

Germany: The Monitoring System of the German Adaptation Strategy

Context

► Policy context

The **2008 German Adaptation Strategy** (*Deutsche Anpassungsstrategie, DAS*) is the national framework for adapting to the impacts of climate change in Germany. It provides a general inter-departmental overview of key priority sectors for climate adaptation and aims to stimulate work on adaptation by various sector agencies at all levels. Its implementation is supported by the **2011 Adaptation Action Plan (APA)**, which contains general actions to be taken by the Federal government (i.e. it is not a detailed implementation plan of all climate change adaptation activities). DAS highlights possible climate impacts and options for action for these 15 sectors, so called **action fields**¹. As a general framework, the DAS does not have an explicit time frame but it is expected to be continuously developed. A review and update report will be released by the end of 2015.

¹ The 13 'action fields' are: (1) human health; (2) building sector; (3) water regime, water management, coastal and marine protection; (4) soil; (5) biological diversity; (6) agriculture; (7) woodland and forestry; (8) fishery; (9) energy industry (conversion, transport and supply); (10) financial services industry; (11) transport and transport infrastructure; (12) trade and industry; (13) tourism industry. The two cross-sectoral fields are: (14) spatial, regional and physical development planning; and (15) population protection.

► Purpose of the M&E System

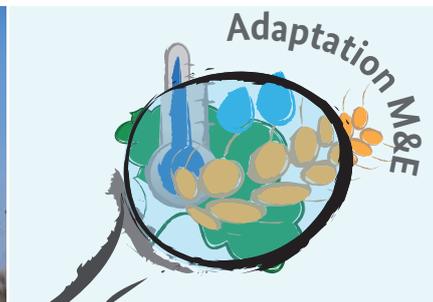
The monitoring system focuses on climate change impacts as well as on progress towards the implementation of the DAS in terms of adaptation responses along the 15 priority sectors. The purpose is not to evaluate the effectiveness of specific adaptation actions, since their implementation falls under the responsibility of many different departments at federal and state level.

► Level of application and aggregation

The monitoring system aims to provide a broad, inter-departmental overview on the Federal level along 15 priority sectors. However, the system uses data and monitoring systems provided by subnational levels of government. In addition, several German states (Länder) have already established an adaptation strategy, or are in the process of doing so, and may develop climate change impact or response monitoring for their specific circumstances, while taking the DAS monitoring system into consideration.

► Status as of October 2013

The monitoring system is at the final stage of development. Every indicator has been agreed on at scientific level and the political consultation is expected to be completed by early 2014. The first monitoring report of the DAS will be completed by the end of 2014. It will form one part of the first DAS' review report and the updated Action Plan, which will be released by the end of 2015 (see outputs and reporting on page 3).



Process

► Institutional arrangements

The German Federal Ministry for the Environment (*Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit: BMUB*) is leading the adaptation policy process at federal level and is in charge of the DAS. The Federal Environment Agency (Umweltbundesamt: UBA) provides technical inputs and policy recommendations particularly through its Competence Centre on Climate Impacts and Adaptation (*Kompetenzzentrum Klimafolgen und Anpassung: KomPass*). KomPass coordinates the development of the monitoring system in close collaboration with other governmental departments and agencies. A Federal Interministerial Working Group on Adaptation to Climate Change, composed of representatives from all Federal Ministries, is in charge of promoting the active cooperation of and input from all Federal Ministries. It further acts as the decision-making body to the DAS, which includes the review and approval of the monitoring system and related reports. To link the federal and state level there is also a Committee for Adaptation to Climate Change Impacts (*Ständiger Ausschuss zur Anpassung an die Folgen des Klimawandels*), which has been involved in developing the DAS and in the consultation process of the indicator development.

Table 1 Six-step process of indicator selection

Step	Purpose	Description
1	Classification	Identification of climate impacts and possible adaptation measures for each action field and classification according to sub-themes which were then grouped into a series of Indication Fields based on literature review and discussions among experts (see table 2)
2	Prioritization	Weighting the Indication Fields according to key criteria based on expert interviews
3	Research	Analysis of other monitoring systems (sectoral and international approaches) and search for potential data sources
4	Specification in expert discussions	Discussions among experts to fine-tune the indicators
5	Indicator factsheets	Generating Indicator Factsheets describing the specific definition and way of measurement of every indicator and review of these factsheets by experts
6	Assessment	Drafting first indicator presentations for the indicator-based monitoring report

Source: Adapted from Schonhaler et al. (2011).

► Establishment process

The development of the indicator system was coordinated by the UBA. An extensive consultation process started in 2010 involving almost 400 people in about 160 institutions from federal and

state government authorities, academic institutions and NGOs to identify indicators for each of the fifteen action fields of the DAS. A particular emphasis has been put on utilising existing monitoring systems and data from different levels of government and academia. The indicator selection was based on a six-step process as shown in table 1.

► Implementation process

The first monitoring report will be coordinated by the UBA and prepared under the research project which has also contributed to the development of the indicators. Since most of the data already exists, the main task is to coordinate data provision, analyse the data based on expert advice, draft the text and coordinate the political approval process. Beyond 2014, a support unit for the on-going monitoring will be created which will also maintain a website on which all indicator factsheets and reports will be available.

Content

► Approach

The approach is centred on an indicator-based system, whose development was supported by three consecutive studies and accompanying consultation processes (Schonhaler et al. 2010; Schonhaler et al., 2011). The DAS monitoring system will be supplemented by **comprehensive, Germany-wide, cross-sectoral vulnerability assessments (VAs)** to support climate risks prioritization and adaptation needs identification at the federal level. A common methodology is being developed under the lead of UBA by the Network Vulnerability, a group of government agencies and scientists. These VAs will use different indicators (i.e. vulnerability indicators), but will focus on similar indication fields. The VAs will form a part of the review report of the DAS.

► Indicators

Under each action field there are two types of indicators: **climate change impact indicators** (i.e. How does climate change affect natural and socio-economic systems?) and so called **adaptation response indicators** (both process/implementation and outcome indicators). The response indicators have been selected to present a snapshot of the adaptation progress within each priority sector. They do not refer to a list of specific adaptation actions, because the DAS does not determine the actions to be taken by the responsible government authorities. In addition, a set of overarching response indicators that describe the level of adaptation activities on the federal level are under consultation.

An initial set of indicators (maximum 13 per action field) agreed on by scientists are under discussion. These indicator proposals are currently being reviewed by government authorities for political approval. It is expected that some 100 indicators will become part of the ongoing DAS monitoring.

Since the final set of indicators has not been released yet, table 2 shows an example of impact and response indicators for the action field 'Agriculture' based on the initial research report. For each action field there is a table listing the 'Indication Field', the sub-theme and the title of the indicators.

Table 2 Sample of climate change impact and response indicators for the action field 'Agriculture'

Indication Field	Sub-Theme	Indicators
Impacts		
Agrophenology, shifts in agro-climatic zones	Extending the growing period for cultivated plants	LW-I-1: Changes in the duration of the growth period (temperature sum/year)
	Shifts in agrophenological phases of cultivated plants	LW-I-2: Shifts in the start of flowering and development of ears on crops (apple, oats, maize, winter barley, winter rape, winter rye, winter wheat) LW-I-3: Number of maize varieties named in the maize varieties list classified by maturity group (FAO numbers)
	De-synchronisation/synchronisation of life cycles of pests, pathogens and beneficial species	No indicator proposed
Yield and quality of crops	Changes in the stability of yields	LW-I-4: Changes in yield of winter wheat (per hectare) LW-I-5: Interannual variability of yields
Responses		
Agricultural advice	Knowledge transfer regarding adapted forms of plant and animal production	LW-R-1: Number of articles on questions of adaptation to climate change in widely-read specialised journals
	Revision of recommendations for cultivation projects	No indicator proposed
	Enhancing risk management in agricultural businesses	No indicator proposed

Source: Schonthaler et al. (2011).

► Data and information requirements

The calculation of the DAS indicators is mainly based on existing governmental and non-governmental data sources. Thus, data collection and quality control will remain the task of the organisation in charge of the specific data source. The UBA is coordinating the data provision and analysis for the monitoring report. The government agencies which were involved in identifying suit-

able data sources have agreed on providing the respective data. The most important data gaps have been identified for the action fields 'financial services industry' and 'soil'.

► Output and reporting

The main outputs of the monitoring system are listed in table 3. In addition, a website will be created on which all indicator factsheets and reports will be available.

Table 3 Main outputs of the monitoring system

Outputs	Purpose
Indicator Factsheets	Detailed information on every indicator (e.g. justification, calculation formulas, data sources, allocation and interpretation aids, strengths and weaknesses, responsible actors, costs) to promote a consistent definition and interpretation of the indicators.
Data Factsheets	Documentation of metadata including the data source, geographical coverage, collection frequency and methodology, cost and format as well as contact information.
Monitoring report	Overview of the current level and historic development of the approximately 100 climate change impact and response indicators including graphics and explanations.
DAS and APA review reports	In addition to the indicator-based monitoring, a review report and update of the DAS and of the Adaptation Action Plan addressed to political decision-makers and any interested members of the public (not a scientific report) will be released by the end of 2015. The report will also include a description of the methodology of the monitoring report as well as results from the vulnerability assessments.

► Resources needed

The development of the monitoring system took five years and required extensive personnel resources to draft and agree on a list of indicators, identify relevant data sources and coordinate among the involved organisations. These resources were mainly provided through government funded research projects whilst many of the involved government officials supported this work as part of their regular duties. Through the research projects and consultations, substantial scientific support and inputs by various experts from a variety of institutions and sectors has been provided. This sophisticated, time and resource intensive development process was feasible due to existing capacities, data and expertise available. Specific resource needs for implementation have not been specified as of now. However, the strong focus on the use of already existing data and monitoring systems will significantly limit ongoing expenses. Resources will mainly be needed for coordination.



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Lessons to date

The following lessons can be drawn from the development of the monitoring system of the German Adaptation Strategy:

- The involvement of experts, policy-makers and stakeholders of all relevant government authorities at federal and state level has fostered science-policy linkages and has led to sound indicators that meet both scientific and political requirements. This broad stakeholder engagement has facilitated the identification and utilisation of a wide range of existing data and further benefits the applicability, use and acceptance of the system.
- One of the system's main outputs is a series of indicator factsheets, which describes the indicators in detail to ensure a common understanding on their practical application and interpretation.
- The system builds upon the various monitoring systems (in environmental media, for the assessment of sustainability, etc.) already in place at various spheres of government and focuses on strengthening existing data sets. This helps to keep additionally required resources for ongoing adaptation monitoring low.
- The extensive multi-year consultation process contributed to greater awareness and a sense of integrating aspects of climate change adaptation into various government authorities at federal and state level. This is an important co-benefit of the participatory approach (Rotter et al., 2013).

For further information

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Information on the vulnerability network can be found on www.netzwerk-vulnerabilitaet.de (in German)

This factsheet is part of a collection of factsheets and an accompanying report which can be obtained at AdaptationCommunity.net.

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