EUROPEAN
COMMISSION

Adaptation preparedness scoreboard

Country fiche for Germany

NOTE TO THE READER

Under Action 1 of the EU's Strategy on adaptation to climate change (COM(2013)216), in collaboration with the Member States, the Commission developed an 'adaptation preparedness scoreboard'. Using the scoreboard, the Commission prepared country fiches on each Member State in an iterative consultation process.[1] The country fiches assess the Member States' adaptation policy as of June 2018, including the content of NASs and plans, for the following aspects:

- Institutional structure
- Quality of national vulnerability assessments
- Knowledge creation (national observation systems in relevant sectors[2] and climate modelling), transfer and use
- Action plans:
  - Quality (incl. the basis used for assessment of adaptation options)
  - Actual implementation mechanisms
- Funding mechanisms
- Mainstreaming into sectoral policies, in particular:
  - Disaster risk reduction
  - Spatial planning
  - Environmental impact assessment (EIA) (how the Directive is transposed)
  - Insurance policy
- Transboundary cooperation
- Monitoring mechanisms in different sectors and governance levels

[1] The first versions of the fiches, prepared in consultation with the Member States in 2014-15, were unpublished and used to fine-tune the scoreboard. The second drafts were published, after consulting the Member States, as background documents to the public consultation on this evaluation in December 2017. https://ec.europa.eu/clima/consultations/evaluation-eus-strategy-adaptation-climate-change_en The final Member State consultation on the draft fiches took place in June 2018.

[2] These relate for example to meteorology, floods, drought, sea level, coastal erosion, biodiversity, human/animal/plant health etc.

The fiches are based on internal work by the Commission and on targeted assistance from an external contractor. They also served as input to the assessment of Action 1 of the Strategy during its evaluation. Annex IX of the Commission's SWD(2018)461 on the evaluation of the Strategy presents a horizontal assessment of the 28 country fiches, while Annex X presents the list of scoreboard indicators and the methodology used in applying them.

The assessments in the country fiches (yes/no/in progress) need to be read in conjunction with the narrative that accompanies them. They assess the state of play within each EU Member State. While all effort has been made to ensure the coherence across fiches in the assessment of the same indicator, it should not be directly compared across the Member States. Two countries with a "yes" on the same indicator could have a different national situation leading to that assessment. Not all indicators have the "in progress" status, some can only be "yes" or "no".

Table of contents

List of abbreviations

APA	National Adaptation Plan
BMBF	Federal Ministry of Education and Research
BMU	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
BMU/UBA	German Environmental Agency
BMVI	Federal Ministry of Transport and Digital Infrastructure
DAS	National Adaptation Strategy (Deutsche Anpassungsstrategie)
DFG	German Research Foundation
DWD	Germany's National Meteorological Service
EIA	Environmental Impact Assessment
GI	Green Infrastructure
ICLEI	Local Governments for Sustainability
IMA	Inter-ministerial Working Group
IPCC	Intergovernmental Panel on Climate Change
NGO	Non-Governmental Organisation
SEA	Strategic Environmental Assessment

POLICY FRAMEWORK

Adaptation strategies

A1. National adaptation strategy

Germany adopted its National Adaptation Strategy (DAS)[3] on 17 December 2008. The Strategy's aim is to proactively reduce vulnerability to the consequences of climate change, to maintain or improve the adaptability of natural, social and economic systems, and to take advantage of opportunities that may rise from effects of climate change. The DAS presents an overview of the effects of climate change, respectively following a sectoral and a geographic approach. In short, the DAS takes into account existing global and national climate projections, as a basis for identification of knowledge gaps and the first steps towards an action plan. The DAS set the framework conditions for tackling climate adaptation in Germany. It was drafted in a manner that allows for continuous refinement, matching the rapid developments in this policy field. In this light, the federal government adopted a report[4] on progress up to the end of 2015 with concrete and updated steps to develop and implement the DAS.

A2. Adaptation strategies adopted at subnational levels

All 16 Bundesländer (federal states) have developed climate adaptation strategies and have developed measures, some as a part of an integral climate change strategy or programme[5] (i.e. 100% of territory covered).

Bundesländer, or regions at the NUTS I level, exercise legislative powers in all areas that are not the exclusive competence of the Federal level. Environmental policy (including climate adaptation) is a concurrent competence between the federal level and Bundesländer level. The Bundesländer also implement legislation at lower levels of governance.

At the time when the DAS was developed (before 2009), 13 Bundesländer had already carried out studies of climate impacts on various sectors. Sectors commonly covered include water management, forestry, agriculture and health. Studies of the climate impacts on biodiversity and soils are less common. The northern German Bundesländer have studies on coastal protection. Specific strategies and measures taken by the Länder administrations are

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[3] German Federal Government (2008). German Strategy for Adaptation to Climate Change. Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/english/pdf/application/pdf/das_gesamt_en_bf.pdf

4 German Federal Government (2015). Adaptation to Climate Change: Initial Progress Report by the Federal Government on Germany's Adaptation Strategy. Available at: https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/fortschrittsbericht_anpassung_klimawandel_en_bf.pdf

[5] See for example: Baden-Württemberg Ministry for Environment, Climate, and Energy (2015). Strategie zur Anpassung an den Klimawandel in Baden-Württemberg. Available at: https://um.baden-wuerttemberg.de/fileadmin/redaktion/m-um/intern/Dateien/Dokumente/4_Klima/Klimawandel/Anpassungsstrategie.pdf

drafted in a coordinated manner, by means of KomPass - Climate Impacts and Adaptation in Germany[6].

Although both the DAS and the national action plan (APA) were drafted at Federal level, these documents build on the activities already undertaken by various Länder and the actions that were commonly defined and carried out at both governance levels. This shows the result of a continuous dialogue between the Länder and the Federal Government. The actual actions concerned vary from Land to Land. Some Länder focus on reducing greenhouse emissions – including by means of legislation – while others have adopted a fully-fledged adaptation strategy at Bundesländ level.

Adaptation action plans

B1. National adaptation plan

The APA[7] (national adaptation plan) was adopted on 31 August 2011. Its main objectives are to implement the DAS and to take steps for the next revision of the DAS. The APA follows a sectoral approach. The sectors presented are human health, the building sector, water regime, water management, coastal and marine protection, soil, biological diversity, agriculture, forestry and forest management, fishery, the energy industry (conversion, transport and supply), the financial services industry, transport and transport infrastructure, trade and industry, tourism industry; and cross-sectional topics, such as spatial, regional and physical development planning and civil protection. The APA was updated as part of the progress report in 2015 (APA II)[8]. The main 'clusters' (i.e. aggregated sectors) that are covered are water, infrastructure, land, health, economy, spatial planning, and civil defence.

B2. Adaptation plans adopted at sub-national level

The APA II lays down a set of criteria for measures to be taken at the level of the Bundesländer, in addition to those to be addressed at the federal level. Examples of these criteria are the extent to which measures are 'no-regret', or of direct or indirect relevance to climate adaptation. The initial lack of a cost-benefit analysis was provisionally filled by means of expert judgment on the efficiency and effectiveness of measures. Furthermore, the states of Hamburg (2013) and Hessen (2017) have both complemented their adaptation strategies with comprehensive action plans.

[6]German Federal Government (2011). The Competence Center for Climate Impact and Adaptation (KomPass). Available at: http://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/kompass

[7] German Federal Government (2011). Adaptation Action Plan of the German Strategy for Adaptation to Climate Change. Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/aktionsplan_anpassung_klimawandel_en_bf.pdf

[8] German Federal Government (2015). Fortschrittsbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

B3. Sectoral adaptation plans

Neither the DAS nor the APA presented an analysis allowing sectors to prioritise measures, such as a cost-benefit study specifically addressing risks per sector, or a supporting vulnerability analysis. This was, however, well acknowledged and it prompted the Federal Government to make the closing of this significant knowledge gap a key area of the Action Plan from 2011 onwards[9]. Within the "Netzwerk Vulnerabilität", also established in 2011, vulnerability assessments were carried out to support prioritisation of climate risks. These were published in 2015 in a dedicated report on Germany's climate vulnerability[10]. The DAS monitoring and progress report (2015) also summarises the results.[11]

SCOREBOARD

Step A: Preparing the ground for adaptation

1. Coordination structure

1a. A central administration body officially in charge of adaptation policy making

Yes / No

In Germany, the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety is the central administration body. Executive power for policy making (i.e. continued development of the DAS and horizontal/vertical coordination) lies with a designated inter-institutional working group – the IMA (Interministerielle Arbeitsgruppe Anpassungsstrategie). The IMA is supported by the StA AFK (Ständiger Ausschuss zur Anpassung an die Folgen des Klimawandels), a further committee whose task is the coordination of action between the federal and Bundesländer institutions for climate adaptation (see Indicator 1b and 1c).

1b. Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities

Yes / In progress / No

Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities. At the federal level, there is an Inter-Ministerial Working Group

[9] German Federal Government (2011). Adaptation Action Plan of the German Strategy for Adaptation to Climate Change. Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/aktionsplan_anpassung_klimawandel_en_bf.pdf

[10] German Federal Government (2015). Vulnerabilität Deutschlands gegenüber dem Klimawandel. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/climate_change_24_2015_vulnerabilitaet_deutschlands_gegenueber_dem_klimawandel_1.pdf

[11] German Federal Government (2015). Monitoringsbericht 2015. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf

(IMA Anpassung) mandated by the cabinet, which meets 3 to 6 times a year, involving all federal ministries. This IWG supervised the drafting of the APA and the progress report, among other activities. For the implementation of adaptation measures, coordination mechanisms tend to have an ad-hoc nature, fitting the specific needs and ministerial expertise required for the various projects. An example of such an initiative is KLIWAS[12] (Auswirkungen des Klimawandels auf Wasserstraßen und Schifffahrt), where the Ministry of Transport and Digital Infrastructure is supported by a variety of government agencies.

Within the Vulnerability Network (*Netzwerk Vulnerabilität*), experts from relevant federal departments and agencies support the identification of the climate vulnerability of relevant sectors. Network partners include the Federal Office of Civil Protection and Disaster Assistance, the Federal Institute for Geosciences and Natural Resources, the German Meteorological Service, various research institutes and the KfW bank[13].

1c. Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making

Yes / In progress / No

Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system. A working group on adaptation to climate impacts under the Conference of Environmental Ministers integrates the federal states in the process (Ständiger Ausschuss zur Anpassung an die Folgen des Klimawandels [StA AFK])[14]. This group meets twice a year to provide input from the federal state level into the national process, to exchange experiences with the strategy processes in the various federal states and to coordinate joint activities. Their primary focus to date has been to develop 'Länder-specific' activities for the implementation of the APA, as part of the German DAS, as well as the development of systematic climate impact monitoring across states by testing and selecting the most meaningful set of indicators to monitor changes throughout nature and the wider environment. More specifically, the APA also lays out those activities to be carried out jointly by the Federal and State Governments, namely expanding the knowledge base, intensifying the communication of knowledge, building networks, drawing up joint concepts and implementing measures, as well as joint Federal-Länder funding programmes for adaptation[15].

[12] KLIWAS. URL: http://www.kliwas.de/KLIWAS/DE/Home/homepage_node.html. Date accessed: 16/05/2018.

[13] Netzwerk Vulnerabilität (n.d.). Netzwerkpartner. Available at: http://netzwerk-vulnerabilitaet.de/tiki-index.php?page=Netzwerkpartner

[14] Federal / State Working Group "Climate, energy, mobility - sustainability". Anpassung an die Folgen des Klimawandels. Available at: https://www.blag-klina.de/Themenfelder-Anpassung-an-die-Folgen-des-Klimawandels.html

[15] German Federal Government (2011). Adaptation Action Plan of the German Strategy for Adaptation to Climate Change, Section D (p. 44-47). Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/aktionsplan_anpassung_klimawandel_en_bf.pdf

Action on adaptation at city level is also increasing. For this reason, the Federal Government, is expanding dialogue about adaptation with the local authority associations and other bodies, such as the Klimabündnis[16] and ICLEI[17], and providing funding support.

2. Stakeholders' involvement in policy development

2a. A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies

Yes / No

A dedicated process was in place to facilitate stakeholders' involvement in the preparation of both the DAS and the APA (and their progress report with the APA II), which were accompanied by a cross-sectoral, multi-stakeholder discussion and various formats for participation as part of the ongoing dialogue and participation process concerned with the DAS. The DAS preparation involved information gathering from administration, the private sector, interest groups, scientists and the general public.

For stakeholders from priority sectors, limited evidence could be collected concerning involvement, participation or public consultation in drafting the DAS and APA/APA II. The examples that could be gathered concern stakeholders from the financial and insurance sector who were identified in the DAS and practitioners who were consulted in drafting the climate projections.

2b. Transboundary cooperation is planned to address common challenges with relevant countries

Yes / No

Transboundary cooperation is mentioned in the DAS in the context of river basin management, in which Germany and its Länder are very active. Germany participates in the international river basin committees for the Rhine, Danube, Meuse, Elbe, Saar-Mosel. The International Commission for the Protection of the Rhine published a climate adaptation strategy in 2014[18]. This is a good example of ongoing transboundary efforts. In addition, Germany has been a leader in BaltAdapt and the follow-up by the Council of the Baltic Sea States[19], as well as participating actively in the Danube adaptation strategy[20].

[16] Climate Alliance. Available at: http://klimabuendnis.org/
[17] Local Governments for Sustainability. Available at: www.iclei.org
[18] IKSR (2015). Strategy for the IRBD Rhine for adapting to climate change. Available at: http://www.iksr.org/fileadmin/user_upload/Dokumente_en/Reports/219_en.pdf
[19] Council of the Baltic Sea States. Available at: http://www.cbss.org/
[20] ICPDR (2012). ICPDR Strategy on Adaptation to Climate Change. Available at: http://www.icpdr.org/main/sites/default/files/nodes/documents/icpdr_climate-adaptation-strategy.pdf

Step B: Assessing risks and vulnerabilities to climate change

3. Current and projected climate change

3a. Observation systems are in place to monitor climate change, extreme climate events and their impacts

Yes / In progress / No

Observation systems are in place to monitor climate change, extreme climate events and their impacts.

The German Government carries out continuous long-term observation of processes in the atmosphere, the oceans and on land. Monitoring the atmosphere is part of the remit of Germany's National Meteorological Service, results of which are made visible through the Climate Atlas. The German Meteorological Service – as the successor of earlier meteorological services – has over 150 years of experience in observing the weather and the climate.

Extreme weather events are monitored and climate impacts on different sectors (fields of action from DAS) are monitored using indicators. This is reported in a monitoring report (2015) and is planned to be updated every four years[21].

Germany also participates in, and funds, several international research programmes, and is one of the leaders in Europe on climate research and Earth observation from space.

Germany's National Meteorological Service (DWD)[22] is responsible for meeting meteorological requirements from all areas of the German economy and society. DWD plays an important role in providing services to the Federal Government and the Länder in terms of climate monitoring. This includes the provision of climate projections for the planning and preparation of adaptation measures.

3b. Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)

Yes / In progress / No

Projections are available at both the Federal level and at the level of the Länder.

[21] German Federal Government (2015). Monitoringsbericht 2015. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf

[22] DWD. Available at: http://www.dwd.de

Both statistical and dynamic regional climate models are used. Only studies that were developed after 2009 take ENSEMBLES into account when determining a climate signal. Most of them look at time frames up to 2100. A number of different Intergovernmental Panel on Climate Change (IPCC) scenarios are used, including the Representative Concentration Pathways (RCP) scenarios, although A1B is most frequently selected as the reference scenario (followed by A2 and B1). Both statistical and model-based approaches are used to determine the consequences of climate change, depending on the sector under consideration. Most calculations of the potential future consequences of climate change use only climate projections. Socioeconomic background conditions, such as demographics or land use, are seen as constants.

Excerpts of climate projections can be found in the Climate Atlas[23]. Regional climate projections are also carried out by the individual Länder.

3c. Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making

Yes / In progress / No

Climate risks and vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.

The first vulnerability assessment of climate impacts for selected fields of actions in Germany was conducted in 2005[24]. In 2011, the Vulnerability Network was established: a network of 16 governmental departments and institutes, financed by the Federal Government (BMUB) and supported by the scientific project UBA. The aim was to conduct an up-to-date, standardised cross-sectoral vulnerability assessment, covering the whole of Germany. Two different scenarios were used (strong change and weaker change) and for the prioritisation, social, economic, ecological and cultural criteria were used. Furthermore, interactions between different 'action fields' were analysed and cross-cutting vulnerabilities were identified. The results of the extensive vulnerability assessments were published in 2015, pointing out which sectors are most vulnerable and should be prioritised within the adaptation action plan[25]. The 14 sectors analysed are: soil, biodiversity, agriculture, forestry, fishery, maritime and coastal protection, water management, transport, buildings, industry, energy, tourism, finance and human health.

[23] DWD. Climate Atlas. Available at: http://www.dwd.de/EN/climate_environment/climateatlas/climateatlas_node.html

[24] German Federal Government (2005). Climate Change in Germany - Vulnerability and Adaptation Strategies of Climate-Sensitive Systems. Available at: http://www.umweltbundesamt.de/en/publikationen/klimawandel-in-deutschland-vulnerabilitaet

[25] German Federal Government (2015). Vulnerabilität Deutschlands gegenüber dem Klimawandel. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/climate_change_24_2015_vulnerabilitaet_deutschlands_gegenueber_dem_klimawandel_1.pdf

In addition, various studies and activities have been carried out by individual Länder to assess the level of climate vulnerability. These have been reviewed in a meta-analysis and include 155 studies that had been published up to mid-2012 throughout different Länder. The meta-analysis has extracted the most relevant findings across Länder and impact sectors in order to feed these into the analysis of climate risk and vulnerability presented in Chapter 6 of Germany's vulnerability to climate change report (2015)[26].

3d. Climate risks/vulnerability assessments take transboundary risks into account, when relevant

Yes / In progress / No

Sectoral vulnerability assessments take transboundary risks into account in a qualitative way. The 2015 vulnerability report recognises international risks mainly for the sectors industry and business, transportation and infrastructure, fishing, finance and in lesser degree biodiversity, human health and tourism. Within flood risk and water management, transboundary cooperation is already well established.

Germany recognises that climate impacts in other parts of the world will be large and those can in effect have impacts on Germany, for example, through trade and migration (progress report). The research regarding the quantification of these effects is, however, still premature.

4. Knowledge gaps

4a. Work is being carried out to identify, prioritise and address the knowledge gaps

Yes / In progress / No

Work is being carried out to identify, prioritise and address the knowledge gaps, in collaboration with key stakeholders (from science, administration and the private sector). Research and development in the field of climate change and adaptation are supported and developed by a national centre of competence for consequences of climate change and adaptation (KomPass[27]). The KomPass centre derives from the DAS. Its core tasks are policy advice, environmental research, information distribution, networking and stakeholder involvement.

The Climate Service Centre was an initiative of the German Federal Government, that was kickstarted in 2009. In June 2014, the Centre was institutionalised in the Helmholtz

26 Meta-analysis findings of existing Länder studies are published in chapter 6 of German Federal Government (2015). Vulnerabilität Deutschlands gegenüber dem Klimawandel. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/climate_change_24_2015_vulnerabilitaet_deutschlands_gegenueber_dem_klimawandel_1.pdf

27 German Federal Government (2011). The Competence Center for Climate Impact and Adaptation (KomPass). Available at: http://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/kompass

Association and renamed Climate Service Center 2.0[28]. It offers decision support and decision support tools for administrations dealing with the effects of climate change. Global consequences of climate change are researched by a national climate research centre in Potsdam[29].

Specific effects of climate change for the building sector have been researched in ExWoSt[30]. An additional overview of translation of projections to the regional level can be found in KlimZug[31]. The aim of KlimZug is to integrate expected changes to the climate and the associated extreme weather challenges in regional planning and development processes. Networks are to be formed, partly to increase the future competitiveness of regions, and partly to advance the development and use of new technologies, methods and strategies for adapting to climate change in regions[32].

Identified knowledge gaps are used to prioritise public funding for research on climate impacts, vulnerabilities and adaptation.

Knowledge gaps are well defined by research institutes dealing with climate change. In some cases, designated research bodies within a sector exist, working on climate change challenges on both mitigation and adaptation sides.

The APA and APA II present efforts to be undertaken in scientific research, dealing with uncertainties, new observational methods and systems. Extensive studies on these topics are funded by the Federal Ministry of Education and Research (BMBF) and the German Research Foundation (DFG).

The Federal Government defines priority research fields in its APA and APA II to strengthen the knowledge base and to develop climate models on different scales. The BMBF contributes through several research projects, e.g. 'The economics of climate change'[33] and a research programme related to 'Climate services' within the framework of "JPI Climate"[34]. There is also collaboration between 14 European countries to coordinate their climate research jointly and fund new transnational research initiatives, for which BMBF is one of the key funders.

[28] Climate Service Center Germany. Climate Services for Adaptation. Available at: http://www.climate-service-center.de/
[29] Potsdam Institute for Climate Impact Research. Climate Impacts and Vulnerabilities. Available at: https://www.pik-potsdam.de/forschung/klimawirkung-vulnerabilitat
[30] BMUB. ExWoSt. Available at: http://www.bbsr.bund.de/BBSR/DE/FP/ExWoSt/exwost_node.html, buildings
[31] German Federal Ministry of Education and Research. KlimZug. Available at: http://www.klimzug.de/en/160.php
[32] German Federal Government (2008). German Strategy for Adaptation to Climate Change. Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/english/pdf/application/pdf/das_gesamt_en_bf.pdf
[33] BMBF (2015). Economics of Climate Change Adaptation. Available at: http://www.oekonomie-klimawandel.de/
[34] JPI Climate. Available at: http://www.jpi-climate.eu/home

The Inter-Ministerial Working Group on climate has published guidelines for Climate Impact and Vulnerability Assessments, containing recommendations for applying regional and national assessment methods.

5. Knowledge transfer

5a. Adaptation relevant data and information is available to all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means)

Yes / In progress / No

Adaptation relevant data and information is available to all stakeholders through a dedicated website. In the framework of the APA, KomPass transformed its webpage into a national Information, Communication and Cooperation Platform on Adaptation[35]. The KomPass portal is intended to provide information on adaptation activities and policy interactively, and will be expanded further for this purpose in cooperation with other governmental agencies.

In addition to the website of DKD and KlimAdapts, Klimanavigator[36] (Climate Navigator) is a national web portal that guides users to climate and environmental information. Other informative websites related to the current and future German climate are the German Climate Portal (Deutsches Klimaportal)[37] and the Regional Climate Atlas[38].

5b. Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated

Yes / In progress / No

Capacity building activities take place; education and training materials on climate adaptation concepts and practices are available and disseminated.

Making knowledge available, providing information, and playing an enabling role is one of the key areas of the DAS. This comprises initiatives by the Federal Government to expand knowledge bases, provide and communicate information, expand the research and information infrastructure and support stakeholder dialogue, participation and networking. At the Bundesländer level, examples of interactive workshops can also be found[39].

Science-policy interfaces, such as workshops, are in place to facilitate dialogue between researchers and decision and policy–makers. An example of exchanges between government,

[35] German Federal Government (2011). The Competence Center for Climate Impact and Adaptation (KomPass). Available at: http://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/kompass
[36] Klima Navigator. Available at: http://www.klimanavigator.de/
[37] German Climate Portal. Climate Services for Germany. Available at: http://www.deutschesklimaportal.de
[38] Germanys Regional Climate Atlas. Available at: http://www.regionaler-klimaatlas.de/
[39] MKULNV. Klimashutz. Available at: https://www.klima.nrw.de/mediathek/dokumentation/workshops-anpassung/

society and the scientific community is offered by the Helmholtz Centre for Environmental Research[40].

Education and capacity building was an important part of the project KlimZug, part of the sustainable development project of the Federal Ministry of Education and Research[41].

Many tools, guidelines and handbooks have been developed by the Federal Government within the research projects[42]. Between 2011 and 2014 five regional conferences were organised by BMUB, which discussed specific adaptation themes and aimed to support cooperation between stakeholders.

Step C: Identifying adaptation options

6. Adaptation options' identification

6a. Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts

Yes / No

Adaptation options are based on sectoral risk assessments and good practices, defined in Indicator 3c, and taking into account geographic specificities, as defined under Indicator 3b. In the DAS, adaptation options are presented to a limited extent; nonetheless, opening up the possibilities for development of adaptation measures through the APA. For the further development of the DAS and the prioritisation of climate risks and needs for action, an up-to-date, standardised cross-sectoral vulnerability assessment and progress report were published in 2015[43,44,45].The APA is updated according to these findings, for example, it includes more sector-specific measures and instruments[46]. The APA II identifies adaptation options for all clusters (i.e. grouped under 14 priority sectors, as mentioned above). Actions can be cross-cutting and specific to a multitude of priority sectors under one cluster. All priority sectors are mentioned in the APA II action list.

[40] UFZ. Available at: http://www.ufz.de/
[41] German Federal Ministry of Education and Research. KlimZug. Available at: http://www.klimzug.de/en/160.php
[42] BBSR. Available at: www.klimastadtraum.de
[43] German Federal Government (2015). Monitoringsbericht 2015. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf
[44] http://www.umweltbundesamt.de/en/publikationen/klimawandel-in-deutschland-vulnerabilitaet
[45] German Federal Government (2015). Vulnerabilität Deutschlands gegenüber dem Klimawandel. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/climate_change_24_2015_vulnerabilitaet_deutschlands_gegenueber_dem_klimawandel_1.pdf
[46] German Federal Government (2015). Fortschrittbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

An additional overview of the actions taken and options identified, collected at the federal level, can be found in the KomPass project catalogue, providing an overview of programmes and projects related to climate adaptation[47].

6b. The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks

Yes / No

The updated APA II, as initiated under the DAS progress report[48], includes prioritisation of adaptation options based on the vulnerability assessments. It takes into account expected impact, urgency and the time that it takes to implement a measure. The qualification of options according to these measures was based on expert judgment by the authors of the vulnerability assessment. The expert judgment was mainly informed by an extensive literature review of 285 climate-relevant (impact) studies in Germany.

6c. Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies

Yes / In progress /No

There is evidence of mechanisms in place to coordinate disaster risk management and climate adaptation. It is clear that there have been contacts and cooperation between the institutions responsible for both policies. A representative of the Federal Office for Civil Protection and Disaster is part of the inter-ministerial working group for climate adaptation. The office nominated a contact person for the topic civil protection and climate change. Members of the office are represented in the Strategic Governmental Agencies Alliance (see Indicator 8b) and in the Vulnerability Network[49].

Since 2007, there has been a 'Strategic Governmental Alliance Climate Adaptation' between the Federal Office for Civil Protection and Disaster Assistance, the German Meteorological Service, the Federal Institute for Research on Building, Urban affairs and Spatial Development and other institutions.

[47] German Federal Government (2011). The Competence Center for Climate Impact and Adaptation (KomPass). Available at: http://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/kompass

[48] German Federal Government (2015). Fortschrittbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

[49] Netzwerk Vulnerabilität (n.d.). Netzwerkpartner. Available at: http://netzwerk-vulnerabilitaet.de/tiki-index.php?page=Netzwerkpartner

7. Funding resources identified and allocated

7a. Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action

Yes / In progress /No

For all measures described in the APA II, the amount and source of available funding is described, both for vulnerable sectors as well as for cross-cutting adaptation action.

The Federal Government is providing funding for developing the German Climate Projections, the national climate change risk assessment, the maintenance of the Adaptation Subcommittee, the climate services websites, and other research and cross-cutting actions needed to implement the APA and coordinate action nationally. The Federal Government is also funding exemplary model and demonstration schemes at local and regional level, that develop and test concepts and approaches for climate adaptation.

Since the beginning of 2011, the ongoing funding of local authority climate protection concepts under the National Climate Protection initiative[50] has been supplemented with options to develop integrated adaptation and climate protection concepts, and sub-concepts for adaptation. Furthermore, the BMU is launching a new round of funding (in August 2018)[51] promoting climate adaptation at the level of individual enterprises. This funding scheme also supports communal lighthouse projects, projects fostering local and regional adaptation cooperation, and the development of educational adaptation tools[52]. It has been in operation since October 2011.

Where relevant, funding is available to increase climate resilience in vulnerable sectors. All activities under the APA are funded from the budgets of the respective governments' departments within the current financial planning. Thereby all activities reside with the ministries responsible.

Local authorities' adaptation activities are supported by the expanded opportunities to obtain funding under the National Climate Protection Initiative. Further support is being provided by the Environment Ministry and the German Environmental Agency (BMU/UBA), the Federal Ministry of Transport and Digital Infrastructure(BMVI/BBSR) and the BMBF, in particular[53].

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[50] BMU. Climate Initiative. Available at: http://www.bmub.bund.de/en/topics/climate-energy/climate-initiative/general-information/

[51] Förderung von Maßnahmen zur Anpassung an die Folgen des Klimawandels. Available at: https://www.ptj.de/folgen-klimawandel, Date accessed: 16/05/2018

[52] BMU (2017). Bekanntmachung des BMUB über die Förderung von Maßnahmen zur Anpassung an den Klimawandel. Available at: https://www.ptj.de/lw_resource/datapool/systemfiles/cbox/715/live/lw_bekdoc/das_foerderbekanntmachung_klimawandel_bf.pdf

[53] German Federal Government (2015). Progress Report on the German Adaptation Strategy on Climate Change. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

Furthermore, the LIFE program of the European Union regularly co-funds climate-relevant projects in Germany. Since its inception, 197 of those projects implemented have focused on environmental innovation and 132 on nature conservation. Under the newest LIFE programme, four projects have specifically focused on climate adaptation (and mitigation). For more specific information consult the LIFE website's Germany profile[54].

Step D: Implementing adaptation action

8. Mainstreaming adaptation in planning processes

8a. Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments

Yes / No

The revised Environmental Impact Assessment (EIA) Directive was transposed into Germany's EIA legislation[55], as part of a wider reform of the country's urban planning legislation in March 2017[56]. It now acknowledges the need to assess climate as one of seven subjects of protection from impacts of a specific plan or project. The specific focus hereby lies on general changes to the climate (e.g. via greenhouse gases) or a change to local climates arising from inside the parameters of influence of the planned project(s). At the same time the revised Directive also requires the project(s) to assess their vulnerability to potential impacts of climate-related extreme weather events and to outline the types of adaptation measures that are planned. Integration took place with the EIA and Strategic Environmental Assessment (SEA) document[57]. In a majority of the Bundesländer adaptation plans, EIA is mentioned as an existing tool to address the effects of climate change in local spatial planning. SEA is included in part of the same German EIA legislation as the EIA document and, hence, also considers climate change.

8b. Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections

Yes / **No**

Early warning systems for civil protection purposes at Bundesländ-level draw heavily on the information that is available for extreme weather events, for example, from the 24-hour

[54] LIFE – Germany. Available at: http://ec.europa.eu/environment/life/countries/germany.html, Date accessed: 16/05/2018

[55] Gesetz über die Umweltverträglichkeitsprüfung (UVPG). Available at: http://www.gesetze-im-internet.de/uvpg/UVPG.pdf

56 https://www.bundesregierung.de/Content/DE/Artikel/2016/11/2016-11-30-urbane-gebiete.html

[57] Gesetz über die Umweltverträglichkeitsprüfung (UVPG). Available at: http://www.gesetze-im-internet.de/uvpg/UVPG.pdf

inundation early warning system that was recently inaugurated by the Saxonian government (early 2018)[58].

No evidence has been found of how disaster risk management plans and associated risk analyses take account of future climate projections. Climate change and adaptation is being included in educational activities for crisis management, emergency planning and civil protection[59]. This initiative is financed and carried out by the Federal Office of Civil Protection and Disaster Assistance (see Initiative 6.2 in the APA II).

8c. Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change

Yes / No

When the Federal Regional Planning Act was revised in 2008, climate adaptation was introduced as one of the principles of spatial planning (Paragraph 2, Section 2, No. 6). This Act put in place a framework that has allowed inclusion of adaptation-relevant considerations when the spatial plans of the Länder and regions are revised.

KLIMAPAKT is an example of a project integrating climate change into land use and land management. It has established best practices for spatial planning in Germany (2008-2010). The internet platform Klima und Raum is a result of this project and aims to promote long-term collaboration between research, institutions and practice[60]. A recent report (2016) of the Federal Environmental Office provides a practical guide for consideration of climate adaptation in spatial planning[61]. There are several more research projects related to climate change and spatial planning. Examples include: the Klimawandelgerechter Regional Plan[62] and projects within the KlimaMORO framework, which aims to develop strategies for spatial development and climate change[63].

In addition to consideration of climate adaptation in spatial plans, the National Strategy for an Integrated Management of Coastal Zones (IKZM, 2006 – latest version)[64] takes account of climate change as a crucial factor influencing decision making in maritime spatial planning.

[58] Hochwasserfrühwarnung für Einzugsgebiete kleiner 200km2. Available at: https://www.umwelt.sachsen.de/umwelt/infosysteme/hwims/portal/web/fruehwarnung, Date accessed: 16/05/2018

[59] German Federal Government (2015). Fortschrittbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

[60] Klima und Raum. Available at: http://www.klima-und-raum.org

[61] German Federal Government (2016). Klimaanpassung in der räumlichen Planung. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/1968/publikationen/fkz_3711_41_103_internet_hauptprodukt_praxishil_fe_klimaanpassung_in_der_raumlichen_planung.pdf

[62] BBSR (2016). KlimREG. Available at: http://www.bbsr.bund.de/BBSR/DE/FP/MORO/Forschungsfelder/2014/KlimREG/01_start.html?nn=406988

[63] KlimaMoro. Available at: http://www.klimamoro.de

[64] BMU (2006). Integriertes Küstenyonenmanagement in Deutschland. Available at: http://www.ikzm-strategie.de/dokumente/endbericht_kabinettversion_30032006.pdf.

The main legal document for urban planning in Germany, the Baugesetzbuch (BauGB)[65], states that the protection of the climate should always be taken into account. It also states that urban planning measures that contribute to climate mitigation and adaptation are to be supported and fostered.

8d. National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies

Yes / In progress / No

National policy instruments promote adaptation at sectoral level, in line with national priorities. The APA and its successor, the APA II, adopt a sectoral approach (see above). Implementation of the actions identified in the APA and APA II is the responsibility of the Länder. The action programmes and model projects of the APA and APA II are adopted by the relevant stakeholders. In practice, however, climate adaptation does not have the highest priority in most municipalities, except in those that are model projects[66].

The progress report (2015) identifies the following sectors as having incorporated climate adaptation in their legislation: the protection of critical infrastructure, spatial development, forest management, biodiversity, water and flood management.

Examples of the policy instruments applied to promote adaptation at sectoral level include:

- The building code, which was amended to ensure that climate adaptation is considered in urban planning by municipalities[67].
- Regulations that require that facility safety consider expected intensities of river high water, flood events and heavy rainfall.

Research projects are also important for the promotion of adaptation in different sectors. For example, KLIWAS (by BMVI) investigated climate impacts on waterways and shipping and developed adaptation options[68]. It also developed new methods and tools by involving relevant stakeholders across 30 projects, which has increased systemic understanding of the sector and encouraged implementation of adaptation measures.

[65] German Federal Government (2017). Baugesetzbuch, Fassung 2017. Available at: https://www.gesetze-im-internet.de/bbaug/BJNR003410960.html

[66] German Federal Government (2015). Fortschrittbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

[67] German Federal Government (2015). Fortschrittbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

[68] Kliwas. Available at: http://www.kliwas.de/KLIWAS/DE/Home/homepage_node.html

8e. Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention

Yes / No

Activities described in the APA and APA II discuss insurance options for physical damage. Other measures discuss the binding inclusion of climate factors in risk analysis by financial services companies.

According to the progress report (2015), the insurance sector has the capacity to react to climatic changes and can continue to provide insurance against natural disasters. The insurance sector in Germany is well aware of the risks of climate change, which are considered within risk management. Insurance products incentivising the development of climate-resilient buildings (e.g. natural hazard insurance) are identified as important elements for risk prevention in the APA II and supported by Action 5.5. (funding for increased campaigning).

9. Implementing adaptation

9a. Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents

Yes / **In progress** / No

The progress report states that from the 150 measures identified in the APA, 43 have been implemented since 2011, 78 are in the process of being implemented, 13 measures are not yet being implemented, while 10 are in preparation (status of May 2015).

At a federal level, implementation has been focusing on four pillars:

- Pillar 1: Providing knowledge, informing, enabling and involving
- Pillar 2: Framework-setting by the Federal Government
- Pillar 3: Activities for which the Federal Government is directly responsible
- Pillar 4: International responsibilities.

A total of 60% of all APA I activities are assigned to Pillar 1. Extensive research and development activities have been implemented to deepen the understanding of changing, regional climate impacts and the areas affected. Two key examples include: 'KLIMZUG – Making climate change sustainable in regions' (completed), and 'Local adaptation to climate change – Forums for the exchange of ideas and cooperation' (ongoing).[69]

Pillar 3 covers the Federal Government's responsibilities for climate adaptation in its capacity as the owner of property, land and infrastructure, and also as a developer. For example, one

[69] http://www.klimzug.de/de/1426.php

of the completed projects was 'KLIWAS – Impacts of climate change on waterways and navigation – Searching for options of adaptation'.

From a sectoral perspective, good progress in project implementation can be found mainly for coastal protection, flood protection and prevention, protection against heavy rains, heat waves and droughts[70].

In the plans drafted by the Länder, specific challenges to sectors are addressed when deemed relevant by the regional government. A complete overview can be found on the Kompass web page[71]. A short background of relevant mechanisms induced by climate change is described for each sector.

The progress report has particularly indicated an urgent need to further support small communities. Whereas large cities are capable of performing costly climate and vulnerability analyses, small communities often lack the resources to initiate an adaptation process.

9b. Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)

Yes / No

Cooperation mechanisms are in place to foster and support adaptation at relevant scales (e.g. local, subnational).

The Federal Government supports adaptation at the local level[72], including through funding schemes. Cooperation between the federal level and the Bundesländer is well coordinated. In order to support activities at the local level, the Federal Government has initiated projects on adaptation issues in various model regions, facilitated dialogues (with support of relevant ministries), grants and workshops. As a result, several reports with research results, guidance and implementation examples have been published[73,74]. Within the project KlimZug,

[70] German Federal Government (2015). Fortschrittbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: http://www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_fortschrittsbericht_bf.pdf

[71] German Federal Government (2011). The Competence Center for Climate Impact and Adaptation (KomPass). Available at: http://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/kompass

[72] EU (2016). Regional and local adaptation in the EU since the adoption of the EU adaptation strategy in 2013. Available at: http://cor.europa.eu/en/documentation/studies/Documents/Local%20and%20regional%20adaptation.pdf

[73] BBSR (2016). Klimaresilienter Stadtumbau. Available at: http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/Sonderveroeffentlichungen/2017/klimaresilienter-stadtumbau-dl.pdf?__blob=publicationFile&v=3

[74] BBSR (2016). Anpassung an den Klimawandel in Stadt und Region. Available at: http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/Sonderveroeffentlichungen/2016/anpassung-klimawandel-dl.pdf?__blob=publicationFile&v=2

cooperation networks are built to integrate climate adaptation measures effectively into regional planning and development projects[75]. IT-supported information services for climate impact assessment are available for local authorities, such as the UBA/KomPass Klimalotse, an adaptation decision-support tool and the BBSR's Stadtklimalotse[76]. The website Klimascout gives a wiki-like overview of climate for municipalities[77].

9c. Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure

Yes / No

Procedures or guidelines are available to assess the potential climate impacts on major projects or programmes, and facilitate the choice of alternative options. The most relevant guideline is Germany's Environmental Impact Assessment (EIA) legislation[78] of March 2017, which transposes the EU's revised EIA Directive into national law. This new EIA legislation requires major projects to assess on the one hand their potential contribution to climate change, as well as their potential vulnerabilities to climate impacts. It includes a requirement to make an analysis of alternative options.

Additionally, from 2014-2017, the climate resilience of infrastructure was examined through a project which investigated the weak spots of current infrastructure and developed scenarios for future infrastructures. These scenarios considered climate and extreme weather events, societal and technological change as well as a vision of future climate resilient and sustainable infrastructures[79].

Another project about climate-resilient regions studied the vulnerability of (critical) infrastructure in the context of climate change. Approaches to design climate-resilient infrastructures was developed. This included the consideration of social, organizational and institutional consequences that are associated with the adaptation of existing or alternative infrastructures. Based on this, policy recommendations will be developed for actors at the

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http://www.bbsr.bund.de/BBSR/DE/FP/MORO/Studien/2011/LeitfadenRegionaleKlimafolgenbewertung/Downloads/DL_Handbuch.pdf;jsessionid=9E901BD9056219A1DFBB0E103B660DB1.live11294?__blob=publicationFile&v=3

[75] German Federal Ministry of Education and Research. KlimZug. Available at: http://www.klimzug.de/en/160.php

[76] German Federal Government. Klimalotse. Available at: www.klimalotse.anpassung.net/

[77] KlimaScout. Available at: http://www.klimascout.de/kommunen/index.php?title=Hauptseite

[78] Gesetz über die Umweltverträglichkeitsprüfung (UVPG). Available at: http://www.gesetze-im-internet.de/uvpg/UVPG.pdf

[79] German Federal Government (2017). Klaris. Available at: https://www.umweltbundesamt.de/en/topics/climate-energy/climate-change-adaptation/adaptation-tools/project-catalog/klaris-needs-opportunities-for-climate-resilient

federal level and other adaptation stakeholders (e.g. municipalities) for developing climate-resilient infrastructures[80].

It is not clear if green infrastructure (GI) is facilitated specifically as an alternative to major projects or programmes, but Germany is active in the field of GI, and GI is, at least, promoted as a climate adaptation measure for flood protection. In urban areas, green areas, water retention basins and reduction of sealed soil are seen as important measures for climate adaptation (as described in the National Urban Development Policy, Nationale Stadtentwicklungspolitik).

9d. There are processes for stakeholders' involvement in the implementation of adaptation policies and measures

Yes / No

Stakeholders are being actively involved in adaptation policy development and implementation. For the development of the DAS, the APA and the progress report. Academia, research, NGOs and the business sector have been particularly heavily involved[81].

In order to showcase and bundle how non-state actors are involved in implementation, ongoing activities by stakeholders are captured in an ever-expanding information platform to share this knowledge and experience with other interested citizens, business, NGOs, etc. primarily at local and regional levels: 'Tatenbank Anpassung' (Actionbase Adaptation)[82]. However, the APA, expert opinion[83], and the progress report emphasise that there is still a need to embed the necessity for climate adaptation more deeply in society. Awareness particularly needs to be increased among non-state actors and citizens in order to encourage more active involvement.

Step E: Monitoring and evaluation of adaptation activities

10. Monitoring and reporting

10a. NAS/NAP implementation is monitored and the results of the monitoring are disseminated

Yes / No

[80] German Federal Government (2016). Climate-resilient regions. Available at: https://www.umweltbundesamt.de/en/topics/climate-energy/climate-change-adaptation/adaptation-tools/project-catalog/climate-resilient-regions

[81] For example, see p. 17 of APA. Available at: http://www.bmub.bund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/aktionsplan_anpassung_klimawandel_en_bf.pdf

[82] http://www.tatenbank.anpassung.net/cln_095/Tatenbank/DE/Home/home_node.html

[83] https://www.nachhaltigkeitsrat.de/aktuelles/nachhaltigkeitspolitik/detailansicht/artikel/tut-deutschland-genug-zur-anpassung-an-den-klimawandel/

Climate impacts on different sectors (fields of action from DAS) and the progress on adaptation are monitored using qualitative and quantitative indicators. Most recently, a monitoring report was published by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety in 2015 and progress is planned to be reported every four years[84]. The progress report includes information on allocated budgets.

10b. The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated

Yes / No

As indicated in relation to Indicator 10a, the monitoring report is structured per vulnerable sector and, therefore, the integration of climate adaptation into the priority sectors is monitored. At the same time, the monitoring process does not include a method for specifically monitoring the integration of climate action in the priority sectors.

10c. Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated

Yes / No

No formal monitoring and reporting mechanism or legal requirement seems to be in place for adaptation at regional or local levels. However, guidance on establishing monitoring and evaluation systems at municipal level are provided (e.g. Anpasssung an den Klimawandel in Stadt und Region[85]) and states engage in monitoring and reporting practices throughout the country. As an example, the Bundesländ of Baden-Württemberg recently published its first monitoring report for its regional Climate Protection Law (2017)[86].

11. Evaluation

11a. A periodic review of the national adaptation strategy and action plans is planned

Yes / No

[84] Umweltbundesamt (2015). Monitoringsbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf

[85] BBSR (2016). Anpassung an den Klimawandel in Stadt und Region. Available at: http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/Sonderveroeffentlichungen/2016/anpassung-klimawandel-dl.pdf?__blob=publicationFile&v=2
http://www.bbsr.bund.de/BBSR/DE/FP/MORO/Studien/2011/LeitfadenRegionaleKlimafolgenbewertung/Downloads/DL_Handbuch.pdf;jsessionid=9E901BD9056219A1DFBB0E103B660DB1.live11294?__blob=publicationFile&v=3

[86] LUBW (2017). Monitoring-Bericht zum Klimaschutzgesetz Baden-Württemberg. Available at: https://www4.lubw.baden-wuerttemberg.de/servlet/is/269448/monitoring-bericht_zum_klimaschutzgesetz_baden-wuerttemberg.pdf?command=downloadContent&filename=monitoring-bericht_zum_klimaschutzgesetz_baden-wuerttemberg.pdf

A periodic review of the DAS and APA is undertaken through the monitoring report and the progress report (see Indicator 10a). These reports inform any revision needed. For instance, an update of the APA was published in 2015, containing among other things a detailed planning of activities and a funding plan aimed at reaching the DAS objectives. The monitoring report described under Indicator 10a is to be drawn up every four years.

11b. Stakeholders are involved in the assessment, evaluation and review of national adaptation policy

Yes / No

Stakeholders are involved in the assessment, evaluation and review of national adaptation policy mostly through consultation, and as receivers of information. It would appear as though active stakeholder involvement has been limited to science and research stakeholders.

The indicators for the monitoring of climate impacts and adaptation have been developed over a 5-year long process in which governmental and non-governmental experts from national and Länder-level were involved, but no evidence can be found that stakeholders were involved in the evaluation of the indicators[87].

[87] Umweltbundesamt (2015). Monitoringsbericht zur Deutschen Anpassungsstrategie an den Klimawandel. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/monitoringbericht_2015_zur_deutschen_anpassungsstrategie_an_den_klimawandel.pdf

SUMMARY TABLE

Adaptation Preparedness Scoreboard		
No.	**Indicator**	**Met?**
Step A: Preparing the ground for adaptation		
1 Coordination structure		
1a	A central administration body officially in charge of adaptation policy making	**Yes** / No
1b	Horizontal (i.e. sectoral) coordination mechanisms exist within the governance system, with division of responsibilities	**Yes /** In progress / No
1c	Vertical (i.e. across levels of administration) coordination mechanisms exist within the governance system, enabling lower levels of administration to influence policy making.	**Yes /** In progress / No
2 Stakeholders' involvement in policy development		
2a	A dedicated process is in place to facilitate stakeholders' involvement in the preparation of adaptation policies	**Yes /** No
2b	Transboundary cooperation is planned to address common challenges with relevant countries	**Yes** / No
Step B: Assessing risks and vulnerabilities to climate change		
3 Current and projected climate change		
3a	Observation systems are in place to monitor climate change, extreme climate events and their impacts	**Yes** / In progress / No
3b	Scenarios and projections are used to assess the economic, social and environmental impacts of climate change, taking into account geographical specificities and best available science (e.g. in response to revised IPCC assessments)	**Yes** / In progress / No
3c	Sound climate risks/vulnerability assessments for priority vulnerable sectors are undertaken to support adaptation decision making.	**Yes** / In progress / No
3d	Climate risks/vulnerability assessments take transboundary risks into account, when relevant	**Yes** / In progress / No
4 Knowledge gaps		
4a	Work is being carried out to identify, prioritise and address the knowledge gaps	**Yes** / In progress / No
5 Knowledge transfer		
5a	Adaptation relevant data and information is available to	**Yes /** In progress

Adaptation Preparedness Scoreboard		
No.	**Indicator**	**Met?**
	all stakeholders, including policy makers (e.g. through a dedicated website or other comparable means).	/ No
5b	Capacity building activities take place; education and training materials on climate change adaptation concepts and practices are available and disseminated	**Yes /** In progress / No
Step C: Identifying adaptation options		
6 Identification of adaptation options		
6a	Adaptation options address the sectoral risks identified in 3c, the geographical specificities identified in 3b and follow best practices in similar contexts	**Yes** / No
6b	The selection of priority adaptation options is based on robust methods (e.g. multi-criteria analyses, stakeholders' consultation, etc.) and consistent with existing decision-making frameworks	**Yes** / No
6c	Mechanisms are in place to coordinate disaster risk management and climate change adaptation and to ensure coherence between the two policies	**Yes** / In progress /No
7 Funding resources identified and allocated		
7a	Funding is available to increase climate resilience in vulnerable sectors and for cross-cutting adaptation action	**Yes** / In progress /No
Step D: Implementing adaptation action		
8 Mainstreaming adaptation in planning processes		
8a	Consideration of climate change adaptation has been included in the national frameworks for environmental impact assessments	**Yes** / No
8b	Prevention/preparedness strategies in place under national disaster risk management plans take into account climate change impacts and projections	Yes / **No**
8c	Key land use, spatial planning, urban planning and maritime spatial planning policies take into account the impacts of climate change	**Yes /** No
8d	National policy instruments promote adaptation at sectoral level, in line with national priorities and in areas where adaptation is mainstreamed in EU policies	**Yes** / In progress / No
8e	Adaptation is mainstreamed in insurance or alternative policy instruments, where relevant, to provide incentives for investments in risk prevention	**Yes /** No
9 Implementing adaptation		
9a	Adaptation policies and measures are implemented, e.g. as defined in action plans or sectoral policy documents	Yes / **In progress** / No

Adaptation Preparedness Scoreboard		
No.	**Indicator**	**Met?**
9b	Cooperation mechanisms in place to foster and support adaptation at relevant scales (e.g. local, subnational)	**Yes /** No
9c	Procedures or guidelines are available to assess the potential impact of climate change on major projects or programmes, and facilitate the choice of alternative options, e.g. green infrastructure	**Yes** / No
9d	There are processes for stakeholders' involvement in the implementation of adaptation policies and measures.	**Yes /** No
Step E: Monitoring and evaluation of adaptation activities		
10 Monitoring and reporting		
10a	NAS/NAP implementation is monitored and the results of the monitoring are disseminated	**Yes** / No
10b	The integration of climate change adaptation in sectoral policies is monitored and the results of the monitoring are disseminated	**Yes /** No
10c	Regional-, sub-national or local action is monitored and the results of the monitoring are disseminated	**Yes** / No
11 Evaluation		
11a	A periodic review of the national adaptation strategy and action plans is planned	**Yes** / No
11b	Stakeholders are involved in the assessment, evaluation and review of national adaptation policy	**Yes** / No