong Delta is vital due to its socioeconomic and ecological importance. Economic status significantly impacts environmental awareness and stewardship, with poverty limiting pro-environmental behavior (14). Biodiversity conservation relies on awareness and education, particularly among university students, to promote protective behaviors essential for ecosystem health (15). Sustainable agriculture requires diverse, integrated farming methods that balance environmental and social needs (16). Additionally, transitioning to mechanized rice production is crucial for improving agricultural practices and ensuring sustainability (17).

Research shows that various sociodemographic factors, including age, experience, education, and gender, influence farmers' environmental protection behavior, often shaped by cultural-historical patterns and scheme factors (18). Psychological elements such as participation consciousness, benefit perception, and perceived behavioral control play key roles in shaping both intentions and actual behavior (19). Practical knowledge and personal experience also strongly affect environmental attitudes and actions (20). Education moderates the link between environmental protection behavior and subjective well-being, with more educated farmers potentially deriving less well-being from these activities (2). Additionally, the policy environment significantly impacts the relationship between farmers' intentions and their participation in environmental protection (19). Together, these factors create a complex and multifaceted framework influencing farmers' environmental behavior.

This study aimed to investigate the influence of demographic factors on farmers' agricultural environmental protection behavior, focusing on identifying which specific demographic factors affect their environmental practices.

# Methodology

This cross-sectional study used a convenience sampling method to survey farmers in a province of the Mekong Delta. Farmers were given detailed information about the study, and the survey was conducted only if they agreed to participate. The study followed the American Psychological Association's guidelines for research involving human subjects, ensuring that all participant information remained confidential.

The researchers developed a questionnaire tailored to the study's objectives, consisting of six scales: Environmental Protection Behavior in Agricultural Production (30 items), Environmental Protection Behavior in Technology Investment (6 items), Environmental Protection Behavior in Daily Life (11 items), The Necessity of Environmental Protection (5 items), The Convenience of Environmental Protection (3 items), and Attitudes toward Environmental Protection (3 items). The first three scales were rated on a 4-point Likert scale, ranging from 1 (Do not intend to do) to 4 (Do regularly). The remaining three scales used a 3-point Likert scale, ranging from 1 (Disagree) to 3 (Agree).

After data collection, the researchers entered the data into SPSS version 20 for coding and analysis. Reliability statistics indicated that the scales had reliability values ranging from 0.676 to 0.947, suggesting good reliability (refer to the information presented in Table 2). Descriptive statistics were used to analyze demographic variables, while t-tests and ANOVA were applied to examine differences between demographic groups.

# Results

Table 1 presents the sociodemographic characteristics of the participants (N = 250). Gender distribution indicates a nearly equal representation, with 48.0% (n = 120) male and 52.0% (n = 130) female respondents. In terms of age, the largest proportion of participants (54.4%, n = 136) fell within the 51–60 years age group, followed by 25.6% (n = 64) aged 60 years and above, 13.6% (n = 34) aged 41–50 years, and 6.4% (n = 16) younger than 40 years. Regarding education, 55.2% (n = 138) had attained secondary school or lower, while 44.8% (n = 112) had completed high school or higher. Agricultural production size was predominantly large (57.2%, n = 143), followed by medium-sized (30.8%, n = 77), small-scale (6.8%, n = 17), and those who did not disclose their production size (5.2%, n = 13). Most participants (76.4%, n = 191) reported over 10 years of agricultural production experience, while 16.8% (n = 42) had less than 10 years, and 6.8% (n = 17) chose not to disclose their experience. These data provide an overview of the demographic and agricultural background of the study participants.

**Table 1:** Socio-Demographics of Participants (N = 250)

| | n | % |
|---|---|---|
| Gender | | |
| Male | 120 | 48.0 |
| Female | 130 | 52.0 |
| Age group | | |
| < 40 years old | 16 | 6.4 |
| 41–50 years old | 34 | 13.6 |
| 51–60 years old | 136 | 54.4 |
| > 60 years old | 64 | 25.6 |
| Education level | | |
| Secondary school and lower | 138 | 55.2 |
| High school and higher | 112 | 44.8 |
| Agricultural production size | | |
| Big | 143 | 57.2 |
| Medium | 77 | 30.8 |
| Small | 17 | 6.8 |
| Not disclose | 13 | 5.2 |
| Agricultural production experience | | |
| < 10 years | 42 | 16.8 |
| > 10 years | 191 | 76.4 |
| Not disclose | 17 | 6.8 |

Notes: n = number of participants, % = percentage

Table 2 provides the mean (M) and standard deviation (SD) for various scales measuring environmental protection behaviors and attitudes. The highest mean score (M = 3.40, SD = 0.76) was observed for Environmental Protection Behavior in Daily Life, indicating relatively strong engagement in such behaviors. Environmental Protection Behavior in Technology Investment also had a relatively high mean (M = 2.94, SD = 1.13), followed closely by Environmental Protection Behavior in Agricultural Production (M = 2.91, SD = 0.75). The Necessity of Environmental Protection had a mean of 2.46 (SD = 0.64), while the Convenience of Environmental Protection recorded the lowest mean (M = 2.41, SD = 0.65), suggesting a perception of low ease in adopting environmental protection measures. Attitudes toward Environmental Protection had a mean of 2.87 (SD = 0.24), reflecting a moderately positive stance.

**Table 2:** Mean, Standard Deviation, and Reliability of Scales

| | M | SD | α |
|---|---|---|---|
| Environmental Protection Behavior in Agricultural Production | 2.91 | 0.75 | 0.947 |
| Environmental Protection Behavior in Technology Investment | 2.94 | 1.13 | 0.935 |
| Environmental Protection Behavior in Daily Life | 3.40 | 0.76 | 0.908 |
| The Necessity of Environmental Protection | 2.46 | 0.64 | 0.923 |
| The Convenience of Environmental Protection | 2.41 | 0.65 | 0.790 |

| | | | |
|---|---|---|---|
| Attitudes toward Environmental Protection | 2.87 | 0.24 | 0.676 |

Notes: M = mean, SD = standard deviation

A two-sample t-test was conducted to compare the mean scores of the scales between genders (Table 3). The results revealed a significant difference in the Environmental Protection Behavior in Agricultural Production scale, with males (M = 2.78, SD = 0.71) scoring lower than females (M = 3.02, SD = 0.76); $t_{(247)} = -2.495$, p = 0.013.A one-way ANOVA was conducted to examine the effect of age group on all subscales shown in Table 4. The results showed no statistically significant differences between the mean scores across age groups.

**Table 3:** T-test Comparison between Gender (M±SD)

| | **Male** | **Female** | **p-value** |
|---|---|---|---|
| Environmental Protection Behavior in Agricultural Production | 2.78 ± 0.71 | 3.02 ± 0.76 | 0.013* |
| Environmental Protection Behavior in Technology Investment | 2.80 ± 1.16 | 3.06 ± 1.10 | 0.081 |
| Environmental Protection Behavior in Daily Life | 3.30 ± 0.83 | 3.49 ± 0.69 | 0.051 |
| The Necessity of Environmental Protection | 2.50 ± 0.60 | 2.42 ± 0.69 | 0.326 |
| The Convenience of Environmental Protection | 2.46 ± 0.60 | 2.36 ± 0.70 | 0.224 |
| Attitudes toward Environmental Protection | 2.88 ± 0.23 | 2.86 ± 0.25 | 0.594 |

Notes: M = mean, SD = standard deviation, *p < 0.05

**Table 4:** ANOVA Comparison between Age Group (M±SD)

| | **< 40 Years Old** | **41–50 Years Old** | **51–60 Years Old** | **> 60 Years Old** | **P-Value** |
|---|---|---|---|---|---|
| Environmental Protection Behavior in Agricultural Production | 2.93 ± 0.82 | 2.75 ± 0.88 | 3.01 ± 0.69 | 2.76 ± 0.74 | 0.073 |
| Environmental Protection Behavior in Technology Investment | 3.11 ± 1.33 | 3.10 ± 1.08 | 2.92 ± 1.09 | 2.83 ± 1.22 | 0.663 |
| Environmental Protection Behavior in Daily Life | 3.30 ± 0.72 | 3.67 ± 0.55 | 3.36 ± 0.80 | 3.37 ± 0.78 | 0.168 |
| The Necessity of Environmental Protection | 2.73 ± 0.41 | 2.53 ± 0.66 | 2.40 ± 0.69 | 2.50 ± 0.56 | 0.203 |
| The Convenience of Environmental Protection | 2.73 ± 0.35 | 2.46 ± 0.66 | 2.34 ± 0.69 | 2.45 ± 0.59 | 0.124 |
| Attitudes toward Environmental Protection | 2.92 ± 0.19 | 2.87 ± 0.23 | 2.84 ± 0.26 | 2.90 ± 0.20 | 0.333 |

Notes: M = mean, SD = standard deviation

Two separate two-sample t-tests were conducted to compare the mean scores of scales between educational levels (Table 5). The first test showed a significant difference in the Environmental Protection Behavior in Agricultural Production scale, with participants who had secondary school or lower education (M = 2.77, SD = 0.80) scoring lower than those with high school or higher education (M = 3.08, SD = 0.64); $t_{(246.942)} = -3.382$, p = 0.001. The second test revealed a significant difference in the Environmental Protection Behavior in Technology Investment scale, with participants with secondary school or lower education (M = 2.70, SD = 1.23) scoring lower than those with high school or higher education (M = 3.21, SD = 0.95); $t_{(230.820)} = -3.618$, p = 0.000.

**Table 5:** T-test Comparison between Education Level (M±SD)

| | Secondary School And Lower | High School And Higher | P-Value |
|---|---|---|---|
| Environmental Protection Behavior in Agricultural Production | 2.77 ± 0.80 | 3.08 ± 0.64 | 0.001* |
| Environmental Protection Behavior in Technology Investment | 2.70 ± 1.23 | 3.21 ± 0.95 | 0.000* |
| Environmental Protection Behavior in Daily Life | 3.37 ± 0.84 | 3.43 ± 0.65 | 0.528 |
| The Necessity of Environmental Protection | 2.46 ± 0.64 | 2.47 ± 0.66 | 0.890 |
| The Convenience of Environmental Protection | 2.40 ± 0.65 | 2.43 ± 0.66 | 0.767 |
| Attitudes toward Environmental Protection | 2.87 ± 0.24 | 2.86 ± 0.23 | 0.695 |

Notes: M = mean, SD = standard deviation, *p < 0.05

A one-way ANOVA was conducted to examine the effect of agricultural production size on all scales (Table 6). The results showed statistically significant differences in several scales. For the Environmental Protection Behavior in Technology Investment scale, participants with small agricultural production size (M = 3.50, SD = 0.95) had higher scores than those with medium (M = 2.95, SD = 0.85) or large production size (M = 2.75, SD = 1.28); $F_{(2, 219)}$ = 3.591, p = 0.029. In the Environmental Protection Behavior in Daily Life scale, participants with small agricultural production size (M = 3.67, SD = 0.53) scored higher than those with medium (M = 3.18, SD = 0.86) or large size (M = 3.45, SD = 0.73); $F_{(2, 234)}$ = 4.596, p = 0.011. The Necessity of Environmental Protection scale also showed a significant difference, with small production size participants (M = 2.82, SD = 0.29) scoring higher than medium (M = 2.23, SD = 0.84) or large size participants (M = 2.52, SD = 0.51); $F_{(2, 234)}$ = 8.739, p = 0.000. A significant difference was found in The Convenience of Environmental Protection scale, with small agricultural production size participants (M = 2.73, SD = 0.44) scoring higher than medium (M = 2.16, SD = 0.82) or large size participants (M = 2.47, SD = 0.54); $F_{(2, 234)}$ = 8.252, p = 0.000. Finally, for Attitudes toward Environmental Protection, participants with small agricultural production size (M = 2.96, SD = 0.11) had higher scores than those with medium (M = 2.91, SD = 0.15) or large production size (M = 2.83, SD = 0.28); $F_{(2, 234)}$ = 4.427, p = 0.013.

**Table 6:** ANOVA Comparison between Agricultural Production Size (M±SD)

| | Big | Medium | Small | p-value |
|---|---|---|---|---|
| Environmental Protection Behavior in Agricultural Production | 2.79 ± 0.80 | 2.99 ± 0.66 | 3.12 ± 0.55 | 0.059 |
| Environmental Protection Behavior in Technology Investment | 2.75 ± 1.28 | 2.95 ± 0.85 | 3.50 ± 0.95 | 0.029* |
| Environmental Protection Behavior in Daily Life | 3.45 ± 0.73 | 3.18 ± 0.86 | 3.67 ± 0.53 | 0.011* |
| The Necessity of Environmental Protection | 2.52 ± 0.51 | 2.23 ± 0.84 | 2.82 ± 0.29 | 0.000* |
| The Convenience of Environmental Protection | 2.47 ± 0.54 | 2.16 ± 0.82 | 2.73 ± 0.44 | 0.000* |
| Attitudes toward Environmental Protection | 2.83 ± 0.28 | 2.91 ± 0.15 | 2.96 ± 0.11 | 0.013* |

Notes: M = mean, SD = standard deviation, *p < 0.05

A series of two-sample t-tests were conducted to compare the mean scores of scales based on agricultural production experience (Table 7). The results revealed significant differences across all scales. For the Environmental Protection Behavior in Agricultural Production scale, participants with less than 10 years of experience (M = 3.34, SD = 0.54) scored higher than those with more than 10 years of experience (M = 2.79, SD = 0.76); $t_{(81.007)}$ = 5.448, p = 0.000. In the Environmental Protection Behavior in Technology Investment scale, participants with less than 10 years of experience (M = 3.88, SD = 0.33) had higher scores than those with more than 10 years of experience (M = 2.65, SD = 1.14); $t_{(209.910)}$ = 12.333, p = 0.000. For the Environmental Protection Behavior in Daily Life scale, participants with less than 10 years of experience (M = 3.76, SD = 0.43) scored higher than those with more than 10 years of experience (M = 3.29, SD = 0.81); $t_{(114.016)} = 5.263$, p = 0.000. In The Necessity of Environmental Protection scale, participants with less than 10 years of experience (M = 2.80, SD = 0.38) had higher scores than those with more than 10 years of experience (M = 2.36, SD = 0.68); $t_{(106.565)} = 5.682$, p = 0.000. For The Convenience of Environmental Protection scale, participants with less than 10 years of experience (M = 2.79, SD = 0.34) scored higher than those with more than 10 years of experience (M = 2.29, SD = 0.68); $t_{(121.896)} = 6.879$, p = 0.000. Finally, in the Attitudes toward Environmental Protection scale, participants with less than 10 years of experience (M = 2.92, SD = 0.21) scored higher than those with more than 10 years of experience (M = 2.84, SD = 0.25); $t_{(69.952)} = 2.082$, p = 0.041.

**Table 7:** T-test Comparison Between Agricultural Production Experience (M±SD)

| | **< 10 years** | **> 10 years** | **p-value** |
|---|---|---|---|
| Environmental Protection Behavior in Agricultural Production | 3.34 ± 0.54 | 2.79 ± 0.76 | 0.000* |
| Environmental Protection Behavior in Technology Investment | 3.88 ± 0.33 | 2.65 ± 1.14 | 0.000* |
| Environmental Protection Behavior in Daily Life | 3.76 ± 0.43 | 3.29 ± 0.81 | 0.000* |
| The Necessity of Environmental Protection | 2.80 ± 0.38 | 2.36 ± 0.68 | 0.000* |
| The Convenience of Environmental Protection | 2.79 ± 0.34 | 2.29 ± 0.68 | 0.000* |
| Attitudes toward Environmental Protection | 2.92 ± 0.21 | 2.84 ± 0.25 | 0.041* |

Notes: M = mean, SD = standard deviation, *p < 0.05.

## Discussion

This study aimed to examine the effects of socio-demographic factors on farmers' environmental protection behavior. The findings revealed significant differences in certain scales across demographic groups. The study revealed that female farmers scored higher than males in environmental protection behavior in agricultural production, consistent with research showing gender differences in environmental practices. Women generally exhibit greater concern for environmentally friendly practices than men (21), though barriers such as lower education, limited access to agricultural services, and weaker decision-making power hinder sustainable practices in female-headed households (22). Additionally, women farmers experience higher stress and lower resilience than men (23), indicating that despite stronger environmental attitudes, they often lack the necessary resources and support for sustainable practices. The study found no significant differences in environmental protection behavior between age groups, aligning with some research suggesting no overall age-related variations in environmental protection behavior (24). However, other studies indicate specific differences, with younger farmers influenced more by personal norms and older farmers by social norms (1). Factors shaping environmental protection behavior include personal and social norms, perceived behavioral control, and policy environment (1, 19). Environmental protection behavior contributes to farmers' well-being by enhancing quality of life and social interactions, with education potentially moderating these effects (2). Additionally, the policy environment significantly influences the link between intention and actual environmental protection behavior participation (19). The study found that farmers' educational levels influence their environmental protection behavior in agricultural production and technology investment, consistent with research linking higher education to improved environmental behaviors. Educated farmers exhibit greater environmental knowledge, pollution awareness, and pro-environmental behaviors (25). Higher education enhances digital literacy, strengthening subjective norms, attitudes, and control over environmental practices (26). Environmental literacy, closely tied to education, fosters green agricultural production through cognitive and willingness-based mechanisms (27). Additionally, education improves decision-making skills and technology adoption in dynamic environments (28). However, higher education may increase motivation for material rewards, potentially reducing well-being derived from environmental activities (2). The study found that agricultural production size influences farmers' environmental protection behavior, reflecting complex dynamics across farm sizes. Small-scale farmers often score higher in technology investment, likely due to stronger social networks that promote technology adoption (29). Medium-sized farms may adopt environmental innovations driven by leadership and pro-environmental attitudes of executives (30). Environmental protection behaviors enhance subjective well-being by improving quality of life and social interactions, with education potentially moderating these effects (2). However, a gap persists between farmers' intentions and actions, characterized as "strong intentions and weak actions," influenced by psychological factors such as benefit perception and participation consciousness (19). Legal cognition and policy environments also play moderating roles, with laws and policies strengthening the link between intentions and actions (11, 19). Additionally, value perceptions, including egoistic, altruistic, and biospheric values, shape pro-environmental intentions (31), while factors like social networks, land rights, and incentives further influence conservation behavior (32). The study revealed that agricultural production experience influences farmers' environmental protection behavior, consistent with research indicating that experienced farmers often demonstrate stronger ecological practices. Older farmers possess greater non-cognitive abilities, enhancing environmental behaviors by increasing social capital and technical value perception (33). Environmental protection activities can improve subjective well-being, particularly for experienced farmers adept at managing environmental risks and fostering social interactions (2). Legal cognition also moderates environmental behaviors, with greater familiarity with laws promoting stronger actions (11). However, older farmers may be more risk-averse and less inclined to adopt new technologies (34). In contrast, younger farmers are more likely to experiment with green technologies and implement environmentally beneficial management practices, contributing to reduced nitrogen, phosphorus, and soil loss (34). Personal resources, such as positive emotions and cognitive goal-oriented hope, further influence green production adoption, moderated by economic perceptions (35, 36). Despite generational differences, environmental awareness among farmers remains high, with many recognizing their responsibility for rural environmental safety (37).

The findings of this study highlight the need for targeted policies, educational programs, and sustainable practices to enhance farmers' environmental protection behaviors in the Mekong Delta. Policies should focus on improving access to education and training tailored to farmers' diverse needs, alongside incentives such as subsidies for green technology adoption and legal awareness campaigns to promote compliance. Educational initiatives should prioritize practical training, mentorship, and community-based programs to bridge gaps in environmental literacy and encourage sustainable farming practices. Addressing resource and decision-making barriers faced by women farmers can further strengthen environmental sustainability efforts. Additionally, integrating social benefits, such as cooperative farming, can improve farmers' well-being and foster greater participation in sustainable practices. To address the gap between intention and action, future research should investigate psychological and structural barriers while developing comprehensive frameworks that integrate demographic, psychological, and policy factors. These strategies are essential for advancing sustainable agriculture and environmental stewardship in the region. This study has several limitations that should be considered. First, the cross-sectional design restricts the ability to establish causal relationships between demographic factors and environmental protection behaviors, highlighting the need for longitudinal studies to examine behavioral changes over time. Second, reliance on self-reported data introduces potential social desirability bias, as participants may overstate their environmental practices; future research should include observational methods or third-party evaluations to address this issue. Third, the sample was limited to one province in the Mekong Delta with and convenience sampling method, which may reduce the generalizability of the findings to other regions with differing socio-economic or cultural contexts. The results may also be affected by the culture and government framework for local farmers. Expanding the scope to diverse locations would improve applicability.

Finally, the study focused solely on demographic factors, neglecting other key influences such as economic incentives, institutional support, and environmental constraints. Future research should consider these factors for a more comprehensive understanding of farmers' environmental protection behavior.

# Conclusion

This study explored the impact of demographic factors on farmers' environmental protection behaviors in the Mekong Delta, highlighting the roles of gender, education, production size, and experience in shaping sustainable agricultural practices. The findings demonstrated that female farmers exhibited stronger engagement in agricultural production practices, while higher education levels were linked to increased adoption of environmentally friendly practices, particularly in technology investment. Additionally, smaller farm sizes and less agricultural experience correlated with greater environmental engagement. These results emphasize the need for tailored policies and educational programs to address specific demographic barriers, such as resource constraints for women and small-scale farmers or the gap between intention and action. Future research should overcome study limitations by expanding the geographical scope and incorporating broader factors like economic and institutional influences to develop a comprehensive framework for promoting environmental protection behaviors. Integrating these findings into policy and practice can support sustainable farming and enhance environmental stewardship in regions like the Mekong Delta.

## Abbreviation

Not applicable.

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## Author Contributions

NgaThi Do: Methodology development, literature review, manuscript drafting, Nguyen Thi Minh: Manuscript writing, data interpretation, Nguyen Thi Mai Lan: Principal investigator, conceptualization, research design, and final approval, PhanKhanh Duong: Data collection, statistical analysis, validation, Nguyen ThiHoa Mai: Project administration, critical revision, Nguyen Mai Huong: Manuscript revision, quality assurance. All authors have reviewed and approved the final manuscript for submission.

## Conflict of Interest

The author declares no conflicts of interest associated with this work.

## Ethics Approval

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. All participants were informed about the purpose of the research and provided their written informed consent prior to participation. Participation was voluntary, and confidentiality of all personal information was ensured throughout the study.

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