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The Role of Environmental Law in Farmers' Environment-Protecting Intentions and Behavior Based on Their Legal Cognition: A Case Study of Jiangxi Province, China

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Abstract: Agriculture contributes to environmental degradation by using unsustainable farming practices, such as the intensive use of chemical fertilizers and fossil fuels. With China's growing environmental concerns, new environmental laws have begun to disseminate information about environmental preservation among residents. This legislation plays a major role in developing individual behavior. Thus, the purpose of this study was to investigate the moderating role of environmental laws in relation to environment-protecting intentions and behavior based on their legal cognition. Based on 1350 randomly selected farmers from Jiangxi Province, we confirm the theory of planned behavior through a structural equation model. The results demonstrate that the perceived behavior control, personal factors, and attitude of farmers directly contribute to both types of farmer's intentions, i.e., citizen and activist; and indirectly to both types of farmer's environmental-oriented behavior (citizen and activist). The inward attitude effect was stronger than the outward attitude in both types of intentions of farmers. The farmers' legal cognition also moderated their environment-protecting intentions and behaviors. This implies that as the farmer's legal familiarity grows, the direct effect of both types of farmer's intentions on the farmer's environmentally oriented behavior continues to increase. Awareness programs, financial support, and extension services should be enhanced in rural areas, which may develop the farmers' proenvironmental behavior and lead to them adopting environmentally friendly farm practices.

Keywords: environmental law; legal cognition; sustainable agriculture; environment protection



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1. Introduction

Environmental degradation, ozone depletion, global warming, and acid rain are just a few of the worldwide environmental issues that are directly linked to the unsustainable use of natural resources [1]. Now, everyone in the world knows how important it is to protect the environment [2,3]. The developed nations began addressing these issues earlier and have made some progress, such as the successful installation of several carbon capture and storage demonstration projects [4]. The coordination of economic development and environmental conservation, however, continues to be a challenge for many emerging nations [5].

In the last few decades, China's economy has grown quickly, but this progress has come at the cost of an inefficient energy system and a lot of damage to the environment [6]. Biofuel (crop residue) has been the main source of energy for rural Chinese people for thousands of years, due to the country's large agricultural sector [7,8]. Coal and natural

gas have lately replaced oil and electricity as the primary sources of noncommercial energy consumption in rural areas [9], reflecting the extraordinary urbanization that has occurred there over the previous 30 years [10]. Grain-producing regions with high population densities, established economies, and an abundance of fossil fuel sources have traditionally burned much of their crop residue directly in the open field rather than storing it for later use as home fuel [11,12]. The transformation of the energy structure in rural areas has resulted in an increase in environmental issues [13,14]. Crop residue burning in the open field is a major contributor to air pollution, which has been linked to adverse effects on human health and the environment [15–17]. The combustion of fossil fuels has historically been blamed for the majority of CO₂ emissions [18,19], the primary cause of global warming [20]. Agricultural straw combustion has already turned into one of the most significant sources of CO₂ emissions in China [21,22], where hundreds of millions of tons of agricultural crop residue are burned annually [23,24].

The Chinese economy has made significant progress since opening up to foreign trade and implementing reforms. China has embraced swift economic expansion over the past 40 years, but the nation also has significant environmental problems that have a negative impact on both the health of its citizens and its ability to prosper economically [25,26]. For instance, the State of Global Air Report 2019 estimates that 1.2 million Chinese people died as a result of air pollution in 2017 and that 425 million people were exposed to household air pollution [27]. Policymakers and the academic community are giving environmental pollution reduction more and more attention [28,29]. Yet, China's hasty economic growth has seriously polluted the environment [30–32]. Due to this, more than one-third of Chinese cities could meet the minimal criteria for environmental air quality set by the government.

Moreover, environmental pollution, such as contaminated water and waste products, has done a lot of damage to people [33–35]. As a result, major adjustments are required in China's environmental governance structures. Importantly, environmental regulation in China is primarily based on two mechanisms: planning and law. Yet, with regular growing economic development and the destruction of the environment, the influence on the quality and implementation of the law has increasingly grown inappropriate to satisfy the requirements of social development [36]. Awareness among the public about the new environmental laws is crucial for their implementation as well as for ecological accountability. Can law be used as an adjunct tool to govern farmers' environmental behaviors in a command-and-control manner [37,38]? Can the rule of law encourage farmers' participation in environmental governance? Therefore, it is important to find out if new environmental laws can really change what people do to protect the environment. Moreover, it is also important to implement and improve public policies that aim to protect the environment over time. Environmental policies have a significant impact on the public's lifestyle [39].

Environmental laws have been demonstrated to have a significant impact on fostering green innovation [40,41]. In order to test the Porter hypothesis, Costantini and Mazzanti [42] analyzed data on five industrial sectors in the European Union from 1996–2007 and showed that environmental laws can stimulate environmental innovation capabilities and encourage ecofriendly trade. Shen et al. [43] examined the influence of various environmental laws on national green innovation and concluded that environmental taxes can encourage green innovation, whereas CO₂ emissions trading generally has little impact on green innovation. Caelel and Antoine [44] looked at the EU Emissions Trading Scheme's effect on technical advancement and found that environmental law has no influence on low-carbon patents. Greenhouse gas emission trading in China was studied by Cui et al. [41], who used data from publicly traded Chinese companies between 2003 and 2015 to conclude that the policy had a large and favorable influence on low-carbon innovation.

Most of the earlier studies on environmental law and pollution have emphasized the assessment of—and problems with—law enforcement [45–51]. Additionally, the majority of the existing literature has focused on jurisprudential study as well as micro- and macroeconomic perspectives and macrodevelopment, while the laws' effects on environ-

mentally oriented behaviors have mostly gone unrecognized [52,53]. Thus, the purpose of this study was to investigate the moderating role of environmental laws in relation to environment-protecting intentions and behavior based on their legal cognition.

In a nutshell, this paper contributes to the existing literature in many ways. For the first time, this study investigates whether the new Chinese environmental protection regulations have an impact on farmers' environmentally oriented behavior or not. Secondly, assessing the realistic impact of environmental laws in rural areas with resident participation and multigovernance of public administration gives our findings practical meaning and social value. To further improve the expanded model based on the theory of planned behavior, we have separated farmers' environmental attitudes into inward and outward attitudes based on their daily activities, including farming. Inward environmental attitude refers to the perspective of an individual consumer with regard to environmental issues, and outward environmental attitude refers to the perception that collective action is required from a variety of aspects of society in order to protect the environment.

In addition, the study provides insightful suggestions on a worldwide scale, particularly for those emerging countries that confront similar environmental challenges and nations with authoritarian regimes. Moreover, how to find a balance between economic growth and protecting the environment is a serious problem for emerging economies that are growing quickly. In order to encourage the public's involvement, especially that of rural residents, in environmental conservation, this article lays out many solutions and considerations. Our research, for example, proves that legal cognition significantly influences environmental behaviors, which should make policymakers pay greater attention to the law. This research also offers novel ideas for public administration by demonstrating that even in authoritarian states, people's behaviors are influenced by the law's mandated leniency.

2. Theoretical Background and Hypothesis Development

The theory of planned behavior (TPB) contends that planning determines the behavior of people. In numerous fields, including marketing, public affairs, advertisements, health, sports, and sustainable development, this theory has been extensively used in research on the relationships between attitudes, views, behavioral intentions, and behaviors [54]. Al-Suqri and Nasser [55] reported that the academic database currently has more than 1200 research bibliographies on TPB. This aids in explaining people's behavior in different contexts. Preproof-specific settings contend that social behavior is produced by behavioral intentions, and that the attitude, behavior control, and control beliefs of an individual have an impact on their behavioral intentions [56]. The objective variable "environmental behavior", according to TPB, is a behavior that, in theory, might be influenced by the attitude, beliefs, and surroundings of a person. The theory of planned behavior has been extensively utilized to understand human environmental behavior [57,58]. The term "pro-environmental behavior" refers to a wide range of actions, and those who are concerned about the environment are frequently more eager to participate in a variety of environmental protection initiatives [59]. Stern [60] stated three different types of behaviors that may comprise diverse types of activities that are beneficial to the environment. These behaviors include environmental activist behavior; good civic conduct, such as recycling; and green buying behavior.

Due to the complex nature of environmental laws, it is useful to classify environmental-oriented behavior in order to more precisely examine how environmental law affects environmental behavior. This study primarily examines activists' and good citizenship behavior. Two factors contribute to this: (1) farmers being environmentally responsible citizens (responsible citizenship behavior; RCB), such as cutting back on energy use and recycling or reusing materials from day-to-day life and from routine farm leftovers; and (2) activist environmental behavior (AEB), such as joining an organization that aims to preserve the environment and disclosing environmental issues. Based on these two types of environmental behavior of rural residents, we also considered the two types of intentions of farmers,

including responsible citizens and activist environmental farmers' intentions; those were coded as responsible citizens environmental intentions (RCEI) and activist environmental intentions (AEI), respectively. Numerous studies suggest that after considering internal factors (such as one's own knowledge and feelings) and external factors (such as the costs and rewards), a person can arrive at a well-thought-out strategy and make decision to take action [56]. Researchers observed that perceived behavioral control only occurs when self-cognition alters. Wang et al. [61] used a SEM to directly verify that the environmental intentions of tourists impacted their environmental-oriented behaviors, and significant results were found. Moreover, Liu et al. [62] found that behavior toward preserving the environment is directly influenced by environmental-oriented intentions. Similarly, Lee et al. [63] found that environmental-oriented intentions directly influence environmental protection behavior. Therefore, the following two hypotheses were formulated.

Hypothesis 1 (H1). *Responsible citizen environmental intentions (RCEI) positively affect farmers' responsible citizen behavior (RCB);*

Hypothesis 2 (H2). *Activist environmental intentions (AEI) positively affect farmers' activist environmental behavior (AEB).*

Behavioral intentions are not independent of the farmer's attitude [64,65]. Leonidou et al. [66] stated that outward environmental attitude (OEA) and inward environmental attitude (IEA) affect the proenvironmental intentions of individuals directly. IEA is defined as "attitudes related to one's environmental misuse"; that is, the attitude towards humans or themselves implementing environmental actions. OEA, on the other hand, is related to persons and groups of peoples apart from humans or themselves. It means people's perspectives on the importance of community, legal, and political changes to conserve the ecosystem [60]. Several studies have reported that in order to effectively protect the environment, society, governments, NGOs, and other stakeholders must actively participate in addition to individuals [67]. Since the current study looks at how laws affect environmental behavior, we are interested in farmers' perspectives on whether other groups should be required to make adjustments for the environment; "OEA" is a suitable variable that we consider in the study. Individual attitudes are vital for the protection of the environment, according to both empirical and theoretical research [66]. Leonidou et al. [66] stated that it is vital to understand the function played by inward and outward attitudes separately in forming the intention–behavior link in order to fully understand this relationship. Therefore, we proposed the following hypotheses.

Hypothesis 3a (H3a). *Farmers' outward environmental-oriented attitudes affect responsible citizen environmental intentions (RCEI) positively;*

Hypothesis 3b (H3b). *Farmers' outward environmental-oriented attitudes affect activist environmental intentions (AEI) positively;*

Hypothesis 3c (H3c). *Farmers' inward environmental-oriented attitudes affect responsible citizen environmental intentions (RCEI) positively;*

Hypothesis 3d (H3d). *Farmers' inward environmental-oriented attitudes affect activist environmental intentions (AEI) positively.*

Behavioral intentions are directly impacted by personal factors; personal factors are those who change their behavior after being affected by others [68]. People alter their behavior through observing others in society, such as relatives, friends, and companions, and individuals or groups always encourage socializing. Individuals are also more inclined to feel socially responsible, which makes them more likely to engage in actions that help society; this is because of the influence of social norms and legally binding requirements [69].

Based on the important role of personal factors in enhancing environmental intentions, we formulated the following hypotheses.

Hypothesis 4a (H4a). *Personal factors positively affect responsible citizen environmental intentions (RCEI).*

Hypothesis 4b (H4b). *Personal factors positively affect activist environmental intentions (AEI).*

An individual's personal perceived behavioral control (PPBC) reflects the barriers they have faced and expect to face. According to planned behavior theory, those who believe they have more chances and resources expect fewer barriers and have higher personal perceived behavioral control [70]. The PPBC plays a vital role in enhancing individuals' environmental intentions [71]. We divided PPBC into two: citizen (CPPBC) and activist (APBC) personal perceived behavior control. CPPBC stresses the opportunities and challenges that farmers face in their responsible citizen environmental protection behavior. This includes the state of fundamental equipment for farmers' waste and reprocessing, the expediency of saving energy and water, and the installation of recycling facilities for items such as old clothes and farm leftovers. APBC exhibits itself in more active environmental behavior such as protesting, reporting, contributing, and joining environmental-oriented organizations [63]. All these control factors influence environmental intentions directly and environmental-oriented behavior indirectly [72]. Thus, we proposed the following hypotheses.

Hypothesis 5 (H5). *CPBC positively influences responsible citizen environmental intentions (RCEI).*

Hypothesis 6 (H6). *APBC positively affects activist environmental intentions (AEI).*

Expectancy theory states that legislation presents expected rewards or results that can stimulate positive behavior. The rule of law is extremely important in everyday life. The rule of law has a disciplinary and preventive influence on people's behavior, creating a legal encouragement to do the right thing [68]. The legislation is also influential in shaping actions in the field of environment. Environmental legislation and regulation, as found in Sutherland's [73] research, encourages financial support for agricultural expansion from farmers. Lu [50] and Zhao et al. [74] also demonstrated the significant role of environmental-oriented laws in controlling pollution, as well as in the green development of firms. In the current study, we focused on both internal and external (laws and policies) factors related to farmers to evaluate their environmental-oriented behavior, because individuals are influenced to varying degrees by policy, society, laws, and other external variables in addition to their own subjective experiences [62]. To evaluate the moderating effect of laws in the current study, we considered legal cognition as an external variable. We argue that environmental laws beneficially impact the taming revolutionary behavior of a person to protect the environment.

Hypothesis 7a (H7a). *The relationship between the RCEI and RCB of farmers is positively moderated by environmental laws.*

Hypothesis 7b (H7b). *The relationship between the AEI and AEB of farmers is positively moderated by environmental laws.*

The study hypotheses are summarized in Figure 1.

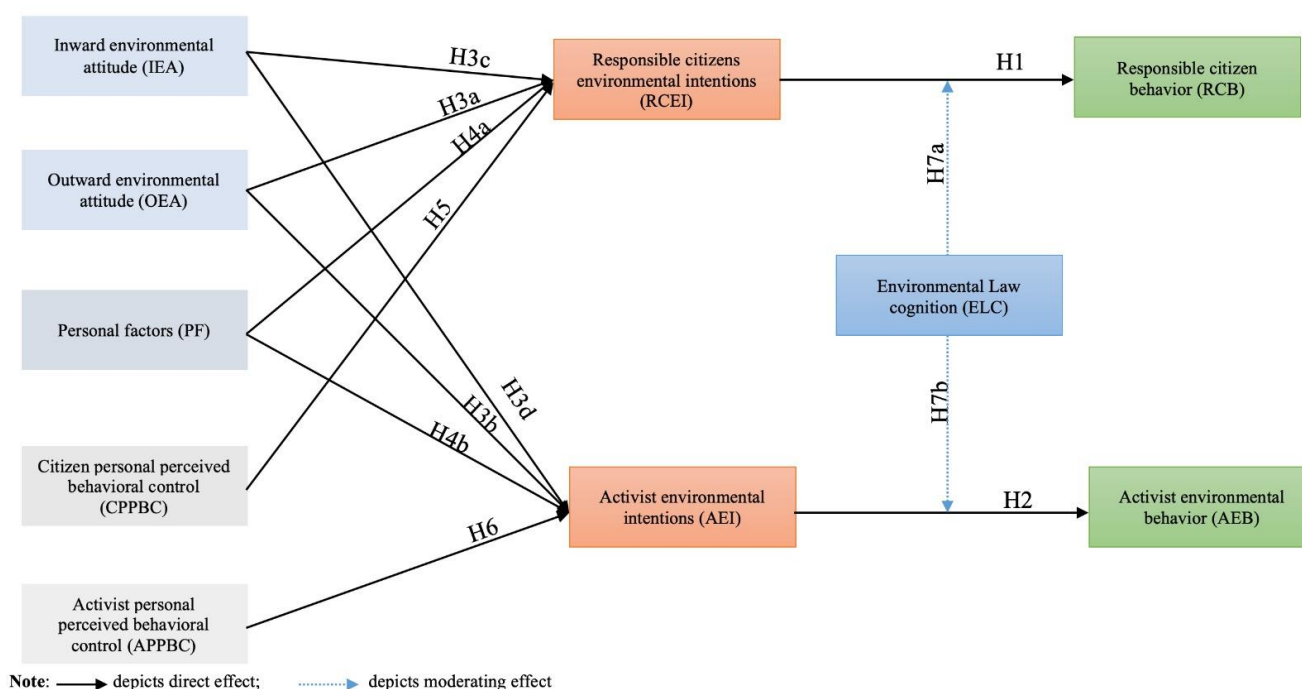


Figure 1. Conceptual framework and study hypotheses.

3. Materials and Methods

3.1. Study Area and Sampling Methods

Jiangxi Province is situated in southern China on the Yangtze River's south bank, and its land area is 166,900 km², with more than 46 million people. It is located at 24°29'0"–40°40' N, 113°34'0"–118°28'0" E. With an average annual rainfall of 1700–1943 mm and an average annual temperature of 16.3–19.5 °C, Jiangxi Province is characterized by a subtropical monsoon climate. According to Jiangxi Province Statistics, the province had a total grain cultivation area of 36,651 hectares, with an annual grain output of 21.574 million tons. Grain crops make up between 60 and 70 percent of the total crop area grown in the Jiangxi region, making it a major grain-producing region in southern China. More than 85 percent of the acreage used for growing grain crops is dedicated to rice. Northern Jiangxi is where most of the province's wheat is produced, while central and southern Jiangxi are where most of the sweet potatoes are cultivated, and the east and south banks of Poyang Lake and the Jitai Basin are where the majority of the province's soybeans are grown. The majority of Jiangxi Province's residents work in agriculture, and the province itself is mostly rural. It plays a significant role in the production of essential agricultural items such as grain, oilseeds, vegetables, and aquatic products [75], making it a prototypical agricultural province and one of China's 13 key grain-producing provinces. Jiangxi Province is a prime example of the classic Chinese agricultural style. Farmers in Jiangxi are representative of farmers throughout China; therefore, the lessons learned there may be applied elsewhere.

The study used a multistage purposive and random sampling technique to collect the data from the farmers. In the first step, keeping in view the importance of Jiangxi Province in Chinese agriculture, it was purposefully selected as a study area to represent China. In the second step of sampling, three cities (Jiujiang, Nanchang, and Ganzhou) were purposefully chosen to improve the statistical representativeness of the sample. These cities were located in the northern, middle, and southern regions of the province. In the following step, five counties were randomly selected from each selected city. In the fourth step, five villages were selected randomly from selected counties. In the last step of sampling, twenty farmers were chosen randomly from each village. Thus, a total of 1350 valid responses were collected in this survey. The survey was accomplished by a team of 10 well-experienced and well-trained researchers, consisting of both males and females.

3.2. Questionnaire Design

The current study was carried out using cross-sectional data. A well-designed questionnaire was employed for this. Before finalizing the questionnaire, we identified the possible factors that influence farmers' or rural residents' environmental behavior, and legal cognition of farmers was integrated to examine the laws' moderating role between farmers' intentions and their behavior. We took into account the knowledge of farmers regarding new environmental laws as a moderating variable. For this purpose, their knowledge was assessed based on ten questions to measure their local legal understanding. The final questionnaire contained a total of 48 statements, 10 of which [70] were legally relevant judgment questions. The questionnaire asked about important environmental law systems in China, such as those for public interest lawsuits, the use of motor vehicles, secret reports, pollution discharge permits, no-fault responsibility, and daily penalties. It took into account laws that tell people what their rights and responsibilities are, as well as laws that teach people about the environment and make it illegal to pollute it. The remaining 38 questions related to the farmers' environmentally oriented behavior, intentions, attitude, personal factors, and perceived behavior control (Table 1). The questions were asked on a 5-point Likert scale (1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly agree). A similar measurement approach for measuring attitude was adopted by Trivedi et al. [67] and Kilbourne and Pickett [76]. We followed Prete et al. [77] for personal factors, and Han et al. [78] and Cheung et al. [79] for perceived behavioral control. However, many statements were added upon the suggestions of many field experts.

Table 1. Sample background.

Characteristics	Category	Percent	Mean	SD
Age * (Years)	Young	45.50	41.05	23.71
	Old	54.50		
Education * (Years)	Low	70.30	7.23	3.21
	High	29.70		
Income * (CNY/year)	Low	39.45	103,243	3654.98
	High	60.55		
Land size * (hectares)	Small	62.35	2.67	0.65
	Large	37.65		
Family size * (members)	Small	41.75	3.03	0.49
	Large	58.25		
Gender	Male	58.00		
	Female	42.00		
Organizational membership	Yes	43.00		
	No	57.00		
Extension services	Yes	67.70		
	No	32.30		

Note: The mean and SD (standard deviation) have only been presented for continuous variables. * The sample was divided into two categories by considering the mean of the sample as the cut-off point.

In light of the content coverage, the environmental behaviors “adopting best management practice at farm”, “saving energy and water”, “proper recycling and dispose of plastic”, and “green traffic” were selected. Moreover, we took into account the farm-activity-related questions that may contribute to protecting the environment. On the one hand, it is necessary to provide access to water and electricity, which are fundamental needs and public infrastructure in a country with a large population. On other hand, recent studies, for example, Mi et al. [80] and Fan et al. [81], have discovered that the majority of GHG

emissions in China is strongly linked to the consumption of energy in large cities, particularly in the transportation sector [82–84]. Chinese residents are able to travel privately at relatively cheap rates thanks to the booming online car-hailing industry and the country's booming economy. However, the country's rapidly expanding passenger vehicle fleet has a significant impact on fuel consumption and greenhouse gas emissions [85]. Based on the current debate, we have incorporated almost all aspects that would be necessary to ask for a comprehensive evaluation of farmers' environmental behavior. The previous literature on protecting behaviors suggests that the sociodemographic characteristics of the farmers also play an important role in their attitude toward proenvironmental behaviors. Therefore, in addition to the above questions, demographic questions, such as age, education, family background, income, gender, etc., were also asked of the farmers. Thus, the survey questionnaire was prepared by thoroughly reviewing the relevant literature. Before starting the field survey, the data collection instrument was tested in two steps to check its reliability and validity. In the first step, four experts in the fields of farm-related environmental regulation, farm management, and the environment first reviewed the survey data collection instruments. This ensured that the data collection tools were backed by relevant data and technical terms. In the second step, a pilot study was conducted with 40 farmers to make the data collection harmonious with the ground realities.

3.3. Statistical Methods

The study used descriptive statistics and partial least-squares structural equation modeling (PLS-SEM) to analyze the data from the survey. The descriptive statistics were used to analyze the socioeconomic backgrounds of the study samples.

The structural equation model (SEM) is a powerful statistical tool that blends the best parts of factor analysis and path analysis into one tool. SEM uses regression analysis, analysis of variance, factor analysis, and path analysis [86–88] to look at the relationship between multiple effects, multiple factors, and hidden variables. All of the factors in this study were linked in some way, either because they were hidden variables or because they affected each other. PLS-SEM is a multivariate structural equation modeling method from the second generation. It can estimate complicated causal connections in structural models with latent variables. Even for studies with small sample sizes, it gets rid of assumptions about distribution and has better statistical power [89]. With PLS-SEM, it is easy to check the truth of items used in constructs because a reduction and validation process is performed before making the final structural model for each manifest variable. Previous research reported that at least 100 respondents were needed to use this model to obtain fair results [90]. Moreover, Hair et al.'s [91] ten-times rule and G*Power showed that the sample size of this study was enough for this model. The PLS-SEM method suggested by Hair et al. [91] was used in this work. Two models—a measurement model and a structural model—were set up in this study, as suggested by PLS-SEM-relevant literature [91,92].

4. Results

4.1. Sample Background

Table 1 describes the demographic characteristics of the sampled farmers. The average age of the sampled farmers was more than 41 years. More than half of the farmers were older than the average age of the sampled farmers. More than two-thirds of the farmers had an education level below the overall mean (7.23 years) of the sample. The average annual income of the participating farmers was estimated at CNY 103,243, and more than three-fifths of the farmers had higher income levels than the sample average income level. More than two-thirds of the farmers had land sizes smaller than 2.67 hectares. More than 41% of the farmers had families larger than the sample's overall average of 3.03 members. A majority of the farmers participating in the study were male, making up 58% of the total sample. More than two-fifths of the sampled farmers were members of some farming

organization. A large majority of the sampled farmers availed themselves of extension services from private or public extension agents.

4.2. Descriptive Statistics of Sample Farmers' Responses

The results show that the farmers had good knowledge of the new environmental laws (Table 2). According to citizen and activist environmental behavior, they excelled at environmentally conscious behavior. Similarly, the majority of them had more environmentally conscious intentions. They were eager to implement environmentally friendly practices both on the farm and at home. They intended to save energy and water as well as preserve natural habitats at their farms. Furthermore, they were more active in promoting environmental protection. They had a positive attitude towards their responsibility to preserve the environment. Their peers, such as relatives and friends, also encouraged them to engage in environmentally friendly activities.

Table 2. Descriptive statistics from the 5-point Likert scale analysis.

Constructs/Items	Mode	Mean	Std. Dev.
Environmental Law cognition (ELC)		3.58	1.20
An important component of governmental policy is environmental protection. (ELC1)	5	4.35	1.12
In my area, there is a restriction on motor vehicle tail numbers. (ELC2)	3	3.09	1.05
The law also defines noise as pollution. (ELC3)	4	3.78	1.21
Construction will be compelled to cease if it begins before the environmental assessment statement (or draft) has been reviewed. (ELC4)	3	2.98	1.11
Environmental pollution practices apply faultless liability. (ELC5)	3	3.02	1.33
To encourage citizen reports of polluting behavior, the concerned entities maintain their confidentiality. (ELC6)	4	4.67	1.06
China develops a framework of sewage permits. (ELC7)	5	4.02	1.01
Polluters who refuse to stop their unlawful actions will be fined on a daily basis. (ELC8)	4	3.55	1.43
Criminal culpability may result from serious environmental pollution. (ELC9)	3	2.88	1.29
Litigation in the interest of the public regarding the environment cannot be filed by private citizens. (ELC10)	3	3.45	1.43
Responsible citizen behavior (RCB)		4.04	1.28
I always turn off the lights (RCB1)	5	4.66	1.21
I use the water saving technologies at farm (RCB2)	4	4.02	1.55
I and my family always try to use water carefully for daily activities. (RCB3)	5	4.65	1.23
I and my family always try to use public transport. (RCB4)	4	4.12	1.21
I always use the crops leftover at farm to increase the soil fertility. (RCB5)	3	2.94	1.31
I always try to carefully dispose of the chemical bottles after using them. (RCB6)	4	3.56	1.09
I and my family always try to put the plastic bottles to recycle bin. (RCB7)	5	4.34	1.36
Activist environmental behavior (AEB)		3.45	1.20
I or one of my family members is the member of environmental organization. (AEB1)	4	3.69	1.43
I and my family always support the organization who works locally for protection of environment. (AEB2)	3	2.77	1.11
I and my family always protest against activity polluting the environmental at local level. (AEB3)	3	2.67	1.03
I always encourage the plantation at farm in area. (AEB4)	5	4.66	1.24
Responsible citizens environmental intentions (RCEI)		4.06	1.18
I would like to use renewable energy resources as much as possible. (RCEI1)	5	4.55	1.18
I would like to use natural resources efficiently at farm. (RCEI2)	4	4.09	1.33
I would like to save natural habitats as much as possible. (RCEI3)	4	3.98	1.08
I would like to choose mostly green travel. (RCEI4)	3	2.99	1.01
I would like to minimize the farm waste as much as possible. (RCEI5)	5	4.88	1.22
Mostly, I would like to sort the farm leftovers, home garbage and material for recycling. (RCEI6)	4	3.87	1.27
Activist environmental intentions (AEI)		3.88	1.37

Table 2. Cont.

Constructs/Items	Mode	Mean	Std. Dev.
I will not compromise the life of my family and mine due to the environmental pollution, and I will take the action actively. (AEI1)	4	4.01	1.22
I will never allow the any project or construction that may cause the pollution in environment. (AEI2)	3	2.55	1.67
In future, I will always intent to support the environmental activities in my area. (AEI3)	5	4.56	1.16
I will intent to increase the use of renewable energy sources in future. (AEI4)	5	4.44	1.53
In future, I will intend to adopt the organic farming. (AEI5).	4	3.86	1.27
Inward Environmental attitude (IEA)		4.31	1.22
I feel guilty when anyone in the society harm the natural environment such as land, lakes, forest etc.	4	3.99	1.33
The environment is something that worries me a lot. (IEA1)	5	4.33	1.19
I think everyone is responsible for protect the environment. (IEA2)	5	4.89	1.14
I appreciate the other farmers when they adopt best management practices at the farm. (IEA3)	4	4.01	1.21
Outward Environmental attitude (OEA)		4.07	1.32
Political changes should be environmental oriented. (OEA1)	4	4.11	1.21
The social awareness is necessary. (OEA2)	5	4.44	1.32
The major changes in law are required. (OEA3)	3	3.66	1.43
Personal factors (PF)		3.61	1.34
My relative and friends always encouraged me to adopt the environmental friendly energy sources. (PF1)	4	4.15	1.01
My relative and friends always encouraged me to adopt the renewable energy for heating water. (PF2)	4	3.96	1.33
My relative and friends always encouraged me to plant the trees at the farm or at bank of road. (PF3)	5	3.77	1.27
My reputation would suffer if the environment were damaged. (PF4)	3	2.56	1.76
Citizen personal perceived behavioral control (CPPBC)		3.58	1.40
Public transport is enough for my travelling needs. (CPPBC1)	4	3.89	1.55
I can find the organic minerals easily. (CPPBC2)	3	2.87	1.28
The garbage and recycling bins are easily accessible for me. (CPPBC3)	4	3.99	1.37
Activist personal perceived behavioral control (APPBC)		3.65	1.18
I can easily get help from internet regarding the new environmental farm practices. (APPBC1)	4	4.19	1.26
I am aware of numerous options for reporting ecologically harmful behavior. (APPBC2)	3	3.11	1.09

Note: All statements were inquired about on a 5-point Likert scale (1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly disagree).

4.3. Testing Measurement Model

The discriminant validity and convergent tests were conducted to figure fitness of the measurement model fit. For this purpose, the widely adopted methods of composite reliability (CR) and average variance extracted (AVE) are two important coefficients that were used to measure the model's convergent validity. The empirical examination of formative measurement models in PLS-SEM is subject to the convergent validity assessment. The degree to which one measure correlates with other measurements of the same phenomenon is known as convergent validity [72]. To check for convergent validity, the factor loading of each item used to measure latent variables or constructs was looked at and compared to the cutoff value. Literature says that for a construct to be convergent, the factor loading should be greater than 0.70 [93,94]. All loadings of individual items in constructs are higher than the threshold value of 0.7. The average variance explained shows how much variance the construct captures relative to variance resulting from measurement error. In general, assuming convergent validity (i.e., satisfactory loadings), we would anticipate that a route of 0.80 or higher would be suggestive of achieving an adequate and comprehensive set of formative measures [92]. The factor loadings in Table 3 show that the items are part of the right construct. The fact that no single item had a factor loading less than 0.80 confirmed the convergent validity of the study model.

Table 3. Validity measures of constructs.

Construct/Items	Factor Loadings	Cronbach's Alpha	CR	AVE
ELC		0.87	0.974	0.793
ELC1	0.91			
ELC2	0.892			
ELC3	0.854			
ELC4	0.844			
ELC5	0.812			
ELC6	0.839			
ELC7	0.826			
ELC8	0.843			
ELC9	0.954			
ELC10	0.933			
RCB		0.89	0.955	0.753
RCB1	0.901			
RCB2	0.92			
RCB3	0.876			
RCB4	0.858			
RCB5	0.802			
RCB6	0.823			
RCB7	0.896			
AEB		0.83	0.874	0.636
AEB1	0.932			
AEB2	0.902			
AEB3	0.897			
AEB4	0.883			
RCEI		0.85	0.945	0.744
RCEI1	0.945			
RCEI2	0.892			
RCEI3	0.844			
RCEI4	0.882			
RCEI5	0.832			
RCEI6	0.846			
AEI		0.82	0.910	0.671
AEI1	0.905			
AEI2	0.87			
AEI3	0.836			
AEI4	0.868			
AEI5	0.894			

Table 3. Cont.

Construct/Items	Factor Loadings	Cronbach's Alpha	CR	AVE
IEA		0.87	0.897	0.686
IEA1	0.876			
IEA2	0.866			
IEA3	0.859			
IEA4	0.846			
OEA		0.81	0.822	0.606
OEA1	0.844			
OEA2	0.837			
OEA3	0.864			
PF		0.83	0.874	0.625
PF1	0.897			
PF2	0.9			
PF3	0.877			
PF4	0.859			
CPBC		0.85	0.845	0.647
CPBC1	0.921			
CPBC2	0.881			
CPBC3	0.824			
APBC		0.82	0.851	0.741
APBC1	0.906			
APBC2	0.838			

Note: ELC = environmental law cognition; RCB = responsible citizen behavior; AEB = activist environmental behavior; RCEI = responsible citizen environmental intentions; AEI = activist environmental intentions; IEA = inward environmental attitude; OEA = outward environmental attitude; PF = personal factors; CPPBC = citizen personal perceived behavioral control; APPBC = activist personal perceived behavioral control.

In order to determine whether the construct was valid, the CR coefficient was determined. The purpose of CR is to determine the measures' internal consistency and reliability, describing the combination reliability of latent variables underlying a scale [93–95]. CR is measured from the factor loadings, and it generates more accurate estimates of reliability than those provided by Cronbach's alpha [96]. To confirm the model's construct validity, the CR coefficient should not be less than 0.60 [97,98]. Additionally, a CR coefficient higher than 0.70 [99] signifies model adequacy. Moreover, for confirmatory purposes, the model suitability requires a value of CR greater than or equal to 0.80 [92]. The requirements of a CR value (=0.82) for all latent variables greater than the threshold value lend support for further research. Moreover, because the AVE values for each construct were above the cutoff level (0.50), the convergent validity of the AVE was confirmed [82,88]. When the explained variance is greater than the error variance, the AVE is greater than 0.50 [100]. These results showed that the construct and convergent validity of the measurement model are good. The latent variable's Cronbach's alpha value needs to be higher than the threshold value of 0.70 [101,102]. Cronbach's alpha [103] is a well-known statistic that is frequently used in the literature to discuss the reliability of the instruments. It has been given the title of 'one of the most important and widespread statistics that is routinely reported for the development of scales meant to assess affective constructs' [104,105]. It establishes the internal consistency or average correlations among the questionnaire's variables and establishes the reliability of those factors. Its coefficient alpha has a value between 0 and 1. A greater value of alpha denotes a more reliable measurement scale. The latent variable's Cronbach's alpha value

needs to be higher than the threshold value of 0.70 [106,107]. The value of Cronbach's alpha for all constructs was in range of 0.81–0.89. Therefore, the outcomes of the study revealed that all constructions' Cronbach's alpha values exceeded 0.80, suggesting typical internal reliability. This suggests that the measurement scale is significant, and therefore suitable and appropriate for further analysis.

The latent variables have to be different from one another [98]. This was achieved by confirming the discriminant validity (DV), which states that each latent variable in the model is different from every other latent variable in the model. The square root of the AVE can be used to describe the DV of a latent variable. This is achieved by comparing the correlation coefficients of a latent variable to those of all other latent variables. The total correlation coefficients between a latent variable and all other latent variables must be lower than the square root of the AVE for that variable [106]. The diagonal results in Table 4 showed that discriminant validity was present. The higher diagonal values than the correlation coefficients depict that there is more variation in the latent variable with its own measures compared to other measures. The heterotrait–monotrait ratio (HMR) values were also investigated for DV. The fact that HMR is less than 0.90 supports the DV [100,105].

Table 4. Discriminant validity.

Fornell–Larcker Criterion										
Constructs	ELC	RCB	AEB	RCEI	AEI	IEA	OEA	PF	CPPBC	APPBC
ELC	0.891									
RCB	0.432	0.868								
AEB	0.392	0.333	0.798							
RCEI	0.328	0.231	0.254	0.863						
AEI	0.453	0.402	0.328	0.444	0.819					
IEA	0.653	0.632	0.546	0.254	0.328	0.828				
OEA	0.675	0.534	0.622	0.328	0.546	0.333	0.779			
PF	0.324	0.321	0.565	0.546	0.622	0.436	0.565	0.791		
CPBC	0.443	0.663	0.436	0.622	0.565	0.632	0.436	0.573	0.804	
APBC	0.548	0.675	0.632	0.348	0.436	0.209	0.632	0.678	0.693	0.861
Heterotrait–Monotrait Ratio (HMR)										
Constructs	ELC	RCB	AEB	RCEI	AEI	IEA	OEA	PF	CPPBC	APPBC
ELC	—									
RCB	0.476									
AEB	0.403	0.432								
RCEI	0.32	0.574	0.321							
AEI	0.213	0.765	0.476	0.574						
IEA	0.493	0.493	0.323	0.375	0.463					
OEA	0.567	0.476	0.567	0.493	0.439	0.476				
PF	0.63	0.439	0.432	0.398	0.567	0.403	0.201			
CPBC	0.445	0.567	0.274	0.435	0.654	0.432	0.445	0.329		
APBC	0.473	0.63	0.582	0.562	0.274	0.213	0.332	0.291	0.302	—

Note: ELC = environmental law cognition; RCB = responsible citizen behavior; AEB = activist environmental behavior; RCEI = responsible citizen environmental intentions; AEI = activist environmental intentions; IEA = inward environmental attitude; OEA = outward environmental attitude; PF = personal factors; CPPBC = citizen personal perceived behavioral control; APPBC = activist personal perceived behavioral control.

4.4. Goodness of Fit Measures

Before testing the research's hypotheses, structural model indices were used to see how well the models fit as a whole. If the goodness-of-fit index (GFI) for a given model is high enough, it means that the model's suggested covariance structure is sufficiently close to the covariance structure of the sample data. Adequate fit is often recognized when the chi-square (χ^2) test of significance fails to reject the null hypothesis that the hypothesized covariance matrix is identical to the observed covariance matrix. The issue is that the statistic's functionality depends on N. The χ^2 statistic provides a statistically powerful but practically useless evaluation of model fit for large sample sizes. Consequently, many GFIs have been presented as viable substitutes to χ^2 . The root-mean-squared error of approximation (RMSEA) [107], the normed fit index (NFI) [108], and the comparative fit index (CFI) [109] are just a few of the commonly used metrics [108]. All indices' values showed a good fit of the model because the values of all indices fell within the threshold limits: GFI = 0.96; CFI = 0.96; χ^2/df (2.07); NFI = 0.93; AGFI = 0.94; and RMSEA = 0.051 (Table 5). All measures' results favored the case for additional analyses. This study consulted material from past works such as Singh and Prasad [96] and Sher et al. [97] in order to evaluate the model structure.

Table 5. Measurements of the model fit structural model.

Goodness-of-Fit Measures	Structural Model Results	Threshold Level *
Chi-square test/degree of freedom (χ^2/df)	2.07	≤ 3
Goodness-of-fit index (GFI)	0.96	≥ 0.90
Comparative fit index (CFI)	0.96	≥ 0.90
Adjusted goodness-of-fit index (AGFI)	0.94	≥ 0.90
Normed fit index (NFI)	0.93	≥ 0.90
Root-mean-squared error of approximation (RMSEA)	0.051	≤ 0.08

* Chen et al. [72].

4.5. Structural Model Analysis

R^2 , which stands for “explained variance”, was used to figure out how well the structural model predicted what would happen in the future. All hypotheses except H4a have R^2 values higher than 0.50 (Table 6). According to Wetzels et al. [110], the relationship between the latent variables hypothesized from H1 to H6 was examined using the nonparametric bootstrapping method. All the hypotheses were accepted. The results revealed that the environmental-oriented intentions RCEI ($\beta = 0.442, p < 1\%$) and AEI ($\beta = 0.400, p < 1\%$) have a strong positive impact on the farmers' environmental oriented behavior, since their t-value is higher than the threshold value (2.32). Furthermore, the outcomes showed that inward environmental attitude strongly influenced RCEI (H3a; $\beta = 0.564, p < 1\%$) and AEI (H3b; $\beta = 0.401, p < 1\%$). Similarly, the outwardly oriented environmental attitude also significantly affected RCEI (H3c; $\beta = 0.453, p < 1\%$) and AEI (H3d; $\beta = 0.321, p < 1\%$). The effect of personal factors on RCEI (H4a; $\beta = 0.553, p < 1\%$), and AEI (H4b; $\beta = 0.411, p < 1\%$), was also significant, since their t-values were greater than the critical value (2.32). The results also indicated that in the context of the perceived behavior control (citizen), this significantly influenced RCEI (H5; $\beta = 0.409, p < 1\%$), and AEI (H6; $\beta = 0.310, p < 1\%$).

Table 6. Structural model results regarding the hypotheses established.

Hypothesis	Relationship	Beta-Value	Std. Dev.	t-Value	f ²	Q ²	R ²	Decision
H1	RCEI → RCB	0.442	0.043	10.279 *	0.319	0.201	0.721	Accepted
H2	AEI → AEB	0.400	0.061	6.557 *	0.048	0.253	0.606	Accepted
H3a	OEA → RCEI	0.453	0.047	9.638 *	0.180	0.354	0.578	Accepted
H3b	OEA → AEI	0.321	0.081	3.963 *	0.320	0.229	0.662	Accepted
H3c	IEA → RCEI	0.564	0.072	7.833 *	0.298	0.231	0.701	Accepted
H3d	IEA → AEI	0.401	0.057	7.035 *	0.175	0.432	0.543	Accepted
H4a	PF → RCEI	0.553	0.063	8.778 *	0.077	0.309	0.441	Accepted
H4b	PF → AEI	0.411	0.056	7.339 *	0.112	0.331	0.598	Accepted
H5	CPBC → RCEI	0.409	0.042	9.738 *	0.063	0.354	0.522	Accepted
H6	APBC → AEI	0.310	0.042	7.381 *	0.127	0.320	0.613	Accepted

Note: * $p < 0.01$ if t-value ≥ 2.32 .

4.6. Moderating Role of Environmental Law between RCEI and RCB

All variables were normalized before analyzing the moderating role of farmers' familiarity with environmental law in the relationship between the farmers' intentions and behavior. We followed the methodology proposed by Preacher and Hayes [111]. The direct and significant influence of RCEI on RCB was found (Table 7). Moreover, there was a significant impact of farmers' environmental legal cognition ($\beta = 0.09$, $p < 0.01$) and RCEI ($\beta = 0.029$, $p < 0.01$) on farmers' responsible citizen behavior. Similarly, the interaction effect of farmers' environmental law cognition and RCEI had a significant and positive (β value = 0.35, $p < 0.01$) predictive effect on RCB. This study provides empirical evidence that farmers' familiarity with the law moderates the impact of RCEI on RCB.

Table 7. Moderating role of farmers' environmental law cognition between RCEI and RCB.

Variables	Coefficient	SE	R	R ²	F-Value
Environmental legal cognition (ELC)	0.09	0.022 *	0.51	0.26	59.203 *
RCEI	0.29	0.053 *			
ELC \times RCEI	0.35	0.057 *			

Note: RCB is dependent variable; * depicts significance level at 1%.

4.7. Moderating Role of Environmental Law between AEI and AEB

Table 8 describes the significant positive effect of legal cognition and farmers' activist environmental intentions on the activist behavior of farmers toward preserving the environment. The significant interaction effect of farmers' knowledge of law in the relationship of the farmers' environmental intentions (activist) and their behavior (activist) ensures that familiarity with environmental law moderates the intentions and behavior of the farmers.

Table 8. Moderating role of farmers' environmental law cognition between AEI and AEB.

Variables	Coefficient	SE	R	R ²	F-Value
Environmental legal cognition (ELC)	0.12	0.031 *	0.49	0.24	46.82 *
AEI	0.38	0.047 *			
ELC \times AEI	0.42	0.039 *			

Note: AEB is dependent variable; * depicts significance at 1%.

5. Discussion

China's economy is growing quickly, but this progress has come at the cost of an inefficient energy system and a lot of damage to the environment. As a result, major adjustments are required in China's environmental governance structures. Environmental laws have been demonstrated to have a significant impact on fostering green innovation [32–36]. Significantly, the primary drivers of environmental concerns involve not just corporations and businesses, but also ordinary inhabitants. Therefore, both businesses and ordinary people are responsible for maintaining a healthy environment [52,53]. Therefore, this study is planned to explore the moderating role of the new environmental laws in the relationship between farmers' intentions and their behavior in preserving the environment while they organize their farm- and family-related activities. A total of 1350 farmers were interviewed in person, and a descriptive and structural equation model was used to accomplish the study's purpose.

The results have shown that the TPB is applicable in the environmental field. The results show that outward and inward attitudes, personal factors, and perceived behavior control have an indirect effect on the activist and citizen environmental behavior of farmers through their environmentally oriented intentions. Attitude influences both environmental-oriented intentions and farmers' behavior. Morris et al. [112] and Sinthamrong and Rompho [113] both observed comparable findings. The more environmentally conscious farmers are, the stronger their activist and citizen environmental intentions. Our findings are consistent with those of Levine and Strube [114]. According to them, attitude greatly predicts environmental intentions.

The individual's outward attitude refers to farmers' perceptions of public groups taking constructive steps to safeguard the environment. People gradually begin to believe in these societal, legal, and administrative environmental preservation activities after learning about their effectiveness from external elements, i.e., society, government, and law [76], and thus, their intentions towards protecting their environment increase. This endorses the favorable link found in the literature between a person's trust and their environmental behavior protection measures at national levels [53,66,76]. Inward attitude influences two types of environmental conservation behavior in farmers. Farmers' attitudes and behaviors are coordinated, according to Festinger's cognitive dissonance hypothesis, because individuals want to sustain stability between their attitudes and behaviors in order to prevent cognitive conflict [115]. As a result, those who are deeply committed to environmental conservation are more likely to take action.

Farmers' perceived behavior control (PBC) also had a positive influence on their behavior by preserving the environment through their intentions. The findings align with Sidique et al. [116] and Amutenya et al. [117] regarding the impact of PPBC on the respondents' intentions and their behavior. People desire ease and predictability from a psychological standpoint, according to Li et al. [118] and Zhang et al. [119]. The philosophy of convenience plays an essential role in environmental behavior [119]. Perceived control over a behavior's performance can explain significant variation in intentions and behavior [120]. Personal factors also have an important role in developing farmers' environmental behavior. The stronger the intention to conserve the environment, the greater the felt social pressure, which is consistent with scientific findings for a variety of individual studies [121,122]. Farmers are more likely to perceive or acquire opinions from their society, which shapes their sociocultural perspectives, their attitudes, and their behavior accordingly. Respect and solid interpersonal connections are valued in traditional communism. According to Frederickson [46], the objective of governance is for everyone in society to uphold social morals and refrain from rebellion. As a result, Chinese people are more likely to accept and implement the ideas of their social peers.

This research's findings indicate that farmers' legal cognition also regulates their intentions as a responsible citizen (citizens) and their environmental-oriented behaviors (activists). It implies that farmers' familiarity with environmental laws may promote environmental-oriented behavior on the farm. According to Zhang et al. [31], laws can

encourage environmental protection and help in the reduction of pollution. We begin by considering rules and regulations from the perspective of their regulatory role on intervention intention in the behavior process. China's environmental legislation is classified as general law, which is further separated into two subcategories: soft law and hard law [123]. It is important to note that the majority of environmental legislation and regulations in China that affect or are directed at specific residents rely on incentives. Legislative awareness controls the extent to which people's environmental intentions influence their behavior. Soft law incentives, which make up the vast majority of laws and rules about daily behavior, are better than hard law at getting people to protect the environment every day and directing them to do so [73]. For those who lack interest or motivation in preserving the environment, legislation can serve as a source of instruction and inspiration, shaping their environmental intentions and inspiring them to act sustainably in their daily lives.

Furthermore, law cognition moderates the effect of farmers' environmental intentions (activists) towards their activist behavior more than it regulates the effect of farmers' environmental intentions (citizens) towards their citizen type of behavior. This is due to the fact that average people's opinions and behaviors towards the environment conflict with the views of activists; their citizen environmental action is more spontaneous [124]. Farmers' moral behavior towards the environment has also improved. Self-regulation and restrictions are all that is required for the public to fulfill moral standards and act ethically; hence, supporting such behavior is cheap, simple, and risk-free. Trivedi et al. [67] found that self-regulatory approaches to protecting the environment are more effective than laws that require people to act in a certain way. Residents' daily actions aimed at protecting the environment are, thus, influenced more by their own morality and intentions than by the legislation. Not only are the laws and regulations notable, but so is how they are actually enforced. Dongol and Heinen [125] and Akella and Cannon [126] described that the effectiveness of the restrictions depends on how strictly they are put in place. The more effective the implementation, the more people will have faith in the rules and regulations and be encouraged to follow them. Working together, the government and society can make it easier for people to follow the law. The government is also very important for making sure those laws and rules are followed [126,127]. As a result, legal cognition more powerfully regulates good environmental preservation intention and behavior.

6. Conclusions

This study investigates the elements that influence the environmental behaviors of farmers towards environmental preservation as responsible citizens and activists using a structural equation model supported by the theory of planned behavior. We may give policymakers new ideas for enhancing the efficacy of the law in managing individual environmental behaviors by using legal cognition as a moderator variable to close the intention-behavior gap.

The findings illustrate the planned behavior theory's applicability to both the citizen and activist environmental behavior of farmers by demonstrating that perceived behavior control, personal factors, and attitudes (outward and inward) positively directly affect farmers' intentions and indirectly affect their behavior. Inwardly held environmental attitudes strongly influence farmers' intentions more than outwardly held environmental attitudes have an effect on those intentions. Although perceived behavior control has a stronger influence on citizen environmental behavior and personal influence has a greater influence on farmers' activist environmental behavior, an external attitude has a positive and direct effect on farmers' intentions. Moreover, legal knowledge serves as a bridge between environmental goals and behaviors. Furthermore, when farmers' legal cognition increased, the direct impact of environmental intentions on environmental behaviors would gradually increase. Therefore, the results of the current study suggest that the weaker mandatory law may also have a substantial role in farmers' actions. Based on the findings, we may propose the following policy implications.

1. The focus of society should be on finding ways to make farmers more aware of how important the environment is. Moreover, local government and organizations should play their part in developing farmers' attitudes. In this regard, the government and organizations may organize regular awareness programs for farmers to develop their inward attitude, which greatly influences their intentions.
2. Taking into account the significance of perceived behavior control, the administration should boost the acceptance of environmentally friendly infrastructure, such as recycling bins and public transit, and broaden and simplify the ways in which citizens can contribute to environmental protection. Increasing the prevalence of environmentally friendly buildings may inspire citizens to take better care of the planet in their daily lives.
3. As a matter of law, familiarity plays a vital moderating role in the relation of the farmers' intentions and their behavior towards the environment. The Chinese government has made effective changes to its new environmental law to disseminate information about protection of environment. Further, the local government may provide financial as well as extension services to farmers to adopt environmentally friendly farming practices to minimize the deterioration of the environment.

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