C3-ALPS

capitalising climate change knowledge for adaptation in the alpine space

Climate Adaptation Policies and Governance in Alpine Countries

Transnational Synthesis Report of Work Package 4 in the C3-Alps Project

Susanne Menzel, Marco Pütz

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Organisation	Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)
Authors	Susanne Menzel, Marco Pütz
Contracting body	Federal Office for Spatial Development ARE, Bern, Switzerland
Contact	Melanie Butterling, Federal Office for Spatial Development ARE, CH-3003 Bern melanie.butterling@are.admin.ch +41 (0)31 3224064
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Abbreviations

A –	Austria
CCA –	Climate Change Adaptation
CCAP –	Climate Change Adaptation Policy
CH –	Switzerland
CO_2 –	Carbon dioxide
F –	France
FL –	Liechtenstein
G –	Germany
GHG –	Greenhouse gases
I –	Italy
IPCC –	Intergovernmental Panel on Climate Change
NAS –	National Adaptation Strategy
PP –	C3-Alps Project Partner Organisation
SLO –	Slovenia
UNFCCC –	United Nations Framework Convention on Climate Change
WP4 –	Work Package 4: “Adaptation policy and governance”
CAP –	Common Agricultural Policy

1 Executive summary

This report gives an overview of the status of climate change adaptation (CCA) policy-making and governance in the Alpine space and constitutes an assessment of CCA policy performance based on an investigation of policy documents and policy-making processes, as well as their existing and expected impacts. The current challenges and barriers to – as well as the strengths of – CCA policy-making have been identified. Based on the performance assessment and a compilation of good practice examples, policy recommendations have been formulated for different stages of the CCA policy cycle. Furthermore, the main features of the science-policy interface have been determined, in order to develop recommendations for its improvement.

The findings are based on data gathered in a number of Alpine countries and regions: Switzerland, Slovenia, Austria, Liechtenstein, France, South Tyrol, Piedmont and the Veneto region of Italy, as well as Bavaria and Baden-Württemberg in Germany. The *screening* of available CCA policies and potentially CCA-related strategy documents revealed that five of these countries and regions did not have a policy document mentioning CCA as an aim, even in draft form. Further data for this study was collected from three different sources: interviews, an online survey, and a brief analysis of policy documents. The analytical instruments, i.e. interview guides, online surveys and the manual for the policy document analysis were developed by the work package leader, then first translated and later used by the project partners in their respective national languages.

Since a classic performance assessment, which would compare intended outcomes with actual outcomes, was not possible, the performance assessment included an evaluation of CCA policy-drafting processes against good governance criteria, and a status analysis of the weaknesses and strengths of, as well as challenges faced by, CCA policy-making and governance.

The results show that, although the countries and regions are at very different points in the policy cycle, most of them show some level of CCA policy-making activity. The results further indicate that there is no ideal process to achieve an approved policy document that will lead to the effective implementation of measures. Overall, the results are very diverse and, in part, contradictory. This makes it difficult to derive general recommendations from the variety of experiences in the countries and regions investigated. Despite this difficulty, we succeeded in developing a series of policy recommendations for the different stages of a CCA policy cycle.

The main reason that countries and regions do not have a CCA policy document is that policy and decision-makers do not perceive the topic as sufficiently relevant and urgent. Competing political and economic interests, as well as governance challenges (e.g. horizontal and vertical coordination, stakeholder participation, and assignment of responsibilities), also contribute to the non-existence of CCA policy documents. We suggest a series of measures and practices to overcome challenges and enhance the performance of CCA policies.

The **initial or preparation stage of climate adaptation policy-making** demands that an official board be formed, or an existing agency asked – or even issued with a political mandate – to draft a CCA policy document. At this stage, CCA responsibilities must be assigned at different administrative levels. Moreover, awareness must be raised that CCA is a topic which is distinct from, and handled independently of, climate change mitigation. Research projects can contribute to this stage by interviewing potential key players in a CCA policy about the state of CCA policy-making in their region or country. This raises awareness of CCA issues and how they might be linked with established policy topics. The obstacles or even blocks encountered at this stage might include political instability, an upcoming election or rivalry between

jurisdictions, i.e. between sectors at one political and administrative level (horizontal conflicts) or between different administrative levels (vertical conflicts and competition).

The **drafting stage** begins when an official board has been formed to prepare a CCA policy document. This stage is where competing interests meet, and where they might develop into serious conflicts. Thus, one of the main challenges is to identify these interests, and to detect emerging or potential conflicts in order to address these issues as early as possible. It is crucial at this stage to dedicate time to these different interests, by meeting and discussing with stakeholders in groups or bilaterally. Furthermore, getting stakeholders involved means inviting and motivating them to contribute to the drafting process.

The stage at which an **action plan is developed** might follow the drafting and approval of a more strategic document. However, it is also possible that action-oriented sections and more strategic sections are developed (or at least approved) at the same stage. In any case, when an action plan is developed, it would appear helpful for its later implementation to involve different levels within the public sector, to allow strategic considerations to be coordinated and to take into account questions of feasibility and financing. This will likely help the implementation of envisioned measures.

Only a few countries have entered the **implementation stage**, as yet. From our in-depth investigation of the Swiss case, we can surmise that financing is a major issue at this stage, and that it has not been possible thus far to acquire funding for CCA at the federal level. Usually, sub-national administrative levels are responsible for the majority of public spending, so these levels are crucial for the implementation stage. There are nonetheless signs – mainly from regions without CCA policy documents – that the usability of established instruments, such as planning regulations, is being assessed, and that these instruments are already being used to adapt to climate change.

Where the **science-policy interface** is concerned, we highlight the dual role of science and of scientists in the policy process. On the one hand, scientists and scientific knowledge is seen important to CCA policy-making and even as having an icebreaker role, i.e. taking the topic of CCA to governmental organisations, and even launching policy-making. On the other hand, critical comments have been made about the behaviours and attitudes of scientists. Thus, it is obvious that there is room to improve interaction between the holders of knowledge and the generators of knowledge. First and foremost, there is a need for more applicable scientific knowledge, i.e. knowledge that contributes to specific decision-making problems. There is also a need for a willingness among practitioners and knowledge-generators, as well as intermediate organisations, to engage in shared projects. This shared engagement is expected to create an exchange between a variety of parties. In the course of a project, this will enhance the understanding of what is actually needed in practice, whether it is knowledge of policy-drafting, or implementation. Practitioners, for example, might develop a better understanding of the limited options for generating reliable knowledge.

2 Introduction

Policy-makers within public administration, and those responsible for implementing adaptation policies at different administrative levels, in different organisations and within different governance systems, are two of the main target groups for the capitalisation effort of the C3-Alps project. The generation of the usable knowledge needed by decision-makers to develop effective policies and successfully to put them into action, the transfer and communication of that knowledge to target groups, and the implementation of adaptation measures on the ground are all embedded in policy frameworks and governance systems. It is thus crucial to know: a) the players and institutions in the "climate change adaptation" policy field; b) how they interact; c) within which governance framework they operate; d) how existing climate adaptation knowledge is used; e) whether or not the "right" knowledge is available in the "right" forms, and what information needs are currently unfulfilled; and f) what the barriers to and success factors for policy-drafting and the implementation of climate adaptation policies are. More specifically, the policy performance analysis conducted in Work Package 4 contributes to the main objectives of C3-Alps by:

- providing insights into the information needs of policy-makers and policy implementers as users of adaptation knowledge,
- informing the design and organisation of the C3-Alps knowledge inventory, and providing input to the content of adaptation policies in Alpine countries,
- applying lessons learned to the development of regional and municipal adaptation strategies in pilot areas,
- facilitating transnational learning between policy-makers from Alpine countries.

2.1 Objectives

The overarching objective of public governance can be understood as providing support for individuals and society as a whole in identifying and pursuing practices that lead to prosperity and wellbeing. Climate change can present new challenges to the achievement of this objective. Climate change adaptation policies (CCAP) are widely proposed to avoid and to reduce adverse consequences, and to take advantage of new opportunities resulting from climate change (Cimato and Mullan, 2010). How one should go about developing an effective CCAP remains an open question.

The objective of the "Adaptation Policy and Governance" Work Package within the C3-Alps project was to improve knowledge about what kind of CCA policies lead to good performance. We were interested in finding out what has already contributed, what contributes, and what can be expected to contribute to good performance in climate change adaptation policy-making.

More specifically, we aimed to:

- better understand CCA policy-making and performance in different Alpine regions,
- flag up barriers to or weaknesses in (effective) CCA policies and the corresponding policy-development processes,
- formulate suggestions on how to overcome weaknesses and barriers,

- suggest next steps for policy-making and/or implementation, according to the specific stages of CCA policy evolution in different countries and regions, in order to drive action on adaptation forward.

Further points of focus for our analysis were **strengths and weaknesses** of CCA policy-development processes, of CCA policy documents, and of the corresponding governance arrangements as well as of the **science-policy interface**, as an integral part of CCA policy-making. Finally, we aimed to identify **lighthouse examples ("good practice")** of CCA policy-development processes and CCA policy document characteristics.

2.2 Definitions

We define **climate change adaptation policy** (CCAP) as the sum of processes at different phases, including the resulting documents applied by governments or administrations with the explicit aim of influencing adaptation to climate change. An emerging CCAP may be represented primarily by a formal or informal working group or board, working towards a formal commitment by the government to draw up a CCA policy document (see Figure 1). Examples of *parts* of a policy are:

- supranational and transnational policy documents (e.g. EU Adaptation Strategy[1], Climate Action Plan of the Alpine Convention[2]),
- national adaptation strategies (to be) adopted by governments (e.g. A, GER, F, CH),
- sub-national adaptation strategies (e.g. Bavaria),
- climate action plans including adaptation measures,
- support programmes, pilot activities and financing instruments (e.g. KLIMZUG[3] and KlimaMORO[4] in Germany; pilot adaptation to climate change programme in Switzerland[5]),
- laws and regulations (e.g. Art. 8 of the new CO_2 Act in Switzerland[6]),
- sector strategies, plans and measures/activities that include adaptation, are consistent with adaptation goals, and have integrated adaptation goals and measures (climate-proofed sector policies),
- national, sectoral, and regional boards, formal and informal working groups (led by governmental organisations) as well as other institutional or governance arrangements with the aim of advising, supporting, drafting and/or coordinating the development and implementation of CCA policies,
- symposia and conferences with a focus on CCA (organised/led by governmental organisations).

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1 http://ec.europa.eu/clima/policies/adaptation/what/documentation_en.htm
2 http://www.alpconv.org/en/ClimatePortal/actionplan/Documents/AC_X_B6_en_new_fin.pdf
3 http://www.klimzug.de/en
4 http://www.klimamoro.de
5 http://www.bafu.admin.ch/dokumentation/medieninformation/00962/index.html?lang=de&msg-id=48192
6 For the Act in German, visit http://www.admin.ch/ch/d/sr/6/641.71.de.pdf

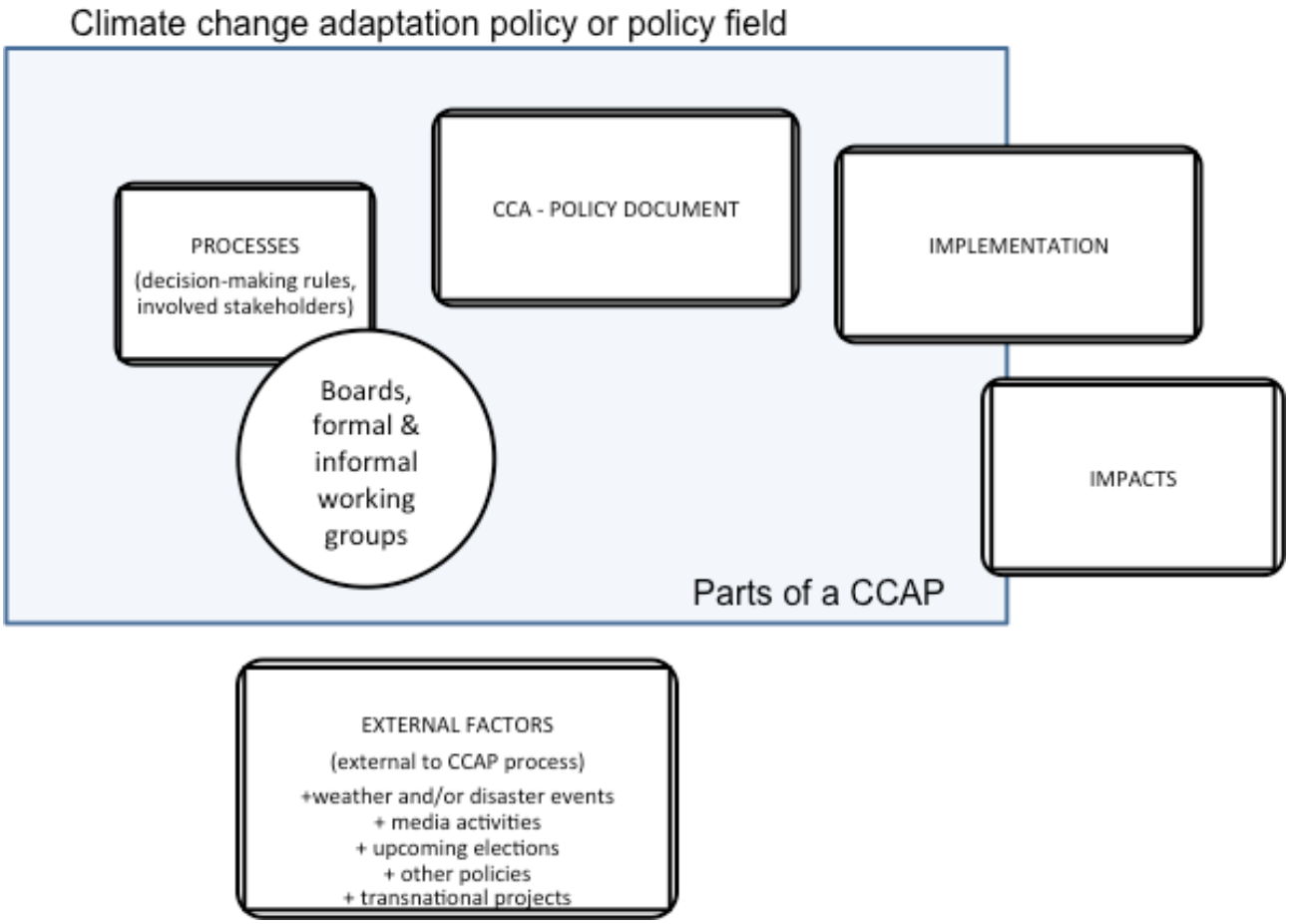

Figure 1: Climate change adaptation policy, implementation, impacts, and external factors.

Policy documents are a central element in our analysis, as they are tangible and thus well-defined objects. They therefore provide a good starting point for a performance assessment of a policy or policy field, particularly in a relatively immature area such as CCA, in which implementation is often at an early stage, and policy impacts are not yet detectable. We define a climate change adaptation policy document as a drafted or finalised text that explicitly mentions adaptation to climate change as an aim, and has been adopted or is applied by a government or public administration.

The other central object of our analysis is the **policy development** or **policy-drafting process**, i.e. the process that leads to the creation of a policy document. As **impacts**, we define all types of results or changes that may be brought about by a policy document or drafting process. We understand **implementation** as the putting into action of planned, coordinated and coherent measures that have been developed to achieve the objectives of a CCA policy document.

By **science-policy interface**, we mean the **type of knowledge and the form in which it is included** in the different stages of a CCA policy cycle (see below), the impact of science and knowledge on policy-making, and the impact of policy-making on scientific knowledge generation from interaction with the policy process. Where this interface is concerned, we ask: how is knowledge included in the policy-making process? Or: how is the process of integration organised between the knowledge needs of policy-makers and knowledge generation by researchers (e.g. are integration structures institutionalised)? Do policy-

makers include the findings of social science in strategy development? To what extent are adaptation policies science-based? What are the key knowledge needs or knowledge demands that have not been fulfilled by knowledge producers so far? What ideas or measures exist to improve communication between researchers and policy-makers?

Good practice in climate adaptation governance refers to the processes und structures of climate change adaptation policy-making. Following the policy cycle concept (see next section), good practice in climate adaptation governance supports all stages of climate change adaptation policy-making, namely preparation, strategy development, the development of measures, and implementation. Good practice in climate adaptation governance is intended to enhance the effectiveness of climate change adaptation policy-making.

2.3 Structure of the report

This report gives an integrated view based on the empirical material gathered by all project partners. The individual regional and country assessment reports that have been authored by our partners are published as separate reports (www.c3alps.eu). These reports give a more detailed picture of the workings of CCA policy (-making) in those regions.

The evaluation instruments (interview guides, online questionnaire, manual for document analysis) are compiled in the English language version in the Appendix (cf. Section 10) to this synthesis report.

3 Conceptual framework

3.1 Main concepts

We employ policy cycle approaches as our overall conceptual framework, as these appear useful – when used with caution – in accommodating the diverse CCAPs that can currently be found in the Alpine space. The framework has also demonstrated its value in understanding policy development and evolution (Howard 2005). Thus, in accordance with policy analysis literature, we assume that policy development occurs in different stages. We follow the literature that suggests the following policy stages: problem framing, policy development, policy implementation, and policy evaluation (Wuelser et al., 2012) (see also (Figure 2).

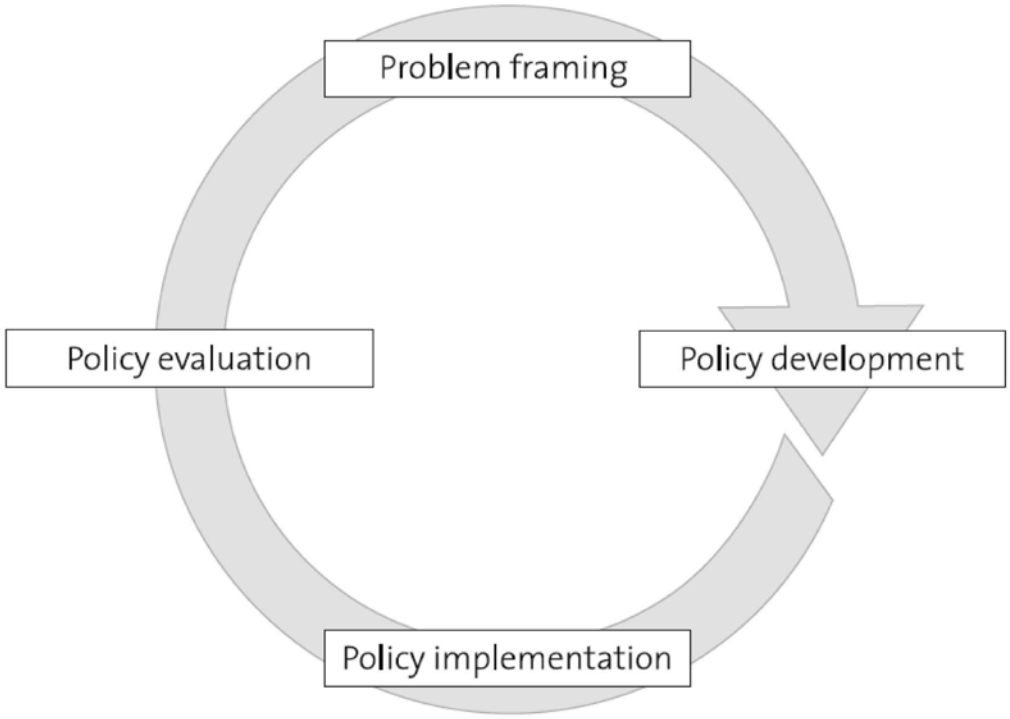

Figure 2: Policy cycle (based on Wuelser et al. 2012: 86).

Taking into account and adapting the original literature, and leaving aside for our purposes the policy evaluation phase (which among Alpine countries is conducted only by France at present), we further specify and re-name these stages. This renaming is informed by the knowledge of the project partners, who observed that policy development (see Figure 2) sometimes occurs in two stages, with a strategy formulated at an earlier stage, and an action plan later on. We name the stages as follows:

- initial stage (at this stage there is no formal mandate to develop a strategy document; this phase is similar to the problem framing stage),
- strategy development stage,
- action plan development stage,

- implementation stage, which is characterised by coordinated action on climate change on the ground (Figure 3).

For each phase we assume that — if things go well —a process will lead to a *substantial* output, such as a policy document, and/or to impacts such as *learning* effects or changes in awareness. We distinguish process impacts such as learning effects from substantial outcomes because we think they merit special attention over and above (or as a precondition for) these substantial or "conventional" policy outcomes. Overall, we assume that policy processes reflect a series of process-output-impact cycles that ultimately lead to action (in sectors, by various types of stakeholders in different regions) that achieves good CCAP performance. By different types of stakeholders, we mean individual citizens, governments, non-governmental organisations, and business.

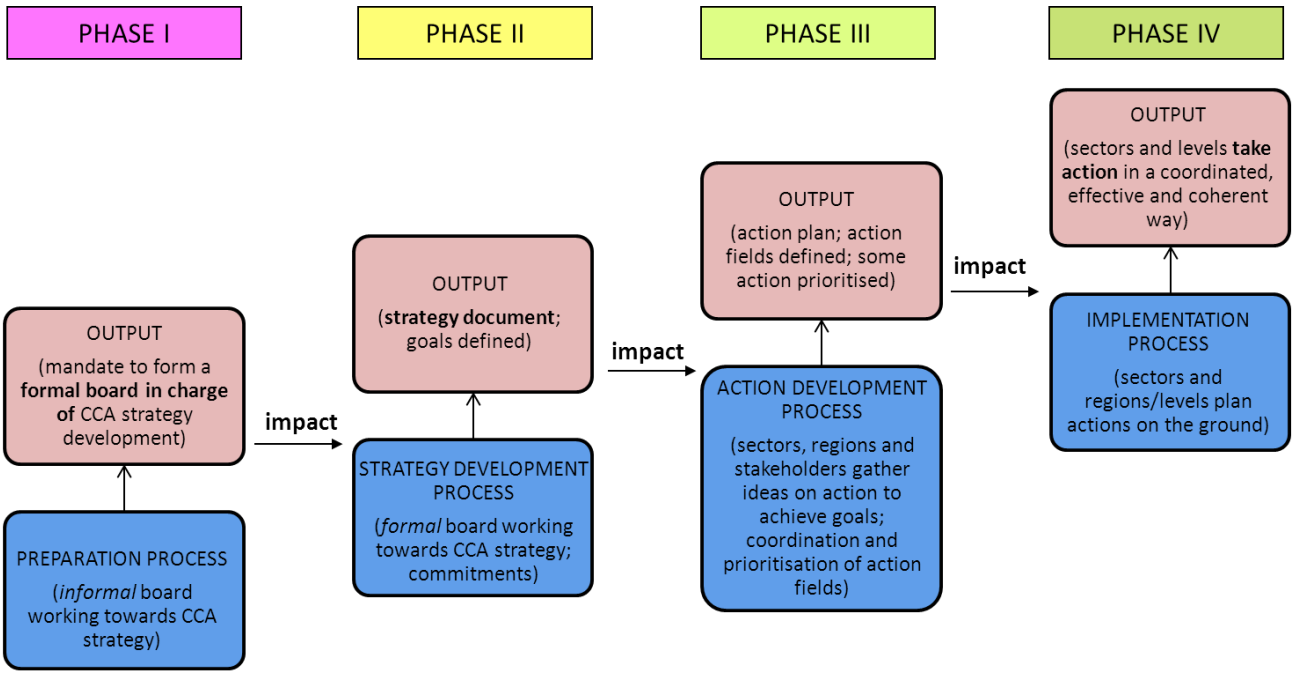

Figure 3: Stages of the climate change adaptation policy process (own conceptualisation).

3.2 Performance assessment

It is a challenge to assess the performance of CCAP, for two intertwined reasons. First, performance is usually understood as level of goal attainment or final outcome, or more specifically "the effectiveness in meeting the primary objective [e.g. to enable those concerned to benefit from climate change or avoid and reduce adverse consequences from climate change]" (see Swart et al. 2009: 149). The definition of a primary objective, however, is highly complex in the case of CCAP. There are many factors affecting the capacities of those concerned to benefit from climate change or to avoid adverse effects. Furthermore, these factors are difficult to prioritise against each other. Thus, it is not possible meaningfully to define a one-dimensional and universal adaptation goal covering all sectors and regions. Accordingly, we are not aware of any such one-dimensional and integrated CCAP goals having been formulated or quantified for entire nations or regions. This renders unsuitable the obvious evaluation approach, which consists of measuring actual goal attainment against set goals.

This is also due to the fact that CCA is generally a fairly recent and still-immature policy field. Policy documents tend to be rather strategic in nature (Biesbroek et al., 2010), with few concrete measures spelled out. Consequently, there are few, if any, monitoring and evaluation schemes, and in most cases it is still much too early to observe the real outcomes of intervention on adaptation. Often, the effects of adaptation measures, or the lack thereof, will become visible only in the more distant future.

Our performance assessment consists of a number of elements. In the regional and country reports which can be found in the Appendix, the reader will find the characteristic attributes of policy-development processes, the policy outputs which have been achieved, and a characterisation of the science-policy interactions for each region and country studied. In this synthesis report, we first described the **status of CCA policy-making** by assigning the countries and regions to the stages in the policy process. Second, we compiled **weaknesses and challenges, as well as strengths**, as the interviewees reported them. We allocated the challenges to the different stages of the CCA policy process. Third, we conducted an **output and process assessment** by employing criteria commonly considered "good", for example, the "good governance criteria" formulated by the European Commission in its White Paper (see e.g. European Commission, 2001).

The identification of **strengths and weaknesses** is based on interviewee assessments, i.e. subjective evaluations of the processes in which the interviewees were themselves involved. Some of the interviewees were even responsible for coordinating the policy document drafting process.

Process performance assessment: where **process criteria** are concerned, a process may – according to the literature – be considered good if certain process conditions are fulfilled. One example is **stakeholder participation**. Accordingly, a process in which a broad set of stakeholders participate in the committee (board, panel) that developed a policy document will —other things being equal — be judged as performing better than a process that does not have any stakeholder participation. We include the following process criteria that are laid down in the European Commission's White Paper: **openness and effectiveness**, as well as **transparency**. Additionally, and with reference to the research objective to learn more about the science-policy interface, we include the criterion **evidence-based**. This criterion assumes that a CCAP that relies on a strong scientific evidence base will perform better than a CCAP that is less intensely based on evidence. A sample indicator that relates to openness and the science-policy interface is: "Leading players (and or scientists involved in strategy development) openly communicate about uncertainties and lacks in knowledge regarding climate change impacts". We also use the admittedly broadly understood term of "**professionalism**" to gain insights into the quality of project management for countries which had gone through a drafting process.

Output performance assessment: the central output-related good governance criterion laid down in the European Commission's White Paper on good governance is **coherence.** This means that policy documents should not contain internal contradictions nor should they contradict other policy documents. The output-based approach also permits the inclusion of criteria that have been identified in earlier performance research on CCAPs, such as the explicit consideration of horizontal and vertical policy **integration** and **synergies**, as well as **trade-offs** or potential conflicts between and within sectors in CCAP documents (Massey and Bergsma, 2008; Swart et al., 2009). These criteria are only relevant to the investigation of CCAPs where policy documents already exist. Additionally, we presume that a policy document that defines **measures** (adaptation action) is more likely to reach the **implementation** phase or to result in actual changes in how governmental and other parties approach their daily practices and whether they consider CCA. For this reason, we judge a strategy document that suggests or assigns measures (e.g. action plan, work programme) or refers to a document in which measures are suggested as performing better than a document that does not suggest measures.

Good evaluation principles: our evaluation follows the good evaluation principles that were proposed by Harley et al., 2008. They are:

- target group oriented,
- participative (in development and assessment),
- combining quantitative indicators with narrative reporting (to provide context and explanation).

Moreover, transferability to other territories (countries, regions) was an important requirement in selecting the indicators used for the performance assessment. The indicators mentioned above, such as coherence, transparency and effectiveness, were applied in practice and used to formulate interview questions for the online survey and the interview guide, as explained further in the next section.

3.3 Compilation of good practices

Good practice in climate adaptation governance refers to the **processes und structures of climate change adaptation policy-making**. Following the policy cycle concept, good practice in climate adaptation governance supports the different stages of climate change adaptation policy-making introduced above: preparation, strategy development, action development, and implementation. Good practice in climate adaptation governance is intended to enhance the performance of climate change adaptation policy-making. The identification of good practice examples is based on literature reviewing criteria or principles for successful, effective and sustainable climate adaptation (Bruneniece and Klavins 2013, Debels et al. 2009, Doria et al. 2009, Eriksen et al. 2011, OECD 2009, Prutsch et al. 2010, Tabara 2011). The following criteria were applied in identifying and compiling examples of good practice in climate adaptation governance for this study.

Good climate adaptation governance:

- **is embedded in policy-making** according to a clear mandate, and characterised by clear responsibilities for climate change adaptation, including in particular responsibilities for horizontal and vertical coordination,
- **is supported by the integration of knowledge, tools and guidance** provided by transfer or boundary institutions, clearing house mechanisms and other supporting facilities to inform stakeholders, to advance their capacities for implementing adaptation, to improve the evidence base and thus to enhance the science-policy interface,
- **involves stakeholders** with participatory approaches to raising awareness, enhancing acceptance of adaptation, and ensuring the democratic legitimacy of the policy-making process.

With these criteria in mind, we propose six categories of good practice:

- Clear mandate and regulatory framework,
- Governance arrangements for horizontal and/or vertical coordination,
- Stakeholder involvement,
- Knowledge brokerage and scientific advisory institutions,
- Web-based knowledge platforms (clearing houses) and other decision-support facilities,

- Research programmes.

A compilation of good practices in climate adaptation governance is given in Section 7.

4 Empirical approach and data analysis

4.1 General description of empirical approach

In the first step, we screened available CCA policy documents from our project partners in Austria, Germany, Italy, Liechtenstein, Slovenia and Switzerland, as well as the regions of Bavaria and Baden-Württemberg (Germany), Piedmont, South Tyrol and the Veneto (Italy) and Rhône-Alpes (France). This revealed that six of the territories involved in the present Work Package (WP4) did not have a policy document mentioning CCA as an aim, even in a draft form. Five of the regions and countries covered by the study do have a policy document in at least draft form, and are thus more advanced in the field of CCA policy. Appendix 1 (Section 10.1)[7] gives an overview of the policy documents that were identified in the screening process. The countries and regions investigated in the study are thus at significantly different stages of policy-making. This required the development of a differentiated research strategy, which allowed a comparative analysis of CCA policies for these various territories. The research strategy is explained in greater detail below.

To assess how different processes, policy documents and their impacts score on performance criteria, we developed instruments that translate evaluation criteria into questions about the characteristics of CCAP processes and documents. These instruments also allowed data about expected and achieved policy and/or process impacts to be gathered, in addition to information about the science-policy interface in policy-making. The following instruments were developed and applied in the individual national languages of the territories covered:

- an **online survey (questionnaire)** [see Appendix 2 (Section 10.2)],
- two **interview guides** (one for territories <u>with</u> a policy document, and one for territories <u>without</u> a policy document) [see Appendices 3 (Section 10.3) and 4 (Section 10.4)],
- a **manual for policy document analysis** [(see Appendix 5 (Section 10.5)].

Details of these instruments, including the type of data they are intended to provide and the parties responsible for the assessment, are summarised in Table 1.

Interview guides

The interview guide for regions <u>without</u> a policy document [=Instrument 1] focused on five issues:

- possible **rationales for not having** a policy document,
- the **context** of a possible or emerging CCA policy,
- what has **happened so far** with regard to CCA, and the **challenges** of developing a policy document or of **mainstreaming** CCA in sector policies,
- the **science-policy interface**,
- the **impacts** of CCA-related activities and the overall policy field.

[7] A report including the compilation of climate adaptation strategies can be found on the C3-Alps website (www.c3-alps.eu).

The interview guide was developed in English and translated by the project partners into German and Italian. An English version of the interview guide can be found in Appendix 4 (Section 10.4).

The interview guide for regions with a policy document [=Instrument 2] also focused on five aspects of CCA policy:

- characteristics of the CCA **policy document**
- **context and external factors** influencing the policy field of CCA
- the **policy-development process**
- the **science-policy interface**
- the **impacts** and the **overall policy field**.

The interview guide was developed in English and translated by the project partners into French, German and Slovenian. An English version of the interview guide can be found in Appendix 3 (Section 10.3).

Questionnaire

For territories in which a policy document exists, every interviewee was asked to fill in an online survey [=Instrument 3] before the interview. Additional responses to the online questionnaire from experts who did not participate in interviews were also welcome.

The questionnaire data were gathered online after the project partners had sent a link to the questionnaire to their interview partners. The questionnaire was developed in English and translated into French, German and Slovenian by the project partners. The English version of the questionnaire can be found in Appendix 2 (Section 10.2). Also, in the regions with policy document a document analysis was conducted on the basis of a brief manual, which can be found in Appendix 5 (Section 10.5).

Table 1: Instruments employed in data gathering

	Interview (guide)	Online survey/questionnaire	(Manual for) document analysis
Target knowledge	Background information, stories, reasons behind facts	Factual knowledge and assessments that can be expressed in figures or ratings	Characteristics of policy document
Knowledge characteristics	Mainly subjective	Objective and subjective	Objective
Done by	Experts in policy-drafting (=interviewees) interviewed by project partners (=interviewers)	Experts and stakeholders responding to the questionnaire	Project partners on their own
Territories without policy document [Italy (nat. level), Liechtenstein, the Veneto region (IT), South Tyrol (IT), Piedmont (IT), Baden-Württemberg (GER)]	Instrument 1	None	None
Territories with policy document [A, CH, F, SLO, Bavaria (GER)]	Instrument 2	Instrument 3	Instrument 4

4.2 Sampling

Before data collection could begin, the project partner chose for further examination those policy document from the compilation (the result of the screening of policy documents mentioned above) that were considered most relevant and interesting for their regional and/or national contexts. The availability of interview partners also drove document selection.

4.3 Data collection

Data were collected between August 2012 and November 2012 in interviews in Austria [9 interviews], Bavaria [3], Baden-Württemberg (Germany) [2], Piedmont (Italy) [3], South Tyrol (Italy) [6], the Veneto region (Italy), Italy at the national level [5], Liechtenstein [18], the Rhône-Alpes region (France) [5], Slovenia

[4], and Switzerland [4]. One additional interview was conducted for each of France and Germany at the national level. Project partners conducted the interviews. They interviewed individuals who were involved in CCA policy-drafting processes. In regions in which no policy document exists, the interviews were conducted with interviewees who were expected to have some knowledge about CCA and/or would possibly play a role if a national or regional adaptation strategy were to be developed. Some of the interviews were recorded and transcribed in full (e.g. South Tyrol), while other PPs submitted an interview protocol to the Work Package leader and authors of this report. Some of these were rather brief (e.g. Piedmont).

Data based on the online questionnaire were collected as follows: the project partners that did interviews in territories with policy documents sent a link to the online survey for the region in question to the interviewees by email before the interviews. In these emails, interviewees were asked to follow the link and to fill out the online questionnaire.

Project partners conducted the policy document analysis using the English manual enclosed with this report (Appendix 5, Section 10.5).

This study was partly a self-evaluation, because some of the interviewers and authors of the assessment reports have been personally involved in the policy-development processes under examination. Interviewers, as well as some of the interviewees and respondents, were also involved in the development of the instruments, as well as in data gathering.

All empirical data gathered reflect the situation in the investigated territories up to October/November 2012. Due to the overall time schedule, it was not possible to explicitly consider information about new developments that occurred after closure of the data gathering phase in the transnational data analysis. In some cases (Austria, Baden-Württemberg), more recent information has been integrated in the respective country and region reports, which are separately available on the project website (www.c3alps.eu).

4.4 Data processing and analysis

For the results presented in this synthesis report, we **sampled** 42 of the 59 **interviews** for further analysis, leaving out some of the interviews from Liechtenstein and Austria, as these countries did (far) more interviews than were conducted in other regions. The selection from the pool of Austrian and Liechtenstein interviews was random. For the country and regional-level reports (which can be found in the Appendix to this report), all interviews were analysed. The interviews were coded according to a scheme that included, for example, the categories “strengths”, “weaknesses”, “supporting factors”, “challenges”, and “conflicts”. Then a qualitative content analysis was conducted in which the answers in these categories were compared between countries and regions.

Overall, ten **policy documents** were analysed using the manual. Of the total of 66 returned online questionnaires, we had to select the 38 most useful response sets. The main reason for omitting response sets were questionnaires which had not been completed in full. The data were analysed according to content analysis principles.

Examples of good practice in climate adaptation governance were identified based on desktop research, a literature survey, and also on the data gathered in the interviews and the online survey. The compilation of good practices is not limited to Alpine countries and includes examples from other countries, as well as from international organisations.

5 Results I – Performance assessment

5.1 Current stages of climate change adaptation policies

One general difference between the countries and regions we investigated was whether or not they had an approved policy document (strategy, action plan) addressing climate change adaptation (see Table 2). Countries and regions that already had an approved strategy covering multiple sectors were: Bavaria (Germany), France, and Switzerland. Austria had a multi-sectoral document finalised but not politically approved, and Slovenia had a sectoral strategy approved (national sectoral strategy and action plan for agriculture). Slovenia had also drafted the "Strategy for the transition of Slovenia to a low-carbon society by 2050". The Austrian and Slovenian national-level multi-sectoral strategies were not politically approved at the time of data gathering. Liechtenstein, Piedmont (Italy), South Tyrol (Italy) and Italy (national level)[8] had not started a policy document drafting process. In - (Germany), the Council of Ministers decided in March 2012 that the region would develop its own climate change adaptation policy document, specifying the framework set for CCA by the German National Adaptation Strategy (NAS).

Only after conclusion of the empirical data gathering phase, relevant new developments took place in two of the investigated territories. The Austrian national adaptation strategy has been approved by the Austrian Council of Ministers on 23rd October 2012. Baden-Württemberg (Germany) has started developing a regional adaptation strategy. At the time of finalizing the present report, various sectors are working on their respective sector adaptation strategies, with some being more progressed than others; presentation of a comprehensive, cross-sectorial strategy document for Baden-Württemberg is expected at the end of 2013. In both cases, it was not possible anymore to consider these recent developments in the transnational analysis of empirical data. The empirical information collected from interviews and online surveys and the analysis results presented in this synthesis report thus reflect the status quo in both countries at the time of data gathering, i.e. until about October 2012 only. As far as relevant, however, more recent developments up to summer 2013 have been considered in more detailed ways in the country assessment report of Austria and in the regional assessment report of Baden-Württemberg (www.c3alps.eu).

[8] A preliminary document containing the very latest (scientific) knowledge on CCA was provided in December 2012. It is considered the first of three phases in national CCAP development.

Table 2: Climate change adaptation policy development stages of the various countries and regions[9]

Country/region	Stage the process is (likely) at	Range given in interviews
Austria[10]	Stage III (action plan is developed)	Stage II (actual strategy developed) to Stage IV (implementation)
Switzerland	Stage III	Stage III
France	Stage IV or V	Stage III to Stage IV, also stage V monitoring mentioned
Bavaria (GER)	Stage III to IV	
Baden-Württemberg (GER)[11]	Stage I	Stage I to Stage II (also: "mixed, depending on the sector")
Italy (nat. level)[12]	Pre-stage I	"Not much has happened" at Stage I
South Tyrol (ITA)	Pre-stage I	
Piedmont (ITA)	Pre-stage I	
Veneto (ITA)	Pre-stage I	
Liechtenstein	Pre-stage I/Stage I	"Not much has happened" at Stage I
Slovenia	Stage II	Stage I to Stage III; also "mixed, depending on the sector"

Key: Stages: pre-preparation stage (no political decision, no mandate); Stage I - preparation stage (political decision to develop CCA); Stage II – strategy development process (with mandate); Stage III – action plan development process; Stage IV – implementation; Stage V – monitoring (see also Figure 3)

Monitoring and evaluation are not yet implemented at the national policy level. France is the only country where a monitoring and evaluation system for the NAS is already in place and attempts have been made to evaluate CCA policy-making (mid-term review scheduled for 2013).

[9] The table shows the status quo at the time of data gathering up to October 2012. For brief updates at the time of publishing this report please refer to the footnotes in the table.

[10] The Austrian national adaptation strategy and action plan have been adopted on 23rd October 2012. At the time of publishing this report, Austria can thus be considered to be in transition from Stage III to Stage IV.

[11] Development of the regional adaptation strategy of Baden-Württemberg has been on-going in 2013. Presentation of the final policy document is expected at the end of 2013. At the time of publishing this report, Baden-Württemberg can thus be considered to be in Stage II to Stage III.

[12] The NAS development process in Italy has started after closure of data gathering and is currently on-going. Action plan development is scheduled to take place still within 2013. At the time of publishing this report, Italy can thus be considered to be in Stage II.

5.2 Characteristics of the policy documents

Some of the policy documents are rather action-oriented, while others are more strategic in nature. Whether a policy document is more strategic or action-oriented seems to depend on region or country-specific conditions, and related decisions that are not documented in the individual policy documents. Austria combines both an overarching strategic framework document and an action plan in one policy document package that was delivered at the same time. In some other countries, the policy document is developed and drafted in two steps. Switzerland, for example, first drafted and approved a document of a strategic nature, and then started to develop an action plan. Similarly, France first adopted a national adaptation strategy in 2007, before the national adaptation action plan was drafted and accepted in 2011. The preparation of a medium-term operational programme for CCA is expected to be included in the draft Slovenian strategy.

All documents state the **reasons** that adaptation intervention is necessary. Some documents mention climatic changes that have already occurred, as well as projections of future changes in exposure, such as increasing average or extreme temperatures, and changing precipitation patterns. Other documents focus more on the expected impacts of climate change, such as the increasing instability of hillsides, or the spread of disease and non-native species. Others still underline the economic consequences of these impacts. The French national strategy, for example, emphasises the associated costs, and highlights the price of inaction. Climate-induced risks of water scarcity appear to be one of the most frequently mentioned adaptation concerns across the documents. The French document, in particular, emphasises water issues. The Austrian NAS highlights domestic political commitments, as well as existing international obligations and policy processes, including adaptation policy activities undertaken by other EU states, as motivating and legitimating factors.

The overarching **objectives** of CCA are stated in similar terms in most documents. These include “to avoid the negative effects that climate change may have on society, environment and the economy” (wording from the Austrian strategy). By contrast, harnessing the potential benefits of climate change, i.e. “take advantage of positive opportunities” is a comparatively rare among the listed objectives. The documents examined, the project partners responsible for the analyses, and the main objectives stated in the documents, are summarised in Table 3.

Table 3: Policy documents examined, their regions and countries, and stated objectives.

Name of document in English	Country/ region	Objective (as stated in document)	Project partner
Water management adaptation plan in agriculture	France	Best sharing and use of water resources	Université de Savoie
Interregional convention for the Alps massif	France	Maintain and develop Alpine massif appeal. Protect people and property against natural hazards.	Université de Savoie
National climate change adaptation action plan	France	Improve climate change knowledge to help the implementation of adaptation measures. Integrate adaptation into existing policies to affirm the transversal adaptation approach. Inform society about adaptation so that everyone can understand and act. Consider interaction between activities. Define responsibilities in terms of implementation and financing.	Université de Savoie
Climate change – how to adapt in Rhône-Alpes	France	Explain what adaptation is, and why it is necessary.	Université de Savoie
Austrian national climate change adaptation strategy	Austria	To avoid the negative effects of climate change on society, environment and the economy and to use the opportunities that may arise.	Umweltbundes-amt GmbH
Austrian spatial development concept ÖREK 2011[13]	Austria	To realise sustainable settlement and traffic development in order to limit the further sealing of surfaces and urban sprawl and ensure resource efficiency. To deploy spatial planning measures to help deal with the consequences of climate change and limit the threat to settlements and society.	Umweltbundes-amt GmbH

[13] Not dealt with in the present synthesis report. For details, please refer to the country assessment report Austria (www.c3alps.eu).

Name of document in English	Country/ region	Objective (as stated in document)	Project partner
Adaptation strategy of Slovenian agriculture and forestry to climate change	Slovenia	The purpose of adaptation is to "reduce the risk and damage to the environment and health of people owing to current and future negative impacts of climate change in a cost-efficient manner, or by exploiting potential benefits" (p. 5). Increasing coping capacity for adaptation in agriculture and forestry is one of the "elements, pillars or guidelines" of the strategy.	Urbanistični inštitut Republike Slovenije
Strategy for the transition of Slovenia to a low-carbon society by 2050	Slovenia	Where adaptation is concerned, the state's long-term objective is that vulnerability to climate change impacts should not rise above the current level.	Urbanistični inštitut Republike Slovenije
Swiss climate change adaptation strategy; first part: aims, challenges and fields of action	Switzerland	The objectives are to exploit the opportunities arising from climate change, while applying targeted measures to minimise the risks involved, protect the population, infrastructure and natural landscape, and increase the adaptive capacity of society, the economy and nature.	Federal Office for the Environment
Bavarian climate adaptation strategy	Bavaria, Germany	None clearly stated	Bayerisches Staatsministerium f. Umwelt und Gesundheit

Some – but not all – strategies contain ***principles***. Principles are an element of a strategy document that can contribute greatly to its coherence with existing policies. This is particularly relevant when a policy document deals with a new or emerging issue. For instance, the principles of the Swiss NAS – like the Austrian strategy document – include the consistency of CCA policy and action with the aims of sustainable development.

Principles of the Swiss climate change adaptation strategy

- CCA follows the principles of sustainability; this implies that the opportunities of future generations should be impaired as little as possible by action motivated by CCA. This also means that environmental, economic and social interests and concerns will be considered in a well-balanced way.

- Adaptation follows the precautionary principle and the solidarity principle

- Adaptation is based on partnership between municipalities, cantons and the Confederation, and respects existing responsibilities and competences (between these levels)

- CCA measures may not contradict the aims of climate mitigation

- CCA is based on scientific evidence

- CCA is based on risk analysis; focal points for adaptation are formulated

- The process is transparent and traceable

- Uncertainties must be considered; robust measures must be developed

- Consideration must be given to different time scales in different fields/areas (of human activity)

- Contribution to and participation in international exchange will be sought

- Progress on adaptation is evaluated; indicators that make it possible to judge the impacts, outcomes, and outputs must be identified

- Adaptation is seen as a dynamic process that requires constant change in the environment to be addressed; this change must be documented, and scenarios for future development paths must be updated regularly

Source: Swiss climate change adaptation strategy: part 1, p. 20-21

The Austrian document mentions further principles, such as prioritising climate change impacts, exploring a wide range of adaptation options, prioritising adaptation measures based on proposed selection criteria, and mainstreaming adaptation goals by means of existing instruments and structures.

Mainstreaming, i.e. the horizontal integration of adaptation goals and actions into sector policies, is generally identified in the academic literature on CCA as one of the main challenges of adaptation policy-making. We consider the explicit consideration of mainstreaming to be a particular strength in a policy document. Surprisingly, mainstreaming is only rarely mentioned as a clear goal in strategy documents. It appears in particular in the French national adaptation plan and in the Austrian NAS. In the latter, the importance of mainstreaming in terms of horizontal policy integration across sectors is repeatedly emphasised as a challenge, a guiding principle and a general action principle. Moreover, the Austrian action plan supports mainstreaming by regularly identifying instruments, further implementation steps and players from various relevant sectors for each single recommendation for action, thereby providing starting points for implementation within other sectors. Also, in the Slovenian strategy for the transition of Slovenia to a low-carbon society by 2050, the integration of CCA goals into sectoral policies is stated as part of the strategic approach to CCA, although the term “mainstreaming” is not used explicitly.

Among the policy documents examined, there is a diversity of approaches in dealing with the challenge of **cross-sector coherence**, including cross-sectoral interdependencies, synergies, conflicts, inconsistencies, coordination needs and trade-offs. Some policy documents do not address these topics at all. Others, such as the Austrian strategy, deal with these issues extensively, indicating that cross-sectoral coordination and

the management of potential conflicts lies at the core of CCA policy and its development. Here, potential conflicts are managed by identifying possible interactions and link between sectors, as well as making explicit reference to conflict potential. It has, however, proved impossible to resolve potential inconsistencies in policies for participating sectors, as well as competing interests. The implicit intention is to inform and sensitise those in charge of implementation about contradictory goals and the possibility of unintended cross-sector effects. As the strategy does not prescribe solutions or provide guidance on how to cope with cross-sector inconsistencies at the action level, these issues may come up in future evaluations and in the further development of CCA governance. However, there are also signs that, in other territories, issues, of cross-sector coherence tend to be overlooked or deliberately ignored. In the present authors' view, failure to address these issues constitutes a weakness in a policy document.

A fairly common characteristic that the documents display is a lack of **clearly defined measures for implementation**. Generally speaking, an operational implementation plan should include an assignment of instruments, parties and responsibilities, time lines, and budgets. The French national climate change action plan is an exception in this regard. It contains 32 action "fiches", or fact sheets, in which measures are defined and the roles of the different sectors in realising these measures are assigned.

Instruments that are most regularly mentioned in CCA policy documents – and that also have been suggested in interviews in regions without policy documents – are hazard maps and spatial planning instruments.

The topic of **uncertainty** is raised explicitly in more than half of the documents. A common strategy to deal with uncertainties in adaptation planning is to focus on no-regret, robust and/or flexible measures. Some authorities also work with "big change" versus "small change" scenarios to cover a range of possible climate change paths, and their implications for adaptation measures.

An interesting difference between the policy documents concerns whether, and to what extent, the policy-development process has been made transparent and documented within the policy document itself. In our view, the Austrian national adaptation strategy (NAS) is an example of how this is done well. First, the process is described in a separate chapter in the strategic part of the document. Second, the action plan and all (sectoral) sub-strategies are available online. Third, the action plan contains one page with a reference list of all studies that were used to draft the NAS. Finally, the sub-strategies contain information about the procedure for developing the documents. Which steps where completed when, and by whom in the policy-development process, is thus transparent. Information is given on who conducted the research, by what means, and with whose financial support.

5.3 Sectors involved in the policy process

The sectors involved were identified as part of the online survey, so these data are drawn from countries and regions where policy documents exist as drafts or in approved form. In the interviews, information was gathered on both fast-moving and reluctant sectors.

The data suggest that agriculture is the sector that has participated most frequently in CCA policy-making in the regions and countries studied. It is followed by natural hazard prevention, water-related sectors, forestry and energy. Involved to a slightly lesser extent were tourism and planning, followed by conservation, health and transport. Urban planning did not participate as often, and only two thirds of the respondents mentioned the finance department as participating. However, there are differences between countries and regions with regard to which sectors are moving fast on CAA. In general, those which have been, or are likely to be affected by climate change impacts are those which are water-related, as well as tourism, forestry and agriculture. Also, these sectors (at least partly) focus on CCA measures that are similar to those they have applied or practiced in the past for reasons other than climate change, and for which they have other, or additional, motivations.

The industrial, transport, and energy sectors were all mentioned several times as most reluctant to participate in CCA policy-making. The housing sector was also mentioned in this context, appearing to resist CCA policy where it collides with development plans such as the extension of built-up areas. The water management sector seems to play different roles in different regions. While it was mentioned as slowing down CCA policy-development processes in Slovenia, in France the water sector seemed to be at the forefront of CCA. Local farmers have been reported to be reluctant to change their water use practices, and industry as such was also perceived by some of the respondents as resisting activities by public administrations to combat the impact of changing climatic conditions.

Independent of the specific constellations of CCA policy in a given region or country, this policy field is characterised by multi-sectoral involvement, different sectoral motivations and interests. This mix of motivations and interests usually gives rise to a series of challenges. Before we elaborate on these, we will first discuss more general challenges to the field of CCA policy-making.

5.4 Identified challenges

We define challenges as facts which confront CCA policy-makers and which require an effort to be overcome before coordinated CCA measures can be realised and/or CCA is included consistently in administrative activities. In contrast to hindering factors, challenges are issues that can be, or have been, resolved in CCA governance.

The most profound challenge to policy-making in the field of CCA is the still-prevailing **perception of climate change as something distant, with little urgency**. Thus, for many public servants CCA still seems to be a marginal topic. Additionally, in some regions there is still an on-going debate, at least in some circles, as to whether or not climate change exists at all. Policy-makers in the field and in the C3-Alps project have all experienced several occasions on which their discussion partners have held this position more or less openly. In any case, the **impacts of climate change are still not being felt by many of those concerned**. The fact that climate change is often perceived as an **environmental topic** also causes it to be side-lined by some parties and institutions.

Some of our findings about challenges to CCA policy-making in the different stages of the policy cycle are set out below.

5.4.1 Challenges at the initial and preparation stages

Some sense of urgency must be created, especially early on in the policy cycle, in the phase where a **critical mass of individuals from the relevant governmental organisations needs to be motivated to engage in the topic** of CCA. As long as politicians, and other decision and policy-makers hold the view that climate change is slow and something that will not affect a country or sector on his/her watch, there is little incentive for these individuals to tackle issues related to CCA. This situation is aggravated when topics of great political urgency emerge, such as the financial and sovereign debt crises. Competition between problems calling for political attention, and crowded political agendas, make it difficult to establish a political commitment to CCA policy-making.

The interviews also revealed that a **strong focus on mitigation in a region might result in a challenge for** those who are pushing for effective **CCA policy-making**. We can only assume that, once considerable efforts have been made to tackle one climate-related issue, there is little motivation to invest in another climate-related topic. This is particularly relevant at the regional/federal state/cantonal level, where resources for dealing with climate issues might be more limited. In this context, one of the achievements of the process in Austria was to clarify the differences between adaptation and mitigation, and to **establish adaptation as a separate political topic**.

A challenge resulting from the **cross-cutting nature of adaptation matters** is that this inherent complexity comes up against **existing government competencies that are strongly fragmented**. Legislation, administration and policy execution are assigned to different sectors and political and administrative levels. In federal state systems, in particular, the sub-national levels often hold considerable legislative powers, which can add another level of coordination. Furthermore, a lack of clarity in the organisation of competencies and responsibilities, e.g. between sectors at the same level, between sectors at different levels, and between legislative and administrative levels, exacerbates the complexity of CCA policy-making and governance.

5.4.2 Challenges at the strategy development stage

The **cross-sectoral and multi-level challenges to CCA** described above also arise at the strategy development stage. CCA cannot be achieved (solely) by setting up a new department. CCA is most likely to be achieved when existing departments change some of their rules so practitioners change (some of) their practices. To generate adaptive behaviour, existing working routines must be assessed in terms of their compatibility with anticipated future climatic conditions. **This requires intellectual capacity and time to acquire the relevant information.** Some individuals, particularly at lower administrative levels where fewer resources are available for the variety of topics that are of potential relevance for decision-making, seem overburdened by the new topic of CCA.

The costs and time involved in coordination are an additional challenge, first in identifying, and then in **coordinating different interests under changing climatic conditions**. In these coordination efforts, **potential conflicts need to be identified** and then ways to resolve them found. Conflicts have emerged not only between different sectoral offices and administrative departments, but also between the departments that have coordinated CCA strategy development and the finance department. Also, **authorities at different levels sometimes collide**. This is usually the case where higher-level government staff attempt to motivate lower-level administrative officers to engage in CCA topics. In the Swiss case, for example, it was reported that in some cantons, at least, public officials at the cantonal level resisted federal-level attempts to promote CCA. Thus, different public representatives potentially can and do interpret the topic of CCA in different ways, and this creates scope for conflict.

Non-governmental organisations were not involved in all countries and regions. However, where they were involved, in some cases tensions emerged between those organisations and government officials.

Another crucial challenge to adaptation planning and the associated policy-drafting work are **uncertainties and gaps in the knowledge base**, i.e. a perceived lack of the information and certainty that are needed to act effectively. The general complexity of CCA matters implies communication challenges, which we examine in greater detail in the section on the science-policy interface. For example, changing climatic conditions can result in shifting trends in climatic parameters for seasons, regions, and elevation zones, and it often brings with it greater climatic variability within a given year or decade . Also, these changes may, in turn, affect different sectors in different ways, so **some sectors are likely to care about certain changes more than others**. Uncertainty about climatic change, and varying levels of concern (e.g. winter tourism about snow in winter and agriculture about maximum temperatures in the summer), makes communication between sectors very difficult. [For a more detailed discussion of issues related to knowledge, knowledge gaps and knowledge generation, see Section 6.]

Furthermore, **different sectors may have contradictory visions for adaptation to climate change**. In one country, for example, the department of economic affairs has been reported as promoting the development of skiing areas by arguing for the use of artificial snow production or the construction of additional lifts at high altitudes and in territories not currently used for skiing. Other departments object to these adaptation measures and argue that they are incompatible with, for example, the principle of sustainability, as they would cause damage to so far largely unaffected natural areas that are habitats for rare species. **These conflicts require extensive investment in communication** within the public administration, and a willingness to engage in and capacity for dialogue.

5.4.3 Challenges at the implementation stage

Proposed adaptation measures must be prioritised before implementation can begin, in order to ensure the efficient and effective use of public resources, especially where these are limited. Indeed, prioritisation might be considered at the strategy development stage. **Transparent and clearly defined criteria** are necessary for this prioritisation. The document analysis revealed that **little to no guidance** is given in the existing CCA strategies on how to set priorities. Here, the French national strategy stands out as identifying the most important measure for each sector. In the case of Switzerland, certain priorities have been set within sectors themselves, and higher-priority fields of action determined. The Austrian NAS provides guidance (e.g. selection criteria) on setting priorities for those involved in implementation, but there is no systematic prioritisation in the action plan itself. Decision-making on priorities is thus left to those in charge of implementation. To our knowledge, Germany at least is in the process of developing tools to prioritise proposed implementation measures.

Before a strategy can be implemented, **concrete measures have to be specified** in sufficient detail for the sub-national to local levels. Higher-level parties then have to motivate local or provincial players to take action on CCA. However, as spelled out above, **CCA is a low political priority**, due in large part to a lack of information and capability at the more local level. Thus, **greater vertical integration is a crucial step in supporting local implementation**. In this vertical integration, attention must be paid to the individual sectoral responsibilities at lower levels of government, where synergies and conflicts may not take the same forms as at the higher level. Thus, additional sectoral coordination might be necessary at the province/federal state/cantonal levels, and then again at the municipal level.

A final challenge for CCA is its **relationship with the policy field of mitigation**. The measures proposed in the context of CCA should not be contradictory to mitigation goals, but harmonised with them. That said,

CCA must be established as a separate policy field, as it can have very different implications in terms of effective action. Obviously, both the distinction between adaptation and mitigation, and an integrated approach to both policy fields which strives for synergies and to avoid trade-offs should be established early on in the policy-development process, and considered closely in the entire drafting process.

Further challenges are:

- **funding uncertainties and budget restrictions:** a lack of clarity about funding for implementation measures, the fear of future budget cuts in times of economic crisis, and austerity measures, can undermine the willingness of stakeholders to take action.
- **uncertainty:** knowledge gaps and uncertainties, especially at a greater level of spatial detail, make adaptation decisions more difficult. At the very least, they may act as a cognitive barrier, or may be taken as an excuse for inaction. As some interviews suggest, uncertainties are sometimes perceived as a lack of consensus between researchers, and are experienced as demotivating.
- **lack of political interest resulting from a perceived lack of urgency to adapt to climate change** leads to the absence of any high-level political commitment to adaptation. The long time horizons associated with climate change create uncertainty about the payoff of investments in adaptation measures. This is aggravated by the short time horizons in which politicians tend to think, which leads to the prioritisation of problems that are perceived as more urgent.

5.5 Hindering factors: reasons for the non-existence of climate change adaptation policy documents

A number of conditions may act as hindering factors – barriers to policy development – at different stages of the policy cycle (see Table 4). Some of these factors resemble the insurmountable challenges we discussed in Section 5.4. For example, when awareness of existing climate change cannot be raised and/or those in charge do not learn to see the need for developing or approving a policy document that addresses CCA, it will be difficult or impossible to get any such document signed off. This, in turn, makes the implementation of those policies highly unlikely. Also, **powerful sectors which do not see potential in the topic of CCA, or which may even be threatened by the issues involved, may put up barriers** so high that all attempts to start the policy process are doomed to failure – at least this is what some of our interviewees suspected. It might, however, also be the case that a document is politically approved, but that the (informal) structures that are in place are themselves so rigid and inflexible that no genuine changes in practice ensue. This is a fear at least in some countries. It is also, to some extent, the experience with previous integrated policy strategies from other policy fields (e.g. sustainable development, biodiversity, and climate change mitigation).

Unclear or overlapping responsibilities are a further hindering factor. These offer little room for manoeuvre to those who are motivated to act in favour of CCA. One very great obstacle, and a challenge that has obviously been overcome in cases where a policy document has been drafted, may be **the absence of any specific, allocated responsibility for CCA**.

In some regions, the **structure of the administration and government itself was mentioned as a hindering factor** in policy development. Some interviewees also referred to these structures when they gave reasons for the non-existence of a policy document. Also, **a lack of stability in the administration**, as the result of frequent changes of government, was reported as a hindering factor in policy development and approval. Examples here include Slovenia and the Italian regions, as well as Italy at the national level. As mentioned

above, an **earlier focus on mitigation on the part of (regional) key players** can result in too much attention being concentrated on this issue, which might have the consequence of reducing capacity and resources for CCA. South Tyrol seems to be a particular prominent example of this phenomenon.

For regions without CCA policy documents, other reasons for their non-existence were given in addition to those listed above. Chief among these was the **dominance of other topics or other priorities**. Interviewees also suspected that, apart from the administrative and institutional circumstances described above, (anticipated) costs and **other political and economic interests** explain why no policy document has been drafted so far. Area-specific reasons were given by some countries and regions . For example, the small size of a country, with the implication that "everybody knows everybody" was given by one interviewee as the reason that no policy document had been developed. Opaque processes, corruption and strong traditions were mentioned as additional country-specific reasons.

Table 4: Reasons for the non-existence of climate change adaptation policy documents and their frequency

Frequency	Reason for non-existence of CCA policy document
12	CC(A) perceived as irrelevant/other priorities
11	Country-specific explanations [corruption, small size of country, strong traditions]
6	Institutional framework
5	Costs (including anticipated costs)
4	Political and economic interests that conflict with CCA
1	Lack of foresight
1	Political campaigns

In countries with CCAP documents, the **enforcement** of their content can be hindered, for example, by their **legislative "powerlessness" (non-binding nature)**. One interviewee (from Switzerland) lamented the lack of legislative instruments to enforce measures or initiate changes in legislation on other sectors as result of the CCA strategy. Strategies or sectoral measures that have been implemented without coordinating with other sectors or the CCA coordinating agency present another factor which hinders effective implementation. This results, for example, in adaptation activities which are incompatible with the sustainability paradigm, or which counteract mitigation efforts.

In countries that have an approved CCA strategy, the main preoccupation is with implementation, as the existence of a strategy does not automatically translate into changes in practice. For all countries, whether they are among the richest in the world or nations in transition, the lack of access to **financial resources** appears to be one of the main preoccupations. These resources – or the lack of them – are frequently mentioned as a **hindering factor for implementation**. A shortage of resources presents problems at all stages of the policy cycle, but is particularly relevant just before the implementation phase. However, it

also seems to be the case that countries and regions are hesitating, or have hesitated in the past, to start a strategy development process, because they anticipate that they would ultimately have to finance the related measures.

5.6 Supporting factors

We define supporting factors here as activities or forces that support the inclusion of CCA in government action and/or that motivate coordinated adaptation measures.

5.6.1 General supporting factors

Natural disasters and extreme (weather) events such as floods, heatwaves and droughts have drawn political attention to climate change, and subsequently **created a political will** to deal with (local) impacts and to prevent them in the future. Some interviewees emphasised that a single event was not enough to spur political will, and that instead a series of events had to take place. It also appears that **extreme events have tended to motivate action by those parties and sectors which are most affected, and not necessarily action at the national and transsectoral level**.

Cross-sectoral activities at the national level have usually started after some vanguard sectors became active in the field of CCA. For example, in Slovenia it has been reported that an international scientific workshop about reducing the vulnerability of **agriculture and forestry to climate change** was organised in 2002 in Ljubljana. The report on the workshop was discussed by the Slovenian government, which then asked the Slovenian Environment Agency to prepare comprehensive research on the subject. In the next step, an **inter-sectoral group was established** to prepare a climate change adaptation strategy for these two sectors. The strategy was adopted in 2008. Action on formulating the strategy to make Slovenia a low-carbon society by 2050 began after the adaptation strategy for agriculture and forestry had been prepared.

The creation of **inter-departmental or inter-sectoral working groups**, as mentioned above, appears to be **crucial to the formulation of a cross-sectoral CCA policy document**. The policy-drafting process, then, fosters awareness about climate change and the need for CCA. It also usually results in a policy document that lays the foundation for measures and their implementation.

Sometimes, the relationship between extreme events and subsequent policy-making can be more indirect. For example, in Austria it is reported that a series of **flood disasters** and other extreme weather events first received considerable **media attention** and triggered a **public debate** about possible causes and response measures. This subsequently influenced the establishment of **new climate research funding** programmes. These in turn generated a growing body of scientific knowledge about climate change and climate impacts, which then provided the **basis for the emerging political discourse** about adaptation.

5.6.2 Factors motivating climate change adaptation strategy development

To **motivate CCA strategy development, external or higher-level activities** and international organisations such as the UNFCCC process, the Assessment Reports by the IPCC, EU policies such as the EU White Paper on Adaptation or the CAP and, for some countries, EU funding, are highly supportive factors. EU funding appears to be particularly important in the case of Italy, while in Slovenia, EU funding and pressure became more important in later stages of the policy cycle. These documents, and the related activities at the international level, create a **framework that legitimates CCA activities** in European nations and regions.

This is particularly true of countries with less stable or less well-functioning administrations and governments [mentioned particularly by Slovenia and Italy].

In terms of higher-level activities or organisations and their influence at the national level, membership of the European Environment Agency (EEA) proved important to CCA policy-making in Switzerland, as a non-EU country. For Austria, one supporting factor was the policy action on adaptation taken by other EU Member States.

At the domestic political level, it has been decisive in Austria that the **production of a national adaptation strategy was defined as a goal in the government's programme for the current legislative period.** While there was never a high-level political mandate to enter into the strategy development process, at a more informal political level a resolution was passed by the Conference of Provincial Environment Ministers and Officers (*Landesumweltreferentenkonferenz*) to support the NAS process. The initial coordination talks between provinces and the federal government were felt to have been supporting factors in Austria. Also, the existence of certain national sector policy documents that had already included adaptation issues was felt to be a facilitating factor, as were pioneering sectors which had already begun to engage in adaptation, such as forestry.

5.6.3 Factors supporting the drafting process

The drafting process can be promoted by **tying** it to **international activities** and thus connecting it to something of wider-ranging relevance and recognition. For example, in Slovenia awareness about the vulnerability of agriculture and forestry to climate change was raised by organising an international scientific workshop on this topic as a parallel event to a meeting of the committee of the World Meteorological Organization on agro meteorology.

EU-funded projects and **other CCA activities** within a region and/or on the part of other sectors at the same political level can **help to create broader (sectoral and regional) support for CCA**. These pioneer activities help to create the political will (for the government) to issue **political mandates** to develop a cross-sectoral CCA strategy at a higher administrative level or different region. A political mandate, in turn, **motivates those invited to participate in a cross-sectoral process to actually participate in drafting** a national strategy, for example. This motivational effect has been reported in Switzerland. In the Austrian process, it was emphasised that having the topic of CCA (or better still, the drafting of a CCA strategy) included as **an objective in the governmental programme** for the 24th legislative period of 2008-2013 was key driver behind the national CCA strategy.

Furthermore, well-prepared and **synthesised scientific information**, and its **translation for policy-making** purposes, have been crucial not just to the drafting process, but also even earlier to create an awareness of the need to deal with CCA. **Individuals and institutions** with a flair for communicating science **were of the utmost importance here**. These individuals were usually employed in public administration or in agencies acting as (semi-)public support units, and seem to have a high personal motivation to enable and to motivate other individuals from both inside and outside the public sector.

Very welcome were professional drafting processes, which are characterised – according to the interviewees – by **good process design** and **professional project management**, with timelines, statements of objectives and clear responsibilities. Depending on the geographical region and sectoral origins of interviewees, factors such as transparency, trust, openness, effectiveness and efficiency were mentioned as valued characteristics. Trade-offs between these factors must be considered in the design of a policy process, as it will not be possible to fulfil all of the criteria in a given process to the same high degree.

Finally, **cross-sectoral or vertical coordination bodies, established prior to the drafting process,** proved very useful.

5.6.4 Factors supporting document adoption

When a policy document has been drafted, it usually takes a few months or even years until it receives political approval. It appears that the parties involved in, and/or responsible for, the drafting process have little influence on the political approval process. At least based on the empirical data gathered, **how and under what conditions political approval for a CCA policy document is granted** remains something of a mystery**.** In one country, an interviewee suggested that the main political players needed to be replaced in order for the draft document to be approved. It was also mentioned that outside pressure (coming from beyond the countries' borders) is helpful in the adoption of the draft policy document.

5.6.5 Factors supporting implementation

Implementation was a hot topic for several of our interviewees. It appears that those **regions and countries that opted for a broader, participatory approach** and involved the very institutions in the drafting process that would later be responsible for implementing the proposed measures, or that act as a broker between higher and lower administrative levels, **are in a better position when it comes to implementation**. In other words, the involvement of the implementing institutions in strategy development ultimately aids implementation, by building trust, awareness, and commitment between the parties involved, and thereby breaking down barriers. This seems the case at least as long as the quality of the process is high, and the project management (drafting process) is professionally led.

It certainly also supports implementation when regulation in other sectors already integrates CCA goals. Overall, changes in the regulatory framework that are motivated by adaptation concerns are helpful for implementation (e.g. revision of technical building norms or technical regulations in the field of industrial plant safety [snow load, wind and floodwaters] in Germany). Also, the more support, interest or at least awareness that exists for CCA, the easier it is to implement CCA measures. This awareness or support can be created or aided by media attention.

Where the following points are concerned, we can only speculate as to why the countries investigated have not reached the implementation stage: France, for example, has highly detailed **action plans with clearly practicable, prioritised measures**. We would therefore expect implementation in France to be more successful than in other regions where measures have been neither spelled out nor prioritised. We might expect that the **allocation of funds** would also aid implementation. However, we are not aware of any country which has set specific funds aside for this purpose, so we were not able to test this hypothesis within the framework of this study. One of the most recent developments is the **pilot CCA programme in Switzerland**. With this initiative, the federal government departments are attempting to circumvent one of the challenges to CCA implementation in federal states: that the federal level has little power to spur or motivate CCA activities at lower administrative levels.

5.7 Performance assessment based on strengths, weaknesses, impacts, and potentials for improvement

The CCA policy of each country and region has its strengths and its weaknesses. Also, some countries started the process earlier than others, and this has had a certain influence on their particular good and less good points. Thus, it would not be appropriate to rank the regions and countries studied here with regard to where they stand at a certain moment in time. It is more useful to point out the different ways in which they have chosen to move on CCA policy-making, and also to highlight achievements that are likely associated with or the result of these chosen paths.

5.7.1 Strengths

In their response to the question of strengths (which was asked only in countries and regions where a policy document exists), most respondents implicitly referred to the policy-drafting process. That the process was **participatory and even included NGOs** and a broad range of stakeholders in general was emphasised by interviewees from Slovenia and Austria. Also the German interviewee (at the national level) mentioned participation as an asset. Participation was also important in France during the drafting process for the national adaptation action plan. Openness in a discussion which did not prioritise sectors or actions allowed for constructive dialogue. Another positive attribute shared by the policy processes in Slovenia, France and Austria is the **inclusion of science** and scientific expertise in the process. German, Swiss and Slovenian interviewees mentioned the high degree of horizontal coordination as a strength. Particular strengths of the document from the perspective of interviewees from Austria were comprehensiveness, and the **thematic breadth** of the Austrian process and document. By contrast, Swiss interviewees emphasised the **compactness** of their policy document as a particular strength. An overview of the strengths mentioned, and their frequencies, is given in Table 5.

Table 5: Strengths, and their frequency, as were mentioned in the interviews and countries

Frequency	Strengths	Relevant country or region
12	Participation	SLO, A, GER, F
8	High degree of horizontal coordination	CH, GER, SLO
7	Awareness-raising	F (at the territory level), A, SLO
6	Comprehensive; thematic breadth	A
5	Integration in sector policies/plans	Only interviewees from countries and regions that do not have a cross-sectoral policy document mentioned this
4	Document developed	A, SLO, CH
3	Two-step approach [development of a strategy in the first step; after its political approval, an action plan is developed in step two]	CH
3	Standardised method for sector analysis; very systematic approach to prioritising CCA issues within sectors	CH
2	Coherence; integrated/cross-sectoral approach	A, CH
2	Vertical coordination (federal with state level)	A
2	Definition of measures	CH
2	Assignment of responsibilities	GER, F
2	Inclusion of science; science-driven, evidence-based	SLO, A, F
2	Good process coordination	CH, A
2	Consensus-oriented process	CH
2	Transparency of process	SLO
2	Identification of challenges & interfaces	CH

Another strength that was mentioned relatively often was the awareness-raising effects of the document-drafting process itself. In France, the documents are expected to **raise awareness,** in particular at the regional administrative level. The documents give a synthesis of knowledge on the subject in a way that is accessible to people not familiar with CCA issues. Slovenian interviewees highlighted **good leadership** and a **well-structured** (policy development) process, as well as **transparency** (all of the documents were published on a website and e-news was provided to interested persons). A French national interviewee also emphasised the transparency of the process. As in Slovenia, all of the documents were published on a website, and in France an online survey of 3,500 respondents was conducted to gauge public opinion.

The strength of the Swiss strategy document appears to be its very **systematic approach**, based on a standardised method which almost all of the sectors involved used to develop their contribution to the national strategy. A further strength for the Swiss is the identification not only of interfaces between sectors, but also with related fields of action as a basis for their action plan (in development in winter 2012/2013).

Germany stands out because there appears to be a relatively **strong political commitment** to the policy field of CCA. In addition, responsibilities are already well defined in Germany. Finally, we think it is worthwhile mentioning that only Austria has included **social science aspects and expertise** in the process, albeit at a rather late stage, and incorporated this content in the strategy document. This makes the country something of a pioneer in this field.

Interestingly, we found that respondents tend to **assess the *attributes of their processes* as representing particular strengths**. This seems to be the case largely irrespective of the attributes a process has. For example, Austrian and Swiss interviewees mentioned attributes of their own processes as particular strengths: in Switzerland, a two-step approach was chosen, with the strategic part of the NAS being developed first. Following its approval by the Swiss Federal Council, the action-oriented part is now in development. Austria, on the other hand, developed the two documents – the more strategic context document and the action plan – in parallel. Experience thus shows that not only are both paths feasible, but also that both may be regarded as a particular strength of the CCA policy-drafting process. This makes it difficult to derive recommendations, other than that there is no one correct path, but multiple viable ones, and that each region and country must consider the context and objectives of CCA strategy development when choosing which to take.

5.7.2 Weaknesses

CCA policy-making takes place in wider administrative and governance contexts that are region and country-specific. Some of these contexts and settings may present factors that either support or hinder the process. For example, for France it was reported that there is a huge perceived (communicative) distance between the central government developing strategic documents, and the local level at which implementation is expected. This, however, is not a failure of those coordinating CCA policy-making, but a phenomenon typical of a centralist nation. It thus constitutes a contextual challenge for CCA policy-making and should be recognised as such. Consequently, policy-making that ignores the particular challenges in a centrally organised state of translating strategic plans and thinking to the regional level is counted as a weakness.

We grouped the weaknesses that were mentioned in the interviews into general weaknesses, those related to the policy-development process, and those that relate to the characteristics of the policy document itself. We compiled the weaknesses that were mentioned in the interviews into a bulleted list below, so that readers can see the spectrum of weaknesses that might be encountered. However, it is important to

note that some of the weaknesses tend to describe general conditions, such as the overlapping authorities of the offices involved.

Weaknesses mentioned in the interviews:

General

- Little awareness of strategy
- Lack of original approaches (more of the same)
- Lack of competence at the national level
- CCA restricted to soft measures; no way of using hard (policy) instruments
- Lack of/obstacles to implementation
- Lack of political support
- Lack of long-term perspective

Policy-development process

- Lack of transparency
- Lack of consideration of social matters
- Hasty development of the policy document; insufficient deliberation
- Too much focus on environmental topics and risks
- Stakeholder inclusion too late; some stakeholders not consulted
- Unsatisfactory interaction between scientists and policy-makers
- Process too slow
- Overlapping authorities of the bodies involved
- Measures considered only at a late stage
- Lack of political mandate/decision

Policy document characteristics

- Target groups not defined, implementing bodies not strictly assigned
- Length or lack of concision
- Different depth of analysis for different sectors
- Vagueness of the strategy
- Lack of measurable indicators
- Lack of timeline for the next steps
- Financial responsibilities not defined

- Document not binding in nature
- Failure to resolve trade-offs and conflicts (e.g. between sector policy goals)

Obviously, the complaint about, say, a lack of transparency implies that **policy-development processes should be as transparent as possible given other expectations, such as efficiency**. That processes were considered both too long and too short implies that there is considerable variation. The document should also be of a reasonable length. The aim is neither absolute comprehensiveness, nor a document that has been produced just for the sake of having one, but which runs the risk of being rather vague and ineffective, because of a lack of will to implement it.

We must take into account that these **"weaknesses" are subjective judgements about processes and policy documents**. One person may value the use of social science methods, while another does not see the added benefit. With this in mind, we do not believe it is for us to derive policy recommendations directly from lists such as those given above. Weaknesses are considered more fully in the policy recommendations set out in Section 8.

5.7.3 Impacts

Impacts and expected impacts, i.e. all types of results or changes that may be brought about by a policy document or drafting process, are other features that allowed policy performance to be assessed. The responses to the question in the online survey about the (expected) impacts of the strategy document revealed a mixed picture. On the one hand, an overwhelming majority of respondents from all countries stated that it was **too early to talk about impacts**. On the other, **respondents were optimistic with regard to the effects of CCA policy within the next five years**. They were undecided and more critical when it came to assessments of the impact of CCA policy on other sectors. About a third of the respondents expected CCA policy to have a major influence here. A direct comparison of the answers from Swiss and Austrian experts shows that there was a more optimistic attitude in Austria about the possibility of transforming other sectors through CCA policy. In Switzerland, respondents were more optimistic about the on-the-ground impacts of CCA policy within the next five years.

Table 6: Impacts of CCA policy as mentioned in the interviews, in order of frequency.

Frequency	Impact
7	On law-making/revision/mainstreaming
5	Sectoral impacts
5	Too early or too little evidence to discuss them
3	Cantonal/federal state strategies and activities
3	Financing for research
2	Sympathy for/understanding of CCA
2	Change in funding instruments
1	Effects on scientists and intermediary organisations
1	New databases
1	Pilot implementation programmes

The interviews confirmed the opinion voiced via the online survey that it was too early to talk about the impacts of CCA policy. However, **some activities or changes that constitute impacts were actually mentioned.** An overview of these impacts can be found in Table 6. One specific example is a fund for pilot programmes at the local authority level in Germany. New norms and guidelines, changes in funding instruments and conditions for the award of funding, as well as changes to legislation, were also mentioned in the interviews. These can be seen as impacts of CCA policy. For example, the proposed revised Spatial Planning Act in Switzerland contains a paragraph on CCA. Interviewees also pointed to new alliances as impacts of CCA policy.

5.7.4 The institutional dimension of climate change adaptation policy-making

Where the organisational dimension of CCA policy is concerned, we argue that the greatest changes have been in the research sector. **Numerous academic and non-academic research institutions have taken on the topic of CCA and conducted research projects.** These institutions also provide science-based inputs into policy-drafting processes. It seems common for sectoral administrations to commission knowledge such as vulnerability assessments for certain regions, or to consolidate CCA knowledge on specific regions or sectors. A number of public universities and research centres have undertaken projects that contribute to CCA strategies and policy-making in the Alpine space, some of which are still ongoing. In this way, numerous academic and non-academic research institutions in different Alpine countries have begun to address CCA and institute research projects that will also allow them to advise on policy-making.

Governance arrangements, i.e. process ownership and organisations in charge of drafting the CCA policy documents: the process owner of the drafting process in Austria was the Ministry of Life and the Environment Agency was consulted to coordinate. In Germany it was the Federal Environment Ministry that was the process owner and the Federal Environmental Agency was in charge of coordination. In Switzerland, the process was owned by an interdepartmental working group. The political owner was the Federal Council, and the Federal Office for the Environment (FOEN) coordinated the drafting process for the CCA strategy document. In France, the Ministry of Ecology, Sustainable Development and Energy was the process owner, and in Bavaria it was the State Ministry of the Environment and Public Health. In Slovenia, the Ministry of Agriculture and the Environment was the process owner and the Government Office of the Republic of Slovenia of Climate Change was in charge of coordination.

In some cases, **CCA policy-making activities have been outsourced beyond the public administration**. In Austria, the University of Vienna was commissioned to coordinate the content of CCA policy, and a private company was in charge of facilitating communication in the strategy drafting process. In terms of changing institutional arrangements in connection with CCA policy-making, existing government institutions have also received additional resources to tackle issues related to CCA. In Switzerland, for example, the FOEN was given funding for two additional employees dealing with CCA, bringing the total number of federal employees to four on this topic.

Also in Austria, units in existing institutions and **existing coordination bodies extended their mandate** or service portfolio in response to policy-making needs. For example, the Environment Agency broadened its CCA focus and steadily strengthened its services and roles in policy support, knowledge brokerage and applied research. The Kyoto Forum, an existing body active in the coordination of mitigation policies between the provincial states and the federal state, expanded its scope by supporting the CCAP development process, as well as policy integration during that process. Where institutional change is concerned, Slovenia established its Government Office of Climate Change in 2009. However, on 9 March 2012 the authorities of the Office were transferred to the Ministry of Agriculture and the Environment. In other words, the newly created office was suspended less than three years after its creation. An Inter-ministerial Working Group for Drought Monitoring and Management was set up as a coordinating body, and an inter-ministerial working group for climate change adaptation is also envisaged, possibly including representatives of the local and other levels. In Germany, a competence centre by the name of KomPass has been created to study climate impacts and adaptation.

Switzerland has set up a new virtual institute – or collaborative project, to be more accurate – although it will focus primarily on climate and weather predictions. The C2SM centre for climate system modelling is a joint initiative between the Federal Institute of Technology (ETH) in Zurich, MeteoSwiss, Empa, WSL, and Agroscope Reckenholz-Tänikon, with the main objective of improving understanding of the earth's climate system. C2SM was founded in November 2008 and has been operational since March 2009. In Swiss institutions overall, we are seeing a new awareness of the relevance of CCA within existing bodies, rather than the establishment of new ones. This greater awareness of CCA is confirmed by ProClim (CH) and the OcCC symposia. ProClim is the Forum for Climate and Global Change, and serves as a liaison body between science, public administration, politics, business and the public. Another of its objectives is to enhance communication between these spheres of public life. The OcCC – the Swiss Advisory Body on Climate Change – has a stronger advisory role and formulates recommendations about climate and global change for politicians and the federal administration. It organises a yearly symposium.

5.8 Evaluation against normative performance criteria

In a second performance assessment step, as explained in the method section we adopted performance criteria from the European Commission's White Paper on European Governance that are relevant to the CCAP context (European Commission, 2001). These criteria are **openness, participation, effectiveness**[14] **and coherence.** We added **"science-based"** to these criteria, as we think that public action, including policy-making, should be based on evidence and knowledge derived from systematic investigation. We also added transparency as a widely considered criterion that reflects good governance.

These normative performance criteria could only be checked for regions that already have a finalised cross-sectoral policy-development process, and thus a policy document, at least in draft form. This section also deals with the topics of professionalism and trade-offs.

5.8.1 Effectiveness

The online survey shows that the **respondents assess the policy-drafting process as effective**, which is of little surprise as only individuals who participated in processes that resulted in a policy document filled out the survey. If we regard the policy document as the outcome of a policy-drafting process, then the process is effective if a document is actually produced. We did not explicitly ask about efficiency[15] in the online survey or the interviews. The **interviews**, however, **revealed that some perceived the drafting process to be too long** (Austria). By contrast, an interviewee from Slovenia said that she thought the drafting process was too quick (or, rather, that there was not enough time for deliberation). An interviewee from France emphasised the **need for a process that takes the time to consider all viewpoints and collect all the necessary information**. A process that is too fast leads to lower participation and thus lower acceptance for the policy, he reasoned. One public servant from Switzerland, who had a leading role in the policy-drafting process, characterised it as "exciting and painful". The latter attribute might indicate the difficulty of conducting an effective process. Also, how effective a process is might depend not only on the parties leading it, but also on those who are expected to contribute to the policy document. However, if these contributors have little CCA expertise, and/or do not see the relevance of CCA to their area of responsibility, the policy-drafting process is likely to be more difficult than where all of the parties concerned are well informed about CCA and its implications.

5.8.2 Participation

The answers to the questions on participation, or the **nature and level of involvement of different levels,** show variation in the dimensions of "*who*" and "*how",* and thus took very different forms. For example, in Austria, local authorities, federal states, federal offices, and NGOs were not only consulted, but also participated in drafting parts of the policy document. The general public was consulted via an e-

[14] Only mentioned by interviewees from Italy and France

[15] Some readers might consider efficiency another normative criterion for policy-making. It does not, however, seem to be of huge concern to those involved in policy-making process. We believe that a policy document that is developed quickly might face the disadvantage that those who are expected to implement measures are not prepared. The document will ultimately be less efficient, because it will have little effect on the ground.

participation survey. In Switzerland, involvement consisted of invitations sent by the FOEN to other federal offices to contribute sectoral sub-strategies to the NAS. The cantons were consulted only once, during the drafting process for the first part of the strategy. The Swiss process is thus a clear case of horizontal coordination at the federal level. The Austrian process was stronger on vertical integration.

The process in Slovenia is remarkable, as NGOs participated to a degree that some respondents even found excessive. By contrast, Slovenian NGOs assessed the process of preparing the country's low-carbon strategy as a good practice example of the inclusion of the public in policy-development processes. The Slovenian process is also remarkable because reports from all of the workshops that were held to develop the strategy were available on the website of the Government Office of Climate Change.

In France, one interviewee who was involved in drafting the national adaptation strategy emphasised that participation was one of the central concerns of the process. A series of meetings involving stakeholders from various sectors was held and there was the aforementioned online public consultation before the final version of the strategy was compiled. Nevertheless, at local level some of the stakeholders in charge of implementing these documents feel that the process was not participatory enough.

Consensus: the online survey data reveal that the Austrian process was mostly consensus-based, as opposed to top-down. The Slovenian process was even more consensus-based, but topped by the Swiss (5 of 5 respondents gave a 5). The French process was assessed as mixed, with most respondents feeling it was rather top-down. With the exception of the French example, it might be speculated that the more participatory the process, the more diverse opinions have to be coordinated, so the less likely a consensus.

5.8.3 Professionalism

The respondents in the online survey attest to **high levels of professionalism among process leaders.** About 80% rated professionalism at between 10 and 8 on a scale of 1 (poor) to 10 (excellent). The most critical voices came from France, with a mean of 7 and votes ranging from 4 to 10. There was also one very critical assessment from Austria, although as a single vote it seems to be something of an anomaly. From the interview questions, it became clear that understandings or definitions of professionalism vary considerably. The majority of respondents associate professionalism with a **clear schedule, defined and achievable objectives, good moderation, clear tasks and responsibilities, a well-structured procedure and a good evidence base.** These criteria can be taken as characteristics of good project management. That said, "consensus", "stakeholder involvement" and "bilateral communication" also featured among the attributes used to describe professionalism.

It became obvious from the interviews that **different understandings of professionalism** nonetheless caused tension in some cases. The coordinating or lead institution is particularly challenged where some prefer a clearly structured approach based on a solid foundation of knowledge, and others expect involvement and openness to different viewpoints and are conscious of uncertainty. The latter is particularly important, because the field of CCA is sown with the unknown. Uncertainty, compounded by competing understandings of professionalism, has given rise to power struggles and opportunities for resistance to CCA policy-making.

In Switzerland, for example, tensions and power struggles between one involved sector (a federal office) and the coordinating office to some extent took the form of a debate about professionalism. Overall, there is a risk that offices or sectors with much to lose (where fundamental paradigms are contested in the debate about adaptation, for example) choose to gain ground or room for manoeuvre by questioning or contesting the coordinating or lead institutions' credibility and professionalism.

A small number of interviewees emphasised some connection with politics, or at least some **knowledge about political (adoption) processes, as one important aspect of professionalism** on the part of the coordinating organisation.

We conclude that a **process should be well-organised and based on well-synthesised knowledge** that includes the available stakeholder-based information as well as the preferences and values of stakeholders to a reasonable degree. We also suggest that policy-drafting processes provide some defined – but not excessive – scope for suggestion and debate. Displaying leadership capability might be an asset in helping to motivate participants of a policy process who are more accustomed to top-down policy processes.

5.8.4 Transparency

In comparison with the assessments of effectiveness, science-basis, and professionalism, **processes were ranked highest in terms of their transparency.** It also appears that **most process participants trusted the process owners**. Responses to the questions about openness revealed even more clearly how positively the respondents – on average – assessed the practice of policy-drafting as carried out by the process owners. One important characteristic seems to have been that participants could trace why and how decisions were made. **Transparency and openness are created**, for example, when preliminary reports are published and opinions about these reports are consulted and later woven into final report versions. Slovenia and Austria seem to have done a particularly good job in this regard.

5.8.5 Trade-offs and positive feedback loops with normative performance criteria

We found evidence of **trade-offs between the level or intensity of participation on the one hand, and efficiency on the other** (Austrian interviewee comments). Obviously, **participatory and inclusive processes take longer and involve more effort than developing policy documents in expert circles**. However, as mentioned in the introduction, policy documents and other tangible outcomes are only one form of policy process outputs. **Other important impacts are awareness-raising effects and commitment-building**, which are thought to favour implementation. These effects take time to emerge and are thus created to a lesser degree, if at all, by the fast processes which some label efficient.

Processes with participants that are already familiar with CCA issues, or with experts, will naturally **produce faster results**. Processes with stakeholders who are unfamiliar with this topic will take longer, as knowledge of the topic must be nurtured until a change in awareness can be triggered and decisions can be made.

We also noted a **positive feedback loop between participation and the level of sectoral integration.** Processes that involved parties from more sectors integrated different topics to a greater degree, and those that involved bodies from different administrative levels were able to integrate concerns from these different levels.

From the processes that the authors investigated more closely, we derive that **there are links between investments in time and effort, and outcomes**. For example, those responsible for the Austrian process decided to pay considerable attention to vertical integration between the bodies involved in the drafting process of the CCA strategy document. By contrast, the Swiss policy-makers focused much more on horizontal integration. The results of the two processes show that you get what you invest in. When the interviews were conducted (summer and autumn 2012), statements indicated that horizontal coordination at the federal level was well advanced in Switzerland. Attention subsequently shifted to how the cantons and municipalities could be motivated to act in the sense of the CCA strategy and the action plan. In

Austria, by contrast, some of the federal states (Steiermark (Styria), Tyrol, Lower Austria, Upper Austria) have played a pioneering role in the Alpine space, initiating regional CCA strategy-building processes either as early as the NAS development process, or following the adoption of the NAS. Often, policy development has been preceded or accompanied by project-based activities on the ground.

5.8.6 Initial lessons learned from the performance assessment

Overall we want to emphasise that **balancing and coordinating interests**, which also includes reconciliation, is one of the most important tasks for those who want to advance CCA policy-making and the implementation of CCA measures. **Conflicts are a reoccurring topic in countries both with and without a CCA strategy.** Only when these can be addressed in a competent way that satisfies all of the parties concerned to some degree can a policy document be agreed that will later also be approved by decision-makers (politicians/ government) and accepted by those tasked with implementation. This process of coordinating and balancing interests is **time-consuming**. It requires both a knowledge of the sectoral specificities (e.g. transportation, forestry, biodiversity, water or agriculture), and an adequate institutional framework for cooperation. It also requires debate moderation skills.

We found evidence of the two main policy-drafting process outcomes we referred to in the introduction. First, the policy process usually results in a draft or final policy document, and this *substantial outcome* is, indeed, its main official purpose. Second, and probably more importantly, the actual process brings about a shift in understanding or mental models about climate change and CCA in the individuals involved, which in turn results in impacts on society and in changes in awareness and knowledge.

6 Results II – The science-policy interface

We would like to draw the reader's attention to the multi-dimensionality of the ways in which science and policy interact. This is expressed with the term science-policy *chain*. The main challenges we identified in this chain, or perhaps network, are unsatisfactory communication, or a lack of communication at all. As mentioned above, the main challenge faced by those involved in the science-policy network is the huge complexity of CCA, as a field that potentially affects a broad spectrum of human activities.

6.1 Science as leverage in the policy process

The most common perception among the interviewees was that **the role of science is to provide basic knowledge of changes in climate**, such as precipitation and temperatures. The initial disappointments also became clear here. Often, interviewees highlighted the lack of and need for more regional (fine-scale) climate projections.

Interestingly, interviewees from Austria, France, Germany, Italy, Italy-South Tyrol, Italy-Veneto Region, and Liechtenstein said that, in their view, science has – or had – a **leading, active or icebreaker role** in CCA policy-making. However, it is worth mentioning that four of the 13 interviewees who attributed such a role to science work for a research organisation, and some of the others work as scientific officers in public administration or at consultancy firms. As such, they themselves represent science to some extent.

For the Austrian process, it was reported that a total of 600 university-level scientific staff and experts from non-university research institutions and the Environment Agency were engaged in developing input for the national CCA strategy.

We derived from the interviews that **scientists or scientific staff at the public-sector body in charge of CCA can play an important role when they act as translators or initiate translations** [or "digestions"] of scientific findings. In other words, they reformulate results published in scientific outlets into information that is understandable to, and addresses the concerns and interests of, government staff, the public and/or other stakeholders such as representatives of business.

Individuals who are familiar with both the scientific research field and the practical concerns of sectors such as insurance, forestry or agriculture, are key to this translation process. Some knowledge of the general workings of public administration is also helpful. Some interviewees even stated that science provided the justification for governmental and private action in the field of CCA.

Interviewees from Austria, Liechtenstein and South Tyrol suggested that the presence of local scientific organisations supports regional CCA activities, as these institutions tend to provide locally relevant scientific (policy) action-related knowledge.

The feedback was also positive on events such as symposia and working groups, as they provide opportunities for researchers and practitioners alike to acquire new information and – probably most importantly – to get to know each other. Networking in this sense is vital groundwork that permits informal consultation at a later stage. Policy-makers were not keen on the prospect of even more reports.

6.2 Knowledge gaps and the lack of knowledge impacts

In the interviews, the policy (-making) side expressed disappointment in how **often scientific knowledge was of limited use to policy-making.** This disappointment was not voiced in the online survey, however, which revealed that policy-makers found the scientific information provided for the policy-drafting process to be quite useful (see Figure 3). Also, the policy-drafting process appears to have been informed by relatively up-to-date information.

However, the survey also revealed that only about 20% of respondents thought that the scientific information that is required is also widely available. This indicates that the **available information is hardly satisfactory**. Also, it appears that comparatively little use has been made of social-science information as well as social science methods and local knowledge. Social-science information was apparently used even less than local knowledge. The issue here is not that this information was available and yet ignored, but that no social science studies were commissioned to support the drafting process. A noteworthy exception is Austria, where a special sub-report was drawn up by the Environmental Agency on the social aspects of climate change.

Meanwhile scientists, and particularly those from Italy, say that the knowledge they create does not have the impact they hope(d) for or expect(ed). Gaps in knowledge, the fact that existing scientific knowledge is not being implemented properly, and the disparity between the scientific knowledge that is available and that is required for policy-making and policy implementation points to breaks or barriers in the science-policy chain as a key issue.

6.3 Barriers

Despite progress on science-policy interaction at the national and, in some countries, also at the regional level, **communication problems are still the main barrier** between those working for research institutions and those employed in public administration. As in all cases of miscommunication, both sides contribute to the problem. And, as is usually the case when communication challenges or miscommunications occur, each side tends to blame the other. There are notable exceptions, of course.

Policy-makers and practitioners find science and scientists unhelpful in a wide range of respects. For example, very critical interviewees voiced their perception that the scientific information they had received from the scientific organisation they had commissioned, was “completely useless” in the strategy preparation process. Less harsh criticism revealed that **policy-makers thought that scientists use too much jargon**, that **they lack a practical perspective** in their work and/or their ability to communicate their results or highlight their practical relevance is rather limited. **Some interviewees even suspected that scientists are uninterested in the needs of policy-makers and practitioners**. Other respondents perceived at least some scientists as high-handed. The suspicion was raised that some scientists are corrupt, i.e. they produce findings that please those who pay for the research.

A **lack of high-resolution (localised) analyses and forecasts** was a relatively frequent complaint, especially where vulnerability assessments and climate change projections are concerned. Policy-makers and practitioners also showed little sympathy for the disciplinary structure of science. On a refreshingly self-critical note, one interviewee from a government background nonetheless pointed out that it was the responsibility of public administration to communicate better with scientists and to make a greater effort to formulate aims and tasks for research projects more clearly.

Some of the scientists who were interviewed also pointed out what they saw as **weakness on the policy-making side**. One said she thought that **policy-makers could not manage their knowledge needs** well. In her view, they do not know what they should or need to know – and even less so when it comes to what they should be knowing in three years' time. Another scientist complained that decision-making at the political level was driven by gut feelings (rather than hard facts), as well as political calculation. They voiced their impression that decision-making within governmental institutions sometimes lacked a basis in evidence. Another interviewee criticised that **political decision-making tends to prioritise power (considerations) over evidence**.

Overall, the interviews clearly highlight the fact that those who represent knowledge-generation, and those who need information for CCA policy-making and drafting and policy implementation, **speak different languages**. One side is not getting the information it had hoped for, and the other is failing to get its message across. Those involved in the science-policy chain are sometimes unable to express what information (or type of information) they would like to have, whereas the other side is unable independently to understand the information needs of practitioners.

The parties have thus rarely been able to communicate in a way that would result in defined projects, topics or issues that fulfil the two basic information (-generation) conditions: producing the knowledge must be feasible, and it must be useful and applicable. Despite this fact, policy-makers still commission studies from researchers. We found indications that **reaching a level of mutual understanding that allows the generation of useful knowledge can be quite a laborious process,** and that informal contact between knowledge-generators and knowledge-consumers is usually helpful.

The main reason that interviewees gave for unsatisfactory interaction between scientists and those in need of knowledge (practitioners, policy-makers) is **a lack of effort to foster contact** between the parties. For Italy in particular, but also for Austria and Switzerland, interviewees lamented **scarce opportunities for contact between scientists and policy-makers** and policy-implementer. There is also evidence that scientists have very little contact with *regional and local practitioners*.

The **ways in which specific public spheres work**, such as the rules that apply at different levels of government, or those prevailing within academia, pose a challenge to both sides. Within these spheres, there are a variety of internal hierarchies, incentives and currencies which are irritating to those who are not involved in them. They can also seem absurd from an outside perspective. This can undermine respect for others, notably when they behave in an unexpected way, e.g. when scientists do not deliver the kind of results the public administration employees had hoped for.

Communication challenges mean that the **information needs of policy-makers and implementers remain unfulfilled**. There is a demand, for example, for higher-resolution climate models, but also local information about impacts and vulnerabilities. According to several of the interviewees, long-term and large-scale scenarios are of little use at the practical and local levels. However, the smaller the scale, the more difficult it is to predict impacts and vulnerabilities. The unfulfilled need for **high-resolution (localised) analyses and forecasts** is nonetheless the result of objective limits to scientific feasibility. It is not caused by shortcomings in knowledge provision, or limited willingness on the part of scientists to address practitioners' knowledge needs. This also reveals the **limited understanding practitioners have of scientific inquiry**.

Furthermore, policy-makers would welcome proposals for win-win situations between different sectors, based on integrative studies. The strength of science, however, lies more in sectoral analyses. **There is a need for individuals and/or institutions that have the capacity to integrate knowledge.** For politicians, short summaries would be as much help as studies about the different types of cost associated with climate change and CCA, such as those of damage, adaptation, and inaction. Last, but not least, non-scientists and

scientists alike wished for more efficient communication by scientists. They saw a clear responsibility on the side of science to communicate, explain and transfer its findings to the broader public, and to translate those findings into a format that can be applied in practice by those implementing action plans.

One practitioner also suggested that researchers should attach much greater value to access to practitioners' information needs than is currently the case. He further advocated partnership between practitioners or policy-makers and researchers, and that government funding should be set aside for such collaborative projects. These resources should allow public-sector staff to invest the necessary time in this work.

6.4 Potentials and options for improving the science-policy chain

The deficits discussed above give rise to the question: **how can** interaction and communication between the parties in the science-policy chain be improved and, in the longer term, **the usability of scientific knowledge increased?**

A series of options was proposed by the interviewees to improve the science-policy chain and communication within it. The assumption on which these suggestions rest is the that **scientists and politicians must talk and listen to each other**, to learn that they use different languages and that they must learn the languages the others use – at least to some extent. **A degree of knowledge of the other party's language** would likely enable policy-makers and practitioners to more clearly communicate what information they need. This interaction would also enable scientists to better understand those needs. Furthermore, this mutual understanding would help scientists to be more open about the limitations of their profession. There is obviously the hope that better mutual understanding will contribute to the **generation of more useful and targeted knowledge.** These insights and knowledge, however, are likely to be generated in the course of a longer communication process between policy-makers and information producers, and not in a single workshop.

6.4.1 Measures

Obviously, measures to permit or facilitate such interactions must be **joint events** in which the various parties must **participate actively**. It is important to include an **informal section** in these events, as it is here that **personal relationships are forged more strongly**. Organisations and projects that are located between science and policy/practice are also of enormous value, as they promise to improve the flow of information between knowledge producers and users. Additionally, new organisations have been set up with the specific task of **brokering information** between information producers and those who need that information. These organisations, such as the Competence Centre on Climate Change, require less engagement by scientists and representatives of public administration, because their own staff are responsible for translation or brokerage activities.

Another interviewee proposed **greater involvement in research projects on the part of policy-makers and government,** or **joint projects** that combine research with the compilation of existing information. He suggested that projects in which administrations function as partners promise closer interaction than projects in which government staff are only consulted in interviews. The same interviewee pointed out that a great deal of contract research is being commissioned at the moment. Here, the public administration assigns the task of knowledge generation to an external institution, a research institute, university or private consultancy firm. The interviewee nonetheless advocated joint projects. This raises the suspicion

that governments are not satisfied with the results of the research projects they have commissioned, at least some of the time. In this context, it is worth mentioning that the same interviewee emphasised that **public administration needs to learn to formulate clear assignments or tasks**. As mentioned above in the context of the ability to manage information needs, one of the **challenges seems to be to know what you need to know.** Subject to the limited knowledge-generation options, you will then have a sufficient basis on which to make meaningful and reasonable decisions.

Overall, interviewees called for **transdisciplinary** research (with or without using this particular term). They sometimes also used the term "interdisciplinary research" when referring to projects in which practitioners were involved. If joint projects are not possible, interviewees called for **early-stage interaction between scientists and policy-makers/implementers**, at least, in order to foster the generation of useful knowledge. All in all, policy-makers and practitioners believe that **scientists must learn to think at as early a stage as possible about the practical applicability of their research projects**. According to policy-makers, scientists should thus be asking themselves these questions: "in what sense could what I do here be of any practical use?", and: "who, working in the 'real world', might be interested in what I am doing here?".

Another proposal was to provide funding only to projects and institutions that generate useful science. This, however, would require individuals with the ability to judge what useful information is, and whether and how it can be produced/acquired.

In any case, we can conclude that **bridging the communication gap between scientific knowledge production, and administration and policy needs**, is a huge challenge in the diverse, complex, cross-sectoral and unpredictable field of CCA, which is also characterised by high stakes for the individuals who are affected. Institutions were proposed as a **starting point for closer communication, knowledge brokerage, bridge-building and knowledge-transfer**. The good reason for such proposals is that neither research institutions nor government are structured in a way that is clear to an outsider. Thus, it is difficult to identify the right person within the other organisation. Brokering offices either within existing institutions, or as separate institutions, can channel requests to the appropriate office or person. Broker institutions that are not part of an existing organisation can direct individuals or bodies to the appropriate department or individual within other institutions. Such an office or organisation might also be tasked with synthesising available information into a form that is useful for potential "customers", and be in charge of distributing this information.

Last but not least, one interviewee proposed a **new culture between policy and science**. She pointed out that **trust was lacking** on both sides, and that it must be built up to motivate scientists to be agents of knowledge who also reflect critically upon their own methods and approaches. In her view, science tended too much to apply old methods to new problems. Looking ahead, she first expressed the wish that science be more engaged in communicating knowledge and conveying scientific findings in the form of a dialogue. Second, she elaborated on her expectations of the content of scientific research. Here, again, she criticised the **inward-looking nature of science**, and expressed her desire **for more transdisciplinary work**. In political decisions, she hoped that evidence and knowledge would begin to outweigh questions of power and authority.

6.4.2 Potentials

One way in which science and other knowledge producers can potentially improve the science-policy chain is to downscale information to the local level. Some of our interviewees found that regions with regional universities or research institutions have an advantage here, as these institutions are more easily motivated to engage in local issues.

Interviewees gave the following responses when asked who future knowledge producers will be, and where they can be found:

- universities of applied science (*Fachhochschulen*)
- consultancy firms
- experts/scientific officers at (semi-)public environment agencies (institutions which are subordinate to ministries or which advise the government)
- contact or brokerage/transfer/moderating bodies such as the Climate Service Centre Germany
- universities.

Universities and other public research institutes probably have the most to learn about generating knowledge that will satisfy the information needs of practitioners, as they tend to produce highly generalised information. Researchers employed by these institutions also tend to have more difficulty communicating with practitioners in a way that would be understood by non-scientists. These researchers are also not accustomed to translating their findings so that they are of practical use to those who would like to use them as a basis for action.

We suggest that (more) joint programmes are set up to generate useful knowledge for implementation or strategy development. In many cases, this knowledge-generation might consist mainly of compiling and synthesising existing information and conducting pilot implementation projects. This might also provide opportunities for conducting cutting-edge science, possibly in social science fields. Programmes designed for developing countries might also offer examples of how to combine research with its practical application. Canada and Switzerland, for example, have programmes that finance combined development and research projects. The resources for this programme in Switzerland – known as r4d (research for development) and launched in 2012 – come from development as well as research ministries.

6.4.3 Institutional dimension of the science-policy interface

"Additional funding for research" was mentioned above as one of the impacts of CCA policy-making. Given that one of the main impacts of government activities in the field of CCA is actually via new funding opportunities for scientific research, we would like briefly to address this issue. Funding opportunities were reported mainly for Austria. One example is the Climate and Energy Fund[16], which supports mitigation as well as adaptation research activities. Also powered by the same fund, the Austrian Climate Research Programme (ACRP) has recently been established, which can be viewed as one of the impacts of the national CCA strategy process. Recent calls for proposals within the ACRP have increasingly been targeted at generating scientific knowledge in support of NAS implementation.

Scientific activity has also motivated and enabled CCA policy-making, however. Austrian scientists founded a platform for researchers working on climate topics (*AustroClim*)[17] as long ago as 2002. This platform played an important part in delivering expert studies and scientific input to the NAS policy-making process.

The StartClim climate research programme, financed by a range of government offices and the private sector (ministries, the Austrian national bank, and an insurance company), began as long ago as 2002, but

[16] http://www.klimafonds.gv.at/ueber-uns/aufgaben-and-ziele/).
[17] AustroClim was replaced by the Climate Change Centre Austria (CCCA) in 2011.

with a focus on mitigation. Increasing attention has been paid to climate change adaptation only since 2008. The impact of creating research platforms, subsequent funding schemes, and the influence of the funded research on policy-making demonstrates an alignment between research policy and adaptation policy, and that knowledge-generation and policy formulation in the CCA policy field are to some extent mutually reinforcing.

In France, the ONERC (national climate change impacts observatory) was created in 2001 to collect and disseminate information and research about climate change, with a view to making recommendations for adaptation and prevention measures. The GICC (Management and Impacts of Climate Change programme) was created in 1999 with the aim of developing knowledge in support of public policies, by considering climate change in terms of impacts, adaptation measures, and mitigation of the effects of greenhouse gases.

7 Results III – Good practice examples

As explained in Section 3, based on criteria for good climate adaptation governance we propose six categories of good practice, and provide some examples below:

A) Clear mandate and regulatory framework,

B) Governance arrangements for horizontal and/or vertical coordination,

C) Stakeholder involvement,

D) Knowledge brokerage and scientific advisory institutions,

E) Web-based knowledge platforms (clearing houses) and other decision-support facilities,

F) Research programmes.

The compilation of good practices below represents an indicative and by no means exhaustive list of examples. They have been identified from the empirical data gathered and analysed within the C3-Alps project for this report. Additional information has been drawn from a series of transnational exchange meetings of policy-makers from Alpine and other countries in the frame of the project as well as from a review of recent literature (including Mullan et al. 2013, Bauer et al. 2012, Bauer and Steurer 2012, and EEA 2013). The compilation includes selected examples from countries beyond the Alpine Space.

A) Clear mandate and regulatory framework

Good practice	Country
Mandate to coordinate adaptation activities at the federal level (August 2009), laid down in the revision of the Swiss Federal CO2 Act, Article 8, which entered into force on 1 January 2013.	CH
Amendment of the Swiss federal CO_2 act (in force since January 1, 2013): pursuant to Article 8, the federal government has been assigned the mandate to coordinate adaptation activities and to ensure that basic information needed for adaptation is made available to; the operational coordination responsibility is exercised by the Swiss Federal Office for the Environment (FOEN).	CH
The **Grenelle Law**, adopted in 2009, regulates that the French Government had to release a national adaptation strategy in 2011.	F
In 2005, the German government committed itself in the **German Climate Protection Programme** to develop a concept for a German strategy for adaptation to climate change pursuant to Article 4 of the UNFCCC.	D

Good practice	Country
The UK government adopted a binding **"Climate Change Act"** in 2008, which stipulates that a National Adaptation Programme has to be set up, climate change risk assessments have to be renewed at least every five years, and an Adaptation Sub-Committee has to be established to act as a scientific advisory body to governmental authorities.	UK
The **Delta Act** established a legal basis for adaptation in water management in the Netherlands in 2011.	NL
Development of a national adaptation strategy in Austria, including involvement of all relevant stakeholders, was defined as a goal in the **Austrian government program** for the current legislation period (2008-2013).	A

B) Governance arrangements for horizontal and/or vertical coordination

Good practice	Country
Establishment of a **new "Climate Reporting and Adaptation"** section in the department "Climate" in the Swiss Federal Office for the Environment (FOEN).	CH
Establishment of a **working group "Adaptation to Climate Change"** under the Interdepartmental Panel Climate (IDA Klima) to coordinate adaptation policy-making between all Federal Offices on federal level, based on a mandate by the Federal Council.	CH
Stipulation by the revised CO_2 act to set up an **institutionalized panel to coordinate implementation of the Swiss NAS** and Action Plan between the Federation, the Cantons and the municipalities (installation to be prepared until 2015).	CH
Creation of the **Inter-ministerial Working Group "Adaptation Strategy"** to draft the national action plan and to coordinate on horizontal level, mandated by the Federal Cabinet	D
Installation of a **Permanent Committee on "Adaptation to Climate Change Impacts"** by the Conference of German Environment Ministers of the Federation and the Länder to coordinate vertical implementation of the German NAS.	D
Making use of **existing governance structures** for coordinating strategy development, in particular the Conference of Municipality Mayors, in Liechtenstein.	FL
Inter-ministerial working group on adaptation to coordinate drafting of the sectorial adaptation strategy for the agriculture and forestry sectors in Slovenia.	SLO

Good practice	Country
Fulfilment of important informal vertical and horizontal coordination functions by the **national stakeholder participation process** during strategy development in Austria; informal involvement of existing coordination bodies (Kyoto Forum of the Länder and the Federation, Inter-ministerial WG on Climate Change) that have expanded their previous functions.	A
On-going installation of **inter-departmental working groups** for cross-sector coordination on provincial administration level in Austria.	A
Domestic Adaptation Board (DAB) for horizontal coordination of the National Adaptation Programme in the UK on government level.	UK
Local Adaptation Advisory Panel (formerly: Local and regional adaptation partnership board) as an institutionalized vertical coordination body in the UK.	UK
Mainstreaming of adaptation by means of a requirement for all UK government departments to produce **Departmental Adaptation Plans (DAPs)**, with 16 DAPs having been published in 2010.	UK
Regional Climate Change Partnerships (RCCP) as a voluntary network and partnership approach to facilitate vertical coordination in the UK.	UK
Regional Adaptation Collaboratives (RACs) for knowledge sharing and vertical coordination on sub-national level in Canada.	CA
Joint organisation of **Regional Conferences** by the Länder and the Federal Government in Germany in order to facilitate knowledge sharing and coordination, including with non-state actors.	D
Regional market places (pilot phase) to promote project-related adaptation partnerships between state and non-state actors on sub-national levels in Germany.	D

C) Stakeholder involvement

Good practice	Country
Participation in the development of a national adaptation strategy in Austria: There has been a breadth and depth of involvement as local authorities, federal states, federal government offices and NGOs were not only consulted, but also participated in drafting parts of the policy document. Participation included federal ministries and offices, federal states, interest groups representing cities and municipalities, NGOs, large business companies, service providers and insurance companies, via "informal workshops", series of sectorial stakeholder workshops, written consultation rounds, and an online consultation of the public. The intensity level of participation went considerably beyond consultation, because stakeholders were actively involved in the policy drafting process.	A
Participation in the development of the "Strategy for the transition of Slovenia to a low-carbon society by 2050": all the reports from workshops that were held to develop the strategy were made available on the website of the Government Office of Climate Change. NGOs participated in strategy development.	SLO
Stakeholder conferences have been conducted in Germany since 2009 as part of a stakeholder dialogue process accompanying the **development** of the German adaptation Strategy. The stakeholder dialogues pursue the aim of contributing to knowledge exchange and networking of actors and to exploring adaptation issues in greater depth. For development of the national action plan, an **online consultation of the public** has been conducted in March 2011.	D
Besides serving coordination purposes, **regional conferences** organised jointly by the Länder and the federal government as well as **regional market places** aim at bringing state and non-state stakeholders together on the ground in order to support **implementation** of the NAS in partnership approaches.	D
Participation in the development of the national adaptation action plan in France: as in Slovenia, all documents were published on a website, and in France an online survey of 3,500 respondents was also conducted to gauge public opinion.	F
Stakeholder involvement in the **development** of the Dutch NAS. Regional impulse meetings with local authorities and non-state stakeholders as well as joint fact finding within the Delta Programme have been conducted early in the policy formulation phase. Stakeholders are also involved in the **implementation** of national adaptation policy via **Advisory Boards** that have been installed for Delta sub-programmes.	NL

Good practice	Country
In the UK, non-state stakeholders are involved in **institutionalized coordination bodies**, such as the **ACC (Adapting to Climate Change) Partnership Board**, alongside local, regional, and national administrators. A network of nine R**egional Climate Change Partnerships (RCCP)**, constituted as a not-for-profit Community Interest Company, in the English regions and the three devolved administrations of Northern Ireland, Scotland and Wales joins administrators and various non-state stakeholders; the RCCP aims at knowledge sharing and coordinating local action.	UK
Six **Regional Adaptation Collaboratives (RACs)** have been established in Canada to support coordinated action towards advancing regional climate change adaptation decision-making. The RACs Program is a collaboration between the federal government and provinces and territories, and engages local governments, communities, industry, business, academia, and Aboriginal and non-governmental organizations.	CA

D) Knowledge brokerage and scientific advisory institutions

Good practice	Country
UKCIP United Kingdom Climate Impacts Programme: Established in 1997 by the UK government, UKCIP is a "boundary organization" intended to create stronger links between the research and policy making communities. Its mission is to support adaptation to the unavoidable impacts of a changing climate, to work at the boundary between scientific research, policy making and adaptation practice, bringing together the organizations and people responsible for addressing the challenges climate change will bring. UKCIP coordinates and influences research into adaption to climate change and shares the outputs in ways that are useful to stakeholders. UKCIP is involved in most coordination bodies and processes in the UK, including the local and regional adaptation board. Since it began, UKCIP has been based at the Environmental Change Institute at the University of Oxford. Website: www.ukcip.org.uk/	UK
ASC Adaptation Sub-Committee: The ASC of the Climate Change Committee (CCC) was established under the Climate Change Act 2008. Joining scientists and other experts, the Sub-Committee provides advice on the climate change risk assessment and monitors and assesses the progress of UK adaptation policies. Website: www.theccc.org.uk	UK

Good practice	Country
ONERC Observatoire National sur les Effets du Réchauffement Climatique: the French national climate change impact observatory was created by law on 19 February 2001. Its activities cover mainland France, as well as its overseas départments and territories. Its primary role is to collect and disseminate information, to undertake studies and research on risks associated with climate change and extreme climate events, and to make recommendations on potential prevention and adaptation measures to limit these. Website: www.developpement-durable.gouv.fr/-Impacts-et-adaptation-ONERC-.html	F
KomPass Kompetenzzentrum Klimafolgen und Anpassung: The Competence Center for Climate Impacts and Adaptation has been newly established in the Federal Office for the Environment. It acts as a central guide and contact for adaptation activities in Germany and serves as an interface between climate impacts research, society and politics. KomPass identifies vulnerable sectors and regions, assesses climate impacts and indicates opportunities of climate adaptation as well as barriers to adaptation. Website: www.anpassung.net	D
CSC Climate Service Center Germany: The main tasks of the CSC, an institute within the Helmholtz-Zentrum, Geesthacht, are the following: to investigate the need within society for advice on climate-related issues, to provide a link between climate researchers and climate advisors in Germany, to integrate research data on the climate system and to prepare this for the needs of customers, to provide this information to customers via products which are sector-specific and tailored to individual needs, and to coordinate feedback from practitioners to scientists. Website: www.climate-service-center.de	D
OcCC Swiss Advisory Body on Climate Change: The Advisory Body on Climate Change (OcCC) was appointed in 1996 by the Federal Department of Home Affairs and the Federal Department of the Environment, Transport, Energy and Communication (ETEC). Its role is to produce assessments of climate impacts and vulnerabilities in Switzerland and to formulate recommendations on questions regarding climate and global change for politicians and the federal administration. The mandate to create this body was given to the Swiss Academy of Sciences, which invited approximately 30 persons from research, the private sector and the federal administration to participate in this body. The Federal Office for the Environment (FOEN) provides federal representation. Website: www.occc.ch	CH

Good practice	Country
EAA Environment Agency Austria: The Environment Agency Austria represents one example of a country where the scope of existing boundary institutions has been expanded in response to adaptation knowledge needs of policy makers, administration and practitioners. The EAA acted as a semi-public support unit for development of the Austrian NAS by preparing vulnerability assessment studies, steering the participation process, and preparing expert recommendations for adaptation options. The EAA also advises sub-national adaptation programs and supports adaptation in practice by developing tools and guidance.	A
CCCA Climate Change Center Austria: The CCCA is an alignment of many research institutions that understands its role as a coordinating facility to promote, support and conduct climate research in Austria. Founded in 2011, the CCCA replaced the former research alliance AustroClim.	A

E) Web-based knowledge platforms (clearing houses) and decision support facilities

Good practice	Country
CLIMATE-ADAPT European Climate Adaptation Platform: CLIMATE-ADAPT, the European Climate Adaptation Platform: aims to support Europe in adapting to climate change. It is an initiative of the European Commission, and helps users to access and share information on expected climate change in Europe, the current and future vulnerability of regions and sectors, national and transnational adaptation strategies, adaptation case studies and potential adaptation options, and tools that support adaptation planning. Website: climate-adapt.eea.europa.eu	EU
KomPass Kompetenzzentrum Klimafolgen und Anpassung: the competence centre for climate impacts and adaptation within the German Federal Office for the Environment is the lead agency and contact for adaptation activities in Germany. It serves as an point of contact between climate impact research, society and politics. KomPass identifies vulnerable sectors and regions, assesses climate impacts, and pinpoints opportunities for and barriers to climate adaptation. Vital tools include the so-called “Tatenbank”, a searchable database on adaptation measures implemented in particular on local and regional levels, a project database, and the so-called “Klimalotse”, a step-by-step online guideline for adapting to climate change, which addresses primarily small and medium-sized enterprises and municipalities. Website: www.anpassung.net	D

Good practice	Country
Klimaportal – Informationen zu Klimaänderung, Auswirkungen und Massnahmen: website providing information on climate change, impacts and measures. It is hosted by the ProClim Forum for Global and Climate Change, and is a Platform of the Swiss Academy of Sciences. Website: www.climate-change.ch/	CH
Klimaanpassung Schweiz*:* a clearing house for climate adaptation policy-making in Switzerland, hosted by the Federal Office for the Environment. Website: www.bafu.admin.ch/klimaanpassung/	CH
KlimaWandelAnpassung: website providing comprehensive information on climate change, impacts and vulnerabilities, adaptation policy and measures in Austria. The platform features a database on national research projects, a database about existing adaptation activities and a newsletter service. The website is operated by the Environment Agency Austria and funded by the Climate and Energy Fund. Website: www.klimawandelanpassung.at	A
UKCIP United Kingdom Climate Impacts Programme: supports adaptation to the unavoidable impacts of a changing climate; works at the boundary between scientific research, policy-making and adaptation practice, bringing together the organisations and people responsible for addressing the challenges climate change will bring. UKCIP coordinates and influences research into adapting to climate change, and shares the outputs in ways that are useful to stakeholders. It encourages organisations to use its tools and information to help them consider their climate risks, and to plan to adapt. UKCIP was established in 1997 by the UK government, when it was then known as the UK Climate Impacts Programme. Since it began, UKCIP has been based at the Environmental Change Institute at the University of Oxford. Website: www.ukcip.org.uk/	UK
weADAPT Collaborating on Climate Adaptation: an online "open space" on climate adaptation issues, including synergies with mitigation, which allows practitioners, researchers and policy-makers to access credible, high-quality information and to share experience and lessons learned. Website: weadapt.org/	global

Good practice	Country
ALM Adaptation Learning Mechanism: the United Nations Development Programme, along with other agency partners, launched the Adaptation Learning Mechanism (ALM) in 2007. UNDP is facilitating the ALM in close partnership with the UN Framework Convention on Climate Change (UNFCCC), UNEP, the World Bank and specialist UN agencies, including FAO. The ALM represents a collaborative global learning process, with leadership, facilitation and extensive participation from Southern institutions. Seeking to provide stakeholders with a common platform for sharing and learning, the ALM bridges knowledge gaps by bringing relevant knowledge and stakeholders together to exchange information, experience, and expertise. Additionally, the ALM complements the wide range of adaptation knowledge networks and initiatives already underway. Website: www.adaptationlearning.net	global

F) Research programmes

Good practice	Country
Pilot Programme Adaptation: A pilot programme to promote and support implementation of the NAS on cantonal, regional and local levels has been established and a call for projects recently launched in March 2013 in Switzerland. The pilot programme provides limited funding to cantons, regions, municipalities, research institutions, associations and enterprises, with financing being shared between the Federal Offices and the project partners. It pursues the goals to trigger and implement innovative adaptation projects and to foster cooperation among levels and actors. The themes subject to the first call for projects correspond with the priorities set by the NAS: local water scarcity, natural hazards, ecosystems and land use, urban development, knowledge transfer and governance. Website: www.bafu.admin.ch/klimaanpassung/12575/index.html?lang=de	CH
ACRP Austrian Climate Research Programme: The ACRP is powered by the federal Climate and Energy Fund and is one example of a newly established national climate research programme, as they have been set up in many other countries as well. The ACRP focuses on issues of climate change and its impacts, adaptation, mitigation, and their mutual interrelation. Recent calls for proposals are increasingly targeted at generating knowledge in support of implementation of the NAS. Guidance and adaptation tools elaborated by ACRP-funded projects, such as FAMOUS, Capital Adapt, COIN etc., are being used by administrators and stakeholders to take action on adaptation in regions and municipalities. Website: www.klimafonds.gv.at/foerderungen/aktuelle-foerderungen/2011/austrian-climate-research-program/	A

Good practice	Country
StartClim: the Austrian climate research programme was established in 2002 by the AustroClim climate research initiative. Since 2008 increasing attention has been paid to adaptation. The programme is financed by a range of governmental offices at national and provincial level as well as by the private sector. StartClim initiates and funds research by annual calls to establish the most pressing research needs. Website: www.austroclim.at/index.php?id=40	A
KLIMZUG, KlimaMORO, KlimaExWoST: A number of programme lines focusing on adaptation issues in model or pilot regions has been initiated in Germany. Most prominently, KLIMZUG is a project-based initiative funded by the Federal Ministry of Education and Research that aims at promoting innovative approaches to climate change adaptation. Starting out from concrete local requirements, innovative adaptation strategies shall be developed for German regions. A specific focus is on adequate integration of expected climatic changes in regional planning and development processes. Website: www.klimzug.de	A
CCRA Climate Change Risk Assessment: A country-wide Climate Change Risk Assessment has been published in the UK in 2012 and is to be updated every five years. It outlines key risks and opportunities arising due to climate change. The CCRA has assessed over 100 different risks across eleven sectors. The CCRA's approach provides an indication of the level of risks posed by climate change by considering both the scale of impacts and the likelihood of different impacts occurring. The assessment provides evidence to support and inform adaptation measures and policy making, both geographically and by sector, while also placing the risks from climate change in context of other social and economic pressures on society. Website: www.gov.uk/government/publications/uk-climate-change-risk-assessment-government-report	UK

8 Policy recommendations

We recommend the following to overcome barriers and obstacles when formulating CCA policy, to minimise weaknesses and reinforce strengths, and to ensure good policy performance.

8.1 Stage I – Recommendations for the pre-drafting stage

Recommendation 1: Identify key players and create a critical mass of climate-aware policy-makers

In the first stage, in which the ground is prepared so a drafting process can start, it is important to create a critical mass of individuals who are aware of CCA. In this process, the focus should be on key individuals in administration and government who can play a leading role in the later drafting stage of the policy process. Interviews as part of research or capitalisation projects can help to identify individuals who are willing to engage in CCA-related (government) activities. When identifying this critical mass, it is helpful not only to be patient with those who insist that climate change is not human-made, or just not important enough to take action, but also to be convincing and persuasive in your work. Issues to be overcome here are crowded policy agendas and competition from other problems perceived as more urgent.

Recommendation 2: Make use of existing working groups and networks

At this, and also at later stages of the process, it is helpful to make use of existing cross-sectoral or cross-level working groups, or other public administration boards. In Switzerland, for example, several interdepartmental working groups were formed to revise the CO_2 Act. One of these groups deals with CCA, the others with mitigation, emissions trading, etc. This group, headed by the FOEN, was and still is the platform for coordinating the NAS.

8.2 Stage II – Recommendations for the drafting process

Recommendation 3: Identify the CCA issues you want to deal with

In the second stage, the policy-drafting process, the structure of the working group that drafts the policy document is particularly important. If the strategy is to be more than a compilation of measures and instruments that are already in use, it is an asset to have a cross-sectoral working group that has some common understanding of specific regional CCA issues, yet offer scope for factoring in sector-specific necessities.

Recommendation 4: Obtain a political mandate to draft a policy document

It is essential for the agency coordinating the drafting of a CCA strategy to hold a political mandate if it is to motivate other individuals and bodies from inside and outside the administration to contribute to the drafting process. The political support and legitimacy a mandate provides to the process can be decisive. Thus, the coordinating agency should try to gain considerable political support at higher levels, such as the ministerial.

Recommendation 5: Agree upon a common understanding of CCA to engage stakeholders

The facts and events that motivate the development of a CCA strategy should be clearly formulated and serve as common ground for the core group in charge of development. An agreement should be reached early on in the process on the common principles of CCA. This background and these principles can help to communicate the topics are CCA policy-making clearly to potential stakeholders. It can also support stakeholder involvement, increase awareness of climate change and options for and principles of adaptation. A shared understanding of CCA-related issues and ways of engaging with the topic before action is requested will also help the subsequent implementation of adaptation measures.

Recommendation 6: Place CCA policy work on a solid foundation of evidence

For the drafting process, it is important to gather sufficient scientific evidence that has a good level of regional detail. In addition to climate projections, basic information on impacts and vulnerabilities – and their regional and seasonal distributions – is helpful. As the topic of climate change is associated with great uncertainty, and information is scarce for some of the regions mentioned above, working with "big change" and "small change" scenarios has been a useful approach in a number of processes. This involves developing the CCA strategy and subsequent measures on the assumption that there may be either big or small changes, in terms of mean and extreme temperatures, and mean and extreme precipitation, for example. Focus on win-win measures and on no or low-regret measures that are flexible, robust and beneficial under big and small change scenarios alike for plausible climatic pathways.

Recommendation 7: Ensure professional project management

It is also important that the coordinating or lead partner develops a structured, organised and well-planned project and the related process design, and communicates it to the partners that are involved in drafting the policy document. Ideally, there should be consent about the process design and process rules. As part of the set-up stage, a time schedule, decision-making rules, expected levels of involvement, communication and interaction rules should be agreed upon and communicated. This process concept should also contain information about what topics will be dealt with, and what milestones are planned. In the drafting process, it is important to inform participants about the achievement of these milestones. The coordinating office may also be responsible for coordinating or consulting with the relevant political players or leading ministry staff. Professional project management also implies that the coordinating agency communicates as clearly as possible what inputs it expects from contributing partners, and what form these inputs should take.

Recommendation 8: Invite stakeholders to participate, organise consultations

Milestones should be discussed not only within the core group that drafts the policy document, but also with stakeholders beyond this circle. For example, it is advisable to consult or actually include other or lower political levels (such as the German/Austrian federal states and the Swiss cantons, as well as local authorities), the private sector, the scientific community, NGOs or even the general public. Of course, consultation processes bear the risk of considerable extra work when feedback has to be responded to or possible changes to the draft have to be discussed and decided about in the core group. Consultation processes and other forms of participation are naturally also time-consuming, but stakeholder inclusion offers considerable benefits, such as the incorporation of additional (practical) knowledge that can increase the quality of the policy document. The core working group also gains a broad insight into the values and needs of stakeholders. Furthermore, the policy document will have a higher profile if it is discussed before its official publication. Individuals and groups will be able to identify with its content, and will thus be more willing to implement the measures that the document proposes.

Recommendation 9: Organise workshops to discuss issues directly

Workshops are a particular fruitful way of holding consultations and including the opinions and suggestions of groups and individuals that are not part of the core group drafting the policy document. The number of topics that can be covered in a one-day workshop is sometimes overestimated, however. Facilitators who have experience with similar tasks and are able to assess the content that can be covered in a workshop should therefore be included.

Recommendation 10: If you involve stakeholders, do it well

Good governance criteria imply that it is advisable to involve stakeholders and other knowledge-bearers in the policy-drafting process. This involvement requires professional process management that strives to achieve high-quality input. We suggest that only participatory processes that pay serious attention to good governance criteria will perform well and be capable of delivering the aforementioned functions and benefits, such as the inclusion of stakeholder values and knowledge, and a motivating effect on implementation. Badly led, or merely *pro forma* involvement processes can, by contrast, severely damage credibility and acceptance, and thus themselves be a factor hindering policy performance.

8.3 Stage III – Recommendations for action plan development

Recommendation 10: Be sure to select adaptation measures that extend beyond sectoral interests

In the third stage, when the policy document is approved and an action plan under development, a balancing act is needed that ensures coordination between sectoral interests and respect for sectoral necessities and expertise. It can be difficult for the coordinating or lead organisation to assess which of the measures proposed by the sectors or regions actually represent CCA adaptation measures, and which are measures that suit sectoral interests, disguised as adaptation measures. This may be a hazard in particular where the strategic and action plan parts of a strategy are developed in separate steps. Collaboration with external advisors or research organisations might be helpful at this point, to develop a scheme or tool that supports the assessment of proposed actions and measures.

Recommendation 11: Tie your CCA activities to international CCA activities

Furthermore, tying a national or regional drafting or implementation process to international activities can promote an administration's own endeavours by connecting them to something with broader relevance and recognition. One example here is Slovenia, where awareness about the sectoral strategy for the adaptation of agriculture and forestry was raised by organising a debate about it at an event parallel to a meeting of the committee for agriculture and agro-meteorology of the World Meteorological Organization.

8.4 Stage IV – Recommendations for implementation

Recommendation 12: Those drafting an adaptation strategy should also implement it

The main challenge in implementation – and thus the fourth stage of adaptation policy from the perspective of those who drafted the strategy – is to motivate others to act in the spirit of the CCA policy document. For this stage, it is helpful if the implementers have already participated in the development of the policy document (stage II). The stronger the involvement, i.e. where implementers were not only

consulted, but have actually participated in the drafting process, the higher the apparent motivation to implement proposed measures.

Recommendation 13: Develop regional strategies to prepare specific local CCA activities

The challenge faced by national adaptation strategies is that public investment and spending (e.g. on infrastructure) are mostly handled by lower levels of government. Thus, a national framework might help to push CCA issues or raise awareness, but public investment needs to be redirected at lower levels, such as the regional, departmental and local. The most effective CCA measures are therefore developed at this level. We suggest that regional or federal state/cantonal strategies can function as bridge between the rather abstract national level, and the specific local implementation level.

Recommendation 14: CCA is a new policy field – make use of the opportunities

At all stages, it is crucial for those in charge of CCA to motivate, deal constructively with potentially frustrating events, and to maintain momentum even when the steps are small. It is important to be persistent and convinced of what you are doing, even though it might be sometimes be difficult. What we have not emphasised enough so far in this report is that CCA is an interesting and new field of policy-making that affords public-sector staff and others considerable scope for creativity. Other political fields are already defined, and not much can be designed from scratch. Thus, the potential for frustration is outweighed by the opportunities the field offers to create something new.

8.5 Recommendations for improving the science-policy chain

Recommendation 15: Organise events where scientists meet and exchange with policy-makers

Joint events attended by government staff and researchers should be organised to create a space in which communication between these parties can be encouraged and improved. Based on the interview responses, we would suggest that non-scientists, in particular, appreciate opportunities for informal exchange between participants at such events. These meetings make it possible to get to know each other and to develop relationships of trust that enable all sides to ask questions they would otherwise fear would reveal gaps in their own knowledge. Such communication can be very valuable in learning each others' way of thinking, in finding common ground, and in identifying questions from those who need information, so that knowledge-producers can respond.

Recommendation 16: Collaborate on common projects with scientists

Practitioners suggested that researchers should value getting access to the information needs of practitioners far more than they currently do. One measure which would express appreciation for the practitioners' knowledge would be to set up projects in which practitioners, policy-makers and researchers are partners. It is important to such projects that the administration is allocated resources for participating in such projects. Currently, the lack of such resources presents a hindering factor. Common projects are also a good opportunity to build a shared understanding of key CCA-related concepts and identifying knowledge needs to which researchers can respond. Members of such projects can also function as a liaison between higher and lower levels of CCA governance – something which is often absent in practice.

Recommendation 17: Involve local universities

Evidence of the value of having local universities involved in producing knowledge to underpin the development of CCA measures for their own region leads us to recommend that these local universities be supported in their efforts to produce knowledge of a high local value. While national funding for research institutions tends to emphasise the international standing of those organisations, which generally take a more global and abstract perspective, regional research organisations can employ individuals who are more interested in local concerns, and the conditions faced by people in particular areas.

Recommendation 18: Establish knowledge-brokerage and transfer organisations

Communication between research and decision-makers (policy-makers, government experts) needs to be facilitated by an adequate institutional environment. This may require the founding of new "boundary institutions", or the expansion of the traditional roles of existing institutions. The functions to be fulfilled by knowledge brokerage institutions, working at the point where research, policy-making, public administration and practice meet, may involve the preparation of existing knowledge in forms usable to decision-makers, acting as a platform for matching knowledge production more effectively with user needs, transferring and disseminating available knowledge to implementers, and increasing their capacity actually to act upon such knowledge.

9 References

Bauer, A., Feichtinger, J., Steurer, R. (2012): The Governance of Climate Change Adaptation in 10 OECD Countries: Challenges and Approaches. Journal of Environmental Policy & Planning, 14(3): 279-304.

Bauer, A., Steurer, R., (2012): Multi-level Governance through Regional Adaptation Partnerships. Paper prepared for the Symposium 'The Governance of Adaptation', Amsterdam, the Netherlands, March 22-23, 2012.

Biesbroek, G.R., Swart, R.J., Carter, T.R., Cowan, C., Henrichs, T., Mela, H., Morecroft, M.D., Rey, D. (2010): Europe adapts to climate change: Comparing National Adaptation Strategies. Global Environmental Change, 20: 440-450.

Bruneniece, I., Klavins, M. (2013): Normative Principles for Adaptation to Climate Change Policy Design and Governance. In: Knieling, J., Filho, W.L. (eds.): Climate Change Governance. Berlin, Heidelberg. 41-65.

Cimato, F., Mullan, M. (2010): Adapting to Climate Change: Analysing the Role of Government. Defra Evidence and Analysis Series, Paper 1.

Debels, P., Szlafsztein, C., Aldunce, P., Neri, C., Carvajal, Y., Quintero-Angel, M., Celis, A., Bezanilla, A., Martinez, D. (2009): IUPA: a tool for the evaluation of the general usefulness of practices for adaptation to climate change and variability. Natural Hazards, 50: 211–233.

Doria, M.F., Boyd, E., Tompkins, E.L., Adger, W.N. (2009): Using expert elicitation to define successful adaptation to climate change. Environmental Science and Policy, 12: 810-819.

EEA European Environment Agency (2013): Adaptation in Europe: Addressing risks and opportunities from climate change in the context of socio-economic developments. EEA Report No 3/2013. Copenhagen.

Eriksen, S., Aldunce, P., Bahinipati, C.S., D'Almeida Martins, R., Molefe, J.I., Nhemachena, C., O'Brien, K., Olorunfemi, F., Park, J., Sygna, L., Ulsrud, K. (2011): When not every response to climate change is a good one: Identifying principles for sustainable adaptation. Climate and Development, 3: 7–20.

European Commission (2001): European Governance. A White Paper. COM(2001) 428 final. Brussels.

Harley, M., Horrocks, L., Hodgson, N., van Minnen, J. (2008): Climate Change Vulnerability and Adaptation Indicators. ETC/ACC Technical Paper 2008/9.

Massey, E., Bergsma, E. (2008): Assessing adaptation in 29 European countries. Report W-08/20. Vrije Universiteit, Amsterdam.

Mullan, M. et al. (2013): National Adaptation Planning: Lessons from OECD Countries. OECD Environment Working Papers, No. 54, OECD Publishing.

OECD Organisation for Economic Co-Operation and Development (2009): Integrating Climate Change Adaptation into Development Co-operation. Policy Guidance. Paris.

Prutsch, A., Grothmann, T., Schauser, I., Otto, S., McCallum, S. (2010): Guiding principles for adaptation to climate change in Europe. ETC/ACC technical paper 2010/6.

Swart, R., Biesbroek, R., Binnerup, S., Carter, T., Cowan, C., Henrichs, T., Loquen, S., Mela, H., Morecroft, M., Reese, M.D.R. (2009): Europe Adapts to Climate Change: Comparing National Adaptation Strategies. PEER Report No 1. Helsinki: Partnership for European Environmental Research.

Tabara, J.D. (2011): Integrated climate governance in regions – assessing Catalonia's performance using the climate learning ladder. Regional Environmental Change, 11 (2): 259-270.

Wuelser, G., Pohl, C., Hirsch Hadorn, G., (2012): Structuring complexity for tailoring research contributions to sustainable development: a framework. Sustainability Science, 7: 81-93.

10 Appendices

Appendix 1: Compilation of climate change adaptation policy documents

Appendix 2: Online questionnaire

Appendix 3: Interview guide for regions with a climate change adaptation policy document

Appendix 4: Interview guide for regions without a climate change adaptation policy document

Appendix 5: Manual for the analysis of climate change adaptation policy documents