

Coastal flooding, uncertainty and climate change : Science as a solution to (mis)perceptions?

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« Challenging ‘the climate consensus’.

Perspectives from the social sciences and humanities to analyze ‘skepticism’ and ‘dissonant voices’ on mitigation and adaptation in the public debate on climate change »



The work that we are sharing with you today comes from the European project Theseus, a Project about “Innovative technologies for safer European coasts in a changing climate.”

It is the largest Integrated Project funded by the European Commission, and evolved from three main observations:

*Climate change is increasing the frequency and severity of flooding and erosion events, while socio-economic changes are increasing the threatened assets;

*Historic approaches to managing these risks are inconsistent with the Habitats Directive as they maintain human safety at the expense of coastal habitats;

*Europe has not yet developed an integrated approach for the assessment and management of these growing erosion and flood risks that addresses these multiple human and environmental challenges.

Leading the Work Package 4 “Impact mitigation: society and economy” our experiments reach the core of the project and we bring social sciences into a context often structured by eighteenth century engineering inertias.

We develop the contributions of social science into a portfolio of tested operational innovative tools to be used for policy creation and the management of coastal flooding risks in the context of Climate Change, paying attention to:

- * the impact on urbanization and spatial planning,
- * the Damage to businesses and recovery,
- * the Post-crisis response and
- * the Risk communication and science for building resilience in the context of Climate Change.

Four points in order to Provide homogeneous methods;

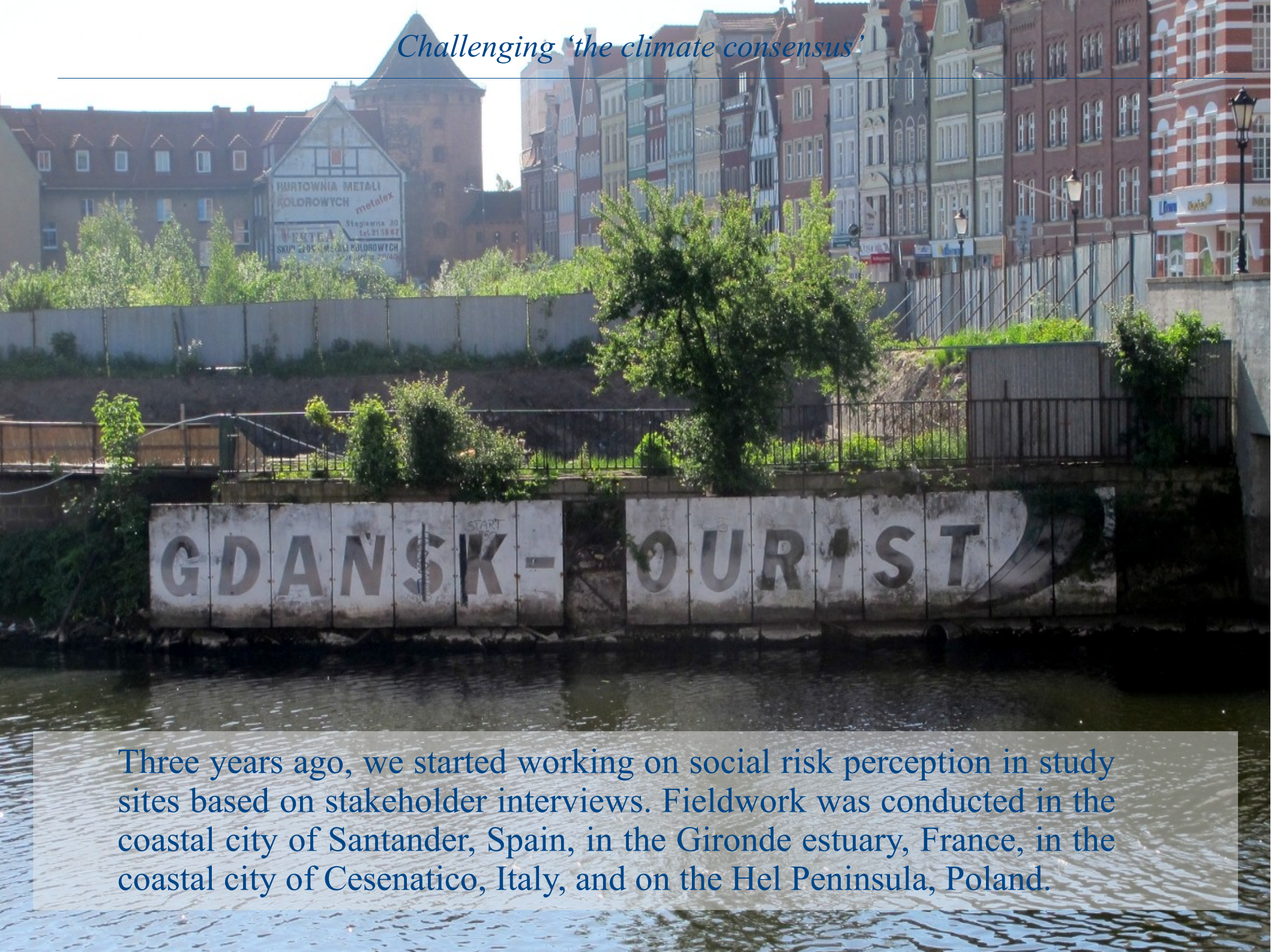
to evaluate direct (tangible and intangible) and indirect (tangible and intangible) damages into the coastal zones;

to explore coastal flooding risk perception in study sites in the context of Climate Change by local communities and by different groups of stakeholders involved in flood mitigation, planning and dissemination of knowledge and

to relate social risk perception to community resilience.

So with those elements in mind....

Challenging 'the climate consensus'



Three years ago, we started working on social risk perception in study sites based on stakeholder interviews. Fieldwork was conducted in the coastal city of Santander, Spain, in the Gironde estuary, France, in the coastal city of Cesenatico, Italy, and on the Hel Peninsula, Poland.

For each of these study sites, we conducted semi-structured interviews.

In depth thematic coding was conducted with Atlas.ti using predefined and emerging thematic categories. An initial theorization using grounded theory was conducted on these corpuses. Using the results of the initial theorization, a second iteration of theorization was then conducted...

...but, before I dive into the fieldwork details; I will introduce a key word, we need to clarify the word RISK if we really want to be "Challenging" with "the 'climate consensus'".

Challenging 'the climate consensus'

The word "RISK"...



So...

Rather than designing another standard “risk perception study” using overused and abused theoretical and empirical approaches, we chose to start from Renn’s theoretical synthesis and ground it into the experience of flooding and erosion by key individuals and the general population in study sites.

We will therefore focus on the idea that coastal flooding and erosion risks under climate change is to be approached through the analysis of the Relevance, Evidence and Normative claims that capture the various determinants of perception.

The goal in this risk perception study is therefore to understand how those affected by flooding and erosion risk in a changing climate theorize the risks they are facing;

This illustrates a few dimensions:

* We are working with a double layer of uncertainty. First, as THESEUS is dealing with the changes associated with climate changes, current practice are not sufficient to assess relevance. Second as THESEUS is an agent of change through the development of innovative management strategies and technologies, relevance in terms of tradeoffs will be changed...

And, as a producer of knowledge rooted in science, THESEUS will unavoidably generate knowledge base that will differ from the knowledge base of stakeholders.

This has two important consequences:

First, the building of knowledge by this project will somehow need to be integrated with collective and individual heuristics of stakeholders.

Second, the tools (technological or governance) developed by THESEUS will need to take into account this integration explicitly for future applications.

Envisioning and developing governance and technological options for safer European coasts there will necessarily raise:

Questions of **resource distribution**:
who will benefit from these tools and

Questions of **redistribution**:
some of these tools may create perception of gain and losses.

Furthermore, flood, erosion and other phenomena related to Climate Change control mechanism are rooted in history and as such in culture.

Challenging 'the climate consensus'

Technological options may therefore be preferred not on technological or economical ground but simply because they are “valued” in terms of historical acceptance.

Finally, flood and erosion mitigation options do interact strongly with nature and landscape.

Tinkering with relationship between human activity, nature, and landscape has a huge potential of raising concerns rooted in **local values**.



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...rooted in **local values**...



...but « normative claim » seems unresolved,
we will discuss this point later ; slides 26, 27...

In generic terms, we propose that the participants to the stakeholder interviews and to the focus groups be the same persons with the following characteristics:

1 land use planner, 1 flood risk manager or 1 erosion risk manager, 1 representative of a commercial association, 1 representative of a resource based primary industry, 1 representative of a resource based secondary or tertiary industry, 1 representative of the tourism industry, 1 environmental planner, 1 academic, 1 harbor administrator, 2 representatives of NGO, 1 dealing with public education and 1 dealing with environmental protection.

This sampling is adapted to local specificities, these people have been identified and mobilized by the study site champions and commit themselves to participating to at least two focus groups and one interview. In the Gironde estuary the representative from the following structures type were interviewed: Applied research centre, Environmental NGO, regional government technical department for environmental planning, Harbour authority, Flood management coordinating body, Erosion control regional body. In Santander the representative from the following structures participated to the interviews: River Basin Authority, Land use planner, Environmental planner, City council, Minister for Environment at region level, Flood risk manager, Dealing with Social and Sportive activities in the harbour...

...harbour administrator, Harbour user, Coastal manager at the national level, Coastal manager at regional level, Industry, Chamber of Commerce and Industry, Academic, NGO dealing with public education, NGO dealing with environmental protection. In the Cesenatico study site the following respondent have been met: Cooperative employee, Fisherman association member and official, Long time resident, representative of the tourism sector, business person, land use planning authority, local government elected official, regional government body representative, public work department from the local government body...

The semi structured interview framework is designed to elicit information about the way stakeholders frame the issue at hand. This framework was therefore designed as a set of broad questions that are complemented by a set of prompt that are to be used if the information has not been given within the answer to the broad question.

The use of the question and of the quotes has to be systematic of coherence purposes. What is more the analytical choices that are made (either thematic analysis and/or grounded theory) calls for allowing as much latitude in the responses as possible. This framework is not designed to gather only factual “concrete” information about the study sites, it is designed to capture the stakeholders and residents perceptions and social constructs of the risk issues at hand.

All interview and focus group have been recorded. A verbatim transcription of the interviews or the focus groups has been done in the original language. This corpus has been coded thematically and analyzed using a dialogic approach to grounded theory.

The following primary code have been used:

Relevance claim :

Quotes where the interviewee seems to state what is a phenomenon that is worth attention.

Evidence claim :

Quotes where the interviewee seems to establish causal linkages related to coastal flooding or erosion

Normative claim :

Quotes where the interviewee seems to state what is good, acceptable and tolerable regarding coastal erosion and flooding risk management options .

The key consideration that must be introduced here is the qualitative nature of the corpus needed and the analysis that needs to be conducted.

Capturing risk perception cannot, and should not, for the purpose of operational risk governance be conducted in quantitative terms.

This basically means that governance choice, and therefore technological choice, must be centered on giving the opportunity for all stakeholders to express their relevance, evidence and normative claims. This basically may mean that any decision support system that is developed will have to contain possibilities for deliberative risk governance at all stages.

The following results emerged quite robustly across interviews:

Participants associate risk with the modified state of the receptor or the consequences of flooding and erosion.

Very seldom do participant mention the probabilistic nature of flooding and erosion risk. It seems therefore safe to consider that for interviewees in the Santander, Cesenatico and Gironde areas risk=consequences.

When the probabilistic nature of flood and erosion risks is mentioned, it is only as part of an evidence claim associated with (over) exposure by living or having an economic activity on either the pathway or the receptor.

This is a quite fundamental result for Us.

One of initial cognitive drivers of this work lies in the fact that, because of climate change, the probability density function of extreme events will be modified.

This means that, if one wants to contribute to safer European coasts to deploy itself in society and policymaking, it will be of paramount importance to convey the probabilistic nature of flooding and erosion risk in a changing climate, through public deliberation.

In general terms our analysis of the interview corpus shows that relevance is established by the interviewees through a mix of expert-based knowledge and personal heuristics; yet interviewees generally express the fact that pertinence is proxied by actual current investment in risk mitigation and that investment decisions are driven by a mix of technocratic and economic considerations feeding political decisions that are themselves mostly run by normative claims. When pushing the analysis further relevance claims made were essentially presented as conditional to policy decision for which the key determinant identified was congruence with the normative claims expressed by stakeholders/voters.

In terms of evidence claims, our results allow for two levels of analysis regarding perceptions. These are associated with the three following questions:

- (a) What are, according to interviewees, the causes and effects of flooding;
- (b) What is the interviewees' basis for their beliefs on the causes and effects of flooding;
- (c) What is the interviewees' basis to apprehend the probabilistic nature of floods.

In all study sites, interviewees stress the importance of individual and collective behaviours as the main cause of vulnerability to past flood events.

This is an extremely important result for Us:

Because...meteorology, local topography, and the likes are not seen as the main cause of vulnerability, human behaviour is.

When attributing floods to behaviour, interviewees stress the impact of human activities on either flood management infrastructures (interfering with dykes, storm sewer and the likes) or with sensitive habitat (sand dunes mostly, and flood plains to a lesser extent). Furthermore interviewees stress the fact that one's mitigation strategy may have a distant effect on others: raising grounds increase flooding risk on non raised rounds, breakwaters through changes in sedimentary dynamics lead to erosion-based floods elsewhere, etc.

When considering individual behaviours in the context of evidence claims, interviewees do mention overexposure; it is only framed as part of normative claims. At a more collective level, within evidence claims, the interviewees identify ill designed policies in terms of governance process, mostly poor land use planning (e.g., real estate developments below sea level), administrative segmentation (e.g. different beach replenishing procedure in adjoining municipalities) and lack of administrative coordination (e.g.: building permit that are turned down at the local level then given at a regional level), “absurd” engineering infrastructures (e.g., flood gates that have never been functioning properly), and funding.

Basically, when considering the causes of flooding risk, participants identify a critical lack of risk governance, not a lack of knowledge.

Challenging 'the climate consensus'

When considering the knowledge base that may be mobilized within evidence claims, participants stress the importance of individual and collective heuristics.

But, for participants, the Normative claim seems unresolved.
Because

- (a) interviewees state that the science that is available shows problems of scale (i.e. available evidence concerns areas that are too small to be representative of flood event at risk management scale),
- (b) they state that the complexity of flood dynamics cannot possibly be captured by science as it is practiced,
- (c) they state that floods are multi-factorial events, where the human factor is very rarely recognized, and

Challenging 'the climate consensus'

(d) in some instances, there are clear statements where criticised engineering options are associated with science-based knowledge, thus disqualifying the latter for the interviewees.



Finally, the probabilistic nature of floods is very seldom mentioned by the interviewee. The potential changes in flood probabilities, induced by climate change, are almost totally absent from the interviewees' statements.

Normative claims were at the core of the interviewees' statements.

Very briefly said, as a conclusion...

The results show the following line of thought that clearly dominates.

A) Risk management is a political decision

B) Political authorities will only move if their move is accepted by the affected population or by the affected economic agents

C) Acceptability is contingent upon the redistributive nature of the decision to be made

D) Coastal flooding boils down to the acceptability (in terms of norms) of the options envisioned

E) In the end the risk may very well not be managed in a way that makes sense in terms of increased safety.

This causal chain manifested itself when putting in balance the collective benefits and individual losses of a risk management option. Normatively it was clearly expressed that the only acceptable way to envision coastal risk entails considering risk management options where the cost of flooding risk and management options is born collectively, even if the assets protected benefit to a minority. Furthermore, risk management strategies that are good collectively cannot really be implemented if they harm individual interests.

Analyzing this line of discourse shows that this “rule” suffers one exception: if the overexposed population chooses overexposure in order to reap benefits that are seen as “exaggerated” by the interviewees (e.g., high value seafront real estate development, clearly below sea level), then no public money should be spent on managing the risk they are exposing themselves to. In all study sites it appears that resolving conflicting normative claims are at the core of the process of envisioning flooding risk. This is critical for the purpose of contributing to safer coasts. Any risk mitigation option that will be developed will necessarily pass through a deliberation process regarding its acceptability, potentially regardless of the scientific quality of the knowledge that generated this mitigation option.

These results show that there seems to be very little space in the public's and stakeholders' attitudes and perceptions for science-based knowledge.

On the one hand, the knowledge used to frame risk belongs to the world of individual and collective experience. Values and norms occupy most of the cognitive space when framing risk. The risk perception analysis presented here sheds a light on the path to follow in order to contribute to safer coasts. From the analysis conducted it appears that first and foremost, the flooding perceptions of the stakeholder is run by consideration that have very little to do with the hazards and associated probabilities themselves as framed within the scientific community dealing with current and future coastal risks.

For local stakeholder risk management is mostly associated with the ability to make decisions that are compatible with the core values of the affected communities. This has as a consequence that any initiative to reduce risk that is not co-constructed with the affected communities will most likely not be implemented for reasons that have nothing to do with the quality of the knowledge base that is mobilized. What is even more challenging is that in some cases this heuristics leads risk stakeholders to a genuine mistrust of science-based or engineering-based approaches. What we see from these results is that for local communities, if a solution is to be found to overexposure to flooding risk, it is to be found in better risk governance rooted in an explicit taking into account of the values expressed by potential flood victims.

In more general terms, our results show that, if science-based knowledge is to have its place in climate change coastal risk governance, it is of critical importance that its production takes place in a process that allows for constant interactions with those at risk and their values.

If science-based knowledge is to be a solution to the problem of (mis)perception then a particular care will have to be given to the way science is practiced.

...that's all...

THANKS !!!

If you have any questions or for further discussion please contact:

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