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ORIGINAL ARTICLE

An Investigation of Factors Influencing the Pro-Environmental Behavior of Orchardists in Dena Kooh District, Semirom County

Zabihollah Azizi Habibabad¹, Maryam Sharifzadeh^{2*}

¹M.Sc. of Rural Development, Faculty of Agriculture, Yasouj University, Yasouj, Iran

²Associate Professor, Department of Rural Development Management, Faculty of Agriculture, Yasouj University, Yasouj, Iran

Correspondence

Maryam Sharifzadeh
Email: m.sharifzadeh@yu.ac.ir

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ABSTRACT

At present, environmental crises caused by irresponsible agricultural activities are known to increase environmental vulnerability around the world. So, it is important to know how people think about the environment, what they know, and how concerned they are with nature and the environment. This survey research was aimed at understanding the pro-environmental behavior and its influencing factors among the apple orchardists of the Dena Kooh area of Semirom County. The population consists of 4019 horticultural producers in 28 villages in the Dena Kooh district, and the sample size was determined by random cluster sampling regarding the economic status of villages in two rich and poor clusters. 320 interviews were carried out with all sample members. The data collection instrument was a structured questionnaire, and its face validity was confirmed by Yasouj University faculty members. The Cronbach's alpha coefficient was calculated between 0.61 and 0.92, indicating acceptable reliability of the measures. The results showed that the average environmental behavior of the orchardists is at a poor level. A comparison of the average current and past environmental behavior of orchardists showed that their pro-environmental behavior has developed. The results of hierarchical regression showed that knowledge, responsibility, socio-cultural norms, values and emotions, external commitment, and past behavior accounted for 69% of the variance in orchardists' environmental behavior in the economically rich cluster. The results of hierarchical regression in the economically poor cluster showed that emotions, knowledge, responsibility, socio-cultural norms, external commitment, and past behavior accounted for 75% of the variance in orchardists' environmental behavior. The current research can benefit policymakers, researchers, and farmers in determining pro-environmental practices, considering the viewpoints of farmers. However, various issues identified in this study have implications for future research and for other crops under different farming systems.

KEYWORDS

Past Behavioral Pattern, Institutional Context, External Commitment, Incentives, Attitude.

نشریه علمی

آموزش محیط‌زیست و توسعه پایدار

«مقاله پژوهشی»

واکاوی سازه‌های مؤثر بر رفتار حامی محیط‌زیست باغداران بخش دنا کوه

شهرستان سمیرم

ذبیح‌اله عزیزی حبیب‌آباد^۱، مریم شریف‌زاده^{۲*}

چکیده

پژوهش حاضر با هدف واکاوی رفتار حامی محیط زیست باغداران و عوامل مؤثر بر آن در بخش دنا کوه شهرستان سمیرم صورت پذیرفت. جامعه آماری متشکل از ۴۰۱۹ باغدار در ۲۸ روستای بخش دنا کوه بود. نمونه آماری با استفاده از روش نمونه‌گیری طبقه‌ای با انتساب متناسب تعیین شد. بدین ترتیب، تعداد ۳۲۰ باغدار در دو طبقه برخوردار و نابرخوردار بطور تصادفی شناسایی و مورد سنجش قرار گرفتند. ابزار جمع‌آوری داده‌ها، پرسشنامه‌ای ساختارمند بود که اعتبار صوری آن با بررسی دیدگاه اعضای هیأت علمی دانشگاه یاسوج تأیید شد. با هدف سنجش پایایی پرسشنامه، مطالعه‌ی پیش‌آهنگ در بخش مرکزی شهرستان سمیرم انجام شد که ضریب آلفای کرونباخ بین ۰/۶۱ تا ۰/۹۲ نشان از پایایی قابل قبول سنجه‌ها بود. یافته‌های پژوهش نشان از میانگین ضعیف رفتار باغداران از نظر رعایت معیارهای محیط زیستی داشت، هرچند در قیاس با رفتار پیشین باغداران، رفتار محیط زیستی توسعه یافته است. نتایج حاصل از رگرسیون سلسله مراتبی در منطقه برخوردار نشان داد که دانش، مسئولیت‌پذیری، هنجارهای فرهنگی- اجتماعی، ارزش‌ها، تعهد بیرونی و رفتار پیشین تبیین کننده ۶۹ درصد از واریانس رفتار محیط زیستی باغداران بوده است. در حالی که سازه‌های ارزش‌ها، دانش، مسئولیت‌پذیری، هنجارهای فرهنگی- اجتماعی، تعهد بیرونی و رفتار پیشین تبیین کننده‌ی ۷۵ درصد از واریانس رفتار محیط زیستی باغداران در منطقه نابرخوردار بوده است.

واژه‌های کلیدی

الگوی رفتار پیشین، بستر نهادی، تعهد بیرونی، مشوق، نگرش.

^۱ کارشناس ارشد توسعه روستایی، دانشکده کشاورزی، دانشگاه یاسوج، یاسوج، ایران
^۲ دانشیار، گروه مدیریت توسعه روستایی، دانشکده کشاورزی، دانشگاه یاسوج، یاسوج، ایران

نویسنده مسئول:

مریم شریف‌زاده
رایانامه:

m.sharifzadeh@yu.ac.ir

استناد به این مقاله:

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Introduction

Environmental experts have interpreted "over-collapse pressure" to refer to the dangerous conditions (Bardi, 2016) that have resulted from the rapid growth of the population during the 20th century and its associated consequence of production and consumption (Mahboobi & Sepehrara, 2013). This has caused a variety of environmental threats (such as reduction of biodiversity, global warming, climate change, and pollutants), and international concern has risen in response. While the use of high-yield crops, fertilizer, irrigation, and pesticides has had a positive effect on food production (Matson, 2009), continuing this trend carries irreversible consequences for the global environment (Esmacilzadeh Seilabi et al., 2022).

According to the Food and Agriculture Organization, the worldwide, Asian, and Iranian cultivated area of agricultural goods stands at 4801, 1668, and 45 million hectares, respectively (FAO, 2021). Global Economy declares the share of employment in the agricultural sector accounted for 23.4 percent internationally, 8.8 percent in Asia, and 17.2 percent in Iran (Global Economy, 2019). Iran is third in the world in terms of the variety of horticultural products -with 15 important horticultural products in terms of variety; China and the United States rank first and second, respectively, and Iran is joint third with Turkey (FAO, 2015). Apples are among the most extensively cultivated fruits due to their adaptability to various climates in most parts of the globe. 887 million tonnes of fruit were produced worldwide in 2020, with Iran coming in sixth in global production at 2.799.197 million tonnes (FAO, 2021). Based on data from the Ministry of Agricultural Jihad, apple exports were exceedingly high in both 2018 and 2019, totaling 884.8 thousand tons. By optimizing pesticide and fertilizer use and employing integrated strategies for managing pests and soil nutrients, the products can adhere to global standards and aid in boosting exports. Statistics from the Ministry of Agricultural Jihad from the year 1400 concluded that the total production of horticultural products across 652 million hectares of garden-filled land in the country was 22.4 million tons. Of that, 18 percent (approximately 4 million tons) were

apples, harvested from 218,654 hectares of garden area (which is 7/8 of the fertility rate of the nation's gardens). Out of all the provinces, Isfahan placed fifth in apple production, comprising 1.6% of the country's produce, with an area of 82,414 hectares of horticultural crops (Ministry of Agriculture Jihad, 2021). The area of apple orchards in Isfahan province is 21,512.7 hectares, and Semirom County has the most lush apple orchards spanning an area of 36 thousand hectares, with 40 percent of those located in the Padena region alone. In recent years, environmental difficulties such as water contamination, soil degradation, vegetation, and wildlife loss, etc. have developed due to the overuse of artificial fertilizers and pesticides, according to data gathered by regional specialists, resulting in a decline in yields (Ministry of Agriculture Jihad, 2017). In this regard, this study aims to concentrate on the pro-environmental behavior of farmers from the Dena Kooch district in Semirom County and to determine the factors that influence their pro-environmental behaviour. Additionally, it seeks to create strategies for smart and sustainable exploitation of resources that will benefit current and future generations. So, the general purpose of this research is to understand the pro-environmental behavior and its affecting factors among the orchardists of the Dena Kooch district of Semirom County.

Previous studies have largely focused on the general role of humans in the creation of environmental issues. Many theories have been used to assess social behavior towards nature, which includes the new environmental paradigm (Dunlap & Van Liere, 1978), post-material values (Inglehart, 1977), Fishbein and Eisen's reasoned action model, Fietkau and Kessel's model of ecological behavior (Fietkau & Kessel, 1981), Schwartz's altruistic behavior (Schwartz, 1992), Thompson and Barton's environmental attitudes (Thompson & Barton, 1994), Olander and Thøgersen's multiple models (Olander & Thøgersen, 1995), the needs-opportunities-ability model (Vlek et al., 1998), Schnaiberg and Gould's treadmill of production (Schnaiberg & Gould, 2000), Blake's risk society (Blake, 2001) and Lucas et al.'s model (2008). All of these theories are centered on well-regarded social and psychological concepts and seek to explain why people behave in certain ways towards the

environment and how that behavior is formed.

Although the models used in the above studies show a clear picture of how the pro-environmental behaviors are, most of these models have a poor estimate of repeated behaviors. Kollmuss and Agyeman (2002) sought to refine Lucas and colleagues' model of environmental behavior by introducing a tiered structure of demographic, external, and internal factors. They proposed that repeated environmental behavior is determined by the combined impact of demographic attributes, external factors such as institutional, economic, social, and cultural influences, and internal factors like motivations, responsibilities, and priorities. Analysis of the effects of institutional factors and guiding and restraining laws and regulations demanding people to adhere to the environment have been highlighted in different studies (Lahsaeizadeh et al., 2005). In addition, various other studies have observed the influence of the economic base of society on environmental behavior (Orellano & Chuvieco, 2022; Wang et al., 2021; Hemayatkhah Jahromi et al., 2017; Mi et al., 2011; Steg & Vlek, 2009). The personal economic status (financial ability and economic and income status) of farmers has a marked effect when it comes to making decisions (Melgar et al., 2013; Zhao et al., 2016).

Besides these infrastructures that offer a legal and safe environment for individuals, environmental attitudes, values, motivations, priorities, and a sense of responsibility also form a set of duties and obligations. This motivates people to maintain and assist the society they live in (Gatersleben et al., 2014; Evans et al., 2013; Royaie & Mehrdoost, 2009). The term environmental attitude is complicated and multi-dimensional, comprising steady beliefs and actions, which are expressed through behavior in various studies (Vaghefi & Haghghatian, 2016; Mei et al., 2012; Durpoix, 2010; Mohammadian & Khataei, 2011; Linan & Chen, 2009). It is defined as one's beliefs and sentiments regarding particular environmental issues and topics (Hayati et al., 2010). Karimi (2008) explains that our attitude towards the environment is shaped by our sensory perception, opinions, and emotions. Particularly, Grob (1999) notes that heightened

emotions are more likely to inspire environmental support behaviors. The findings of Milfont et al. (2010) suggest that the creation of cultural groups and activities is the best way to reduce environmental destruction. Additionally, Kalantari et al. (2016) demonstrated from their survey of Tehrani citizens that there is a strong correlation between environmental values and protecting the environment. In Ardeleanu's (2012) opinion, an individual's attachment to a particular place is an ecological value and shows people's sensitivity regarding the quality and safeguarding of the land. Such a bond, however, is not similar among all exterior surrounding places, and, in relation to the serenity of a small town, forest, and mountain, there is a perceptible distinction. Hajizadeh Meymandi et al. (2015) have examined the cultural aspects linked to environmentalism and found that one's lifestyle has a beneficial impact on pro-environmental behaviors. In light of that, particular procedures should be taken towards establishing a culture within a society. It seems that the cultural capital of the society could be enriched to carry out pro-environmental behaviors. Media is an important platform here. Bahmanpour and his colleagues (2023) discovered that individuals gain environmental awareness from the media. Bahmanpour worked to cultivate knowledge and culture in the group from an early age to encourage environmental care. There have been multiple studies substantiating the positive effects that social norms have on boosting environmental practices (Menatizadeh et al., 2016; Adhami & Akbarzadeh, 2010).

The summary of prior studies demonstrates that in order for environmental behavior to be enacted, the availability of infrastructure is necessary, as well as the internal motivation to take action. Infrastructure requires facilities to make the desired behavior possible, and individuals must have the internal drive to use these resources in order to perform the desired behavior. Additionally, internal factors also demonstrate the potential to affect people's behavior. Therefore, in this research, the framework by Kollmuss and Agyeman (2002) was employed in order to evaluate the active structures behind the development of pro-

environmental behavior. Variables included in this framework are internal (inner) factors (awareness of environmental knowledge, environmental attitude, responsibility, environmental values, and personal economic status), external outer elements (environmental,

institutional context and infrastructure, economic context and infrastructure, and social and cultural norms and customs), and adjusting variables (internal motivating factors, external motives and agreements, and past behavior patterns).

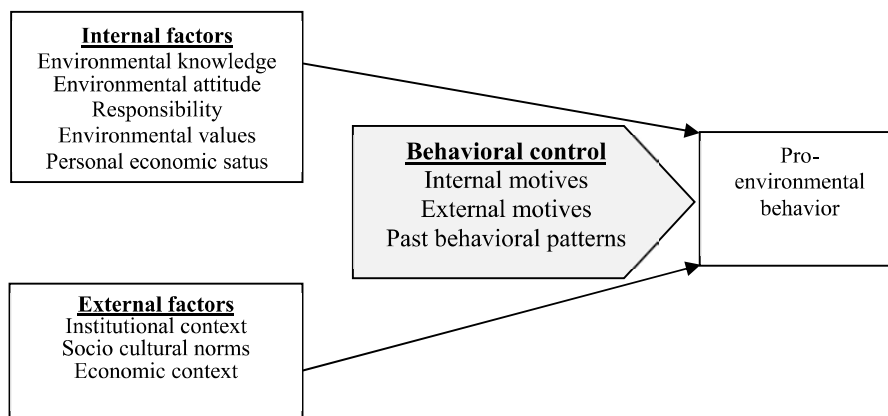


Figure 1. Theoretical Framework, Factors Affecting Pro-environmental Behavior (Adapted from Kollmuss & Agyeman, 2002)

Therefore, based on the hypotheses of the theoretical framework, the following specific goals have been pursued in the current research:

1. Identifying the relationship between internal factors (environmental knowledge, environmental attitude, responsibility, environmental values, and individual economic status) and pro-environmental behavior of Dena Kooh orchardists;
2. Determining the relationship between external factors (institutional context, socio-cultural norms, economic context) and orchardists' pro-environmental behavior; And
3. Determining the role of behavioral controllers (internal and external motives and past behavioral patterns) affecting the environmental behavior of orchardists in the Dena Kooh district.

Research Methodology

This study utilized a descriptive research method with a cross-sectional correlation type. The target population of the research was comprised of apple orchardists from 28 villages located in the Dena Kooh sector of Semirom County in southwest Isfahan province. The total garden land and acreage of Dena Kooh are over

5250 hectares (Afshari, 2013). Apple farming is the primary means of income in this area, as 100,000 tons of apples were produced in this region in the crop year 1400 (Organization of Agriculture Jahad Isfahan, 2021). To group and zone the region according to economic status, the cluster analysis test was applied. In order to cluster the studied rural areas, nine variables of the economic state of the rural area under study were calculated. The total number of resident households, the total number of farmers (agricultural products), the average number of fruitful trees, the average harvest (yield) from each tree in a crop year, the average annual income, the average annual cost of gardens for providing human resources and institutional and technical equipment, the average income of the households in an agricultural year, non-agricultural income, the number of light livestock and heavy livestock was determined by visiting the villages in person and studying the available documents and statistics, and the following equation was used to normalize the score of each variable.

$$A = \frac{x_i - x_{min}}{x_{max} - x_{min}} \times 100 \quad (\text{equation 1})$$

Then, the K-means cluster analysis was

applied to the data from the economic base of the society under study in order to split up the rural areas into two main classes- the rich (11 villages) and the deprived poor (17 villages). From both of these classes, 320 different orchardists were then picked out for the statistical sample through proportional allocation. Fieldwork and a researcher-made questionnaire were employed as sources for the necessary data. To measure the internal factors (environmental attitude, environmental values, environmental knowledge, responsibility, and personal economic status), external factors (socio-cultural norms, institutional context, and economic context), the behavioral controller (internal and external motives and past behavioral patterns), and demographic items, questionnaire were set in four parts. In the first part, the standard scale of Dunlap and Van Liere (Dunlap & Van Liere, 1978) was used to measure the environmental attitude. In this scale, attitudes were measured by the 15-item scale consisting of five interrelated facets, including antiexemptionalism, ecocrisis, antianthropocentrism, limits to growth, and balance of nature. Ten close-ended questions measure the responsibility, as people's accountability to the environment and other living organisms in the ecosystem. Environmental values were measured using Stern's (2000) biospheric, altruistic, and egoistic values. Using eleven yes/no items, the environmental knowledge was measured to identify farmers' knowledge of pro-environmental behavior. The personal economic status was assessed by asking open-ended questions about participants' property (owning the house and its infrastructure, vehicle, agricultural tools, etc.) and income, and their livelihood status. The data was then normalized (Equation 1). Internal and external incentives and motives (financial costs, etc.) and all the obligations that the government has towards pro-environmental behavior are measured in the current study using a 7-point Likert scale ranging from very low to very high. With twelve yes/no items, the historical behavioral pattern indicates the difference in orchardists' behavior over the last five years. It is apparent that prior behavior and past experiences influence future behavior and have

the potential to change external and internal structures. The institutional context was evaluated using nine accessibility factors (training courses, knowledgeable specialists, government subsidies and media, recommendations, the possibility of recycling poisons and fertilizer packages, and so on). Socio-cultural norms were assessed using eight measures that addressed the society's anticipated dos and don'ts (important individuals and institutions to villagers and family) and the degree of subjection to them. Socio-cultural norms are a result of a collection of views known as normative beliefs. The economic context reflects the region's welfare state (in terms of inhabitants' income levels, financial ability to fulfill the fundamental requirements and basic needs of life in a rural and agricultural society, the amount of the region's land, and the quantity of heavy livestock in the region, etc.). This variable was also analyzed and standardized using Equation 1. The pro-environmental behavior of orchardists was researched using twelve yes/no questions (usage of chemical fertilizers and pesticides, irrigation techniques, and recycling behaviors). A panel of six Yasouj University specialists approved the validity of the questions, and pilot research was undertaken with 30 orchardists in rural locations outside the statistical community of Padena district to assess reliability. In terms of production structure and social characteristics, the selected areas were similar to the target areas. Cronbach's alpha coefficients ranged from 0.61 to 0.92, indicating that the measurements were reliable.

Research Findings

This research found that the average age of orchardists was 44.3 years old. Out of the statistical population, 59 orchardists (18.4%) were uneducated, 95 (12.2%) had less than a diploma, 39 (8.4%) with a diploma, and 56 (31.6%) with a bachelor's degree or higher. There were 22 (6.9%) female orchardists and 298 (93.1%) male. Regarding their other jobs, 72 (22.5%) of them had another job, while 248 (77.5%) did not. The average income of orchardists was 780 million Rials (with a standard deviation of 380 million Rials) within

the range of 110 to 250 million Rials.

Pro-environmental behavior

The findings of Table 1 suggest that the current average score of 4.45 (with a standard deviation of 1.69) for orchardists' environmental behavior is less favorable than the score of 3.43 (with a standard deviation of 1.30) observed

over the previous five years. Despite the higher rate of pro-environmental behavior in the resource-rich region, the environmental behavior among orchardists in these areas fails to meet expectations. This could be due to the illusion of resource abundance resulting in a lesser comprehension of resource limitations.

Table 1. The Comparison of Current and Past Pro-environmental Behavior

Region		Mean*	SD	T	Sig
Poor	past behavior	4.05	1.72	-1.96	0.050
	current behavior	4.42	1.60		
Rich	past behavior	3.43	1.30	6.98	0.001
	current behavior	4.45	1.69		

* Mean range 1-12.

Table 2 presented an average of environmental attitudes, values, and behavior controllers of orchardists in both advantaged (resource-rich) and disadvantaged (resource-poor) areas. According to the respondents, damage to nature has not yet reached a realistic level, and mankind can prevent further

destruction and ruin of the ecosystem. Although there was dissatisfaction with the degradation of the environment, the participants did not express a lot of worry on the topic, implying a low level of responsibility that is a result of the cultural challenge in this area.

Table 2. Internal and External Variables and Controllers of Orchardists' Pro-environmental Behavior

Variables	Factors	Poor region		Rich region	
		Mean	SD	Mean	SD
Internal factors	Environmental attitude*	3.06	0.38	3.07	0.46
	Environmental values*	3.14	0.83	3.52	0.76
	Responsibility*	2.68	0.42	2.75	0.39
External factors	Personal economic status**	0.10	0.09	0.27	0.13
	Social norms*	1.32	0.72	1.50	0.60
	Institutional context***	2.00	1.41	1.90	1.77
Behavioral control	Internal motives*	3.26	0.28	3.19	0.23
	External motives*	3.14	1.03	3.60	0.80

* Mean range: 1-5.

** Mean range -1-+1.

*** Mean range 0-7.

Determinants of pro-environmental behavior of orchardists in resources rich and poor regions

The correlation test was used to figure out the structures that account for the pro-environmental behaviors of orchardists. Table 3 shows that there are substantial correlations between environmental attitude (with p=0.001 and r=0.526), environmental values (p=0.001

and r=0.467), responsibility (p=0.001 and r=0.549), and pro-environmental behavior of orchardists (white cells in the Table). Furthermore, the research unveiled that there is a positive and significant link between the institutional context and the pro-environmental behaviors of orchardists (p=0.001 and r=0.576) and between personal economic status and the pro-environmental behaviors of orchardists

($p=0.001$ and $r=0.289$).

Table 3. The Correlation Matrix of Factors Affecting the Pro-environmental Protection Behavior of Orchardists in Rich and Poor Regions

	1	2	3	4	5	6	7	8
1	1	0.514**	0.644**	0.592**	0.3514**	0.041	0.539**	0.146
2	0.526**	1	0.531**	0.541**	0.157	0.131	0.503**	-0.062
3	0.467**	0.511**	1	0.673**	0.610**	0.599**	0.651**	0.268**
4	0.549**	0.414**	0.540**	1	0.751**	0.287**	0.356**	0.188*
5	0.027	-0.074	0.328**	0.653**	1	0.406**	0.231**	0.186**
6	-0.175*	-0.057	0.489**	0.165	0.381**	1	0.335**	0.329**
7	0.567**	0.534**	0.530**	0.379**	0.065	0.573	1	0.177*
8	0.289**	0.137	0.385**	0.410**	0.283**	0.221**	0.148	1

1. Pro-environmental behavior, 2. Environmental attitude, 3. Environmental values, 4. Responsibility, 5. Socio-cultural norms, 6. Environmental knowledge, 7. Institutional context, 8. Personal economic status

*Significance at the level of 0.05 and ** Significance at the level of 0.01

Grey cells in Table 3 illustrate a strong positive correlation between how devoted a orchardists is to the environment and how likely orchardists are to act in ways that protect it. This was affirmed by the outcomes of the study, which indicated that a statistically significant correlation exists between orchardists' environmental attitude and their pro-environmental behavior ($p=0.001$ and $r=0.514$). Similarly, there was a significant positive correlation at a one percent level between respondents' environmental values and the behavior they exhibited towards the environment ($p=0.001$ and $r=0.644$). Consequently, this elucidates that the more someone cherishes the environment, the more likely they are to behave in a protective manner. The research found a positive and significant correlation between responsibility and pro-environmental behavior, which had a statistical significance of 1% ($p=0.001$ and $r=0.592$). By adhering to social customs and norms, people can better control their behaviors in order to limit the damage done to the environment. Additionally, it was determined there was a significant and positive correlation between socio-cultural norms and pro-environmental behaviors of orchardists ($p=0.001$ and $r=0.314$). The data suggests that upholding socio-cultural norms pertaining to the environment contributes largely to favorable conservation actions. No appreciable correlation was discovered between the orchardists' environmental knowledge and their pro-

environmental behavior ($p=0.615$ and $r=0.041$), yet a significant positive correlation existed between the institutional infrastructure and the pro-environmental behavior of orchardists ($p=0.001$ and $r=0.539$). Economics, however, may not have any evident bearing on the orchardists' ecological conduct and their pro-environmental behavior ($p=0.070$ and $r=0.146$).

A hierarchical regression test was used to explain the determinants of pro-environmental behavior as a dependent variable. Based on the theoretical model of research, internal factors (environmental knowledge, environmental attitude, responsibility, environmental values, and personal economic status), external factors (institutional infrastructures, socio-cultural norms, and economic infrastructures), and the moderating variables (internal motives, external motives, and past behavioral patterns) were successively entered into the equation and were measured.

The initial regression model looked into a group of internal factors, and it was found that they explained 51% of the changes in orchardists' pro-environmental behavior. Then, the model was modified to include external factors (institutional context, socio-cultural norms, and economic context), and an increase in the explanation of variance in the dependent variable to 62% was observed. In the third step, behavioral controllers were entered into the equation. With the inclusion of this variable, the predictive power of the model was 67%, and in the final step, the past behavioral patterns were

entered into the equation, which brought the coefficient of determination to 69%.

The third row of this Table highlights the determinants of changes in pro-environmental behavior among orchardists living in an economically resource-poor (disadvantaged) area. Using the first model, 61% of these variations in behavior can be attributed to

internal factors, while the collection of external factors (economic context, institutional context, and socio-cultural norms) accounts for 66%. In the third step, the inclusion of the behavioral controllers increased the outcome prediction rate to 67%, and with the addition of past behavioral patterns, the coefficient of determination rose to 75%.

Table 4. The Regression Coefficients for the Pro-environmental Behavior of Orchardists in Rich and Poor Region

Region	Model	R	R ²	R ² change	Sig
Rich	1 ^a	0.72	0.51	0.51	0.001
	2 ^b	0.79	0.62	0.11	0.001
	3 ^c	0.83	0.67	0.05	0.001
	4 ^d	0.84	0.69	0.02	0.001
Poor	1 ^a	0.79	0.61	0.61	0.001
	2 ^b	0.82	0.66	0.05	0.001
	3 ^c	0.84	0.69	0.03	0.001
	4 ^d	0.87	0.75	0.06	0.001

Note: dependent variable: pro-environmental behavior;
 a. independent variable: residual and internal factors;
 b. independent variable: model 1 and external factors;
 c. independent variable: model 2 and behavioral controllers;
 d. independent variable: model 3 and past behavioral patterns.

According to the results of Table 5, one standard deviation change in the amount of responsibility, environmental knowledge, socio-cultural norms, internal motives, external motives, and past behavioral patterns,

respectively, results in changes of 0.335, -0.480, -0.691, 0.208, 0.782, and 0.203 in the standard deviation of the pro-environmental behavior of orchardists in the rich region.

Table 5. Predictors of Pro-environmental Behavior of Orchardists in the Rich Region

Variable	Unstandardized Coefficients	Standardized Coefficients	T	Sig.
constant	-6.277	-	-3.835	0.001
environmental attitude	-0.027	-0.008	-0.104	0.917
environmental values	0.327	0.155	1.727	0.086
responsibility	1.366	0.335	3.283	0.001
environmental knowledge	-0.287	0.480	-6.872	0.001
personaleconomic status	-0.001	0.001	-0.001	0.999
institutional context	0.009	0.011	0.140	0.889
social norms	-1.826	-0.691	-7.491	0.001
internal motives	1.401	0.208	2.406	0.017
external motives	1.562	0.784	5.959	0.001
past behavior	0.257	0.203	2.758	0.007

The same test used to predict how orchardists in the poor region would behave revealed a change of one standard deviation unit in the amount of environmental values, environmental knowledge, socio-cultural norms, responsibility, and external motives (Table 6). Additionally, the past behavioral

pattern alters the standard deviation of orchardists' pro-environmental behavior by 0.668, -0.596, -0.509, 0.459, 0.329, and 0.293, respectively. The findings of the research regarding orchardists in both rich and poor regions indicate the role of environmental values, environmental knowledge, socio-

cultural norms and responsibility, external motives, and past behavioral patterns on pro-environmental behavior. However, while in the rich region, internal motives play an important

role in explaining pro-environmental behavior, in the poor region, past behavioral patterns play a greater role in explaining the pro-environmental behavior of orchardists.

Table 6. Predictors of Pro-environmental Behavior of Orchardists in the Poor Region

Variable	Unstandardized Coefficients	Standardized Coefficients	T	Sig.
constant	-3.881	-	-3.628	0.001
environmental attitude	-0.010	-0.002	-0.035	0.972
environmental values	1.386	0.668	4.663	0.001
responsibility	1.886	0.459	4.445	0.001
environmental knowledge	-0.376	-0.596	-9.935	0.001
personaleconomic status	0.943	0.052	1.126	0.261
institutional context	0.017	0.020	0.339	0.735
social norms	-1.204	-0.509	-6.297	0.001
internal motives	-0.088	-0.014	-0.222	0.825
external motives	0.549	0.329	2.090	0.038
past behavior	0.374	0.293	6.041	0.001

Conclusion

This study identified the factors that contributed to the pro-environmental behavior of the orchardists in Semirom's Dena Kooch region. Over a five-year period, the respondents' pro-environmental behavior was examined. According to the t-test analysis, generally, there has been a significant increase in orchardists' pro-environmental behavior compared to the past, with the exception of a few fields. In order to improve the conditions, it is suggested to foster the appropriate culture. Besides building the appropriate infrastructure, it is feasible to employ organic and biological fertilizers in place of chemical fertilizers to ameliorate the situation. Additionally, by providing facilities, orchardists will have the ability to set up and use recycling systems for poison containers and tree-trimming waste.

The results of the study on orchardists' environmental attitudes indicated that this variable was at an average level. In other words, even though orchardists are aware of the risk associated with destroying the environment and believe that their continued habits are the root cause of global warming, they believe that the severity of the damage and the likelihood of global warming is exaggerated. As a result, steps should be taken to educate them about environmental issues and enhance their commitment to protecting the environment. The importance that orchardists place on themselves

(self-centered), others (altruistic), and the environment (bio-eco-centered) clearly determines how they see environmental behavior. As a result, the greater the level of environmental value, the more activities will be in tune with the environment. Therefore, the higher the level of environmental value, the more aligned the behaviors with the environment will occur. This finding is consistent with the studies of Milfont et al. (2010) and Ardeleanu (2012).

The examination of responsibility among orchardists revealed that they only held the government accountable for regulating and keeping an eye on the ingestion of pollutants. The non-institutionalization of orchardists' environmental behavior, which necessitates the adoption of rigorous environmental regulations, led to this conclusion, which is supported by field research, indicating a legal vacuum and negligence in preventing environmental devastation. It goes without saying that a person's feeling of duty creates a set of responsibilities and duties that motivate him or her to preserve the stability of the society in which he or she lives and works.

According to a research on sociocultural norms pertaining to pro-environmental behavior, orchardists view social media platforms like Instagram and Telegram as the most significant sources of knowledge about environmental issues. This demonstrates that

planners and decision-makers have a decent chance to use these networks to build a viable platform. Citizens can get environmental information through the media, as Bahmanpour and his colleagues highlighted in a study (Bahmanpour et al., 2023). The environmental infrastructures are essentially weak, according to the findings from the field observations of the exterior structures, and these flaws are seen as significant barriers in the way of environmental activity. Infrastructure barriers include restrictions on access to knowledgeable professionals, suitable inputs, water and soil laboratories to ascertain the biological requirements of soil and plants, garden waste disposal facilities (containers for poisons, production waste, etc.), recycling tools and equipment, educational resources, etc.

The findings of the research indicate that rich orchardists' environmental attitude, environmental values, responsibility, institutional context, and personal economic status have a strong relationship with pro-environmental behavior, while the pro-environmental behavior of orchardists has not significantly been influenced by environmental knowledge and socio-cultural norms. The relationship between environmental attitude and pro-environmental behavior is consistent with the research results of Durpoix (Durpoix, 2010), Linan & Chen (2009), Mei et al. (2012), and Mohammadian & Khataei (2011). In a study of Shiraz citizens, Vaghefi and Haghghatian examined environmental behavior in four components and concluded that respondents' responsible attitude and behavior had a positive association with their pro-environmental behavior (Vaghefi & Haghghatian, 2016). Given the link between environmental attitudes and behaviors, as well as the relevance of this structure, it is advised that a more positive attitude be created by ways and processes such as organizing exhibits, conferences, promotional classes, and so on. The link between Tehrani inhabitants' sense of belonging to the environment was highlighted in Kalantari et al.'s research (Kalantari et al., 2016). Their data also revealed a 1% favorable and significant relationship between responsibility and pro-environmental behavior. The findings of this study on the influence of institutional context on pro-environmental behavior are consistent with those of

Lahsaeizadeh et al., 2005. The varying influence of the personal economy on pro-environmental behavior is similarly comparable to Zhao et al.'s (Zhao et al., 2016) and Melgar et al.'s (2013) investigations.

The findings of the research in relation to poor orchardists indicate that environmental attitude, environmental values, responsibility, socio-cultural norms, and institutional infrastructure have a significant positive relationship with pro-environmental behavior, but environmental knowledge and personal economy do not. In accordance with the findings of this study, Steg and Vlek demonstrated in another study how people's pro-environmental behaviors and motives are influenced by the accessibility and comfort of infrastructures (Steg & Vlek, 2009). It is clear that society will behave more sustainably the more cultural and social standards related to the environment are upheld. The findings of several investigations, including those by Menatizadeh et al. (2016) and Adhami & Akbarzadeh (2010), support this statement. According to previous research, people are more likely to engage in low-risk actions when social norms supporting these behaviors are more strongly held. In other words, social norms increase the likelihood that low-risk behaviors will occur (Mi et al., 2011; Orellano & Chuvieco, 2022).

According to the regression analysis, external motives have the greatest contribution to pro-environmental behaviors for the group of orchardists in rich areas as compared to the orchardists in poor area for whom environmental values play a more important role. It implies that the strengthening of pro-environmental behavior in the privileged rich region is summed up in the form of a legal and supportive environment that the responsible organizations provide for promoting public awareness. Indeed, improving the level of external obligations of pro-environmental behavior is dependent on strengthening the limits of control that a person receives to perform the behavior. In this regard, the government must control the use of pollutants to ensure that the environment is less damaged. In the poor region, strengthening the sense of place attachment can reduce the repetition of non-pro-environmental behaviors. This will be possible through education and culture.

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