

The perception of Romanian college students regarding climate change

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Abstract

People are starting to notice the effects of climate change more and more in their daily lives. People must be aware of their behaviors and how they affect the environment as long as they are trying to reduce climate change. People don't realize how their actions affect the environment or how they can help lessen the effects of climate change because they don't have clear and accurate understanding about the causes and solutions to the problem. The purpose of this study is to determine how young people perceive climate change in a number of ways, including their perspectives, opinions, and beliefs about its causes, effects and solutions; their level of knowledge about the tactics of international climate actors; their involvement in and opinions about the necessity of these actions; and their perceptions of the importance of environmental and climate education in schools. The results show that the majority of respondents think that economic activity and human activity are the primary causes of climate change and that it is currently a severe concern. Nearly half of respondents consider that they are not affected by climate change now, despite the fact that the majority of them think it will have an impact on their lives in the future. The respondents are in favor of tougher sanctions and penalties for environmental crimes, as well as the creation of an Environmental Court in Romania to handle such cases. The majority of respondents believe they know very little about global climate actors and initiatives. The respondents claim to have a high or very high level of knowledge about climate change mitigation, deforestation, flooding, desertification, and extreme weather occurrences.

Keywords

Climate change; Questionnaire; Perceptions; Knowledge; Education;

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Introduction

Climate change means significant changes in the planet's weather patterns. Major aspects of climate change include rising global temperatures, melting glaciers, ocean acidification, impacts on biodiversity and extreme weather events.

Over the years, the Earth's average temperatures have risen, with an increase of 0.20 C every decade (Ministry of Environment, Waters and Forests, 2024). The main cause of rising temperatures are emissions of greenhouse gases: carbon dioxide, methane, gases from activities such as burning fossil fuels. Climate change has also led to the melting of glaciers and ice caps, resulting in rising sea levels (Ministry of Environment, Waters and Forests, 2024). Another effect of climate change is increased CO₂ emissions leading to ocean acidification, negatively affecting marine ecosystems. Biodiversity is being affected globally by climate change, causing changes in habitat and species distribution.

People are starting to notice the effects of climate change more and more in their daily lives. However, according to the *Special Eurobarometer 516 - European citizens' knowledge and attitudes towards science and technology* (2021), 47% of respondents in Romania say that the statement "climate change is largely caused by natural cycles and not by human activities" is true, while 13% of respondents do not know if it is true or false. The results of the *Special Eurobarometer 516 - European citizens' knowledge and attitudes towards science and technology* (2021) show that there are only three countries in the European Union where a minority of respondents correctly say that the statement is false. Romania is one of them. Romania recorded only 40% of respondents saying the statement "climate change is largely caused by natural cycles and not by human activities" is false, along with Slovakia with 46% and Hungary with 47%.

The results imply that climate change education in Romania is very important nowadays. In order to be able to contribute to reducing climate change and its impact, individuals need to become aware of available actions and their effects on the environment. The results of the *Special Eurobarometer 516 - European citizens' knowledge and attitudes towards science and technology* (2021) draw attention to the need for climate change education in Romania. Climate change education can contribute to the correct knowledge of information about the causes of climate change and its consequences on the planet.

Understanding causes, awareness of their own influence, knowledge of feasible solutions, personal involvement, and a sense of duty are some of the factors that indicate people's level of climate change knowledge. To encourage individuals to make behavioral changes and incorporate sustainable practices into their daily lives, it is imperative that they have access to accurate and lucid information regarding climate change. In order to promote a proactive mindset and group action to safeguard the environment, education and awareness are essential.

This paper aims to identify students' perceptions of climate change along several dimensions: students' perspectives, opinions and beliefs about the causes and solutions to climate change; students' level of knowledge about climate change, strategies and international climate actors; students' involvement in climate change actions and their

views on the need for such actions; and students' perceptions of the need for environmental/climate education in schools.

I chose to identify young people's, specifically students', perception of climate change because young people can have a significant influence in educating others about climate change. Greta Thunberg and the *Fridays for Future* movement is an example of activism that has captured global attention and motivated thousands of young people to take to the streets with the aim of implementing concrete actions to mitigate climate change. Young people can influence communities and social groups by adopting sustainable practices. They also have greater access to technology and are more open to innovation and can thus contribute to the development and implementation of innovative solutions.

However, changing personal behavior is unlikely in the absence of accurate and clear information about the causes and consequences of climate change. Individuals are more likely to take responsible action and change their behavior when they are well informed and aware of the implications and possible solutions. That is why this research also aims to identify students' level of knowledge about climate change and their opinion on the need for environmental education in schools.

To identify students' perceptions of climate change, I propose four research questions.

First, what are students' perspectives, opinions and beliefs on the causes and solutions to climate change? This paper examines whether students' perspectives, opinions and beliefs on climate change vary according to various factors such as education, personal experiences, social and cultural background. Students may or may not be aware of the causes of climate change, the negative effects of their own actions and lifestyle.

Secondly, I will be looking at how student engagement in climate change action manifests itself? Students may or may not be engaged and concerned about the causes, effects and solutions to climate change depending on their perspectives, opinions and beliefs.

The third question I propose to answer is: what is the level of knowledge about climate change, strategies and international climate actors? Changing personal behavior towards a more sustainable approach to the environment is closely linked to having the right information on the causes and solutions to climate change.

The final research question is what is the students' perception of the need for environmental/climate education in schools? Education and public awareness are essential and can become key tools for transforming attitudes and behaviors towards climate change. In the absence of clear and accurate knowledge about the causes and solutions to climate change, students could not be aware of the impact their actions have on the environment and how they can contribute to reducing the effects of climate change.

Conceptual background and previous studies

Climate change was one of the subjects of a national opinion survey that Inscop Research conducted in February 2023. In February 2023, information was gathered via phone interviews. The 1000 respondents in the random sample were representative of Romania's non-institutionalized population aged 18 and over in key sociodemographic characteristics (gender, age, and occupation). The results of the survey showed that 90.9% of respondents believe that significant climate change has occurred on the planet, 79.5% that significant climate change has occurred in Romania and 68.7% believe that these changes are caused by human economic activity, with forest exploitation (42.3%) being the most important contributor to climate change and severe droughts (47.6%) having the most negative effects in Romania today. Another important finding of the *Inscop Research* survey (2023) is that the majority (80.1%) consider Romania to be the landfill of Europe. Also, 80.8% are against new coal mining, as it requires the clearing of forest areas, and 54.9% believe that Romania should not allow private investors to be involved in the exploitation of natural resources essential for the country's security, economic development and people's well-being.

Eurobarometer 95.1 (2021) conducted from March to April 2021 had as key topics youth participation in European elections (QA), climate change (QB), justice, rights and values (QC), EU consumer habits regarding fishery and aquaculture products (QD). "Since the early 1970s, the *European Commission's Standard and Special Eurobarometer* has regularly monitored public opinion in EU member countries. The main investigators are the Directorate-General for Communication and sometimes other departments of the European Commission or the European Parliament" (European Commission, 2021). The results show that European citizens identify the economic situation as their main concern at EU level, followed by the environment and climate change and immigration (European Commission, 2021).

In 2021, the non-profit organisation *Save the Children* published a study analysing children's perceptions of climate change in Romania. Data was collected during April 2021 from a sample of 1,005 respondents aged 8-17 years old from all counties of the country, from both rural and urban areas. The survey results showed that most children expressed an interest in air quality, with air pollution being the topic that raised much interest. Children are more aware of air pollution (47%), recycling (36%) and plastic pollution (31%). On the other hand, the majority of children (54%) feel they have little or no information about climate refugees (Salvați Copiii România, 2021). Romania is also seen as less responsible than other countries: 30% of children believe that politicians can prevent and reduce climate and environmental problems, with deforestation being the main issue where respondents believe the Romanian government should take immediate action.

In 2023, a study conducted by Andrada Istrate and Alexandra Ciocănel analysed the current and potential role of students in European climate change policies. The study analysed literature published between 2018-2022, data from Eurobarometer surveys and qualitative research with young people and experts from environmental and youth organizations. The results of the study highlighted the shortage of resources in Romania

as the most important problem. “A first observation that emerges from this study is related to the scarcity of educational resources on climate change in Romania for young people, with the exception of a few initiatives of NGOs or individual efforts of teachers” (Istrate & Ciocănel, 2023, p. 90). Another conclusion is the slow pace of the education system in implementing climate change education and the lack of institutional coherence oriented towards sustainability.

The research report on the perception of young people in Romania towards climate change education (2021) conducted by Arpad Todor and collaborators was based on a questionnaire consisting of 13 questions, administered to 500 respondents. An important conclusion of the study is that 62% of the respondents believe that climate change should be introduced in school curricula, especially in high school. The most important climate change topic identified by respondents is ecosystem destruction “of the environmental/climate topics that young people consider most important to study, ecosystem destruction ranks highest, probably due to the geographical proximity of the phenomena (at the opposite pole is ocean acidification)” (Todor et al., 2021, p. 11). The report also concluded that respondents’ level of knowledge on environmental topics (i.e. ecosystem destruction, species extinction, sea and ocean level rise, desertification, causes and effects of climate change, extreme weather events, climate change mitigation) is average.

Research conducted in Australia by Vaile Dawson (2015) investigated the level of understanding of climate change among 438 high school students in Western Australia. The aim of the study was to assess students’ knowledge before developing curriculum resources and teacher training programs. The results indicated that only one in three students could correctly or partially correctly formulate a definition of the greenhouse effect and climate change.

In the article “*What is climate change education?*”, Robert B. Stevenson, Jennifer Nicholls and Hilary Whitehouse (2017) discuss how educators should teach and how students could be encouraged to learn from the human and ecological risks and consequences of climate change. The authors believe that teachers need to use teaching and learning methods that stimulate creativity and give students the opportunity to take initiative. “If the goal is to prepare students for an uncertain future by helping them acquire the capabilities (i.e., knowledge, skills, dispositions, and values) to meet future challenges, educators must rethink climate change mitigation and adaptation in ways that are not just technical but also socially transformative, using teaching and learning approaches that harness creativity and empower students to take action” (Stevenson et al., 2017, p. 67). According to the authors, in the future climate change education will no longer be a choice. It will be indispensable, and human creativity and ingenuity will underpin change.

In her article “*Combating climate change through quality education*”, Allison Anderson argues that “climate change threatens to reverse and even reverse progress towards the Millennium Development Goals (MDGs) and represents one of the most serious challenges to the international community in reducing global poverty” (2010, p. 3). However, the author believes that the key strategy to combat climate change is investment in education. The article aims to identify current climate change actions, engagement and

barriers in the education sector in climate change mitigation and adaptation. “The education sector offers an opportunity to combat climate change by contributing to mitigation efforts and building the adaptive capacity of education systems and students, thereby reducing vulnerabilities and building resilient societies” (Anderson, 2010, p. 3). Through the education system, the importance of climate change awareness and education can be emphasised, providing sound knowledge and promoting responsible action among students. The development and implementation of innovative educational programmes focusing on sustainability and solutions at local and global levels could be the key to mobilizing new generations towards a more sustainable approach to climate change.

There are two main strategies for tackling climate change: mitigation and adaptation. Mitigating climate change requires education focused on understanding how lifestyles, economies and social structures can be transformed to reduce excessive greenhouse gas production. The second strategy Allison Anderson discusses in her article “*Combating climate change through quality education*” (2010) is adaptation. “Adaptation is, therefore, not a choice between reducing overall vulnerability and acquiring the knowledge to learn about, prepare for, and respond to specific hazards. On the contrary, adaptation requires both options” (Anderson, 2010, p. 4). First, reducing overall vulnerability means taking steps to strengthen the capacity of communities and infrastructure to cope with climate change as a whole.

On the other hand, acquiring specific knowledge refers to a detailed understanding of the particular risks associated with climate change in a given region. Effective adaptation to climate change therefore requires a balanced and integrated approach, covering both general and specific issues, to build more resilient and prepared communities in the face of climate impacts.

In the article “*Education Responses to Climate Change and Quality: Two Parts of the Same Agenda?*” (2010), Colin Bangay and Nicole Blum discuss the role of education in addressing the challenges of climate change and the capacity of education to contribute to adaptation and mitigation measures. “First, the potential of the full range of educational channels - formal and non-formal, from primary to tertiary to adult education - needs to be highlighted. Secondly, educators need to recognise the dangers of labelling and the preconceptions/misconceptions that often arise when using terms such as environment” (Bangay & Blum, 2010, p. 359). The education response to climate change must go beyond simply providing new elements in the curriculum; a much more complex and holistic approach is needed that involves changes in teaching methodologies, community awareness and engagement, and the integration of sustainability themes into all aspects of education.

Supporting education involves integrating climate change concepts into the curriculum, developing appropriate materials, but also training teachers, working with the community, providing educational resources. By implementing these strategies, effective and sustained education about climate change can be ensured, thus contributing to an aware and proactive generation facing climate challenges.

Yoko Mochizuki and Audrey Bryan highlight in their article “*Climate Change Education in the Context of Education for Sustainable Development: Rationale and Principles*” (2015) the critical role that education plays in addressing climate change. “The purpose of the article is to present a comprehensive overview of, and rationale for, climate change education (CCE) within the context of ESD. First, it seeks to demonstrate why education should be a more central and visible part of the international response to CC by underscoring the critical role that it can play in addressing and responding to CC in all of its complexity. Second, it provides a number of interlinked rationales as to why CCE should be addressed in the context of Education for Sustainable Development” (Mochizuki & Bryan, 2015, p. 5). The article provides a detailed perspective on the importance of education in the context of climate change. Primarily, it aims to highlight why education should become a central element of the international response to climate change challenges.

In the article “*Climate Change Education in the Context of Education for Sustainable Development: Rationale and Principles*” (2015), Yoko Mochizuki and Audrey Bryan present key principles for organising climate change education for sustainable development. A first principle presented is to ensure an integrated and interdisciplinary approach to climate change knowledge. “If citizens are to develop a comprehensive and nuanced understanding of climate change and its far-reaching effects, it must be taught from an interdisciplinary perspective. Scientific knowledge - while vital for promoting climate awareness and climate literacy - provides a partial understanding of climate change” (Mochizuki & Bryan, 2015, p. 13). Attention is also needed to broad social, political and economic processes, which require significant transformation to address climate change effectively. A second principle presented is to address local and global perspectives on climate change. “Addressing the risks of climate change requires global and local action to reduce greenhouse gases and reduce vulnerabilities to climate change impacts. The relationship between local and global - and how they shape each other in mutually interdependent ways - is one of the central tenets of climate change education for sustainable development” (Mochizuki & Bryan, 2015, p. 14). Addressing local and global perspectives on climate change is essential for a comprehensive understanding of this complex issue. Another principle presented is the approach of a climate justice perspective. “Approaching climate change from a social justice perspective can improve learners’ ability to hold accountable the agencies and institutions that are most implicated in climate change and encourage them to imagine alternatives to existing political-economic arrangements and ideologies that promote unjust global relations and practices” (Mochizuki & Bryan, 2015, p. 15). Approaching climate change from a social justice perspective involves recognizing that the impact of climate change is not evenly distributed across society and that vulnerable or marginalized groups are often disproportionately affected.

In her study “*Hope and climate change: the importance of hope for environmental engagement among young people*” (2012a), Maria Olaja investigated whether hope about climate change has a significant relationship with pro-environmental behavior, as well as an impact on behavior. “Although many young people believe that climate change is an important issue for society, research indicates that pessimism is quite common. Therefore,

finding ways to instill hope could be considered vital. However, is hope positively linked to commitment or is it just a sign of delusional optimism?” (Olaja, 2012a, p. 625). Two questionnaire studies were conducted, one with a group of Swedish adolescents (n = 723) and one with a group of Swedish young adults (n = 381), and the conclusion of the studies was that hope is not only a pleasant feeling, but could also function as a motivational force.

Maria Olaja also studied how Swedish 12-year-olds (n = 293) cope with climate change and how different coping strategies relate to environmental engagement and well-being in the article “*How do children cope with global climate change? Coping strategies, engagement, and well-being*” (2012b); “Three coping strategies were identified: problem-focused coping, stressing the severity of climate change, and meaning-focused coping” (Olaja, 2012b, p. 225). Problem-focused and meaning-focused coping had positive associations with measures of environmental engagement.

In another article “*Hope in the Face of Climate Change: Associations with Environmental Engagement and Student Perceptions of Teachers’ Emotion Communication Style and Future Orientation*” (2015), Maria Olaja identified two types of hope: constructive hope and denial-based hope. “Constructive hope was positively associated with engagement and with the perception that teachers respect students’ negative emotions about societal issues and have a future-oriented, positive, and solution-oriented communication style” (Olaja, 2015, p. 2). Students who experienced an optimistic outlook based on climate change denial were less likely to engage in pro-environmental behaviors. They also perceived that their teachers did not pay enough attention to their emotions and communicated in a way considered pessimistic.

Public consultations on the report “*Climate Change and Environment Education in Sustainable Schools*” opened in January 2022, and closed on February 2022. The report outlines the need to protect the environment, the role of education in combating climate change, international models of best practice in climate change and environmental education. In the report, it is proposed to update the curricula of biology, geography, economics and technology education with environmental and climate change concepts, introduce optional courses on climate change and the environment, promote good practices and actions for the environment, reward the teaching staff involved, organize teacher training programmes, disseminate course materials, develop partnerships. Other measures proposed in the report are the addition of activities focused on climate change and the environment to the “School in a different way” programme and the implementation of an additional week, called “Green Week for Climate Change and the Environment” from the school year 2022/2023.

As key tools, the report includes a dedicated web platform, digital and classic textbooks, kits for measuring air pollutants, free apps in schools to measure pollutants, teacher training programmes and competitions. The report proposes a series of solutions for educational resources, infrastructure for sustainable schools, and human resources for climate change and environmental education. The educational resources mentioned are new technologies, i.e. smart phones, tablets, laptops and other smart devices that can facilitate climate change and environmental education; development of an integrated platform with mobile resources and apps for students. The online platform is dedicated to

gathering essential resources for students and teachers, thus proving to be beneficial in the context of climate change and environmental education. “A web platform dedicated to gathering key resources for students and teachers is useful in climate change and environment education to increase accessibility to these resources and to stimulate student participation in environmental action” (Presidential Administration, 2022, p. 20). This platform will also be linked to other virtual resources and libraries.

Another educational resource featured is a mobile app for students, namely Mini Environmental Inspector, which “aims to form habits and reinforce environmental information with the support of students. Students will be given a portion of a satellite map to track on a weekly basis and keep a log of the changes they notice. If they notice radical changes (guided by the app), they will be able to send a report directly to the National Environmental Guard” (Presidential Administration, 2022, p. 21). Other apps dedicated to students are two disaster preparedness apps, which aim to prepare students for emergencies such as extreme weather events, earthquakes, landslides, floods, etc.

In terms of school infrastructure, the report aims to support and rehabilitate pre-university education facilities in Romania, develop sustainable architecture, monitor and evaluate school buildings. The objectives and measures proposed for training and human resources are the promotion of a culture of sustainability at school level, professional and continuous training of teachers, motivation of inspectors, school principals and teachers for involvement in education.

According to the report, to broaden access to climate change and environmental education, it is essential to increase the collaboration of several stakeholders, namely: NGOs, local government, community, parents, private companies and the media. “Harmonious collaboration between these and formal education structures is essential in rapidly broadening access to climate change and environmental education” (Presidential Administration, 2022, p 35). Through this broad involvement of different actors, a comprehensive and effective approach to climate change and environmental education can be ensured, with a significant impact on the awareness and empowerment of the community.

In 1992, the United Nations Framework Convention on Climate Change (UNFCCC) was adopted in Rio de Janeiro and signed by 154 countries at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro. Parties to the UNFCCC are classified as Annex I, Annex 2, least developed countries and non-annexed. Annex 1 includes developing countries and economies in transition. Annex 2 comprises members of the Organisation for Economic Co-operation and Development (OECD), Least Developed Countries are countries granted special status under the treaty and Non-Annex I comprises mostly low-income developing countries. Romania is one of the 14 economies in transition.

The United Nations Framework Convention on Climate Change (UNFCCC) is operationalised through the Kyoto Protocol. “The Kyoto Protocol operationalises the United Nations Framework Convention on Climate Change by committing industrialised countries and economies in transition to limit and reduce greenhouse gas (GHG) emissions in accordance with individually agreed targets. The Convention itself only requires those

countries to adopt mitigation policies and measures and to report regularly” (United Nation, 2023, p. 1). The Kyoto Protocol entered into force in 2005 and was replaced by the Paris Agreement.

The Kyoto Protocol addresses emissions of six greenhouse gases: carbon dioxide; methane; nitrous oxide; hydrofluorocarbons; perfluorocarbons; sulphur hexafluoride. “Under the principle of common but differentiated responsibilities and respective capabilities, the protocol required 37 industrialized countries plus the European Community to reduce their greenhouse gas emissions by an average of 5% below 1990 levels and to establish a system to monitor countries’ progress” (United Nations, 2023, p. 1). While the Kyoto Protocol only required developed countries to reduce emissions, the Paris Agreement established climate change as a problem for all states.

The Paris Agreement - part of the *United Nations Framework Convention on Climate Change* - was signed on 22 April 2016. The agreement recognises the need for a response and acknowledges the threat of climate change: ‘RECOGNISING the need for an effective and progressive response to the urgent threat posed by climate change, based on the best available science; RECOGNISING ALSO the specific needs and special circumstances of developing country Parties, in particular those that are particularly vulnerable to the adverse effects of climate change, as set out in the Convention’ (Official Journal of the European Union L 282, 2016, p. 4). The agreement represented a significant global effort to address climate change and to limit global average temperature increase to below 2 degrees Celsius above pre-industrial levels. Article 2 outlines three important ways to strengthen the global response to the threat of climate change: “keeping the global average temperature increase well below 2°C above pre-industrial levels, increasing resilience to the adverse effects of climate change and encouraging climate resilience and low greenhouse gas emission development, taking the necessary measures to ensure that financial flows are consistent with a shift towards low greenhouse gas emission and climate resilient development” (Official Journal of the European Union L 282, 2016, p. 5). The agreement aims to strengthen the global response to the threat posed by climate change, including by limiting warming to well below 2 degrees Celsius. The agreement was adopted by 195 countries, Romania being one of them.

To support the implementation of sustainable reforms, the European Commission has set up a *Recovery and Resilience Mechanism*. “In order to use the RRM funding instrument, each EU Member State must draw up its own Recovery and Resilience Plan (RRP) setting out its priority areas for investment to exit the crisis, recover the economy and build resilience. Romania is at this stage” (Government of Romania, 2023). In total, Romania would receive €29.2 billion, of which €14.248 billion in grants and €14.935 billion in loans.

According to fridaysforfuture.org, *Fridays for Future* “is a youth-led and youth-organized movement that began in August 2018 after 15-year-old Greta Thunberg and other young activists stood outside the Swedish parliament every school day for three weeks to protest the lack of action on the climate crisis” (Fridaysforfuture.org, 2023). The movement is present on all continents, in 7,500 cities and with 14,000,000 participants.

Extinction Rebellion is another global movement drawing attention to climate change. Founded in the UK in 2018, the XR movement draws attention to the fact that life on Earth is in crisis. “Our climate is changing faster than scientists have predicted and the stakes are higher. Biodiversity loss. Crop failure. Social and ecological collapse. Mass extinction. We are running out of time and our governments have failed to act. Extinction Rebellion was formed to solve this” (rebellion.global, 2023). The movement is taking place in 89 countries, with 1007 groups established that individuals can join and 88 events planned around the globe. According to the rebellion.global website, governments must (1) tell the truth by declaring a climate and environmental emergency, working with other institutions; (2) act now to halt biodiversity loss and reduce greenhouse emissions to zero by 2025; and (3) create and be led by the decisions of a Citizens’ Assembly on environmental and climate justice.

Alongside Fridays for Future and Extinction Rebellion, we mention Letzte Generation, Just Stop Oil, indigenous movements and counter movements. *Letzte Generation* means *Last Generation*, with their website stating that “we are the last generation that can stop the collapse of our society”. In 2022, the Letzte Generation movement blocked Germany’s busiest motorway. The movement continued with road blockades, vandalism of gardens, famous paintings, buildings, restaurants.

Just Stop Oil is a British group using civil resistance to draw attention to stopping new fossil fuel licensing and production. According to the juststopoil.org website, the plan focuses on three parts: the truth “we are being lied to. We need to confront the scale of the crisis”; community “when we unite, then we can begin to confront the challenge of our lives. When we unite, we are strong” and action “this is how civil resistance works: applying nonviolent pressure until we force change” (2023).

Indigenous movements refer to movements of indigenous peoples: Amerindians, Sami, Inuit and Indigenous Australians. “In 2021, Norway’s Supreme Court ruled that two wind farms built in the centre of the country violated the rights of the Sami people under international conventions, but the turbines remained in operation 16 months after that ruling” (Euronews, 2023). In 2023, Greta Thunberg and activists from the indigenous Sami population protested against the two wind farms in Norway, seeking to block all entries to a state-owned company operating 80 of the turbines at Fosen.

The Committee on the Environment, Climate Change and Energy comprises the *Green Local Compact Working Group*, which aims to put cities and regions at the centre; *Task Force 3*, which supports the *Green Local Compact Working Group*; the *Covenant of Mayors* activities; the *European Climate Pact*, which aims to give citizens the green means and *stakeholder platform to reduce pollution to zero*. “The Commission for the Environment, Climate Change and Energy (ENVE) is responsible for preparing and providing the necessary resources and tools so that the Committee can fully play its advisory role in the EU legislative and policy process” (European Committee of the Regions, 2023). The key topics that ENVE focuses on are climate change, biodiversity, circular economy, zero pollution, energy and space policies of the European Union.

According to the website, the IPCC (The Intergovernmental Panel on Climate Change) is the United Nations’ body for assessing climate change science. “The

establishment of the IPCC was approved by the UN General Assembly in 1988. Its initial task, as outlined in UN General Assembly Resolution 43/53 of 6 December 1988, was to prepare a comprehensive analysis and recommendations on the state of knowledge of climate change science; the social and economic impacts of climate change; and potential response strategies and elements for inclusion in a possible future international climate convention” (IPCC, 2022).

Methodology

This paper is a sociological survey based on a questionnaire. For this research we analysed a number of 303 questionnaires, which were sent online to Romanian undergraduate students via *Google Forms* and then self-completed. *Google Forms* allows the creation, editing of the form and the collection of data entered by respondents in the data sheet. We chose this method of distributing the questionnaire because the *Google Forms* platform allows easy access to the questionnaire to a wide audience by distributing the link.

The sample consists of 303 students from several universities in Romania: University of Bucharest, Valahia University of Târgoviște, Lucian Blaga University of Sibiu, Polytechnic University of Bucharest, Spiru Haret University, University of Oradea, University of Medicine, Sciences and Technology “George Emil Palade” of Târgu Mureș, West University of Timișoara, Academy of Economic Studies of Bucharest, National School of Political and Administrative Studies of Bucharest, University of Medicine and Pharmacy “Carol Davila” of Bucharest, National University of Defence Carol I, University “Dunarea de Jos” of Galați, Transilvania University of Brașov. The age of the respondents is between 18 and 35 years old, and their background is both urban (60%) and rural (40%).

We chose this research method because the sociological survey allows us to collect a large amount of data and to measure respondents’ opinions and attitudes, their knowledge and behavior about facts and phenomena, and to identify the demographic, social and lifestyle characteristics of the respondents.

The research instrument is the questionnaire, which consists of 31 closed questions with pre-coded answers. The questions are either single-choice questions or multiple-choice questions. The questionnaire is self-administered and is delivered online via social media. The questions are more general in content at the beginning and become more specific over time, using the ‘funnel technique’.

The questionnaire looks at several aspects of climate change:

- Students’ perspectives, opinions and beliefs on the causes and solutions to climate change.
- Students’ involvement in climate change actions and their views on the need for such actions;
- Students’ level of knowledge on climate change, strategies and international climate actors;
- Students’ perception of the need for environmental/climate education in schools.

The questionnaire is based on the *Inscop Research - National Opinion Survey 1-13 February 2023* and the *Eurobarometer 95.1 (2021) Country Questionnaire Romania*.

Questions 1-14 are questions contained in the *Inscop Research Report*. This survey was conducted nationwide from 1-13 February 2023 using a questionnaire interview as the research method. Data were collected using the CATY method. A total of 1000 people aged 18 years and over were interviewed by telephone in the survey. The sample is simple random and is representative of the significant socio-demographic categories of the non-institutionalized population in Romania.

Questions 15-17 are questions included in *Eurobarometer 95 (2021)* and measure students' perception of the severity of climate change and the need for initiatives to mitigate/reduce its impact. Questions 18 and 19 seek to identify the level of knowledge on climate change, strategies and international climate actors. The next questions follow the perception of the need for environmental/climate education in schools and questions 22-31 are socio-demographic questions.

The general objective of this research is to identify students' perceptions of climate change. The specific objectives of this research are the following: (1) Identify students' perspectives, opinions and beliefs on the causes and solutions to climate change; (2) Identify the level of knowledge on climate change, strategies and international climate actors; (3) Identify student perceptions of the need for environmental/climate education in schools.

Data analysis and interpretation

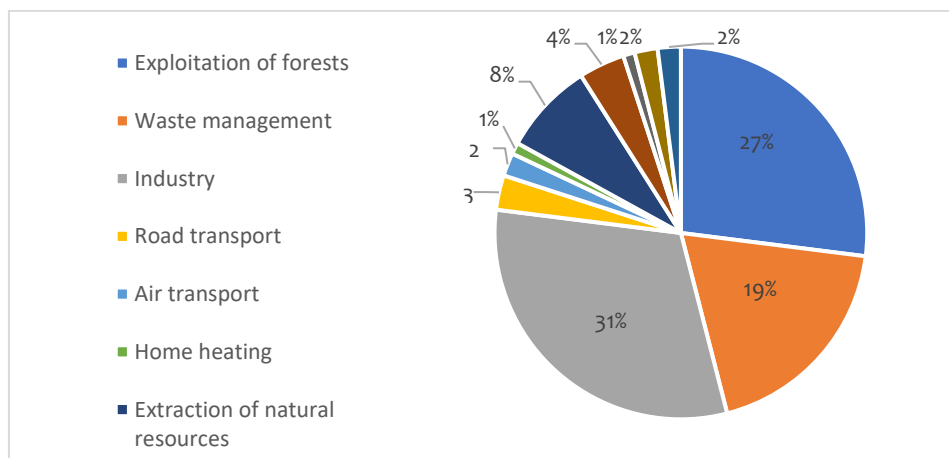
In general, individuals are divided on climate change. Some believe climate change is man-made, some believe it is natural, and some believe it does not exist. Of the 303 students, most believe that climate change is caused by human activity, and a small percentage (9%) believe that climate change is natural, not man-made. Don't know/don't answer accounted for 4% of responses and the no climate change option for 0%. The majority of students also consider climate change to be a serious problem at the moment. Thus 74% of students perceive climate change as a serious, very serious or extremely serious problem. In contrast, the general population, which is characterised by a more diverse level of education and access to information, has perspectives that attribute climate change to natural factors to a greater extent. The results of the *Inscop Research Report - National Opinion Poll 1-13 February 2023* show that 29% of the general population in Romania believe that climate change is natural and 68% believe that climate change is human-made.

The majority of respondents in this survey believe that there has been quite a lot of climate change on the planet in the last 3 years: 91% of students believe that significant climate change has occurred on the planet and 9% of students believe that no significant climate change has occurred on the planet in the last 3 years. Respondents also believe that significant climate change has occurred in Romania over the last 30 years: 32% of students believe that Romania has experienced very large changes in climate over the last 30 years, and 61% believe that fairly large changes have occurred. At the other end of the scale, 7% believe that no significant changes have occurred in Romania over the last 30

years. On this question, the results of the *Inscop Research - National Opinion Survey 1-13 February 2023* report show that more than three quarters of respondents (80%) believe that very large and fairly large climate change has occurred in Romania and less than a quarter (20%) believe that fairly small and very small climate change has occurred. Compared to the results of the report, this research suggests that students are more likely to be concerned about climate change and to attach greater importance to it.

Industry ranks first among the activities that contribute most to climate change, according to students. Very close behind is forestry, waste management, natural resource extraction, while air transport, road transport, home heating and energy production are mentioned in a smaller degree (Figure 1). In the *Inscop Research Report - National Opinion Survey 1-13 February 2023*, the economic activity that contributes most to climate change is logging (42%). While industry recorded a lower percentage (13%) and waste management a similar percentage (17%). Students, with a generally higher awareness of global issues, realise the link between industry and environmental impact. Industry, especially the energy industry and industrial production, is one of the main sources of greenhouse gas emissions and other pollutants contributing to climate change. On the other hand, the general population perceives logging as a major factor in climate change, influenced by concerns about massive deforestation. However, logging, waste management and industry are the main activities identified by both this research and the *Inscop Research Report*.

Figure 1. Types of activities contribute to climate change according to students' perception

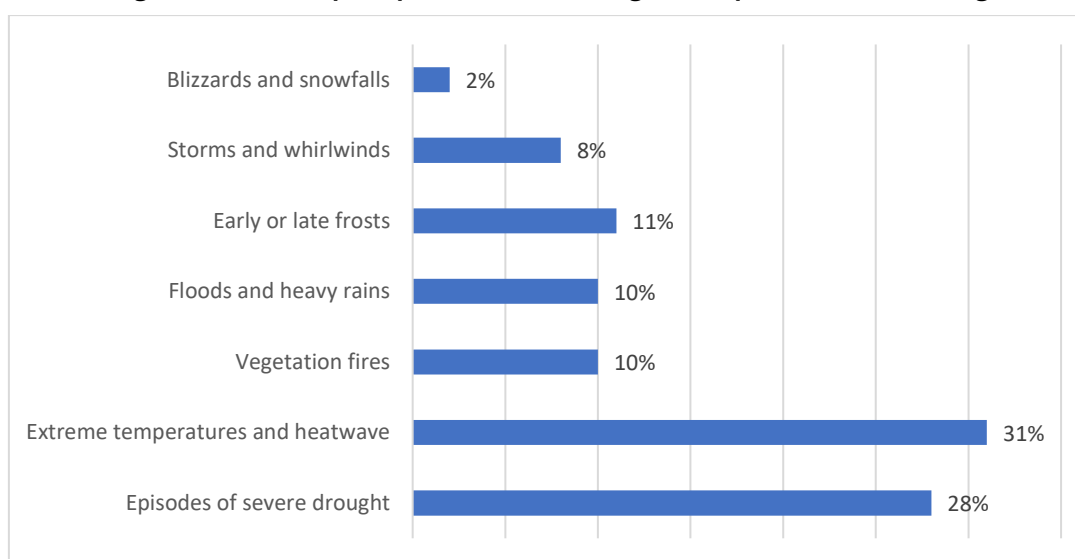


Source: own contribution

The students believe that in Romania the phenomena associated with climate change that produce the most negative effects are extreme temperatures and heatwaves and episodes of severe drought. Extreme temperatures and heatwaves accounted for 31% and severe droughts for 28%. At the other end of the scale, there might be mentioned late frosts, vegetation fires, floods and heavy rain, storms and blizzards, blizzards and heavy snowfall. Early or late frosts accounted for 11%, vegetation fires 10%, floods and heavy rain 10%, storms and blizzards 8%, and blizzards and heavy snowfall 2% (Figure 2). According to the *Inscop Research Report - National Opinion Survey 1-13 February 2023*, severe droughts

(48%) and extreme temperatures and heatwaves (20%) also rank as the most negative consequences of climate change, but with different percentages compared to this research. It is interesting to note that severe drought and extreme temperatures are perceived to be among the most negative consequences of climate change, but the percentages associated with these aspects vary. Differences in percentages may be influenced by multiple factors, including diversity and sample size, as well as other demographic or cultural variables. Regardless of the percentages, it is important to note that both samples consider both severe drought and extreme temperatures and heatwaves to be serious issues.

Figure 2. Students' perception of the most negative impacts of climate change



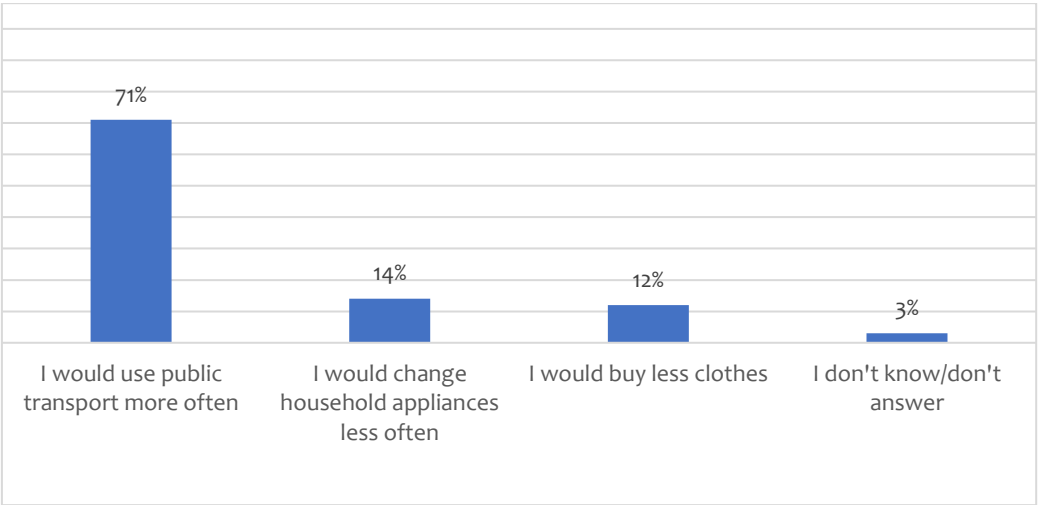
Source: own contribution

In terms of the future, most students believe that their lives will be affected to a great (58%) or very great (26%) extent in the coming years. A further 15% believe that their lives will be affected to a small or very small extent by climate change in the coming years. Although the majority of respondents believe that their lives will be affected by climate change in the future, almost half (47%) believe that they are not currently affected by climate change. Students are often exposed to information about climate change in schools and universities and their education may play an important role in how they perceive this phenomenon, they are generally more connected to technology and media and are aware that they will be the ones living with the consequences of climate change in the future. According to the results of the *Inscop Research Report - National Opinion Poll 1-13 February 2023*, 20% of respondents believe that their lives will be affected to a great extent and 45% believe that their lives will be affected to a very great extent in the coming years. Another 31% think their lives will be affected to a small or very small extent by climate change in the coming years. The results show that students perceive their lives to be more affected by climate change than the rest of the population. This perception may reflect an increased level of awareness and engagement among students about climate change.

Climate change is a global problem. Individual and collective efforts are essential to slow the pace of change and adapt to the new climate conditions. In terms of undertaking individual solutions to reduce and combat climate change, 19% of respondents to this research claimed that they regularly use environmentally friendly alternatives to their own car, the same percentage (19%) try to reduce consumption of disposable products whenever possible, 15% of respondents try to reduce waste and regularly separate it for recycling, 11% take energy consumption into account when choosing a new household appliance, and 10% buy and consume less meat. Public transport is also the option they would be willing to take more often: 71% of respondents declare they would be willing to use public transport more often to protect the environment, 14% would change household appliances less often and 12% would buy fewer clothes (Figure 3). In the *Inscop Research Report - National Opinion Poll 1-13 February 2023*, a smaller percentage (50%) would use public transport more often. Conversely, a higher percentage (24%) would change household appliances less often and buy fewer clothes (23%). One reason why students would use public transport more often is that students, especially those living in densely populated urban areas, can easily access public transport networks such as metro, buses or trams. Public transport can also be a more economical option compared to owning your own car.

Lifestyle, student mobility, cost or the fact that students do not buy as many appliances or are not as committed to their purchase as other age groups may be factors why this research has seen a lower percentage than the *Inscop Research 2023 Report* in terms of switching appliances. Students are also often more receptive to changes in fashion and new trends in clothing. Being more influenced by culture and media, they may be more likely to update their wardrobe more often to keep up with current trends, which is why they would not give up buying clothes to the same extent as the general population in Romania.

Figure 3. Individual solutions respondents are willing to choose to protect the environment



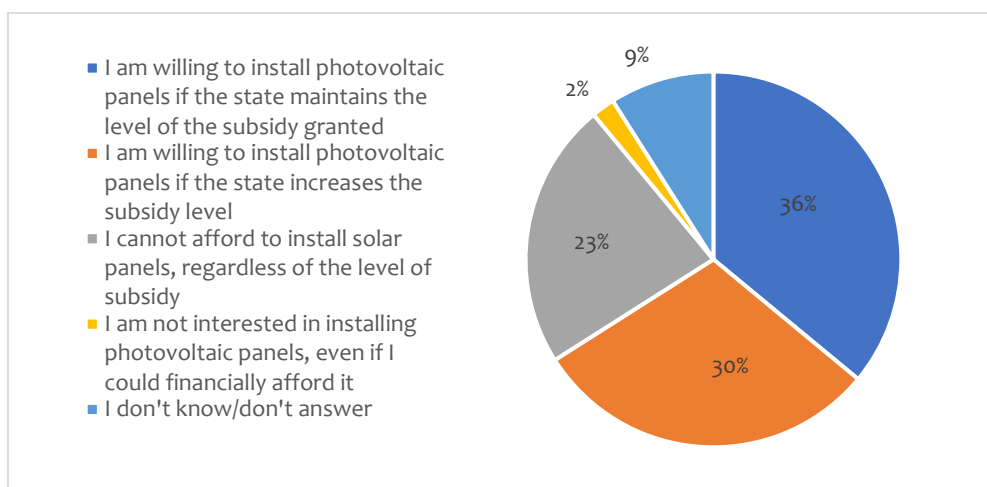
Source: own contribution

The actions with lower percentages in this research are buying and eating organic food (7%), buying a fuel-efficient car (5%), installing equipment to control and reduce energy consumption (4%), considering the carbon footprint of food purchased (3%), buying an electric car (2%), switching to an energy supplier that offers a higher percentage of renewable energy than the previous supplier (1%). The purchase of an electric car, energy control equipment and/or organic food requires students to have a high current income. The low percentage of these actions is driven by the students' income, so that only 12% of respondents feel that they manage to have everything they need without restricting themselves from anything, and 36% feel that they manage to buy more expensive goods, but with restrictions in other areas.

Although most respondents say they have taken various actions to protect the environment in the past, most (48%) say they have not taken any action to combat climate change in the last 6 months, 43% say they have taken action to combat climate change in the last 6 months and 9% do not want/do not know.

Both individual and collective solutions play an important role in managing climate change. Regarding collective solutions to climate change, respondents were asked to choose the statement that best matches their opinion: the state should do more to subsidize the switch to renewable energy production or the state should invest more in opening new coal mines for energy production.

Figure 4. Students' perception of the installation of photovoltaic panels



Source: own contribution

According to the data, 89% of respondents to this survey believe that the government should do more to subsidize the switch to renewable energy production (Figure 4). Of all respondents, 65% say they would be willing to install photovoltaic panels to power their home. Respondents say they would be willing to install PV panels if the current level of state subsidy was maintained (35%) or if the state increased the level of subsidy (30%). In contrast, 24% say they cannot afford to install panels regardless of the level of subsidy and 2% are not interested. In the *Inscop Research Report - National Opinion*

Poll 1-13 February 2023, 71% of respondents to this research believe that the government should do more to subsidize the switch to renewable energy production. Respondents say that they would agree to install PV panels if the current level of state subsidy is maintained (25%) or if the state increased the level of subsidy (30%). In contrast, 30% say they cannot afford to install panels regardless of the level of subsidy and 15% are not interested.

State interventions are supported by 6% of respondents. They believe that the state should invest more in opening new coal mines for energy production. The same percentage (6%) say they agree with clearing forest areas to open new coal mines, while 86% are against and 8% do not know or do not answer. This statement registered a much higher percentage in the *Inscop Research Report - National Opinion Survey 1-13 February 2023*. Almost 28% of the respondents believe that the state should invest more in opening new coal mines for energy production, and 17% agree with clearing forest areas for new coal mines, while 81% are against and 2% do not know or do not answer. Students are more supportive of the transition to renewable energy sources, such as solar and wind power, which are less polluting and more sustainable than energy generated from coal and other fossil fuels. Also, the fact that students are often better informed and more aware of climate change and environmental pollution issues may be one reason why a lower percentage of survey respondents support opening new coal mines than respondents to the *Inscop Research - National Opinion Poll 1-13 February 2023* report.

Half of the respondents to this survey (51%) agree that Romania should attract private investors who have the financial and technical capacity to exploit natural resources essential for the country's security, economic development and people's well-being, while 35% are against. Respondents also agree with the establishment of an Environmental Court in Romania to address environmental crimes (96%) and with tougher sanctions and penalties for environmental crimes (98%). More respondents to the *Inscop Research - National Opinion Survey 1-13 February 2023* (55%) believe that the state should not attract private investors who have the financial and technical capacity to exploit natural resources essential to the country's security, economic development and people's well-being than respondents to this research (35%). Some students may see private investment in renewable energy and other alternatives to fossil fuels as a way to address the challenges of climate change and promote a more sustainable future, while other segments of the population may be more reluctant. Regarding the establishment of an Environmental Court and tougher sanctions and penalties for environmental crimes, the results of the *Inscop Research Report - National Opinion Poll 1-13 February 2023* are not different from those of the present research, with 89% and 95% respectively. As far as nuclear energy production in our country is concerned, opinions are divided: 38% of students think it is a good thing and 36% think it is a bad thing.

Raising public awareness and education on climate change can stimulate community involvement in adaptation and mitigation measures. The majority of respondents consider their level of knowledge about international climate strategies and actors is low. Thus, the majority consider that they do not know at all about the Paris Agreement 48%, 51% about the United Nations Framework Convention on Climate Change, 44% about the National Recovery and Resilience Plan, 40% about the Global Climate

Strike/Fridays for Future, 50% about the Committee on Environment, Climate Change and Energy, 62% about the index of knowledge of international efforts to combat climate change, 59% about the Intergovernmental Panel on Climate Change, 58% about the Kyoto Protocol. At the other end of the scale, there were low percentages of those who are well or very well informed about international climate strategies and actors: 4% about the Paris Agreement, 5% about the United Nations Framework Convention on Climate Change, 5% about the National Recovery and Resilience Plan, 10% about the Global Climate Strike/Fridays for Future, 5% about the Committee on Environment, Climate Change and Energy, 5% about the index of awareness of international efforts to combat climate change, 3% about the Intergovernmental Panel on Climate Change, 5% about the Kyoto Protocol.

In terms of the negative effects of climate change, respondents say their level of knowledge is higher.

On extreme weather events, the majority consider that they know a great or very great deal about them (44%), 30% consider neither a great deal nor a little, and 25% a little or very little. About floods, most of them consider that they know a great or very great deal about them (36%), 32% consider neither to a great or very great extent, and 32% to a little or very little extent.

On the subject of logging, the majority consider that they have a great or very great deal of knowledge about it (59%), 26% consider that they have neither a great nor a little knowledge, and 14% a little or very little knowledge. About desertification, the majority consider that they know a great or very great deal about it (47%), 18% consider neither a great deal nor a little, and 35% a little or very little. On ecosystem destruction, the majority believe that they have a great or very great deal of knowledge about it (48%), 26% believe neither to a great extent nor to a small extent, and 26% to a small or very small extent.

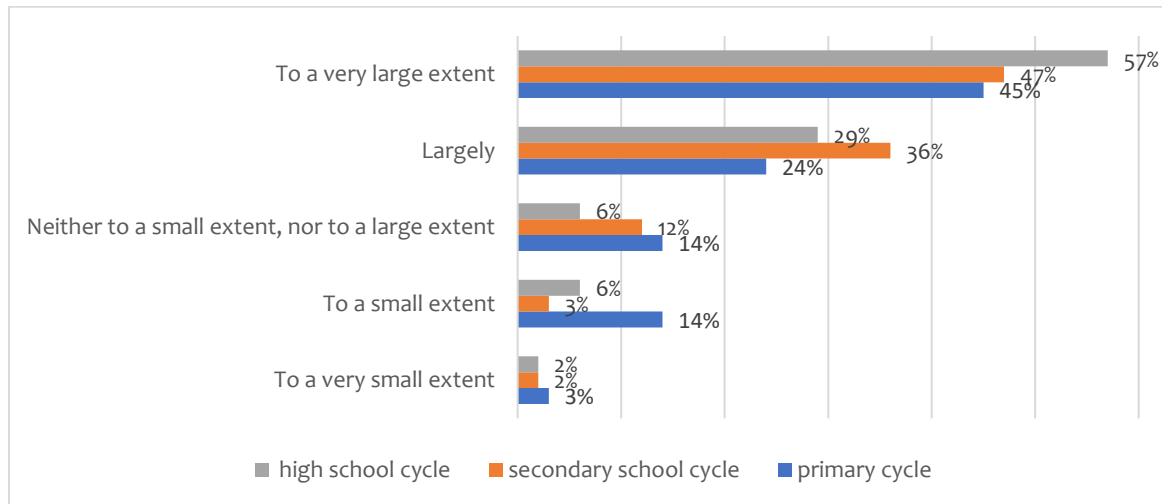
On climate change mitigation, the majority of respondents (43%) consider that they know a great deal or a very great deal about climate change, 30% consider that they know neither a great deal nor a little, and 6% a little or very little. On adaptation to climate change, the majority feel that they have neither a lot nor a little knowledge (40%), 38% a lot or very much knowledge and 22% a little or very little knowledge.

About sea level rise, most of them consider that they have little or very little knowledge about it (41%), 30% consider neither to a great extent nor to a small extent, and 29% to a great or very great extent. On species extinction, the majority of people feel they have little or very little knowledge about species extinction (40%), 31% feel neither to a great extent nor to a small extent, and 29% to a great or very great extent. On greenhouse gases, the majority consider that they have little or very little knowledge about them (45%), 23% consider neither to a great extent nor to a small extent, and 32% to a great or very great extent.

Thus, respondents claim to have a great or very great deal of knowledge about extreme weather events, flooding, deforestation, desertification, ecosystem destruction, climate change mitigation. Respondents claim to have neither high nor low knowledge about climate change adaptation and low or very low knowledge about sea level rise, species extinction and greenhouse gases.

Regarding the importance of introducing compulsory courses addressing climate change (Figure 5), most respondents consider it important to a great and very great extent in secondary school (86%), in secondary school (83%) and in primary school (69%).

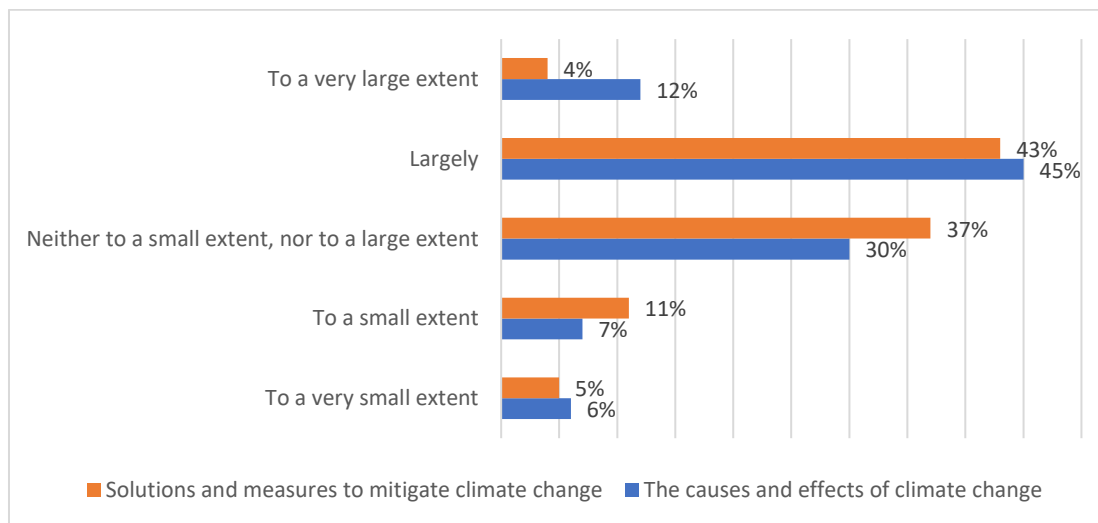
Figure 5. Respondents' perception of the need for climate education in schools



Source: own contribution

Regarding the causes and effects of climate change (Figure 6), respondents feel that they know about them to a great and very great extent (57%) or neither to a great extent nor to a lesser extent (30%). Regarding solutions and measures to mitigate climate change, respondents say they know about them to a great and very great extent (47%) or neither to a great extent nor to a lesser extent (37%).

Figure 6. Respondents' perception of the level of knowledge about climate change



Source: own contribution

Conclusions

The survey's initial finding is that most students think that human activity, specifically economic activity, is the primary cause of climate change and that it is currently a significant issue. Respondents also believe that there has been quite a lot of climate change on the planet in the last 3 years and that significant changes have occurred in Romania over the last 30 years. Compared to the general population, this research suggests that students are more likely to be concerned about climate change and to attach greater importance to it.

As for the future, most students believe that their lives will be affected to a great or very great extent in the coming years. Although the majority of respondents believe that their lives will be affected by climate change in the future, almost half of them believe that they are not currently affected by climate change.

Industry ranks first among the activities that students believe contribute most to climate change, alongside forestry and waste management. Students believe that in Romania the phenomena associated with climate change that produce the most negative effects are extreme temperatures and heatwaves and episodes of severe drought. The students, having generally a greater awareness of global issues, realize the link between industry and environmental impact. Industry, especially the energy industry and industrial production, is one of the main sources of greenhouse gas emissions and other pollutants that contribute to climate change.

It is interesting to note that severe drought and extreme temperatures are perceived as among the most negative consequences of climate change in both this research and the *Inscop Research 2023 Report*. Differences in percentages may be influenced by multiple factors, including diversity and sample size, as well as other demographic or cultural variables. Regardless of the percentages, it is important to note that both samples consider both severe drought and extreme temperatures and heatwaves to be serious issues.

Public transport is a solution that respondents would be willing to use more often, followed by changing household appliances less often and buying clothes in a smaller degree. Of all respondents, the majority say they would be willing to install photovoltaic panels to power their home if the current level of subsidy is maintained.

The majority of respondents say that the state should subsidize the switch to renewable energy production and that Romania should attract private investors who have the financial and technical capacity to exploit natural resources essential for the country's security, economic development and people's well-being. Respondents also agree with the establishment of an Environmental Court in Romania to deal with environmental crimes and tougher sanctions and penalties for environmental crimes. Students are more supportive of the transition to renewable energy sources, such as solar and wind power, which are less polluting and more sustainable than energy generated from coal and other fossil fuels.

The majority of respondents consider their level of knowledge about international climate strategies and actors to be low. Respondents claim to have "a great deal" or "a very great deal" of knowledge about extreme weather events, floods, deforestation,

desertification, ecosystem destruction, climate change mitigation. Respondents claim to have “neither a great deal nor a little” knowledge about climate change adaptation and “little” or “very little” knowledge about sea level rise, species extinction and greenhouse gases. Regarding the importance of introducing compulsory courses addressing climate change, most respondents consider it “very important” and “very important”, both at secondary school and in secondary and primary education.

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