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Research Article

**BRANŞ ÖĞRETMENLERİNİN KÜRESEL İKLİM
DEĞİŞİKLİĞİNE DAİR GÖRÜŞLERİNİN İNCELENMESİ:
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ÖZET

Bu araştırmanın amacı branş öğretmenlerinin küresel iklim değişikliğine yönelik düşüncelerinin incelenmesidir. Küresel iklim değişikliğinin her geçen gün kendini gösterdiği ve herkes tarafından fark edilebilecek düzeye geldiği için bu konu hakkında çalışmaların yapılması önemlidir. Araştırmada nitel bir yöntem belirlenmekle birlikte araştırmanın çalışma grubunu 12 öğretmen oluşturmaktadır. Araştırmada veri toplamak amacıyla araştırmacı tarafından geliştirilen yarı yapılandırılmış görüşme formu kullanılmıştır. Veriler içerik analizi yöntemiyle geliştirilmiştir. Araştırma sonucunda sürdürülebilir enerji ve ulaşım politikaları ile doğal kaynakların korunmasına yönelik uygulamalar, çevresel risklerin azaltılmasında temel stratejiler olarak öne çıktığı, çevresel sürdürülebilirlik ve kaynak yönetimine yönelik politikaların bütüncül biçimde uygulanması, ekosistemlerin korunmasını ve doğal kaynakların verimli kullanımını güvence altına aldığı vb. sonuçlara ulaşılmıştır.

Anahtar Kelime: Branş öğretmenleri, iklim değişikliği, öğretmen görüşleri.

ABSTRACT

An Examination of Subject Teachers' Views on Global Climate Change: The Case of Samsun Province

The aim of this research is to examine the opinions of subject teachers regarding global climate change. Since global climate change is becoming increasingly evident and noticeable to everyone, it is important to conduct studies on this subject. A qualitative method was chosen for the research, and the study group consisted of 12 teachers. A semi-structured interview form developed by the researcher was used to collect data. The data were analyzed using content analysis. The research results indicate that sustainable energy and transportation policies, along with practices aimed at protecting natural resources, stand out as fundamental strategies in reducing environmental risks; that the holistic implementation of environmental sustainability and resource management policies ensures the protection of ecosystems and the efficient use of natural resources, etc.

Key Words: Subject teachers, climate change, teachers' opinions.

ENTRANCE

Climate creates the environment necessary for human life to continue. It is a force that influences all important aspects of human life, from living spaces and socio-economic environments to cultural and political structures. Changes in climate have significant effects on all these elements (Davarcioğlu, 2018). Today, a process of awareness has begun regarding the global climate change. We can define global climate change as undesirable temperature differences in average climate temperatures. The reasons for the rapid emergence of these differences can be listed as excessive

consumption of fossil fuels due to industrialization, misuse of land, and certain environmental impacts (Türkeş, 2008). These processes have caused changes in the composition of atmospheric components, resulting in the greenhouse gas effect. The greenhouse gas effect can be expressed as an increase in the concentration of components in the atmosphere, primarily carbon dioxide, but also methane, nitrogen, and fluorinated gases. This increase has begun to negatively affect the average temperature values necessary for the continuation of life on Earth. The climate change process has begun to manifest itself intensely (Başoğlu, 2014). In addition to all this, human activities also affect global climate change.

The greenhouse gas effect has begun to affect the Earth more and more with the increasing population and urbanization. This is because the demand for energy is increasing day by day. Today, this demand is mostly met by fossil fuels. Therefore, climate change stands before us as an inevitable outcome (Erdoğan, 2020). Against this inevitable outcome, countries around the world have begun to take action to implement certain measures. Countries around the world have felt the need to create a plan to address this situation through the United Nations. Various regulations have begun to be implemented under the auspices of the United Nations, with the participation of industrialized countries and developing countries (Şanlı, Bayrakdar and İncekara, 2017). These regulations have aimed to create global awareness about climate change. The responsibilities of the countries in charge have been determined within the framework of the United Nations Convention on Climate Change and the Kyoto Protocol. Under this protocol, the relevant countries will prepare greenhouse gas inventories, utilize technological advancements for the benefit of climate activities, provide information on this issue in state policies, and allocate budgets for climate processes (Ulueren, 2001). Turkey is closely following these processes and is not indifferent to the issue. Located in the temperate zone and the Mediterranean basin, our country is one of the countries affected by the global climate change process. The variable topography of our country, the presence of different climate types, the industrialization process, and population growth are triggering this process. The variability in our country's climate will also show its effects on many areas. These areas have been identified, and studies on their effects have begun (Ünal, 2017).

Climate change will show its effects on our country's economy in many areas, primarily agriculture, industry, health, and tourism. There are some studies that have been and will be carried out to minimize the possible negative consequences of the climate impact on our country. First of all, reserve areas should be created to prevent disruptions in the ecological system. The destruction of forests should be prevented, and new forest areas should be created. Water resources should be used more efficiently. Agricultural areas should absolutely not be opened to settlement. The use of environmentally friendly fuels instead of fossil fuels should be encouraged in cities (Öztürk 2002).

The city of Samsun, which is the subject of this research, is located in the Black Sea Region of Turkey. Situated on the Black Sea coast, Samsun is thought to be primarily affected by the variation in sea surface temperatures during the climate change process. Changes in sea level may alter the city's climate. Furthermore, it is predicted

that the city, where agricultural activities are intensively carried out, will begin to lose its agricultural production characteristics.

Purpose and Importance of the Research

The main objective of this research is to examine the views of subject teachers working in Samsun province regarding global climate change and to reveal the reflections of these views on the education process. The study aims to contribute to the development of education policies on climate change by determining the level of awareness of teachers regarding environmental problems. Examining the attitudes and thoughts of teachers is of great importance because it plays a critical role in shaping students' environmental awareness. In addition, the findings obtained at the regional level can shed light on education planning to be carried out at the national level. In this context, the research provides a scientific contribution to both the professional development of teachers and the strengthening of sustainable environmental education.

Sub-Problems

1. How do subject teachers define global climate change, and what are their perceptions of this concept?
2. According to teachers, what are the main causes of global climate change, and how should these causes be addressed in the education process?
3. What activities do they think can be implemented in educational settings to prevent global climate change?
4. According to teachers' views, what are the priority measures that should be taken to mitigate the effects of global climate change?

METHOD

This research is a qualitative study designed using a semi-structured interview form to determine the opinions of subject teachers regarding global climate change. Qualitative research is an approach that requires a holistic approach to perceptions and events and relies on qualitative data collection methods. Survey models, on the other hand, are types of research that aim to describe current or past situations as they are (Karasar, 2005).

Working Group

The study group consisted of subject teachers employed by the Ministry of National Education during the 2025-2026 academic year. Twelve of these teachers were included in the study. As part of the research, the teachers were informed about the study, and those who voluntarily participated were provided with a data collection tool. Participating teachers were encouraged to share their opinions through the relevant form, and the data obtained were analyzed.

Data Collection Tool

Twelve subject teachers participating in the study were asked four questions from the data collection instrument. The data collection instrument used in the study is a semi-structured interview form developed by the researcher. This form consists of two parts. The first part includes questions about the participants' personal information such as their job title, gender, age, and educational status. The second part contains four questions aimed at evaluating the teachers' opinions on global climate change.

Data Analysis

In this study, content analysis, a qualitative research method, was used to analyze the data. Content analysis aims to organize data with similar characteristics by grouping them around specific concepts and themes in a way that is easily understandable to the reader. This method aims to reveal the concepts and relationships that will clarify the obtained data (Yıldırım & Şimşek, 2016). In this context, written data obtained from interviews with teachers were examined, and problems were coded and grouped within the framework of management functions. The codes were reviewed and their accuracy was confirmed. In addition, the opinions of subject teachers regarding global climate change were examined using descriptive analysis and presented along with their interpretations.

FINDINGS

Participants in the study were asked, "**What comes to mind when you hear 'global climate change'?**" Some of the responses received from the participants are given below:

"T1: Rising global temperatures, melting glaciers, and rising sea levels. T3: Loss of agricultural yields, increased risk of drought, and jeopardizing food security. T4: Increased frequency and intensity of natural disasters (floods, storms, wildfires) T9: Dependence on fossil fuels in energy consumption deepening the climate crisis. T12: Urbanization and industrialization increasing environmental pressure and accelerating climate change."

Themes and sub-themes were created based on the data obtained from the participants.

Table 1. Findings Regarding Participants' Opinions on Global Climate Change

Theme	Sub-theme	<i>f</i>
Environmental Impacts	Global temperature rise and melting of glaciers	5
	Agricultural yield loss and risk of drought	4
	Increase in natural disasters	3
	Ecosystem degradation and loss of biodiversity	1
Socio-Economic Impacts	Negative effects on human health	4
	Dependence on fossil fuels, pressure of urbanization and industrialization	4

The environmental impacts of global climate change threaten the sustainability of ecosystems by causing serious disruptions in natural systems. Furthermore, its socio-economic dimension negatively affects social life by directly impacting human health and economic processes. Therefore, climate change presents itself as a multi-dimensional crisis at both environmental and societal levels.

Participants in the study were asked, "**What do you think are the causes of global climate change?**" Some of the responses received from the participants are given below:

"T2: Intensive consumption of fossil fuels during industrialization, leading to increased carbon emissions in energy production. T3: Deforestation and destruction of natural ecosystems, disrupting the carbon cycle. T5: Rising energy demand due to rapid urbanization and population growth. T8: Improper land use and intensive use of chemical fertilizers/pesticides in agricultural areas. T9: Widespread use of fossil fuel-based vehicles in the transportation sector. T10: Changes in global consumption habits and the overproduction-consumption cycle. T11: Acceleration of the greenhouse effect caused by the accumulation of greenhouse gases (CO₂, CH₄, N₂O, etc.) in the atmosphere."

Themes and subthemes were created based on the data obtained from the participants.

Table 2. Findings Regarding Participants' Views on the Causes of Global Climate Change

Theme	Sub-theme	f
Environmental Causes	Fossil fuel consumption and carbon emissions	6
	Deforestation and ecosystem destruction	4
	Improper land use in agriculture	1
Socio-Economic Causes	Urbanization and population growth	5
	Use of fossil fuels in transportation	4
	Overconsumption and accumulation of greenhouse gases	2

According to Table 2, Environmental causes of global climate change threaten ecosystems by disrupting the natural balance through processes such as fossil fuel consumption, deforestation, and improper land use. Socio-economic factors, on the other hand, accelerate greenhouse gas accumulation through urbanization, the use of fossil fuels in transportation, and excessive consumption habits. This situation demonstrates that environmental and social dynamics deepen the climate crisis in a mutually reinforcing cycle.

Participants in the study were asked, "**What activities do you think can be done to prevent global climate change?**" Some of the responses received from the participants are given below:

“T1: Reduction of fossil fuel use and expansion of renewable energy sources (solar, wind, hydroelectric). T5: Protection of forests and increase in new afforestation efforts. T7: Efficient use of water resources and development of awareness about water conservation. T8: Adoption of sustainable methods in agriculture; reduction of chemical fertilizer and pesticide use. T11: Promotion of public transportation in cities and expansion of environmentally friendly transport vehicles. T12: Strengthening environmental education, raising climate awareness in society, and emphasizing individual responsibilities.”

Themes and subthemes were created based on the data obtained from the participants.

Table 3. Findings Regarding Participants' Thoughts on Preventing Global Climate Change

Theme	Sub-theme	<i>f</i>
Sustainability in Energy and Transportation	Reduction of fossil fuels	4
	Renewable energy	3
	Environmentally friendly transportation	1
Conservation of Natural Resources	Protection of forests	3
	Water conservation	2
Social and Agricultural Transformation	Sustainable agriculture	4
	Environmental education	1

According to Table 3, sustainability in energy and transportation plays a critical role in reducing carbon emissions through the reduction of fossil fuels, a shift towards renewable energy, and the promotion of environmentally friendly transportation. Within the scope of natural resource conservation, the continuity of forests and water conservation ensure the continuity of ecosystem services, thereby increasing environmental resilience. Societal and agricultural transformation, on the other hand, strengthens individual responsibility through sustainable agricultural practices and environmental education, ensuring societal acceptance of long-term climate policies.

Participants in the study were asked, **"In your opinion, what measures should be taken to prevent global climate change?"** Some of the responses received from the participants are given below:

“Ö1: Expansion of the use of renewable energy sources and reduction of dependence on fossil fuels. Ö3: Protection of forests, implementation of new afforestation efforts, and ensuring the sustainability of ecosystems. Ö6: Effective management of water resources and raising public awareness of water conservation. Ö8: Implementation of sustainable methods in agriculture; promotion of organic production and reduction of chemical use. Ö9: Development of environmentally friendly urban transportation systems and expansion of public transport. Ö10: Improvement of waste management, increase in recycling activities, and limitation of plastic use.

Ö11: Strengthening environmental education, raising climate awareness among individuals, and supporting international cooperation.”

Themes and subthemes were created based on the data obtained from the participants.

Table 4. Participants' opinions on measures that can be taken to prevent global climate change.

Tema	Alt tema	<i>f</i>
Environmental Sustainability and Resource Management	Use of renewable energy	4
	Protection of forests	2
	Water management	1
Urban and Social Transformation	Environmentally friendly transportation	5
	Waste management	2
	Environmental education	2

According to Table 4, Sustainability policies focused on energy, forestry, water, and agriculture reduce environmental risks by protecting ecosystems and ensuring the efficient use of resources. Within the scope of urban and social transformation, transportation, waste management, and environmental education contribute to the spread of sustainable lifestyles by transforming individual behaviors. The holistic implementation of these two main axes strengthens the structural adjustments necessary for achieving long-term climate goals.

RESULTS, DISCUSSION AND RECOMMENDATIONS

Global climate change is a multidimensional phenomenon that directly threatens human life through its environmental and socio-economic dimensions. The disruptions occurring in natural systems generate lasting impacts on economic processes and social life. Therefore, policies aimed at preventing climate change must be addressed through a holistic approach and supported by international cooperation.

The fundamental causes of global climate change stem from both environmental and socio-economic processes. While fossil fuel consumption, deforestation, and improper land use disrupt the natural balance, urbanization, transportation, and excessive consumption habits accelerate the accumulation of greenhouse gases. These multidimensional factors contribute to the deepening of the climate crisis on a global scale and pose a serious threat to sustainable living.

Sustainable energy and transportation policies, along with practices aimed at conserving natural resources, emerge as key strategies in mitigating environmental risks. Within this framework, strengthening social awareness and agricultural transformation supports the institutional and individual adaptation required to achieve long-term climate objectives.

The comprehensive implementation of policies on environmental sustainability and resource management ensures the protection of ecosystems and the efficient use of natural resources. In the axis of urban and social transformation, strategies developed for transportation, waste management, and environmental education align individuals'

environmentally friendly behaviors with institutional policies. The coordinated advancement of these two main approaches is of critical importance for achieving long-term climate goals and enhancing societal resilience.

Argument

In the study conducted by Şanlı and Özekicioğlu (2007), it was emphasized that Turkey is considerably rich in renewable energy resources, which are regarded as a solution to global warming; however, the technological infrastructure necessary for the effective utilization of these resources has not yet been established. The prevention of climatic change was noted to be possible through the reduction of greenhouse gas emissions, the efficient use of renewable energy sources, and the enforcement of environmental laws with adequate sanctioning power.

In the study conducted by Kılıçoğlu and Akkaya Yılmaz (2021), it was found that middle school students acquired their knowledge about global warming primarily through the internet, television, their families, and school lessons. A significant proportion of the students described the concept of global warming as the increase in global temperatures and carbon dioxide levels, as well as the melting of glaciers. They identified the primary causes of global warming as smoke and waste emitted from factories, the use of deodorants, and human activities in general. Furthermore, the participating middle school students stated that the problems arising from global warming include, in particular, the melting of glaciers, desertification, and rising water levels. They emphasized that the most important measure to be taken is the education of people on this issue, which they considered essential for addressing the problem.

In the study conducted by Eroğlu and Aydoğdu (2016), it was concluded that although pre-service science teachers' knowledge levels regarding global warming were above average, their understanding was found to be incomplete in certain areas.

Suggestions

To mitigate the impacts of climate change, priority should be given to the use of renewable energy sources. In addition, by strengthening environmental education and international cooperation, societies can be guided toward sustainable lifestyles.

Increasing the use of renewable energy sources and reducing dependence on fossil fuels should be a primary step. Furthermore, through sustainable urbanization policies and educational programs that enhance environmental awareness, the effects of climate change can be minimized.

For the effectiveness of sustainable energy and transportation policies, it is recommended that local governments develop concrete incentive mechanisms. Moreover, integrating environmental education more strongly into curricula will contribute to the permanent enhancement of social awareness.

It is suggested that local governments coordinate energy, transportation, and waste management policies within a holistic framework. Additionally, the

institutionalization of environmental education at the national level will strengthen individual responsibility awareness and contribute to the achievement of sustainability goals.

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