BASE BOTTOM-UP CLIMATE ADAPTATION STRATEGIES TOWARDS A SUSTAINABLE EUROPE

Title: **Participation in Climate Change Adaptation**

Summary: This report aims at investigating the participation process in climate change adaptation for 22 European BASE case studies. A description of participatory methods and a further analysis of 9 BASE case studies where there has been a deliberative adaptation process present are given. Based on the results presented, a set of recommendations to policy-makers and practitioners are given. The output from D5.3 will lead up to D5.5, in which a more detailed analytical description of the framework will be given and a meta-analysis of the empirical contents will be delivered.

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BASE report

Contents

1 Introduction to Participation in Climate Change Adaptation

This deliverable explores participation in climate change adaptation for a selection of 22 European case studies. Chapter 1 introduces participation in climate change adaptation, the objectives and aim of the deliverable, approach and a case study overview. Chapter 2 is an analysis of the participatory aspects of the case studies, whereby the involvement of stakeholders is explored in four defined adaptation phases: initiative/decision to act, development of potential adaptation options, decision-making and implementation. On this basis, similarities and differences in climate adaptation across the case studies has been investigated. Chapter 3 describes a range of participatory methods applied by the presented case studies in climate adaptation. This leads to chapter 4 where 9 case studies where a deliberate adaption process has taken placed are analysed in more detail. The analysis is based on the participatory methods presented in chapter 3 and the experiences gained from the process is explores. The findings of the previous sections lead to a set of recommendations and conclusion to policy-makers and practitioners presented in chapter 5. This deliverable is a presentation of empirical data and steps in analysis which will lead to deliverable 5.5, in which a more detailed description of the analytical framework will be presented and a meta-analysis of the empirical contents will be delivered.

The rationale for exploring concrete cases of participation in climate change adaptation is a wish to gather and disseminate knowledge on positive impacts from and challenges with such experiences gathered by real-world practitioners in local government administrations.

To local authorities, citizens and businesses, adapting to the effects of climate change often presents a complex of interrelated challenges. Climate change adaption thus falls into the category of ‘wicked’ problems (Rittel and Webber 1973), which generally affect public planning and governance. Faced with such problems, many administrators and managers have increasingly forsaken top-down strategies for solution development and implementation and replaced them with more bottom-up strategies involving the involvement of stakeholder groups and citizens up-stream in what may be thought of broadly as new forms of ‘collaborative governance’ (Ansell and Gash, 2008). With this new mode of governance, practitioners increasingly seek to circumvent adversarial modes of planning and implementation in favour of ‘co-management’ that eschews universally applicable solutions to the benefit of locally embedded approaches (Folke et. al. 2005, Folke 2010). At a general level, we can thus expect collaborative and participatory approaches to have some degree of relevance for climate change adaptation initiatives.

As the Aarhus Convention entered into force on 2001, a further rights-based incentive has been provided for increasing the participation of citizens in local planning and implementation of climate change adaptation strategies. Under the Convention local authorities are obliged to carry out and disclose environmental impact assessments to citizens and the community and to provide options for the public to react. Such processes of ‘governance-by-disclosure’ (Gupta, 2008) may serve to activate the public. But from the point of view of collaborative governance theory, it may also serve to entrench adversarial modes of planning and implementation as ‘the public’, which these processes serve to construct, is structurally placed in an adversarial rather than a collaborative position.

If climate change adaptation is to benefit from the resources of local communities, there is therefore a need to explore good examples of collaborative forms of citizen participation that go beyond the rights-based obligations of administrators into the territory of ‘co-management’ described above. Providing practitioners with comparative data on the arguments for and inspirations on how to carry out processes of participatory collaboration is a way of constructively supporting the dissemination of best-practice between locally embedded actors. Such research already exists in the area of climate change mitigation (e.g. Hoff and Gausset, 2016), but with regard to climate change adaptation, the BASE project is breaking new ground.

Throughout the report, we use the term ´participation´ as the active involvement of a broad range of stakeholders in the adaptation process. We define the adaptation process as defined by four stages: (1) initiative/decision to act, (2) development of potential adaptation options, (3) decision-making and (4) implementation. And for each of the cases studied, we explore the types and degrees of involvement process in the defined adaptation processes. (See also Chapter 3 below).

1.1 Objectives and Aim

It is one of the main objectives of BASE to explore the role of participatory and deliberative methods in improving the integration of knowledge and views of citizens and stakeholders in the design of adaptation strategies, with the aim of improving the design and implementation of such strategies. This task and respective deliverable (5.3) intend to support BASE projects achieving directly the following objectives mentioned in the DoW (Part B, page 5):

"6. Use and develop novel participatory and deliberative tools to enhance the effective use of local contextualized knowledge in adaptation strategies to assess perceptions of adaptation pathways and their co-design by citizens and stakeholders.

Through a systematic approach to the study of participatory methods within the BASE climate change adaptation case studies, this report aims to understand the current use (or not) of participatory methodologies and to develop a better understanding of the use and potential of the existing and new methods in climate adaptation process, thus going beyond the current 'state of the art'. Its specific objectives are:

a) To produce advice on the use of participatory methods in adaptation/planning processes in connection with policy design and implementation
b) To assess how particular participatory methods function in different cultural contexts
c) To test and develop new participatory methods through systematizing and building on existing ones
d) To further develop comparability, reproducibility and robustness of results from research using this type of methodological framework
e) To assess and communicate the results within BASE to Deliverable 5.5 where the results can be set in the larger case assessment context and to assess the outcomes and feed the results to other BASE work packages.

1.2 Approach

To fulfil the aims and achieve the specific objectives mentioned this deliverable uses two "types of" methodologies:

1. Map the type and level of participation in all BASE case studies.
2. Test participatory methods in some of the BASE case studies

To better describe the decision-making processes leading to the identification and/or adoption of adaptation plans and measures in all case studies, with a particular focus on the participation and inclusion (or non-inclusion) of experts, stakeholders and citizens in these processes, this deliverable will furthermore examine:

a) The scope for involving participatory methods at different stages of adaptation development

b) The "width" (the variety of societal actors involved and different types of participants involved) and the "depth" (the level of influence and responsibility given to the actors involved) of participation and

c) Describe any novel participatory methods observed in the case studies.

The assessment of the empirical input is divided into two sections. Chapter 2 will examine all case studies with the purpose of analysing the stakeholder involvement in adaptation processes, hereby mapping the level of participation present in the case study. This will be done by applying a modified model based on the 'ladder of participation', which is described further in detail in section 2.1. Chapter 3 is a description of the participatory methods applied by BASE case studies. In Chapter 4 the case studies where a deliberative participatory process has taken place are analysed. In chapter 5 conclusions are drawn and recommendations made with regards to both the perspective of policy makers and practitioners.

All information for this deliverable was obtained through the Case Study Living Document filled by case study responsible (BASE researchers), designed to provide all necessary information for this deliverable. The reporting structure and how the BASE researchers were asked to report their data can be seen in Annex 2.

This report is based on input from 22 BASE case studies in different European regions that have provided empirical material based on a reporting framework. The case studies were asked to provide information on a number of indicators and processes using a number of different methods.

1.3 Case study overview

Table 1 provides an overview of the cluster case study, BASE partner, climate risk/s and temporal definition. The temporal definition distinguishes between retrospective and prospective case studies. Retrospective case studies are case studies where climate adaptation actions have been revisited and evaluated by BASE partners, whereas the prospective cases have involved an on-going interaction or involvement in the case study area during the BASE project[1]. A detailed description of the 22 case studies can be found in the BASE report D5.1.

Table 1: BASE case study overview

Case context (Cluster)	Case study	BASE Partner	Climate risk/s	Temporal Definition
Agriculture and forestry	Alentejo	FFCUL	Water availability (drought)	Retrospective and prospective
	Holstebro (Climate adaptation in two Danish	AU	Flooding (fluvial and pluvial)	Prospective

[1] For a detailed description of these definitions see Deliverable 4.1

	rural municipalities)			
	Lolland (Climate adaptation in two Danish rural municipalities)	AU	Flooding (pluvial)	Prospective
	South Moravian Region	CzechGlobe	Water availability (drought)	Prospective
	Ústí Region	CzechGlobe	Water availability (drought)	Retrospective and prospective
Biodiversity and ecosystems	Dartmoor	UniExeter	Drought and flooding (pluvial)	Prospective
	Green Roof, Sumava Region	CzechGlobe	Ecosystem degradation	Prospective
Cities and infrastructure	Cascais	FFCUL	Heat stress	Retrospective
	Copenhagen	DBT	Flooding (coastal and pluvial)	Prospective
	Jena	UFZ	Heat stress and flooding (pluvial)	Prospective
	Prague	CzechGlobe	Heat stress and flooding (pluvial)	Retrospective
	Rotterdam	Deltares	Flooding (fluvial and coastal)	Retrospective
	Venice	CMCC	Flooding (coastal)	Retrospective and prospective
Coastal zone	Aveiro Coast: From Barra Beach to Areão	FFCUL	Flooding (coastal)	Retrospective
	Kalundborg	DBT	Flooding (coastal and pluvial)	Prospective and retrospective
	South Devon Coast	UniExeter	Flooding (fluvial and pluvial)	Retrospective and Prospective

	Timmendorfer Strand	EI	Flooding (coastal)	Prospective and retrospective
Human health	Cornwall	UniExeter	Heat stress	Prospective and retrospective
	U.K. Health	UniExeter	Heat stress, vector borne diseases	Prospective
Water resources	Kalajoki River Basin	SYKE	Flooding (fluvial)	Prospective
	Lake Ijsselmeer Region	Deltares	Water availability (drought and flooding)	Prospective
	Tagus River Water District, Madrid	UPM, BC3	Heat stress	Prospective

2 Participatory Analysis of Case studies

Chapter 2 is an indepth study of participation in the 22 BASE case studies. The chapter starts with a methodological explanation of the analysis. The section is followed by an individual analysis of the case studies. The key findings are thereafter presented. Chapter 2 concludes with an analysis of the objectives of applying participation and the involvement of stakeholders in adaptation planning.

2.1 Methodology for Participation Matrix Analysis

The BASE case studies are analysed using a “Participation Matrix”. The aim of the “Participation Matrix” is to provide conceptual clarity when analysing participation and the actor groups involved. The goal of the matrix is to allow for the better understanding of the participatory activities involved in the adaptation process for the case studies. Figure 1 is a template of the “Participation Matrix”, whereby the case studies are analysed. The aim of the “Participation Matrix” is not prescriptive, but descriptive as it does not claim that a higher intensity of participation is better but rather recognizes the involvement of actors at any stage of the adaptation process. The matrix identifies different dimensions of participation, which is informally visualised, and makes the model suitable for comparing initiatives across case studies.

In the BASE project some of the case studies have performed a participation process. In this section it is chosen to assess the stakeholder involvement in the case study and not differentiate between the case studies who have performed participatory approach and those who have not. In this context, *participation* is used as a general term to describe the interaction process between stakeholders. Normally there is a deliberative strategy behind the concept of *participation.* The case studies where there has been a deliberative participation process associated with the adaptation process are further analysed in Chapter 4.

2.1.1 Participation Matrix Outline

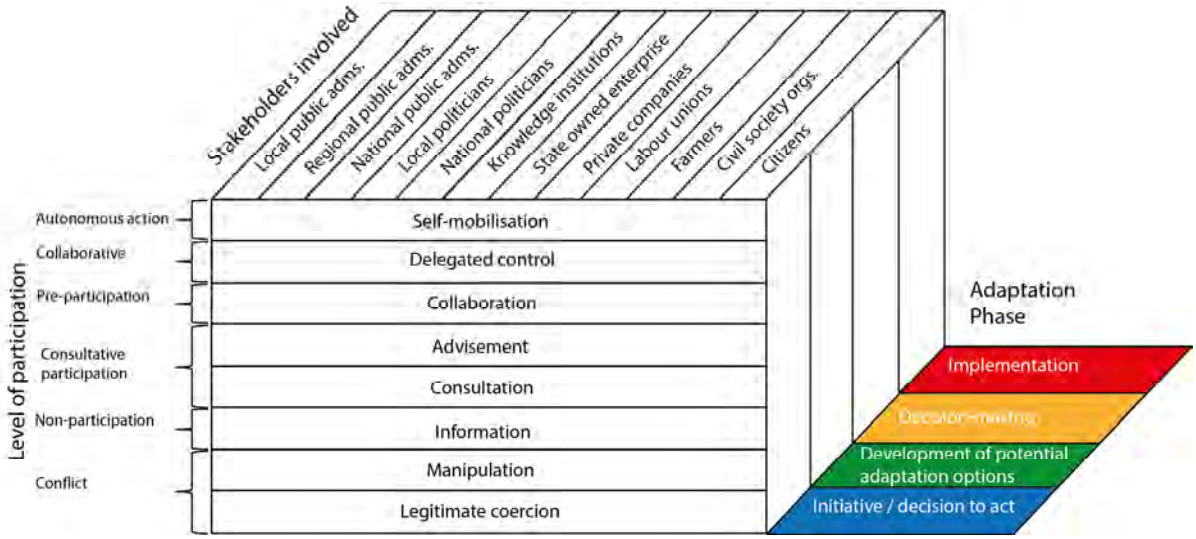

Figure 1: Template of the Participation Matrix

The identified dimensions include: 1. *Level of Participation*, 2. *Stakeholders involved in the participation process* and 3. *Adaptation phases.*

2.1.2 Level of Participation

The level of participation is based on the original ladder from Sherry Arnstein. It is reflected in the y-axis of the matrix. This level describes the level of collaboration executed. The original Arnstein ladder is modified to fit the data across all BASE case studies. The ladder goes from legitimate coercion to self-mobilisation. A detailed description of the different levels is provided in the table below.

Table 2: Definition of level of participation

	Definition	Example
Legitimate coercion	Refers to situations where there is a conflict and some affected stakeholders or citizens do not agree with the actions being implemented.	Coordinated demonstrations, strikes, boycotts
Manipulation	Is a part of the non-participation category and is characterised by the attempts to manipulate in order to keep actors quite, satisfied, with the impression of being heard but there is no real intention to listen to them.	Information meeting

Information	Means that information about what is being done, or planned to be done, is provided to all.	Website, campaign, information meeting
Consultation	Means that some channels are organised that allows feedback from the actors/stakeholders to be heard by the decision-maker.	Focus groups, stakeholder workshops
Advisement	Allows for stakeholders to provide elaborated advice to the decision-maker, as part of a conversation.	Focus groups, stakeholder workshops
Collaboration	Means that the decision making capacity is implicitly or explicitly shared through the principles of collaboration, understanding that participants are partnering together to find good solutions. The final decision should be influenced by what is recognised and agreed in the cooperation. The different power relation is not changed since all partners have to accept each other's power.	Focus groups, stakeholder workshops
Delegated control	This means that the control of some decision-making is delegated to the participatory actors. Usually the decision maker can reclaim the control in case of emergency but by default the decision maker is willing to accept the results of the participatory collaboration. The decision maker is often a member of the participatory mechanism and is able to defend their interests.	Co-participatory initiative Citizens science
Self-mobilisation	Is a part of the autonomous action category and refers to the people participate by taking initiatives independent of external institutions to change systems. They develop contacts with institutions for technical advice but retain control. May not challenge existing distributions of power.	Grassroots and bottom-up initiatives e.g: Farmers individually or in group investing in lakes without support or incentive; neighbourhood associations investing in flood prevention; communities organising, debating their future and making an adaptation plan; people migrating away from frequent drought areas.

(Adapted from: Kyosei, A.C., Prieto-Martin, P., 2011.; Reid et al., 2009)

2.1.3 Stakeholder Groups involved in the participatory process

This dimension in the "Participation Matrix" allows differentiating actors. This is done by grouping them. The identified groups of actors are defined to fit the data provided by the BASE case study partners. The inclusion of this dimension allows the model to analyse both administrative, top-down participation and autonomous, bottom-up participation, as it gives information on who is involved in the adaptation process.

In the analysis of the BASE case-studies, stakeholders can be involved in multiple Adaptation Phases (z-axis). If this is the case, the colour of the actor group will correspond to the designated colours assigned to the adaptation phases. For example if the *local public administration* is involved in the phases: *initiative/decision to act, implementation and decision-making,* the actor group will be highlighted with the colours: blue, green and red, respectively.

Below a description of how the stakeholders are defined for the purpose of the analysis is given.

2.1.4 Definition of stakeholders

Local public administration - Public institutions that act only at the local level implementing government policy or creating and implementing local policy. e.g. technical workers in municipalities.

National public administration – Government, governmental agencies and departments, public governmental institutions. e.g. Environmental Agency, DEFRA (Department for Environment, Food and Rural Affairs), National Park Authority

Regional public administration – Public institutions that act at the regional level implementing government policy.

Local politicians - Elected people and representants at the local and regional level e.g. Mayor

National politicians - Elected people and representants at the national level e.g. minister

Knowledge institutions - Organisation designed to do research on a certain topic i.e. universities, BASE partners

Private companies - Privately held companies owned either by non-governmental organisations or company members.

State-owned enterprise - Companies whose ownership is at least 50% from the national state, government or the local public administration institutions. They are created to perform a strategic service at the local, regional or national level and have typically few or no market competition.

Labour unions - Organisations intended to represent the collective interests of workers in negotiations with employers over wages, hours and working conditions in related fields.

Farmers - Persons working in agriculture, which covers both private companies and family run farms.

Civil society organisations - Organisations that manifest interests and will of citizens and that are neither part of a government nor a conventional for-profit business. Ex: NGOs - Non Governmental Organisations.

Citizens - A person who is legally recognized as a member of a case study region, with associated rights and obligations.

2.1.5 Adaptation Phases

The *Adaptation Phase* dimension of the "Participation Matrix" refers to the process stages and has been divided into four stages. This dimension allows specifying in which phase participation is present and who has been involve. The phases are highlighted with a defined colour in order to give a clear visualisation of who has been involved and its level of participation. As visualised in Figure 1 the following colours are assigned to the four adaptation phases: *initiative/decision to act* – blue, *development of adaptation options* – green, *decision-making* – yellow and *implementation* – red. For example if a certain stakeholder group is highlighted with blue and green it means that the stakeholder group has been involved in the two adaptation phases: *initiative/decision to act* and *development of potential adaptation options.* Below a description of the analysed phases is given:

Phase 1: Initiative/decision to act

The first phase refers to who has taken the initiative to the first stage of the adaptation process. The case studies were asked to answer which participatory methods have been used in the first phase in the adaptation/planning process. Also, they provide information about involved stakeholder groups and their specific roles in the initial adaptation planning process.

Phase 2: Development of adaptation options

The second phase is the development of adaptation options. This includes a description of who has been involved in developing adaptation option(s). Such possible adaptation options cover a wide range of types and take numerous forms that range from a list of measures, initiatives or strategies, which have a potential to moderate the impact of climate change if they were implemented. The adaptation measures are based on experiences, observation and speculation (Smit & Pilifosova, 2003).

Phase 3: Decision-making

The decision making phase refers to the actors involved in deciding what adaptation measures to implement. Based on previous process e.g. participatory approaches and involvement of stakeholders decisions are made.

Phase 4: Implementation

This phase includes the implementation of strategies, policies and adaptation measures to lessen the adverse impacts of climate change. In climate adaptation multiple actors are often involved in implementing actions after the decisions have been made. This phase describes who has been involved in the implementation of the applicable measures.

2.2 Case studies placed in the Participation Matrix

To provide a qualitative description of the participation in the case studies, draw conclusions and make comparison across the case studies an analysis of all the BASE case studies is given. The participation analysis for the case studies follows the structure below.

a) BASE's role and focus of the case study analysis
b) Time scale of the study

c) Context of the case study
d) Participation Matrix presented
e) Description of “Participation Matrix” (level of participation, phases, actors involved)
f) Experiences

The experiences from the process are described for the case studies where there has not been a deliberate participatory approach present as part of the BASE project. The case studies where this applies will be further analysed in Chapter 4, whereby the experiences will not be analysed in Section 2.2. The analysis starts with the case study where there has not been a deliberate participatory process and concludes with the case studies where there has a participatory process.

2.2.1 Cornwall

The focus of the Cornwall case study is to assess cross-sectoral adaptation strategies to reduce the impacts of climate change in Cornwall. It focuses on local plans for adaptation to climate change and provides an approach to assess the main adverse climate impacts (specifically incidence of skin cancers) on human health. Currently, the UK has adopted a number of public health campaigns specifically aimed at reducing the incidence of skin cancer in the UK. These strategies have been locally adapted and include the ‘SunSmart Cornwall’ campaign.

Climate change may have significant adverse impacts on human health (IPCC 2007). Direct adverse impacts are related to heatwaves, flooding and other extreme weather events (Pall et al. 2011), and these have received the most attention to date (García-Herrera et al. 2010). However, many impacts of climate change on human health will be indirect, i.e. not linked directly to weather events (Kurane 2009). In the UK the main climate related health threats include: summer heatwaves and droughts; flooding and its associated mental health issues (Paranjothy et al. 2011); interactions between air pollutants, pollen and higher temperatures (Cecchi et al. 2010; Laaidi et al. 2011); deterioration in food and water quality (Lobell et al. 2011); increase in vector borne diseases (Jones et al. 2008) and increased exposure to elevated UV irradiance. Different UK regions will experience these impacts to different extents will be required to adapt locally to the new conditions. Cornwall experiences higher levels of UV in comparison to the rest of the country.

Participation Matrix

The *Participation Matrix* for the Cornwall case study shows the level of participation and the actors involved in the following adaptation phases: *decision/initiative to act, development of potential adaptation options* and *decision making.* The level of participation in the case study is characterised as *information* in the ladder of participation as the adaptation options under consideration are public health campaigns associated with delivering information regarding reducing the risk of excessive UV exposure. This is linked to changes in behaviour and the interacting effects of decreased cloud cover, rising temperatures and uncertainty surrounding ozone layer depletion levels and potential increase levels of UV. Currently there are a number of UK-wide public health campaigns aimed at educating and informing the public on how to reduce their individual risk of excessive UV exposure.

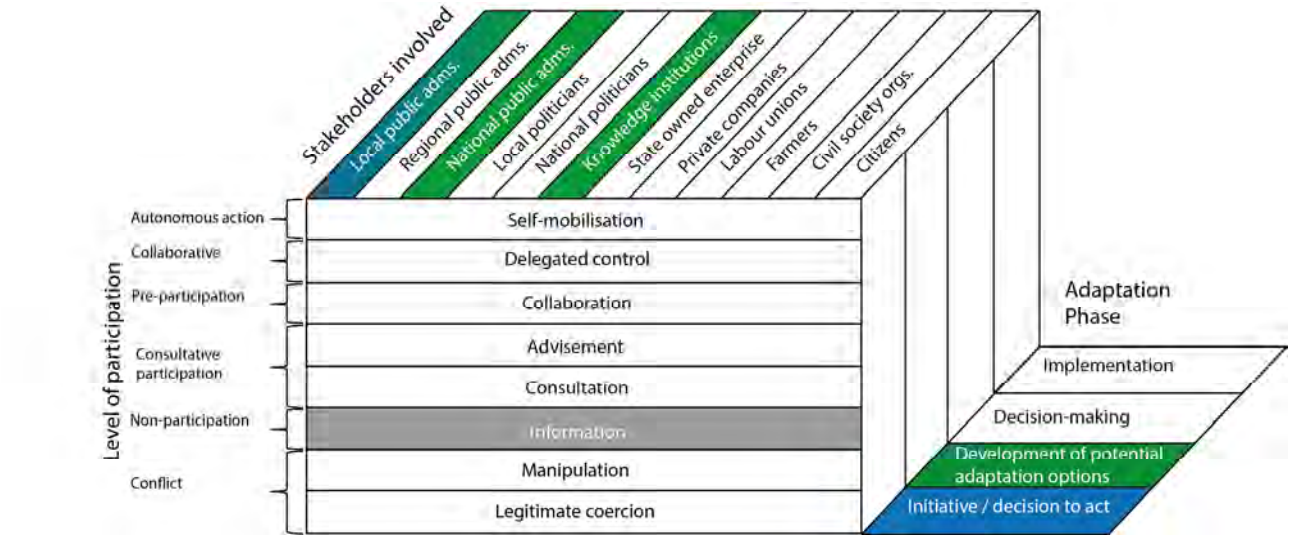

Figure 2: Participation Matrix for the Cornwall case study

Initiative/ Decision to act

The Cornwall Council (*local public administration)* have taken the initiative to local plans for adaptation to climate change. The Cornwall Council is a unitary authority for Cornwall, England, UK and has responsibilities for public health, environment, planning, schools, social services, rubbish collection and highways. The Local Cornwall Health and Wellbeing Board works to improve health and wellbeing, help identify and meet needs across Cornwall and work together to tackle health inequalities.

Development of potential adaptation options

The *local public administration, national public administration* and *knowledge institutions* have been involved in the development of potential adaptation options (green). Participation by individuals in Public Health and the council were informal interactions relating to developing an understanding of the mental health position in the broader climate change impacts on health in general. Engagement with these stakeholders helped the identification of priorities and to identify potential options. These initiatives are employed and/or are applicable at the local level (Cornwall) and include: Met Office UV index; Sunsmart; 'Saving our skins' toolkit; general behaviour change.

No formal participatory process was employed in the preparation of this case study, though they have engaged with Cornwall Council's public health team and Public Health England.

Decision-making and Implementation

The decision-making and implementation phase of for the Cornwall case study is not reached yet as Sunsmart Cornwall is currently running and is hosted by Cornwall Council.

Experiences

There is no specific adaptation strategy in place for the impacts of climate change on mental health. Participation by individuals in Public Health and the council were informal interactions

relating to developing an understanding of the mental health position in the broader climate change impacts on health in general. Engagement with these stakeholders helped the identification of priorities and to identify potential options. Formal participatory methods in a health context are difficult to implement – stakeholder time is valuable and stakeholders change frequently in this sector.

2.2.2 Dartmoor

The focus of the participatory analysis of the Dartmoor case study is an analysis of the Management Plan 2014-2019 'Your Dartmoor' for Dartmoor National Park. The Management Plan 2014-2019 'Your Dartmoor' is the single most important plan for the future of Dartmoor National Park. It is the strategic plan for the national park and is one that will guide decisions affecting Dartmoor's future over the coming five years. Climate change adaptation is not explicitly addressed in this plan, though there are several actions recognizable as addressing climate change.

Dartmoor National Park is an upland located nature conservation area (with several peaks rising up to 600 meters) in the South West of England covering about 954m2. Several ecosystem services are provided by the Dartmoor area. Natural England, an advisory body to the UK government on the natural environment, has recently identified ecosystem services provided by Dartmoor. These include (Natural England, 2014, pp. 13-15):

- Provisioning services such as food provision, water availability and genetic diversity.
- Regulating services such as climate regulation, regulating soil erosion, regulating water quality and regulating water flow.
- Cultural services such as sense of place/inspiration, sense of history, tranquillity, recreation, biodiversity and geodiversity.

Large parts of this upland located area are covered by moors. The substrate of moors is peat, accumulated organic matter. This peat layer absorbs and then slowly releases water from precipitation; functioning as a sponge and naturally protecting the downstream areas from peak run-offs. This peat layer provides a habitat for specific flora and fauna. The landscape of the upland moors of Dartmoor is typically highly appreciated for its recreational value. Under influence of increasing temperature and intensive grazing regimes (by sheep, cattle and ponies), the peat layer of this upland moor National Park is expected to decompose and shrink. When this peat layer becomes thinner it will be less able to hold water. As a consequence - together with events of peak precipitation - chances of flash floods are likely to increase. The peat layer may also decompose when agricultural uses increase in this National Park. Eventually, if these moors would disappear, the habitat and landscape would change. There is a climate change adaption plan developed for this National Park, which the Dartmoor National Park Authority states has been translated into their Management Plan (2014-2019), though they do not want to explain how.

Participation Matrix

The *Participation Matrix* for the Dartmoor case study shows the actors involved in the two first phases of the adaptation process: *initiative/decision to act* and *development of potential adaptation options.* The matrix also visualizes the level of participation for the case study. For the Dartmoor case study the level of participation is characterised as *consultation.*

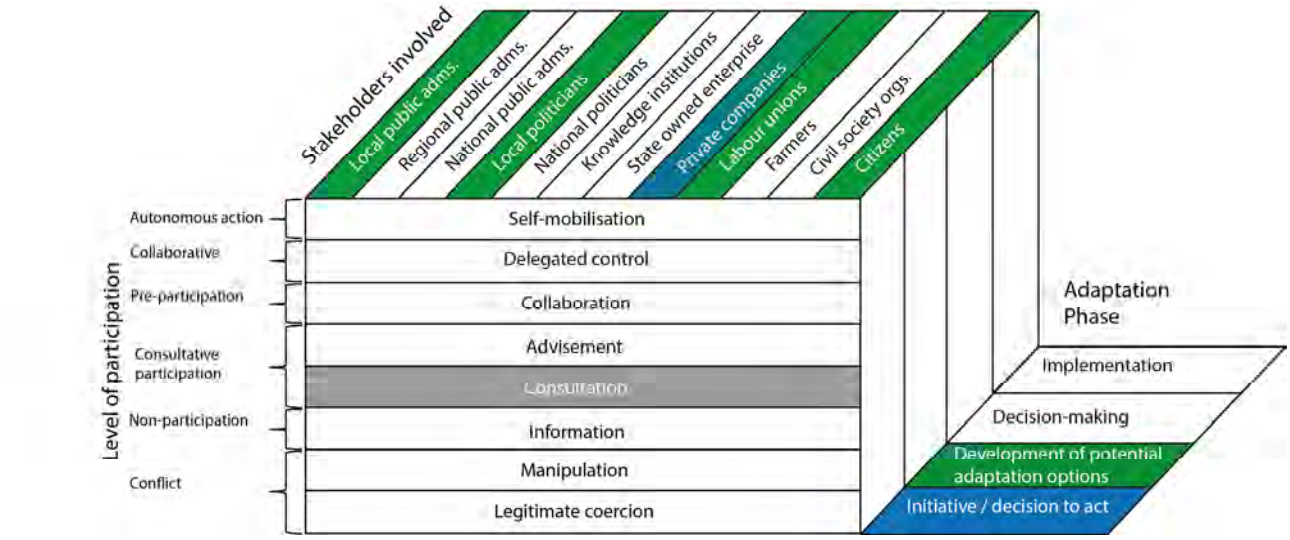

Figure 3: Participation Matrix for the Dartmoor case study

Initiative/ Decision to act

The National Park Authority has taken the initiative to the Management Plan 2014-2019 'Your Dartmoor'. The National Park Authority is classified as a *Private company* as the authority is a special purpose, local, freestanding authority created under the Environment Act 1995.

Development of potential adaptation options

The level of participation in the development of potential adaptation options for the Management Plan can be placed in the *Consultation* phase in the ladder of participation. Over the autumn and winter of 2012, the National Park Authority undertook a wide consultation and engagement process to identify the key issues and challenges facing the National Park over the next five years, and identify actions needed to address these. This included meetings with key partner organisation, a public online questionnaire and a series of three workshops on the three themes of Sustain, Enjoy and Prosper.

The adaptation phase involved participants from the *local public administration*, *local politicians, private companies, labour unions* and *citizens.* The Dartmoor National Park Authority were leaders of the Management Plan, whereby the National Farmers Union, Dartmoor Commoners Council, Duchy of Cornwall, Public official from Devon County Council were involved in the consultation process.

The Dartmoor Commoners Council makes regulations about most matters, which concern the management of the commons and is classified as *local politicians.* Duchy of Cornwall is a private organisation from the Prince of Wales which owns about a third of the land in the park, thereby under the *private company* actor group.

Following on from the initial consultation, the National Park Authority prepared a draft Management Plan, responding to the issues and challenges identified. As partnership working is key to delivering the Management Plan, a period of consultation with key delivery partners was undertaken on the draft action plans during March and April 2013, to ensure that the actions identified were the right ones, and could be delivered.

Public consultation on the draft Management Plan was held from 24 May to 5 July 2013. The consultation was published on the front page of the Dartmoor National Park Authority's website, via Twitter and Facebook and articles in local newspapers.

Decision-making and Implementation

The completion of the management plan is still underway, whereby the *decision-making* and *implementation* phase of the plan has not been reached. The National Park Authority have indicated that some elements are informally already being implemented, as "daily management continues"; though monitoring of their management actions is not yet taking place.

Experiences

Experiences from the participation process in the development of the Management Plan shows that the adaptation strategy could have been more explicitly discussed in the Working Groups for the Management Plan. The working groups could have been better documented; and documentation (agenda and minutes) could have been made available online, the Working Groups could also have been continued during implementation.

2.2.3 Holstebro

The focus of the Holstebro case study is an analysis of the 'Farmer as Water Manager Network', which is a cooperation project which aims to explore the role of agriculture in retaining water in the Storå catchment in order to limit water runoff from land to the water course in times of extreme precipitation. The Farmer as Water Manager is one of 11 projects considered in the Climate Actions Plan of Holstebro Municipality, and involves farmers in Holstebro Municipality as well as in two upstream municipalities as water managers.

The municipal climate adaptation plan was developed i) partly in response to the EU flooding directive (Directive 2007/60/EC), as the municipality was identified, by the Danish Government, as one of the flood risk prone areas according to the directive, ii) partly in response to the national requirement that Danish municipalities develop plans for how to adapt to climate changes. Moreover, the municipality has experienced several significant flooding events in which the center of Holstebro town was flooded. Hence, the Holstebro plan focuses primarily on water management, particularly, how on to prevent and deal with flooding.

Described in the local Climate Action Plan, the 'Farmer as Water Manager project' is a cooperation project which aims to explore the role of agriculture in retaining water in the Storå catchment in order to limit water runoff from land to the water course in times with extreme precipitation. Ideas developed in the network may then be introduced as proposals to political decision makers in the three municipalities along the Storå water course.

The Holstebro Climate Action Plan was adopted by the Holstebro City Council in June 2014 as an addendum to the Municipal Plan which lays out the general direction and guidelines for physical and land use development for a 12 year period. The adoption followed a 3-months public hearing as required by the Danish Planning Act.

Participation Matrix

The *Participation Matrix* for the Holstebro case study visualizes the stakeholders involved and the place on the participation ladder for the adaptation phases regarding the 'Farmer as Water Manager' project. The matrix shows the involved actors in the two first adaptation phases: *initiative/decision to act* and *development of potential adaptation options.* The level of participation is placed in the *collaboration*, *consultation* and *information* steps on the level of participation. A description of the participation and actors involved is given below.

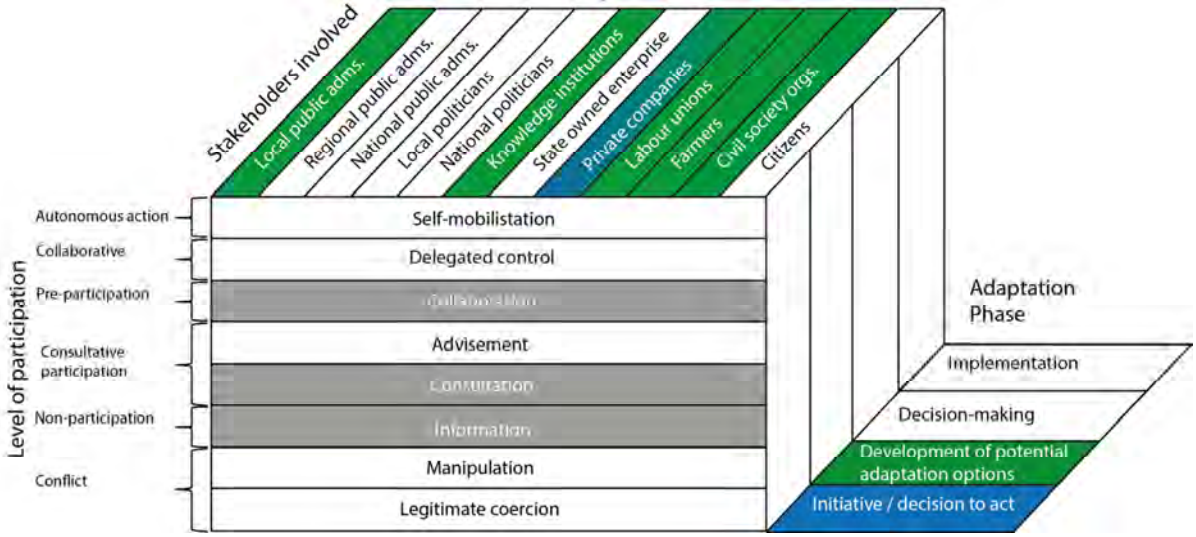

Figure 4: Participation Matrix for the Holstebro case study

Initiative/ Decision to act

The 'Farmer as Water Manager Network' was initiated by the Knowledge Center for Agriculture (now SEGES) which define itself as a consultancy building bridge between science and agriculture in practice, municipalities in selected areas of Jutland, agricultural consultancies, knowledge institutions and another consultancy (private company). Holstebro Municipality is a participant in the network, but SEGES has played the key role in developing the concept of the ´Farmer as Water Manager' as well as organising network activities and participation. SEGES is highlighted with blue, visualizing their role as taking the initiative to act in the first phase.

Development of potential adaptation options

Research Institutions have contributed with knowledge and analyses in the water manager network. These findings have been presented at meeting with stakeholders (e.g. farmers). Engineering consultancies have been contracted to develop proposals and assess consequences of different options. This places *local administrative organisation, private companies, knowledge institutions* in the *collaboration* step on the participation ladder.

The network has organized a number of meetings and workshops, with participation from municipalities, among these the three municipalities located in the Storå catchment, agricultural organizations and other stakeholders and has also involved experts from universities and consultancies. The aim has been to develop ideas, exchange knowledge and experience and to provide a forum for dialogue, but not to decide on or implement any specific projects. Hence, while the project is mentioned in the Holstebro Climate Adaptation plan and while it has explored project ideas for the Storå catchment no specific proposals have been developed yet. As for the process, the many meetings and workshops indicate a rather participatory approach, particularly as regards

private organizations, knowledge institutions and municipalities. But also nature and recreational organizations and farmers have been invited to presentations of the project ideas (civil society organisations). But the attention is only now beginning to turn to individual farmers with land in the Storå catchment, who may actually be affected by the project.

The Municipality of Holstebro have been involved in developing the project by participating in meeting and workshops and by including the idea in the Holstebro Climate Action Plan. Agricultural organisations have been part of the network and invited to participate in public meeting and workshops, including the discussion about a dam project. The local chapter of Danish Nature Conservancy were invited to participate in meetings. They also had a representative from the municipality present the project ideas at a chapter annual meeting. Interest organisations such as Fishermen's associations etc. have been invited to meeting in the network (NGO).

This places the "Local Public Administration", in the "Consultation" stage, as they have been involved in stakeholder workshops.

The politicians of Holstebro City Council have participated in a tour of the area and sites for specific projects under consideration. This places the local legislators in the "*Information"* step in the level of collaboration as information about what is being done or planned to be done is provided.

Citizens have not been invited to participate in the development of farmer as water manager measure but they have been Involved through a hearing phase for the local climate adaptation plan. Individual farmers with land adjacent to the water course have not been directly involved in the development of the Climate Action Plan for Holstebro Municipality. However, individual farmers have been presented for the ideas at a meeting with the network (Aarhus University, 2014). Survey results reflect that farmers were relatively negative about the municipal interest in their viewpoint regarding and also indicate that while farmers have heard about the ideas of farmers as water managers they have not participated in discussions or been involved in any other way.

Decision-making and Implementation

At this stage Holstebro has not reached the *decision-making* and *implementation* adaptation phases yet, as no decisions regarding climate adaptation measures are made. The Climate Adaptation Plan has been adopted and politicians are furthermore supposed to adopt the Risk Management Plan during second half of 2015 after a public hearing.

Experiences

The Farmer as Water Manager network/project has helped set an agenda about using farmland as buffers for urban problems, but also to address potential flooding problems in farming areas; moreover, it has helped bring together diverse players around this agenda. This has brought out much knowledge about both opportunities and barriers. The end result, however, may be a conclusion that the barriers seem greater than the opportunities, at least as far as the more decentralized measures. Hence, at this point it appears that the more traditional, centralized solution of building a dam is the more likely measure to be adopted.

2.2.4 Jena

Within the BASE project the role of participation in the development of the urban adaptation strategy is analysed retrospectively. Analysis focuses on the preparatory pilot project as well as the subsequent development of the local adaptation strategy *Jenaer KlimaAnpassungsStrategie – JenKAS.*

Given the city's exposure to current climatic risks, especially floods and heat stress, urban planners and local scientists raised the question how these risks might change over time. In 2005, the first ideas of developing a plan for managing climate change-related impacts were discussed. In 2009, the Department of Urban Development & City Planning (DUDCP) commissioned and financed a pilot study to analyse local climate change impacts, to identify potential adaptation measures, and to better understand the risk perceptions of stakeholders. The 6-months pilot project was carried out from July to December 2009 and financed through local public funds.

On the basis of its results, it was decided to develop the local climate change adaptation strategy JenKAS. The development was initiated as well as steered by the DUDCP. It was implemented from 2010 to 2012 and mainly funded by the Federal Ministry of Traffic, Construction and Urban Development. Due to the strong interest and commitment of the local administration and politicians some local funds have also been provided to support the development of JenKAS. It involved experts from all relevant departments of the city administration and agencies of the federal state of Thuringia, local politicians, scientists and stakeholder groups, e.g. associations and cooperatives.

JenKAS was formally adopted by the City Council in May 2013 and consists of various elements. Its backbone is a handbook on climate sensible urban planning that includes information on current and future climatic conditions and their potential local impacts; information on legal aspects of climate change adaptation; exemplary economic assessments of adaptation options; and best practice examples of successful climate change adaptation in Jena and elsewhere. For each city district, impacts are described in detail and related risks are visualised using a traffic-light labelling system. Recommendations for urban planning in particularly affected areas are presented in form of a map.

The main focus of implementing JenKAS is on mainstreaming climate change adaptation into administrative decision-making, i.e. the consideration of adaptation-related aspects in these processes. DUDCP promotes mainstreaming through various in-house activities. As a consequence of these efforts, a constantly growing number of land development plans refer to JenKAS when making recommendations or substantiating restrictions. It is expected that the results of current research efforts will further promote this uptake. Beyond the actions directed at internal municipal processes, there are several activities addressing local citizens and associations.

Participation Matrix

The *Participation Matrix* for the Jena case study visualises the actors involved in the four adaptation phases: *initiative/decision to act, development of potential adaptation options, decision-making* and *implementation.* In the *development of adaptation options* phase the level of participation level among the participatory actors is placed at the *collaboration stage*. In the *implementation* phase of the adaptation process the participation is placed at the *information stage,* as there is limited involvement. Several activities address citizens and local associations. Still there are relatively few activities, which aim to create civic ownership of the JenKAS strategy, while there is a strong focus on facilitating the use of the information and tools provided by JenKAS within the city administration. With regard to the general public the assignment of the "*information* step" is comprehensible. The main focus of the strategy was always to promote the mainstreaming of the adaptation into urban planning, therefore, the strategy has been published as "Handbook on climate sensible urban planning". Hence, it is not surprising that the multitude of implementation

related activities addresses employees of the city administration in general and urban planners in particular.

The variety of support offers (e.g. trainings, active involvement in the development and implementation of scientific projects aiming at continuously updating and expanding the existing knowledge base) offered to employees of the local public administration can rather be seen as evidence for “consultative participation”.

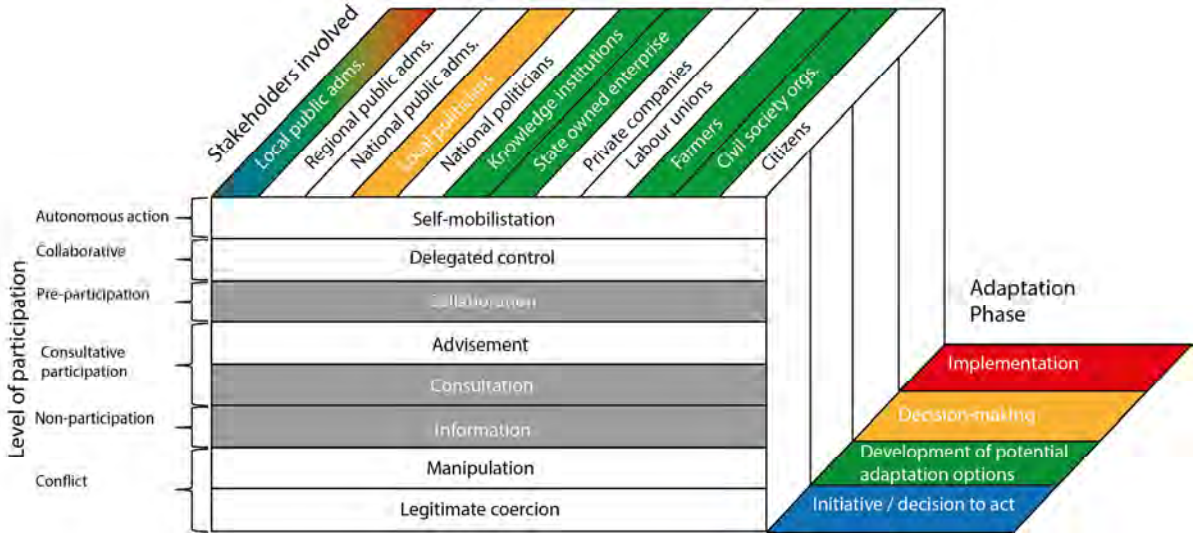

Figure 5: Participation Matrix for the Jena case study

Initiative/ Decision to act

The JenKAS process was initiated by the local public administration. The administrative head of the Department of Urban Development and City Planning (DUDCP) of the city of Jena was the main driving force behind this initiative. He convinced the political head of the DUDCP to pursue a precautionary approach for dealing with climate change-related risks by developing a local climate adaptation strategy. His efforts were in line with those of a senior scientist from the Department of Geography of the local university, where the idea of developing a system to manage urban climate change impacts has been discussed since 2005.

In 2008, the senior scientist proposed to the city administration to develop an integrated climate mitigation and adaptation strategy. The DUDCP and the senior scientist decided to join forces as it was apparent that the administration would not have the expertise to develop an adaptation strategy on their own. The DUDCP prepared a resolution for the development of an urban adaptation strategy, which was adopted by the City council in April 2009. The resolution was the legal basis for a preparatory 6-months pilot project and the subsequent development of the urban climate change adaptation strategy.

Development of potential adaptation options

The development of potential adaptation options for JenKAS took place in the context of the preparatory project as well as in the JenKAS project. The pilot project aimed at establishing an inventory of adaptation measures, which already had been implemented and – considering the entire city – could potentially be implemented in future. The JenKAS project built on this

information, but went a step further developing district and policy field-specific recommendations of adaptation measures to be considered for future urban development and construction projects.

Both projects used thematic workshops grouping stakeholders to provide policy field-specific information and collect inputs. The goal was an intensive participatory exchange with the experts in the particular field. The preparatory project organised three thematic workshops: (1) Construction, traffic, infrastructure, (2) Ecosystems, agriculture, forestry and (3) Energy supply, businesses, industry. The respective workshops in the JenKAS project addressed the following policy fields: (1) Agriculture, forestry, green spaces, environmental protection, (2) Traffic, (3) Urban development, construction and (4) Infrastructure. Preliminary results have been discussed and final results disseminated in follow-up workshops.

In the beginning of the thematic workshops scientists of the Thuringian Institute of Sustainability and Climate protection gave an overview about the status quo and expected changes of various climate-related risks relevant for the respective policy field. Thereafter, stakeholders and representatives of the various departments of the city administration provided inputs regarding a wide array of adaptation-related questions based on a questionnaire sent around before the workshops. Stakeholders requested that the scientists involved in the project should develop a one-page description for each potentially relevant adaptation measure (classification, target group, legal aspects, synergies, conflicts, impacts, costs, time horizon etc.) and provide this information as an input for the next workshop.

Decision-making

JenKAS was adopted as an informal urban planning principle by resolution of the City council (*local politicians)* in May 2013.

Hence, participation in the decision-making process was restricted to members of the City council. However, the resolution has been prepared by the DUDCP and (almost) all relevant stakeholders were invited to participate in the development of JenKAS. One of the motivations of DUDCP to get stakeholders from all relevant fields of action involved (especially in the development of potential adaptation actions) was to create a broad consensus among different stakeholder groups regarding JenKAS. This was considered to be a pivotal requisite not only for the adoption of the strategy by the City council but also for its implementation thereafter.

Implementation

The main focus of implementing JenKAS is on mainstreaming climate change adaptation into administrative decision-making, i.e. the consideration of adaptation-related aspects in these processes. DUDCP promotes mainstreaming through various in-house activities. There is a strong focus on facilitating the use of the information and tools provided by JenKAS within the city administration.

Various stakeholders, primarily representatives of public bodies (*local public administration*), are engaged in research and/or consultancy projects, which aim to validate and expand the existing knowledge base regarding climate change impacts as well as adequate responses. Based on the specific focus of the respective projects relevant stakeholders are invited for participation, if their area of responsibility and/or expertise is affected.

Relatively few activities aim to create civic ownership of the JenKAS strategy. However, there are also several adaptation-enhancing activities addressing the general public, e.g. the annual green façade award and a nature trail with display boards financed by local businesses that provide

information about important aspects of the changing urban climate as well as the local adaptation strategy.

Experiences

Overall about 120 potential adaptation measures were presented to the participants of the four thematic follow-up workshops. Preliminary selections of potential adaptation measures were discussed in detail including practicability and legal aspects. A final selection of adaptation measures to be recommended for consideration in the context of future urban development and construction projects was agreed upon by the participants. These measures have been included in the so-called JELKA database (Jenaer Entscheidungsunterstützung für lokale Klimawandelanpassung - Decision support for local climate adaptation in Jena).

Most stakeholders involved came from various departments in the city administration. The second biggest stakeholder group were representatives of companies owned or run by the municipality, e.g. public transport company, public services, public real estate management and municipal electric utilities. Single stakeholders included people from public authorities of the federal state of Thuringia, academia, agricultural cooperatives and nature protection associations.

The second relevant stakeholder group, which could have been better represented in the JenKAS process, was the allotment gardeners' association. Urban gardeners were invited for the presentation of the JenKAS strategy to the general public. At this occasion they made a statement stressing that there was a gap between the relevance of urban green structures stressed by many presenters and their non-involvement in the process. The main reason for not inviting the urban gardeners to participate in the development of JenKAS was that before the process started there was a fierce debate about the municipality's initiative to search for options to relocate some dozen of allotment gardens to zone these lots residential. The JenKAS steering committee was worried that this particular situation and the allotment gardeners' uncompromising comportment would restrain open debates and the decision-making processes in the workshops. Tone and content of the statement at the final presentation confirmed that this concern was not unfounded.

In the aftermath of the JenKAS project members of the steering committee reflected on whether it would have been possible and created some added value, if citizens were directly involved in the JenKAS process, i.e. not only through civic associations. Based on experiences made at the various JenKAS workshops they came to the conclusion that keeping in mind the primary goal of the JenKAS process, i.e. to develop recommendations to climate-proof urban planning, and the fact that providing the input needed was very challenging even for the experts involved, quite probably this would not have been the case.

2.2.5 Lake Ijsselmeer Region

The case study of Lake IJsselmeer in The Netherlands focuses on the adaptation strategy developed within the Delta Programme. The participatory analysis will focus on the actors involved and level of participation in the adaptation phases in the development of the Delta Programme. The timeline of the analysis is from 2008, which was when the Delta Committee suggested to initiate a new Delta Programme which started in in 2010 and ended in 2014.

The Delta Programme [RvdB1] was created to further advance on the visionary view of the Delta Committee, by executing research and doing strategic planning across the multiple institutions involved in Dutch water management and spatial planning (including the national, regional and local authorities). (See also: Boezeman et al. 2013; Kabat et al. 2009; Verduijn et al. 2012). The interdisciplinary advice was reflected in the way the Delta Program was launched, namely as a joined effort by the relevant national, local and regional authorities (e.g. a national program).

The Delta Programme was set up as a national programme, so by definition, all relevant local and regional governments were actively involved, e.g. the Ministry of Infrastructure and Environment (formerly known as the Ministry of Public Works and Water management), the water boards, the provinces and relevant municipalities. Collaboration took place in so called 'regional processes'. The results of the study can help to implement the adaptation strategies in the Dutch Delta Programme and contributes to the application and development of Adaptive Delta Management, the guiding concept in the Dutch Delta Programme.

Participation Matrix

The *Participation Matrix* for the Lake Ijsselmeer shows the actors involved in the four adaptation phases: *initiative/decision to act, development of potential adaptation options, decision-making* and *implementation.* The level of participation is defined as *collaboration* in the ladder of participation.

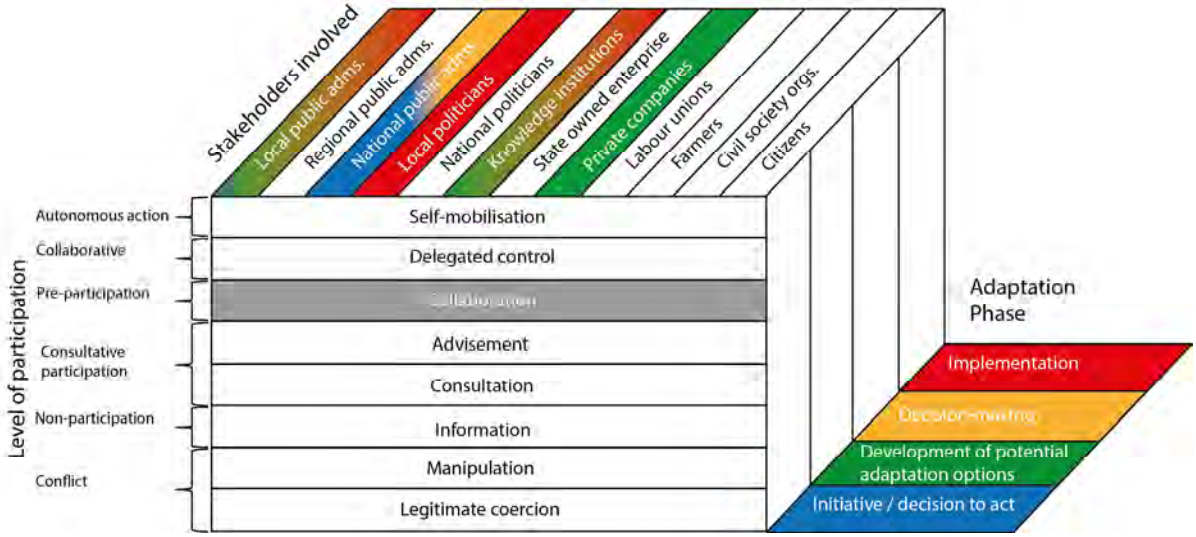

Figure 6: Participation Matrix for the Lake Ijsselmeer case study

Initiative/ Decision to act

The Delta program was originally initiated by the *national public administration* as a result of the delta committee, who in 2008 argued that a new Delta Plan was needed in order to meet the challenges of climate change. That committee involved people (predominantly experts, but some with a political background) with a wide variety of disciplinary background.

Development of potential adaptation options

In the development of the Delta Plan, the committee involved people with a wide variety of disciplinary background including actors from the *local public administration, national public administration, local politicians, knowledge institutions* and *private companies (*green areas in the *Participation Matrix)*. A large participatory process involving stakeholders, interested citizens, experts and officials in collecting different perspectives and visions on the development of the Netherlands regarding water in a broad sense was initiated. Their advice resulted in the parliamentary acceptation of their recommendations to install the Delta Programme, with as judicial backbone the Delta Act and a fund to provide for financial resources.

The Delta Programme consisted of four phases. The results of each phase were reported to parliament, together with the planning and budget (in September of each year). The first phase (2011-2012) of the Delta Programme was devoted to the problem analysis based on long term delta scenarios. The second phase (2012) encompassed the development of possible strategies. During the third phase (2013) the most promising strategies were selected and in the fourth phase elaborated further and tuned into one main strategy per sub-programme. These were combined into five so called Delta-decisions and offered to the Dutch parliament in September 2014 (in the report called Delta Programme 2015).

Knowledge institutes such as Deltares, PBL (the Dutch planning institute) and KNMI (the Dutch meteorological institute) played an important role throughout the different phases wherein the development of the delta scenarios (in co-production with user groups) and impact assessments were important aspects. These institutes also played an important role in the identification of solutions and the assessment of proposed strategies and measures, and subsequent refinement by assessing the (im)possibilities and cost-effectiveness of possible strategies. This was done in commission of the various subprograms.

In the IJsselmeer sub-programme, local politicians and officials were involved in a regional collaboration body (called in Dutch: Regionaal Overlegorgaan IJsselmeergebied) and in a smaller Steering group (in Dutch: Bestuurlijk Kernteam IJsselmeergebied). Throughout the process these platforms existed, though its members increased and decreased over time.

Ten important NGO's in the region were clustered into one representative Stakeholder action group representing all their individual stakes concerning fresh water supply, fishery, nature, harbours, and agriculture. This group has been actively involved in the development of the strategy. The main proposal of the strategy – creating more flexibility in the Lake's water level – was a long lasting wish in this group.

Aside these platforms, there have been a number of so-called Area Sessions. In these sessions, citizens were asked to discuss the results and strategies and reflect on the process ahead.

Decision-making

The results, the adaptation strategies and the regional process in the Delta Programme were all done as policy preparations for the five Delta decisions that were offered to Dutch Parliament in 2014. Parliament agreed and the five Delta decisions were laid down in an official management contract between the Ministry of Infrastructure and Environment, The Interprovincial platform, the Union of water boards and the United Municipalities. These five delta decisions are, however, general guidelines. Local and regional measures and implications are the responsibility of the local and regional democratic and legitimate authorities.

Implementation

The *local public administration, local politicians* and *knowledge institutions* have been involved in implementing the Delta Plan (red areas in the *Participation Matrix*). After January 2015, various regional and local governments have started to begin with the implementation of the five Delta decisions. With regard to the Ijsselmeer region, most of parties are intent on keeping the different discussion and participation platforms alive. They understand they need to keep communicating on a regular basis in order to implement the strategies successfully. The steering board of local politicians will actively participate and discuss all matters relating to the implementation of the strategy and concrete measures. Next to the steering board, a wider 'community of practice' will be invited for a coming-together twice a year to discuss implementation matters. Also experts will

remain to be involved on the same basis as they did in the earlier phases: by means of commissioning for specific projects on regional or local scale.

Experiences

At the level of the Delta Programme as a whole, participation was key. From the onset on, the Delta Programme was designed as a joined programme of the relevant authorities: Ministry Infrastructure and Environment, Ministry of Public Works and water management, the water boards, provincial authorities and municipalities. In addition knowledge institutes and universities were involved as well as private companies, predominantly consultants. All these organisations have more or less co-created the adaptation strategies. Important was the Delta Commissioner and his coordinating staff who supervised and supported the process and also securing deadlines, which resulted in a clear organisational structure and tempo.

At the level of the sub-programme IJsselmeer-region, participation was also very important. All the relevant provinces, water boards and a selection of municipalities were involved. Ten prominent stakeholders in the Ijsselmeer region have been actively involved in the development of the adopted strategy. Citizens were involved in so-called Area-sessions, in which they were asked to discuss and reflect on the results. Also experts were involved and played an important role.

At the level of our own activities, the influence was only marginal. Up to now, only two focus groups have been held (the third is upcoming). Hence, our influence has been very small. We did however contributed to the awareness of uncertainty and adaptive delta management as an approach to deal with that.

If we had been involved from the start to end, we could have designed a series of focus groups covering relevant topics concerning strategy development and implementation under uncertainty.

2.2.6 Lolland

The focus of the Lolland case study is an analysis of the climate adaptation activities in the municipality and farmers' response to the activities. The analysis below focuses on the participation in the climate adaptation project for the Rødby Fjord catchment area.

In 2011, Lolland experienced extensive flooding problems due to extreme precipitation. The causes of the extensive flooding problems were perceived differently between the stakeholders. The perceptions included lack of maintenance of the water course, too little rainwater pumping to the sea, too much run-off from the cities etc. In general, farmers were unsatisfied with the municipality's role - they felt the municipality were inactive in solving the flooding problems.

In 2012, a climate adaption project started for the Rødby Fjord catchment area, which was one of the hardest struck areas in the 2011 flooding, involving several stakeholders and partly funded by the Ministry of the Environment. The project focused on developing a hydraulic model, which can assess flooding risk and can be considered a decision tool supporting the development of the local climate adaptation plan. The project ended in February 2014, with the desired end product – a hydraulic model which has given the project participants a common knowledge which they can use in assessing whether different climate adaptation measures are appropriate to solve the flooding problem.

Participation Matrix

The Participatory Matrix for the Lolland case study visualizes the stakeholders involved in the adaptation phases and the case study´s place on the participation ladder. The stakeholders who have taken the initiative/decision to act are highlighted with a blue colour and the stakeholders involved in developing potential adaptation options are highlighted with a green colour. The level of participation involved in the Rødby Fjord project is characterised as *collaboration.* A description of the involved stakeholders and level of participation is given below.

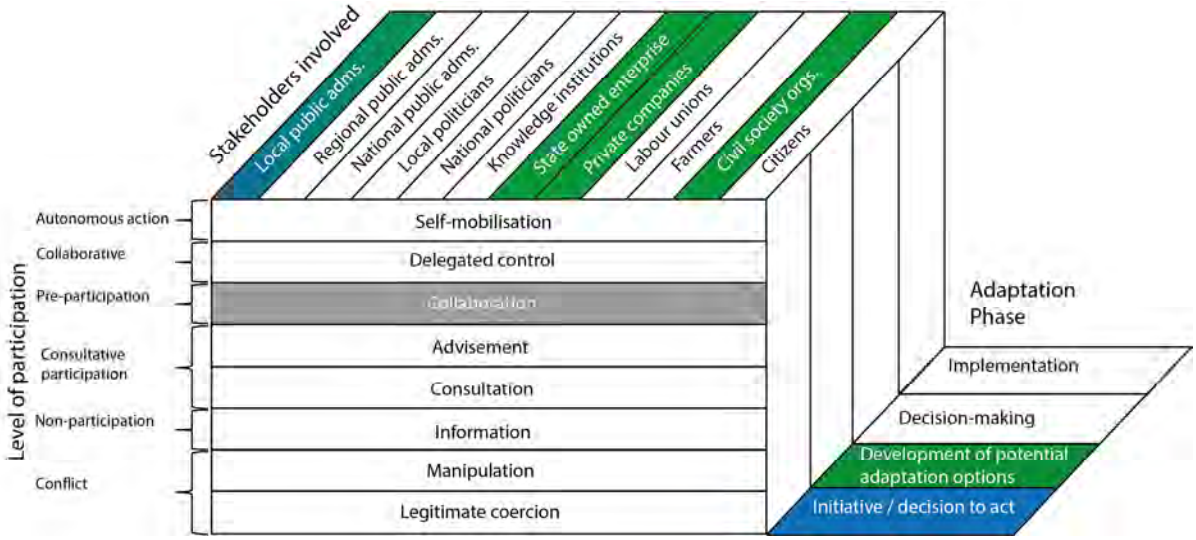

Figure 7: Participation Matrix for the Lolland case study

Initiative/ Decision to act

The local public administration has taken the initiative to act regarding the climate adaptation project for the Rødby Fjord catchment area. In 2012, Lolland Municipality took the initiate to start the project for the Rødby Fjord catchment area due to pressure from farmer representatives, who were unsatisfied with the municipality's asserted inactiveness after the 2011 flooding. The Rødby Fjord catchment area was one of the hardest struck areas in the 2011 flooding. The project focused on developing a hydraulic model, which can assess flooding risk and can be considered a decision tool for supporting the development of the local climate adaptation plan.

Development of potential adaptation options

The development of the hydraulic model in the Rødby Fjord Project have involved the local public administration, a single farmer, a state-owned enterprise (the water supply), private companies (agricultural consultancy and two other consultancies), and civil society organisations (representing the land reclamation guild and holiday home owners). The involved stakeholders in this phase are highlighted with green in the Participation Matrix. The involvement of these stakeholders can be placed in the *"Collaboration"* step in the ladder of participation. The local public administration has involved stakeholders in the Rødby Fjord Project through a project group, where they have provided with feedback to the municipality to be heard by the decision maker, which in this case will be Lolland Municipality.

Farmer representatives have been deeply involved in developing the hydraulic model for Rødby Fjord. The Rødby Fjord project has also involved holiday home owner representatives, the land reclamation guild (running Northern Europe's largest pumping station in the area), representatives

from the water supply, the municipality and two external consultants (one involved in the modelling and one involved in facilitating the cooperation process through a stakeholder analysis). When the Rødby Fjord project ended, the results were presented at a public meeting which were attended by approximately 75 persons – including representatives from environmental NGO's.

Environmental NGO's were not represented in the Rødby Fjord project group; this was an intentional decision made by the municipality based on the expectation that it would be impossible to have a productive debate if all stakeholders were involved in the group and therefore only included stakeholders with a personal, commercial or economic interest in the area (Interview Lolland Municipality, 2014). According to the municipality, the environmental NGO's were very discontent with this decision – however, the municipality chose to debate climate adaptation with the environmental NGO's in another fora – the local Green Council – with positive outcome according to the municipality (Interview Lolland Municipality, 2014).

Decision-making and Implementation

At this stage Lolland has not reached the decision-making and implementation phases yet, as no decisions regarding climate adaptation are made. The public hearing on the Risk Management Plan ended 7th July 2015. It is expected that Lolland Municipality later in 2015 will send a Climate Adaptation Plan in public hearing.

Experiences

According to the stakeholders the hydraulic model is a very important input to development of future climate adaptation measures in Lolland. The model was constructed in a process involving several different stakeholders and it is very important in making a common knowledge among the stakeholders on how flooding behaves locally. The process gives the stakeholders a common ground/knowledge on how rainwater behaves in the areas.

Representatives from the municipality and the farmers are very happy with the end result – the hydraulic model - and the whole process developing it. It is emphasised by several stakeholders that there is now agreement – a common ground - on how the precipitation behaves during extreme events. It is also emphasised that the project had open minded discussions and all participants got a new knowledge. Finally, there was a realisation that prejudiced opinions on how water behaves were not necessarily correct.

Environmental NGOs were not part of the project, what they were very dissatisfied with. However, the inclusion of a broader group of stakeholders might have hampered the process of developing the model due to more disagreements. From a democratic viewpoint, some might ague that they should have been involved. They got the chance to be involved through the Green Council instead- needless to say, this is not the same as being involved in the main fora though.

2.2.7 Prague

The main aim of the Prague case study is to assess the flooding adaptation capacity of the city and analyse the process of adaptation to climate change in selected key sectors (flood risk management, infrastructure, spatial planning). The participation analysis focuses on the process of development and implementation of flood control system (FCS) after the 2002 flooding. The analysis should help to give an understanding of the activities and processes which were crucial for the whole adaptation system in Prague.

In 2002, Prague experienced severe flooding (500-year flood) with total damage of 24 billion CZK (1 billion EUR). This event was recognized as one of the most expensive weather-related disasters in history of the city with heavy damages on infrastructure, housing and environment. Since this event, Prague Municipality has been developing and implementing flood control measures. Future climate scenarios predict a change in the number and intensity of extreme events, inter alia, increasing the risk of river flooding. However, these measures just as current Czech flood management strategies do not adequately correspond to impacts from future climate change and they seem to be more a reaction to past events than an adaptation to future climate change. A common understanding of need for climate change adaptation is yet to be developed.

At the regional level, Prague City Hall in cooperation with the Povodí Vltavy is responsible for implementation of flood control measures on the Vltava River Prague and small watercourses. Some environmentally oriented organizations and local initiatives of citizens raising suggestions are also involved in the adaptation process. In the case of Prague, the stakeholders involved include Prague City Hall, affected Prague districts, political representation, the Czech Hydrometeorological Institute, Povodí Vltavy - Vltava River Basin and professional firms (eg. Hydrosoft).

Participation Matrix

The *Participation Matrix* for the Prague case study illustrates the actors involved and the level of participation in the four adaptation phases: initiative/*decision to act, development of potential adaptation options, decision-making* and *implementation.* Public participation in spatial planning is missing especially at the regional level, despite the Czech Republic no longer is a communist country. The greater involvement of local stakeholders and citizens is still missing in the adaptation process. The flood adaptation measures are often organised by the state administration without wider public involvement.

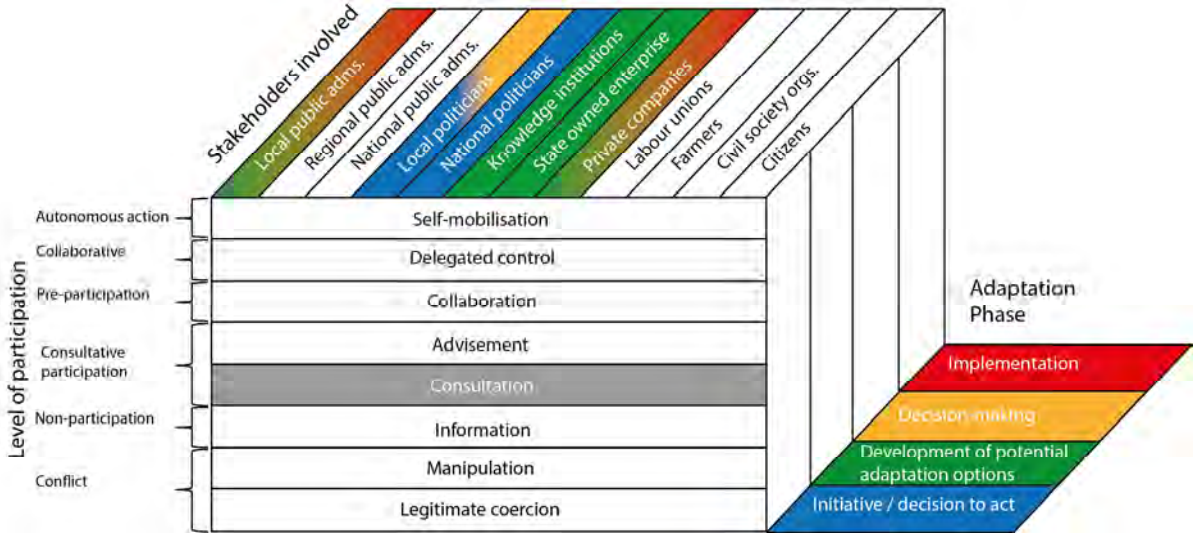

Figure 8: Participation Matrix for the Prague case study

Initiative/ Decision to act

The experience of a series of disastrous floods in a relatively short period of time (eight extreme flood events in the last 16 years) in the Czech Republic has stimulated a greater engagement in climate change adaptation. In particular, the floods in 2002 and later in 2013 may be considered

important landmarks that initiated a profound shift in the perception of climate change among public and triggered changes in approaches to climate change adaptation.

Local and *national politicians* took the initiative to the flood control system after the 2002 flooding. Even though the plans and the first stage of development had already been in place, the 2002 event showed that the dimension was not sufficient to face floods in the 21st century and therefore pushed the politicians to strengthen the resilience level of the city. The safety and crisis management department of the Prague Hall along with the Prague districts affected by the flood risk have also been involved in the initiation process. It was expected to see entrepreneurs and businesses in this phase, especially in order to express their expectations for the extent and location of the flood control system. They, however, did not really express any greater interest .

Development of potential adaptation option

The *local public administration, state owned enterprises*, *private companies* and *knowledge institutions* were responsible for developing potential adaptation options for flood control measures. The safety and crisis management department of the Prague City Hall (*local public organisation)* were responsible for the identification of areas to be protected and find suitable adaptation measures. Even more, Povodí Vltavy, a state company responsible for the administration of Vltava river basin, ecologist, Czech Hydro Meteorological office and expert companies have also been involved in this phase. The level of participation in the development of potential adaptation options can be classified as *consultation* in the ladder of participation with the actors involved in the phase (green areas in the *Participation Matrix).*

Decision making

*Local politician*s have been the main actors of the decision making phase. The decision was based on financial availability (the project was mostly funded by the EU, Prague city hall and national government) and consultancy in previous phases.

Implementation

The implementation of flood control measures has been by *private companies* (expert companies) eg. Hydrosoft and *state owned enterprises*.

Experiences

In the Prague case study, participation did not really influence any of the strategies or measures as there was no intent to create any. They did, however, influence the current flood protection system in Prague. It was local officials and politicians who had the greatest influence, as well as experts. Also, as the historical centre of Prague was involved and affected by the FCS, the preservationists had a great influence in terms of the design of mobile barriers and their exact trajectory.

The participatory process could be improved through enhanced communication between individual actors in spatial planning/adaptation process, which would support discussion and help to raise public awareness.

2.2.8 South Devon Coast

The focus of the South Devon Coast case study is a study of climate change adaptation in the South Devon Coast from Dawlish Warren to Teignmouth. The analysis focuses on understanding and explaining current discussions in relationship to climate change adaptation in the area. The timeframe of the analysis is a study of the current situation (2014-2015) regarding climate adaptation in the case study-area.

A formal climate change adaptation strategy to deal with the issues at the South Devon Coast has so far been absent. In general, the extreme events at the Dawlish coast in February 2014 have shown the situation is poorly adapted to extreme weather events. As far as there have adaptation actions, these have been clearly insufficient to prevent severe disruptions such as severe flood risks and infrastructure disconnections. Adaptation at the South Devon Coast was around the period of February-March 2014 a hot topic of discussion, though not under the heading of climate change adaptation, rather under the discourse of responding to coastal dynamics. Overall, the current discussion mostly focused on advantages and disadvantages of options to reroute the railway, which links the South West of England to London and which currently runs along the cliff base.

Climate change adaptation of the coastal area is addressed in a fragmented way. The current discussion about how to adapt this coastal area to current and expected challenges focuses on adaptation of the railway connection, and does not link it to climate change and flood risk management. Several options to adapt the railway are currently being considered and a decision about it has not yet been made.

The railway line along the coast at Dawlish provides an important infrastructure connection between Cornwall and the west of Devon, and London and the rest of England. It's usual that the railway is closed every year in winter for a short while to repair damages due to high and strong waves, and the discussion of how to adapt this part of the railway has been ongoing for several years and focuses on options of rerouting and/or maintaining the current train line. However, the storms of February 2014 have led to very heavy damage to the railway rendering it unusable, with a 2-months-repair period (until Easter 2014). The vulnerability of this part of the railway has been exposed as the Achilles' heel in the connection between Cornwall and London.

Participation Matrix

The *Participation Matrix* for the South Devon Coast case study only covers the actors involved in the first phase of the adaptation process: *initiative/decision to act.* The following three adaptation phases are not visualised in the figure because everything regarding climate adaptation in the case study area is set on hold. This also applies for the level of participation, as there is no participation involvement occurring regarding climate change adaptation in the case study.

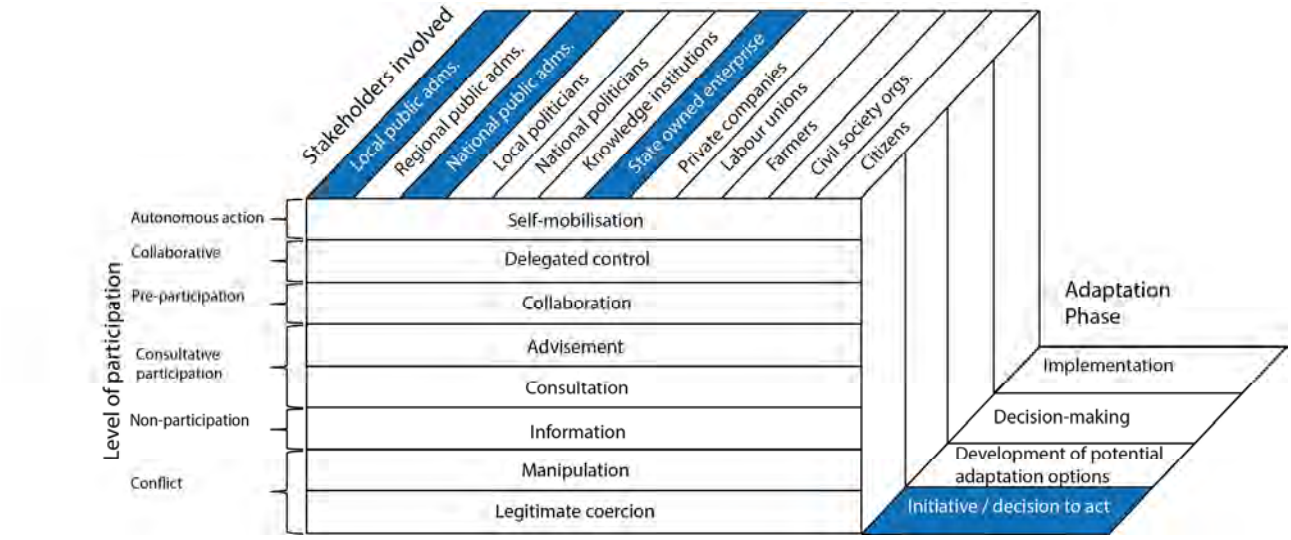

Figure 9: Participation Matrix for the South Devon case study

Initiative/ Decision to act

The initiative/decision to act was in response to the February 2014 storms taken by the local public administration (Teignbridge District Council), national public administration (Environmental Agency) and state owned enterprise (Network Rail). A collaborative process is said to have started in May 2014 between Network Rail, Teignbridge District Council and the Environment Agency, to discuss the future of the area. In addition, businesses from the South West have been pleading with the national government for more pro-active action during the 2nd half of 2014 and beginning of 2015.

Development of potential adaptation options, Decision-making and Implementation

Everything about adaptation in the South Devon Coast case study has been set on hold. Meaning at this stage the case study has not reached the *development of potential adaptation options, decision-making* and *implementation* phases yet.

Experiences

So far, the policymaking process (so that's mostly the Shoreline Management Plan and the internal policy from Network Rail) has turned out to deliver insufficient capacity to deal with heavy storms such as this winter. Apparently, Network Rail did not feel incentive enough to participate in the Shoreline Management Plan process, and did not feel incentive enough to open up their internal policy. However, it is not that a lack of collaboration and lack opening up of the internal policy on behalf of Network Rail can be straightforwardly pinned down as the cause of the failure of the seawall. Rather, there is a mixture of reasons behind this (extreme weather event, national government policy on climate change adaptation not very pro-active, national policy making context on public expenditures on infrastructure).

Network Rail has stated that their intention is to be inclusive and open to a collaborative process on the local level as well as the regional level (the Dawlish railway area also affects cities and areas further west, such as Plymouth and Cornwall). If they can really do that, it would be a great change with regards to the current and previous policymaking context. Let's see whether they can make that true.

2.2.9 South Moravian Region

The focus of the South Moravian case study is related to drought and extreme weather events. The participation analysis of the case study is an analysis of the current adaptation process in the agricultural sector in 2014/2015.

The main climate related risks posing significant hazard for agro-ecosystems investigated in the case study include: (a) extreme weather events (such as storms, short periods of very warm weather in winter, spring frost, flood, heat wave etc.) and (b) water availability and drought.

The South Moravian Region and the Czech Republic does not have a long adaptation history, whereby very few adaptation processes currently exist to support adaptation at the national, regional and local level. Czech Republic does not have approved National Adaptation Strategy. The preparatory process for the Czech National Adaptation Strategy began in 2009. According to the Policy Statement of the latest Czech government, approval of the Strategy is expected in mid-2016. Since the adaptation process in the Czech Republic is mostly top-down, the actual implementation of specific adaptation measures depends on the implementation of National Adaptation Strategy. Therefore, the adaptation activity on the regional and local level and specific sectors is limited.

Participation Matrix

The *Participation Matrix* for the Ústí Region case study visualises the actors involved and the level of participation for the adaptation phases: *initiative/decision to act*, *development of potential adaptation options,* and *implementation*. In the case of agriculture, the adaptation actions are rather fragmented and autonomous due to the non-existence of a particular sectoral adaptation strategy. The practices are realized by farmers themselves, and the participation in such an adaptation process can be placed in the *self-mobilisation* stage in the ladder of participation. The practices mainly include measures related to agricultural management practices, water saving measures and insurance.

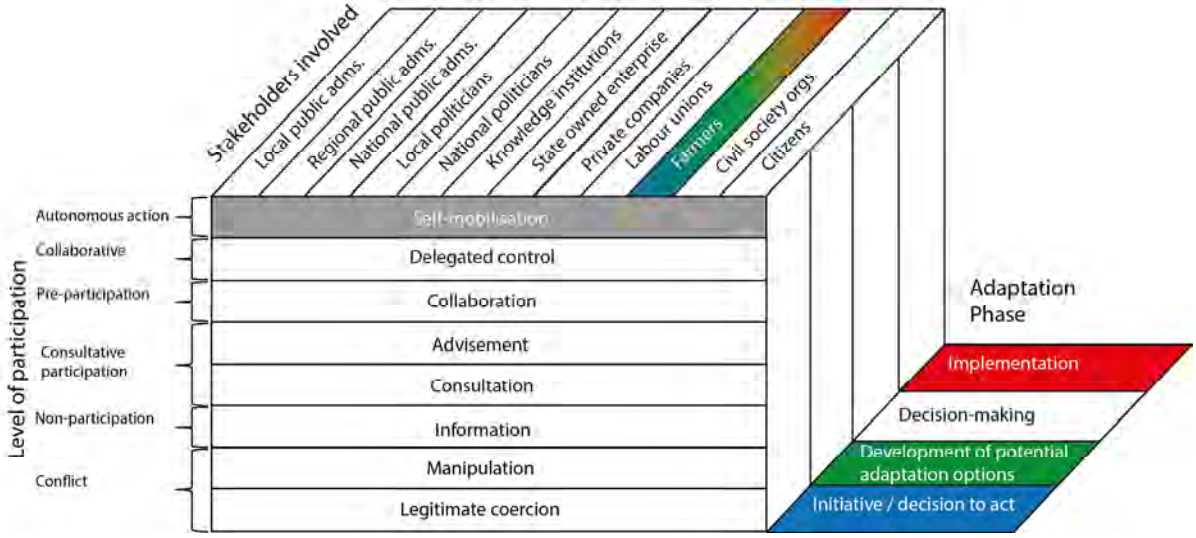

Figure 10: Participation Matrix for the Moravian case study

Initiative/ Decision to act

Farmers have taken the initiative and decision to act, due to the non-existence of a particular sectoral adaptation strategy. The adaptation actions are rather fragmented and autonomous. This phase is visualized by the blue highlighted areas in the Participation Matrix. In case of integrated vine production, agro-envi-climate measures that are part of new agricultural policy of Rural Development Programme can support the adaptation.

Development of potential adaptation options

The case study involves autonomous adaptation measures undertaken by farmers. This is classified as self-mobilisation in the ladder of participation in the Participation Matrix (green). Based on the survey among 29 respondents farming mainly in organic (33.3%) and integrated vine production (59.3%) in the Czech Republic, measures to increase water retention (such as, infiltration zones, buffer strips, hedges, terracing) were highly preferred, 93% of respondents perceived these measures as important. Majority of respondents also support shift in timing of agricultural practices, pest management and change in irrigation practices.

Decision Making

The decision making in the adaptation process is not assessed in the scope of the analysis as there is currently no local, regional or national adaptation strategy. Decision-making regarding climate policy and adaptation has top-down approach. Recently, the risk of drought and water availability in context of changing climate and impacts on agriculture as well as other sectors is to some extent becoming part of political agenda.

Implementation

The implementation of adaptation measures in the South Moravian case study has been taken by farmers. The level of participation in the implementation of adaptation measures is placed in the *self-mobilisation* level in the ladder of participation.

However, in case of integrated vine production, new agro-envi-climate measures (AEKO) are currently in place under Czech agricultural policy of Rural Development Programme. AEKO consists of variety of measures that aims to support farmers to protect and improve environment of farmland. The agro-envi-climate measures for integrated vine production are mainly focused on pest management, but also include measures, such as lighting of vine bushes, grassing of vine inter-row with set of certified seed mixture.

Although, adaptation measures against drought, increasing landscape water retention that are of major importance in the context of changing climate, are not included.

Experiences

The adaptation policy in the Czech Republic has rather top-down approach. Therefore, approval of the National Adaptation Strategy is needed in order to mainstream adaptation into other sectoral policies, such as agriculture and initiate official participatory process to develop sectoral, regional adaptation policies.

However, problems related to climate change impacts, such as drought and water availability are gaining increasing political attention and support. In July 2015, the government of the Czech

Republic approved document of “Preparation for the implementation of measures to mitigate the negative effects of drought and water scarcity". This policy document takes into account climate change projections and deals with the risk of drought, water availability and flood risk in long term perspective. The drought management plans should in the future become part of the legislation. In this phase measures and procedures that need to be implemented are proposed, on general basis these include:

- Drought monitoring and information (e.g. drought risk classification of CZ, drought and water availability monitoring)
- Legislative changes (e.g. drought management plan)
- Organizational measures (e.g. management of current reservoirs, irrigation efficiency)
- Economic measures (e.g. set up of water pricing tools)
- Technical measures (e.g. support to construction of new reservoirs)
- Environmental measures (e.g. ecosystem-based measures)

2.2.10 Timmendorfer Strand

The Timmendorfer Strand case study is an analysis of the coastal defence process in Timmendorfer Strand extending from 1999 to 2011. Prior to BASE, the first discussion about an integrated flood protection concept for the community of Timmendorfer Strand started in 1999. It was agreed that the concept should be accepted by all involved stakeholder. Therefore, analyses of various social and economic parameters were performed. With these data and scientific principles, an innovative method for active public participation (the so-called sensitivity analysis) was applied. The results of this participatory process were used as a basis for a design competition among selected consultants. These three steps (valuation, sensitivity analysis and the competition of ideas) were used for the first time in a participatory ICZM-process. The completion of the project was in 2011 with a total cost of around € 30 million. The focus of the Timmendorfer case study is on a retrospective analysis of the participation approach present in the integrated flood protection concept.

The municipality of Timmendorfer Strand is a German coastal municipality and seaside resort located in the district of Ostholstein, in the state of Schleswig-Holstein. It is located in the interior of the Bay of Lübeck in the Baltic Sea, roughly 15 km north of the city of Lübeck 70 km northeast of Hamburg. The community is located in lowlands and has around 9000 inhabitants. Tourism is the main economic sector; around 200000 tourists spend their holidays in Timmendorfer Strand with a total of 1.2 million overnight stays.

With respect to climate change, it is mainly threatened from impacts such as sea level rise, storm floods or coastal erosion. From a coastal defence perspective, changes in mean and maximum water levels and sea condition caused by climate change are predominately relevant. Both parameters (water level and sea conditions) are essential basis for the dimensioning of the coastal flood defences.

Participation Matrix

The *Participation Matrix* for Timmendorfer visualizes the actors involved and the level of participation for the adaptation phases: *initiative/decision to act, development of potential adaptation options, decision-making* and *implementation*. The level of participation in the case

study is defined as *collaboration* amongst the involved stakeholders. Below a qualitative description of the actors involved in the adaptation phases and the level of participation is given.

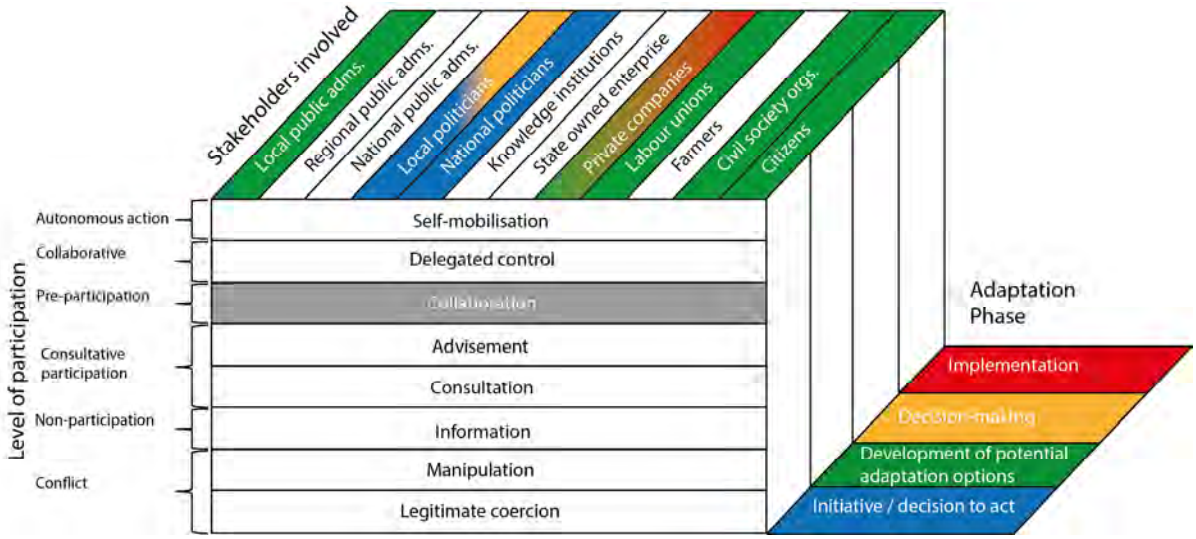

Figure 11: Participation Matrix for the Timmendorfer case study

Initiative/ Decision to act

The implementation of the adaptation measures was initiated by the regional ministry of the federal state, who is responsible for coastal defence in general. Authorities in Germany have the "legal obligation" to protect settled coastlines. The municipality was responsible for flood defence. It is hereby the *local politicians* and *national politicians* who have taken the initiative to act.

Initiated by the Schleswig-Holstein State Ministry for the Rural Areas, State Regional Planning, Agriculture and Tourism (MLR, now MELUR) in 1999, the measure took over 10 years to its finalization in 2011. The existing defence structures were seen "rather critical" (Hofstede & Schernewski, 2005), since it was estimated that a breaching of the spits will occur with a water level of about 2.1 m above MSL. Results from a study undertaken by coastal defence administration showed that the protection in Timmendorfer Strand was not sufficient against future flooding (based on increase of seal level rise in last 100 years, and future projections in the next 100 years by 40-60 cm).

The citizens of Timmendofer Strand were not involved in initiating the participatory process since the initiative to this process came from the authorities (top-down approach). But because of their fears regarding the attractiveness for tourists (tourism is the most important economic sector in the municipality), they had to be convinced, that coastal protection is necessary.

Development of potential adaptation options

In the development of potential adaptation options a participatory process was initiated in planning the coastal defence system. Actors from the *local public administration, private companies, labour unions, civil society organisations* and *citizens* were involved in the process.

Officials from the municipality (local public administration) and the ministry were involved in leading the participatory process. Stakeholders and citizens were involved in the development of adaptation measures. During the participation process different versions of the coastal protection

measure were discussed. For the local stakeholder it was most important that tourists would not feel disturbed by the new coastal defence measure. Therefore a compromise was found between all parties. It included an agreement about the height of the measure, which was lower than proposed by the ministry. Also elements that ensure access (via mobile retention wall that can be put up in case of a flood) and view (via glazed retention walls) to the beach were installed. Where possible the defence measure was integrated into the landscape, so it is not visible at a first glance. These additional measures had to be covered in most parts by the municipality. The actual planning of the measurement was done by landscape architects. The participative process had a strong component of awareness raising and affirmation of proposed coastal defence measures.

In the planning of the coastal defence, nine working groups meetings and two public meetings were held. At the nine working groups or focus groups, more than 50 local stakeholders (from the coastal protection authority, fishermen, tourism representatives, local residents and community authorities) participated. Results from these meetings are published (in German) by Kaul & Reins (2001). Focus of these meetings was the question of how different coastal protection measures would affect the community (system) with the assumption of increasing risks of flooding due to climate change. Thematically these nine meetings were split in two steps. The first step included five meetings, were the 'system' Timmendorfer Strand was defined by the participants. Variables were collected and relationships between these variables were disclosed. The second step, including four meetings, was aimed at specific aspects concerning sustainable solutions in coastal protection measures. For example, it was discussed how flood protection measures affect key variables (elaborated in step 1) in Timmendorfer Strand. As results of this approach, the participants supported the results of the sensitivity analysis and recommended a combination of coastal protection and flood defense measures. They also agreed upon further involvement in the process of the implementation of the coastal defense measure. The coastal defense administration valued this approach very positive, because the participants recognized the long-term risk for the coastal area, they accepted responsibility, and they "evolved from skeptics to advocates of an integrated coastal defense concept" (Hofstede 2001: 5).

Decision making

In the *decision-making* phase The Mayor of Timmendorfer Strand had the final commitment of the project. In the *Participation Matrix* the *local legislators* are highlighted as the decision-makers in the Timmendorfer case study. But with the participatory approach he ensured public support and the close cooperation with the responsible ministry he ensured public funding.

Implementation

Landscape architects were responsible for the implementation of the climate adaptation project. The implementation phase is highlighted in red in the *Participation Matrix,* whereby private companies (landscape architects) is highlighted. The results of this approach were basis of a following ideas competition, where four engineering offices were asked to develop innovative ideas for the coastal defence measure. The execution on site started in 2006 and was finished in 2011.

Experiences

The coastal defence process in Timmendorfer Strand took 15 years of implementation. The process has contributed to the entire town getting involved. Through the participatory process, participants evolved from sceptics to advocates of an integrated coastal defence concept. For example the glazed retention walls or the landscaping works would not have been realized without

the participation of the citizens. The mayor involved the stakeholders and talked to them to convince it is a good idea to pay extra for the dyke to be built and make a solution which fits the purpose and give extra value to the dike. The mayor took political ownership. He encouraged hotel owners and shops to get engaged in the planning process. One way to get people engaged is through cost-benefit analysis, which gives economic incentive to do something. The actual coastal defence was state financed, whereby the town paid extra to raise the value of the dyke in order for it to become a tourist attraction.
Learning from experiences, it has been stated that the low number of participants and the time-consuming procedure were critical aspects during the process (Hofstede & Schernewski 2005). Especially through netter time management this process could be shortened and therefore less resource-consuming.

2.2.11 U.K. Health

The focus of the U.K. Health case study is to assess the cross-sectoral adaptation strategies to reduce the impacts of climate change on mental health in England, UK.

Climate change may have significant adverse impacts on human health (IPCC 2007). Climate change results in climatic variability and will have significant consequences for human and natural systems by increasing the frequency of heat stress, drought and flooding (IPCC, 2014). Direct adverse impacts are related to heatwaves, flooding and other extreme weather events (Pall et al. 2011), and these have received the most attention to date (García-Herrera et al. 2010). However, many impacts of climate change on human health will be indirect, i.e. not linked directly to weather events (Kurane 2009). In the UK the main climate related health threats include: summer heatwaves and droughts; flooding and its associated mental health issues (Paranjothy et al. 2011); interactions between air pollutants, pollen and higher temperatures (Cecchi et al. 2010; Laaidi et al. 2011); deterioration in food and water quality (Lobell et al. 2011); increase in vector borne diseases (Jones et al. 2008). Different UK regions will experience these impacts to different extents will be required to adapt locally to the new conditions.

Currently no specific adaptation process or strategy specifically for mental health are present whereby no participatory methods are used within the case study. Interactions with key stakeholders (NHS, Public Health) were held informally in order to determine if any potential mental health adaptation plan(s) were in progress or planned. Possible actors include: Public Health, NHS, Health & Wellbeing Boards, Cornwall Council - despite being included in significant climate change adaptation reports (i.e. CCRA, CCAP, IPCC), no decisions regarding mental health have been made to date. A *Participation Matrix* for the U.K. Health case study has not been constructed as the data available has not made it possible.

2.2.12 Ústí Region

The focus of the Ústí Region case study is to investigate suitable and sustainable adaptation measures and strategies in the agricultural (particularly hop growing) and water management sector to deal with the changing climate (mainly water availability, extreme weather events), while incorporating perceptions of local stakeholders. Moreover, the participation analysis of the Ústí case study focuses on the adaptation actions in the agricultural sector. The time frame of the case study is the current situation of the adaptation process in 2014/2015.

The Czech Republic does not have an approved National Adaptation Strategy. The preparatory process for the Czech National Adaptation Strategy began in 2009. According to the Policy Statement of the latest Czech government, approval of the Strategy is expected in mid-2016. Since

the adaptation process in the Czech Republic is mostly top-down, the actual implementation of specific adaptation measures depends on the implementation of National Adaptation Strategy. Therefore, the adaptation activity on the regional and local level and specific sectors is limited.

Participation Matrix

The *Participation Matrix* for the Ústí Region case study visualises the actors involved and level of participation for the adaptation phases: *initiative/decision to act* (blue) and *development of potential adaptation options* (green) and *implementation* (red). In the case of agriculture, the adaptation actions are rather fragmented and autonomous due to the non-existence of particular sectoral adaptation strategy. The practices are realized by farmers themselves, and the participation in such an adaptation process can be placed in the *self-mobilisation* stage in the ladder of participation for the *development of adaptation options* and *implementation* adaptation phases. The practices mainly include measures related to agricultural management practices, water saving measures and insurance.

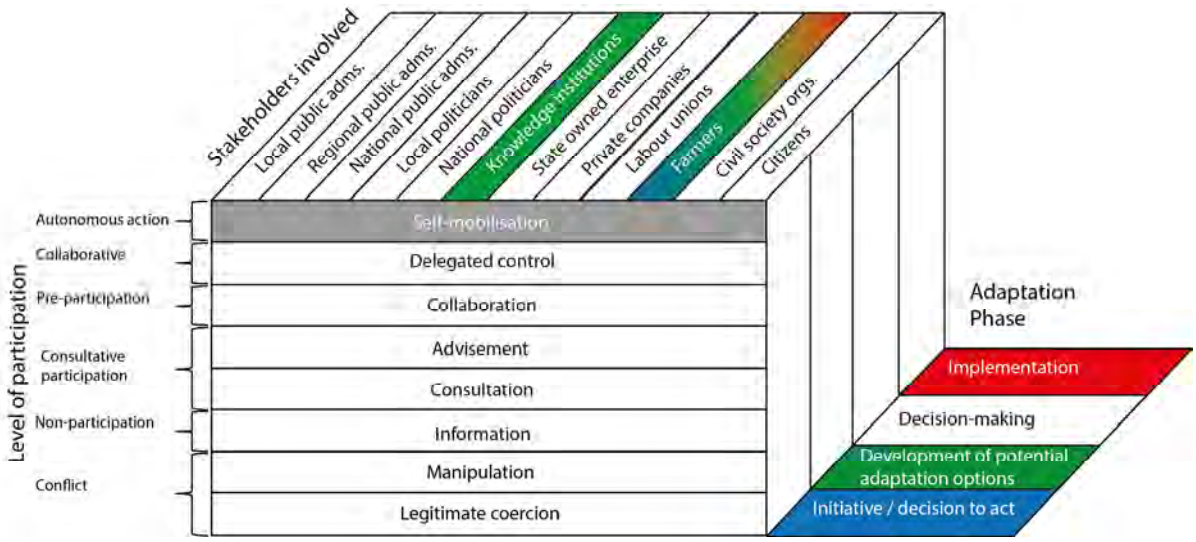

Figure 12: Participation Matrix for the Ústí case study

Initiative/ Decision to act

Farmers have taken the initiative and decision to act, due to the non-existence of particular sectoral adaptation strategy, whereby the adaptation actions are rather fragmented and autonomous. This phase is visualized by the blue highlighted areas in the *Participation Matrix*.

Development of potential adaptation options

The case study involves autonomous adaptation measures undertaken by farmers. This is classified as *self-mobilisation* in the ladder of participation in the *Participation Matrix.* The adaptation measures include:

- Soft measures e.g. Insurance policies

- Agricultural management practices e.g. permanent set aside of arable land, adaptation measures related to changes in planted crop variety, no-tillage technologies, shift in the timing of agricultural activities (time of planting, sowing, treatment etc.)
- Water saving measures e.g. increase of water retention, change in irrigation practice

The Hop Research Institute has been partly involved in breeding more drought resistant varieties of hops. In the *Participation Matrix, knowledge institutions* are highlighted as an actor involved in the *development of adaptation options.*

Decision Making and Implementation

The decision making in the adaptation process is not assessed in the scope of the analysis as there is currently no local, regional or national adaptation strategy. Based on the survey, when asking about responsibility of the stakeholders for initiating steps to protect the farm from potential negative impacts of climate change (e.g. drought, floods, and storms), majority of respondents agree and strongly agree with all of the suggested options, confirming the role of farmers themselves, government, as well as insurance companies. Concerning the proportion, 64% of respondents support the role of the government, 55% also support role of the agricultural insurance, 53% agree with important role of themselves in initiating steps to protect their farm from the potential negative impacts of climate change.

Implementation

The implementation of the adaptation measures in the Ústí case study is initiated by the farmers (red). The level of participation in the implementation of adaptation measures is placed in the *self-mobilisation* level in the ladder of participation. Based on the survey among hop farmers, majority (80%) of farmers are willing to implement management measures to increase water retention in the farming area, 57% would increase the volume of insured areas, and 50% prefer shifts in the timing of agricultural activities.

Experiences

Approval of the National Adaptation Strategy is needed in order to mainstream adaptation into other sectoral policies, such as agriculture and initiate official participatory process to develop sectoral, regional adaptation policies. So far, the adaptation policy has rather top-down approach. Adaptation activities in hop farming sector are currently not substantially supported by sectoral climate change adaptation policy. Barriers to implementation of adaptation measures are often related to ownership of the farmland properties, financial, farming policy constraints, etc.

However, problems related to climate change impacts, such as drought and water availability are gaining increasing political attention and support. In July 2015, the government of the Czech Republic approved document of “Preparation for the implementation of measures to mitigate the negative effects of drought and water scarcity". This policy document takes into account climate change projections and deals with the risk of drought, water availability and flood risk in long term perspective. The drought management plans should in the future become part of the legislation. In this phase measures and procedures that need to be implemented are proposed, on general basis these include:

- Drought monitoring and information (e.g. drought risk classification of CZ, drought and water availability monitoring)
- Legislative changes (e.g. drought management plan)
- Organizational measures (e.g. management of current reservoirs, irrigation efficiency)
- Economic measures (e.g. set up of water pricing tools)
- Technical measures (e.g. support to construction of new reservoirs)
- Environmental measures (e.g. ecosystem-based measures)

2.2.13 Venice

The Venice case study focuses on analysing processes of spontaneous private adaptation measures to adapt their premises and urban structures (pavement levels) and services (alert systems and emergency services) to increasing sea levels.

The experience accumulated in the city in adapting an urban system to rising levels of flooding, albeit not fruit of a homogeneous climate change adaptation plan, is nevertheless anticipating impacts other coastal urban areas might prepare for, and will provide insights into the possibilities and limits of adaptation of urban systems to sea level rising induced by climate change.The principal goal of the case study is to illustrate, and, as far as possible, quantify and assess, spontaneous adaptation efforts in the historic Centre of Venice, which is interested by periodic flooding events, and to detect interactions with public policies and infrastructures provision.

The historic centre of Venice is located in the centre of a coastal lagoon situated at the northwestern edge of the Adriatic sea and directly connected to the sea via three inlets serving as exchange for water between lagoon and sea and as shipping lines. The entire city is exposed to occasional flooding related to exceptionally high tides entering the Lagoon from the Adriatic sea. Due to subsidence, the city of Venice is actually sinking at a rate of approx. 0.05 cm/year (Carbognin et al. 2009), but subsidence during the industrial phase of the city, from the 1930ies until 1971, contributed to a subsidence of 10 cm over the century. Tendencies of subsidence due to anthropogenic causes has been arrested when industrial uses of groundwater have been suspended in the early 70ies of the 20th century. With regards to the eustatic rise of sea levels, Carbognin et al. (2009) observed an increase of mean sea level of 0.12 ± 0.01 cm/year for the period from 1890 – 2007. On this background extreme flooding events created by a combination of meteorological, tidal and oceanographic phenomena are increasingly frequent in the city.

This situation which is only since recently discussed in connection with climate change, has nevertheless generated activities for the safeguarding of the city, implementing a range of hard and soft protection and early warning measures, where elements of preparedness and resilience are in some cases translated into interesting reinterpretation of traditional strategies of “living with the water”.

Participation Matrix

The *Participation Matrix* for the Venice case study encompasses the actors involved in *initiative/decision to act, development of potential adaptation measures* and *implementation* adaptation phases. The *decision-making* phase is not relevant for the Venice case study as the focus is on the autonomous adaptation measures initiated by citizens and businesses. The Venice case study is placed in the *self-mobilisation* step in the level of participation, as the adaptation measures are autonomous.

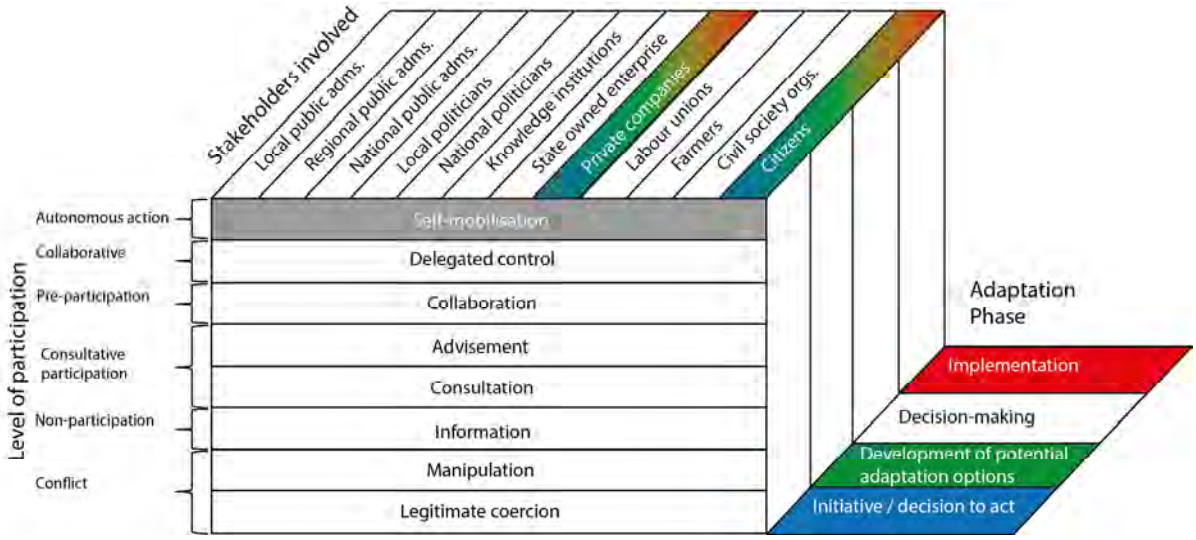

Figure 13: Participation Matrix for the Venice case study

Initiative/ Decision to act

The actors who have taken the initiative/decision to act regarding climate adaptation in the focus of the Venice case study consist of *citizens* and *private companies* who are the owners of buildings.

Development of potential adaptation options

Architects and technicians support privates in the building process, as far as building measures are required. The adaptation measures are autonomous, whereby the phase is placed in the *self-mobilisation* step on the ladder of participation.

Decision making

The decision making phase is not relevant as the case study focuses on spontaneous, private adaptation actions and is based on individual choices. The decisions is made on the basis of individual considerations of costs and benefits. Costs to be considered consist of (a) damages from flooding and salt water intrusion resulting in increased maintenance costs (b) working time required for arranging sensitive objects prior to a flood event and cleaning up after each event; (c) psychological stress from having one's premise invaded by water. The analysis of monetary costs and benefits for existing protection measures suggests that the psychological aspect of costs (stress from flooding) plays a considerable role in explaining investment decisions, as the damages avoided do not justify especially the more costly measures aiming ad dry flood proofing.

Implementation

The measures are implemented by public actors and by citizens in order to protect their premises. Citizens and private businesses organise the reconstruction works, whereby the actors involved in the *implementation* phase include *private companies* and *citizens*. In the level of participation, the actions are considered to be autonomous, whereby the *implementation* phase is placed in the *self-mobilisation* step on the ladder of participation. The decision about the timing of intervention is

eventually dictated by plans for general renovation works, and of transformation of uses of private dwellings (e.g. from family dwelling to touristic dwelling).

Experiences

Experience from citizens who have undertaken renovation works in dwellings situated in Venice shows that the works related to flood proofing consisted essentially in raising floor levels reducing the exposure to flooding, and providing to impermeabilization of walls for reducing damages from salt intrusion. The decision about the level of floor raising was dictated by trade-offs between security levels (against which level of flooding do we want to be protected) and liveability inside a small apartment (how many steps inside the corridor to reach the new floor level) the result was a compromise which substantially raised the security level, without reaching what actually is considered a 1 in 100 years threshold.

Costs of interventions are difficult to be separated from the overall refurbishment of the dwelling, as also other issues had to be addressed including (sanitary installation, heating system etc.). The decision to intervene was surely driven by the aim of increasing flood security, but the intervention was much more comprehensively aiming at improving the living standard.

No public funding was available, as public loans and subventions for flood proofing are now entirely dedicated to the MOSE project.

2.2.14 Alentejo

The Alentejo is Portugal's biggest region, situated between the Tagus River in the North, the Algarve region in the south, the Atlantic Ocean on the west and the Spanish border to the East. It is worldwide recognized by its unique landscape – the 'Montado' sustainable cork oak agroforestry ecosystem - as well as by its beautifull coastline.

Alentejo has a Mediterranean climate and its area is almost all characterized as having a high risk of desertification due to the present quality of soils, land use patterns associated with cereal crops and predicted increase in the frequency of droughts and heavy rainfall, reduced average precipitation and increase in medium and maximum temperatures (Do Rosário, 2004; Ciscar et al. 2011).

The Alentejo case study focused on the adaptation of the agriculture and forestry sectors to climate change and, as a Bottom-Up research project, BASE, through FFCUL, looked at different micro or niche experiences in Alentejo retrospectively and prospectively to identify innovative solutions and approaches for climate change adaptation. At the micro or niche level BASE looked at farmers and their autonomous adaptation but also at communities namely the ecovillage of Tamera with the adaptation measure of Water Retention Landscapes and Aldeia das Amoreiras sustainable village with its approach to increase the adaptive capacity of the population as a whole. Additionally, BASE reached out the regime level, by approaching a wide number of researchers implementing studies related to landscape regeneration in Alentejo, in a "participatory state of the art workshop" to join efforts in a common approach for producing knowledge for decision makers at all levels. The workshop was followed by another workshop in 2014 where farmers and other stakeholders were invited to perform a participatory multi-criteria analysis of 15 adaptation measures to the agriculture and forestry in the region of Alentejo. The measures that were evaluated resulted from both the proposals given in the first workshop and from the data collected from farmers in a set of semi-structured interviews.

Participation Matrix

The *Participation Matrix* for the Alentejo case study needs to take into account the different research objects namely Farmers, Tamera Ecovillage and Convergence Centre at Amoreiras village.

At the farm level the engagement in research was led by the BASE researchers who contacted and inquired about farmers adaptation to climate change. Still farmers had already, in the majority of cases, implemented adaptation measures due to their water needs, for example, even though they hadn't framed their action in this way. The adaptation was self-mobilised despite the fact that in many cases there were subsidies that supported and co-financed the implementation of these measures.

Regarding the Tamera ecovillage, their adaptation process was also self-mobilised eventhough they also framed it in another way, namely fighting desertification or using Permaculture to create water retention landscapes and peace biotopes. Their adaptation measure was already implemented and the process resulted form their self-mobilisation with the collaboration and consulting of other stakeholders.

The analysis of the Amoreiras Village Sustainable Community participation can be characterized as also as self-mobilisation. The study in this community applied an action-research methodology for producing a self-evaluation of projects - the "Systematization of Experiences" (SE) (Mantilla et al. 2010). It is likely that if project BASE had not interacted with this community, the SE would still have been done. This Convergence Centre project at Amoreiras Village has been active since 2006 and participation is a core principle in the group's structure and functioning. Their actions in promoting the adaptive capacity of the village were self mobilized and furthermore they also co-developed and initiated with BASE researchers the Systematization of Experiences to evaluate their work and learn from their past.

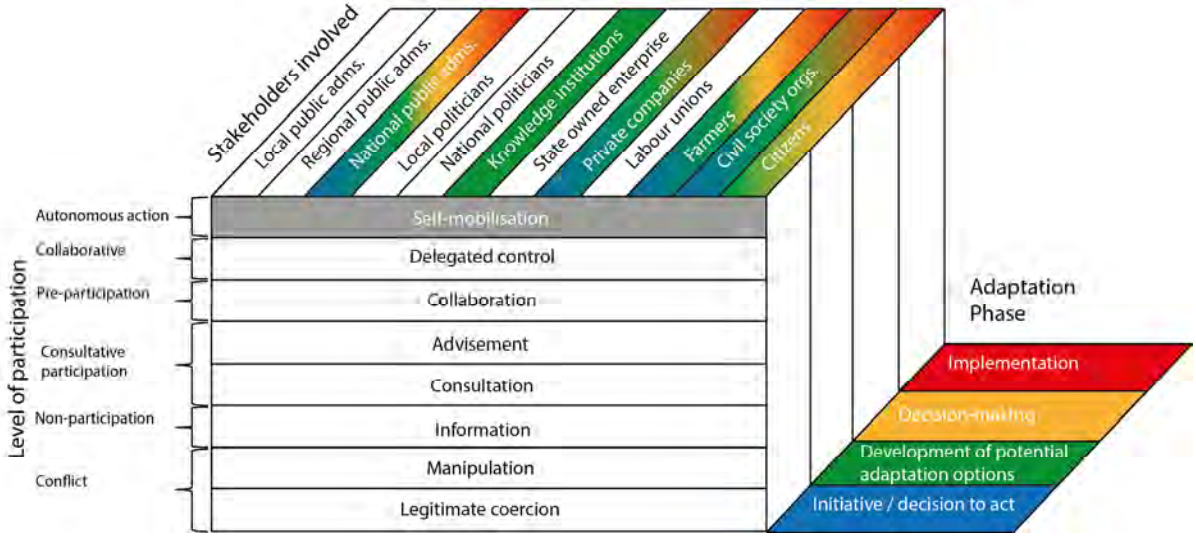

Figure 14: Participation Matrix for the mix of the Alentejo bottom up initiatives of Amoreiras Village, Tamera Ecovillage and interviewed farmers

Initiative/ Decision to act

Like in other case studies and sectors, in the region of Alentejo and in the agriculture sector several adaptation measures are implemented without being specifically designed for adaptation to climate change. These measures are thus mostly considered as autonomous adaptation and are of initiative of local stakeholders. In this case researchers analysed the autonomous adaptation of

farmers, of the community of Tamera, and the village of Aldeia das Amoreiras. At the regional level there is not a strategy for adaptation but only at the national level. A discussion and reflection on the impacts and measures at the regional level was developed in the context of BASE.

Development of potential adaptation options

At the regional level, the adaptation options were developed during the action research process, namely over the two mentioned workshops - Participatory State of the Art and Participatory Multi Criteria Analysis of Adaptation Measures. These workshops benefited from the participation of several universities, research groups and researchers, farmers, private companies, local development and environmental NGOs, a public company responsible for the management of the Alqueva dam and the national agency of environment.

At the farm level, the adaptation options are developed by farmers, who receive information mostly from farmers associations and federations and private consulting companies. These options became known to BASE researchers through a set of semi-structured personal interviews to a representative sample of Alentejo Farmers (i.e. 19 interviews)

At the Tamera community level, the development of potential adaptation options was over the previous decade with the participation of their Tamera residents and several external experts. The main contributor and designer for the adaptation options (i.e. artificial lake system for water retention in the landscape) was an external Permaculture expert and consultant named Sepp Holzer.

At the Amoreiras village level, the objective of study was the increase in adaptive capacity through the work of the Convergence Centre (CCA) and its initiatives in the village namely a project that engaged the population to identify their vision of a sustainable village (dream village) and work in this direction. The development of future actions was done in groups around each dream for the village with the population and the support of the Convergence Centre and other partners. Complementarily, the CCA during nine years of work organized activies, courses and produced publications for the village developing adaptation options and awareness raising of the population.

Decision-making

At the regional level, there are several implemented adaptation measures that have important impacts at the regional scale, namely the Alqueva Dam (the biggest artificial lake in Europe) and financial support for regional development. Decisions at this level are made by different stakeholders in different sectors but are normally coordinated by the Regional Coordination Commission (CCDR – Alentejo). There still are no regional strategies for climate change adaptation in the agriculture and forestry sector in Portugal.

At the farm level, decisions are made by farmers that are frequently also owners of the farm. When farmers and farming companies only rent the farm the interest for long term investments and climate adaptation reduces. Farmers' decisions are mostly determined by the economic feasibility and capacity of investment, which means that given the present economic conjuncture the decision for implementing adaptation options is influenced by public subsidies/ payments/ incentives to the farm/farmer.

At the Tamera community level, decisions are made by a coordination body. The decision to implement a measure for water retention within the frontiers of the Eco Villa's community, did not wait for local/regional approval and permissions. This created some legal issues with the local administration, although the process of licensing has been taking place over the last year.

However, the community's disregard for local dominant rules and structures ultimately simplified decision-making and the implementation of the innovative adaptation measure.

At the Amoreiras village level, a higher level of adaptability and resilience has been intrinsically linked to the participatory process and collective action taking place over the past nine years. Collective action resulted in a set actions directly implemented by the population and its associations but also a set of requests from the population to institutions such as the municipality, the national health system or the regional public enterprise of waste management. Actions that were directly implemented by the population in the follow up of the participatory process include the whitewashing of the village by the population, the improvement of public green spaces, the promotion of adaptation measures in agriculture and forestry, the general disseminating and raising awareness on sustainability and climate change issues, the demonstration of techniques to prevent soil erosion, water efficienty in agriculture, organic farming, new species and crops, diet diversification, documentation of ancient and traditional sustainable farming practices, etc.

Implementation

Altogether, implementation of adaptations in this region is done mostly by the farmers, private and public companies, and local innovators and entrepreneurs. Measures implemented may be highly disarticulated. There is not yet a concerted regional or national action-plan to implement climate change adaptation in Alentejo.

2.2.15 South Aveiro Coast

The South Aveiro Coast case study consists of the development of a vision and strategy for climate change adaption along the coastal stretch of Barra-Areão in the municipalities of Ilhavo and Vagos, in the region of Aveiro. The case study followed a participatory action research approach (McNiff 2013), using a combination of methods, designated as SWAP - Scenario Workshop and Adaptation Pathways. The case study methodology included the use of: scenario workshop, multi-criteria analysis, adaptation pathways and tipping points and cost benefit analysis. The methods result from the different interactive research cycles that have been developed.

Climate Change Adaptation in this region includes the coastal management effort to address coastal erosion but also the already occurring sea level rise. Since coastal erosion and storm surges affect strongly the region, protection actions are considered also adaptation measures and some have been implemented for decades, namely: artificial sand nourishment, construction of groynes and longitudinal rocky revetment, strengthening of dunes, relocalisation of roads, remediation of infrastructures, to name a few.

The region is a 20 km stretch of coast in front of a coastal lagoon in the delta of the River Vouga and is considered a highly vulnerable region to climate change, namely sea level rise and increase in storm surges. The region has previously been researched by other research projects were the potential climate change impacts were modelled and climate change adaptation measures were debated in a participatory process (Fortunato et al. 2013; Schmidt et al., 2014). The main challenge identified for adaptation, apart from the financial resources needed, was the difficulty of articulation between several institutions and stakeholders. Moreover, local social actors had not participated nor been involved in decision-making processes (O'Riordian et al., 2014). Thus, having identified the need for an inter-municipal long-term adaptation plan for the region, in a context where participation was infrequent, BASE researchers opted for proposing facilitating the making of an action-plan until 2100. Different stakeholder groups were contacted (listed in the matrix below) and the project of facilitating the co-creation of a long-term adaptation action-plan for

the region was presented. Stakeholders were interested and collaborated throughout the different stages of planning, implementing and evaluating this action-research cycle.

The Plan would be co-created by local stakeholder representatives through the Scenario Workshop (SW) method. Nevertheless, despite addressing the need for a wider participatory process and for promoting long-term planning, the SW method was not ideal for responding to other research questions which quickly emerged at the exploratory stages of the case study: 1. how to choose between the multiple technical options and variations of the potential adaptation measures to be included in the final action-plan? 2. Moreover, how to integrate future climate uncertainties (e.g. sea level rises) in the planning process? 3. Finally, what are the different secondary effects of these options, and what will be there monetary costs and possible benefits?

To address these questions, the researchers in the BASE project decided to propose the application of a novel combination of methods, which was designated as SWAP - referring to the Scenario Workshop and Adaptation Pathways and Tipping Points (AP) methods, used to support the making of the action-plan. Furthermore, a multicriteria (MCA) analysis and a Cost-Benefit Analysis (CBA) were done.

Participation Matrix

A participatory action-research was developed and initiated by the researchers of BASE in 2013 with the collaboration of local partners and stakeholders. The objective was to develop participated vision and plan for climate adaptation of the coastal area. Even though the initiative of the participatory process was not from a local group or institution, the process was increasingly collaborative and the final result was appropriated by the stakeholders. Regarding the 2013 BASE initiative, a small group of stakeholders was initially contacted to co-develop and co-organise the process of making a participated vision and plan for climate adaptation. Afterwards, a larger group of stakeholders was invited to a consultative participatory activity, the scenario workshop. The process quickly evolved to reach more collaborative stages as some stakeholders started to build on the results obtained in the process, implementing some of the agreed actions. Before the initiative proposed by BASE, different stakeholders had already some active role in the adaptation process. Several non-governmental institutions had taken the space to organise events to raise awareness on the climate change problems and debate possible solutions. The local University was studying impacts and solution administration was supporting coastal defence as much as possible with their own means and the national governmental organisation was implementing the protection measures. The municipalities and the regional inter-municipal community have taken some of the role of fundraising and implementing some measures. It is desirable that the following adaptation process in this region will develop an even more intense delegated control and self-mobilisation action. BASE project could only go as far as promoting the creation of an action-group and empowering local leaderships and different roles of stakeholders. This was done while also facilitating the creation of an adaptation plan for the region and providing needed technical knowledge. The action-group, the local leaderships and the different stakeholders should now continue to lead the adaptation process forward. This places the case study in the *collaboration* stage in the level of participation in Figure 16.

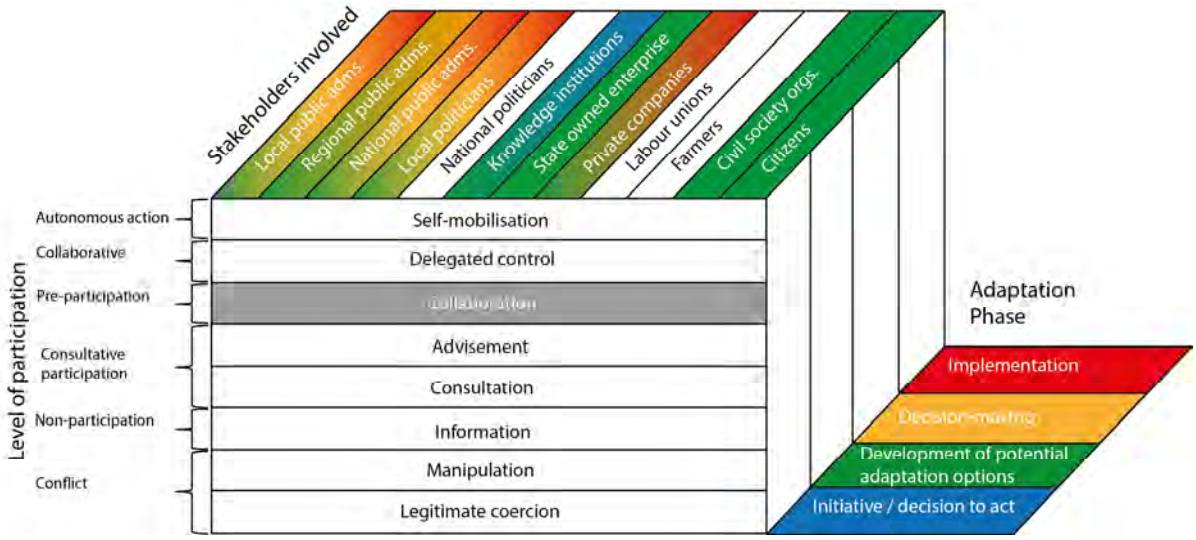

Figure 15: Participation Matrix for the South Aveiro Coast case study

Initiative/ Decision to act

The initiative to act is the national environmental agency's responsibility (Agência Portuguesa do Ambiente). It normally involves the consultation of the regional coordination commission (CCDR - Centro) and the local municipalities (Ilhavo and Vagos). The participatory process that was implemented in 2013-14 during the BASE project was proposed by the BASE research partner (FFCUL) and it involved in the initial group the stakeholders of University of Aveiro, the municipalities of Ilhavo and Vagos, the inter-municipal community for the region of Aveiro (CIRA), the regional coordination commission (CCDR -centro), the administration of the Aveiro Harbour (AAH) and the association of local residents of Barra (AAPB).

Development of potential adaptation options

The development of potential adaptation options is largely the product of a participatory process in the context of an action-research approach. The participants involved throughout this process were: the national environmental agency (Agência Portuguesa do Ambiente); the regional coordination commission (CCDR - Centro); University of Aveiro; the municipalities of Ilhavo and Vagos, the inter-municipal community for the region of Aveiro (CIRA), the administration of the Aveiro Harbour (APA) and the association of local residents of Barra (AAPB); the civil protection and risk management regional entity (CDOS); a national environmental defense NGO (Quercus); a local private tourism company affected (Vagasplash); association of traditional fishing of the region (APARA); local district/ parishes public administrations (Gafanha da Boa Hora; da Encarnação; da Nazaré).

Decision making

Decision is made by the national public administration , namely the national agency for environment (Agência Portuguesa do Ambiente - APA). The decision needs the approval of the local public administrations (municipalities) and regional public administrations (regional coordination commission CCDR).

Implementation

Implementation of adaptation measures is done by private companies contracted to implement and also by the local public administration who also have this capacity. The national public administration is also frequently the contractor and therefore is deeply involved in the implementation.

2.2.16 Cascais

The Cascais case study consists of the revision of the strategic plan for adaptation to climate change in the municipality of Cascais (PECAC). Cascais is a municipality in the region of Lisbon, Portugal that faces the Atlantic coast and host 206.479 inhabitants (2011). It is mostly vulnerable to city floods but also to other impacts such as seal level rise and heat waves.

In 2009/2010 the Cascais Municipality made a strategic plan for climate change adaptation. During the BASE project the adaptation measures and the PECAC adaptation plan were revised in a participatory way. They were analysed through a participatory multi-criteria analysis, a participatory cost-benefit analysis (i.e. participants suggest potential monetary costs and benefits to society)and brainstorms carried out through nine participatory workshops. The results of the participatory approach led to a new prioritization of adaptation measures and the development of a more detailed analysis and plan for a few of these priority measures. The final top priorities were then assessed economically through a cost-effectiveness analysis. All research in this case study was done based on a collaborative framework with municipality representatives, mainly from the Agenda 21 Cabinet.

Participation Matrix

In Cascais, the study also followed an action-research approach. The municipality's Agenda 21 Cabinet was a partner of BASE researchers and a tight collaboration was established from the beginning. All workshops (and later two surveys also developed in this case study), were co-developed with the local partners. In this sense, the Cascais municipality, and in particular the Agenda 21 partner oscillated between collaborative and a self-mobilisation type of engagement. Throughout the two years of action-involvement, there were periods when the municipality led the process forward, requesting BASE research group for new information and data. These requests equally led to new data collection processes, such as the two surveys done (one to the municipality's technical body, the other to local residents). However, there were periods when BASE researchers pushed the process forward. These dynamics have been largely intertwined with the municipalities own political priorities and agendas. For instance, during an internal process of restructuring that resulted in the closing down of the Agenda XXI Cabinet (sustainability matters were re-oriented to another Cabinet), researchers had to maintain a close dialogue and communication in order to keep the productive active engagement. Nevertheless, despite these dynamics, the participatory involvement has been always at the collaborative levels, placing the case study in the *collaboration* stage in the Participation Matrix in Figure 16.

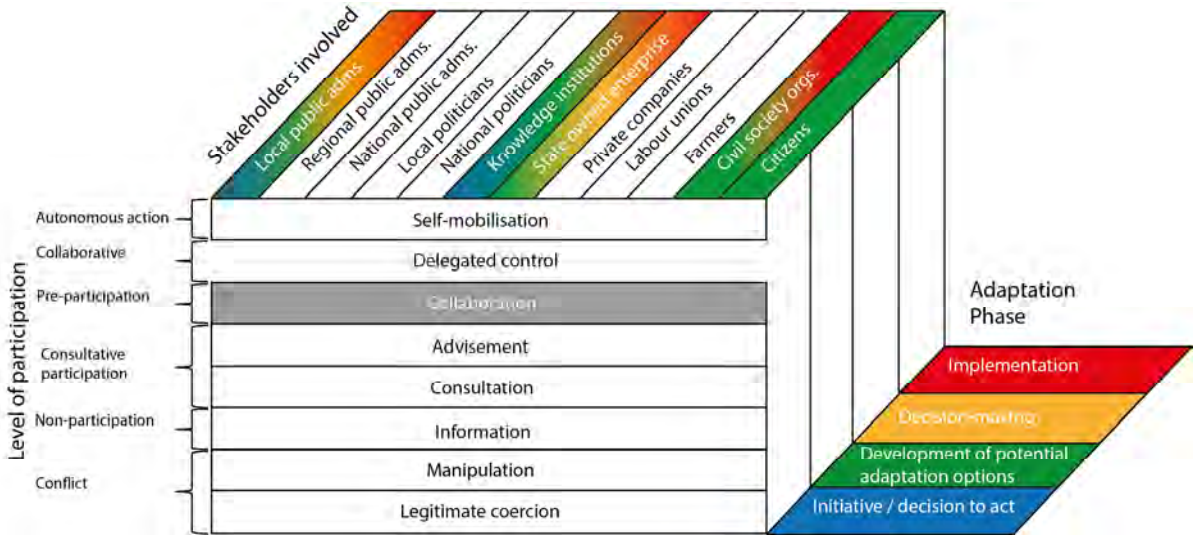

Figure 16: Participation Matrix for the Cascais case study

Initiative/ Decision to act

The revision of the PECAC adaptation plan had a "false start" once the Municipality intended to subcontract a research group to do this work but then failed to have funds for it. Then, was an initiative of FFCUL through the BASE research project. This initiative was fully supported and embraced by the municipality of Cascais, through its Agenda 21.

Development of potential adaptation options

Development of potential adaptations made through an action-research process, co-lead and co-developed by FFCUL and the Cascais municipality. Many stakeholders were involved in this process that aimed to consult their opinion, but also promote the collaboration and empowerment of the different groups and their particular interests in implementing specific options through their own institutions. The stakeholders involved were public companies, schools, civil protection, private companies, local politicians and citizens. In the first participatory workshop every municipality department was present, as well as local police, firemen and Civil Protection. In the sectoral-specific workshops, crucial stakeholders were identified and brought to each workshop, for example, in the Health workshop there were representatives from Cascais' major Hospitals, the Police, Local Residents Association, the school of Medicine and Health; and from the National and Regional Health System . Overall more than 200 people and 30 institutions were involved during the research.

Decision-making

The Decision-making process regarding the implementation of the Adaptation measures was centralized in the Cascais Municipal Director and the Innovation Alderman. Several proposals were brought to the city council Assembly but no budget has been allocated to implementation. Nevertheless, the recommendations and suggestions made during the research were added as an annex to the revision of the Municipal Land Use Plan. According to follow-up interviews done to key municipal representatives who have been developing the adaptation process since its initial stages, have also been involved in the action-research project led by BASE and are municipal

planners who have equally participated in the drafting of the Land Use Plan, this policy integration of the adaptation recommendations has been influenced by the action-research project.

Implementation

Out of the adaptation measures under analysis 53% were considered 'Implemented' or 'In implementation', either by the Municipality or its partners. Following the recommendations from the research, other measures were prioritized, but not yet implemented due to budget constraints in the Municipality. Nevertheless, it is important to mention that due to BASE research some big investments that were foreseen proved not to be cost-effective and were halted , e.g., the water retention gardens (3) initially budgeted at 5M€ were opted out for the renaturing of the RIbeira das Vinhas water stream with only one water retention basin estimated at 1M€.

2.2.17 Copenhagen

The Copenhagen case study is both a retrospective and a prospective case study. In 2012, the Copenhagen Climate Plan was finally approved by the town council. Climate change will result in heavy rain and rising sea level which will affect the city in the near future. The Municipality of Copenhagen divided the climate adaptation plan into two themes: cloudbursts and storm-surge. The adaptation process for the two climate threats has proceeded differently in the municipality. The participatory analysis of the Copenhagen case study is therefore divided into a two: an analysis of the cloudburst adaptation planning and an analysis of the storm surge adaptation planning.

Cloudburst

The planning of cloudburst adaptation has been prioritized, due to two large cloudbursts, which gave the incentive for a Cloudburst Management Plan. DBT, within the BASE research, have studied the participatory processes involved in the planning of cloudburst adaptation.

Participation Matrix

The *Participation Matrix* for the cloudburst adaptation process in Copenhagen shows the actors involved for the four adaptation phases: *initiative/decision to act, development of potential adaptation options, decision-making* and *implementation.* The level of participation in the adaptation process is characterised as *consultation* on the ladder of participation. It is mainly the *local public administration* who has been responsible for formulating the Copenhagen Cloudburst Plan and a consultancy firm (*private company)* have developed the solutions. The involvement of other actor groups in the development of potential adaptation options has been limited to one public hearing and a questionnaire sent out to citizens. It is in the implementation phase, which is still underway, the participation process is anticipated to take place.

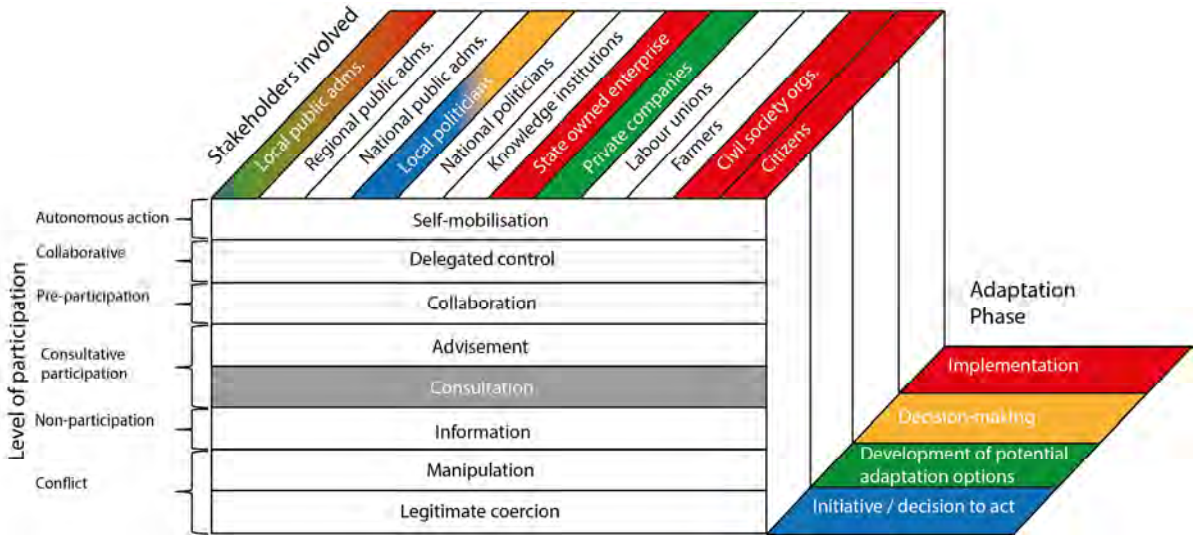

Figure 17: Participation Matrix for the Copenhagen cloudburst case study

Initiative/ Decision to act

Two large cloudbursts in August 2010 and July 2011 causing massive flooding in the city gave political incentive to start the development of the Copenhagen Cloudburst Plan. The events created a pressure for political action on securing the city from future cloudburst and thus sped the adaptation planning and increased the funding.

Development of potential adaptation options

The consultancy firms Rambøll have developed solutions and prioritised 28 defined water catchments.In the beginning of the planning process, 2 citizen hearings were planned to be carried out before Rambøll began developing solutions. Due to time pressure in the decision making process, one hearing was swapped with a questionnaire sent out to citizens. The local public administration have been responsible for formulating the Copenhagen Cloudburst Plan. *(private company, local public administration)*

Decision-making

The Cloudburst Management Plan was approved by the town council in December 2012, where after the Copenhagen Cloudburst Plan was submitted for public hearing. (local politicians, citizen)

Implementation

The water catchments are controlled by 2 project managers from the Municipality of Copenhagen and 2 employees from HOFOR. The Vesterbro/Ladegårdså Water Catchment is one of the first areas to start the process of developing and implementing actions because it is one of the highest prioritised water catchments in Copenhagen Municipality. On the 19th of February 2013, the Municipality and the Local Committee of Vesterbro met to discuss the involvement of citizens in the area. The municipality are interested in the Local Committee of Vesterbro's opinion in regards to a

citizen workshop in order to achieve citizen involvement and for the citizen's to participate and feel a sense of ownership to the adaptation actions being implemented.

Citizens will be involved in the process of choosing which solutions should be implemented. This will take place in a workshop where consultancy firm presents 2-5 possible solutions and the citizens will be able to discuss and give advice on which solution should be implemented.

Experiences

The municipality express the importance of local participation in the adaptation process. The experience is that the more local the focus in the workshops, the more citizens will be interested in attending. In an interview with the head project leader of the Climate Adaptation Plan, he expresses that the citizens need to have a feeling of ownership to the project otherwise the project will be a fiasco. He also says that there is a political wish for citizen participation in climate adaptation in Copenhagen Municipality.

In an another interview with the head of the civil society organisation in the inner city of Copenhagen, he says that citizens have been involved in developing the cloudburst solutions, which are in the process of being implemented, but they have not been involved sufficiently. He expresses that if citizens are presented to the projects they will take ownership to the project but this strategy has been missing in the cloudburst adaption process.

The experiences of the cloudburst adaptation process can partly be explained by time pressure. The development of the Cloudburst Management Plan and the implementation of cloudburst solutions has been under extreme time pressure, due to the two flooding events in 2010 and 2011, and there has been political incentive to start the implementation of cloudburst solutions as fast as possible. This can explain the reason why the level of citizen involvement has not been criticised by the head of the civil society organisation.

Storm-surge

The adaptation planning for storm surge in the city of Copenhagen has only just begun. This has given DBT the possibility to influence the planning process. DBT has in collaboration with the Municipality of Copenhagen initiated a stakeholder involving process to facilitate the discussion of storm-surge adaptation in the City of Copenhagen. The involvement process included the

Participation Matrix

The *Participation Matrix* for the storm-surge adaptation process for the Copenhagen case study shows the level of participation and actors involved for the two adaptation phases: *initiative/decision to act and development of potential adaptation options.* The participatory approach involving stakeholder workshops and a seminar with the Parliament's Environmental Sub-committee places the case study in the *collaboration* level on the ladder of participation.

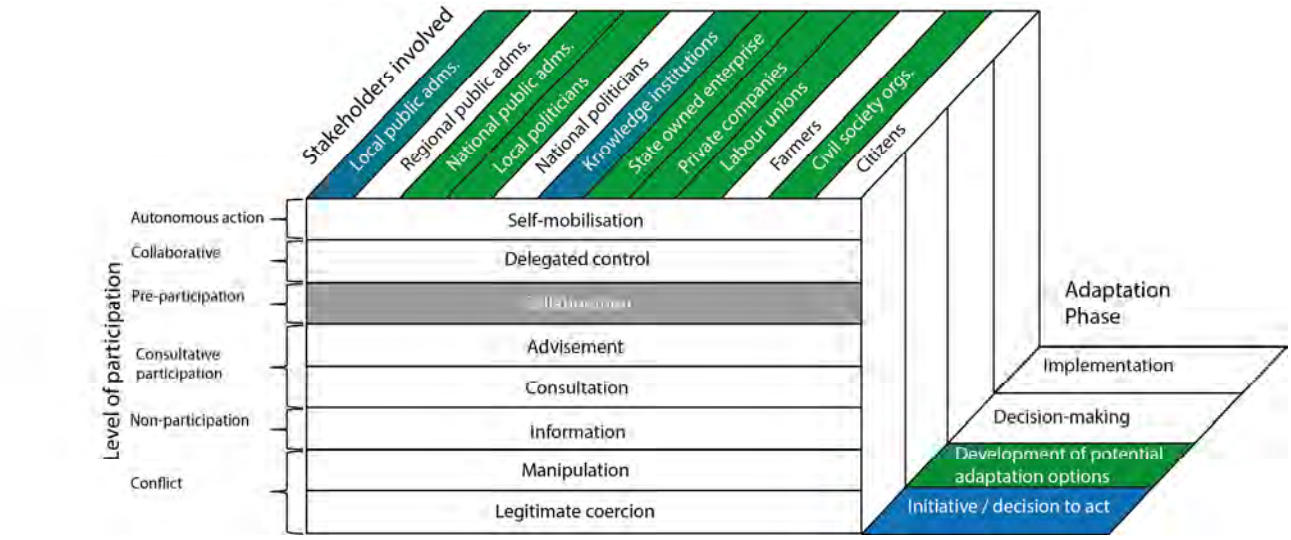

Figure 18: Participation Matrix for the Copenhagen storm-surge case study

Initiative/ Decision to act

DBT (*knowledge institution)* has in collaboration with the Municipality of Copenhagen (*local public administration*) taken the initiative to facilitate the discussion of storm-surge adaptation in the City of Copenhagen.

Development of potential adaptation options

Actors from the *local public administration, national public administration, local politicians, knowledge institutions, state owned enterprises, private companies, labour unions* and *civil society organisations* have been involved in developing potential adaptation options in the storm-surge adaptation planning for the Copenhagen case study. In collaboration with Copenhagen Municipality, DBT has started a 'stakeholder involving process' to facilitate the discussion about financial and legal questions, concrete adaptation solutions and the allocation of responsibility in adaptation Copenhagen to storm surges in the future. DBT has organized 3 stakeholder workshops on climate data, finance and concrete adaptation solutions regarding storm-surge protection in Copenhagen. The participants at the workshops all have an interest in the planning of storm-surge protection in Copenhagen. The stakeholder's position in the local community should reflect their interest in being able to influence the climate adaptation planning. Stakeholders have involved consulting firms, national coastal authority, national meteorological agency and private sector representatives, interest organisations, representatives from the municipality of Copenhagen and neighbouring municipalities, architects, lawyer etc.

The consultancy firm COWI have started investigating possible adaptation solutions regarding storm-surge protection in the city of Copenhagen.

Storm-surge adaptation planning is still in an early phase, which means that citizens have not yet been involved.

Decision-making

The decision-making of storm-surge adaptation planning in the Copenhagen case study is not yet reached.

Implementation

The implementation of storm-surge adaptation measures is not yet reached in the Copenhagen case study.

2.2.18 Green Roof, Šumava Region

The main focus of the Green Roof case study is to analyse the potential impact of climate change adaptation on biodiversity and ecosystem services sector (together with tourism and forestry sector), with the aim to propose integrated adaptation measures that would support climate change adaptation in the region from ecosystem services perspective. The aim is to analyse current adaptation actions, assess potential future impacts, propose adaptation measures and analyse their feasibility. Engagement with local stakeholders and participatory development of adaptive scenarios is integral part of this research.

One of the main aims of the Green Roof case study is to propose several adaptation scenarios for Šumava National Park and evaluate their impacts on local ecosystem service provision up to the year 2050. Since potential ecosystem-based adaptation measures in the study area will encompass land-use/land-cover (LULC) changes, it is vital to assess the actual impact of these measures on the future levels of ecosystem services. The focus of the participatory analysis of the case study is to:

- Build an array of scenario storylines describing potential future development of the area (including anthropogenic and natural driving forces, such as climate change).
- Incorporate potential climate change adaptation measures into the scenarios.
- Assess the level of ecosystem services provided under each complex adaptation scenario.

The Šumava National Park (NP) was established in 1991 owing to its unique natural assets and high conservation importance; however, the area has been protected under different regimes already from the 1960s.

The Šumava NP presents a very complex area, with contrasting interests of a high number of involved stakeholders. Generally, various stakeholder groups fail to reach an agreement on the desirability of different conservation approaches. Therefore, the attempts to find a shared future vision of this valuable area have failed so far. Local communities, local political representatives and other stakeholders have been involved in numerous discussions and media interest in the past two decades. Since they tend to favour rather non-protectionist attitudes (Gorner et al., 2012), the involvement of scientists and researchers in the area has not been particularly welcome.

The main climate threat for the Šumava region involves higher occurrence of extreme weather events (including storms and wind storms) and altered water regime (including temporal and spatial distribution of precipitation and lower average precipitation rates).

Participation Matrix

The *Participation Matrix* for the Green Roof case study shows the level of participation and the actors involved for the two adaptation phases: *initiative/decision to act* and *development of*

potential adaptation options. The case study is places in the *collaboration* phase in the level of participation.

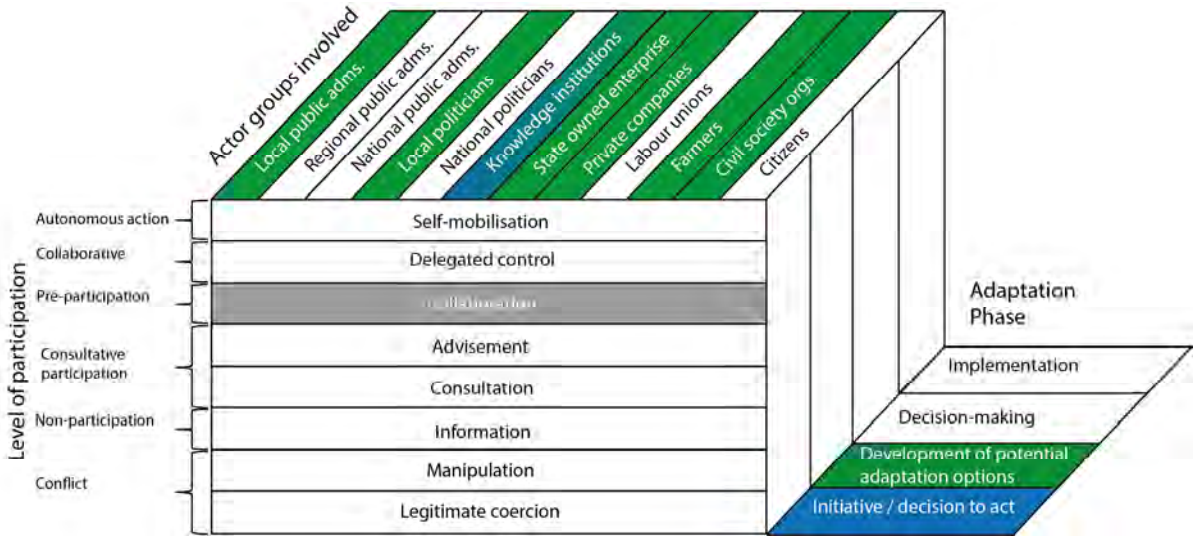

Figure 19: Participation Matrix for the Green Roof in the Šumava Rgion case study

Initiative/ Decision to act

The initiative to develop potential adaptation measures was taken by the *knowledge institution* and BASE partner, CzechGlobe. Since climate change adaptation has not been a mainstream issue in the Czech Republic, there has not been a pronounced adaptation process in the Šumava Mountains so far. Although local stakeholders have confirmed to perceive climate change on the local scale, local initiatives have aimed at climate change only indirectly through other environmental issues so far. Therefore, the initiative arisen from the activities of CzechGlobe within the BASE project has been the first adaptation-related action in the area. Unfortunately, it is not likely that the measures suggested in this case study will be implemented within the BASE project duration. A practical implementation of adaptation measures is a part of a top-down process in the Czech Republic and local stakeholders are usually not able to start an adaptation process of a larger extent. Therefore, the main asset of the participative process was awareness raising and drawing attention to different adaptation possibilities, and all adaptation measures developed within this case study will be potential, to provide the basis for ecosystem services modelling and a cost-benefit analysis.

Development of potential adaptation options

The level of participation is characterised as *collaboration* in the ladder of participation, through the stakeholder workshops (see *Participation Matrix)*. Potential adaptation measures elaborated within this case study are developed by CzechGlobe in collaboration with local stakeholders, participating at scenario workshops.

The theoretical concept of adaptation measures were developed by local stakeholders at adaptation workshops initiated by Czech Globe within the BASE project. Stakeholders in the workshops included actors from: *local public administration, local politicians, research institutions, state owned enterprise, private companies, NGOs* and *farmers.* Specifically the stakeholders involved in the workshop included local agricultural businesses, touristic and recreational infrastructure owners, representatives of the national park and protected landscape area, energy

production and water managers from the municipal authorities, the Regional Development Agency Šumava, researchers from universities and mayors.

Decision-making

For the Green Roof case study the decision-making adaptation phase has not yet been reached. The participative scenario workshop within the Green Roof case study presented the first introduction to the adaptation concept for local mayors. Since most of them agreed they have perceived the impacts of climate change on local environment and communities, it can be expected that an adaptation process will be developed in the study area in the long term. However, it is hard to predict the time frame of such activities, which will probably not start before the approval of National Adaptation Strategy in mid-2016 and will definitely be a part of a top-down process.

Political elections to local authorities took place between the first and the second workshop, which means that at least some members of local municipality councils and some mayors were replaced during autumn 2014. These elections take place regularly every four years but usually do not break the continuity of governance in local villages. Both current and future mayors were invited to the second workshop. However, we do not expect that local authorities would start a practical adaptation process triggered by the scenario workshop immediately, because of the above described reasons. Therefore, we do not think the elections played a major role in the local adaptation process.

Implementation

No implementation process has been present in the case study area. Since the adaptation process in the Czech Republic is mostly top-down, the actual implementation of specific adaptation measures depends on the implementation of National Adaptation Strategy, which is currently in the preparatory process. Therefore, the adaptation activity on the regional and local level is very limited.

2.2.19 Kalajoki River Basin

The focus of the Kalajoki River Basin case study is on comparing alternative management choices and their impacts in the Kalajoki river basin in Western Finland. The case study supports ongoing planning processes (flood risk management and river basin management) and the integration of climate adaptation measures into the plans. The focus of the participatory analysis is a study of the flood risk management planning process. During the BASE project, the flood risk management plan was prepared for the first time according to the floods directive, which gave a great opportunity to influence the participation process.

The timeframe of the case study extends from 2011, with the preliminary flood risk assessment, public hearing and nomination of significant flood risk sites to 2015, with a revision of the Flood Risk Management Plan and the Ministry of Agriculture & Forestry approval of the plan.

The river basin is characterized by large intra-seasonal variations in discharge, resulting in frequent floods and low discharge in dry periods. Ditching and dredging projects in the river basin have fastened the runoff. In addition, flood protection measures, mainly flood embankments, have reduced the natural flood plains. Climate scenarios predict increases in air temperature and precipitation in Finland during the 21st century and these will results in changes in hydrology.

Seasonal changes in discharges in Finland are the most distinct anticipated impacts of climate change.

Participation Matrix

The *Participation Matrix* for the Kalajoki River Basin case study visualizes the actors involved and level of participation for the four adaptation phases; *initiative/decision to act, development of potential adaptation options, decision-making and implementation.* The level of participation in the Kalajoki River Basin case study is placed in *collaboration.*

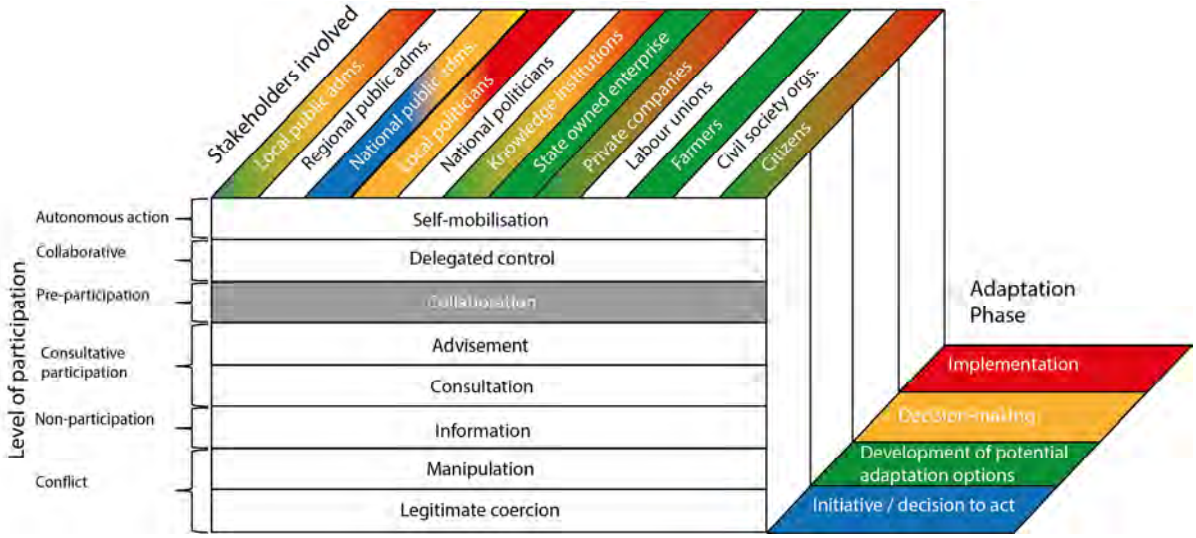

Figure 20: Participation Matrix for the Kalajoki River Basin case study

Initiative/decision to act

The initiative to the flood risk management (implementation of floods directive) was taken by the *national public administration*. The regional flood management group is a statutory body nominated by the Ministry of Agriculture and Forestry, while the official members of the flood management group are authorities (governmental and municipalities). The flood management group is composed of the representatives of the centre for Economic Development, Transport and the Environment (ELY-centres), Regional Council, municipalities and regional rescue services. The Centres for Economic Development, Transport and the Environment come under the administrative branch of the Ministry of Employment and the Economy. il A regional council is the region's statutory joint municipal authority; every local authority must be a member of a regional council. The councils have two main functions laid down by law: 1) regional development and 2) regional land use planning.

In addition, the group can invite external experts to the meetings. The group is set for 6 years, the current one is until end of 2017. The composition of the group is not legally confined.

The main tasks of the flood management group are to:

- Process the studies and documentation prepared for the flood risk management plan;
- Set the objectives for flood risk management;
- Approve the proposal for the plan and the measures included in it.

- Assure adequate interaction between authorities and stakeholders.

Development of potential adaptation measures

The flood risk management planning process in Kalajoki involves actors from the *local public administration, knowledge institutions, private companies, state owned enterprise,* and *farmers* and *citizens.* The level of participation in this phase is characterised as *consultation* on the ladder of participation. The results from stakeholder workshops were used in the developing of potential adaptation options. Whereby knowledge institutions and experts in regional authority (ELY-centre) and SYKE selected the measures to be analysed from regional perspective: evaluation of effects, costs and other consequences. Experts in ELY-centre had a key role in developing alternatives.

Two stakeholder workshops were organized by SYKE in cooperation with the regional water authority in ELY-centre. In the first workshop, potential flood risk management measures were presented. The pros and cons of the measures were discussed in small groups, utilising learning café method. In the second workshop, the results of the assessment were presented and discussed.

Politicians did not have a strong role in this adaptation phase. They only had an indirect influence, depending on how actively the representative of the municipality/county administration representative communicates with the local politicians (this was not investigated, but was not obvious in this case compared to other areas in Finland).

Decision-making

The flood management group is the main decision making body in the Kalajoki River Basin case study. The flood management group made the draft plan and prioritization of the measures based on the results of multi-criteria analysis and stakeholder workshops. The final plan will be approved by Ministry of Agriculture and Forestry (*national public administration*) and their influence on the final plan remains to be seen.

The decision-making of selecting measures in the draft flood risk management plan included following stakeholders: *local public administration, national public administration, local politicians and knowledge institutions*. Also, *other stakeholders* and *citizens had possibilities to influence the decisions.*

The *local politicians* were involved when draft flood risk management plans with proposed measures were published for comments (1/10/2014- 30/3/2015). Statements of the municipality are approved in the politically elected board of the municipality. They also have indirect influence, depending on how active is communication of the representative of the municipality/county with the local politicians (this was not investigated, but was not obvious in this case compared to other areas in Finland).

Experts (*knowledge institutions)* role in evaluation of the feasibility, costs and benefits of the alternatives had a major influence on the decision making. However, no decisions on new investments are made just based on flood risk management plan (general level plan by nature), but the plan gives an incentive for more detailed cost-benefit analysis or investment plans.

The results of the *stakeholder* consultation (workshops) were taken into account when drafting the plan. In final flood risk management plan will state, how the opinions of the stakeholders collected during the planning process have influenced the plan. This involvement places the involved stakeholders in the *consultation* level in the ladder of participation.

Citizens are involved when draft flood risk management plans with proposed measures were published for comments (1/10/2014- 30/3/2015). The public was informed using national and regional press releases and open public event in February 2015. Postal questionnaire to all households in the flood risk area (1320 households) 10/2014 by SYKE in cooperation with the regional water authority (ELY-centre). Issues covered in the survey included: experiences of floods and flood damages; flood risk mapping and flood mitigation measures; flood insurance & self-directed flood protection measures & flood communication. The members of the flood management group were invited to test and comment the questionnaire form. Total no. of responses was 552 with response rate being 41,8 %, can be considered high. The results of the questionnaire and comments from hearing will be taken into account when revising the plan. In final flood risk management plan will state, how the opinions of the citizens have influenced the plan.

Implementation

The actors involved in the implementation of the measures defined in the flood risk management planning include *local public administration, local politicians, private companies*, *knowledge institutions and citizens (landowners and households).* The level of participation in the implementation phase is characterised as *collaboration* in the ladder of participation amongst the involved actors (see red areas in the *Participation Matrix)*. The implementation is shared amongst the involved actors.

Actors responsible for implementing the measures are defined in the flood risk management plan. Local public administration (governmental and municipal) and knowledge institutions are responsible in most of the measures. Private sector, such as water supply and sewerage companies, dam owners or landowners are partly responsible of some measures.

Local politicians have a major role in deciding on how much resource is budgeted to flood risk management. Political boards also decide on land use planning and building permissions.

Municipal officials prepare the decisions for municipal councils.. Municipalities have a major role also in water and energy supply, sewerage and traffic services as well as stormwater management. Municipality officials have a big role on detailed level planning of the measures (land use planning, building, water and energy supply, sewerage and traffic services, stormwater management). Regional administration coordinates, partly finances and monitors implementation. They also have a strong role in dissemination and communication between actors.

Knowledge institutions role is mainly related to research and development. These include measures to develop forecasting and analysing the effects of floods: flood modelling, ice dam modelling, flood warning service etc.

Citizens and other stakeholders (farmers and landowners) have a small role set in the implementation of the plans, but their role can be stronger in practice. Citizens (including land owners) are responsible for protecting their own property. A voluntary home insurance covers losses caused by a flood with a return period of 1/50 or more.

2.2.20 Kalundborg

The focus of the Kalundborg case study is a retrospective analysis of the participatory aspects of the decision making process carried out in the EU-Interreg project 'BaltCICA' the Municipality of Kalundborg was a part of from 2009-2012. The focus of the Kalundborg case study during BASE has been to revisit the Kalundborg in order to make a retrospective view of the different participatory aspects of the decision-making process that was carried out and how these manage

to make their mark on the final adaptation plan. Existing data from the participatory process has been used together with the adaptation plan which consists of 3 elements; the plan itself, a supplement to the general municipal plan (which is an adapted version of the plan itself), and a so called ´action description`, which is a specific list of adaptation measure proposals. This material has been supplemented by focus group interviews with a broad selection of local politicians, officials, stakeholders and citizens who have been involved in the climate adaptation process. The focus group interviews have in a few cases been supplemented with individual interviews.

The BaltCICA project was set out to find ways of dealing with climate change in the Baltic Sea Region. The Kalundborg case study has included a thorough and path-breaking participatory approach with special focus on the experience gained from the different elements in the decision making process and on the interaction between the elements leading up to the climate adaptation plan. A scenario workshop and a citizen summit were participatory methods chosen to build a deliberative decision-making process. The scenario workshop was designed to involve local stakeholders in the development of different possible land use and adaptation measures. The citizen summit was designed to consult ordinary citizens about their views on possible futures, adaptation measures and principles for an adaptation strategy.

The case study area is threatened by future flooding from the sea and heavy precipitation. Low-lying land behind the coastline has delta-like characters which makes the area vulnerable to extreme weather conditions. The summer cottages in the low-lying areas are expected to get most seriously affected by future floods. Altogether, there are 3,036 summer cottages in the area. Some permanent residences, large farmland areas and internationally protected nature areas with meadows, bogs streams and lakes are equally exposed.

Participation Matrix

The *Participation Matrix* for the Kalundborg case study shows the level of participation and the actors involved for the adaption phases: *initiative/decision to act, development of potential adaptation options* and *decision-making.* The participatory including a stakeholder scenario workshop and citizen summit places the Kalundborg case study in the *collaboration* level on the participation ladder (see *Participation Matrix*). The participation process has involved a large group of actors including actors from the *local public administration, local politicians, knowledge institutions, state owned enterprises, private companies, farmers and citizens.*

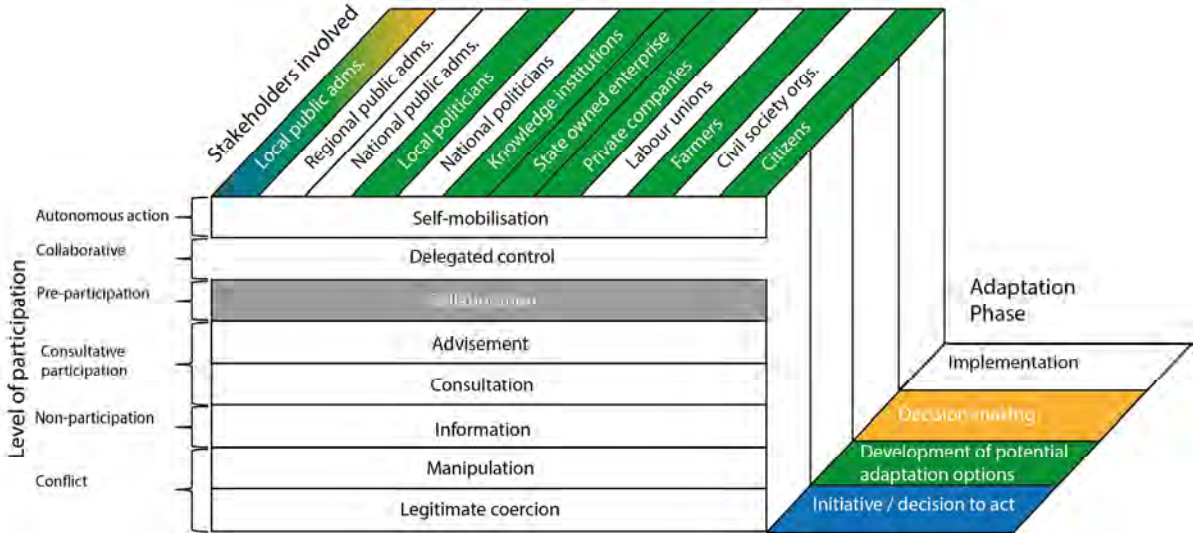

Figure 21: Participation Matrix for the Kalundborg case study

Initiative/ Decision to act

The initiative and decision to was taken by the *local public administration.* Officials from the Department of Engineering & Environment realised that 'the weather' was an imminent issue and that it was only a matter of time before they had to address the challenge. The municipality lacked proper tools and resources to meet the challenges, whereby the BaltBICA project was regarded as an opportunity to prepare the staff and to gain knowledge on climate change and insight into GIS modelling.

The BaltCICA project was a collaboration between the the Kalundborg Municipality, the Danish Board of Technology (DBT) and Geological Survey of Denmark and Greenland (GEUS). The DBT and GEUS selected Kalundborg Municipality in order to address future problems with flooding caused by storm surge and heavy precipitation.

Development of potential adaptation options

The development of potential adaptation options for the climate adaptation plan involved a wide range of participants including actors from the *local public administration, local participants, knowledge institutions, state owned enterprises, private companies, farmers* and *citizens.*

DBT assisted the municipality in organising a scenario workshop and a citizen summit.

Participants involved in the stakeholder workshop involved local stakeholders with an interest likely to be affected by climate change and with a position in the local community investing them with the power required to push for the implementation of adaptation measures. The participants invited to participate in the scenario workshop consisted of 28 participants including local politicians, local and regional officials (technicians, civil servants), farmers and representatives from homeowners associations, nature and environmental organizations, outdoor organizations, harbour authorities, youth, the tourist and business committee, the water supply sector, dyke and pump association and the archeological society.

In March 2011, 350 citizens participated in the citizen summit in Kalundborg. The citizens were chosen to represent the demographic distribution in the municipality with regards to age, gender and geographical residency. The citizens voted on alternative answers to a total of 19 questions. The participants then engaged in moderated discussion at their tables, which purpose was to give all participants time to listen to other opinions and reflect prior to voting. In advance of the summit, moderators were trained to provide facilitation at the tables. The thematic session concluded with citizens casting their votes anonymously on one to five questions.

After the scenario workshop in Kalundborg different visions drawn out by the stakeholders were developed. The consultancy firm NIRAS estimated the practical viability, the environmental consequences and economical costs of implementing the adaptation options in the visions.

Discussions about adaptation challenges and options in other parts of the municipality began between the municipality and DBT. DBT assisted the administration with the clarification of the adaptation options available and identified the political choices involved in choosing one adaptation measure over the other.

Decision-making

The results from the citizen summit (based on the results from the scenario workshop and further technical analyses discussed in the municipality) were received and discussed by city council members and has been taken into account in the preparation of the adaptation strategy for Kalundborg Municipality. The citizens have given the municipality a broad mandate to make political decisions about long-term strategies for climate change adaptation, even if such strategies disregard private interests for the sake of more important and common interests. The results from the citizen summit have provided the politicians with a better idea of what kind of climate adaptation solutions the citizens of Kalundborg prefer.

Implementation

The actual implementation and adaptation action of the climate plan has yet to come.

2.2.21 Rotterdam

The focus the Rotterdam case study is a retrospective analysis of the participation in the Rijnmond-Drechtsteden subprogramme of the Dutch Delta Programme. A larger National structure of the Delta Programme formed the context wherein the Rijnmond-Drechtsteden Delta programme was executed.

The study is based on policy analysis, interviews and minutes of participatory meetings. The case looks specifically at the flood risk related measures and strategies developed in this programme. The Rijnmond-Drechtsteden subprogramme of the Dutch Delta Programme primarily addressed water related climate change adaptation, with emphasis on flood risk. The prime focus in this case will be on flood risk management from the main river tributaries in the Rotterdam area. The current system can be divided in the main water system and the urban water system. The main water system's emphasis is on safety measures including the main flood defences such as dikes, storm surge barriers 'the Maeslantkering' and 'the Hartelkering' and pumping and drainage systems in the polder areas behind the prime defence system.

The timeframe of the analysis starts in 2008 with the initiation of the Delta Programme as a result of the Delta Committee arguing that a new Delta Plan was needed in order to meet the challenges of climate change.

Participation Matrix

The *Participation Matrix* for the Rotterdam case study visualises the actors involved and the level of participation for the adaptation phases: *initiative/decision to act, development of potential adaptation options* and *decision-making.* The initiative for the Delta Progamme was taken by *national politics*. By the instalment of the Delta Committe to consult the public at large (with direct consultation of citizens, companies and knowledge institutions) parliament was advised to start a multiple year programme. This led to the decision by national politics to set-up the Delta Programme. The participation in the *development of potential adaptation options* phase in the participation ladder is characterised as *collaboration*, whereby participatory processes involving a range of actors was initiated e.g. design workshops. The participation level in the *decision-making* phase of the adaptation process is placed in the *consultation* level in the ladder of participation. The *national politicians* in Parliament are the final decision-makers, but the strategies for flood risk and adaptation are developed by a combined effort of *national* and *local public administration* who consult *citizens* under obligation of Dutch law.

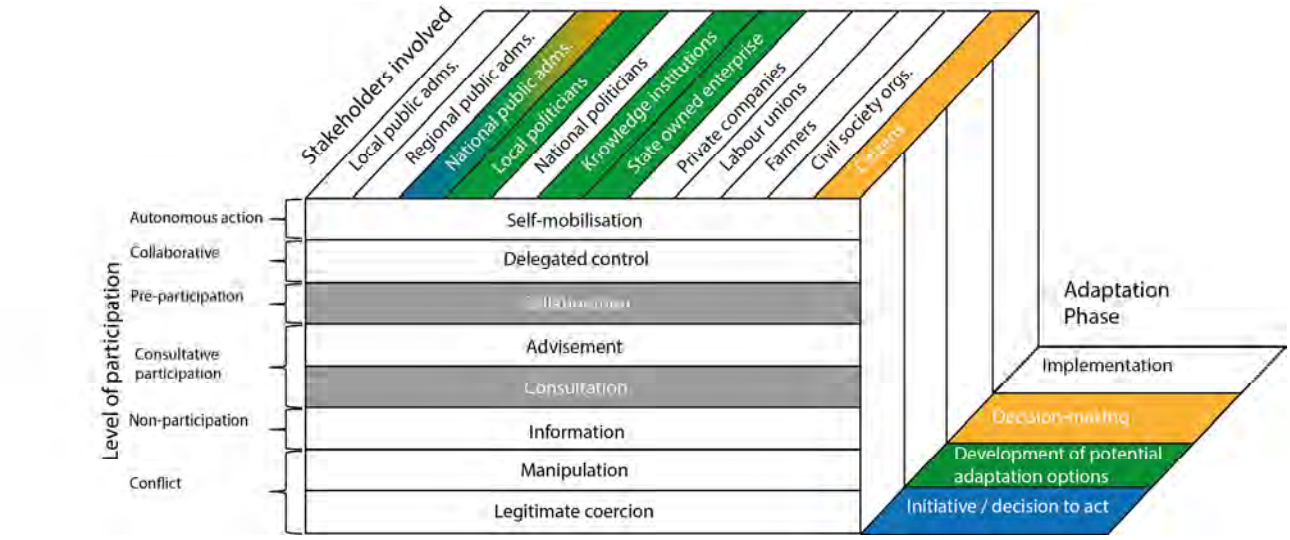

Figure 22: Participation Matrix for the Rotterdam case study

Initiative/ Decision to act

The Rijnmond-Drechtsteden Delta Programme was initiated by the *national public administration* as a result of the Delta Committee. The Delta Committee involved people (predominantly experts, but some with a political background) with a wide variety of disciplinary backgrounds. In the initial stage, each regional Delta Programme, whereof the Rotterdam region became one, was responsible for its own organisation and process architecture, although some general guidelines were provided in the existing use of programme management principles throughout the Dutch government and in the new Delta Act. This initially existed out of the 'Projectbureau' consisting out of employees from all Governmental layers (Municipality of Rotterdam and Dordrecht, Waterboards, Provinces, Ministry of Economic affairs, Rijkswaterstaat (executive body of the Ministry of Infrastructure and the Environment) and the port Authority).

Due to the complex situation in the delta of the Rhine, with the confluence of sea and river water, and the historical emphasis on large scale infrastructure in flood risk management, the programme set out to explore a broad range of strategies in conjunction with the upstream measures and the measures within the delta to the south of the Rijnmond-Drechtsteden area. The complex situation and the necessity of a broad range of strategies was acknowledged at the start of the programme in 2010. Therefore, at that time, the range of stakeholders was also defined. This included all governmental levels, companies, NGO's, citizens and scientific experts (DPRD 2010). At that time, the goal was to execute the strategy-making process in co-production with these stakeholders, with as core values transparency of the steps, involvement in, and commitment to the process. Thereby expertise and knowledge from all stakeholders should be included within the process via joint fact finding. Participation was seen as a necessity for good decision making (DPRD 2010: 6). This was organized via a societal advisory board consisting of representatives of each stakeholder group, including representatives of different groups of citizens (youth, elderly, etc.) and economic sectors (maritime, recreation, industry, etc.).

Development of potential adaptation options

For the development of the potential adaptation options, several participatory processes were used, overall these processes are characterised as *consultation* on the ladder of participation. These can be divided among the phases of developing the adaptation options, as described in the

overall strategic planning approach Adaptive Delta Management, and among the involved groups within society.

The process of the Delta Programme, based on ADM (Van Rhee 2012; Van der Brugge et al. 2012; Vlieg & Zandvoort 2013) existed out of 4 phases, each lasting a year: from preliminary assessment, via possible strategies, to making a choice for a preferred strategy (which was proposed to Dutch parliament in September 2014 in the report called Delta Programme 2015). The first phases of the Delta Programme were devoted to problem analysis based on long term delta scenarios, and subsequent refinement by assessing the (im)possibilities and cost-effectiveness of possible strategies. Dutch knowledge institutes such as Deltares and the KNMI (the Dutch meteorological institute) played an important role throughout the different phases wherein the development of the delta scenarios and impact assessments were important aspects. These institutes also played an important role in the identification of solutions and the assessment of proposed strategies and measures. This was done in commission of the various subprograms.

The Delta Committee, in 2008, already laid out several possible strategies which formed the starting point for the Rijnmond-Drechtsteden strategizing process. There were 4 different strategies in 2010 to start analysis and collaboration. Experts did an economic effectiveness study of these 4 strategies, on a range of different criteria (Jeuken et al. 2011). Meanwhile, a design workshop with a set of stakeholders was used under the title ‘From possible strategies to narratives’ (DPRD 2011), to come to a first line of reasoning and consensus about the (im)possibilities of the different strategies. The main aim of these narratives was to communicate the (im)possibilities and technical know-how to the general public and to provide possible storylines to discuss the different possible strategies.

Each of the steps within the Delta Programme were reported to parliament on a yearly basis, together with the national budget in September of each year. Local politicians were involved via their contributing officials in the smaller governmental steering board (the ‘Bestuurlijke Stuurgroep’) and within the larger regional collaboration efforts structured around conferences for politicians and consultation sessions with both officials and politicians (respectively ‘Bestuurdersconferenties’ and ‘ambtelijke & bestuurlijke consultatierondes’). The participation of different governmental layers within the national programme started with a conference attended by politicians from municipalities, provinces, and water boards. This resulted in a round of interviews among the regional governmental coordination bodies and conversations with the responsible politicians at the different governmental bodies. All representatives indicated they wanted to be involved, even if the regional strategies didn’t have large effects on their respective constitutive areas. As such, the participatory process was to a certain extent created in a participatory way.

Next to the involvement of the specific governmental layers, also existing intergovernmental platforms were used to create some participatory efforts. The main construction was based out of the initial round of consultation. This led to a division of the full region into in 7 smaller sub-regions, each having its own specific characteristics from a water management and urban perspective. Each of these regions had its specific intergovernmental body which was informed and to a certain extent involved in the process. Several of these regions became very important in the latter half of the four year programme. Within the regions the main effects of the strategy and hence, the major efforts regarding execution and overcoming barriers to implementation are located. As such, the design workshops were mainly focussed on, and used in these regions.

From 2013 onwards, another important intergovernmental body was deemed to be important to involve, this is the governing board of the so-called safety region. This governing board is responsible for emergencies of all kinds within a specific region and consists out of different representatives of the government but also from the emergency organisation responsible for first response in case of, for example, a chemical disaster or a flood. As such this governing board was regarded as being important to inform and to participate with to align the strategy with the functioning of the safety region.

The societal actors were involved via a societal advisory board (Maatschappelijke Adviesgroep) consisting out of 11 members, each representing a different stake. This included all major economic sectors, and societal values regarding nature and landscape. The societal advisory board advised the steering board of the Rijnmond-Drechtsteden. This was the main set-up to involve different stakeholders from society. Twice a year a large stakeholder meeting with amongst others the representatives for the stakes within the Maatschappelijke Adviesgroep were conducted to both inform stakeholders and provide input for the strategizing process. There was a deliberate choice not to actively involve citizens in these phases in the Rijnmond-Drechtsteden programme. It was deemed sufficient to incorporate societal organisations from different relevant domains, and let the citizens be represented by the municipalities. However, the programme was open to citizens who took action themselves to be incorporated in the process, the programme bureau was open to these private initiatives (DPRD, 2014).

Decision-making

In the decision-making phase of the adaptation process the level of participation is characterised as *consultation,* whereby the *national administrative organisation* provided the final strategies to *parliament* wherein the final decision-making is formally arranged. Within the actual decision-making, participation is thus very formalised via legal procedures and only parliament is responsible for decision-making, with other stakeholders and governmental bodies only participating in the development of possible options. Advice from different stakeholders and other governmental layers is seen as important and parliament will normally not alter course regarding the proposed strategies.

Within the Dutch law, citizens can give their opinion, for example in advance via letters, or at the local level via public hearings. There is a more elaborate democratic mechanism in place if the strategy implies infrastructural projects or alteration of law. In these cases there are hearings and also the right to proceed via legal ways to influence or stop a decision. This latter possibility does also account for local or regional authorities who can formally object against national decisions to alter legal prohibitions for lower tier institutions. Water related issues, however, are normally not subject to such types of legal mechanisms. Within the actual decision-making, participation is thus very formalized via legal procedure and only parliament is responsible for decision-making, with other stakeholders and governmental bodies only participating in the development of possible options. The advice of different stakeholders, however, is seen as important and parliament will normally not alter course regarding the proposed strategies (which was indeed not the case).

Implementation

The implementation of the adaptation is under way, whereby this adaptation phase has not yet been reached for the Rotterdam case study.

2.2.22 Tagus River Water District, Madrid

The Tagus River Water District case study focuses on climate adaptation to water shortages and health effects in the Tagus Water District of Spain, predominantly in urban municipalities: Madrid metropolitan area that comprises 22 municipalities. The aim is to identify the co-benefits of the adaptation strategies in different sectors. The case study is structured in three scales of analysis: local, regional and national, involving stakeholders, experts and citizens.

The case study builds on previous knowledge and proposes a four steps method involving the main stakeholders at different scales. The first step involves National Regional and Local

Administration decision makers with key actors of Water, Energy and Agriculture sectors in a workshop to exchange information on vulnerabilities and identify adaptation pathways. The second step —carried out through a Fuzzy Cognitive Mapping method, with twenty five experts— looks for a semi quantitative weighting of measures. In the third step a cost and benefit analysis is performed an adaptation measures are evaluated and compared. Finally the case study will explore the incentives and barriers of the civil population to implement the adaptation strategies.

The timeframe of the case study started in 2013 with the start of a series of meeting at the Ministry in which the main adaptation topics were discussed and stakeholders identified, and spans through the BASE project.

Impacts on water resources are the main climate threat focus of the case study. The combination of increasing temperature and decreasing precipitation cause a reduction of inputs and a modification of the water demand. Current water resources in the Tagus Water District are scarce and their current level of use is very high. Even more, climate change can have an effect on health by intensification of extreme events as heat waves or drought periods, and by increasing the rate of transmission of certain types of diseases. While current resources ensure supply to urban areas, climate change poses a threat to the maintenance of this level of assurance in the future, therefore adaptation to climate change is essential. Adaptation measures should include rationalization of water use, increasing efficiency and reducing consumption.

Participation Matrix

The *Participation Matrix* for the Tagus River case study shows the actors involved and the level of participation for the adaptation phases: *initiative/decision to act* and *development of potential adaptation options*. The level of participation is characterised as *consultation* in the ladder of participation.

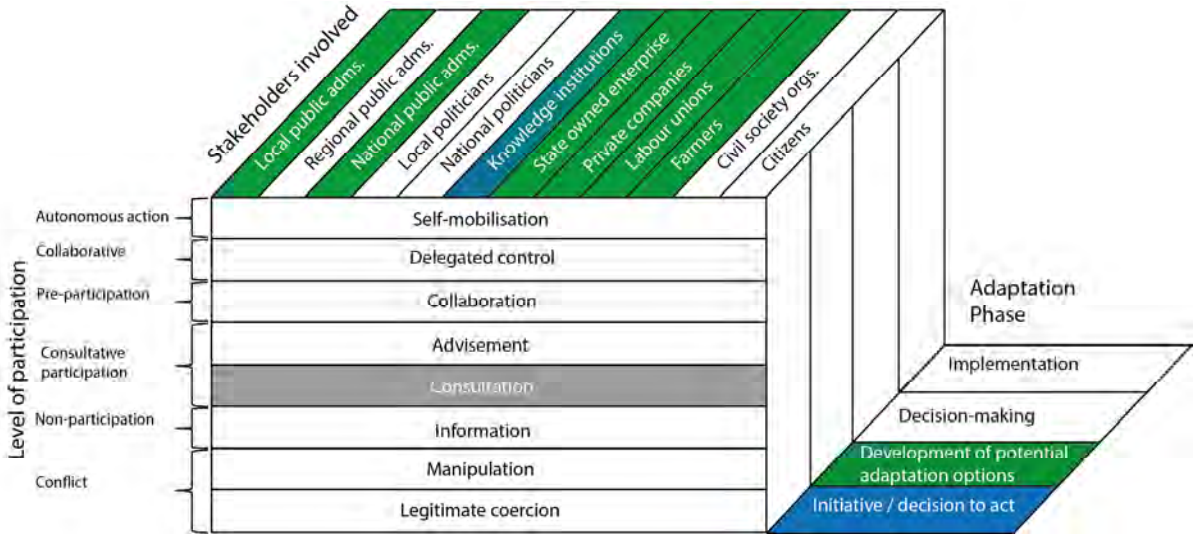

Figure 23: Participation Matrix for the Tagus River Water District case study

Initiative/ Decision to act

The initiative of identifying co-benefits of adaptation strategies came from the case study BASE research team, consisting of UPM and BC3. The case study is being integrated in the Spanish Office for Climate Change, which means the results will have an effect on legislation.

Development of potential adaptation options

To identify the co-benefits of the adaptation strategies actors from the *local public administration, national public administration, knowledge institutions, state owned enterprise, private companies, labour unions* and *citizens* are involved.

The participatory methodology of the Tagus River Water District followed a process with three phases, involving stakeholders, experts and citizens.

The first phase involved interviews and focus group. The initial step was held as a series of meetings at the Ministry to discuss the main adaptation topics and identification of stakeholders. Thirty stakeholders were identified and invited to a focus group held at the Technical University of Madrid. The stakeholders included the Spanish Office for Climate Change, Water Quality Department, Ministry of Health, Observatory of Health and Climate Change, Spanish Office for Climate Change from the *national public administration,* Water Management of the Municipality of Madrid, water supply company, Hydropower company, Farmer's union, university and research centres.

The second phase was the Fuzzy Cognitive Mapping, which is a participatory semi-quantitative interview and analysis method (see e.g. Glykas, 2010; Özesmi and Özesmi, 2004) in which personal interviews with experts were performed during May 2014. The objective of the method is to identify cause-effect relations through causal reasoning More specifically, causal diagrams were used to identify potential co-benefits among adaptation measures in a semi-quantitative way which can be later assessed using traditional cost-benefit analysis tools. The method was applied in the context of climate change and focus on health related outcomes.

The final step was a survey conducted in the Madrid Region with the aim to study public support for adaptation policies. A Logit model will be utilised to analyse which predictors positively or negatively effect people's support for adaptation policies, in order to determine the main barriers and incentives for the implementation of these policies.

The overall participation process is characterised as *consultation*, as UPM and BC3 have used the feedback from the stakeholders and citizens to identify co-benefits on cross-sectoral strategies.

Decision-making

The prospective character of the case study, with the aim of identifying co-benefits on cross-sectoral adaptation strategies will not go into the decision-making process and is out of the time frame of the BASE project.

Implementation

The possible implementation process of the adaptation measures goes out of the time frame of the BASE project.

2.3 Overall observations

This section intends to integrate and summarize the individual case study provided in the previous section. We will highlight the participatory general statistics of BASE case studies as well as the key experiences and reflections done by BASE case studies researchers.

The participatory matrix seems to map the geographical, cultural, sectorial and diversity of the European case studies well. This makes it a good tool for clearly mapping and characterizing the participatory complexity of the case studies.

Regarding the temporal definition of the case study 50% of the case studies have been a prospective study, 18% a retrospective study and 32% both a prospective and a retrospective study.

Across all the case studies it is evident that participation or the interaction between stakeholders is applied in the planning phase of the adaptation process.

The analysis has shown that a relatively large number of the studies case studies are placed in the *consultation* phase in the ladder of participation.

2.3.1 How far are the case studies in the climate adaptation work?

How far the case studies have reached in the climate adaptation work varies. Figure 25 visualises which phase the case studies have reached. Out of the 22 European case studies 12 of the case studies have a complete overview of the adaptation cycle from *decision/intiative to act* to *implementation* adaptation phase.

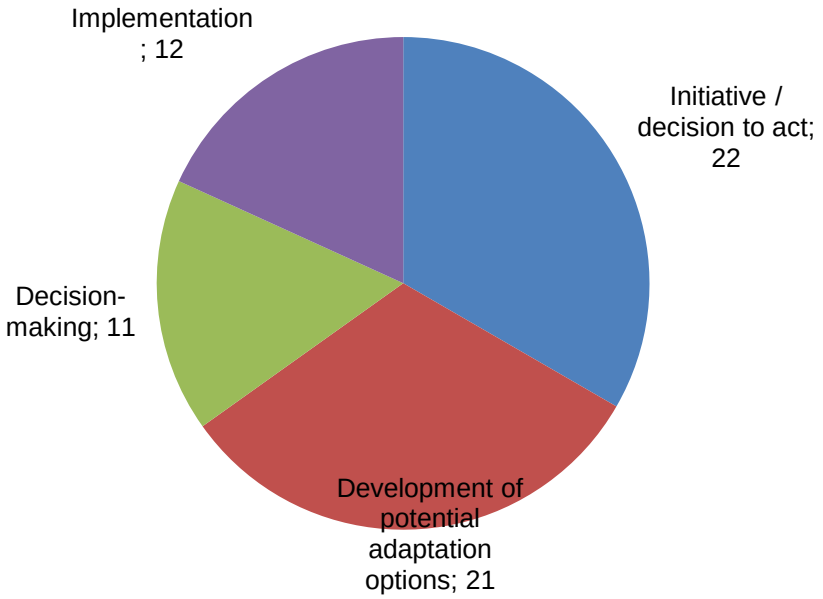

Figure 25: Number of case studies who have reached the four *adaptation phases*

2.3.2 Stakeholders involved in the adaptation phases

The following section presents the number of case studies where the defined stakeholders are involved in the four adaptation phases: *initiative/decision to act, development of potential adaptation options, decision-making* and *implementation.*

Initiative/decision to act

Figure 26 visualises the number of case studies where stakeholder groups are involved in the *initiative/decision to act* adaptation phase. The results show that it is primarily the *local public administration* (8 case studies) and *knowledge institutions* (7 case studies) who have taken the initiative and started the adaptation process. In a number of the case studies the knowledge institutions who have taken the initiative to act are the BASE partners. The following other stakeholder groups have also been involved in taking the initiative/decision to act: *private companies, farmers, citizens, natation public administration, local politicians* and *national politicians.*

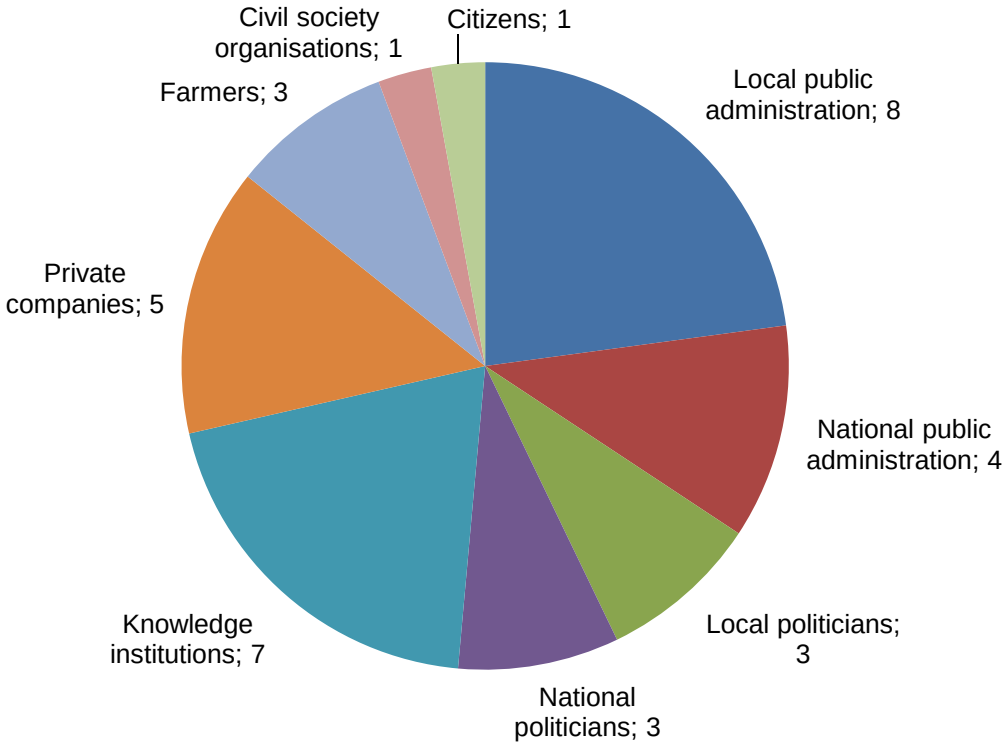

Figure 26: Number of case studies where the stakeholder groups are involved in the adapation phase: *intiative/decision to act*

Development of potential adaptation options

In the *development of potential adaptation options* there are many different stakeholders involved in the adaptation phase. The results show that it is the local public administration (18 case studies), private companies (16 case studies) and knowledge institutions (17 case studies) who are the involved actors in a majority of the case studies. However, this is the adaptation phase were there are a large number of other stakeholder groups involved, who are not involved in the other adaptation phases. This includes primarily *state owned enterprises, civil society organisations, citizens, farmers etc.* The results indicate that *development of potential adaptation options* is the adaptation phase with the highest level of participation.

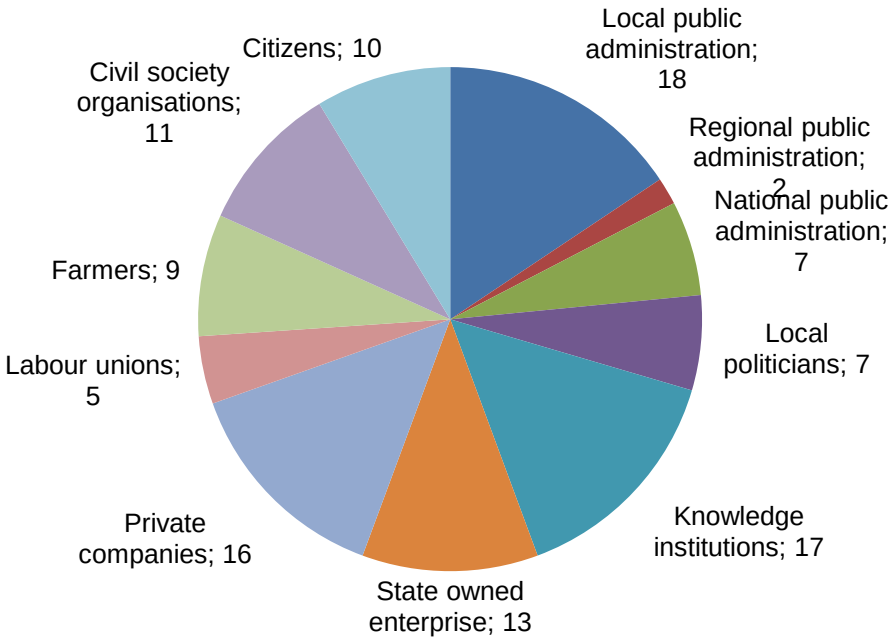

Figure 27: Number of case studies where the stakeholder groups are involved in the adapation phase: *development of potential adaptation options*

Decision-making

The stakeholders involved in the *decision-making* adaptation phase are more limited to a set of stakeholders compared with the previous adaptation phase. The findings have shown that it is primarily the local politicians (6 case studies), local public administration (5 case studies) and national public administration (3 case studies) who are involved in the decision-making during the adaptation process. The results also show that the number of stakeholders involved are also usually limited to one or two decision-makers. This indicates that *decision-making* is an adaptation phase with a low level of participation. Figure 28 illustrates the number of case studies where the defined stakeholders have interacted in the *decision-making* adaptation phase.

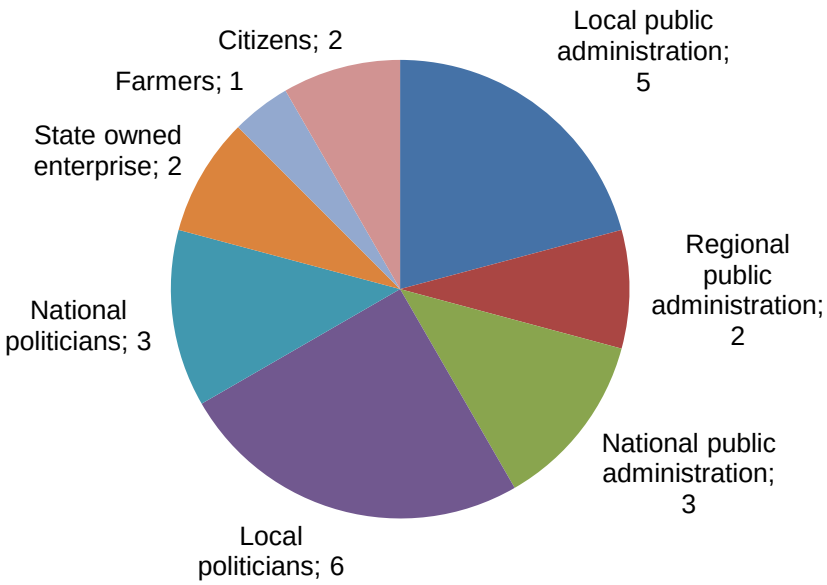

Figure 28: Number of case studies where the stakeholder groups are involved in the adapation phase: *decision making*

Implementation

The *implementation* of adaptation actions involves a larger groups of stakeholders compared with the *decision-making* adaptation phase. The results show that it is primarily the local public administration (8 case studies) and private companies (7 case studies) who are involved in implementation the adaptation options. Amongst other stakeholder groups are citizens, civil society organisations, farmers, state owned enterprise, knowledge institutions, local politicians and national public administration also involved in the implementation in some of the case studies. Compared with *decision-making,* the level of participation in the *implementation* phase is a little higher, whereby a larger stakeholder group are involved in implementing adaptation actions.

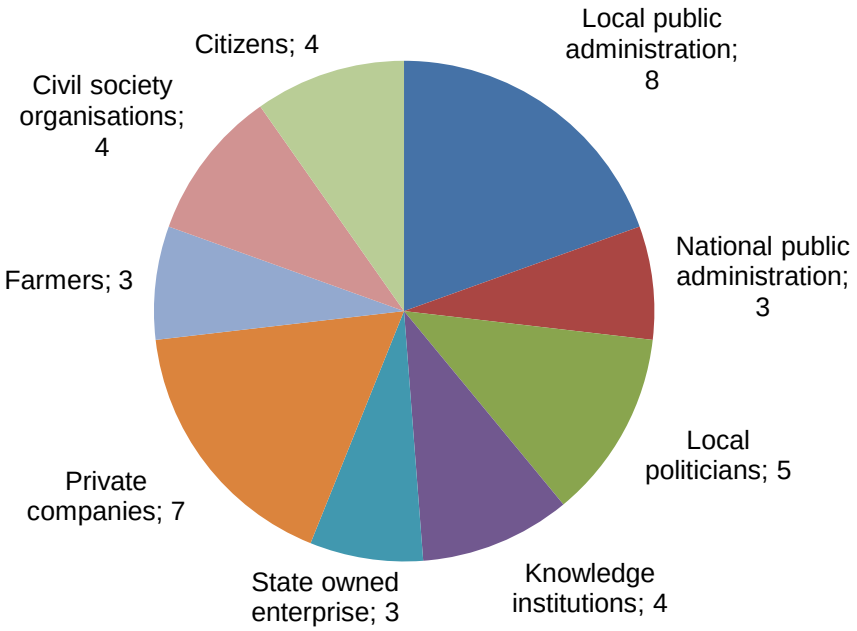

Figure 29: Number of case studies where the stakeholder groups are involved in the adapation phase: *implementation*

2.3.3 Level of participation

Below general observations of the level of participation are given as well as experiences from the specific BASE case studies.

Self-mobilisation

The level of interaction between stakeholders is placed on the *self-mobilisation* stage on the level of participation for three of the case studies (Ústí, South Moravian and Venice). The adaptation actions present in these case studies all represent autonomous action amongst the involved stakeholders. For these case studies there is no decision-making present. The involved stakeholders in this participation level include the stakeholders being affected by climate adaptation.

Ústí and South Moravian: For the Ústí and South Moravian case studies the involved stakeholders include farmers.

Venice: In the Venice case study the stakeholders encompasses citizens and private business who are protecting their premises from flooding.

Alentejo: In this region several bottom up initiatives have been researched that show self-mobilisation namely farmers, an ecovillage and an NGO project in a village.

Collaboration

A number of the case studies have been placed in the the *collaboration* stage on the level of participation. Similar for the case studies placed in this level of participation are a wide range of stakeholders involved in the adaptation process. The *collaboration* stage is placed relatively high

on the ladder of participation, whereby the responsibility is shared by the involved stakeholder groups.

Lolland: The involvement of different stakeholders was seen as very important in making a common knowledge base to develop a hydraulic model. Representatives from the municipality and the farmers have been very happy with the hydraulic model, and the process developing it. It has been emphasized by the stakeholders that the project has been an open minded discussion and all participants got new knowledge.

Holstebro: The participation process in the Farmer as Water Manager Network has brought together a lot of knowledge by diverse players around the agenda, which has helped set an agenda about using farmland as buffers for urban problems, but also to address potential flooding problems in farming areas.

Jena: There was a collaborative process in the thematic workshops, however the stakeholders primarily included various departments in the city administration and the representatives of companies run by the municipality whereby the stakeholders were a selected group. In the aftermath of the JenKAS project members of the steering committee reflected on whether it would have been possible and created some added value, if citizens were directly involved in the JenKAS process. Based on experiences made at the various JenKAS workshops they came to the conclusion that keeping in mind the primary goal of the JenKAS process, i.e. to develop recommendations to climate-proof urban planning, and the fact that providing the input needed was very challenging even for the experts involved, quite probably this would not have been the case.

Lake Ijsselmeer: Participation was very important in the Ijsselmeer case study, whereby all the relevant provinces, water boards and a selection of municipalities were involved. Ten prominent stakeholders in the region have been actively involved in developing the adaptation strategy, citizens were involved in so-called area-sessions, in which they were asked to discuss and reflect on the results and experts were involved and played an important role

Timmendorfer: In the Timmendorfer case study the entire community were engaged in the planning of the integrated coastal defence system. The process lead to the design of a system which not only protects the community from flooding but also has a great value as a tourist attraction. The Mayor took political ownership by encouraging hotel owners and shops to get involved by creating a cost-benefit analysis, which gives economic incentive. Experiences have shown that the long process expanding over 15 years from planning to implementation could have been shortened though netter time management.

South Aveiro: The decision makers at several levels have collaborated jointly in a scenario workshop process to create an adaptation plan for a coastal territory of two municipalities.

Cascais: The municipality worked together with the main stakeholders in the territory to co-develop and revise the municipal adaptation plan.

Copenhagen storm-surge: The participatory approach with stakeholder workshops included participants with a wide range of backgrounds with an interest in the future planning of Copenhagen's harbour. The participation process enabled a 'stakeholder involving process' to facilitate the discussion about financial and legal questions, concrete adaptation solutions and the allocation of responsibility in adaptation Copenhagen to storm surges in the future.

Green Roof: In the Green Roof case study a participatory scenario workshop with local stakeholders aimed at introducing the case study area and eliciting stakeholder's preferences and opinions regarding future development of the case study area. These scenarios will subsequently be used as the basis for ecosystem service modelling with InVEST tools

Kalajoki River Basin: In the Kalajoki River Basin case study the results from two stakeholder workshops have been used in preparing the Flood risk management plan for the Kalajoki river

basin. Knowledge institutions and experts in regional authority (ELY-centre) and SYKE selected the measures to be analysed from regional perspective: evaluation of effects, costs and other consequences.

Kalundborg: The participatory approach in the Kalundborg case study including the stakeholder scenario summit and citizen summit have been taken into account in the preparation of the adaptation strategy for Kalundborg Municipality. The citizens have given the municipality a broad mandate to make political decisions about long-term strategies for climate change adaptation, even if such strategies disregard private interests for the sake of more important and common interests. The results from the citizen summit have provided the politicians with a better idea of what kind of climate adaptation solutions the citizens of Kalundborg prefer.

Rotterdam: In the Rotterdam case study a participatory approach with a wide range of stakeholders was initiated for the development of potential adaptation options including design workshops.

Consultation

A number of the BASE case studies are placed in the *consultation* stage in the ladder of participation. For these case studies the stakeholders have been used to provide information, knowledge and opinions regarding the adaptation process. Eventhough this was in most cases clear to the participants the decision makers do not fully use the potential benefits that can result from the engagement of participants in the adaptation process …

Dartmoor: In the Dartmoor case study the National Park Authority undertook a wide consultation and engagement process to identify the key issues and challenges facing the National Park over the next five years, through meetings, public online questionnaire and a set of workshops. The experiences from the process in developing the Management Pan shows that the adaptation strategy could have been more explicitly discussed in the Working Groups for the Management Plan.

Holstebro: In the Holstebro case study the local *public administration* are placed in the consultation phase in the level of participation, as they have been involved in stakeholder workshops.

Jena: The involvement of the employees at the local public administration can be placed in the *consultation* level on the ladder of participation as they have been involved through a variety of support offers e.g. trainings, active involvement in the development and implementation of scientific projects aiming at continuously updating and expanding the existing knowledge base.

Prague: In the Prague case study there has been a collaboration between the local public administration, state owned enterprise , private companies and knowledge institutions in developing potential adaptation options for flood control measures public participation in spatial planning is limited , however the greater involvement of local stakeholders is missing in the adaptation process and the flood adaptation measures are organized by the state administration without wider public involvement.

Copenhagen cloudburst: In the Copenhagen cloudburst case study the public administration have had control the adaptation process, whereby stakeholder groups have been involved in developing adaptation solutions. It is in the implementation phase participation through citizen involvement is expected to take place.

Rotterdam: The Rotterdam case study is also placed in the *consultation* level on the ladder of participation regarding the *citizens.* The national politicians in Parliaments are the final decision makers but following Dutch law the citizens need to be consulted with the strategies for flood risk and adaptation planning.

Tagus: The level of participation in the Tagus case study is placed in the *consultation* level on the ladder of participation. The participation approach Fuzzy Cognitive Mapping, which is a participatory semi-quantitative interview and analysis method has been used to identify cause-effect relations through causal reasoning. More specifically, causal diagrams were used to identify potential co-benefits among adaptation measures in a semi-quantitative way which can be later assessed using traditional cost-benefit analysis tools. The feedback from the stakeholders and citizens has been used to identify co-benefits on cross-sectoral strategies.

Information

There were a number of case studies placed in the *information* level on the ladder of participation. Similar for these case studies was that the participation present included informing citizens and/or stakeholder about adaptation options, climate knowledge etc. This occurred through public campaigns, information meetings or information handbooks. This form of participation is placed low of the participation ladder, whereby stakeholders/citizens influences on the adaptation process is very limited.

Holstebro: The local politicians have received information and participated in a tour of the area and sites for specific projects under consideration. This places them in the information phase in the level of participation as information about what is being done or planned to be done is provided.

Jena: The general public have been involved by promoting the mainstreaming of the adaptation into urban planning and the strategy has been published as a “Handbook on climate sensible urban planning”.

Cornwall: There was a limited participation process involved in the adaptation process in the Cornwall case study. The involvement occurred through public health campaigns.

2.4 Objectives for the interaction of stakeholders

Based on the information provided by the BASE partners in the CSLD *Section 3 Participation in Climate Change Adaptation* the motivation for the interaction between stakeholders has been analysed for the case studies. A number of reasons for interaction between stakeholders have been defined through the empirical data for the case studies. These defined objectives will be identified for the case studies. It has become apparent that the purpose of interaction between actors and involvement of stakeholders in climate adaptation varies. This includes the reasons for the interaction, the actors involved, in the different adaptation phases. The reason for this is to provide an understanding of why participation can be an important step in achieving successful climate adaptation.

The identified objectives for involving stakeholders are to:

1. Development of adaptation options, strategies or plans
2. Analyse current adaptation options
3. Assess consequences of adaptation options
4. Resolution handling
5. Knowledge exchange
6. Communicate
7. Decision-making
8. Implement adaptation options
9. Evaluation of implemented adaptation actions

Nine tables with the defined objectives are set up whereby the case studies that have the specified objective as a motivation for an interaction with stakeholders have been identified. The table provides a case specific description of the objective, the involved stakeholders, how the involvement has taken place and in which phase of the adaptation process. Before the table is presented, a description of the objective is given to supply an understanding of the context of the objectives.

2.4.1 Development of adaptation options, strategies or plans

For a large number of the BASE case studies, interaction between stakeholders was used to develop adaptation options, strategies or plans. In other words, this is the assessment and planning phases of the adaptation process.

Table 3: Case studies where the objective for interacting with stakeholders was for the development of adaption options strategies or plans

Case study	Description of objective	Who has been involved?	How?	Adaptation phase
Alentejo	Identify, discuss and evaluate Adaptation Options and Measures	Universities and researchers, Farmers, Farmers organisations, National public administration, NGOs, Private consulting companies	Participatory State of the Art (Pecha Kucha + World Café); Participatory Multi-Criteria Analysis (MCA); Participatory Cost Benefit Analysis; Systematization of Experiences	Development of adaptation options
Aveiro	Discuss potential adaptation options, agree on a common vision and strategy for adaptation, overcome conflicts	National, regional and local public administration, local politicians, local stakeholders, state-owned enterprise, NGOs, University, private companies	Scenario Workshop & Adaptation Pathways (SWAP)	Development of adaptation options
Copenhagen (cloudburst)	Develop cloudburst adaptation solutions	Citizens, Consultancy firm, municipality	Citizen hearing, questionnaire	Development of adaptation options
Copenhagen (storm-surge)	Identify possible concrete adaptation solutions in relation to storm-surge in	Local public administration, national public administration, local politicians, knowledge	Stakeholder workshops	Development of adaptation options

	Copenhagen and receive input for the planning process	institutions, state owned enterprises, private companies, labour unions, civil society organisations		
Green Roof	Create a set of scenarios describing potential future development and adaptation measures which might be implemented	Local public administration, local politicians, research institutions, state owned enterprise, private companies, NGOs, farmers	Scenario workshops	Development of adaptation options
Holstebro	Discuss how agriculture in retaining water in the Storå catchment can limit water runoff from land to the water course in times with extreme precipitation.	Local public administration, knowledge institutions, private companies, NGOs, labour unions, farmers	Meetings and stakeholder workshops	Development of adaptation options
Jena	Establish an inventory of adaptation measures	Stakeholders mainly from various departments of the city administration	Thematic stakeholder workshops	Development of adaptation options
Kalundborg	Develop possible land use and adaptation measures	Local stakeholders	Scenario workshop	Development of adaptation options
Lolland	Develop a hydraulic model to assess flooding risk and can be considered a decision tool to support the development of the local climate adaptation plan.	Local public administration, private companies, labour unions and civil society organisations	Stakeholder meetings	Development of adaptation options
Prague	Find suitable adaptation measures and identify areas to	Safety and crisis management department of the Prague City Hall,	Meetings	Development of adaptation options

	be protected	state company		
Rotterdam	Develop potential adaptation options	Deltares Dutch meteorological institute The Delta Committee Stakeholders including: major economic sectors, and societal values regarding nature and landscape	Design charettes	Development of adaptation options
Timmendorfer	Plan coastal defence system	Local stakeholders including the coastal protection authority, fishermen, tourism representatives, local residents and community authorities	Working group meetings and public meetings	Development of adaptation options

2.4.2 Analyse current adaptation actions

For some case studies the motivation for involving stakeholders in climate adaptation has been to analyse the current adaptation actions.

Table 4: Case studies where the objective for interacting with stakeholders was to analyse current adaptation options

Case study	Description of objective	Who has been involved?	How?	Adaptation phase
Cascais	Revision of the current municipal strategic plan for climate change adaptation. Making it visible and articulated inside the organisation and local stakeholders	Municipality, local public administration, local stakeholders, local state-owned enterprises, private companies.	Participatory multi-criteria analysis, participatory cost-benefit analysis, 7 participatory workshops	Development of adaptation options
Copenhagen (cloudburst)	Understand where and what caused problems	Municipality, citizens	Questionnaire, citizen hearing	Development of adaptation

	for the area under the cloudbursts in July and August 2011 to better plan the effort			options

2.4.3 Assess consequences of adaptation options

Another motivation for creating involvement is to assess consequences of adaptation options.

Table 5: Case studies where the objective for interacting with stakeholders was to assess consequences of adaptation solutions

Case study	Description of objective	Who has been involved?	How?	Adaptation phase
Copenhagen (storm-surge)	Receive input from important stakeholders in order to access dyke solutions to protect Copenhagen from storm surges based on the solution proposals from 2010	Local stakeholders	Stakeholder workshop	Development of adaptation options
Lolland	The hydraulic model which was the end product of the participatory process has given the project participants a common knowledge which they can use in assessing adaptation measures	Farmer representatives, holiday home owners, the land reclamation guild, representatives from the water supply, municipality, external consultants	Meetings	Development of adaptation options
Rotterdam	Assess proposed strategies and measures (problem analysis based on long term delta scenarios and impact assessment)	Knowledge institutions	Expert analysis of strategies	Development of adaptation options
Tagus	Identify co-benefits of	25 stakeholders	Fuzzy Cognitive Mapping method	Development of adaptation

	adaptation strategies in different sectors		with	options

2.4.4 Conflict Resolution

Examples of conflict resolution include an attempt to find a shared vision of the future and the facilitating of an action plan in order to minimise conflicts.

Table 6: Case studies where the objective for interacting with stakeholders was for conflict resolution

Case study	Description of objective	Who has been involved?	How?	Adaptation phase
Aveiro	Discuss potential adaptation options, agree on a common vision and strategy for adaptation, overcome conflicts	National, regional and local public administration, local politicians, local stakeholders, state-owned enterprise, NGOs, University, private companies	Scenario Workshop & Adaptation Pathways (SWAP)	Development of adaptation options
Green Roof	Attempt to find a shared vision of the future	Local stakeholders	Stakeholder workshop	Development of adaptation options
Jena	Create a broad consensus regarding JenKAS	Stakeholders from all relevant fields of actions	Thematic stakeholder workshops	Development of adaptation options
Lolland	The participatory process of developing the hydraulic model involved long dialogue with farmers and lowered conflict between the municipality and the farmers.	Farmers and municipality	Meetings	Development of adaptation options
Rotterdam	First line of reasoning and consensus about the (im)possibilities of different strategies	Local stakeholders	Design workshop	Development of adaptation options

2.4.5 Knowledge Exchange

For some case studies and all the case studies where there has been a deliberate adaptation process, participation was used to identify key issues and challenges by exchanging knowledge e.g. by providing a forum for dialogue.

Table 7: Case studies where the objective for interacting with stakeholders was for knowledge exchange

Case study	Description of objective	Who has been involved?	How?	Adaptation phase
Alentejo	Identify, discuss and evaluate Adaptation Options and Measures	Universities and researchers, Farmers, Farmers organisations, National public administration, NGOs, Private consulting companies	Participatory State of the Art (Pecha Kucha + World Café); Participatory Multi-Criteria Analysis (MCA); Participatory Cost Benefit Analysis; Systematization of Experiences	Development of adaptation options
Aveiro	Discuss potential adaptation options, agree on a common vision and strategy for adaptation, overcome conflicts	National, regional and local public administration, local politicians, local stakeholders, state-owned enterprise, NGOs, University, private companies	Scenario Workshop & Adaptation Pathways (SWAP)	Development of adaptation options
Cascais	Revision of the current municipal strategic plan for climate change adaptation. Making it visible and articulated inside the organisation and local stakeholders	Municipality, local public administration, local stakeholders, local state-owned enterprises, private companies.	Participatory multi-criteria analysis, participatory cost-benefit analysis, 7 participatory workshops	Development of adaptation options
Copenhagen (cloudburst)	Discuss and exchange knowledge of where exactly to implement cloudburst solutions.	Municipality, civil society organisations, citizens	Workshop, questionnaire	Development of adaptation options
Copenhagen (storm-surge)	Discuss and exchange knowledge about	Local public administration, national public	Stakeholder workshops	Development of adaptation options

	storm surge adaptation planning	administration, local politicians, knowledge institutions, private companies, labour unions, civil society organisations		
Dartmoor	Identify key issues and challenges facing the National Park over the next five years	Local public administration, local legislators, private companies, labour unions and citizens	Meetings and workshops	Development of adaptation options
Holstebro	'The Farmer as Water Manager´ network has organised a number of meeting and workshops to exchange knowledge	Municipality workers, experts from universities and consultants, and other relevant stakeholders	Meetings and workshops	Development of adaptation options
Jena	Validate and expand the existing knowledge base regarding climate change impacts and adequate responses	Involved stakeholders	Workshops	Development of adaptation options
Lolland	Develop ideas, exchange knowledge and experiences and provide a forum for dialogue	Local public administration, private companies, labour unions and civil society organisations, sociologist	Meetings	Development of adaptation options
Rotterdam	Explore a broad range of adaptation strategies	Stakeholders form all governmental levels, private companies, NGOs, citizens and scientific experts	Societal advisory boards	Development of adaptation options
Tagus	Exchange information on	National, regional administration	Workshop	Development of adaptation

	vulnerabilities and identify adaptation pathways	decisions makers, key actors of Water, Energy and Agriculture		options

2.4.6 Communicate

Communicate is a way to give information or facilitate the involvement process.

Table 8: Case studies where the objective for interacting with stakeholders was to communicate

Case study	Description of objective	Who has been involved?	How?	Adaptation phase
Alentejo	Identify, discuss and evaluate Adaptation Options and Measures	Universities and researchers, Farmers, Farmers organisations, National public administration, NGOs, Private consulting companies	Participatory State of the Art (Pecha Kucha + World Café); Participatory Multi-Criteria Analysis (MCA); Participatory Cost Benefit Analysis; Systematization of Experiences	Development of adaptation options
Aveiro	Discuss potential adaptation options, agree on a common vision and strategy for adaptation, overcome conflicts	National, regional and local public administration, local politicians, local stakeholders, state-owned enterprise, NGOs, University, private companies	Scenario Workshop & Adaptation Pathways (SWAP)	Development of adaptation options
Cascais	Revision of the current municipal strategic plan for climate change adaptation. Making it visible and articulated inside the organisation and local stakeholders	Municipality, local public administration, local stakeholders, local state-owned enterprises, private companies.	Participatory multi-criteria analysis, participatory cost-benefit analysis, 7 participatory workshops	Development of adaptation options
Copenhagen (cloudburst)	Communicate and inform citizens of adaptation projects, for example how the	Municipality, consultancy firm, citizens	Citizen meetings	Development of adaptation options

	projects will affect the city in the future.			
Cornwall	Public health campaign to deliver information regarding reducing the risk of excessive UV exposure	Public	Develop public health campaign	Development of adaptation options
Jena	Promote mainstreaming of the adaptation into urban planning		Strategy published as ¨Handbook on climate sensible urban planning¨	Development of adaptation options
Rotterdam	Communicate the (im)possibilities and technical know-how to the general public	General public	Narratives were written by stakeholders through design workshops	Development of adaptation options
Timmendorfer	Citizens consulted and informed of the impacts of climate change in order to be convinced that coastal protection was necessary	Citizens of Timmendorfer	Consulted	Development of adaptation options

2.4.7 Decision making

The motivation for involving case studies has for some case studies been to support or improve the decision making process.

Table 9: Case studies where the objective for interacting with stakeholders was for decision making

Case study	Description of objective	Who has been involved?	How?	Adaptation phase
Aveiro	Facilitating a process where a common vision and strategy for adaptation is developed and agreed demonstrates decision-makers that participation	National, regional and local public administration, local politicians, local stakeholders, state-owned enterprise, NGOs, University, private companies	Scenario Workshop & Adaptation Pathways (SWAP)	Development of adaptation options, decision making

	can make decision and planning easier and more effective.			
Cascais	Using a participation to revise a current municipal strategic plan for adaptation supports decision-makers to invest in adaptation and make choices that are deeply evaluated before investment and trial.	Municipality, local public administration, local stakeholders, local state-owned enterprises, private companies.	Participatory multi-criteria analysis, participatory cost-benefit analysis, 7 participatory workshops, survey.	Development of adaptation options, decision making
Holstebro	Ideas developed in 'The Farmer as Water Manager´ may be introduced as proposals to political decision makers in the three municipalities along the Storå water course.	Municipalities, experts from universities and consultants, farmers, fishermen associations	Workshops and meetings	Development of adaptation options, decision making
Kalundborg	A deliberative decision making process was built as a result of the scenario workshop and citizen summit. Results were taken into account in the decision making	Local stakeholders and citizens	Scenario workshop, citizen summit	Development of adaptation options, decision making
Rotterdam	Results from the Delta Programme are reported to parliament on a yearly basis. Advice from stakeholders is taken into account in the decision making.	Stakeholders and citizens	For example via letters or at the local level via public hearings.	Development of adaptation options, decision making

	Citizens can give their opinion to parliament.			
Timmendorfer	The Mayor of Timmendorfer ensure public support through dialogue	Citizens, Mayor	Dialogue	Development of adaptation options, decision making

2.4.8 Implementation of adaptation measures

For some case studies participation has been applied in the implementation process of climate adaptation.

Table 10: Case studies where the objective for interacting with stakeholders was for the implementation of adaptation measures

Case study	Description of objective	Who has been involved?	How?	Adaptation phase
South Moravian	Implement adaptation actions to adapt to climate change	Farmers	Autonomous initiated action	Implementation
Ústí Region	Implement adaptation actions to adapt to climate change	Farmers	Autonomous initiated action	Implementation
Venice	Implement adaptation actions to protect their premises from flooding	Private companies and citizens	Autonomous initiated actions	Implementation

2.4.9 Evaluation of implemented adaptation actions

Despite the fact that human lead climate change is still beginning, human adaptation to climate is a common practice. When this autonomous adaptation process results in the implementation adaptation actions that can be further mainstreamed or developed in the future, case studies have used participatory processes to evaluate these implemented adaptation actions.

Table 11: Case studies where the objective for interacting with stakeholders was to evaluate implemented adaptation options

Case study	Description of objective	Who has been involved?	How?	Adaptation phase

Alentejo	Evaluate the implemented adaptation measure of water landscapes; evaluated the sustainable village of Aldeia das Amoreiras; evaluate the agriculture adaptation measures based on farmers past experiences of implementation.	Farmers, Farmers organisations, National public administration, Universities and researchers, NGOs, Private consulting companies	Participatory Cost Benefit Analysis ; Systematization of Experiences; Participatory Multi-Criteria Analysis (MCA)	

3 Participatory Methods in Climate Change Adaptation

3.1 Participatory Methods

In the context of climate change adaptation, participatory processes can be used with different motivations and/or to achieve different objectives as presented in section 2.2. To implement a participatory approach many participatory methods are a possibility. Nevertheless it is important to understand which methods can be used for which objectives and phases regarding the adaptation process. On the other hand it is also relevant to understand that implementing a participatory method requires knowledge of the method and practical skills in facilitation participatory processes. These aspects can also be considered by practitioners as important barriers or incentives towards the use of a particular method or approach in a process of assessment, planning, implementation or evaluation of climate change adaptation.

The BASE project took as a main goal to understand the importance participatory processes for climate adaptation but also to identify effective and innovative methods that can raise the knowledge and experience of what works for climate adaptation. In some cases, BASE researchers looked at past experiences where participatory methods were used with apparent success. In other cases BASE researchers accompanied ongoing processes that used participatory processes. Finally, in other cases, BASE researchers used and organized/facilitated participatory methods themselves, either to support an ongoing adaptation process or to evaluate past experiences of adaptation. Several different participatory methods have been used in one or more of these case studies and their choice and application derives often from a strategic choice, whereby different methods may be more suitable than others. In Milestone 8, developed before the use of participatory methods in the case studies, the BASE project identified several methods that promote and use participation to improve climate adaptation (see Appendix 1). In the table presented in MS8 a summary of each method is presented with some additional criteria namely what is the output of the method, what are its limitation/gaps, advantages, input data and references.

In this chapter we will described briefly some of the methods used in BASE and more in depth the methods developed (innovated) in BASE. For each method a general description and their role in

base is presented and a more descriptive methodology is provided to the ones tested whitin BASE project.

The participatory methods used are presented bellow:

- Stakeholder workshop
- World Café
- Participatory add-ons to Multi Criteria Decision Analysis
- Systematization of experiences
- Design workshop
- Citizen summit
- Fuzzy Cognitive Mapping
- Scenario workshop
- Dynamic Adaptive Policy Pathways (old Participatory add-ons to Adaptation Pathways)

The participatory methods developed within BASE are presented bellow:

- SWAP – Scenario Workshop & Adaptation Pathways
- Participatory Benefit-Cost Analysis

3.2 Participatory methods used

3.2.1 Stakeholder workshop

General Description:

Stakeholder workshop is a broad term for a work session that brings together several representatives of stakeholder groups to discuss issues of concern in a participatory way. Stakeholder workshops can be designed in a multiple of different ways depending on the objective and purpose of the participatory method. This broad methodology is frequently used in science-practice events in order to share, discuss and validate data and information.

Role within BASE:

Stakeholder workshop is characterized as a participatory method in the analysis of the participatory methods as some of the BASE case studies have applied this method in the participatory adaptation process. They have been used in the different phases of an adaptation process namely, assessment, planning, implementation and evaluation.

3.2.2 World Café

General Description:

World Café is a method conducted in a workshop format which follows the principle of a good conversation. The setting should create an environment which is most often modelled like a café (including round tables with 4 or 5 chairs). The host should begin with a welcome and an introduction in the process and the “Café Etiquette”. A World Café process begins with the first of

three or more twenty minute rounds of conversation for the small group seated around a table. After the first round each member of the small groups moves to another table. One person will stay at the table and is the host for the next round and briefly fills them in on what happened in the previous round. Each round of a World Café is prefaced with a question designed for the specific context and desired purpose of the session. After the small groups, the participants are invited to share results from their conversations with the rest of the whole group. These results are reflected visually in a variety of ways, most often using graphic recorders in the front of the room (Engage2020, 2014).

This methodology belongs to the Open Space Technology family and is being used very frequently in large events, such as the EEA Grant / Norway conference and CIRCLE-2 project final conference.

Role within BASE:

Since participants gather around tables to discuss different topics, this method can be used in several phases of the adaptation process, namely to support the assessment of adaptation options, the planning of adaptation actions and the evaluation of implemented adaptation actions or options.

In the BASE project, the Alentejo and Kalajoki case studies have applied the world café methodology in their participatory approach. Alentejo case study used the World Café to identify and evaluate climate impacts, assess, identify and evaluate adaptation measures, discuss institutional frameworks that support adaptation and to brainstorm on cooperation possibilities for adaptation studies for the region. Kalajoki used world café to consult stakeholders and support the planning of the adaptation in the river Kalajoki namely by evaluating of effects, costs and other consequences on the adaptation measures.

3.2.3 Participatory add-ons to Multi Criteria Decision Analysis (MCDA)

General Description:

The multi-criteria decision analysis (MCDA) is a formalisation of common sense for decision problems which are too complex for informal use of common sense. The MCDA methods help individuals or groups to analyse alternatives having multiple and incommensurable impacts. Whereby the goal is to create a structured process to identify objectives, create alternatives and compare them from different perspectives. The aim is to improve the quality of decisions by making choices more transparent, rational and efficient.

MCDA software is used by experts to summarize information and to rand alternatives. MCDA provides a framework for the participatory planning process and a tool to foster participants' learning (Engage2020, 2014; Marttunen & Rytkönen, 2013).

Role within BASE:

MCDA is a generic approach, which can be applied in very different ways in many kinds of situations. The approach is highly applicable to climate adaptation and examples of MCDA cases are related to watercourse regulation and flood risk management (Marttunen & Rytkönen, 2013).

Participatory add-ons to MCDA can be used by experts to rank alternative strategies or can be used as a framework for producing the data and involving stakeholders in decision making. It is a

tool for stakeholder involvement and not for public participation. The results can be presented to wider public to present how the preferences affect the desirability of options.

The method was applied in Cascais, Copenhagen storm-surge and the Kalajoki case studies.

3.2.4 Systematization of experiences

General Description:

Systematization of experience is a method aimed at improving practice based on a critical reflection and interpretation of lessons learnt from that practice.

The methodology encompasses the identification, documentation and transfer of experiences and key lessons extracted from a project or an initiative, or group of projects or initiatives for the purpose of advocacy, learning and replication/scaling up. Systematization does not end with the description of the experience and results, but involves a deeper insight into how it was possible to achieve what was achieved – what worked and what did not?, What were the key factors for success?, What could have been different and why?– in order to facilitate the exchange and use of development solutions.

Systematizations can be done at any point in a project or initiative. If done at the beginning they have to be embedded as reflection spaces and milestones in the project cycle, and generate mid-term products that are distributed to internal audiences for internal learning and improvement, scaling up, etc. The knowledge products as a result of a systematization process include but are not limited to guidelines, toolkits, how to briefs, roster of experts, and case studies.

Role within BASE:

The Systematization of Experiences (SE) been used to evaluate rural development processes in a participatory way. It is an analytical and procedural approach, with a focus on drawing a final set of guidelines for the future, but also on understanding how different characteristics of the process have influenced a project's history, its results and impacts (Selener et al., 1996). The methodology may be adjusted according to the characteristics and needs of the project being assessed. Therefore, various methods and tools may be integrated.

In the participatory retrospective analysis of the Convergence Center of Amoreiras Village, the method was suggested by the case study partners and co-designed with the researchers.

3.2.5 Design Workshops

General Description:

Design workshops are a participatory method often used in urban planning to facilitate input from the community in a specific geographic area. They are intensive workshops for many stakeholders to work together, including policy-makers, experts and the general public. A key element is the integration of design activities in an early phase to make implementation plans and/or research proposals (Engage2020, 2014).

The design workshop follows a series of processes. First, there should be a clear goal for the design workshop. Second, there should be both a moderator and a designer function involved.

Third, data and maps needs to be collected. Four, based on the goal for the design workshop the actors need to be invited around the tables. After these four points are accounted for, the rest of the sessions depend on the goal, the possible investment of actors and the other resources for executing the project. Thus, design becomes input for a discussion and is altered during the conversation.

A design workshop should always be finalised with some kind of report, in text and image. This is normally the responsibility of the designer and moderator, who feedback the information to the participants or a wider (specific) public and address the evaluation of the efforts in the design workshops vis-à-vis the set goal and intervention (area) (Zandvoort & Jeuken, 2015).

Role within BASE:

Design workshops are specifically designed to use in relation to climate adaptation used for the purpose of research, for seeking consensus, for collecting ideas or a combination of all.

In BASE, design workshops were used in the Rotterdam case study throughout the Dutch Deltaprogramme.

3.2.6 Citizen summit

General Description:

The citizens' summit is a method to find out the citizens' attitudes about political priorities and possible courses of action provided on an informed basis. The objective of the method is to provide advice and inspiration for the political decision-making process. Politicians are not obliged to abide by the voting results; yet, the summit provides a clear indication about citizens' attitudes, which implies some degree of commitment by the policymakers. The citizens' summit is a large-scale (typically between 200--5000 people) deliberative public meeting. It combines small-scale face-to-face deliberations in groups with the impact of large group collective decision making through voting. An important part in the implementation of the method is the use of communication technologies such as electronic voting, text messages, and online surveys to facilitate discussions. The participants are ordinary/lay citizens interested in the summit issue and the political decisions and priorities that are to be debated. The aim is to achieve the best representative spread of age, gender and employment. When the objective is to identify a particular target group's attitudes, participants can be selected according to more specific issue criteria. Usually, the organisers invite a number of speakers, which may be politicians, interested parties or experts. The presentations either take the form of opposing views or one speaker expresses the opposing points of view. Their task is to present the summit topics and the possible courses of action, which are to be voted on (Engage 2020, 2014).

Role within BASE:

The result of the citizens' summit is a prioritised list of visions and possible courses of action within the given area. This gives the politicians a sense of citizens' priorities, thus, political decisions can be based on citizens' wishes and achieve greater anchorage, acceptance and permanence.

This method is becoming more frequent in climate related events in order to involve citizens in "glocal" key topics where experience, decision and action of all is required. The citizen summit was assessed in the Kalundborg case-study once it was applied within the BaltCICA project.

3.2.7 Fuzzy Cognitive Mapping

General Description:

Fuzzy Cognitive Mapping (FCM) is a participatory semi-quantitative interview and analysis method that emerges as an extremely useful tool for complex decision environments as it is able to aggregate the accumulated experience, knowledge or perception of experts or actors. Participants are required to translate their knowledge or experience into a map (or network) consisting of nodes and weighted interconnections, which represent states of the system and the weighted cause-effect relations between them. FCM provides information on the main features of the network and allows evaluating scenarios of policy options or decision alternatives.

Role within BASE:

Fuzzy Cognitive Mapping can be used in a climate change adaptation process mostly in the assessment or the evaluation phase since it is an analysis that allows the visualization and deeper understanding of concepts, elements, functions, relations and patterns that condition impacts and vulnerability to climate change and adaptive capacity.

In BASE it has been used in the Tagus River Basin case study.

3.2.8 Scenario workshop

General Description:

The scenario workshop is an instrument for participatory planning, based on dialogue and collaboration between a group of local citizens, stakeholders, experts and policy makers. The method aims to stir dialogue, provide the opportunity for exchanging experience and knowledge about existing barriers and possible solutions, enhance the understanding on the central topic/problem of discussion, and facilitate consensus on proposed solutions among the involved groups.

The purpose of the scenario workshop is to assess different solutions to a specific problem. The solution can be technical, regulatory or an alternative method to organise or manage a problem. The scenario workshop is ideally a two day meeting involving 25-30 local representatives such as citizens, policy makers, stakeholders, technology experts and private sector representatives. Before the workshop, a set of scenarios are developed and used as visions and inspiration at the scenario workshop. From these, the participants develop visions in groups through discussion (first day) and develop local plans of action to solve the problem (second day) (Engage2020, 2014).

Role within BASE:

The scenario workshop can be used in to assess adaptation options, to create a vision for a future with adaptation and to develop a plan of adaptation. The scenario workshop can be used inside an adaptation process as a consulting method to capture the ideas of stakeholders and people who are specifically affected by climate change. On the other hand, the scenario workshop can be used in a higher level of participation delegating control to the participants of the scenario workshop in the creation of the vision and plan of adaptation. In such cases the invitation of participants to the scenario workshop plays an important role since it is important that not only all the stakeholder representatives are present but also the decision makers and the adaptation experts. The need to have all these participants in a scenario workshop and the logistical constraint of having around 30 participants in the process means that the region/locality of the adaptation plan should be small

enough so that 30 participants are still representing the different stakeholders and people affected by the climate change impacts or adaptation options.

Under BASE, the scenario workshop was used in the case studies of Kalundborg (analysis of retrospective implementation), Green Roofs (Czech Republic) and Aveiro (Portugal). In the later the scenario workshop was combined with Adaptation Pathways and some other changes, resulting in an innovative method created in BASE and named SWAP – Scenario Workshop & Adaptation Pathways, described latter on.

3.2.9 Dynamic Adaptive Policy Pathways

General Description:

The Dynamic Adaptive Policy Pathways (DAPP) approach aims to support the development of an adaptive plan that is able to deal with conditions of deep uncertainties. The approach is developed by Deltares and TU Delft and has inspired the Adaptive Delta Management concept of the Dutch Delta Programme. An adaptive plan specifies actions to be taken immediately to be prepared for the near futures and actions to be taken now to keep options open to adapt if needed in the future. The exploration of adaptation pathways is one of the main ingredients of an adaptive plan. A monitoring system collects information to get early warning signals (triggers) for implementation of actions or for reassessment of the plan.

Adaptation Tipping Points (ATP) are a key concept in DAPP. An adaptation tipping point specifies the conditions under which the status quo, a policy action or a portfolio of actions will fail. An adaptation tipping point is reached when the magnitude of external change is such that a policy no longer can meet its objectives, and new actions are needed to achieve the objectives. The timing of an adaptation tipping point (the sell-by year of actions) is scenario dependent.

Adaptation pathways describe a sequence of policy actions or investments in institutions and infrastructure over time to achieve a set of pre-specified objectives under uncertain changing conditions. An adaptation pathways map provides insight into policy options, the sequencing of actions over time, potential lock-ins, and path dependencies.

Role within BASE:

Many investment and policy decisions in water management have significant and often long-term consequences. Moreover, long-term objectives often require near-term decisions. Making sound near-term decisions is critical, yet we live in an increasingly unpredictable dynamic world governed by competing and changing beliefs and preferences. When decision makers and analysts face a deeply uncertain future (e.g. due to climate change), they need more than traditional prediction or scenario-based decision methods to help them to evaluate alternatives and make decisions. Adaptation pathways have been developed in several projects. For example EU RISES, BASE and Thailand.

3.3 Methodologies developed within BASE project:

The following methods have been developed within the BASE project.

3.3.1 SWAP – Scenario Workshop & Adaptation Pathways

General Description:

The method SWAP combines the application of the Scenario Workshop and the Adaptation Pathways methods. The Scenario Workshop is a two-day stakeholder workshop were the first day is used to create a vision for the future and the second day is used to develop a plan of action to solve the problems and implement the vision develop in the first day. The adaptation Pathways is a method that creates a visualisation of the tipping points of the adaptation options/ measures in time and depending on the climate change scenarios. With the Adaptation Pathways stakeholders and decision makers can visualize the valid time frame of each adaptation option/measure and include the uncertainty of climate change predictions into a dynamic plan that can change I time according to the observed effects and impacts of climate change in the region. When using SWAP, like in Scenario Workshop all stakeholders that have power, are interested or are affected by climate change in the locality are selected and invited to the workshop together with relevant experts that can support the decision making. In SWAP, in the first workshop day, visions are developed in groups in the first day and are then agreed upon by the whole group of participants by finding what is common among the visions of all the sub-groups and if possible discussing other ideas that can still work their way into the common vision. In between the first workshop day and the second, the adaptation pathways are developed based on the adaptation options included in the common vision. In the second day of workshop, the stakeholders discuss the adaptation pathways that are presented for the different stretches of territory and choose the adaptation pathway based on their group analysis. A MCA –Multi Criteria Analysis - may be provided to support the discussion and evaluation if the adaptation pathways by the participants. The adaptation pathways chosen in each group are then agreed into a common adaptation pathway and a map for the future that result in a strategic and dynamic plan of adaptation. An implementation plan can be later developed based on the strategic plan that results from SWAP or further workshop sessions can be organized to develop the plan into the implementation detail.

Role within BASE:

The SWAP method is specifically designed to use in climate change adaptation since it merges with the adaptation pathways method. It can be used like scenario workshop as a consulting method or as a method that delegates control to the stakeholder panel that is present in the workshop to develop a vision and strategic plan of adaptation for a specific locality. I this case, decision-makers should also participate in the workshops.

In BASE, the SWAP method was used for coastal climate change adaptation in the region of Aveiro, in the coastal municipalities of Ílhavo and Vagos. The method was used as a consulting process to support the adaptation process of assessment and planning. Furthermore, in the year of 2016 the method is to be used in adaptation in the agriculture and forestry sector in a Mediterranean region of Portugal.

Methodology

Framed by an action-research approach, the combination of methods used has been designated as SWAP: the Scenario Workshop (Andersen and Jæger, 1999), and the Adaptation Pathways and Tipping-Points (Hassnoot et al., 2013). To support the design of adaptation pathways, SWAP includes a Multi-Criteria exercise. Additionally the following sources of evidence and knowledge exchange can also be used: documental analysis of climate scenarios and risk assessments for the area; informal meetings with each relevant actor-group; seminars; and semi-structured interviews.

Documental analysis and literature review of vulnerability and risk assessments made for the area are essential to prepare the participatory engagement.

Stakeholder groups are first approached through seven informal meetings. Various actor-groups with particular interests in the area/topic and at various levels of governance are identified. The meetings usually highlight the need to provide a strong knowledge base to social actors on relevant topics. Researchers can then organize one or more seminars, which included presentations from the researchers, as well as from invited speakers, on climate change impacts and adaptation options for coastal regionsthe considered region.

Scenario Workshop

Participatory scenario methods have been developed in climate change adaptation research with the objective of involving individuals and groups in co-creating future visions for adapting their region or country. The application of the Scenario Workshop method used in SWAP includes three stages - critique, vision and action plan – proceeding along two day long workshops.

A representative group of 30 people is invited to participate in the workshops. Thirty is considered a good number of participants to achieve the aims of the workshop.

In the first session day, participants are informed about climate change projections for the area. Risk assessment maps are displayed on the workshop room's tables and serve as a crucial graphical tool to support the discussions. Together with the maps, participants are presented with three extreme future storylines of their coast, for the following 100 years. The storylines are based on the scenarios and risk assessments referred, and are purposely extreme and normative to promote a critical discussion. Presented (read by the facilitator) as fictional narratives, the storylines provides three alternative visions of what the future could be according to different courses of action. Table 12 provides a synthesis of potential alternatives (used in the Aveiro case study).

Table 12: Synthesis of alternative future storylines presented at the Scenario Workshop

a. Do nothing and maintain existing coastal defence structures, resulting in serious flooding events and damages to human settlements and infrastructures with great economic losses.
b. Protect everything, resulting in an artificial coast, with massive investments in a series of constructions (dikes and breakwaters), which radically change the natural landscape, as well as economic and social life in the region.
c. Relocate, allowing the sea to advance and coastal erosion to continue at will, some local settlements are abandoned, and the region gains a pristine ecological value.

Using the information presented (climate change scenarios, maps and storylines), participants are engaged in the critique and vision stages of the scenario workshop, by discussing in small groups the different alternatives. Common goals are identified and a forth alternative emerges, which includes characteristics from the three storylines presented. The same stakeholders are invited to meet again after four weeks, for the action-plan stage. The design of the action-plan is supported

by a multi-criteria analysis and by the adaptation pathways and tipping-points method, described below.

Multi-Criteria Analysis

A Multi-Criteria (MC) analysis of the potential adaptation measures in the common vision is presented to all in the second workshop day, and serves to provide stakeholders with relevant information for designing the pathways. The MC showes scores, ranging from very high to very low potential costs, benefits, efficacy, uncertainty and secondary effects of possible adaptation measures. It is made clear to the group that the scores attributed to different criteria should be understood as a qualitative evaluation to support the choices of measures.

Adaptation Pathways and Tipping-Points

The Adaptation Pathways and Tipping-Points method is used in the second workshop day has been developed by Hassnoot et al. (2013). It is a methodological tool to aid decision making and planning processes under conditions of great uncertainty for the long term. The resulting policies or measures shaping the adaptation pathways are flexible and dynamic. The pathways integrate changes in external conditions, which culminate on particular tipping-points, or a moment in time when a measure ceases to be effective and a new policy needs to be integrated to respond to the new conditions.

To apply the method in a participatory context, researchers started by presenting a set of potential pathways and their respective tipping-points. The pathways is usually printed and left in the room's working tables. Afterwards, participants are distributed in discussion groups and given the task of choosing or creating a new pathway that reflected their choices for the area. These new pathways are sketched by the groups on top of the original prints. The following step is for each group to present the pathways, while the facilitator designes the pathways, seen by the whole group in the room's projector. The final pathways are subsequently aggregated into a single pathway for the whole coast. This final visual representation of potential adaptation measures, according to tipping-points for the following 75 years, represented a synthesis of the resulting action-plan of the scenario workshop.

Interviews

Three weeks after the workshops, 10 out of the 25 participants are interviewed. Interviews have two central objectives. First, they should offer understandings regarding what was learned by social actors throughout the engagement processes, taking into account SWAP's objectives. Second, results would deliver suggestions regarding what could be important strategies to endorse the implementation of the action-plan. A semi structured interview schedule is based on a set of key questions as shown in Table 13.

Table 13: Semi-structured interview schedule

Was it relevant to plan for the long-term (i.e. 100 years); was it important to think so far ahead in time?
Did SWAP changed opinions regarding long-term planning?

What had been learned about climate uncertainty? Was it more likely to deter or to promote anticipatory adaptation and why? What about other types of uncertainty?
What have been the most positive and negative features of the participatory experience?
What should be the next steps for the research design in order to promote the implementation of the plan?

3.3.2 Participatory Benefit-Cost Analysis (PBCA)

Within the existing literature there are only a few examples of hybrid methodologies being used in climate change adaptation at the local/regional level, making the PBCA an innovative tool to be considered and evaluated directly from empirical evidence.

General Description:

The Participatory Benefit-Cost Analysis (PBCA) is a methodology developed and tested by FFCUL in the case study of Cascais (see Deliverable 5.2 – page 9 and full description from page 391), within the framework of action-research, in order to bridge between the Participatory Multi-criteria Analysis (PMCA) and the Cost-Effectiveness Analysis (CEA) regarding the economic appraisal of the adaptation measures taken into consideration by the local stakeholders. The PBCA is an economic appraisal tool which assesses through participatory methodologies the relative costs and benefits of different adaptation measures of the Strategic Plan for Climate Change of Cascais (PECAC). It has been designed and developed to be a simple-to-use, resource efficient, solutions focused, pro-active, deliberative process to be implemented within the framework of the Stakeholder Workshops (9) organized by BASE in Cascais. It is a complementary tool to the PMCA which aims to combine the advantages and strengths of multi-criteria analysis with the rationality of Cost-benefit Analysis (CBA), thereby evolving from the simplicity of the Simplified Participatory Cost-Benefit Analysis (SPCBA) as proposed by the Climate Resilience Framework – Training Kits (3rd series) – to deliver an all-in-one procedure for action-researchers working in climate adaptation.

PBCA can be defined as a hybrid methodology of economic project appraisal as it is composed of heterogeneous sources and diverse elements, combining interpersonal deliberation and quantitative methodologies to produce both depth and breadth in valuation and appraisal processes. Hybrid methodologies are another growing trend within economic project appraisal tools and methods as they "*resituate specialist knowledge claims through attention to their framing conditions and boundaries of uncertainty, while co-producing new forms of citizen and stakeholder expertise, thus opening up the appraisal of projects, plans, programmes, and technologies to other forms of framing and reasoning*" (Davies, 2006: pp. 235)

It is rather important to mention that the PBCA has been developed within a larger framework of action research and included within the program of four of the nine Stakeholder workshops, namely the cluster-specific workshops, in order to allow a deeper understanding and reflection from the stakeholders regarding the economic impacts of specific measures. These stakeholder workshops

were a full day meeting were groups of 20-27 participants from different organizations gathered to discuss, vote upon and analyse different adaptation measures.

The PBCA is conceptually and in practice distinct from what is normally referred as PCBA. The inversion of Cost-Benefit to Benefit-Cost is an intended, conscious decision as the focus of the analysis derives not from a needs/problem analysis but from an asset-based perspective. We focused on creating the space for intentional conversations between stakeholders around potential connections, solutions and actions regarding climate change adaptation. In doing so we also moved beyond traditional vulnerability analysis and entered into opportunity analysis for building resilience within our communities and ecosystems, following the Asset-based Community Development (ABCD) approach [1].

The PBCA was developed in order to answer most of the challenges recognized in the CBA literature and embody the new trend towards participatory methodologies as well as the call for more complementarity between economic appraisal tools.

Although the focus is on climate change adaptation, we believe that the method, as proposed, could also be applied to different contexts and circumstances, and different challenges facing our societies today. An example would be with social entrepreneurs and community workers, interested in having a better understanding of their community preferences and perceptions regarding different options as well as facilitating participatory decision-making processes within a structured dialogue along positive and negative effects of concrete measures.

The Methodology (also described at D5.2 page 406):

The PBCA tool was developed together with a wider action-research methodology agreed upon by the Municipality of Cascais and BASE. In this sense, PBCA is one of several tools which were designed with an integral perspective and co-evolved within a larger framework whose main objective was to evaluate the efficiency, effectiveness, adequacy, barriers and opportunities for different adaptation measures in Cascais. The tool was tested in three separate participatory workshops, with local stakeholders, each time in one hour period.

The PBCA Methodology has 5 different steps which can and should be completed in approximately one hour by groups of diverse stakeholders. The methodological steps are presented at the beginning by a session facilitator, which cannot be also a group focalizer. The objective of the session is also presented at the beginning, clarifying that the purpose “is not to calculate the “right” decision, but no help improve the understanding for decisions involving risks, multiple criteria, and multiple interests.”(Bell et al, 2003: 2) as Michelle Bell, Benjamin Hobbs and Hugh Ellis have argued for participatory MCDM. The 5 Methodological Steps are:

Step 1: Organize participating stakeholders into mixed groups of [3min-9máx], where each group is given one Adaptation Measure/Project to assess and one facilitator. It is extremely important to guarantee diversity/heterogeneity in the constitution of the groups, so as to foster rich debates from multiple perspectives. The adaptation measure to be analysed can come from a previous exercise and be selected by the group or it can be a new measure suggested by the facilitator of the session according to the groups’ interest and motivation.

Step 2: Each group is given the PBCA Matrix (explained below) and 30 min to fill it according to sub-step 1 - name the impacts – sub-step 2 - value each impact according to the given scale – sub-step 3 - calculate ratios.

Step 3: The session facilitator presents the concept of discounting and offers different alternatives for the participants’ consideration. Doubts are clarified.

Step 4: The participants are given 15 min to debate the discount rate to apply in each group. Group Discussion on which Discount factor to apply and net final value calculation.

Step 5: Each group selects a representative group speaker which presents in 1-3 minutes the final net value, the discount rate choice and the overall discussion regarding the costs and benefits of the adaptation measure under scrutiny.

The fundamental structure of the PCBA is presented to the participants in Step 2, and it serves as the underlying matrix for the discussion that will follow. The PBCA Matrix was developed having as the starting point the SPCBA Matrix proposed and tested by the Climate Resilient Network, while bringing into the exercise both time differentiation (short-term; long-term) and the possibility of unequal weighting of the criteria (Economic, Social and Environmental). This was a conceptual possibility but it was never truly explored in our participatory workshops, mainly due to time limitation.

Still regarding Step 2, filling-up the PBCA Matrix has 3 Sub-steps:

1) **Name them**!! Each group has to come to a common agreement on the 2 most important effects (positive and negative) for each of the three 'criteria' based on their expert knowledge and synthetically describe them. If necessary, more than 2 can be named and valued, if the group agrees. In the end you should have 12 important impacts identified for your Climate Adaptation Measure
2) **Value them**!! Each group has to come to a common agreement for a scale-valuation (1-5) for each effect named before. In the end you should have 24 single valuations. This means that based on the expert judgment from the participants within each group (which could be supported by existing evidences and studies, such as CBAs and others) has to come to a consensus on the value they will attribute to the positive and negative impact of a particular adaptation measure.
3) **Time for Math**: Add and divide by two for each 'criteria box', add all Benefit means as well as Costs means and by now you should have 4 final sums (Short-term Benefits; Short-term costs; long-term benefits and long-term costs) and 8 partial Benefit/costs ratios

Uncertainty can be internalized if the participants don't reach a common agreement for a certain valuation by allowing for intervals, let's say for example [3-5]. This was the case within one of the groups were consensus was not reached and the facilitator suggested intervals. The scale can also be adapted for [1-10] if necessary, for better distinction between adaptation measures. Bigger, proportional scales [1-100] can also be used. Nevertheless, in our view they add substantial complexity without improving dramatically the overall conclusion. Although the final value is a ratio a unique scale should be decided prior to the use of the PBCA in any context, in order to guarantee perfect comparability between results and final ratios. Based on our experience within BASE, we recommend the use of [1-10] scale.

4 Analysis of Deliberate Participation Processes

The use of participatory methods are context specific and a participation process depends on a multiple of different factors. In the following section the BASE case-studies, where there has been

a deliberate participation process present are analysed. The aim of the analysis is to assess the experiences gained from applying participation methods.

4.1 Methodology for case study analysis

The analysis follows the following structure for the case studies:

- Introduction to case study
- Overview of the participation process
- Objective of the participatory process
- Figure with timeline
- Context and description of the participation process
- Analysis of implementation of participatory methodologies

For the case-studies a description and analysis of how the participation process has been implemented is given. The analysis includes a general introduction to the case study and the participation approach. A description of the participation approach is given including the actors involved and the objectives of using the participatory approach. A visual presentation of process is shown through a timeline.

Each case study analysis ends with an analysis of the implementation of the participatory methodologies. The experiences learned are visualised through a SWOT analysis, and a description of the influence of participation on strategies and measures and possible improvements in the participatory process is given.

The outcomes and experiences of participation are diverse. The aim of analysing the implementation of participatory methodologies for the respective case-studies is to share the experiences of applying the described participatory approach to the specific case study. The goal is thereby to be able to draw conclusions based on the experiences gained in order to come with recommendations to practitioners and policymakers in order for a participatory approach to be transferable to another context and promote good adaptation practices (Chapter 5).

4.2 Case study analysis of deliberate participation process

In the following section an indepth analysis of the 9 BASE case studies, where there has been a deliberate participation process is given following the methodology presented in section 4.1.

4.2.1 Alentejo

The FFCUL-CCIAM research group has looked at the adaptation to drought and climate change in the Alentejo region through different perspectives, stakeholders and projects. To begin with participatory state of the art on Adaptation Climate Change in Alentejo on the Agriculture and Forestry sector was organized to bring together researchers and other stakeholders discuss the state of the art on the topic. In November 2013 FFCUL brought together 36 researchers, experts and institutions to present their work on the topic and discuss in groups the climate impacts in the

region, the adaptation measures, the political framework and possible collaborations between stakeholders.

Following the participatory state of the art were a screening and mapping of projects that implement adaptation measures was made, two projects were researcher in depth with participatory approaches. The Tamera eco-community was researched due to the implementation of the Water Retention Landscapes and was subject of a Participatory Benefit Cost Analysis and a Cost Benefit Analysis. The village of Amoreiras was also researched in depth due to the work of the Convergence Centre that joined all the population to create a common and sustainable vision for the future of the village. This project was researched with the Systematization of Experiences participatory method.

Furthermore, 21 farmers were interviewed and surveyed to understand how farmers are autonomously adapting to climate change. These 21 farmers were identified by the three biggest Portuguese confederations of farmers' organisations and by Rede Convergir (an online platform of sustainability projects) due to their best practices in agriculture.

Finally, farmers and other stakeholders were invited to a Participatory Multi Criteria Analysis to evaluate the adaptation measures that are implemented by farmers in the region.

Timeline

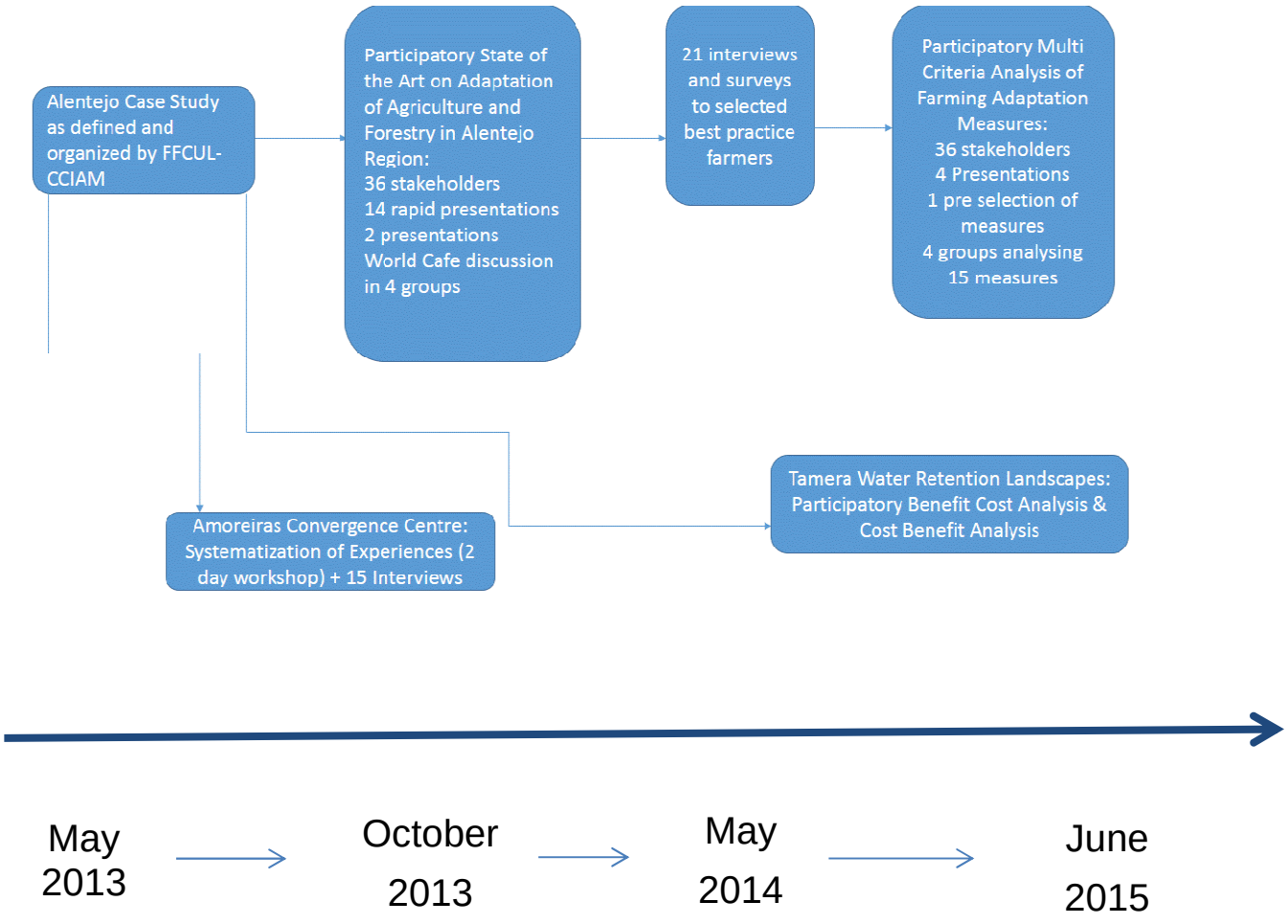

Figure 24: Timeline of the participatory process in the Alentejo case study

Context and description of the participation process

The regions in Portugal do not have adaptation strategies or plans despite the fact that thorough national strategies for adaptation exists in mostly all sectors. On the other hand the Alentejo region is highly vulnerable to climate change impacts on the agriculture and forestry sector. BASE researchers from FFCUL addressed the regional stakeholders developed a participatory action research approach with the aims of: understanding the regional state of the art on adaptation to climate change in the agriculture and forestry sector; identifying autonomous adaptation measures that have been implemented in the region by different stakeholders; evaluating some of these adaptation measures; and promoting the networking among the stakeholders to promote the adaptation of the region.

Analysis of implementation of participatory methodologies

As mentioned above several participatory methodologies have been applied in the case study of Alentejo namely:

- Participatory State of the Art (combination of methods used in BASE)
- Participatory add-ons to Multi Criteria Analysis
- Systematization of Experiences;
- Participatory Benefit cost Analysis (new method developed in BASE)

While all these methods, except Participatory State of the Art, have already been described in chapter 3.1 it is important here to analyse their implementation in this adaptation context and in the light of the recommendations or main questions addressed to participation and adaptation.

Participatory State of the Art

The program for the Participatory State of the Art workshop was:

1. Rapid Formal Presentations (5 to 7 min. Inspired by the Pecha Kucha method) on “Mapping the Useful knowledge to Climate Change Adaptation on Alentejo Region”
2. Presentation on Climate Change Adaptation to Alentejo
3. Discussion in Breakout Groups (using World Café method)
4. Presentation of results of group work

The workshop day was designed to fit the objective of developing a State of Art and at the same time providing a networking moment for researchers and experts to get to know their work and review the climate change impacts, the national adaptation strategy and the political and spatial management instruments for the region in this context. After the morning where all stakeholders were presented and about half of them presented their research work and expert work, stakeholders gathered in the discussion afternoon in a world café approach. Participants were randomly divided in four different groups to discuss four defined topics at different tables, with individuals switching tables periodically and getting introduced to the previous discussion at their new table by a facilitator. Each group group/ table had present around 7-9 people adding to the total number of participants in the whole day. All participants contributed to all the four different themes and in each group the facilitator briefly updated the participants about i) what was the aim of the discussion, ii) what the previous groups have been discussed and iii) the main conclusions

so far. At the end of the four sessions of group discussions, the outcomes of the groups discussions were presented to all the participants by the facilitators. The main aim of the breakout group was to: i) discuss the main impacts of climate change in the agriculture sector of the Alentejo region; ii) to discuss the adaptation measures for the region and identify projects that implement some of them; iii) to discuss the framework of spatial management instruments and policy that conditions adaptation and to iv) identify the main gaps of knowledge and promote cooperation among the stakeholder for further action-research work.
The workshop was evaluated as highly positive identifying the knowledge gaps, promoting actual cooperation that did foster future work and deepening the discussion on the issues of impacts and adaptation measures and strategies among the stakeholders present.

Participatory Add-ons to MultiCriteria Analysis

In the context of this case study a multi criteria analysis to 15 adaptation measures to agriculture was made by a group of 36 stakeholders (among 15 were farmers) . The workshop started with the presentation of about 70 adaptation measures. These measures were prioritized by the stakeholders present based on their effectiveness for the adaptation purpose. The top 15 measures were then subject to a multi criteria analysis by the stakeholders gathered in five groups were each group analysed three measures. The criteria used were: 1. Costs of Investment; 2. Costs of Maintenance; 3. Economic Benefit in 5 years; 4. Potential Jobs; 5. Autonomy; 6. Capacity to Implement; 7. Replicability; 8. Flexibility; 9. No Regret; 10. Urgency.

The participatory process made possible that the multi criteria analysis had more knowledge and that the opinions of less expert participants were validated and corrected in group. Each participant had made their own MCA but then the group discussed the results and participants were given the opportunity to change their answers and also create a group answer.

Results include the multicriteria table with all the 15 adaptation measures and an overview of of criteria weights.

Table 14: Multicriteria Analysis of 15 adaptation measures made by 36 stakeholders in 3 groups - overview

Measure \ Criteria	1. Costs of Investment	2. Costs of Maintenance	3. Economic Benefit in 5 years	4. Potential Jobs	5. Autonomy	6. Capacity to Implement	7. Replicability	8. Flexibility	9. No Regret	10. Urgency
Mulching and plant covering	3	3	6	3	8	7	9	9	10	10
Regenerate Soils	3	3	7	4	8	5	9	10	10	10
Direct Sowing	6	5	7	4	7	5	6	8	8	8
Agro-Forestry integrated landscapes (Montado)	6	6	6	6	7	8	7	8	9	8
Micro-climates : Use, create, manage	7	5	6	6	7	7	7	7	8	7
Keyline planning and plowing	5	4	7	4	6	5	6	8	9	7
Micro-modelation of soil for water retention	6	6	6	5	6	7	7	7	7	6
Increase Diversity and complexity of agro-ecossistems	4	3	5	4	6	5	8	9	9	8
Strenghten the role of Forests and Agriculture in protecting water and soil	4	4	6	6	5	8	9	9	10	10
Increase Diversity of crops, species and varieties	5	4	6	6	5	5	9	9	9	7
Soil conservation and promotion of organic matter in soil	4	2	1	4	5	4	8	9	10	10
Water harvesting in very big dams and irrigation	9	6	6	6	5	6	5	5	6	3
Water harvesting in small dams	8	5	8	4	4	5	7	7	7	8
Selection and natural Improvement of species	8	7	7	6	3	4	5	6	7	7
Pay Farmers, shepards, forest farmers for ecossystem services	10	8	5	9	2	3	10	10	8	10

Systematization of experiences

In chapter 3 the systematization of experiences is described a method that is used to revisit the learning of each team member regarding a project or action that was done in the past, allowing that the individual experiences are shared in the group and the team or organisation grows and brings the past experiences into lessons for the future. The differences from a simple evaluation process are several namely: it includes the whole team and not just the top/responsible/planners/decision makers; it includes a history of actions and processes and not just a specific moment or action or

project; it includes several different ways of cognitive approaches directed towards the different participants, from charts and numbers to deep discussions, role plays, etc.

In the case study of Alentejo the Systematization of Experiences was used to evaluate and systematize the experience of the Convergence Centre of the village of Amoreiras, a local development project, considered a grassroot innovation, that in its work of 8 years in a village of 200 people in the region of Alentejo, promoted the adaptive capacity of the population attempting to create a sustainable village. The group intended to increase of the adaptation capacity and to create a sustainable village adapted to climate change with the population while at the same time bridging the village life with the urban life. These objectives were prosecuted by 328 events between 2006 and 2012 and one specific project called sustainable village that joined the 90% of the population to dream the future of their vision and join in groups to make those dreams come true. This project was studied and evaluated by a series of research studies and the systematization of experiences complemented this past works by making the evaluation a participatory process made with and for the Convergence Centre present and past team members. The results therefore are useful for researchers but also for the organisation itself whereas other studies were frequently only read by one or two members of the project team. The systematization of experience in this concrete case study consisted on a 10 month study that was focused on a three day workshop with all the present and past members of the team of the Convergence Centre, while including the questions made from many partners of the Centre.

Table 15: Systematization of Experiences steps used in Convergence Centre Amoreiras, Alentejo

METHODOLOGICAL STAGES (FROM MAY 2013 TO FEBRUARY, 2014)	OBJECTIVES	INTERACTIONS, METHODS AND TOOLS
Preparation and joint discussions to co-delineate Methodology design	Define research questions Establish a coordinating group	Kick-off meeting with ACC Timeline of the Convergence Center
Continue outlining methodological design [systematization questions]	Collection of systematization questions among ACC partners and former members	Analysis of 137 systematization questions; identify main themes
Interviews	Prepare and apply (17) interviews. Provide ACC with a synthesis report of results	Participatory interview schedule (meeting with the ACC group); 17 in-depth Interviews
Three-day Residential workshop	Design and implement workshop (26 participants)	Collective Design of WS program: World Café; Responses Session; Quantify Successes

Follow-up and synthesis	Final meeting, collecting results Producing systematization report for participants	Audio and video recordings; personal notes; photography; flipcharts

Participatory Cost Benefit Analysis

As mentioned in 3.1 the Participatory Cost Benefit Analysis (PBCA) method is designed to incorporate in a fast way the externalities associated with climate adaptation measures and their non-market value with the opinions from stakeholders. The participatory cost benefit analysis can make the use of cost benefit analysis more effective since it can help the economist team to identify what are the most important cost and benefits of a certain action or project, even if these costs and benefits are uncertain and no precise estimate of their exist. When making Cost Benefit Analysis (CBA), experts are limited to the knowledge of experts to understand what can be the most important cost and benefits unless they choose indirect methods to obtain these values or direct methods that can be prohibitively expensive to obtain. With participatory cost benefit analysis, these non-market values are identified promptly and weighted, resulting in a prioritization of the values, thus providing the economist team the information on whether it is necessary or not to invest in a direct method to evaluate the externalities, such as a contingent valuation for example.

In the context of the Alentejo case study PBCA was used to complement the CBA made on the implementation of the Water Retention Landscapes and was applied prior to the CBA. The PBCA was applied to a group of about 15 stakeholders divided into three groups from which about half are residents of the Tamera Community and half are neighbours and neighbour organisations.

The results consist of a Benefit Cost Ratio, a qualitative Net Present Value (NPV) and a list of major positive and negative impacts and their score from 1 to 10 on the environmental, social and economic aspects.

Table 16: PBCA - Participatory Benefit Cost Analysis to Water Retention Landscapes in Tamera Ecovillage - global analysis

	Environmental		Social		Economic		TOTAL		Discount rate selected	NPV	NPV for a 0% discount rate
	B/C Ratio Short term (2016)	B/C Ratio Long Term (2050)	B/C Ratio Short term (2016)	B/C Ratio Long Term (2050)	B/C Ratio Short term (2016)	B/C Ratio Long Term (2050)	B/C Ratio Short term (2016)	B/C Rácio Longo Prazo (2050)			
Group I	2,50	6,67	1,00	3,80	1,20	10,00	1,42	5,90	-1%	4,94	3,66
Group II	0,88	4,00	2,40	5,00	0,64	3,80	1,00	4,21	0%	2,6	2,61
Group III	2,75	9,50	4,00	10,00	0,75	10,00	1,72	9,83	-5%	32,01	5,78

Analysis of implementation of participatory methodologies

The SWOT analysis to the whole participation process of the Alentejo case study includes learning from the different part of the participatory process and learnings from the whole process as well.

Table 17: SWOT analysis of the participatory process in the Alentejo case study

STRENGTHS	WEAKNESSES
- Identify local solutions for soil irrigation and regeneration techniques - Identify research gaps in climate change scenarios and adaptation for the region - Multi-actor and multi-level engagement in joint discussions for climate adaptation - Gain the support of national and regional policy makers. - Identify new adaptation options not listed in the national adaptation strategy for the agriculture and forest sectors or in bibliography - In the positive constructive process, stakeholders learned from each other and changed their answers in the process. - Concrete results with high level of detail and quality arise from the participation processes. - Results can be used to complement other non-participatory and more quantitative analysis	- Difficult to involve all relevant stakeholder groups in an action-research design that encompasses the whole region. - Workshops were not righty timed as they happened too far from each other… some times months. - Would be relevant to have separated opinions from different stakeholders to able to eventually cluster opinions and stakeholders interests
OPPORTUNITIES	**THREATS**
- Develop an adaptation action-research group for Alentejo - Design an adaptation strategy for Alentejo, with the involvement of all relevant stakeholder groups - Identify strategies, policies and regulations which may support local adaptation - Training and awareness raising - Participatory action-research seen as an adaptation measure	- An regional adaptation plan may never be made or move to an implementation stage, leading to demotivation of stakeholders - Becoming a participatory “circus” if there isn’t serious political power supporting the process as well as the decisions - Too much participation without concrete action can lead to frustration and disengagement

Influence of participation on strategies and measures

The Alentejo case study is an overview on the impacts and adaptation measures for the region one the agriculture and forestry at the farmers and community level. At the level of farmers and communities the participatory processes were used only to evaluate already implemented adaptation measures. The evaluation process when done in a participatory way, namely with the methods used, contributes to the reflection of the stakeholder even in a research process. The follow up of this reflections was not under study, thus we cannot state the influence on future strategies and measures planned or applied by the stakeholders participating in the study. At the regional level, there is not stakeholder responsible for a regional adaptation plan or strategy, thus again, there is no concrete direct influence of the participatory process. On the other hand, as mentioned above on the summary report of the participatory state of the art, the participatory process made possible other projects that already are occurring on the scope of adaptation to

climate change in the forest of Alentejo, namely the project Adapt For Change, a project of implementation of adaptation with partners that participated in the Participatory State of the Art and the Participatory Multi Criteria Analysis. Other smaller collaborations have also occurred among other stakeholders making clear that participatory processes also influence adaptation simply by the simple aspect of bringing stakeholders together in a constructive and open dialogue that creates opportunities.

Possible improvements in the participatory process

A participatory process is more effective if integrated with a decision making process and a perceived need regarding a specific issue. In the case of the Alentejo region and its adaptation to climate change there is a clear perceived need but there is no clear decision making process to integrate into. This lack of decision making process and institution responsible about the elaboration and implementation of an adaptation plan for the region diminishes the potential results of the participatory process. The nature and objectives of any participatory process should also be designed together with the relevant stakeholders to improve the potential use of its results. In BASE this was made in several aspects of the participatory action research but not in all of them. It was done in the Systematization of Experiences thoroughly but the other projects were mostly researched according to the research and project needs, diminishing also therefore the potential use of the results by the stakeholders. Finally, the timing of the workshops, the connection between them and the outputs provided to stakeholders could improve the connection between the stakeholders and the participatory process and its results.

4.2.2 South Aveiro Coast

The case study of the South Aveiro Coast is presented in chapter 2.1 in the section 2.2.15 and the method used in the case study, the SWAP – Scenario Workshop & Adaptation Pathways, is described in section 3.1 in section 3.1.3 and 3.1.4. This method was used in this case study using a participatory action-research approach to address the main adaptation obstacles identified in a previous participatory project called CHANGE (Schmidt et al., 2014). This process and method was furthermore integrated with a cost benefit analysis and a brainstorm workshop on how to finance coastal adaptation as mentioned below in the timeline figure 25.

Timeline

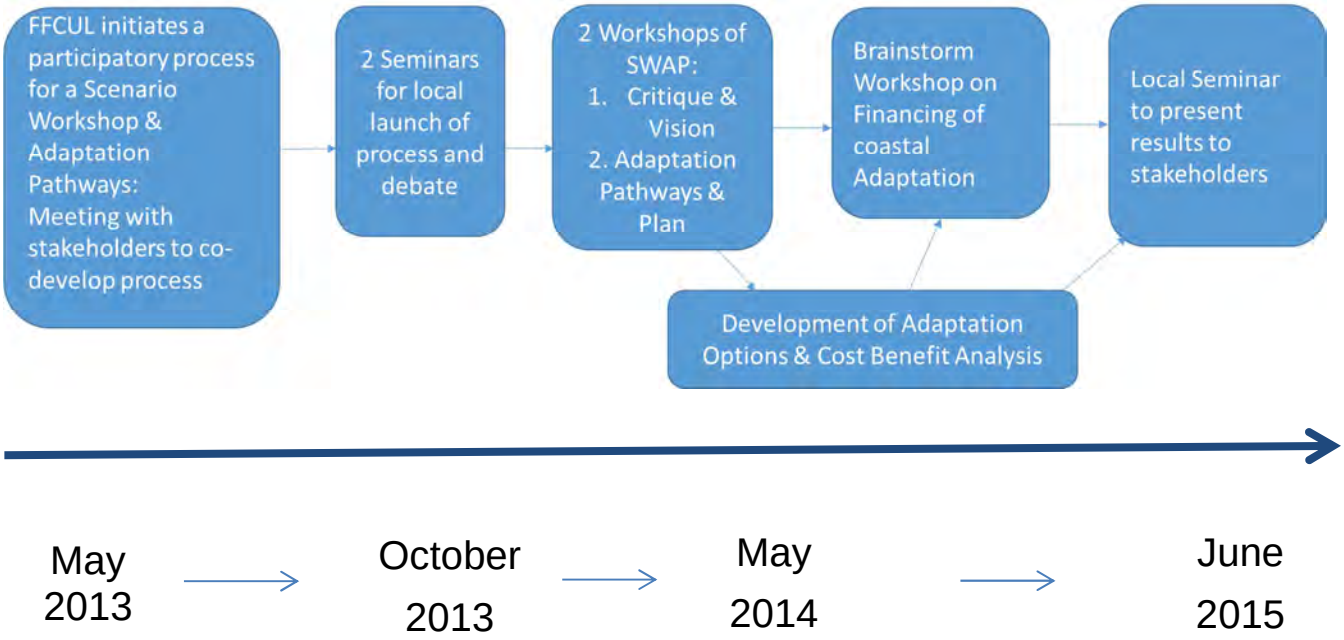

Figure 25: Timeline of the participatory process in the South Aveiro case study

Context and description of the participation process

The objective of BASE research has been to bring together a group of relevant stakeholders to promote institutional dialogue and the co-design of an adaptation plan a highly vulnerable area of about 20 km of coast. There is a national adaptation strategy for Portugal – ENNAC though it is still at the beginning stages of implementation. Additionally, 2013 winter's events (storm surges which threatened several coastal zones in Portugal), lead the Portuguese Ministry of Environment to create a working group for costal adaptive management. The group gathered data to advice on a plan for adapting the Portuguese coastline to both climate change impacts and coastal erosion and used information from BASE project and results to its report.

Locally, political agendas are concerned with maintaining the functioning of the beaches during summer season, thus protecting investments and business in the tourism sector, but also in deterring the devaluation of real-estate investments.

The problem of this coast continues South to the district of Mira and Figueira da Foz, as well as North to Ovar. An association of the municipalities that surround the Aveiro delta (CIRA) have created a joint strategy to supports implementation and fundraising strategies, which includes coastal adaptation and protection as part of its agenda. Thus, planning coastal adaptation in this smaller section of the affected territory can be an important pilot experiment for other regions to the North and South.

We began by presenting to stakeholders, individually, our methodological proposal based on the Scenario Workshop (Rasmussen, 2003) and the Adaptation Pathways and Tipping Points methods (Hassnoot et al, 2013) supported by a Multicriteria Analysis. The use of the Adaptation Pathways and Tipping Points method in a participatory context had, to our knowledge, not been done before. We evaluated the workshops with follow-up individual interviews where we asked participants to assess their experience, as well as their views on local barriers, uncertainties and perceptions regarding climate adaptation. The SWAP workshop resulted in an adaptation pathway and based

on this a map for the year 2025 was created that is considered the base for the short term planning.

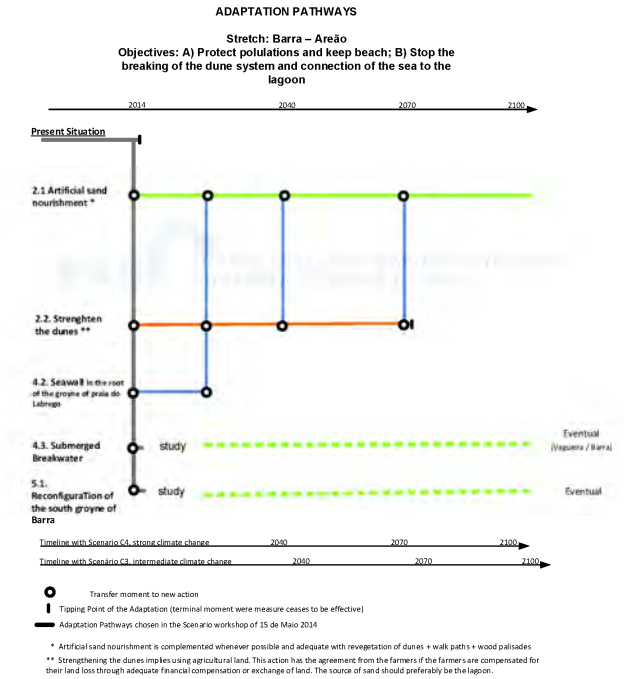

Figure 26: Adaptation Pathway map for the Varra- Areâo case study

Figure 27: Map of the Barra-Areão stretch in 2025

After the SWAP workshops, the adaptation actions selected by local stakeholders were economically assessed through a Cost-Benefit Analysis. These actions are mostly “hard measures”:

- Beach sand replacement;
- Reinforcing the dune system (by building sand dikes, and relocate farming fields); maintain existing structures (groynes);
- Build a longitudinal adherent construction on the existing groyne South of Vagueira Beach;
- Re-align the direction of the Aveiro Harbour’s Southern groyne;
- Build an artificial reef in front of either Barra or Vagueira beach (or both).

Complementary, a participatory workshop was organized in partnership with the project CAFCA – Coastal Adaptation Financing Coastal Areas – to brainstorm of possible sources and ways of fundraising for the planned coastal adaptation. Finally, a seminar to present the results to the local stakeholders and general population was organized in Aveiro.

Analysis of implementation of participatory methodologies

Table 18: SWOT analysis of the experiences of the implementation of the participatory methodologies in the South Aveiro case study

STRENGTHS	WEAKNESSES
Having for the first time a group of relevant stakeholders designing together an adaptation plan for this coast Creating a space for dialogue between different institutional bodies. Clarifying myths and misconceptions about adaptation options Access in real time to both expert knowledge and local knowledge to support the analysis and selection of adaptation options	There are no guarantees that the plan will be implemented.
OPPORTUNITIES	**THREATS**
Testing new methodologies that are assimilated by stakeholder groups and can be replicated at their institutions, groups or associations. Promoting the implementation of an adaptation plan Promoting political dialogue Increasing knowledge on local adaptation possibilities for the region. Using the case study as a pilot project for the whole coast of Portugal.	There could be no commitment to the implementation of the plan by local stakeholders If the plan is not implemented stakeholders may be demotivated and less likely to engage in future discussions. There has been a clear call for action throughout the planning process that may not be fulfilled.

The SWAP method is now being used in another project in adaptation in agriculture. The H2020 funding is providing fund for adaptation in municipalities and the Vagos municipality is already intending to apply to proceed with the implemention of the SWAP results.	

Influence of participation on strategies and measures

The participatory process has made possible the agreement of many stakeholders and institutions that have conflicting interest and have a hard time in making common long term plans. The SWAP method as created this opportunity and this result which was only possible by the method of SWAP and the specific detail of the common minimum consensus. This common minimum consensus was after all not so minimum allowing a detailed cost benefit analysis to be made and some action to be implemented. Some actions were already in the way to be implemented and continued to be implemented, namely the artificial sand nourishment. The way this artificial nourishment is done was now studied in detail and with a cost benefit analysis based on the interest of stakeholder thus providing specific support to the implementation of the adaptation measures. The agreed need for a study of a submerged breakwater in front of the village of Vagueira and the positive result that this measure had from the Cost Benefit Analysis that studied the results of the participatory process also empowered the Mayor of the municipality of Vagos to continue with his efforts to study and implement this measure. The brainstorming on funding opportunities also developed further the idea of creating a regional fund that is managed but the intermunicipal community for regional and local coastal adaptation. Strategically, the long term vision for the territory is now more clear and common among all the participants despite the fact that some ideas and proposal that were not consensual are still present in among the stakeholders and will arise in the future for more intense debates and studies, namely the relocation of the front line urban areas. In summaray, the SWAP workshop and participatory process complemented with a Cost Benefit Analysis and one follow up workshop influenced clearly the strategies and measures to be applied in the region, namely through the clarification and harmonisation of the visions and opinions of the local, regional and national stakeholders.

Possible improvements in the participatory process

A participatory process such as any expert based process or analysis is limited in time by the resources, momentum of action and needs and skills of the participants. While the participatory process applied was considered fully successful, further improvements can always be made and choices regarding the objectives of the process must also be made between a more research oriented output or a more action planning output.

To further improve the participatory process the initial phase of the process can take longer so that a more profound involvement of the stakeholders is done. On the other hand, regarding the research and study objective the Scenario Workshop method does not respond to some other research questions that emerged at the exploratory stages of the case study: 1. how to choose

between the multiple technical options and variations of the potential adaptation measures to be included in the final action-plan? 2. Moreover, how to integrate future climate uncertainties (e.g. sea level rises) in the planning process? 3. Finally, what are the different secondary effects of these options, and what will be there monetary costs and possible benefits?

To address these questions, the researchers in the BASE project decided to propose the application of a novel combination of methods, which was designated as SWAP - referring to the Scenario Workshop and Adaptation Pathways and Tipping Points (AP) methods, used to support the making of the action-plan. Furthermore, a multicriteria (MCA) analysis and a Cost-Benefit Analysis (CBA) were done.

Finally, to improve the use of the outputs of the participatory and process it would be beneficial if results were publicized in the media and some media materials were made such as press releases, video, visual reports, specific website, etc.

4.2.3 Cascais

Participatory Methodologies in Cascais have been extensively used as a mean as well as an end itself and are at the core essence of BASE work with the Cascais Municipality from day 0. The research work with Cascais Agenda XXI started in October 2012 with preliminary/exploratory meetings with representatives from the Municipality in order to align the research team with the municipality needs and expectations while at the same time set agendas and resources to meet the goals that together we've co-created. The road to the final definition of the research methodology was itself a participatory iterative process which allowed us to bring the Cascais Municipality fully aboard and expand, well over our initial ambition, our aspirations towards the case study. We've organized 7 participatory workshops with different stakeholders engaging more than 120 people, conducted 2 questionnaires – one for the municipality's technical body (99 valid answers), the other for the general population (2060 people) – and we're planning to host a Citizen's Summit no later than November 2014. All summed up this makes Cascais BASE's case study icon regarding the use of Participatory Methodologies.

The 7 Workshop Cycle:

1. Workshop PECAC 2.0 – 26th of July; 20 Participants; DNA Cascais
2. Workshop GREENFEST (TOURISM) – 03rd of October; 30 Participants; Estoril Congress Center
3. Workshop PECAC 2.1 Biodiversity Cluster – 05th of November; 12 Participants; Cascais Ambiente
4. Workshop Neighborhood Tutors – 05th of November; 12 Participants; CIAPS
5. Workshop PECAC 2.1 Water Cluster – 19th of November; 10 Participants; DNA
6. Workshop PECAC 2.1 Education||Training|| Raising Awareness – 7th of February 2014; 17 Participants; DNA
7. Workshop PECAC 2.1 Health – 21st of February'14; 18 Participants; DNA

The 7 Workshop Cycle had three key purposes: PAST - Analyze and evaluate PECAC 2010; PRESENT - Re-prioritize according to new knowledge and possibilities; FUTURE – PBCA, MCA and Road Maps on selected Adaptation measures. The first was the kick-off workshop bringing together representatives from the majority of the municipality departments, as well as from key

stakeholders – Police, Fireman, Civil Protection, NGO's -, for a full day of work with the BASE Team. After that we had sector-specific workshops with sector-specific stakeholders and adaptation measures under analysis as well one workshop (4) with the Neighborhood Tutors of Cascais for a more in depth, non-technical, non-political perspective. These workshops took place between the 3rd of October 2013 and the 21st of February 2014, were made possible with the strong commitment of the Agenda CASCAIS XXI and enabled us to have a wide and clear picture of the considerations of different stakeholders regarding what had been done, what should be done and what could be done, by whom, when. The workshops followed always the same structure and logic, with minor changes to accommodate different size groups or available time.

Along this period, since the beginning of WP5 - Month 6 -we've also conducted Evaluation Questionnaires on us, our work and methodologies, by the municipality, on a semester base.

Timeline

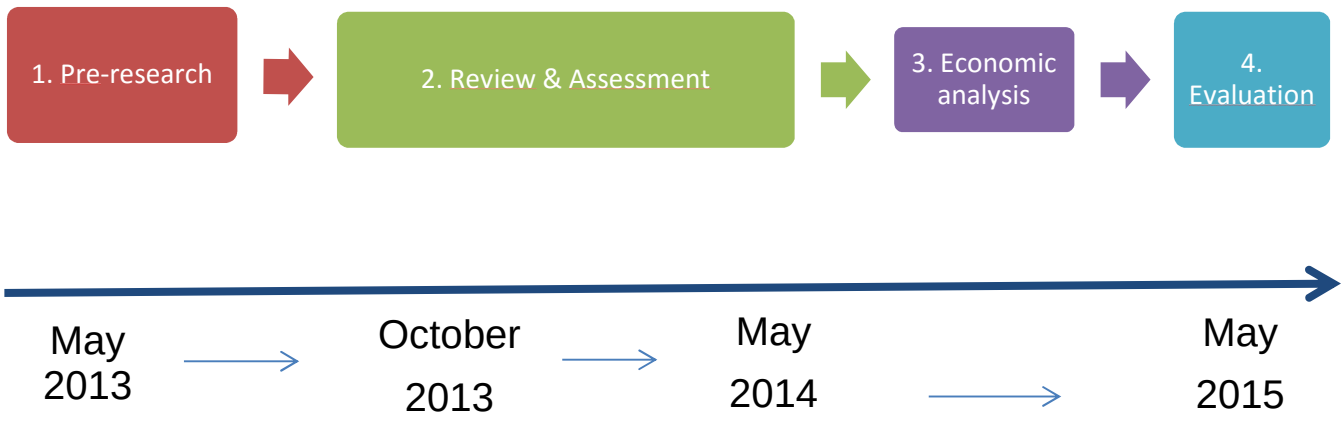

Figure 28: Timeline for the participatory approach in the Cascais case study

1) Pre-research (Until the 30th of May 2013)

- Initial information about the Case-Study
- Start-up, exploratory meeting with the CS representatives
- Methodological Definition and Alignment
- Planning of the Research Project
- Preliminary Questionnaires (being sent to the CS, to be filled until the 15th of May)

2) Review and Assessment (July'13 – February'14)

- First shared Analysis of the Initial Data collected in Phase 1 (28th of May – Working Meeting with CS representatives)
- Co-definition of the research questions (28th of May – Working Meeting with CS representatives)

- Participatory Session with different stakeholders for reviewing PECAC 2010 - 26th July 2013

- Participatory cluster workshops PECAC 2.1

- Socio economic Questionnaire on the municipality population (n = 1885)

- Techno economic Questionnaire on the municipality workers (n = 99)

3) Economic analysis of adaptation measures (October'14 - February'15)

- Multiple Stakeholder meetings with Multi-criteria Analysis (MCA) and Participatory Benefit-cost Analysis (PBCA) for Adaptation Measures

- Cos-effectiveness Analysis (CEA) for key selected Adaptation Measures

4) Evaluation (Jan'15 – March'14)

- Cost-benefit analysis applied to our research methodology

- Analysis of the semester feedback questionnaires

- Closing the circle of research

5) Reporting and Dissemination (October'14 - March'15)

- Publication and Dissemination of Results (Progress Report; Final Report)

- Scientific papers (2)

- Participatory sessions for decision-making processes with local stakeholders, namely the Municipality

Context and description of the participation process

The Municipality of Cascais had a Plan of Adaptation to climate change that was made by researchers and experts with little participation in 2010. In 2013 with the opportunity of the BASE project and the proactive approach by the municipality, FFCUL developed together with the municipality a participatory process of revising the adaptation plan. The municipality of Cascais has several other experiences of participation, namely the participatory budgeting and other experiences and projects that relate to climate phenomena and environment in the municipality. The participatory process was integrated in the whole revision of the adaptation plan (PECAC) which includes several participatory qualitative and quantitative methods namely Participatory Benefit Cost Analysis, Multi Criteria Analysis, Surveys and Brainstorming workshops.

Analysis of implementation of participatory methodologies

Table 19: SWOT analysis of the experiences of the implementation of the participatory methodologies in the Cascais Aveiro case study

STRENGTHS	WEAKNESSES
- Engagement and alignment within the Municipality workforce - Debate and communication between different stakeholders allowed for easier and more concrete implementation plans as well as to spot efficiencies in shared resources and shared responsabilities - Innovative and transparent which brought curiosity and trust to all the process	- Workshops were not righty timed as they happened too far from each other…some times months. - Not always the experts engagement and participation was efficient and representative - Reliance on just one contact point within the Municipality is not resilient
OPPORTUNITIES	**THREATS**
- Build a transversal working group on Climate Change from the critical mass engaged in the workshops - Increased know-how from the Municipality workforce and their partners regarding CC - Training and awareness raising..Participatory action-research seen as an adaptation measure	- Becoming a participatory "circus" if there isn't serious political power supporting the process as well as the decisions - Too much participation without concrete action can lead to frustration and disengagement - Timing is essencial

Influence of participation on strategies and measures

The participatory process had a great influence in determining which concrete actions should be prioritized and implemented in Cascais as well as in the overall strategy regarding Climate Change adaptation in Cascais. The evidence supporting this statement is very clear as when we analyse all the date from the 7 participatory workshops we've come to realize that the scientific expert-based priorities ranked in a multicriteria exercise in 2010 and which feed directly into PECAC 2010, were unanimously disregarded and transformed by all stakeholders - experts and citizens – giving birth to the new, revised PECAC 2014, which not only has new adaptation measures considered but also as a new priority ranking list. Without the participatory process we've conducted it would never be possible to compare the visions from the scientific experts, with the vision from the municipality experts with the citizen's opinions and ideas and construct an overall strategy which builds from existing scientific knowledge, from expert-based field knowledge from many Municipality departments and is validated by the citizen's.

Possible improvements in the participatory process

Some of the following aspects could possibly improve the participatory process and its outcomes: More political support and engagement within the Municipality; Bigger team from our side to

quicker analyse results and put them efficiently to the use of the municipality; Better communication of results after each workshop

4.2.4 Copenhagen

The focus of the participatory process in the Copenhagen storm-surge case study has been to start the discussion of storm-surge adaptation planning in the city. DBT has in collaboration with the Municipality of Copenhagen started a stakeholder involvement process to facilitate the discussion regarding storm surge adaptation in the City of Copenhagen. DBT has held three stakeholder workshops which have highlighted different aspects dealing with the adaptation to storm surge including. The theme of the three stakeholder workshops has included:

1. A discussion of the consequences of climate data and IPCC on storm-surge in the City of Copenhagen
2. A discussion of financial models for storm-surge adaptation solutions
3. Concretisation of adaptation solutions including a participatory add-on to MCA and adaptation pathways

The output from the three stakeholder workshops were summed up and the participation process concluded with a seminar with the parliament's environmental sub-committee with a focus on the legislation barriers.

Timeline

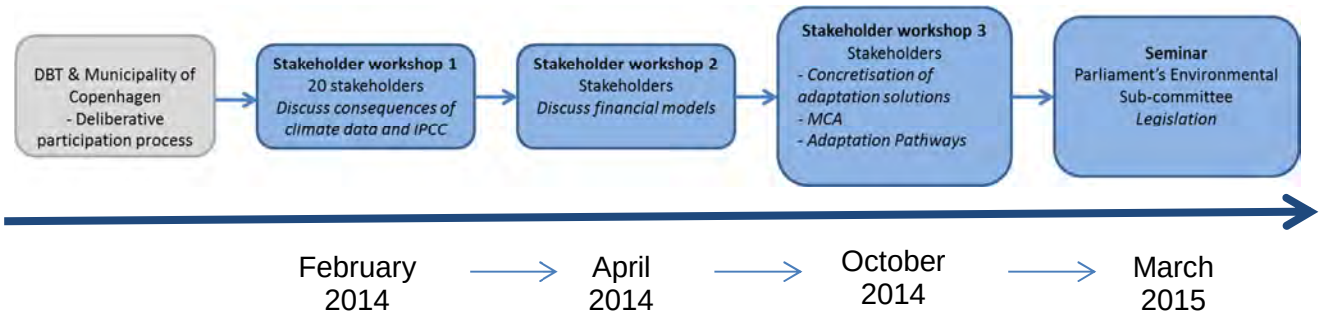

Figure 29: Timeline of the participatory process for the Copenhagen storm-surge case study

Context and description of the participation process

The first thematic workshop was held on February 4th 2014 with focus on storm surge protection in the Copenhagen metropolitan area. The main aim of the workshop was to characterize the current knowledge of future sea level rise and storm surge, as well as to discuss further development of the future planning of flood protection in the area. 19 stakeholders participated in the workshop, including Real Dania, a private philanthropic organization based on investment activities, consulting firm COWI, The Danish Meteorological Institute (DMI), representatives from Copenhagen municipality, as well as surrounding municipalities including Taarnby, Dragør, Gentofte, Gladsaxe, Hvidovre, The Capital Region of Denmark, The Danish Nature Agency,

Danish Coastal Authority, Local Government Denmark (LGDK), interest group and member authority of Danish municipalities.

The second stakeholder workshop was held as a half-day strategic forum on financing adaption to storm surge on the 25th of April 2014. The aim of the day was to:

- Initiate dialogue between central actors on the basis of financing adaptation to storm-surge and coastal protection
- Highlight experiences and complications from the state and municipal level, as well as the legal and regulatory challenges
- Discuss and uncover solutions for financing storm-surge (tangible proposals and needs for legal amendments)

The participants included Local Government Denmark (LGDK), Real Dania, CPH City & Port Development, Horten Law Firm, National Coastal Authority, Danish Ports, Deltares, The Danish Insurance Association, Stormrådet, Ministry of Business and Growth, The Marina Association, Sund og Bælt, The Danish Nature Agency, politicians from Copenhagen, Gentofte, Hvidovre, Dragør, Taarnby municipality and head of the Technical and Environment Department from Næstved, Gribskov, Roskilde, Odense, Halsnæs, Odsherred, Faxe, Slagelse, Stevns and Vordingborg Municipality.

The strategic forum was divided into two parts: Part 1- presentations with brief Q&A and Part 2- Discussion and group work. The presentations were held by the National Coastal Authority, Local government Denmark, Deltares and Horten Laywers. The purpose of the discussion and group work was to discuss:

- Concrete solutions based on the issues raised during the presentations; potential financing solutions, legal amendments visions for the area, etc.
- Circumstances and matters that will have to be considered when the subject is discussed at the national political level (this fed into the seminar on legal amendments).

On the 8th of October 2014, the third stakeholder workshop was held to identify possible concrete climate adaptation solutions and receive input for the planning process. Two participatory methods were applied during the workshop: Multi criteria analysis and Adaptation pathways exercise. By applying multi criteria analysis (MCA) the aim was to receive input (ideas, challenges, possibilities etc.) from important stakeholders for the implementation of a dike solution to protect Copenhagen from storm surges. The objective of the adaptation pathways exercise was to point out protection measures which can be used to protect Copenhagen from storm surges until a permanent solution has been constructed.

On March 26th 2015, the legal challenges regarding storm surge adaptation and coastal protection were presented during a seminar to the Parliament's Environmental Sub-committee. The input received during the workshops was used to formulate the key challenges. The workshop participants were presented with the material beforehand and asked to comment on the findings. The results were presented for the sub-committee by DBT, an architect and a lawyer, who have attended the workshops.

Analysis of implementation of participatory methodologies

Table 20 shows experiences of the implementation of the participatory methodologies in a SWOT analysis for the participation process in the Copenhagen storm-surge case study.

Table 20: SWOT analysis of the experiences of the implementation of the participatory methodologies in the Copenhagen storm-surge case study

STRENGTHS	WEAKNESSES
- A wide range of stakeholders were engaged who would normally not go into dialogue with each other on the subject of storm-surge adaptation. - The participants in the workshops were selected based on their expertise and area of interest relating to the themes, hence enabling a high level of professionalism. - MCA: Identifies the participants' preferences on how storm-surge adaptation solutions should be shaped and integrated in the city planning. - High degree of awareness raising and knowledge sharing amongst key stakeholders on the subject. - Raise awareness on storm-surge adaptation amongst stakeholders, officials and politicians. - Can be held with relatively few resources.	- In this context, the output was not directed towards an implementation or adaptation plan or a specific policy process, which made the results unhinged from a concrete outcome. - MCA:
OPPORTUNITIES	**THREATS**
- Incorporate stakeholder's views, knowledge and visions into the future planning of storm-surge adaptation, who are not normally involved in the planning process. - Initiate a long-term adaptation process amongst policymakers. - Prepare stakeholders and policymakers to put long-term storm-surge adaptation planning on the agenda.	- It is not politically anchored as storm-surge adaptation planning is not perceived as an imminent issue.

Influence of participation on strategies and measures

Due to the fact that the adaptation planning for storm-surge in Copenhagen is still in the early phases, the participation process initiated during the BASE project has given the opportunity to influence the planning process regarding the long-term adaptation planning in the city. In an interview with the head project leader of the Climate Adaptation Plan in Copenhagen Municipality, he expresses that up till now storm-surge adaptation planning has not been on the political agenda. It is the public administration who has put storm-surge protection on the agenda and is in control of the process.

The participatory process in the planning of storm-surge adaptation organised by DBT and the municipality of Copenhagen created a forum for discussing possible adaptation solutions. The

participants included experts in different fields relating to climate adaptation and urban planning. The results from the participatory process can be used as valuable information for the further planning for storm-surge adaptation in the city. The results from the storm-surge stakeholder workshops showed that there was an incentive amongst the participants to develop an adaptation solution which creates synergy with other urban development projects. They also expressed the importance of creating a solution with added benefit to the city, which does not only protect the city from flooding during storm-surge events.

Possible improvements in the participatory process

An aspect not included in the participatory process up to now is direct citizen participation. The stakeholders who participated in the stakeholder workshops included a wide range of people who all had an interest in the harbour's future but the citizens where not represented. To represent the views of the citizens the head of the *civil society organisation* in the inner-city participated. However, as the planning is still in the early phases, there is plenty of time to incorporate citizen participation in the adaptation process.

Another improvement is the fact that during the time of the participatory process, storm-surge adaptation was not on the political agenda in the city. The incentive to use the results in the further planning has to some extent been lost, as there are currently few resources put into the storm-surge adaptation planning in the local public administration.

4.2.5 Green Roof, Sumava Region

Within the Green Roof case study there has been a deliberate participation process present. The main aim of the participatory process has been to create a set of scenarios describing potential future development and adaptation measures which might be potentially implemented. These scenarios will be subsequently used as the basis for ecosystem service modelling with InVEST tools.

The BASE partner, Czech Globe have utilised a participatory scenario workshop approach within the Green Roof case study. The scenario workshop took place in July 2014 and aimed at introducing the case study and eliciting stakeholders' preferences and opinions regarding future development of the case study. The scenario workshop consisted of three parts, aimed at:

- Constructing visions of future development of the case study area in terms of demographic and economic development, tourism/recreation, agriculture and nature conservation, etc.
- Proposing adaptation measures suitable for the study area and matching them to the preciously constructed visions.
- Map the areas most suitable for the implementation of previously proposed adaptation measures.

The scenarios were subsequently used as the basis for ecosystem service modelling with InVEST tools.

The second workshop was a three hour dissemination and discussion seminar, where the results from the ecosystem service modelling was presented to the participants. The stakeholders discussed what the consequences of the results could mean for the area, how they perceived the results and a general discussion of the conclusions.

Timeline

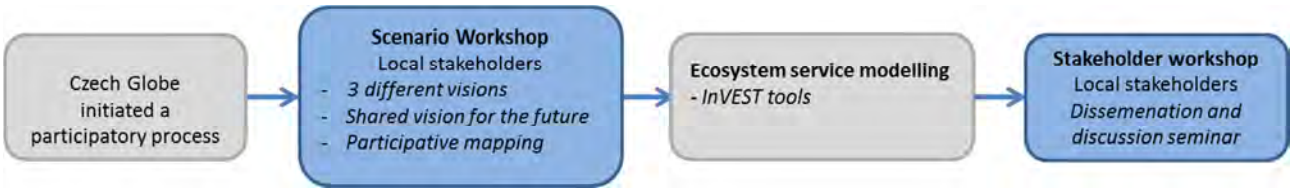

Figure 30: Timeline of the participation process for the Green-Roof case study

Context and description of the participation process

Climate change adaptation has not been a mainstream issue in the Czech Republic, whereby there has not been a pronounced adaptation process in the Šumava Mountains so far. The scenario workshop organized by CzechGlobe presented the first initiative introducing potential threats posed by climate change to local stakeholders and eliciting their opinions on feasible adaptation measures.

Since the issue of environment and nature protection remains rather sensitive in the area, the intention was to assemble a group of stakeholders able to collaborate and discuss the issue without extensive controversy. The management of the national park is a subject of several conflicts, especially between the administration of national park, environmental green groups, scientists and local interest groups, including representatives of municipalities and businesses. The park is split into three zones: Zone I is the most valuable and strictly protected part of the NP (which should be equivalent to the core zone under Czech legislation), Zone II includes the natural ecosystems that in the past were variously influenced by human activities, and Zone III has areas which allow a wide variety of activities on them. At present, the core-zones of the national park are small-scale and disconnected, scattered around the area of the National Park, while some of them are partly non-interventionist. Currently, the legislation designing the national park is being revisited. The Šumava NP presents a very complex area, with contrasting interests of a high number of involved stakeholders. Generally, various stakeholder groups fail to reach an agreement on the desirability of different conservation approaches. Therefore, the attempts to find a shared future vision of this valuable area have failed so far. An example is a recent study by EFTEC on An outline of economic impacts of management options for Šumava national park, which has been promoted by science community but dismissed by the NP administration. Local communities, local political representatives and other stakeholders have been involved in numerous discussions and media interest in the past two decades. Since they tend to favour rather non-protectionist attitudes (Gorner et al., 2012), the involvement of scientists and researchers in the area has been perceived as unwelcome. Therefore, we have excluded the stakeholders from the edges of the opinion range, with sharply contradictory attitudes, since we were afraid they might make a productive discussion impossible.

The aim was to assemble approximately 15 participants covering all key sectors in the area. The number of participants was chosen in order to enable a personalized approach to each stakeholder while ensuring representative composition of local key stakeholders. Based on preliminary scoping and expert input from a local development agency, stakeholders with extremely strict opinions were not addressed, since their involvement in the workshop could bring contradiction and make the discussion unproductive. Nevertheless, the invited participants represented the whole range of opinions. In the first turn, 20 selected stakeholders were addressed; however, it was necessary to address another 10 stakeholders in the second turn due to a low response rate, eventually gaining 13 attendees.

The invitation letter for the stakeholders contained a statement of workshop purpose and a brief description of the workshop's background including the BASE project and the Green Roof case

study. It was decided not to include the description of preliminary scenario storylines which were to be further developed during the workshop, since the idea of scenario building would be completely new for the stakeholders and there was a wish to prevent confusion of the stakeholders and the risk they might feel overwhelmed by the demands of the workshop in advance.

Analysis of implementation of participatory methodologies

The two SWOT analysis below shows the experiences from the implementation of the participation process applied in the Green Roof case study. Table 21 shows the experiences from participative scenario workshop and table 22 shows the experiences from implementing the participative mapping exercise.

Participative scenario workshop:

Table 21: SWOT analysis of the experiences of the implementation of the participative scenario workshop in the Green Roof case study

STRENGTHS	WEAKNESSES
– The possibility to assemble the majority of relevant stakeholders at one spot and to elicit a shared vision. – Materials for stakeholders serving as a guide for the creation of visions, e.g. a list of sectors to focus on and questions to address. – The participative scenario workshop turned out to bring much more concordance than originally expected. It seemed that the concept of climate adaptation, which was quite new for the stakeholders, helped to avoid traditionally negatively accepted environmental topics and brought about the ground for easier agreement. – Appointing a workshop moderator from outside the CzechGlobe team, which ensured the atmosphere of objectivity.	– Rather a negative approach of local stakeholders to activities and workshops on issues linked to nature conservation, which is a sensitive topic in the area. – The stakeholders were rather unfamiliar with the concept of a vision/scenario. It was necessary make clear the difference between forecasting the future and expressing preferences towards the future. – The stakeholders had negative impression about the real impact of previous stakeholder meetings they attended in the past and had doubts about the effect of the present scenario workshop. – Due to the complexity of the topics and the novel character of the topic for the stakeholders, it was suggested that the groups should have more time for discussion. – The workshop should be substantially shorter. The duration of 6 hours (although including coffee and meal breaks) seemed too demanding for the stakeholders, who did not have enough motivation for the last exercise
OPPORTUNITIES	**THREATS**
– To stress that the scenario approach and participative scenario building in particular are a widely recognized and used technique. – In order to make it easier for stakeholders to distinguish projections and scenarios, it might be helpful to ask them to create one of each: a projection, i.e. what they consider as the most	– The issues of climate change and adaptation to climate change have not had strong and continued support by recent political representations in the Czech Republic. Political and to a certain extent also social atmosphere has been restrained to the importance and currentness of climate change and tended to

probable future development, and a vision, i.e. what development they would prefer in the future. Subsequently, only the visions would be used for the preparation of future scenario storylines. – To emphasize very strongly that *stakeholder scenario* building is based on own opinions and preferences and does not require a comprehensive knowledge of all trends and factors necessary to create a *prediction*. – To apply the SWOT approach on the creation of visions in the future. – To add the finalized scenario storylines in the invitation letter for the second workshop, so that all stakeholders could prepare their comments and feedback.	disregard its effects on nature and society. – The elections scheduled for autumn 2014. New mayors are likely to become a part of the decision-making process.

Participative mapping exercise:

Table 22: SWOT analysis of the experiences of the implementation of the participative mapping exercise in the Green Roof case study

STRENGTHS	WEAKNESSES
– The possibility to let the stakeholders think outside the box and perceive the landscape from the new perspective of climate change adaptation.	– The participative mapping exercise was found demanding by the stakeholders, perhaps since they were unfamiliar with this approach and tired after the previous activities. – The stakeholders perceived their own knowledge of the whole extent of the study area as too limited for the participative mapping exercise.
OPPORTUNITIES	**THREATS**
– Using the participatory mapping exercise to spatially allocate already existing problems, e.g. areas of excessively intensive tourism or hot-spots of other problems, not prospective measures, which are hard to imagine and spatially allocate for the stakeholders. – To place the participative mapping exercise earlier in the programme in order to avoid participants' tiredness. – To determine beforehand which locations would be suitable for different adaptation measures in the maps used for participative mapping and to ask stakeholders to choose among them. (It seemed too demanding to require the stakeholders to make up the most suitable locations by themselves.) – To provide the stakeholders with a separate list of specific adaptation measures to map during the participative mapping exercise and ask	– NA

them to supplement it with their own ideas. Not to require the stakeholders to come up with all the adaptation measures to map by themselves.	

Influence of participation on strategies and measures

In the Green Roof case study, any strategies and measures have not been decided up till now. However, the approach of participatory scenario workshop seem to have seeded the topic of climate change adaptation among local stakeholders and will probably shift the approach of stakeholders to environmental issues, which they previously considered as not linked to climate change. This change may hypothetically lead to a bottom-up implementation of adaptation measures in the future.

Possible improvements in the participatory process

Since the issue of climate adaptation is perceived as quite novel in the study area, it is thought that the new terminology and concepts introduced at the participatory workshop might have been quite demanding for some of the stakeholders. In the future, it is projected that it may be beneficial to focus on a smaller number of exercises and consequently to give the stakeholders more time to discuss their ideas. Ideally, the scenario workshop should be planned as a two day meeting.

Some of the stakeholders had difficulties understanding the concept of a scenario/a vision. It proved hard for them to distinguish between being asked to predict or forecast the most probable future development and to formulate the most favourable alternative of the future development. Therefore, we think it might be beneficial to ask the stakeholders to do both, so that the difference between a prediction and a vision became clearer.

4.2.6 Kalajoki River Basin

The participatory elements in BASE case study focused on flood risk management planning. Two stakeholder workshops were organized in November 2013 and January 2014. The purpose of them was to facilitate preparation of the Flood risk management plan for the Kalajoki river basin. The regional water management authority is responsible for the plan. SYKE was supporting the evaluation of measures and stakeholder participation within the BASE project. The principles of multi-criteria analysis offered a framework for the evaluation of actions.

Timeline

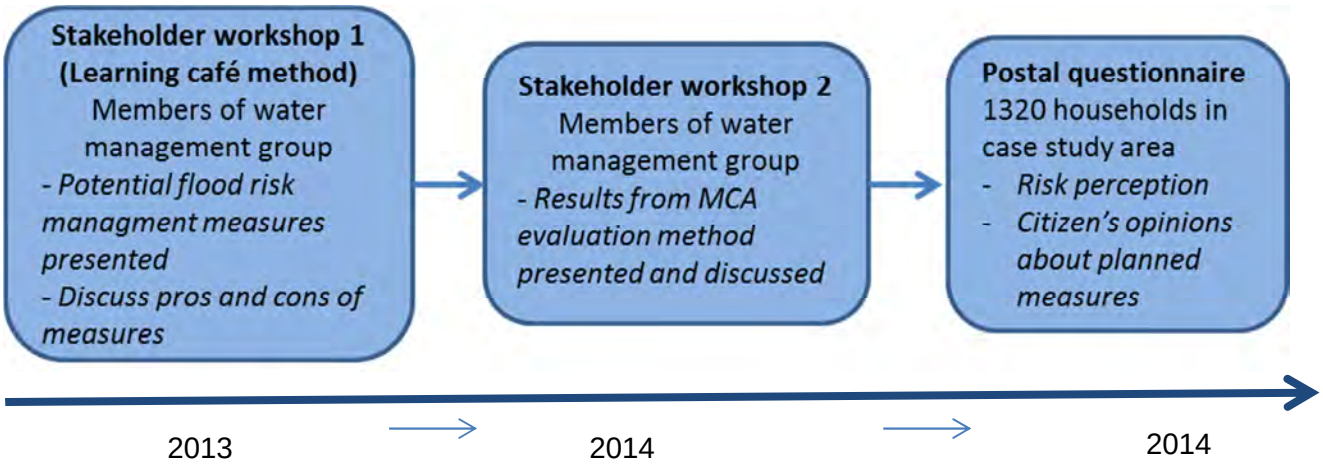

Figure 31: Timeline of the participatory process of the Kalajoki case study

Context and description of the participation process

The purpose of the MCDA and two workshops was to:

- Systematically evaluate the alternative flood risk management measures, their costs, benefits and impacts.
- Figure out stakeholders' views and opinions about the measures: what is the acceptability of measures, which ones are supported by stakeholders?
- Support learning of stakeholders on the need, solutions and uncertainties related to flood risk management planning.

Stakeholders invited were:

- the flood management group, consisting of officials (municipalities of the river basin, rescue authorities, county council and regional water management authority) + other following stakeholders:
- water supply companies
- farmers' unions
- fisheries collectives
- forest owners' associations
- mining company
- youth organization (4H)
- relevant research institutes

In the first workshop, potential flood risk management measures were presented. The pros and cons of the measures were discussed in small groups, utilising learning café method. Prior to the second workshop, the most promising measures were assessed in detail in a MCA evaluation framework, using fact-based information and expert judgment. In the second workshop, the results of the assessment were presented and discussed.

A contingent valuation survey on the acceptability of flood risk management measures was realized in October-November 2014, at the time when the public hearing of the flood risk management plans started. In the questionnaire, the risk perception of the citizens of the flood risk area was studied. The questionnaire also studied the citizens' opinions about the planned measures and their willingness to pay for increased flood protection level.

For the Kalajoki case study two stakeholder workshops were organized by SYKE in cooperation with the regional water authority. The first workshop potential flood risk management measures were presented. The pros and cons of the measures were discussed in small groups, utilising learning café method. Prior to the second workshop, the most promising measures were assessed in detail in a MCA evaluation framework, using fact-based information and expert judgment. In the second workshop, the results of the assessment were presented and discussed. The stakeholders invited were representatives of voluntary based water management group for Kalajoki basin. The group included municipalities, NGOs, industry and other water users, governmental institutions.

Workshop I

- Introduction of participants, expectations towards flood risk management planning and plan how to carry out the evaluation process
- Presentation of the on-going flood risk management planning and its objectives
- Presentation of preliminary measures and their division into 3 categories (see figure 1)
- Discussion about the measures in 3 small groups utilizing the "learning café -method". Each group had 2-3 measures to discuss about. The questions to be discussed were:
    - Is the measure needed? Why?
    - Are there (potential) conflicts related to the measure? What are they?
    - Is the measure feasible? Why/ why not?

  Each group had a host/secretary to take notes. After about 30 minutes discussion, the group moved on to the next roundtable and started discussing the other measures. The host presented what came up in the previous group(s) and the new group could start on that.
- At the end of the workshop, the groups presented their outputs
- After the workshop, the experts gathered to revise the classification of measures in three categories and prepared more detailed analysis of the measures according to the criteria and assessment scales.

Workshop II

- Summary of the previous workshop and what has happened after that
- Presentation of the results of the expert evaluation of the measures. The participants were given the summary of expert evaluations (1 A4 sheet per measure + summary table) and maps were available in the workshop
- In-between the presentation, breaks were taken to discuss briefly in groups of 2-3, one measure at time
    - Category 1: "current measures and their development"
        - What is the status of the measure currently? How it could be improved
    - Category 2: "potential measures"
        - Do you agree with the expert judgment?
        - Is there any negative/positive impacts that haven't been identified?
        - What do you think of the feasibility of the measure?

  For each measure, the groups shared with the others a few key points from their discussion.

- In the end of the workshops, the participants filled individually a short questionnaire form (see attachment):
    - How important you consider the following measures → 5-step scale from very important to not at all important & development ideas
    - Feedback of the workshops and material
        - statements & 5-step scale from totally agree--- totally disagree
            - I got new information
            - The issues were presented in an understandable manner
            - My impression of the measures changed during the workshops
            - The time for handling the issues was sufficient
            - I consider my input important in flood risk management planning
        - "school grade" to the workshops and material
        - What was most interesting?
        - Other issues

A scheme for the evaluation of measures

The selection of measures was carried out in three step analysis. In a preliminary assessment, flood risk management measures were grouped in three categories. The first category included feasible, "obvious" measures that did not require further analysis. These included e.g. improving flood communication to citizens as well as current flood management measures. In the second category included measures that would need further analysis. They were:

1) Using agricultural land as temporary water storage
2) Extended use of regulated lakes as water storage
3) Improving summer flood preparedness in Hautaperä reservoir regulation
4) Improving summer flood preparedness in lake Reisjärvi regulation
5) Increasing the retention capacity of the river basin
6) Permanent flood protection structures

The third category included measures that were not feasible or applicable in the case study area. This group included mainly large scale "grey" measures, such as

- Relocation of buildings and activities
- Building a new reservoir
- Bypass channels
- Dredging of the river channel

A contingent valuation survey on the acceptability of flood risk management measures was realized in October-November 2014, at the time when the public hearing of the flood risk management plans started. In the questionnaire, the risk perception of the citizens of the flood risk area was studied. The questionnaire also studied the citizens' opinions about the planned measures and their willingness to pay for increased flood protection level.

Analysis of implementation of participatory methodologies

Table 23: SWOT analysis of the experiences of the implementation of the participatory methodologies in the Tagus case study

STRENGHTS	WEAKNESSES
The planning process - The minimum standards set in the legislation: ensures equity - Some level of national coordination: visibility, good materials: maps, common websites. - Work is done simultaneously in many regions – support, synergies **Participatory Methodologies** - Participatory MCDA supported learning process and inclusion of stakeholders' values in the evaluation process - Questionnaire: covers a wide sample, ordinary citizens, also "silent know-how" - An "old-fashioned" postal questionnaire seems to be still the most effective means to reach citizens. The online-hearing has resulted in very poor response rate.	**The planning process** - Relatively top-down oriented, may seem as bureocratic, unflexible, too general level, unflexible - Not concrete enough to gain the interest of local citizens - Difficult expert terminology **Participatory Methodologies** - MCDA: exclusive participation and low participation activity - Questionnaire: does not enable two-way communication
OPPORTUNITIES	**THREATS**
The planning process - An "education campaign" on climate change and flood awareness (reform of flood compensation system) - To build more integrated approach than before: flood management planning, land use planning, river basin management etc. **Participatory Methodologies** - **MCDA and questionnaire:** to promote understanding of the problem, responsibilities and solutions and increase commitment of stakeholders to take responsibility	**The planning process** - Does participation really make a difference? - How to gain interest in the grassroots level - Good quality planning but do the plans come into action - Are the objectives too ambitious? Are the plans financially feasible? **Participatory Methodologies** - Resources of the officials are very limited to invest in stakeholder participation - How to motivate the participants?

Influence of participation on strategies and measures

The multi-criteria analysis offered a framework for the evaluation and selection of flood risk management measures in the Kalajoki case, and was reported as a part of the plan. As well, the summary of the results of the workshops and stakeholder preferences was presented in the plan. Thus, it had a large impact on the final outcome of the plan draft. The data produced in the MCDA process, including the results of both expert evaluation and prioritization of measures by stakeholders, formed a basis for the decision making in the flood management group.

Possible improvements in the participatory process

Despite the extensive invitation list, only minority of the invited organisations, and not all the flood management group members did show up in the stakeholder workshops. The participation activity was quite low compared with other river basins where the corresponding planning process was going on. There might be several reasons for that. Firstly, the majority of the urban area is protected by embankments. Not all the citizens might be aware they are living in a flood risk area. Secondly, the latest major floods have occurred in 2000 and 2012 but no significant economic losses were caused. The citizens might not be very concerned about flood risks. Thirdly, the state has traditionally played a major role in flood protection in the region. And finally, there are no large, controversial project initiatives such as new reservoirs or bypass channels in Kalajoki river basin that heat up the conversation in some other areas.

In addition to the above mentioned issues, the flood risk management planning could have been better marketed to stakeholders and citizens. The process was probably seen as bureaucratic and stiff and leaned too much on implementing national legislation and EU directives, instead of trying to seek for innovative and flexible solutions. In addition, as the objectives mainly focused on large, extraordinary floods, it easily excluded soft, small-scale and "green measures".

When it comes to the MCDA process itself, the inclusion of stakeholders is unavoidably exclusive and a wide group of stakeholders cannot be reached. In addition, participation in an MCDA process, in an ideal case, requires motivated stakeholders that are prepared to introduce themselves to the supplementary material and expert evaluations and take part in a series of workshops. Only then the MCDA process can support learning and commitment.

4.2.7 Kalundborg

The Kalundborg case study is an examination of how Kalundborg Municipality and DBT carried out a comprehensive and path-breaking participatory approach as a part of the EU-Interreg project "BaltCICA" on climate adaptation in the Baltic Sea Region running from 2009-2012. The main aim of the participatory process was to prepare the municipality for the climate change adaptation plan by involving local stakeholders and citizens.

The participatory process was divided into four phases as shown in figure 32. The first phase was to calculate local consequences of climate adaptation for Kalundborg. Three alternative future scenarios based on downscaled IPCC scenarios were developed for the case area based on downscaled IPCC scenarios. The scenarios were presented to local stakeholders who discussed how to plan for a changing climate during a scenario workshop. The different proposals from the scenario workshop was then thoroughly analysed and this analysis was an important input to the citizen summit where 350 local citizens discussed and voted on how Kalundborg Municipality should act regarding climate change adaptation. Based on the output of the citizen summit a climate change adaptation plan has been made, which was approved in 2012 (BaltCICA).

Timeline

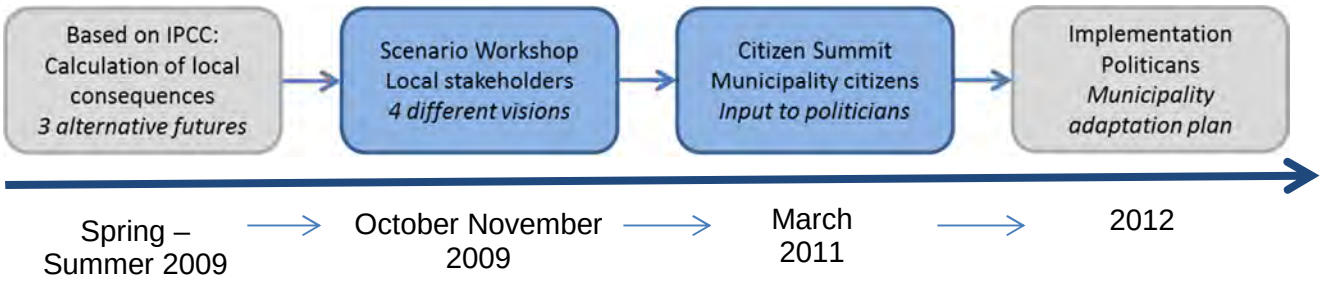

Figure 32: Timeline of the participation process for the Kalundborg case study

Context and description of the participation process

The participatory process in the Kalundborg case study started as a result of the municipality feeling that they lacked proper tools and resources to meet the climate change challenges the municipality will be forced to address in the future. The BaltCICA project was regarded as an opportunity to prepare the staff and to gain knowledge on climate change and insight into GIS modelling.

The first participatory method was a stakeholder workshop which involved local stakeholders with an interest likely to be affected by climate change and with a position in the local community investing them with the power required to push for the implementation of adaptation measures. The participants invited to participate in the scenario workshop consisted of 28 participants including local politicians, local and regional officials (technicians, civil servants), farmers and representatives from homeowners associations, nature and environmental organizations, outdoor organizations, harbour authorities, youth, the tourist and business committee, the water supply sector, dyke and pump association and the archeological society. The results from the scenario workshop were used in the in the following participatory method, the citizen summit.

In March 2011, 350 citizens participated in the citizen summit in Kalundborg. The citizens were chosen to represent the demographic distribution in the municipality with regards to age, gender and geographical residency. The citizens voted on alternative answers to a total of 19 questions. The participants then engaged in moderated discussion at their tables, which purpose was to give all participants time to listen to other opinions and reflect prior to voting. In advance of the summit, moderators were trained to provide facilitation at the tables. The thematic session concluded with citizens casting their votes anonymously on one to five questions.

After the scenario workshop in Kalundborg different visions drawn out by the stakeholders were developed. The consultancy firm NIRAS estimated the practical viability, the environmental consequences and economical costs of implementing the adaptation options in the visions.

Discussions about adaptation challenges and options in other parts of the municipality began between the municipality and DBT. DBT assisted the administration with the clarification of the adaptation options available and identified the political choices involved in choosing one adaptation measure over the other.

The results from the citizen summit (based on the results from the scenario workshop and further technical analyses discussed in the municipality) were received and discussed by city council members and has been taken into account in the preparation of the adaptation strategy for Kalundborg Municipality. The citizens have given the municipality a broad mandate to make political decisions about long-term strategies for climate change adaptation, even if such strategies disregard private interests for the sake of more important and common interests. The results from

the citizen summit have provided the politicians with a better idea of what kind of climate adaptation solutions the citizens of Kalundborg prefer.

Analysis of implementation of participatory methodologies

The SWOT analysis below shows the experiences of the implementation of the participatory methodologies in the Kalundborg case study.

Table 24: SWOT analysis of the experiences of the implementation of the participatory methodologies in the Kalundborg case study

STRENGTHS	WEAKNESSES
- Framed the work for formulating the adaptation plan. - Certain controversial issues are only brought forward in the plan because the topics have matured through the process. - Raise awareness on climate change among stakeholders, citizens, officials and politicians. - Feelings of joint responsibility regarding precautions and adaptation measures (also amongst citizens). - Involve stakeholders in local planning. - Views from different stakeholders resulted in a handful of very different proposals dominated of current interests among the stakeholders. - Abortive or futile adaptation projects could be avoided. - The citizens are consulted before the adaptation plan is prepared. - Participants in the citizen summit take all stakes and considerations into account, and discuss the best solution for the municipality as a whole.	- The participatory process requires a lot of resources both in terms of costs and time. - What happens after the citizen involvement could have been clearer. More political involvement so they are more committed and better coordination between other sectors and activities in the municipality. - Citizens feel there is no substance in the strategy plan- feel let down by the municipality. - Difficult to include all affected citizens in the citizen summit as it encompasses climate adaption in the entire Kalundborg Municipality.
OPPORTUNITIES	**THREATS**
- Capacity building in the municipality by preparing staff and gain knowledge on climate change, insight into technical tools and obtain funding for necessary equipment. - Citizen summit as an opportunity to try out new ways of citizen dialogue and receive concrete and tangible results immediately by voting. - Build up a coherent deliberative process. - Prioritization of adaptation measures/funds.	- The outputs of the participatory process need to be followed up by concrete implementation plans. Otherwise they can remain as advice and not be applied as a resource for the municipality. - Creates unrealistic expectations among citizens in regard to how much the municipality will be able to help and support citizens that are threatened from climate change. - Can create false expectations to which solutions are chosen to implement. Feels they have set the stage for one solution and then the municipality choses a different solution.

Influence of participation on strategies and measures

The participatory process succeeded in influencing the municipal adaptation plan: The process contributed to frame the work of formulating the adaptation plan and the participatory process is explicitly described in the plan and results from the process are referred to in regard to various issues in the plan.

The adaptation plan often refers directly to voting results from the citizens' summit. One example is the sensitive issue of priority between protection of farmland and the development of wetland nature areas. One way to protect areas from flooding caused by cloud-burst or rivers is to allow the water to flood farmland and thus hold up the water before it reaches inhabit areas. Hereby the municipality can also create more wetland areas and thus improve the nature environment. Such measures are mentioned in the plan and specific farmland areas are pointed out. Here the plan refers closely to the voting results at the citizens' summit and hereby the municipality uses the participatory process as an opportunity to present these delicate issues. The interviews with officials and politicians confirmed that the participatory process gave the municipality a mandate (and the courage) to be more specific in addressing these kinds of issues.

Many factors have influenced the process but there are especially two issues which were absolutely essential to make the participatory process manage to get a marked influence of the adaptation plan. The first concerns timing, i.e. the order in which the various elements of the participatory process have replaced each other. In the case of the Kalundborg case study it has been crucial that stakeholders and citizens were involved before the municipality began to draw up the plan and had a real influence on the way the plan was designed.

The second issue is that decision makers, especially members of the Committee for Engineering and Environment were involved from the very beginning and consulted continuously during the participatory process. For example, the design of the process was discussed and they were asked to give their input to the questions to be addressed by the citizens at the summit. To provide them with hands-on experience with the process they were, for example invited as group facilitators at the citizen summit which enhance their confidence and ownership to the event as such.

Possible improvements in the participatory process

A key challenge with regard to implementing the local adaptation plan was and is (the lack of) resources.

4.2.8 Rotterdam

Part of the Rotterdam case study is an analysis of the delta ateliers or design charrettes used to address climate adaptation need within the Rijnmond-Drechtsteden. The use of the participatory methodology of design workshops were used to enable joint fact findings, and to seek for possible solutions together with participants from society. In the Deltaprogramme Rijnmond-Drechtsteden design ateliers where set up whereby spatial experts, water managers, governmental actors and interested local stakeholders collaborately tried out and discussed different landscape designs.

The first initiatives were supported by both the national staff and the Delta commissioner, the regional director and the societal steering group which led to further involvement of landscape architects under supervision of a national atelier team. Amongst other 7 designs for the Architecture Biënnale were created and used to research how measures could be fitted into the populous and heavily used landscape and to envision the local effects of measures for communication and debate purposes (Zandvoort & Jeuken, 2015).

Timeline

Figure 33: Timeline of the participation process for the Rotterdam case study

Context and description of the participation process

On the 23rd of April 2013 one of the participatory design workshops were executed in Alblasserwaard-Vijfheerendlanden. The proeftfuin was organised by the Deltaprogramme Nieumwbouw & Herstrucutring and the participants included 3 designers, 3 experts (including facilitator), 10 from represented institutions, municipalities, water boards. The breadth aim was to search for different 'smart combinations' between future spatial developments and adaptation regarding water safety issues. A more specific goal was to explore the spatial impact and test possibilities for spatial implementation of adaptation options. This fed into the larger DPRD strategy-making process halfway between exploring the first possible strategies and the final regional strategy. The day started with several presentations based on the analysis done in the DPRD strategy-making process and explorations of a student-team. This was done based on different climate change scenarios for the river discharge and possible scenarios for flooding depending on dike breaches.

Based on the national strategy making, new standards would give a new task in strengthening the dikes in light of future climate change. In the proeftuin, this insight was coupled to possible different strategies on regional and on local scales. In the proeftuin, the participants divided into three groups to discuss these topics based on three specific locations, where the discussion was further processed based on possible interpretation and the barriers in governance perspective. This was done with designers, which results in graphical output together with new insights and recommendations for the further strategizing process in DPRD (Zandvoort & Jeuken, 2015).

Analysis of implementation of participatory methodologies

The SWOT analysis below shows the experiences of the implementation of the participatory methodologies in the Rotterdam case study.

Table 25: SWOT analysis of the experiences of the implementation of the participatory methodologies in the Rotterdam case study

STRENGTHS	WEAKNESSES
- Integrated approach. - Possible to involve all relevant participants. - Emphasises quality of options. - Practical and hands-on approach. - Imagining quantitative data. - Creates strong relation between designers and modellers/experts.	- Necessity of design specialists to execute the design component. - Necessity of sufficient detailed information as input for the design and sufficient resource to collect data and material to disseminate within the charrette. - The group size is limited. - Only relevant for physical options, not for

	governance/legal/institutional adaptation.
OPPORTUNITIES - Relevant for all local and regional scale participatory planning processes. - Attractive form of participation due to visuals and instant interaction about forms. - Connecting quantitative data with qualitative design solutions. - Functioning as a knowledge broker.	**THREATS** - Large focus on how it looks on a local detail, risk of leaving out larger scale perspectives. - Focus on what works, so very pragmatic which can conflict with tacit or expert knowledge, it can possibly open a box of Pandora regarding the myriad of visions and knowledge claims if not executed properly. - Possible imbalance between form (aesthetics) of an adaptation option and function (effectiveness) of options.

Influence of participation on strategies and measures

This question can be answered on three levels: At the level of the Delta program: This was a four year national program, which means that it was a shared program of the relevant institutions: Ministry of Transport and Public Works, Regional Water management authorities, Provincial authorities and Municipalities. In addition knowledge institutes and universities were involved as well as private companies, predominantly consultants. All these parties have co-created the strategies.

Participation among governmental layers, principal stakeholder groups and members of the scientific community has influenced the strategies to a large extent. There was large emphasis on getting different societal partners on board, and the resulting strategies are to a large extent influenced by the regular meetings with stakeholders and also underwritten by the different governmental bodies involved. Although the focus on participation was primarily via democratic representatives of the public in lower tiers governmental layers, it was highly influential in taking the local aspects into account and, based on the localities of places, alter the main strategies. This mainly resulted in flexibility for the implementation (between space for the river versus hardening the dikes), and possibly the resistance against room for the river, which have enormous local implications influenced to some extent the strategies for dike reinforcement and only where possible seek for spatial solutions. Also, some actors were influential in bringing local spatial measures within the Multi-layer Safety Approach (Zandvoort & Van der Vlist, 2014) to the fore, amongst others the municipal of Dordrecht did a lot with this newly establish paradigm (which still knows cultural resistance since it seems to challenge the hegemony of engineers and water boards vis-à-vis spatial planning).

To what extent the lobby and influence of companies such as the harbour based industry and transport interests is not has altered the strategies is not clear. The stakes are however clearly factored in (which is for example also visible with the high revenue horticulture which is dependent on both specific quantity and quality of the water supply and the transport stakes regarding

possible alternatives including closing the harbour entrance with a sluice complex, these latter possibilities are discarded). As visible from the cost-benefit analysis, the primary rationale are the high costs for these market parties.

Possible improvements in the participatory process

An important aspect lacking in the current participatory process is the inclusion of direct citizen involvement. Via delegates participation is to some extent useful, because the local and site specific interests can be taken into account. However, fuller inclusion of societal parties including interested citizens could deliver new perspectives and insights for the strategy making process. Although the large geographical scale of the Delta Programme, the Delta Committee (which advised the instalment of the programme) did do such a participatory process on a national scale. For the regional and local implementation and exemplar projects probably the participation will be extended to the citizens and fuller involvement of also smaller companies and NGO's. The already used participatory method of design ateliers shows the necessity of including citizens at least at a local and supra-local scale.

4.2.9 Tagus River Basin, Madrid

The participatory process in the Tagus River Basin case study consisted of three phases: interviews and focus group, fuzzy cognitive mapping (FCM) and survey.

FCM is a valuable tool for complex decision environments as it is able to aggregate the accumulated experience, knowledge or perception of experts or actors. Participants are required to translate their knowledge or experience into a map (or network). This maps consists of concept nodes and weighted cause-effect relations between concepts nodes. FCM provides information on the main features of the network and allows evaluating scenarios of policy options or decision alternatives. During this participatory process, stakeholders have been asked to evaluate the feasibility of five adaptation strategies proposed by the researchers (or their preferences on them). The option are : air conditioning, Heat wave warning systems, parks and forests, trees in streets, green roofs and water bodies.

Timeline

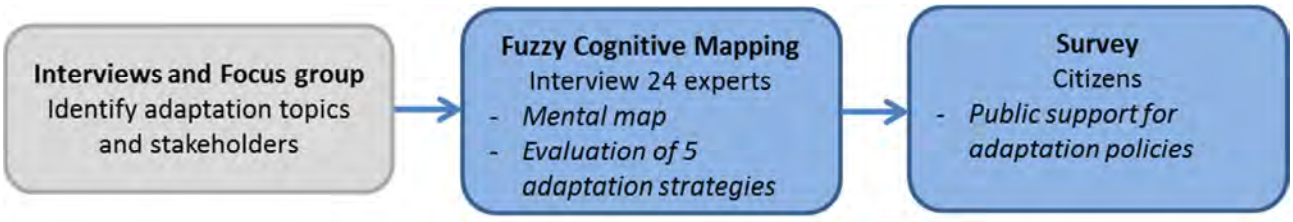

Figure 34: Timeline of the participatory process of the Tagus case study

Context and description of the participation process

Phase 1: Interviews and Focus group

Being one of the objectives of the case study exploring co-benefits in the water and health sectors, it was important to ensure the involvement of the Observatory of Health and Climate Change —an organism depending on the Health Ministry— as the main stakeholder.

A series of meetings were held at the Ministry in 2013 in which we discussed the main adaptation topics and identified the stakeholders. The stakeholder selection criteria prioritized the participation of those positions that they may hold decision-makers or the ability to influence the decision making process.

Citizen's participation was limited to NGOs and Farmer's Unions.

Thirty stakeholders were identified and invited to a Focus Group held at the Technical University of Madrid (UPM) in November 2013.

Phase 2: Fuzzy cognitive Mapping

The second phase was the Fuzzy Cognitive Mapping, a participatory semi-quantitative interview and analysis method (see e.g. Glykas, 2010; Özesmi and Özesmi, 2004) in which personal interviews with experts were performed during May 2014. The objective of the method is to identify cause-effect relations through causal reasoning More specifically, we used casual diagrams to identify potential co-benefits among adaptation measures in a semi-quantitative way which can be later assessed using traditional cost-benefit analysis tools. We apply this method in the context of climate change and focus on health related outcomes.

During each interview, the tasks of the 24 participants of the FCM were:

1. To develop their mental map responding to the question "what are the impacts of heat waves in the city of Madrid?" according to their perception, experience and knowledge. In this first stage they were asked to list the most important factors that have a role in this phenomenon and its impacts. Secondly, they were asked to connect them signing the relations in positive or negative. Lastly, they were asked to weight in a range from 0 to 1 (regardless of being negative or positive) with one or two decimals such connections depending on the certainty of their connection (which in most cases they understood this as, the level of strength of this connection or the level of correlation depending on their background – being more scientific the latter).
2. To evaluate the feasibility of five adaptation strategies proposed by the researchers (or their preferences on them)

In most cases, when questioned about the impacts of heat waves in Madrid, participants also mentioned adaptation options when drawing their maps. In these cases, they were asked to confirm those as potential adaptation strategies for the city.

Phase 3: Survey

Finally a survey is going to be conducted in Madrid Region with the aim to study public support for adaptation policies. A Logit model will be utilized to analyse which predictors positively or negatively affect people's support for adaptation policies, in order to determine the main barriers and incentives for the implementation of these policies.

Analysis of implementation of participatory methodologies

Table 26 shows experiences of the implementation of the participatory methodologies in a SWOT analysis for the participation process in the Tagus case study.

Table 26: SWOT analysis of the experiences of the implementation of the participatory methodologies in the Tagus case study

STRENGHTS	WEAKNESSES
- Collect data from the main sectors affected: - participatory methods enable to collect data in a relative short time period (during interviews) - Identify synergies and trade-offs between sectors: the FCM (**Fejl! Henvisningskilde ikke fundet.**) helps identify the most important concept nodes - Direct access to stakeholders' knowledge: participatory methods enable to collect data in a relative short time period (during interviews). Cost estimates of HHWS, potential for green future green infrastructure can be obtained during interviews for example. Adaptation options can be preliminary tested with stakeholders. - Learn from ongoing adaptation strategies already implemented or planned. In the case of Heat-Health warning system (HHWS) for example, scientific experts call our attention to the fact that temperature threshold defined by the current HHWS are inappropriate. Therefore a relevant adaptation measure would be a plan with a temperature alert that could significantly save more lives. - Identify unintended (negative or positive) impacts of adaptation policies. The FCM as described in next section enable to draw a picture of the causal relationship of complex concepts interconnections like the one of climate change, health outcomes and adaption measures. The method enables to draw a complete and detailed view the potential impacts.	- The results (the most beneficial adaptation options) are not going to be implemented on the short term - Access to data related to costs could be limited (review in a later stage) - Time constraint and limited capacity to obtain knowledge. Interviews of the FCM lasted 1hour and 30 minutes on average which is already quite large. Information required to obtain a model based CBA (ie non full participatory CBA) is large and stakeholders have time constraints. - FCM cannot estimate directly costs and benefits.

OPPORTUNITIES	THREATS
- Strengthen knowledge - Share knowledge between sectors - Raise stakeholders' interest towards climate change issue: enable to bring the issue directly at stakeholder level when most of the time climate change is not an immediate issue (day by day) dealt with by stakeholders. - Scientific: potential complementary of FCM with Cost-Benefit analysis. FCM could be used to test the robustness of a CBA, and the capacity to list all the potential benefits/costs. FCM enables to obtain the typology of costs and benefits from stakeholders and their weighted interrelations. The CBA estimates them. - Some information obtained in the participatory process can serve as a starting point for further scientific investigation on causal relationship. This gives more robustness to the results. This is the case with the epistemological relationship between temperature and mortality. - Opportunities to disseminate results of research back to stakeholders.	- Give excessive weight to experts and practitioners due to the design of the methodology which makes that most data are collected from them. - Potential bias in the causal relationship estimation (FCM) depends on representativeness and diversity of stakeholders. A biased analysis will threaten the relevancy of adaptation measures and their implementation.

Influence of participation on strategies and measures

The FCM had no official influence on the strategies and measures which are now being drafted, as we have not validated the model with the stakeholders. The participatory processes served to help stakeholders think about potential adaptation measures and to realize about the multiple connections among elements in the system. A new adaptation strategy is now being developed for the city of Madrid.

Possible improvements in the participatory process

In light of the above, the model should be validated in a second stage with stakeholders through e.g. a workshop and used in the planning process.

5 Conclusions and recommendations

This section draws on the findings and observations from all the European case studies of the BASE project to compare and analyse the participation research questions across contextual settings of each case study such as climate risks, adaptation solutions, cultural backgrounds and policy traditions. The analysis will be done based on the findings from chapter 2 (Participatory analysis of case studies) and 3 (Participatory Methods) and will provide conclusions and recommendations aimed at both policy makers (5.1) and practitioners (5.2). Finally, 5.3 will conclude this section with final remarks. The findings presented in the participatory analysis of the BASE case studies (chapter 2) have given insight into about participation (or the lack of participation) in the adaptation processes in a wide range of European localities, namely its benefits and challenges. The analysis of the Partipatory methods (chapter 3) has provided a better understanding of the practical aspects of using participation, participatory methods and learning the specific stakeholder involvement issues when participation is used in climate change adaptation processes. Finally, the analysis of the case studies where a deliberative adaptation process has occurred has also contributed to provide a better understanding of how participation works in practive (chapter 4). The authors' discussion of this in depth analysis has resulted in the following conclusions and recommendations.

5.1 Policy makers

In the following section a set of policy recommendations are listed based on the participatory analysis of the 22 case studies. The recommendations are listed as guidelines, which can be applied by policy makers in order to have a better chance of achieving successful participation in climate adaptation. These guidelines are followed by a list of opportunities of applying participation methods in climate adaptation.

5.1.1 Guidelines to achieve successful participation

Politically anchored

Political backing and anchoring is important to achieve a successful participatory process. Stronger political / decision-makers backing and compromise with the participation process produces better participatory results. The involvement of stakeholders can support political decision-making to make it easier to choose in complex situations thus constituting an incentive for political support of a good participatory process.

- In Kalundborg and South Aveiro Coast mayors and other politicians took part in the process making it relevant for decision-making. The ideal situation is a previous political compromise with results of the participatory process eventually combined with a quantitative expert analysis.

Economic incentive

An economic incentive is important to be related with the expected outputs of the participatory process.

- In Timmendorfer stakeholders got engaged through a cost-benefit analysis as this gave the stakeholders an economic incentive to get involved, whereby the town paid extra to raise the value of the dyke. In Cascais, different groups of stakeholders analysed the adaptation measures with Participatory Benefit Cost Analysis, thus acquiring a new perception on the ration of benefits and costs of each adaptation measure. The result is a cleared choice of the adaptation measures based on the economic incentive but seen in a full benefits and costs perspective (including the social, environmental and future economic values). The fact that this analysis is applied provides a perception that participation is promoting economic efficiency, thus adding value to the participatory work and process.

Selecting participants

Selecting participants in a participation approach is an important step to achieve a successful adaptation process. The selection process requires a goodunderstanding of the context whereby the participation process will take place, which requires reseach to find the right participants. In a participatory process it is important to include participant with the following characteristics: decision-making power, scientific expertise and knowledge about the subject and participants with interests at stake. If there is a stakeholder group who feel excluded from the participation process can lead to problems and solutions may become unsuccesful. However, if people feel accepted and an open process is facilitated the results can lead to long-term robust solutions.

Complement with quantitative expert analysis

Participatory processes and stakeholder workshops can produce concrete results and decisions but the discussions are frequently made based on interpretations of reality. It is therefore important to have present in the room or throughout the process, experts on the issue at hand. Furthermore, the participatory process can and should, when possible, be complemented with quantitative and expert analysis. It is important that the quantitative and expert analysis serves the participatory process and not the other way around (don't use participation to convince the public and validate technical expert choices).

- In the case of South Aveiro Coast an expert analysis on the adaptation options and a multicriteria analysis was used to inform the two participatory workshops. The results of the participatory process was then developed in a detail analysis to the adaptation options chosen by the participants and these technical alternatives were then analysed in a Cost Benefit Analysis. This Cost Benefit Analysis was then presented to the stakeholders, decision makers and general public as a result of the whole process.

- In Kalundborg the entire participatory process was designed to both include expert involvement through a scenario workshop, as well as a citizen summit, which then would allow citizens to relate to the quantitative output coming from experts. In this way it was demonstrated that citizens can in fact relate critically to hard facts and figures and make difficult economic prioritisations. Some of these decisions even came as a surprise to the politicians, since they included controversial, but economically sound, decisions about giving up certain unsustainable domiciles and land areas in case of sea-level rise.

Clear objective of the process

A participatory process should be designed and organised with a main clear objective in sight. If stakeholders are invited for processes that are not clear it generates frustration, missed expectations and stakeholder fatigue. If the objective is clear, the facilitators and organisers team can design a quick and effective participatory process.

- In Cascais the objective was clear which made the participation of stakeholders more focused, quick and effective. The objective was to revise the existing adaptation plan for the municipality in a participatory way.

Timing

A participatory process frequently interacts with other sectors or policy areas, thus reinforcing the importance of good timing and articulation when planning the participatory process. Good timing can also be an efficient support to involve stakeholders if it conjugates with other factors such as a momentum in public debate, media coverage or important social events.

- In the Kalundborg case study it has been crucial that stakeholders and citizens were involved before the municipality began to draw up the adaptation plan in order to have a real influence on the way the plan was designed. In the South Aveiro Coast case study the participation was done right after the winter storms and before the new H2020 funds for adaptation. The timing after the storms gave more interest and dedication to the process. Doing it before the H2020 call for projects made possible to apply funds to follow up the project.

Participation is about giving power and receiving support

When participants are empowered they contribute with their best knowledge and support, according to the degrees of responsibility they are given in the participatory process. The participatory process should therefore be designed to maximize the best quality support from the different stakeholders to the adaptation process either in the assessment, planning, implementation or evaluation stage. On the other hand, when participation is used without the intent of using the inputs resulting from the participatory process then is it called “manipulation” in the ladder of participation and can result in conflict in later stages of the adaptation process. The analysis of the practical use of participation in the case studies of BASE suggest that higher levels in the ladder of participation have resulted in higher support for decision makers and more efficient, equitable and sustainable adaptation processes.

5.1.2 Opportunities of applying participation

If the above-mentioned conditions are fulfilled, the following opportunities can be reached, whereby participation can be perceived as an opportunity to achieve successful climate adaptation.

Participation can save time

In complex situations where decision making is separated in different institutions with different responsibilities of decision making, participatory processes can save time by creating the time and space for all this articulation to take place. Additionally, hard choices are hard to make

which lead to frequent need for more and more studies to fundament the decision. Participation can make these decisions happen faster since it allows to quickly integrate the subjective environmental, social and economic aspects that frequently make studies take so long time to make and hard to trust the decision on. Making the subjective transparent and using it with sound participatory methods and good facilitation for responsible decision making can save significant amounts of time.

- In the South of Aveiro Coast cases study a common agreement was made between all the stakeholder and all the relevant institutions present. This discussion had been on for years without a clear consensus for action.

- In the Cascais case study several adaptation measures were left behind after the participatory process together with the Cost Benefit Analysis made it clear they were not adequate.

Participation can make it cheaper

When stakeholders are involved and empowered they take part in the processes and actions using their own time and resources to make the common decisions happen faster and better. This can reduce costs either in the organisation of events, in the implementation of adaptation measures or in the elimination of the costs of conflict, complaint and awareness raising.

- In the municipality of Cascais, one inhabitant in each neighbourhood is given a mobile phone and the responsibility to inform the municipality about the flood problems (and others) that arise and need intervention, thus reducing costs of remediation and intervention. In Cascais also the presence of dozens of stakeholders and institutions in the participatory workshops acts an awareness raising moment and stakeholders leave the process with a clear agenda for their work and role in the adaptation plan for the municipality.

- In the Tamera Ecovillage case study, the implementation of the Water Retention Landscapes took time to reach a consensus among the population but afterwars it was implemented with all its support reaching a very high perception of benefit, evaluated in the participatory cost benefit analysis.

- In the village of Amoreiras, the Convergence Centre organised all the population in groups to create a vision for the future of the village. The result was the involvement of the population in the implementation of several actions and the increase in the adaptation capacity.

Synergy with other policy areas

Participatory methods and the involvement of different stakeholder groups can promote joint thinking and incorporate climate adaptation in the long-term planning in other policy sectors, where adaptation intrinsically is not a part of the agenda, but still experiences the effects. This goes for other areas of planning such as urban development, environmental concerns, recreational areas, tourist industry, etc. There are several examples across case studies, where the interaction of quite diverse stakeholder groups have signified an increasing awareness across sectors, but also where adaptation solutions have been improved by cross-sectoral thinking.

- In the Copenhagen case study, an important aspect of the adaptation solutions to storm-surge, is that they will play an active part in shaping the city and the solutions will thus need to consider other practical purposes than 'just' protecting the city from sea-level rise and storms. The proposals were seen to have an added value to the city.

- In the Timmendorfer case study the engagement of the entire community in the planning of the integrated coastal defence system lead to the design of a system with a tourist attraction. Originally the plan was for the coastal defence to function as a defence system, however the engagement process resulted in hotel and shop owners were willing to pay for glazed retention walls which transformed the defence system into a tourist attraction.

Participation as a tool for prioritisation

The use of PCBA – Participatory Benefit Costs Analysis or the use of Participatory add-ons to Multi Criteria Analysis can be an effective way to prioritize adaptation options or adaptation measures. Other methods, such as the SWAP or Participatory Budgeting, for example, can also be used to achieve this result. This prioritization can be of important to support decision-making and adaptation to climate change.

- In the municipality of Cascais case study the stakeholder were given a limited budget of 3 million € and were asked to use this budget among the 20 top adaptation measures. Together with the multi-criteria analysis and the participatory benefit cost analysis a clear prioritization of the adaptation measures for the adaptation plan of Cascais municipality was done.

- In the Copenhagen storm-surge case study the MCA exercise at the stakeholder workshop identified the participants' preferences on how storm-surge adaptation solutions should be shaped and integrated in the city planning.

- In the South Aveiro Coast case study the use of the SWAP method resulted in a clear prioritization of the adaptation options and measures for the short, medium and long term. An initial set of 12 adaptation options and dozens of combinations of adaptation measures was in the first workshop prioritized into 19 adaptation measures and in the second workshop to 5 adaptation measures combined and prioritized in time using the adaptation pathways scheme timeline. The resulting 9 combinations of measures were then made chosen using a CBA and technical expert analysis to one pathway with one combination of measures.

Cost effective long-term planning

Participation can create a more cost effective long term planning.

- In the South Aveiro case study the participatory process has made possible the agreement of many stakeholders and institutions that have conflicting interest and have a hard time in making common long term plans. The SWAP method as created this opportunity and its result was then used in a cost benefit analysis with a detailed development into 9 combinations of measures and their different variations. The result was the choice of the most cost effective long term application of the measures, such as artificial sand nourishment, etc.

- In the Kalundborg case study the citizen summit gave the municipality a broad mandate to make political decisions about tong-term strategies for climate change adaptation, even if such strategies disregard the private interests for the sake of more important and common interests.

Improve decision-making

The participatory process can give the political backup to take difficult decisions with the support of citizens and stakeholders.

- In Kalundborg case study the participatory process allowed the politicians to take cutting edge political decisions concerning what areas not to protect from storm-surge flooding in the future. These political decisions would not otherwise have been taken without the citizen support given through a citizen summit. In addition, the results from the citizen summit have provided the politicians with a better idea of what kind of climate adaptation solutions the citizens of Kalundborg prefer.

Understand the complex systems associated with the topic of climate adaptation

The participation process can create a process to understand and integrate the complex systems associated the topic of climate adaptation.

- In the Copenhagen storm-surge case study the participation processes with a wide range of participants who do not normally go into dialogue with each other on the subject of storm-surge adaptation created a forum for knowledge exchange. The focus of the workshops were on different aspects of storm-surge adaptation which enabled the stakeholders to get an understanding of the complexity of the issue.

- In the Green Roof case study the Šumava National Park is a complex area, with contrasting interests of a high number of involved stakeholders. Several adaptation scenarios for Šumava National Park followed by storylines which describe the potential future development of the area it became more tangible for the stakeholders to understand the complex issue of climate adaptation in the case study area.

- In the Rotterdam case study the complex situation in the delta of the Rhine, with the confluence of sea and river water, and the historical emphasis on large scale infrastructure, the programme set out to explore a broad range of strategies in conjunction with the upstream measures and the measures within the delta to the south of the Rijnmond Drechtsteden area. The complex situation was acknowledged from the start of the programme; therefore the range of stakeholders included all governmental levels, companies, NGO's, citizens and scientific experts to create a wide knowledge base from the start.

Bring climate adaptation on the political agenda

Participation methods can enable a discussion of climate adaptation and can put it on the political agenda.

- In the Copenhagen storm surge case study the participation process helped raise awareness about storm-surge adaptation amongst politicians through knowledge sharing at the stakeholder workshops.

New state-of-the-art adaptation solutions

A participation process can foster new ideas and new state-off the art adaptation solutions.

- In the Green Roof case study the participative mapping exercise engaged the stakeholders to think out of the box and perceive the landscape from the new perspective of climate change adaptation. The results can be used for policy makers to implement new adaptation solutions.

- In the Kalajoki case study “Applied participatory MCDA” can be reported as a novel use of participatory method. Based on the experiences, a guideline included suggestions how to integrate MCDA approach in the flood risk management planning process, how to select suitable participation method, how to conduct a step-by-step analysis of measures, suggestions on the key stakeholders, examples of evaluation criteria, assessment scales, impact matrices and questionnaire forms and suggestions how to report the results of the process in the flood risk management plan.

- In the Rotterdam case study the use of design workshops were used as a novel participatory method. The use of design workshops can be positioned in Dutch water management towards more control on participation, citizen involvement and quality of designs (Klijn et al. 2013). The two overall functions of design workshops are: research-by-design and co-design based on join fact finding.

5.2 Practitioners

The following section lists a set of recommendations for practitioners in order for a successful participatory adaptation process to be achieved. These recommendations are aimed at the practitioners who facilitate the participation process. The recommendations are based on the analysis of the 22 BASE case studies. The practitioners are the people who typically organise and implement the participation process whereby it is relevant to provide them with a list of lessons learned in order for participatory adaptation processes to be carried out successfully.

5.2.1 Recommendations to practitioners

Clear vision of the participatory approach

If the vision, objectives and future use of the results of the participatory process are clear, then the process will also be clearer, simpler to design and to apply and to use its results.

- In the participatory state of the art in Alentejo, a world café table focused on the spatial planning instruments that influence adaptation did not have a clear result since the vision and approach was not clear and too open. On the other hand, in the same workshop the table of impacts obtained a clear revision of the impacts of climate change for the region based on a planned mind map a clear structure of discussion.

Balance between quantitative and qualitative results in a participatory process.

A participatory process can produce quantitative and qualitative results by combining methods or using time to comment and discuss more quantitative participatory methods such as PBCA of PMCA. If participants are asked to provide only quantitative information they can feel their quality information and the detail needed is being disregarded. On the other hand, if the process is only focused on qualitative discussions and no concrete quantitative results are achieved, some stakeholders feel the process is not building on the discussions and qualitative information gathered.

- In the Alentejo case study as well as in the Kalajoki case study multicriteria analysis were developed together with the stakeholders resulting in a quantitative output but valuing the qualitative and open discussions that happen in the groups and allowed the participants to change their opinions and group answers.

Tailor the participatory process to the participants and stakeholders

The implementation of participatory methods in BASE case studies have demonstrated that, in spite of having a well described and documented method at hand, it will need a high level of tailoring to the local context and participants. The cultural setting and democratic tradition, along with other socio-political aspects play in, when devising a participatory process.

- In the Green Roof case study a lesson learned for the participation process was that since the issue of climate adaptation is perceived as quite novel in the study area, the new terminology and concepts introduced at the participatory workshops were quite demanding for some of the stakeholders. In addition, some of the stakeholders had difficulties understanding the concept of a scenario and a vision. It proved hard for them to distinguish between being asked to predict or forecast the most probable future development and to formulate the most favourable alternative of the future development. A lesson learned is that it is important to tailor the process to the participants to prevent confusion.

- In the South Aveiro Coast case study the participatory workshops changed the group organisation to address the needs of the participants: in the first workshop day the participants were organized in heterogeneous groups composed by people from different institutions and kinds of stakeholders but also separating in different groups people that were known to have had strong conflicts in the past. In the second workshop day the participants were organized around each of the substretch of coast to incorporate their personal preferences since some of them inhabit and work in different stretches of coast. The whole participatory objectives and methods were designed to fit the context and previously identified needs.

Experienced Facilitation

An experienced facilitator or team of facilitators is essential to create a constructive space for discussions to happen, were participants feel empowered and protected to open their ideas while at the same time feeling confident that the process will come to concrete results. Unexperienced facilitation can create a feeling of manipulation, demotivation, loss of time, conflict, etc. Expert facilitators can adapt the participatory methods to serve the needs of the group and reach constructive conclusions in unexpected contexts. If the facilitators and organizing team are not experienced they should compensate with more preparation time and more involvement of stakeholder representatives in the preparation and design of the participatory process itself.

- In the South Aveiro Coast case study a consensus was obtained around the strategy for coastal adaptation for the future were normally only exists conflict between institution with conflicting interests. The consensus was obtained by using a minimum (but large) common agreement. To prepare the participatory process, the organizing team had preparatory meetings with 10 stakeholders groups and their representatives. In these meetings the proposed process was presented and several aspects were presented, discussed , changed and chosen such as venue, dates, times, stakeholders, criteria for MCA, concepts, possible conflicts and constrains, opportunities, etc.

- In the Cascais case study the coordination by an expert facilitator and one facilitator in each group made possible to organize 9 very effective workshops of half a day with many stakeholders and in each workshop develop several multicriteria analysis and participatory benefit cost analysis and other discussions about the municipal plan of adaptation.

Define a time frame for the participation process

The results of the analysis have shown that developing a clear time frame for the participation process can promote efficiency and limit the waste of resources.

- The Timmendorfer case study showed that the lack of time management resulted in a planning processes expanded over 15 years.

- If the stakeholders are very busy it is bet to make a participatory process that is fast than no participatory process at all. A short participatory process must have smaller and more concrete objectives.

Have sufficient time for the participation exercises and process

Having sufficient time for both the participatory exercises and their preparation is essential to achieve quality results.

- In the Green Roof case study, it was projected that it may have been beneficial to focus on a smaller number of exercises and consequently to give the stakeholders more time to discuss their ideas. Ideally, the scenario workshop should be planned as a two day meeting. In the Alentejo case study in the multicriteria analysis, with better preparation the

opinions of stakeholders, namely farmers, could have been clustered providing a deeper analysis and understanding of the results.

- In the South Aveiro Coast, Cascais, Amoreiras case studies the time given in between the start of the participatory process and the moment of result presentation is long enough to allow for the integeration of the knowledge by the stakeholders.

Make sure that the stakeholder process is built on a common knowledge base

As several case studies have shown, it is crucial for the discussions amongst various stakeholders, to create a common knowledge base and understanding of the matter at hand. Especially when dealing with often multifaceted issues such as climate change adaptation.

- In Copenhagen and Cascais, the participants where all introduced to and discussed relevant themes such as climatic data, projections and scenarios, in order to level the playing field and enable sound discussions and decision making.

- In the Lolland case study the participation process enabled open minded discussion and all participants got a new knowledge and a realisation that prejudiced opinions were not necessarily correct.

Involve, Empower, Let Go

Decision-makers, organizers, facilitators and practitioners have frequently a difficulty in empowering the (other) stakeholders. Involving is essential for the success of the participatory process but even more important is the empowerment of those people involved. You want that the participants consider the result of the workshop or participatory process their own, not yours. Even if you are the most important stakeholder in the region, practitioners must learn to empower and let go of the ownership of the process and results. This does not mean, on the other hand, that they should not their role and contribute actively to the process. The more empowered the participants are and better the organizers let go of the ownership of the results, the more likely it is that they are fully used and integrated in the action plans of the different institutions and stakeholders present.

5.3 Concluding remarks

Adaptation to climate change is occurring and will occur in society whether it is planned or whether it is autonomous. If it is planned it will more likely result in good, equitable, sustainable, cost-efficient adaptation practices and participation can play a very important role in this goal. The impacts of climate change affect almost all sectors and the implementation of adaptation measures benefits from the involvement of the economic agents, civil society, institutions and other stakeholders in the territory. Participation and involvement of stakeholder should be considered in this context not a luxury but a common practice designed to improve the quality of the whole adaptation process, its efficiency and results.

Analysing the different experiences of participation and stakeholder involvement in the case studies of the BASE project, we conclude that participation can contribute (or not) to the adaptation process, depending on the way it is implemented. In some instances participation can contribute to the adaptation process by potentially improving the quality of results, the economic efficiency, the

social cohesion and the environmental integration of the assessment, planning, implementation or evaluation of adaptation.

There is some indication from the analysis of participatory case studies of the BASE project that show that participation can help prevent obstacles and promote opportunities for adaptation at different levels. At the same time, participation can be used in an efficient way when combined with quantitative analysis namely Cost Benefit Analysis, also benefitting the economic and other expert analysis. Participation can further be seen as an opportunity of receiving results which are not apparent in cost-benefit analysis.

There are many participatory methods that can apply to many different contexts and needs felt at any locality. These methods can and should be adapted to each context by experienced facilitation teams that can support decision makers and stakeholders in achieving faster, cheaper and better decisions.

Participation can also be misused to manipulate opinions and processes and should be used with clear and transparent objectives at all times. Misuse of participatory processes and bad facilitation and moderation can also cause problems and frustration thus emphasizing the need for careful participated planning of the participatory process and the use of experienced facilitation teams.

The analysis, results, conclusions and recommendations from this deliverable will be used as input for BASE Deliverable 5.5 in order to be fully integrate with the results from other WP5 BASE deliverables.

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7 Annex 1: Summary of methods to support participatory planning, implementation, evaluation and monitoring

Method	Description	Quant / Qualitative	Advantages	Limitations/gaps	Input data	Output	Participatory insights
Scenario workshop	Stakeholders develop alternative adaptation measures to deal with consequences of climate change affecting their interests. The workshop is informed by short scenarios, stimulating debate about possible futures.	Qualitative	Brings local knowledge into the formation of adaptation strategies. Helps to bring different interests into the open and helps to broker disagreements and mediate between different interests.	Sensitive to the choice of stakeholders invited. Does not necessarily take the interest of ordinary citizens into account.	Short future scenarios jointly developed by a journalist, public authorities and experts.	Proposals for adaptation measures and possibly also action plans for their implementation (depending on the specific context)	Facilitates participation of stakeholders.
Citizen summit	Deliberations and individual voting on alternative solutions with regards to climate change adaptation. Between 100 and a thousand representatively selected citizens.	Qualitative/ quantitative	Brings citizen's preferences into the policy forming process. Creates awareness and promotes active citizenship.	Can be expensive. Depends on close cooperation with public administration.	Written background information about pros and cons of choosing different adaptation methods and strategies.	Voting results and direct input to the policy forming process.	Facilitates participation of citizens.

Method	Description	Quant / Qualitative	Advantages	Limitations/gaps	Input data	Output	Participatory insights
Future workshop	Development of proposals for solutions and actions for concrete and well defined challenge with citizens and stakeholders with interests at stake.	Qualitative	Involves local stakeholders in developing adaptation strategies and measures they can help implement themselves	Only relevant for local and well confined challenges.	Short presentation of the challenge ahead.	Concrete solutions.	Facilitates participation of citizens and stakeholders.
Café seminar/ World café	A dialogue between 25-100 participants with the purpose of creating a common understanding of the challenge ahead	Qualitative	Provides a shared starting point for the development of adaptation strategies and measures.	Results are not so tangible	Short presentations by speakers.	A better shared understanding of the challenges at hand.	Facilitates a dialogue with stakeholders.
Participatory Learning & Action (includes Participatory Action Research)	Participatory Learning and Action (PLA) is an approach for learning about and engaging with	Quantitative and qualitative	Whilst a powerful consultation tool, it offers the opportunity to go beyond mere consultation and promote the active participation of communities in	To co-create research questions with the objects of research (communities, organisations, companies,	Input provided by stakeholders that can be technical or communities.	Concrete actions with participated diagnostic, planning and action accompanied by research team.	Maximum level of participation can be achived meaning that instead of scientist driven, the research can be community driven.

Method	Description	Quant / Qualitative	Advantages	Limitations/gaps	Input data	Output	Participatory insights
	communities. It combines an ever-growing toolkit of participatory and visual methods with natural interviewing techniques and is intended to facilitate a process of collective analysis and learning. The approach can be used in identifying needs, planning, monitoring or evaluating projects and programmes.		issues and interventions which shape their lives.	goverments) assumes that the cientist are interested in having a good relation with the stakeholders and with achieving good results but it may change the expected result which can lead to difficulties with fund reports since the outcome of the research tended out to be different because the objects of research had other priorities of research and knowledge to apply in the real life of decision making.			
OpenSpace Technology (P)	OpenSpace Technology is a simple way to run	Qualitative	The participants are always very motivated to participate in the	What motivates the people to participate is	Participants contribute actively sharing their information	The open space meeting consists of several meetings and in each of	The whole process is partipated except the organizing which includes choosing how many hours

Method	Description	Quant / Qualitative	Advantages	Limitations/gaps	Input data	Output	Participatory insights
	productive meetings, for five to 2000+ people, by organizing people in real time in work groups according to their interests around a motivating question. All participants are invited to present their topic of discussion in the venue.		discussions since they are discussing what the topics they present or choose and if there isn't an interesting topic they can present one. It can also bring together diferent stakeholders to talk at the same table in a very functional way.	the general question /theme of the open space. The motivation depends on how well that theme is formulated and if it reaches the target group. Like all methods the participants need to trust in the facilitator since the ways in which an open space is run is different from other meetings. The organizer also have to trust the participants because the result will be lead by them and cannot be easily manipulated by the organizers.	regarding the discussion topic. If specific output is desired the participants should be invited before hand to bring the relevant information.	these the participants write the minutes of the meeting with the issues raised, the conclusions and the tasks list. At the end of the open space a booklet is produced with all the minutes from all the meetings. An open space of discussion is usually complemented with an open space on action planning where participants make plans of specific projects or parts of a bigger project.	or days it lasts and what is the general question /theme of the open space.

Method	Description	Quant / Qualitative	Advantages	Limitations/gaps	Input data	Output	Participatory insights
Dragon Dreaming (P)	Dragon Dreaming is an holistic method for the implementation of creative, collaborative, sustainable projects. It bring the tools to create a vision in group instead of having one person with a vision and trying to impose it on a community..	qualitative	To share the vision and motivate everyone in a common project.	Official training is limited to certified trainers. It is not designed for analysis and collecting information but more for visioning, planning, implementing and celebrating in group amazing projects	People with ideas and the will to make a project	A project designed with management detail	The facilitator can be used to make a set of ideas come true but the ideas or dreams have to come from the people.
Backcasting (P)	Consists of 2 moments: 1st) participants in small groups defining the objectives for a future time (e.g. the year 2030) for the territory in question on several sectors (example, agriculture, health,	Qualitative	A very visible planning tool for the long term. By bringing different stakeholders into the planning with backcasting, all stakeholder understand the limitations of resources and understand the need to define priorities in local/regional or national planning. I one afternoon it is	Making a plan for a long period the future implies the presumption that the world will continue as it is now which is normally not the fact in ranges of 30 years planning. Therefore the	To produce more detailed results there should be preparation and detailed information on all sectors of the planned region. If not the result will more dependent on the participants knowledge but it can still be very rich.	A plan on a timeline with many sectors for the future of a region for the next 10, 20, 30 years.	It can be done with many people participation in groups of different sectors, like agriculture, transports, educations, health, etc.

Method	Description	Quant / Qualitative	Advantages	Limitations/gaps	Input data	Output	Participatory insights
	transports, etc.). There can be as many groups as sectors. 2nd) The groups look at the objectives for the given time (e.g. the year 2030) and write what has to be done in each year until today to make that happen.		possible to have an idea of the future participants want.	limitation is that it is almost impossible to apply a plan made 10 or 30 years before which can lead to frustration in the participants.			
Systematization of experiences (R)	Systematization of experience is a method aimed at improving practice based on a critical reflection and interpretation of lessons learnt from that practice. The methodology encompasses the identification, documentatio	Qualitative	Systematizations can be done at any point in a project or initiative. If done at the beginning they have to be embedded as reflection spaces and milestones in the project cycle, and generate mid-term products that are distributed to internal audiences for internal learning and improvement, scaling up, etc. The knowledge products as a result of a systematization	To experience its full potential it can take up to 3 days of work. It can also be done only in one afternoon.	The memory of the participants about the experience and all the information that they want to bring namely reports.	Participated evaluation and learning from the past experiences by the participants	It can and should involve all members from an organization. It has the potential to trigger joint action and profound changes in the activities of an institution for the future.

Method	Description	Quant / Qualitative	Advantages	Limitations/gaps	Input data	Output	Participatory insights
	n and transfer of experiences and key lessons extracted from a project or an initiative, or group of projects or initiatives for the purpose of advocacy, learning and replication/scaling up.		process include but are not limited to guidelines, toolkits, how to briefs, roster of experts, and case studies.				
Multi-criteria analysis (MCA)	To make a comparative assessment between projects or heterogeneous measures, with complex multi-criteria problems. Each option is scored with reference to a number of criteria.	Quantitative and qualitative	Assessment of distributional impacts, use of evaluation criteria different from the monetary one and when an impact cannot be quantitatively measured. The analysis is not necessarily data intensive. Possible to include robustness of outcomes in terms of uncertainty as one criteria.	Subjectivity of the attribution of weights and final ranking (depends on the stakeholders' views), complexity and timespan of the consultation process (agreement can be difficult to reach).	MCA can work with mixed data and incorporating both qualitative and quantitative information. It needs to define objectives and criteria to be evaluated for each option, and to assign weights and scores.	Ranking or rating of options evaluated against specific weights. The option with the highest score is chosen.	Facilitates public participation as methods easier to understand and possible to assess distributional impacts assigning weights to winners and losers affected. Choice of objectives and criteria are open and can be changed by stakeholders. It provides an important mean of communication.
Participatory cost-benefit analysis (PCBA)	It uses participatory research	Qualitative and quantitative	Requiring less technical knowledge than in traditional	Subjectivity related to the ranking and	Identification of costs and benefits from a qualitative	Cost benefit ratio	Facilitates public participation. Allows input from many different

Method	Description	Quant / Qualitative	Advantages	Limitations/gaps	Input data	Output	Participatory insights
	appraisal (PRA) methods to identify and score financial, social and environmental benefits and costs.		CBA and allows participants to be contribute to the identification of costs and benefits.	scoring. Costs and benefits are scored according to stakeholders' perceptions.	point of view, assignment of unit monetary values when possible. Information on current and future climate risks, with magnitude and likelihood of impacts.		community groups and stakeholders.

8 Annex 2: Reporting Structure

Process overview

The case studies were asked to describe the use of participatory methodologies within their case study, namely its integration in the overall research methodology, the rationale behind the participatory methods and key expected outcomes.

To assess the adaptation process the process of implementing adaptation measures is divided into four phases: 1) Initiative/decision to act, 2) Development of adaptation options, 3) Decision making and 4) Implementation. In the following section the four phases will briefly be explained.

Analysis - Process Phases

Phase 1: Initiative/decision to act

The first phase refers to who has taken the initiative to the first stage of the adaptation process. The case studies were asked to answer which participatory methods have been used in the first phase in the adaptation/planning process. Also, they provide information about involved stakeholder groups and their specific roles in the initial adaptation planning process.

Phase 2: Development of adaptation options

The second phase is the development of adaptation options. This includes a description of who has been involved in developing adaptation option(s). Such possible adaptation options cover a wide range of types and take numerous forms that range from a list of measures, initiatives or strategies, which have a potential to moderate the impact of climate change if they were implemented. The adaptation measures are based on experiences, observation and speculation (Smit & Pilifosova, 2003).

Phase 3: Decision making

The decision making phase refers to the actors involved in deciding what adaptation measures to implement. Based on previous process e.g. participatory approaches and involvement of stakeholders decisions are made.

Phase 4: Implementation

This phase includes the implementation of strategies, policies and adaptation measures to lessen the adverse impacts of climate change. In climate adaptation multiple actors are often involved in implementing actions after the decisions have been made. This phase describes who has been involved in the implementation of the applicable measures.

Analysis - Participatory Experience

Depth

Some of the BASE case studies have engaged in on-going climate change planning and adaptation processes and thereby tests participatory methods. Furthermore novel participatory methods will be developed and tested by running them in practice. Strong collaboration between the partners will be required in order to deliver the desired results.

Running participatory processes, and thereby interacting with a decision-making process, is very context specific, and it will therefore be impossible to run identical processes, but by collaborating about the use and development of participatory methods, comparisons can be made and experiences gained which will lead to recommendations for the use of existing and novel methods.

Participatory methods, while to some extent standardised, are never used in the exact same way (precisely because they are context sensitive) and are therefore constantly evolving. New methods are often hybrids of existing ones and a matter of using components of one method in others, thereby designing novel participatory approaches to a decision-making process. Novelty is quite often a matter of applying participatory methods used for planning and decision-making processes in one area to new areas, thus taking on new shapes in the meeting with new contexts and purposes. It is from this understanding of the term “novel methods” that BASE will proceed.

Investigation of participatory elements of adaptation in BASE case studies

All the case studies where asked to give a description of the sections listed in the table below:

Key sections	Description / Questions
Step 1: Process Overview	Please describe the use of Participatory Methodologies within your case study, namely its integration in the overall Research Methodology explained earlier in the CSLD, the rational behind it and key expected outcomes.
Step 2: Participation in the Process Phases	Please uncover the role of all participants in the process of implementing adaptation measures. The adaptation implementation has been divided into four phases for purposes of ease: 1) Initiative/decision to act, 2) Development of potential adaptation options, 3) Decision-making, and 4) Implementation. The process phases are to be filled out with information corresponding to each participant. I.e. if experts were not consulted in the ‘decision-making’ phase, then describe why they were not included. It is also important that a wide array of participants is described, including those that were excluded from parts of the process.
	Initiative/decision to act Stakeholders: Citizens: Experts: Politicians: Officials/legislators:
	Development of potential adaptation options Stakeholders: Citizens: Experts: Politicians:

	Officials/legislators:
	Decision making (decision on adaptation plan) Stakeholders: Citizens: Experts: Politicians: Officials:
	Implementation Stakeholders: Citizens: Experts: Politicians: Officials:
Step 3: Participation Experience	Please report with regards to your case study and the implementation of Participatory Methodologies using a traditional SWOT analysis – Strengths; Weaknesses; Opportunities and Threats
Step 4: Learning through Participation	In order to capture how participation could improve the climate change adaptation process, please report with regards to your case study:
	Your view whether and how participation influenced the strategies and measures decided in your case? How you think the participatory process in your case could be/have been improved?
	c) Any novel (use of) participatory methods observed in the case studies?

Reporting of participatory components and processes in BASE case studies

The data input from all case studies is organised in order to carry through the analysis in 5.3. As a large part of the data collection will be qualitative, an interview guide (figure 1) has been devised to systematise the themes and questions that case studies will report on. Case study leaders will then use these interviews as a source to, fill out the process overview at the end of this section, for each case study.

The case studies were sent following interview guide as inspiration when conducting interviews for the reporting.

Interview guide (Figure 1)

Themes to be uncovered in interviews	Questions	Potential actors of interest
Democratic and political tradition for participation (country/region)	1. What is the democratic and political tradition for involving experts, stakeholders and citizens in spatial planning in the country/region? How is planning of climate change adaptation situated within that tradition? 2. Has any historical event been important for the local engagement in climate change adaptation?	Local policy-makers and politicians
The institutional setting within which adaptation takes place (locally)	3. What specific [local] institution is authorised/has the responsibility to carry through participatory exercises or citizen involvement in the case in question (if any)? 4. Is participation [in the case in question] based on formal laws, general guiding principles or more informal initiatives, and how exactly is the framework for this involvement described?	
The range of actors involved and their perceptions *Consider also the actors that were not involved in the adaptation process*	5. Who (experts, local policy-makers/politicians, stakeholders, citizens) have been involved in the adaptation planning process? At which stages of the decision-making process (from initiative and early decision to act, to the development of adaptation measures, to the decision-making, and to implementing them)?	Stakeholder groups Citizens Local Policy-makers/politicians Experts
The participatory process and the distribution of power *In the retrospective cases it would be relevant to ask the interviewees' perception of the degree of impact of participation in*	6. Which participatory methods have been used at which stage of the adaptation/planning process? 7. Do you think you influenced the adaptation/planning process and were you appropriately involved? When in the process were you involved [see	Stakeholder groups Citizens Local Policy-makers/politicians Experts

the adaptation process? *In question 7 'you' refers to the interviewees as the categories specified in the third column.*	figure 2]? 8. How do you think that participation in the adaptation/planning process could have been improved?	
The use of economic assessments in the different phases of the participatory processes	9. Were economic assessments presented and utilised in the adaptation planning process that you were involved in? And how important are economic considerations in your view, compared to other factors?	Stakeholder groups Citizens Local Policy-makers/politicians Experts

Terminology

"Citizens" here refer to a broad category of people (for example the residents in a municipality) who themselves will not directly be affected by climate change (for example flooding of their house) but as a taxpayer could have positions or ideas for how to priorities land use and climate change measures in the future.

"Stakeholders" refer to local/regional actors with an interest likely to be affected by climate change or with a position in the community investing them with the power required to push the implementation of adaptation measures, if needed. In this regard it is important to be inclusive, and consider a span of small (less powerful) as well as larger stakeholders.