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Conclusions from the International Symposium

Time To Adapt Climate Change and the European Water Dimension

Vulnerability – Impacts – Adaptation



Umwelt
Bundes
Amt 
Für Mensch und Umwelt



**CONCLUSIONS FROM THE INTERNATIONAL SYMPOSIUM
TIME TO ADAPT – CLIMATE CHANGE AND THE EUROPEAN WATER DIMENSION**

A. It is time to adapt now! Scientific evidence urges action

1. Climate is changing! The scientific evidence conveys the clear message that this change will impact the water cycle and water resources in Europe and worldwide. An increase in the frequency and intensity of extreme events such as floods and droughts is expected as well as long-term shifts in regional water balance and water availability. Both may have disastrous consequences for European societies.
2. Changes in water resources will not only have significant adverse impacts on the drinking water supply and wastewater services in Europe, but also on other key economic activities such as agriculture, hydropower and other electricity production, tourism and navigation. These damaging effects will by far surpass minor benefits that may be experienced by individual regions or sectors.
3. Ecosystems and biodiversity are likely to suffer from climate-driven changes in hydrology. Ecosystem services play a key role for human and economic activities, and their long-term protection and preservation should be given priority.
4. Changes in climate will occur, even if climate protection measures are effectively implemented today. Although the magnitude and shape of climate change impacts on the water cycle and water resources cannot be predicted exactly, scientific evidence is sufficient to urge immediate action.
5. Therefore, while climate change mitigation should remain a priority for policy-making, there is also an urgent need to develop strategies for adaptation to the already inevitable climate-change-driven changes in water resources at all levels of policy-making – from the European to national to local levels. There is now consensus on this among the science and policy communities.

B. Sustainable water resources management provides the basis for adaptation

6. Adaptation should be embedded in integrated water management approaches, which allow for a consideration of all environmental, economic and social aspects. Action is required at all levels – policy, implementation and operational.
7. Decision-making under uncertainty is a particular challenge. Water management and the implementation of water policy needs to be capable to respond to unexpected developments caused by climate change. Strategies for adaptation need to be developed and implemented in a flexible way, in order to take into account further progress of scientific knowledge. Special emphasis should be placed on “no-regret” and “win-win” measures that are effective and sustainable under different scenarios.
8. For adaptation it may be necessary to define priority water uses and to find appropriate ways to implement prioritisation. Choices may have to be made concerning the allocation of water resources, and criteria and indicators need to be developed on the basis of which such choices can be made.
9. The water sector (water supply and sanitation services) will have to work on combined supply and demand side measures. This could include legal, regulatory and contractual requirements that foster implementation and an equitable repartition of costs among users, providers and polluters.

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10. Reducing vulnerability to extreme weather events is key for adaptation, and both disaster prevention and response measures need to be part of strategies and approaches. Appropriate risk assessment for building development is essential to avoid the accumulation of assets in high risk areas, for instance in floodplains and along the coast. Flexible water management systems that can react to both water scarcity and flood situations may be helpful instruments.

C. A successful adaptation strategy needs a common and integrated approach

Water dependent sectors need to be involved

11. Successful adaptation strategies have to follow a common and integrated approach that covers measures in all water-related sectors, in particular, in sectors that are strongly depending on the availability of clean and/or sufficient water, such as water supply, agriculture, electricity production, inland navigation and tourism. Such an approach will provide successful win-win solutions and avoid negative cross-sectoral feed backs of measures or non-action in one sector. It also allows to include the preservation of aquatic and other water-dependent ecosystems, which is a prerequisite for developing effective adaptation strategies.
12. Water needs to be used more efficiently across all sectors. Measures to be taken include water-efficient irrigation techniques and water-saving appliances, reduced leakage in supply systems, and water recycling and rain water harvesting. Changes in behaviour will be required and can be supported through adequate water pricing.
13. At all policy levels, potential conflicts between sector policies and adaptation needs should be identified, and efforts should be made to make different policies consistent with each other and compatible with adaptation. As a consequence, adaptation to water-related climate change impacts is not just an issue for environment departments at all levels, but is also a challenge to other Directorates of the European Commission, national ministries, regional and local government departments. In particular, local and regional authorities will need more practical guidance on how to cope with the local and regional impacts of climate change on water. On the other hand, local authorities can provide valuable information on measures that have been implemented already and help to identify best practice examples.

Relevant policies and projects need to be climate-proof

14. Future investments in infrastructure must be climate-proof. Investment that appears to be cost-effective under current conditions may become economically and ecologically not viable when considering the climatic predictions and their impacts on water resources. Flexibility in approaches is key to account for these uncertainties.
15. Climate change impacts and adaptation measures should increasingly be integrated in the design of compensation, subsidies and incentives schemes, in order to ensure their long-term sustainability. This has to be considered in the future development of the Community's regional and cohesion policy.

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Current EU water policy provides ample tools to start adapting to climate change

16. Existing policy instruments and processes, such as those under European water policies and national integrated water and coastal zone management strategies, can be used as a starting point but have to be developed further through strengthening integrated approaches on all levels of governance.
17. The Water Framework Directive (WFD), with its objective to prevent further deterioration and to protect and enhance the status of aquatic and related ecosystems, provides a valuable framework for introducing climate change impacts into water resources management and river basin planning, as well as for assessing changes in the conditions of other sectors and for co-ordinating possible adaptation activities with the needs of these sectors. Climate change impacts should be taken into account when assessing pressures and impacts on water resources. Measures to cope with these impacts should become part of the Programmes of Measures in a stepwise manner. As much as possible, the consideration of such impacts should be incorporated into the first planning cycle in 2009. At a minimum, a screening of the likely effects of climate change on the pressures identified in the article 5 analysis and of the climate impact sensitivity of the Programmes of Measures is recommended. This will help selecting measures today that will be effective, sustainable and cost-efficient under changing conditions. In the second planning cycle, climate change impacts should be taken fully into account.
18. The forthcoming EU Flood Risk Management Directive will be a useful framework to take into account climate change effects in the assessment and management of flood risk. The foreseen six year review cycle of Flood Risk Management Plans gives the opportunity to adapt to improved information on climate change impacts.
19. Present action at the EU level on water scarcity and droughts, which aims at a common strategy, should be closely linked to activities on climate change impacts and adaptation. Climate change will enhance water scarcity problems with negative impacts on water quality and aquatic ecosystems. Protection and integrated sustainable management of water resources will thus be particularly important under water scarce conditions.

Mitigation and adaptation need to be aligned

20. Synergies with climate change mitigation measures should be created. This means avoiding negative impacts of mitigation activities on the resilience of water resources as well as negative feedbacks of adaptation measures on mitigation. For example, new policies promoting agricultural production to mitigate climate change like the Biomass Action Plan should be assessed and monitored with regard to their possible side-effects on water resources. This also applies to future development of hydropower and navigation policies.

Participation and contribution by all actors and stakeholders are necessary.

21. Stakeholders at all levels have to be engaged in the process. Businesses and industries will have to develop their capacities to adapt. Also, adaptation efforts by private individuals will have to be bolstered in a variety of ways. Improved information and awareness of long-term perspectives, the necessity to adapt, and potential measures for adaptation are prerequisites for creating support for adaptation and for reaching agreement between different stakeholders on adaptation strategies. Participative approaches are necessary to enable the equitable use of water between different stakeholders and between upstream and downstream users. In order to encourage changes in the behaviour of individuals and in order to ensure support for adaptation policy, it is vital to create a

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shared understanding of climate change impacts and adaptation through information, education and discussion processes.

More intensive co-operation and common action at EU level

22. At EU-level, an intensive exchange between Member States on their approaches in addressing adaptation to climate change impacts through water resources management should be facilitated, and a common process for developing appropriate guidance, tools and methodologies should be organised in the context of the existing mechanisms. EU-level activities should further concentrate on improving monitoring and assessment of climate change impacts on water resources in Europe, enhancing the data base and the forecasting capabilities concerning extreme events (floods and prolonged droughts) and on developing appropriate indicators to support decision making and communication.
23. All EU policy areas need to undergo an adaptation check. So far, not all EU policies contribute sufficiently to adaptation to climate change. In fact, some policies or their implementation may even be counterproductive. A “climate-proofing” should be carried out by 2009 for all relevant policy areas, including funding instruments, sector policies and environment policies. For new policy proposals, adaptation aspects should be incorporated in the impact assessment. This will also contribute to a better, more effective regulation. The same should apply at national level.

D. The user pays - Information on costs is needed to develop financing mechanisms

24. When making decisions about adaptation, the costs of adaptation measures as incurred today need to be weighed against their potential benefits for the future. Therefore, climate change impacts on water and water dependent activities need to be translated into economic terms. Assessments should include the current and future benefits and costs of both mitigation and adaptation measures, and they should take full account of environmental costs and benefits.
25. Appropriate financing mechanisms have to be developed to cope with the costs that will occur from adaptation. For this, information on the share of costs and benefits of proposed measures and on the scale, timeframe and the cost-effectiveness of investments needed for a given region is essential.
26. Economic instruments, as set out in the WFD, should be widely applied to recover the costs, including ecological costs, of coping with and adapting to climate change impacts, and to ensure that these costs are shared fairly between users, providers and polluters. A gradual move towards full cost recovery should be envisioned in all sectors, taking into account social aspects. One way forward is the 'user pays principle', regardless of whether the water is taken from a tap, a river or an aquifer or used for shipping and energy production. Water prices that fully reflect at least all investment and operational costs set strong incentives for consumers to reduce water consumption and increase water use efficiency. Experience shows that this approach can be highly successful, and suggests that appropriate water pricing forms a valuable adaptation option.

E. Agriculture - key player in food production and landscape management

27. Agriculture has a high potential for mitigation (e.g. appropriate production of biofuels, carbon sequestration) and adaptation to climate change (e.g. diversification and adjusted management

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schemes as shifts to new crops and shifts in cropping seasons). Planning for adaptation in agriculture should also consider effects on mitigation and vice versa. Forests and forestry also play an important role both for mitigation and adaptation, and need to be considered in climate policies and strategies as well.

28. Agricultural water use has to be optimised, especially in central and southern European water-scarce regions. Northern regions will face an increase in nutrient losses and erosion due to increased precipitation, with negative impacts such as eutrophication of aquatic ecosystems. These impacts can be tackled by regional planning, landscape design and farming techniques.
29. Agriculture can - through adapted land use management and changing to less water demanding crops - contribute to securing water resources (i. a. increase of ground water recharge), protecting water resources (less nutrient loss) and to improving flood management.
30. There is certainly scope for improving the adaptive capacity of European agricultural systems through the funding schemes provided by the Common Agricultural Policy (CAP) of the EU. Adaptive capacity might benefit from realising full de-coupling of payments. Rural development funding, provided under the second pillar of the CAP, can be used to directly support measures aimed at adaptation, such as the development of new products, processes and technologies that are more adaptive or measures on education and advice.

F. Electricity production and consumption

31. The adaptive capacity of alternatives for electricity generation should be used to assess the further development of the energy sector. Decentralised approaches and a diverse energy mix are likely to be beneficial both in terms of adaptation and mitigation on the supply side through energy efficiency, which should play a key role in national and trans-national European mitigation and adaptation policies.
32. The management of cooling water demand, in particular under low flow conditions, should be made a part of the river basin management plans, and should include hydro peaking, minimum flow, reservoir management.
33. The electricity sector should take into account in its planning the vulnerability of the European electricity system to intensified climate variability and water related extreme events.
34. The existing grid should be assessed and if necessary further developed to reduce vulnerability against climate change. Options such as decentralised electricity production and / or an interconnected "European Grid" should be taken into account.

G. Adaptation integrated part of inland waterway transport management and planning

35. Development of adaptation strategies is still in an early stage. A more detailed assessment of the vulnerability of inland waterway systems to climate change impacts on river discharge levels and the frequency of extreme floods and droughts is needed, as well as of the associated risks and of possible adaptation measures.

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36. Nevertheless, no-regret policies based on current knowledge on increasing variability of the hydrological regime can be a starting point. To maintain flexibility, reversible measures should be given priority.
37. Adaptation should become an integral part of long-term Inland Water Transport (IWT) management and investment planning, involving all relevant actors (e.g. waterway managers, international inland water and river protection commissions, water authorities, ship owners, IWT customers). For instance, the European Development Plan, which is proposed by the NAIADES action plan, might be used to support and guide the sustainable adaptation of IWT infrastructure. The promotion and development of adapted ships that are economically feasible and environmentally friendly should be encouraged.

H. The challenge of sustainable tourism

38. In order to promote the implementation of sustainable development measures in the tourism sector, improved water use efficiency should become one of the main priorities. This may be achieved by the introduction of water saving strategies and techniques, water recycling, tourist awareness and education schemes, staff training and Environmental Management Systems in tourism businesses and facilities.
39. A diversification of tourism activities, supported by EU as well as national policy action, could further help to make the sector more resilient to changes in climatic conditions and in water resources availability. The diversification of the tourism product should aim at developing activities that are less dependent on water resources (in summer tourism) and on snow coverage (in winter tourism).
40. As part of an integrative policy approach, water adaptation issues should be incorporated into Environmental Impact Assessments of tourist infrastructures, while climate change factors should be integrated into national and local tourism policies. Investments in water supply and waste water disposal infrastructure need to take into account the seasonally different demand and pressure generated by tourism.
41. Further research and in-depth analysis is needed on the behaviour of consumers (tourists) and tourism enterprises in reaction to changes in climatic conditions and water resources and on how changes in tourism flows will influence water demand and supply patterns. This analysis has to be regionally focused and should take other factors into account that influence tourism, such as ecosystem changes, demographic and economic trends, in order to be applicable as a tool for policy making.

I. Further research activities are necessary to tackle adaptation issues properly

42. Scientific results and research will play a crucial role for enabling and facilitating adaptation processes. Through further research, more detailed information will become available on the impacts of climate change on the water cycle, in particular with respect to issues that are still subject to major uncertainties, such as future changes in the frequency and magnitude of extreme events. Research will also provide essential contributions to the identification of the most adequate adaptation measures and strategies, for instance by investigating economic and cost aspects. To ensure that research generates information that is suitable and useful for adaptation, scientists and practitioners

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need to work together to figure out how best to adopt research results and apply them in adaptation activities.

43. Further research activities are necessary and should focus in particular on:

- a. Better understanding and quantification of uncertainty throughout the chain of “emissions → climate change → physical impact → ecological impact → socio-economic impact” and improving the communication and handling of uncertainty in political decision making processes.
- b. Better understanding and quantification of economical and social impacts of climate change in the different sectors.
- c. Further improving and linking climate, hydrological, bio-physical and socio-economic models to better understand the complexity of the water cycle and aquatic ecosystems and how these will react to climate change. Since projections of changes at regional or river basin level will be most relevant for adaptation, the downscaling of models to lower scales needs to be a focus of future research.
- d. Identifying thresholds and points of no return beyond which recuperation of the water resources and the water dependent systems is no longer possible.
- e. Options for adaptation strategies, which integrate sectoral and cross-sectoral measures, and the assessment of their ecological, social and economic potential, benefits and costs. Interdisciplinary approaches will be key, and attention should be given to the design of organisational structures that increase the capacity of water management to adapt to climate changeⁱ.
- f. Establishing of a solid baseline for evaluating Member State’s adaptation plans, based on a historical archive of climatology

J. Don’t forget the world outside the EU - Adaptation should be a key element of development co-operation

- 44.** While developing their own adaptation strategies, the EU and its Member States should not forget about the urgent need to support adaptation in the developing world, since these countries will be most strongly affected by the impacts of climate change. Adaptation should be mainstreamed into the EU’s development co-operation and assistance schemes, such as those for Africa and the EU neighbourhood countries. International programmes and activities aiming at the development and improvement of adaptation measures should be supported. Measures that may help developing countries to cope with climate change impacts include monitoring and prediction of climate change impacts on water and water uses, risk management, access to climate change risk insurance markets, preparedness and disaster response, methods to avoid and combat further land degradation, and development of more resistant food crops. Such efforts are particularly important in cases where current resource conflicts might be exacerbated by climate change impacts.

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