CITIZENS EDUCATION ABOUT FLOODS: A SERBIAN CASE STUDY

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Abstract: The aim of quantitative research is a scientific explication of the effects certain demographic, socio-economic and psychological citizens characteristics on citizens education in Serbia about floods. It is because of that that during the whole 2015 a series of 2,500 face-to-face interviews was conducted in 19 out of the 190 municipalities of the Republic of Serbia. The study population consisted of all adult residents of the local communities in which floods occurred, and the sample size complied with the geographical and demographic size of the community. Results of the descriptive statistical analysis showed 24.9% of respondents were educated about natural disasters at school, 40.2% in the family, 29.9% at work, 39.9% of respondents know where elderly, disabled and infants live, 14% noted that they knew the risks of floods, etc. The research findings indicated that there is a statistically significant correlation between the level of knowledge about natural disasters and sex, age, marital status levels of education, fear of disaster, previous experience and income level. On the other hand, education at school, within the family, at work is statistically significantly associated with age, the level of education, marital status and employment status. The awareness of where elderly, disabled and infants live was not statistically significantly related to sex, the level of education, marital status and previous experience. The research indicates how to raise the level of citizens' knowledge starting from their demographic, socio-economic and psychological characteristics. The research originality lies in the uncharted impact of those factors on the citizens' knowledge about natural disasters in Serbia. The results can be used for the design of strategies to improve citizens' knowledge about the natural disasters caused by flooding.

Keywords: floods, citizens, education, factors, Serbia.

INTRODUCTION

Flooding is usually defined as a result of the overflow of the river over its levees and spreading over nearby valley[1]. The risk of flooding only exists as part of the relationship between water and human habitation. For most of the world's population, flooding is a regular seasonal phenomenon that ensures the growth of crops as it brings danger.[2] In the period from 1900 to 2013, in world 8 thousand floods occurred, where 13 million of people died, 2 million have been injured, 6 billion have been affected leaving 176 million homeless. Over an annual statistical observation, it can be said that there were 74 flood events, six per month, and 0.20 per day[3]. Floods and torrential floods are the most frequent phenomena of the "natural risks" in Serbia. Their frequency, intensity and diffusion across the territory make them a continual threat to ecological, economic and social spheres.[4]

Every individual has the right and the obligation to be informed of the potential risks that exist in the area where they live or work and to be able to get ease access to this type of information. In this context, the role of the media is of particular importance. Mass media are responsible for the efficient and quick communication about the onset and consequences of disasters.[5] Disaster risk reduction should be systematically treated across the curriculum and through the grade levels at schools. The treatment must extend beyond the basic explanation of hazards and safety measures but need to consider prevention, mitigation, vulnerability and resilience[6]. School education is essential in enhancing knowledge and perception in this framework, but even the family education is a vital element too.

In general, people are resilient to natural disasters thanks to their knowledge and gained through experience made in previous similar situations. Families and communities education in this regard is directed towards the development of competencies to recognise the characteristics of such phenomena, to protect themselves and others, and to respond appropriately in a given moment[7].

LITERATURE REVIEW

Dufty[8] defines community flood education as learning process or activity that builds community resilience. He highlighted that community flood education emcompasses both public communications than information products and services e.g. publications, Internet sites, and

1 Bradford, M., & Carmichael, R. S. (2007). *Notable Natural Disasters*. California: Salem Press.
2 Cvetković, V. (2014). *Spatial and temporal distribution of floods like natural emergency situations*. Paper presented at the International scientific conference Archibald Reiss days Belgrade; Gačić, J., Jakovljević, V., & Cvetković, V. (2014). Floods in the Republik of Serbia - vulnerability and human security. In Ivica Đorđević, Marina Glamotchak, Svetlana Stanarević, & Jasmina Gačić (Eds.), *Twenty Years of Human Security: Theoretical Foundations and Practical Applications* (pp. 277-286). Belgrade: University of Belgrade – Faculty of Security Studies.
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displays, but also training, development and industry- or community-specific programs comprehending education palns e.g. school and university curriculum. In addition, he proposes a new approach that involves the participation of the learners, focused on building people resilience, links with the 'flood cycle'and other flood mitigation and resilience-building plans and methods but gave emphasis on the longevity and the evaluation of flood education programs.

Shiwaku and colleagues[9] underlined that school disaster education based on lectures could raise risk perception, but it cannot enable students to know the importance of pre disaster measures and actions. They also argued that self education is an effective instrument for promoting students' preparedness for disaster risk reduction. Same findings have been highlighted by Shaw and colleagues[10] promoting the essentiality of self-education for realising and deepening the family and community education in the decision making process. They draw attention especially in the tool of disaster education finding conversation, experiencing, and visual aids to bet the more effective. In relation, Botzen et al. [11] found that individuals with little knowledge of the causes of floods have lower perceptions of flood risk proving that the provision of flood-risk information to the public usually increases their awareness[12]. Other socio-economic and demographic varibales such as gender have a degree of influence in the knowledge and acceptance of rflood risk. It has been found that they displayed larger sensitivity and knowledge to these events, however, this did not translate into a capacity to react[13]. They highlighted that their work as child-carers and housekeepers made them unable to create a strong social network within the community being less informed and involved in the decision-making process.

A lot of studies have been conducted to attempt to quantify the impacts of community flood education in minimising flood damages and assisting in emergency management.[14] Kellens and colleagues found that most studies operationalize disaster knowledge as perceived knowledge, by asking respondents to what extent they think or believe their knowledge reaches about risk related topics[15].Shiwaku and Shaw[16] in their research conducted in different parts of Japan, had the aim to understand the link between disaster education and students' awareness. They found a distinctly higher risk perception and risk reduction actions of the students in the Maiko, as compared to other schools. This is because the Maiko focuses on mitigation and preparedness, teaches about the social environment, and makes students develop the idea about the importance of prompt actions. According to the literature consulted, it appears that despite the fact students have already learnt about disasters and prevention measures for years at school they demonstrated to be confused about these extreme events.[17]

9 Shiwaku, K., Shaw, R., Kandel, R. C., Shrestha, S. N., & Dixit, A. M. (2007). Future perspective of school disaster education in Nepal. *Disaster Prevention and Management, 16*(4), 576-587.
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Research results conducted in Scotland have shown that 38.1% of respondents informed about natural disasters over the neighbours, friends; 28.6% over the radio; 27.2% of the press; 28.5% over the national television; 36.7% through the competent authorities and 12.8% in other ways.[18] Cvetković et al.[19], found that those who had someone at school talking to them about natural disasters more often believed that they knew or were not sure whether they knew what best describes an earthquake, whereas those who did not listen to school when the subject of earthquakes was discussed more often believed that they did not know what an earthquake is. Also, they found that the sources of information about natural disasters (family, school, television, the Internet, radio, video games and lectures) influence the perceptions of secondary education students on their knowledge about earthquakes.

METHODOLOGICAL FRAMEWORK IN RESEARCH

The aim of this research is to examine the role of citizens' education about floods in Serbia in their perception and preparedness actions. In this respect, the authors focused their attention in investigating the level of knowledge about floods, the vulnerable people that might be more exposed to such risks, the prompt actions after an official warning and the household safety procedures to undertake. To examine this, respondents were asked to rate on a Likert scale their opinions from 1 (I do know absolutely) to 5 (I do not know absolutely), or to express their agreement on close ended questions and multiple choice ones. To examine their level of education and knowledge about floods, they were asked to answer to the following questions:

- Have you ever been educated on flood events?
- Have you ever been educated by your family about the causes of floods?
- Have you ever been educated at your work-place about the causes of floods?
- Do you know elderly, disabled and infants live in your community?
- Do you have knowledge about risk maps and official warning about flood occurrence?
- Do you know what to do after an official warning of a flood occurrence?
- Do you know the location and how to manage water valve, gas valve, and electricity device in your household?

The sampling has been undertaken based on the stratification of the population of the Republic of Serbia and according to its exposure to flooding. For this reason, 19 out of 190 communities were randomly selected including Obrenovac, Šabac, Kruševac, Kragujevac, Sremska Mitrovica, Priboj, Batočina, Svilajnac, Lapovo, Paraćin, Smederevska Palanka, Sečanj, Loznica, Bajina Bašta, Smederevo, Novi Sad, Kraljevo, Rekovac and Užice. A series of 2,500 face-to-face interviews has been conducted during the whole 2015 being a good census-based representation of the whole population of Serbia.

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RESULTS

Given the importance of familiarity with safety procedures for responding to a flood, the respondents were asked to choose what they would do if a flood would occur. According to the results obtained the higher proportion of people (41.4%) would fill and use sandbags. In decrescent order, the 23.9% would put their furniture on the upper floors and similarly (23.9%) would keep the most important things and evacuate. The 4.3 % would move their vehicles to a safer place and just the 3.3% would brick up the doors and shut all the openings (Figure 1).

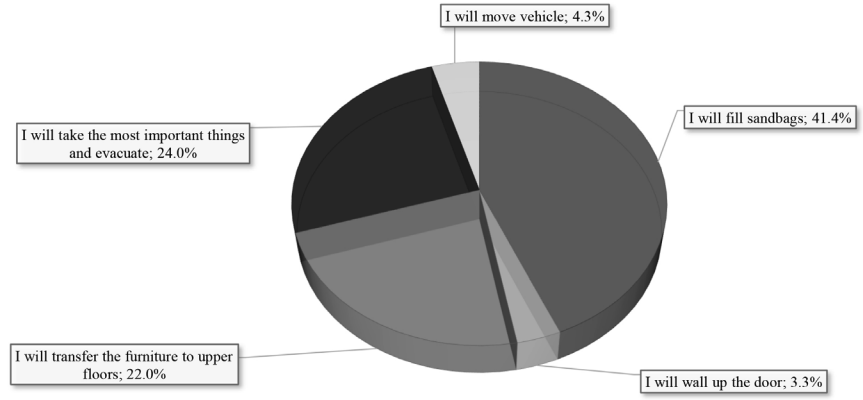

Figure 1. Percentage distribution of answers to the question: "What would you do in the period when expecting the flood wave?"

The school is a centre of education and results of this educational process are passed onto the families and the local community being centres of culture and teaching. Accordingly, the respondents were asked whether they have been educated about floods during high school. The answers were in the majority negative (75.1%) evidencing a tiny attention of school programs towards disasters occurrence and consequences. Apart from the school, the family, as the basic unit of society, usually bears the more negative burdens of floods. For this reason, they might have developed personal strategies to cope with these events generated by family-generated knowledge and past experiences acquired with previous situations. For this reason, the respondents were asked whether someone in the family educated them about floods. The majority (40.2 %) of the respondents discussed about flooding occurrence within the family context whereas the 38.9 % never explored this between household members. The remaining percentage was not sure about it. Furthermore, the respondents were asked whether the work-place was a source of knowledge about these events. The majority (45.5 %) answered negatively while the 29.9% received some information and training about flood events. The remainder again was not sure about the answers.

Mutual support and respect in the event of a natural disaster are of particular importance. However, to provide adequate assistance to vulnerable people, the citizens of local communities need to know where in their community elderly, disabled and infants live. Respondents were asked whether they have any idea about the locations of the most vulnerable people in the community. The percentage is not encouraging reaching just the 40 % of people that know where the more fragile people are based. In this regard, the respondents were asked to answer the question whether they know what type of assistance is required by elderly, disabled and infants before, during and after a flood. Slightly more than 50% of the respondents feel secure

about the procedures to undertake in the whole life of the flood may be ground on the composition of their own household.

Knowledge of flood risks by citizens in a local community is an essential precondition of awareness about the necessity of implementation of preparedness measures for a response. Risk map in this framework are essential knowledge to understand the place where they live and the potential danger they are exposed to. According to the interviewees only 14% are aware about the existing of these maps and are not knowledgeable about flood risk location in general. In line with this, the familiarity with warning systems is important for creating an environment in which evacuation could be an efficient procedure to undertake. According to the results, 26.6% said that they are familiar on the proper sections and after an imminent warning they know what to do. On the other hand, the remaining proportion of people are not sure (33.8 %) or don't know what do at all (32 %). The critical action to undertake before an incoming flood event needs to be taken even at the household level. People need to have sound knowledge of the location of valves for water, gas and main electricity supply and how to manage them in order to keep the house safe. The 76 % of respondents know where the water valve is, and 71.8 % know how to manage it. Concerning the gas valves, the 41 % of people know the location and only 38.8 % know their functioning. At the end 72.5% know where the main electricity switch is and 66.7% know how to treat it.

The results of chi-square test of independence show that there is a statistically significant relationship between almost all of the variables selected and the socio-economic factors, the demographic variable san dthe psycologicla ones (Table 1). Further analysis showed that men in a higher percentage than women claim that they know what a natural disaster is, in fact in slightly higher percentage than women (27.7 % vs. 25.3%) state that they have been informed at school. Similar findings have been found for adults respect the younger individuals. This is in contrast with the cross-tabulation with hazard education since the youngest are the one that expressed a higher education to these events. What is interesting to notice is that young people get educated even at a family level but this does not translate into a higher knowledge. The interviewees with a University degree in highest percentage (31.6%) state that they know what a flood is, unlike the citizens who have completed doctoral studies, i.e. the more educated category (0.5%), but no difference in education was found. Engaged citizens in the largest proportion (30.6%) claim that they know what a natural disaster is unlike the citizens who are singles or divorced. In addition, the power to be two individuals gave them the opportunity to speak about floods being more self confidence about these events. When it comes to fear, it was found that people who have fear of floods to a higher percentage (28%) respect painless people probably on the grounds of the education they have received. The information at household level has unfortunately been seen to be statistically correlated to fear. It seems that exchange communication elnarge the burden of worry. Even income has been seen to be a predictor of knowledge of floods occurrence. Low income people (up to RSD 50.000; 20.2 %) have lesser knowledge with respect to higher income people (above RSD 90.000; 35.4 %). Unexpected interviewees with no past experience (62.6%) of floods know better these events with respect to the ones who experienced such events (21.4%). The latter have been found to be more informed in the family context with respect to the opposite group. The employement status has been a predictor to the level of the information acquired at the houhold level. The unemployed people are more informed about these evetnts. Education at work is statistically significantly associated with all tested variables where men, adults, educated people, fearful people, employed and with prior flood experience got the higher values.

Table 1. Results of the chi-square test of independence

	Gender	Age	Education	Marital status	Fear	Past experience	Income	Employment
Knowledge	.000*	.000*	.000*	.000*	.000*	.000*	.000*	.175
Education	.347	.000*	.003*	.003*	0.263	.087	.000*	.000*
Family education	.085	.000*	.000*	.000*	.012*	.001*	.162	.009*
Work-place education	.000*	.000*	.000*	.000*	.000*	.002*	.000*	.000*
Knowledge of the location of vulnerable people	.249	.005*	.060	0.07	.008*	.338	.023*	.011*
Knowledge of risk maps	.013*	.000*	.002*	.002*	.043*	.234	.000*	.562
Familiarity with official warnings and related actions	.073	.000*	.000*	.000*	.021*	.000*	.000*	.027*

*statistical significant correlation ≤ .05

Citizens aged 38 to 48 years in the highest percentage (45.9%) know where elderly, disabled and infants live. Similar statistical correlation has been found from married couples, more sensitive towards these fragile categories probably grounded on the comosition of the household. In additon, fearful people feel more concerned about the actions and the location around the more vulnerable in line with those that had previous experience. The correlation with knowledge of flood hazards and the set of dependent variables had almost the same results obtained for the knowledge of risk maps. Men (16.3%), citizens aged 58 to 68 years old, those that feel worried about these events (15.3%) and the employed (14.7%) are familiar with the risk maps. As expected past experience was the predictor of the knowledge of this documents.

Finally, education on how to act after an official warning about the approach of flood statistically significantly is associated with age, the level of education, marital status, fear of disasters, previous experience, level of income and employment while there is no association with gender. Adults are more confident on the actions to be underatken after a flood event (44.7%) with respect to the youngest (21%). Low educated people have similar confidence in line with sigle parents. It is probable that they have less responsibility for the preparing the household in the mitigation and recovery processes. Again the fear and past experience of floods is a proxy of a higehr level of knowledge about the actions in the aftermath a possible occurrence.

CONCLUSIONS AND DISCUSSION

Regarding disaster risk reduction, schools should become increasingly important institutions in creating and improving the safety culture in children and youth. But not only since they provide the whole essential information and knowledge about disasters in the local community where students live. It can be said that the importance of school education on disasters has risen sharply in the last decades, especially bearing in mind that children are the most

vulnerable people in the society.[20] In this paper our findings highlighted the highest number of respondents were educated about natural disasters at school, than in the family and the end at work. School disaster education is very important and children who have been taught about the phenomenon of disasters and how to react to those situations have proved to be able to respond promptly and appropriately.[21] Also, continuous community involvement is the most important factor for school disaster education.[22] Johnston and colleagues found that the traditional educational programs on natural disasters focused on passive information provide a very low level of awareness and motivation of citizens to raise the level of preparedness for response.[23]

In the moments before the arrival of the flood the highest number of respondents would fill sandbags and the smallest nubmer would move their vehicles. Similar findings have been found in Scotland.[24] Regarding the actions aimed at preparing for a flood. They have evidenced that filled sandbags and locked doors were the most underatken measures underlining the place attachment and the unwillingess to evacuate or protect proper goods. Elderly people and disabled are in many ways especially vulnerable to the natural disasters and have specific needs in emergency situations.[25] Our findings highlighted that less than half of respondents know where elderly, disabled and infants live, while half of them know what assistance is required by these categories of people.

The awareness of the possibility to get exposed to a flood threats plays an important role in disaster risk reduction.[26]

The exposure to a threat plays an important role. In general, our respodents showed low personal flood-risk and level of knowledge of floods what to do in the period before the arrival of the flood wave. On the other hand, our findings highlighted that more than half of the respodents know where and how to handle the water valve and the main electric switch is. But less than half know where and how to handle the gas valve.

Community flood education is becoming an increasingly important flood mitigation and disaster management mechanism.[27] Citizens who are informed on time about the upcoming natural disaster through the warning and notification systems will not feel such fear because they know everything will go according to the pre-established procedures. [28] Besides fear, knowledge, previous hazard experience and feeling of threat of those at risk are important factors in the recognition of different risks.[29] We found that men, engaged citizens, respodents

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who have a fear of floods, higher income peple and unemployed in a higher percentage than women, singles or divorcées, respodents who don't have fear of floods, low income people and employment claim that they know what a natural disaster is. To improve knowledge it is necessary to raise awareness through campaigns, educational programs and strategies for all citizens, especially women, citizens - aged 28 to 38 years, those who have completed doctoral studies, singles, those who have fear, who have incomes up to RSD 50.000 and who have no previous experience.

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