



Risk perception and trust management in inhabitants exposed to coastal flooding: The case of Cartagena, Colombia

Luz Adriana Muñoz-Duque, Oscar Navarro, Diego Restrepo-Ochoa, Ghazlane Fleury-Bahi

► To cite this version:

Luz Adriana Muñoz-Duque, Oscar Navarro, Diego Restrepo-Ochoa, Ghazlane Fleury-Bahi. Risk perception and trust management in inhabitants exposed to coastal flooding: The case of Cartagena, Colombia. International Journal of Disaster Risk Reduction, 2021, 60, pp.102261. 10.1016/j.ijdr.2021.102261 . hal-03545396

HAL Id: hal-03545396

<https://hal.science/hal-03545396>

Submitted on 9 May 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial 4.0 International License

IJDRR 102261

Article reference: IJDRR_IJDRR-D-20-00893

Risk perception and trust management in inhabitants exposed to coastal flooding: the case of Cartagena, Colombia

Luz Adriana Muñoz-Duque, University of Antioquia, Colombia, luza.munoz@udea.edu.co

Oscar Navarro (Corresponding autor)*, Laboratoire de Psychologie des Pays de la Loire, University of Nantes, France. BP 81227-44312 NANTES Cedex 3 - France
oscar.navarro@univ-nantes.fr

Diego Restrepo-Ochoa, CES University, Colombia, drestrepo@ces.edu.co

Ghozlane Fleury-Bahi, University of Nantes, France, ghozlane.fleury-bahi@univ-nantes.fr

* Corresponding author: Laboratoire de Psychologie des Pays de la Loire, University of Nantes, France. BP 81227-44312 NANTES Cedex 3 - France oscar.navarro@univ-nantes.fr

ACKNOWLEDGMENTS

This research was supported by the French National Research Agency within the framework of the CLIMATRisk project, [grant numbers ANR- 15-CE03-0002-01].

Risk perception and trust management in inhabitants exposed to coastal flooding: the case of Cartagena, Colombia

Abstract

This study aimed at understanding the phenomena associated with risk perception related to climate change, particularly coastal flooding, integrating the cultural, spatial and psychosocial levels involved in their construction. To this end, a qualitative methodology was adopted, based on symbolic interactionism which followed procedures of analysis of grounded theory. 33 interviews were conducted using the criteria of a theoretical sampling. The findings highlight the significant role of previous experience with coastal flooding risk, habituation to the risk, and the emotional bond with the place as determinants of risk perception. Similarly, mistrust in government institutions regarding their role in managing this risk has emerged as a relevant factor, as they are considered ineffective, co-opted, negligent and corrupt. When there is a strongly perceived risk, together with a significant degree of rootedness in the place and a lack of planning for action in the event of the materialization of this threat, this mistrust appears to increase feelings of hopelessness and impotence to cope with coastal flooding risk.

Keywords:

Environmental Hazards; Risk perception; Social Vulnerability; Coastal Flooding; Trust.

1. Introduction

Today, there is a considerable volume of literature on climate change and its consequences in terms of "extraordinary" events which have a significant impact on the daily lives of people worldwide. This issue is on the agenda of scientific communities, social movements, political groups and the media. The Intergovernmental Panel on Climate Change (IPCC, 2007) declared a proliferation of these phenomena, related to the rise in global sea level, with serious implications for coastal territories (erosion and coastal flooding).

In this sense, studies on the effects of climate change, and in particular on coastal risks, favor a hazard-based approach, which, according to authors such as Meur-Ferec et al. (2012) and Hellequin et al. (2013), contributes to neglecting other dimensions that could be key to controlling so-called global vulnerability: challenges, coastal residents' perceptions and risk management from more comprehensive perspectives involving psychosocial aspects. The issue of risk perception was the last to be included in risk analysis. However, it is recognized as fundamental in risk assessment, providing information on the variability and complexity of people's knowledge, beliefs, judgments, reactions and willingness to act, issues which are essential for decision-making, both institutional and in the daily lives of the inhabitants of vulnerable territories (Peretti-Watel, 2000).

Broadening the understanding of coastal risks, the perceptions of reality of people living under the threat of coastal flooding, their assessments and practices in relation to this, can provide guidelines for the design and implementation of public policies, together with considering risk communication and participation strategies that are more suited to the characteristics of the population, based on relevant information about the dynamics of the relationship between people and the risks inherent to the territories where they lead their lives. This article presents the findings of a research study conducted in the Colombian city of Cartagena, a UNESCO World Heritage Site. Our study aims to understand the phenomena

associated with the perception of coastal risks, integrating the cultural, spatial and psychosocial levels involved in their construction.

1.1 Risk perception or social knowledge of hazards

The study of risk perception has focused on identifying and understanding people's judgments about risks. In this sense, it concerns the dangerousness of objects or activities perceived as threatening, as well as natural risks or risks associated with the use of technologies, for instance nuclear (Corral, Frías & González, 2003; Weber, Hair & Fowler, 2000). Risk perception significantly influences the decisions and actions of individuals, which are determined by negative feelings generated by the hazard and regulated by the possibility of facing it (Slovic, 1987).

Beyond the characteristics of the event or situation itself, there are numerous determinants of risk perception. Thus, it has been found that it is affected by one's own experiences and that it differs between individuals whose experience of a threat is different (Ho et al., 2008; Saurí et al., 2010; Siegrist & Gutscher, 2006). It is a construction influenced by the social and physical context, by experience, memory and communication (Masuda & Garvin, 2006; Siegrist et al., 2006; Pidgeon et al., 2003; Lupton, 1999; Kasperson et al., 1988). Some authors have shown that risk perception is also determined by personal involvement with the risky object (Navarro & Michel-Guillou, 2014), by the fear of the potential consequences, the uncontrollable dimension of the phenomenon and the seriousness of the consequences (Slovic et al., 1980). Associated emotions, such as fear or worry, can influence the way we interpret the risk and the behavior adopted in these situations. Risk perception also changes according to the impression the individual has about a possible direct effect on their health or well-being (Fleury-Bahi et al., 2013; López-Vázquez and Marván, 2003).

Considering the risk perceptions associated with climate change, it has also been pointed out that political orientation and beliefs about the environment are important determinants (Safi et al., 2012). More than a physical or objective vulnerability, it could be the capacity to adapt and the sensitivity to the threat that potentially increase risk perception (Navarro, 2017). In addition, the central role of socio-economic conditions in judging and believing in environmental risks has been recognized (Vaughan, 1995). As it is a spatial risk, it is also conditioned by the emotional link with the place of residency (Fleury-Bahi, 2008; Moser, 1998, Navarro et al., 2020). In sum, several factors can be associated with risk perception of coastal flooding, according to the literature (Navarro et al., 2020). First, we may note the objective characteristics of the habitat and the nearby environment that favor or not a feeling of vulnerability, as well as the identification and psychological place attachment expressed towards said environment. Likewise, risk perception of coastal flooding is associated with collective adaptation strategies perceived as possible and even with individual coping strategies (Navarro et al., 2020). These variables or factors must be taken into account when assessing the exposed population's risk perception.

1.2. Trust in government institutions and risk perception

In the literature on risk perception and management of environmental risks, especially flooding, it has been considered that a high level of trust in institutions, especially governmental institutions, reduces citizens' perception of the flooding probability, the fear raised by this risk and, consequently, the inhabitants' intentions to prepare themselves in the event of a catastrophe (Terpstra, 2011). In this sense, it is necessary to consider the dimension of trust in the institutions in risk management, and to understand the affective and cognitive mechanisms associated with risk communication, especially in populations that have no previous experience with coastal flooding risk.

A number of studies in the field of risk perception and acceptance include trust in institutions as an explanatory variable (Siegrist, 2019). However, its importance

has been questioned, insofar as it is not known whether it is a cause or effect, or the nature of its explanatory role with respect to risk perception (Siegrist & Zingg, 2014). The first studies in the field of risk perception were carried out in relation to nuclear waste management (Freudenburg, 1993) and technological risks (Earle & Cvetkovich, 1997). These studies identified the key role of trust in the institutions involved in risk management or risk acceptance. To this extent, trust is defined as a psychological state determined by the "intention to accept vulnerability based on the positive expectation of the other's intentions and behavior" (Rousseau et al., 1998, p. 395). Trust may then become a mechanism for reducing complexity (Luhmann, 1979) and, in that sense, it may be important for decision-making in certain cases, but not necessarily in other situations (Siegrist, 2019).

Moreover, the contextual, physical and social factors of the hazardous event determine the confidence or negative emotions that people experience in such situations, such as the lack of knowledge about it (Siegrist & Zingg, 2014). The state of the art on the subject (Earl, 2010), has shown that the strength and value of the relationship between trust and risk perception vary considerably depending on the context, i.e. the type of risk, social conditions and management policies. The relationship between trust and risk perception also depends on the knowledge of the hazards and the importance of the problem (Earle et al., 2007), in such a way that confidence is more significant in situations where individuals have no information on which to base decisions (Siegrist & Cvetkovich, 2000), as they do not relate directly to risks, but rather rely on trust to apprehend them indirectly.

The literature review enables us to differentiate two types of reliable sources. On the one hand, trust is identified based on the experience or expertise of the institution (in other words, trust based on ability). On the other hand, trust is identified based on the perceived honesty of the institution (in other words, trust based on integrity) (Terwel et al., 2009). This typology is widely prevalent in the literature, although different terms are employed, such as "social trust" (Earle & Siegrist, 2006). As a result, most studies on trust explicitly or implicitly evoke aspects related to the perceived competence and values of the institution or

organization in question. However, in certain circumstances, it is not possible to determine the basis of trust in participants under consideration, i.e. whether it is based on competence or values (Siegrist, 2019). This distinction between values and capacity (performance) seems particularly useful for understanding the impact of trust on risk perception and behavior. Trust plays an important role in decision-making and even in protective behaviors (Earle, 2010), rather than the evaluation of a situation, a technology or a product considered as risky. This is specifically the case of protective behavior in health risk situations such as communicable diseases (Jang et al., 2020; Siegrist & Zingg, 2014).

In addition, the degree of trust or distrust in the authorities or organizations responsible for managing a risk can determine how citizens will address information about this risk (Frewer, 2003), and even how well they will comply (or not) with the indications and recommendations of protective or preventive behavior (Siegrist & Zingg, 2014). Information from a source considered as reliable is internalized and determines protective reactions. On the contrary, information from sources considered to be suspicious, unreliable or even promoting particular interests, can generate opposition and effects contrary to those expected (Frewer, 2004).

Little is known about the types of judgment that lead people to grant or deny trust. Some studies suggest that judgments of trust based on perceived "shared values" are more significant than judgments about the technical and/or scientific competence of the institution (Allum, 2007). Poortinga and Pidgeon (2003) propose two common factors to the British government's perceived reliability in managing five major risk categories: climate change, cell phones, radioactive waste, genetically modified foods, and genetic testing. The first aspect combines two sub-dimensions, competence and care; while the second encompasses aspects such as credibility, reliability and common interest. Furthermore, it has been pointed out that the main function of trust is to reduce the cognitive complexity inherent to a risky situation, although the process via which trust may be granted also involves considerable complexity. In this way, social trust is based on the similarity of values

(Earle & Cvetkovitch, 1997), that is, on the perception that people have of sharing a series of values with the institutions that administer them. In the opposite case, it is mistrust that replaces it.

The objective of this study is to examine the risk perception of coastal flooding in inhabitants exposed to this phenomenon, in a city which is a world heritage site and highly vulnerable to climate change and rise in sea levels: Cartagena de Indias. Specifically, we seek to evaluate, through a comprehensive and inductive methodology, how people perceive risk and their own vulnerability, but also their individual risk coping strategies, as well as risk adaptation strategies established by the risk-management institutions. The novelty of our study lies in the qualitative and inductive approach to the issue of trust in the institutions in charge of risk management, since this issue was not addressed directly through a question, but rather via its being spontaneously described by the participants, thus neutralizing the impact of social desirability proper to this type of exercise and the sensitivity of the subject. Our general hypothesis is that, in addition to the feeling of vulnerability linked to living conditions and risk exposure, trust in the risk-management institutions plays a fundamental role in the risk perception of coastal flooding as well as shaping personal coping strategies.

2. Method

2.1. Type of study

This research is epistemologically based on symbolic interactionism and methodologically adopts the procedures of grounded theory proposed by Strauss and Corbin (2002). Symbolic interactionism suggests that people act on the basis of the meanings that they attribute to things, people, and situations. It also affirms that these meanings are social constructions that arise during interaction (Blumer, 1986). This approach is important for risk analysis, since it allows us to understand that it is not the facts themselves that determine the decisions to act in the face of

certain natural hazards, but rather the interpretations that people make of said hazards based on the beliefs, expectations, and experiences that have been shaped, changed, and sustained through their interactions with family, friends, other community members, and civic agencies (Paton et al., 2010, p. 184). This research approach has been used to address risk perception related to various natural disasters such as earthquakes (Becker et al., 2012), hurricanes (Kusenbach, 2017), and forest fires (Paveglio et al., 2010), among others.

2.2. Participants

The field work was carried out in 2016 among 33 inhabitants of the coastal area in the city of Cartagena (Colombia), which was declared a world heritage site by UNESCO in 1984. In order to select participants, a sampling for convenience was initiated, in which people who had participated in the first quantitative phase of the study were contacted and then authorized the use of their data to participate in the qualitative phase (8 participants). Afterward, a theoretical sampling was carried out, using a snowball technique, which allowed us to finetune the selection of the participants by identifying the properties and dimensions which had emerged in the first phase of the sampling (25 more participants, for a total of 33). **The main inclusion criterion was the fact of living in a flooding zone, according to the formal data proposed by the local authorities¹.** Participant characterization is presented in Table 1.

Table 1: Participants' characteristics

	Characteristics	N (%)
Gender	Men	17 (51.5)
	Women	16 (48.5)
Age	< 40	16 (48.5)

¹ See: <https://midas.cartagena.gov.co/Content>

	40-60	13 (39.4)
	> 60	2 (6.1)
	NR	2 (6.1)
Professional status	Active	22 (66.7)
	Retired	1 (3.0)
	Unemployed	8 (24.2)
	NR	2 (6.1)
Level of education	None	1 (3.0)
	Primary	2 (6.1)
	High school incomplete	2 (6.1)
	High school completed	12 (36.4)
	Undergraduate	13 (39.3)
	Master's program	3 (9.1)
Flood victims (people who reported having been directly affected by a flood)	Yes	12 (36.4)
	No	20 (60.6)
	N/A	1 (3.0)

2.3. Data collection

To obtain the data, 33 semi-structured interviews were carried out, and were recorded and transcribed for later analysis. The interview guide was articulated around five central issues **identified in the theoretical introduction**: description of housing and environment, coastal dimension of the living environment, perception and evaluation of flood risk by storm surges (*mares de leva*), place adaptation and coping strategies regarding the risk.

2.4. Data analysis

For data analysis, the methodological procedures of the grounded theory were followed: open coding, axial coding and selective coding, while maintaining the method of continuous comparison as a guiding principle (Strauss & Corbin, 2002).

The initial coding of the interviews was undertaken by one of the research team members and later triangulated with the other researchers. For the coding synthesis and integration, the paradigmatic matrix or "coding paradigm" was used, which suggests a logic of analysis to relate the process structure. This matrix allows schematic presentation of the relationships among the phenomena, conditions, actions/interactions and consequences that make up each of the emerging categories (Strauss & Corbin, 2002). Coding and classification of the material was performed with the assistance of the Atlas Ti® version 8 program.

The ethical considerations of the study and the informed consent forms were approved by the University of Nantes (France) and endorsed by the Human Research Ethics Committee of the CES University of Medellin (Colombia).

3. **Results**

3.1. Risk types and attributions

In response to the questions regarding coastal flooding risk at different residential levels (city, neighborhood, house), the participants tended to point out several risks associated with proximity to the sea. They referred to flood risks through storm surges such as potential tsunamis, hurricanes, tornadoes, or the arrival of "giant waves"; as well as flooding through overflowing channels. Likewise, in many cases, there was reference to possible flooding by rain, related to the city's insufficient infrastructure in terms of sewage systems.

Regarding threats from sea flooding, some interviewees mentioned the risk to which Cartagena is exposed, given its location and the condition of many areas of the city, which are below sea level. Concerning this awareness about the city, one participant said,

"here we have an event like this, cruel, and goodbye everyone" (Participant 27).

However, for the majority of participants, some areas are more exposed to the flooding risk, as their characteristics make it common for them to be occupied by water.

In relation to risk attribution, or the manner in which the participants explain the risk, there is no univocal position in the narratives. While for some it is a natural phenomenon, inherent to ocean dynamics, for others, although it has a component of this type, it is also attributable to human behavior, especially because of its relationship with climate change, seen as a consequence of human action and which has led to a progressive global increase in sea levels:

"sea levels have risen, and one realizes that, as one is always working near the port, a few years ago, the water did not reach there, but now it has risen a little more" (Participant 2).

Similarly, following these stories, coastal flooding risk is associated with human interventions, for example with the construction of infrastructure works that invade the natural areas of sea occupation, or alteration of the ecosystemic mangrove. In addition, the idea of lack of care for the city is expressed, represented by the inadequate disposal of waste, or even, according to numerous participants, by not perceiving the city as their own (not only on the part of tourists, but also some residents). In this perspective, coastal flooding risk is not natural. To an extent, it responds to human action, its materialization is accelerated or its potential impact on citizens is increased.

On the other hand, although less frequent, magical-religious stories also emerged to explain the coastal flooding risk, as well as the possibilities of protection against it. In this regard, there were expressions such as:

"I think that these are God's designs, whatever may happen" (Participant 18)

In this sense, an alternative for staying protected is to pray or beg God not to materialize a risk of this nature.

A few participants also pointed out that they had no knowledge of the causes of risk of flooding by storm surges.

3.2. The place of experience with coastal flooding risk

Although several interviewees stated that they had not been affected by sea flooding, they have been affected by events caused by it. Even though they have not suffered losses associated with flooding or it has not penetrated their homes, they have suffered from inconvenience or disruption in their daily activities because of it. One respondent stated:

"the last time, recently, it was very hard, I was walking with my little girl and I could not cross to Carulla (a supermarket), so I would say that the parking lots on the second floor could be flooded, it was something serious, serious" (Participant 27).

Most of the participants' locations (city, neighborhood, house) were close to floods. Some even referred to projections of the city's risk of coastal flooding, which warn about the progressive increase in sea levels, and how they could cause a large-scale disaster in the city. This was pointed out by one participant:

"It is always a disadvantage to be at the seashore, it will always be like that, and as far as we know the level of the sea increases every year, as well as the risk for us. That is very well understood" (Participant 24).

Consequently, among the potential effects, they referred to damage of goods, mobility difficulties in the city and difficulties for accessing basic services and products, as well as loss of belongings and separation from places and people with whom there is a significant emotional bond.

On the other hand, from some participants' narratives, it is possible to infer that having experienced the risk is a determining factor in its perception. In this perspective, the fact of not having experienced a flood in their residence means that, although the city may be impacted, or even their neighborhood, and despite their having heard about it, they could stay there without any difficulty, since they have not faced an event of this nature before. One interviewee expressed it thus:

"it has always been said that 'La Boquilla, is under a storm surge risk, but I have always lived here, and nothing has ever happened. From our experience, I repeat, they have already said that about La Boquilla and I have already seen that nothing has happened over 31 years. I think that experience has made it clear that there will be no problem" (Participant 18).

Despite having experienced flooding events in the neighborhood, some participants reported not being affected, since the water did not reach their homes. They also stated that despite the fact having to move around the neighborhood with canoes at some points, this was not considered as a consequence, to the extent that they were certain that this was a temporary event, that disappears after a few days:

"we had to go canoeing to the grocery store, but that didn't affect us, nor did we try to move to somewhere else, because we knew that was a flood that had to cease someday" (Participant 1).

Likewise, certain narratives demonstrate low risk perception based on the non-occurrence of critical events, even if they have been warned, and on the assumption of knowing the sea dynamics and the period of time that these difficulties caused by sea flooding commonly last:

"In my lifetime, when the sea gather strength or rage as one calls it, high tide, one already knows how long the sea can last like that, one already knows more or less by experience, one estimates the lapse of days, one analyzes" (Participant 23).

The issue of little or low risk perception, or in other words, not feeling concerned about the risk, is associated with several conditions: the floods have not caused damage to property, they have occurred in the neighborhood but not in the house, and the house is located on an elevated site, therefore, it has not been necessary to leave the place in the event of water occupation. In this sense, some participants consider a tragedy caused by a coastal flood to be a remote event.

On the other hand, although some participants perceive a risk of flooding, they have adapted to this, as well as to the materialization of said risk. This adaptation or naturalization of the risk is associated with the experience of always being close to the sea, having experienced water occupation events and routinized warnings regarding potential future floods. One interviewee pointed out that this is a kind of culture in which there is a close relationship with water, although this does not imply that the risks to which they are exposed are unknown:

"we have learned to live in an amphibious culture, we live inside water. Despite all the risks, it is beautiful, because of the weather, the conditions; but it is risky, quite risky" (Participant 24).

Taking into account the statements of some participants, this naturalization is also related to the above-mentioned knowledge of the dynamics of the sea, as well as to the few negative consequences perceived regarding past flooding events (as people are not incited to leave their homes in the event of a possible flood). For example, one interviewee added:

"Here in Cartagena flooding occurs very often, so I am used to Cartagena is flooded, then I will continue living at my place" (Participant 12).

It is then a risk seen as common, as inherent to life in Cartagena. From this perspective, some participants pointed out that, although they are aware of the risk of coastal flooding, they have chosen to be there, they have not found an alternative place to live or have no intention of doing so. However, flooding risk is also unpredictable, which is why some wonder if they would have time to act in the face of a possible event or if it would come and destroy everything in its path. Similarly, some say that they must be prepared to cope with the risk occurring, and its implications. It is noteworthy that no preventive actions were implemented by the participants, in the event of coastal flooding, while most of them reported not having thought about possible places for protection, or what they would take with them in case they had to leave their homes in an emergency. Furthermore, no routes or evacuation methods were described precisely. This idea can be illustrated with the following fragment in a participant's story:

"but where would I go? I don't know, every time there are flooding events I think 'what can I do? where might I go?', I have 11 grandchildren, I would take all of them. (Participant 32).

3.3. Coastal flooding risk perception and bond with the residential site

The bond that people have with the place is relevant in two respects: firstly, it accounts for the preservation of the city, the natural environment and, particularly, the sea; and in that it is the absence of a feeling of belonging, empowerment and love for these places that leads to actions that affect them and, consequently, can increase the risk of coastal flooding. Evidence of this can be seen in inadequate waste disposal or lack of maintenance of city locations. In this regard someone added that:

"(a part of the city) is a forgotten Cartagena, which lacks development, social investment, social awareness, in a way the local population does not care for their city, they do not assume it is their own" (Participant 27).

Secondly, a positive emotional attachment to the place seems to play a relevant role in the way people relate to the risk. The participants' stories account for their dependence on the place and the benefits they consider they enjoy from being there, despite the threats. The participants' narratives reveal an appreciation of the idiosyncrasies of Cartagena, the beauty of the landscape, the safety in some parts of the city, the accessibility to the city center and to everyday places, the familiarity in social relations, and the quietness of the city. One participant, referring to what he appreciates about his city, said:

"The breeze, the tranquility, because even though everyone sees it as unsafe, we see it as very safe place, and also the beauty of its landscapes, the sunsets, the part of the walls, the question is la Popa hill, trading activity, the bay, the port" (Participant 24).

The above is stated in the assumption of not leaving the place in the face of a possible materialization of flood risk, due to home, neighborhood and city attachment. The benefits of living near the sea and the tendency to point out that they would only move away from their place of residence in the face of a serious event, in which case the majority expressed their inclination to return when the situation normalized:

"As soon as this end, I will return, yes, because I don't think that this will be for good, this will be an eventuality, I'd say, a bad time happened and it suddenly stopped, and that's it" (Participant 19).

Considering these approaches, it is possible to perceive an association between the participants' risk perception and their positive emotional bond with their residential place.

3.4. The role of government institutions in coastal flooding risk management

Another question which was tackled is how the role of institutions, especially government institutions, is understood in the face of coastal flooding risk, as well as the management of public resources in their charge. In this sense, it is important to point out that, according to the participants, it is common to refer to these institutions as the main ones responsible for generating structural actions in order to protect the citizens:

"The government has the duty to protect the citizen, it is the one with the command to make any prevention program. It is only and exclusively the government".

(Participant 21).

These institutions are thus responsible for studying the risk and, consequently, the elaboration of projections associated with climate change and the study of the probabilities of serious water inundation in the city. In addition, strengthening the regulatory framework and implementing public policies to address these circumstances is their responsibility, as well as establishing interventions aimed at risk communication and developing preventive and impactful mitigation actions, such as the construction of infrastructures, eviction processes in certain areas and the relocation of families to safer places. In relation to this, one interviewee said:

"The responsible would be those who rule the city, the government" (Participant 17).

In this way, it could be suggested, from the participants' viewpoints, that coastal flooding risk management is to a great extent in the hands of the governmental institutions with competence in the matter, whose actions should involve the communities and be guided by the assessments and recommendations made by experts in the field. In this regard, based on the analysis of the information obtained in the framework of this research, people trust in the relevance of science as an enabler of knowledge around risk, meaning that government actions must be supported by relevant technical knowledge.

3.5. Inefficiency, co-optation, negligence and corruption. Mistrust of government institutions

The participation of government institutions, considered as ideal in terms of risk management, is far from the perceived institutional presence and efficiency, for which there is an important sense of mistrust on the part of the interviewed citizens. On the one hand, the participants expressed their dissatisfaction with the ineffectiveness of the institutions in taking measures to deal with the flooding risk as well as in regulating adequately to cope with it. In this sense, some consider that the regulations are weak and the institutional action is permeated by acts of corruption, in addition to the lack of interest in environmental issues on the part of the government:

"Bodies do not regulate as they should. We are a highly regulated company and we are constantly being screwed over. Fortunately, we are within the law, but other companies are not because of corruption across the world" (Participant 2).

There are institutional actions that can even increase the coastal flood risk, since, for example, they have made possible the construction of large buildings in the city, with some participants perceiving socio-environmental impacts, both on the beaches and in swampy and mangrove areas, and for this purpose, in some cases, they have "invaded the sea area":

"They fill in the mangrove area and create soils for selling. For example, in the Ciénaga de la Virgen, the whole eastern side has been filled in and people bought soil in a piece of water; they cut the mangrove, put some stakes and sell it, I'd say, five million pesos; and there are people who can only afford that, they buy it, and then they fill it in. Also, there are builders involved who take material from the junk, I mean, from their building works, and they send it supposedly to the authorized landfills, but that junk ends up filling (the marsh). So, this is a very serious problem". (Participant 11).

In this context, institutional actions are also perceived as negligent, in the sense that they have disregarded the quality of life of the population, which is expressed in the testimonies, in terms of what could be called an institutional abandonment, visible in the lack of public investment in barrier infrastructure works to prevent flooding in different sectors of the city, in the strengthening of urban planning, in the improvement of roads and means of transportation, as well as in the lack of suitable leisure spaces for the inhabitants of the neighborhood, particularly the non-tourists, the locals. In the words of some of the interviewees, there is:

"a radical state of abandonment, [...] there is not even a park, there is absolutely nothing, nothing new, nothing" (Participant 18).

In the same direction, one of the testimonials clearly shows the lack of interest of governmental authorities in issues related to the care and improvement of environmental conditions, since their action is focused on areas considered more strategic, towards which public funding is addressed.

"For me the politics is broken, for me the government is more focused on overseas aid than on us, it is centered on the war, not on the environment. The government is not interested in the environment in my opinion, either we go to war or we build another building to imitate another country, or we fix roads, but not take care of the environment, it's not about saving our planet, the improvement sense is understood towards infrastructure not about nature. So, politics does not work" (Participant 14).

However, considering the participants' contributions, this could be seen as a partial institutional negligence, while citizen distrust is also based on perceiving inequity in public investment, which is centered in certain sectors due to particular interests that co-opt state institutions.

3.6. Differential and selective public expenditure: perception of inequity and strategic risk discourse

The participants seem to perceive that public expenditure in general, as much for infrastructure works for flood containment and urban planning, is greater in the tourist sectors or with higher tourist potential, in comparison to the areas inhabited by the native population who, according to the majority of the interviewees, experience precarious situations in different areas, such as housing, health, work, transport and education.

The idea of the existence of two Cartagena cities emerges: one, the city that everyone knows, beautiful, sought after by tourists, with a high living cost; the other, the one forgotten by the governmental institutions and not very adapted for the citizens, the one that is not shown in "the tourist guides" (Participant 27). Throughout this metaphor of the two cities, it is possible to identify the participants' recurring complaints in relation to the inequities experimented in Cartagena, the deepening gap between those who live in the tourist areas, which are frequently improved and well protected, and those who live in neighborhoods on the margins of tourism, perceived as poor, violent, with difficulties in accessing public services, fewer social opportunities and greater pollution. The latter are ignored by institutions and, therefore, do not benefit from risk management. These are two territories with different characteristics and needs. As one of the respondents puts it:

"a great social crisis from the view of the inequality and inequity, in other words, it is a city of contrasts" (Participant 20).

This issue is also seen as a reflection of the country's reality.

In this sense, there is a perceived injustice and inequity with respect to the distribution of resources in the different sectors of the city, based on what could be called a strategic use of risk discourse, where, on its basis, decisions are made in favor of certain particular interests. As a participant pointed out:

"According to the report by the port authorities, they can't build here, a street in La Boquilla cannot be paved, since we are in a high-risk area, and a high-risk area is

not only in La Boquilla, because if we analyze Bocagrande, downtown, Manga, are all high-risk areas, due to they are areas at the edge of the sea, those zones have the sea even closer than us, but there they do take action there because they have some interests" (Participant 19).

From this perspective, there are particular interests that co-opt institutions and constrain government support from improving certain places which, although currently residential, seem appealing and could potentially lead to the development of economic activities, particularly tourism. Several participants agreed that the institutions' neglect of their neighborhood conditions has to do with a strategy to pressure the inhabitants to leave the place:

"Since La Boquilla is a very attractive place, it doesn't have much help from the government, because, I suppose, what they want is to see us in bad conditions thus, one day we can get out of here, I see it in that way [...] There are projects here in these hotels, for example, they play with the maps, there are some maps in which La Boquilla doesn't appear, they already have their idea that they are going to disappear us from here anyway, so that they can start building hotels and things like that, what they call development. I think that the exclusion of the State, especially towards us, is what I like the least. I think that these are the reasons why my community does not receive any help" (Participant 18).

However, from another perspective, some interviews show that what the government institutions have done, based on this strategic use of the risk discourse, is to point out that in some neighborhoods there is no sea flooding risk, in terms of not distributing resources to improve their infrastructure and to support the non-generation of measures to deal with it.

However, from another perspective, some interviewees emphasize that by not distributing resources to improve some neighborhoods' infrastructure, the governmental institutions have indicated that said areas are not at sea flooding risk.

According to these data, although the outstanding role of public institutions in the management of the coastal flooding risk is recognized, considerable mistrust has developed with respect to it. Thus, in the face of a strongly perceived risk, significant place attachment and a lack of action planning in the event of the threat occurring, this mistrust seems to increase a feeling of despair and powerlessness to face the risk in question.

3.7. Synthesis of the main findings

Figure 1 recapitulates the findings of this research study, which can be thought of in two dimensions. On the one hand, a theoretical dimension of risk perception, which denotes the fact that, when referring to the perceived risk, the participants not only define it, but also try to explain it using theories of common knowledge. In this case, participants mainly focus on an anthropic explanation of coastal flooding risk. In other words, its origin is attributed to human action. Experience of the risk is another relevant aspect with regard to risk perception, insofar as, although the respondents have been warned about the threat, not having experienced losses as a result of sea floods lowers risk perception. Even though floods are fairly frequent events, coupled with the significant link with the place, particularly through dependence on it, people seem to have grown accustomed to the risk and according to the discourses, to considering its severity as low, and to the idea that it is not potentially catastrophic.

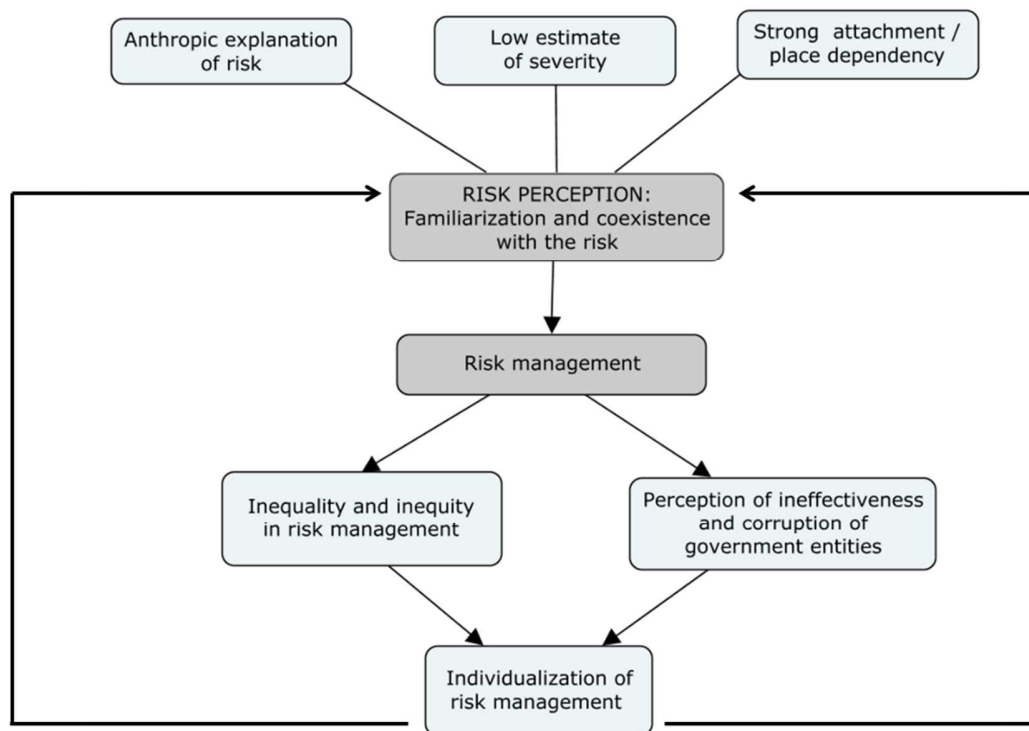


Figure 1. Dimensions of risk perception

As for the second dimension, it points to risk management, which, from the perspective of the participants, is the primary responsibility of governmental entities. However, this expectation of public action contrasts with perceived institutional inefficiency and inequity. Two levels of risk perception emerge: one that refers to the sea flooding of Lev as an objective phenomenon and conceived as being potentially harmful for the city and its inhabitants; and another that refers to risk perception related to management (in its precariousness or absence), which is deepened in terms of its estimation of severity. In other words, the perceived risk of coastal flooding, as such, does not seem to be of major concern, given the familiarity with it and the participants' desire to remain in their neighborhoods. However, there is greater risk potential to the extent that the institutions to which the responsibility of managing threats is attributed are not seen as fulfilling that function. Thus, in the event of a flood, some actions may be deployed individually, but the vulnerability of the city is extended, an issue that can act as a trigger for

thinking about the problem of risk and its management from broader social aspects.

From this perspective, risk perception does not only depend on technical calculations or the objective dimensions of the phenomenon (in the case of flooding), but is also influenced by broader social arrangements, by the perception of inequities in the form of management of the burdens and resources of society and, among these, the strategies to face threats, which are also distributed differentially between groups. In short, risk perception does not only depend on the characteristics of the phenomenon, but also on its social character.

4. Discussion

4.1. Regarding the perception of coastal flooding risk

Some authors interested in individuals' interpretations and judgments of risks have pointed out that causality attributions are not only influenced by technical or scientific estimations about situations or hazardous events, but also by whether or not it is perceived as fair that certain groups are vulnerable to the risk, if this is seen as assumed voluntarily or involuntarily, as artificial or natural, which is associated with greater or lesser uncertainty and perceived fear in the face of potential damage (Slovic, 2000; Slovic & Weber, 2002; Wester-Herber, 2004). In the case of this study, coastal flooding risk is associated with climate change, generally attributed to human action and consequently interpreted as an avoidable issue on a global scale. In this sense, such preventability is not seen as dependent on individual behavior and participants do not perceive their own possibilities of action as capable of containing the rise in sea levels.

When observing territories' vulnerability, coastal flooding risk is one of the most notable effects of climate change. In addition to the expected sea level rise by 2100 (IPCC, 2015), which increases this risk (Nicholls, 2002), there is a

phenomenon of greater production of hazards, induced by real estate development practices in risk areas, given the strong anthropogenic pressure exerted on the coasts (Idier et al., 2013). In other words, the concentration of problems increases the risk vulnerability of coastal flooding (Meur-Férec et al., 2008), issues that are known by the participants, who relate an intensifying of flood risk in the face of urban planning and construction decisions that exceed their decision-making power regarding city issues.

Thus, it is a risk interpreted as human-made, to which citizens are involuntarily exposed. Social vulnerability, in these terms, is an imperative that approaches the proposals of some authors, who have suggested that natural disasters do not exist, to the extent that it is human behavior and decisions that increase the impact of natural phenomena (Maskrey, 1993). It is also important to note that risks assessed as involuntary have been associated, in other studies, with the impossibility of controlling them and with the belief in significant harmful potential (Slovic, 2000).

In the case of Cartagena, this is also a reported risk, for which there are projections known by most participants. However, for many of them, the risk is there. The non-occurrence of serious events and the confidence in one's own capacity to interpret the dynamics of the sea, emerge as associated with little preventive behavior and the lack of planning to face a possible disaster. Not having been affected by a flooding event can help explain this circumstance. For some authors, perceptions of environmental risk and the feeling of vulnerability that surrounds them are conditioned by previous experiences with risky events, which provide individuals with cognitive patterns to understand and cope with threats (Korstanje, 2010; Saurí et al., 2010; Siegrist & Gutscher, 2006; Weber et al., 2000).

A potential explanation for this issue is given by Brody et al. (2008), who argue that people living in areas suffering from loss of life due to environmental hazards perceive climate change as more serious than people living in areas where deaths from these phenomena are less common. In this sense, it has been stated that

even if people accept that climate change has effects on humanity, they may consider that the risk of their being affected is lower (Fleury-Bahi, 2008).

A communicated risk, but whose materialization has not led to consequences seen as serious, together with the pleasure of life near the sea, also lead to the notion that the practices occurring in these locations and the affective bond with them, require the incorporation of the sources of risk as an integral element of the space, that is, familiarization with them (Bernardo, 2013). In this sense, individuals can emphasize the benefits associated with the proximity of the ocean and with the vital objectives that make it possible, understand coastal risks as inherent to life near the ocean. Thus, when people are close to places that are important to them, they gain a sense of confidence that increases their trust in being protected (Fried, 2000).

4.2. Mistrust in institutions and coastal flooding risk perception

On the other hand, trust in institutions emerged in this study as a relevant category. The first factor to be identified is the government's responsibility in its role as protector of citizens; a conception of the government that is essential for evaluating the coastal flooding risk and, overall, in managing problems related to climate change. However, according to the participants, this aspect contrasts with a perception of ineptitude, voluntary negligence and even corruption of government action. In this sense, it is perceived as a sort of "abandonment" of their fundamental mission of protection.

The citizens have thus developed a strong mistrust regarding the governmental institutions, which are not considered legitimate in crisis management. These issues lead to the third aspect identified in the interviews: a perception of government action as explicitly and deliberately excluding, through an unequal treatment of different areas of the city and different social categories. As a result, the local and national governments appear to be the architects of a great social

exclusionary divide. In this context, it is difficult for participants to consider that government institutions can play a role in risk management, leadership in protection and/or adaptative actions against the effects of climate change, considerably increasing the feeling of vulnerability of the city's inhabitants.

Trust is seen as a "lubricant" for social interactions, ensuring the smooth and harmonious functioning of social institutions (Tyler & Degoe, 1996). As mentioned in the introduction, trust allows the reduction of social uncertainty and complexity (Luhmann, 1979; Earle & Cvetkovich, 1997) and is considered a fundamental element of social capital, necessary for the constitution of a healthy democracy (Kasperson et al., 1999). Consequently, the management of risks related to the impact of climate change requires a minimum of confidence, both to reduce the feeling of vulnerability, and to manage risky situations.

This trust is the result of the reliability that the political institution generates towards the administered, with this reliability supported by the perception of competence, i.e. its suitability or capacity to face the risk. In the literature, several studies attempt to determine which factors best explain trust. There seems to be a predominance of "evaluative" aspects over judgments regarding "technical ability" to deal with risks (Poortinga & Pidgeon, 2003). That is, correspondence of value and perceived motivations of the institutions are more important than their capacity to build a trustful relationship. Similarity of values may be a fundamental aspect in the configuration of trust. In other words, the citizen's identification with the institution leads to greater trust. In turn, this similarity of values is the result of a series of attitudes, pre-existing judgments, not only about the risk object, but in general, even about other issues not directly related to the threat (Poortinga & Pidgeon, 2006). So it is that an image of ineffectiveness, negligence and corruption in the governance system, built up by Cartagena's people, contributes to a deep-rooted attitude of distrust that affects risk management.

Trust in institutions is a means of observing structural, social and political issues, which go beyond simple risk management, and include the actual relationship

between those who govern and those who are governed. As Slovic (1993) said in a founding article on this reflection, risk management has become an increasingly politicized and controversial function. Research on risk perception has provided a new perspective on this problem. Citizens' mistrust of risk analysis and institutional management, especially governmental institutions, plays a central role in this perspective. In addition, it is important to clarify that such conflicts and controversies are not due to ignorance or public irrationality, but rather to new forms of participatory democracy, generated by technological and social changes that destroy trust. Recognizing the importance of trust and understanding the reasons for its breakdown will impact how risks are addressed in the future (Slovic, 1993).

According to Gierlach et al. (2010), cultural variables can have considerable influence on risk perception. Thus, considering the findings in successive investigations in Colombian contexts, it would be relevant to examine cultural dimensions associated with such perception of hazards, in relation to the (dis)trust in the institutions regarding their competence in risk management. Social inequities and the precariousness of the State's presence constitute structural factors that intensify the sense of vulnerability in communities that are considered as abandoned (Navarro, 2017). This dimension of how people assess the institutional role and the trust in said institutions opens up a research perspective that deserves to be explored further. Although quantitative studies are on the rise, it is important to point out that qualitative approaches allow for a broader understanding of the reasons for trust or mistrust in these institutions.

Acknowledgments

This research was supported by the French National Research Agency within the framework of the CLIMATRisk project [grant numbers ANR- 15-CE03-0002-01].

References

Allum, N. (2007). An empirical test of competing theories of hazard-related trust: The case of GM food. *Risk Analysis*, 27(4), 935–946.

Becker, J. S., Paton, D., Johnston, D. M., & Ronan, K. R. (2012). A model of household preparedness for earthquakes: How individuals make meaning of earthquake information and how this influences preparedness. *Natural Hazards*, 64(1), 107-137. <https://doi.org/10.1007/s11069-012-0238-x>

Bernardo, F. (2013). Impact of place attachment on risk perception: Exploring the multidimensionality of risk and its magnitude. *Estudios de Psicología*, 34(3), 323–329. <https://doi.org/10.1174/021093913808349253>

Blumer, H. (1982). *El Interaccionismo Simbólico: perspectiva y método*. Barcelona: Hora S.A.

Brody, S.D., Zahran, S., Vedlitz, A. & Grover, H. (2008). Examining the relationship between P.V. and public perception of global climate change in the United States. *Environment and Behavior*, 40(1), 72–95.

Corral V., V., Frías A., M. & González L., D. (2003). Percepción de riesgos, conducta proambiental y variables demográficas en una comunidad de Sonora, México. *Región y Sociedad*, XV(26), 50–72.

Earle, T. C. (2010). Trust in risk management: A model-based review of empirical research. *Risk Analysis*, 30, 541–574.

Earle, T. C. & Cvetkovich, G. (1997). Culture, cosmopolitanism, and risk management. *Risk Analysis*, 17(1), 55–65.

Earle, T. C., Siegrist, M. & Gutscher, H. (2007). Trust, risk perception, and the TCC model of cooperation. In M. Siegrist, T. C. Earle, & H. Gutscher (Eds.), *Trust*

in cooperative risk management: Uncertainty and scepticism in the public mind (pp. 1–49). London: Earthscan.

Earle, T. C., & Siegrist, M. (2006). Morality information, performance information, and the distinction between trust and confidence. *Journal of Applied Social Psychology*, 36, 383–416.

Fleury-Bahi G. (2008). Environmental risk: perception and target with local versus global evaluation. *Psychological Reports*, 102, 185-193.

Fleury-Bahi, G., Marcouyeux, A., Préau, M., & Annabi-Attia, T. (2013). Development and validation of an environmental quality of life scale: study of a French sample, *Soc. Indicat. Res.* 113(3), 903-913.

Freudenburg, W. R. (1993). Risk and recreancy: Weber, the division of labor, and the rationality of risk perceptions. *Social Forces*, 71(4), 909–932.

Frewer, L. J. (2004). The public and effective risk communication. *Toxicology Letters*, 149, 391–397. doi: 10.1016/j.toxlet.2003.12.049

Frewer, L. J. (2003). Trust, transparency, and social context: Implications for social amplification of risk. In N. F. Pidgeon, R. E. Kasperson, & P. Slovic (Eds.), *The social amplification of risk* (pp. 123–137). Cambridge, UK: Cambridge University Press.

Fried, M. (2000). Continuities and discontinuities of place. *Journal of Environmental Psychology*, 20, 193-205. doi:10.1006/jevp.1999.0154

Gierlach, E., Belsher, B. y Beutler, L. (2010). Cross-cultural differences in risk perceptions of disasters. *Risk Analysis*, 30(10), 1539-1549. doi: 10.1111/j.1539-6924.2010.01451.x

Hellequin, A., Flanquart, H., Meur-Ferec, C., & Rulleau (2013) Perceptions du risque de submersion marine par la population du littoral languedocien :

contribution à l'analyse de la vulnérabilité côtière. *Natures Sciences Sociétés*, 4(21), 385-399.

Ho, M. C., Shaw, D., Lin, S. & Chiu, Y. C. (2008). How do disaster characteristics influence risk perception? *Risk Analysis*, 28(3), 635–643.
<https://doi.org/10.1111/j.1539-6924.2008.01040.x>

Idier, D., Castelle, B., Poumadère, M., Balouin, Y., Bertoldo, R., Bouchette, F., ... Vinchon, C. (2013). Vulnerability of sandy coasts to climate variability. *Climate Research*, 57, 19–44.

IPCC (2007). *Synthesis Report. Intergovernmental Panel on Climate Change* [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

IPCC (2015). *Climate Change 2014. Synthesis Report*. IPCC, Geneva, Switzerland, 169 pp.

Jang WM, Kim U-N, Jang DH, *et al.* (2020). Influence of trust on two different risk perceptions as an affective and cognitive dimension during Middle East respiratory syndrome coronavirus (MERS-CoV) outbreak in South Korea: serial cross-sectional surveys. *BMJ Open*, 10. doi: 10e033026.
doi:10.1136/bmjopen-2019-033026

Kasperson, R. E., Golding, D., & Kasperson, J. X. (1999). Risk, trust and democratic theory. In G. Cvetkovich & R.E. Löfstedt (Eds.), *Social Trust and the Management of Risk*. London: Earthscan.

Kasperson, R.E., Renn, O., Slovic, P., Brown, H.S., Emel, J., Goble, R. & Ratick, S. (1988). The social amplification of risk: a conceptual framework, *Risk Analysis*, 8(2).

Korstanje, M. (2010). El 11 de septiembre y la teoría de la percepción del riesgo. *Pasos. Revista de Turismo y Patrimonio Cultural*, 8(2), 389–402.

Kusenbach, M. (2017). "It's Not Where I'd be Running Like an Idiot for a Small One:" Hurricane Perceptions and Evacuation Decision Making Among Florida Mobile Home Residents. *International Journal of Mass Emergencies and Disasters*, 35(2), 91-119.

López-Vázquez, E., & Marván, M. L. (2003). Risk perception, stress and coping strategies in two catastrophe risk situations. *Social Behavior and Personality*, 31(1), 61-70.

Luhmann, N. (1979). *Trust and Power*. New York: Wiley.

Lupton, D. (1999). *Risk and Sociocultural Theory: New Directions and Perspectives*, Cambridge University Press.

Maskrey, A. (1993). *Los desastres no son naturales*. Red de Estudios Sociales en Prevención de Desastres en América Latina.

Masuda, J.R. & Garvin, T. (2006). Place, culture, and the social amplification of risk, *Risk Analysis*, 26(2) (2006) 437–454, <https://doi.org/10.1111/j.1539-6924.2006.00749.x>.

Meur-Ferec, Hénaff, Lageat, & Le Berre (2012) *Les effets du changement climatique sur la vulnérabilité des territoires côtiers aux risques d'érosion et de submersion en France métropolitaine : une fraction du problème*. Colloque International " Géorisque 2012 ", El Jadida : Maroc.

Meur-Ferec, C., Deboudt, Ph., Morel, V. (2008). Coastal Risks in France: An Integrated Method For Evaluating Vulnerability. *Journal of Coastal Research*, 24(2), 178–189.

Moser, G. (1998). Attribution causale et sentiment d'insécurité de victimes de différents types de vols. *Les Cahiers Internationaux de Psychologie Sociale*, 39, 43-52.

Navarro, O., Restrepo-Ochoa, D., Muñoz-Duque, L-A., Zapa-Perez, K., Ameline, A., Mercier, D. & Fleury-Bahi, G. (2020). Determinants of coping strategies in two types of natural hazards: Flash floods and coastal flooding. *International Journal of Disaster Risk Reduction*, 46, 101514. Doi.org/10.1016/j.ijdr.2020.101514.

Navarro, O., Krien, N., Rommel, D., Deledalle, A., Lemée, C., Coquet, M., Mercier, D. & Fleury-Bahi, G. (2020). Coping strategies regarding coastal flooding risk in a context of climate change in a French Caribbean island. *Environment and Behavior*. doi.org/10.1177/0013916520916253

Navarro, O. (2017) Social inequality and environmental risk perception. In Fleury-Bahi, Pol & Navarro, *Handbook of environmental psychology and QOL research*, New York: Springer.

Navarro, O. & Michel-Guillou, E. (2014) Analyse des risques et menaces environnementales. Un regard psycho-socio-environnemental. In : Marchand, Depeau & Weiss (Dir) *L'individu au risque de l'environnement. Regards croisés de la Psychologie environnementale*. Paris: Edition In Press

Nicholls R.J, (2002). Analysis of global impacts of sea-level rise: a case study of flooding. *Physics and chemistry on earth*, 27, 1455-1466.

Paton, D., Sagala, S., Okada, N., Jang, L.-J., Bürgelt, P. T., & Gregg, C. E. (2010). Making sense of natural hazard mitigation: Personal, social and cultural influences. *Environmental Hazards*, 9(2), 183-196. <https://doi.org/10.3763/ehaz.2010.0039>

Paveglio, T. B., Carroll, M. S., Absher, J., & Robinson, W. (2010). Symbolic Meanings of Wildland Fire: A Study of Residents in the U.S. Inland Northwest. *Society & Natural Resources*, 24(1), 18-33. <https://doi.org/10.1080/08941920802499073>

- Peretti-Watel, P. (2003). *La Sociologie du risque*, Paris, Armand Colin.
- Pidgeon, N., Kasperson, R. & Slovic, P. (2003). *The Social Amplification of Risk*, Cambridge University Press, Cambridge.
- Poortinga, W. & Pidgeon, N. F. (2006). Prior attitudes, salient value similarity, and dimensionality: Toward an integrative model of trust in risk regulation. *Journal of Applied Social Psychology*, 36, 1674–1700.
- Poortinga, W. & Pidgeon, N. F. (2003). Exploring the dimensionality of trust in risk regulation. *Risk Analysis*, 23, 961–972. doi: 10.1111/1539-6924.00373
- Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *Academy of Management Review*, 23(3), 393–404.
- Safi, A. S., Smith, W. J., & Liu, Z. (2012). Rural Nevada and Climate Change: Vulnerability, Beliefs, and Risk Perception. *Risk Analysis*, 32(6), 1041–1059
- Saurí, D., Ribas, A., Lara, A., & Pavón, D. (2010). La percepción del riesgo de inundación: experiencias de aprendizaje en la Costa Brava. *Papeles de Geografía*, 52, 269–278. Retrieved from <http://dialnet.unirioja.es/servlet/articulo?codigo=3312002>
- Siegrist M. (2019). Trust and risk perception: a critical review of the literature. *Risk Analysis*, 27.
- Siegrist, M. & Zingg, A. (2014). The role of public trust during pandemics: Implications for crisis communication. *European Psychologist*, 19(1), 23–32. <https://doi.org/10.1027/1016-9040/a000169>
- Siegrist, M. & Gutscher, H. (2006). Flooding risks: A comparison of lay people's perceptions and experts' assessments in Switzerland. *Risk Analysis*, 26(4), 971–979. <https://doi.org/10.1111/j.1539-6924.2006.00792.x>

- Siegrist, M., & Cvetkovich, G. (2000). Perception of hazards: The role of social trust and knowledge. *Risk Analysis*, 20(5), 713–719.
- Slovic, P. (1993). Perceived risk, trust, and democracy. *Risk Analysis*, 13, 675–682.
- Slovic, P. (1987). Perception of Risk. En P. Slovic (Ed.), *The Perception of Risk* (pp. 220–231). Washington: Earthscan.
- Slovic, P. (2000). *The perception of risk*. Washington: Earthscan.
- Slovic, P., Fischhoff, B. & Lichtenstein, S. (1980) Facts and fears: understanding perceived risk, in: R.C. Schwing, W.A. Albers (Eds.), *Societal Risk Assessment: How Safe Is Safe Enough?*, Springer US, Boston, MA.
- Slovic, P. & Weber, E.U. (2002). Percepción del riesgo generado por eventos extremos. En *Estrategias de Manejo de Riesgo en un Mundo Incierto*. Palisades, New York. http://cursos.campusvirtualsp.org/pluginfile.php/7062/mod_page/content/1/modulo2/content/slovic-weber-percepcion-del-riesgo-representado-por-eventos-extremos.pdf
- Strauss, A. & Corbin, J. (2002). *Bases de la investigación cualitativa. Técnicas y procedimientos para desarrollar la teoría fundamentada*. Medellín: Universidad de Antioquia.
- Terpstra, T. (2011). Emotions, trust, and perceived risk: Affective and cognitive routes to flood preparedness behavior. *Risk Analysis*, 31(10), 1658–1675. <https://doi.org/10.1111/j.1539-6924.2011.01616.x>
- Terwel, B. W., Harinck, F., Ellemers, N., & Daamen, D. D. L. (2009). Competence-based and integrity-based trust as predictors of acceptance of carbon dioxide capture and storage (CCS). *Risk Analysis*, 29(8), 1129–1140. <https://doi.org/10.1111/j.1539-6924.2009.01256.x>

- Tyler, T.R. & DeGoey, P. (1996). Trust in organizational authorities. In R. M. Kramer & T. R. Tyler (Eds.), *Trust in Organizations. Frontiers of Theory and Research*. London : Sage.
- Vaughan, E. (1995). The socioeconomic context of exposure and response to environmental risk. *Environment and Behavior*, 27(4), 454-489.
- Weber, J.M., Hair, J.F. & Fowler, C.R. (2000). Developing a Measure of Perceived Environmental Risk. *Journal of Environmental Education*, 32(1), 28–35.
- Wester-Herber, M. (2004). Underlying concerns in land-use conflicts - The role of place-identity in risk perception. *Environmental Science and Policy*, 7, 109–116. <https://doi.org/10.1016/j.envsci.2003.12.001>