

Social Mobilization to Prevent Floods and Runoffs in the City of Batna, North-Eastern Algeria

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Abstract

With the growing interest in ways to protect cities from the danger of floods, we try in this research to create a social mobilization based on the dissemination of awareness in the city of Batna, northeastern Algeria, after examining the factors that control its construction at present, exploiting bibliographic research and the results of a questionnaire in electronic and other paper formats, and some short free interviews with residents of the city.

The study showed that some of the current factors, such as the class of belonging in the society, limit the attempt to build a resilient city, and that the lack of awareness could be the reason for the interruption of the chain of flood risk management in the city. The study also aims to clarify some means of prevention and protection, such as avoiding building near valleys.

The study also refers to mechanisms and ways to educate the population, such as exploiting the media and educational institutions. Thus, this research aims to support non-structural measures to protect the city from this hazard.

Key words: Social mobilization, community awareness, flood risk, Batna.

INTRODUCTION

In recent decades, with the change of the climatic situation (Zafar & Zaidi, 2016), interest in ways to prevent and protect communities from the danger of floods has increased, although the focus was entirely on preparing technical studies related to protection facilities and methods of achievement, even with the progress recorded in this framework the Algerian city still suffers from this danger. The actual research on the problem leads to one hypothesis, which is that there is a break in the risk management chain and one of the main causes of this discontinuity could be the unconsciousness in the society.

The success of mitigation measures is linked to their acceptance and implementation (Cruz-Bello & Alfie-Cohen, 2022) by society. The current system may be an incomplete system, and any stage of risk management cannot succeed if it is not supported by disciplined societal support. So It is not possible to benefit from structural preventive measures or forecasting and early warning systems if this is not coupled with preparing individuals to act in order to avoid the crisis, before and after its occurrence. Batna is an example of an Algerian city suffering from flooding (Slimani & Kalla, 2017). And working on the social mobilization of its residents could be a decisive factor in the future of flooding in the city.

Social mobilization refers to the principles that are used to influence a large number of members of society to participate in an activity (Rogers et al., 2018), i.e., it is an attempt to mobilize the efforts of individuals for the change process.

In this context, social mobilization calls for the diffusion of awareness. People's awareness that they and their property are located in flood risk areas is an effective and supportive element for protective measures (Netzel et al., 2021) and can change their irresponsible behavior towards the urban environment.

Thus, they become an active element in the circle of risk management in the urban center, and this will be an important factor to value the efforts made by the authorities. Awareness is therefore the basis of any individual or collective contribution to the protection of the city.

Lack of community awareness is one of the main factors involved in increasing the level of danger, as irresponsible actions and behaviors in the context of urban life can be one of the main problems hindering the national flood risk prevention strategy. Citizen participation depends on hazard awareness (Wehn et al., 2015). In addition, awareness is necessary for the city's resilience to the threat and improved preparedness capabilities (Rufat & Botzen, 2022).

In this research, we aim to answer the following questions: How might the factors controlling community awareness currently affect authorities' efforts to protect the city of Batna from flooding? What mechanisms are available to disseminate awareness, mobilize society, and involve it as an active element in managing the hazard?

From there, the research tries to highlight an important element in flood risk management, whose role is usually absent or reduced, namely the community. Likewise, the research indicates the mechanisms of awareness of the population, and what the inhabitants of the city must achieve in this context, and what are the levels in which they can be involved.

In this research work, we also aim to clarify the role of social mobilization and the elements that must be taken into account to mitigate the danger and prevent its exacerbation, and how social mobilization can be used as a tool to stand between the danger and the disaster.

Consequently, the research is an attempt to support efforts to create resilient cities and resist the risk of flooding, based on the dissemination of community awareness on proportion to the magnitude of threats and vulnerabilities that the city of Batna suffers.

METHODOLOGY

The research was based on a literature review and the results of a closed questionnaire in electronic format that was made available through the social network site Facebook with an updated publication in the most important pages and groups interested in the city, and a paper version that was hand-delivered and included 69 people, in an attempt to involve both age groups of less than 18 years and more than fifty years,

The questionnaire questions were taken from previous research on the same topic, to which 464 people from the general population responded, the (Fig. 1) represents the personal data of the research sample. The research also relied on short, open-ended interviews with some of the residents in the study area. These interviews, which we felt were an additional way to understand the factors controlling awareness of this hazard, and perhaps to take note of new factors outside the research.

The research relied more on the research included in the widely used Scopus database, where we tried to find the factors on which the awareness of the danger of floods is currently based and an attempt to assess their effects, as well as ways to create social mobilization to prevent the danger based on the spread of awareness and what mechanisms to be used, the research was done using the following vocabulary:

TITLE (flood) AND (perception OR Awareness OR knowledge OR consciousness OR realization) AND (LIMIT-TO (SUBJAREA,"SOCI")) AND (LIMIT-TO (DOCTYPE,"ar"))

The search resulted in 2095 articles and we used VOSviewer, a software tool to create a visualization of the bibliographic network as in (Fig. 2) according to the common presence in the titles and abstracts, and we tried through the bibliographic search to know the possibility of the impact of these factors on the population of the city of Batna and understand the reasons for the failure to form a new community vision of the danger of flooding. A vision that clarifies the size of the expected threats, as a background to present suggestions and recommendations to mobilize community efforts as an important element in the preventing and handling flood risk in the future.

(Burningham et al., 2008; Zabini et al., 2021) have attempted to understand the basis of awareness and its relationship to flood risk preparedness through their study of a population at risk.

Although understanding the factors controlling risk perception is a complex issue (Miceli et al., 2008), these studies illustrate an important aspect of this research, in addition to the study (Al-Juhaishi, 2012), which was interested in the mechanisms of diffusion of awareness related to the environment in general, which can change The prevailing culture, including the behavior of society in relation to the urban space, and we took the above and tried to adapt and relate it to the topic and research area. Although the city has its own specificities, the reasons for the lack of awareness of the phenomenon of floods and torrential rains can be relatively generalized because many cities through the world frequently are experiencing it.

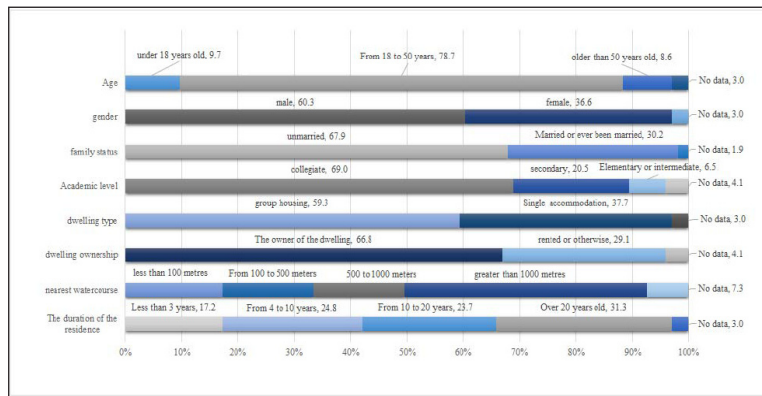


Figure 1. Personal data of the research sample. Source: Authors, 2022

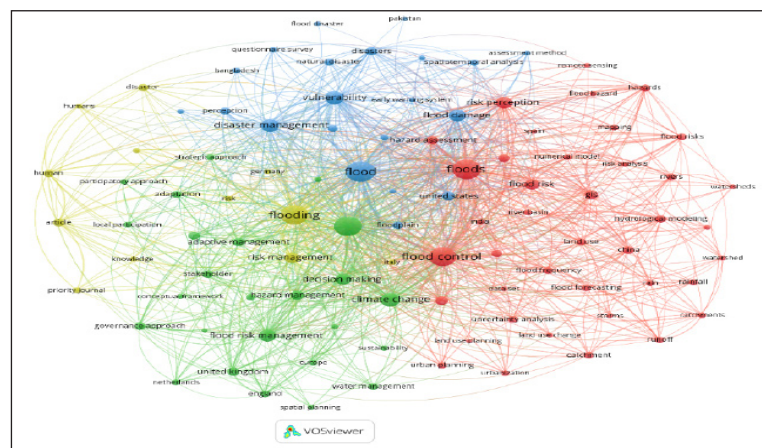


Figure 2. Vocabulary network according to common occurrence in research papers. Source: Authors, 2022

RESULTS AND DISCUSSION

The Most Important Current Factors Controlling Community Flood Risk Awareness

Previous Flooding Experience

Individuals who have experienced previous extreme incidents have a greater perception of danger than others (van der Linden, 2015) and preconceived ideas about necessary precautions for prevention and protection based on the event they experienced, which means that previous events contribute to the construction of collective memory (Cruz-Bello & Alfie-Cohen, 2022).

According to our research, only 17% of people who have ever been exposed to flooding take personal action to protect their property, which sometimes includes voluntarily cleaning the sewers adjacent to the property.

This percentage is not consistent with desired outcomes, as it is assumed that a previous flooding experience significantly contributes to awareness (Burningham et al., 2008; Poussin et al., 2014) and causes increased interest in climate change and its effects (Spence et al., 2011). However, the large percentage of the population that sees the responsibility to protect the city as being the responsibility of the state is an explanation for not taking personal protective actions.

Societal Class

The fragile classes are generally less interested by the hazard, due to several factors such as income (Miceli et al., 2008), and the most important manifestation of this is the fragile dwellings that are prevalent on the edges of valleys and in areas identified as uninhabitable.

(Burningham et al., 2008) indicates in his study that the lower classes of society, which represent the most deprived population, are the ones that occupy the largest surfaces of the areas at risk of flooding, and he supposes that the low level of education and the lack of participation in the campaigns organized by the state may be an explanation. (Gray-Scholz et al., 2019) indicated the importance and role of education in hazard perception and that there is a positive relationship between them.

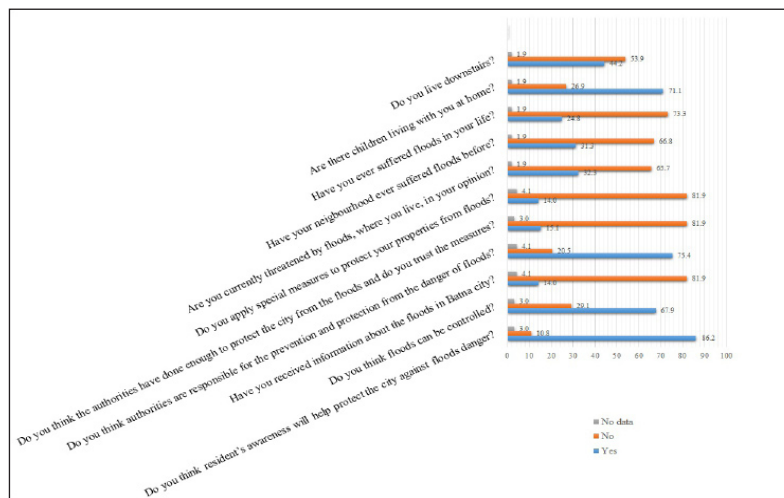


Figure 3. Percentages of responses to the questionnaire. Source: Authors, 2022

Residence

People’s perception of risk and their involvement may vary based on geographic factors from city to city and from neighborhood to neighborhood within the same city. This may be due to the location of the area or its nature and function, even if it has been affected by previous flooding events (Wehn et al., 2015).

It may also be due to the extent to which its residents benefited from awareness campaigns, as they generally target high population densities in cities, and are therefore more directed to spread awareness among large urban areas that may be at risk of flooding. Compared with the share of small urban communities in awareness campaigns which may be low (Burningham et al., 2008) and although the city of Batna is frequently exposed to flooding, 81.9% of the study sample did not receive any information about flooding in the city.

Length of residence

In general, former residents of the area judge the possibility of flooding based on their length of residence and knowledge of the area, and age is an influential factor in hazard perception (Kellens et al., 2011). The survey showed that 25% of respondents who are in the over 50 age group, who have resided in the area for more than 20 years, believe they are at risk of flooding.

Despite its importance, it is not possible to rely entirely on the period of residence in the area to judge future incidents. Studies have shown that it is possible to approximate the prospects for torrential rainfall, flow levels, and the possibility of flooding in the area based on long periods of time, but the field is still open to exceptions, as there may be incidents that contradict expectations.

Social Contagion

That is, the perception of some individuals and their behavior is characterized by imitating others without being based on a strong basis, and that is when an individual occupies an area at risk of flooding for special reasons, being intentionally exposed to danger in the hope of benefiting from relocation to new housing where he finds no reel opposition from the bodies charged with monitoring irregular constructions, thus opening the door for others to more violations and a race to occupy the banks of valleys.

Confidence in Protective Measures

That is, residents are mainly dependent on the efforts of the authorities and modern technology to protect themselves (Gray-Scholz et al., 2019; Netzel et al., 2021) and see the entire responsibility for protecting the city as falling on the state and do not see the possibility for them to help, and their role or knowledge of this threat does not matter, and it became clear that 81.9% do not trust the protection measures and believe that the authorities have not done enough to protect the city, which is the same percentage that represents the number of residents who do not take special measures to protect their personal property, and 75.4% % of the sample consider the authorities to be responsible for the protection of the city from flooding.

Uncontrollable Flooding

While some people consider flooding to be something uncontrollable and that no means are able to control it because it is the result of an enormous force and anger of nature or a form of punishment, our study found that 29.1% of respondents believe that flooding cannot be controlled, including academics, 26% of whom agree with this statement, and this has nothing to do with ineffective protective measures or irresponsible societal behavior.

Urban Flooding is an Unusual Hazard

Compared to flooding in valleys and rivers with constant flow, urban floods and torrents represent an intangible, unusual, and invisible threat. This may be one reason that affects society's interest in it as a real hazard requiring attention and response (Netzel et al., 2021). Although many points in the city are considered vulnerable to flood hazard due to the location of the city, 65.7% of the surveyed sample consider that they are not threatened by flood hazard.

Proximity or Distance to Valleys and Type of Housing:

The population close to the watercourse is more aware of the danger (Miceli et al., 2008) because they witness changes in water levels and flow periods and are more at risk. The questionnaire revealed that 45% of the population that is separated by less than 100 meters from the nearest watercourse thinks they are at risk. On the other hand, 85% of the population whose residence is located more than 1,000 meters from the nearest watercourse do not think they are at risk.

This is also an erroneous basis for assessing risk, as risk is related to topographic levels rather than distance. Remote areas, which are at a lower level of the valley, may be at greater risk than buildings near the valley, which are at a higher level. Although residents occupying the lower floors of buildings are expected to be more concerned about the hazard because they are more vulnerable, our research shows that only 31% of them believe they are at risk of flooding.

Building Ownership and Family Status

Some studies indicate that building owners are more concerned about the risk of flooding and torrential rain than renters because their private property is at risk, and the perception of danger among married couples and those with children is greater than among singles (Miceli et al., 2008) and for our study, 32% of those who are married or formerly married and have children at home think they are in danger, compared to 15% of singles who do not have children and think they are in danger.

How to Reach an Awareness of the Danger of Flooding in Batna

What Needs to Be Achieved for the City's Inhabitants

Regarding the city of Batna, what the population needs will be mainly related to the sensitivity of the city to the risk of flooding due to its particular location in the mountains, as explained by (Guellouh et al, 2020; Harkat et al, 2020; Slimani & Kalla, 2017; Bella, 2006). It is related to the avoidance of building near the water courses in general, except in case of total guarantee and taking into account the topographic levels, and this includes even the old paths of the wadis, including Tazoult, Hamla and Azzeb, to avoid building in areas exposed to the risk of flooding or even erosion. As for the houses located near the Al Gourziwadi, especially in the low areas of it, and the houses located near the covered waterchannelsthalweg and Hizam channel, which cross the city center as represented in (Fig. 4), as well as all the houses adjacent to the water divider basin park Aforage, so, they must be prepared structurally and their residents must be prepared for any scenario including the flooding of the area by water, and coordination must be made with the authorities in charge of the crisis response, as well as with civil society organizations, and deal with evacuation arrangements. All residents should also be aware of the need to protect the water passage channels from obstruction, especially those of Tazoult Road, and all residents should understand the greater importance of the function of the 1G channel related to the water tunnel located in the eastern side, which should be fenced and protected from waste, which can be sponsored by the authorities or diligently by the community.

Community involvement will be a basic requirement and pivotal factor in any initiative or strategy to protect the city in the short, medium, or long term (Netzel et al., 2021), especially with climate change that will undoubtedly affect the way rain falls in ways that can pose a real threat to individuals. As well as property, involving the community in new aspects can make a difference in the level of protection of the city, such as collecting data to manage flood risk (Wehn et al., 2015). Or for the community to participate in the expenses of protection, and this task can be delegated to private institutions after ensuring that the community is aware of the hazard and understands the returns that come with it.

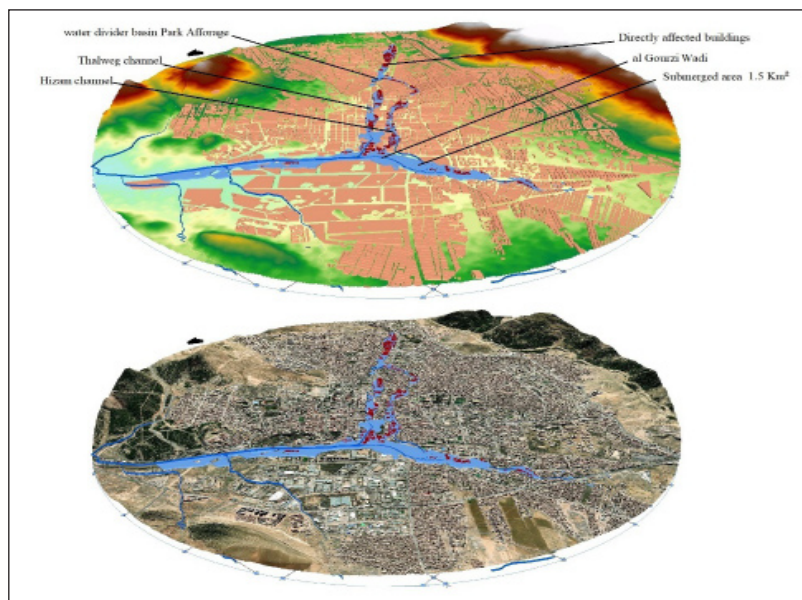


Figure 4. The common area at risk of flooding in Batna city for a return period of 100 years, according to the studies of each of (Bella, 2021; Guellouh, 2017; Harkat, 2021; Slimani, 2020). Source: Authors, 2022

Sensitization Mechanisms

Media

The current media, which gives general attention to this aspect through coverage of events and crises, is not sufficient, although coverage of flooding incidents is an important factor in raising awareness of the hazard (Netzel et al., 2021).

What makes a difference in the optimal use of media is to direct it preemptively, if possible at the local level, and on a periodic and regular basis, because it can be one of the most important means of change (Zahani, 2019), as it can be used for prevention, and its importance is most evident during emergencies (Bird et al., 2012). It can be used to inform the public or to identify affected areas that require immediate response (Smith et al., 2017). It can also represent a platform for mutual communication between authorities and the public.

Civil Society

The need for prevention must be realized first and foremost by representatives of civil society, which again raises the need to support and select people interested and with a sufficient amount of culture in this aspect. Community initiatives and public awareness programs that can greatly contribute to reducing people's exposure to the hazard (Ciullo et al., 2017). And it should be subject to controls and should have a periodic system planned in advance. In this context, it is possible to prepare cleaning campaigns that take into account the water channels in the period before the rainy seasons. It is also to try to train individuals on how to overcome the crises related to this type and to organize assistance. (Bakhdeh, 2013) specified that the work of associations must come in parallel with the work of local authorities and in coordination with the different actors in the context of achieving the concept of public participation and dedication to the principles of good governance (Kamal, 2017) to avoid environmental damage and crises.

Family and School

They are the first stations to prepare individuals for responsibility towards the urban environment and build the foundations for a healthy life within the occupied areas, and the effectiveness of measures to mitigate the effects of floods depends on the ability of families to adapt and respond to hazards (Koks et al., 2015), in addition to the school, which works on the framing and confirmation of ideas related to the promotion and protection of the environment, the protection of individuals within it, and the management of different types of threats.

The need for training in this area may differ from region to region depending on the degree of vulnerability, and historical events are expected to play a role in this regard, and locally for the inhabitants of the city, and interest in the subject at the scale of geography or one of the scales concerned with the environment to a sufficient extent can reconcile the relationship between future generations and the territory of the city.

Environmental legislation

Legislation represents one of the most important means and mechanisms to mobilize the necessary resources to deal with risks (Guerbi, 2020), and it can be said that the Law No. 04-20 on the prevention of major risks and disaster management within the framework of sustainable development, dated 25-12-2004 represents The most important thing in the Algerian legislation in this context, it aims to prevent disasters and support their effects on human settlements, their environment and their activities. Among the principles on which this law is based, there is the principle of participation that gives the citizen the right to know the dangers that surround him and the factors of vulnerability, as well as the modalities of prevention and management of disasters. Therefore, the task entrusted to local authorities in the service of awareness is to make plans to identify the locations of expected floods and make them available to the public, and highlight their importance and vulnerability to their occurrence according to Executive Decree 09-399 specifying the mechanisms of flood forecasting of 2009, which is a difficult issue at present. Because there are many reasons to doubt the results, the issue is based on prediction, and because creating citizen confidence in flood forecasting models can be difficult, legislators can emphasize the importance of using geographic information systems as reliable tools within scientific methods.

Developing the Local Environment

The authority's emphasis on its interest in the urban environment and the protection aspect of the city will serve the community's awareness efforts. Movements with an official character help to create the idea of the importance of this topic, and the residents' sense of the presence of flood protection measures is likely to motivate them to take the necessary domestic structural measures to deal with the danger. (Poussin et al., 2014), and the authorities have several responsibilities in preparing cities to deal with various threats and hazards, and civil society cannot have effective and complete control in this area (Scolobig et al., 2015).

Religion

Religious institutions are also concerned with raising awareness and guiding the population towards proper and environmentally friendly behavior. This should not be limited to mosques alone, despite their importance as an influential and local element in residential areas. Rather, technological means should be used to reach wider groups of people, and within this mission, the available or necessary aspects of the participation of the population in the work of prevention and the ways to act during crises must be included.

CONCLUSION

Community involvement will be a basic requirement and a central factor in any initiative or strategy to protect the city in the short, medium, or long term, especially with climate change undoubtedly affecting the way rain falls in ways that can pose a real threat to people and property. Community involvement in new aspects can make a difference in the level of protection of the city, such as data collection to manage flood risk, or community participation in protection-related expenses. The advances seen in flood hazard prevention methods cannot be beneficial if they are not accompanied by the involvement of individuals and clarification of their roles, responsibilities in dealing with the big threat of flooding. Thus, working on the social mobilization of individuals based on awareness may be the missing factor in national flood risk prevention plans and the decisive element for controlling the future of flooding in cities.

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