GoApply - Multidimensional Governance of Climate Change Adaptation in Policy Making and Practice

Climate Adaptation Governance in Germany

Country Report Germany (WP1)

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1. Introduction

1.1. Background: the GoApply project

This report is a deliverable of the project **GoApply – Multidimensional governance of climate change adaptation in policy making and practice**[1] (11/2016 – 04/2019). The project is co-funded by the Interreg V B Alpine Space Programme 2014-2020, runs under programme priority 4 "Well-governed Alpine Space" and addresses the programme objective "Increase the application of multilevel and transnational governance in the Alpine Space".

GoApply responds to challenges, barriers and gaps related to multilevel governance that currently all Alpine countries are facing in their efforts to implement their national adaptation strategies in practice. The project aims to strengthen capacities for the governance and implementation of climate adaptation across multiple levels and sectors. In doing so, it pursues the following specific objectives in interlinked work packages:

(1) Improving understanding of adaptation governance systems and promoting vertical coordination and cooperation for the implementation of adaptation policies across levels

(2) Supporting effective horizontal integration of climate change adaptation into relevant sector policies (mainstreaming)

(3) Strenghtening more active involvement of public and non-public stakeholders in regions and municipalities and stimulating adaptation coordination structures on sub-national levels

(4) Sustaining, deepening and leveraging transnational cooperation, knowledge transfer and learning in the context of the EU Strategy for the Alpine Region (EUSALP) and the Alpine Convention

GoApply tackles these objectives in a transnational approach. The project builds on the network of the national public adaptation coordinators responsible for climate adaptation policy-making in the Alpine countries. These institutions are carrying out the project as project partners and in observer roles.

WP1 of the GoApply project is centered around three main lines of activities:

- Mapping, analysing and comparing multilevel climate adaptation governance systems
- Compiling good practice examples of effective adaptation governance
- Exploring and developing governance enhancement options and innovations

The results are delivered in country reports (Austria, Germany, Italy, Switzerland) and compiled in a transnational synthesis report, which presents a knowledge base for enhanced Alpine multilevel adaptation governance and a portfolio of success factors, barriers, lessons learnt, good practice examples, and enhancement options. Moreover, the mappings of the national adaptation governance systems have been visualised in an interactive website[2]. The report at hand contributes to the transnational synthesis and complements the online visualisation.

1.2. Goals of the report

In accordance with the objectives of WP1 of the GoApply project, the goal of this analysis is to provide a deeper understanding of the adaptation landscape in Germany and to explore possible linkages with current research processes and products of UBA-KomPass. The examination of the case studies with its focus on success factors and barriers intends to provide empirical information as a

[1] http://www.alpine-space.eu/projects/goapply/en/home
[2] http://markjanbludau.de/goapply/?#

basis for generalization and lesson-drawing regarding adaptation implementation on the local and regional level beyond the German Alpine region. Moreover, the governance mapping and its visualization shall be examined with regard to its suitability for advancing communication of adaptation governance issues and policy advice.

2. Climate adaptation governance in Germany

2.1. Methods

The methodological approach for the governance mapping is based on the concept as well as the mapping template provided by FOEN/WSL. For Germany, we focus on governance elements on the national level. A detailed, multi-level description of the adaptation governance landscape across all political and territorial levels is beyond the scope of this report. Significant links between federal and regional level are referenced where applicable. National implementation of supranational frameworks, such as the EU Water Framework Directive, are therefore omitted; for more information see section on international policies (FOEN).

Information sources for the mapping are based, for the most part, on the work of UBA KomPass, in particular the knowledge base provided by core KomPass products as well as results of projects conducted. The information was gathered, analyzed and qualified through internal discussion within the UBA-KomPass team.

For the **policy** section, we focused on policies which "comprise both actual climate adaptation policies and sectoral policies with climate adaptation *goals* (climate mainstreaming)", according to the methodological concept. The selection of policies is, to a large extent, based on the research project "Analysis of the interfaces between strategies for adaptation to climate change and strategies within the context of environmental policy“ („Strategieschnittstellen“), commissioned by UBA KomPass.
The **measures** section is largely based on the most recent “Adaptation Action Plan of the German Strategy for Adaptation to Climate Change” (APA II, 2015), which includes 125 sectoral and 20 cross-sectoral measures. The selection of measures was based on an expert assessment of relevance.

The **actors** section focuses on the national level as well. The selection of actors was based primarily on the research project „IKK DAS III – Information, Communication and Cooperation within the German Adaptation Strategy” (2015), which analyzed the adaptation actors' landscape for Germany. In addition to individual actors, we emphasized the role of networks, which play a crucial role in developing and promoting the adaptation process.
The **knowledge** base for adaptation in Germany contains a vast number of information hubs, web portals, study results, project reports, climate service provisions covering a wide range of action fields across all territorial and political levels. For the mapping, we focus on national knowledge bases and services; core instruments and services of UBA-Kompass are described below. Information was gathered using the resources of the KlimAdapt project. The project, initiated in 2017 applies a

systematic approach to reviewing information and gathering data, tools and consulting services which support climate adaptation decision-making.

2.2. Mapping Descriptions

2.2.1. Policies and Measures

Climate change adaptation on the federal level in Germany was given closer consideration within the context of the climate protection program ("Klimaschutzprogramm") of the federal government in 2005. The program intended to develop an adaptation strategy on the national level. Under the lead of the Federal Ministry for Environment (BMU), the national adaptation strategy was devleoped, accompanied by an informal, inter-ministerial working group on adaptation. The strategy was adopted in 2008 as German Strategy for Adaptation to Climate Change ("Deutsche Anpassungsstrategie an den Klimawandel, DAS). Among the focus areas of the DAS are descriptions of climate change impacts and options for action covering 15 fields of action.

Subsequently, the first adaptation action plan ("Aktionsplan Anpassung", APA I) was developed in close cooperation between federal and state governments and adopted by the federal government in August 2011. The development involved an extensive participatory process which included representatives from local municipalities, science and civil society.

In accordance with the DAS, the APA I aims at reducing negative impacts of climate change and exploiting existing opportunities. To this end, the APA I assists individuals, companies and policy-makers in including climate and extreme weather-related factors in their planning and decision-making processes. Thus, the actors' capacity to act and their self-provision abilities - often referred to as adaptive capacity – are strengthened. The action plan explains how the objectives and potential measures that are set out in the German Adaptation Strategy can be substantiated with specific activities of the federal government. APA I includes 150 measures, divided into four pillars:

- Pillar 1: "Providing knowledge, informing, enabling and involving": 89 measures
    - Government initiatives, which intend to expand the knowledge base, provide and impart information. Furthermore it is meant to promote dialogue processes, participation and networking.
- Pillar 2 "Framework setting by the German Federal Government": 14 measures
    - Aims at ensuring that social actors increasingly take climate change adaptation into account by establishing the appropriate legal frameworks. This includes, for example, giving impetus to adopt adaptation measures in standardization and in view of technical standards as well as establishing incentive mechanisms in promotion policies of the federal government.
- Pillar 3: "Activities for which the Federal Government is directly responsible": 13 measures
    - Activities of the federal government that adapt state-owned areas, property, infrastructure (such as federal waterways or railways) and construction projects to climate change.
- Pillar 4: "International responsibilities": 34 measures
    - Provides information on European and international climate change adaptation initiatives of the federal government. This refers, inter alia, to Germany's contributions to development and research cooperation.

Climate change adaptation is a dynamic field with an ever-growing knowledge base, range of involved actors and necessity for intensified coordination and cooperation across territorial levels and fields of action. Therefore, the adaptation strategy and action plans are under constant refinement. In 2015, the federal government adopted a **Progress Report** with concrete steps to develop and implement the DAS. The progress report included a number of elements, as follows.

Monitoring Report ("Monitoringbericht")

On the basis of defined indicators, the monitoring report describes the current state of development and implementation of climate change adaptation in Germany. In a multi-stage process, the Federal Environmental Agency developed indicators for the 15 fields of action of the German Adaptation Strategy in close cooperation with federal and state authorities, associations, companies and scientists. These indicators demonstrate how Germany is affected by climate change and where adaptation measures have already been taken. The indicator system for the DAS is primarily an instrument of the federal state, which is meant to accompany the process of implementing the DAS.

Vulnerability analysis ("Vulnerabilitätsanalyse")

The vulnerability analysis presents the results of the work of the vulnerability network (see also below) in assessing German vulnerability to climate change between 2011 and 2015. The analysis prioritizes the risks of climate change and the need for action at the federal level. For that purpose, existing regional and sectoral evaluations of climate change impacts and vulnerability studies were analyzed. Furthermore, a methodology for a new cross-sectoral, nation-wide standardized vulnerability assessment was being developed. Using the vulnerability methodology, an interdisciplinary screening procedure identified those regions and systems across Germany that are particularly endangered by climate change.

Adaptation Action Plan II (APA II) (see also: measures)

The updated APA II presents future actions of the federal government as well as a concrete time and financing plan. It identifies measures grouped into 6 thematic clusters, with each cluster connecting different fields of action of the DAS:

- Cluster "Water": 16 measures
- Cluster "Infrastructure": 46 measures
- Cluster "Land": 32 measures
- Cluster "Health": 13 measures
- Cluster "Economy": 6 measures
- Cluster "Spatial Planning and Civil Protection": 12 measures

Furthermore, there are 20 cross-sectoral measures identified in the APA II.

Relevant policies / strategies on national level

Since nearly all societal and environmental sectors will be or already are affected by climate change and a wide range of actors are called upon to implement adaptation measures, the DAS and its ensuing implementation process essentially adhere to a “mainstreaming” approach. Thus all ministries and agencies are responsible for integrating adaptation to climate change in their relevant planning processes and development strategies in a systematic way. Policy strategies of the federal government and the individual government departments are seen as a possible point of departure for anchoring adaptation to climate change in policy and for concretizing strategic considerations.

Amongst others, policy strategies serve the general purpose of fleshing out political topics, demonstrating political will, providing the necessary conditions for coordinated action under changing conditions.
The mapping, therefore, includes relevant policy documents and strategies on the national level in which climate adaptation has already been mainstreamed to some extent or which make explicit references to adaptation issues. The mapping is, to a large extent, based on the research project report "Analysis of the interfaces between strategies for adaptation to climate change and strategies within the context of environmental policy" (2015). Relevant policies included in the mapping are:

- National Sustainability Strategy of the Federal Government and according progress and monitoring reports (Nationale Nachhaltigkeitsstrategie (NHS) & Fortschrittsberichte & Indikatorenberichte)
- National Biodiversity Strategy of the Federal government (Nationale Strategie zur biologischen Vielfalt (NBS))
- Climate Action Plan 2050 (Klimaschutzplan 2050)
- German Resource Efficiency Program (Deutsches Ressourceneffizienzprogramm (ProgRess))
- National Strategy for Integrated Coastal Zone Management (Nationale Strategie für ein integriertes Küstenzonenmanagement (IKZM))
- Energy Concept of the Federal Government (Energiekonzept der Bundesregierung)
- National Strategy for the Protection of Critical Infrastructures (Nationale Strategie zum Schutz Kritischer Infrastrukturen (KRITIS)
- National Forest Strategy 2020 (Waldstrategie 2020)
- Guiding Principles and Action Strategies for Spatial Development in Germany (Leitbilder und Handlungsstrategien für die Raumentwicklung in Deutschland)
- Position paper of the Association of German Cities (Deutscher Städtetag): Adaptation to Climate Change - Recommendations and Measures of the Cities (Positionspapier Anpassung an den Klimawandel - Empfehlungen und Maßnahmen der Städte)

2.2.2. Actors and Interactions

Climate change adaptation on the national level lies within the sphere of responsibility of the Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU). In order to support the development and implementation process of the adaptation strategy, the section "KomPass – Climate Impacts and Adaptation" was established within the German Environment Agency in 2006.

Institutional networks are vital for the development and implementation of the adaptation strategy as well as mainstreaming, monitoring and evaluation efforts. Therefore, this section focuses on most important network bodies and their interlinkages, which are described below.

The informal inter-ministerial working group advising the development of the national adaptation strategy was formalized after the adoption of the DAS as the **"Interministerial Working Group on Adaptation to Climate Change"** (IMAA). Nearly all ministries on the federal level are represented in the working group. Its purpose is to coordinate the cooperation among the participating ministries and further develop the DAS. Members of the IMAA are listed in the visualization under "networks".

In order to promote cooperation between federal and state level, the Conference of Environmental Ministers established a **standing committee for the adaptation to climate change impacts** ("Ständiger Ausschuss zur Anpassung an die Folgen des Klimawandels; StA AFK") in 2009. It is part of the federal government and federal states working group on climate, energy, mobility and sustainability (Bund-Länder-Arbeitsgemeinschaft Klima, Energie, Mobilität und Nachhaltigkeit; BLAG

KliNa). The committee's task is to provide information to the federal government and the federal states and coordinate and link their respective climate adaptation activities.

Both bodies play a vital role in the development and refinement of the adaptation action plans.

The **Vulnerability Network** is a network of 16 federal agencies and institutes supported by a scientific consortium. Its work focuses on assessing the vulnerability of Germany to climate change. The network was vital to developing the vulnerability analysis as part of the progress report in 2015

The **Strategic Agency Alliance** ("Strategische Behördenallianz") supports the federal government in its efforts to identify and implement strategies, instruments and measures to minimize vulnerabilities towards climate change impacts and increase adaptive capacity. The network focuses on improving societal response to extreme events in particular, from short-term, operative measures to long-term, strategic planning. Underlying questions of the work are:

- Which climate change aspects and impacts are relevant for civil protection and disaster preparedness?
- which strategies and measures can be developed and implemented in civil protection and spatial planning to increase adaptive capacity towards extreme events such as heat periods, heavy precipation and storm events?

The expert discussions on climate change impacts and adaptation ("**Fachgespräche Klimafolgen und Anpassung**") bring together state level agencies and the Federal Environment Agency. Coordinated by the UBA, the network focuses on information exchange on on-going projects, study results etc, as well as joint tasks such as preparing expert input for the Conference of Environmental Ministers.

The **KlimAdapt network (**KlimAdapt-Anbieter-Nutzer-Netzwerk**)** is currently in development. Based on the progress report of 2015 and specified in the APA II, a central platform for climate services and climate adaptation service is under development which aims at presenting and updating publicly available data, information, extension and advisory services as well as tools and instruments for climate change adaptation. Through the work of the network, target groups, key users and multiplicators are identified and brought together in order to foster exchange on supply and demand of climate adaptation services in Germany.

The **German Climate Services Network** (Deutscher Klimadienst - DKD), initiated in 2015, brings together agencies and authorities from federal and state level which provide data and information on climate change as well as a variety of climate services. The DKD implements the Global Framework for Climate Services (GFCS) for Germany, which aims to ensure the provision of reliable, coherent climate information and services.

2.2.3. Knowledge

As stated in the method section, a detailed list and description of all significant knowledge hubs would be beyond the scope of this report. Hereafter, we provide a brief overview of some core products and services provided by UBA KomPass. Additional knowledge elements can be found in the mapping table itself.

Some of the core elements have been previously discussed, such as the progress report with its individual parts (monitoring report, vulnerability analysis, adaptation action plan II) or the KlimAdapt information hub currently in development.

The **Climate Navigator ("Klimalotse")** supports decision-makers in developing their own adaptation strategy. It addresses local authorities as well as companies. The platform contains specific information and examples for these target groups and does not require any prior knowledge. Currently, the Climate Navigator is under revision.

A **database for adaptation actions ("Tatenbank")** presents good practice examples of adaptation measures of different stakeholders. The information portal provides all interested parties with a forum for an independent registration of adaptation projects and to receive suggestions for effective action. The data base focuses on local and regional measures that have already been carried out or are currently being implemented in Germany.

The **Project Catalogue** documents scientific projects in Germany and Central Europe, which generate basic knowledge on climate change adaptation. It informs stakeholders from research and research sponsors by collecting existing knowledge about climate impacts and adaptation.

Attached to this report are pre-selected examples of the visualization to showcase the results of the governance mapping (see annex).

3. Good practice examples of climate adaptation governance in Germany

Methods

The good practice examples were identified through expert assessment, based on following criteria:

- The range of examples should exemplify all types of governance mapping as described in section 2 - policy, measure, actor, knowledge, interaction;
- The range of examples should provide a multi-level perspective, covering national, state and municipal level;
- Examples chosen should be examined and identified as "good practice" either through research activities or peer-reviewed competitions processes.

Name (type)	Agency Network for Climate Change and Adaptation (actor, interaction)
Region (country)	Germany, national level
Date (if possible)	January 2017, establishment
Description	The agency network was established in 2017 as a permanent entity, which supports the Interministerial Working Group on Adaptation to Climate Change to implement the German Adaptation Strategy. The composition and operation of the agency network is based on its precursor the vulnerability network, which was active from 2011 to 2015. The main task of the agency network comprises the coordination of scientific content and the elaboration of the German Adaptation Strategy. At present, 22 different federal agencies and institutions are members of the agency network. The network is organized and mainly guided by the German Environment Agency.
Explanation (why good practice)	The agency network represents the governance category actor and interaction due to its establishment as a permanent body and the involvement of 22 different federal agencies and institutions, which facilitate successful cross-sectoral cooperation and concerted action. Furthermore, regular meetings ensure a long-term integration of all members and a continuous exchange regarding the German Adaptation Strategy. The network contributes its scientific expertise to the development of the central products of the DAS (e.g. monitoring report, vulnerability analysis and action planning) and thus supports the interministerial coordination.
References (website, report)	Project „Cooperation network of state authorities on climate change adaptation": https://www.umweltbundesamt.de/en/topics/climate-energy/climate-change-adaptation/kompass/kompass-projects#textpart-2

Name (type)	Germany's Vulnerability to Climate Change 2015 – Vulnerability Assessment

	(knowledge, interaction)
Region (country)	Germany, national level
Date (if possible)	2011-2015, elaboration; November 2015, publication
Description	To analyze Germany's vulnerability to climate change an interdisciplinary vulnerability network was established in 2011. This network included sixteen federal authorities and institutes from nine ministries, which enabled the formulation of a cross-sectoral vulnerability assessment for Germany comprising specialist knowledge. From 2011 until 2015, a cross-sectoral vulnerability assessment for Germany was elaborated. It served as a basis for the progress report of the German Adaptation Strategy as well as the further development of the German adaptation policy and comprises 14 different areas of activity. The vulnerability assessment names regions and systems, which are particularly vulnerable to climate change and allows comparable assertions of climate impacts in Germany.
Explanation (why good practice)	The vulnerability assessment is categorized as and is characterized by its nation-wide, interdisciplinary, consistent and scientific valuation of climate change impacts. Furthermore, the willingness of the participating actors to engage in cross-sectoral cooperation and their expertise entailed a successful vulnerability assessment for Germany. The results of the vulnerability assessment were used to formulate action needs for the adaptation strategy. They therefore influence the thematic orientation of many activities of the DAS.
References (website, report)	https://www.umweltbundesamt.de/publikationen/vulnerabilitaet-deutschlands-gegenueber-dem; https://www.eea.europa.eu/publications/climate-change-impacts-and-vulnerability-2016, p. 279 https://www.umweltbundesamt.de/publikationen/guidelines-for-climate-impact-vulnerability https://www.bmu.de/en/publication/adaptation-to-climate-change-initial-progress-report-by-the-federal-government-on-germanys-adapt/

Name (type)	"KlimaStadtRaum" („ClimateCitySpace") – Online Information Portal about Climate Change and Spatial Development (knowledge)
Region (country)	Germany, national level
Date (if possible)	2014, establishment

Description	The online information portal is provided by the Federal Institute for Research on Building, Urban Affairs and Spatial Development and it comprises current research findings as well as practical project examples from different disciplines and research areas on climate mitigation and adaptation. The provided information and documents are publicly accessible and also comprise external sources. Furthermore, practical tools to successfully implement climate mitigation or adaptation measures are allocated. The information portal is complemented by approximately 30 short movies on climate change.
Explanation (why good practice)	The "KlimaStadtRaum" online information portal represents the governance category knowledge. The information portal bundles various information on climate mitigation and adaptation from different institutions and thereby provides a useful, publicly accessible overview of current information. Offered entries comprise specialist as well as application-oriented information. The information portal is characterized by its user-friendliness and clarity, e.g. through short movies and comprehensible summaries.
References (website, report)	https://www.klimastadtraum.de/DE/Home/home_node.html

Name (type)	Baden-Württemberg Support Programme to compile Municipal Heavy Rain Risk Management (policy, measure)
Region (country)	Baden-Württemberg, Germany, federal state level
Date (if possible)	2015, start
Description	Municipalities can receive financial support from the federal state Baden-Württemberg for compiling a municipal map of heavy rain risks, a subsequent risk analysis and a proximate implementation concept. The financial support can cover up to 70 percent of the costs. Cities and municipalities identify potential local risks of flooding by means of heavy rain risk maps, which comprise three different scenarios. Such risk maps can form the foundation of developing measures to prevent flooding. The subsequent risk analysis is done by involving all local stakeholders and their specialist knowledge. Finally, the implementation concept is elaborated, which comprises different measures to manage floods. The implementation concept should be coordinated appropriate by involving stakeholders and it should be publicly accessible.

Explanation (why good practice)	Heavy rain events have a high damage potential. Nevertheless, municipal heavy rain risk management has hardly been widespread to date. The state of Baden-Württemberg is the only federal state to date that supports the municipalities in their heavy rain precautions with a subsidy programme. The municipal heavy rain risk management is a largely standardized tool which is sorted in the governance categories policy and measure. It comprises three different steps. These steps all serve useful functions by identifying potential local risks of flooding, involving different local stakeholders and their expertise, and set coordinated goals and appropriate concepts to prevent and successfully manage flooding.
References (website, report)	https://www.lubw.baden-wuerttemberg.de/wasser/starkregen; http://www4.lubw.baden-wuerttemberg.de/servlet/is/261161/

Name (type)	Municipal flood prevention at times of climate change – concept and implementation in Solingen, Germany (measures)
Region (country)	Solingen, Germany, local level
Date (if possible)	ca. 2015, project start; beginning of 2018, establishment of integrated drainage planning
Description	Due to an increasing risk of flooding, the technical companies Solingen established an integrated drainage planning in 2018, which mainly seeks to prevent flooding by effective and suitable drainage systems. Different sectors are working together regarding flooding, which is now seen and handled as a cross-cutting issue. To identify the areas most affected by flooding, analysis and simulation methods were developed and adjusted in 2015. Additionally, the risk potential of municipal infrastructure is assessed since 2016 and the infrastructure planning is attuned to flooding prevention since 2017. To inform citizens, the technical companies Solingen are about to elaborate an information concept, which will comprise flyer besides a website, an online survey and advisory service as well as a flood warning app.
Explanation (why good practice)	The municipal flooding prevention concept and implementation is classified as governance category measure due to its holistic and cross-sectoral approach and the involvement of different municipal companies in flood prevention planning. Furthermore, the public is informed and warned about flooding events through different media. The municipal flood prevention concept won the „Blauer KomPass" award in 2018, in which the German Environment Agency assigns innovative and seminal measures to enhance the adaptability to climate change.

References (website, report)	https://www.solingen.de/de/aktuelles/schutz-vor-ueberflutung/; https://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/werkzeuge-der-anpassung/tatenbank/kommunale-ueberflutungsvorsorge-in-zeiten-des

4. Case Studies

The objective of the case study work is to gain a deeper understanding of specific governance dynamics in climate adaptation processes and projects. Particular emphasis was put on the most important barriers and success factors that hinder or support the planning and implementation of climate change adaptation as well as on options to overcome barriers and to further capitalize on success factors. Guiding questions for the case study work were based on the work package methodology concept (citation only?)

(1) Which are the climate adaptation goals that are/were pursued in your case studies?
(2) To which extent have these goals been achieved?
(3) What are the most supportive factors for climate adaptation in your case studies?
(4) What are the main barriers for climate adaptation in your case studies?
(5) Which are the major lessons learned in your case studies?

Further emphasis was put on two aspects:

- Examining specifics of communication and cooperation structures between stakeholder groups in order to link the work to the content of work package 3 (case study 1)
- Examining aspects of multi-level integration of adaptation governance (case study 2)

4.1. Methods

Selection of case studies

In addition to the framework laid out by the methodological concept for WP1, the German case studies were selected based on a screening of examples using a qualitative criteria-based assessment with a simple dichotomous procedure ("Does the proposed case study fulfill the criterion? (+/-) "Why / Why not?"). The criteria were:

- Strategic value: Are the case study and its representing actors of strategic interest for the work within GoApply and the work of UBA-DE as case study investigator?
- Pre-existing knowledge: Are there any previous activities / knowledge bases regarding the case study which we can build upon?
- Regional focus: Does the case study have a connection to the Alpine region?
- Multi-level aspects: Does the case study include multi-level aspects of adaptation governance which can be examined?
- Synergies: Are there options for creating synergies between the work in WP1 and the other work packages of GoApply?

The case studies chosen were

1) The Kempten (Allgäu) region

2) The coordination of climate change adaptation between federal and state level with a focus on Southern Germany

Analytical steps

Document analysis: In order to gain insight into the case studies' setup, to build upon previous analyses and to prepare the subsequent steps of the analysis, a qualitative document analysis was conducted.

Interview approach and analysis: The interviews were designed and conducted as qualitative, semi-structured expert interviews (Bogner et al. 2005). All interviews were conducted based on the same interview guide- Topics and questioned were developed and adjusted, based on the objective of the study, the underlying information provided by the document analysis, and the interviewee's background.

The interviews were conducted either face to face or as telephone interviews; they lasted between 70 and 105 minutes. The interview material, based on minutes and additional field notes was examined via qualitative content analysis (Patton 2002), using the MaxQDA software package.

4.2. Case study 1 - Kempten / Allgäu region

4.2.1. Case study description

The city of Kempten is located in the Allgäu region in the south-western part of Bavaria. It is a major regional center (“Oberzentrum”) in the region and the second-largest city (after Augsburg) in the administrative district Swabia (Regierungsbezirk Schwaben). Kempten is located along the Iller River; and has an elevation between 646 and 915m NN. The population is 70,000 (2017), the demographic trend shows increase in population.

The Economic structure of the city is dominated by the service industry (76% of the workforce), with another significant share of the workforce employed in the industrial sector (23%) (Stadt Kempten 2013). The city is an important regional center with regard to the retail sector, tourism, education and culture. Demand for housing development and, accordingly, real estate prices are increasing; new development sites are being developed not only in the peri-urban areas, but in the city itself. In general, the growing population and related trends - pressure on the housing and real estate market, mobility and increase in traffic – are significant topics for the city which, in part, also shape the discussion about climate mitigation and adaptation. Moreover, the greater Allgäu region is well-known for its scenic landscape and rural tourist destinations; therefore, issues such as biodiversity, agricultural development and nature-based tourism are also closely connected to the regional discourse on climate change and adaptation

4.2.2. Case study analysis

Adaptation goals – Kempten's pathway towards adaptation?

Kempten has been an exemplary municipality with regard to climate mitigation activities. However, climate adaptation is a comparatively new topic for the city. While there is a growing interest among key stakeholders within the city's administration, there is no comprehensive adaptation strategy. The topic itself, however is gaining some traction in the region; the neighboring rural district of Ostallgäu e.g. recently started to develop an adaptation strategy.

Therefore, our analysis focuses less on specific adaptation measures, and more on the foundations for future adaptation activities. How do experiences and lessons learned from mitigation activities translate to adaptation? Can past experiences with mitigation activities be used to promote adaptation among key stakeholders in government, administration, civil society and the population in general? In the following, we put the most important factors in perspective as either supporting future adaptation action, presenting barriers or carrying supportive as well as hindering qualities.

Supporting factors

Building on previous experiences – Kempten's progress in mitigating climate change

In the past, Kempten has undertaken various activities to promote and implement climate change mitigation measures. Milestones are:

- An organized effort in the municipality to combat climate change started in the wake of the Rio conference in 1992 as was the case in many cities;
- the Local Agenda 21 was founded in 1996, following an decision made by the environmental committee of the local parliament, focusing on 6 topics in working groups– mobility, energy and climate protection, societal responsibility from global to local level; urban development, environment and nature, sustainable regional economic development)
- Activities led to different projects and associations, such as a common solar power installation
- 1998: foundation of eza! – regional energy and environmental center (based on initiative by city mayor and "Landrat" (head of authority) of the Oberallgäu rural district. The regional energy agency serves as think tank, information center and expert consultant for energy-related matters, such as building refurbishment for increased energy efficiency
- 2000: position of municipal energy manager created for promoting climate protection within the city administration – focus on reduction of energy and water use in public facilities
- 2009: climate protection is defined as one of five strategic goals for the future of the city until 2020 (besides strengthening the economy, youth education, manage demographic change, decrease municipal debt)
- 2011: integrated climate protection concept ("Energiezukunft 2020"), developed by an "energy team" within the administration provides the basis for specific measures; also serves as the basis for participating in the European Energy Award (eea) competition
- 2012: European Energy Award winner
- position of a municipal climate change manager established
- Participation in federal pilot project "Masterplan 100% climate protection 2050" which support municipalities in reducing their greenhouse gas emission by 95% (compared to 1990) and their energy use by 50% before 2050.

In summary: On-going and future activities can profit from this history of active climate policy – the content of the “Masterplan” is e.g. based on the preparatory work for the eea participation, which in turn was elaborated based on the climate protection concept “Energiezukunft 2020”.

Expertise, culture of cooperation and deliberative discourse within the administration and civil society organizations

All interview partners emphasized the level of expertise and cooperation within the city administration. Especially with regard to climate mitigation, experiences and expertise gathered through the “Masterplan” activities provide a promising basis for further activities. The administration is committed to continue working on climate issues and to cement the city’s status as an “exemplary municipality” for climate change mitigation. The Masterplan states that climate policies are supported by a broad coalition on the local level, which cuts across party lines; the success of a variety of activities, such as the energy management of public facilities is in part attributed to this large support.

Moreover, there is a culture of civil society activism with a high level of interest and engagement by associations, interest groups etc. It needs to be stated, however, that the majority of climate activities continue to focus on mitigation with the goal of reducing GHG emissions by 95% by 2050. Participatory processes enjoy high levels of acceptance; civil society organizations and interest groups have a lot of experience engaging in stakeholder interaction formats (e.g. “Planungswerkstätten” during development of mobility concept).

Focus on communication, education, and participation activities

Awareness-raising through public events is seen as one important supportive factor for adaptation as a political issue. Events like the market exchange (“Kooperationsbörse”) in 2017, jointly organized by the climate management of Kempten, the Ostallgäu district and UBA, was seen by the interview partners as one opportunity to “prepare the ground” for future activities. They identified communication and awareness-raising as key issues which require more effort in the future.

Recently, promising efforts have been made in cooperation with local schools in order to connect climate change issues with education. Within the frame of the "Masterplan 100% climate protection 2050" implementation a local high school (Gymnasium) has been established and certified as "climate school". In cooperation with the regional energy agency and the local climate change management, the school has committed to a variety of actions such as

- Development of a climate plan to make the school carbon-emissions-neutral in 2026

- Integration of climate change issues into the curriculum

- Additional activities such as urban gardening, changing meal plans, organization of workshops and project groups e.g. with regard to climate communication.

According to the interview partners, the efforts were met with enthusiasm, especially by the students themselves. Not only do they drive and shape the activities, they also act as multipliers as they are transporting their experiences in school into their families and to the larger population through communication activities.

Factors with supporting as well as hindering aspects

Sensitivity towards singular issues, i.e. extreme flood events

As stated above, there is a limited number of adaptation activities currently undertaken in Kempten. However, the region is highly sensitized towards flood protection and preventive measures for curbing effects of flood events. Thus, adaptation efforts have to a large extent focused on flood protection, due to experiences in the past. Heavy precipitation as well as river flood events occur frequently in the region. Accordingly, public sensitivity and political pressure have led to quite extensive measures undertaken. Foremost among them was the cooperation between Kempten and the neighboring rural district to install retention areas along the river Iller to protect the city. Other measures included infrastructural improvements to the drainage and sewage system.

On the other hand, one interview partner remarked that due to past experiences with frequently occurring extreme rain events and measures undertaken for flood protection, future climate impacts have not yet come into focus for the larger populace. The general attitude among the population, according to the interview partner, is a sense of being used to re-occurring flooding events as well as being reasonably well-prepared for future events due to the flood protection measures implemented in the recent past.

Other climate impacts such as heat island development in the city are not as pressing in Kempten due to the prevalent fresh air corridors. The projected decrease in snowfall will undoubtedly impact the tourism sector – though arguably less so in the city of Kempten compared to destinations closer to the mountain range. While tourism actors are alerted and have begun to adapt, the interviewees did not mention this development as causing particular worries among the larger populace.

As a consequence, political pressure for developing and implementing adaptation measures on the whole with a strategic perspective is comparatively low.

Interest in adaptation through personal experience

One factor was mentioned repeatedly by the interview partners: the impact of being personally affected by climate impacts as a source for motivation and political pressure. As mentioned above, the extensive activities in flood protection were to a large extent the result of two HQ100 flooding events within the course of a few years. These developments resulted in concerted action in cooperation with the neighboring rural district.

Another example is the regional strategy to protect and develop forest areas in mountainous regions. The “Bergwaldoffensive” aims at restructuring forest areas and forest management to increase resiliency – e.g. by introducing more drought-resistant tree species. One important trigger for the development of the strategy were economic risks for forestry, due to windfall damages. Another important factor: the Bergwaldoffensive was largely successful due to the commitment and actions of a few selected actors. These trends are in line with scientific literature. Extreme events push adaptation to the forefront of public / media discussion and can create windows of opportunity.

However, this is not necessarily just a success factor; two interview partners framed it differently: The lack of general interest in and awareness of adaptation means that a jump to action is largely based on being personally affected or suffering from impacts. In consequence, there is less general initiative and less commitment to long-term efforts. In the example of flood protection: after the extensive flood protection measures were implemented, the topic faded from the public sphere of

discussion and was replaced by other issues. One interview partner commented rather wearily: “People respond only to external pressure.”

General support for nature- and environment-related issues

All interview partners stated that living close to nature is part of a regional identity in the Allgäu region. In consequence, there is a high awareness towards climate- and nature related issues such as biodiversity, extreme weather events etc. On the other hand: „living close to nature“ also means that potential pressure for adaptation and in general, a transformation towards a greener infrastructure is lower than in larger agglomerations. As interview partners stated, living close to nature means that one can easily escape the city towards more rural areas and thus feels less pressure to engage in adaptation activities within the city.

Barriers

Lack of coherent strategy

Currently, there is no strategic approach towards adaptation which spans across different action fields; activities are mostly undertaken on a project-level basis or as secondary activities.

“NIMBY”-attitude for some specific measures

While the interest in climate change and related issues may be growing on a more abstract level, the interview partners reported that resistance to specific measures is high when individuals feel negatively affected or restricted by them – the “Not-in-my-backyard”-attitude. An example given during the interviews: Interest in biodiversity issues is high among the general population. Biodiversity decrease, e.g. concerning honey bees and other pollinating insect species is met with concern. But efforts to mitigate these effects, e.g. by converting public green spaces towards more biodiversity was seen as critical (“it looks untidy”); installation of honey bee farms on rooftops to promote urban greening and create opportunities for marketing local products in the process (“urban honey”) drew criticism from local entrepreneurs (cafes, bars) out of the fear that customers would be disturbed by the insects. In another example provided during the interviews, plans to plant additional trees along residential streets was met with opposition and had to be curbed significantly. The concern among residents was a lack of car parking space as a consequence of additional trees.

Public support and cooperation restricted to administration and limited number of stakeholders:

While there are good working relationships and a high level of expertise and interest between experts within the administration, political support is lacking behind, in part, because public interest in climate change ranks lower than other issues. One interviewee stated that “administration is more progressive than the population” when it comes to climate change mitigation and adaptation activities. The culture of participation does not seem to translate to a larger population beyond a limited number of (expert) stakeholders. Civil society activities are driven by a limited number of actors. Addressing and mobilizing a larger population is “Door-to-door”-work, i.e. time- and resource-intensive. Awareness-raising for climate mitigation, much less adaptation is a difficult enterprise; as a consequence, this lack of mobilization transfers to a lack of political pressure within the municipal government.

Low prioritization of adaptation = lack of political support for concrete action and funding

As a consequence, the lack of awareness, interest and reservations about specific activities among the general public translates into a lack of political support on the municipal level. Interview partners stated a lack of political commitment towards mitigation and adaptation measures, especially when public funding is required or regulative measures are to be put in place. In addition, regulative measures are seen as problematic in part as a question of political philosophy: according to the interviewees, representatives from the majority party (conservatives) are reluctant to support measures which would restrict individual choices and freedoms as a matter of principle.

4.2.3. Lessons learned

The interview partners in the Kempten case study are very aware of the supporting and hindering factors which affect their efforts to promote and strengthen adaptation activities; they have adjusted their own activities to use the strengths of the city's governance landscape and focus on the most promising activities. Lessons learned from the analysis above can be summarized as follows:

- **Communicate individual stakes to raise awareness and responsibility.** As the analysis above shows, windows of opportunity open up after extreme events or in situations where citizens are personally affected by climate change impacts. Personal experience and personal stakes are powerful motivators to engage in climate change mitigation and adaptation activities, if communicated e.g. through relatable narratives. However, the findings in the case study also indicate that awareness raised through these windows of opportunity needs to be actively transformed into long-term interest and strategic efforts.

- **Connect adaptation to prevalent issues.** Where adaptation itself is not a prioritized topic of public/political discussion, a "piggyback strategy" can be appropriate – the attachment of adaptation issues to other, more prevalent topics. Just as extreme weather events can create windows of opportunity for promoting adaptation, sustainability-related topics and their public discussion can provide entry points for adaptation as well – well beyond a mainstreaming process in policies and regulation. The Kempten case shows that public awareness of and interest in topics such as biodiversity in agriculture and urban green spaces, tourism development, mobility and urban growth is high. By showing how these issues are exacerbated by climate change impacts or can be supported through adaptive measures, respectively, adaptation can be introduced "undercover" by sectoral administration experts (see UBA 2016).

- **Prioritize activities which have political support.** Pragmatism is a key when making decisions about promoting adaptation. In a situation where adaptation enjoys comparatively little political priority and has to compete with other topics for attention, support, and funding, focusing on a limited number of activities which do have political support can act as stepping stone towards broader support. The example of the climate school described above illustrates how a project which has political support can gain traction if it is prioritized.

- **Socio-cultural differences affect efforts to raise adaptation awareness. Communication activities need to be adjusted accordingly.** One important lesson from the experience of the

interview partners was that interest in climate change-related issues is, in part, a generational question. Younger people seem to be more open towards the issue, relate better to climate change topics, and are often better educated regarding climate change and the way they are affected by current and future climate impacts. Creative efforts to integrate adaptation into education, to communicate climate change issues and to empower groups like high school students to engage can serve as a means to create more awareness and interest among a larger group of stakeholders.

4.3. Case Study 2 - Cooperation and coordination of climate change adaptation between federal and state level

4.3.1. Case study description

The case study focuses on the vertical governance of climate change adaptation between the German Federation, the Federal states and the municipalities. The research interest is directed at the question of how federal and state level share their responsibilities to support local and regional adaptation. It will be analyzed how they coordinate climate adaptation activities and how they share in particular information and funding for the local level.

Taking into account the regional relationship of the project to the Alpine region, the activities in the states of Bavaria and Baden-Württemberg were selected for the analysis.

The key actors in this field are the responsible units for climate change adaptation at the German Federal Environmental Ministry (BMU), at the Bavarian State Ministry of the Environment and Consumer Protection (STMUV) and at the Ministry of the Environment, Climate Protection and the Energy Sector Baden-Wuerttemberg. The key body for coordination climate change adaptation between federal and state level is the Standing Committee on “Climate Change Adaptation” (StA AFK). The Federal Government, Saxony and North Rhine-Westphalia jointly chair the Standing Committee. The members of this group are the representatives of the BMU and of all Federal States. It was established in 2009 by the Conference of Environmental Ministers (UMK) as part of the Federal Länder Working Group on Climate, Energy, Mobility and Sustainability (BLAG KliNa) (BMUB 2016).

Because climate change adaptation is a mainstreaming issue it is integrated in different sectoral fields, e.g. the water or health sector. So the field of responsible actors for the coordination of climate adaptation issues between the federal and state level is much broader than described here. To narrow down the topic, this mainstreaming perspective was excluded from the study.

4.3.2. Case study analysis

The German adaptation strategy describes a crucial role for municipalities and regions in adaptation to climate change [(The federal Government 2008 p.56). Thus, the Federal and state level have the general goal to support local and regional actors to adapt to climate change but there are no quantitative objectives. Following the subsidiarity principle, the tasks of the federal level is mainly seen in building the appropriate framework conditions to facilitate local and regional adaptation (Die Bundesregierung 2015 p.64). There is no monitoring of municipal adaptation implemented in

Germany, yet. Indications of the extent of municipal activities are generated from Germany-wide surveys and research projects.

Supporting factors

A framework for climate adaptation at federal states level has been established

Baden-Württemberg has a climate protection law which also includes climate adaptation. The KLIMOPASS funding programme advises local authorities and promotes conceptual and planning measures (e.g. climate analyses, vulnerability studies, adaptation concepts) as well as the implementation of investment measures, e.g. the greening of municipal kindergartens, schools and nursing homes or the installation of publicly accessible drinking water dispensers. The state strategy for adaptation to climate change in Baden-Württemberg (2015) gives priority to necessary measures and also addresses local authorities as responsible actors. The Bavarian Climate Adaptation Strategy (2016) informs municipalities in particular about the general action needs and funding framework for climate adaptation. It identifies responsibilities for the implementation of specific measures, which are outlined in the strategy. Bavaria provides concrete support to municipalities through model projects, guidelines and further information. The funding program for municipal climate protection is to be extended in future to include climate adaptation. The focus should be on adaptation concepts and planning measures, but not on investment measures.

The importance of cooperation with local authorities has increased in the federal states

When it comes to the implementation phase of adaptation strategies, municipalities are key actors for adaptation measures on the local scale. Consequently, municipal climate change adaptation has been a regular item on the agenda of the meetings of the Standing Committee on “Climate Change Adaptation” since 2017. The focus here is on the alignment of funding programs.

Experienced extreme weather events generate momentum for climate adaptation

Municipal activities are often intensified when an extreme event has affected the municipality itself. They are a triggering factor for municipal climate adaptation activities (see UBA 2018). Nevertheless, there is a need for additional promoters to initiate climate adaptation strategies and concrete measures.

Integrating climate adaptation into ongoing development processes of municipalities

Climate adaptation is often successful in the municipality if the topic of climate adaptation is also addressed in planning or strategy development processes that are already in place. Setting up an independent climate adaptation strategy is often a major constraint for the municipality, as additional resources have to be made available for this.

Barriers

Lack of resources to deal with adaptation issues systematically

Especially the local level addresses scarce resources for personnel, external expertise as well as to prepare, implement and finance municipal adaptation measures. Even if mainstreaming of adaptation into existing strategies, plans and measures is the preferred approach, there is a need for

an additional adaptation budget. Substantial costs are caused in particular by the realization of adaptation measures. This challenge is the most important barrier especially in smaller municipalities (see UBA 2016, 2018, 2019).

Low personnel resources for climate adaptation on the federal state level

State ministries are responsible to set the adaptation framework on federal state level. Usually only one person is in charge of the topic at the environment ministry, who is partly supported by environmental agencies. Climate adaptation is a cross-cutting task that requires a great amount of time to coordinate work within and between ministries and to increase priority for the issue. An intensive exchange between state and municipalities is therefore hardly feasible

Inadequate understanding of the tasks involved in climate adaptation at local level

On the one hand not all municipalities are sufficiently aware of the impacts of climate change they are exposed to. Therefore vulnerability or risk analysis on local or at least on regional scale are required. On the other hand there are uncertainties about their responsibilities. For some municipalities it is not clear which tasks are compulsory for them and which tasks can be fulfilled on a voluntary basis.

Lack of awareness of climate change adaptation

Even if there is a general awareness of climate change, politics and administrations on local scale as well as the public and the economy sector not accept, that adaptation needs to be set up on the working agenda and that actions are needed for prioritized impacts (see UBA 2018).

4.3.3. Lessons learned

- **Drivers on federal states are essential to support local adaptation sufficiently.** The Standing Committee on "Climate Change Adaptation" makes decisions by consensus. Therefore, it takes time to develop new topics. In addition, there is a need for drivers who want to promote municipal adaptation in order to further improve the frameworks of the federal states. Regional conferences have been established by the federal and state governments for cross-level exchange. Consideration should also be given to this format for the Alpine region in the future. Thematic priorities in the Alpine region such as sustainable winter tourism could be discussed here.

- **Strategic priorities should be coordinated across levels.** These priorities should then be worked on and communicated at all levels. The role of the district governments ("Bezirksregierungen") as a link between the municipal and state levels should also be considered. It must be clarified which are the appropriate bodies for coordination between the different levels and what role organizations such as the Bavarian Association of Cities can play in this.

- **Funding programs at federal and state level should be better coordinated.** The funding framework of the Federal Government and the federal states should be designed in such a way that it complements each other appropriately. It should be geared to the needs of the municipality and be easily accessible to them. It should be noted that, especially for smaller municipalities, the state institutions are often the closer contacts for employees in local administrations. Funding should be tailored to enhance adaptive capacities of local actors (UBA 2019).

- **Transnational exchange on the local level in the Alpine region should be consolidated.** For the municipalities, transnational exchange formats enable learning processes that undermine familiar cultural approaches. Such formats make it easier to think beyond the existing framework conditions. The spectrum of perspectives on climate adaptation can thus be broadened.

- **Local authorities pursue climate adaptation as a voluntary task in the absence of a binding legal framework.** The municipalities expect the federal states and the federal government to further clarify the legal framework conditions, including the adaptation of laws, standards, regulations and assessment approaches. However, this is not a priority on the agenda at state and federal level (see UBA 2018).

- **The municipalities need significantly improved data availability** and processing as well as active support from the responsible state offices in vulnerability analyses or estimation of possible climate impacts and risks (see UBA 2018).

- **Responsibilities need to be reconsidered.** For small municipalities, it must be clarified whether climate adaptation responsibilities should be partly located at district level in order to relieve the municipalities (see UBA 2018).

5. Enhancement options

Participation of stakeholders groups is essential. In particular, the integration of non-governmental actors into the strategy process can lead to improved understanding and the consideration of a broader knowledge base. It can enhance the quality of decisions made, increase legitimacy and support; participation also furthers the successful implementation of adaptation measures. These benefits are a recurring theme, not only in literature (see UBA 2019), but also throughout the interviews and workshops conducted in the case studies.

Municipalities need to strengthen ties and increase exchange on adaptation among one another. Suitable formats could be modeled after the “Masterplan 100% Klimaschutz” ("Master Plan 100% climate protection”) initiative.

There is a variety of strategies to promote adaptation on the local level; all of them require committed actors and/or political will. In order to mainstream adaptation and make approaches more permanent, **municipalities require a stronger legal framework and appropriate financing,** e.g. through

- work toward making mitigation and adaptation a “statutory duty” (“kommunale Pflichtaufgabe”)
- work toward establishing mitigation and adaptation as decision criteria for climate-relevant decisions on the local and regional level (e.g. in spatial planning, mobility etc.)

Municipalities can chose different ways to **integrate adaptation to climate impacts into already existing planning and administration processes**, e.g. using development plans, formal planning processes (e.g. agricultural plans or flood management plans) or informal processes and procedures (e.g. urban development concepts). Additional, organizational integration in established cross-

sectoral units (e.g. for sustainable development) could help to mainstream adaptation into the local administration (UBA 2016).

Mitigation and adaptation need to be approached in concert, not played off against one another. Experiences and synergies with mitigation efforts should be reflected and transferred to adaptation; existing mitigation governance structures should be utilized for adaptation efforts as well.

Coordination of the political framework between federal and state level needs to be improved. Implementation responsibilities need to be clarified between different levels such as "Regierungsbezirke" (district governments), "Landkreise" (rural districts) and "Gemeinden" (municipalities). The Standing Committee on Climate Change Adaptation is considered an apt body for coordination efforts. Nevertheless, the committee should strengthen its focus on setting strategic topics for adaptation and intensify the communication and cooperation with municipal interest groups, such as national associations of municipalities ("kommunale Spitzenverbände").

Climate adaptation is (among other efforts) a **communication challenge**. Elements of this challenge are:

- address and educate about how target groups are personally affected by climate change impacts in order to promote awareness and action;
- work with narratives and connect adaptation with emotionally appealing messages;
- communicate with target-group specific messages and media instruments which acknowledge socio-cultural differences; e.g. through a focus on younger generations which are more likely to be engaged in adaptation discussion;
- engage in co-creative processes with the target groups to create more authentic and convincing messages;
- tailor the communication of climate impacts which affect particular groups accordingly (e.g. health impacts of heat spells for senior citizens and people with chronic health issues).

Promote and intensify transnational exchange, especially among experts responsible for strategy-setting and implementation on local and regional level:

- exchange and learning processes can disrupt inefficient institutional decision-making processes and behavioral patterns;
- exchange on good-practice-examples can spark and improve the transfer of ideas;
- transnational networking can also provide legitimization and prestige of local adaptation work for internal and external communication.

Windows of opportunity can generate momentum and initiate adaptation action – these impulses need to be solidified before the windows close again. On the administrative level this can be achieved e.g. by creating new (informal) structures for cooperation, such as cross-sectoral working groups; by gathering political support, legitimization, and funding for more long-term efforts. Windows of opportunity can be used to create narratives which serve as (emotional) anchors for communication work even after windows are closed again (e.g. by appealing to collective action in times of crisis, remind target groups of past impacts of extreme events through appropriate communication instruments) (see UBA 2019).

6. Conclusions

The analysis conducted in work package 1 sheds a light on the complexity of governance arrangements through a mapping approach, examines specific support factors and barriers towards adaptation implementation across the multi-level system in two case studies and highlights good practice examples of adaptation governance in Germany. The results emphasize the need for vertical coordination of adaptation strategies and processes as well as horizontal integration and "mainstreaming" of adaptation issues and concrete actions.

The governance mapping exemplifies the degree of complexity of the adaptation governance system. The visualization in particular is a convincing approach for presenting the complexity of the adaptation governance landscape in Germany and provides a thorough descriptive overview. The strengths of the visualization lie in its potential for communication purposes as well as for gap examination in order to identify e.g. a lack of interactions between actors, measures and knowledge elements. There is potential for improvement, especially regarding the quality of interconnections; the intensity of interlinkages, such as strong or weak ties between actors is not yet part of the approach. For further use and application of the visualization, the data base needs to be extended, maintained and constantly updated to reflect the dynamics of the governance landscape. As the mapping for Germany focused mainly on the national level, it remains to be explored whether the increased complexity resulting from the integration of governance elements on regional and local level could be sufficiently expressed through the selected mode of visualization of governance elements.

While we aimed at drawing lessons learned from the case studies and more general enhancement recommendations for adaptation governance, the case study approach has limitations with regard to generalization. Governance settings, actor constellations and cooperation processes are context-specific; therefore lessons drawn here have to be assessed for their potential of transferability.

To reduce this potential limitation we reflected interview results in light of other UBA-KomPass research of incentives for and barriers towards adaptation processes on regional and local level. Resource scarcity, lack of a binding legal framework, insufficient availability of information on impacts, vulnerabilities, adaptation options, lack of political support, and lack of cross-sectoral coordination are barriers to effective adaptation implementation. Adaptation efforts are supported by awareness-raising, connecting relevant actors, linking adaptation activities to existing municipal strategies, creating and using windows of opportunity and tailored communication about impacts, risks and options (UBA 2017).

With regard to multi-level aspects of adaptation governance, the analysis highlights the need for better coordination of strategic priorities, of competencies, as well as resource provision through funding across the different administrative levels. It elaborates on the need of state-level support for local adaptation activities. Among other factors, the case study work underlines the role of connecting levels such as district governments ("Bezirksregierungen") as intermediary between municipal and state level. Further research is needed on how these intermediate administrative levels reconcile requirements from state and local level and what kind of resources they need in order to enhance communication and coordination of adaptation efforts. Moreover, the work in WP1 emphasizes the significance of supranational transnational exchange and cooperation for learning

processes and creating impulses for improved adaptation on local and regional level, especially in interconnected macro-regions such as the Alpine region.

The analysis conducted in WP1 serves as an important starting point for a deeper examination of governance settings, processes and the identification of knowledge gaps. In this regard, further research is needed to support the design and implementation of adaptation strategies, such as:

- Provision of information on climate change impacts, vulnerabilities and available climate services tailored to the needs of the target groups on regional and local level;
- Enhancement of multi-level coordination of adaptation processes, promoting coherency and cooperation;
- Impact assessment of governance arrangements and policy instruments;
- Support and advancement of participation and interconnectedness of stakeholders;
- Impact analysis of communication and interaction instruments which promote adaptation activities.

In conclusion, the work conducted provides valuable insights for future analysis of adaptation governance in Germany. As shown, the German national adaptation strategy (DAS) sets a supporting framework for adaptation action; however, there is still a need for a more strategic governance approach to reduce adaptation barriers, in particular with regard to the implementation of adaptation actions on the regional and the local level.

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8. Annex

8.1. Interviews conducted in case study analysis

Case Study	Actor	
	Affiliation	**Role**
Case Study I – Kempten	Municipal administration	Head of department for land use planning, development and transportation (Referat für Planen, Bauen und Verkehr)
	Municipal administration	Climate manager
	Energy and Environment Agency Allgäu Region (Energie- und Umweltzentrum Allgäu)	Section head - climate protection
Case Study II – Cooperation/coordination state – federal level	German Environment Agency (Umweltbundesamt)	Section Climate impacts and adaptation (KomPass)
	Bavarian State Ministry of the Environment and Consumer Protection	Section head – climate policy and research
	Bavarian State Ministry of the Environment and Consumer Protection	Section climate policy and research

8.2. Interview Guide – Example Case Study I

Project GoApply - Multidimensional governance of climate change adaptation in policy making and practice

Work Package 1 (WP1): Strengthening capacities for multilevel climate adaptation governance - Identification of cases studies for in-depth examination of governance structures

Leitfaden für Interviews

Ziele:

- Kennenlernen der Akteure
- Regionale Besonderheiten und bedeutsame Themen in Bezug auf Klimaanpassung
- Rahmenbedingungen, Programme, Maßnahmen, Wissensbezüge, Akteure und insbesondere Interaktionen (aufbauend auf Dokumentenanalyse und Arbeit WP3)
- Zielerreichung; Förderliche und hinderliche Faktoren für Anpassungsarbeit
- Lerneffekte, insb. im Hinblick auf Verbesserungen in Mehrebenen-Governance
- Ausblick für zukünftige Arbeit

Zielgruppe:

- Fachexperten aus Verwaltung
- Multiplikatoren in regionaler und lokaler Anpassungsarbeit

Methodik:

- Basis: Dokumentenanalyse
- qualitatives, teilstrukturiertes, face-to-face/ telefonisches Experteninterview,
- explorative Ausrichtung, keine Überprüfung konkreter Hypothesen
- Dauer: geplant ca. 1,5 Stunden
- Protokollierung: schriftlich, Audioaufnahme nach Zustimmung Interviewpartner
- Auswertung: qualitativ, auf Basis Ergebnisprotokoll
- *Erläuterungen / Stichworte / optionale Nachfragen kursiv in Klammern*

1. Einführung *(soweit nötig)*	
• Vorstellung der Interviewführenden und der Einrichtung (UBA-Kompass) • Kurzbeschreibung Projekt GoApply • Ziel und Umfang des Gespräches • Hinweis auf Datenschutz / Vertraulichkeit • Abfrage: Audioaufnahme ok?	☐
2. Allgemeines / Tätigkeit /	☐
Bitte beschreiben Sie kurz Ihren Tätigkeitsbereich! Welche Aufgaben übernehmen Sie im Bereich Klimaschutz und –anpassung?	☐
3. Regionale Schwerpunkte	☐
Welche besonderen Themen und Herausforderungen bestehen für die Region im Bereich Klimaanpassung? *(ökonomisch-ökologisch-sozial, Ergänzung zu Dokumentenanalyse)*	☐
Welche Rolle spielt Klimaanpassung in der öffentlichen Diskussion / Wahrnehmung?	☐
4. Konkrete Vorhaben und Maßnahmen	☐
Welches sind die wichtigsten Vorhaben im Bereich Klimaschutz und -anpassung – in der Vergangenheit und aktuell? *(Ergänzung zur Dokumentenanalyse)* *Mögliche Beispiele: Masterplan Klima 2050; Öko-Modellregion Oberallgäu-Kempten; Förderprogramm Qualifizierte Baubegleitung; European Energy Award*	☐
Bitte beschreiben Sie die Vorhaben etwas genauer; was sind die konkreten Ziele, mit welchen Maßnahmen werden diese umgesetzt? Nach welchen Kriterien wurden die Maßnahmen entwickelt / ausgewählt / priorisiert?	☐
Wer ist verantwortlich für die Umsetzung des Vorhabens? Wie wird es finanziert?	
Wie werden / wurden die Maßnahmen umgesetzt? Wurden die Maßnahmen im Rahmen bestehender Mechanismen und Abläufe umgesetzt? Wurden für die Umsetzung neue Mechanismen und Abläufe entwickelt?	☐

(Beispiele liefern)	
Wer sind die wichtigsten Partner bei der Umsetzung des Vorhabens? Wie waren diese in die Vorhabenerstellung eingebunden? Wie sind sie an der Umsetzung beteiligt? (*Positiv- / Negativbeispiele; Welche Formen der Zusammenarbeit)* *(Einfluss auf Gestaltung der Maßnahmen, Austausch und Kommunikation)*	☐
Wer ist verantwortlich für die Steuerung von Kooperation und Kommunikation zwischen den Partnern?	☐
Wie gestaltet sich der Austausch / die Kommunikation im Vorhaben? Wie werden unterschiedliche Akteursgruppen einbezogen? Was funktioniert dabei besonders gut, was könnte verbessert werden? *(Regelmäßigkeit und Grad der Formalisierung, eingesetzte Instrumente, besondere Multiplikatoren, Einbeziehung unterschiedlicher Akteursgruppen)*	☐
Inwieweit wurden die gesteckten Ziele erreicht? Gibt es Monitoring- / Evaluationsanstrengungen? Wenn ja, welche?	☐
Welches sind die wichtigsten Erfolgsfaktoren für die Umsetzung?	☐
Gab es Probleme bei der Umsetzung? Wenn ja, welche? Welche Hemmnisse sehen generell Sie für die Vorhabenumsetzung in der Region?	☐
Wie könnten diese Hemmnisse in Zukunft überwunden werden?	☐

5. Akteure und Interaktionen allgemein	☐
Welche weiteren Akteure / Akteursgruppen sind ihre wichtigsten Partner in der Zusammenarbeit (*generell)*? *(staatliche Akteure, Privatwirtschaft, Zivilgesellschaft?)*	☐
Welchen Austausch gibt es bezüglich Klimaschutz und –anpassung mit der Bundesebene? (DAS-Prozess) - *Welche Informationen und Positionen der Klimaanpassung auf Bundesebene werden für die Arbeit vor Ort genutzt?* - *Was ist besonders hilfreich? Wo würden Sie sich Verbesserungen wünschen?*	☐
Wie arbeiten Sie mit übergeordneten politischen Ebenen im Bereich Klimaschutz und –anpassung zusammen – Regierungsbezirks- und Landesebene? - *Wie gestaltet sich die Kommunikation/ Zusammenarbeit über unterschiedliche Sektoren und Ebenen hinweg?* - *Welche Besonderheiten machen die Kommunikation/Kooperation mit Vertretern anderer politischer Ebenen?* - *Wie werden Landesinformationen und Landespositionen in die Arbeit vor Ort aufgenommen?* - *Was ist dabei besonders hilfreich? Was könnte verbessert werden?*	☐
Wie arbeiten Sie mit anderen Kommunen bzw. Landkreisen zusammen? Was funktioniert dort besonders gut, an welcher Stelle würden Sie sich Verbesserungen wünschen?	☐
Gibt es weitere Formen der Zusammenarbeit oder des Informationsaustausches? (mit Kommunen in anderen Bundesländern, über die Grenzen hinweg mit Österreich bspw.) In welchen Bereichen hätten Sie Interesse an stärkerer Zusammenarbeit?	☐

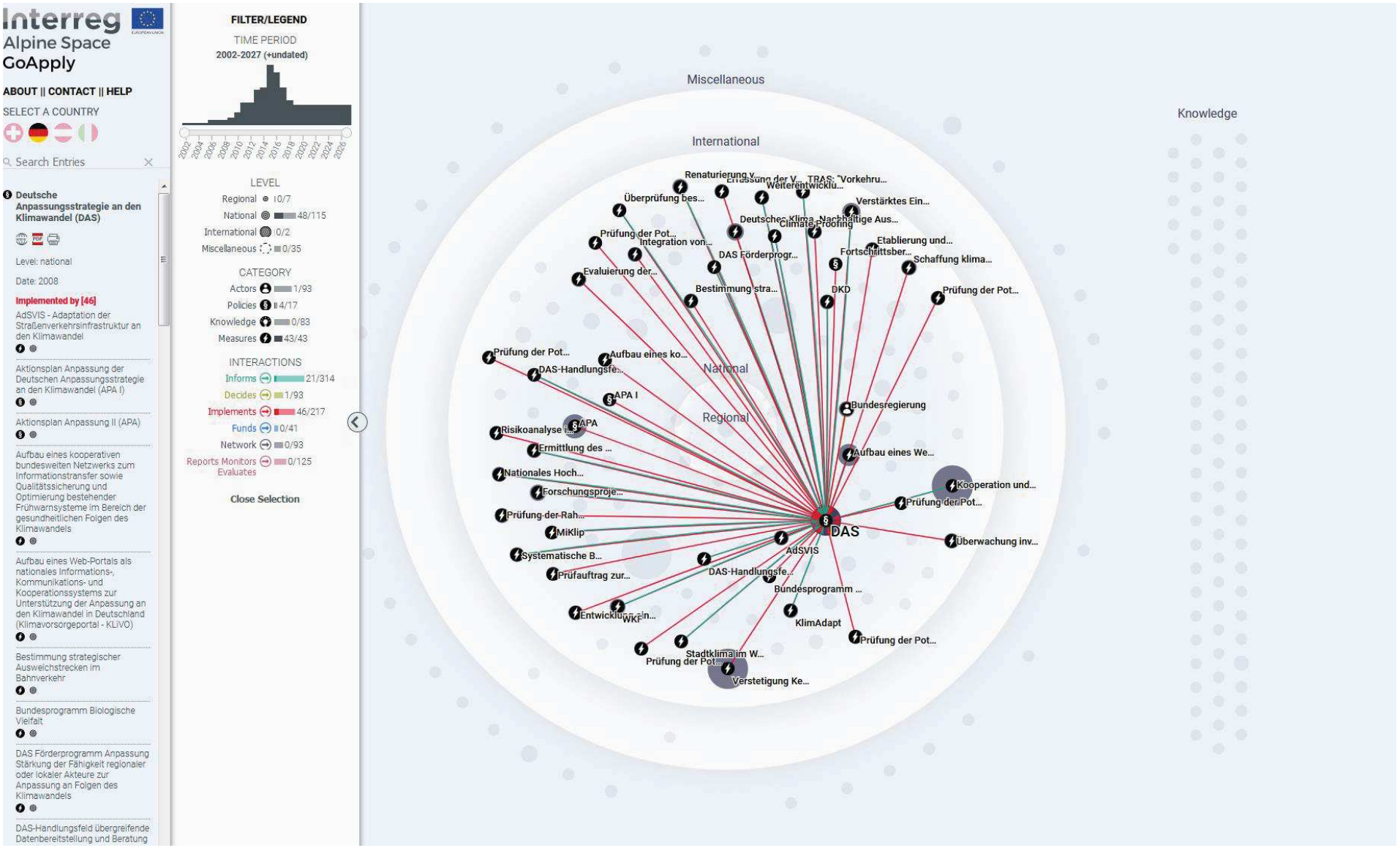
6. Informationen und Rahmenbedingungen	☐
Welches sind (weitere) wichtige Informationsquellen für die Anpassungsarbeit? *(Bsp. geben; nicht nur formalisierte Quellen / Kulturkapital – auch Sozialkapital, informelle Bezüge)*	☐
Welche Wege nutzen Sie selbst, um Wissensaustausch zu Klimaschutz und –anpassung zu befördern? Womit haben Sie gute / schlechte Erfahrungen gemacht?	☐
Welche Rahmenbedingungen/ politische Instrumente sind für Ihre Arbeit in Klimaschutz und –anpassung besonders zielführend? Welche nicht? Warum? *(Bsp. Strategien Landesebene, Förderinstrumente, Unterstützungs- und Informationsangebote?)*	☐
Welche politische Ebene ist aus Ihrer Sicht besonders geeignet, Klimaschutz und –anpassung umzusetzen und warum? *(supranational, national, regional, lokal)* - *Sind individuelle (lokale) Projekte geeignet, Klimaanpassung erfolgreich umzusetzen? Warum / warum nicht?*	☐
Wie müssten sich politische Rahmensetzungen ändern, um Klimaschutz und –anpassung erfolgreicher zu gestalten? *(Bsp. Gesetzgebung, Förderinstrumente, Wissensbereitstellung…)*	☐
7. Zusammenfassung / Ausblick	☐
Hat sich seit Ihrer Arbeit zu Klimaschutz und -anpassung etwas verändert an Ihrer Sichtweise auf Klimaanpassung und Vorhaben zu deren Umsetzung?	☐
Welche Themen werden im Bereich Anpassung in Zukunft eine wichtige Rolle spielen? Wie werden diese in der Region angegangen?	☐
Wir möchten Ihnen natürlich auch die Gelegenheit geben, selbst Fragen zu stellen. Gibt es etwas was Sie zu uns und unserem Projekt wissen möchten?	☐
Vielen Dank, dass Sie sich die Zeit für dieses Gespräch genommen haben!	

8.3. Visualization of Adaptation Governance Mapping Germany

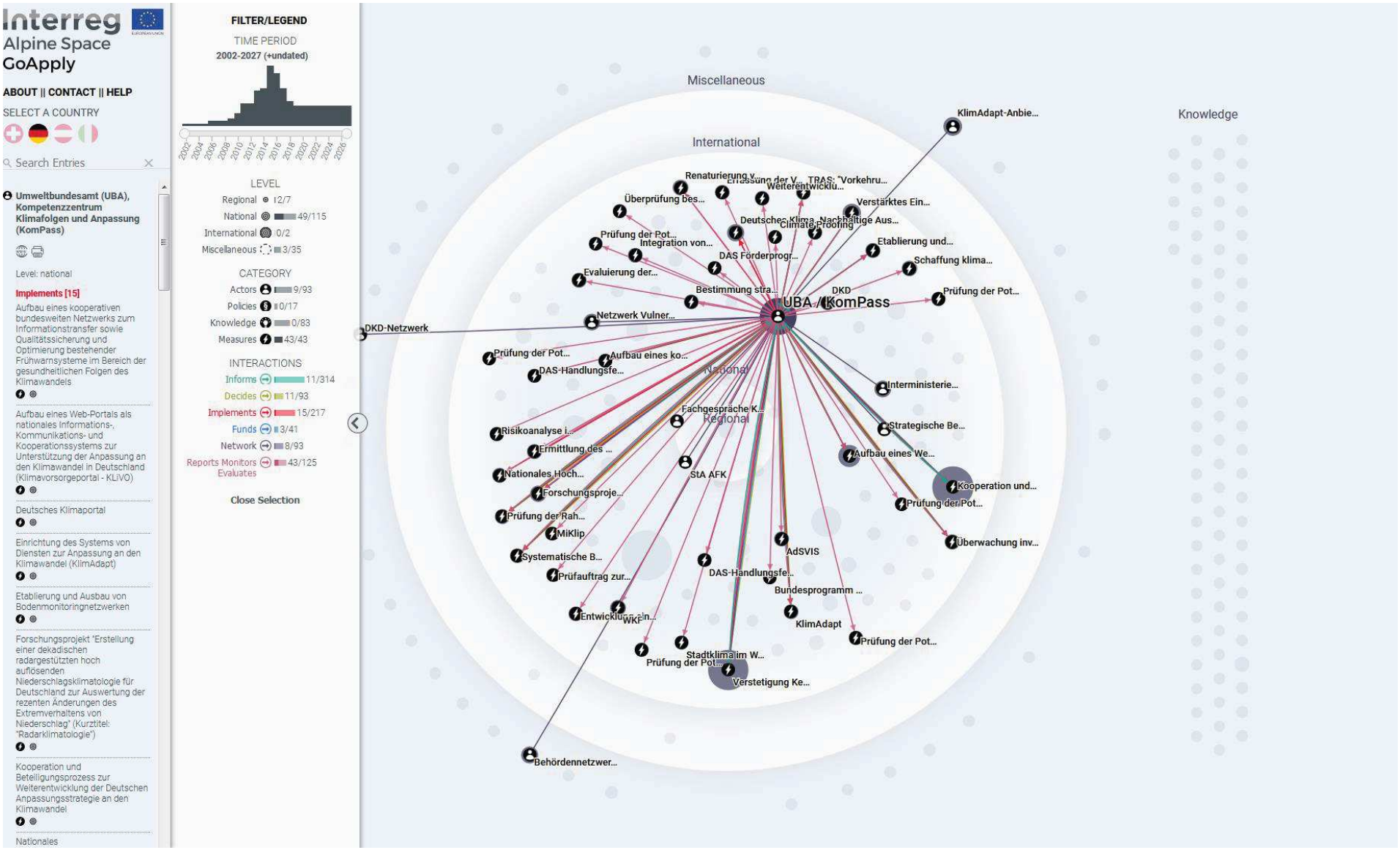
Pre-selected introductory examples:

- Policy: National Adaptation Strategy (DAS)
- Actor: UBA-KomPass
- Network: Interministerial Working Group on Adaptation to Climate Change (IMAA)

Policy: National Adaptation Strategy (DAS)



Actor: UBA-KomPass



Network: Interministerial Working Group on Adaptation to Climate Change (IMAA)