BASE

BOTTOM-UP CLIMATE
ADAPTATION STRATEGIES
TOWARDS A SUSTAINABLE EUROPE

Synthesis of integrated climate policy perspectives

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under Grant Agreement No. 308337 (Project BASE). The contents of this document are the sole responsibility of BASE and can in no way be taken to reflect the views of the European Union.

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Title: **Synthesis of integrated climate policy perspectives**

Summary: This deliverable evaluates the integration of climate adaptation into the sectoral policy making of the European Commission, particularly following the publication of the European Union Adaptation Strategy. It focuses on integration in key sectors: coasts and marine, agriculture and biodiversity, health and water, with an emphasis on barriers and enablers of integration. It finds that the integration of adaptation into sectoral policy-making is largely dependent on institutional dynamics at the EU-level combined with how member states and wider sectoral stakeholders engage with adaptation concerns. In particular, too many policy objectives at the EU-level of policy-making combined with member states' ambivalence, has tended to hamper the integration of adaptation goals. In sectors which have had more recent and regular exposure to climate impacts such as agriculture these factors appear to have had less impact on integration as stakeholders may be more aware of some sectoral vulnerabilities.

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SEVENTH FRAMEWORK PROGRAMME

BASE report

Contents

1 Introduction

In April 2013, the European Commission adopted an European Union (EU) Strategy on Adaptation to Climate Change (COM 2013a). The overall aim of the Adaptation Strategy was to enhance Europe's resilience to the impacts of climate change through ensuring that adaptation is integrated in relevant EU sectoral policies. The EU Adaptation Strategy was designed as a "framework strategy" that set general goals, outlined the course of action and suggested mechanisms for implementation without stipulating specific details. Crucially, the strategy recognised climate change adaptation as a cross-cutting long-term issue which should be picked up by relevant policy sectors. In other words, the aim of Strategy was to encourage actors in different policy sectors to integrate long-term climate impact considerations into their decision making rather than just focusing on shorter-term sectoral goals. The Strategy particularly prioritised five crucial policy sectors in which climate change must be integrated to enhance future resilience to climate change impacts, namely: flood and drought management, coasts, agriculture, health and urban planning. In this deliverable, all but the last of these sectors serve as point of departure for analysing the extent of policy integration and barriers and enablers for further integration of climate adaptation policy issues in EU policy making.

This deliverable reports on the work of Task 7.2 of the BASE project. It seeks to provide a current and forward looking analysis of adaptation policy, therefore contributing to the synthesis of BASE findings within deliverable 7.1 which examines policy integration in principle, and WP2's baseline analysis of current adaptation policy. It also produces analysis relevant to the EU-funded MEDIATION project (http://www.mediation-project.eu) which seeks within one of its aims to analyse the decision-making context of climate change adaptation. It provides fresh perspectives on policy coherence and efficiency for adaptation through evaluating 'live' EU-level policy developments and procedures (e.g. Impact Assessment, consultation, inter-DG steering groups). This deliverable in particular focuses on 'live' adaptation policy development since the publication of the Adaptation Strategy in 2013 in the relevant sectors of agriculture and biodiversity, health, water and coasts and marine, which also are key sectors around which BASE case studies are focused, and, as indicated above, the crucial sectors highlighted in the EU Strategy. It contributes in particular to BASE Objective 3: "To identify conflicts and synergies of adaptation policies at different levels of policy making with other policies (including climate mitigation) within and between sectors".

The objective of this deliverable is to analyse the EU Adaptation Strategy and how the strategy can contribute to policy integration and the production and use of knowledge of adaptation. In meeting this objective the deliverable asks the following research questions: To what extent has climate change become integrated into key EU policy sectors since the publication of the EU Adaptation Strategy, and what are the key factors that have facilitated or hindered the consideration of climate impacts in on-going decisions?

The deliverable particularly builds upon Deliverable 2.1 (Hilden et al. 2013) which analysed EU Adaptation Strategy and how it can contribute to policy integration and production and use of knowledge of adaptation. D2.1 analysed the context of the adaptation strategy in terms of its policy integration programme theory, and also focused on the implications for two critical sectors at the EU level, namely marine and coasts and agriculture. This deliverable looks more at the actual impact of the EU Strategy on the aforementioned sectors to actually analyse if and how adaptation is being integrated into their policy making processes. Thus the principal analytical focus of this this deliverable is policy integration. Policy integration concerns how cross-cutting issues such as climate change adaptation are incorporated into the decision making of cognate policy sectors. While the academic literature outlines a series of very different approaches to policy integration (see Jordan and Lenschow 2010, for an overview), official guidelines issued by public administrations (e.g. EEA 2005) and international organisations (e.g. OECD 2002) are often highly

prescriptive and often conforming to a normative interpretation of policy integration - see for example the chapter on the programme theory of EU's Adaptation Strategy in D2.1, in which normative integration logic of the 2013 EU Adaptation Strategy is evaluated. In this deliverable, we draw on the tradition of political science literature to argue that regardless of the design of an integration strategy, the success or failure of a strategy depends upon the institutional environment in which it must be implemented. Therefore, we review the institutional literature (e.g. Peters 2005; Turnpenny et al. 2009; Turnpenny et al. 2014) to develop a framework to better understand the 'logic' of how policy integration (and non-integration) works.

In sum, this deliverable aims to investigate the extent of integration of climate adaptation policy in the EU polity with specific focus on the period leading to and after the adoption of the EU Adaptation Strategy in 2013. In so doing we have three main strands to our analysis:

1) a description/diagnosis on the state of integrating climate adaptation into critical policy sectors, including factors that promote or inhibit integration;
2) analysis of the process and degree of integration of climate adaptation policy issues in selected policy sectors.
3) identification of factors that shape and influence the adoption of climate adaptation goals under an institutionalist theoretical lens.

In undertaking this analysis, the intention is to contribute towards debates on adaptation governance through highlighting important political factors related to how institutions function and deal with policy, which hitherto have tended to be neglected in existing studies. Moreover, we seek to deepen the policy integration literature which tends to broadly but not exclusively focus on normative, conceptual and empirical understandings of policy integration (for an exception see Jordan and Lenschow 2008 among others), at the expense of deeper theoretical insights.

The remainder of this deliverable unfolds as follows: First it presents our analytical framework to outline the way in which we measure integration and conceptualise integration through micro, meso and macro institutional lenses (section 2). Second it lays out the methods used to collect data for the analysis (section 3). Third, it outlines our analysis of the integration of climate adaptation in the agriculture and biodiversity, water, health, and coastal and marine European-level policy sectors since the publication of the EU Adaptation Strategy (section 4). Fourth, barriers and enablers of climate adaptation integration are discussed in relation to our micro, meso and macro institutionalist framework (section 5). Fifth, we conclude the deliverable by discussing the implications of our findings and reflect upon the implications for upcoming policy initiatives in the studied sectors in which the consideration of climate adaptation is central (section 6).

2 Climate adaptation: An institutionalist framework for analysing barriers to integration

2.1 Measuring integration

Given that this deliverable is looking to examine the extent to which climate change adaptation has been integrated into on-going live sectoral policy development since the publication of the 2013 EU Adaptation Strategy, it is important to have a measure by which to observe whether climate adaptation has been integrated or not, and thus assess whether any change has occurred. Only then can we start to make observations about barriers and enablers to climate policy adaptation integration in our selected policy sectors. For this reason, our analysis (as with D2.1) adopts a modified measure of integration first put forward by Mickwitz et al. (2009) and Brouwer et al. (2013) (see Table 1).

Table 1: A scale to measure policy integration

Indicator	**Key aspects which can be observed**
Inclusion	- Climate change adaptation objectives and needs identified - Actions identified which anticipate climate change impacts
Consistency	- Contradictions between climate change adaptation and other policy goals identified - Efforts to minimize contradictions between climate change adaptation and other policy goals
Weighting	- Relative priorities of climate change adaptation compared to other policy aims identified - Procedures identified to decide relative priorities of climate change adaptation compared to other policy aims
Reporting	- Scheduled evaluation climate change adaptation - Reporting requirements of evaluation of climate change adaptation (e.g. identification of criteria and indicators, answering to which audience, constituency or affected stakeholders)

2.2 Institutions as barriers to, and enablers of, policy integration

As stated above, this deliverable draws on long standing traditions of political science which say that institutions are key to understanding policy and related implementation outcomes (Peters 2005). Drawing on this tradition, we develop an institutionalist framework to better understand how different institutional dynamics can impact upon the integration of climate adaptation into policy developments in different sectors. In taking an institutional approach we define an institution as a setting wherein an established or ad-hoc configurations of 'systems of rules, norms and cultural systems of meaning that shape the courses of action' (see for instance Scharpf 1997: 38) develop towards achieving common, and often public, goals. Thus in broad terms, institutions are understood as constructs consisting of formal and informal rules, norms, roles and cultural systems that, for example, include common framing of policy issues that have a regulating impact on the behaviour of actors who are involved in policy making and implementation. This means that (policy) institutions are dynamic social entities that over time attain a relatively high degree of resilience (Scott 2001: 51), and which coordinate behaviour across policy through harmonized perceptions and scripts for action (Aspinwall and Schneider 2000; DiMaggio 1997). In other words, when integration of climate adaptation becomes institutionalised across key EU policy sectors, adaptation policy issues may become naturalised and part of the predictable framing of sectoral policies for institutional actors and external actors.

Drawing on Turnpenny et al. (2009) and Turnpenny, et al. (2014), we can see that institutions can affect the integration of cross-cutting initiatives within sectoral decision-making on three different levels, the micro, meso and macro (Table 2):

- *The micro scale* is concerned with the individuals involved with embedding of new ideas, their behaviour and the resource constraints which bear upon them.
- *The meso scale* is concerned with organisational dynamics, including organisational procedures and management structures, systems of knowledge transfer, norms and incentive structures and inter-organisation competition. This also includes dynamics between organisational units, concerned with a certain policy topic.
- *The macro scale* is concerned with the wider societal and sectoral political economic and social context, including linkages with broader values, norms and goals. Note that there is no assumption that the 'macro' level provides the overarching societal and political structure within which decisions at other levels are taken. Its function is rather to enable the identification of influencing factors at different scale levels, which interact with each other, and shape each other.

Table 2: Micro, meso and macro institutional factors shaping the embedding of new ideas into established policy making procedures

Scale	Focus	Examples of key barriers and enablers to embedding
Micro	Individual behaviour	Expertise, professional background, timeframes, awareness, understanding, networks
Meso	Organizational rules and dynamics	Informal and formal established procedures, core objectives of an organizational unit, incentives, organizational competition

Macro	Wider social context and political context	Broader societal values, dominant political discourses (fringe and core issues) – at level of EU policies (MEP) as well as at level of member states, sectoral actors

(Source: adapted from Russel et al. 2014)

Through conducting an extensive review of the institutionalist literature, the outline framework in Table 2 was further developed to better understand how the incentive structures within decision making institutions and how the relations between actors might operate at the different scales of analysis (micro, meso and macro), and how these might impact upon policy integration.

2.2.1 Micro-level

The micro level is concerned with the individual behaviour of officials working in the separate parts of the European Commission. Ideas on policy actions (in this case climate change adaptation) need transmitters (individuals or groups) to promote the idea, influence behaviour and build coalitions (Oliver and Pemberton 2004) – also see Béland (2005). However, institutions place constraints on the (rational and irrational) actions (Torfing 2001) of individual actors in policy making because of the informal and formal decision making rules often operating at the meso level (see below). Institutions offer incentives and disincentives for certain types of interventions and behaviours – e.g. whether dealing with an issue such as climate adaptation is linked to achieving formal goals and positive career progression for policy officials (Hall and Taylor 1996). Moreover, institutions and meso-level rule-making and prioritisation shape how much human and time resources are available to policy makers to collect suitable data and to integrate this data into their policy making for cross-cutting issues like adaptation (Turnpenny et al. 2009; Russel and Jordan 2009, 2007; Russel et al. 2014).

The agency of individual policy makers to engage with an issue such as climate adaptation is also bounded by factors related to knowledge management and the individual cognitive capacities of policy actors that can shape the way in which an issue like climate change adaptation is readily taken up by individual actors in their decision making. A key factor cited in the literature is the supply and quality of information provided to decision makers (Hall and Taylor 1996; Jordan and Schout 2006; Torfing 2001). There can be information asymmetries and data gaps (and lack of information demand due to a perceived lack of priority) making it difficult for policy makers to understand for example the climate impacts in their sector and the relevance to the policy at hand (Russel et al. 2014). Even if data is available, it may not be dispersed widely and not be in an easily usable form for policy makers (Russel et al. 2014; Russel and Jordan 2009). Moreover, individual policy makers are only capable of processing and interpreting a given amount of data (Béland 2005) meaning decision makers can only focus on a few core issues at one time. Thus if an issue like climate change is not seen as core to an official's job, it can all too easily be ignored. What and how policy makers process and embed issues like climate adaptation can be shaped by individual expertise and professional identity (Torfing 2001), beliefs (Hall and Taylor 1996) and ideologies about what governments should do within a narrow area of expertise (Christensen 2013) and the associated fixed preferences of actors (Hall and Taylor 1996). Expertise is said to shape interpretative frames, and professional identity can direct policy makers to pursue some reforms over others (Torfing 2001). For example, an official with a background in law may prioritise legal reform whereas an economist would prioritise efficiency around climate change adaptation.

The training of bureaucrats is argued to be crucial to shaping how ideas taken up (Christensen 2013; Russel and Jordan 2007) as training can shape expertise, ideas and identity. According to Christensen (2013) officials with a strong professional background will be less susceptible to norms associated with

meso level dynamics (see below) and more in tune with doing what they perceive to be professionally right. Moreover, technical bureaucracies have more skills than generalist ones which may give them a stronger role vis a vis politicians in terms of setting the policy agenda, and critiquing policy plans (ibid.).

2.2.2 Meso-level

Meso level behaviour is driven by formal and informal decision making rules and goals of decision making organisations, which in our case is the European Commission. Among other things, rules make it possible to coordinate simultaneous activities, avoid conflict and help to mitigate against unpredictability (March and Olsen 1989: 24), and to reduce "the time and energy otherwise used on thousands of decisions about how to perceive and evaluate an otherwise unintelligible stream of information (March and Olsen 1994: 253). While, over time or in times of acute crisis, these rules and routines can change, it is said that they tend to have a "surprising durability" (March and Olsen 1994: 262), which may even give the impression of inertia (Smith et al. 2000).

Recourse to the institutional literature suggests that rules develop for a number of reasons. On the one hand they are claimed to develop from the more rationally-orientated goal of structuring interactions to stop free-riding and to pursue organisational goals. In this situation, rules shape decision making around a logic of consequence where decisions are framed around achieving rational instrumental goals and efforts to reduce transaction costs of action (Torfing 2001). On the other hand, through more sociological processes (Hall and Taylor 1996) rules are argued to evolve as social processes, images, symbols and rituals that combine to form rules of behaviour which lead to the development of shared meaning (Morgan 1997: 132) or to "webs of meaning" (Marsh et al. 2001: 21). These webs of meaning then shape the rules through which networks and collectives of policy-making actors develop cognitive scripts; this process and the resulting rules and scripts are then used to tackle policy problems (Hall and Taylor 1996). In this situation, rules conform to a *logic of appropriateness* rather than a *logic of consequence*. This means that actions are expressions of appropriateness or acceptable behaviour within the norms and routines of a given context rather than achieving instrumental rational goals (March and Olsen 1994: 252; 1996: 250).

So what are meso level implications of rules for the embedding of new ideas such as climate change adaptation? Institutional rules act as external constraints that define the repertoire not the choice of action (Torfing 2001: 286) and, as such, affect the range and sequence of alternative actions when confronting policy making (Hall and Taylor 1996). Indeed such institutional rules structure how policies are made, the policy objectives addressed, the resources allocated to given issues and the (dis)incentives under which policy makers operate (Torfing 2001: 293) – see also the micro level above. Moreover, they structure what is considered a legitimate course of action (Torfing 2001), or legitimate evidence to support action (Juntti et al. 2008). They can shape how evidence, such as climate impacts are interpreted and integrated in policy development. Thus rules either allow space or crowd out (rule in/rule out) initiatives like climate change adaptation, depending on how the issue fits with established practice (Russel and Jordan 2009; Torfing 2001). Rules also shape the relations and interactions of the sub-units of an organisation, which may have a set of complementary but also different and conflicting rules (Richards and Smith 2002). In the case of the Commission, the sub-units can be conceived of as the separate DGs, their agencies, or even different teams within DGs. In situations where rules between sub-units are in conflict, a situation often referred to as departmental pluralism or departmentalism can develop (Russel and Jordan 2009). In this case, the cross-cutting initiative of one part of the organisation or DG does not fit with the rules of another DG, leading in some cases to conflict and active resistance. This situation can mean that coherent action on climate change adaptation might become difficult, if it cuts against the grain of dominant formal and informal rule making processes within a sector. Rules also manifest through certain veto points (processes through which a policy must go through before being implemented) or veto players (actors whose support is needed to push through policy) into the broader meso-level landscape (Chistensen 2013). Such veto points

or veto players can either manage or exacerbate interdepartmental conflict, depending on how they align with the issue of conflict.

2.2.3 Macro-level

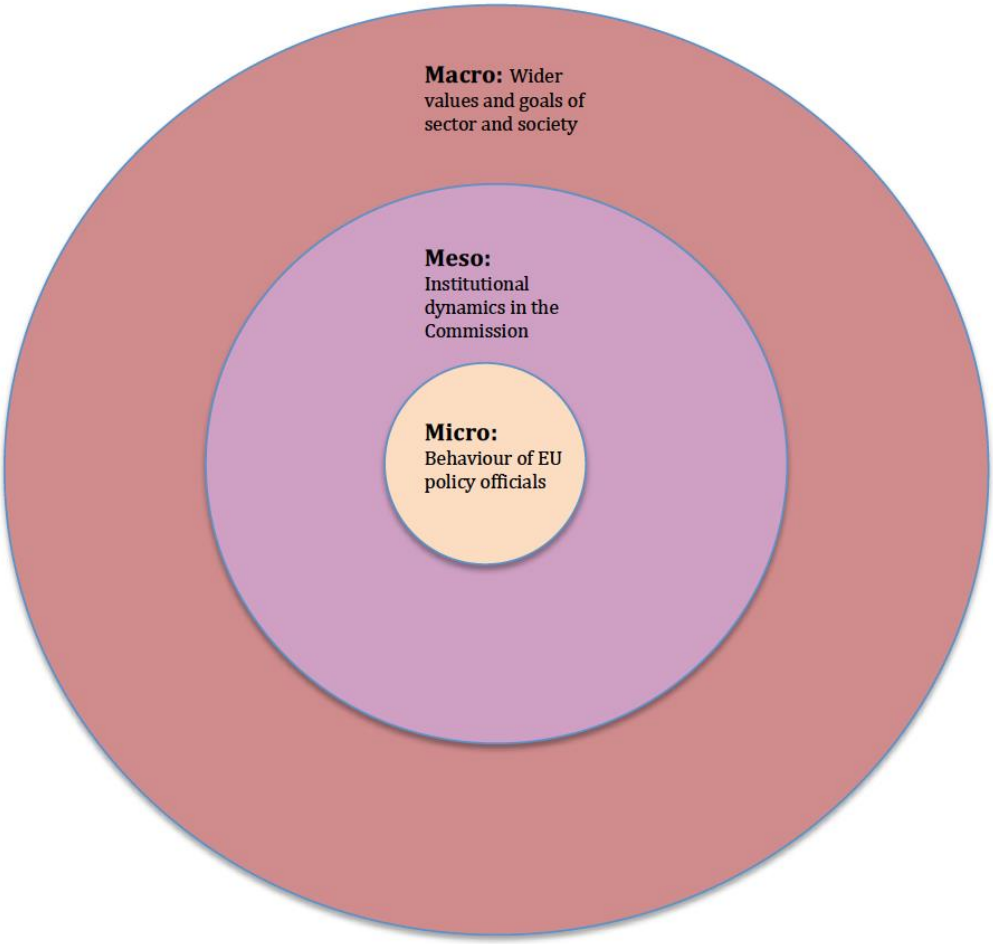
At the macro level, broader historical political developments, institutional configurations of governments and political parties, combined with politicians and interest groups can structure, influence and shape the behaviour of organisations (meso level) as well as officials (micro level). Institutional organisation of the polity, society and the economy structures behaviour, and promotes certain values and ideas over others (Christensen 2013; Hall and Taylor 1996; Weir and Skocpol 1985). Moreover institutional organisation at the macro level can embed power asymmetries allowing some groups disproportionate access to decision making over others (Hall and Taylor 1996). This situation leads to the creation of constraints and opportunities for embedding new ideas, as the historical sequence of decisions structure political debate and related dominant paradigms and values in society (Béland 2005). In such situations, problems can arise with the embedding of cross-cutting goals like climate adaptation into policy making when that issue is too far from the dominant policy paradigm. As Niemelä and Saarinen (2012) note, this maintenance of the dominant norms is akin to the production of cognitive locks, so that rather than a change in the policy making approach, policies and existing institutions are reproduced over time. Thus there is a risk of path dependency (Béland 2005; Hall and Taylor 1996) whereby climate change adaptation goals are rejected to reduce the risk of instability at the macro level (Hall and Taylor 1996) In such circumstances even if change is initiated it is marginal, as the 'new solutions', in this case climate change adaptation, are built upon pre-existing political, societal and economic paradigms that dominate a sector and/or wider society (Niemelä and Saarinen, 2012; Torfing 2001: 297).

This is not to say that change cannot occur at this level. Exogenous events that disrupt the policy sector and wider society can have a destabilising effect on the status quo (Torfing 2001) which can provide windows of opportunity (Béland 2005; Niemelä and Saarinen 2012) for new policy directions to be formed. In the case of climate change adaptation we might think of the cloud burst event of 2011 in Copenhagen which caused significant flooding and created a wider appetite for adaptation planning. In addition, opportunities for change occur if a stable policy paradigm fails to provide the envisaged solution, weakening its credibility and thus creating opportunities for new initiatives such as climate change adaptation (Hall and Taylor, 1996).

2.3 The relationship between the levels

To further clarify this multi-level model of institutions, we use a Russian Doll analogy to depict how the three levels relate to each other (Figure 1). Action at the micro level by individual or small groups of policy makers in the Commission is an important factor that can shape the embedding of climate change adaptation into sectoral policy at the EU level, as it is ultimately individuals or small collectives of them who drive policy development. This individual behaviour is influenced (bounded and/or enhanced) by the meso-level organisational dynamics which in our case represents the Commission and its agents. Indeed, the institutional dynamics working at the meso level can shape the amount of resources available to officials working at the micro level or the incentive structures under which they operate, bounding or enhancing the actions of micro-level actors. These meso-level organizational dynamics are then in turn bounded by wider sector and society values and priorities that come from outside of the meso-level organisation dynamics of the Commission. These macro level values can restrict action at the meso-level to those areas and issues acceptable to the wider sector and society. Thus if climate change adaptation is not on the macro-level radar, EU organizations operating at the meso level are less likely to provide resources for micro-level policy actors to mainstream adaptation.

Figure 1: A Russian Doll depiction of a multi-level micro, meso and macro framework for understanding the relationship between institutions and behaviour (specified to the context of EU policy making)



3 Methods

This deliverable draws on data from detailed documentary analysis and semi-structured interviews with expert stakeholders.

The documentary analysis examined how climate change adaptation had been integrated into the selected policy sectors by studying following key policy making instruments, processes and documents, among others:

- Policy documents, including informal documents, e.g. minutes, and formal, e.g. white papers, work programmes and reports
- Impact Assessments
- Consultation exercises
- Communications
- Inter DG steering groups
- Comitology
- Financial mechanisms, e.g. participating in structural funds
- EP committees
- Technical working groups

We analysed the content of these documents around the following themes:

- The current main (formal) policy goal(s) in the sector
- The main events and/or policy actions which have shaped the sector as a European policy area.
- How adaptation relates to the main sector goals?
- The main decision makers in terms of sectoral goals and the integration of adaptation
- The main stakeholders and actors
- The history of climate change adaptation in the sector
- Assessing the extent of climate adaptation integration into the sectoral policy
- Upcoming policy that requires the greater consideration of climate change adaptation

The time period for the analysis of documents is from 2010-June 2015, with a few key policy documents going further back. The reason for this is that it allows us to see if there has been a change from the state of play before and after the publication of the EU Adaptation Strategy. In so doing, we recognise that prior to the publication of the strategy, the EU had been sending strong signals on its proposed approach to climate change adaptation through for example the adaptation Green Paper published in 2007 (CEC 2007a), which could have promoted adaptation activity prior to the publication of the White Paper (a situation also discussed in D2.1 of the BASE project). Moreover, autonomous initiatives within Directorates General (DGs) on adaptation may have also occurred prior to 2013.

Thus the impact of the Adaptation Strategy may be difficult to detect from documentary analysis alone. For this reason, interviews with key stakeholders within and outside of the Commission were pursued. In all we approached over 30 people from the European Commission, European Parliament, EEA and science, industry groups and NGOs. However, most people we contacted were reluctant to be interviewed, the implications of which are considered in the analysis So in total, we only interviewed 8 officials; 4 from the Commission, 1 from the European Parliament, 1 from industry groups, 1 from the EEA and 1 from environmental lobby groups – See Box 1.

Box 1. List of Interviewees

European Commission:

- Staff member from DG Climate Action
- Staff member from DG Environment (on coastal and marine policy)
- Staff member DG Environment (on biodiversity policy),
- Staff member DG MARE

European Parliament (EP):

- Staff member for Green party fraction

Knowledge support & advisory:

- Staff member EEA

Industry groups:

- Chair of a Fisheries Advisory Council

Environmental lobby groups:

- Staff member from a national conservation NGO

As is generally the norm with expert interviews, we followed a semi-structured approach to allow for flexibility while retaining some comparability between respondents (Richards 1996). Broadly the interviews were conducted around the following themes:

- How climate adaptation objectives are generally integrated in sectoral policies
- The factors that specifically shape and influence the process of climate change adaptation into sectoral policies (cf. barriers and enablers).
- The role of factors like knowledge and information, impact upon integration
- The way policy-making actors and networks perceive their role in relation to claite change adaptation
- How norms and values impact upon how climate adaptation goals are integrated

- The extent to which there is a shared idea amongst a policy making sector about the expected impacts of climate change and associated vulnerabilities, and to which extent current policy addresses these
- Upcoming policy that require the greater consideration of climate change adaptation

4 Results: Sectoral experiences of climate policy adaptation

4.1 The EU agriculture and biodiversity policy sector

4.1.1 Main/general issues and challenges

The Common Agricultural Policy in its current form aims to address three main challenges facing European agriculture: maintaining the economic viability of European agriculture, ensuring environmentally sustainable and climate resilient agriculture and maintaining the social/territorial viability of rural communities. The economic viability of the sector is important for another overall challenge which is to provide secure and stable food supplies in the face of growing global demand and volatility, and uncertainty due to climate change.

Economic viability

Europe's farmers are under economic pressure due to falling productivity growth and the combination of price volatility on agricultural commodities combined with price increases on production input such as energy and fertilisers (CEC 2011a). Energy prices, for instance, increased by 220 pct. and fertiliser prices by 150 pct. during the 2004-2010 period compared with the 1986-2003 period, considerably more than agricultural prices, which rose by 50 pct. in the same period (CEC 2011a).

Moreover, the structure of European agriculture with a relatively large share of small landowners leave farmers in less favourable positions to bargain with the strong players in other parts of the food chain (such as distributors, retailers), and leave them vulnerable to the competitive pressure of the global market forces as well as to the impact of climate change (CEC 2011a). Overall, farm profitability is under pressure; farm incomes are on a long-term downward trend, and investments in more productive farming methods are needed (CEC 2011a). To meet these challenges, the Common Agricultural Policy reform primarily aims to promote greater competitiveness and greater effectiveness in European agriculture.

Environmental sustainability and climate resilience

Intensive agricultural production exerts significant pressure on the environment, including negative impacts on soil fertility, water quality, pesticide-related risks to human and ecosystem health, climate, and biodiversity (EEA 2012; Olesen and Bindi, 2002; Iglesias and Garrote 2015; CEC 2013a). Therefore, agricultural policies need to be coordinated and integrated so as to ensure that they meet EU policy objectives related to environmental and biodiversity protection, climate mitigation and climate adaptation. Highly specialized agriculture based on monoculture or short crop rotations may deplete soil fertility while also releasing greenhouse gases; this may in turn lead to increased use of fertilisers and pesticides, posing risks to water quality.

Agricultural practices crucially impact on biodiversity. Hence, the European Parliament in its resolution on the 2011 Biodiversity Strategy commented that the key to halting biodiversity losses was not the biodiversity strategy itself as much as the (then) forthcoming reforms of the agricultural and fisheries policies (EP 2012). Several agricultural practices or changes in practices have led to loss of biodiversity on farm land, including decline of mixed farming systems, ploughing and other land management practices, drainage and intensive grazing (EP 2013). Moreover, increased use of fertilizer and pesticides also affects species and habitat diversity. Intensive and specialised agricultural production, in particular in old member states, may lead to loss of biodiversity and long-term sustainability due to soil degradation and loss of pollinators or increases in diseases EP 2013:1). Yet, at the same time agricultural production is crucially

dependent on a well-functioning ecosystem. Soil processes regulate decomposition of plants, nutrient cycling and regulation of pests and diseases, and these processes involve a high level of biodiversity. Likewise, biodiversity supports natural biological control of pests, diseases and weeds, just as pollination requires viable species communities of a range of animals. Thus, biodiversity underlies both processes and plant and animal genetic resources that are necessary for a robust agricultural production.

The 2020 Biodiversity Strategy aims to improve integration of biodiversity objectives in key sectors including the agricultural sector. Specifically for agriculture, the strategy lays out the objective that by 2020 to maximize agricultural areas that are covered by biodiversity-related measures under the CAP so as to ensure the conservation of biodiversity.

As for the links between climate change and agriculture these are multi-faceted. Agricultural production, particularly intense livestock production, contributes to emissions of GHGs. In 2012, GHG emissions from agriculture amounted to nearly 10 percent of all EU emissions (EEA, 2012). Agriculture accounts for a substantial share of the total emissions of nitrous oxide and methane. Likewise, some land use changes, including drainage of peat land and converting it into arable or grassland lead to losses of carbon from the soil; yet, agricultural soil may also contribute to carbon sequestration (CEC 2011a). Energy crops used for biofuels may replace fossil fuels and thus contribute to reduced CO_2 emissions and provide energy security; but if this leads to competition over land and intensification of agriculture, the net effect may be negative (ibid). While agricultural production may contribute to climate change as well as mitigation, agricultural production is itself vulnerable to climate change (see section B).

Viability of rural communities - territorial balance

A third challenge addressed by the CAP is to ensure viable rural communities, hence to counteract depopulation and closing of businesses and demographic trends such as aging of rural populations as well as income disparities between rural and urban areas. On the other hand, natural resources and environmental quality have been identified as potential drivers of rural economies (CEC 2011a).

Simplification

In addition to the main challenges outlined above, the complexity of agricultural policies represents a challenge. Thus, the Commission states that ‘simplifying the CAP is essential to making our agricultural economy more competitive’ (DG Agri 2015). Cross compliance added new layers of regulation that farmers had to obey in order not to lose their direct payments, leaving some farmers to complain about the amount of paperwork involved in getting EU monetary support. Likewise, some countries have at times had difficulty administering or using allocated rural development funds, as requirements and documentation made the voluntary measures less attractive. Nonetheless, as pointed out by the Institute of European Environmental Policy (2014), the extent to which policies can be simplified is limited by the interrelatedness in the production of market goods and ecosystem services (and related policy objectives) and the structural heterogeneity of European agriculture.

Bio-based economy

Agriculture is increasingly being targeted as a supplier of energy and other biological raw materials as well as a developer of biological processing methods. The bioeconomy encompassing production of renewable resources from land, fisheries and aquaculture environments and their conversion into food, feed, fiber bio-based products and bio-energy, may also contribute to other ecosystem service of more public good nature if produced sustainably (CEC 2012a). The bio-based economy thus promises innovation and economic growth delivered in a sustainable manner. However, with the great promises of biobased production and innovation it is key that the policy framework ensures that sustainability promises are actually realized.

Should the demand for biomass lead to increased pressure for intensive agricultural production, the bioeconomy may result in the same environmental externalities as traditional food production.

How does that relate to climate change?

As stated above, agriculture is vulnerable to climate change. Changes in temperatures and precipitation patterns will impact on water systems, soil characteristics, pest occurrences and nutrient cycles (IPCC WG II, 2014) (as already explored in BASE Deliverable 2.1, Hilden et al. 2013), which again will alter the feasibility and productivity of farming and its potential for delivering ecosystem services. Climate change therefore may interact with and cut across both economic and environmental challenges. The economic viability of farming may be affected where increasing temperatures and decreasing water availability reduces the yield of crops and perhaps even hampers the feasibility of growing certain crops; this scenario is more likely in Southern Europe, where soil erosion also threatens the viability of farming (Orlandini et al. 2008; Reidsma et al. 2010; EEA 2012). On the other hand, in Northern Europe, changes in temperature may improve the feasibility of growing new crops and lead to better yields of other crops due to longer growing seasons (Olesen and Bindi 2002; Orlandini et al. 2008; EEA 2012; Iglesias and Garrote 2015). However, Northern Europe may experience new pests and diseases which will reduce yields or increase costs to farmers and the environment; likewise flooding may reduce arable lands or at least lead to occasional loss of crops (CEC 2009). Meeting environmental and climate policy objectives therefore is also further challenged by climate change. New pests and diseases could increase pesticide use, flooding and increased precipitation may lead to nutrient leaching, and migration of invasive species may undermine conservation of habitats (EP 2013).

Moreover, climate change may add to the regional disparities within the EU. Southern European farmers appear most at risk due to the rise in temperatures and decreased availability of water, whereas Northern European farmers could see some beneficial changes such as a longer growing season (EEA 2012). These interactions suggest that integration of climate adaptation policy and the design of climate adaptation measures with EU agricultural and biodiversity policies is a complex affair as there may be both co-benefits and potential conflicts with economic, environmental and climate mitigation policies.

4.1.2 Main (formal) policy

Table 3: Relevant policies in the agriculture and biodiversity sectors

Policy	Year	Leader	Main objective and policy measures
CAP rules for direct payment	2013 Reg. no. 1307/2013	DG AGRI	Direct payments to farmers to ensure income stability, but decoupled from production. To ensure provision of public goods direct payments are increasingly linked to mandatory greening, i.e. requirements to observe certain practices that benefit the environment and climate, and compliance with environmental regulations (cross-compliance).
CAP rural development through	2013 Reg. no.	DG AGRI	This second pillar of the CAP sets guidelines for support for rural areas to

European Agricultural Fund	1305/2013		meet economic, social and environmental challenges. The policy is implemented through national rural development programmes which must address at least 4 of 6 common EU priorities. It builds on voluntary measures.
Water framework directive	2000 2000/60/EC	DG ENV	To establish a framework for the protection of inland waters, transitional waters, coastal waters and ground waters, which prevents deterioration and promotes sustainable water use. Main measure is river basin management plans and the local adoption of measures to protect water.
Nitrate directive	1991 Directive 91/676		Reduce water pollution from nitrates through - Establishing codes of good agricultural practice - Designate nitrate vulnerable zones - Monitor water protection
Pesticide framework directive	2009 Dir. 2009/128	DG AGRI	Achieve sustainable use of pesticides to reduce risks and impacts of pesticide use on human health and the environment Promoting the use of integrated pest management and alternatives techniques to pest management
Soil thematic strategy	COM (2006)232 COM(2012)46	DG AGRI	To protect the soil while using it sustainably, through the prevention of further degradation, the preservation of soil function and the restoration of degraded soils.
Biodiversity strategy	2011 COM (2011) 244	DG ENV and Council (ENV)	Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.

Habitat directive	1992 Directive 92/43	DG ENV	To ensure biodiversity through the conservation of natural habitats and of wild fauna and flora in the member states The main measure is to establish a coherent conservation network across Europe (Natura 2000), based on a list of natural habitats
Birds directive	2009 2009/147/EC	DG ENV	To conserve all the species of naturally occurring birds in the wild state in the European territory of the MS to which the Treaty applies. It covers the protection, management and control of these species and lays down rules for their exploitation
Bioeconomy Strategy	2012 COM(2012) 60 final	DG RES/INO	The objective of the strategy is to promote an 'innovative, resource efficient and competitive society' that reconciles food security with the sustainable use of renewable resources for industrial purposes, while ensuring environmental protection. Measures: - Research and innovation - Reinforce policy interaction and stakeholder engagement - Market enhancement

In addition to these policies, regulation no 1306/2013 (CEC 2013b) on the financing, management and monitoring of the CAP and regulation 1303/2013 (CEC 2013c) lays down the common provisions for the structural funds, establishes a general framework that specifies common policy objectives and procedures for ensuring that the CAP is implemented in accordance with these policy objectives.

4.1.3 Reference to EU Adaptation Strategy

The Common Agricultural Policy does not explicitly refer to the EU adaptation strategy, but climate adaptation is addressed throughout the regulatory framework for the CAP. Climate adaptation is included most prominently in regulation 1305/2013 (CEC 2013d) on support for rural development (EAFRD). The rural development programs to be implemented by member states are to be structured around six priorities, and the regulation explicitly states that all priorities shall contribute to "the cross-cutting objectives of innovation, environment and climate change mitigation and adaptation" (reg. no. 1305/2013) (CEC 2013d). Likewise, climate mitigation and climate adaptation are listed as possible thematic sub-programmes to which member states may offer rural development funds (Article 7) and climate mitigation, adaptation and biodiversity are among a few sub-programmes that may receive increased support (article 6). Regulation

1303/2013 (CEC 2013c) which lays out the common provisions for the European Structural Funds also explicitly mentions climate adaptation among objectives that must be pursued in the implementation of the structural funds, including the EAFRD. The regulation on direct support (1307/2013) (CEC 2013b) mentions climate adaptation in chapter 3, 'Payment for agricultural practices beneficial for the environment and climate', including crop diversification and maintaining grassland. Finally, regulation 1306/2013 (CEC 2013b) includes rules for provision of farm advisory systems and also explicitly mentions climate mitigation, adaptation and biodiversity as topics areas that *may* be covered by farm advisory services (article 12).

The EU Biodiversity Strategy stems from before the EU Adaptation Strategy, but makes reference to the strategy as a policy that may contribute to the achievement of biodiversity objectives. The biodiversity strategy also outlines the interdependency between biodiversity and climate mitigation and adaptation efforts. For instance, restoration of ecosystems by incorporating green infrastructure in spatial planning will contribute to improved biodiversity as well as to climate change mitigation and adaptation (CEC 2011c).

4.1.4 Timeline with main events and policy developments

Table 4: Recent developments in agricultural policy

Development/policy event	Time	What is the change?	Implication for integration in agriculture and biodiversity
CAP reform (Fischler)	2003	Significant move away from product support to producer support (decoupling) and targeting public goods provision through the rural development fund CAP policies target farmers and sectoral policy makers at the national and local level	Climate change adaptation little attention in these reforms, but was listed as a threat that future policies would have to consider. The reorientation towards public goods provision also paved the way for inclusion of climate adaptation in the CAP funding provision
EU study on impact of climate change on different agri-climatic zones and possible adaptation options	2007	Not a policy change, but a study which outlined the vulnerability of agriculture to climate change and particularly the differentiation of this challenge across different regions of Europe, suggesting also a policy making challenge	The study contributed to placing adaptation on the agricultural policy agenda
2008 health check of CAP reform	2008	A greater share of agricultural funds were transferred from direct payments to farmers to the Rural Development Fund (modulation)	The rural development fund allows for more targeted funding of environmental and climate change activities and such activities will receive a greater share of EU funding than other activities under the rural development fund

White paper on climate adaptation	2009	The white paper targets policy makers and identifies agriculture and biodiversity as policy sectors that need to integrate climate adaptation into policy reforms and also as areas that need to be coordinated.	The white paper and the working document on agriculture together provide a knowledge base and a framework for Integrating of climate adaptation into agricultural policy
Commission Staff Working paper SEC(2009) 417	2009	Adapting to climate change: the challenge for European agriculture and rural areas. Outlines principles for adaptation at farm-level, sector-level and EU policy level	This is a working document on adaptation in the agricultural sector accompanying the white paper on climate adaptation
Biodiversity Strategy 2020	2011	The strategy draws up a framework for action with the objective of reversing biodiversity loss and fostering a transition towards a resource efficient economy.	Outlining the interdependencies between biodiversity and climate change mitigation and adaptation, the strategy suggests that policy responses to both objectives are linked through ecosystem-based approaches
CAP reform	2013	The 2013 CAP reforms further applied the principles of decoupling, greening and targeting rural development funds towards specified EU priorities	Climate change and adaptation gained a more prominent role in the 2013 reform. Reference to climate change adaptation was made in the specific objective No 3: “To pursue climate change mitigation and adaptation actions” (COM (2011) 625 final/2) and climate change and adaptation are among the specified priorities to which rural development funds should be targeted, which *could* provide a boost for climate adaptation.
Green Infrastructure policy (COM (2013) 249.	2013	Part of implementing the Biodiversity Strategy , specifically Target 2 that requires that 'by 2020, ecosystems and their	Emphasizing again Ecosystem based approaches foster the use of biodiversity and ecosystem services as part of an overall strategy to adapt to

		services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems' – through information sharing and guidance.	climate change (SEC 2013/155)

4.1.5 Main actors in agriculture and biodiversity sectors

The EU Commission as a whole is and has been since the founding of the EU the key player in developing agricultural policy, given the centrality of agricultural policy to the overall European project. Moreover, the Commission as a collective is responsible for balancing agricultural policies and budget allocation with other European objectives, and given the large share of the European budget allocated to agriculture, agricultural policy is necessarily a high-priority area for the Commission at large. The commission has also taken leadership in shaping the successive reforms of the CAP in a more market-oriented direction as well as coupling agricultural support to provision of public goods. The Commission has argued for the need to respond to the budgetary pressure on EU funding following EU enlargement and to failing legitimacy of EU policies. Hence, in regards to the 2008 health check the Commission put forward proposals that would have put a cap on EU payments to land holders and transferred more funds from direct payments to the rural development fund than the agricultural ministers were willing to adopt. Of course, this would also shift the burden of financing policies more towards the member states.

Within the Commission the following DGs play a role:

- DG AGRI is the main actor in the field of agricultural policy making; the directorate is attentive to the need for climate adaptation as reflected also in the sector strategies and the inclusion of climate change and climate adaptation in the recent CAP reforms, but at the same time, the DG has not put forward actual legislation binding member states to undertake climate adaptation in the agricultural sector.
- DG ENV is responsible for biodiversity policies as well as other environmental policies that are linked to the CAP under cross compliance, greening and agri-environmental schemes. As these components have gained in prominence as components of agricultural policies so has the indirect role of DG ENV in formulating agricultural policy. Yet, as far as climate adaptation the directorate has not played a very active role in ensuring that water scarcity and drought issues have been forcefully addressed in agricultural policies (interviewee, European Commission).
- DG CLIMA is responsible for climate mitigation and adaptation, and with agricultural being an important sector for both areas, the DG may play an important role for development of agricultural policy in the future, but so far has not been a strong agenda setter in the agricultural field (Interviewee, European Parliament).

EC and member states

The member states are also very important in the continuous reform efforts of the CAP as well as in its implementation. As far as policy development, the different divisions, power positions and coalitions among member states shape the policy course and possible compromises. It also implies that agricultural policy is a highly salient EU policy field at the member state level. Interests vary with regards to how much support should be in direct payments vs. the structural funds, the level of market orientation and the level of greening. In connection with the 2008 Health Check of the agricultural policy, the European Council of Agricultural Ministers thus moderated the Commission's proposal to reduce direct payments to farmers as well as to the share of direct payments to be moved into the rural development fund (Nielsen et al. 2009).

Moreover, at the implementation stage, the difference in vulnerability to climate change is likely to shape the force with which climate adaptation is pursued both in policy documents as well as in policy implementation. In general, the CAP has developed towards greater flexibility where member states have more leeway in the implementation of overall policy objectives and principles.

Stakeholders

Agricultural interest groups have played an important role in the development of the CAP. European farmers, but also agro-industrial interests are well organised. Copa-Cogepa, the agricultural lobby group representing European farmers, in a 2009 position paper on the roadmap to Copenhagen stated that *'Copa-Cogeca wishes to reinforce the current and future key role of EU agriculture and forestry in adapting to and mitigating climate change, but believes that this should not jeopardise the economic viability of sustainable farming and forestry'* (Copa_Cogepa 2009: 2). Likewise, in its response to the Commission's CAP reform proposals Copa stated that the primary goal of the CAP must be to ensure 'a competitive and dynamic agricultural sector'. Climate change is listed as a cross-cutting theme focusing with an emphasis on win-win solutions that would benefit the environment as well as productivity (Copa-Cogepa 2015). Moreover, the organisation argued that climate change challenges must be based on the voluntary approach under the EAFRD and would require significant incentives. According to some interviews, the agricultural lobby groups have not forcefully pursued EU adaptation policies.

4.1.6 Stability and change

Table 5: State of integrating climate adaptation in EU agriculture and biodiversity policy sectors

Indicator	**Key aspects which can be observed**	**In EU agriculture and biodiversity policy**
Inclusion	Climate change adaptation objectives and needs identified?	Climate change adaptation is mentioned as a crosscutting policy objective in the CAP regulation
	Actions identified which anticipate climate change impacts?	Rural development program include support for climate adaptation measures
Consistency	Contradictions between policy goals identified?	The regulations as passed do not consider consistency among policy objectives. However, the impact assessment that was undertaken to assess the proposed regulations SEC(2011) 1153 final/2 compared three scenarios: a limited adjustment scenario, an integration scenario aiming for better integration of the policy across objectives and a refocus scenario, supporting primarily environmental purposes. The impact assessment explicitly discussed the balancing of different objectives, and it concluded that the so-called integration scenario 'is the most balanced in progressively aligning the CAP with the EU strategic objectives', while others scenarios do not adequately meet climate and environmental challenges nor the objective of viable food production.

	Efforts to minimise contradictions between policy goals?	In the current policy documents there is no mention of contradictions between climate adaptation and other main objectives and by extension no explicit efforts to minimise contradictions between climate change adaptation and other policy goals.
Weighting	Relative priorities of climate change adaptation compared to other policy aims identified?	The regulations do not directly assess relative priorities of climate change adaptation vs. other policy aims identified in the policy, neither other environmental objectives, climate mitigation objectives nor do they weight the three main objectives against each other. However, Reg. no. 1305/2013 on the EARFD authorizes member states to increase support rates by 10 percentage points for operations 'supported in the framework of thematic sub-programmes concerning small farms and short supply chains, climate change and adaptation and biodiversity. This indicates a weighting of climate change objectives and biodiversity and a few activities compared with other sub-programmes. The structural funds, including the EAFRD shall support a number of thematic objectives, including climate adaptation and risk prevention. But the regulation does not specify a hierarchy among the 11 thematic objectives. There is a requirement that national rural development programmes designate at least 30 per cent of the budgets for measures that are beneficial for the environment and climate change.
	Procedures identified to decide relative priorities of climate change adaptation compared to other policy aims?	
Reporting	Scheduled evaluation climate change adaptation	Monitoring and evaluation obligations include assessment of CAP measures in relation to the policy objective of sustainable management of natural resources and climate action measures (COM (2011) 627 final/2).

	Reporting requirements of evaluation of climate change adaptation	Member states are required to report on climate adaptation measures in the Partnership Agreements to be submitted to the commission, outlining the implementation of the structural funds, including the Rural Development Programme (Reg.1303/2012, article 8).

The recent rounds of CAP reforms have maintained the same overall objectives of ensuring viable food production, sustainable agricultural production and supporting viable rural communities. But the specific substance of these objectives has changed over time, not least the inclusion of multiple policy objectives under the sustainable agricultural production which in the latest round of reforms more explicitly covers climate change and adaptation. The idea of a more environmentally sustainable and climate friendly/resilient agricultural policy has gained a strong grounding, suggesting significant change, but policy battles remain as to who should pay or how: agricultural interests prefer voluntary measures and generally object to direct payments also being tied to public goods objectives. Moreover climate adaptation has been mixed into an already crowded policy space, and the CAP must accomplish multiple objectives without clearly specifying the weighting between these. Therefore actual integration of climate change would depend on the degree to which sectoral actors, i.e. agricultural interest organisations on behalf of farmers and the food industry as well as local and national politicians, will seek to use the CAP to promote climate adaptation.

4.1.7 Likely or expected risks and vulnerabilities not yet covered by formal EU policy

Vulnerability to climate change is expected to intensify, particularly in the south and southeast which is already experiencing severe water scarcity and droughts. Ensuring that agricultural funding actually contributes to a more climate change resilient agricultural sector, not least a sector that maintains or upgrades the natural capital on which it relies, remains a challenge in the face of the many purposes the agricultural funds should support. Incomplete knowledge and uncertainty about sustainable practices that also build resilience and natural capital also embody vulnerabilities. At a policy level it may be a vulnerability that CAP measures are typically delivered at the individual land-holder scale, while climate adaptation and other environmental goods may benefit from measures at a landscape scale or at least require coordination and cooperation (EP 2013; Merckx et al, 2009; Franks and McGloin, 2007).

4.2 The EU water policy sector

4.2.1 Main/general issues and challenges

At a European level, water policy has moved from regulation of water use and water pollution of water in the early decades until the negotiation and finally adoption in 2000 of a common Water Framework Directive (WFD) outlying common principles and procedures for ensuring a good ecological status for water bodies in Europe. Water policy is included among the policy sectors under the auspice of the DG Environment, where it is among the most comprehensive policy areas in EU environmental policy. Also, the WFD was formulated as a cornerstone in European water policy in the context of tensions between strengthening water/environmental policy through a common framework (and strongly supported by some member states) for the Community on the one hand. On the other hand member states in the 1990s followed a de-regulation agenda and strongly supported a strict interpretation of the subsidiary principles that with the Maastricht Treaty of 1992 institutionalised primacy to local (national) decision making whenever appropriate (Kallis and Butler 2001). The overall objective of EU's water policy since the WFD is

to improve ecological quality in water systems and clean water in sufficient quantities for nature, people and industry (CEC 2000).

Aims and key challenges in EU water policy

The main policy objective in the water sector has developed since the late 1990s to the present, and has gradually turned its focus to also include climate change impacts in the form of flooding, droughts and water scarcity. This reflects the way the main challenges are perceived. Until the mid-2000s, the pollution of Europe's water systems, including e.g. rivers, lakes, water basins, coastal areas and groundwater systems, caused deteriorating ecological quality with related effects for a range of societal areas, for example health, tourism, agriculture and securing access to drinking water. To address the drivers of this pollution has constituted a critical policy challenge in European water policy. In stressing the drivers of inadequate ecological quality of water, the implication is that the inadequate treatment of urban wastewater and other sources of pollution need addressing. This includes the protection of waters against agricultural use of pesticides and pollution caused by nitrates from agricultural sources, deteriorating quality of water intended for human consumption, and insufficient bathing water quality. Thus the protection of groundwater against pollution and deterioration has been singled out as a critical challenge for the European Union.

How does that relate to climate change?

Flooding events (including those that cross member state borders) in Europe are perceived as natural phenomenon which are highly affected by human activity. The location of housing, industries and services, the construction of transport infrastructure and other grey infrastructure, the exploiting water resources and subsequent changing water flows affect the risk of flooding and the exposure of populations to this risk. Since the adoption of the Flooding Directive in 2007, the risks of flooding has increased due to building and construction in risk prone areas, etc. Flooding as climate impact is in addition perceived to potentially harm the quality of water, and thus also affecting biodiversity and industries relying on clean water.

Drought and water scarcity are equally seen as natural phenomenon that are highly affected by human actions and are especially predicted to be accelerated by current and predicted climate change as anticipated by the IPCC (CEC 2007b). Hence, in the light of climate change, the almost 20 per cent increase in areas and people affected by droughts and water scarcity that Europe has experienced during the last quarter of the 20th century is perceived as only the tip of the iceberg in terms of Europe's exposure to drought (CEC 2007b).

4.2.2 Main (formal) policy

The overall aim of the early EU water policy is to protect and improve the ecological status of water bodies in the EU, through measures to promote sustainable use of water and secure adequate water supply. In the WFD, water management plans are central to this aim, as well as for integrating water management goals horizontally across policy areas and vertically across governance levels and ecological scales. Also, the principle of cooperation across member state borders, in particular for cross-border river basins is a central pillar. This principal also addresses cooperation with non-EU countries in cases where the river basins also cross the border of the EU.

The policy offers measures to promote ecological quality of European water systems. Specifically this concerns environmental quality standards for water, chemical analysis, the monitoring of water status, and a common Framework for Community action in the field of water policy. Monitoring and adjustment of existing policy is based on mapping water status, current developments and progress on water quality. In 2015, mapping water quality is still stressed as a vital measure, as it is lacking for 40 per cent of EU's water systems.

The Flood Directive and the assessment and management of floods focuses on prevention, protection and preparedness. Implementation should include assessing the extent of possible extreme events in the future in order to reduce risks. Soft non-structural measures should be prioritised. This means for instance, using natural processes to the maximum to reduce flood risks (e.g. working with wetlands), maximising retention capacities at source, sustainable land use and spatial planning and limiting exposure and vulnerability. However, hard structural flood defences will continue to be important to cope with extreme flooding

As a key element in promoting water quality and addressing flood risks and water scarcity, the WDF regulates water, including the management of water related climate change impacts, across the EU through a common framework based on common principles such as sustainable water management and user pays principle. As part of the common framework, the WFD contains the building blocks for a common strategy for implementing the WDF, supported by a community wide team of national experts, who work as representatives of the Community (Bouleau and Pont 2015). This, to a large extent amounts to the harmonisation of procedures, as for example with reporting, and is used for flood policy.

The Floods Directive targets potential adverse consequences of future floods for human health, the environment, cultural heritage and economic activity. It outlines the analysis of, and approach to, managing flood risks at Community level. A range of policy measures follow this. Part of this is an obligation to submit to the European Parliament and to the Council a report on the implementation of the Directive. The impact of climate change should be taken into account in drawing up this report.

The key measure is flood risk management plans which represent a measure to implement the Floods Directive (and the WFD) and harmonize procedures among the member states. The management plans include reporting and evaluating progress by member states. Member states shall ensure that a river basin management plan is produced for each river basin district lying entirely within their territory. Contemplating the large uncertainties relating to flooding - when, scale, where, and interaction with natural and built environment - these reporting mechanisms within the overall framework offer a way to, and make room for, major adjustments of the policy. Furthermore, the iterative process of the water management plans presents a way to handle uncertainty, climate change and new developments within the water sector (Carter and White 2012; Raadgever et al. 2011).

As part of the policy, flood hazard maps and flood risk maps, must also include description of the floods which have occurred in the past and which had significant adverse impacts on human health, the environment, cultural heritage and economic activity. This measure also addresses a way to manage the scientific and political uncertainty. The mapping includes a description of the floods which have occurred in the past and which had significant adverse impacts on human health, the environment, cultural heritage and economic activity. The plans are based on the scientific community and on harmonized procedures for conducting risk assessment

The EU’s approach to droughts and water scarcity is represented by the Communication on Droughts and water scarcity (CEC 2007c). The main policy addresses the move towards a water efficient and water-saving economy through devising effective drought risk management strategies. Two policy principles are central for developing policy instruments to achieve these objectives; the user-pays-principle and the principle of water hierarchy. Moreover, the policy specifies estimation of pressures on the quantitative status of water including abstractions and the analysis of other impacts of human activity on the status of water. Inconsistent land-use planning and bad water allocation automatically stresses the need for integrating water policy issues. The ‘user pays’ principle is hardly implemented beyond the sectors of

drinking water supply and wastewater treatment. Introducing this principle more widely at EU level would put an end to needless losses or waste.

The water policy sector also contains fiscal incentives for the promotion of water-efficient devices and practices, in particular in water scarce areas, which take into account the social context and the potential regional differences. Water tariffs based on a consistent economic assessment of water uses and water value, with adequate incentives to use water resources efficiently and an adequate contribution of the different water uses to the recovery of the costs of water services.

Water saving must become the priority and all possibilities to improve water efficiency must therefore be explored. For this reason the Commission is launching plans for the introduction of compulsory metering programmes for member states. Policy making should be based on a clear water hierarchy and recover sustainable water resources. Additional water supply infrastructures should be considered as an option when other options have been exhausted, including effective water pricing policy and cost-effective alternatives. Water uses should also be prioritised, and it is clear that public water supply should always be the overriding priority to ensure access to adequate water provision. Through community strategic guidelines for water infrastructures a new legislative framework provides for investments in infrastructure related to water management (storage, distribution, treatment), clean and water-efficient technologies as well as risk prevention measures.

Through the structural funds there is the financing of measures to improve water demand management, in particular through measures of adaptation, sustainable practices, more water savings, monitoring systems and adapted risk management tools. Another measure is the process of mapping of droughts and water scarcity risks at member state level/ regional level: identify river basins which face quasi-permanent or permanent water stress or scarcity. For those river basins that are at risk, member states must set up appropriate regulations to restore a sustainable balance. It is acknowledged by the Commission that voluntary schemes could make a positive contribution and need to be promoted. If results prove insufficient in very sensitive areas, compulsory measures on water saving and water efficiency should be introduced.

Integrating water issues into relevant sectoral policies provides an option to engage other sectors. Measures here concern how sectoral policies could better and further contribute to effective water management, utilising associated funds to foster the delivery of environmental services by water users in an efficient way. Integration is anticipated to promote more complete use of full decoupling and increased support for water management within rural development programmes. It will be also important to analyse the impact of the increase in biofuels on water availability. All production including irrigated and biomass production and all economic activities should be adapted to the amount of water available locally. This is a key condition for sustainable land-use planning across Europe. Addressing the consequences of climate change in particular water scarcity and droughts is one of the priorities of EU regional policy in the period 2007-2013.

4.2.3 Timeline with main events and policy developments

Table 6: Timeline of relevant policy development in the water sector

Development/policy event	Time	What is the change?	Implication for Integrating in the water sector

Water Policy Ministerial Seminar in Frankfurt (Kallis and Butler, 2001)	1988	Initiated the EC policy process leading to the WFD. Involved the CoM/member states, the Commission	Put a common approach to water on the European policy agenda
Communication on proposal for WFD (Kallis and Butler, 2001)	1997	Agenda setting of a common framework approach to promoting secure and sufficient water	No direct impact on integrating but established key aspects of the framework approach
Water framework Directive (EC 2000)	2000	Formalisation of a common EU water policy. Member states targeted in implementation and reporting	With a focus on clean (and sufficient) water, WFD does not mention climate change impacts but paves the way through establishing a policy framework for addressing water related climate change impacts
Flooding Elbe and Danube	2002	Involved cross-border impacts of some of Europe's large and iconic rivers	Ammunition for addressing flooding at EU level (is referred to in CEC 2006). This pushed the preparation of the Commission communication that prepare the formulation and securement of support for the Floods Directive
Widespread droughts in EU with over 100 million people and a third of the EU territory affected	2003	Revealed the human and monetary costs of increasing droughts in Europe. Involved a large part of EU member states and a large part if the population	Sparked public and political attention, reflected in the Council of Ministers addressing EU drought risks, directed at DG ENV (is referred to in CEC 2006: 3)
Request for action from Council of Ministers	2006	Mandates DG ENV to develop a proposal for a community policy	Pushes the Commission to formulate common policy instruments that address managing risks of droughts and water scarcity
Floods Directive (EC 2007)	2007	The establishment of a pan-European Framework for identifying, evaluating, and addressing flood risks	Explicitly addresses climate change impacts and mandates member states to address flooding risks and the Commission to address impacts in the progress reports. Increases attention to flooding as ongoing climate

			impact and provide initial approach for addressing the challenge.
Communication on challenge of water scarcity and droughts in the European Union,	2007	The Commission outlines a common EU approach to water scarcity and droughts, subsequently supported by the Council of Ministers	Extends the water policy agenda to also include water scarcity and droughts with specific reference to climate change impacts
Inclusion of water related climate adaptation in EU Regional Policy for 2007-2013	2007	Addressing the consequences of climate change in particular water scarcity and droughts is priority	Opens up for funding of adaptation projects such as water infrastructure through the mechanisms of the structural funds. Represents a potential integrating of water policy issues including water scarcity in the Community regional policy
Commission Green Paper on climate adaptation	2007	Targets climate adaptation within specified sectors, including water	Stresses the importance of integrating in the implementation of the WFD and in the formulation of the Floods Directive. Highlights the urgency of adapting and the costs of non-adaptation
Flood risk assessment report	2011	Member states must map and hand in 1st risk assessment report	Pushes attention to flooding risks and increases knowledge on flooding in most vulnerable areas in member states at national and local levels
Management plans	2013	Member states turn in 1st risk assessment and flooding management plans	Enforces attention to some adaptation issues and mapping at member state level
Common Implementation Strategy for WFD and Floods Directive 2013-2015	2013	Member states are requested to consider climate adaptation issues in reporting and river basin management plans	Addresses specifically and provides procedures for including climate adaptation issues in the river basin management plans, i.e. the local level framework for policy action. sustains the formalisation of including adaptation issues in the implementation of the WFD

Cohesion Funds	2014	Climate mitigation and adaptation included in eligible areas for funding over the Cohesion Fund	Funding increased for recognition of adaptation

4.2.4 Main actors in water sector

Within the European water policy sector, the type of policy actor is relevant in two respects: 1) as actors who can put climate adaptation integration on the agenda of water policy and push for actions; and 2) as the actors that are allocated a central role in developing or implementing water policies that are supportive towards the integration of climate adaptation policy issues.

DG Environment was active in putting flooding high on the policy agenda and in pushing for the formulation of a common directive addressing risks of flooding, assisted by science such as those involved with the Stern report and at national level such as in the UK (Wilby et al. 2006: 1045). The European Parliament and the Council of Ministers with the request for action issued to DG ENV (CEC 2007c) not only authorised inclusion of climate adaptation on the water policy agenda but also emphasised integration of climate change as paramount to European water management at European level as well as in the affected member states. Also other parts of DG ENV added to this development. The Green Paper on Adaptation (CEC 2007a) stresses how adaptation to the impacts of climate changes within the water sector will depend on multilevel governance, and outlines the different areas of action for governing at EU level to local level. This is reflected in the Floods Directive and also in the specifications for water basin management plans and flood risk management plans issued since the mid-2000s. The council of Ministers have been active in pushing for policies and in supporting the policy approaches and policies developed and pushed by DG ENV, and has per se a central role in formalising integration through adoption, together with European Parliament, of the directives on which the water policy is based and which formally institutionalise climate adaptation issues with water policy making.

With respect to actual policy development and implementation, DG ENV has been active in developing water policy and especially the approaches to water management within specific areas of European water policy. These approaches have been designed in ways that also address climate change impacts, for example in the actions presented in the Communication on drought and water scarcity (CEC 2007c) which stress measures that will enhance water use efficiency through pricing (user pays principle), soft measures (awareness raising, voluntary change of crops, etc.) and grey measures (water saving technologies, better water infrastructure), as a way to adapt to the changing natural water flows.

Member states have an active role in implementing the directives and reporting progress in e.g. flood risk management plans. The EU adoption of the WFD pushed for a reinvigoration of water policy and planning in many member states such as Germany (Albrecht 2013), the Netherlands (Raadgever et al. 2011) and the UK (Wilby et al. 2006). The Commission stressed repeatedly that in water policy many policy problems run across member state border and this is specifically relevant for flooding and water scarcity as key climate adaptation issues. Concomitantly, many actions to manage water (river basins, flood risks, risks of droughts) are closely linked to local and regional planning, thereby relating directly to the principle of subsidiarity and the slumbering line of conflict between common EU policies and Community harmonisation of, environmental and land use regulation on the one hand, and member state sovereignty and national planning principles on the other. The WFD and Floods Directive both stress that coordinated action at Community level would bring considerable added value and improve the overall level of e.g. flood

protection. In EU water policy, this has implied that the principle harmonised water management procedures such as the reporting laid down in the periodically revised management plans. Also stakeholders from different sectors are important in the integration of climate adaptation in the European water sector, especially in terms of their local implementation responsibilities. National experts and experts from the international science community also participate in policy development, in particular policy preparation and identifying adjustments that are needed in policies.

4.2.5 Stability and change

While the European water policy did not pay attention to climate change adaptation issues in the early stages, the water policy experienced a radical change in the mid-2000s, pushed by flooding and drought events in Europe and the growing recognition of the scale of impacts in Europe and elsewhere. Thus, in this policy area and speaking in general terms, integration and in particular adaptation to water related impacts, i.e. flooding and droughts, has/have been integrated at all three policy levels. Impacts not related to water are however not considered, to some extent due to the overwhelming task of addressing the costly challenges of water related impacts and pushing member states to take sufficient actions. Integration can thus be considered deep in water-related issues and very immature for other adaptation areas such as heat islands or indirect impacts.

The change in precipitation and sea levels, cloud bursts and droughts highlights water as a key aspect of climate adaptation. In the common water policy, changing water flows, flooding and droughts or heavily reduced precipitation constitute policy concerns that overlap with adaptation objectives. In this respect, European water policy per se includes key adaptation issues in water policy making. Since the adoption of the Floods Directive in 2007, the focus on climate change impacts has been direct and formalised, although this focus can just as well be seen as an outcome of the water policy itself as a response to policy integrating. Moreover, concerning droughts and water scarcity, integration has however not been formalised in directives (EP interview), even though DG ENV published a Communication on Droughts and Water scarcity in 2007 (CEC 2007c). Droughts and water scarcity has gradually been integrated into the common implementation of the WFD through inclusion in the water basin management plans (CEC 2013f). For example, the Work Programme 2013-2015 addresses the links between other specified areas of managing water basins and the work conducted by the working group on droughts and water scarcity established to assist the implementation of the WFD. Equally, water scarcity issues are eligible for funding over the Cohesion Funds, demonstrating recognition and prioritization of droughts and water scarcity. Hence, a framework apt for including climate change adaptation issues has indirectly existed in the WFD since 2000 while it took another seven years for European water policy to target adaptation issues directly. In this sense, it there is also consistency between flooding and drought policy issues and the water policy issues.

In 2007, the Council of Ministers and the European Parliament adopted the Floods Directive, which refers repeatedly to how climate change amplifies flooding as a natural phenomenon and stresses furthermore climate change adaptation as a pressing and large challenge for water policy which must be integrated in water policy making at multiple levels. Following this recognition of the relevance of climate adaptation for the water policy sector, attention to water related impacts in Europe due to climate change grows and becomes a major focus area that sets it mark on subsequent policies, reports, guidelines and evaluations of in particular the Water basin management plans and the Flood risk management plans. In other words, integration grows within the European water policy sector. Adaptation issues related to prevention of flooding or reduction of the risk of flooding is thus also granted priority within water policy. Significantly, the priority assigned to flood prevention is not contrasted to other key policy aims such as clean and sufficient water; rather they are seen as mutually supporting. This outlines a specific policy focus within the overall EU Water Policy on mitigating through adapting river deltas and coastal areas to the changing risk of flooding which receives almost the same efforts in policy making as securing clean, sustainable water and

water bodies. Thus, the specific policy focus on a major climate impacts and additionally represents a specific weighting of adaptation issues relative to other policy issues high on the water policy agenda.

Moreover, reporting is included in the two main directives of the area in two aspects. Firstly, the Commission must address flood-related climate change impacts, in the progress reports to Council of Ministers and European Parliament on water policy (CEC 2007d: art 14). Secondly, in the form of member states' periodic submission of assessments and of plans for actions to implement the requirements of the directives; the River basin management plans and the Flood risk management plans. Both directives present periodical (and coordinated) reviews of the mandatory River basin management plans (CEC 2000: art 13) and risk assessment and Flood Risk Management Plans (CEC 2007d: 14) every 6 years, including an update of measures and actions where the existing water management measures have not been sufficient. The central position the management plans are allocated in EU water policy is also reflected in the Common Implementation Strategy Work Program 2013-2015 that links especially Floods Directive to the WDF and its basic principles and procedures, and target flooding and droughts and water scarcity as areas that needs more attention to ensure implementation of the WFD (CEC 2013e). This structured, predictable and iterative process, which relates to developing the water management policies and measures at member state level provided by the general policy framework of the WFD (Wilby et al. 2006), provides a dynamic platform for integration of climate policy issues. Though these were not addressed by the WFD itself.

The Floods Directive explicitly refers to climate change impacts in Article 14 addressing 'Reports, reviews and final provisions', while the WFD focuses mainly on securing clean water in the Community and coordinate action in trans-boundary water bodies and only are expanded to also include climate adaptation through the dynamic interpretation of the composition of the water basin management plans and the water basin issues to address and grant high priority in water management. Due to this, the reporting laid down in the Floods Direcctive and the room for dynamic developments of the water basin management are the more important for integration of climate adaptation issues; i.e. for institutionalisation of integration.

Table 7: - State of integrating climate adaptation in EU water policy sector

Indicator	**Key aspects which can be observed**	**In EU water policy**
Inclusion	Climate change adaptation objectives and needs identified	The Floods Directive, Work Programs and Commission communications on the EU water policy and its implementation explicitly recognise climate impacts, with climate adaptation being central to reporting mechanisms.
	Actions identified which anticipate climate change impacts	Explicit actions in terms of climate change adaptation are identified the WFD and the Floods Directive, and are included in part of the reporting and monitoring processes. .
Consistency	Contradictions between climate change adaptation and other policy goals identified	To some extent, although links to cognate policy sectors (e.g. agriculture and biodiversity) could still be stronger.

	Efforts to minimise contradictions between climate change adaptation and other policy goals	See comment above
Weighting	Relative priorities of climate change adaptation compared to other policy aims identified	Climate change has been a key priority since the early 2000s alongside teh more established concern of water quality.
	Procedures identified to decide relative priorities of climate change adaptation compared to other policy aims	Not found
Reporting	Scheduled evaluation climate change adaptation	Reporting and evaluation provisions are strong components of the WFD and the Floods Directive
	Reporting requirements of evaluation of climate change adaptation (e.g. identification of criteria and indicators, answering to which audience, constituency or affected stakeholders)	EU water policy evaluations use a well-developed set of evaluation criteria, which along with other policy goals touch upon climate change adaptation.

4.2.6 Likely or expected risks vulnerabilities not yet covered by formal EU policy

With the growing attention to the impacts of climate change in the 2000s, the main policy challenges were expanded to also include issues related to climate adaptation, specifically risks of flooding and of droughts and water scarcity. These challenges have potential adverse consequences for human health, the environment, cultural heritage and economic activity. For risks of flooding, the challenges include an assessment of frequency, scale and patterns of flooding, and developing ways of managing the risks of flooding, especially when the risks are cross-boundary (CEC 2007d). For droughts and water scarcity, the key policy challenge concerns securing enough water across the Community. In this context climate change impacts are generally expected to be increased precipitation in the Northern of the EU part, decreases in the southern part, with water scarcity expected to be dependent on the extent to which the climate changes. Over the past thirty years, droughts have dramatically increased in number and intensity in the EU. Almost a sixth of the 6th of the EU's territory has been affected by water scarcity, which has had an impact on more than 1 European citizen in 10. This scale of water scarcity is made even more challenging under more extreme drought conditions (as expected with climate change) and can have a direct impact on the citizens and economic sectors that use and depend on water, such as agriculture, tourism, industry, transport and energy (including in particular hydropower). Moreover, water scarcity and droughts have negative side-effects on biodiversity, water quality, increased risks of forest fires and soil impoverishment (CEC 2006 drought).

The policy challenge is thus to address the drivers of water scarcity. A main driver that amplifies water scarcity caused by climate changes is inefficient water use, which amounts to 20 per cent waste of water as community average. Also water pricing policies that inadequately reflect the sensitivity to use of water resources at local level are singled out as a main challenge for the European water policy, as is inadequate water allocation between economic sectors due to land use planning that does not integrate water issues. Both result in imbalances; the former between water use and water resources, and the latter between water needs and existing water resources. Additionally, a lack of knowledge and information on the extent of the challenge and projected trends is stressed as a challenge, as are European and national assessment and monitoring programmes that are largely incomplete and not yet comprehensively integrated in member state regulations and planning. Addressing these background factors and causes of droughts and water scarcity is explicitly stated as part of the policy challenges ahead in the light of climate change (CEC 2007d)

4.3 The EU health policy sector

4.3.1 Main/general issues and challenges

Background

European health policy is mostly a competence of the member states. As with all social policies, health policy is, in conventional definition, concerned with policies that influence the well-being and life chances of individuals (Titmuss 1974). It aims at “collective organisation and financing of policies that protect individuals against market and social risks like sickness, [..] old age and parenthood” (Anderson 2015: 2). Hence, it is typically about redistributing financial resources across social groups and the provision of public services.

The role of the EU in health policy, and in social policies in general, is very different, however. Financial and administrative resources are limited at the EU level, and the European institutions are subject to the subsidiarity principle when exercising their authority in areas of social and health policy. Therefore, the EU’s role is mainly regulatory: The EU has explicit legislative powers in only a few spheres of preventive policy (e.g. workplace health and safety, health-related consumer protection). The member states, by contrast, have the authority to shape the health care system and continue to dominate the distributive parts of health policy (Anderson 2015: 2).

Nevertheless, EU policy and law touch a large number of aspects of social policy, and health policy in particular. For example, the EU regulation intrudes into social services such as national health care systems that have for long been considered immune to supranational influence, among others as a result of patient mobility and service provisions from other member states (Rosenkötter et al. 2013: Table 4). A large body of literature explores the EU’s social policy competence despite the general weakness of social policy provisions in the European Treaties (e.g. Leibfried and Pierson 1995; Hantrais 2007).

The scope for EU action in health policy is set in Article 168 of the Treaty on the Functioning of the European Union. The Treaty stipulates that the EU shall fully respect the responsibility of individual member states to define their health policies and organise and deliver their health services and medical care, including any resources assigned to them. At the same time, the member states are committed to the overriding principle that human health is well protected and accounted for in the development of all EU policies and activities.

The EU mostly complements and supports the work that goes on in the member states on issues where coordination, cooperation and exchange of information, knowledge and best practice is the best way

forward. It also uses legislative instruments to regulate certain areas. EU health policy supports pooling of resources, and helps countries to tackle the common challenges, including health threats such as pandemics, the risk factors associated with chronic diseases and the impact of increased life expectancy on healthcare systems (Rosenkötter et al. 2013: 2).

Aims and key challenges in EU health policy

The main objectives of EU health policy are to prevent disease, to promote healthier lifestyles and well-being, to protect citizens from health threats, and to support dynamic health systems and new technologies (CEC 2014a: 3). These objectives are also laid down in the European Health Strategy, which was adopted in 2007 (CEC 2007e).

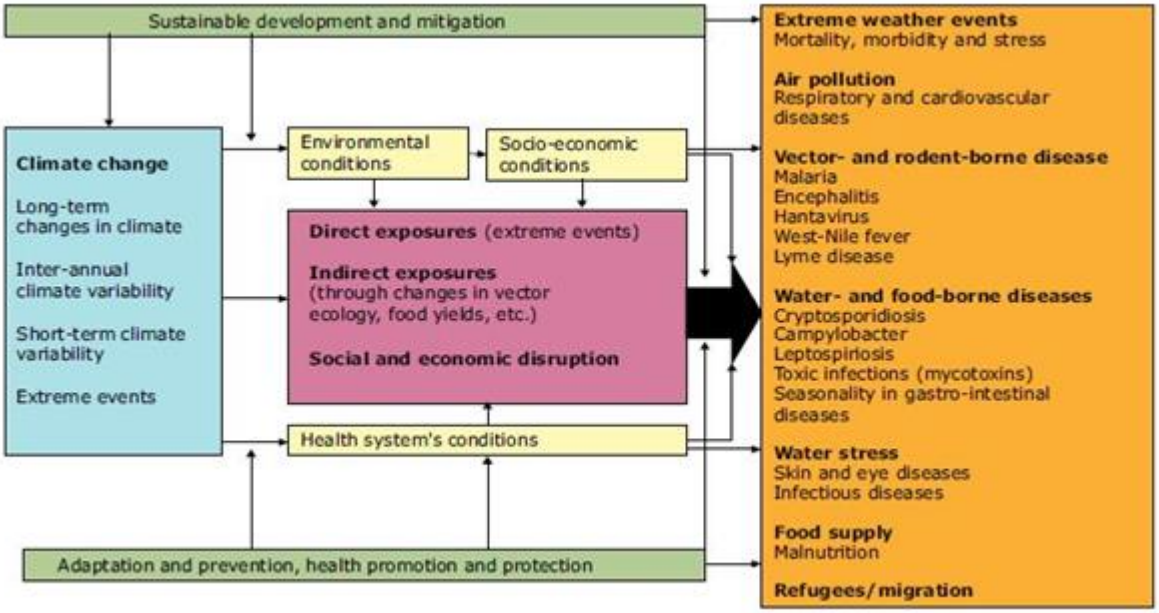
To achieve a high level of human health and quality of healthcare across the EU, a number of challenges must be overcome, including the following (CECa 2014: 3-4):

- *Sustainability:* Healthcare systems must adapt to demographic changes and a growing demand for care. Health system reforms must guarantee universal access to high-quality care and improve the efficiency and financial sustainability of the health systems.
- *An ageing population:* EU citizens are living longer – often well beyond the retirement age – but the average age to which they enjoy good health remains the same. This places pressure on society and the economy, as well as healthcare systems. The incidence of certain diseases, for example Alzheimer's and dementia, is also increasing as the population gets older.
- *Reducing the incidence of preventable diseases:* Cancer, heart disease, diabetes, respiratory, mental and other chronic diseases represent great suffering to citizens and come at a huge cost to society and the economy. Many cases of chronic diseases are preventable and linked to four common risk factors – tobacco, harmful use of alcohol, nutrition and lack of physical activity.
- *Health inequalities:* Huge differences in health and healthcare exist between and within EU countries and regions. The level of disease and the age at which people die are strongly influenced by factors such as employment, income, education and ethnicity, as well as access to healthcare.
- *New and emerging health problems:* New diseases, or strains of diseases, are being identified all the time, e.g. AIDS and H1N1, a new type of pandemic influenza, a new type of pandemic influenza. Some bacteria have become resistant to the drugs used to treat them, which has made it harder to treat specific infections with certain antibiotics.
- *Health security:* serious cross-border health threats – including biological agents and infectious disease, chemical agents and environmental hazards –pose a great threat to health and international travel and trade. The 2014 Ebola outbreak that began in West Africa and led to several medical evacuations to Europe and the 2009 global H1N1 flu pandemic are recent examples.

How does that relate to climate change?

The impacts of climate change may directly or indirectly affect human health in many ways, among others via changing weather patterns and extreme events; impacts on ecosystems, agriculture, and livelihoods; exacerbation of existing environmental problems, such as poor air quality and water scarcity; and damage to infrastructure, for example water and energy supplies (see Figure 2). Climate change is globally already having adverse effects on human health in form of diseases and premature deaths (IWGCCH 2012). In Europe, health effects are related mainly to extreme weather events, changes in the distribution of climate-sensitive diseases, and changes in environmental and social conditions.

Figure 2: Direct and indirect impacts of climate change on human health



Source: EEA 2012, p. 183.

In the context of the overall aims of EU health policy, the impacts of climate change mostly fall under the category of disease prevention and influencing of health risks. Climate change can increase or reduce existing health risks, and may introduce new health risks to previously unaffected regions. Globally, adverse impacts are projected to outweigh beneficial ones; in Europe, the health and welfare costs are estimated to be substantial (Kovats et al. 2011; Watkiss and Hunt 2012). Climate change-related health effects depend largely on population vulnerability and its ability to adapt, linked to ecological, social, economic and cultural factors. Vulnerable population groups include the elderly and children, the urban poor, subsistence farmers, and island and coastal populations (WHO 2011). Also some regions, such as the Arctic and the Mediterranean, are particularly vulnerable to climate change.

Attribution of health effects to climate change is however difficult due to the complexity of the interactions, and possible modifying effects of other factors, such as land-use changes, public health preparedness, and socio-economic conditions; uncertainties also need to be carefully considered. The completeness and reliability of available data differs between regions and/or institutions, and may change over time. Quantitative projections of future climate-sensitive health risks are difficult due to the complex inter-linkages between climatic and non-climatic factors, climate-sensitive disease and other health outcomes (EEA 2013: ch. 12).

4.3.2 Main (formal) policy

The subsequent Table 8 lists the main pieces of regulation regarding climate change-related health issues and risks. EU health policy as such is a much broader field (see above), however, and the majority of policies do not relate to climate change and climate adaptation. They are thus not included here.

Table 8: List of main (formal) EU health policies relevant to climate adaptation

Policy	Year	Leader	Main objective and policy measures
EU Health Strategy "Together for Health: A Strategic Approach for the EU 2008-2013" (European Commission 2007a)	2007	DG SANTE (formerly SANCO)	Strategic framework spanning core issues in health integration of health in all policy fields, and global health issues. Key objectives: 1) fostering good health in an ageing Europe; 2) protecting citizens from health threats; 3) supporting dynamic health systems and new technologies These objectives shall support the goals of the Europe 2020 strategy for smart and sustainable growth (European Commission 2010) – one prerequisite of which is a population in good health. Under this Strategy, **climate change-related health issues** mostly come into the picture as protection from (existing and new) health threats.
Decision No 1082/2013/EU of the European Parliament and of the Council on Serious Cross-border Threats to Health	2011	DG SANTE (formerly SANCO)	General objective: more effective protection of citizens of the European Union against serious cross-border threats More specifically, it aims to reinforce the response to *all* serious cross-border threats to health based on a comprehensive and coherent approach to preparedness and response planning, risks monitoring and assessment, and risk management including risk communication **Climate change impacts** on health are explicitly mentioned
Third EU Health Programme 2014-2020 (European Union 2014)	2014	DG SANTE (formerly SANCO)	The Programme has overarching objectives: 1) promote health, prevent diseases and foster supportive environments for healthy lifestyles taking into account the 'health in all policies' principle, 2) protect Union citizens from serious cross-border health threats, 3) contribute to innovative, efficient and sustainable health systems, 4) facilitate access to better and safer healthcare for Union citizens. **Climate change** is mentioned under area 2): Protection from serious cross-border health threats include "actions required by, or

			contributing to, the implementation of Union legislation in the fields of communicable diseases and other health threats, including those caused by biological and chemical incidents, environment and **climate change**. Such action may include activities aimed at facilitating the implementation, application, monitoring and review of that legislation" (European Union 2014: Annex I, 2.3). The Health Programme is implemented by means of annual work plans which set out priority areas and the criteria for funding actions under the programme. The total budget for the current programme is €449.4 million.

4.3.3 Reference to EU Adaptation Strategy

Climate change in relation to its potential adverse impacts on human health is addressed in the 2007 Health Strategy, in the Decision on cross-border health threats, and in the Third Health Working Programme (see Table 8). The 2013 Adaptation Strategy is however not explicitly mentioned in the Working Programme (which is the only piece of regulation that was issued after the Adaptation Strategy came out).

The other way around, there are policies explicitly concerned with health issues in climate adaptation policy. The EU Climate Adaptation Strategy includes a Commission Staff Working Document (CSWD), entitled "Adaptation to Climate Change Impacts on Human, Animal and Plant Health" (CEC 2013g). It is an update of the 2009 CSWD which already highlighted the main effects of climate change on human, animal and plant health. The current CSWD describes the direct and indirect impacts of climate change on health as well as the capacities of the European institutions to address these challenges.

4.3.4 Timeline with main events and policy developments

The subsequent Table 9 lists a number of policy developments and events in European health policy that have had or potentially will have an impact on the consideration of climate change-related impacts on health issues. It also takes into account some of the earlier policy developments which were key processes that fostered the establishment of health policy at the Community level – which is still ongoing. The following table nevertheless mirrors only a small part of the ongoing developments in the health sector which are concerned with all kinds of health topics (not related to climate topics).

In addition, more general policy developments, e.g. in EU climate adaptation policy and EU financial policy that have an impact on the integration of climate adaptation in the health sector are included.

Table 9: Timeline of events and policy developments relevant for integrating climate adaptation in the EU health sector

Development/ policy event	**Year**	**What is the change?**	**Implication for integrating of climate adaptation in the health sector**
Increasing Europeanisation of health policy	Since late 1990s	In the context of the Europe 2020 (and the earlier Lisbon Strategy), Europeanisation is stimulated by the orientation towards a more competitive economy. The regulatory requirements of the European Economic and Monetary Union are also stimulating the Europeanisation of health policy. While Europe 2020 goes along with a strategic upgrading of health policy more generally, health policy is increasingly used to strengthen economic competitiveness. In addition, the Open Method of Coordination (OMC) is applied increasingly to the health policy area. OMC is a mode of soft governance within the European multi-level system which aims to spread best practice and achieve convergence towards EU goals in those policy areas that fall under the partial or full competence of member states. OMC as an instrument is still evolving. In 2010, the role of the EU therein was expanded because member states were then required to report on their progress in achieving Europe 2020's social goals, and because the Commission and the Council now have the competence within the European Semester to make country-specific recommendations to individual member states.	Europeanisation can in general be seen as a means of standardisation, of harmonising policies, and of accelerating reforms in health policy. Hence, it is a process that potentially promotes change. Regarding the impact on the integration of **climate issues** in health policy, we can argue that a harmonised and coordinated approach might foster integration of other policy objectives, such as climate adaptation**,** in health policies.
Health in All Policies (HiAP) approach	2006	Health in All Policies (HiAP) is a policy strategy which targets the key determinants of health through integrated policy response across relevant policy	In principle, HiAP could lead to the development of actions in other areas where synergies between health and these policy fields (e.g.

		areas with the goal of supporting health equity (Ståhl et al. 2006).	**climate change**) are to be found. It may also lead to the discussion of health in other sectors. This in turn might create feedback in the health sector to set the stage for integration of topics like climate change. In practice, the approach has however never been implemented fully ('tick box exercise') (Rosenkötter et al. 2013: 8).
EU Health Strategy	2007	The Strategy is the guiding framework for EU health policies and joint EU and member state actions on health.	There are numerous public health relevant EU-level actions which can, among others, be attributed to be a result of the more strategic and coordinated approach in EU health policy (see Rosenkötter et al. 2013: Table 4). This might also apply to integration of **climate change** issues. The explicit objective in the Strategy to "protect Union citizens from serious cross-border health threats", which also includes climate-related diseases and health risks, can in principle be seen as beneficial for including climate considerations in health policy. Furthermore, the added value of a strategic EU approach can be found in "improving surveillance and alert systems", and "increasing cooperation on issues such as climate change" (European Commission 2007b: 26).
Communication "A Budget For Europe 2020"	2011	This sets the EU Budget 2014-2020. As stated in the Communication, the Commission has committed to integrating **climate change** (and other priority topics) into overall Union spending programmes and to direct at least 20 % of the Union budget to climate-related	The Communication sets a financial preconditions for integrating **climate issues** in other policy fields, e.g. health policy. This provision was later applied in the Spending Programme related to serious cross-border health threats – *see Decision No*

		objectives (European Commission 2011a).	*1082/2013/EU, below in this table.* This should contribute in a general manner to those objectives by addressing health threats associated with climate change.
Commission Staff Working Document "Adaptation to Climate Change Impacts on Human, Animal and Plant Health", accompanying the EU Climate Change Adaptation Strategy	2013	The Document, which is accompanying the EU Climate Adaptation Strategy, is highlighting the connection between **climate change** and human, animal and plant health impacts, and the capacities existing in the EU institution to deal with this.	The document foresees that the adoption of the Commission proposal on serious cross-border threats to health by the Council and the European Parliament could take place during the first semester of 2013 - *see next item in this table*. Its implementation will require the identification of member states' preparedness, risk assessment and risk management structures for cross-border threats to health including **climate change** (European Commission 2013a: 29).
Decision No 1082/2013/EU of the European Parliament and of the Council on serious cross-border threats to health	2013	The aim of the Health Security Initiative (HSI) is to streamline and strengthen capacities and structures on health security in order to improve the protection of the citizens of the EU from all serious cross-border threats that may affect public health. This includes "communicable diseases, biological agents causing diseases that are not communicable, and threats of chemical or environmental origin, or caused by **climate change**".	HSI explicitly recognises that **climate change** and its adverse effects already show impacts on human health as they can act as an amplifier of existing health problems but also contribute to new and emerging health threats. The recognition of health threats related to climate change increases attention to these problems and thus is a precondition for integrating climate issues in health policies. It potentially improves preparedness, risk assessment and risk management in this area and a more coordinated approach among the relevant policy actors and levels. On the other hand, HSI attempts to increase resilience to cross-border health crisis in an array of potential risks, of which climate change-related ones are *only one*. So far,

			communicable diseases (e.g. SARS, H1N1) have been at the centre of actions on cross-border health threats (European Commission 2011b: 15).

4.3.5 Main actors in health sector

In the European Commission, the sector is represented by the *Directorate General for Health and Food* (DG SANTE), which until 2015 was called DG for Health and Consumers (DG SANCO). DG SANTE is divided between Brussels and Luxembourg. It comprises around 960 staff, of which 660 are based in Brussels, 120 in Luxembourg and another 180 in Grange, near Dublin (EPHA 2013: 2). The DG was established in 1999 as an independent, formal structure for EU health policy. Its formation followed the political decision to separate the health dossier from DG V, the former DG with the responsibility for health policy as well as a focus on employment and social policies. The establishment of DG SANTE (then SANCO) led, on the one hand, to a more mature health policy field. This can be seen as a way forward for the DG to shift its sectorial policy approach from a focus on specific topics to a horizontal one with the formulation of the first health strategy. On the other hand, DG SANTE as an actor is widely regarded as rather weak, especially compared to other DGs that represent more influential policy sectors (Rosenkötter et al. 2013: 7).

The *Consumers, Health and Food Executive Agency (CHAFEA)* is an executive body that helps the European Commission manage the European Health Programme, among others. CHAFEA, established in 2014, is a successor to the Executive Agency for Health and Consumers (EAHC), which was set up by the Commission in 2006. It manages relations with some 2800 beneficiaries and contractors working on nearly 400 projects/service contracts in the fields of health, consumer protection and food safety. It has about 50 staff members based in Luxembourg.

Further institutions at European Union level include the *European Parliament (EP)*, representing the people of the EU member states; and the *European Council* representing the member states. The EP organises its work through a system of twenty (standing) specialised committees. *The Environment, Public Health and Food Safety (ENVI) Committee* is in charge of health policy. With currently 69 members, it is the largest committee in the European Parliament. In the European Council, the *Employment, Social Policy, Health and Consumer Affairs Council (EPSCO)* is dealing with health policy. The EPSCO Council is composed of ministers of employment, social protection, consumer protection, health, equal opportunities, family and children. For most decisions, the European Parliament and the EU Council hold the legislative power.

Another actor at EU level is the *European Economic and Social Committee (EESC)*, a consultative body that gives representatives of Europe's socio-occupational interest groups and others a formal platform to express their points of views on EU issues. Its opinions are forwarded to the larger institutions – the Council, the Commission and the European Parliament. It thus has a key role to play in the Union's decision-making process.

In addition, the EU has created specialist and decentralised agencies to support member states, and to allow for geographical devolution and the need to adapt to new legal tasks and provide technical/scientific advice. They are subject to European public law, distinct from EU institutions and have legal personality

(EPHA 2013: 8-11). Examples of decentralized EU agencies in the health field include the European Centre for Disease Prevention and Control (ECDC), and the European Medicine Agency (EMA).

Beyond these European institutions, health policy is a very complex policy sector with a plethora of public and private actors at all governance levels. In contrast to most other branches of the social security system, which redistribute financial benefits, it concerns mainly services. As a result, the healthcare sector produces highly specialised services and employs a large number of workers as well as highly qualified professionals, many of them with an independent status. It is structured by powerful public and private organisations representing the collective interests of both service providers and clients. Health is furthermore a cross-cutting policy field, as many aspects of health policy are regulated in other policy sectors, which further enlarges the number of relevant actors.

4.3.6 Stability and change

The following Table 10 presents a rough assessment of the status integration of climate adaptation in the health policy at the EU level.

Table 10: State of integrating climate adaptation in EU health policy sector

Indicator	**Key aspects which can be observed**	**In EU health policy**
Inclusion	Climate change adaptation objectives and needs identified	The 2007 EU Health Strategy and the Decision on serious cross-border threats to health explicitly recognize climate change as a threat for health and acknowledge the need to adapt to climate change.
	Actions identified which anticipate climate change impacts	Explicit actions are identified in the Health Work Programme. A large share of this is funding of research to analyse the complex impacts of climate change on health.
Consistency	Contradictions between climate change adaptation and other policy goals identified	Not explicitly identified in health policy
	Efforts to minimise contradictions between climate change adaptation and other policy goals	Not explicitly identified in health policy
Weighting	Relative priorities of climate change adaptation compared to other policy aims identified	Not explicitly identified in health policy

	Procedures identified to decide relative priorities of climate change adaptation compared to other policy aims	Not explicitly identified in health policy
Reporting	Scheduled evaluation climate change adaptation	Reporting provisions exist in the Decision on serious cross-border health threats.
	Reporting requirements of evaluation of climate change adaptation (e.g. identification of criteria and indicators, answering to which audience, constituency or affected stakeholders)	Specific requirements, also explicitly related to climate adaptation do not exist.

4.3.7 Likely or expected vulnerabilities not yet covered by formal EU policy

The current EU health policy does explicitly take climate-related health threats into account. The 2013 Health Security Initiative (Decision No 1082/2013/EU) (CEC 2013h) does however not specify which areas of climate-related diseases and health risks should be in focus. The same holds true for the operational work programmes.

Another relevant factor is that knowledge on the various impacts of climate change on health, including indirect impact relations, is not at all clear-cut. It is also not comprehensive for all areas related to health, and all regions of Europe (given the stark spatial variability of climate change impacts). Hence, the issue of (likely or expected) vulnerabilities is a difficult one which also has a strong knowledge component in it.

4.4 The EU coasts and marine policy sector

4.4.1 Main general issues and challenges

Our findings indicate that in the European Union's coastal and marine policy field, the main challenges concern (whereby different parties will emphasise different issues): (1) management and distribution of fishing rights of stocks in the various European Union (EU) fishing regions; (2) management of conflicting interests and different rule-making traditions with regards to freedom of access (fishing, transport) and designation of areas (offshore wind farms, Marine Protected Areas); and (3) dealing with different positions of member states – some member states are strongly against any policy action from the EC in relation to coastal and marine issues, especially when it affects planning issues (such as UK and Germany), while others (mainly Mediterranean member states, actively call for more adaptation action and support from the EC to address impacts on coastal and marine issues (a number of Mediterranean member states).

Coastal protection (against flooding, erosion, storm surges) may also be one of the main challenges in the EU coastal and marine sector which is expected to be impacted by climate change (Hallegate 2009).

However, as will be further explained in the chapter, coastal management and adaptation is however currently not an EU competence, but lies exclusively with the member states. As will be mentioned at the end of this sectionn, it is also not yet clear what will happen with the concept of 'Integrated Coastal (Zone) Management'. It might be included in existing or new Framework Directive or it might be put on hold. The importance of sustaiable coastal zone management to the EU is reflected in its OURCOAST project which seeks to "support and ensure the exchange of experiences and best practices in coastal planning and management" (http://ec.europa.eu/environment/iczm/ourcoast.htm).

The main challenges with regards to coastal and marine issues may be affected by climate change in various ways (e.g. Nicholls and Klein 2005; Hallegate 2009; Bosello et al. 2011; Elliott et al. 2015). First, climate change can impact sea and ocean currents, and thus affect transport routes and fish migration routes. Second, changes in temperature can impact fish stocks and coastal and marine species, inducing the migration of species (or pressure population sizes of flora and fauna). This could for example lead to migration of stocks (of species such as herring, mackerel and blue whiting) to waters outside the coverage of current international agreements. For example, the EU currently does not have international agreements about management of fish stocks with Iceland and Norway. Third, increases in storm surge events could impact offshore wind farms, aquaculture sites (i.e. cultivation of maritime species such as shellfish), fisheries, and increase coastal erosion (thus affecting human coastal activities and settlements and coastal conservation sites). Fourth, increase in sea level can impact habitat and breeding sites of species which live just above sea-level. Sea level rise can also lead to saltwater intrusion in terrestrial coastal areas, and severely impact agricultural practices next to the coast. Fifth, acidification of ocean and sea water through carbon absorption can put further pressure on marine species.

However, these possible climate change impacts appear not to be unanimously recognised across the coastal and marine sector. For example, the European Commission's DG Environment (DG ENV) and DG Climate Action (DG CLIMA) share a concern about expected and possible climate change impacts on coastal and marine issues. The Directorate General assigned to deal with Maritime Affairs and Fisheries (DG MARE), though, does not, and is not actively considering climate change impacts in its policies. Only a relatively smaller number of conservation NGO's appears to be oriented towards considering adaptation; several of the major conservation NGO's and environmental lobby groups do not actively address adaptation in relation to coastal and maritime issues. Also, in the fisheries sector, considering climate change impacts and possible adaptation actions seems in a (very) early stage. Some adaptation actions in the fisheries sector, though, are taking place, such as adaptations to vessels to better stabilize them during heavy weather.

4.4.2 Main (formal) policy

Table 11: Relevant policy developments in the in the coastal and marine sector

Policy	Year	Leader	Main objective and policy measures
1) Common Fisheries Policies (CFP) (Most recent formal reference: Regulation (EU) 2015/812)	First in 1970. Updated several times since then. Most recently in 2014	DG MARE	Managing European fishing fleets and conserve fish stocks, as a common resource, and providing all European fishing fleets equal access to EU waters and fishing grounds.

2) Marine Protected Areas	Gradually put into place by the member states since 2005	Currently falls partly under the Habitat Directive from DG ENV and partly under the Maritime Spatial Planning Directive from DG MARE	Adequately cover the diversity of the constituent ecosystems such as protected areas required under Habitat and Bird Directive as well as other types of marine protected area set up under international or regional agreements (Art.13(4), Marine Strategy Framework Directive).
3) Marine Strategy Framework Directive (Directive 2008/56/EC)	2008	DG ENV	Achieve good environmental status in the marine environment by 2020 (Art.1)
4) Maritime Spatial Planning Directive (Directive 2014/89/EU)	2014	DG MARE	Providing a framework for maritime spatial planning aimed at promoting the sustainable growth of maritime economies (Art.1.1)

Also relevant to mention here seems the policy memo on “Climate Change Adaptation, coastal and marine issues”, which accompanied the EU Adaptation Strategy (CEC 2013a). However, it was not referred to by the policymakers consulted in this research.

4.4.3 Reference to EU Adaptation Strategy

The Common Fisheries Policies is from 1970. The recent update from 1 Jan 2014, does not refer to the EU Adaptation Strategy, and refers briefly to climate change impacts and adaptation. Our findings suggest that in the fisheries sector, considering climate change impacts and possible adaptation actions at a very early stage. To give an example, one of the interviewees from an Advisory Council on Fisheries, indicated that they had never touched upon the topic at all in their meetings and discussions. Nevertheless, some adaptation actions are already taking place (though not under the heading of climate change adaptation). Such as measures to better stabilise vessels during storms and heavy weather, and measures to enable the crew to work safely on the ship in events of high and strong waves.

Marine Protected Areas are not stipulated by their ‘own’, specific directive, but are covered under the Marine Strategy Framework Directive (2008) together with the Habitats Directive (which first came into place in 1997). Article 13(4) of the Marine Strategy Framework Directive states: “Programmes of measures established pursuant to this Article shall include spatial protection measures, contributing to coherent and representative networks of marine protected areas, adequately covering the diversity of the constituent ecosystems, such as special areas of conservation pursuant to the Habitats Directive, special protection areas pursuant to the Birds Directive, and marine protected areas as agreed by the Community or member

states concerned in the framework of international or regional agreements to which they are parties". The Marine Strategy Framework Directive dates from 2008 and the Habitats Directive from 1997 and (the updates) do not yet explicitly refer to the EU Adaptation Strategy (Elliott et al. 2015). Our findings indicate that integrating climate change impacts in Marine Protected Areas is in a (very) early stage. This is an especially relevant issue may be that Marine Protected Areas tend to be protected by a legal status, making them difficult to adapt when species migrate out of the area. However, Marine Protected Areas are preferably designated to following a network structure, enabling species to migrate between protected areas. Also, when designation of a Marine Protected Area is based on several species, and not just based on a single species, it is expected it offer a habitat to a wider range of species and so does not lose its function if a single species migrates out of that area.

The Marine Strategy Framework Directive dates from 2008 and does not (yet) explicitly refer to the EU Adaptation Strategy (Elliott et al. 2015). The Marine Strategy Framework Directive does include climate change adaptation in an implicit way. This Directive requires member states to identify a 'good environmental status', and to monitor and report on the progress of environmental measures to improve the marine environmental status (and achieve this by 2020). Their recommended format to do so also includes a paragraph on climate change impacts, and identification of targets and measures to anticipate these impacts. (Please note that the 'good environmental status' is different from the 'good ecological status' from the Water Framework Directive').

The Maritime Spatial Planning Directive dates from 2014 (CEC 2014c) and refers to the 2013 EU Adaptation Strategy. Adaptation is mentioned as a tool to create resilient maritime ecosystems (Art. 5.2). Our findings indicate that the reference in the Maritime Spatial Planning Directive is mainly as a result of the input of DG CLIMA and DG ENV. Especially in what is referred to as the "interservice consultation process", DG CLIMA and DG ENV added text on climate change impacts and possible adaptation to the proposed directive. When a final Directive is developed, it is submitted to the inter-service consultation process, whereby all the Directorate Generals check the proposed Directive. In this consultation process, the DG's can also add some text.

In addition, there seems to be an important EU funding programme in place for coastal and marine issues which includes references to climate change adaptation (which did not emerge from the interviews).The European Maritime and Fisheries Fund, which is part of the European Structural and Investment Funds, has included criteria on consideration for climate change adaptation. In a document prepared in preparation for this Fund, entitled "Principles and Recommendations for Integrating Climate Change Adaptation Considerations under the 2014-2020 European Maritime and Fisheries Fund Operational Programmes" (CEC 2013i) explicit references were made to the EU Adaptation Strategy.

4.4.4 Timeline with main events and policy developments

Table 12: Timeline of events and policy developments relevant for integrating climate adaptation in the EU coastal and marine policy sector

Development/ policy event	**Year**	**What is the change?**	**Implication for integrating of climate adaptation in the coastal and marine policy sector**

1) Common Fisheries Policies	Since 1970; various updates since then; most recent update 2014	A recent update from 2014 makes an small reference to climate change adaptation. However, in discussion circles around fisheries policy, climate change adaptation appears to be absent.	Not known why reference to climate change adaptation was included in the Common Fisheries Policy update. Climate change adaptation appears to be a new topic to consider in the fisheries sector (in practice, some measures are already taking place).
2) Marine Protected Areas	Since 2005	Climate change adaptation is not explicitly considered yet for Marine Protected Areas. Not one clear reason why climate change adaptation is not yet considered for Marine Protected Areas.	Absence of consideration can be point of concern, as species may migrate, and formal designation status of areas may be difficult to adapt. However, network structure of Marine Protected Areas is expected to facilitate species. Observations on possible barriers indicate a clash of traditions in rule making on marine issues. Some member states strongly oppose EU interference with matters related to planning and environmental conservation.
3) Marine Strategy Framework Directive	2008	Different accounts of when climate change adaptation was considered in the Marine Strategy Framework Directive. Some indicate climate change adaption was discussed from the start of the development of this directive. Others indicate it does not refer to climate change adaptation at all, as it only refers to ‘direct human stress’ and excludes indirect impacts from climate change.	Some member states strongly oppose EU interference with matters related to planning and environmental conservation.
4) Maritime Spatial Planning Directive	2014	Different accounts of when climate change adaptation was considered in the Maritime Spatial Planning	Some member states strongly oppose EU interference with matters related to planning.

		Directive. Some indicate climate change adaption was discussed from the start of the development of this directive. Others indicate there is no reference at all to climate change adaptation (the Directive only stipulates a plan is made, but does not stipulate content or process); and that any reference to climate change adaptation results from the inter-service consultation process.	Climate change adaptation not widely recognised across maritime sector.

4.4.5 Main actors in coasts and marine sector

The coasts and marine sector has a number of actors involved in policy making and implementation ranging from policy officials through to fishing boat owners. Key actors are the member states, as they develop and decide upon all issues related to planning, including: the Maritime Spatial Plans (as stipulated by the Maritime Spatial Planning Directive); the goals and way of implementation of the 'good environmental status' (as stipulated by the Marine Strategy Framework Directive); Marine Protected Areas (as stipulated by the Marine Strategy Framework Directive and the Habitats and Birds Directive); and their other coastal and marine policies. Moreover, several bodies from the European Commission are critical decision makers in the sector in particular with DG MARE and DG ENV, as they are the main developers of the two Framework Directives for coastal and marine issues (the Marine Strategy Framework Directive and the Maritime Spatial Planning Directive), and DG MARE is in charge of the Common Fisheries Policy. The fisheries sector, represented through Advisory Councils at the European Commission (EC), has an influential position in maritime and fisheries policies. The transport and maritime industrial and business (such as energy and tourism) sector as well as the environmental lobby sector appear somewhat less prominent in the field of coastal and marine policy than initially expected. To give an example, a prominent and established conservation NGO who we approached for an interview, responded they were not in any way active or considering climate adaptation in relation to coastal and marine policies. In fact, they indicated that were not addressing climate adaptation at all in their activities. Also, a recent mutual statement from a range of green conservation NGOs, the "Blue Manifesto for Europe 2015" (Bird Life International et al. 2015) does not refer to climate change adaptation (only implicitly and vaguely). Attempts to contact groups from the transport and industrial sector remained unanswered. That does not necessarily mean the transport and energy sector and environmental lobby sector are entirely absent in this field (we have found a national environmental conservation NGO that was indeed very active with climate adaptation in coastal and marine issues); it may rather indicate they are not publicly, collectively, actively and/or widely involved in the discussion circles around EU coastal and marine policies.

4.4.6 Stability and change

Table 13: State of integrating climate adaptation in EU coastal and marine policy sectors

ndicator	**Key aspects which can be observed**	**n EU coastal & marine policies**

Inclusion	Climate change adaptation objectives and needs identified	In the Marine Strategy Framework Directive to some extent, in the other policies implicitly or barely.
	Actions identified which anticipate climate change impacts	Not explicitly, that is up to the member states.
Consistency	Contradictions between climate change adaptation and other policy goals identified	Not explicitly identified in these four policies.
	Efforts to minimize contradictions between climate change adaptation and other policy goals	Not explicitly identified in these four policies.
Weighting	Relative priorities of climate change adaptation compared to other policy aims identified	Not explicitly identified in these four policies.
	Procedures identified to decide relative priorities of climate change adaptation compared to other policy aims	Not explicitly identified in these four policies.
Reporting	Scheduled evaluation climate change adaptation	In the Marine Strategy Framework Directive to some extent, in the other policies implicitly or barely.
	Reporting requirements of evaluation of climate change adaptation (e.g. identification of criteria and indicators, answering to which audience, constituency or affected stakeholders)	Not explicitly identified in these four policies.

Consulted actors involved indicate various perspectives upon the question to which extent (and how) climate change is sufficiently integrated into these coastal and marine policies. These perspectives of the degree of integration seem to correspond to degree of recognition of relevance of climate change impacts to the sector, as explained above. To give an example, a policy staff member of DG MARE indicated that climate change adaptation is barely considered in marine policy. Whereas a policy staff member from DG ENV indicated that climate change adaption is sufficiently integrated in the Marine Strategy Framework Directive, and to some extent in the Maritime Spatial Planning Directive.

4.4.7 Likely or expected vulnerabilities not yet covered by formal EU policy

The likely or expected vulnerabilities in the sector not yet covered by formal EU policy include:

- The issue of likely migration of species out of Marine Protected Areas is not yet being formally discussed and considered. The concept of Marine Protected Areas as a network may facilitate

migration. Dynamic protected areas and focusing on a family of species (instead of a single specie), may also help.

- The issue of saltwater intrusion in agricultural areas near the coast due to sea level rise does not seem to be formally addressed yet, which is expected to be especially an issue in the Mediterranean member states, as these coasts receive less fresh water supply (precipitation, groundwater and surface water).
- It is not fully clear yet to which extent coastal defences are geared up against storm impacts, which especially applies to the North-West European member states, as storms are expected with higher frequency in these areas.
- Climate change impacts on the fisheries sector do not appear to be formally considered yet. Storm surges may shorten or challenge the fishing season, and changing water temperatures and changing currents may affect size and location of fish stocks. Some measures are already being implemented to fishing vessels, for example to better stabilise vessels (albeit not under the heading of climate change adaptation).
- It is not yet clear what the ‘land-sea interactions’ from the Maritime Spatial Planning Directive and the ‘coastal zone’ from the Marine Strategy Framework Directive exactly cover, and whether those definitions cover a comprehensive and inclusive view of the coast, or whether certain elements of the coast may be left out of these directives (such as estuaries).
- Following this, it is not yet clear what will happen with the concept of ‘Integrated Coastal (Zone) Management’. It might be included in the Marine Strategy Framework Directive, it might be included in a newly proposed integrated directive which aims to integrate Maritime Spatial Planning, the Marine Strategy Framework Directive and Integrated Coastal Management, or it might be put on hold (or dismissed).

5 Combined perspectives on climate adaptation integration: micro, meso and macro enablers and barriers

This section draws on our analytical framework outlined in Section 2 to explore the factors that act as barriers to, or enablers of climate adaptation policy integration. In so doing it seeks to highlight those factors which appear to more commonly occur across the policy sectors, and those that are particular to a sector. Table 13 provides an overview of micro, meso and macro barriers associated with climate adaptation integration in our selected sector. Table 13 is explained in detail in subsequent text below.

Table 13: Key Barriers and enablers identified in the analysed material

	Barriers	**Enablers**
Micro	- Lack of sector leadership inhibiting attention at micro level (biodiversity - Knowledge complexity (health) - Few staff resources for adaptation in DG CLIMA	- Individual Advocates (coasts) - Training (all), developing knowledge base/infrastructure (all)
Meso	- DG power and competition (agriculture and biodiversity, health) - Complexity of policy field – overcrowding of objectives (health, agriculture/ biodiversty, water)	- Use of existing policy paths - Link to funding (agriculture, coasts) - Inter DG consultation (all)
Macro	- Possible clashes with dominant policy frame/ tradition (agriculture) - Subsidiarity/competency (all) - Not on MS Agenda/active opposition (water, marine, ALL) - MS use reframe existing policy mechanisms (no change from Business as usual) (all) - Economic growth/deregulation agenda (all) - Competing political interests (all) - Little environmental NGO interest (mitigation indicated as more urgent)/weak stakeholder demand/no adaptation constituency	- Long term viability of the sector (agriculture) - Clear local level benefits (agriculture) - Role of NGOs (all) - Pressure from the EP (all) - Support from MS (all)

5.1 Micro-level

5.1.1 Barriers

While likely to be a problem in many sectors, a *lack of sector leadership* in promoting climate adaptation integration was observed to be particularly problematic for the agriculture and biodiversity sectors. It has been pointed out in interviews that there is no incentive at the micro-level to integrate climate adaptation objectives into biodiversity policies, as it has not been made a leadership priority in the DG ENV. This lack of leadership is reinforced by the fact that the Biodiversity Strategy does not suggest climate adaptation actions, but primarily deals with climate change as a source of pressure on biodiversity. It is useful to note that weak leadership has generally been seen to be a barrier to integration in a number of academic studies (e.g. Jordan and Lenschow 2010). A lack of leadership to promote cross-cutting issues is also tied to the departmentalism at the meso-level which means that departmental leaders are more likely to devote attention to sector objectives.

A theme particularly pertinent in the Health, and the Agriculture and Biodiversity sectors relates to *knowledge complexity* which makes integrating climate change adaptation into policy making more difficult. Good knowledge flow is claimed to be a critical ingredient for policy integration (Jordan and Schout 2006) as it helps policy actors to identify where integration is needed and the types of policy responses that are required. In the Agriculture and biodiversity sectors, a lack of knowledge has been a particular problem in terms of understanding the complex role ecosystems play in maintaining the functioning of economic systems. Thus there is a knowledge gap which has become a barrier to greater integration of biodiversity into agricultural policies. Within the health sector, because of complex impact chains, the attribution of diseases to climate change as a causal factor is not always clear-cut. Diseases and health risks resulting from indirect exposures, e.g. through changes in vector ecology, food yields, or as a result of socio-economic disruption caused by climate change, are especially difficult to attribute to the changing climate. Also, many diseases are caused by a mix of factors, of which the climate may only be one. A factor relating to attribution and knowledge of the ecological system also emerges in relation to the Marine Strategy Framework Directive, which focuses on ‘endogenous’ environmental stress factors (and excludes ‘exogenous’ stress factors). According to our findings, member states have interpreted this as excluding climate change-related environmental stress.

A final micro level barrier which has implications for all EU policy sectors was found to be the fact that there are *few staff resources* across the commission devoted to ensuring the integration of climate change adaptation across sectors. Indeed, the adaptation office in the European Commission, which is at DG CLIMA, is quite small. Less than 15 staff members in DG CLIMA are working on adaptation. At the same time, almost 200 staff members are working on mitigation.

5.1.2 Enablers

Our research has found few micro-level enablers of climate that are common across the sectors we studied. For example, in the coastal and marine policy sector the role and *support of a single individual* at DG MARE was seen to heighten the visibility climate adaptation. This person has actively made a case for more knowledge availability of the data on climate change impacts and has worked on compiling an overview of existing data, to enable member states and others involved to identify possible risks and actions. In addition, individual vessel owners have made some adaptations to their ships. This could also be seen as a type of autonomous adaptation, as it was not in response to any kind of policy, but initiated and implemented by the ship owners themselves. These adaptations mainly include measures to better stabilize the vessels and create safe working conditions during heavy weather.

Knowledge development, education, information, insight *and training* are (repeatedly) indicated as a factor which would help to identify risks and vulnerabilities by sectoral policy makers to help to create common ground among groups involved to identify possible actions and policies. To illustrate this point, one of the interviewees (from the Commission) indicated: “More specific insight in the effects of climate change on specific sectors, and reduced uncertainty in expected impacts and possible actions, will help to convince more actors and member states to address climate change adaptation.” To give another example, there are working groups in the fisheries sector that consider ecosystem impacts, one of those groups would be keen to learn more about expected climate change impacts on fisheries. In the fisheries sector, climate change impacts and possible adaptation actions are not yet publicly or formally discussed and considered. Yet, fishermen are experiencing an increase in the intensity of storms over the past decade, which leads among others to bigger wave swells. And, as mentioned above, various vessel owners have already made adaptations to their ships (to better stabilize them during heavy weather). More information on climate change impacts and adaptation actions may facilitate a wider discussion in the fisheries sector. In a similar vein, for the health sector, despite the aforementioned knowledge complexities, there is an *established and developing knowledge infrastructure*: Climate-ADAPT has a comprehensive section on health which may help political actors to collect information on specific climate-related health issues. Climate-ADAPT is not just an important knowledge management tool for the health sector as it provides policy relevant data on climate adaptation for a number of policy sectors including our other case study areas (water, coasts and marine, agriculture and biodiversity).

5.2 Meso-level

5.2.1 Barriers

Departmentalism is an often cited barrier to policy integration (Russel and Jordan 2009; Jordan and Lenschow 2010), whereby departments compete with each other over resources and policy turf rather than cooperate, and is a commonly cited meso-level institutional feature (see above). Our findings suggest that departmentalism in the EU commission in the form of *competition between DGs* represents a key barrier to integration of climate adaptation in relation to all of the sectors studied. With agricultural and biodiversity policy, the integration of climate adaptation rests with three different DGs. This inhibits the flow of information necessary to ensure proper understanding of policy issues and solutions, and it results in a lack of leadership within each directorate regarding cross-cutting issues. Moreover, there is an issue of the relative position of power among the different directorates, where the weaker directorates, e.g. DG ENV, DG CLIMA in the eyes of some, are less likely to influence the policy making of more powerful directorates (e.g. DG AGRI), hindering integration. According to an interviewee from the commission, this situation also affects resource allocation where the weaker DGs have a harder time attracting funds, including funding for research. While similar problems exist for the health sector there are fewer DGs involved (just DG CLIMA and DG SANTE), making cooperation between the different parts of the commission easier compared to other policy sectors such as agriculture and biodiversity, which as we explain above are characterised by involvement of several DGs.

A point of concern in the marine and coasts sector is that it is not yet clear what the EU policy will be on integrated coastal management, considering that coastal areas may be significantly impacted by climate change. His issue might be included in the Marine Strategy Framework Directive, it might be included in a newly proposed integrated directive which aims to integrate Maritime Spatial Planning, the Marine Strategy Framework Directive and Integrated Coastal Management, or it might be put on hold (or dismissed altogether). To further illustrate this issue, according to our interviews (with three DG’s in the commission), the two coastal and marine policy expert groups do not really interact with each other. The expert group for Integrated Coastal Management (to support and facilitate the Maritime Strategy Framework Directive), and the expert working group for the Maritime Spatial Planning Directive are argued to speak past each other as they respond to two different audiences. Also, the wording and associations used in these two expert

groups tend to differ which can cause integration problems. For example, the expert group for the Maritime Strategy Framework Directive uses the concept of 'coastal zone', whereas the working group for the Maritime Spatial Planning Directive uses the concept of 'land-sea interactions'. It is not yet clear what these two concepts (i.e. 'land-sea interactions' and the 'coastal zone') will exactly cover: a comprehensive and inclusive view of the coast, or whether certain elements of the coast may be left out of these directives (such as estuaries). DG ENV is currently aiming to develop a common understanding of the issues associated with 'coastal zone' and 'land-sea interactions', and preferably a common terminology to refer to these issues to better aid the communication and thus integration processes.

The problems of inter-DG competition and departmentalism are probably exacerbated by the *complexity of policy field, in which there are many competing sectoral and cross-sectoral objectives. Such situations can lead to an overcrowding of objectives* (Jordan and Halpin 2006) with resource constrained DGs having to select their policy making focus according their formal and informal policy making rules. Our data suggests that this situation may be observed across the Commission but is especially seen in the studied health, agriculture and biodiversity, and water sectors. For instance, the Water Framework Directive equally aims to mainstream water policy within a number of sectoral policies, including the CAP, urban development, transport, business. According to one interviewee, this means that for the sectoral policies, there may be a tendency to overcrowd sectoral policy agendas with other expectations i.e. creating competition for policy attention. Likewise, the multi-purpose character of the CAP 2014-2020, with an ever growing list of ecosystem services to be taken into account in the implementation of both rural development funds and direct payments, leads to a level of complexity that cognitively challenges policy makers and administrators at the micro-level. Policy documents may thus mention and allow for climate adaptation objectives, but it is possible that these will not receive significant attention in the implementation phase due the overcrowding of policy objectives and the complexity of integrating them all. This challenge is exacerbated when adding into the mix biodiversity policies, which must also be integrated into agricultural policies, at the same time that climate adaptation should also be integrated into biodiversity.

5.2.2 Enablers

The use of existing policy paths/policy synergies, to integrate cross cutting concerns into policy sectors can be seen as a path of least resistance, as existing policy paths have a well-established structure and constituency, which can be used to aid the implementation of an issue like climate adaptation integration. Indeed as an interviewee commented, this re-use and re-framing of existing policy may also pave the way for adaptation policy since it can use existing policy paths (procedures, measures, perceptions, etc.). For instance, the overlap between the Floods Directive and the Water Framework Directive creates potential synergies for addressing adaptation policies (CEC 2015). With the CAP the integration of adaptation into agricultural policy can be seen in regulations as well as the common provisions regarding implementation of the European structural funds (CEC 2013c) which refer to climate mitigation and adaptation as cross-cutting objectives of the union to which implementation of the CAP should contribute, just as climate change and adaptation and biodiversity are among thematic sub-programmes to be targeted by the policies. The consistent inclusion of adaptation among prioritized objectives contributes to the integration and may direct attention towards these objectives.

The power of the purse is a familiar theme in the rational choice and budgetary political science literature (Russel and Benson 2014). In this vein, the integration cross-cutting objectives into funding rules and the allocation of funding, is a potentially useful means by which to integrate climate adaptation objectives into sectoral policy. In this respect we have observed some developments in the water, agriculture and biodiversity and the coasts and marine sectors. For example, for the water sector, risk management, including flooding, is eligible under the 2014-2020 Cohesion Policy which allows for additional funding to deal with weather related risks and disasters (CEC 2015). This represents an inclusion of climate change adaptation in established cohesion co-financing procedures and thus integrates adaptation as, via Water

Policy, a valid aspect of Cohesion Policy. With Agricultural policy there is a requirement that 30 percent of member state funding under the European Agricultural Fund for Rural Development must be allocated to activities that benefit climate mitigation and adaptation and environmental purposes and this provides an important institutional vehicle for ensuring member state prioritisation of these objectives, but not how to prioritise among them. An important financial incentive specifically for the coastal and marine sector is expected to be new application form requirements on climate change adaptation, which appear to have been integrated in an important EU fund for maritime issues, the European Maritime and Fisheries Fund (CEC 2013i), which is part of the European Structural and Investment Funds (period 2014-2020).

Moving away from narrower sectoral initiatives, in the current European Structural and Investment Funds (ESIF) programme period, running from 2014-2020, there are clear requirements for submitting information related to climate change adaptation and mitigation. Applications to ESIF will have to address climate change adaptation in 2 or 3 sections of the form, and explain how their proposed action is expected to be affected by climate change, and what the applicants plan to do to anticipate these expected impacts. These requirements are expected to make sure that beneficiaries of major projects will conduct appropriate analyses to assess the potential impacts of climate change on their projects. Other EU funds such as LIFE and Horizon 2020 are also in the process of considering criteria for consideration of climate change adaptation.

The formal Commission decision rule of *Inter DG consultation* could help the integration of climate adaptation into appropriate sectors if used in the right way. When the final draft of a directive is developed, it is submitted to the inter-service consultation process. All the DG's can then amend the proposed text, and add, specify or elaborate things. For example, in this inter-service consultation process, DG ENV and DG CLIMA have added text on climate adaptation to the proposed text for the Maritime Spatial Planning Directive. Likewise, other existing decision rules, like impact assessment and consultation, open up opportunities for integrating climate adaptation considerations into sectoral policy. For instance, impact assessment is a tool by which policy impacts of a policy proposal are established ex-ante so that the least impactful policy path can be followed (Nilsson et al. 2009). It is thus a key stage in which knowledge on climate impacts can be integrated into policy development.

5.3 Macro-level

5.3.1 Barriers

One of the most prominent macro-level integration barriers observed as part of this research was that climate change adaptation goals did *not fit*, or indeed, *clashed with dominant historical policy frames and traditions* creating a cognitive lock (Niemelä and Saarinen 2012). In the coasts and marine sector this may be especially the case, when it concerns discussion of designating sites for protection, which tends to clash with freedom of access norms. The freedom of navigation tradition means that the transport and fisheries sector expects that routes are accessible. Offshore wind farms and Marine Protected Areas may obstruct those routes. Designating fixed locations are generally met with strong opposition from the transport and fisheries sector. Similarly, if adaption would imply designating areas or sites, it will most likely be met with strong opposition from the transport and fisheries sector. In the agricultural sector climate change adaptation goals may or may not clash with the historically dominant frame of productivity - depending on the extent to which actual adaptation measures coincide with production objectives or compromises the short-term production potential of agriculture. Agriculture has played an important role in the early formation of an EU identity, seen as a vehicle for European food self-sufficiency and important exports. Consequently, agricultural interests and interest organisations have traditionally weighed heavily in EU policy making as well as at member state level. This suggests an institutional constraint on the integration of any policy issue not in line with agricultural interests. The greening of the CAP, however, also suggests

limits to the powers of agricultural interests, in part aided by the negotiations about agricultural subsidies under the World Trade Organisation as well as by increasing competition over EU funding and the need to justify agricultural subsidies (Nielsen et al. 2009). While agriculture remains at the core of EU policy making, these macro-institutional forces have led to a partial reframing of agricultural policy as support for ecosystem services, but a strong productivity frame remains, as suggested by the challenges addressed in the current CAP reform.

Another major theme to emerge across the studied sectors was that climate adaptation was not on the *Agenda of sectoral policy makers in the member states, or was even actively resisted by them.* For example in the water sector, the Commission observes that only a third of the member states consider long term developments in assessment of risks (CEC 2015: 9), and thus fail to include the majority of climate change impacts. The Commission notes this as a barrier for the implementation of the Water Framework Directive, and in our perspective the short term focus of implementation is also a barrier to integration. For many member state policymakers, climate change impacts may simply end up below the radar. Furthermore, according to one interviewee (from the EP), besides a call to address water scarcity and droughts in the Southern member states, an overall the call for more attention on adaptation has been very limited. In addition, when implementing EU water related directives, there has been a tendency among member states to use known measures or to reframe actions for climate adaptation. This may help ease the implementation of a policy (see meso enablers above) but risks not providing the real change needed to reconfigure policy to address the growing challenges related to climate impacts in an efficient manner – i.e. it is just a variation on business as usual. According to an interviewee (from an environmental NGO), the importance of existing member state policy structures is shown by German resistance to the new Maritime Spatial Planning Directive because the directive did not match with the specific decision-making structure in Germany (the lander structure). Attention to climate adaptation in coastal and marine policies depends significantly on the agenda of the member states and lobby groups. If they do not perceive climate adaptation as urgent and push for inclusion, it is unlikely existing directives will be amended, or new ones developed to include attention for climate adaptation. As one of the interviewees (from the European Commission) summarised it: “The main reason why climate change adaptation receives relatively little attention in EU marine policy is that the impacts are not perceived as urgent or problematic.” For instance, with regards to the Marine Strategy Framework Directive, the member states decide what they want to identify as ‘good environmental status’, how low or high ambitious they want to be in their coastal and marine policy, and how ambitious they want to be in addressing climate change adaptation. Achieving this status also depends on local authorities and local actors involved in the four EU sea regions (i.e. the Mediterranean, the Baltic, the Black Sea, and the North-East Atlantic), so they are also key decision makers in whether climate change adaptation is actually addressed in coastal and marine policy.

Adaptation is something that can be seen by member states to bring additional policy *costs.* This perception can lead to calls for financial support by the member states to implement measures to address adaptation as they implement EU sectoral policy. A new policy does not necessarily have to be accompanied by budgetary support, as the biodiversity policy (Birds and Habitats Directive) shows. But this mechanism may make net-paying member states weary of supporting a new directive or policy, out of concern it may not be accompanied by budgetary support to net-beneficiary member states. It raises the question to which extent or in which way climate change adaptation is a collective responsibility, or whether it should be dealt with locally. To give an example, a type of argument that a net-paying member state may apply, may run along the lines of ‘why should we pay for decisions made by holiday destinations to locate hotels at vulnerable coastal sites’.

Weak member state support or resistance to integrating adaptation in EU sectoral policy may be complicated by the *subsidiarity principle and the defence of policy turf that is only a partial EU competency.* For instance, the competence of the European Union in health policy is limited. The subsidiarity principle

applies, so that health policy, as with other social policies, largely remains a competence of the member states. Also due to the limited financial resources of the Union, the role of the EU is mostly limited to regulatory policy whereas the member states dominate the important distributive parts of health policy. Health policy is however evolving at the Community level and becoming gradually more integrated. Yet it is not a field equally mature when compared to traditional EU policies, such as agriculture. With agriculture the substance of the policy can often depend on how member states interpret and implement it. While the EU draws up policy frameworks and authorises funding of climate adaptation activities within the CAP, the implementation of the CAP to a significant extent occurs in the member states who draw up and make decisions on the actual spending of rural development funds, for instance, as well as on greening measures. It therefore remains an open question whether integration on the ground actually takes place, or if climate adaptation will take a back seat to other objectives. This issue may be even more pertinent for those countries, where the impact of climate change on agriculture is ambiguous.

Adaptation in coastal and marine issues is closely connected to planning, and planning is an exclusive task for the member states. The European Commission explicitly does not want to intervene into planning policy in the member states. This refers to the 'subsidiarity principle': governance should take place at the most appropriate level. For policies involving water, the tension between subsidiarity principles (and member states' own policies and plans) and common policies (and EU standards and regulations) has according to an interviewee constituted a barrier for developing flooding/water policies (also see Kallis and Butler 2001). It would be very difficult to mainstream European water policy if this was to happen outside the procedures and framework of the WFD. The framework and its procedures, including the expert group and the iterative process of reporting, are in some studies (e.g. Bouleau and Pont 2015) seen as based on long negotiations between member states and between member states and the Commission. This situation thus represents (for the time being) reconciliation of the tension between Commission competencies within environmental policy and member states' own policy making, including with reference to the subsidiarity principle.

In general, the *economic growth and the deregulation agenda* are strong in the wake of the financial crisis and the new commission. This agenda may according to our data constitute a barrier to policy objectives including the integration of climate adaptation to the extent that it may incur short-term costs on policy sectors. Indeed, in the context of the Europe 2020 (and the earlier Lisbon Strategy), Europeanisation is stimulated by the orientation towards a more competitive economy. Hence, where climate adaptation and biodiversity objectives require changes in agricultural practices that conflict with short-term production objectives the viability of such policy integration may be limited, given the macroeconomic primacy of economic growth. The regulatory requirements of the European Economic and Monetary Union are also stimulating the Europeanisation of health policy. While Europe 2020 goes along with a strategic upgrading of health policy more generally, health policy is increasingly used to strengthen economic competitiveness.

Overall our findings suggest little *wider stakeholder interest and demand* for adaptation policy within sectors. Many actors consider taking adaptation actions as a burden. They find it a risky investment, as the expected impacts are partly uncertain, and the adaptation investment may turn out to have been "unnecessary". For instance, there is currently a clear need expressed to address the issue of water scarcity and droughts. That will probably stimulate the Commission (in particular DG ENV, which deals with water policy), to see whether and how that could addressed, for example whether it could be included in the Water Framework Directive, or in another way. However, according to one interviews (from the EP), the agricultural lobby as a whole has not called (yet) for attention to adaptation despite the fact that the agricultural sector may be amongst the most impacted by climate change, in terms of pests, water scarcity, flash floods, temperature changes (and an agricultural adaptation policy does not have to work against the sector, but could enable it to remain productive under the conditions of a changing climate, as the recent reforms of the agricultural policy are set out to do). If there is no clear call from the member states and/or from the most important lobby groups, it is very difficult to force-feed new policies, according to our

interviewee. (For example, a proposal for a Soil Directive stagnated in the final stages of the development process, because the business lobby did not want it.) Moreover, during the course of our research, several environmental conservation NGO groups indicated they were not involved in discussions or considering climate adaptation. As to why, a speculative reason that was mentioned (by other interviewees) is that these conservation NGOs are probably more oriented towards direct species and habitat conservations, as that communicates better to the public, and towards mitigation, as that is a more strategic goal which NGOs can address. To give another example, climate change adaptation appears to be a relatively small topic in the field of marine and coastal issues. Issues like fisheries (management and access to stocks) and aquaculture management, offshore energy (designating sites), and trade routes (access) are far more important issues than adaptation. Also, mitigation was repeatedly indicated as relatively more politically rewarding to address across sectors than adaptation, because mitigation is aimed at reducing the source of climate change and is thus more politically salient and obvious in terms of achieving policy goals. Thus, at the moment, political attention seems more oriented towards mitigation than adaptation. Furthermore, adaptation tends to be considered as something that is relatively practical, that can or should be addressed at local and regional level, and not necessarily at the level of the EU. Whilst mitigation is something more strategic, and is more appropriate to be addressed at EU level.

5.3.2 Enablers

As sectors become *more exposed to climate risks*, some key stakeholders may be inclined to take action to protect the long-term viability of the sector. This may especially be the case with those sectors that are already exposed to climate impacts. This exposure presents window of opportunities for actors to change the policy direction. Given the vulnerability of agriculture to climate change, as outlined above, the new climate adaptation objectives in the agricultural policy are at least generally coherent with the production paradigm that prevails within the agricultural sector and to some extent in the European societies more generally. However, our findings also indicate that the agricultural lobby as a whole has not called (yet) for attention for adaptation at the EU level. As far as climate adaptation measures serve to ensure the on-going viability of agricultural production and protects it from adverse effects from changing temperatures and precipitation patterns, it is in the interest of agriculture to adapt. In fact, it would be in line with current agricultural interests that adaptation measures are eligible for agricultural funding. By considering the long-term viability of a sector, clear local level benefits can be observed. For instance, with biodiversity it has been pointed out that a shifting of the decision making locus of climate action and climate adaptation policies may enable integration of adaptation and biodiversity policies. Indeed at the local level economic and planning benefits from integration of blue and green infrastructures has been experienced.

In contrast to the above argument that members states act as a barrier to the integration of adaptation at a macro level, we do find some instance where member state support has produced positive outcomes. One interviewee (from the European Commission) indicated that the two current main policies on coastal and marine issues, the Maritime Spatial Planning Directive, and Marine Strategy Framework Directive, do provide sufficient potential to address climate change adaption, because, in general there is increasing recognition that considering climate change impacts is important and relevant. Especially among the Mediterranean member states, there is a shared sense of problem understanding and urgency, as there are clear visible consequences from climate change on coastal and marine issues. This means they support inclusion of climate change adaptation in the Marine Strategy Framework Directive and the Maritimes Spatial Planning Directive, and aim to fulfil these policy ambitions on climate change adaptation in coastal and marine policy. However, actual implementation will indeed depend on the agenda and perspectives of the member states.

The *European Parliament* (EP) can exert some influence, it has a relatively strong Green Party contingent and it can propose alternatives or elements while a directive is being developed, and during the final discussion for the approval (which is done together by both the European Commission and the European Parliament). However, it may be important to note that the EP does not have the right of initiative, which lies with the Commission, potentially reducing its overall impact.

Member state and stakeholder cooperation might also be helped by communicative processes such as the Open Method of Coordination (OMC) which is applied increasingly to the health policy area. OMC is a mode of soft governance within the European multi-level system which aims to spread best practice and achieve convergence towards EU goals in those policy areas that fall under the partial or full competence of Member States. OMC as an instrument is still evolving. In 2010, the role of the EU therein was expanded because member states were then required to report on their progress in achieving Europe 2020's social goals, and because the Commission and the Council now have the competence within the European Semester to make country-specific recommendations to individual Member States. In addition, there is the Monitoring Mechanism Regulation (MMR), in which member states are bound to report on climate action (including both mitigation and adaptation). An example from the water policy sector shows that to integrate climate adaptation issues in the basic framework of the water policy sector will imply entering an arena where the tension has been (temporarily) calmed. This would enable a policy community approach to integration within the water policy sector to occur with less friction, and will allow the already established policy community will serve as an enabler for integration.

6 Conclusions

This deliverable aimed to investigate the extent of integration of climate adaptation policy in the EU polity with specific focus on the period leading to and after the adoption of the EU Adaptation Strategy in 2013. In order to develop and deepen our understanding of adaptation policy integration in the EU, we scrutinised which phenomena related to EU policy making served as enablers or barriers to the process of policy integration in four policy sectors that the EU Strategy emphasises as key for adaptation, i.e. coastal, agriculture and biodiversity, water and health policy.

In meeting the deliverable aim, we have provided a:

1) diagnosis on the state of integrating climate adaptation into critical policy sectors, including factors that promote or inhibit integration;
2) analysis of the process and degree of integration of climate adaptation policy issues in selected policy sectors;
3) identification of the factors that shape and influence the adoption and integration of climate adaptation goals under an institutionalist theoretical lens.

What though are the key implications of our analysis? First, there are some signs of integration of climate change adaptation into EU sectoral policies, but it is patchy and in many cases feels fairly symbolic. Climate adaptation may be included in key policy documents but may not be reinforced by strong policy requirements or monetary resources. Overall, climate change adaptation seems to be still a fairly new type of policy task in sectors such coasts and marine and health. Nevertheless, there are some examples where climate change adaptation does seem to be explicitly integrated into sectoral policies. An example of an institutional commitment/reinforcement of integration is the latest reform of especially the European Agricultural Rural Development Fund, which is forcing 30 percent of the national rural development programmes into activities that benefit climate change and adaptation and environmental objectives. This may follow from a relatively strong awareness at the strategic level about the sector's vulnerability to climate adaptation. In the water sector, the WFD does not explicitly address climate change but provides a framework that has been easy to adapt by sectoral actors to also cover climate change adaptation issues. The Flood Directive has a focus on integration into sectors but like the WFD calls for integration are more concerned with the integration of water policy issues into other sectors. Overall, from our analysis, it appears that those sectors with greater exposure to climate risks started to integrate climate adaptation into decision making before the EU started formally engaging in this area to develop a cross-commission approach. In contrast, those sectors (such as health and coasts and marine) where risks are higher in the medium to longer term are only just beginning to engage with climate change adaptation in a manner more in line with the development of the EU's Adaptation Strategy.

Second, our findings so far indicate *that barriers tend to be operating strongly at the macro-level (wider society and sector stakeholder) and at the meso-level (*institutional dynamics in the commission). At the macro-level, we observe a lack of support and demand from member states and the various sectors, leading to weak demand for the integration climate adaptation and to monitor the process (i.e. lack of constituency). At the meso-level, we see a combination of departmentalism and a tendency to multi-dimensional integration of policies, which can crowd out less salient issues like climate change adaptation. While policy integration is strong as an idea, its implementation appears to be hindered by decision making and implementation structures. Departmentalism seems to lead to weak or narrowly confined leadership and thereby weak integration of adaptation.

Third, another observation to highlight is *that good or bad practice at one level is not singularly enough to help or hinder integration.* As we explain above, the logic of the framework suggests it is more a matter of how factors operating at different levels interact in terms of supporting or contradicting each other. For instance, it is possible to have strong support for climate change adaptation at the micro and meso-levels, but this will not necessarily lead to more integrated policy making in the sectors if macro level processes and policy making traditions are not receptive. Likewise, there could be an appetite for change at the macro level, but whether this change occurs meaningfully may depend on the resources allocated to the micro level to for example, monitor climate impacts. The allocation of resources at the micro level is in turn dependent on meso-level dynamics that can dictate the rules of engagement with climate change adaptation. It is the mix, coherence and/or the tailoring of approaches across levels that matters. Our analysis partially reinforces the theoretical expectation that the levels interact (see section 2) to produce different pathways that may inhibit or facilitate the integration of climate change adaptation into sectoral policy making. More research would be fruitful to explore this issue in more depth through extensive interviews as the Adaptation Strategy gathers more traction.

Fourth, a further key to integration, as explored in Work Packages 2 and 5 of the BASE project, are National Adaptation Strategies and national level (sectoral) policies from member states, as the member states are key implementers of their own policies (corresponding to the subsidiarity principle) as well as EU-level initiatives. This implies that the integration of climate adaptation into member states' policies is largely outside the direct scope of the European Commission. In this sense the commission can only raise attention and recommend action, and because member states face the challenge of prioritising resources between different purposes, we may see barriers to long-term or timely adaptation, but produce strong reactions to immediate threats. This situation is exacerbated by the ongoing financial troubles in some member states and slow growth in others in Europe, which means public finances are massively under pressure. Thus, politicians seeking re-election are even more likely to focus on short-term issues such as the economy at the expense of longer term issues such as climate change adaptation. At the same time local and national politicians may be held accountable for delayed adaptation. While extreme events or incidents (which are interpreted as climate change) could significantly improve implementation and set in motion climate adaptation plans, we have also observed the opposite in the BASE project: that even after extreme events, the development of long term adaptation policies is not always evident (see for example the South Devon coast case study in Work Package 5).

Fifth, our observations indicate that adaptation *needs more advocates inside and outside of the Commission for consistent integration to occur*. Without such advocates, adaptation can all too easily move to the periphery of policy attention as competing policy objectives come to the fore, despite formal decision rules at the meso-level that could promote in the inclusion of adaptation. However, enforcing rules on climate integration may not be in line with the reported EU's deregulation agenda that some in the commission have seemingly been promoting. A relatively more promising route seems to be to mobilise political attention and stakeholder demand. To some extent this entails greater engagement with stakeholders to help them better understand climate impacts and what the implications are for their sector in the short, medium and the long-term.

Sixth, one of the aims of the deliverable was to make reflections on upcoming sectoral policy developments that will need to consider adaptation. In some ways, we have been hindered in this task by the fact that we were unable to secure a large number of interviews to help us with this mapping process. Second, the signals being sent by the 'new' commission and member states suggest an appetite for the consolidation of policies and even deregulation. This implies that fewer new policies will be coming to the table. In this respect, the retrofitting of climate change adaptation considerations into existing policies becomes more important, especially in those sectors that are only just beginning to engage with climate impacts (e.g. health and coasts and marine). However, our findings indicate that climate adaptation policy integration is

important for several upcoming European Commission policy developments: for example in the coasts and marine sector there are on-going cross-national issues (e.g. renegotiation of common fisheries policy post-2020, designating protection sites); in the water sector, there are opportunities for integrating climate change adaptation into the WFD through the third round of River Basin Management Plans to be implemented in 2022, through a directive on droughts and water scarcity and through funding over the Cohesion Fund; in the agricultural sector, ongoing discussion over the CAP provide excellent opportunities for further integrating climate change adaptation considerations, with discussion already beginning over the direction of the CAP post-2020. It has been harder to point to upcoming actions for the health sector which is largely due the limited EU competence over this policy section.

Finally, in writing this deliverable we have *developed a theoretically informed analytical framework by which to gain practical insights into the barriers to and enablers of the integration of climate adaptation into sectoral policy making.* This development builds upon academic understanding of how institutional processes operate in a tri-level context to help or hinder climate change adaptation integration. Specifically, we have argued that barriers to policy integration operate within institutional settings. From this point we have drawn on the existing new institutional literature to devise a framework to understand how climate change adaptation integration can be aided or hindered by: micro-level institutional factors operating at the level of the individual: meso level institutional dynamics and rule making processes within the European Commission; and macro-level processes in terms of wider social values and sectoral stakeholder interactions. This applied framework has allowed us to not only to systematically identify barriers and enablers in our empirical work, it has also touched upon their sources and possible tensions: where do barriers and enablers come from and how do they relate to each other? Through empirically applying this framework in the setting of EU sectoral policy, we a provided a policy relevant account of actual and possible barriers to integrating climate change adaptation considerations into sectoral policy making. These insights will be extremely helpful for the remaining work in Work Package 7: for D7.1 it provides an empirical account of actual integration, and provides an institutional framework on enablers and barriers for the synthesis exercise to utilise; for D7.3 it provides a more precise, indepth and theoretically informed account of the factors that may help or hinder adaptation integration allowing for the development of more targeted guidance for policy makers. The policy-relevance of these findings will be highlighted in the forthcoming BASE policy brief, and will be further explored and developed with the aid of key stakeholders in the up-coming BASE policy workshop in 2016.

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