• ŠTÚDIE A ANALÝZY •

DOI: https://doi.org/10.31577/SPS.2022-1.1

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Communicating the Climate Change: The Role of Experts and Policy Makers[1]

Science experts play important role in spreading the science-related knowledge that can improve societal outcomes by guiding policy in transformative way. Experts communication and its influence on policy decision-makers is particularly important topic when it comes to problems of climate change. This paper explore how European citizens perceive the role of experts and policy makers in science communication in climate change topic. It is based on the international research analysing European citizen's perception of science communication to better understanding of how beliefs, perceptions and knowledge of science-related issues originate among EU citizens and to enquire their proposals for enhancing the quality of science communication. The findings of this paper come from studies performed within a European project entitled CONCISE which was carried out in five European countries (Portugal, Spain, Italy, Slovakia, Poland) based on qualitative research method - public consultation. The purpose of this paper is to review the existing structural obstacles that experts and policymakers, currently face when attempting to communicate the climate change successfully and to present the main findings from public consultation about the main proposals for experts and policy makers in communicating the climate change to public.

Key words: climate change, policy makers, EU citizens, public consultations, science communication, beliefs, trust, proposals, challenges

Introduction

Climate change poses far-reaching challenges to ecosystems, social and cultural systems as well as economic development. Policies play important role in abilities to reduce the negative aspects and in the way of creating new opportunities to reduce risks. Adaptation to new effects of climate change requires action by individuals, communities, local and national governments and international policy-making agencies. Adaptation to new changes and mitigation of climate

[1] This paper is a outcome of the project funding from the European Union's Horizon 2020 research and innovation programme under grant agreeement 824537

change are local and regional challenges which scientists, policy decision makers, and the public face today. Policy makers plays a critical role in the response to climate change on local and global level. The responses need to be based on science and scientific data which can be challenging as most of the policy makers are not climate scientists. There has been a clear consensus from the science community in the last decades that greenhouse gas concentrations increased in the atmosphere has caused a rise in global temperature (IPCC, 2014). This scientific consensus highlighted the urgent need for governments to set worldwide policies on climate change adaptation and mitigation (Burton, Malone and Huq, 2005).

Mitigation and adaptation strategies are considered the two main policy responses to climate change. Despite the extensive climate change science research there is still a gap between recommendations from scientific community and current actions done by policy makers on national or international level. (Kollmuss - Agyman, 2002; Arvai et al., 2006). Scientists and the media have failed to communicate the urgency of the situation successfully to policy makers and the general public (McBean - Hengeveld, 2000; Somerville - Hassol, 2011). Existing research suggests that understanding of the issues of climate change is quite difficult for many people. Identifying the direct impact of climate change on people's daily lives is not entirely straightforward, and as a result, it is often difficult to define the causes and the possible consequences for the everyday lives of the general population. However, a great deal of research suggests there is significant concern among EU citizens about the consequences of climate change (Papoulis et al., 2015; Moser, 2016). Science communication can help more to advance public understanding of climate change issues and emphasize the impact of personal choices, behaviour and encourage public in supporting the adaptation and mitigation policies (Ockwell at al., 2009).

Even the science communication in climate change is relatively young practice it can be seen as a tool to change public behaviour and help to better understand the importance of public acceptance of adaptation and mitigation strategies. Science communication represents the practise of communicating science-related topics to non-experts. It is also very important tool in climate change policy and research. Science can provide information to improve societal outcomes by focusing debate and guiding policy in ways that are transformative. The science that is done to support climate change policy, however, must be focused and relevant. A partnership between science and policy must be forged at multiple levels and at many time scales in order to be effective (Brown et al., 2012, 50). According to Bosetti's study (2017) on how policy makers understand climate change science, the design of presented data in science communication plays important role. For example, visualization principle of data can be easily implemented when communicating climate science and can be very efficient to better inform public policy. The study shows how the right approach in communicating climate science to policy makers can be used to ensure scientific data has a meaningful impact on climate policy.

Science communication is developing and changing as a field of research as well as a practice of professional communicators. Science communication is very important but also very challenging field of expertise. Climate crises together with new technologies creates new tasks for science, media, public and politics. Science communication is going through deep and significant changes. According to Bucchi and Trench, the key dynamics influencing the global spread and development of science communication needs to be form by government programmes that

can boost science awareness (Bucchi and Trench, 2021). To promote the science communication to wider public it is evitable to identify existing barriers. American survey focused on 6.000 U.S. based scientists pointed out a serious interest in science communication as a tool which is able to increase the trust in scientific community which needs to be support by institution and policies (Rose, Markowitz and Brossard, 2020). Science communication to public audience is recognized as a responsibility of scientists (Greenwood and Riordan, 2001) and researchers can play important role in supporting effective policy making (Pfisterer, Paschke and Pasotti, 2019).

Science and technology studies also show that climate science needs to have infrastructure and institutional support to spread the knowledge (Edwards, 2010). It requires a lot of work to position environmental issues as a relevant concern into social and political practices and institutional processes (Asdal - Marres, 2014). Science communication has crucial role in perception of science-related knowledge in public sphere. Experts influence on policy makers is particularly important topic when it comes to problems of climate change. It is essential to review the existing structural obstacles that experts and policymakers currently face in regards the climate change topic and it is it is also important to identify the key points where the communication can be improved. Danish survey about science communication practices and representations pointed out that scientists are keen to participate more in science engagement activities which should receive more public funding (Nielsen, Kjaer and Dahlgaard, 2007).

Communicating science about climate change effectively to policy makers is a task that moved mostly to sustainable development discourse. Capacity of media and science journalist should focus on effective way of presenting the information and active influence of policy makers to take action on adaptation to climate change. Media plays important role in shaping public debate about climate change as well as in informing policy decision makers. Taking action and decision making at all levels of climate change mitigation needs to integrate climate change adaption into policy development, plans and strategies.

Methodology

This paper is based on research project CONCISE - Communication role on perception and beliefs of EU Citizens about Science. The core methodology underpinning the project involved organising and staging public consultations with EU citizens. Public consultation, on which the methodology of our study is based has been traditionally used to study the implementation and achievements of the Climate Change Adaptation Strategy, compared to the objectives set when it was adopted in 2013. This public consultation was carried out in 2017 and was promoted by the EU. Other initiative was World Wide Views on Global Warming carried out by The WWViews project to get the opinion of the inhabitants of the planet for taking to the political leaders (Blue, 2014).

CONCISE project was also based on public consultation method of data collection mainly due to possibility to run multiple group discussions simultaneously and to create a participatory experience for the attendees and empower them by offering an opportunity to contribute to science development. Public consultation method also enabled to promote among the citizens the feeling

of being a part of a national and international community. Through group discussions we were able to gain the citizens' opinions, beliefs and perceptions and benefit from the group dynamics and interactions that help uncover the reasons behind the attitudes towards a topic that might be complicated to get through survey techniques.

The main objective of this project was to learn the role science communication plays on the origin of beliefs, perceptions and knowledge concerning scientific issues. The study is based on the method of public consultations that were carried out with 500 citizens in each 5 European countries (Portugal, Spain and Italy – representing Southern Europe; Slovakia and Poland – representing Central Europe) hold between September and November 2019 and the data were analysed during 2020. The public consultations discussed four specific scientific topics (climate change, GMO, vaccines and alternative and complementary medicine) within main research questions:

– how are citizens informed and which channels are preferred to access information
– how do citizens rate channels and sources of information in terms of reliability
– what do citizens propose to improve scientific communication

Our paper is using the qualitative research methodology of public consultations based on group discussion about the topic of climate change. The discussions were entirely tape-recorded and fully transcribed. The transcriptions were subjected to qualitative content analysis through NVivo coding by all CONCISE teams using a common codebook with a tree structure articulated around the three main sections of the discussions. Codes were grouped together in order to identify clusters and prioritise main themes (King and Brooks, 2018).

According to Oreskes (2018), there is a 97% consensus on the scientific community about the existence and source of the current climate change phenomenon. While the EU citizens latest survey, proved that just 74% of the surveyed thought climate change to be a very serious problem. In contemporary societies, we tend to look at to the environmental problems as distant not to feel guilty and to lower our level of anxiety on natural catastrophes, derived from the action of humans. According to Uzzell (2002) citizens think that the consequences of climate change will occur in remote places and into a long time. In other words, we tend to feel more concern the environmental problems that are further away in time and space. Perception of environmental issues as more worrying the further away they locate has been called "environmental hyperopia." Studies have demonstrated how people perceive the local environmental problems as less critical than problems generated far away, such as global warming or deforestation, unless the problem involves an immediate risk.

This paper is focused on reviewing and presenting the main finding from public consultation about the main proposals for science communication experts and policy makers in communicating the climate change to public. It is based on this thematic analysis and citations from participants are illustrative of the diversity of opinions expressed. The main proposals for improving climate change communication for policy makers and science communication experts are divided into two different areas perception of climate change communication and recommendations from European citizens.

Perception of climate change communication by European citizens

Recent Eurobarometer (2019) studies on Climate Change public opinion shows that almost 25% of Europeans think Climate Change is the single most serious problem facing the world what represent an increase of 11 percentage points since the Eurobarometer in 2017 (European Union, 2019).

According to our data analyses of CONCISE project, climate change is the most covered issue from all discussed topics in traditional and social media. It has a strong international dimension where we could see that European citizens most frequently mention international politicians (Trump, Bolsonaro, Al Gore), activists (Greta Thunberg), public figures (Leonardo Di Caprio) and organisations (IPCC). Visualisation plays important role in climate change presentation mostly in photographs, films and documentaries dealing with the topic.

"A young Swedish woman who has been popular only recently, but her campaign started two years ago. She sat in front of the Swedish parliament for two years before" (Slovakia, Male, 45–54, secondary education).

Scientists are seen as those who represents the trustworthy information about climate change in Portugal and Spain, countries as Slovakia, Italy and Poland see as trustworthy the information from institutions. Scientists represents the authority, competence and credibility necessary to obtain useful information. Scientists who are used to communicate on the public stage are effective as they can learn during their presentation how to make themselves understood by broader public audience.

"I think that scientists, at least for me, are still people who, precisely because of this distance from society, end up being very fascinating and I think that the fact, for example of being one day at a conference, even if it is through a webcam, having a scientist talking and speaking in a common way, that is clear, I think it is something that creates a really big impact" (Portugal, Female, 25–34, university education).

Media also represents effective connection for engaging the public in the topic of climate change. In Italy, Spain and Portugal are traditional media (TV, newspapers, radio) seen as tools able to raise awareness and interest in environmental issues and create space for open debate and discussions between different subjects. Participants suggest presenting more science content on television as it has better impact on people who are not actively looking for science communication in this topic.

"Each television channel should have a specific time to talk about these topics… half an hour, specifically to talk about these topics on television. Just to talk about these topics, which is very important. If this is not television, it is not worth." (Portugal, Male, 55–64, secondary education).

In Slovakia, Spain and Poland educational system is pointed as the strongest medium for communicating scientific content, especially in climate change and environment. Teaching critical thinking should be a base for any education programs. Education can help to understand the impact of global warming, increase awareness and encourage the changes in student's behaviour and attitude. The education system is expected not only to convey science information, but also to offer students a solid training in critical look at unsubstantiated information.

"I think that education is very important, but first the family and only then the school has children to lead the issue, children repeat what they see in parents, it is a connection with education, which brings a better result" (Slovakia, Female, 18–24, secondary education).

"Start communicating science well to children because they are the adults of tomorrow. I have this memory…my teacher was passionate about it and in any case, she passed this information on to me" (Italy, Female, 35–44, university education).

Role of young people who are well educated in climate change issues can bring positive aspects to wider family environment. They can reach adults easily, take the information home and stimulate change in behaviour in positive way among adults in family or setting up initiatives related to climate change issues. Young people are also seen by European citizens as those who should represent the individual change and listen more to science community.

"For me, one of the ways in which gets to my home is through schools. My daughter brings information home. And, perhaps, some of you, children, grandchildren, nephews. . . I think it was important that whoever studies this, in academic terms, should give mini conferences in schools. Because when we started to sort the garbage at home, a lot of that stimulus came from the children" (Portugal, Female, 45–54, university education).

"Young people should be motivated to change their interest to be aware of environment… everyone should draw information from scientific sources because they are trustworthy. The scientific community should be the authority as they present the information based on research and statistics." (Slovakia, climate change, female, 18–24, secondary education)

Visualisation (videos, infographics, data, charts) is also seen as an influential tool in presenting the climate change topic as a real fact to wider audience. Visual communication strategies are rated as effective way of bringing the public closer to environmental interest and critical issues connected with global warming.

"For those willing to read, but also with pictures. There must always be this connection, I'm talking about the visual side of a message". (Poland, Female, 45–54, university education).

The big data, numbers and calculations defined the political discourse in climate change mitigation, but they are harder to grasp to people's everyday life. Climate change conversation initiated by science communicators should be based on common ground with clear language and examples the public is more likely to be familiar with. The science communication should also focus on shared public values and local interest which vary according to specific social groups depending on age, education or location. Connection with these interest and values can bring better effect and is more likely to be heard.

Recommendation for science communication by European citizens

According to our data analyses, European citizens believe that scientific institutions and scientists should play a leading role in producing information and communicating scientific findings. The role of science communicators and journalists is seen effective in presenting the relevant data in climate change topic, especially with traditional media by creating a specific science section on the news, broadcasting science programs on television primetime by inviting scientists to participate in programs with high audience ratings. Science training for professionals, such as

journalists, is also highlighted. The content of science news should be factual and truthful with relevant information created on institutional platforms where they can easily find relevant and reliable information on specific topics.

European citizens also call for more direct engagement with scientists. They also demand more opportunities for participating in scientific debates, local initiatives and consultations, as well as specific formats that bring scientists and science students in contact with them and offer them the opportunity to ask questions. Climate change should be given more prominence both in the school programs and in the traditional media, especially on television. There should be more local lectures and initiatives that promote active engagement between institutions, scientists and citizens and which take into consideration the impact of climate change on different communities. European citizens consider that it is very important that they include not only practical information but also explicit information on how climate change will impact their everyday lives. The "politicization" of climate change topic weakens the arguments of authority of scientists and may contribute to mistrust and scepticism.

According to data analyses gathered during public consultation there are several recommendations from European citizens for science communicators who represents the experts and connect them with broader audience:

- increasing the use of social media, offering content in suitable formats (videos, infographics), using clear language and taking advantage of the two-way communication afforded by digital platforms,
- developing a science communication that is balanced, fact-based and straightforward, and expressed, organised and designed in an appealing and simple manner,
- ensuring that science-based information is supported by appropriate referencing: identification of authors, affiliation, citations, sources, funders, methodology and sampling, supplying only information that has been confirmed by multiple independent organisations, institutions and researcher groups,
- encouraging science communicators to offer better explanations of how science is done in terms of methods and methodologies, in order that citizens should understand its construction,
- making clear that science and technology are at times unpredictable activities and, because they are based on evidence and facts, often fail to give complete and immediate answers to problems of public interest,
- providing institutional support to scientists for the dissemination of research findings, by offering professional development solutions to improve skills in the use of the traditional and digital media,
- developing academic science communication programmes to provide training to science communicators, journalists and other intermediaries,
- organising participatory initiatives that actively involve scientists and citizens in scientific debates where citizens have the opportunity to discuss research results with scientists through two-way communication.

The recommendation to policy makers analysed in public consultation with European citi-

zens confirmed the importance of open space for public debate as one of the crucial tools how to increase the interest in climate change issues. There are also other several recommendations gathered in data analyses:

– supporting incentives for primetime science programmes on public TV with focus on documentaries, debates, interviews with science experts and science communicators,
– providing science journalists with specialised training, engaging with professional science communicators in government agencies and departments in order to encourage them to convey science-based messages and recommendations more efficiently,
– increasing public funding for science and science communication to avoid funding sources that may lead to conflicts of interest, interfere with the results or limit intellectual freedom,
– making a greater effort to support and promote popular science magazines, forums and spaces for science debate, since they are information sources that increase people's trust,
– promoting programmes aimed at increasing the digital literacy of the public and developing evaluation strategies (how to deepen, debunk and triangulate information)
– motivating and supporting scientists and institutions, in their communication role, to disseminate scientific findings, through funding and regulation,
– including the transversal importance of science and scientific issues in all subjects during compulsory education and highlighting the relevance of the 'scientific method' throughout the educational path enhancing critical thinking skills in the curriculum at all educational levels,
– supporting the creation of a network of onsite and virtual science shops that operate as myth-busters and places to verify news; this should serve as a 'defence system' for combating pseudoscience and for promoting scientific facts,
– implementing a comprehensive global policy on climate change as it is not only necessary to change individual behaviours as well as production systems.

Conclusion

Climate change mitigation requires collective changes that can be achieve through public action. Citizens attitudes and their perception on climate change should be a part of attention of science communicators whose task is to find the right communication tools on how to present the science data. Policy makers plays the critical role as well in the response to climate change on local and global level and their communication needs to be based on science what can be challenge for them too. Listening to the public and their needs in perceiving scientific information is therefore an important role not only for scientific communicators but also for policy makers.

The aim of this paper was to present main findings and analysed data gained from European citizens on how to improve science communication in climate change topic and propose the recommendations for experts in science communication and policy makers. Public consultation engaged citizens on how to improve science communication in climate change and bring the opportunity to see deeply into needs and expectations of European citizens in preferences how to be informed about science, especially climate change issue. The CONCISE project shows the importance of

verified and truthful information presented by the experts in the field of climate change who should be trained to use understandable language and should recognized different tools of presentation for different social groups (children, young adults, elderly, educational level).

The European citizens perception of science communication confirmed differences in the positioning the science experts, science institution and science communicators. In Spain and Portugal is important role of scientist in dissemination of climate change information and they are seen as representatives of scientific truth, reliability and authority. In Slovakia and Poland, the most significant role in spreading the scientific information about climate change play institutions represented by science communicators who use understandable language and more attractive presentation for wider audience. Even the role of science communicators, especially in Slovakia, is not as spread as in other countries, there is a need for those professionals in science communication mostly among journalists. The role of science communicators in media should also be independent of political orientation and should offer comprehensive and balanced information with appropriate language attractive to the lay public.

European citizens confirmed the need to develop science communication initiatives that support the citizen's involvement and possibility to participate in scientific debates. They asked to be seen as a part of science communication and want to be empowered through multiple initiatives (Dziminska, 2021). The policy makers should also listen carefully to the demands of the scientific community to create better space for presentation of their data and launch dedicated calls for funding science communication activities. Science communication should be promoted as a part of science career in public science institutions. The tradition of science communication is visible in countries such as Italy, Portugal and Spain, where it is also a field of university specialisation and studies in sciences and technologies. Citizens in these countries were able to identify representatives of scientific communication more easily in the field of climate change, working mainly in the media as journalist or scientist who popularised these issues with specifical attractive language understandable for wider audience. In Poland and specially in Slovakia the tradition of science communication in general is not so well known and it is sometimes more difficult to identify the main popularisers of science for the topic of climate change as well as scientific communicators presented in the media.

Although climate change is often perceived as a global issue, impacts can already be observed in both the national and local scales (Pittock, 2009). Slovakia is exposed to climate change adaptation issues and is coping with challenges that require commitment of the government and more political support. The climate policy in Slovakia is determined by the EU framework and agreed targets which concentrate on mitigation connected with decreasing emissions and adaption concentrated on adjusting climate impacts. According to Filčák (2016) there will be more pressure for achievement the progress in mitigation and adaptation in public policies and the key challenge is to make climate change a mainstream policy issue in public debate in Slovakia. It is a big challenge to translate these goals as a positive agenda in development of Slovakia which should be presented by policy makers as changes that could bring positive benefits for the country's competitiveness and the wellbeing of its population. The policy makers should listen carefully to scientific experts in climate change and they should support them to be more trained in science communication which can bring values to broader audience and create space for un-

derstandable science based information that can influence the change in attitudes and individual everyday action in climate change mitigation.

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