ADAPT-MED NATIONAL POLICY BRIEF: Portuguese case study, Baixo Vouga Lagunar region

Adaptation to Climate Change from a natural and social science perspective: Water in coastal Mediterranean areas

May 2016

ERA-NET CIRCLE-2 (MED Group) *TRANSNATIONAL CALL FOR PROPOSALS 2013*

THE PROJECT IN A NUTSHELL

1. ADAPT-Med: to identify what needs to be adapted, and how

The ADAPT-Med project funded under the ERA-NET CIRCLE-2 aims to contribute to the identification of: (1) the main constraints (in terms of governance, institutional and decision making) on the internalization of climate change and adaptation into existing policies, strategies and planning processes or on the development of dedicated adaptation strategies; along with (2) practical options for removing these constraints, including in terms of changing the understanding, perception and values of decision and policy makers on the issues and challenges of climate change adaptation. The ADAPT-Med research associates both social and natural scientists, combining expertise, experiences and innovative ideas from these fields. The project's key results will be synthesized into a general policy brief.

2. Bringing knowledge...

The ADAPT-Med project compiles knowledge on the challenges of climate change adaptation in three regional research sites in France, Portugal and Greece. It builds on the collection of existing data, research results and relevant studies complemented by dedicated stakeholder interviews and stakeholder workshops.

Box 1. The ADAPT-Med research sites

ADAPT-Med focuses on three research sites represented below: the coastal zone from the *La Ciotat* bay to *Le Lavandou* in Southern France, the *Baixo Vouga Lagunar* (BVL), part of territory around the *Ria de Aveiro* coastal lagoon in Portugal , and the Eastern coast of Crete (Greece). All these coastal regions have been affected by increased urbanization in the last century, and will be diversely affected by the adverse effects of climate change on water resources, aquatic ecosystems and urban infrastructures.

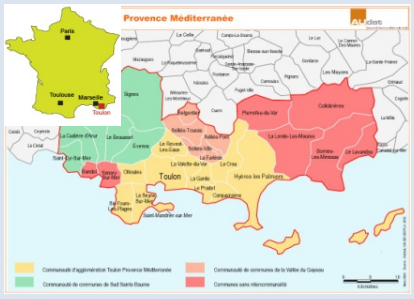

Figure 1. French research site (Mediterranean coast)

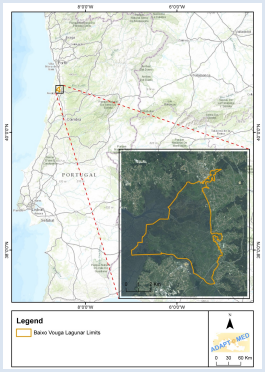

Figure 2. Portuguese research site (*Baixo Vouga Lagunar*)

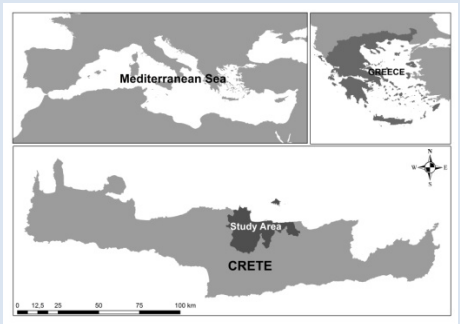

Figure 3. Greek research site (Eastern coast of Crete)

3. … into a participatory process

Stakeholders (experts, elected representatives, public administrations, socio-economic representatives, non-governmental organizations…) are associated to the project through different means and according to the following objectives:

- Interviews to gather knowledge concerning the research site and **current climate change adaptation practices**;
- Surveys to collect their **understanding, perception and values** concerning climate change adaptation;
- Regional workshops to collectively **identify the best opportunities for addressing adaptation** under the current policy framework, along with changes (instruments, framework, governance...) that would be required to enhance the capacity to tackle climate change adaptation issues;
- **Wider dissemination** through policy briefs, scientific publications and newsletters.

THE MAIN OUTCOMES OF THE BAIXO VOUGA LAGUNAR CASE STUDY

1. Context and policy framework

Baixo Vouga Lagunar (BVL) is located at the confluence of the Vouga River and the *Ria de Aveiro* coastal lagoon. It is integrated in the Special Protected Area (SPA) of the *Ria de Aveiro*, and part of the Natura 2000 network. Its landscape is mainly shaped by human activities and water presence, where the equilibrium between the influences of fresh water (of fluvial origin) and brackish water (from the lagoon) is in constant demand. BVL includes three landscape units: **wetlands** of saltmarshes and reedbeds, **open fields** and the ***Bocage*** smallholdings, where human activities, such as agriculture and livestock production, coexist with the biological diversity, particularly in terms of avian species.

The expected impacts of climate change in BVL include: **changes in the precipitation pattern**, increase of **coastline erosion** and **saltwater intrusion** through estuaries and aquifers in adjacent areas. The changes in the precipitation pattern, combined with the estimated **increase in temperature**, will lead to drought events during the summer and floods during the winter. Overall, this will **reduce the capability for aquifer recharge.**

The climate change problematic is typically addressed through two approaches: mitigation and adaptation. In Portugal, the mitigation policies are financed exclusively by national programs, whereas the adaptation strategies are national and internationally (EEA Grants) co-financed. As illustrated in Figure 4, the Portuguese spatial planning policy is based on a Territorial Management System, which is organized within a framework of coordinated interaction at three levels (Law nº48/98, August 11th): national, regional and local. .

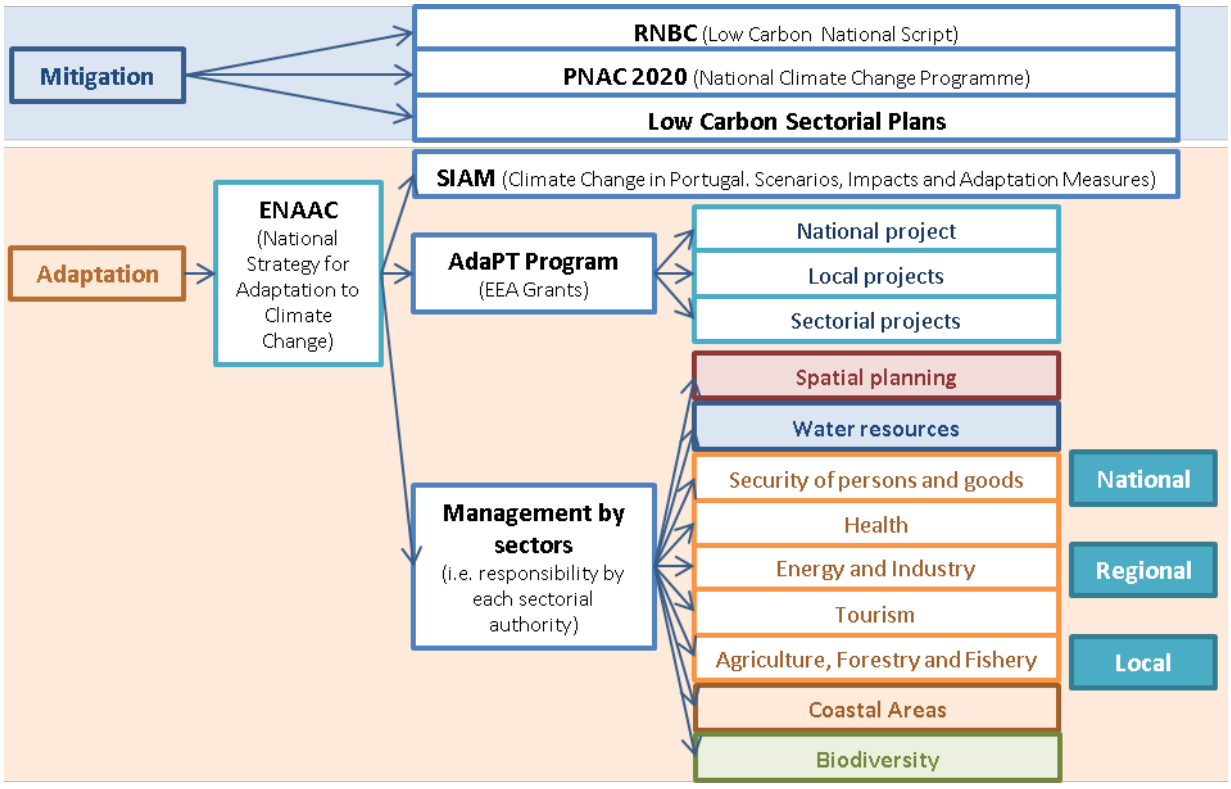

Figure 4. Portuguese spatial planning policy.

In particular, the spatial planning regulations with application in BVL are illustrated below.

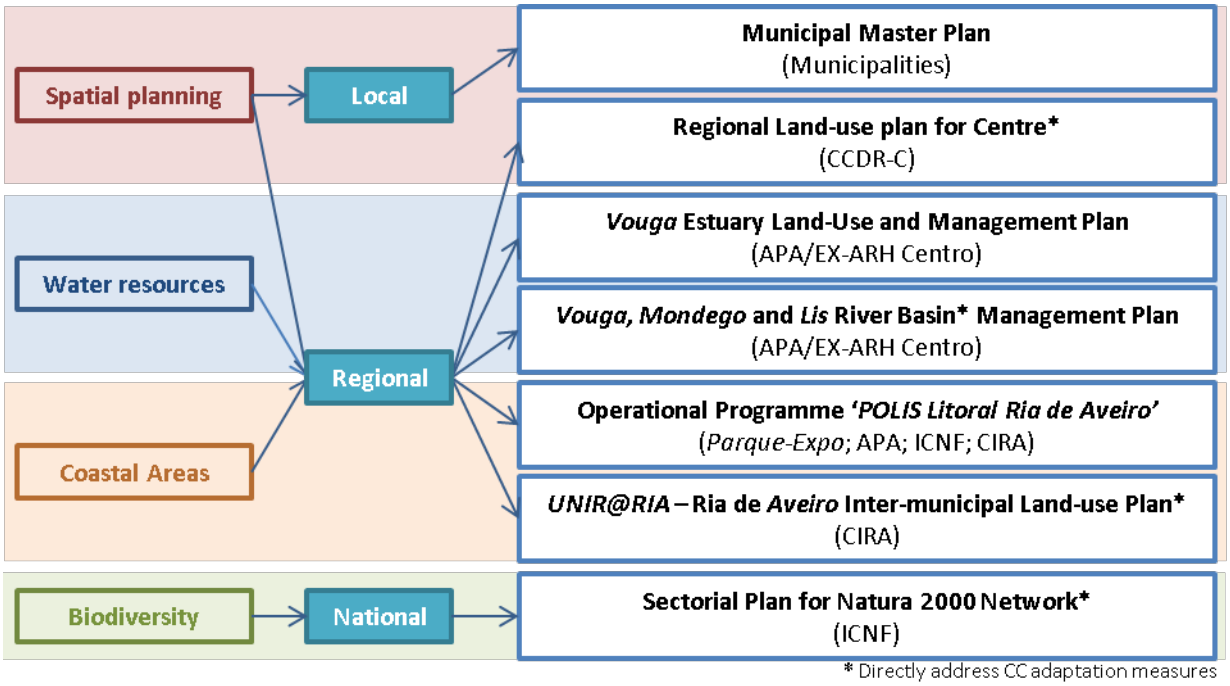

Figure 5. Spatial planning regulations with application in BVL.

Preliminary interviews to 18 stakeholders involved in ADAPT-Med indicated a lack of integrated management of the *Ria de Aveiro* coastal lagoon, including the BVL, which might enhance some incompatibility between the regulations mentioned above. However, in the course of the project, the stakeholders frequently referred to the regulations as key components for the successful management of the BVL; especially CIRA, considered a potentially relevant entity in overcoming these constraints.

2. Perception and intention towards adaptation to climate change

ADAPT-Med used the theory of planned behavior[1] as a general framework to understand stakeholders' intention of engaging in the process of planning adaptation to climate change (CC), using 2050 as the main temporal reference. This theory postulates that a behavioural intention is formed based on the attitude (evaluation of the behaviour), subjective norm (perceived social pressure regarding the behaviour), and perception of behavioural control (perceived ability to perform it), which in turn are formed based on specific beliefs towards the behavior, in this case towards engaging in planning adaptation to climate change. For the BVL, 31 stakeholders responded to a survey that measured these variables, with most indicating identification (e.g. local residents, environmental interests and local interests). Responses pointed towards belief in climate change despite showing temporal optimism regarding 2050, with the exception of coastal zones, due to CC impacts. Here, the benefit from adaptation to CC was perceived to be the highest. Respondents were particularly worried about salt water intrusion (which also had the highest impact estimates), ecosystem degradation, and coastline erosion.

[1] Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckman (Eds.), *Action-control: From cognition to behavior* (pp. 11- 39). Heidelberg, Germany: Springer.

Stakeholders' intention of engaging in planning adaptation to CC was relatively high. Intention was mostly correlated to subjective norm towards engaging, which was medium, indicating stakeholders felt a medium amount of social pressure to engage into this process. This suggests that intention is likely determined by subjective norm. In turn, subjective norm is correlated to normative beliefs (e.g., towards other stakeholders and policymakers), and therefore is likely determined by such beliefs.

Intention was also correlated to stakeholders' attitude towards planning adaptation to CC. Attitude was high, suggesting stakeholders value planning. Attitude correlated, and therefore was likely determined, by attitudinal beliefs towards public participation and general attitudinal beliefs towards adaptation to climate change.

Perceived behavioural control towards engaging in planning adaptation to CC was also correlated with intention. This suggests that intention was likely predicted by perceived behavioural control, besides subjective norm and attitude. Perceived behavioural control was medium/high and correlated with information on public participation and CC, task complexity, stakeholder salience, and organizational support.

3. Workshops

Stakeholders were asked to discuss adaptation to climate change (CC) measures, as well as the related opportunities and constraints, giving particular attention to CC impacts, policies, and engagement in the process of planning adaptation. Stakeholders first prioritized the main climate change issues that were identified for the case study areas. Surface salt water intrusion, floods, and erosion of the coastline and lagoon shoreline were the most mentioned impacts. Regarding policies, stakeholders mostly mentioned that measures such as ongoing program dissemination by the community and active participation of the civil society, along with joint actions for the community information and awareness, would improve significantly adaptation policies. Most stakeholders agreed on the need for engagement, as they argued that a multidisciplinary team composed by technicians, local population, and local authority representatives should be responsible for planning climate change adaptation in BVL.

1. Contexto e enquadramento estratégico

O Bloco do Baixo Vouga Lagunar situa-se na zona de confluência do Rio Vouga com a Ria de Aveiro, integrando-se na Zona de Proteção Especial da Ria. A sua paisagem é moldada pela atividade humana e pela presença de água, havendo uma procura no equilíbrio entre a influência da água salgada (proveniente da Ria) e da água doce (de origem fluvial). As unidades de paisagem caracterizam-se por **zonas húmidas** de sapais e caniçais, o **campo aberto**, e o '**Bocage**', onde as atividades, como a agricultura e a produção de gado, coexistem com a diversidade biológica, em especial as aves.

Os impactes esperados para a zona costeira no BVL incluem: **alterações no padrão de precipitação**, **aumento da erosão costeira** e **intrusão salina** nos estuários e áreas adjacentes. Adicionalmente esperam-se eventos de seca durante o verão e inundações durante o inverno causados pelo **aumento da temperatura** e pelas alterações no padrão de precipitação. Devido também a estas alterações, espera-se uma **redução de capacidade de recarga de aquíferos**, que juntamente com o **aumento do nível médio da água do mar**, resultará no **aumento da exposição a intrusão salina** no BVL.

A problemática das alterações climáticas envolve tipicamente duas abordagens: mitigação e adaptação. Em Portugal, as políticas de mitigação são financiadas exclusivamente por programas nacionais, enquanto que as estratégias de adaptação são cofinanciadas nacional e internacionalmente (EEA Grants). Como ilustrado na Figura 1, as políticas e estratégias de ordenamento do território português baseiam-se num Sistema de Gestão Territorial, organizado num quadro de interação coordenada em três níveis (Decreto-Lei n.º 48/98, 11 de Agosto): nacional, regional e local.

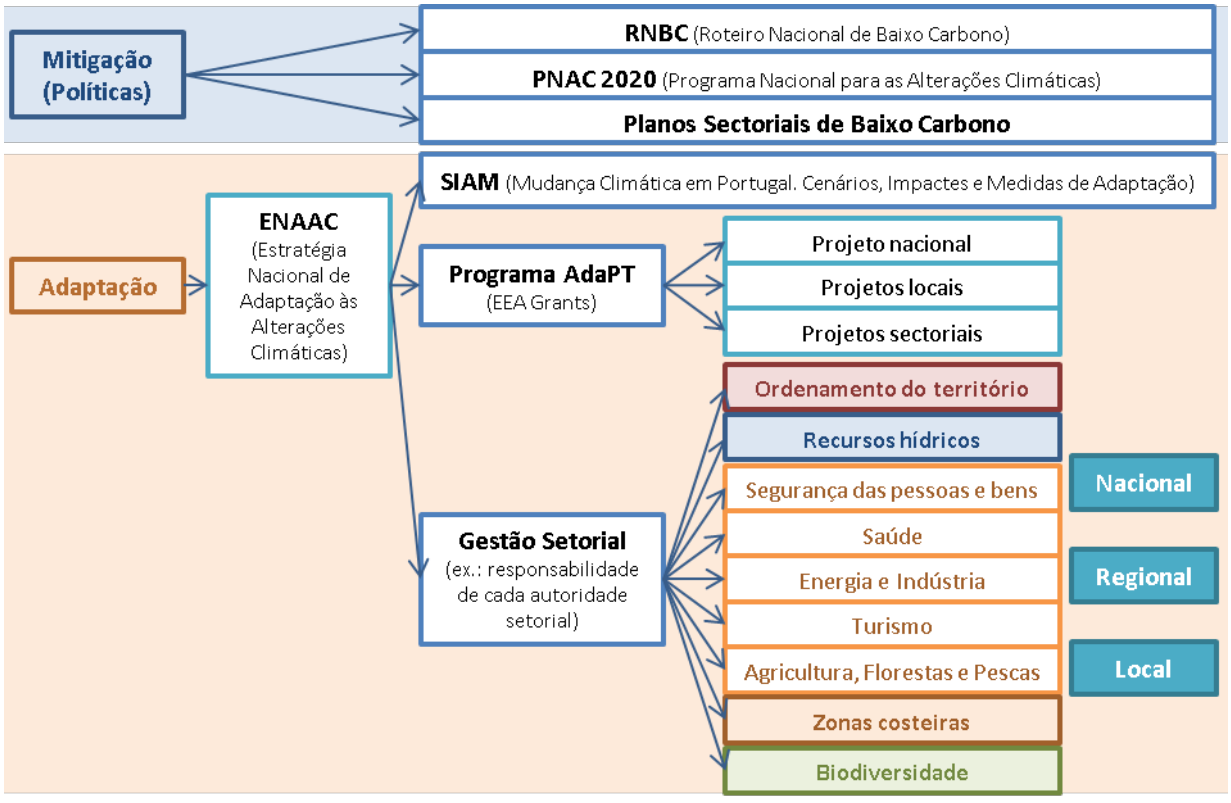

Figura 1. Políticas e estratégias de ordenamento do território em Portugal.

Particularmente, na Figura 5 enumeram-se as estratégias de ordenamento do território com aplicação no BVL.

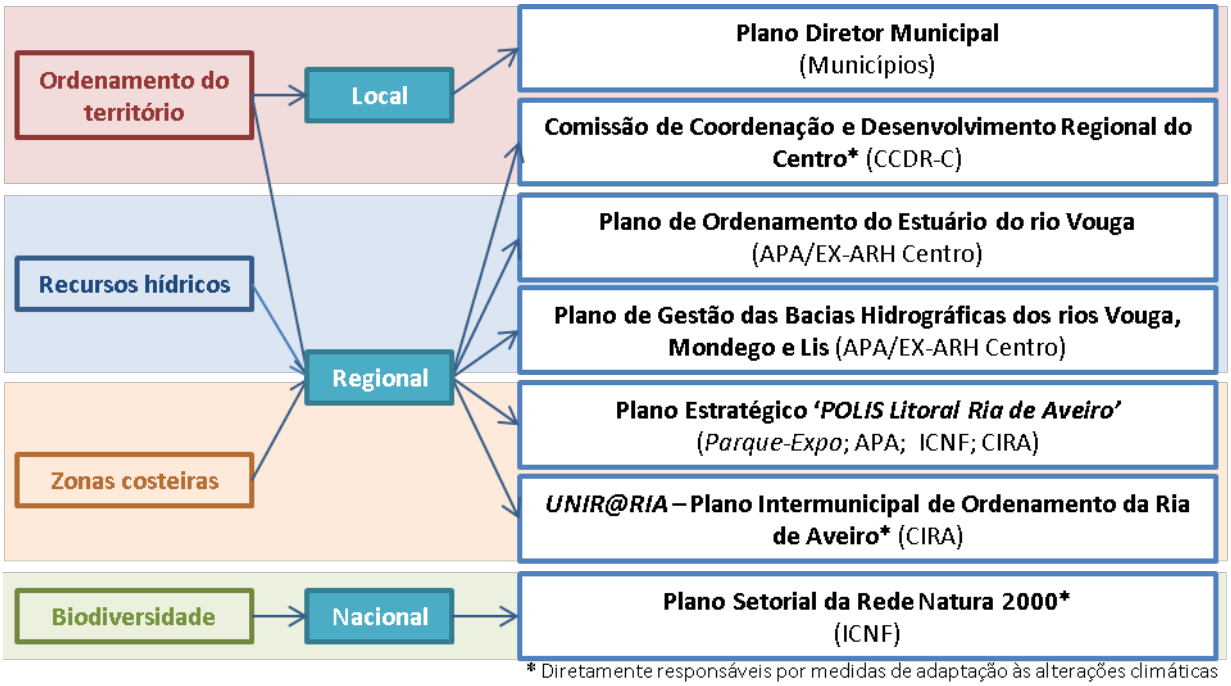

Figura 2. Estratégias de ordenamento do território com aplicação no BVL.

Entrevistas preliminares a 18 atores-chave envolvidos no ADAPT-Med indicaram a inexistência de uma gestão integrada da Ria de Aveiro, incluindo o BVL, realçando uma possível incompatibilidade entre as estratégias de ordenamento do território mencionadas acima. No entanto, no decorrer do projeto, os atores-chave referiram-se frequentemente às mesmas como parte integrante de uma gestão bem-sucedida do BVL; especialmente a CIRA, considerada uma entidade que poderá ter um papel relevante para superar estas contrariedades.

2. Perceção sobre adaptação às alterações climáticas

Para se compreender o envolvimento dos atores-chave no processo de adaptação às alterações climáticas aplicou-se a Teoria do Comportamento Planeado[2], sendo o ano de 2050 a referência temporal para os casos de estudo. Esta teoria postula que uma intenção se forma a partir da attitude (avaliação do comportamento), norma subjectiva (pressão social percebida relativamente a esse comportamento) e controlo comportamental percebido (competência percebida para realizar o comportamento), sendo estes, por sua vez, formados a partir de crenças específicas relativamente ao comportamento em questão, neste caso o envolvimento no planeamento da adaptação às alterações climáticas. No BVL, 31 atores-chave responderam a um questionário que media estas variáveis, sendo que a maioria indicou que se identificava com os habitantes locais, e que tinha interesses ambientais e locais. As respostas indicam que os atores-chave acreditam nas alterações climáticas, embora os inquiridos tenham demonstrado optimismo temporal para 2050, exceto para as zonas costeiras, onde os benefícios da adaptação também foram percebidos como elevados. Os inquiridos

[2] Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckman (Eds.), *Action-control: From cognition to behavior* (pp. 11- 39). Heidelberg, Germany: Springer.

revelaram especial preocupação com a degradação dos ecossistemas, erosão costeira e intrusão salina, estimando um elevado impacte ambiental nestes âmbitos.

A intenção de os atores-chaves se envolverem no processo de planeamento da adaptação às alterações climáticas era relativamente alta. Esta intenção estava sobretudo correlacionada com a norma subjectiva relativamente ao envolvimento, que tinha um valor médio, indicando que os atores chave perceberam uma quantidade média de pressão social para se envolverem neste processo. Isto sugere que a intenção era provavelmente determinada por esta norma subjetiva. Por sua vez, a norma subjetiva correlacionava-se com crenças normativas (ex., relativamente a outros atores-chave e decisores) e, deste modo, era provavelmente determinada por estas crenças.

A intenção estava também correlacionada com a atitude dos atores-chave relativamente ao planeamento da adaptação às alterações climáticas. A atitude era muito positiva, sugerindo a valorização de tal planeamento. A atitude correlacionava-se, e por isso era provavelmente determinada, pelas crenças em relação à participação pública e pelas crenças em relação aos objetivos da adaptação às alterações climáticas.

O controlo comportamental percebido dos atores-chaves quanto ao envolvimento no processo de planeamento da adaptação às alterações climáticas também se correlacionava com a intenção. Tal sugere que a intenção era provavelmente também determinada pelo controlo comportamental percebido, para além da norma subjectiva e da atitude. O controlo comportamental percebido era médio/alto e correlacionava-se com informação sobre a participação pública e sobre alterações climáticas, com a complexidade desta tarefa, com a saliência dos atores-chave e com o apoio da organização do ator.

3. Workshops

Os atores-chave foram convidados a discutir medidas de adaptação às alterações climáticas e respetivas oportunidades e barreiras, tendo em consideração os impactes, políticas e envolvimento referentes ao processo de planeamento da adaptação às alterações climáticas. Para este fim, os atores-chave começaram por priorizar os principais problemas relacionados com as alterações climáticas identificados nas áreas de estudo. Intrusão salina, cheias, erosão costeira e das margens da ria foram os impactes mais mencionados. Relativamente às políticas, os atores-chave mencionaram que medidas como a disseminação de programas em curso por parte da comunidade, participação ativa da sociedade civil e ações conjuntas de informação e de sensibilização da comunidade, resultariam numa melhoria das políticas de adaptação. Por último, a maioria dos atores-chave concordaram que existe uma necessidade de envolvimento, nomeadamente que uma equipa multidisciplinar composta por técnicos, população local e representantes das autoridades locais, deveria ser responsável por planear a adaptação às alterações climáticas no BVL.

WAYS FORWARD

1. How to adapt, solutions from a stakeholder perspective

Regarding on how to adapt to climate change, stakeholders identified and debated the main constraints and opportunities following the three topics presented for discussion: impacts, policies and engagement, as summarized in the following tables.

Measures	Recommendations
Topic: Climate change impacts	
Water management	• Involvement of the CIRA in order to reduce conflicts of interest and to strengthen cooperation • A further implementation of EU policies to overcome the lack of political will and to mobilize funds
Environment and biodiversity	• Find more technical support to take advantage of green infrastructure (sustainable management combined with other economic activities e.g. tourism)
Knowledge, training and cooperation	• Promote engagement at all levels under the lead of CIRA in order to reduce conflicts of interest, improve communication, learn from local knowledge
Socioeconomic activities	• Reinforce and look for win-win situations to limit constraints (e.g. conflicts of interest) and generate higher benefits (e.g. income)
Topic: Climate change adaptation policies	
Information and participation of local stakeholders in policy-making	• Adapt the legal framework in order to foster engagement from policies and from people (linked with communication issues)
Integration of climate change in sectoral and regional policies (agriculture and nature conservation; local and regional)	• CIRA as leading authority with adequate resources to develop an integrated adaptation policy and foster dialogue between sectors at different levels
Local/regional management (CIRA [Inter-municipal Community of the Aveiro Region], procedural simplification)	• Regroup municipalities with shared or common interests and challenges to gain capacities, resources and scale with regards to the national level
BVL as a Project of National Interest	• Further gain national interest recognition by linking the regional scale to the national priorities
Topic: Engagement in the climate change adaptation process	
Mobilize and increase engagement in policy-making	• Build on the existing social capital to promote engagement, as it implies reduced costs and higher benefits • Identify and communicate on the benefits of engagement
Develop communication actions on adaptation to climate change in BVL	• Place local identity to consider in the definition of actions • Show that climate change is happening now despite associated uncertainties (tell the whole story) and bridge with local priorities / show co-benefits
Implement local participatory budgeting with quotas to climate change projects	• Bring climate change adaptation to the municipal agenda and discussion

2. Factors influencing intention of engaging in adaptation

Stakeholders were invited to respond to the survey again at the end of the workshops. Results illustrated an increase in stakeholder intention to engage in the process of planning adaptation to climate change in BVL until 2050. As such, when stakeholders have the opportunity to be engaged in the different policy instruments that manage the BVL, they are likely to consider and plan adaptation to climate change. The increase in intention was likely related to an increase in subjective norm (e.g., in the perceived social pressure to engage in planning adaptation to climate change) which, in turn, was likely determined by the increase in injunctive normative beliefs towards individuals from one's organization. In particular, after the workshops, injunctive normative beliefs towards individuals from one's organization and subjective norm increased from medium to relatively high and stakeholder intention of being engaged in the process of planning adaptation to climate change became slightly higher. The perceived complexity of this task also decreased from relatively high to medium. As such, the workshops were also successful in promoting the intention to engage in the process of planning adaptation to climate change and the psychosocial variables that determine it.

3. General observations

Finally, general lessons can be drawn from the comparison of the results between the French and the Portuguese research sites. On factors influencing the planning behavior of stakeholders, the following conclusions and associated recommendations were met:

Conclusions	Recommandations
• The **theory of planned behaviour** worked to explain intention to plan adaptation. • Engagement to plan adaptation was valued in the participants' attitudes. • Variables are case study-specific.	• **Communication** has a central role in promoting engagement to plan adaptation to climate change. It has to be appropriate to be effective. For instance, using fear to communicate on risks might reinforce the **normalization of risk** effect[3]. Providing open, concrete, non-imposed solutions that have been tested elsewhere is more likely to lead to engagement. • **Local, non-climate related perceived issues** (economy, employment, social services, education, health, some natural risks, etc.) are often considered as a priority. An approach to promote engagement is to start looking at these issues, then to analyze how climate change is going to affect them (or already does).

In terms of the integration of adaptation to climate change within decisions and policy-making processes, there is a general need for:

- **A leader or focal point** in charge of adaptation issues specifically and situated at an intermediate level of governance (e.g. an Inter-municipal Community);
- A trusted, legitimate and credible **scientific authority/figure** (e.g. a "local IPCC" or a network of universities) that produces knowledge at a local scale and is established as a reference;
- **Win-win perspectives** that must be emphasized in a non-regret approach to strategies, supported by economic evidence when possible (e.g. cost-benefit analysis);

[3] It has been observed that when people are exposed to a high level of risk, their perception of the risk will lower in time even if the risk remains at the same level. It is a psychological mechanism to cope with the risk and to continue living with it.