www.gi.sanu.ac.rs, www.doiserbia.nb.rs
J. Geogr. Inst. Cvijic. 2021, 71(1), pp. 43–58

Original scientific paper

UDC: 911.2:551.58
https://doi.org/10.2298/IJGI2101043C

Received: November 10, 2020
Reviewed: February 28, 2021
Accepted: March 15, 2021

PUBLIC PERCEPTION OF CLIMATE CHANGE AND ITS IMPACT ON NATURAL DISASTERS

Vladimir M. Cvetković[1]*, *Lazar Grbić*[2]

[1]University of Belgrade, Faculty of Security Studies, Belgrade, Serbia; e-mail: vmc@fb.bg.ac.rs
[2]Scientific-Professional Society for Disaster Risk Management, Belgrade, Serbia; e-mail: grbicbee2@gmail.com

Abstract: The aim of the research is the examination of the factors influencing the public perception of climate change and its impact on natural disasters. This paper presents the results of quantitative research regarding testing the central hypothesis where education is the predicting variable of public perception of climate change and its impact on natural disasters. A multivariate regression analysis was used, identifying the extent of the total scores of the main dependent variables (perception of vulnerability to climate change, perception of the climate change impact on natural disasters, knowledge and fear scores) were associated with five demographic and socio-economic variables: gender, age, marital status, education level, and employment status. A series of 208 face-to-face interviews were conducted during the beginning of 2020 on the central squares in the selected cities in Serbia, Belgrade (76.92%) and Sremska Mitrovica (23.08%). The results showed that education level was the most effective predictor of the mentioned research variables. Besides, employment status has been found to affect perceptions of vulnerability, while age affects the perceptions of climate change. Based on the obtained results, policies and strategies to improve people's awareness of climate change must take into account a comprehensive understanding of behavioral dispositions.

Keywords: climate change; natural disaster; public; perception

Introduction

Public perception of climate change and its impact on the distribution of the frequency and severity of the consequences of natural disasters greatly influence the implementation of climate policies, the design of educational programs, and the undertaking of preventive measures (Allan et al., 2020; Cuthbertson, Rodriguez-Llanes, Robertson, & Archer, 2019; Seara, Pollnac, & Jakubowski, 2020; Ruiz, Faria, & Neumann, 2020). The majority of the population views climate change as an area that is important for humanity, but when it comes to their daily lives, the issue of climate change is something that is far and less important (Capstick et al., 2015). This perception of the problem of climate change changes after a personal confrontation with the consequences of climate change in the form of extreme weather conditions, which increases the desire to participate in solving the problem (Capstick et al., 2015). According to Adamo, Al-Ansari, and Sissakian (2020), climate change as a phenomenon is nothing new for scientists because geological evidence shows that the climate

*Corresponding author, e-mail: vmc@fb.bg.ac.rs

system has had periods of stability and variability throughout the planet's history. Global climatic conditions in the last 10 millennia have created favorable and optimal conditions for the development and expansion of both humans and flora and fauna (Arora et al., 2018). Climate change is a phenomenon that is an integral part of the functioning of the planet, caused by natural processes and anthropogenic influences, i.e., greenhouse gas emissions, which worsen the negative effects of climate change on the functioning of human communities (AghaKouchak et al., 2020; Hoogendoorn, Sütterlin, & Siegrist, 2020; Hussain et al., 2020). Intense and devastating natural disasters, caused by climate changes, weaken the resilience of communities (Cvetković, Nikolić, Nenadić, Öcal, & Zečević, 2020; Cvetković, Öcal, & Ivanov, 2019; Cvetković et al., 2019), due to the lack of time and resources for recovery (O'Brien, O'Keefe, Rose, & Wisner, 2006).

The negative effects of natural disasters on communities are evident, and an increase in their frequency and intensity is noticeable (Cvetković & Dragicević, 2014; Öcal, 2019; Semenza et al., 2008; Shi, Visschers, & Siegrist, 2015; Yu, Wang, Zhang, Wang, & Wei, 2013). Floods, severe storms, earthquakes, and droughts result in lower mortality rates than socio-political phenomena such as armed conflicts, but still occur more frequently and affect a higher percentage of the population (Fujita & Shaw, 2019; Hunter, 2005). It is estimated that between one-fifth and one-quarter of the world's population was threatened by a natural disaster during the 1970s and 1980s (Hunter, 2005). In the last few decades, there have been serious debates and discussions, both at the local and international level, about the existence of climate change impact on the occurrence and destructive effect of increasingly present natural disasters (Banholzer, Kossin, & Donner, 2014; Bouwer, 2011; Davies, Oswald, & Mitchell, 2009; Kumiko & Shaw, 2019; Mano, Kirshcenbaum, & Rapaport, 2019; O'Brien et al., 2006). Global warming has a direct impact on the increase in the amount and change of the established precipitation patterns (Chakma, Hossain, Islam, Hasnat, & Kabir, 2021; Kilpeläinen, Kellomäki, Strandman, & Venäläinen 2010). The increased temperature causes greater evaporation and faster drying of the soil, which increases the intensity and duration of drought. With each degree of temperature increase, the capacity of water absorption in the air increases by 7%, as well as the amount of water vapor in the atmosphere (Emanuel, 2017; Hatfield & Dold, 2019). Higher precipitation means a higher percentage of rain instead of snowfall, earlier snow melting, then the risk of floods in early spring increases, as well as droughts during the summer period, especially in the continental parts (Trenberth, Cheng, Jacobs, Zhang, & Fasullo, 2018). Natural disasters in Sri Lanka have intensified and become more frequent, as a result of anthropogenic activities and climate change (Ratnayake & Herath, 2005). A study of the impact of climate change on the increase in fire risk at 17 locations in the Southeast Australia region, showed that the number of days when the risk of fire is higher, will increase by 4–25% by 2020 (Lucas, Hennessy, Mills, & Bathols, 2007). The rise in global temperature, caused by anthropogenic impact and greenhouse gas emissions, is exacerbating the situation in many regions, increasing the potential for droughts, or their intensification (Cook, Smerdon, Seager, & Coats, 2014). Gleick (2014) found that between 1988 and 2006 there was increased evaporation in the eastern Mediterranean, indicating an evident increase in the average sea temperature. Adding to the rise in temperature, all the factors together provoke the rising of sea levels, more frequent sandstorms, and the disappearance of groundwater.

Climate change is a reality, and this is evidenced by many studies that have confirmed temperature changes and changes in precipitation patterns (Burić, Ducić, & Mihajlović, 2018; Mahmoudi, Mohammadi, & Daneshmand, 2019; Ruml et al., 2017). In Serbia, it was determined that the frequency of precipitation is at the intensity above the extreme occurrence level (1961–2015) and the frequency of precipitation is at or above the absolute daily maximum during the reference

period (1961–1990) (Anđelković et al., 2018). Besides that, Malinović-Milićević et al. (2018) determined that the climate of the northern and central parts of Vojvodina is getting wetter in terms of the precipitation magnitude and frequency, reflecting the characteristics of the central European regime. Besides that, it was found that a determined increase in air temperature and the reduction of precipitation in the examined period has a significant influence on the possibility of fire occurrence (Živanović, Ivanović, Nikolić, Đokić, & Tošić, 2020). Having in mind the importance of disaster risk perception for the adoption of the appropriate policies and programs for climate change reduction and its impact on natural disasters, the aim of this paper is to investigate the public perception of climate change and its impact on natural disasters through the following dimensions: (a) perception of vulnerability to climate change; (b) perception of the climate change impact on natural disasters; (c) assessment of knowledge about climate change, and (d) perception of fear of climate change and natural disasters.

Literature review

Many papers in the literature examine citizens' perceptions of climate change (Semenza et al., 2008; Shi, Visschers, & Siegrist, 2015; Xie, Huang, Lin, & Chen, 2020; Yu et al., 2013) and its impact on increasing disaster risk (Anderson et al., 2018; Reser, Bradley, Glendon, Ellul, & Callaghan, 2012a). In some papers, the influence of education, awareness, and knowledge (Drummond & Fischhoff, 2017; Leiserowitz, 2007), print and electronic media (Kahan et al., 2012; O'Neill, Williams, Kurz, Wiersma, & Boykoff, 2015), gender and age (Shi, Visschers, Siegrist, & Arvai, 2016; Zaval, Keenan, Johnson, & Weber, 2014), previous experiences (Moyano, Paniagua, & Lafuente, 2009), perception of individual health (Hamilton, Hartter, Lemcke-Stampone, Moore, & Safford, 2015; Scruggs & Benegal, 2012), etc. are examined. Cvetković, Tomašević, and Milašinović (2019) determined that educational institutions, after the electronic media, are the most common way of informing the citizens of Belgrade about the security risks of climate change. Chou (2013) determined that the poor public confidence in the government's ability to fight climate change and the public has called for more risk coordination, transparency, and engagement in climate change policy-making. Lewis (2016) found that the measured temperature patterns are incompatible with the subjective viewpoint interpretation of extremes as objects only of climatic variability. Ruiz et al. (2020) found that attitudes are directly affected by the exchange of values and beliefs within the culture and the direct impact of climate change. They also found that implicit factors are related to the degree of community growth and the distribution of knowledge on climate change. Echavarren, Balžekienė, and Telešienė (2019) came to know that the variation of the concern about climate change is not clarified by political governmental circumstances, and education and political preference are critical mediators. Lewis (2016) discovered that the properties of temperature recorded are incompatible with the private perception-based understanding of extremes as manifestations of natural climate variability alone.

A survey on risk perception, understandings, and responses to climate change (Reser, Bradley, Glendon, Ellul, & Callaghan, 2012b) in Australia, found that 74% of the respondents believe that the world's climate is changing, 50% already feel the effects of climate change, and more than half of them express their personal and immediate concern for their undoubted influence. In the same research, it was found that more than 76% of the respondents believe that it is necessary to take certain measures as soon as possible to mitigate the effects of climate change. Capstick, Pidgeon, and Whitehead (2013) show that most citizens in Wales (88%) believe that climate change is happening. Also, they point out that a little more than half of the respondents (52%) state that the

cause of climate change is in the equal relationship between human activities and natural processes, more than a third of the respondents (35%) believe that change is solely due to human activities, while the least number of respondents (11%) think that the causes of climate change are exclusively certain natural processes. According to them, with concerns about climate change, more than a third (36%) of the respondents are very concerned, and a slightly higher percentage (48%) think they are quite concerned, while a few of them (7%) are not concerned at all. In another study, in the United Kingdom, Capstick et al. (2015) found that more than half (68%) of the respondents are very concerned about climate change, while a very high number of the respondents (88%) believe that climate is changing. Also, for the causes of climate change, less than half (48%) of the surveyed population believe that natural processes and human activities are equally responsible for them, and more than a third (37%) believe that human activities cause climate change. Only 12% believe that nature itself regulates climate change. More than half of those surveyed (55%) think that the effects of climate change are already being felt in the UK, while just over a fifth (23%) of those surveyed think the effects will be felt in 10–25 years.

Methodology

The subject of the research is a scientific explanation of the manner of influence of certain predictors (gender, age, marital status, education, and employment status) on the public perception of climate change and its impact on natural disasters (Figure 1). A series of 208 face-to-face interviews were conducted during the beginning of 2020 on the central squares in the selected cities in Serbia, Belgrade (160 participants, i.e. 76.92%) and Sremska Mitrovica (48 participants, i.e. 23.08%). Beginning with the population of all the people living in the city's area of Belgrade and Sremska Mitrovica, every fourth passer-by was interviewed near the central square of the city. In situations where it was known that the touch passer-by did not reside in the city's territory of Belgrade, he/she was not included in the survey and the next fourth passer-by was chosen in the manner referred to above.

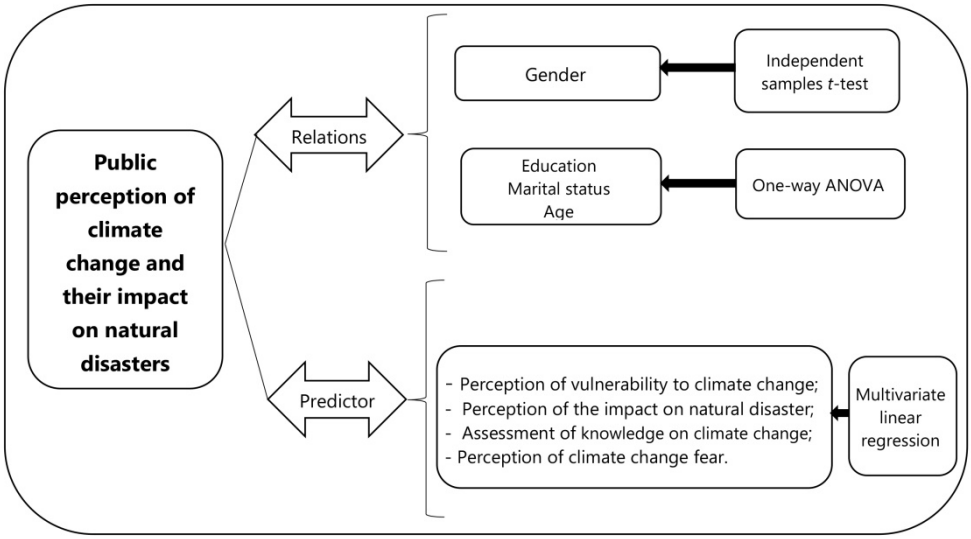

Figure 1. Research design.

Questionnaire Design

The structured questionnaire was developed using close-ended and five-point Likert scale questions (1 = *strongly disagree* to 5 = *strongly agree*). The first part of the questionnaire contained the socio-economic and demographic characteristics of the respondents and the sections in the second part included issue questions related to (a) perception of vulnerability to climate change; (b) perception of the climate change impact on natural disaster; (c) assessment of knowledge about climate change; (d) perception of fear of climate change and natural disasters. Several published survey approaches were consulted (Capstick et al., 2015; Cook et al., 2014; Hamilton et al., 2015; Scruggs & Benegal, 2012; Semenza et al., 2008; Shi et al., 2015; Yu et al., 2013) and adapted to the conditions of the Serbian socio-economic status. In Belgrade (Central Serbia), a pilot pre-test of the questionnaire was performed in March 2020 with 25 people to test the comprehensibility and efficiency of the questionnaire. Our quantitative analysis was compatible with the Helsinki Declaration (Tyebkhan, 2003) defining the standards for socio-medical research concerning human subjects.

Socio-economic and demographic characteristics of the respondents

Of the total of 208 participants, 48.1% were women and 51.9% were men (women 51.3% and men 48.7% of the total country population—Statistical Office of the Republic of Serbia, 2020). The mean age of the participants was 34 years of age and perhaps the most represented group was 30–50 years of age (47.6%) while the smallest group was of the participants aged 50+ (19.2%) (average population age 42.6 years—Statistical Office of the Republic of Serbia, 2020) (men 41.2 and women 43.9). It emerges from the study that the largest number (43.7%) finished university studies and only a small number finished primary school (5.3%) (secondary school: 26%, high school: 14.4%, undergraduate: 7.69%, and graduate: 36.01%). In the household sample, individuals in a relationship account for 33.7%, the widows/widowers for 3.84%, the divorced for 8.66%, and the married people rate for 38%. The respondents selected also represented the different status of jobs, with 75.5% employed. In comparison, the largest number (60.1%) of the participants had children (Table 1).

Table 1
Basic socio-economic and demographic characteristics of respondents (n = 208)

Variable	Category	*f*	%
Gender	Male	108	51.9
	Female	100	48.1
Age	18-30	69	33.2
	30-50	99	47.6
	50+	40	19.2
Marital status	Single	33	15.9
	In relationship	70	33.7
	Married	79	38
	Divorced	18	8.66
	Widow/widower	8	3.84
Education	Primary school (grade 1–8)	11	5.3
	Secondary degree—4 years	54	26
	High school diploma	30	14.4
	Undergraduate	16	7.69
	Graduate	75	36.01
	Master/doctorate	22	10.6
Children	Yes	125	60.1
	No	83	39.9
Employment status	Employed	157	75.5
	Unemployed	26	12.5
	Retiree	25	12
	TOTAL	208	100

Statistical analysis

In this study, descriptive statistics were calculated for the basic socio-economic and demographic characteristics of the participants. *T*-test (Kim, 2015), one-way

ANOVA (Heiberger & Neuwirth, 2009), and multivariate linear regression (Tabachnick, Fidell, & Ullman, 2007; Yuan, Ekici, Lu, & Monteiro, 2007) were used to examine the relationship between the predictors and public perception of climate change and its impact on natural disasters. Bearing in mind that the preliminary analysis of the homogeneity of variance (Test of Homogeneity of Variances) have shown that there is a violation of the assumption of homogenous variance, used the results of the two tests—Welsh and Brown-Forsythe, which are resistant to the violation of the assumption. All the tests were two-tailed, with a significance level of $p < .05$. Statistical analysis was performed using IBM SPSS Statistics (Version 26). The internal consistency of Likert scales for Perception of Vulnerability Subscale (six items) is good with a Cronbach's alpha of .85, for Perception of the climate change impact on natural disasters Subscale (five items) .84, Assessment of Knowledge Subscale (four items) .82, and Perception of Fear Subscale (five items) .85. To examine the factors associated with the overall scale, we performed regression analyses, with the four dependent variables (Table 2). We tested the central hypothesis where education is the predicting variable of public perception of climate change and its impact on natural disasters. A multivariate regression analysis was used, identifying the extent to total scores of the main dependent variables (perception of vulnerability to climate change, perception of the climate change impact to natural disasters, knowledge and fear scores) were associated with five demographic and socio-economic variables: gender, age, marital status, education level, and employment status. Previous analyses checked on the residual scattering diagram (Tabachnick et al., 2007), showed that the assumptions of normality (Normal Probability Plot P-P and Scatterplot), linearity, multicollinearity ($r = .8$), and homogeneity of variance had not been violated.

Results

Starting from the abovementioned methodological framework and research design, the results were divided into two categories:

- The predictors of perception of vulnerability to climate change, perception of the climate change impact to natural disasters, assessment of knowledge and perception of fear scores related to the public perception of climate change and its impact on natural disasters;
- Results of descriptive statistics and the relations between the variables and perception of vulnerability to climate change, perception of the climate change impact to natural disaster, assessment of knowledge and perception of fear scores related to the public perception of climate change and its impact on natural disasters.

The predictors of public perception of climate change

The multivariate regression analysis showed that education level was the most effective predictor of perception of vulnerability to climate change. Further analysis showed that the most important predictor for vulnerability is education level ($\beta = .503$), and it explains a 21.3% variance in the score of perception of vulnerability, followed by the employment status ($\beta = .134$, 1.1%). The remaining variables did not have significant effects on the perception of vulnerability. This model ($R^2 = .349$, Adj. $R^2 = .333$, $F = 21.68$, $t = 7.63$, $p = .000$) with all the mentioned independent variables explains the 33.3% variance of perception of vulnerability to climate change. Also, the results of the multivariate regressions of perception climate change impact on natural disasters showed that the most important predictor is education level ($\beta = .577$), and it explains a 28.9% variance in perception, followed by age ($\beta = –.123$, 1%). The remaining variables did not have significant effects

on the perception of the impact of climate change on natural disasters. This model (R^2 = .416, Adj. R^2 = .401, F = 28.73, t = 10.73, p = .000) with all the mentioned independent variables explains the 40.1% variance of perception of vulnerability to climate change (Table 2 and Figure 2).

Table 2
Results of a multivariate regression analysis concerning the perception of vulnerability, perception of climate change impact, assessment of the knowledge, and perception of fear scores (n = 208)

Predictor variables	Perception of vulnerability			Perception of climate change impact			Assessment of knowledge			Perception of fear		
	B	*SE*	*β*	*B*	*SE*	*β*	*B*	*SE*	*β*	*B*	*SE*	*B*
Gender	–.056	.095	–.034	–.089	.083	–.058	–.055	.073	–.041	.047	.096	.027
Age	–.081	.078	–.069	–.133	.068	–.123*	–.017	.060	–.019	–.115	.079	–.095
Marital status	–.014	.057	–.016	.028	.050	.035	–.029	.044	–.043	–.050	.058	–.056
Education level	.292	.036	.503**	.308	.031	.577**	.286	.027	.617**	.338	.036	.565**
Employment status	–.162	.080	–.134*	–.097	.070	–.087	–.023	.061	–.024	–.052	.081	–.042

Note. Males, the youngest, married, secondary educated respondents, coded as 0; 1 has been assigned otherwise. *B* = unstandardized (*B*) coefficients; *SE* = Standard error; *β* = standardized (*β*) coefficients. *$p \leq .05$. **$p \leq .01$.

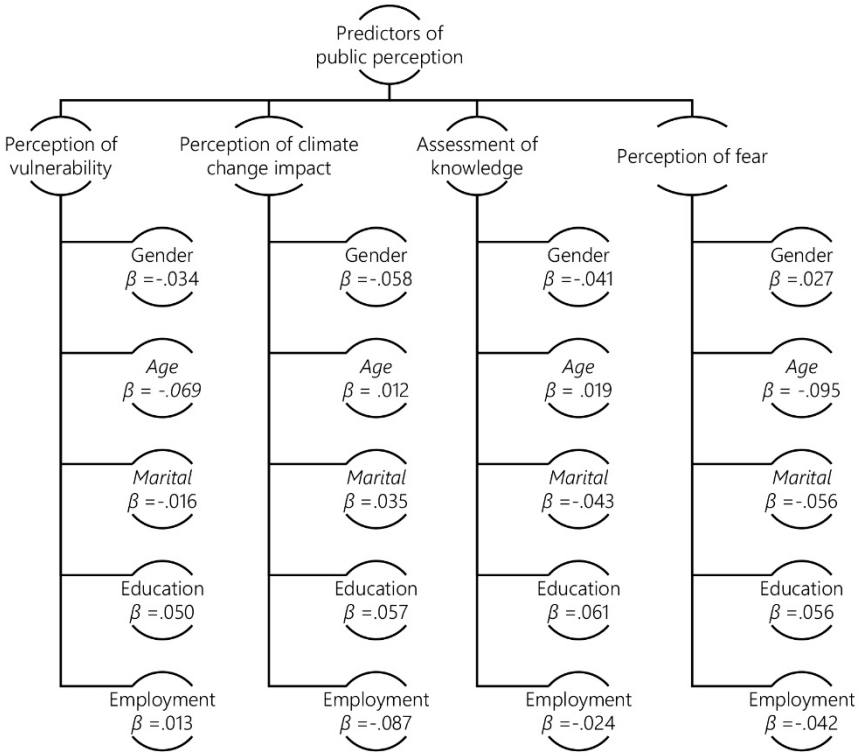

Figure 2. The predictors for the public perception of climate change and its impact on natural disasters.

On the other side, the results of the multivariate regressions of assessment of knowledge about climate change showed that the most important predictor is education level (β = .617) and it explains 31.36% variance in the assessment of knowledge. The remaining variables did not have significant effects on the assessment of knowledge on climate change. This model (R^2 = .406, Adj. R^2 = .391, F = 27.58, t = 10.33, p = .000) with all the mentioned independent variables explains the 40.6% variance of assessment of knowledge on climate change (Table 3 and Figure 2). Concerning to perception of fear of climate change, analyses showed that the most important predictor is education level (β = .565) and it explains 26.01% variance in knowledge. The remaining variables did not have significant effects on the assessment of knowledge about climate change. This model (R^2 = .378, Adj. R^2 = .363, F = 24.56, t = 5.95, p = .000) with all the mentioned independent variables explains the 36.3% variance of climate change fear (Table 3 and Figure 2).

Results of descriptive statistics and the relations between the variables and public perception of climate change

The results of the research show that the largest number of the respondents (56.7%) points out that, to a certain extent, they know about climate change, observed on a scale from 1 (*absolutely know*) to 4 (*absolutely don't know*). Only 1.3% of the respondents point out that they know absolutely nothing about climate change, while 13.5% believe that they are familiar with such a phenomenon. Over 91.8% of respondents believe that the climate is changing globally, while 14% of respondents believe that the issue of climate change is not important to them at all on a personal level. On the other hand, 36.1% of the respondents believe that the issue of climate change is important in the perspective of everyday life. To a question related to concerns about the potential effects of climate change that they could have on them, most respondents believe they are partially concerned (31.7%), while 13.9% are not concerned at all. With the perceptions of the impact of climate change on society, the results are slightly different and 25% are not concerned at all.

Regarding the sources of information they trust the most when reporting on climate change, 51.9% of the respondents opted for scientists, 39.9% for the media, while 7.7% of the respondents said they trusted the authorities the most. When it comes to the perception of the causes that lead to climate change, the highest (46.6%) opinion is that the roots are in human activities, while 6.3% of respondents believe that these are natural processes, while 4% believe that these are mutual interactions of the mentioned factors. When asked whether climate change will cause a more serious problem in Serbia if certain proactive measures are not taken shortly, 51.9% have a positive attitude on this issue, while a very small number of 6.3% of the respondents believe that not taking such measures will not harm. On the other hand, 62.5% of the respondents believe that the impact of climate change is already being felt in Serbia, while 9.6% think that it will happen in the next 25 years, and 2.4% in the next 50, and 1.4% point out that this will happen in the next 100 years. When asked to assess the level of vulnerability of the region to climate change, 8.2% of the respondents point out that it is not endangered, while 47.6% claim that it is partly endangered, and 13.9% believe that it is endangered. About the perception of weather change due to climate change, 36.5% of the respondents point out that there is more frequent heavy rainfall, 30.3% that the temperature has risen, 18.3% that winters are warmer, 4.8% that summers are warmer, 1.9% say that the weather is extremely unstable, and 0.5% of the respondents point out that the winters are colder and the air is more polluted.

Bearing in mind that the increase in the average temperature is an integral part of global warming and climate change (Burić et al., 2018; Jacob et al., 2018; Malinović-Milićević et al., 2018), the respondents were asked what caused the increase in temperature. More than half of the respondents stated that the main cause is human activity, 32.7% of the respondents pointed out that human activities and natural cycles have an equal share in it, 9.6% of the respondents stated the cause were natural cycles, while 4.8% of respondents share neutral attitude. Related to the perception of vulnerability to climate change, we also examined the attitudes of the respondents regarding the percentage of their friends who believe that the increased carbon dioxide emissions caused by human activities affect climate change. The obtained results show that 28.8% of the respondents think it is up to 30% of their friends, while 63% of respondents think it is up to some 60%, and 8.2% of respondents think it is over 60% of their friends. In terms of the assessment of an activity which would best contribute to reducing carbon dioxide emissions into the atmosphere, 37% of the respondents preferred the use of renewable energy sources, 21.6% of the respondents chose the use of fossil fuels, 14.4% of respondents preferred to buy an electric car, 13.9% preferred recycling, 10.1% of the respondents opted for saving electricity, 1.4% of the respondents chose reducing air traffic, 1% of respondents were for using public transport, while 0.5% of respondents preferred growing organic food. Also, related to the perception of climate change vulnerability, we asked the question of the state of the natural environment in the place where they live, and most respondents, 74.5%, rated it as good, 21.6% of the respondents rated it as bad, 2.4% of respondents said it was very good, while, in contrast, 1.4% pointed out that the situation was very bad. Then, it was found that 91.8% of the respondents believe that the average temperature has increased in the last 100 years.

Examining the perception of the impact of climate change on the frequency and intensity of natural disasters (floods, droughts, stormy winds, etc.), 59% of the respondents believe that they have a significant impact, while 6.3% say that they do not affect at all. Then, 33.2% of the respondents believe that concerning the type of natural disaster that could befall them in the near or distant future because of climate change, floods are expected, 32.7% believe that these are heat waves, 24% that stormy winds can be expected, 7.2% expect landslides, and 2.9% expect droughts. Concerning the assessment of the level of vulnerability to natural disasters caused by climate change, 87.5% believe that they are endangered, while 1.4% believe that they are not endangered. When asked whether the frequency of natural disasters increased during their lives, the respondents mostly (83.7%) answered affirmatively, while the remaining 34 respondents (16.3%) answered that this was not the case. When asked about the distance of the respondents from the region where natural disasters can be expected, 100 respondents (48.1%) answered that the distance is 51–100 km, 46 respondents (22.1%) answered that it was 0–25 km, 44 respondents (21.2%) answered 101–250 km, while 18 respondents (8.7%) stated that their distance from the potential focus of the disaster is 26–50 km. About 91.8% of respondents believe that the floods that hit our region in 2014 were caused by extreme rainfall because of climate change.

The results of the *t*-test show that there is no statistically significant difference in the results between men and women in terms of knowledge about climate change (p = .506), assessment of vulnerability to climate change (.507), and perception of the climate change impact on natural disaster intensity (.341) (Table 3).

Table 3
T-test results between gender and assessment of the knowledge, perception of vulnerability, and perception of the climate change impact on natural disaster (n = 208)

	F	Sig.	*t*	*df*	Sig. (two-tailed)	Male	Female
Assessment of knowledge about climate change	2.531	.113	.666	206	.506	2.85	2.79
Perception of vulnerability	.018	.894	.665	206	.507	2.53	2.46
Perception of climate change impact on natural disaster	.046	.829	.954	206	.341	3.10	3.00

The analysis of the obtained results (one-way ANOVA) shows that there is a statistically significant difference between the mean values in the assessment of knowledge about climate change (F = 31.38, p = .000), the perception of vulnerability (F = 22.36, p = .000), and the perception of the climate change impact on natural disasters (F = 23.68, p = .000). In further analysis, it was found that the respondents who have completed higher education (M = 3.03, SD = .383) assess their knowledge about climate change to a greater extent than the respondents with completed primary school (M = 1.81, SD = .404).

The respondents who have completed doctoral studies (M = 3.18, SD = .795) assess the vulnerability due to climate change to a greater extent than the respondents with completed primary school (M = 1.45, SD = .522). Also, it was found that respondents who have completed master's studies (M = 3.52, SD = .506) responded that climate change affects the intensity of natural disasters to a greater extent than it is believed by the respondents who have completed high school (M = 2.61, SD = .656). It was found that there is no statistically significant difference between the mean values of these groups of marital status and knowledge about climate change (F = 2.76, p = .029), but there is a statistically significant correlation with climate change vulnerability assessment and the perception of climate change impact on natural disaster intensity (F = 5.24, p = .06). In further analysis, it was found that married respondents (M = 2.56, SD = .88) assess the level of vulnerability due to climate change to a greater extent than those who are not in a relationship (M = 2.51, SD = .90). Also, it was stated that the respondents who are not in a relationship (M = 2.95, SD = .83) believe that climate change affects the intensity of natural disasters to a greater extent than it is believed by the respondents who are divorced (M = 2.73, SD = .76) (Table 4).

Table 4
ANOVA results between education and assessment of the knowledge, perception of vulnerability, and perception of the climate change impact on natural disaster (n = 208)

	Education				Marital status			
	df	*F*	*p*	η_p^2	*df*	*F*	*p*	η_p^2
Assessment of knowledge about climate change	3	28.36	.000	7.71	4	2.21	.112	2.71
Perception of vulnerability	3	19.995	.000	19.99	4	5.24	.006	2.48
Perception of climate change impact on natural disaster	4	30.156	.000	30.15	4	5.21	.007	3.24

Discussion

Scientists around the world have examined the effects of many factors on the perception of climate change and come up with consistent and inconsistent results (Lee, Markowitz, Howe, Ko, & Leiserowitz, 2015; Nisbet & Myers, 2007). Examining the factors influencing public perception of climate change and its impact on natural disasters, the results of multivariate regression analysis

showed that education level was the most effective predictor of the perception of vulnerability to climate change, perception of the impact on natural disaster, knowledge about climate change and fear scores. The obtained research results are consistent with the results of the research in which it was determined that education is the factor most closely associated with the awareness of the impacts of climate change (Knight, 2016; Linnekamp, Koedam, & Baud, 2011; Nisbet & Myers, 2007; Monroe, Plate, Oxarart, Bowers, & Chaves, 2019; Owusu, Nursey-Bray, & Rudd, 2019). Namely, it was determined that faculty-educated respondents assess their knowledge about climate change to a greater extent than the respondents with completed primary school. Also, it has been found that with the increase in the level of education, the perception of the threat of climate change grows. Married respondents assess the level of their vulnerability to a greater extent than those who are not in a relationship. It can be assumed that they think more about their family or get more informed because of the fears of the mentioned (Lee et al., 2015; Nisbet & Myers, 2007). Also, it was found that respondents who are not in a relationship emphasize to a greater extent that the consequences caused by climate change affects the intensity of natural disasters. It can be assumed that the mentioned respondents have a higher level of knowledge, bearing in mind that Cvetković (2016) showed that the respondents who are not in a relationship know better what to do after an official warning about the flood. Also, it was found that the respondents who are divorced have not been prepared yet, but intend to get prepared in the next 6 months. Certainly, the results of many studies have identified significant influences of socio-demographic characteristics, such as age, gender and wealth, access to information, or civic engagement on the perception of climate change (Semenza et al., 2008; Shi et al., 2015; Yu et al., 2013). In the results of our research, besides the level of education, it was found that employment status affects the perception of vulnerability to climate change, while age affects the perception of climate change. We did not find that gender affects none of the examined dimensions of the perception of climate change, which is similar to the results of the research by Bollettino et al. (2020). Ballew, Pearson, Goldberg, Rosenthal, and Leiserowitz (2020) showed that political polarization in climate change views increases with higher education and income and positive employment status. In some other research, age has been found to have a weak influence on climate change perception (Hesed & Paolisso, 2015; Howe, Mildenberger, Marlon, & Leiserowitz, 2015). Our research has not shown a link between gender and perceptions of climate change, as certain studies point out that women and ethnic minorities are more likely to accept that climate change is taking place and that it is a significant threat (Hornsey, Harris, Bain, & Fielding, 2016; Macias, 2016). To understand climate change research, governance, and decision-making, adults get most of their news from radio, television, and print media and rely on the interpretations of scientific results (Ruiz et al., 2020; Shi et al., 2016). In our research, we found that most of the respondents trust scientists, followed by the media, while the least trust government officials when they report on climate change.

The obtained results showed that most respondents assess to know about climate change. Hoffmann and Muttarak (2017) found that non-formal education, like disaster training and drills, is positively linked with increased resilience and perception. In very interesting research, Bollettino et al. (2020) asked respondents about the links between climate change and their experience with natural disasters. Their results showed that almost half of the total number of the respondents agreed that the natural disasters they had experienced were due to climate change. Also, we have found that most respondents believe they are at risk from natural disasters caused by climate change. Concerning the causes that lead to climate change, most respondents point out that human activities are the main cause of climate change, which is consistent with the results of

research conducted in other countries (Alvi, Nawaz, & Khayyam, 2020; Doloisio & Vanderlinden, 2020; Singh, 2020). It was also determined that most respondents would use renewable energy sources to reduce carbon dioxide emissions, which is expected given that producing energy from renewable sources in Serbia is in its initial phase (Golusin, Tesic, & Ostojic, 2010).

Conclusion

Understanding people's perceptions of climate change is not mere research but a necessary and obligatory precondition in creating and devising adaptation strategies to climate change. In our study, it was found that respondents are aware of climate change, but the dimension of objective knowledge of the processes, causes, and consequences of climate change is insufficiently examined. Most respondents are well acquainted with the connection between climate change and natural disasters, but it remains to examine several dimensions that can provide a clearer understanding of such impacts. All the strategies to mitigate the causes and consequences of climate change are rooted primarily in a comprehensive understanding of behavioral dispositions. Policies and strategies to improve people's awareness of climate change, and campaigns to reduce the causes that lead to the negative consequences of these phenomena must very precisely consider the different demographic and socio-economic characteristics of people in the areas where they are implemented, or their success will be insufficiently guaranteed. In the following research, it is necessary to conduct comprehensive multi-method research, which should include a larger number of respondents from different parts of the country.

Acknowledgements

The authors express their gratitude to the anonymous reviewers for their comments, and the Scientific-Professional Society for Disaster Risk Management (http://upravljanje-rizicima.com/) in Belgrade, Serbia for its scientific and funding support.

References

Adamo, N., Al-Ansari, N., & Sissakian, V. K. (2020). Global Climate Change Impacts on Tigris-Euphrates Rivers Basins. *Journal of Earth Sciences and Geotechnical Engineering*, *10*(1), 49–98. Retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:ltu:diva-77199

AghaKouchak, A., Chiang, F., Huning, L. S., Love, C. A., Mallakpour, I., Mazdiyasni, O., . . . Sadegh, M. (2020). Climate Extremes and Compound Hazards in a Warming World. *Annual Review of Earth and Planetary Sciences*, *48*, 519–548. https://doi.org/10.1146/annurev-earth-071719-055228

Allan, J. N., Ripberger, J. T., Wehde, W., Krocak, M., Silva, C. L., & Jenkins-Smith, H. C. (2020). Geographic Distributions of Extreme Weather Risk Perceptions in the United States. *Risk Analysis, 40*(12), 2498–2508. https://doi.org/10.1111/risa.13569

Alvi, S., Nawaz, S. M. N., & Khayyam, U. (2020). How does one motivate climate mitigation? Examining energy conservation, climate change, and personal perceptions in Bangladesh and Pakistan. *Energy Research & Social Science, 70*, 101645. https://doi.org/10.1016/j.erss.2020.101645

Anderson, S. E., Bart, R. R., Kennedy, M. C., MacDonald, A. J., Moritz, M. A., Plantinga, A. J., . . . Wibbenmeyer, M. (2018). The dangers of disaster-driven responses to climate change. *Nature Climate Change, 8*(8), 651–653. https://doi.org/10.1038/s41558-018-0208-8

Anđelković, G., Jovanović, S., Manojlović, S., Samardžić, I., Živković, Lj., Šabić, D., . . . Džinović, M. (2018) Extreme Precipitation Events in Serbia: Defining the Threshold Criteria for Emergency Preparedness. *Atmosphere*, *9*(5), 188. https://doi.org/10.3390/atmos9050188

Arora, N. K., Fatima, T., Mishra, I., Verma, M., Mishra, J., & Mishra, V. (2018). Environmental sustainability: challenges and viable solutions. *Environmental Sustainability*, *1*(4), 309–340. https://doi.org/10.1007/s42398-018-00038-w

Ballew, M. T., Pearson, A. R., Goldberg, M. H., Rosenthal, S. A., & Leiserowitz, A. (2020). Does socioeconomic status moderate the political divide on climate change? The roles of education, income, and individualism. *Global Environmental Change*, *60*, 102024. https://doi.org/10.1016/j.gloenvcha.2019.102024

Banholzer, S., Kossin, J., & Donner, S. (2014). The Impact of Climate Change on Natural Disasters. In A. Singh & Z. Zommers (Eds.), *Reducing Disaster: Early Warning Systems For Climate Change* (pp. 21–49). https://doi.org/10.1007/978-94-017-8598-3_2

Bollettino, V., Alcayna-Stevens, T., Sharma, M., Dy, P., Pham, P., & Vinck, P. (2020). Public perception of climate change and disaster preparedness: Evidence from the Philippines. *Climate Risk Management, 30*, 100250. https://doi.org/10.1016/j.crm.2020.100250

Bouwer, L. M. (2011). Have Disaster Losses Increased Due to Anthropogenic Climate Change? *Bulletin of the American Meteorological Society, 92*(1), 39–46. https://doi.org/10.1175/2010BAMS3092.1

Burić, D., Ducić, V., & Mihajlović, J. (2018). Relationship between mean annual temperatures and precipitation sums in Montenegro between 1951-1980 and 1981-2010 periods. *Bulletin of the Serbian Geographical Society, 98*(1), 31–48. https://doi.org/10.2298/GSGD180325004B

Capstick, S. B., Demski, C. C., Sposato, R. G., Pidgeon, N. F., Spence, A., & Corner, A. (2015). *Public perceptions of climate change in Britain following the winter 2013/2014 flooding*. Understanding Risk Research Group Working Paper 15-01. Cardiff, UK: Cardiff University.

Capstick, S. B., Pidgeon, N., & Whitehead, M. (2013). *Public perceptions of climate change in Wales: Summary findings of a survey of the Welsh public conducted during November and December 2012*. Retrieved from http://orca.cf.ac.uk/id/eprint/45931

Chakma, U., Hossain, A., Islam, K., Hasnat, G. T., & Kabir, M. H. (2021). Water crisis and adaptation strategies by tribal community: A case study in Baghaichari Upazila of Rangamati District in Bangladesh. *International Journal of Disaster Risk Management*, *2*(2), 37–46. https://doi.org/10.18485/ijdrm.2020.2.2.3

Chou, K. T. (2013). The public perception of climate change in Taiwan and its paradigm shift. *Energy Policy, 61*, 1252–1260. https://doi.org/10.1016/j.enpol.2013.06.016

Cook, B. I., Smerdon, J. E., Seager, R., & Coats, S. (2014). Global warming and 21st century drying. *Climate Dynamics, 43*(9), 2607–2627. https://doi.org/10.1007/s00382-014-2075-y

Cuthbertson, J., Rodriguez-Llanes, J. M., Robertson, A., & Archer, F. (2019). Current and Emerging Disaster Risks Perceptions in Oceania: Key Stakeholders Recommendations for Disaster Management and Resilience Building. *International Journal of Environmental Research and Public Health, 16*(3), 460. https://doi.org/10.3390/ijerph16030460

Cvetković, V. M. (2016). Marital Status of Citizens and Floods: Citizen Preparedness for Response to Natural Disasters. *Vojno delo*, *68*(8), 89–116. https://doi.org/10.5937/vojdelo1608089C

Cvetković, V. M., & Dragicević, S. (2014). Spatial and temporal distribution of natural disasters. *Journal of the Geographical Institute "Jovan Cvijić" SASA, 64*(3), 293–309. https://doi.org/10.2298/IJGI1403293C

Cvetković, V. M., Nikolić, N., Radovanović Nenadić, U., Öcal A. K., Noji, E., & Zečević, M. (2020). Preparedness and Preventive Behaviors for a Pandemic Disaster Caused by COVID-19 in Serbia. *International Journal of Environmental Research and Public Health, 17*(11), 4124. https://doi.org/10.3390/ijerph17114124

Cvetković, V. M., Öcal, A., & Ivanov, A. (2019). Young adults' fear of natural disasters: A case study of residents from Turkey, Serbia and Macedonia. *International Journal of Disaster Risk Reduction*, *35*, 101095. https://doi.org/10.1016/j.ijdrr.2019.101095

Cvetković, V. M., Ronan, K., Shaw, R., Filipović, M., Mano, R., Gačić, J., & Jakovljević, V. (2019). Household earthquake preparedness in Serbia: A study of selected municipalities. *Acta Geographica Slovenica, 59*(2), 27–42. https://doi.org/10.3986/AGS.5445

Cvetković, V. M., Tomašević, K. S., & Milašinović, S. M. (2019). Security risks of climate change: case study of Belgrade. *Sociological Review, 53*(2), 596–626. https://doi.org/10.5937/socpreg53-22371

Davies, M., Oswald, K., & Mitchell, T. (2009). Climate change adaptation, disaster risk reduction and social protection. In *Promoting pro-poor growth: Employment and social protection* (pp. 201–217). Paris: OECD.

Doloisio, N., & Vanderlinden, J. P. (2020). The perception of permafrost thaw in the Sakha Republic (Russia): Narratives, culture and risk in the face of climate change. *Polar Science*, *26*, 100589. https://doi.org/10.1016/j.polar.2020.100589

Drummond, C., & Fischhoff, B. (2017). Individuals with greater science literacy and education have more polarized beliefs on controversial science topics. *Proceedings of the National Academy of Sciences*, *114*(36), 9587–9592. https://doi.org/10.1073/pnas.1704882114

Echavarren, J. M., Balžekienė, A., & Telešienė, A. (2019). Multilevel analysis of climate change risk perception in Europe: Natural hazards, political contexts and mediating individual effects. *Safety Science*, *120*, 813–823. https://doi.org/10.1016/j.ssci.2019.08.024

Emanuel, K. (2017). Assessing the present and future probability of Hurricane Harvey's rainfall. *Proceedings of the National Academy of Sciences*, *114*(48), 12681–12684. https://doi.org/10.1073/pnas.1716222114

Fujita, K., & Shaw, R. (2019). Preparing International Joint Project: use of Japanese flood hazard map in Bangladesh. *International Journal of Disaster Risk Management*, *1*(1), 62–80. https://doi.org/10.18485/ijdrm.2019.1.1.4

Gleick, P. H. (2014). Water, Drought, Climate Change, and Conflict in Syria. *Weather, Climate and Society*, *6*(3), 331–340. https://doi.org/10.1175/WCAS-D-13-00059.1

Golusin, M., Tesic, Z., & Ostojic, A. (2010). The analysis of the renewable energy production sector in Serbia. *Renewable and Sustainable Energy Reviews*, *14*(5), 1477–1483. https://doi.org/10.1016/j.rser.2010.01.012

Hamilton, L. C., Hartter, J., Lemcke-Stampone, M., Moore, D. W., & Safford, T. G. (2015). Tracking Public Beliefs About Anthropogenic Climate Change. *PloS one*, *10*(9), e0138208. https://doi.org/10.1371/journal.pone.0138208

Hatfield, J. L., & Dold, C. (2019). Water-Use Efficiency: Advances and Challenges in a Changing Climate. *Frontiers in Plant Science*, *10*, 103. https://doi.org/10.3389/fpls.2019.00103

Heiberger, R. M., & Neuwirth, E. (2009). One-Way ANOVA. In M. Richard & E. N. Heiberger (Eds.), *R through excel* (pp. 165–191). New York, NY: Springer.

Hesed, C. D. M., & Paolisso, M. (2015). Cultural knowledge and local vulnerability in African American communities. *Nature Climate Change*, *5*(7), 683–687 https://doi.org/10.1038/nclimate2668

Hoffmann, R., & Muttarak, R. (2017). Learn from the Past, Prepare for the Future: Impacts of Education and Experience on Disaster Preparedness in the Philippines and Thailand. *World Development*, *96*, 32–51. https://doi.org/10.1016/j.worlddev.2017.02.016

Hoogendoorn, G., Sütterlin, B., & Siegrist, M. (2020). The climate change beliefs fallacy: The influence of climate change beliefs on the perceived consequences of climate change. *Journal of Risk Research*, *23*(12), 1577–1589. https://doi.org/10.1080/13669877.2020.1749114

Hornsey, M. J., Harris, E. A., Bain, P. G., & Fielding, K. S. (2016). Meta-analyses of the determinants and outcomes of belief in climate change. *Nature Climate Change*, *6*(6), 622–626. https://doi.org/10.1038/nclimate2943

Howe, P. D., Mildenberger, M., Marlon, J. R., & Leiserowitz, A. (2015). Geographic variation in opinions on climate change at state and local scales in the USA. *Nature Climate Change*, *5*(6), 596–603. https://doi.org/10.1038/nclimate2583

Hunter, L. M. (2005). Migration and environmental hazards. *Population and Environment*, *26*(4), 273–302. https://doi.org/10.1007/s11111-005-3343-x

Hussain, M., Butt, A. R., Uzma, F., Ahmed, R., Irshad, S., Rehman, A., & Yousaf, B. (2020). A comprehensive review of climate change impacts, adaptation, and mitigation on environmental and natural calamities in Pakistan. *Environmental Monitoring and Assessment*, *192*(1), 48. https://doi.org/10.1007/s10661-019-7956-4

Jacob, D., Kotova, L., Teichmann, C., Sobolowski, S. P., Vautard, R., Donnelly, C., . . . van Vliet, M. T. (2018). Climate Impacts in Europe Under +1.5°C Global Warming. *Earth's Future*, *6*(2), 264–285. https://doi.org/10.1002/2017EF000710

Kahan, D. M., Peters, E., Wittlin, M., Slovic, P., Ouellette, L. L., Braman, D., & Mandel, G. (2012). The polarizing impact of science literacy and numeracy on perceived climate change risks. *Nature Climate Change*, *2*(10), 732–735. https://doi.org/10.1038/nclimate1547

Kilpeläinen, A., Kellomäki, S., Strandman, H., & Venäläinen, A. (2010). Climate change impacts on forest fire potential in boreal conditions in Finland. *Climatic Change*, *103*(3), 383–398. https://doi.org/10.1007/s10584-009-9788-7

Kim, T. K. (2015). T test as a parametric statistic. *Korean Journal of Anesthesiology, 68*(6), 540–546. https://doi.org/10.4097/kjae.2015.68.6.540

Knight, K. W. (2016). Public awareness and perception of climate change: a quantitative cross-national study. *Environmental Sociology*, *2*(1), 101–113. https://doi.org/10.1080/23251042.2015.1128055

Kumiko, F., & Shaw, R. (2019). Preparing International Joint Project: use of Japanese Flood Hazard Map in Bangladesh. *International Journal of Disaster Risk Management, 1*(1), 62–80. https://doi.org/10.18485/ijdrm.2019.1.1.4

Lee, T. M., Markowitz, E. M., Howe, P. D., Ko, C.-Y., & Leiserowitz, A. A. (2015). Predictors of public climate change awareness and risk perception around the world. *Nature Climate Change*, *5*(11), 1014–1020. https://doi.org/10.1038/nclimate2728

Leiserowitz, A. (2007). *International Public Opinion, Perception, and Understanding of Global Climate Change* (Human Development Report 2007/2008). Retrieved from https://core.ac.uk/download/pdf/6248846.pdf

Lewis, S. C. (2016). Can public perceptions of Australian climate extremes be reconciled with the statistics of climate change?. *Weather and Climate Extremes, 12*, 33–42. https://doi.org/10.1016/j.wace.2015.11.008

Linnekamp, F., Koedam, A., & Baud, I. S. A. (2011). Household vulnerability to climate change: Examining perceptions of households of flood risks in Georgetown and Paramaribo. *Habitat International*, *35*(3), 447–456. https://doi.org/10.1016/j.habitatint.2010.12.003

Lucas, C., Hennessy, K. J., Mills, G., & Bathols, J. (2007). *Bushfire Weather in Southeast Australia: Recent Trends and Projected Climate Change Impacts*. https://doi.org/10.25919/5e31c82ee0a4c

Macias, T. (2016). Environmental risk perception among race and ethnic groups in the United States. *Ethnicities*, *16*(1), 111–129. https://doi.org/10.1177/1468796815575382

Mahmoudi, P., Mohammadi, M., & Daneshmand, H. (2019). Investigating the trend of average changes of annual temperatures in Iran. *International Journal of Environmental Science and Technology*, *16*(2), 1079–1092. https://doi.org/10.1007/s13762-018-1664-4

Malinović-Milićević, S., Mihailović, D. T., Radovanović, M. M., & Drešković, N. (2018). Extreme Precipitation Indices in Vojvodina Region (Serbia). *Journal of the Geographical Institute "Jovan Cvijić" SASA*, *68*(1), 1–15. https://doi.org/10.2298/IJGI1801001M

Mano, R., Kirshcenbaum, A., & Rapaport, C. (2019). Earthquake preparedness: A Social Media Fit perspective to accessing and disseminating earthquake information. *International Journal of Disaster Risk Management, 1*(2), 19–31. https://doi.org/10.18485/ijdrm.2019.1.2.2

Monroe, M. C., Plate, R. R., Oxarart, A., Bowers, A., & Chaves, W. A. (2019). Identifying effective climate change education strategies: a systematic review of the research. *Environmental Education Research*, *25*(6), 791–812. https://doi.org/10.1080/13504622.2017.1360842

Moyano, E., Paniagua, Á., & Lafuente, R. (2009). Políticas ambientales, cambio climático y opinión pública en escenarios regionals. El caso de Andalucía [Environmental Policy, Climate Change and Public Opinion. The Case of Andalusia]. *Revista Internacional de Sociologija, 67*(3), 681–699. https://doi.org/10.3989/ris.2008.01.23

Nisbet, M. C., & Myers, T. (2007). The Polls—Trends: Twenty Years of Public Opinion about Global Warming. *Public Opinion Quarterly, 71*(3), 444–470. https://doi.org/10.1093/poq/nfm031

O'Brien, G., O'Keefe, P., Rose, J., & Wisner, B. (2006). Climate change and disaster management. *Natural Disasters*, *30*(1), 64–80. https://doi.org/10.1111/j.1467-9523.2006.00307.x

O'Neill, S., Williams, H. T. P, Kurz, T., Wiersma, B., & Boykoff, M. (2015). Dominant frames in legacy and social media coverage of the IPCC Fifth Assessment Report. *Nature Climate Change, 5*(4), 380–385. https://doi.org/10.1038/nclimate2535

Öcal, A. (2019). Natural Disasters in Turkey: Social and Economic Perspective. *International Journal of Disaster Risk Management*, *1*(1), 51–61. https://doi.org/10.18485/ijdrm.2019.1.1.3

Owusu, M., Nursey-Bray, M., & Rudd, D. (2019). Gendered perception and vulnerability to climate change in urban slum communities in Accra, Ghana. *Regional Environmental Change*, *19*(1), 13–25. https://doi.org/10.1007/s10113-018-1357-z

Ratnayake, U., & Herath, S. (2005). Changing rainfall and its impact on landslides in Sri Lanka. *Journal of Mountain Science, 2*(3), 218–224. https://doi.org/10.1007/BF02973195

Reser, J. P., Bradley, G. L., Glendon, A. I., Ellul, M. C., & Callaghan, R. (2012a). *Public risk perceptions, understandings and responses to climate change and natural disasters in Australia, 2010 and 2011*. Gold Coast, Australia: National Climate Change Adaptation Research Facility.

Reser, J. P., Bradley, G. L., Glendon, A. I., Ellul, M. C., & Callaghan, R. (2012b). *Public Risk Perceptions, Understandings, and Responses to Climate Change and Natural Disasters in Australia and Great Britain*. Gold Coast, Australia: National Climate Change Adaptation Research Facility.

Ruiz, I., Faria, S. H., & Neumann, M. B. (2020). Climate change perception: Driving forces and its interactions. *Environmental Science & Policy, 108*, 112–120. https://doi.org/10.1016/j.envsci.2020.03.020

Ruml, M., Gregorić, E., Vujadinović, M., Radovanović, S., Matović, G., Vuković, A., & Stojičić, Dj. (2017). Observed changes of temperature extremes in Serbia over the period 1961–2010. *Atmospheric Research*, *183*, 26–41. https://doi.org/10.1016/j.atmosres.2016.08.013

Scruggs, L., & Benegal, S. (2012). Declining public concern about climate change: Can we blame the great recession? *Global Environmental Change*, *22*(2), 505–515. https://doi.org/10.1016/j.gloenvcha.2012.01.002

Seara, T., Pollnac, R., & Jakubowski, K. (2020). Impacts of Natural Disasters on Subjective Vulnerability to Climate Change: A Study of Puerto Rican Fishers' Perceptions after Hurricanes Irma & Maria. *Coastal Management, 48*(5), 418–435. https://doi.org/10.1080/08920753.2020.1795969

Semenza, J. C., Hall, D. E., Wilson, D. J., Bontempo, B. D., Sailor, D. J., & George, L. A. (2008). Public Perception of Climate Change Voluntary Mitigation and Barriers to Behavior Change. *American Journal of Preventive Medicine*, *35*(5), 479–487. https://doi.org/10.1016/j.amepre.2008.08.020

Shi, J., Visschers, V. H. M., & Siegrist, M. (2015). Public Perception of Climate Change: The Importance of Knowledge and Cultural Worldviews. *Risk Analysis, 35*(12), 2183–2201. https://doi.org/10.1111/risa.12406

Shi, J., Visschers, V. H. M., Siegrist, M., & Arvai, J. (2016). Knowledge as a driver of public perceptions about climate change reassessed. *Nature Climate Change*, *6*(8), 759–762. https://doi.org/10.1038/nclimate2997

Singh, S. (2020). Farmers' perception of climate change and adaptation decisions: A micro-level evidence from Bundelkhand Region, India. *Ecological Indicators, 116*, 106475. https://doi.org/10.1016/j.ecolind.2020.106475

Statistical Office of the Republic of Serbia. (2020). *Demografska statistika 2019* [Demographic Yearbook 2019]. Retrieved from https://publikacije.stat.gov.rs/G2020/PdfE/G202014017.pdf

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using Multivariate Statistics* (5th ed.). Boston, MA: Pearson.

Trenberth, K. E., Cheng, L., Jacobs, P., Zhang, Y., & Fasullo, J. (2018). Hurricane Harvey links to ocean heat content and climate change adaptation. *Earth's Future, 6*(5), 730–744. https://doi.org/10.1029/2018EF000825

Tyebkhan, G. (2003). Declaration of Helsinki: The ethical cornerstone of human clinical research. *Indian Journal of Dermatology, Venereology, and Leprology*, *69*(3), 245–247. Retrieved from https://www.ijdvl.com/text.asp?2003/69/3/245/1013

Xie, C., Huang, Q., Lin, Z., & Chen, Y. (2020). Destination risk perception, image and satisfaction: The moderating effects of public opinion climate of risk. *Journal of Hospitality and Tourism Management, 44*, 122–130. https://doi.org/10.1016/j.jhtm.2020.03.007

Yu, H., Wang, B., Zhang, Y.-J., Wang, S., & Wei, Y.-M. (2013). Public perception of climate change in China: results from the questionnaire survey. *Natural Hazards, 69*(1), 459–472. https://doi.org/10.1007/s11069-013-0711-1

Yuan, M., Ekici, A., Lu, Z., & Monteiro, R. (2007). Dimension reduction and coefficient estimation in multivariate linear regression. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, *69*(3), 329–346. https://doi.org/10.1111/j.1467-9868.2007.00591.x

Zaval, L., Keenan, E. A., Johnson, E. J., & Weber, E. U. (2014). How warm days increase belief in global warming. *Nature Climate Change, 4*(2), 143–147. https://doi.org/10.1038/nclimate2093

Živanović, S., Ivanović, R., Nikolić, M., Đokić, M., & Tošić, I. (2020). Influence of air temperature and precipitation on the risk of forest fires in Serbia. *Meteorology and Atmospheric Physics, 132*(6), 869–883. https://doi.org/10.1007/s00703-020-00725-6