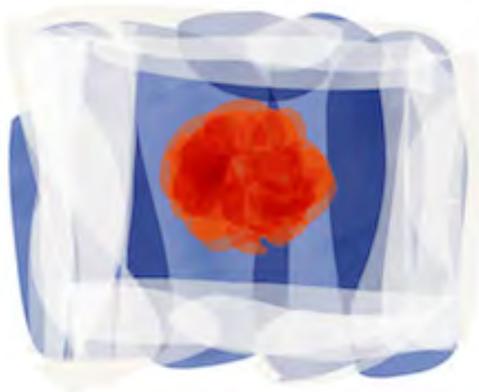


Deliverable 2.1

Case study situation inventory report

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Executive summary/summary

We explored different issues and trends at play in the case study areas that might be relevant for designing local scenarios. Particularly, we examined both climate-related and non-climate related aspects, and aspects that the local community has considerable influence on as well as those that are largely beyond their control. These different aspects provide input for developing future visions, scenarios, and potential hinge/branching points.

Most case study sites (Jade Bay, Bergen, Dordrecht, Golfe du Morbihan) face climate change related challenges, particularly related to precipitation and sea level rise, and their relation to urban planning, coastal management, and agriculture and aquaculture. For Kerourien, it was more difficult to pinpoint climatic challenges, and the case focused on other grand challenges (social justice, migration, urbanisation & housing) instead. Climate change provides added pressure to these.

All case study sites discussed locally important factors that are not or less directly related to climate change, such as local diversity, urban forms, local values and customary practices, local history, economy, (un)employment, social cohesion, social justice, urban renewal and housing issues, migration, and trends in agriculture. The Jade Bay case focused less on non-climate issues, but did focus how local values and practices played an important role. Interestingly, this notion of local values, practices, and particularly also local identity seems to be important in most, if not all, of the case studies (explicitly in Jade Bay, Bergen, Dordrecht, Golfe du Morbihan).



Goal/Purpose of the document

- Brief exploration of the context in which the scenario exercises will be conducted.
- Collect and organise first ideas on the elements that might form the future visions, hinge/branching points, and scenarios.

Relationship to the Description of Work (DOW)

This deliverable presents a first exploratory step in Work Package 2: Scenario design. It bridges between WP1 and WP, by re-examining the material on narratives of change from WP1 through the lens of WP2.



1. Introduction

1.1. Background

This first deliverable for Work Package 2, is the “Case study situation inventory report” (D2.1). WP2 focuses on designing new incremental scenario methods, and testing these in the CoCliServ case study areas. As noted in both the CoCliServ Description of Work and the Draft Scenario Protocol (Wardekker et al., 2018), it is important to first scope the local challenges, in order to tailor the scenario exercises to the local needs. The goal of this document is to establish some ‘situational awareness’ for the case study areas: what’s happening on the ground that is relevant to take into account in the scenario exercises?

This report presents some first outlines of the topics and trends that are relevant for the local communities, and that might take an important role in the future visions, scenarios, and hinge/branching points.

1.2. Approach

CoCliServ will develop ‘policy scenarios’, also called normative or prescriptive scenarios, which describe how the future should preferably evolve (Vervoort et al., 2014; Dammers et al., 2013a,b). They describe the desired future(s) that should be reached (visions), and potential paths towards these (scenarios). Generally, these describe pathways that can be controlled, at least to some extent; e.g. they describe policy strategies or action plans. The scenarios in CoCliServ will also be ‘incremental’: rather than following a straight line from present to future, we assume that there might be points or events along the way that could send the developments in our case study areas into a more or less desired direction (Vanderlinden, 2015; Wardekker et al., 2018). Some are controllable by local actors, but many others might be not or less controllable. We refer to these points as ‘hinge points’ or ‘branching points’.



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In the Draft Scenario Protocol (Wardekker et al., 2018), we described a five-step process to co-design the local scenarios:

1. Preparation & scoping
2. Visioning
3. Scenarios & hinge points
4. Coupling to information & climate service needs
5. Synthesis & dissemination

This deliverable focuses on the first step: Preparation & scoping. During this step, we determine the what, where, when, why, with whom, and how of the scenario exercises. Many of these aspects relate to the goalsetting and process of the scenario development, and these have been discussed in detail in milestone M2.3 (WP2 Implementation Plans). Particularly, we described the goals (why) of the local implementation of WP2, potential local partners and participants (who), and our preliminary designs for workshops and planning (when, where, how). For clarity, however, the case study chapters will briefly recap these issues by providing a summary of the case study area and its situation and the planned scenario design process.

The final aspect to establish, is *what* the scenario work will focus on. For instance (Wardekker et al., 2018):

- What are the problems that the community faces, has faced, or will face in the future?
- Are these related to climate change or weather, directly or indirectly, or not?
- Are they things that they can control, directly or indirectly, or not?
- What are the values that members or groups in the community hold dear?
- What might they want to strengthen into the future?
- What information would we need to conduct the scenario exercise?

The goal of scenarios is often to explore the potential range of plausible futures, e.g. the range of uncertainties and the option space depending on different factors or assumptions of how the future might unfold or of what an ideal future might look like. The choices, uncertainties, and assumptions can be numerous, and a core challenge is to select those that matter. Translated to the the context



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of the CoCliServ scenario exercises: there are numerous trends, challenges, vulnerabilities, strengths & weaknesses, values, and interests/goals for the future at play at the same time. We can inventory them into longlists. However, it would be useful if we could order them in some way. Some of these issues might matter for the scenarios, others might be useful for hinge points; some might have implications for climate services, and others might not. Inspired on the diagnostic diagrams used in assumption analysis (Kloprogge et al., 2011; De Jong et al., 2012; Van der Sluijs & Wardekker, 2015), we've developed and experimented with a diagnostic diagram for CoCliServ. See Table 1. This diagram cross-examines two aspects:

- (a) Which issues are climate related? These aspects are traditionally targeted by climate services.
- (b) Which issues can be influenced/controlled locally? These aspects are traditionally targeted by normative/policy scenarios.

We're working on climate services, so climate and weather related aspects will play an important role. These could focus on general climate or weather variables (temperature, precipitation, etc.), specific impacts of climate change, climate sensitive or vulnerable factors, sectors or populations, et cetera.

However, it is abundantly clear from the narratives collected in WP1 that climate change is not the only problem that our case study areas face. In many cases, it may not even be the among the most pressing problems to local communities. If we are to develop climate services based on local concerns, we will need a broad focus, that gives weight to both climate-related and non-climate issues.

Similarly, there are many aspects that the local communities can influence quite well. More specifically, there are many 'events, trends, risks or goals that the community can directly and significantly influence'. These are issues that are often well-addressed in classic policy scenarios and backcasting exercises, because these exercises focus on designing actionable plans to reach desired futures. However, we need to be aware that there are also numerous issues



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impacting the city or region that the community cannot influence in any significant or timely manner. The case study areas cannot counter them directly, but they may want to develop resilience against these aspects, and explore how the area might deal with their impact. For example, while a municipality might not be directly and significantly able to reduce the level of climate change or its impact on precipitation, it would be able to directly and significantly reduce the risks of precipitation-related flooding through spatial planning, street design, etc. For other climate-related issues, such as major surprises in the climate system, this might not be possible.

Each issue could be further related to the problems/vulnerabilities that people see, the values & strengths that are relevant to the issue, and the interests that the community may have toward the future regarding those issues. Most case studies will elaborate on these aspects later in the process, particularly in the development of future visions.

Table 1. Scoping the focus of the scenario work in WP2 case studies.

	Things we can manage/control locally	Things we can't manage/control locally (or less well)
Climate-related	<ul style="list-style-type: none"> - Problems & vulnerabilities - Values & strengths - Interests for the future 	
Not/less climate-related		



1.3. Link with WP1 on narratives

The scenario work in WP2 will be guided and focused by the narratives collected in WP1 (deliverables D1.1, D.1.2, D.1.3). WP1 has mapped the narratives (Krauß et al., 2018a), analysed the chronology and chronotopes (Krauß et al., 2018b), and provided in-depth analysis of narratives on the relevant actors, issues and values at stake, voices that are heard or unheard, and desires for the future (Krauß et al., 2019). These narratives provide sufficient insight into what's going on in the case study areas to conduct the 'situation inventory' of D2.1, including local views on problems, visions, trends, desires, et cetera. No additional empirical work is needed, although most sites have conducted informal meetings with local partners to further scope the objectives of the local implementation of WP2. However, the narratives in D1.1-1.3 are not yet ordered in a way that facilitates easy inclusion into a scenario exercise. Consequently, this deliverable make the switch from WP1 to WP2, as an intermediate step, re-examining the narratives through a different lens.

1.4. Link with WP3 on climate services

The CoCliServ process focuses on co-production of (place-based) climate services with local communities. Such co-production can have a variety of roles and aspects; it is about more than simply improving the usefulness of the services for these communities (Bremer et al., 2019). The different WPs and deliverables play different roles in this process, preparing the way for the work on climate services in WP3. This deliverable links to (and informs WP3 on) three 'lenses' of co-production in particular: constitutive, interactional and institutional (cf. Bremer et al., 2019)¹. The constitutional lens relates to how local communities understand

¹ Bremer et al. (2019) identifies eight lenses for co-production: constitutive, interactional, institutional, joint services, empowerment, pedagogical, interactive research, extended science.



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climate, climate change and climate action: their ideas on relevant aspects of weather, seasons, natural order, and potential surprises and non-linearities. I.e. the notions that communities have on relevant climatic 'normals', events, and trends, and whether these might be controllable or not. The interactional lens deals with the social, cultural and political processes at play in the case study areas. This relates to the 'Not/less climate-related' factors in our analysis, as well as to local values and identities. Place-based climate services will need to find a way to incorporate such aspects. How to do that is an open question. For example, might climate services need to include analyses, data or visualisations of social trends such as employment, economy, migration, et cetera? Similarly, how might they connect with local values and identities? The institutional lens deals with the local institutional situation, capacities, experience, expertise, resources, and decision-making processes. This will be described in the 'context' of each case: who is this community we're working with, and in which context and with what goal are we collaborating? For example, the Bergen case involves much interaction between the local knowledge agents and authorities; the Dordrecht case deals with interaction between local authorities and citizens; and the Kerourien case heavily focuses on citizens. This makes a difference for designing the climate services.

The scan for relevant local issues with our diagnostic diagram (Table 1) might also indicate where CoCliServ will need to make a creative contribution. The 'climate-related & locally controllable' quadrant seems to be where classic climate services could make important contributions for local actors (particularly policymakers). For the quadrants 'Climate-related & not controllable' and 'Not/less climate-related & controllable', more creative approaches might be needed to develop non-traditional climate services that are useful for local actors.



1.5 Observations from a climate services perspective (Birgit Gerkensmeier & Florentin Breton)

CoCliServ aims to make a contribution in terms of investigating potential challenges and improvements needed to set up new or improved types and format for place-based climate services for adaptation at local levels. To achieve this goal, the CoCliServ approach brings together different perspectives on local debates and climate services. WP3 highlights the role of the 'classical', currently mostly natural-science-driven climate service community in this process. Most climate services support society by informing with regard to climate and climate change, for some with the ultimate purpose of facilitating adaptation (and mitigation to a lesser extent).

However, it is the aim of WP3 to question and stimulate changes to the classical climate service perspective in order to better connect climate services to the locally relevant social, cultural and political processes. In this approach, climate services have a strong role in promoting awareness, understanding, and ideally, action. These three aspects are intertwined with the three co-production lenses mentioned above (constitutive, interactional, institutional), but also with the others (pedagogical, empowerment, joint services, interactive research, extended science). This indicates a close link between WP2 and WP3 in terms of scoping the local challenges and unravelling the needs and requests for local climate services. For example, WP3 can provide physical information to contextually improve the point of departure for the scenario activity. In the course of the scenario exercises, WP3 can offer support at certain points. In return, the results from the scenario exercise are an essential input for the further work in WP3.

Based on the work performed so far (D3.1, M3.1, M3-2 in particular, available in April 2019) focusing on deducing connecting points in terms of needs / demands for climate services/information from the extensive work of WP1, the WP3 work:



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- can basically confirm the observations of WP2 described in the introduction: the local narratives (WP1) reveal a broad range of challenges for each case study region, wherein climate and non-climate issues are closely interwoven with each other. In this context, the inventory of climate service was able to substantiate these findings. It showed that 'classical' climate services provided information and knowledge primarily on generic climate-related variables. Further tailoring towards aspects that are locally controllable (e.g. local vulnerabilities), was significantly less frequent. This current situation is, from the perspective of local climate services for action, not sufficient to adequately address the complex and multi-layered challenges.
- identified only a very few directly expressed needs for climate services. In the Morbihan case study, some starting points for classical climate service tools / information had be deduced and WP3 will continue to pursue this objective. Beyond that, no direct requirements for climate services could be identified. Against this backdrop, the WP2 scenario activity is of major importance and essential for the work in WP3 as it methodologically represents a new way to identify, together with the local actors, possible existing needs for both classical and new forms of climate services.

With regard to the close link and exchange between WP2 and 3 in the co-design process of the local scenarios at different stages of the CoCliServ method, WP3 can support WP2 according to the Draft Scenario Protocol as follows:

1. Preparation & scoping

- ➔ WP3: insights in terms of available (classical) climate services (D3-1) and local climate science knowledge (cf. M3.1) are provided. Furthermore, WP3 can be of assistance with gathering relevant climate information (e.g. past and future trends of temperature, precipitation, sea-level rise, extremes) to provide the workshop participants with a plausible future physical scenario on which to base their socio-economic projections (constitutional lens of climate service co-production)

Are the problems that the community faces, has faced, or will face in the future related to climate change or weather, directly or indirectly, or not?

- ➔ WP3: help to identify which are related to climate (as a driver of problem, part of the problem, or circumstantial / running in the background).

What information would we need to conduct the scenario exercise?

- ➔ Once WP2 has a good overview of the climate information that can be useful for the scenario exercise, WP3 can provide.

2. Visioning



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3. Scenarios & hinge points

- WP3 can support the dialogue between climate scientists and users by linking the developed qualitative scenarios (WP2) to currently dominant IPCC regional climate scenarios. This activity might be helpful in order to establish channels of communication and identify how currently available information may relate to the needs identified.
- Hinge points or elements such as wish lists (as done in Bergen) developed in the scenario workshops represent an essential input from WP2 to WP3.
 - If hinge points / wish list items related to climate require further elaboration / substantiation, WP3 can help

4. Coupling to information & climate service needs

- WP3 provides an overview of the available climate information and services (D3-1; M3.1); if more detailed climate-related questions or concerns are raised during the scenario exercise, WP3 is happy to compile and evaluate further information here.
WP3 can also support activities to connect the actual information/service needs from scenarios and hinge points to the climate science.

5. Synthesis & dissemination



2. Case studies

2.1. Jade Bay, Germany (Werner Krauß)

Desired Futures

How does a climate friendly, earthbound and cosmopolitan coastal landscape look like, and how do we get there? This is the main question for a scenario exercise that I distilled from the many interviews, conversations and participant observation of ongoing events during my fieldwork in 2018. Climate friendly means the often expressed wish to cope with the challenges of climate change; earthbound means the deep connection with the coastal landscape, and cosmopolitan means a sense of belonging that differs from past and present populist right-wing and isolationist ideologies. Of course, these qualifications are mine; but as a result of my fieldwork, they should serve well as an incentive for discussion of desired futures.

The scenario workshop is intended to be inclusive and open to the public. I will especially invite those people I established relationships with, such as politicians, administrators, nature conservationists, climate protection managers, members of NGOs, farmers, journalists and other interested citizens as basis for a common workshop in the second half of 2019 or early in 2020. In this workshop, the above listed desired futures for the coastal landscape will serve as a guideline. The issues at stake will be worked out in the following.

Context

The Jade Bay area is already subject to what Bruno Latour calls 'the new climatic regime'. The exposure of the landscape to the challenges of the sea and rising sea level, to extreme weather events and an abundance of water on the flat land due to rainfall makes this area extremely vulnerable to climatic changes. The landscape is to large parts reclaimed from the sea in a century long process; it is



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a landscape which is constructed through land reclamation, it is protected by dikes and maintained through drainage infrastructures. The interaction between geological and historical processes is characteristic for this coastal landscape. This interaction was and is always shaped historically; for a long time, people lived on mounds and the pieces of land left from the sea, which extended far into the inland. Land reclamation for economic and demographic reasons, territorial claims, German particularism and later on German nation building shaped the line of dikes as much as the threat from the sea. Current threat from storm floods and rising sea level cannot be separated from the social construction of the landscape. Climate change is also present in form of wind turbines, photovoltaic and biogas; Northern Germany is one of the main sites where the German energy transition is visibly implemented and has changed the structure of the landscape accordingly.

Thus, climate change is a current dispositive for coastal politics, economies and increasingly for coastal identity and the sense of belonging. One of my main observations is that the distinctions between climate related and not climate-related problems are fluid, as well as those between “things we can control” and “things we cannot control”. Climate change turns out to be an extremely complex issue which emanates on various scales, from the personal to the political, from the cultural to the natural, or from the local to the global; one of the great challenges is to figure out how these scales are interconnected. The societal transformation, which is one of global and domestic climate goals, is already underway, but it is hardly understood in terms of changes in politics, decision making and senses of belonging. The scenario exercise about desired futures can help to become more conscious and more explicit about what it means to construct a climate friendly, earthbound and cosmopolitan landscape.



Climate related issues:

Instead of listing climate related issues in terms of control, I suggest to understand them in terms of complexity, scales and context. Of course, it is impossible to stop the rise of sea level; but the rise of sea level is only a problem because of the line of dikes that stop the sea. The dikes are construction based on many different factors, most of them being political or economic. This complexity is true for all of the issues listed below. Climate change on a regional scale is complex and messy; the problem at stake is to identify the changes that come into being once the focus is on climate change. While we can identify some structural changes like the implementation of the energy transition, other things that change are hardly made explicit.

- rising sea level is a challenge for coastal protection; dikes are currently adapted to the recent projections of the IPCC;
- extreme weather events with increased amounts of rainfall are a problem for the water drainage infrastructures which characterize the flat land; it gets ever more difficult to bring the water out of the land;
- during my fieldwork end of 2017 until September of 2018, climate change served as an interpretative framework for the extreme winter and summer season: autumn and winter 2017 / 2018 were extremely wet and dark, farmers could not bring out the manure because the fields and meadows were under water, and there were almost no cold days; spring and summer were extremely dry and sunny, with almost no rainfall and again problems for the farmers – some of them had to sell cattle because of the drought;
- extreme weather events are a challenge for agriculture; during the period of my fieldwork, there have been national discussions about the future of agriculture and the differences between industrialized, conventional and biological farming in respect to climate adaptability and mitigation;
- the production of renewable energies with biogas, wind energy and photovoltaic has profoundly changed land use and property structures; there seems to be a common agreement that the production of renewable energies have reached a limit;
- Urban- or better village-sprawl and demographic changes contribute to the sealing of the soil, increase in auto-mobility and an energy consuming life style;



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- Climate protection managers and energy concepts are already part and parcel of official administrations, but not everywhere. Their scope is limited, and in some municipalities, the concepts are contested.
- UNESCO world heritage site and National Park monitors climate change in its area; there are changes in biodiversity due to climatic changes. Nature and climate are linked in the concept of biosphere reservations, which is suggested to be implemented on land – and a source of conflict between nature conservation and farmers;
- Real estate investments in tourism on formerly public ground in the coastal village of Dangast have divided the village between those who are in favor of it and those who want a different way of development, based on natural and cultural values.
- Members of a nature conservation NGO propagate climatic friendly life styles, post-growth strategies, controlled use of energy
- Biological farmers propagate the production and distribution of regional products;
- Electricity companies test digitalization of energy use in households and industries.

Values in play

The best way to make climate change and its messy effects explicit is to focus on narratives of change and the values that are considered at stake. The following list of 'values' is far from being complete; values are always in context and expressed in stories and in context. Anyway, the list helps to understand some common elements which are shared in discussions, conversations, media, narratives etc. All of these values are disputed; they are never "owned", but they are contested and maintained, ridiculed or praised, forgotten or reactivated, depending on the situation.

- Many coastal inhabitants share a strong sense of belonging. Belonging is expressed in the self-identification as Friesians in general, as Friesians as opposed to North and East Friesians, as Oldenburger or as Butjadinger. The particularism of the territory before the German Reich is still a marker for regional and even local identity.
- Friesians share a strong sense of autonomy and independence, even against evidence of the opposite. We talk here about values, and Friesians "are" independent.



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- Another differentiation is related to the soil; those who live in the marshes, those who live on the Geest (the sandy soils of the Northern Plain) or in the moors, and those who live in the towns and villages.
- A further differentiation is between those with a genealogy in the region, those who came here as refugees after WWII from the East, those who came here as newbies for various reasons;
- Identity is closely linked to the characteristics of the landscape, like the existence of dikes and the drainage system, like the weather and the wind, like the mainly agrarian landscape, and like the mudflats and tidal land of the seascape;
- Showing a 'cool' or indifferent attitude in relation to storm floods, to wind and weather is a common attitude;
- Coastal protection and drainage infrastructures are an identity marker and a non-disputable value, at least for those who are concerned with it;
- Dike and drainage infrastructures are based on a shared body of knowledge, which is based on science (IPCC), experience (engineers) and passed on knowledge from previous generation. It is a form of embodied knowledge.
- In coastal protection and other organizations concerned with infrastructures, the production, maintenance and transition of values to the next generation is gendered; seen from this perspective, it is a predominantly patriarchic society;
- In farming, inheritance of land property plays a central role. It is considered important to pass on the land to the next generation. For many farmers, the land or the landscape are the result of the interaction of natural and cultural factors; land is a practice, a way of life and a form of political ecology; it is a way of life that is more-than-human.
- The separation of nature and culture is a value in nature protection, but also in Friesian identity as expressed in popular sayings like "God created the sea, and the Friesians created the coast", or in the impersonation of the forces of the wild sea; Friesians fight against "the blanke Hans", as the murderous North Sea is called;
- And finally, there are many oppositional categories like neoliberal versus regional, community centered versus profit, regional versus global, indigenous versus intruder, town versus country and so on....



Scenario Workshop

The scenario workshop will help to identify and to specify the desired futures for specific areas where climate change and values strongly intersect, such as coastal protection, nature conservation, agriculture, energy production, tourism and a regional lifestyle.

As an incentive for discussion and as the conceptual basis for the co-development of climate services, I suggest a presentation of the regional climate service from Helmholtz about the projected climate futures of the coast. From this commonly shared basis, the individual sections will be discussed in several sections, separated from each other. The common headline for each section is the overall question: how does a climate friendly, earthbound and cosmopolitan coastal landscape look like, and how will it come into being.

Who will be involved: everyone interested. It will be announced as a public event, with the presentation of the regional climate service and an introduction, followed by scenario exercises to the issues listed above.

The workshop will be in German language; we will need several moderators which will have to be trained by WP2 members.



2.2. Dordrecht, the Netherlands (Arjan Wardekker)

Overview of the case area

Dordrecht is a city of ca. 120.000 inhabitants in the west of the Netherlands, just east of Rotterdam and close to the sea. It is surrounded by rivers and the sea on all sides; as locals describe it: “water comes from all directions” (north, east, south, west, above, below). Consequently, the city is highly sensitive to issues around weather, water, and climate. It also struggles with socioeconomic issues, and faces a housing development goal of 10.000-15.000 houses within current city limits. We’re focusing on the Reeland district of Dordrecht, with a specific interest in the Vogelbuurt neighbourhood. The area has been affected by flooding through heavy precipitation events in recent years. The municipality and neighbourhood are exploring on how to cope with weather-related issues and climate change through adaptation, with much local energy and active local organisations. Furthermore, large scale restructuring and maintenance (e.g. replacement of social housing estates), sewer replacements, and redesign of public green spaces and sporting facilities are planned. This provides a window of opportunity to explicitly take citizens’ desires and climate change concerns into account when redesigning the area.

The Dordrecht scenario exercise

The goal in the Dordrecht WP2 case study is to codesign future visions and action scenarios (combining short-term action and long-term strategic plans) for a climate resilient neighbourhood, with local actors. From the narrative research in WP1 (Krauß et al., 2018a,b, 2019; Marschuetz, 2018), we learned that authorities and citizens in Dordrecht have both strong similarities and specific differences in how they perceive climate, weather, and water in the neighbourhood, and how they relate that to perspectives on the future. See Figure 1. Both groups are well



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aware of the history of the city, shaped geographically and economically by water, and by a series of historical floods. This resulted in a shared identity surrounding the 'Island of Dordrecht', and its inhabitants as 'islanders' (Marschuetz, 2018; Wardekker & Marschütz, 2018). Other narratives diverged. Authorities base their narrative on a notion of vulnerability to climate-related risks, and preparation for climate and water-related extremes through strategic long-term adaptation efforts, through spatial planning and infrastructure. Citizens, narrate in a more experiential and holistic way. They observe increasing water levels and expect this to worsen in the future due to climate change. They propose and enact practical, small scale actions for dealing with water, as well as climate mitigation efforts that "tackle the root of these problems" (Marschuetz, 2018; Wardekker & Marschütz, 2018). There are also partly-overlapping concerns regarding citizen involvement, social cohesion, and socio-economic constraints. Both authority and citizen narratives are anchored in a shared concern for climate change and desire for a resilient future. They both provide a valid 'part of the picture' – they are strongly complementary. Consequently, we will work with a single overall notion/vision of a 'resilient island', and further develop sub-visions on specific aspects by combining elements from both narratives (see Figure 1).

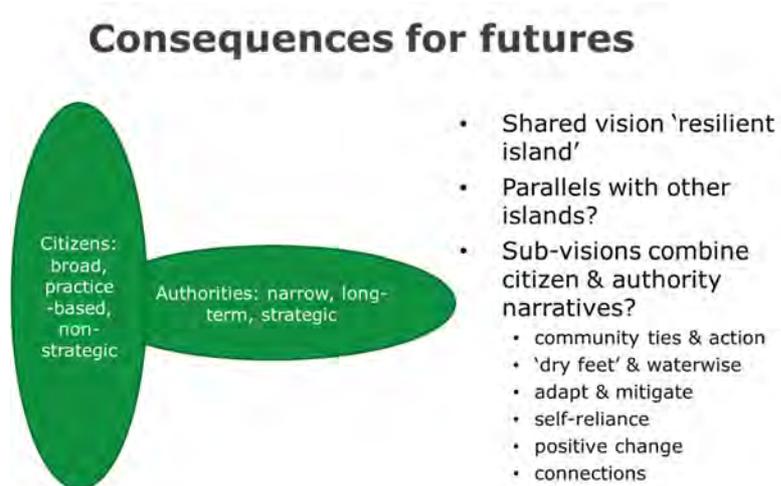


Figure 1. Narrative-based orientation for the visions in the Dordrecht case (Wardekker & Marschütz, 2018).



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The scenarios will be further developed in a series of local participatory workshops. In the first, we will co-design future visions based on the narratives. In the second, we will develop action scenarios on how to reach those futures, and inventory hinge points and do a first scan of information needs. A potential third workshop might further elaborate these into climate service needs and ideas (within WP3).

Climate-related trends, challenges, and desires

The area experiences flood risks from heavy precipitation, rivers, and sea. All of these are influenced by climate and climate change. Historical major flood events have shaped the city and the surrounding region's geography significantly. There are also several factors that increase vulnerability: soil subsidence, low-lying parts of the area that tend to collect runoff from the higher parts of the neighbourhood, and clay soils in many parts of the area that inhibit water drainage into the underground. Other potential climate-related issues, such as heat & health, drought, and impacts on nature and tourism are rarely discussed in the narratives. Local perceptions of climate change and water risks are also important; they impact the desirability of the city for potential new residents and companies. Climate change itself and major international and national trends, such as sea level rise or river discharge, cannot be controlled locally. Local resilience and vulnerability, however, can be influenced, particularly for precipitation-related impacts, and spatial planning (incl. low-lying areas). Soil subsidence is a local issue; while not easy, it can be managed to some degree. Riverine flooding to an extent; major flood defences are a regional responsibility, but the municipality does play a role in flood safety planning, local disaster management, resilience, and evacuation. Sea level issues, storm surge, and major flood events are difficult to influence at both neighbourhood and city level.



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Two potential 'surprise scenarios' were identified (Wardekker & Marschütz, 2018). These might contribute to the hinge points:

- High river discharge from the east coincides with a North Sea storm, and possibly a spring tide, and result in a major flood event. The situation can be partly impacted (positively or negatively) by the responses of German water safety agencies (east), as well as those in Rotterdam (west).
- The population is fed up with growing flood risks or recurring minor flooding, resulting in a negative stigma for the city and the population potentially leaving. Particularly of concern are the higher socio-economic segments – if the richer population leaves, this would heavily impact the city budget, and consequently the resources that the city has available to counteract impacts and adapt climate change.

Less climate-related trends, challenges, and desires

Climate change mitigation (reducing greenhouse gas emissions) and general sustainable/environmentally friendly practices are highly prevalent in the citizen narratives. These are difficult to classify as 'climate' versus 'non-climate' – they do relate to climate change, but less to climate as interpreted in 'climate services'. That is, they require a broader perspective on climate services, so we'll place them under 'less directly climate-related'. Geographical and geological aspects, such as the clay soil, can't be realistically changed much. Vogelbuurt is also a relatively poor area, with much social housing, and parts of the area experience social and socio-economic problems, such as unemployment, climate/water-vulnerable groups, and economic vulnerability. The municipality has similar socio-economic risks through budget constraints and variability, which are strongly influenced by the socio-economic makeup of the city through property tax, as well as through regional, national and international economic variability and change. The large scale urban renewal in the area also present risks for social cohesion, by displacing residents and degrading social support networks.



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One potential 'surprise scenario' was identified (Wardekker & Marschütz, 2018):

- An economic crisis hits key local economic sectors, particularly the ship building and shipping industries, resulting in major financial and job losses for Dordrecht, and potentially long-term economic disruption.

Table 2. Summarizing table of relevant factors for Dordrecht.

	Controllable	Less controllable
Climate-related	<ul style="list-style-type: none"> - Resilience to heavy precipitation events - Resilience to riverine floods (e.g. spatial, infra, preparedness) - Spatial planning (e.g. urban green space & green corridors, water) - Public perception of climate & water - Soil subsidence & groundwater 	<ul style="list-style-type: none"> - River discharge - Sea level rise - Major regional flood events - Storm & wind - Actions by regional and international players that increase local vulnerability or impacts (Rotterdam storm surge barrier, German flood safety policy) - Geological and geographic vulnerabilities (e.g. clay soils)
Less directly climate-related	<ul style="list-style-type: none"> - Local sustainability - Social cohesion - Local vulnerable groups (to some extent; e.g. of vulnerability of elderly, population health) - Urban renewal (housing, infrastructure, facilities) 	<ul style="list-style-type: none"> - City budget constraints & variability - Risks & shocks to local economy and economic sectors - Unemployment



2.3. Bergen, Norway (Scott Bremer)

Context

Bergen is a harbour city in the fjords of Western Norway, with a population in 2016 of 278,121 inhabitants (Statistics Norway, 2016). Bergen today portrays itself along several key themes. First, it remains the busiest port in Norway in freight and passengers. Second, Bergen has become an important centre for higher education and research, with numerous higher education institutions. Third, it was designated a European City of Culture in 2000. Fourth, Bergen is a tourism destination appealing both to its cultural heritage and its proximity to natural landscapes, as the 'gateway' to the UNESCO-listed fjords of western Norway. Finally, it proudly identifies itself as the wettest city in Europe. Bergen's wet weather has historically shaped its cultural and social life, from clothing to city planning, and steered early advances in meteorology and forecasting; Vilhem Bjerknes founded the Bergen School of Meteorology in 1917. This has nurtured Bergensers self-image as weather-resilient people.

But the past 15 years has seen Bergen's identity shift from a 'weather city' to a 'climate city', with climate change a pervasive matter of concern and care. The University of Bergen has focused on climate as one of its central three pillars of research. The local municipality has an ambitious Green Strategy that puts in place far-reaching mitigative measures, like road tolls, that are at the centre of heated local debates. A cluster of non-governmental groups promoting climate action are active in the city. And local cultural institutions like the Philharmonic Orchestra hold climate-themed events. There is an important on-going public discourse about how Bergen can be more resilient to climatic change, albeit mainly within well-defined science and policy communities; enshrined in scientific research projects and policy and activities. Our workshops sought to engage with these on-going discussions and offer fresh perspectives.



The scenario workshops

On the 19th of November 2018, researchers at the University of Bergen held a workshop with 18 diverse participants, as part of the CoCliServ project. The workshop contributed to on-going discussions about how we should plan for Bergen to cope with climatic change, and had three broad goals. *First*, it sought to broaden the participation and thinking around how Bergen should develop over the next 30 years to be more climate resilient by 2050, introducing fresh perspectives from new actors using new approaches. *Second*, it sought to build visions for Bergen's future that are anchored in an appreciation for Bergen's past; the narratives of place and identity that make Bergen particular. In CoCliServ, this was about linking the workshops to the WP1 narrative research. *Third*, it sought to identify the kinds of knowledge and expertise needed to support decision-making and action for making Bergen more climate-resilient; to prioritise climate-related research about Bergen. In CoCliServ, this was about linking the workshops to the WP3 work on enhancing existing climate information and services.

Developing realistic and locally-meaningful future visions or scenarios for Bergen was an important starting point for the workshop.

Preparing the scenarios

In planning the workshop, the Bergen research team had to make some decisions about how participants would develop the future scenarios that would steer their work. We decided that groups of participants would be presented with broadly prepared scenarios that they could tailor to their own aspirations, rather than develop scenarios on a blank sheet of paper. This was mainly to streamline the workshop and make it possible to complete the work in a single day. We decided that groups would be presented with different (though



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complimentary, and quite tightly interlinked) scenarios, to tease out a discussions of different development trajectories for Bergen, with different points of emphasis. Given the size of the workshop (18 participants) we decided that three scenarios, split over three groups of six, was an appropriate design and consistent with focus group best practice. And we decided that the scenarios should be recognisable and relatable to participants. This meant ensuring we had scenarios that fell within existing debates around how Bergen should plan for climatic change, as well as some more lateral scenarios. It meant scenarios that are anchored in existing public narratives of what makes Bergen unique; its features, culture and identity. The intention was to not have scenarios that were too fantastical or detached from the lived realities of Bergensers today.

We decided on an approach where groups would be presented with one of three broad scenario templates, allocated at random, and would personalise this scenario using up to five 'elements' that they thought fitted to the scenario and made the scenario desirable. These elements were represented by 15 small cards that distilled key place-making elements of Bergen, distilled from the analysis of public narratives of Bergen and climate; things like '*A climate science city*' or '*A city linked to nature*' or '*A port city*'. As evident from these three examples, some of these cards were quite closely related to climate, and some were not (see Section 4). Groups were also given a blank card, to create their own element, and were invited to modify the prepared cards as well.

The three scenario templates

We developed three scenario templates; each with a title, a photo and a short quote to communicate the general theme associated with that scenario (see Appendix). '*Scenario A: A 1.5 degree city*' has a quote taken directly from the municipality's 'Green Strategy', and is also influenced by the County's 'Klimaplan'. It emphasises the city's role in mitigating climate change by reducing its



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emissions. '*Scenario B: Let it rain!*' voiced a common theme from across the WP1 narrative interviews and ethnographic research, about Bergensers identity as inherently resilient to all weather, living outdoor lifestyles in all weather. It took a quote from one of the interviews and emphasises the cities adaptation. '*Scenario C: High-tech haven!*' was a theme that emerged from one of the interviews and took quite a different perspective to those normally voiced. It was illustrated with a quote from the interview and looked at how Bergen could not only cope with climatic change, but make the most of it for developing an economy based on climate-related technologies; like renewable energy from wind or waves. The three scenarios were pilot tested in a teaching course at the Norwegian School of Business, and Scenario C was the most popular there, indicating that it was a meaningful scenario for some people in Bergen. The three scenarios were chosen as they represented three different aspects to a common response; how to control climate change, how to live with it, and how to make the most of it. Ultimately any response should include all three aspects, but by teasing them out we tried to unpack the different discourses around responding to climate change.

All scenarios and elements were translated into Norwegian and English, with two groups working in Norwegian and one in English.

The place-making elements

As noted, participants in their groups could modify these scenario templates with elements on up to five cards. Each had a title and was illustrated with two or three bulletpoints. These elements were important because they defined the scenario and framed the elements of the future that people saw as important. This acted to steer all of their subsequent work, on back-casting or distilling knowledge needs. Some of these elements were climate-related and some were



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not, and some were more controllable than others. This also defined how much the scenario was about climate responses that we can actually affect. For this reason, it is interesting to roughly categorise these elements as climate/non-climate related, and controllable/uncontrollable in the table below.

Table 3. Summarizing table place-making elements (factors) for Bergen. Numbers indicate cards used during workshop.

	Controllable	Less controllable
Climate-related	2. Climate proof buildings 5. A climate science city 12. Buses, boats and bybanen	6. Resilient Bergensers 10. Safe from climate impacts
Less directly climate-related	1. A compact city 3. A port city 4. Walkways and cycle-ways 9. Freeing the waterways 11. Rain-friendly places in the city 13. A city linked to nature 15. Green spaces in the city	7. A historical city 8. A local democracy 14. Diverse and international

This is one way of categorising these different place-making elements; other categorisations are possible. What is apparent is that around two thirds of the elements are not directly related to climate, though of course they are not unrelated. For example, 'green spaces' are about improving the quality of the living environment in the city, and strengthening the links to nature, but they also have important mitigation and adaptation functions. At the same time, around two thirds of the elements can be (ostensibly) considered quite highly controllable, through physically shaping the city. This is important for crafting scenarios that are able to be defined around concrete actions that can be affected, and depend less on other uncontrollable factors, like the rate and composition of immigration into the city, or Bergensers attitudes to nature.



2.4. Golfe du Morbihan, France (Ana Rocha & Charlotte da Cunha)

Brief overview of the case study area

Due to its geographical settings, the future challenges of the Golf du Morbihan are obviously related to climate change. The Golf, its inhabitants and its economics activities will be exposed to increasing risks of storms, flooding, submersion, as well as coastline modifications (cumulative effect of submersion and sea level rise). But before all, the Golf will suffer its territorial development choice. Present urban development, started in the years 1960-1980, mostly along the coast and base on secondary houses, influence social and economic development but also political choices.

The most efficient way to make the Golf du Morbihan more climate proof will be multifaceted, as divergent future visions, preferences for adaptation options and other interventions are controversially. The Natural Regional Park has been created in that sense and diverse local actors tries to express their point of view in the face of increasing coastal urbanization. In this context, needs for knowledge and climate services is essential for them and to help decision-maker to make more informed decisions. Different narratives and framings of timescale and season have been interpreted in the Golf du Morbihan, in deliverables D.1.1. and D.1.2. Then, we explored what insights do local narratives in Golf du Morbihan offer to develop a resilient and desirable future under the influence of climate change in deliverables D.1.3.

The Golfe du Morbihan scenario exercise

The WP2 will contribute to the ongoing articulation of the CoCliServ consortium (social and climate scientists) and the local teams (Clim'actions) to provide detailed scientific information for future climate adaptation in the Golf du Morbihan, hopefully in support of existing policy frameworks. The objective in the Golf du



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Morbihan WP2 case study is to codesign future visions and action scenarios (combining short-term action and long-term strategic plans) for a climate resilient neighbourhood, with local actors. The scenarios implementation will be the opportunity to include, in the CoCliServ process, the local decision-maker (elected representatives and local officials from Golf du Morbihan municipalities) and other local actors (such as architects, artists and journalists) to this collaboration to bring new ideas and visions to this core science-policy network. Moreover, this footstep of scenario development allow to start the art–science conjoint analysis (WP4 - Task 4.4). Clim'actions is signing a contract with a local artist (Marianne Cardon), which will develop a practice of participatory art.

During WP1, we have conducted life stories with local economic actors and several discussions with our local partner Clim'actions. We gathered material on the history, issues, and narratives. Thereafter, we plan to conduct two local workshops and another interviews series, through an iterative and interactive process between social (CEARC) and climate (LSCE) scientist, as well as local artist.

The first workshop will likely focus on presenting the narrative material from WP1 and jointly exploring how that may translate into future visions for the Golf du Morbihan, by exploring risks from climatic change and events. This will be a short creative workshop (3 hours), organised in collaboration with the local artist, in order to facilitate participation of actors. An important challenge will be to see how much overlap and how much conflict exists, and to create conditions that allow the main scenarios plot lines to emerge, in order to frame incremental scenarios.

Following this first workshop we will conduct two parallel exercises with a common objective, the collection of information and opinions on these incremental scenarios: 1. a series of qualitative interviews, and 2. an artistic work related to these scenarios to collect, in summer, different data from a larger set of actors (primary and secondary houses inhabitants and tourists no selected in advance).



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A second, longer, workshop will use methods based on backcasting to explore one or two incremental scenarios and their hinge points (1 day). It may be more strategic in nature and will think about how to best involve the neighbourhood (inhabitants, organisations, municipalities). It will also involve some discussion of information and climate services that may be useful for adaptation planning.

Climate-related trends, challenges, and desires.

Controllable locally

- Ecosystems preservation and biodiversity protection are transversal issues that have been mentioned in multiple narratives. Challenges and desires regarding this subject include: the development of robust governance structures, management schemes and policies that integrate different sectors and administrative levels; improvement of local agricultural trade and the rise of organic farming practices in the 1990's as a response to environmental concerns; improved efficiency of transportation and thermal insulation (indirectly related to climate issues); specific policy-making regarding sea level rise and its risks to biodiversity; strengthening of the work developed by Regional Natural Park (PNR) and the Natura 2000 protected area network.
- Climate extreme events could endanger production infrastructure. It is not possible to act locally to avoid them, but adaptative measures can be adopted, such as building or reinforcing dikes around salt farms.
- Protection of traditional economic activities from climate change phenomena and its consequences, as well as the perpetuation of these professions, is a source of concern for some of the engaged stakeholders, such as seashell and salt farming representatives.

Not controllable locally

- Climate change perception is commonly expressed in terms of seasonal changes (drier summers and autumns; wetter winters and springs) and variations regarding meteorological phenomena (less frequent snowing, more frequent storms, fewer but hotter summers).
- Rise of both water temperature and sea level are extremely relevant elements for seashell farming. These issues are faced through the adoption of adaptative measures, such as production relocation to more appropriate zones.



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- Access to climate information is an important driver of adaptation, especially for seashell farming.

Not climate-related trends, challenges, and desires

Controllable locally

- Over the past decade, some of the main activities in the region have been affected by not-climate related trends which were, at least partially, locally controllable. Such changes include agriculture mechanization in the 1960's and a salt sale crisis between the 1960's and the 1980's, which lead to an important rate of workers' exodus, followed by the activity's revival in the late 1980's as a result of a regrouping of local producers.
- There is an important participation of organic agriculture in the territory. In addition to organic practices, current and future concerns in this field are related to strengthening the social and economic links between farmers and clients at a local level, which is driven by both local consumption and tourism-related demands.
- In the past 15 years, mortality in cultivated oyster population is a critical issue for the perpetuation of seashell farming. This phenomenon has been found to be driven by a virus which rests incubated in cold water and until surpassing a given temperature threshold. At that point, the dormant virus is brought into activity. This activation temperature has decreased from 19 °C to 16 °C over the past years, which indicates that even if climate change is not the main cause, it certainly plays a relevant role in intensifying the issue in terms of surface water temperature increase. Production is even more affected in summertime, when hot and anoxic water have led to an oyster mortality rate up to 70-80%. To overcome this loss during the high touristic season, producers have resorted to production diversification, with support of IFREMER². Additionally, production relocation and new commercialization methods, resulting from local mobilization and coordination between oyster farmers, have been put in place.
- Regarding coastal management, past changes to the shore and the contrast regarding primary versus tourism-driven activities have impacted the economy and the habitat of the Gulf. By the end of the 19th century, an important number of people who had previously left the region, mainly for professional reasons, returned to live full-time or seasonally in the territory. They were attracted by local characteristics such as biodiversity,

² "the French institute that undertakes research and expert assessments to advance knowledge on the oceans and their resources, monitor the marine environment and foster the sustainable development of maritime activities" (IFREMER, 2018)



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coastal landscape, leisure activities (notably sailing) and cultural aspects linked to local tradition. This was responsible for a rapid expansion of the housing and tourism sectors. Paradoxically, the very elements that drove them there are threatened by their current presence, due to the consequent increase in resource demand and real estate pressure throughout the 20th century. Recently, the increasing costs of accessing and maintaining the living standards established last century have been contributing to increase inequality and changing the leisure sector. This new dynamic also testifies of a move from proprietary towards functional or usage economy models, where individual property is replaced by the renting or sharing of goods and services. Current and future concern about policy-making which is able to integrate different sectors (notably marine and terrestrial activities), as well as throughout different levels (local, regional, national), was identified in the narratives.

- Loss of local identity due to the abovementioned socioeconomic and environmental changes is a point of concern mentioned in the narratives. Although climate change plays a role, it is not the main driver.

Not controllable locally

- The development of technological solutions which can contribute to adaptative measures is mentioned explicitly regarding the oyster mortality issue. Although some measures adopted to respond to this situation have been mentioned in the “Controllable locally” category, the development of some technological solutions might be carried out at other spheres, such as the academic environment or national level agencies, such as IFREMER.

Table 4. Summarizing table of relevant factors for Golfe du Morbihan.

	Things we can control	Things we can't control
Climate-related	<p><u>Problems and vulnerabilities</u></p> <ul style="list-style-type: none"> - Risks to production infrastructure due to climate events; <p><u>Values and strengths</u></p> <ul style="list-style-type: none"> - Environment and biodiversity protection; - Perpetuation of traditional economic activities; - Adaptative capacity (collective organization); - Rise of organic farming as a response to environmental needs; 	<p><u>Problems and vulnerabilities</u></p> <ul style="list-style-type: none"> - Changes to seasonal dynamics; - Changes to frequency and duration of meteorological phenomena (snow, rainfall); - Water temperature increase; - Sea level rise; <p><u>Values and strengths</u></p> <ul style="list-style-type: none"> - Adaptative capacity (information dependant)



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	<p><u>Interests for the future</u></p> <ul style="list-style-type: none"> - Ecosystems preservation; - Reducing human impact on the environment; - Improvement of local trade; - Improvement of organic practices; - Improved transport efficiency; - Improved thermal insulation; - Strengthened governance (Regional Natural Park, cross-level coastal management strategies); 	<p><u>Interests for the future</u></p> <ul style="list-style-type: none"> - Access to climate information;
<p>Not climate-related</p>	<p><u>Problems and vulnerabilities</u></p> <ul style="list-style-type: none"> - Agriculture mechanization; - Accelerated development of tourism and secondary housing market; - Salt sales crisis and workers exodus; - Loss of local identity; - Inequality intensification; - Evolution from proprietary economy towards a functional/usage model; - Resource demand increase; - Real estate pressure; - Disease spreading in oyster farms leading high mortality rate (though partially climate change driven); <p><u>Values and strengths</u></p> <ul style="list-style-type: none"> - Adaptative capacity, such as production diversification and relocation (although this is at least partially driven by climate change); - Local level workers mobilization to establish collective action; <p><u>Interests for the future</u></p> <ul style="list-style-type: none"> - Dynamization of agriculture; - Integrated policy-making and management of coastal areas (cross-level and cross-sectoral); 	<p><u>Problems and vulnerabilities</u></p> <ul style="list-style-type: none"> - Vulnerability of oyster farming regarding high rates of production loss (partially related to climate issues); <p><u>Values and strengths</u></p> <ul style="list-style-type: none"> - Perpetuation of traditional economic activities; <p><u>Interests for the future</u></p> <p>Development of technological solutions that could be applied locally to enhance vulnerability;</p>



2.5. Kerourien, Brest, France (Juan Baztan & Lionel Jaffrès)

(Prepared by Juan Baztan and Lionel Jaffrès, edited by Bethany Jorgensen)

Brief overview of the Kerourien case study area

As described in the DOW and previous deliverables (D1.1, D1.2, D1.3), Kerourien is in a peri-urban context in the Saint-Pierre quarter in Brest, France. According to the 2013 census, Kerourien has 1200 residents. It is a priority area, mostly structured around post-war housing projects, with a strong “social inclusion” effort focus. Kerourien is one of the most diverse areas in the city and the most challenging in terms of urbanization, migration, and empowerment.

The Kerourien scenario exercise

The scenario exercise follows “The beautiful stories of Kerourien” festival that took place in October 2018, bringing together local stakeholders, other neighborhood residents and project participants through a multi-day festival that included three art forms synthesizing and embedding the efforts of WP1 in narratives as described in D1.3 and 2, two public meetings that created the conditions allowing for the emergence of the main scenario plot lines. The two debates, 2h each, are entitled “Power” and “What to do today to love our neighborhood tomorrow”. Completing the public debates and art forms allowed us to identify preliminary questions from the five main narratives :

- (i) How are community priorities such as housing and physical safety connected with climate narratives in representations of daily life and world views;
- (ii) How do participants embody, through their personal trajectories and experiences, climatic histories that bridge regional and global questions;



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- (iii) Potential connections between expectations and climatic conditions;
- (iv) Political choices regarding climatic questions; and
- (v) The dialogue between these political choices and residents' dynamics.

From these, we reach the three main narrative lines that will be explored in the next steps of the scenario exercise, with special emphasis on how gender weaves into them:

Box 1: Three main narrative lines that will be explored in the next steps of the scenario exercise.

Sc_K_1: Social justice related with climate change and local weather.

Sc_K_2: Migrations and their associated consequences at each unbalanced step.

Sc_K_3: Housing and urbanization in a changing climate context.

These three key horizons will be explored through climate change lenses, and developed during the scenario workshops that will be organized to develop the main scenario plot lines with key stakeholders and inhabitants that have been engaged in the previous phases of the process.

The complementary **constraints** that we have in Kerourien within the CoCliServ scenario exercise comes from three different components: **(i) Epistemological** : How do we connect available knowledge from natural sciences with inhabitants' daily life needs and emergencies? **(ii) Pragmatic**: How do we keep inhabitants engaged once the most stimulating part of the process is finished? And **(iii) Ethical**: Which ethically robust position do we need to have when we share efforts with local communities concerning possible futures? The way we integrate these constraints in the Kerourien scenario exercise will be distributed to scenario exercise participants detailing the constraints, the limits of our approach, the intentions, and the objectives.

The incremental scenario development we are engaged in through the CoCliServ Kerourien process is rooted in a paradigm that assumes the scenario-exercise is



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a social process (Garb 2008, Vanderlinden, 2015) allowing (i) scientific knowledge its own role in the construction of the emergent narrative during the scenario-exercise that embrace the evolution of the related item, and its complexity, in the whole system and (ii) to the participants to go beyond the non-probabilistic nature of the hinge points (Vanderlinden, 2015).

Climate-related and indirectly climate-related trends, challenges, and desires

The inhabitants are aware of their desires and in their articulation there appears to be a need to clarify the trends and challenges that they will face. These three anchors -desires, trends and challenges- will structure the narratives that will be created during the scenario exercise in connection with weather and climatic conditions. We assume that weather and climate change are not under the influence of the local residents, as they are not connected to the main sources of green gas emissions nor to the political decision-making level that can move policy; however, it is extremely important for us in Kerourien to note the inhabitants do have a key role key in how they face climate change impacts and how they are empowered in the co-construction of climate services.

The main challenge for us is to connect the identified desired futures expressed through the inhabitants' and stakeholders' narratives with available scientific knowledge about climate change in order to develop scenario-based narratives that capture the complexity and empower the inhabitants through the process. This will feed the Kerourien scenario and hinge points report (D2.2) and the ground-tested scenario development protocol (D2.3).

Kerourien inhabitants are stressed in their daily lives by their economic constraints and associated societal challenges, such as racism and well-being, and this puts climate change related issues in the background; such issues will



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explicitly be brought to the fore during the scenario exercise when the outcome narratives connect local narratives with available scientific knowledge.

Table 5. Three main narrative lines (with relevant factors) that will be explored in the next steps of the scenario exercise.

<i>Trends, challenges and desires</i>	Controllable locally	Not controllable locally
<i>Social justice</i>	<ul style="list-style-type: none"> • Employment. • Local funding. distribution. • School dynamics. • Local NGO dynamics. • Trust conditions. • Empowerment. 	<ul style="list-style-type: none"> • Criteria for the inhabitants' acceptance. • Rules for the public- and private-sector balance. • Regional and national funding.
<i>Migration</i>	<ul style="list-style-type: none"> • Inform migrants about the climatic conditions in the places they come from or want to go next. 	<ul style="list-style-type: none"> • Migration flow. • Trigger/s for migration.
<i>Housing and Urbanization</i>	<ul style="list-style-type: none"> • Union for H/U rights. • Political pressure. 	<ul style="list-style-type: none"> • Climate planning. • Water scarcity planning. • Energy planning. • Municipal urbanization planning. • Investments for housing rehabilitation;

Ongoing and forthcoming mitigation and adaptation strategies, including a robust starting point for additional climate services, need to be rooted in bridges that connect community concerns and values with available scientific knowledge. Climate services appear as an opportunity for the inhabitants in their empowerment process. Elements based in climate change science are crucial for answering questions related to migration, urbanization and housing (Box 1 and Table 5).



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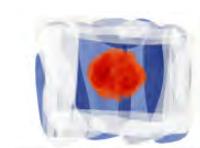
Next steps for field work action

With the main narrative lines identified, we need to improve the connection with available scientific knowledge, particularly with the “WP3: local climate information assessment and evaluation”, in order to find the best fit during the scenario exercise process. The aim is to use two distinct narrative lines, one coming from WP1 and one from WP3, and enable the emergence of a third narrative form that reveals more completely the complexity of local needs in terms of climatic services. The scenario exercise presents the chance to formally develop answer/s to the question “how to get there*”, there* being the future where the inhabitants want to be.



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Appendices

Appendix A: The three scenario templates for Bergen, in English



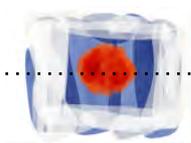
Scenario A: A 1.5 degree city



Wikimedia Commons, 2012

CONTROLLING CLIMATE CHANGE: BERGEN AS A LOW-EMITTING CITY

“The goal is for the people of Bergen to limit their climate footprint in line with the UN agreement on climate change. In 2050, we will have succeeded in ensuring that the people of Bergen do not contribute more GHG emissions than

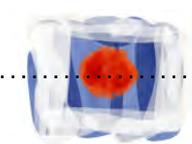


Scenario B: Let it rain!



NURTURING RESILIENCE TO WEATHER AND CLIMATE IN BERGEN

“If it means you can have more rain festivals or go outside and do crazy things when it’s wet, maybe people can do that! [...] Rain isn’t good or bad, it’s just a fact of life.” (Interviewee 4)



Scenario C: High-tech haven



MAKING THE MOST OF CLIMATE CHANGE AS AN OPPORTUNITY FOR NEW SUSTAINABLE INDUSTRIES

“Bergen could become a high-tech haven, particularly for marine resources and technology like electrical power; being a battery for Europe through water, wind

