



Are we all on the same boat? The challenge of adaptation facing Portuguese coastal communities: Risk perception, trust-building and genuine participation



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ABSTRACT

The Portuguese coast is experiencing severe erosion and loss of beachfront, processes which are expected to become worse with climate change impacts. These additional alterations are beginning to show at a time when financing for conventional coastal protection is no longer guaranteed at scales of investment which are likely to be required if future coastlines are to be maintained. This paper looks at how residents and key stakeholders of three coastal communities in Portugal perceive such possible changes, how far they judge and trust current coastal management, and how they perceive their current participation and foresee future forms of involvement on adaptive coastal change. The evidence from these surveys and interviews suggests that there is a strong commitment in each location to maintaining current levels of coastal protection, and to preserving the integrity of local societies and economies, even though there is also recognition that adaptation in some form will eventually be required. However, our research reveals that there is not yet sufficient trust between coastal stakeholders, especially towards public institutions and policies, for any degree of progressive coastal adaptation to take place. Building trust in creative learning processes of progressive adaptation could lead to improved science and participation along with a meaningful dialogue over cooperative coastal planning and financing. The research undertaken for this paper lays the groundwork for such a process of trust-building to begin.

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Introduction

Inhabitants of Portuguese coasts are facing difficult choices. Over the past three decades, rates of erosion have measurably increased. This is a consequence of a reduction in nourishing coastal sediment flows due to sand extraction; construction-derived alteration, inland, of rivers and estuaries; and deployment of shoreline groynes (Dias, 2005). The conduct of coastal policies in the country has been characterised by a lack of policy continuity, ill coordinated management, and patchy political support. This has led to unplanned urban sprawl along much of the Portuguese coast, including illegal construction (Carneiro, 2007; Schmidt et al., 2013a). Portuguese coasts are locations of social transformation

and economic investment. They are threatened by unavoidable risk, but do not yet enjoy the local commitment for socially and economically fair and viable transformation. This case study based paper encapsulates these dilemmas.

Major assessments of coastal change (Nicholls et al., 2007; Dawson et al., 2009) provide evidence for increasing vulnerability of people, economies and ecosystems. According to Dawson et al. (2009), over 1.2 billion people are nowadays at risk in coastal economies, especially in coastal areas where population densities lie well above the global average. The IPCC Fifth Assessment Report (2013, 13–47) emphasises the increasing vulnerability of communities and economies to coastal change, particularly over the medium term. The report offers a range of possible sea level rise projections based on various scenarios of greenhouse gas emissions to 2100. The most likely increases lie between 40 cm and 72 cm. The IPCC also reports the tendency for increased storminess and wave heights and encourages the use of more scenario-based coastal modelling so as to take into account the inevitable uncertainties attached to these predictions (Nicholls et al., 2007). The need for adaptive coastal response is urgent, but in a manner which is sensitive to local coastline changes and local cultures; hence the setting for this paper.

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Portuguese coastal settlements are very popular and, until recently, very attractive for development. Since the 1960s the Portuguese economy has been increasingly dependent on the coastline due to its attractiveness for tourism, housing and other economic activities (Freitas, 2010). By the end of the 1960s, Portugal received roughly 1 million tourists, a number that grew steadily, reaching 12.3 million foreign visitors in 2007 (INE, 2013). Although official policy was to encourage tourist related investment so as to attract international revenue, the Portuguese themselves also started to use their beaches to a previously unknown extent (Schmidt and Prista, 2010). In spite of the economic recession, tourism economic activity continues to increase in the country, having contributed 9.2% to GDP (around 16 billion Euros) in 2010 (Tourism Institute, 2011).

Mass tourism and the suburbanisation of the coast are well in tune with another major motor of the Portuguese economy: construction. This sector (gross production) normally represents around 10% of Portuguese GDP, but a decade ago (2002) it reached 20% (Euroconstruct, 2012). Portugal is, after Spain, the Eurozone country with the highest rate of second homes, mostly concentrated on the coast. In the wake of the economic recession, more than 12% of total dwellings are currently empty (INE, 2013). The economic vitality of coastal communities is a significant issue for determining the future prosperity of the nation. Yet cutbacks in public spending and the general deficit in growth add a second front of danger for the viable future of Portuguese coastal economies, namely underinvestment in protection and adaptation.

Financing for coastal protection is available from both the Portuguese national budget and European Union Regional Funds. These sources pay for expensive engineering projects to maintain beaches and to retain overall shoreline integrity. An investment plan for the Portuguese coast was approved for the period 2007–2013 with a total budget of 550 million Euros, of which approximately 55% were from EU funds, within the National Strategic Reference Framework (NSRF). By May 2012, around 100 million Euros had been spent, the biggest share in coastal defence (41%), mostly in sand nourishment. Another 75 million Euros is likely to be spent on coastal defence by 2015, primarily (64 million Euros) in high risk areas (Ministry of Agriculture, Sea, Environment and Spatial Planning, 2012). The EU authorities are looking for more fundamental understanding of coastal change with a sound evidence base, and a higher level of capacity for managing financing (personal communication, 2012). The weak economic status of Portugal has resulted in a progressive increase in EU co-financing rates, reaching 85% in August 2012 (NSRF, 2012). Although environment and coastal protection will continue among the main priorities for EU funding, there is no official guarantee that the necessary support funds will be available either at the regional or local level from national budgets, given that public expenses have been cut in all sectors, except for military and foreign affairs.

It is clear that conventional planning and top-down decision models based on overlapping local, regional and central institutions do not adequately address the kind of challenges which most coastal communities nowadays have to face (Schmidt et al., 2013a). The complexity of processes – physical, social, political and economic – affecting urban coastal areas requires proactive and adaptive forms of governance. These complexities are necessarily variable according to the geography and history of coastal experiences. This is why we adopt a case study approach following up on our earlier work at the national level (Schmidt et al., 2013a). The emerging national coastal adaptive strategies require much sensitivity towards local economic, cultural and political circumstances.

Objectives

We present three main objectives for this paper. These are set in the context of three coastal communities, located in the Central, Lisbon, and Southern regions of Portugal.

- To gather and characterise the views of a sample of people regarding the risks they face for their coastlines and for their economies.
- To elicit how people judge and trust current coastal management institutions in dealing with the threat of coastal change.
- To explore the potential for genuine participation and local engagement, including innovative forms of financial collaboration, as the basis for a more adaptive coastal management process in the communities concerned.

Adaptive coastal governance and participation

At its heart, adaptivity requires a supportive relationship between democratically accountable managers and policy delivery, and the informed consent of all relevant interests whose support for both prospective planning and financing is vital if flexible progress is to be achieved. What seems to be critical to initiate adaptation is a credible mechanism, based on a trusting sense of fairness, for bringing the science of coastal change into alignment with the hopes and fears of the various coastal publics. Consequently local coastal perceptions of possible danger and safeguard need to be set in terms which are scientifically underpinned, yet consistent with culturally acceptable rates of physical and policy adjustment. In essence the requirement is to combine the knowledge of expertise with the knowledge of social learning. This delicate relationship is vital since real economies and jobs are at stake, important levels of investment are involved, and collective social agreement has to be achieved.

Given the context of policy fragmentation, economic vulnerability and increasing need for cooperative financing in coastal areas, *genuine participation* by local stakeholders and the public is crucial, building on existing and potential social capital (Adger, 2003; Dolan and Walker, 2004). Indeed, it has been shown that natural resources in general – and specifically in relation to coastal zones – can often be better managed when stakeholders are directly involved in the management process (Edwards et al., 1997). Participation by stakeholders who are most directly affected by management decisions can increase compliance, reducing the need for enforcement (Smith, 2012). Furthermore, it has also been demonstrated that the actual quality of environmental decisions tends to improve when all relevant stakeholders are involved in the decision process (Beierle, 2002).

The perception of a *common risk* – in the case of coastal zones, the impacts of extreme weather events and coastal retreat – may contribute to the development of a stronger *sense of community* and thus better prepare coastal populations to respond and adapt (Webler et al., 2001; Dolan and Walker, 2004; Manzo and Perkins, 2006). But to achieve an adaptive governance approach, a consistent *trust* between different institutions dealing with coastal issues, as well as between these and the range of interested stakeholders, has to be brokered (Milligan et al., 2009).

Urban coastal areas like the ones we will present in this paper are characterised by different types of social groups and a multitude of actors, often with competing interests – tourism, fishing, local business and environmental organisations – and with very different stakes on the coast. With overlapping interests in such a relatively small area, it is often the case that interventions aimed at benefiting one group can interfere with another group's activities (Baker, 2002), carrying obvious challenges to the successful implementation of public participatory processes.

These critical social justice aspects are also addressed by O'Riordan and Nicholson-Cole (2010). They highlight the need for

creating appropriate conditions for social learning and for ensuring favourable outcomes for diverse stakeholders. These observations guide the research methods pursued in this paper. They also highlight the need for sequential and inclusive forms of stakeholder engagement of the kind followed here and reported in subsequent papers.

This emphasises the need to create a common agenda where all diverging interests meet and foster forms of participation that allow faithful representation of the multitude of interests that exist on the coast. With time, community ties and the social capital they create will be strengthened with inclusive participation in meetings (Smith, 2012). Interests and influences affecting power relations between stakeholders should also be also considered (Fletcher, 2007; Soma and Vatn, 2009).

Douglas et al. (2012), in a study of two coastal communities facing increasing flooding in the US, found that raising awareness and enthusiasm for adaptive responses depends on the creative use of images of possible coastal futures; detailed and empathetic understanding of existing cultural values and social relationships in each community involved; and early and progressive engagement. These conditions which establish joint learning about adaptation, as well as generating the trust and commitment for continuous engagement, lie at the heart of the adaptive process.

Schmidt et al. (2013a) argue that there are four essential ingredients for the development of adaptive coastal governance in Portugal. The primary one is a science forged by common understanding between competent scientists and well informed community acceptance. This is a *cooperative science* which builds on trust, common visions and goals. The second condition is *trust building* in a participatory learning process which enables this cooperative science to play out in actual phasing of decisions and investment along the lines outlined in the section above. The third element is a dialogue over future *financial support* based on both cooperative science and trust, and taking into consideration concerns of *social justice*. The fourth feature concerns the need for *policy clarity* and *strong political will* of coastal management, with agencies and governments revealing their capacity to listen and to respond. In our case studies we test these ingredients to see just what scope there is for taking adaptive coastal governance forward in Portuguese coastal communities.

Public participation traditions in coastal management differ considerably across Europe. In countries where participatory mechanisms involving stakeholders in coastal planning are already well institutionalised (e.g. Norway), more attention is now being paid to deepening the quality and effects of this participation (Soma and Vatn, 2009). In the Netherlands, where a hold the line strategy is deeply engrained in clear and communicative public policies, the population feels protected and exhibits low coastal flood risk awareness (Filatova et al., 2011). Despite half of the country being below sea level, the urge to participate is less present than in other countries, such as the UK. There, the prospect of managed realignment has sparked a multiplicity of practical experiences involving the implementation of more effective and localised adaptive governance mechanisms for coastal zones (Tompkins et al., 2008; Milligan et al., 2009; Fletcher, 2007).

Turning to southern Europe, Koutrakis et al. (2010), in a comparative study between Italy, France, Greece and Spain, found that stakeholders involved in coastal management generally experienced a lack of collaboration and poor communication, resulting in a general lack of awareness on coastal erosion issues.

The cases of Portugal and Spain seem fairly similar in this context. Studies in these countries agree over the main barriers to effective participation in coastal management. Lack of coordination and unavailability of adequate information (permanently up-to-date, integrated and accessible) hinder the engagement of both stakeholders and the general public in coastal issues. The

existence of formal consultative participatory procedures does not appear significantly to encourage public involvement (Barragán Muñoz, 2010; Martins et al., 2009; Pinho et al., 2008). Martins et al. (2009) conducted a survey in one of the most endangered coastal stretches in Portugal in 2006 (Esmoriz-Vagueira). It shows that, despite 84% of the permanent and seasonal residents' willingness to participate in coastal planning, 97% never did. The majority were not aware of the existence of public consultation mechanisms and more than a half did not even know there was a Shoreline Management Plan (SMP) for their area. In another study on flood risk (Figueiredo et al., 2004), the need to foster participation and the engagement of local stakeholders, so as to implement more effective environmental policies, are both urged, but researchers consistently point out that Portugal is lagging behind in these efforts.

Faced with final documents and decisions, local stakeholders feel their participation will not have any influence on public policies. This has been hindering the success of public programmes specifically designed for coastal cities, such as Costa Polis, as we explain later. In other cases, it was found that local stakeholders were not even aware of the conflicting interests all around them. This was the case in a marine protected area in Portugal, where the "timing" of the participation and the way it was (or not) prepared were found to be undermining the public acceptance of conservation policies (Vasconcelos et al., 2013).

The theoretical basis for this research is therefore based on probing a carefully selected cross section of residents in three contrasting coastal communities as to how far they understand, and are prepared to respond to, likely coastal change: how they judge the quality and reliability of existing processes of coastal governance: and under what circumstances might they become engaged with processes of devising credible science, planning and financing that should lead to reliable engagement.

Since trust and participation connect to socially acceptable adaptation, we concentrate in this paper on how it may be possible to overcome these blockages. We build on this evidence to develop the final stages of our research (not reported here), in which we use focus groups and workshops as a mean to foster dialogue and generate common visions towards the future of our three study locations. In doing so, we take into consideration alternative participatory approaches that have been used to support public environmental policies, such as scenarios based on local common visions of climate change, with effective engagement by local stakeholders (Tompkins et al., 2008; Lorenzoni and Hulme, 2009).

Three coastal communities in Portugal

To demonstrate the changing nature of the Portuguese coastline and its problems, we selected three case studies that correspond to critical stretches, in terms of erosion and flooding, as well as economic activity and social pressure (Fig. 1). These are:

- in the Central region (Aveiro), the case of the coastal stretch Barra-Vagueira;
- in the Lisbon metropolitan area, the case of Costa da Caparica; and
- in the South (Algarve), the case of Quarteira

These three coastal areas have important similarities, which make them appropriate for a comparative analysis. They all emerged from small fishing villages with mostly seasonal occupation, until mid-20th century. Their evolution is representative of the very recent rapid occupation of coastal areas in Portugal (except for the main estuarine cities such as Lisbon and Porto). All still have local fishing communities. And all are located on sandy low shorelines, facing increasing coastal erosion, with costly sea and

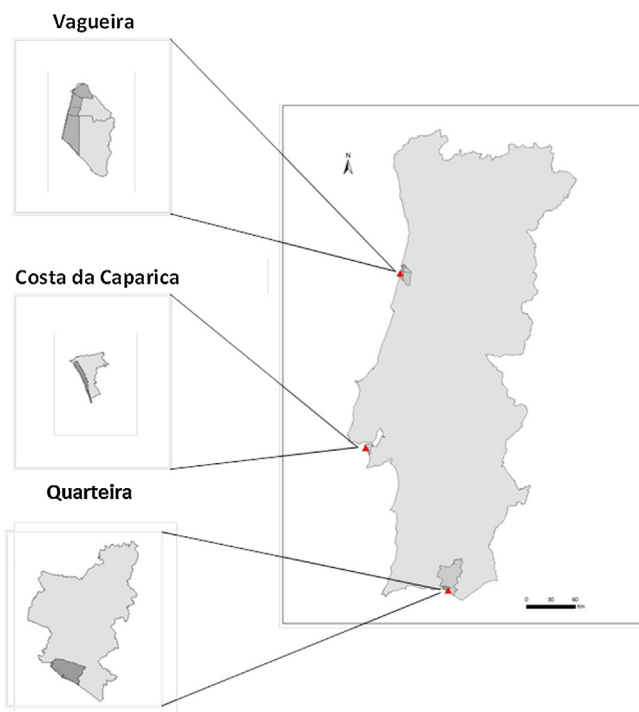


Fig. 1. Location of the three case studies.

sediment protection. These were among the first coastal stretches to be protected by groynes and seawalls in the country.

Yet, these communities are also distinctive, especially in terms of their historical evolution and their social composition (Table 1).

Methods

We based our empirical work on two types of methodology. We ran a comprehensive survey of a quota sample of residents based on the framework of adaptive coastal governance outlined earlier. We also used a qualitative approach through a set of interviews with targeted stakeholders from the three study areas, which informed the design of the residents' survey.

Resident/business survey

The survey was conducted through personal and direct interviews at the residence or business of the respondents during August and September 2011. We used a quota type sampling method, representing the universe of the residents (owners or renters) and non-residents (seasonal homeowners, business premises or other companies) of the three study areas. The quotas related to age, gender, length of residence, and distance from the seashore. We conducted interviews with a total of 643 individuals in the three study areas (210 in Vagueira, 200 in Costa da Caparica and 233 in Quarteira), aged between 15 and 90. The data collected were analysed using the statistical software SPSS (version 20).

Stakeholder interviews

Between May 2011 and January 2012, we conducted 64 in-depth semi-structured interviews with local stakeholders from the 3 study areas. The stakeholders were selected based on their interests on the coast: local actors with economic stakes on the coast, such as restaurant and hotel owners; business and residents' associations and other key individuals, such as fishermen, and surfers, who potentially have different views on coastal change. On a more

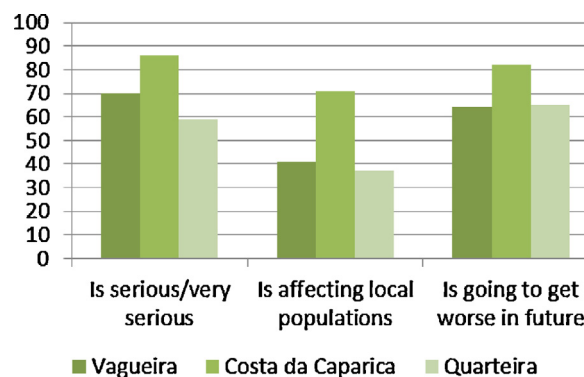


Fig. 2. Perceptions of coastal erosion (%).

institutional level we interviewed representatives from regional and local authorities (parish, municipalities), port officials and maritime authorities, scientists from universities in the region, and environmental NGOs. Table 2 summarises the different types of interviewees.

The questions used in both the residents' survey and the stakeholder interviews specifically addressed the theoretical framework laid out in the adaptive coastal governance section. This covered the recognition and perceptions of coastal risks; the role of scientists; coastal policies and management, including knowledge and perceived effectiveness of defence measures; public participation and trust in institutions responsible for coastal management, as well as prospects for coastal financing in the future, and willingness to be involved in possible alternative funding schemes. The samples were chosen so as to reflect possible different views on coastal issues depending on their proximity to the shoreline, their economic activities and reliance on the coast for living.

Results

In this section we combine both sets of data – the opinions of the local populations and the views of local stakeholders – to illustrate public perceptions over credible science, and associated concerns with impacts of coastal risk on local populations and economies, pointing out the differences between the three study areas, whenever relevant. We also explore the potential to foster more genuine forms of participatory collective action, including forms of financial co-operation, and possible ways of establishing better fairness and trust in adaptive responses.

Social perceptions of coastal risks

There is widespread awareness of coastal erosion in the three study areas (Fig. 2). Overall 70% of the survey respondents regard this as a serious or very serious problem, which is going to get worse in the future (65%). Particularly in Costa da Caparica, over 80% of the population see this to be a very serious problem³ and 70% think it is already affecting the local economy. Although the values are slightly lower for Quarteira, still over half the sample is concerned over coastal erosion.

An analysis of variance (ANOVA) confirms these results, showing that coastal risk is perceived as more serious in Costa da Caparica (3.18) and in Vagueira (3.09) and less serious in Quarteira (2.72).⁴ Regarding the impacts in local populations, a cross section analysis⁵ shows that in Costa da Caparica respondents believe local people

³ From 1, not serious to 4, very serious.

⁴ $F(2) = 20.069$, $p < 0.001$.

⁵ $\chi^2(6) = 72.002$, $p = 0.000$.

Table 1
Characterisation of the case study areas.




	Vagueira	Costa da Caparica	Quarteira
			
Location and geomorphology	On the north-western coast of Portugal, south of the Aveiro Port. Low coastal plains, with extensive sandy beaches. Located between the sea and a lagoon, important for the sediment equilibrium of the area.	On the west coast of Portugal, just south of the Tagus estuary. Coastal plain, low and sandy, increasing in width to the north. The low topography and the fragility of its sand dune system make this section prone to coastal flooding.	In Algarve region (South). Prevalence of cliffs interrupted by coastal plains located at river mouths. The coastal environments in the coastal plain are the most prone to flooding from both maritime and river origins.
Historical background	The port has a powerful influence in coastal dynamics and is generally considered an important factor influencing erosion on the beaches further south, namely Vagueira, where urban growth is very recent (1980s) and where some buildings on the seafront are below sea level.	The urban sprawl in this area began in 1966, with the bridge over Tagus river. The arrival of thousands of people to work in the industry sector, together with the fishing communities and Lisbon "migrants", generated significant social and cultural diversity, but also chaotic and in some cases illegal occupation.	Quarteira was born less than 50 years ago from a fishing village. It has been a destination marked by tourist activities, especially after World War II. Modest summer houses appeared around 1945, but the construction boom started in the 60s, when Algarve became a renowned tourist destination.
Coastal erosion rates and defence structures	Groynes were first built along Costa Nova in 1973 to stall erosion. This increased the erosion further South. During the 1980s the coast kept retreating at about 10–15 m/yr and in 1984 groynes and a seawall had to be built in Vagueira (South), but since then its beach has almost disappeared. The most sensitive area is the stretch between Vagueira and Mira, where the shoreline receded 26 m from 2002 to 2010 (Bernardes, 2010). In 2002 and 2011 the sea invaded the lagoon. From 1995 to 2010, in Aveiro region, 43 million Euros were spent in coastal protection and emergency works.	Between 1957 and 1964 the beach retreated around 100 m (Veloso-Gomes et al., 2006). In 1959 the first groyne was built, followed by 7 more groynes and a 2.5 km seawall. Some sections of this coastal stretch lost 26 m of sand between 1999 and 2007 (Pinto et al., 2007). Some investments in the seafront were made within an urban development programme, Costa Polis (2001). Adding to this, emergency construction took place. This included the rehabilitation of the seawall and artificial sand nourishment, costing around 17 million Euros. This programme is still incomplete, mainly due to lack of funding.	The sea front is aligned along a promenade defended by a large seawall and 5 groynes (built in 1972), which have helped to stabilise the sand and secure the urban front. In Forte Novo, between Quarteira and Vale do Lobo, the average annual retreat was 6 m from 1991 to 2001 (Oliveira et al., 2005). This stretch has received 3 artificial sand nourishments since 1998. The last sand nourishment cost around 10 million Euros and will probably have to be reinforced some 10 years from now. Some houses in a luxury resort have already been demolished and more demolitions are due.
Socio-demographic characterisation	This coastal stretch, comprising 4 parishes, contains 24 626 inhabitants. Vagueira has seen a doubling of its population and a sharp increase in the number of dwellings – 327% from 1960 to 2011. The number of secondary homes increased in all 4 parishes, but in Vagueira (1930 dwellings total) they are double the number of permanent residencies (953). Overall this coastal stretch has 16,569 dwellings, 6445 second homes (39%) and 1100 empty houses. Gafanha da Boa-Hora (Vagueira) has 3018 dwellings, most (64%) being second homes. Most people work in restaurants, industry, local trade, or in administrative services. The unemployment rate (13.24%) is close to the national average (13.18%).	Between 1960 and 2011 the population increased 6 times (from 2306 to 13,418 inhabitants), while the number of dwellings increased nearly eight times (741%), during the same period. The parish has 13,935 dwellings, most of them (76%) built from 1961 to 1995. Seasonal populations joined residents; many from the south, such as workers in heavy industries in the 1960s came to live here. A high number of people (11,000, estimate) live in camping sites. With the arrival of immigrants the proportion of permanent occupants increased. Here the foreign permanent population reaches almost 12%. Most people work in restaurants, local trade or in administrative positions. The unemployment rate (13.91%) is slightly above the national average (13.18%).	Since 1960 the population increased 474%; today Quarteira is a city with a permanent population of 21 798 inhabitants (2011 census), a figure that has doubled in the past two decades. In the summer the population triples. The proportion of second homes is 59% (2011). Quarteira has 31,467 dwellings. Between 1960 and 2011, the number of dwellings increased 30 times. In the last decade alone there was an increase of 39%. The foreign population is more than 5 times the national average (16% against 3%), mostly Brazilian (6%). Most people work in restaurants and shops; only about 4% work in agriculture or fisheries. The unemployment rate is well above the national average and is the highest among our case study areas (17.4%).

Table 2
Interviewed stakeholders in each case study location.

		Vagueira	Costa da Caparica	Quarteira
Institutional actors	Local Authorities	6	4	2
	Regional and Central Authorities		3	2
	Port and Marine Authorities	1	1	
	Scientists	1	1	1
Total		8	9	5
Non Institutional actors	Resident associations		3	1
	Companies and business associations	4	2	3
	Beach restaurants associations	2	5	3
	Other associations	1	1	1
	Surfers	1	2	1
	Fishermen	3	2	3
	NGOs			2
	Other stakeholders	1	1	
Total		11	17	14
Total interviews		19	26	19

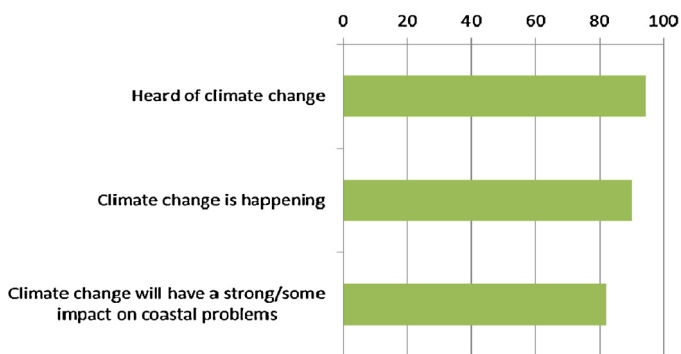


Fig. 3. Perceptions of climate change (%).

have been affected (AR=7.5), whilst in Quarteira more respondents tend to feel coastal erosion has not affected local populations (AR=3.6). Overall, more permanent residents in the three areas believe that local populations have been affected, compared to non-residents (visitors and second home owners).⁶ Concern about coastal erosion in the future is also widespread in all three places, but is more accentuated in Costa da Caparica.⁷

The interviews with local stakeholders confirm this widespread awareness of the risks the coastal areas currently face,

In 30 years the beach has receded a lot: to go down to collect a bucket of water used to take me 15 minutes, now it takes 5 minutes. (Representative of local association, Costa da Caparica)

When I was a boy I had to walk half an hour to get to the sea, now I don't have enough of the beach to run my boat aground. (...) There were dunes so large you could hide in there and in half a day they wouldn't find you. (Fisherman, Vagueira)

In this stretch of Forte Novo, we have experienced since the 70s, average losses of 2.5 to 3 meters a year. Such retreat rates do not exist elsewhere in the Algarve. (University researcher, Quarteira)

As shown in Fig. 3, almost all individuals surveyed had heard of climate change, are convinced that it is happening, and believe that it will have an impact on future coastal economic viability. The interviewees connected climate change to the sea level rise and

were aware of the scientific discourse on this issue. Many stated that the problem was too far in the future to concern them personally. However, some expressed apprehension for their children's sake, hesitating over buying property in land that may in future be flooded,

We all have that in mind. I have children and I ask myself if I want them to live in Costa. (Representative of local association, Costa da Caparica)

Social and economic vulnerability

Overall, 61% say they are concerned with the possible devaluation of their properties due to coastal erosion (home and business owners), but there are differences between the three sites. Respondents from Costa da Caparica (2.92⁸) and Vagueira (2.65) are, on average, more concerned with devaluation of their properties than individuals in Quarteira (2.47).⁹ The economic downturn and deteriorating market conditions form an added concern for property owners.

With the advance of the sea, in 50 years' time or less it will be impossible to have houses here. (Local residents association, Costa da Caparica)

As a last resort, if interest in an area like Quarteira disappears for lack of tourist influx, the need for investment goes away; there will be a degradation of defence infrastructures and then a degradation of occupation. In such a scenario, we will either have a ghost city or we demolish it, which also has high costs. (Scientist, Quarteira)

Our financial context is brutally devaluing our properties, much more seriously than the erosion impact, which is not yet causing the sale of houses. (Senior municipal officer, Vagueira)

In Quarteira and in Costa da Caparica the economic concern seems to be mainly related with the effects that this depreciation will have on tourism, while in Vagueira the situation seems to be more life threatening, potentially affecting the lives and livelihoods of the people living there. It is also interesting to note that some stakeholders – mainly local officers, real estate and local business owners – are reluctant to attribute property devaluation to coastal phenomena, fearing stigmatisation. They prefer to argue

⁶ $\chi^2(3) = 8.589, p = 0.035$.

⁷ $\chi^2(4) = 14.437, p = 0.006, AR = 2.5$.

⁸ From 1, not concerned to 4, very concerned.

⁹ $F(2) = 12.574, p < 0.001$.

this is mainly due to the current financial crisis (as the last quote demonstrates).

These responses suggest that there is a propensity across a wide range of residents and stakeholders for some sort of constructive engagement with scientists and policymakers over the basis for adaptive coastal management. The recognition of the problem and the strong risk perception, appear to form a key prior condition for effective public engagement. This reflects the theoretical framing of *propensity to engage* based on a raised collective awareness of the risks.

Public participation in coastal management decisions

Our survey showed very low levels of public participation in the three case study areas: less than 5% of the respondents in each area have participated in a public meeting to discuss coastal management decisions. Even of those few respondents who have participated, only a quarter think local people have any influence in coastal management decisions. The stakeholder interviews help to understand the reasons behind these low participation levels,

Costa Polis [the local urban development plan] never heard fishermen, indeed, never heard anyone. (Fisherman, Costa da Caparica)

There is a lack of civic engagement (...). We are not having enough political strength so as to give a voice to our problems here. (Local business owner, Vagueira)

Usually you don't hear local voices. (...) People take an interest, there were around 30 people at the discussion [of the shoreline management plan]; they participate; then they close the book and say goodbye. (Representative from local business association, Quarteira)

We have already made reference in Schmidt et al. (2013a) and in our literature review, that there is little confidence in building up participation in coastal management in Portugal. Many interviewees feel that their voice is not heard by the authorities. They claim that meetings for "public discussion" are rarely publicised, and in any case are more like public presentations of projects which are already *fait accompli*.

"Costa Polis", a State urban development programme developed in Costa da Caparica over the last decade, is especially singled out for criticism in this context. According to its statutes, it must deliver information and promote frequent public consultation sessions. However, local interviewees feel they were not listened to and showed their distrust about how the funds were managed how apparently particular interests and groups benefited.

The public consultation sessions are publicised in the newspapers and not everybody has access to the information (...), but when it comes to demolitions, notifications are delivered door to door. (Local civic movement, Costa da Caparica)

Polis in fact promoted public discussions, but from what was suggested there nothing was really taken into account. We are busy people, we have our jobs ... the distance grows up and we eventually give up participating. (Local association, Costa da Caparica)

In our introductory sections, we identified various blockages to participation which are commonplace. In our case studies, one of these blockages concerns lack of information in the context of formal public consultations. Others have to do with perceived lack of transparency (Costa Polis) and the lack of appreciation of local knowledge when offered.

Our stakeholder interviews revealed that some officials underestimate local people's capacity to understand coastal phenomena,

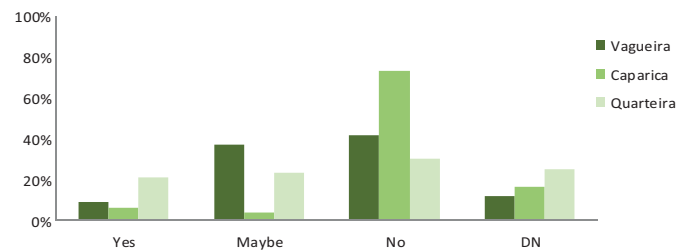


Fig. 4. Has current coastal management been able to solve problems on the coast?

do not perceive them as important partners in decisions, and hence do not see the need for communicating all available information.

People in this area lack civic culture. Most of the people don't get involved in local issues, don't read, and don't seek information. (Senior local officer, Vagueira)

The residents' survey also revealed that over 95% of respondents believe that people should have a say on coastal matters, together with local authorities, scientists and NGOs, stating the best option would be to share power among different participants. This inclusive view of participation is echoed by some stakeholders.

Fishermen know about this, but nobody listens to them. (Senior local officer, Vagueira)

Sand renourishments have caused conflicts with surfers, fishermen, beach restaurants. (...) Works are carried out during the high season, despite our opposition. They say this is the only appropriate time to do it, because of the undulation, but we, the surfers, don't agree. We have knowledge about waves and they don't take this into account. (Surfer, Costa da Caparica)

Usually local voices are not listened to. (Business association representative, Quarteira)

What these statements also demonstrate is the wide variety of interests in the coastline. Interventions that benefit tourism can hinder surfing or fishing activities, while environmental organisations often oppose local businesses interests. Hence decision makers face a hard time seeking balancing all these interests.

From a theoretical viewpoint, the overriding issue is the failure of trust in meaningful participation, as well as the differing perceptions of the value of participation in relation to payoff for particular coastal economic interests.

(Dis)Trust in institutions

If all diverging interests are to gather around the same objectives, confidence in who manages these processes is vital. Yet 48% of respondents from the three communities (Fig. 4) reveal a deep lack of trust in the way coastal problems have been confronted. This is particularly the case in Costa da Caparica, where 74% of respondents say they do not trust the way authorities have been addressing coastal issues. In Vagueira, opinions seem to be divided between distrust and uncertainty about the authorities' competence to solve the problems on the coast. Although in Quarteira respondents show some ambivalence, here is where we find the highest number of respondents that trust coastal management authorities.

The stakeholder interviews allowed us to probe deeper into the reasons behind this lack of trust in the authorities:

I honestly don't know if it's the Municipality, the Water Authority, the Ministry of Environment, or if it's Polis that defines things (...) I think this is crazy. (Surfer, Costa da Caparica)

It's too bad they [Water Authority] don't come more often to the locations and that they sometimes lack pragmatism and common sense. (Senior port officer, Aveiro)

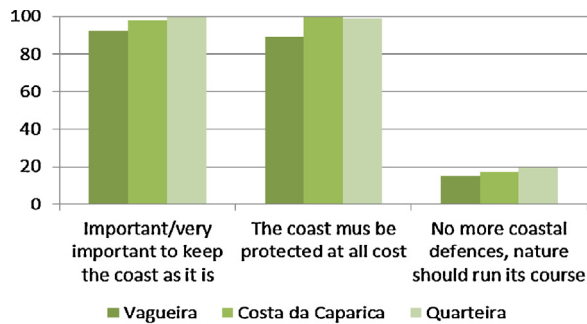


Fig. 5. Opinions over the future of the coast and coastal protection (%).

The dispersion of responsibilities on the coastal area is one of the greatest dramas that we have. The port captain, the marine police, the local councils, the regional water administrations - are indeed many entities. The line between them is not always very clear (...) it requires much greater coordination to achieve a good beach management. (Tourist resort representative, Quarteira)

The general impression given in the interviews is of a widespread perception of institutional disarray, overlapping responsibilities, and lack of contact with the local context and the community. All of this clearly undermines confidence in authorities. Once again, one of the primary conditions for engagement in effective adaptive coastal management from a theoretical perspective is palpably not met in any of these case studies.

Future coastal protection

We found that individuals in all case areas share a general will to stay in their places and would like the shoreline to remain where it is now, at least. This is confirmed by the set of responses presented in Fig. 5. As we can see in the first and second graphs, over 90% of respondents in the three locations think it is important or very important¹⁰ the shoreline remains unchanged and protected at all costs.¹¹

This idea is reinforced by the results on the right hand graph where we observe that a fatalistic approach of letting nature run its course is quite rare (less than 20%). It is clear that the vast majority of respondents would not accept any outcome where coastal defence ceased and their familiar coasts disappeared.

Local authorities seem completely determined to defend their coasts and preserve their beaches. This is driven, by the need to keep lucrative tourism revenue which in turn relies on effective coastal infrastructure and sizeable, stable beaches. But this is not the only motivation:

... people have to continue living in Costa da Caparica; they cannot demand that someone who has been living here for 40 years must move elsewhere. (Representative of local residents association, Costa Caparica)

This land, this holy land we have here; it has a history that has always been connected with fishing and the importance fishing has in this place is still considerable; tourism only moves in for four months each year (...) when fishing is in crisis it affects everything else. (Fisherman, Quarteira)

Table 3

Positive and negative aspects mentioned by respondents in each coastal area (open ended question).

		Vagueira	Caparica	Quarteira
Negative	Coastal erosion\loss of sand	29%	23%	5%
	Insecurity \criminality	4%	12%	24%
	Unplanned coastal development	5%	2%	6%
Positive	Proximity to the sea\the beach	32%	22%	44%
	Secure setting	32%	11%	7%
	Good weather	12%	10%	16%

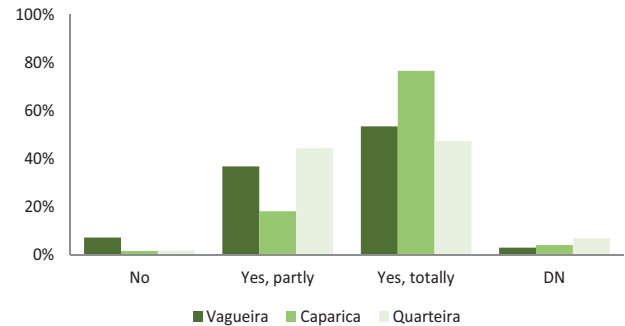


Fig. 6. Opinions over the state continuing to pay fully for coastal defence works.

We [fishermen] came here and created this beach. This beach had no name. This was a farm. There was no Vagueira and no beach: it simply didn't exist at that time. (Fisherman, Vagueira)

What these quotes suggest is a strong interest in the preservation of the physical place, especially by those groups that are more emotionally connected to the coast, like fishermen (Schmidt et al., 2013b). But new residents also value highly the landscape where they have chosen to live. These emotional ties may generate a real motivation to invest time and resources in protecting their coasts as described in the literature (Manzo and Perkins, 2006; Brown et al., 2003).

The findings of a deliberately open ended pair of questions in the residents' survey, regarding what respondents liked and disliked in general about their communities, show that most residents enjoy the proximity to the beach, the safety of their neighbourhoods (especially in Vagueira) and the good climate conditions. But a quarter (namely in Vagueira and Quarteira) mentioned coastal threat as a disadvantage (Table 3). An equal proportion, in Quarteira, expressed concerns social breakdown and loss of security. Overall the general feeling for staying was positive, but there were sufficient latent anxieties to suggest that a well-designed process of community engagement over social, economic and coastal security would be welcome.

Financing coastal protection and willingness to pool resources

When comes to financing, the majority of people think the state should remain the sole party responsible for financing coastal interventions. This is especially the case in Costa da Caparica. However, there are differences between the three locations.¹² In Vagueira and Quarteira, opinions are more divided and many respondents believe the state should only partially pay for the costs, which opens possibilities for alternative ways of financing (Fig. 6).

¹⁰ 1, not important to 4, very important (results combine responses to important and very important).

¹¹ 1, totally disagree to 4, totally agree (results combine responses to agree and totally agree).

¹² $\chi^2(6) = 56.759, p = 0.000$.

Table 4

Levels of agreement over three sets of alternative measures for state financing in each study area. The scale for the central column is 1–4 (least agree to most agree).

		Mean	SD
Taxing the access to the beach	Costa da Caparica	1.57	0.539
	Quarteira	1.39	0.571
	Vagueira	1.85	0.665
	Total	1.59	0.621
Financing by local citizens and businesses	Costa da Caparica	2.25	0.651
	Quarteira	2.29	0.623
	Vagueira	2.58	0.558
	Total	2.37	0.628
Private sector and EU funding	Costa da Caparica	3.00	0.554
	Quarteira	2.98	0.622
	Vagueira	2.94	0.905
	Total	2.97	0.705

Respondents with lower education levels think the state should continue to be the only one in responsible, while respondents with a post-secondary education and university degree tend to think the state should only cover a part of the costs of coastal reconstruction in the future.¹³ Such variations are important aspects to consider when targeting this message to the public.

This view of the state as the central piece of financing coastal works is shared by local stakeholders,

Who intervenes has to pay: the nation must realise that we are an international asset. (Representative of local association, Costa da Caparica)

When needed, if we have an emergency situation, the money will show up. (Coastal expert, Algarve)

The state has to keep financing coastal defence works. Municipalities only have the capacity to do small maintenance beach works. (Scientist, Vagueira)

Some stakeholders argue the state needs to pay because of the iconic and economic asset these coastal areas represent. Most claim that local authorities simply do not have the capacity to fund the protection of their coastal stretches, so coastal safeguard will always depend on central government, despite the current austerity.

When faced with the possibility of the state being unable to pay for coastal defence works in the current economic crisis, survey respondents reacted to contrasting funding alternatives¹⁴ with significant differences between the three case studies (Table 4). Despite overall being an unpopular measure, in Costa da Caparica and Vagueira people tend to show some agreement with “taxing access to the beach”, while in Quarteira respondents tend to disagree with this measure.¹⁵ Vagueira is where the respondents tend to agree more with “contributions from citizens and local businesses”, when compared to Costa da Caparica and Quarteira.¹⁶ In all three regions, respondents show a high level of agreement with forms of “private sector and EU funding”.

Given the scenario of a suspension of public financing for coastal works, home and business owners were asked about their availability to contribute to a local fund for coastal protection. Once more, there are significant differences¹⁷ between the three locations (Fig. 7). Respondents from Vagueira are far more willing to

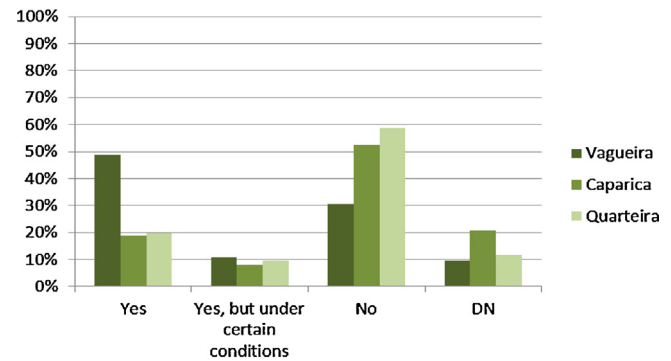


Fig. 7. Willingness to contribute to a local coastal protection fund.

contribute to a local fund than in Quarteira and Costa da Caparica. In Vagueira owners have also demonstrated a greater willingness to contribute under specific conditions of accountability.

Our results indicate that age may also be a factor to consider, with significant differences between age groups.¹⁸ Overall, older respondents are not keen to contribute to local funding, whereas adults between 24 and 44, for whom the coastal risks are more salient, are more willing to contribute under certain conditions. These conditions revealed a concern over the adequate allocation of funds, which may reflect the lack of trust in institutions we have reported earlier. Some home and business owners would contribute if they could verify the money was being well spent, while some respondents seek a fully transparent public presentation of any plan and budget. Property owners, who are more concerned with the devaluation of property due to coastal erosion, are also more willing to contribute to a local fund for coastal protection.¹⁹

The stakeholders' interviews reinforce the conclusions drawn from the survey,

We would be willing to contribute, but we do not want to pay and stay the same and the money disappears. In Costa Polis a lot of money disappeared. I even think there should be a contribution now, so people should understand the value of things. (Representative of local association, Costa da Caparica)

The contributions from users would be 'peanuts', it would never be a significant amount, but if the situation calls for it I think we could mobilise people ... (Representative of local business association, Vagueira)

Yes. Some say that the beach is a public good, but I think a small contribution wouldn't hurt, at least in terms of car parks, I think we are already doing a bit of that, but this has to be well targeted towards coastal protection and environmental issues (...) but I think so, provided it is not too much. (Beach restaurant owner, Quarteira)

Some stakeholders from regional and local administrations think the general public are distrustful and hence would not collaborate in this kind of initiative. Trust building promises to be particularly difficult in Costa da Caparica where interviewees recurrently criticise the unsatisfactory experience of Costa Polis. Others believe that if the situation called for it, people could be mobilised to contribute, provided there are clear objectives and plans.

Discussion

Our results have shown that irrespective of the variety of social actors and their various (and often conflicting) interests there are

¹³ $\chi^2(9) = 25.993, p = 0.002$.

¹⁴ Through a factor analysis (principal components analysis) we extracted 3 components regarding the various financing alternatives to government funding: "Funding from local citizens and businesses", "Taxing access to the beach" and "External financing (EU and private)"; Cronbach alphas = 0.710, 0.505 and 0.809.

¹⁵ $F(2) = 30.963, p = 0.000$.

¹⁶ $F(2) = 17.325, p = 0.000$.

¹⁷ $\chi^2(6) = 61.457, p = 0.000$.

¹⁸ $\chi^2(9) = 28.726, p = 0.001$.

¹⁹ $p < 0.001$.

some common topics that bridge this diversity. One of these is that in all three coastal places, citizens realise they face coastal erosion and climate change, with consequent deterioration of social and economic security (*recognition of risk and propensity to engage*). The reasons behind the desire for maintaining the coast may be varied – for economic resilience, for political interests, and even for emotional reasons. But most take a strong stand and argue that their coastal areas are worth protecting. Tackling this threat and preserving their coastal areas can provide the common sense of purpose through which these communities may build a shared identity and social cohesion (Webler et al., 2001). Other research has shown that it is vital that local communities be genuinely involved and indeed actively explore issues such as sense of place or cultural identity (Adger et al., 2009). The process may be slow, but in time a broader understanding and a more unified vision about the future of the coast can be achieved (Day et al., unpublished results). Our results also indicate disbelief, discouragement and distrust on the part of all social actors to participate, to be heard and to be recognised as partners by the political powers in their various governmental settings. However, despite current low participation levels and the inability to influence decisions (perceived by the public), in all three locations there is still a general willingness to intervene, subject to an appreciation of sincerity and policy reliability on the part of all government entities responsible for managing the coastline. There is also a recognition that if the public sphere has to shrink, then given the appropriate conditions of credible science and meaningful social learning engagement, progress could be made on innovative approaches to local financing and to risk-based restrictions on future planning and settlement.

We argue that this important finding, namely both a willingness to engage, and a degree of enthusiasm to learn and to contribute to possible adaptive measures stems from the interactive processes we designed for our two stage methodology. This fits in with the theories of the advantages of creative and progressive participatory processes based on building common visions and socially fair outcomes.

Our case studies also exhibited important differences. One such contrast lies in the financial willingness to contribute to coastal defence efforts. In Vagueira, despite being a lower-income location we find people more willing to contribute than in Quarteira where the population surveyed expressed a greater reluctance to contribute, despite its wide set of benefitting stakeholders (hotels, luxury beach and golf resorts and a number of other small and medium size businesses).

In terms of distance to power we also find important differences between the case study locations. In Quarteira, most stakeholders – and in the Algarve in general – regard their area as the “crown jewel”. Tourism is the only effective economic asset in the region, so it is assumed that “the authorities” will do something about any future coastal danger, as they have always done in the past. At the other end of the spectrum, Vagueira is not a tourism icon like Quarteira, does not enjoy proximity to the country's capital like Costa da Caparica, and has recently been neglected in terms of coastal protection.

Overall distrust and dismay in coastal institutions is widespread, even in Quarteira where community relationships with local authorities are less tense than in the other two areas. The high profile case is Costa da Caparica where the failure of local planning procedures (the “Costa Polis”) reinforced public distrust and possibly undermined any future attempts at community involvement and participation.

In all cases people seem willing to stay and live in the place they have chosen and like. Thus, one way to elicit a common goal could be to foster people's pride in the area and their enthusiasm to retain the quality of their coastal stretch. Even in the places with a more recent occupation and where most residents are migrants,

like Vagueira, our results suggest – especially at the stakeholder level – that individuals are proud and attached to their locality.

Another common aspect is the perception of a common threat and its socially binding effect (Manzo and Perkins, 2006). In Costa da Caparica, there is a clear concern about the future, which may prove instrumental in unifying disparate forces. In the more risky case of Vagueira, we can envisage a scenario where the prospect of a real catastrophe happening before the eyes of a seemingly ineffective central administration can actually work as a social cohesive factor (Schmidt et al., 2013b). Hence, both for good and bad reasons, a perception of real coastal threat could possibly help to create the propulsion for the joint learning which citizens require to engage and participate in the public sphere.

In all three locations fishermen are a key-group. From what we observed in the stakeholder interviews, those socially rooted and respected communities of fishermen, well represented by active local fishing associations (although Vagueira is an exception), can be important partners in building community ties. Together with other long term residents, they could help socialise newcomers and other less attached residents to the strengths and history of the place (Brown et al., 2003). Even in Costa da Caparica, despite its social and cultural diversity, there are pockets of more rooted residents and traditional communities – such as fishermen and clam collectors – that seem active and engaged in protecting their area.

Trusted community leaders can be important partners in building upon the existing strengths of the community, helping people to feel they have to deal with their coastal problems and engage more effectively in participative decision-making processes (Tompkins et al., 2008). Distance to central power (Lisbon) and the feeling of abandonment appear to exacerbate people's lack of trust in official institutions, and to address more forcefully the dangers their coasts are facing (Tapsell and Tunstall, 2008).

Conclusions and recommendations

What we gather from the case studies is that there is a strong awareness of coastal risks and the possible impacts of phenomena such as climate change. We have also identified a disconnection between the “top” and the “bottom” of coastal management decision-making processes, which leads to general distrust and blocked communication between local stakeholders and institutions in charge of coastal management. This has proven to be one of the main obstacles to the involvement of local stakeholders in coastal issues, as we have seen from previous studies and from our evidence.

Nonetheless, there are signs of a fundamental common purpose to confront coastal change, that there is a willingness to engage in adaptive management approaches – provided that there will be a genuine commitment by the official bodies – and that there is scope, at least in the most threatened communities facing both economic and coastal insecurity, for a constructive dialogue. Social groups with stronger local roots, such as fishermen, may well act as key players in any future collective adaptation strategy, owing to their status and recognised knowledge as perceived by their coastal communities.

To achieve this there needs to be a shared social and institutional awareness. The role of scientists – both from natural and social backgrounds – is crucial in this context (Abecassis et al., 2013). A credible cooperative science would be grounded in a better understanding of the causes of past failures in coastal planning and illegal settlement in danger zones, appreciation of the conditions for improved participation, and more coherent coastal cooperation by the relevant agencies involved (see Schmidt et al., 2013a for a fuller analysis). We also emphasise the need for clear and constructive leadership at national, regional and local levels.

Better forms of participatory learning, which also address social justice, might not lead immediately to better adaptation, but it can assist its progress. There is still great distrust over coastal management, and particularly the inconsistent policy fragmentation and agency bickering. Achieving effective adaptation is by no means guaranteed. Indeed it is possible that without constructive learning, offering more participation could heighten conflict. Considering the framework we have presented, our next stage of community forging workshops might just prove to be a path-breaking undertaking for Portuguese coastal management, and is one we believe is vital to explore based on the evidence we have provided.

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