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Places of fear and attachment. How Azoreans perceive seismic and volcanic risk.

Isabel Estrela Rego, Ana Moura Arroz

Education Department, University of the Azores, Ponta Delgada, Portugal.

imcer@uac.pt

Abstract

Earthquakes and volcanic eruptions have been regular phenomena in the Azores. In spite of the knowledge already gathered by local historians and earth sciences researchers, there are no scientific data on the socio-cultural dimensions of volcanic and seismic risks. A research project on risk perception of natural hazards (TOPOI METUS) is now being carried out in order to study the social cosmographies of seismic and volcanic hazard. Based on data produced along fourteen in-depth extensive interviews conducted in five of the nine islands of the archipelago, this presentation focuses on preliminary findings of perceptions regarding seismic and volcanic risk profiles, patrimonial and economic vulnerability to those risks, and risk management (i.e. information and actions taken before a crisis, and during the response and recovery phases of a disaster situation). Exploratory results show that people living in the most vulnerable areas insist in staying there, even when they are aware of the dangerousness involved in it. To uncover the apparently irrational reasons beneath these options will allow understanding some of the barriers encountered by risk managers engaged in the minimization of destructive impacts of those natural hazards. Knowing that people both 'put themselves in the Hands of God' and highly identify with the patrimonial history of their living place may help to develop knowledge to more fully inform civil protection/defence policies. Results may also allow reconceptualising the variable "identification with the local" in the scope of risk perception.

Key words: Seismic risk perception; volcanic risk perception; place attachment; the Azores islands.

Introduction

The Azores are nine islands of volcanic origin located over the triple junction of the North American, Eurasian, and African tectonic plates. These characteristics make phenomena such as earthquakes and volcanic eruptions regular natural threats throughout the archipelago's six centuries of

history. Some of those were quite expressive natural events with serious impacts in the physical and social environment of the islands. Recent events, still in the memory of Azoreans (earthquakes of Faial Island, in 1998, and Terceira Island, in 1980) have caused deaths, wounded, homeless and mass destruction of buildings in several villages in different islands.

The seriousness of the potential impact and the uncertainty of occurrence of seismic and volcanic events in the islands justify the social investment that has been put forward both in their study and in the implementation of civil protection/defence devices. However, in spite of the notion that a successful process of decision making and implementation of complex strategies of risk management depends upon the integration of both people's perceptions of risk and experts' risk assessment (Bernardo, 1998; Brunsdon & King, 2002; Renn, 2004; Sjöberg, 2000), the management of these natural risks has been solely based on experts' evaluations. In other words, seismic and volcanic risk appraisal and management in the Azores have not taken into consideration the analysis of the social and cultural factors which frame people's perceived risks as well as their perceptions and behaviour towards those risk situations. In addition, there is also a lack of knowledge concerning other elements considered to be crucial for an efficient way of managing natural hazards - the communication between all parts involved in the situation, the participation of citizens and stakeholders in decisions, and the trust people hold in persons and institutions responsible for risk governance (Renn, 2004). In fact, drawing on a wide and quite comprehensive perspective on risk governance, a framework proposed by IRGC – International Risk Governance Council, a central assumption in this study is that governance choices today are believed to call for an interchange between governmental institutions, economic agents, and the civil society (IRGC, 2005). If there is to be interplay among them, considering the different stakeholders' interests and the possibility of eventual conflicts with respect to what is at risk and how severe that risk might be, it would be necessary to understand, develop

and integrate different perspectives of risk.

Earthquakes, like other natural and technological disasters, are random, rare and when they occur there is not time to implement risk control measures. Due to these characteristics, they are usually perceived as threatening and fatal – *risk as a fatal threat model* (IRGC, 2005; Renn, 04). Contrary to technological hazards, which are understood as resulting from reasoned decision, natural events may also be seen as catastrophic events that no one can escape from or, except God, can control. For that reason, such situations, including earthquakes, are often seen as prescribed phenomena – *risk as fate model* (idem). Renn (2004), in his revision of perception models used by society in perceiving and assessing risk, posits that people react to those sources of risk either by moving away from them, when they can afford doing it and when events occur regularly or frequently, or by denying them or their severity, if they are rare and random, as the risks under study in this research.

Knowing that a high risk perception does not lead necessarily to people moving away from the threat (Gaillard, 2008), then what can explain the decision to stay in one's living place? Also, why people who are exposed to seismic/volcanic risk are frequently less equipped to deal with those events than they should be (Spitall et al., 2008)? Controllability associated to natural hazards such as earthquakes is not related to when they will occur but rather to the strength and the capacity of systems and social structures to manage disasters. Thus, can it be expected that having populations better prepared to deal with this source of risk will contribute to both empower them and reduce the denial of the threat they face?

Studies on public's perception of earthquake risk concerned with *loss* reduction strategies

identified factors that seem to contribute to the adoption and support of protective measures and behaviour. Some of these factors are: recent experience, degree of personal exposure, degree of perceived control over risks, awareness of mitigation options, the availability of resources to address them, trust in the loss-reduction strategies suggested and those who intend to implement them, perception of responsibility for loss reduction actions, the social costs and benefits associated with risks (e.g. Gouch, et al., 1995; Palm and Hodgson, 1992; Smith, 1992; referred in Wachtendorf & Sheng, 2002). Other research (Brunsdon & King, 2002; Shaw, 2003; Mileti, 1993) also focusing on risk perception and risk reduction have pointed out the crucial role that education, families and the community play in contributing for both a culture of preparedness and disaster recovery. Place identity and local attachment, which have been studied with a greater emphasis in the fields of community psychology and environmental psychology, can also mediate/moderate practices of preparing for and coping with disasters.

A considerable body of literature in those fields has been devoted to explaining the links between people and places. 'Sense of community' (Sarason, 1986; McMillan & Chavis, 1986; Chavis & Pretty, 1999), 'place/local identity' (Proshansky, Fabián & Kaminoff, 1983), and the emotional bond between people and place or 'place attachment' (Tuan, 1974; Cuba & Hummon, 1993; Mesch & Manor, 1998) have been central constructs in research intended to explore and clarify people's behaviour, perceptions and decisions regarding aspects of their physical and social surroundings. The relationship of those constructs with variables such as the adoption of sustainable habits and behaviours (Pol, 2006), the use of natural resources (Bonaiuto et al, 2008),

land use changes (Bonaiuto et al, 2002) or the support of protected areas (Carrus et al, 2005) are just a few examples. Studies on seismic/volcanic risk perception have focused on issues such as confidence on emergency plans and public officials (Barberi, et al, 2008), household adjustment to earthquake hazard (Lindell & Perry, 2000) or hazard preparedness (Ngyuen et al, 2006; Spital et al., 2008) and only some have looked at the relationship of risk perception with people's sense of community or people's attachment to their living place (Barberi, et al, 2008; Gaillard, 2008).

To address the above mentioned gap between experts' risk assessment and people's risk perceptions, as well as the lack of information on disaster preparedness in the Azores, a research project, "*TOPOI METUS - Social cosmographies of danger. Risk perception of natural disasters*", is now being carried out by social science researchers in collaboration with geological risk researchers at the University of the Azores. This study, along with others focusing on risk perception and communication regarding different hazards, aims at contributing to bring together and to facilitate the communication among all parts involved in a particular risk situation: decision-makers, researchers, citizens and the media. As such, in addition to creating knowledge on the social dimension of risk situations, it is crucial to develop communication assets and devices (videos, web, video games, cartoons, flyers, etc) capable of supporting decision and action intended to mitigate risk sources and/or consequences. Thus, the study's major goals are:

1. To explore personal narratives of natural disaster situations in order to both understand how dangerous and uncontrollable events are interpreted

- and to obtain information capable of helping in the construction of a questionnaire;
2. To construct a questionnaire, sensitive to the Azorean context, the mysticism historically embedded in natural disasters, and the people's identification and emotional relationship with the place, (1) to study perceptions of risk associated to natural disasters (*i.e.* the existent knowledge on the agent of risk, the risk profile and the vulnerability of the different systems to the risk; the public evaluation of the social response to these situations; and people's commitment to a 'preparedness culture'), and (2) to clarify communication aspects (strategies and means of communication people value the most; public trust; and what functions should risk messages serve); and
 3. To validate the questionnaire for stratified samples of the population in different islands of the archipelago.

The research was organized in 2 phases: the first was an exploratory study of people's narratives devoted to uncover their perception of seismic and volcanic risk, and the second was dedicated to the construction of a questionnaire, based on the information gathered in the exploratory phase, and its validation in the Azores. The study is still in progress and is expected to be finished towards the end of 2009. This presentation focuses on the first phase and on preliminary findings emerging from data obtained through the participants' narratives.

Method

The *TOPOY METUS* Study will be based on thirty in-depth, individual interviews in five

of the nine islands of the archipelago (São Miguel, Santa Maria, Terceira, Faial, and Flores). These islands were selected by employing a maximum variation sampling (Patton, 1990) and by using as criteria the frequency, time of last occurrence and severity of seismic and volcanic events. This presentation focuses on data produced along fourteen interviews already carried out (until the preparation of this presentation in May of 2008) with an average duration of 60 minutes, conducted in three of the nine islands of the archipelago (São Miguel, Santa Maria, Terceira)

As to participants in the study, in order to obtain a greater diversity, the thirty participants were stratified in terms of age (10 from 18-25 years old group; 10 from 26-55 years old group; 10 from more than 56 years old group) and sex (15 males; 15 females).

A set of predetermined open-ended questions were designed to address a system of four dimensions, and 14 sub-dimensions of seismic and volcanic risk perception as well as predictors such as age, sex, place of birth, place of residence, religious orientation, educational level, profession and place attachment– connectedness with the place. Given the salience of this last predictor in the present study, it makes sense to present some questions asked to assess it – *“How connected are you with this place? How much do you enjoy living here? Would you live in another place? Knowing the dangers of living in the Azores, why do persist in living here? What are the main reasons for you to live here/not moving to another place?”*

The interview dimensions were:

- (1) Risk source characterization (*e.g.* *“How do you describe an earthquake? And how do you describe a volcano?”* *“What causes*

- earthquakes/volcanoes in the Azores?”);*
- (2) Risk profile assessment (e.g. *“Have all the islands been equally affected by those natural events?” “Which events do you think were the most severe?” “Do you think that the probability of occurring an earthquake in this island is smaller, equal or larger than the probability of an earthquake to occur in another island? Why?” “Is there anything we can control in an earthquake or in a volcano? What is it?”);*
- (3) Systems’ vulnerability evaluation (e.g. *“Who has been more affected by earthquakes/volcanoes? Has anyone benefited with those events? Who? How?” “In your opinion, which aspects can make a given place more vulnerable than another place?” “What kind of damage can earthquakes and volcanoes cause?”);*
- (4) Risk management - before, in response to, and recovering from the crisis. (e.g. *“What should people do to prepare themselves for earthquakes / volcanoes?” “Do you consider that what is being done so far guarantees peoples’ safety? Why? What do you think that might be failing regarding prevention? Which actions should be carried on to improve the situation? The information you have is sufficient to face the problem? Where did you learn what you know about the way of acting in the situation?”); and*
- (5) Trust – in information processes; in risk management processes (e.g. *“How much do you trust the entities involved in crisis management?” “How much do you trust the information that is given to citizens*

before, during, and recovering from a crisis?” Who, from all persons and entities involved in the management of these phenomena, do you trust most? Why?” “Who can’t we trust? Why”).

Data are being content analyzed by the three members of the research team, individually at first and jointly later, in order to reach a consensus. The analysis aims are twofold: (1) to identify data ‘regularities’ - the participants’ more salient shared perceptions and perspectives regarding the risks under study; and (2) to spot data ‘specificities’ - the diversity of participants’ ways of understanding and explaining phenomena. While the former may account for possible trends or tendencies in perceiving the various dimensions of risks and, therefore, may allow for some sort of comparison with findings from other studies, the later would provide the heterogeneity of positions crucial for the empirical oriented construction of the intended Seismic and Volcanic Risk Perception Questionnaire in a further phase of the study.

The findings presented next refer to a preliminary analysis of data from fourteen interviews analyzed up to the present.

Preliminary data analysis

Earthquakes were regarded as the most serious (more dangerous; uncontrollable; with more devastating effects on social and physical contexts) natural hazard in the Azores. Other natural hazards (*i.e.* small tornados, floods, land sliding) and ‘man-made’ hazards (*i.e.* *“The Azores being attacked as a retaliation of Cimeira das Lajes”* - A., Male 76 yrs. old), were also appointed as significant but, curiously, volcanoes were not mentioned at all. The smaller relevance attributed to volcanoes is somewhat reinforced by the difference in ways of describing the two natural hazards

under study: while earthquake descriptions rested on a multiplicity of dimensions - sensorial, emotional, physical, and cognitive – (e.g. “*Earthquakes put everything shaking. You see and feel things trembling. (...) They can have either a tectonic or volcanic nature. (...) They scare me.*” - M., female, 45 yrs old), volcanoes were described in a much simplistic and typified manner and often portrayed as spectacular events (e.g. “*A volcano is when the magma comes out of the earth. (...) peaces of earth in fire projected in the sky*” - J., male, 19 yrs old). Nevertheless, there is a strong connection of emotions with both earthquakes and volcanoes. Referring to them, the majority of interviewees, regardless of their age, sex, island of residence or previous experience with this kind of events, expressed fear and anxiety (i.e. fear of dying; fear of loosing a loved one). Regarding the perceived severity of events, most participants stated that seismic and volcanic risks varied in the various islands (some islands being very much affected while others having no seismic and volcanic activity and events ranging from quite strong to very weak). As matter of fact, the way people recognize the threat varies with the degree of perceived personal exposure.

The interviewees considered that earthquakes cannot be predicted but pointed out that the weather and specifically a certain type of weather (e.g. quiet, muffled, warm, ‘deaf’), was a sign of earthquake announcement. Animal (strange, bizarre) behaviour was also appointed as premonitions by many respondents. For some of them this uncontrollability seems to justify their lack of concern in adopting measures to get better prepared for disaster (e.g. “*What can we do?! Nothing. Earthquakes don’t announce themselves!*” - A., Female, 23yrs old). Others, despite considering those events uncontrollable

believe there can be a relative controllability by strengthening the infrastructures resistance and/or by developing an efficient social response and individual preparedness to crisis – (e.g. “*little can be done to control the situation except being better prepared to respond during a crisis, for example: to have more resistant houses and buildings in general; knowing what to do during the occurrences*” - J., Male, 23yrs old). In a further and deeper analysis of these results it would be interesting to see if there is juxtaposition between the prediction of earthquakes and the plausibility of preparedness in the justification people provide for their behaviours and their commitment with a culture of precaution.

Far from the time when earthquakes and volcanoes were seen as God’s punishments and/ or signs of discontentment, as described in the 16th through 18th century historical narratives, today’s prevailing explanations are mainly grounded on factual and/or scientific evidence. However, the majority of interviewees think that these events cause losses in the generality of the affected populations: casualties were appointed as the worst consequence, followed by patrimonial losses. With respect to who is more negatively affected by the disaster situation and who benefits with an earthquake, opinions were associated to the ‘seismic experience’ of respondents. Those who had never had that experience tended to believe that there were no gains in these situations (e.g. “*nobody can gain anything with an earthquake, everybody is affected (...) the poor people is the population segment suffering more with earthquakes*” - E., Female, 75 yrs old). On the other hand, those who had experienced an earthquake reported different points of view: an emphasis on losses suffered by a particular segment of the population (e.g. “*the ones that had something [a house, a business]*

before the earthquake but were not rich are the most affected one; they lose everything they possessed and had worked for throughout their entire lives and then, because of that, they are 'rewarded' when they are considered rich and don't get any support to repair the damages suffered" - L., Male, 60 yrs old); and, curiously, the belief that everybody, both at a personal and at a community level, gained something with an earthquake (e.g. "Everybody gets something out of it. And, in general, the society also benefits because of the reconstruction that gets done in the buildings and everything. J., Male, 23yrs old).

The inexistence of a culture of precaution becomes more evident with data pertaining to risk management on the pre-occurrence phase of disasters. The majority of interviewees revealed not doing anything in special to get prepared for these kinds of events, and not needing more information in order to be better prepared to respond to such situations. This idea sounds paradoxical taking into consideration the negative evaluations addressed to public entities. The Government and Civil Defence forces are seen as being quite inactive in preparing citizens for a crisis. Regarding trust on the various parts involved, the interviewees showed a tendency for trusting others – official and non official entities – regarding both risk/crisis communication and risk/crisis management, although opinions differ with respect to public entities: (*i.e.* “... if there is a disaster the different entities – military, Government and NGOs - joint themselves and come to rescue and help” – A. Female, 40 yrs. old ; “I want to believe them, but I am not sure to what extent they tell us the truth”- A., Male 76 yrs. old; “No, we cannot trust anybody anymore” - L., Male, 60 yrs old; or “No,

they do not really care to help people” - E., Female, 75 yrs old).

With regard to ‘Place Attachment’, interviewees reported having a quite strong connection to their living place and that feeling was grounded on both social-emotional reasons - birth place, life history, interpersonal relationships, knowing the place, and beauty; as well as material/quality of life reasons - owning a house, having facilities near the house. Participants who had lived through a seismic and/or volcanic crisis stressed the solidarity among people and the capacity of affected community residents to solve conflicts as the major facts in those situations.

Although these are preliminary analyses, data suggest interesting paths to explore later. Taking into consideration the uncontrollability of events, the strong social and emotional ties with the place and among people, and a general sense of basic trust our results gain new contours. Understanding how these three tendencies, which are positive and functional, conjugate to sustain rationales of avoidance and disinvestment regarding crisis preparation is a challenge that remains open to be addressed next.

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