

Adaptation measures in the Program of Measures and correlation with the Water Framework Directive

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Climate change adaptation

- Adaptation seeks to lower the risks posed by the consequences of climatic changes
- Adaptation measures may be planned in advance or put in place spontaneously in response to a local pressure. They include large-scale infrastructure changes – such as building defenses to protect against sea level, prior improving the quality of road surfaces to withstand hotter temperatures – as well behavioral shifts such as individuals using less water, farmers planting different crops and more households and businesses buying flood insurance.

Vulnerability to climate changes

- The IPCC describes vulnerability to climate change as being determined by three factors:
 - exposure to hazards (such as reduced rainfall),
 - sensitivity to those hazards (such as an economy dominated by rain-fed agriculture)
 - capacity to adapt to those hazards (for example, whether farmers have the money or skills to grow more drought-resistant crops).
- Adaptation measures can help reduce vulnerability – for example by lowering sensitivity or building adaptive capacity – as well as allowing populations to benefit from opportunities of climatic changes, such as growing new crops in areas that were previously unsuitable.

Types of adaptation measures

- Adaptation or improvement of dykes and dams
- Adaptation of Flood Management Plans
- Water Recycling
- Floating or Amphibious Housing
- Floating or Elevated Roads
- Extended of Water Supply Services
- Urban Farming and Gardening
- Adaptative management of natural habitats
- Green spaces and corridors in urban area

Detailed planning and implementation steps

- Analyze past observation data, review responses (including existing measures) to climate change and extreme weather events
- Plan and Implement monitoring of climate change and its impacts
- Project future climate change and its impacts
- Assess impacts, vulnerability, resilience, and risk
- Determine need for adaptation measures, determine priority
- Design and implement adaptation measures
- Track and assess progress and effects of adaptation policies measures, revise regularly
- Conduct integrated adaptation, basic capacity enhancement
- Communicate and share information with the public
- Review and implement based on feedback and re-assessment

Simplified steps for adaptation planning and implementation.

- Share knowledge and approaches to adaptation, and examine existing measures
- Assess risks associated with climate change impacts
- Promote communication and decide adaptation plans, programs, and measures
- Start with the most feasible initiatives
- Consolidate risk assessments and adaptation measures based on monitoring and the latest knowledge ...

Approaches to incorporate adaptation into plans, programs and policies

- Use diverse options, including “soft” and “hard” measures
- Create synergies and prevent adverse socioeconomic and other impacts
- Integrate adaptation measures

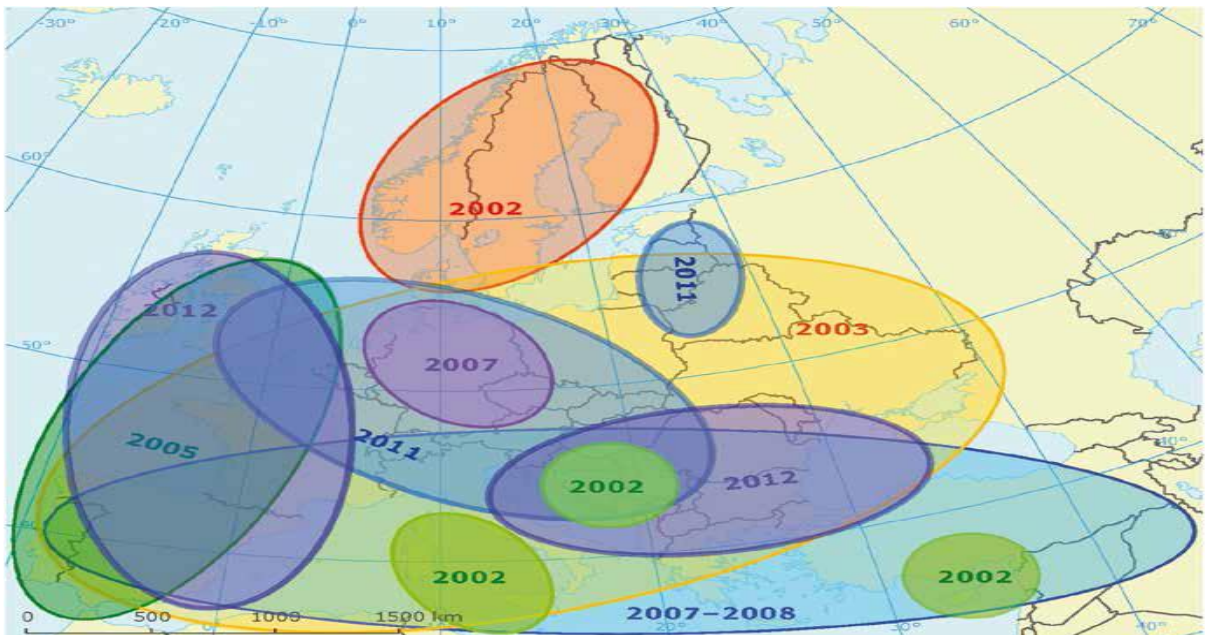
Vulnerability to Climate Changes

Changes in mean climate, variability, extreme events and sea level rise	Effects on livelihoods	Impact on vulnerability
Increased temperature and changes in precipitation reduces agricultural and natural resources Changes in precipitation run-off and variability leads to greater water stress Increased incidence or intensity of climate related extremes such as water stress Temperature, water and vegetation changes resulting in increasing prevalence of disease	<p>Direct impacts of climatic shocks and stresses such as livelihood assets, health, food and water security</p> <p>Increased pressure on Coping strategies and social protection measures</p> <p>Reduced ability recover due to increased frequency of climatic shocks or increased intensity of climatic stresses</p>	<p>Increased vulnerability due to:</p> <ul style="list-style-type: none"> • Lower capacity to prepare; • Lower capacity to cope; and • Lower capacity to recover from climatic and non-climatic shocks and stresses

Adaptation measures

		Anticipatory	Reactive
Human systems	Natural systems		Changes in length of growing Changes in ecosystem composition Wetland migration
	Private	Purchase of insurance Construction of house on stilts Redesign of oil-rigs	Changes in farm practices Changes in farm insurance premiums Purchase of air-conditioning
	Public	Early-warning system New buildings codes, design standards Incentives for relocation	Compensatory payments, subsidies Enforcement of building codes Beach nourishment

Droughts in Europe





Danube River Basin Management Plan 2015

- Climate change is a cross-cutting issue
- „No-regret-measures“ and „win-win-measures“ have been considered as part of the JPM and the national PoMs
- Underline the need to further closing of knowledge gaps
- Update of the ICPDR Strategy on Adaptation to Climate Change in 2018, linking it with the six-years planning cycles according to the WFD and FD

Preparation measures

- Additional, intensified monitoring activities to follow and assess climate change and climate change impacts
- Homogenous data production, digital mapping and a centralized database for data exchange and comparability among regions and countries
- Identification of potential risk areas and hot spots
- Implementation of forecasting and warning services (e.g. for extreme events such as floods and droughts)
- Development of action plans or integration of specific issues into ongoing planning activities (e.g. to deal with water scarcity and flood situations)
- Further research to close knowledge gaps, determine vulnerability or reduce uncertainty

Ecosystem-based measures

- Taking environmental implications and the conservation of biodiversity into consideration in all other measures
- Sustainable management of land use practices for improving resilience, and for enhancing the capacity to adapt to climate change impacts
- Implementation of green infrastructure to connect bio-geographic regions and habitats
- Protection, restoration and expansion of water conservation and retention areas
- Rehabilitation of polluted water bodies

Behavioural and managerial measures

- Support education, capacity building, awareness raising, information exchange and knowledge transfer
- Establishment of and support for an integrated risk management
- Support of a water saving behaviour
- Propagation of best practice examples
- Application of sustainable methods (e.g. good agricultural practices)

Technological measures

- Adjustment of (existing) infrastructure, e.g. construction and modification of dams and reservoirs for hydropower generation, agriculture, drinking water supply, tourism, fish-farming, irrigation and navigation
- Development and application of water-efficient technologies
- Efficient waste- and sewage-water treatment and water recycling

Policy approaches

- Support of an institutional framework to coordinate activities
- Harmonization of international, basin-wide legal limits and threshold values
- Implementation of restrictions (e.g. for development in flood risk areas)
- Expansion of protection areas (e.g. for drinking water resources)
- Adaptation of policies to changing conditions



Thank you
very much
for your
attention !