



Adaptation Pathways

Aim of PACINAS

The project PACINAS (Public adaptation – Investigating the Austrian adaptation strategy) addresses the costs of adaptation to climate change for the public budget and the associated macroeconomic effects. Case studies on city, provincial and federal level made it possible to estimate the current adaptation deficit and the potential future costs of adaptation up to 2050. The project focuses on adaptation costs due to extreme events such as flooding, mass movements and heat stress as well as on activity fields of the Austrian adaptation strategy (BMLFUW, 2012) with high relevance for the public budget (agriculture, forestry, water, protection from natural hazards, catastrophe management, transport, cities and urban green). PACINAS was carried out by the Wegener Center of the University of Graz in cooperation with the Umweltbundesamt, AIT and IIASA.

Context and methodological approach

One of the key questions for climate change adaptation is how robust decisions can be made under uncertain and changing conditions. Based on international good-practice, and working jointly with stakeholders and decision makers, the first step towards such a robust adaptation pathway was developed. The conceptual framework builds upon two methods: the *Dynamic Adaptive Policy Pathways* by Haasnoot et al. (2013) and the *Concept of Adaptation Phasing* by Watkiss et al. (2015). Starting from the suggested action of the Austrian Adaptation Strategy (BMLFUW, 20120) and from the adaptation budgets identified by PACINAS, the analysis explored five key questions to develop adaptation targets and pathways.

Background: The Austrian Adaptation Strategy

The Austrian Adaptation Strategy aims to reduce the negative impacts of global climate change on the environment, society and economy and to identify opportunities arising from climate change (BMLFUW, 2012). The corresponding Action Plan provides 132 recommendations for action in 14 activity fields (Agriculture, Forestry, Water Resources & Water Management, Tourism, Energy, Construction & Housing, Protection from Natural Hazards, Disaster Risk Management, Health, Ecosystems/Biodiversity, Transportation In-

frastructure, Spatial Planning, Business/Industry/Trade, Cities - Urban Green and Open Spaces).. The recommendations for action provide a starting point for the development of individual and sectoral adaptation pathways.

Which methods are suitable for the planning of climate change adaptation?

In the Austrian Adaptation Strategy, each of the 132 recommendations consists of a concrete adaptation aim and a list of detailed measures (suggested next steps). Decision makers can select which of these actions fall in their field of responsibility, which can be realized with the available resources and which will lead to the largest benefit possible. In summary, decision makers are faced with the following challenges:

- To implement – despite future uncertainty – robust adaptation actions that are mutually aligned, flexible, cost effective and acceptable to those affected.
- To identify synergies and avoid conflicts with mitigation and other key objectives.
- To initiate options to address short, medium and long-term goals, noting that due to future scenario and climate uncertainty, static „optimal“ decisions are insufficient (Haasnoot et al., 2013).

The following international good-practice approaches were used to produce a simple applicable method to help decision makers develop successful adaptation pathways.

Dynamic Adaptive Policy Pathways: Prioritizing adaptation actions and development of adaptation pathways

Haasnoot et al. (2013) developed a framework to help decision makers (in policy, administration and the economy) to integrate climate change adaptation into plans and programs. This was built on the premise that adaptation should not be rigid or linear: instead, it should take different future adaptation paths depending on how the future evolves. Adaptation to climate change is therefore a process (a series of decisions) that will lead to different actions over the decades to come, based on the evidence and level of change that emerges, rather than a single, early task.



When designing these types of ‘robust’ adaptation pathways, different future scenarios need to be distinguished and integrated alongside climate change. This therefore takes account of changing political, legal, socio-economic and demographic developments, as well as financial and personnel resources.

The approach has a number of benefits, as it provides alternative options (for different futures), it increases flexibility, and it can help to avoid the “lock-in” of early decisions (or investments) to future climate change. An interactive online tool¹ supports the framework and allows development of individual adaptation pathways and illustrates, in addition to path dependencies, scorecards (evaluations) with information on costs, benefits and co-benefits for different variants.

A key part of the method is to allow adaptation decisions to be altered as the evidence emerges, thus during implementation, the effectiveness of adaptation measures and the robustness of the chosen pathway needs to be checked regularly. At defined points, termed „Transfer station to new action“ (Figure 1), decisions must be taken on which path should be followed to achieve the set adaptation target. The pathways are presented as figures, which are comparable to a metro network: alternative decisions can be taken at each node (represented as a circle below).

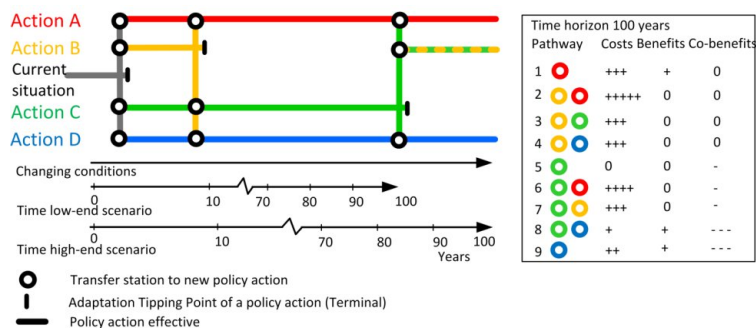


Figure 1: „Adaptation Pathways Map“ based on Haasnoot et al. (2013): The adaptation pathways map shows different possible sequences of activities and decisions in order to achieve the set targets. A scorecard helps to evaluate adaptation pathways and decisions.

This method has been applied to linear and partly complex topics with large uncertainties involved, such as sea level rise, flood risk management and partly drinking water supply. It is also being used in urban and spatial planning (Haasnoot et al., 2013). The method was developed within the „Delta Programme“ in the Netherlands and was successfully implemented in the management plan for the Rhine delta.

Concept of Iterative Adaptation Phasing

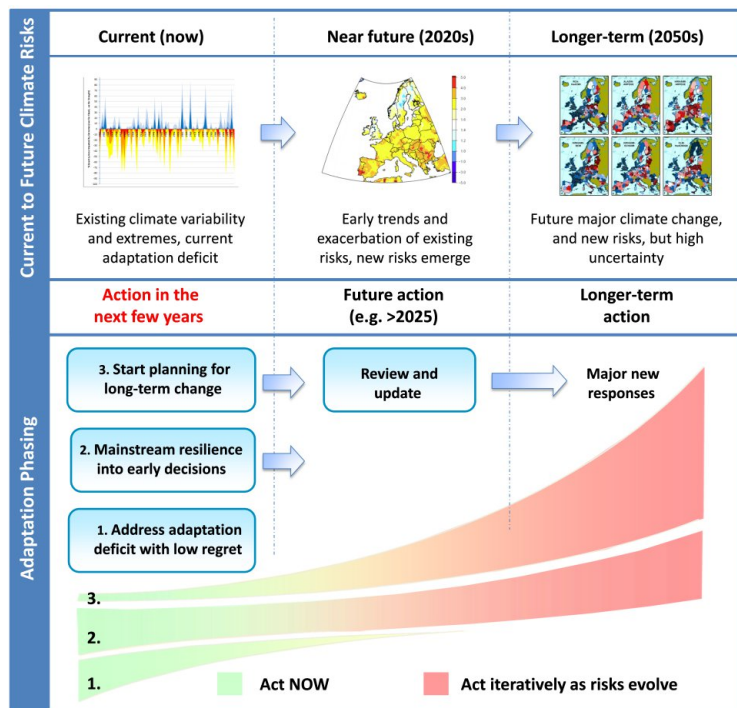


Figure 2: Adaptation phasing based on the concept of Watkiss et al. (2015)

A similar framework was developed by Watkiss and Hunt (2011) as part of the UK Climate Change Risk Assessment. This was built around iterative climate risk management and starts with current climate variability, and then looks at future climate change risks, including uncertainty. A framework for adaptation is proposed that focuses on the type, phasing and sequencing of options. This identifies three types of early adaptation activities (‘building blocks’) that can be included within a programme or portfolio for the next five to ten years, noting this includes actions to address both current and long-term climate risks (see Figure 2). The three building blocks are:

- Immediate actions that address the current risks of climate variability and extremes (the adaptation deficit). This includes the introduction of no- and low-regret actions, which provide immediate economic benefits as well as enhancing resilience to future climate change.
- The integration (mainstreaming) of adaptation into early decisions or investments with long life-times, such as infrastructure or planning. This involves climate smart planning with the identification of flexible or robust options that perform well under uncertainty.

¹ Link: <http://pathways.deltares.nl>



- Early monitoring, research and learning to start preparing for the long-term impacts of climate change. This includes a focus on the value of information and future option values, and as part of an adaptive learning cycle, to allow decisions to be brought forward or delayed as the evidence emerges. This is similar to the Dynamic Adaptive Policy Pathways approach above.

These three areas should be taken forward in parallel, as part of an adaptation portfolio.

Methodological approach for the development of practice-oriented adaptation pathways

To support decision makers in Austria, a simple method was developed in PACINAS that draws on the lessons described above. The starting point in Figure 3 is formed by a set of questions on the current situation. If this starting point is identified, five lead questions guide the decision maker towards how the respective adaptation goal can be reached and what has to be considered to achieve this. These questions are:

- (1) Which steps do I need to take to foster climate change adaptation in this field and to reach the goals set for 2030 and 2050?
- (2) Which barriers and obstacles need to be overcome along the path?
- (3) Which support (infrastructure, tools, knowledge, information,...) do I need for this?
- (4) How can maladaptation be avoided?
- (5) Who are the key actors that can or need to contribute considerably for the success of adaptation?

For 2030, concrete and measurable goals should be set. The future oriented view on 2050 is characterized by large uncertainties. To attain the long term target – to be climate resilient by 2050 three characteristics are essential for the development of adaptation pathways:

- **resilience** (resistance and capacity to accommodate or recover),
- **robustness** (regarding climatic conditions, climate impacts and risks, but also in relation to socio-economic, political, legal etc. developments) and
- **flexibility** (possibility of individual adaptation and change over time).

The methodological approach builds on a participative development of adaptation pathways by sectors (or combined measures across sectors). Figure 3 illustrates the steps.

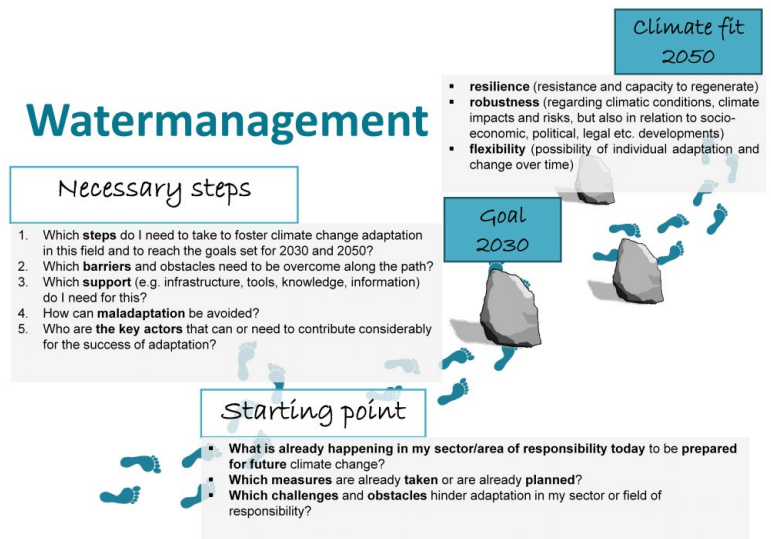


Figure 3: Development of a basis to develop adaptation pathways

Key findings

Different actors – with the relevant responsibilities across political, administrative and economic arenas – need to develop a solid framework for the actions identified in the Austrian Adaptation Strategy.

To advance this, different (sub-)targets and strategies must be formulated and suitable steps for implementation must be defined.

To explore synergies with other fields and avoid trade-offs, key actors need to be involved both from within the field of activity and from related fields.

Given future climate change uncertainty, adaptation actions need to be developed using adaptation pathway approaches: international examples have been adapted to provide practical examples of such pathways for Austria.

The methods and good-practice approaches described in this fact sheet are suitable for all fields of activity and sectors. They support taking robust decisions and developing robust adaptation pathways despite uncertain and changing conditions.

In support of the development of adaptation pathways, user-group oriented planning and implementation needs to be steered by communication activities. A simple guidance with several examples on successful communication of climate change adaptation was for example developed in Prutsch et al. (2014).

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