



PRESERVICE TEACHERS' PERCEPTIONS OF ENVIRONMENTAL ISSUES

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Abstract. *This study explored preservice teachers' perceptions of environmental issues at both global and national levels, revealing marked differences in awareness and prioritization. 708 preservice teachers from different majors participated in the study. Data were collected through demographic information and Environmental Problems Awareness and Sensitivity Forms. Descriptive analysis and chi-square test were used in data analysis.*

Globally, participants identified global warming as the most critical environmental issue, reflecting its widespread impact on ecosystems, climate, and human well-being.

Conversely, waste management emerged as the most significant concern in Türkiye, highlighting local challenges, while water pollution and bioaccumulation received little to no attention.

Population growth was recognized as the primary global driver of environmental problems, whereas lack of education was seen as the leading cause in Türkiye, underscoring the vital role of environmental education.

Results revealed that science teacher education exhibited greater awareness of global issues, likely due to academic exposure, while younger groups showed limited understanding, indicating a need for tailored environmental education.

These insights underscore the necessity of integrating diverse environmental topics into curricula to address gaps in public understanding, promote sustainability, and encourage informed decision-making at both local and global levels.

Keywords: *environmental awareness, global warming, waste management, environmental education, preservice teachers*

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Introduction

Environmental problems observed worldwide are among the most pressing and complex challenges confronting societies today. These issues, including but not limited to global warming, deforestation, hazardous pollution, and biodiversity loss, are interrelated and have profound consequences for ecosystems, human well-being, and sustainable development (IPCC, 2021; UNEP, 2022). Scholars, policymakers, and international organizations have underscored the urgency of addressing these environmental challenges through cooperative global action and localized initiatives that support sustainability and resilience (UNFCCC, 2015; Stern, 2007).

Global warming, for instance, is largely driven by several activities such as deforestation, industrial emissions, and the overreliance on fossil fuels. These practices contribute significantly to the greenhouse effect, resulting in rising global temperatures, altered precipitation patterns, melting polar ice, and shifts in biodiversity and habitat distribution (IPCC, 2021; Ehrlich & Ehrlich, 2013). Pollution, including air, water, and soil contamination, further exacerbates environmental degradation and threatens public health (Kaza et al., 2018). In recent years, attention has increasingly turned to emerging environmental problems that are often underrepresented in public discourse such as light pollution, noise pollution, and microplastic contamination yet hold serious long-term consequences for ecological and human systems (Kyba et al., 2017).

In the context of Türkiye, these global concerns are compounded by specific national challenges. Rapid urbanization, unregulated construction, industrial waste, deforestation, and a general lack of environmental awareness have contributed to significant environmental deterioration (Barton & O'Neill, 2017; Simsar, 2021). Despite international agreements and national environmental regulations, enforcement and public engagement remain inconsistent, limiting progress in addressing pressing ecological threats. The country faces critical issues including air and water pollution, unsustainable waste management, and habitat destruction, all of which pose a serious risk to public health and biodiversity (Kaza et al., 2018).

Environmental education plays a crucial role in addressing these challenges by shaping individuals' knowledge, attitudes, and behaviors toward the environment. It has been widely recognized as a key instrument for achieving environmental sustainability and fostering active citizenship (UNESCO, 2014). Studies have shown that environmental education not



only increases awareness of ecological issues but also promotes pro-environmental behaviors and supports policy engagement (Palmer, 1998; Stern, 2007; Simsar & Doğan, 2019). However, the effectiveness of environmental education largely depends on its scope and implementation, particularly in how well it covers both widely known and lesser-known environmental problems (Girod & Anderson, 2005; Kozłowski, 2018).

Teacher education programs play an essential role in this context, as preservice teachers are future educators who will influence generations of students. Nevertheless, recent research has indicated that preservice teachers often lack sufficient education on environmental topics, particularly on emerging or less-visible environmental issues (Doğan & Simsar, 2019; Barton & O'Neill, 2017). As Simsar and Jones (2021) emphasize, preparing preservice teachers through comprehensive, interdisciplinary, and practice-oriented environmental education is essential for developing the skills and values needed for sustainability. Given that individuals' perceptions of environmental problems are shaped by various factors including educational background, geographic context, and disciplinary training (Smith et al., 2018; Dinler et al., 2020) it is essential to investigate how these factors influence the way preservice teachers understand and prioritize environmental issues. Doing so will not only reveal gaps in existing educational practices but will also inform the development of more effective curricula to cultivate environmentally literate educators.

Research Problem

Numerous studies have demonstrated that environmental awareness is uneven across populations, particularly regarding lesser-known or emerging issues such as the greenhouse effect, light pollution, and non-visible pollutants (Barton & O'Neill, 2017; Kyba et al., 2017). These discrepancies in awareness are often rooted in educational gaps, where environmental curricula tend to focus on more visible and traditionally emphasized topics, while overlooking complex or indirect environmental problems. This lack of comprehensive environmental education can result in limited environmental literacy among future educators and citizens, impeding broader efforts toward sustainability (Höfer et al., 2017; Simsar & Doğan, 2019).

Research has shown that preservice teachers, in particular, may not receive sufficient training in environmental issues within their disciplinary programs. While environmental education is integrated into some teacher education curricula, its depth and scope vary considerably depending on institutional priorities and academic specialization (Doğan & Simsar, 2019). This can lead to inconsistencies in how future teachers perceive the urgency, causes, and consequences of various environmental problems, including lesser-known threats such as noise pollution, urban heat islands, and ecological fragmentation (Wals et al., 2014). Understanding how preservice teachers perceive these environmental challenges is crucial, as they are not only recipients of environmental education but also future transmitters of environmental knowledge to younger generations. Their level of awareness and conceptual understanding directly affects their ability to integrate sustainability concepts into their teaching and influence student attitudes and behaviors (Girod & Anderson, 2005; Stern, 2007). Moreover, exploring these perceptions across disciplines such as science, social studies, and early childhood education may reveal important insights into how educational content and professional identity shape environmental literacy.

Despite the growing body of research on environmental education, relatively few studies have focused on comparing the awareness levels of preservice teachers from different academic backgrounds, particularly concerning underrepresented environmental issues. This gap in the literature highlights the need for a nuanced investigation into how teacher training programs can better equip future educators to address the full spectrum of environmental challenges. This study aims to address that gap by examining the environmental awareness and perceptions of preservice teachers from various educational disciplines in Türkiye. In doing so, it seeks to contribute to the development of more effective, inclusive, and forward-looking environmental education frameworks that align with the global goals of sustainability and climate resilience.

Research Focus

The focus of the research problem is based on the understanding that preservice teachers studying in different disciplines have varying perceptions regarding the recognition and prioritization of environmental issues. These perceptions are influenced by multiple factors, including academic background, personal experiences, and exposure to different environmental concerns. For instance, while some prospective teachers may view global warming or waste pollution as the primary environmental challenges, others may prioritize local issues such as water contamination, soil pollution, or habitat destruction. These differing perceptions can lead to varying levels



of engagement and participation in efforts to address environmental problems. Some preservice teachers may be more likely to engage with global environmental crises, while others may focus their attention on the specific environmental issues in their own communities (Beyer et al., 2019). By analyzing these perceptions, the study aims to identify the factors contributing to these differences and to explore strategies to bridge the gaps in environmental awareness. In doing so, the findings can help develop more comprehensive, interdisciplinary, and targeted educational programs that increase awareness and promote action regarding environmental issues.

Research Aim and Research Questions

The current study explored prospective teachers' perceptions of environmental issues on both global and local scales. It also examined the causes they attribute to these problems and explored the factors that shape their perceptions. The study sought to uncover how participants perceive the most significant environmental challenges at both global and local levels, what views they hold regarding the causes of these issues, and how these perceptions vary based on specific variables such as discipline, prior environmental education, and cultural background. The research questions were as follows:

1. Which environmental issues do preservice teachers perceive as the most significant at global and local scales?
2. Are there any statistically significant differences among majors in preservice teachers' perceptions of environmental issues?

Research Methodology

General Background

This study explored pre-service teachers' perceptions of environmental issues. The research adopted a mixed-methods approach, integrating both quantitative and qualitative data to provide a comprehensive understanding of the topic (Creswell & Plano Clark, 2018). In the quantitative dimension, the correlations between pre-service teachers' perceptions of environmental issues and their major differences were analyzed. This model provided a framework to explore the degree of association between variables, enabling the generation of statistically significant findings. Related data sets were analyzed through a chi-square test (Fraenkel et al., 2019). In the qualitative part of the data, open-ended questions were employed to gain deeper insights into pre-service teachers' perceptions of environmental issues and the reasons for them. The qualitative data were analyzed using descriptive analysis (Merriam & Tisdell, 2016).

Participants

The study included 708 participants out of a total of 814 preservice teachers who voluntarily returned their consent forms, resulting in a high response rate of 87%. The sample size was determined using a power analysis based on a 95% confidence level and a 5% margin of error, which indicated that a minimum of approximately 660 participants would be needed for statistically significant results within the target population. The broad representation across academic departments and year levels enhances the diversity of perspectives and allows for more comprehensive analysis of preservice teachers' perceptions of environmental issues. The sample was predominantly female (74.4%), with male participants comprising 25.6%. The participants also were distributed across several academic departments, with the highest representation from Elementary Education (22.7%) and Science Education (22.0%), followed by Turkish Education (19.8%), Social Science Education (19.1%), and Early Childhood Education (16.4%). In terms of academic year, third-year students (27.4%) and fourth-year students (26.8%) made up the majority, while first-year (24.4%) and second-year students (21.3%) accounted for the remainder. Moreover, engagement in environmental activities varied, with only 42.8% of participants taking environmental courses and 35.0% actively participating in environmental activities. Membership in environmental NGOs was even lower, at 16.7%, indicating limited involvement in structured environmental advocacy. The majority (57.2%) were not enrolled in environmental courses, and 65.0% reported no participation in environmental activities, reflecting a gap in environmental engagement within the sample (see Table 1).



Table 1*Demographic Information of Participants*

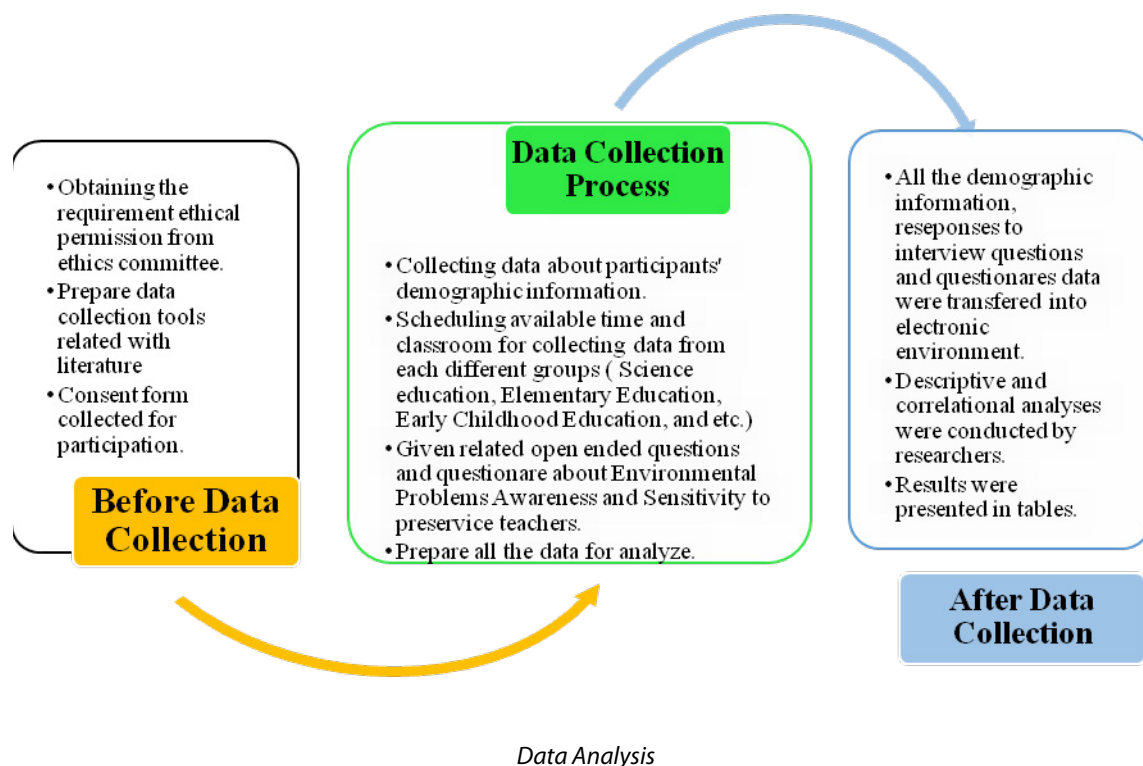
Content			N	%
Department	Science Education		156	22.0
	Elementary Education		161	22.7
	Early Childhood Education		116	16.4
	Social Science Education		135	19.1
	Turkish Education		140	19.8
Class/Grade	First-year student		173	24.4
	Second-year student		151	21.3
	Third-year student		194	27.4
	Fourth/final-year student		190	26.8
Gender	Female		527	74.4
	Male		181	25.6
Engagement in Environmental Activities	Taking Environmental Courses	Yes	303	42.8
		No	405	57.2
	Participation in Environmental Activities	Yes	248	35.0
		No	460	65.0
	Membership in Environmental NGOs	Yes	118	16.7
		No	590	83.3
Total			708	100.0

Instrument and Procedures

Prior to collecting data, consent forms were obtained from 708 participants. Data collection tools, including a structured questionnaire and a consent form, were designed based on a review of related literature. Participants were informed about the study's purpose and assured of the confidentiality of their responses. Consent forms were signed by all participants to confirm their voluntary participation. The data were collected from 708 participants across five academic departments: Science Education, Elementary Education, Early Childhood Education, Social Science Education, and Turkish Education. The researchers scheduled data collection sessions at times convenient for students in each department and grade level, ensuring a diverse sample of first-year students, second-year students, third-year students, and fourth/final-year students. Participants provided demographic details such as their department, class/grade level, and gender, as well as their engagement in environmental education and activities by using the Demographic information form. The questionnaires included closed-ended questions about whether participants were taking environmental courses, participating in environmental activities, or were members of environmental NGOs.

The Environmental Problems Awareness and Sensitivity Form consists of a total of 15 different questions. Some of these questions are open-ended, requiring students to rank the provided environmental problems and their causes. Other questions use a Likert scale to gather the opinions of preservice teachers on various aspects of environmental issues (see the process of data collection in Figure 1). The Environmental Problems Awareness and Sensitivity Form consists of a total of 15 different questions. Before finalizing the form, a comprehensive review of the relevant literature was conducted to identify the problem situation and guide the development of appropriate questions. To ensure content validity, feedback was obtained from three expert faculty members specializing in science education, preschool education, and educational sciences. Following this, a pilot study was carried out with 15 preservice teachers who were not included in the main study. Based on their feedback, necessary revisions were made. The finalized form was then administered to the study group.



Figure 1*Data Collection Process*

In the current study, descriptive statistical analysis was employed to analyze participants' perceptions of environmental issues and the reasons for their prioritization. Environmental issues were ranked from most to least important based on participants' responses from 1 (the most important) to 5 (less important), and descriptive statistics, including frequencies and percentages were given to summarize the distribution of responses. The answers given by the teacher candidates for each ranking were analyzed within themselves, and their percentages and frequencies were obtained. Based on this, the values given the most or least in that ranking were revealed based on the percentages and frequencies stated for the environmental issues or solutions in each ranking. For example, according to the analysis of Participants' Perceptions on The Most Important Environmental Problems Around The World given in Table 2, global warming (32.63%) is seen as the most frequently mentioned value in the rank of 1, which is the most important. However, some of the participants stated that in 2 (17.23%), 3 (13.28%), 4 (8.76%), and 5 (7.91%). This shows that global warming is evaluated in different ways by the participants. To ensure validity, the analysis was guided by clearly defined categories derived from the research questions and participant input, ensuring that the results accurately reflected the participants' perceptions. Reliability was ensured by applying consistent methods across all data sets, minimizing variability in data categorization, and performing checks for internal consistency. This approach ensured that the analysis was both valid in describing participants' perceptions and reliable in producing consistent results across different subgroups within the data.

In the second phase of the analysis, chi-square tests were applied to examine statistical differences across departmental differences in participants' responses regarding environmental issues. The chi-square tests were conducted to compare the frequency distributions of categorical variables such as global environmental issues versus environmental problems in Türkiye, as well as the reasons for these issues. This approach was suitable because the data consisted of categorical responses that could be analyzed to assess their correlation between departments and environmental perceptions. The chi-square tests also ensured that any observed differences between departments were not due to chance, further enhancing the internal validity of the study.

Research Results

The Perceptions of Environmental Problems in the World and Türkiye

Participants' perceptions about global problems all around the world examined and shown in Table 2.

Table 2

Participants' Perceptions on The Most Important Environmental Problems Around The World

Contents	Rates	The Most important Less Important			
	1 <i>n</i> (%)	2 <i>n</i> (%)	3 <i>n</i> (%)	4 <i>n</i> (%)	5 <i>n</i> (%)
Air Pollution	115 (16.24)	70 (9.89)	69 (9.75)	26 (3.67)	38 (5.37)
Water Pollution	0 (0.00)**	75 (10.59)	57 (8.05)	51 (7.20)	45 (6.36)
Soil Pollution	36 (5.08)	11 (1.55)	29 (4.10)	27 (3.81)	22 (3.11)
Noise Pollution	1 (0.14)	6 (0.85)	11 (1.55)	8 (1.13)	5 (0.71)**
Light Pollution	2 (0.28)	1 (0.14)	4 (0.56)**	10 (1.41)	6 (0.85)
Radioactive Pollution	31 (4.38)	30 (4.24)	29 (4.10)	37 (5.23)	29 (4.10)
Depletion of the Ozone Layer	51 (7.20)	76 (10.73)	63 (8.90)	52 (7.34)	51 (7.20)
Erosion	3 (0.42)	5 (0.71)	6 (0.85)	4 (0.56)**	5 (0.71)**
Acid Rain	6 (0.85)	16 (2.26)	17 (2.40)	26 (3.67)	17 (2.40)
Global Warming	231 (32.63)*	122 (17.23)	94 (13.28)*	62 (8.76)	56 (7.91)
Greenhouse Gases	3 (0.42)	14 (1.98)	23 (3.25)	49 (6.92)	24 (3.39)
Climate Change	87 (12.29)	136 (19.21)*	77 (10.88)	69 (9.75)*	46 (6.50)
Population Growth	23 (3.25)	22 (3.11)	45 (6.36)	35 (4.94)	49 (6.92)
Destruction of Forests	27 (3.81)	22 (3.11)	21 (2.97)	53 (7.49)	68 (9.60)
Decline in Biodiversity	7 (0.99)	25(3.53)	18 (2.54)	31 (4.38)	34 (4.80)
Energy Problem	12 (1.69)	6 (0.85)	27 (3.81)	34 (4.80)	24 (3.39)
Food and Nutrition Problem	10 (1.41)	29 (4.10)	32 (4.52)	47 (6.64)	40 (5.65)
Bioaccumulation	0 (0.00)**	2 (0.28)**	5 (0.71)	7 (0.99)	7 (0.99)
Agricultural Activities	3 (0.42)	12 (1.69)	12 (1.69)	34 (4.80)	20 (2.82)
Wastes	60 (8.47)	28 (3.95)	69 (9.75)	46 (6.50)	122 (17.23)*

* Most mentioned environmental problems by participants.

** The least mentioned environmental problems by participants.

When it was looked at Table 2, it was found that while the participants stated global warming (32.63%) as the most important environmental problem in the world, interestingly, the environmental problems they mentioned least or not at all were water pollution (0.00%) and bioaccumulation (0.00%). However, while the least important environmental problem was seen as waste (17.23%), the least important environmental problem was erosion (.71%) and noise pollution (.71%). Interestingly, the most important environmental problem of the participants was global warming (32.63%). Among these, it was determined that the elementary education group touched on this issue the most (26.41%) and the preschool group touched on it the least (12.99%). When the grade levels of the students in the elementary education group, which gave the most space, are examined, it is seen that the fourth/final-year student group (14.29%) emphasizes the most compared to the other groups (third-year student 10.56%, second-



year student 8.07%, and first-year student 6.83%). It is thought that this situation may be due to the education and practices that the students received regarding the environment in different periods. The participants stated waste as the least effective environmental problem (17.23%). Among these, it was determined that the science teacher group mentioned this issue the most (29.51%) and the preschool group mentioned it the least (9.84%).

Due to the perceptions of environmental issues in Türkiye, participants' perceptions were analyzed, and the results are shown in Table 3.

Table 3

Participants' Perceptions of the Most Important Environmental Problems in Türkiye

Contents	Rates	The Most important → Less Important				
		1 n (%)	2 n (%)	3 n (%)	4 n (%)	5 n (%)
Air Pollution		117 (16.53)	57 (8.05)	41 (5.79)	30 (4.24)	21 (2.97)
Water Pollution		6 (59.18)	137 (19.35)*	88 (12.43)	60 (8.47)	73 (10.31)
Soil Pollution		9 (1.27)	39 (5.51)	55 (7.77)	41 (5.79)	24 (3.39)
Noise Pollution		6 (0.85)	14 (1.98)	11 (1.55)	20 (2.82)	11 (1.55)
Light Pollution		2 (0.28)**	2 (0.28)	2 (0.28)**	6 (0.85)	7 (0.99)
Radioactive Pollution		11 (1.55)	10 (1.41)	5 (0.71)	17 (2.40)	21 (2.97)
Depletion of the Ozone Layer		21 (2.97)	12 (1.69)	18 (2.54)	16 (2.26)	16 (2.26)
Erosion		32 (4.52)	43 (6.07)	66 (9.32)	56 (7.91)	38 (5.37)
Acid Rain		3 (0.42)	9 (1.27)	2 (0.28)**	8 (1.13)	6 (0.85)
Global Warming		81 (11.44)	75 (10.59)	63 (8.90)	76 (10.73)	74 (10.45)
Greenhouse Gases		6 (0.85)	8 (1.13)	8 (1.13)	10 (1.41)	6 (0.85)**
Climate Change		61 (8.62)	57 (8.05)	43 (6.07)	48 (6.78)	67 (9.46)
Population Growth		23 (3.25)	14 (1.98)	24 (3.39)	25 (3.53)	23 (3.25)
Destruction of Forests		56 (7.91)	82 (11.58)	87 (12.29)	100 (14.12)*	86 (12.15)
Decline in Biodiversity		4 (0.56)	17 (2.40)	20 (2.82)	32 (4.52)	20 (2.82)
Energy Problem		12 (1.69)	6 (0.85)	12 (1.69)	19 (2.68)	25 (3.53)
Food and Nutrition Problem		9 (1.27)	17 (2.40)	24 (3.39)	30 (4.24)	44 (6.21)
Bioaccumulation		3 (0.42)	0 (0.00)**	3 (0.42)	5 (0.71)**	8 (1.13)
Agricultural Activities		10 (1.41)	53 (7.49)	39 (5.51)	53 (7.49)	48 (6.78)
Wastes		177 (25.00)*	56 (7.91)	97 (13.70)*	56 (7.91)	90 (12.71)*

* Most mentioned environmental problems by participants.

** The least mentioned environmental problems by participants.

Table 3 shows the participants' perceptions of environmental problems in Türkiye. The data results showed that most of the participants stated waste (25.00%) as the most significant environmental problem in Türkiye. Remarkably, light pollution (0.28%) seems the least mentioned as the most important environmental problem in Türkiye. In relation to majors, the science teacher group (29.94%) mentioned most of the time, and the Turkish Education teacher group (14.69%) touched on the least. When the grade levels of the students in the elementary education group, which gave the most space, are examined, it is seen that the fourth/final-year student group (13.66%) emphasizes the most compared to the other groups (third-year student (9.32%), second-year student (6.83), and first-year student (9.32%)). In this case, it can be seen that as the number of environmental courses taken

by students increases, their awareness of environmental problems increases. In addition, the participants stated that the least important environmental issue is waste (12.71%) in Türkiye. In relation to different majors, the science teacher education group mentioned it the most (30.00%), and the elementary education group mentioned it as the least (13.33%).

The Reasons of Environmental Problems in the World and in Türkiye

In addition to environmental issues, participants also responded to the reasons for environmental issues in global and Türkiye perceptions. Participants' responses to environmental issue reasons are organized based on the most important to the least important. In Table 4, the results of the most important reasons for environmental issues all around the world are given.

Table 4

Participants' Perceptions on The Most Important Reason for Environmental Issues All Around The World

Contents	Rates	The Most important → Less Important				
		1 n (%)	2 n (%)	3 n (%)	4 n (%)	5 n (%)
Population Growth		217 (30.65)*	69 (9.75)	68 (9.60)	42 (5.93)	55 (7.77)
Unplanned Urbanization		14 (1.98)	65 (9.18)	36 (5.08)	40 (5.65)	12 (1.69)
Unplanned Industrialization		29 (4.10)	22 (3.11)	59 (8.33)	55 (7.77)	58 (8.19)
Misuse of Natural Resources		81 (11.44)	109 (15.40)*	88 (12.43)*	105 (14.83)*	78 (11.02)
Atmospheric Events and Natural Disasters		30 (4.24)	39 (5.51)	18 (2.54)	30 (4.24)	31 (4.38)
Migrations		7 (0.99)	21 (2.97)	16 (2.26)	11 (1.55)	19 (2.68)
Lack of Education		132 (18.64)	66 (9.32)	63 (8.90)	52 (7.34)	60 (8.47)
Increase in Energy, Water, Paper per Capita		59 (8.33)	100 (14.12)	59 (8.33)	55 (7.77)	53 (7.49)
Deforestation, Fires and Erosion		23 (3.25)	50 (7.06)	58 (8.19)	40 (5.65)	28 (3.95)
Overgrazing and Vegetation Destruction		0 (0.00)**	8 (1.13)	9 (1.27)	10 (1.41)	2 (0.28)**
Motor Vehicles and Marine Vessels		36 (5.08)	20 (2.82)	74 (10.45)	64 (9.04)	49 (6.92)
Mine, Lime, Stone and Sand Quarries		0 (0.00)**	4 (0.56)	6 (0.85)	5 (0.71)	5 (0.71)
Fertilizer and Pesticides		0 (0.00)**	35 (4.94)	13 (1.84)	11 (1.55)	15 (2.12)
Waste and Garbage		36 (5.08)	34 (4.80)	56 (7.91)	87 (12.29)	122 (17.23)*
Tourism		1 (0.14)	12 (1.69)	8 (1.13)	4 (0.56)**	26 (3.67)
Sewage Water		1 (0.14)	8 (1.13)	7 (0.99)	11 (1.55)	7 (0.99)
Draining Wetlands		6 (0.85)	11 (1.55)	19 (2.68)	27 (3.81)	19 (2.68)
Misuse of Lands		1 (0.14)	7 (0.99)	8 (1.13)	12 (1.69)	16 (2.26)
Poaching		1 (0.14)	2 (0.28)**	1 (0.14)**	6 (0.85)	9 (1.27)
Radiation of Technological Devices		34 (4.80)	26 (3.67)	42 (5.93)	41 (5.79)	44 (6.21)

* Most mentioned environmental problems by participants.

** The least mentioned environmental problems by participants.

It is known that there are many reasons for environmental problems in the world. When the participants' perceptions of this related subject were taken about the main cause of environmental problems in the world, it was determined that the majority of the participants stated that population growth (30.65%). In addition, fertilizer

and pesticides (0.00%), mine, lime, stone, and sand quarries (0.00%), and overgrazing and vegetation destruction (0.00%) were not stated by participants as important environmental issues for the world. In relation to the majors of participants, the science teacher group mentioned most of the time (25.81%), and the early childhood teacher group touched on the least (11.06%). It can be thought that one of the reasons for the low preschool education group here is that there are not enough courses and practices on environmental education and environmental problems in this field. In fact, there is only one course on environmental education in the relevant department, and it is known that this course is an elective course. In relation to participants' perception about less important reasons of environmental issues for the world, the results showed that waste and garbage (17.23%). In relation to majors, participants from elementary education (44.26%) mentioned most, and the early childhood education (9.84%) group mentioned less in this category.

Likewise, participants' perceptions of the reasons for environmental issues all around Türkiye were analyzed, and the results are given in Table 5.

Table 5

Participants' Perceptions on The Most Important Reason for Environmental Issues All Around Türkiye

Contents	Rates	The Most important → Less Important				
		1 n (%)	2 n (%)	3 n (%)	4 n (%)	5 n (%)
Population Growth		135 (19.07)	65 (9.18)	59 (8.33)	33 (4.66)	34 (4.80)
Unplanned Urbanization		59 (8.33)	81 (11.44)	57 (8.05)	58 (8.19)	23 (3.25)
Unplanned Industrialization		33 (4.66)	47 (6.64)	34 (4.80)	51 (7.20)	38 (5.37)
Misuse of Natural Resources		64 (9.04)	94 (13.28)	103 (14.55)*	89 (12.57)	69 (9.75)
Atmospheric Events and Natural Disasters		11 (1.55)	16 (2.26)	12 (1.69)	10 (1.41)	17 (2.40)
Migrations		3 (0.42)	16 (2.26)	20 (2.82)	9 (1.27)	7 (0.99)
Lack of Education		237 (33.47)*	96 (13.56)*	67 (9.46)	36 (5.08)	41 (5.79)
Increase in Energy, Water, Paper per Capita		43 (6.07)	79 (11.16)	59 (8.33)	43 (6.07)	56 (7.91)
Deforestation, Fires and Erosion		33 (4.66)	51 (7.20)	66 (9.32)	73 (10.31)	51 (7.20)
Overgrazing and Vegetation Destruction		4 (0.56)	11 (1.55)	14 (1.98)	24 (3.39)	18 (2.54)
Motor Vehicles and Marine Vessels		13 (1.84)	39 (5.51)	50 (7.06)	65 (9.18)	77 (10.88)
Mine, Lime, Stone and Sand Quarries		0 (0.00)**	0 (0.00)**	1 (0.14)	2 (0.28)**	4 (0.56)**
Fertilizer and Pesticides		19 (0.14)	10 (1.41)	14 (1.98)	10 (1.41)	18 (2.54)
Waste and Garbage		36 (5.08)	50 (7.06)	83 (11.72)	99 (13.98)*	98 (13.84)*
Tourism		1 (0.14)	8 (1.13)	9 (1.27)	5 (0.71)	21 (2.97)
Sewage Water		6 (0.85)	8 (1.13)	6 (0.85)	14 (1.98)	14 (1.98)
Draining Wetlands		4 (0.56)	7 (0.99)	19 (2.68)	18 (2.54)	29 (4.10)
Misuse of Lands		7 (0.99)	16 (2.26)	24 (3.39)	40 (5.65)	48 (6.78)
Poaching		2 (0.28)	3 (0.42)	0 (0.00)**	8 (1.13)	6 (0.85)
Radiation of Technological Devices		16 (2.26)	11 (1.55)	11 (1.55)	21 (2.97)	39 (5.51)

* Most mentioned environmental problems by participants.

** The least mentioned environmental problems by participants.

Participants' views on the causes of environmental problems in Türkiye were analyzed (see Table 4). The results revealed that the most commonly mentioned issue was lack of education (33.47%), while mine, lime, stone, and

sand quarries were not mentioned at all (0.00%). Among different majors, the elementary education group (33.33%) identified a lack of education more frequently as the primary reason, whereas the early childhood education group (10.55%) mentioned it less often in their responses. The data results indicated that waste and garbage (13.84%) were identified as a less important reason for environmental problems in Türkiye. Among the major groups, those in elementary education (29.59%) stated this issue more frequently as a less significant concern, while the early childhood education group (14.29%) mentioned it only a few times in this category.

Possible Relationships about Departmental Differences

The perceptions of preservice teachers from five different departments regarding various environmental issues and their causes were analyzed to determine whether there was a significant relationship at the departmental level among the most important environmental issues identified by the participants. This analysis was conducted using the chi-square test, and the findings are presented in Table 5.

Table 5
Chi-Square Analysis of Departmental Differences

Variables		χ^2	df	p
Dependent	Independent			
Environmental Issues in the World	Science Education	141	72	.001
	Elementary Education			
	Early Childhood Education			
	Social Science Education			
	Turkish Education			
Environmental problems in Türkiye	Science Education	252	76	.001
	Elementary Education			
	Early Childhood Education			
	Social Science Education			
	Turkish Education			
Reasons of Environmental Issues in the World	Science Education	190	64	.001
	Elementary Education			
	Early Childhood Education			
	Social Science Education			
	Turkish Education			
Reasons of Environmental Issues in Türkiye	Science Education	168	72	.001
	Elementary Education			
	Early Childhood Education			
	Social Science Education			
	Turkish Education			

The analysis of responses from participants across various departments revealed significant differences in the discussion of environmental issues, both globally and within Türkiye. Specifically, the chi-square test indicated significant departmental differences in the percentage of participants who mentioned environmental issues in the world $\chi^2(72, 708) = 141, p < .001$, and this variation was even more pronounced when focusing on environmental issues within Türkiye $\chi^2(76, 708) = 252, p < .001$. Furthermore, discussions about the reasons behind environmental issues showed similar patterns of significant variance across departments, with a chi-square of $\chi^2(64, 708) = 190, p < .001$ for global issues and $\chi^2(72, 708) = 168, p < .001$ for local issues. These results highlight the impact of departmental specialization on students' awareness and perceptions of environmental challenges, suggesting a need for tailored educational interventions to foster a more uniform understanding of environmental sustainability across disciplines.



Discussion

The study's findings indicate that participants generally viewed global warming as the most significant environmental issue both globally and in Türkiye. Waste was perceived as the least important environmental issue globally, although it was considered the most pressing problem in Türkiye. Water pollution and bioaccumulation were not mentioned, suggesting a lack of awareness about these issues. Participants identified population growth as the main cause of environmental problems worldwide, while lack of education was viewed as the leading cause in Türkiye. These findings highlight a gap in environmental education, particularly in addressing lesser-known but important environmental issues.

Environmental Issues

This study reflects varying perceptions among participants regarding environmental problems, both globally and within Türkiye. The focus on global warming as the most significant environmental issue aligns with a global consensus on the urgency of addressing climate change, which has implications for biodiversity, weather patterns, and human livelihoods (IPCC, 2021). It is a central issue in global policy discussions, with countries worldwide adopting measures to mitigate its effects (UNFCCC, 2015). The fact that water pollution and bioaccumulation were mentioned the least suggests limited awareness or education about these issues. Despite its considerable impact on ecosystems and human health, water pollution is often overshadowed by more widely recognized problems such as global warming (Smith et al., 2018). Similarly, bioaccumulation, which affects both terrestrial and aquatic food chains, might not be perceived as urgent despite its crucial role in ecosystem health (Beyer et al., 2019).

The finding that waste was perceived as the least important issue is notable, given the growing concern over waste management globally. Waste management has been identified as a significant environmental problem due to its contribution to pollution, resource depletion, and association with social and health problems (Kaza et al., 2018). However, participants might not fully grasp the long-term environmental consequences of waste accumulation or may prioritize issues they perceive as more immediately impactful. Additionally, issues such as erosion and noise pollution were viewed as less important, possibly because their effects are not as immediately visible or globally recognized as other environmental problems (Höfer et al., 2017).

In the Turkish context, waste emerged as the most pressing environmental problem, reflecting both global and local trends. Waste management continues to be a significant challenge in many countries, particularly as urbanization increases and consumption patterns shift (Kaza et al., 2018). The low mention of light pollution suggests limited awareness of the environmental and health risks associated with excessive artificial lighting, which can disrupt ecosystems and human circadian rhythms (Kyba et al., 2017). This points to a need for education about the subtler environmental impacts of modern life.

Importance of Environmental Education

Preservice teachers' perceptions of the causes of environmental issues reveal notable trends. The identification of population growth as the primary cause of environmental problems globally is consistent with research highlighting overpopulation as a driving force behind environmental degradation. Increasing population levels contribute to higher resource consumption, waste generation, and increased pressure on ecosystems, making it a central concern for sustainable development (Ehrlich & Ehrlich, 2013; Höfer et al., 2017). The absence of mentions of fertilizers and pesticides, mining, and overgrazing indicates a gap in understanding the broader factors contributing to environmental problems. Research shows agricultural practices, resource extraction, and overgrazing critically impact soil degradation, water pollution, and habitat destruction (Barton & O'Neill, 2017; Lal, 2015). Educational programs emphasizing these causes may help bridge the knowledge gap identified with appropriate mentoring and training for preservice teachers (Burak & Simsar, 2022). However, the fact that the number of environmental courses or practices in different departments is low indicates that educators do not have sufficient awareness of environmental problems and possible causes. This situation shows that in order to increase environmental awareness, environmental courses and practices must be brought to different departments.

In Türkiye, the emphasis on the lack of education as a primary cause of environmental problems aligns with literature on the role of environmental education in shaping public perceptions and behaviors. Environmental



education is widely recognized as a key factor in promoting awareness and encouraging sustainable practices (Barton & O'Neill, 2017; Kyba et al., 2017). The frequent mention of waste and garbage as less significant causes of environmental problems highlights the complexity of public understanding and the need for comprehensive environmental education. Although waste management is an important issue, it is often underestimated due to its localized nature and challenges associated with implementing effective waste management systems (Gupta et al., 2020; Kyba et al., 2017).

Interestingly, the elementary education group identified a lack of education more frequently as a cause of environmental problems, suggesting a greater understanding of the importance of education in promoting environmental awareness. In contrast, the early childhood education group cited it less often, possibly reflecting the limited scope of environmental education at earlier educational stages (Kozłowski, 2018; Simsar et al., 2021). This finding underlines the importance of integrating environmental education early in the curriculum to ensure young learners are aware of environmental challenges and their causes.

Conclusions and Implications

This study reveals varying perceptions of environmental issues among participants. While there is a strong recognition of global warming as a critical concern, issues such as water pollution and bioaccumulation remain underappreciated, suggesting that some environmental challenges are not receiving sufficient attention. This indicates the need for a more holistic approach to environmental education to ensure that all key sustainability challenges are addressed. A key finding of this research is the influence of educational background on environmental awareness. Participants in science teacher education programs showed higher levels of environmental awareness, likely due to their specialized coursework. In contrast, those in early childhood education demonstrated less recognition of significant issues such as waste management. This underscores the importance of tailoring environmental education to specific academic disciplines to ensure that all learners acquire the necessary knowledge and skills for sustainable living.

The study also emphasizes the need for structured environmental literacy programs at all educational levels. Given the recognized role of population growth and lack of education in contributing to environmental degradation, it is crucial to integrate environmental topics into a wide range of subjects to improve students' understanding and practical application of sustainability concepts. Furthermore, hands-on activities and real-world case studies have been identified as effective methods for deepening environmental consciousness and fostering long-term behavioral changes.

In future research, further exploration of the impact of different pedagogical approaches in environmental education is needed. Longitudinal studies could offer insights into how interdisciplinary learning and community engagement influence students' environmental behaviors. One of the limitations of the current study is the low number of participants. That is why, for future studies, it could be more general with different local contexts and numbers of participants. Additionally, the role of emerging technologies, such as virtual simulations and gamification, could provide valuable contributions to enhancing environmental education. In conclusion, fostering environmentally responsible citizens requires a concerted effort to integrate sustainability principles across curricula. Educational institutions have a critical role in equipping students with the knowledge, skills, and motivation to address global environmental challenges effectively.

Declaration of Interest

The authors declare no competing interest.

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