

FLOOD PREVENTION IN THE AREA OF THE MUNICIPALITY OF SRBAC AND THE RESPONSE OF THE COMPETENT AUTHORITIES

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Abstract: Floods are common natural disasters. The reason for such a thing is the geographical distribution of river valleys and low coastal areas, and their attractiveness for the construction of settlements. The aim of this research is focused on researching the responses to floods by the competent authorities at the specific local community. When it comes to capacities, the material and personnel capacities of entities in charge of flood prevention measures in the area of the municipality of Srbac were analyzed. Also, the research includes inter-institutional communication and cooperation in flood prevention. The research results indicate a lack of trained staff for protection and rescue operations, a lack of material and technical resources and a lack of inter-institutional communication.

Keywords: Flood, Prevention, Response, Population, Srbac

1. INTRODUCTION

In accordance with the 2023 EM-DAT report (CRED, 2024), last year recorded a total of 399 disasters related to natural hazards. These events resulted in 86,473 fatalities and affected more than 93 million people. The economic losses were almost US\$203 billion. Two events in 2023, the earthquake in Türkiye and the Syrian Arab Republic and the Indonesian Drought were the most catastrophic event of the year. However, most disasters in 2023 were floods, 41% of all disasters, and most of them happened in Asia. Europe had 61 flood disasters during 2023. Last year in May floods hit north and north-west parts of Bosnia and Herzegovina. Those floods caused huge economic losses in those local communities.

To protect the population from floods is quite challenging. Nature is very unpredictable, but some anthropogenic factors also made floods possible and raised the risk of floods. Preventive measures are supposed to be basic to protect the population, infrastructure, and environment.

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According to the International Strategy for Disaster Risk Reduction, risk management is: "the systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards." (ISDR, 2009)

The subject of research in this paper is flood prevention in the area of local communities with a focus on the municipality of Srbac. Moreover, the focus of the research itself is on the analysis of the work of institutions and entities responsible for the implementation of flood prevention and protection measures. They primarily refer to civil protection authorities, followed by internal affairs authorities and firefighting units.

The research aims to present the institutional capacities of competent protection and rescue entities. This paper consists of some chapters such as the introduction, flood prevention, methodological framework, results of research, and conclusion.

2. FLOOD PREVENTION AND SRBAC MUNICIPALITY

2.1. Flood prevention

Floods are common natural disasters. The reason for such a thing is the geographical distribution of river valleys and low coastal areas and their attractiveness for the construction of settlements. Physically, a flood represents a high water level that exceeds natural or artificial banks. (Culibrk, 2015: 67)

Floods occur as a result of water overflowing beyond natural and artificial boundaries, that is when the inflow of water exceeds the capacity of natural retention (retention) or infiltration. (Varga & Babic-Mladenovic, 2001) A flood, as a natural disaster, unlike others, can last for a longer period (up to several months) and therefore the damage it causes is much greater. As stated in the *Directive on flood risk assessment and management*, "floods are a natural phenomenon that cannot be prevented. However, some human activities (for example, growing settlements and economic assets in floodplains and reducing natural water retention through land use) and climate change contribute to an increase in the likelihood of floods, as well as their harmful effects. It is feasible and desirable to reduce the risk of adverse consequences associated with floods..." (Directive, 2007/60/EC)

The science that deals with water is called hydrology. (Crnogorac, 2009:5) In its broadest form, hydrology is a science that studies the appearance, temporal, and spatial distribution and circulation of water on Earth, its physical and chemical properties, and its behavior under the influence of artificial objects and other human activities. (Zelenhasic & Matilda, 1991:1) According to the basic characteristics of floods in the territory of BiH, they can be roughly divided into calm (in the plains) and torrential (on hilly-mountainous land). (Jurisic, 2016:30) According to the Law on Waters of the Republic of Srpska (Official Gazette of the Republic of Srpska, number 50/06) "water means all water in the interior, which is standing or flowing on the surface of the land and any underground water closer to the ground along the baseline of the border of the territory".

According to the disaster management theory phases of disaster management are: risk reduction (disaster mitigation), preparation, emergency management, recovery, and reconstruction. (Alexander, 2007) Some authors use the term prevention, in addition to mitigation, response, and recovery, as the first and most important activity in disaster management. (Cvetkovic, 2020)

The word prevention is taken from the medical dictionary, so it has a similar meaning as in medicine. Basically, we mean two things by prevention. First, prevention means intervention. To act preventively means to intervene in a certain way and with certain means. However, the key moment for understanding the term prevention is contained in the prefix - before. This prefix means that when we talk about prevention, we mean that type of intervention that is implemented before unwanted phenomena manifest themselves. (Krivokapic, 2002:31)

2.2. Municipality of Srbac

Bosnia and Herzegovina is a country composed of two entities (the Republic of Srpska and the Federation of Bosnia and Herzegovina) and the Brcko District. Both entities consist of lower structures of government. In the Federation of Bosnia and Herzegovina, there are then cantons, and cantons are composed of municipalities. In the Republic of Srpska, there are no cantons just 64 municipalities under the rule of the Republic of Srpska Government.

Moreover, is important to highlight that the system of protection and rescue, is strictly decentralized in Bosnia and Herzegovina. It means that all burden of protection of people, infrastructure, and environment in the case of natural and manmade disasters, is in the hands of local communities, and municipalities. One of those municipalities is Srbac.

The municipality of Srbac is located in the north of Republika Srpska and Bosnia and Herzegovina. It borders the Republic of Croatia in the north, Gradiska in the west, Laktasi in the south, Prnjavor in the southeast, and Derventa in the east. With its 452.51km², the municipality of Srbac is the 24th largest municipality in the Republic of Srpska. Its territory is divided between plains and hilly mountainous regions. About two-thirds of the area is hilly and hilly, and the rest is made up of plains. The number of inhabitants in the Serbian territory changed in the past, so examples were recorded that in one decade the number of inhabitants increased or decreased by a third, or even by a half. In June 1993, an extraordinary population census was carried out in the Republic of Srpska, and 22,145 inhabitants were counted in the territory of the municipality. (Kosutic, 1994:68)

According to the results of the Census of Population, Households and Dwellings in the Republic of Srpska from 2013, published by the Republic Institute of Statistics of the Republic of Srpska, the total number of inhabitants of the municipality of Srbac is 16,933, live in 6,157 households, i.e. in 7,477 buildings with 8,361 apartments.

Municipality Srbac is located on the banks of the Sava and Vrbas rivers, not far from where the Vrbas river flows into the Sava. For this reason, Srbac was flooded whenever larger rivers overflowed their beds. Specifically, some places were flooded in 2010, 2012, 2014, 2018 and 2023. During all these floods, considerable material and economic damage was caused.

River Vrbas and river Sava are, as it is mentioned, the most significant rivers in the municipality. Vrbas River flows from the south to the north of the municipality dividing municipality Srbac into two parts. Moreover, the Sava River flows from west to east and it is the north border of the municipality and the border with the Republic of Croatia. There are also smaller rivers which can cause problems and torrential floods, too.

3. METHODOLOGICAL FRAMEWORK

This paper presents a part of the findings of a wider research (Babic, 2024), which was conducted to determine the presentation of the institutional capacities of competent protection and rescue entities. The hypothesis was that the municipality Srbac is a flooding area and common floodings that hit the municipality in the last couple of years caused huge economic losses. During those floods, some shortfalls were realized related to the planning process, lack

of clear responsibility, poor maintenance of water facilities, lack of training, and lack of equipment.

The research sample in this paper consisted of members of the protection and rescue forces, that is, direct participants in the floods. The research was conducted on a sample of 30 respondents, in the period from July to August 2023. The sociodemographic characteristics of this sample are presented below. The number of male respondents was 90% (27 of them), and 10% of female respondents (3 of them).

When it comes to the age structure of the respondents, we can see that 60% of the respondents are between the ages of 31 and 55 (18 of them), then 27% of the respondents are between the ages of 56 and 65 (8 of them), while 13% of the respondents are between the ages of 19–30. years (4 of them). There were no respondents under 18 and over 65.

The structure of the respondents according to a professional qualification, ie educational profile, can be presented as follows: the largest number of respondents, 23 of them (77%) have secondary education, while 7 of them (23%) have higher education. None of the persons employed in the protection and rescue services has a master's degree or doctorate.

Based on the respondents who make up this sample, we can see that 37% (of them 11) of the respondents are employed in the Territorial Fire Department, then 36% (of them 11) are members of the Sr bac police force, 13% (of them 4) are employed in the Red Cross, 7% (2 of them) is in the Civil Protection and 7% (2 of them) in the Mountain Rescue Service Sr bac (GSS Sr bac). None of the respondents were employed in the Armed Forces of Bosnia and Herzegovina.

To test the hypotheses, with the help of the semi-structured interview method, data was also collected from members of the protection and rescue team.^b

4. RESEARCH RESULTS

In the following, research is presented on a sample consisting of members of the protection and rescue forces and managers of competent authorities.

To the question "In my work organization, am I satisfied with the expertise and competence of the staff engaged in protection and rescue operations?" respondents of the protection and rescue forces answered that 4 or 13.33% conditionally agree, 4 or 13.33% can't decide, 11 of them or 36.67% mostly disagree and 11 or 36.67% do not agree at all.

To the same question to the head of the competent authority, they answer: "that they are not satisfied concerning expertise and competence." Specifically, the head of the Department of Civil Protection states that there are 36 Commissioners of Civil Protection in the municipality of Sr bac, who are distributed among local communities. The same states that these are older people, who have neither been trained nor have much experience when it comes to floods. He also believes that insufficient training is a problem. He believes that the situation is like this because there is not enough budget that is necessary to meet the needs of Civil Protection. For each staff training, it is necessary to refer it to associations that are specialized in flood prevention work. The head of the Firefighting brigade of Sr bac municipality agrees, stating that when it comes to floods, the unit has only three men who are qualified to operate a boat. He also states that he needs to train three more people to have two groups with three people each. When it comes to the Police Station in Sr bac, the deputy commander states that only

^b During the implementation of the research results, a semi-structured interview was conducted with the head of the Department of Civil Protection, the deputy commander of Police Station in Sr bac and the head of Firefighting brigade of Sr bac.

three police officers have completed training as boat operators. No police officer, nor firefighter, has completed training for rescue over water or underwater."

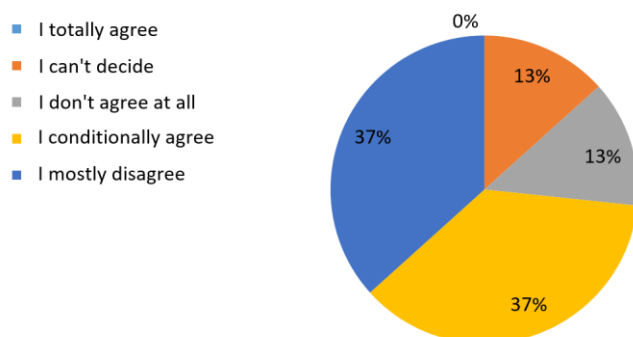


Chart 1: Question 1 - In my work organization, am I satisfied with the expertise and competence of the staff engaged in protection and rescue work

To the second question "Does the organization in which I am employed regularly plans, organizes and implements exercises in the field of flood protection and rescue?", respondents from the protection and rescue forces answered as follows: 11 or 27.50% cannot decide, 15 or 37,50% mostly disagree, while 14 or 35% of them do not agree at all.

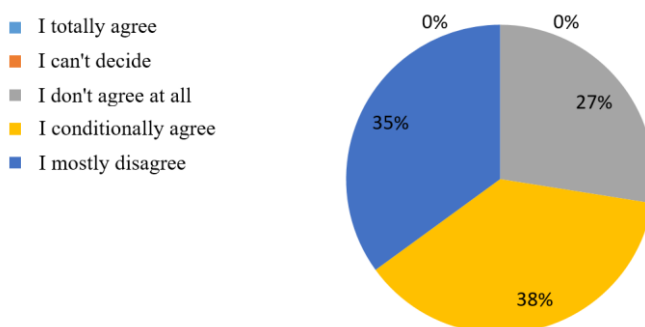


Chart 2: Question 2 - Does the organization in which I am employed regularly plan, organize and implement exercises in the field of flood protection and rescue?

Interview participants state that "once or never a year they independently plan, organize and implement exercises in the field of protection and rescue." Specifically, Civil Protection organizes exercises once a year. Such a situation is justified by representatives of Civil Protection with an insufficient budget. The Firefighting brigade of Srbac municipality elder agrees with these constataions. He believes that the situation is like that because they have a modest budget that is not able to meet all their needs. When it comes to the Police Station in Srbac, they do not plan or implement rescue exercises at all."

To the third question "Does the organization where I am employed together with the protection and rescue forces regularly plan, organize, and implement exercises in the field of flood protection and rescue?", respondents from the protection and rescue forces answered: one or 3.33% cannot decide, 13 or 43.33% mostly disagree, while 16 or 53.33% of them do not agree at all.

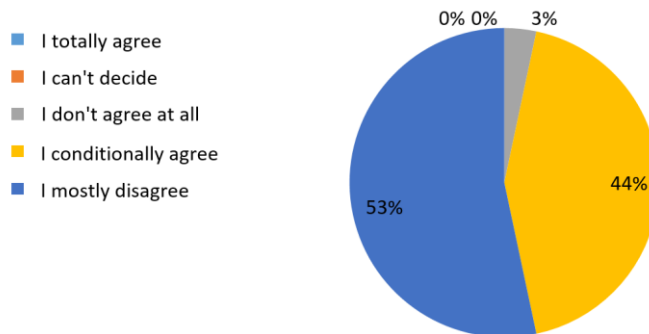


Chart 3: Question 3 - Does the organization where I am employed together with the protection and rescue forces regularly plan, organize and implement exercises in the field of flood protection and rescue?

The participants of the interview stated, "that so far no joint exercise in the field of flood protection and rescue has been planned, organized or implemented." However, everyone agrees that something like this is needed for better coordination among the subjects."

To the fourth question "Does my work organization maintain regular communication with other protection and rescue forces in the territory of the municipality of Srbac?", respondents of the protection and rescue forces answered that one or 3.33% totally agree, three or 10% conditionally agree, two respondents or 6.67% cannot decide, 15 respondents or 50% mostly disagree, while nine of them or 30% do not agree at all.

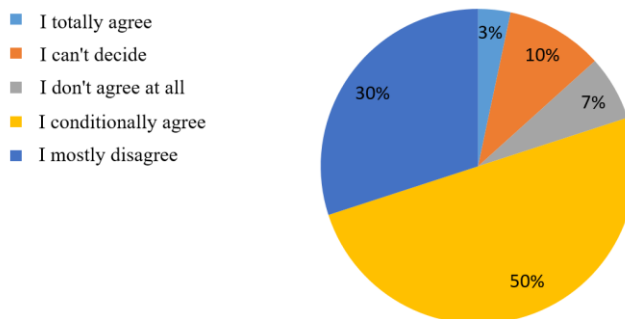


Chart 4: Question 4 - Does my work organization maintain regular communication with other forces for protection and rescue in the territory of the municipality of Srbac?

The participants of the protection and rescue forces state that they maintain communication only in cases when it is necessary, that is when the situation is such that communication is required.

To the question "What are your suggestions to improve prevention in the municipality of Srbac when it comes to floods?" respondents of the protection and rescue forces answered that it is necessary to conduct much more training, which will be continuous. They also emphasized the allocation of more funds from the budget for the needs of equipping units, and special emphasis was placed on more frequent communication between subjects.

Managers of competent authorities share a similar opinion, stating "that the profiles of workers they lack are those who have knowledge and experience in the field of security.

In particular, they need young people who have graduated from related faculties where knowledge in the field of security, natural disasters, and other disasters is studied."

To the next question "In my work organization, and with the aim of protection and rescue, are the existing material and technical means (MTS) sufficient for an efficient and effective response to flood hazards?", respondents of the protection and rescue forces answered that there are three of them or 10% conditionally agree, while 16 of them or 53.33% mostly disagree and 37% answers were "do not agree at all".

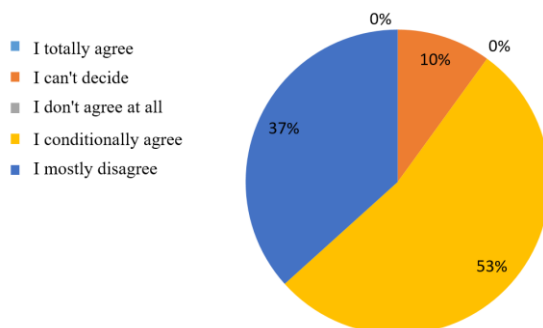


Chart 5: Question 5 - In my work organization, and with the aim of protection and rescue, are the existing material and technical means (MTS) sufficient for an efficient and effective response to flood hazards?

A similar opinion is shared by the respondents who state "that their existing material and technical means are not sufficient for an efficient and effective response. In the interview, the head of the Department of Civil Protection believes that the budget provided for them is not enough, even for the purchase of shovels for filling sandbags. Moreover, he highlights the lack of sandbags, boots, and other accompanying equipment, that is needed for Civil Protection. Also, they do not have a warehouse to store the equipment, and existing equipment is stored on the premises of the Utility Company "Vodovod". He also emphasizes the lack of mechanization needed for flood defense. However, this was partially compensated by the companies that exist in the territory of the municipality. The Firefighting Brigade elder states that they also have a modest budget. Furthermore, he states that, although they have three members trained to manage the boat, there are no life jackets, and the boat they own does not have the accompanying equipment (anchor, technical tools, etc.). He also points out that it is necessary to acquire another boat with all the necessary equipment to fight floods. The deputy commander of the Police Station in Srbac says that they have one boat, but they also don't have life jackets. All respondents agree that it is necessary to allocate a larger budget for the needs of prevention.

When asked about proposals to improve flood prevention in the area of the municipality of Srbac, the head of the Firefighting brigade and the deputy commander of the Police Station in Srbac pay more attention to training. However, everyone agrees that it is necessary to conduct more exercises, to work on improving the condition of its members, as well as on the implementation of joint exercises.

5. CONCLUSION

In this research, it was determined that insufficient staff training, i.e. the lack of profiled staff for flood prevention work, is a big problem. In the conversation with the management entities of the protection and rescue services, they stated that they do not maintain regular mutual communication, that is, communication exists only when a flood occurs, when a problem occurs. The results of the research indicate that the activities must be planned, that is, the number of citizens who will be trained must be defined, as well as the number of members from the protection and rescue system. Also, it is necessary to improve communication

between all subjects, because the job of preventing floods and other natural disasters must be raised to a higher level. It is evident that Civil Protection, as part of the protection and rescue system, is taking on an increasingly important role, which it certainly should have. The activities must be planned, that is, it must be defined how many annual exercises will be organized, the number of people from the citizenry who will be trained, as well as the number of members from the protection and rescue system must be determined. The Prevention of floods should be raised at a higher level in municipality Srbac taking into consideration floods that regularly hit some parts of the territory of municipality Srbac.

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