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Original Research

Harvesting Green Propensity: Creating Environmental Oriented Behavior among Rural Communities through Green Knowledge Sharing

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Abstract

Farmers play an important role in bridging the gap between tradition and modernity, and their farming actions and techniques have a significant effect on the natural environment. Promoting pro-environmental behavior (PEB) among farmers in rural communities is very challenging. Thus, the current study explores the diverse elements that may have an influence on the relationship between eco-centric leadership (ECL) and two main PEB manifestations, such as responsible citizen behavior (RCB) and active environmental behavior (AEB), in Sichuan Province, China. The findings revealed that the farmers have positive perceptions regarding the ECL, environmental consciousness (ECO), psychological green climate (PGC), and green knowledge sharing (GKS) based on the responses of 180 randomly selected farmers. Similarly, the farmers also depicted the remarkable RCB and AEB. The significant relationship between ECL and RCB/AEB shows that ECL plays an incredibly crucial role in the development of responsible and proactive environmental-oriented behavior. Additionally, the findings emphasized the significant mediating role of PGC in the development of RCB and AEB through the GKS. Therefore, it is imperative to promote supportive psychological environments to facilitate eco-centric behavior within rural communities. Moreover, the significant moderating effect of ECO on GKS and RCB/AEB signifies that increased environmental consciousness correlates with environmentally responsible and proactive behavior among farmers. The current study emphasizes the importance of environmental conservation in rural communities and demonstrates the necessity of tangible policy actions to promote environmental health. Therefore, the current research offers valuable insights about the ECL, PGC, and GKS toward the development of RCB and AEB. The study proposes practical policy implications such as the provision of customized leadership,

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regional training programs, and eco-centric legal measures in order to motivate and incentivize farmers for their eco-friendly production.

Keywords: responsible citizenship behavior, active environmental behavior, eco-centric behavior, green psychology climate, green knowledge sharing

Introduction

Farmers are very important because they play a crucial role in bridging the gap between tradition and modernity. With the extensive growth of the harmony of nature, they impeccably incorporate it into their daily lives. As the stewards of agricultural land, their farming activities and methods have a strong impact on the natural environment [1]. It is essential for the farmers in the rural community to adopt pro-environmental behavior (PEB) to increase their eco-friendly activities and protect the planet in the era of globalization [2]. These guardians of agricultural land are obligated to take proactive approaches to foster the ecological responsibility of their agribusiness. However, they consciously ignore laws and authoritarian processes. Thus, the PEB concerns the importance of identifying and adopting sustainable agricultural practices and adopting sustainable solutions to reduce the negative impacts on the environment in rural communities. It also signifies the necessity of eco-centric leadership (ECL) among farmers, which promotes PEB among them. ECL also influences the farmers' actions to achieve sustainability and environmental responsibility among farmers. In fact, sustainable rural development, responsible environmental responsibility, active involvement in sustainable practices, green knowledge sharing (GKS), and PEB among farmers center on ECL [3].

Moreover, farmers who give priority to eco-centric principles may foster the voluntary involvement of their peers in responsible environmental behavior (REB) [2,4]. Therefore, responsible leadership among farmers, who are well-informed about environmental challenges, eco-friendly farming innovations, and REB among farmers in rural areas. This promotes the adoption of sustainable and inventive farming practices [5]. Thus, farmers play an important role in maintaining a sustainable ecosystem in rural areas by adopting sustainable practices such as precision agriculture, conservation measures, organic farming, etc. [6]. This adoption and engagement of farmers in PEB farming demonstrates sustainable land management and biodiversity preservation, which go beyond conventional farming practices. Achieving a more sustainable future in rural communities may be possible through the promotion of ECL, the dissemination of knowledge sharing, and the adoption of PEB.

Scholars have increasingly demonstrated interest in the importance of the adoption of PEB. Leadership, especially in rural communities, is very important for establishing the foundation and sustaining the progress toward achieving the desired eco-friendly outcomes. Therefore, to achieve sustainable rural development, it is necessary to have effective rural leadership to utilize human resources and diverse resources efficiently [7]. Different individuals from the private, public, and commercial sectors are involved in this process. It aims to enhance collaboration among individuals having a common interest, foster collective learning and innovation, and promote community-based initiatives [8]. Thus, effective leadership among the farmers promotes joint efforts and fosters community development. Contextual and environmental factors may promote or hinder the development of leadership in rural areas [9]. However, the studies specially focused on rural areas are in their infancy, and there is little understanding of the leadership tactics that efficiently encourage the adoption of PEB among farmers in rural communities. Hence, the current study provides a comprehensive understanding of the important role of ECL in tackling environmental challenges to achieve sustainable rural development.

The agriculture sector has played an important role in China's economy over the last few decades. Vegetables, cereals, and meat are the agricultural goods that China exports [10]. Due to the expansion of this sector, the ecosystem has suffered. For example, the fast-growing adoption of farming technologies and the increase in consumption of energy inputs resulted in environmental challenges, including energy waste and pollution control [11]. Therefore, Yang et al. [12] describe how bringing agriculture into the digital age may boost farm output and reach the objective of sustainable rural development. Moreover, public investment in agriculture, the development of environmentally conscious policies and strategies to reduce emissions, and the promotion of eco-efficiency in farming according to regional diversity are also required to achieve sustainable rural development [13]. Mensah et al. [14] describe that China should prioritize integrated sustainable development that considers the agricultural-environment nexus to prevent the development of policy goals that are contradictory with one another. Moreover, the leadership among farmers that prioritizes the conservation of the environment and the dissemination of knowledge sharing among their peers is crucial to promoting environmentlly friendly and sustainable practices in rural areas. Under the guidance of the farmers' ECL, they adopt sustainable environmental practices and promote the dissemination of environmental knowledge to ensure the widespread

adoption of these practices, which promote the farmers' PEB in rural communities of China.

Integrative sustainable farming development needs collaboration among farming stakeholders to establish a balanced relationship between agriculture and the environment. Therefore, the ECL among the farmers of China is essential in order to effectively counter environmental issues such as land degradation and farm pollution [15]. Li et al. [16] describe that the sustainable development of rural communities and food security in China highly depends on the growth of green farming. Therefore, the country's government has developed legislation to foster the adoption of eco-friendly farming practices in response to the pressing demand for sustainable development [17]. There are various factors influencing the farmers' propensity to adopt environmentally oriented behavior, such as their age, land transfer compensation, property ownership, and the extension service provider. Moreover, self-interest and the farmers' attitude also influence their intentions to adopt eco-breeding techniques [18]. Similarly, environmental consciousness (ECO), pesticide use knowledge, and uncertainties about the quality of agricultural products [19]. Farmers who adhere to Confucian principles have a higher level of trust in each other and are more likely to adopt environmentally friendly pest control techniques [20]. Lin et al. [21] shed light on the promotion of ECO, developing input oversight and encouraging self-management as strategies to guide the farmers toward the adoption of sustainable agricultural practices. Moreover, the knowledge level of farmers and their adoption of sustainable practices are crucial for increasing agricultural resilience and attaining sustainable agriculture [22]. Thus, the ECL may play an important role in the adoption of eco-friendly farming practices, conserve the environment, and ensure the secure future of the agriculture sector in the country.

The current study signifies the significant research gap on the complex dynamics present in rural communities. Because rural communities are different from those in cities and have a unique socio-cultural psychology that can be influenced by ECL, it must also explore how the psychological green climate (PGC) affects information sharing among farmers. The potential significance of ECL and information sharing has been recognized in past studies. However, more detailed investigation is required to understand the psychological processes that link this interaction, especially among farmers in rural areas. The way leadership styles and information sharing affect farmers 'adoption of environmentally friendly practices is very crucial. This is because understanding is crucial for devising targeted solutions that are consistent with their own values and points of view. In addition, there is also a lack of research on what influence ECO has over the relationship between GKS and environmentally oriented behavior. It is important to examine the influence of ECO on the relationship between PEB and GKS. This information is required for developing policies that consider the ECO among farmers and their different levels of capabilities. Therefore, the current study provides a deep understanding of the complex relationship between ECL, GKS, PGC, and ECO on the farmer's PEB. The study aims to comprehend this complex relationship among variables to develop suitable interventions that promote awareness of the environment and sustainable behavior among farmers.

Theoretical Framework

There are various theories available in the literature that examine how important leadership is in the development of PEB. These include the self-determination theory [23] and the transformational leadership theory [24]. From the perspective of this study, however, it improves our understanding of the basic structure of the theory of planned behavior (TPB). The theory of planned behavior has also been tested in a number of areas: recycling [25], the organic food sector [26]; and drone deliveries for restaurant foods and drinks [27].

In this study, TPB is used as a comprehensive framework for treating ECL and GKS in ways that are helpful to promote environmental development among farmers. The study also examines the mediating effect of a PGC. The versatility of TPB fits well with a system as complex and multifaceted as agriculture. It offers a flexible template through which to explore the complicated, intertwined relations within agricultural communities everywhere. In this research, the humanization of TPB, and the complex relationship between ECL and GKS are combined with psychology in order to create a psychologically green environment. The practice of holding oneself eco-centrically accountable is expected to affect the behavior of farmers. This is a critical technique for getting eco-centered principles into the agricultural community and creating networks of shared practices and insights. The psychological climate serves as a mediator for the basic function of the approach. Psychological climate refers to the common understanding of agriculturalists (the general atmosphere). That affects their shared perception of sustainable principles. In one sense, it is a catalyst for the dissemination and reception of information, as well as its impact on farmers' PEB. In addition, the TPB's prediction potential is very valuable in predicting variables that have an influence on eco-friendly behavior among farmers. The purpose of the study is to seek the complicated links that lie behind sustainable agriculture with psychological climate as a mediating factor. Consequently, as this article presents us with a comprehensive view, when we extend the concept of TPB to include not only those parts that are generally accepted but also its concepts concerning leadership and mental attitude in environmentalism-friendly surroundings where knowledge dissemination

is also effective, they can all be incorporated into pro-environmental behavior. These are wonderfully representative elements of our own lives and are closer to us than we think. This framework not only provides theoretical advice for promoting sustainable behavior among farmers, but can also provide practical action.

Review of the Literature and Hypothesis Development

Biswas et al. [2] point out that ECL is a necessary condition for building environmentally friendly attitudes among employers toward knowledge sharing. Eco-centered leaders focus their decision-making and leadership approach on environmental considerations as well as the overall welfare of humanity [28]. They recognize the inherent worth of nature and express reverence for all forms of life, be they land-based or water-born. On the other hand, leaders with a concern for ecology manage to come up with an original and creative ecological concept; they create a positive, environmentally friendly atmosphere in which unsustainable activities are reduced [2]. They play an important role in promoting sustainability policies and voluntary environmental behavior.

Eco-centric leaders in rural areas are those who attach great importance to environmental issues and proactively promote the development of green activities within their communities. These leaders play an important part in dealing with environmental concerns and promoting rural development. Pujihartati et al. [29] discovered that the rural populace in Pulosari, Indonesia, willingly participates as engaged activists for green behavior, which is healthier than what they pick up from down-country culture and city life. The Leader method is a bottom-up approach to rural development that has now become an integral part of the frameworks for contemporary thinking about policy toward rural areas, as outlined by Annibal et al. [30]. This leader may arise among local farmers, community organizers, or educators. Farmers, in particular, have a special responsibility as environmental leaders because their cultivation of the land directly affects its condition. Community farmers, community activists, or educators are likely to become leaders in the village. They are also important eco-centric leaders since they manage the land relatively responsibly. This has a direct impact on ecosystems [31, 32]. According to research, those who are more active in agriculture and have knowledge of and hands-on experience with the sector are also better placed to run things [33, 34]. They could adopt regenerative agriculture techniques, prioritize soil care, and use environmentally friendly farming methods. Besides, people who advocate responsible actions and teachers who talk about conservation may show eco-centered leadership. A person serving as an eco-centered leader in rural communities is one who places human activities back into the natural environment, advocating for sustainability and calling on others to join them in incorporating ecological practices with a view toward improving not only their own community but all of humanity.

Responsible leadership should encourage PEB by creating a sense of commitment in the business, shared goals that feature environmental sustainability at the top, and an internal conviction that people can change their environment by changing themselves [35]. Moreover, ethical leadership also helps to create a moral climate for the development of followers 'morale and improve its impact [36]. It is based on the precepts of moral conduct: making morally correct selections, especially challenging or controversial ones [37]. Open communication with factual information Whether good or bad, ethical leaders are committed to truthfulness. Leaders who want to do the right thing must first cultivate their own internal power, becoming more concerned with promoting their own well-being and that of others. In addition, ECL places the greatest emphasis on environmental health and world welfare in making decisions on how to lead [38].

Avolio and Gardner [24] found that authentic leadership, a positive style of leadership can be built up to change attitudes towards sharing green information. Further, Ying et al. [39] carried out a study indicating that servant leadership has an influence on stimulating employees to engage in voluntary environmental-friendly action. This effect is achieved through sequential mediation. These focus on people's tendency to share information and knowledge related to environmental issues and sustainable development [40]. The following views are based on the belief that information sharing can help ensure sustainability and cultivate a sense of responsibility towards ecology. There are various ways of expressing green knowledge-sharing attitudes. For example, by transmitting information about sustainable levels of consumption practices as well as eco-friendly reminders and stories related to environmental protection. Worse still, Patwary et al. [41] have found that green leadership and human resources management are crucial to promoting responsive pro-environmental behavior among individuals.

Creating sustainability in remote farming communities involves implementing flexible sustainability principles into agricultural education, embracing eco-friendly design techniques, and cultivating a collective mindset focused on the environment. The consensus among the farmers entails the importance of adopting and implementing sustainable farming practices, which leads to PEB among farmers. Therefore, developing eco-minded leadership, creating the PGC, encouraging the dissemination of green knowledge, and developing the PEB among farmers are necessary to achieve a more sustainable future for agriculture. The researchers have recognized the importance of developing effective leadership in achieving sustainable outcomes [42].

Huo et al. [5] found that sustainable growth requires good leadership. Wu et al. [43] advocate using transformational leadership and workplace participation to share knowledge based on the conservation of resources hypothesis. This might indirectly encourage farmers to share green information by creating a friendly work atmosphere. Kim et al. [44] showed that leaders and peers both contribute to workplace sustainability. This research shows how people at different levels promote sustainable practices. Leaders may influence followers' PEB utilizing social learning theory [45]. Successful performance depends on an appropriate training design [46]. Rural communities may educate farmers about green practices and the importance of leadership in creating a sustainable workplace. ECL concepts may be included in farmer training programs to promote environmental stewardship.

Incorporating ECL may change farmers' views on eco-friendly knowledge exchange. This method promotes responsible, ethical, and transparent leadership styles to inspire personal motivation, fundamental beliefs, and group knowledge, supporting sustainable behaviors. Through training, information sharing, and company promotion, this effort creates a sustainable agricultural environment. In fact, Biswas et al. [2] noted that leaders who prioritize environmental sustainability and embrace eco-centric principles can influence their followers' beliefs and actions, promoting a culture of sharing environmentally conscious knowledge in rural communities.

H1: The ECL within rural communities impacts the GKS attitude of farmers.

The presence of a PGC in rural areas plays a pivotal role in facilitating ECL and the exchange of green knowledge [47]. ECL has a substantial influence on the spread of eco-friendly information [2], while the mediation of a PGC [48] indirectly affects the sharing of green knowledge. The Afridi et al. [49] study suggests that a positive PGC plays a role in mediating this association. Building on this, Khan et al. [4] and Graves and Sarkis [50] have found that an organization's perceived environmental ideals and practices, commonly described as its PGC, have a significant impact on employees' behaviors towards the environment. In fact, a positive psychological green atmosphere has been shown to have a favorable effect on GKS, where employees share relevant information and ideas about the environment. When farmers have an eco-centric mindset and actively support environmental initiatives, they foster a positive, psychologically green atmosphere. As a result, other members of the rural community are inspired to share their own green knowledge. This highlights the importance of eco-centric leadership in creating a nurturing and eco-conscious agricultural environment where the exchange of green information is encouraged in rural areas.

Farmers who prioritize the environment and are committed to eco-friendly farming practices may act as eco-centric leaders. He may affect the PEBs of other farmers in rural areas. Their sustainable farming actions and beliefs may promote long-term environmental sustainability within rural communities. Therefore, these eco-centric farmers can act as farming leaders and have the strong capability to influence the other farmers performance and adoption of green innovation through their ECL abilities.

Eco-centric leaders may improve PGC by practicing environmental stewardship, using sustainable agriculture, and showing a true dedication to green practices [2, 51]. This common viewpoint impacts farmers' attitudes toward sharing green methods. As champions for sustainability and environmental responsibility, farmers are more likely to share ecological ideas, new practices, and sustainable agricultural knowledge. The PGC motivates farmers and fosters a feeling of community and responsibility. Farmers are encouraged to openly share sustainable practices, knowing they will be supported and encouraged. Leadership, rural community mindset, and the desire to share and spread knowledge for sustainable agriculture are interdependent, and the PGC is a crucial mediator in ECL's positive effect on farmers' willingness to share green knowledge.

H2. The PGC mediates the relationship between ECL and GKS attitudes among farmers in rural communities.

The GKS links the ECL and PEB, and the importance of ECL in PEB is well known [2]. Afsar et al. [35] found that the PEB of workers is strongly associated with organization commitment, GKS, and internal environmental control. This outcome signifies the importance of ECL in developing the PEB in the company. Therefore, the leadership is encouraging green innovations by boosting information sharing [5]. The resource conservation theory signifies that workplaces where information sharing is practiced are more likely to practice PEB [43], and ECL facilitates the environment of leader-member exchange of green knowledge [5].

Hemond et al. [52], Liu et al. [53], and Lei et al. [54] described that farmers who understand the importance of conservation practices and prioritize the environment are more likely to admire eco-friendly policies and undertake sustainable agriculture practices. Reid et al. [55] observed a substantial link between crop variety, resource usage, and farm size and management. This shows the importance of regional farm dynamics for agricultural sustainability. Liu et al. [53] and Su et al. [56] innovative investigations show that farmers' attitudes, cultural influences, and perceived control substantially affect their eco-conscious activities. Also, various social relationships boost their readiness to participate in rural environmental governance. Farmers are more likely to embrace sustainable methods and support preservation if they prioritize environmental problems and understand them.

The current study also considers the active and responsible citizenship behavior of farmers. The responsible citizenship behavior (RCB) of farmers emphasizes their adoption of sustainable farming

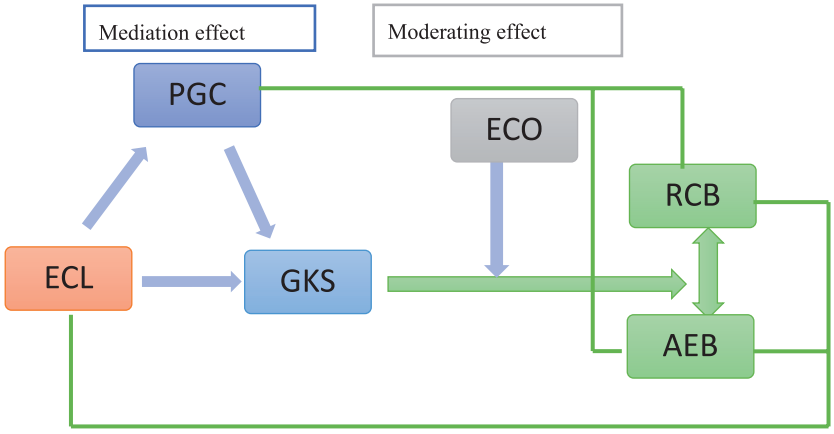

Fig. 1. Conceptual framework and hypotheses.

practices, which include energy-saving on farms and recycling farm waste. The active environmental behavior (AEB) of farmers who participate in organizations is concerned with environmental conservation and creating awareness about environmental issues [56].

H3. The relationship between ECL, RCB, and AEB is mediated by GKS.

H4. The impact of ECL on RCB and AEB through PGC and GKS is significant.

Recent studies indicate the importance of the GKS and the necessity of ECL to foster sustainability [35, 5]. Wu and Lee [43] used the resources conservation theory to highlight the significance of leadership in knowledge sharing. The impact of GKS on the farmer's PEB is strengthened through the ECO [57]. Mansoor and Wijaksana [58] demonstrated that the farmer's PEB is promoted by ECO with GKS.

H5. ECO moderates the relationship between GKS, RCB, and AEB.

Conceptual framework and all hypotheses are shown in Fig. 1.

Material and Methods

Data Source

Sichuan is a unique province in China's southwest portion, covering an area of 486,000 square kilometers. This province has a vast and complicated landscape, from the eastern plains to the western mountains. Average temperatures are 16.5ºC, and yearly precipitation exceeds 1,150 mm, making it comfortable and humid. This province is southwest China's main agricultural area, producing rice, wheat, and maize. As China builds its "Tianfu Granary" and protects its fertile land, Sichuan will play a key role in food security. The region's various and prolific mixed agricultural techniques, including crop production, animal husbandry, and integrated farming, are significantly responsible. The temperature and terrain of Sichuan make it perfect for mixed farming, enabling a range of agricultural activities [59]. The research team performed questionnaire surveys in Beichuan County, Lushan County, Pengzhou City, and Baoxing to gather data for this study. The team created and distributed multi-item farmer survey questionnaires. Each questionnaire took 45-80 minutes, and professional researchers interviewed farmers at home. To verify that the survey questions were comprehensible, 20 possible respondents participated in pilot research [26].

The rural community depends on the leading farmer, who is committed to sustainability and innovative farming practices that protect the environment. They practice eco-friendly agricultural practices and value information sharing, collaboration, and community involvement. These principles unite Sichuan farmers in their pursuit of a more sustainable agricultural practice in this culturally and economically crucial area. Successful farmers in this region inspire others to highlight environmental awareness and help our agricultural techniques become more sustainable. We paid close attention to the participants' responses during the surveys. The three primary parts of our survey were as follows: (1) the perceptions of farmers regarding the ECL of progressive and innovative farmers; (2) the GKS and farmers' perceptions regarding RCB and AEB; and (3) the ECO levels of the respondents. To guarantee a representative cross-section of the population, the stratified and probabilistic random sampling method proposed by Zhou et al. [60] and Ma [1] was used. From each district, we have selected 4 towns, and a stratified sampling technique was adopted to select the 12 villages from each of the 4 towns. At last, 15 farmers from each village were randomly selected, and finally, 180 farmers were interviewed.

Methods

The current study was planned to examine the intricate relationships among the latent variables, and for this purpose, the structural equation model is a powerful tool. SEM facilitates the researcher's ability to obtain a reliable result because it explores the correlations

among the items. Moreover, it also considers the analysis of variance followed by factor analysis to develop the latent constructs. Afterward, it includes regression analysis and path analysis simultaneously [61]. This study uses SEM to find latent interactions between all variables. PLS-SEM, an advanced multivariate SEM that eliminates distribution assumptions and increases statistical power, is ideal for small sample sizes [62]. This research strategy reduces and validates constructs before constructing structural equations for each observable variable. PLS provides a direct item validity assessment. According to prior research, this approach requires 100 individuals for impartial findings [63]. Additionally, 10 criteria and G*power were utilized to choose participants for this model. Using a measurement and structural model as indicated by Chin [64], Hair et al.'s [65] analytical methodology was followed.

Results

Descriptive Analysis of Individual Items and Overall Constructs

As a significant agricultural area in China, farmers in Sichuan Province play a vital role in the development of the rural community and country, and their perspectives are enlightened by these survey findings. The level of agreement of farmers on key points of decision was gathered from the mean scores, modes, and standard deviations. An overall favorable impression of ECL is shown by the average score of 3.48. Importantly, ECL2-" farmers' ECL explains environmental concerns effectively" had an average rating of 3.83, and ECL4 - "farmers' ECL gets involved in sharing knowledge about sustainable farming techniques quite a bit" had an average rating of 3.92. The fact that there are systematic 4's indicates that farmers have agreed on the value of farmers' ECL implementing sustainable practices.

Table 1. Descriptive analysis.

	Mode	Mean	Std. Dev.
Eco centric leadership		3.48	1.25
ECL1	4	3.76	1.23
ECL2	4	3.83	1.27
ECL3	3	2.88	1.12
ECL4	4	3.92	1.33
ECL5	4	3.77	1.41
ECL6	4	3.69	1.09
ECL7	3	2.75	1.18
ECL8	4	3.66	1.37
ECL9	4	3.84	1.21
ECL10	3	2.73	1.26
Responsible citizen behavior (RCB)		**3.62**	**1.28**
RCB1	4	3.68	1.21
RCB2	5	4.72	1.55
RCB3	4	3.79	1.23
RCB4	4	3.88	1.21
RCB5	3	2.94	1.31
RCB6	3	2.76	1.09
RCB7	4	3.58	1.36
Activist environmental behavior (AEB)		**3.74**	**1.27**
AEB1	4	3.54	1.36
AEB2	5	4.66	1.39
AEB3	4	3.58	1.09
AEB4	4	3.66	1.32
AEB5	4	3.37	1.41
AEB6	4	3.65	1.05
Psychological Green Climate (PGC)		**4.18**	**1.29**
PGC1	5	4.78	1.22
PGC2	5	4.65	1.10
PGC3	4	3.53	1.36
PGC4	4	3.64	1.44
PGC5	5	4.77	1.28
PGC6	4	3.69	1.34
Green knowledge sharing (GKS)		**3.96**	**1.30**
GKS1	5	4.53	1.35
GKS2	3	3.88	1.48
GKS3	4	3.79	1.21
GKS4	4	3.91	1.09
GKS5	4	3.68	1.37
Environmental consciousness (ECO)		**4.10**	**1.33**
ECO1	4	3.60	1.44
ECO2	4	3.58	1.35
ECO3	5	4.75	1.22
ECO4	5	4.83	1.02
ECO5	**4**	**3.94**	**1.38**
ECO6	4	3.88	1.54

RCB, which prioritizes sustainability, is shown by the farmers' score of 3.62. One notable practice is water-saving technology, which is RCB2. With an average score of 4.72, its dedication to water conservation is pretty good. Numerous items, including RCB1, RCB4, and RCB7, contain the integer 4. These essential details are also permitted to be part of the standard practices of behavioral responsibility among farmers. The environmental behavior of farmers is characterized by activism, according to an average score of 3.74 on the AEB scale. With a focus on active participation, AEB2 is positioned in the "Participating activities related to environmentally sustainable agricultural methods" category. As a result, its 4.66 average rating is really impressive. Mode 4 is characterized by farmers' active participation, although there may be some diversity.

PGC provides a strong and positive psychological climate in terms of environmental sustainability, with an average score of 4.18. Average scores for PGC1 (supporting and valuing ethical leadership) and PGC5 (I believe that integrating sustainable farming practices produces positive effects over the whole ecological climate) are 4.78, respectively, suggesting a very high degree of agreement. These repeated values of five (mode) are now collectively understood as the provision of a favorable psychological green climate. The total mean score of 3.96 obtained from the GKS analysis has a positive presentation for information-sharing tendency among farmers. With a high desire to spread environmentally sound production methods and ideas, GKS1's mean score is 4.53. There are some differences, but the mode of 4 suggests a prevailing information-sharing culture. According to an average score of 4.10 on the ECO assessment, it is clear that there is already quite a high degree of environmental consciousness among the farmers. Among the items, GCO4 (the conscious use

Table 2. Convergent validity.

	Factor loading	Cronbach alpha	CR	AVE
Eco centric leadership		0.832	0.968	0.755
ECL1	0.950			
ECL2	0.932			
ECL3	0.927			
ECL4	0.893			
ECL5	0.872			
ECL6	0.853			
ECL7	0.839			
ECL8	0.817			
ECL9	0.813			
ECL10	0.810			
Responsible citizen behavior (RCB)		0.832	0.949	0.729
RCB1	0.933			
RCB2	0.921			
RCB3	0.903			
RCB4	0.874			
RCB5	0.859			
RCB6	0.832			
RCB7	0.822			
Activist environmental behavior (AEB)		0.816	0.942	0.656
AEB1	0.928			
AEB2	0.911			
AEB3	0.879			
AEB4	0.857			
AEB5	0.829			
AEB6	0.816			
Psychological Green Climate (PGC)		0.821	0.938	0.718
PGC1	0.947			
PGC2	0.928			
PGC3	0.872			
PGC4	0.859			
PGC5	0.832			
PGC6	0.811			
Green Knowledge Sharing (GKS)		0.853	0.906	0.659
GKS1	0.894			
GKS2	0.871			
GKS3	0.842			
GKS4	0.83			
GKS5	0.822			
Environmental consciousness (ECO)		0.819	0.944	0.667
ECO1	0.941			
ECO2	0.919			
ECO3	0.868			
ECO4	0.853			
ECO5	0.830			
ECO6	0.811			

of green technology and methods) got the highest mean score at 4.83 (Table 1). This number represents a strong commitment to reducing the environmental impact of agricultural activities. The trend of 4 is further highlighting collective consciousness among farmers.

Measurement Model and Its Validity Assessment

Higher factor loading (FL) values suggest a stronger relationship between latent and observable variables. All items in this study had FL values of 0.70 or above, showing a significant link between latent variables and observable indicators for Bentler & Bonett [66] and Cheung et al. [67] (Table 2). If the value of FL is greater than 0.80, it implies that the variables explain significant variation within the construct, which confirms the convergent validity of the measurement model [68]. The values of Cronbach's alpha, composite reliability, and average variance extracted within the required limit demonstrated the convergent validity and allowed for further analysis based on the specified latent variables [56].

This Fornell-Larcker criteria (FLC) compares the square roots of the AVE for each construct to the correlation coefficients identified. If a construct's square root AVE is bigger than its correlation coefficients with other constructs, discriminant validity (DV) is empirically supported [69]. Henseler et al. [70] and Rouf and Akhtaruddin [71] found that heterotrait-monotrait ratio (HTMT) values below 0.90 indicate DV and good DV. Table 3: FLC and HTMT studies demonstrate DV. This emphasizes the need to evaluate each concept independently to uncover strong links between the indicators.

The goodness-of-fit parameters of SEM are used to determine whether the model fits. A low χ^2/df ratio indicates an appropriate fit. This compares the model's degree of freedom to its fit. The χ^2/df value is an excellent fit at 1.63, far below the limit of 3.0. The comparative fit index (CFI) compares the model with a null. The goodness-of-fit (GFI) index evaluates how well the data are accounted for by the model. The GFI explains 92.2% of the variation, more than our thresholds for adequate models at 0.90 or higher. At 0.936, the CFI exceeds 0.9, which is larger than in a null model, signifying a superior fit. With all calculated components, the Adjusted Goodness-of-Fit Index (AGFI) is 0.914, over the threshold of 0.90. The Normed Fit Index (NFI), measuring improvement over a null model, is 0.909 versus 0.90. The RMSEA is 0.033, an extremely exact fit that is far below the threshold limit of 0.8. These are metrics used to evaluate the validity of an SEM model. Calculated results show that the SEM model fits data quite well compared to critical levels.

Path Analysis

We use SEM path analysis to examine the connections between farmers 'ECL, GKS, PGC, RCB, and AEB. The results of the SEM testing show that ECL, GKS, and PGC are all significantly related to each other, while at the same time, they directly influence farmers 'RCB and AEB. A possible interpretation of the findings is as follows:

Table 3. Discriminant validity of the measurement model.

Fornell-Larcker Criterion						
	ECL	PGC	GKS	GCO	RCB	AEB
ECL	0.869					
PGC	0.532	0.854				
GKS	0.384	0.391	0.810			
GCO	0.572	0.372	0.373	0.848		
RCB	0.284	0.274	0.462	0.402	0.812	
AEB	0.403	0.472	0.399	0.322	0.401	0.817
Heterotrait-Monotrait Ratio (HTMT)						
	ECL	PGC	GKS	GCO	RCB	AEB
ECL						
PGC	0.384					
GKS	0.281	0.209				
GCO	0.473	0.553	0.301			
RCB	0.528	0.363	0.433	0.544		
AEB	0.273	0.473	0.364	0.503	0.407	

With a coefficient of 0.464 (t-value = 12.203), ECL has a very significant positive impact on RCB. This means that when farmers see leadership that cares about the environment, they are more likely to behave as responsible citizens. A beta-value of 0.384 (t-val = 5.486) indicates that ECL has a significant positive effect on ACB; this further supports the idea that ECL among farmers leads farmers to take proactive measures for the environment. Studies have proven that eco-centered farming leadership makes farmers more willing to share green knowledge and creates a good psychological "green climate". Accordingly, it appears that ECL exerts a significant effect on GKS and PGC. GKS has a significant effect on both RCB and AEB; the beta-values for RCB are 0.403 (t value = 9.159), and for AEB, they are 0.332 (t value = 8.737). This also reinforces the idea that farmers adopting environmentally friendly practices are more likely to be responsible and active citizens who contribute to environmental protection. A good PGC is correlated with more GKS, RCB, and AEB among farmers.

R2, f2, and Q2 are important parameters in SEM path analysis, for which it is necessary to assess the model's quality as well as its explanatory power. Generally, the R2 provides a sound measure of how well the model fits the data. However, it allows us to analyze just how much variation in endogenous variables can be accounted for by the model. Therefore, R2 represents the percentage of variation in the endogenous variables that is explained by the model. Here, we can see that the model adequately accounts for a large portion of the variation in four variables: RCB (0.708), AEB (0.743), GKS (0.722), and PGC (0.643).

Furthermore, the size of f squared measures the magnitude of the effect, which helps in assessing how much it is practically important. The impact size (f2) measures how much each predictor variable affects the result variables. ECL for RCB has a substantial effect size (f2 = 0.837). This supports the argument that ECL plays a considerable part in explaining differences among farmers 'levels of RCB. ECL for AEB has a sizeable impact size, with a f2 value of 0.658. In many ways, ECL explains why environmentalists behave the way they do. GKS, with a f2 value of 0.896, clearly has a big influence. ECL is an important piece when trying to explain the difference in green information exchange. For GKS, the f2 values for RCB (0.67) and AEB (0.89) indicate comparable to considerable effect sizes. Green information exchange can help you better understand the differences between environmentally conscious activists and responsible citizens. For PGC, the F2 values for GKS (0.568), RCB (0.426), and AEB (0.305) indicate moderate to high impact sizes (Table 4). Therefore, PGC plays an important role in understanding the differences between GKS, RCB, and AEB.

The Q2 employs cross-validation to assess the predictive accuracy of a model relative to endogenous variable forecasts. This is a measure of how well the model predicts values for endogenous variables. As for here, all four Q2 values-0.321 for RCB, 0.372 for AEB, 0.574 for GKS, and 0.4O3 for PGC are positive numbers, suggesting highly predictive significance. The model is using the data to predict the endogenous variables. These indicators, taken together accordingly, offer researchers a comprehensive measure of the model's predictive capacity as well as its ability to illuminate connections and reveal consequences.

Mediation Analysis

The results of the mediation analysis are informative in regard to the mediating function played by PGC between ECL, GKS, and RCB with respect to AEB. A direct route from ECL to RCB via GKS is extremely important (Beta = 0.354, $p<0.001$) (Table 5). This suggests that ECL has a major favorable effect on RCB. PGC's beneficial influence on RCB is also statistically significant along the straight-line route from PGC to RCB by way of GKS (Beta = 0.177, $p<0.05$). A significant indirect path from ECL to GKS via PGC (Beta = 0.043, p = 0.04) verifies the mediating role of PGC between ECL, GKS, and RCB. However, the indirect route from ECL to PGC to GKS and then AEB is not statistically significant (Beta = 0.04,

Table 4. Path analysis.

	Beta-value	Std. Dev.	t-value	f2	Q2	R2	Decision
ECL -> RCB	0.464	0.038	12.203	0.837	0.321	0.708	Accepted
ECL -> AEB	0.384	0.070	5.486	0.658	0.372	0.743	Accepted
ECL -> GKS	0.375	0.083	4.518	0.896	0.574	0.722	Accepted
ECL -> PGC	0.226	0.083	2.723	0.476	0.403	0.643	Accepted
GKS -> RCB	0.403	0.044	9.159	0.670	0.332	0.693	Accepted
GKS -> AEB	0.332	0.038	8.737	0.888	0.284	0.705	Accepted
PGC -> GKS	0.284	0.053	5.358	0.568	0.309	0.574	Accepted
PGC -> RCB	0.332	0.047	7.064	0.426	0.334	0.603	Accepted
PGC -> AEB	0.277	0.032	8.656	0.305	0.431	0.581	Accepted

Table 5. Mediation effect of PGC.

Mediation analysis	Beta-value	Std. Dev.	t-value	p-value
ECL-> GKS->RCB	0.354	0.036	9.725	0.000
PGC->GKS->RCB	0.177	0.045	3.916	0.000
ECL-> PGC->GKS	0.097	0.028	3.415	0.000
ECL->PGC->GKS->RCB	0.043	0.015	2.829	0.040
ECL-> GKS->AEB	0.275	0.064	4.317	0.000
PGC->GKS->AEB	0.089	0.032	2.811	0.000
ECL-> PGC->AEB	0.017	0.004	4.882	0.000
ECL->PGC->GKS->AEB	0.004	0.002	1.869	0.070

Table 6. The moderating effect of ECO on the relationship between GKS and RCB.

Variables	Coefficient	SE	R	R^2	F-value
Environmental consciousness (ECO)	0.362	0.063	0.823	0.677	43.740
GKS	0.274	0.026			
ECO ´ GKS	0.657	0.084			

Dependent Variable: Responsible citizenship behavior (RCB)

Table 7. Moderating Effect of ECO on the relationship between GKS and AEB.

Variables	Coefficient	SE	R	R^2	F-value
Environmental consciousness (ECO)	0.108	0.028	0.623	0.388	39.027
GKS	0.223	0.031			
ECO ´ GKS	0.149	0.047			

Dependent Variable: Active environmental behavior (AEB)

p = 061), with less of a mediating effect in this particular path.

We normalized all variables in order to make comparisons before we explored how ECO moderates the relationship between GKS and RCB. The technique used in this investigation was proposed by Preacher and Hayes [72]. Table 6 shows the rapid and significant impact of ECO on RCB. Additionally, the relationship of ECO among farmers ($\beta = 0.362$, $p<0.01$) as well as GKS ($\beta = 0.274$, $p<0.01$) with RCB was statistically significant. A significant and favorable interaction effect of Farmer's ECO and GKS on RCB was found ($\beta = 0.657$, $p<0.01$). This result is significant because it demonstrates a better chance of predicting RCB. The results show that farmers' ECO moderates GKS 'impact on RCB.

The effect of the ECO on the AEB is illustrated in Table 7. In addition, a significant statistical relationship existed between the ECO of farmers ($\beta = 0.108$, $p<0.01$) and GKS ($\beta = 0.223$), as well as their AEB. The research finds a positive and statistically significant interaction effect of the farmers 'ECO score with GKS on AEB ($\beta = 0.047$, $p<0.01$). This result is important because it shows a higher likelihood of predicting AEB. It shows that farmers' ECO moderates the impact of GKS on their AEB.

In the context of RCB, a larger coefficient means that moderation is more pronounced. This implies that the combined effect of ECO and GKS has a greater effect on RCB. In terms of AEB, a smaller coefficient means a less significant moderating effect. This shows that while ECO does moderate the relationship between GKS and AEB, its actual effect is relatively limited.

Discussion

However, due to environmental problems and the need for sustainable solutions, it has become immeasurably more important than ever that rural development be carried out in a way that is environmentally responsible. The current study explains the complicated mechanism of promoting environmental behavior among farmers in rural communities through the concepts and methods

of ECL, mediated by GKS. Using PLS-SEM, the relationship between different constructions and their impact on promoting environmental sustainability is studied. Therefore, PLS-SEM enables a complex analysis by providing an interactive way of looking at various relationships within the proposed model. In order to ensure the robustness and reliability of these results, a quantitative methodology with well-defined constructs uses established measurement techniques. This study examines the complex relationship of ECL among farmers, their GKS, and PGC in rural areas struggling for sustainable rural development. It offers valuable lessons for intervening in these absolutely crucial areas to expand green prosperity.

The debate about ECL's influence on RCB creates an interesting rural development narrative. Our study shows how eco-centric farmers promote responsible citizenship in their communities. The findings revealed a significant relationship between the ECL and RCB of farmers. The farming community follows the same behavior that is emphasized by their eco-centric leader, which generates a more environmentally aware and sustainable rural community. Tang et al. [73] emphasized that the leadership that a responsible citizen has promotes responsible citizenship behavior among their peers. Therefore, the ECL and responsible citizenship are highly interdependent [74]. The community commonly considers their leader as their role model, and they regard his compelling message to the community. In turn, it develops the RCB among the farmers. For example, eco-centric farmers actively adopt sustainable farming practices, which enhances the chance of other farmers adopting similar behaviors. Therefore, the farmers are more likely to adopt sustainable practices through social networks and rural development initiatives, and they spread the suggested farming practices [75].

Moreover, eco-centric farmers often disseminate their knowledge to other farmers about the environmental consequences of their farm activities. They emphasize the adoption of sustainable practices to tackle environmental issues. Thus, these eco-centric farmers develop a knowledge-sharing culture and promote collective efforts toward strengthening the RCB among the farmers. Consequentially, it creates tangible and responsible behavior among farmers, such as managing farm waste, saving energy, and making daily farming decisions carefully. In rural communities, the farmers regard the eco-centric farmers (as opinion leaders of the area) because these farmers develop eco-centric behavior and views among the other farmers. Moreover, the behavior of these eco-centric farmers is also essential for success. Implementation of policies and innovations [76]. Small farmers need an influential individual for eco-centric information and guidance, and they are more likely to change their farming behavior under the guidance of an influential individual [31]. Various studies support the impact of ECL on the RCB. The ECL is necessary for sustainable development because this type of leader develops a culture of environmental stewardship by influencing businesses and communities. For example, personal incentives and a good attitude affect the decision to participate in eco-breeding activities [77]. Wang et al. [78] highlighted that social leadership is an important element of achieving sustainable rural communities. Similarly, the ECL also promotes the AEB among farmers by motivating and empowering them to engage themselves actively in protecting their environment. Consequently, farmers become more proactive toward the protection of the environment. Thus, ECL catalyzes environmental transformation in rural communities. Consequently, the eco-centric leader promotes the workplace within society, which facilitates actively supportive environmental action [79,80]. This is very important for sustainable agriculture, where eco-centric practices ensure long-term environmental sustainability.

Under the guidance of eco-centric leadership, the farmers like to share their knowledge with each other in the community [81]. As ECL promotes the culture of sustainable knowledge sharing among farmers [22], it strengthens the relationship between ECL and GKS. Thus, these leaders inspire other farmers and lead them toward the adoption of environmentally friendly farming techniques by communicating and demonstrating them practically [31]. Moreover, the field visits, group discussions, and communication with experts and leaders may inspire the farmers to adopt sustainable farming [82]. Thus, the strong relationship of the local farmers within the community with ECL can facilitate their learning about sustainable farming. Consequentially, ECL can enable other farmers to adopt sustainable farming methods through GKS.

This framework of ECL and GKS creates a rural community of well-informed and motivated farmers who attempt to improve agriculture. The current study highlights the significant mediating effect of PGC on the relationship between ECL, GKS, RCB, and AEB. The ECL creates a favorable environmental-focused psychological climate through the GKS among farmers by exemplifying moral leadership, green transportation sustainability, and empowering leadership. For example, under ethical leadership, individuals care for their environment [83, 84], which develops an eco-friendly workplace. Consequently, empowering leadership improves the individual PEB [51]. This cultivates a green working environment and an eco-friendly knowledge sharing environment, which strengthens the PGC among farmers. Moreover, environmental-oriented transformational leadership is linked with the development of sustainable farm products and personal environmental values, which affect the PGC [85]. Xie et al. [81] stated that the ECL motivates farmers to take care of their environment. Thus, farmers become more interested in developing knowledge sharing and considering green information in their daily farming actions. In such a way, ECL plays an important role in affecting the farmers' attitudes and behaviors and developing sustainable rural communities.

This complexity of the link makes the PGC a basic element for integrating ECL, GKS, and PEB among farmers.

The current study also highlights the significant moderating effect of ECO on the relationship between GKS, RCB, and AEB. Farmer's beliefs, knowledge sharing, and behavior are interlinked in the complex world of environmental sustainability. Mansoor and Wijaksana [58] describe that PEB among individuals is increasingly promoted when there is a strong link between their ECO and sharing knowledge. Consequentially, farmers who are more conscious and also share what they know with others in the community are more likely to have responsible, proactive behavior. Thus, Qing et al. [86] found that environmental consciousness significantly affects the production behavior of farmers. Thus, the relationship between GKS and the individual PEB depends on the degree of their environmental awareness [3]. Individual core beliefs and values about the environment impact their knowledge sharing and the development of environmental-oriented behavior [87]. Therefore, the ECL is a basic element to develop the knowledge-sharing environment and create a community that prefers the environment [88].

Conclusion

Promoting pro-environmental behavior (PEB) among farmers is very challenging. The current study emphasizes that promoting pro-environmental behavior in rural communities is very challenging. The purpose of the current study was to examine the diverse elements that have an influence on the relationship between ECL and two types of PEB, i.e., RCB and AEB, among farmers in Sichuan Province, China. The outcomes of PLS-SEM were based on the responses of a total of 180 randomly selected farmers from the Sichuan province of China. The descriptive analysis of the constructs demonstrated the favorable situation of ECL, PGS, and GKS among the farmers. Moreover, they achieved a good level of RCB and AEB. The farmers also perceived high levels of environmental consciousness. Therefore, there was a supportive level of PGC, and farmers had a great attitude toward sharing information in the study area. The path analysis revealed a significant relationship between ECL, RCB, and AEB. Thus, it is confirmed that the ECL plays a crucial role in developing responsible and proactive environmental-oriented behavior among farmers. Moreover, the significant relationship between ECL and GKS ensured that the ECL facilitated the rural community to disseminate their green knowledge and their green experiences with others. Consequently, the ECL promotes knowledge sharing in the environment and leads farmers to achieve responsible and proactive environmental-oriented behavior, which is necessary for maintaining the long-term sustainability of rural communities.

The findings also revealed the significant mediating role of PGC. It underlines the significance of a favorable psychological climate in facilitating the ECL in the development of RCB and AEB through the creation of GKS. Thus, the PGC encourages the farmers to share their green information with other farmers and behave like responsible and proactive citizens. Consequently, it is ensured that the ECL changes the psychology of farmers and their behavior, which generates sustainable and ecologically aware rural communities and fosters environmental stewardship among rural farmers. The significant moderating impact of ECO between GKS and the RCB and AEB of farmers confirmed that the more environmentally conscious farmers are, the more likely they are to behave like responsible and proactive citizens.

The current study proposes practical policy implications that may assist stakeholders and policymakers aiming to promote sustainable agriculture in rural areas. We proposed valuable options by emphasizing the ECL as a way to accelerate environmental improvement in rural areas. Designing farmer-specific leadership programs may have the power to disseminate eco-centric ideas, which include environmental consciousness, effective information dissemination, and creating a healthy psychological environment. The agricultural-related workshops and training at the local level may accelerate the dissemination of green information and the experience of eco-centric farmers. Policymakers should develop agricultural policies that integrate the eco-centric principle and incentivize farmers for their proactive and environmentally responsible production. Moreover, eco-centric farmers or leaders may be recognized and awarded within the communities. In order to promote a favorable environment for sustainable agricultural development in rural communities, collective efforts, educational programs, and research programs are needed. By working together, the proposed suggestions may empower the farmers to achieve more control over their farming actions, foster eco-conscious rural communities, and ultimately lead to long-term sustainability.

Although the current study explores the complex dynamic of eco-centric leadership, green information sharing, and their effect on the responsible and proactive behavior of farmers, and provides useful insights. It is necessary to recognize some limitations. The current study uses self-reported data, which may have problems with social attractiveness and response bias. A mixed methods technique may assist in a complete understanding of farmers' attitudes, beliefs, and experiences. Moreover, the current study is cross-sectional based, which may hinder the causality determination. It underscores the necessity of a longitudinal research design to examine the temporal association across the variables. Therefore, the current study includes the key elements in our model, but some additional variables may influence the pro-

environmental behavior of farmers; the next research may include those other variables.

Conflict of Interest

The authors declare no conflict of interest.

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