



Public perception of flood risk in flash flood prone areas of Eastern Mediterranean: The case of Attica Region in Greece



Michalis Diakakis^{a,*}, Georgios Priskos^a, Michalis Skordoulis^b

^a Faculty of Geology and Geoenvironment, National and Kapodistrian University of Athens, Panepistimioupoli, GR15784 Zografou, Greece

^b Department of Business Administration, Piraeus University of Applied Sciences, Thivon 250, GR12244 Egaleo, Greece

ARTICLE INFO

Keywords:

Flood risk
Risk perception
Flash floods
Public perception
Attica
Eastern Mediterranean

ABSTRACT

Even though flooding is one of the most destructive natural hazards in the Mediterranean, causing hundreds of deaths and economic losses and despite the significant efforts of civil protection authorities of all levels to protect human lives and assets, a critical piece of information, that is how the general population perceives flood risk, is not well known, especially in the Eastern part of the region. This work uses structured questionnaires to obtain basic information on how the population of one of the largest urban areas in Greece and the Eastern Mediterranean understands flood risk, risk mitigation and to what degree they take protection measures, they trust relevant institutions and they are aware of flood warning and flood protection actions. Then, the study examines potential correlations of the findings with respondents' demographics.

Results show that respondents rank floods third in terms of importance behind earthquakes and forest fires that are important risk in the region, although the vast majority believes the risk is increasing, mostly due to anthropogenic factors. Responses illustrate low levels of trust in authorities and low levels of knowledge of protection actions and awareness regarding floods, as well as low levels of preparedness, in terms of taking private mitigation measures. Respondents' characteristics such as age, gender, previous flood experience and marital status are show statistical correlation with responses, as individuals present different perception and levels of knowledge and preparedness. Overall, the findings illustrate the need for better education and awareness campaigns regarding flood risk and mitigation measures.

1. Introduction

Recently, perception of flood risk has been widely recognized as a crucial element in flood risk management, leading to a gradual integration of social aspects with more conventional risk estimation methods [15,16]. The increasing attention towards these aspects is reflected in the impressive number of risk perception research papers published in the last decade [17,51], primarily focusing on areas of Europe and North America.

These studies have explored a series of different parameters affecting perception of flood risk and have shown their impact on a person's behaviour, actions and beliefs. These factors include perceptions about the cause of hazard [90,15,5,63,80], its impacts and their severity [15,18,41,5,52,64,65,70], the likelihood of future flooding [15,45,52,65,70] and analyses of increasing or decreasing trends of risk [11,15,5]. In addition, they focus on laymen awareness [94,15,70] and parameters related to various feelings (e.g. fear, worry etc.) [11,5,52,70]. Studied factors also seek to describe the actual behaviour of individuals against risk, including mitigation actions

[94,11,15,5,66,77], preparedness actions [94,15,66,77] adoption of insurance or several protection measures [94,15,45,64,77] and information seeking regarding floods [66,79].

Relevant works study also previous flood experiences [94,15,45,55,61], respondents demographics [94,45,52], geographic location [94,98], residential history [94,45], the perception of responsibilities [11,12,64,66], trust in local institutions [11,45], examine different sources of information [98,65,79] and the laymen's knowledge of risk mitigation actions [94,11,77].

Previous works have found several links between the aforementioned factors. For instance, demographics, psychometric factors or previous flood experiences have been found to be predictors of behaviour, awareness, perception of risk and likelihood of future flooding [88,93,100,104,106,21,53,70,82–85,86].

Several authors (e.g. [66,6]) claim that this correlation of variables with risk perception has been proved a vital tool in conjunction with flood risk estimation in improving risk management through an integrated approach. Barberi et al. [7] suggest that lack of knowledge on public perception and regarding possible reactions during an

* Corresponding author.

E-mail address: diakakism@geol.uoa.gr (M. Diakakis).

emergency situation can lead to underestimation of risks or overestimation of personal preparedness levels. This applies especially in the case of flash floods, during which high intensity storms lead to rapid flooding of mostly ephemeral watercourses, leaving little time for officials and population to prepare for the imminent threat or evacuate dangerous areas.

In the Mediterranean region, flash floods are one of the most destructive natural hazards that have caused numerous deaths [24,25,75,81] and a noteworthy amount of damages and socio-economic effects [97,23,38,44,69,8]. A large part of flood-related fatalities in the region are caused by flash floods [75].

Flash floods in the Eastern Mediterranean are a persistent problem. For example, in Greece, flood numbers are rising [27], despite the important improvements in infrastructure, the efforts of civil protection authorities and other government agencies and the significant amendments in policy and the establishment of emergency warning [22]. Particularly in urban centres of the region, vulnerability to flooding is increased, as population, assets and socioeconomic activities are concentrated. Jha et al. [49] stress the rising importance of floods in urban environments, within the broader context of the global urbanization trend of the last decades [3].

In the Eastern Mediterranean, despite the above trends and the threat of increased flood frequency due to climate change in the region [2], a critical piece for human protection, that is the public perception of risk, remains to a large extent unexplored. Among the 73 studies on flood risk perception examined by Bubeck et al. [17] and Kellens et al. [51], only 7 concern Western Mediterranean countries (Spain, Portugal and Northwest Italy), whereas no studies focus on Eastern Mediterranean.

In Greece, literature on flood risk perception is very limited as well. In one of the few studies focusing on the country, Papagiannaki et al. [72] examine behaviour, emotions and personal experiences using a questionnaire targeting citizens of Athens after a flood event in October 2015. The study indicates low percentages of people receiving alerts for the flood in question. Papagiannaki et al. [72] described the role of feelings and of warning in preparedness and stressed the importance of marital status in risk perception. Kontogianni [73] explored the perception of laymen about climate change and extreme climate events in Heraklion, Crete in south Greece using a questionnaire. In her study, Kontogianni [73] found that a large percentage of respondents plans to take no measures to enhance preparedness during future flood seasons and that previous experiences along with local community institutions affect their risk perception. Papakonstantinou [69] in a survey of population on Rhodes island, Greece found that a large part of the respondents have never applied preventive measures in their property. In addition, Papakonstantinou [69] showed that the majority of respondents demonstrated low levels of trust towards state agencies responsible for civil protection.

Given the lack of knowledge on several aspects of flood risk perception in the broader Eastern Mediterranean and Greece in particular, and given its significance to social resilience and to the success of emergency plans [13], this work focuses flood risk perception in Attica region. Attica, as a highly populous and one of the most flash flood prone areas in the region, with numerous flash flood-induced damages and fatalities, is studied as a case that bears particular significance for Greece and the broader region. The work aims to:

- provide a basic understanding of how individuals perceive flood risk in Attica and examine their engagement in prevention measures, their level of trust towards relevant authorities, as well as their level of knowledge, awareness and preparedness
- explore correlations of the above factors with respondents demographics, previous flood experiences and marital status.
- add to the poor understanding of flood risk perception in the broader Eastern Mediterranean.

2. Research methodology

2.1. The survey and sample characteristics

The survey was conducted among citizens of Attica in Greece, a flash flood prone region with the highest frequency of floods in the country [27] and a rich record of flood damages [23]. Attica has a history of flood events with a noteworthy number of fatalities, such as the Mandra flood of 2017, which caused 24 deaths in its eastern part [4]. The region is the most populous part of Greece, hosting almost half the population of the country (approximately 5 million residents) and the city of Athens, one of the largest urban areas of Eastern Mediterranean. The city has been a rapidly evolving urban centre, a process that has affected the capacity of natural drainage networks, playing a role to its growing flooding problem [26,29], as in other cases in Mediterranean [92,20]. Attica is relatively dry with a mean annual rainfall of approximately 390 mm [56] and is shaped primarily by rivers and torrents of ephemeral flow, characteristic of the broader region [37].

The study developed a questionnaire containing 21 questions on basic aspects of flood risk perception that was distributed during March to July 2016, to collect a sample of individuals residing in Attica. Given the vast population of the region, the absence of a comprehensive sampling frame and the desire to achieve satisfactory representativeness of the sample, the questionnaire was distributed in collaboration with the press offices of municipalities across Attica. Thus, the final sample of 511 participants consisted of individuals who reside in various locations across Attica and possess a similar demographic profile to that of the general population.

In total, 511 completed questionnaires were returned and the responses were stored in a database. Six (6) of these questions were used to provide explanatory factors connected with personal characteristics of the respondent, including:

- Age
- Gender
- Level of education
- Family status (i.e. single, married, married with children)
- Location of permanent residence
- Previous experience with flooding

The rest of questions were formed in a way to represent different basic aspects of flood risk perception including:

- the importance of flood risk and the likelihood of future floods
- their engagement in preparedness and self-protection measures
- their trust in authorities
- their knowledge and awareness on floods and flood protection actions

Of the 511 questionnaires returned, 237 (46.4%) were from males and 274 (53.6%) from females, a ratio similar to the gender ratio of the population in the region of Attica (males: 47.9%, females: 52.1%) [43].

With regard to the age of respondents, it is quite similar to the age distribution of the local population, obtained by the Hellenic Statistical Authority ELSTAT [43] (Fig. 1). In fact, the deviations between the sample's and Attica's population are considered to be of low importance, as influences of these differences are not expected in the results. In specific, a non-parametric Chi Square test, between the two, has not led to a statistically significant result ($p = 0.943$). This suggests that there is no statistically significant difference between the age distribution concerning the survey's sample and Attica's population. In general, respondents' age ranged from 16 to 90 yr, with a mean of 40.92 yr and a standard deviation of 13.09 yr (Table 1).

With regard to their marital status, out of the 511 respondents, 228 (44.6%) were single, 77 (15.1%) were married without children and

Download English Version:

<https://daneshyari.com/en/article/7471619>

Download Persian Version:

<https://daneshyari.com/article/7471619>

[Daneshyari.com](https://daneshyari.com)