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No Sea, no Flood Risk:

How Importance Granted to the Sea Influences Flood Risk Perception

in the particular case of the Guadeloupe Island, Caribbean Sea

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Abstract: This article focuses on the importance of the coastal dimension of the living area, assuming that even if individuals have a risk culture, flooding by the sea is not always considered as a risk. Starting from the premise that, even if they have a risk culture, not everyone on the coastline considers his/her living area as a coastal one, we expect that those who do will more easily talk about flood risk perception on it. Indeed, through interviews analysis made in Guadeloupe Island in the Caribbean Sea, we highlighted the fact that having a risk culture is not enough for perceiving flood risk. If respondents have actually a risk culture, most of them don’t consider flooding phenomenon as a real risk. It is not a priority for them. We demonstrate here that flood risk perception requires to perceive the coastal dimension of the living area, which is not the case of the most part of respondents. Those who perceive it are those with activities directly linked with the sea. They consider the sea as a part of their living area and not only its delimitation. Therefore, in areas where the sea is too current for being visible, risk culture is not focused on the sea except for people with activities linked with it.

Key words: risk perception, relation to the sea, identity, risk culture, qualitative study

Introduction

Caribbean tourism has really grown since only few decades (Wong, 2015). Hence uninhabited coastal areas are building up to answer this growing pressure. This anthropisation on coastal areas considerably increases stakes on such places exposed to natural hazards relating to the presence of the sea. During a long time, managers tried to contain hazards seeking to fix the coastline. Considered as safe, even places the nearest to the sea has been urbanized. Protecting works can eventually reduce coastal hazards consequences. But, at the same time, urbanization increases

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stakes on concerned areas more and more exposed to the sea because of the rising sea level (Church and White, 2006) and the increase of storms' frequency (Meur-Ferec, 2006; Miossec, 1998). The importance of humans and properties exposed to coastal hazards has never been so important.

Coastal areas have never been so vulnerable, so risky.

**Flood risk perception**

Risk is a subjective construction about damages probability of occurrence (Terpstra, Gutteling, Geldof, & Kappe, 2006). Here we are interested in the specific risk of flooding by the sea on coastal areas and most especially in how risky is the situation according to concerned people (Lopez-Vazquez and Marvan, 2003; Lupton, 1999). In other words, we are interested in how they perceive flood risk (Chauvin, 2014; Slovic, 1987): how dangerous such phenomenon could be, according to individuals exposed to it. To perceive flood risk or not, depends on a wide range of elements. In particular it depends on what constitutes a risk to individuals. In this way it depends on their risk culture. Furthermore risk perception depends on the importance granted to potentially risky factors in the way an area is perceived.

**Risk culture and flood risk perception**

For a part, risk perception is influenced by cultural markers that allows to indicate what is a risk and what is not for individuals in concerned area. It evolves according to the risky dimension granted by people and community to phenomena. We can talk about “risk culture” when the concerned population agreed to consider some phenomena existence in its living area as risks (Castro and Batel, 2007; Douglas and Wildavsky, 2010; González-Riancho et al., 2017; Pidgeon et al., 2003). However, each culture does not consider the same phenomena as the risky ones (Adams, 2013). It depends on the importance granted by individuals to each potentially risky phenomenon they are exposed to, and how they assess the seriousness and the occurrence probability of these phenomena on the concerned area.

**Living area perception and risk**

With regards to the flood risk perception, previous research highlighted the influence of distance to the sea on it. The most people consider they live near the sea, the more they consider their living area as exposed to flooding phenomenon. (Afanador Franco et al., 2006; Lopez Vazquez et al., 2008; Michel-Guillou et al., 2016; O’Neill et al., 2016; Yang Zhang et al., 2010). To a lesser extent, the importance of the coastal dimension of the living area has also been approached. In a quantitative survey, researchers have shown that the more individuals considered their living area as
terrestrial rather than coastal, the less they considered the existence of coastal phenomena such as marine erosion/flooding by the sea (N. Krien & Michel-Guillou, 2015). Thus, floods by sea perception seems to be correlated with the importance of the coastal dimension of living area. Beyond the dichotomy coastal/terrestrial of living area, the importance granted to the sea by individuals (to identify that particular space as their personal use of it) influences the importance granted to every element associate with the sea, including flooding phenomenon.

Aims of the study

According to research regarding the relation between risk culture and flood risk perception, the more some phenomenon can have disastrous consequences and the more frequently it can happen, the more it should be considered as a risky one. It has already been acknowledged that previous experiences of the phenomenon can considerably influence risk perception (Barnett and Breakwell, 2001; Ohman, 2017; Sun and Han, 2018). According to this, we can suppose that phenomena considered as risky ones would be the most dangerous ones in the past and would have a great probability of occurrence. Then, our first aim will be to determine if people living in a particular coastal area exposed to flooding by the sea have a risk culture and, if it’s the case, what they consider as risks, and finally, if they consider flooding by the sea as a risk. Furthermore, based on previous works about the links between living area perception and risk perception, it seems that the more the people give importance to the coastal dimension of their living area, the more they consider flooding by sea as an important phenomenon on this area (a phenomenon they have to take into account and to deal with) and a risky one. But why some people grant a great importance to the coastal dimension when some people don’t? According to Proshansky, Fabian, and Kaminoff (Proshansky et al., 1983), the meaning given to an area depends on the identity of who has given it. Thus the more individuals give importance to the sea when they describe themselves (as sea or coastal people), the more they should give importance to the coastal dimension of their living area description and so the more they should give some credit and some importance to the existence of flood risk in this area. Our second aim will be to determine if everyone on the coastline considers his/her living area as a coastal one. We expect that if some don’t, those who do will describe their living area mentioning the coast and/or reporting activities related to the sea, and they will more consider flood by the sea on this area as important and risky phenomenon. Such findings would demonstrate the existence of different profiles of individuals exposed to the risk of flooding by the sea, depending on the relationship they maintain with the coastal dimension of their living environment. This would highlight a new vulnerability factor.
To perceive flooding by sea as a risk involves first to be in a place where such phenomenon could be relevant. That means to be in a place potentially exposed to such phenomenon. That’s why we decided to locate this study on coastal areas considered by scientists as exposed to flooding by the sea. In some coastal spaces most people attach great importance to the coastal dimension of their living area (Michel-Guillou et al., 2016). In such places it could be difficult to verify our second assumption. But it might not be the case everywhere. Identity is built through similarities and differences (Kuhn and McPartland, 1954). For people living in a place where sea is everywhere, like in a small Island, everyone in their direct environment lives “near the sea”. In this context we expect that people will give less consideration to the coastal dimension of their living area, especially those who have never left this place.

**Method**

**Participants**

For our survey, we had an interest in a place surrounded by the sea: the Guadeloupe Island named “Grande-Terre” (Caribbean Sea). It is only 586 km² in circumference. This place is often exposed to hurricanes and affected by floods (Krien et al., 2015; Zahibo et al., 2007). Furthermore, in 2013, agriculture, marine and fishing sectors represented 5% of the guadeloupean employment (INSEE⁴), which is very low for a coastal area. Because of the volcanic island topography, most important cities are on the coastline. We focused on two particular municipalities considered by scientists as exposed to flood risk (according to historical and cartographic data about flood risk): Pointe à Pitre and Sainte Anne. On the one hand Pointe à Pitre consists in the economic center of the island, it is built in the very south-west of Grande-Terre at the mouth of the Rivière Salée. It is built for a part on a polder and includes many building and social housing. In the other hand, Sainte Anne consists in a touristic area in the south coast of Grande-Terre. It includes mostly single-storey houses or with one floor. In this municipality activities focuses mainly on the down-town beach or near it.

**Material**

To verify our assumptions, we decided to explore the people’s point of view with a qualitative approach. So we established an individual interview guide covering several themes: where they lived in the past, description of their actual home, of their actual neighborhood and municipality of

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⁴ https://www.insee.fr/fr/statistiques/3294491?sommaire=3294516&q=Activit%C3%A9%20Guadeloupe
residence (general aspects, the advantages and disadvantages), activities practised on the municipality and the risk perception of flooding by the sea.

**Procedure**

Using our interview guide, we conducted semi-structured interviews with people living in the municipality of Pointe à Pitre and Sainte Anne during the spring 2017. In Pointe à Pitre 14 interviews were conducted (these were 3 women and 11 men, with an average age of 50 years). In Sainte Anne 16 interviews were conducted (these were 7 women and 9 men, with an average age of 61 years). All in all, we met 30 people for an average duration of 40 minutes.

**Data analysis**

Those interviews were recorded and transcribed literally. Transcriptions were then submitted to a manual analysis through a single category matrix. This matrix was built from the themes developed during the interviews. To meet our expectations particular attention has been drawn to three elements: 1/risks mentioned by people (what are these), 2/the coastal dimension of the living area (if this spontaneously mentioned the area or activities related to the sea), and 3/flooding by sea phenomena on the living area (is it considered as a possibility and as a risk or not). Then all speeches were fragmented and classified according to that matrix, finally they were analysed in order to answer our objectives and comparisons were made between interviews.

In this article all speeches, in French, were translated in English.

**Results**

**Risk culture on studied place**

When people describe their living area, in Sainte Anne as in Pointe à Pitre, several phenomena are spontaneously mentioned, presented as dangerous and described as such. They are then associated with some dramatic experiences. The most mentioned phenomena are the cyclones. In Guadeloupe, special importance is given to the cyclone Hugo which happened in 1989: “I saw cyclone Hugo, you can't do anything against that! You can't do anything” (E.19), often associated with the wind: “Even in buildings there are people they hid in their bathtub! It remained that... the roof left, there only remained the bathroom.” (E.27), and with the rains:

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5 Made by Nathalie Krien
6 Made by Nathalie Krien
A few years ago, in 2011, (...) it had rained! So she asked her husband and
brother-in-law to come and get them (...). The husband and brother-in-law went to get the lady
but the lady wanted her car back and the water was so high they all drowned. (E.21).

Reference is also made to coastal erosion:

I used to go to the beach of Sainte Anne when I was young, to park I could walk on ten meters
of sand before having access to water. Now I'm parking just two meters of sand, I'm already in
the water. (E.06),

to the earthquake: “...I estimate 100,000 victims. And if it's night, half of the population is down. ”
(E.16), or insecurity: “Difficult life. Very difficult life. (...) Difficult and dangerous: lack of
education, lack of many things. It's a world of survival.” (E.05). There seems therefore to be a
certain culture of risk in Guadeloupe that concerns phenomena that have already caused human
losses in the past such as wind during cyclones, heavy rains, earthquakes and insecurity, or
phenomena whose damage remains visible and continues as is the case for beach erosion.

With regard to flooding by the sea, if everyone is talking about it, the subject seems more induced
by our questions than spontaneously mentioned by the interviewees. Some report having
experienced a similar phenomenon, but it is only associated with material damage: “Boats were
found in Victory Place during the cyclone.” (E.11). There is never any question of human losses
linked with this phenomenon. When asked about the existence of a risk of flooding by the sea, most
individuals express doubt:

Honestly, I never thought about that. Then... it never occurred to me. Honestly, I don't know.
That depends. Now I'm not a mind reader, so... Ah, frankly, I... it never occurred to me. But
then you never know, with nature. (E.01),

Or a total rejection of this idea: “The water will drain. But there won't be a water surge. (...) No, we
don't have that risk there. Guadeloupe is a blessed country.” (E.07).

The only allusion to a human drama associated with flooding by the sea is through the reference to
the tsunami. The speeches then show that this phenomenon is considered as the ultimate danger,
almost fantasized: “Because for me personally, the day when there will be a tsunami in
Guadeloupe, Guadeloupe will no longer exist.” (E.06). However, if some believe that this could
happen, then they are more fatalistic than concerned:

We have that in our heads, but we don't think about that. I make my life! We're done to die.
We're done to live and die. Well, I live my life. Maybe I'll see this and maybe I won't see this.
I don't know, I don't know. That's it. Only the good Lord knows that. Anything is possible! We
don't know. We don't decide either, we don't know. It's God's decision. When I say God, it's...
how to say... it can happen. We don't know that. (E08)
Others even consider that this risk is inconceivable: “No because it is really, it will really be, let say an accident, if you will. Yes, not only exceptional but that will leave no trace behind.” (E.16). Thus, even if there does seem to be a culture of risk in Guadeloupe, the phenomena considered as risky are those which have already, in the past, led to serious consequences (human losses), lasting consequences (disappearance of the beach) and with a high probability of occurrence. Flooding by the sea, on the other hand, has not yet had such serious repercussions. To date, it has not resulted in any loss of life and the water has always ended up being evacuated. This phenomenon is therefore not considered as a risk for most of the interviewees, except in its extreme version: the tsunami. Nevertheless some people consider flooding by the sea as a phenomenon likely to happen in their living area, but few consider it as a risk, except in its most extreme and therefore most dangerous form. But similar phenomenon having never been lived yet by the population of Guadeloupe, it remains hardly conceivable.

The key role of living area’s coastal dimension on flood risk perception

These results demonstrate, once again, the link between the experience of a dramatic phenomenon and the perception of this phenomenon as a risky one. With regard to the flooding by the sea on Pointe à Pitre and Sainte Anne, only a few are considering it. Those who are considering it less as a risk than as a fate to which they have to resign to live with when you live by the sea: “So whether I like it or not I am often enough exposed since across the street it is the sea.” (E.06). When we compare these speeches with the relationship of individuals to the sea, we see that those who consider flooding by the sea attach a certain importance to the coastal dimension of their living area: “Because I like it, I like living by the sea.” (E.28). When these individuals describe their living area they spontaneously refer to its coastal dimension: “Well, Sainte Anne, compared to other municipalities that I know, it is that we have a beach that is really, that is really in the town. it is the only municipality that I know that is like this.”(E.29), or to activities linking them to the coast and the sea: “We're a family of sailors. It means that we live the sea. The sea is our everyday activity. It is... today not working on the coastline, for me it's something that... unthinkable.” (E.13). Some of these people are fishermen or ship-owners. Otherwise, they are people who have lived, in the past, far from the sea, on the continent, and who have come, among other things, to enjoy the coastal advantages of this new living area (swimming, beach, surfing, etc.). Nevertheless, in most of our interviews, very little reference is made to the coastal dimension of the municipalities studied. Those who speak least about it are people who have always lived on the island and whose work is not directly related to the sea. Among them, some even declare openly: “We don't even use it [The sea], we don't even realize it. She's here, but given the fact that she's so close we don't care.”
What is then highlighted in particular with regard to the advantages of their living area is the proximity of services: “It is a city where... really organized, where you can find everything. We have everything carried by hand.” (E.02), attachment to the living area: “I like it here. I liked it here at home. It's where I was born, where I grew up.” (E.30), or human relations: “The advantages are that there is conviviality. That means people have an approach that means we live in a community, in solidarity. And that there is mutual aid, there is listening, there is proximity.” (E.07). When it comes to the disadvantages, in addition to the dangers, the people interviewed talk mainly about the unhealthy: “The disadvantages are that there is no lift and I have trouble getting around so it's not easy and for my husband either. And then there's no hot water.” (E.03), or traffic problems: “Traffic problems in Sainte Anne, it blocks every day! Morning and night!” (E.18). The sea seems to be a secondary element of the environment for most respondents, especially those who have always lived by the sea and who do not have a job directly related to this element. Many of them don't even go swimming: “When you're in Guadeloupe, that's it. We don't even care about the sea. Because we're not even going swimming! We're not going swimming! No. Even going to the beaches, we're not going at all.” (E.09). Among those who go, many do not know how to swim: “It's not in the culture of the locals that... they'll teach their children to float and be in the water, yes. Swim, swim 10 feet, no. No, no, it's rare. It's very rare.” (E.06). With regard to flooding by the sea, these people do not allude to it and, when asked, do not see it as a risk:

The water will not rise! it is that the water will take over, which means that there will be a flush, the water will go down, the water will circulate. But the water will be drained. She'll evacuate. Because it's good soil. The water will drain. But there won't be a water surge. Who means so that people can swim in the water, there is no dog, there is no cat, there is no beef, there is no pig that will drown. No, we don't have that risk right now. Guadeloupe is a blessed country. (E.07).

Thus flooding by the sea is only considered by people who attach a certain importance to the coastal dimension of their living area in the way they conceive and use it.

Discussion

Our first objective concerned risk culture. We assumed that if there is a risk culture on our land, it does not necessarily imply that the phenomenon of flooding by the sea is considered a risky one by the people. Considering the results, it seems that even if the term "risk" seems to be used only to echo the interviewers or the discourse of scientists, there does exist a culture of risk in Guadeloupe (Castro and Batel, 2007). This is based in particular on experiences of past phenomena (Kellens et al., 2013; van der Linden, 2014). Indeed phenomena such as cyclones and their violent winds,
heavy rains, earthquakes or even insecurity refer to the idea of human losses and are spontaneously associated with the idea of potential threat and therefore risk. However, this risk culture does not concern flooding by the sea phenomenon. According to our results, it seems that, until then, flooding by the sea have never caused human losses and have had little impact on the communes of Pointe à Pitre and Sainte Anne. The sources of dangers envisaged are little, if any, associated with the coastal dimension of the municipalities: they “do not think about it”. Thus, the phenomenon of flooding by the sea is rarely mentioned spontaneously as a phenomenon existing on Pointe à Pitre or Sainte Anne. When this is the case, the speeches are more anecdotal than about human drama. Moreover, our second objective concerned the relationship between the perception of the coastal dimension of the living area and the perception of the risk of flooding by the sea. The interviews conducted in Pointe à Pitre and Sainte Anne highlighted the fact that the sea is rarely mentioned by respondents to describe their living area. The few individuals who describe their living area as coastal are those who work in contact with the sea or those who have already lived far from it. The sea is thus considered as an integral part of their living environment and not as the limit of it. Thus the populations of Pointe à Pitre and Sainte Anne are divided between those who are turned towards the sea (whose living area integrates the coastal dimension of the municipality) and those who are turned towards the land (whose living area does not integrate this coastal dimension). When it comes to the risk of flooding by the sea, these two groups have quite distinct discourses. Individuals facing the sea recognize it as a source of danger and consider themselves exposed to the phenomenon of flooding by the sea. Nevertheless, they remain more fatalistic than concerned about this. People facing the land, on the other hand, have the impression that a tsunami only would have the strength to flood their living place. Then, flood by the sea is seen as possible according to some people and highly, improbable according to others, the tsunami being considered as an ultimate catastrophe against which nothing can be done. Thus, the fact that living on the seashore does not necessarily imply to imagine this space as a coastal one. But those for whom it is the case are more inclined than others to consider the possibility of flooding by the sea on this space.

The relationship between men and their environment is both physical (“objective”) and social (“subjective”) (Berger and Luckmann, 1966). How a space is described largely depends on who describes it (Breakwell, 2001; Stedman, 2002). Identity is constructed through social relationships and social comparison: by similarization and differentiation (Kuhn and McPartland, 1954). But it is also elaborated through the relationship maintained by individuals with their living environment (lived, uses, etc.) (Hauge, 2007; Proshansky et al., 1983).

Let us recall that our sample comes from a population mainly made up of islanders all living not far from the sea and having, for some of them, never lived elsewhere than in Guadeloupe. On this small
island of Grande-Terre very far from the French-speaking continent, important cities are all coastal.

Thus those who reside in those cities differentiate themselves primarily from those who reside in the countryside. Even though our study areas are seaside municipalities, most of the people build their identity around this “urban”/“rural” comparison. They attach little importance to the coastal dimension of their living area in the way they describe it. They put more emphasis on its urban dimension. Only few identify themselves as living by the sea and even fewer describe themselves as “living the sea” (E.13). This expression is only relevant in opposition to those who do not integrate the sea into their lives. But for people who live on a space where the sea is everywhere, nobody is really far from it. Hence the coastal dimension concerns everyone at first sight. In this context, the coastal dimension of the living environment is only highlighted by professionals specializing in activities directly linked to the sea. Among the others, many do not even use the sea, not even to swim: “It's not in the culture of the locals.” (E.06).

Indeed, if there is a risk culture in Guadeloupe, it does not concern the sea because, for most individuals, the coastal dimension of the living environment is too present to be visible. This element no longer makes sense in the way individuals compare their environment to that of others and, by extension, in the way they compare themselves to others. When we look more closely at the question of the phenomenon of flooding by the sea, the same observation comes back. In most interviews this topic is only developed after the interviewer has guided the discussion on this topic. Even then, for most of the people interviewed, the idea of flood risk from the sea does not make sense. However, there seems to be a difference in the way in which individuals who lives in these coastal areas perceive their living environment as at risk of flooding by the sea or not. In particular, this is due to the fact that the use that is made of this space is not the same for everyone, so the way of understanding it is not the same. Those who make use of the coastal dimension of their living area are more inclined than others to attach some importance to this dimension in the way they describe this space and themselves. They are also more inclined to recognize the advantages and disadvantages associated with this dimension and thus to recognize the existence of the risk of flooding by the sea. Nevertheless, past experience also plays an important role in risk perception. So far, floods by the sea have only caused material damages, while other phenomena have caused human losses. Thus, if the importance given to the sea makes possible to perceive the risk of flooding by the sea, the importance given to this risk will depend essentially on the assessment of its potential gravity in comparison with the other risks envisaged.

To conclude, these results allow us to identify two profiles of individuals living in Guadeloupe in areas considered by scientists to be at risk of flooding by the sea: the individuals we will describe as “facing the sea” and those “back to the sea”. Back to sea individuals represent the majority of the
For them the sea is not included in the delimitation of their living environment. By extension, the associated dangers are not included in their living environment either. Flooding by the sea does not make sense as a phenomenon likely to impact their environment because it has no place there. Individuals turned towards the sea, for their part, attach great importance to the coastal dimension of the island, they integrate the sea into the delimitation of their living space. At the same time, they recognize the dangers of the sea, including flooding, but seem to accept them in sometimes fatalistic ways.

This distinction between individuals facing the sea Vs. individuals back to the sea explains, in part, why so many individuals in Guadeloupe, exposed to flooding by the sea according to scientists do not even consider the occurrence of this phenomenon in their living area. It also demonstrates the importance granted to the coastal dimension of an area for the recognition of the latter's exposure to the phenomenon of flooding by the sea. Thus, in these areas if we wish to assess the vulnerability of populations to flooding by the sea or if we want to understand why individuals continue to live in areas exposed to flooding by the sea and if we want to adapt policies and prevention campaigns to the populations to whom they are addressed, the relationship to the sea is therefore a factor that must be taken into account by the authorities in charge of risk management.

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