



Convention on the Protection and Use of
Transboundary Watercourses and International Lakes
Task Force on Water and Climate
First meeting
Bonn, Germany, 22–23 November 2007

GUIDANCE TOWARDS CLIMATE-PROOFING OF WATER MANAGEMENT

Draft prepared by the ad hoc Core Group on Water and Climate

Background

1. At the fourth meeting of the Parties to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (the Water Convention) (20-22 November 2006, Bonn, Germany), participants decided to transform the Flood Task Force into a Water and Climate Task Force, and requested the Task Force to prepare a “Guidance on Water and Climate Adaptation” for presentation to and possible adoption by Meeting of the Parties at its next session in 2009. The work of the Task Force will be targeted to support cooperation and decision-making in transboundary basins in response to climate change. The work will address adaptation policy and strategy development as well as adaptation measures in transboundary water management and water services vis-à-vis changes in water availability and water quality. The changes to be considered include flood and drought occurrences, water quality and resulting health-related aspects. The adaptation responses to be considered in the context of integrated water resource management (IWRM) include, inter alia, integrated management of surface and groundwater for flood and drought mitigation and response, including benefits of floods to increase water availability and to improve the ecological status of waters. Land use, regional and spatial planning and land use management – and their role in reducing flood and drought risks and damage potential, in particular in the transboundary context – will also be considered. Appropriate use will be made of the analysis of some successful cases and/or ongoing projects on transboundary cooperation (a listing of relevant activities and documentation is made at the end of this document).

Rationale

2. The Guidance builds on the notion that climate change is a reality; the Intergovernmental Panel on Climate Change (IPCC) in its latest assessment report¹ concluded that the global climate is in fact changing, and this change will affect the hydrological cycle and thus water availability as well as water services. Adaptation to a certain degree of climate change is therefore inevitable. In addition, the Stern Review² argued that it is cost-effective to start preparing for adaptation now.

3. IPCC stresses that the impacts are locally specific. However, the level of specificity of knowledge at the local level is limited and needs to be downscaled. The Guidance will provide approaches to this end.

4. The document will provide guidance on how climate impacts can be assessed and how policy, strategic and operational responses can be developed.

¹ IPCC Fourth Assessment Report (AR4) (<http://www.ipcc.ch/index.html>).

² Stern Review on the economics of climate change (http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm).

5. This Guidance will provide a general approach aiming at providing strategies which need to be tailored to specific local situations.

Target Group

6. The document will focus on the transboundary context, but will also be relevant to national policy and planning strategies and be based on measures developed for national purposes. The target groups for the document will be decision-makers and water managers, in particular those responsible for water management in the transboundary context. It will therefore primarily address issues relevant to the water management sector. The document could be also of interest for officials and managers of other water-related sectors (e.g. agriculture, inland water transport, production of electricity, tourism, fisheries) and should in that case also reflect issues relevant to those sectors. The document will be relevant for the entire UNECE region, with a focus on countries with economies in transition.

Scope and issues to be covered

7. The methodology to assess the resilience of water management and water services to cope with climate change is called climate proofing. The Guidance will present the methodology to climate proofing for transboundary basins, and will identify the additional new challenges for water management deriving from climate change, the main one being that planning and operations will have to deal with uncertainty and possible futures.

8. The additionality of climate proofing with respect to IWRM lies mainly in the use of climate scenarios and forecasts instead of historical data. Forecasts and scenarios are uncertain by nature because of the many variables involved. They therefore refer to possible instead of probable futures. The major challenge for the water sector and adjacent sectors to cope with the impact of climate change on water resources is how to deal with the uncertainties between the climate scenarios, climate models, hydrological models and their socio-economic impacts, as well as the complicated linkages between them.

9. In addition to providing guidance on “climate proofing” water management and water services, the document will also address assessing risks and assessing the cost effectiveness of coping measures.

10. The scope of climate proofing in transboundary integrated water resources management has a broad context, including water management and water services (e.g. water supply and sanitation) within the spatial, socio-economic and environmental context. Adaptation to cope with climate variability and change entails a portfolio of structural and non-structural measures.

11. Due to its complexity, the question of whether the document should address a possible link between mitigation and adaptation measures will be considered only at a later stage.

12. Furthermore, the document will contain health-related aspects that will be developed in synergy, as appropriate, with the relevant work undertaken under the Protocol on Water and Health by the Task Force on Extreme Weather Events.

13. The following issues may be considered while developing the document: vulnerability; spatial and planning aspects; prioritization; the water-basin context; flood and droughts options; specific changes in measures required due to the climate change; the concept of risks (including their social-economic dimension); water quality; possible measures (e.g. regulatory and operational

measures, capacity-building, financial instruments); process of adaptation (e.g. generic or case studies); and transboundary aspects and solidarity.

Proposed content

14. The document will be a roadmap towards climate proofing of water management. It will address how to develop policies, strategies and adaptation measures in a transboundary basin, and will focus on adaptation or coping options. To assess the vulnerability³ and risks⁴, an assessment of impacts on water systems and water services is needed. Methodologies to assess vulnerability will be provided. Linkages between adaptation and mitigation measures will be considered at a later stage. A step-wise approach is recommended, that includes the following steps forming the document's basic structure:

- I. Methodologies for climate impact assessment of a basin.
- II. Vulnerability assessment.
- III. Coping measures development (options and cost effectiveness).
 - (a) Prevention measures
 - (b) Improving resistance/resilience
 - (c) Preparation to extreme events
 - (d) Response to extreme events
 - (e) Preparedness for recovery or aftercare
- IV. Evaluation of adaptation strategies

15. An important cross-cutting element in the strategy towards climate proofing is the communication necessary to build the support platform and legitimacy for measures.

16. The health aspects of climate change effects require specific attention. How they will be included should be a joint decision with the Task Force under the Protocol on Water and Health. The structure proposed above possibly provides a good basis for incorporating these aspects.

I. Methodologies for climate impact assessment of a basin.

17. The impact assessment of climate change on water availability and water services is a top-down assessment linking climate models and scenarios to hydrological models at the basin level.

³ Vulnerability is dependency or fragility as well as insecurity, complexity, the absence of effective regulation and low resilience – in simple terms, exposure to contingencies and stress, and difficulty coping with them. Vulnerability defines the extent to which climate change may damage or harm a system. It depends not only on a system's sensitivity, but also on the system's ability to adapt to new climatic conditions. For instance, the consequences of sea-level rise or changes in the distribution of malaria vectors or other climate-zone related diseases are highly determined by the sensitivity, adaptability, and vulnerability of local systems. These are in turn affected by parameters such as welfare of a local society or fitness of a local population. An industrialized country that has enough money for a good coastal defence system will have less exposure to future sea level rise than a developing country that has no money for adequate coastal defence (Food and Agricultural Organization of the United Nations (FAO), 2006. FAO Glossary.

<http://www.fao.org/glossary>). A discussion of vulnerability on water management, including the socio-economic aspects is given in Downing, T.E. and others (2006) *Integrating Social Vulnerability into water management*. Stockholm Environment Institute (SEI) Working Paper and NeWater Working Paper No. 4. Oxford: SEI (www.sei.se/dload/2005/Newater-Downing-vulnerability.pdf).

⁴ Risks are expected losses (of lives, persons injured, property damaged and economic activity disrupted) due to a particular hazard for a given area and reference period. Based on mathematical calculations, risks are the product of hazard and vulnerability (European Environment Agency (EEA), 2006. EEA multilingual environmental glossary. EEA, Copenhagen, Denmark. <http://glossary.eea.europa.eu/EEAGlossary>).

Downscaling is essential and the links between the models and scenarios, as well as the levels of uncertainty are important aspects, to be taken into account.

18. The result of the impact studies is an overview of the potential impacts in a basin and forms the basis for the vulnerability assessment.

II. Vulnerability assessment

19. Vulnerability is an assessment on local level. It is defined in many different ways in the literature, ranging from the exposure to biophysical hazards to the social content of hazard and any combination of the two.

20. Within this framework, there is an immediate need for information that must be defined at the local scale. This includes climate information on strategic (long-term planning, 10-50 years), tactical (medium-term decisions, for example on allocations, 6-9 months), or daily-to-weekly (0-10 days) scales that can be included in models that are linked to scenarios. In addition, spatial information is needed on the socio-economic variables that must be included in the vulnerability assessment. These information needs must be assessed and the collection of the relevant information must be arranged. The document will describe the various types of information needed and give examples. Further reference can be made to the Strategies for Monitoring and Assessment of Transboundary Rivers, Lakes and Groundwaters that were drawn up under the Water Convention's Working Group on Monitoring and Assessment.⁵

III. Development of coping measures

(a) Prevention measures

21. Prevention relates to the measures taken to prevent or moderate the effects of extreme events as a result of climate change. Adaptation to droughts includes development of drought plans of action, water conservation measures, water-saving measures such as permit systems for water users and other financial instruments. Adaptation to flooding includes measures aimed at dam safety, restriction of urban development in flood risk zones, and other legislation. The document will provide guidance on the type of measures to be taken and will give examples.

22. To support prevention measures, forecasts are needed both on a seasonal and a long-term basis. In addition, an early warning system must be put in place to deal with immediate threats. The document will provide guidance on the characteristics of these forecasts and early warning systems and will give examples.

(b) Resistance / Resilience

23. Measures may be needed to improve the resistance or resilience of water systems to climate change effects. In the case of drought management, such measures may include improving irrigation, desalinization, improving the landscape water balance, and introduction or strengthening of a sustainable groundwater management strategy. In the case of flooding, management measures may include dam safety, restriction of development in flood risk zones and other structural measures, land use planning, and legislation specifically aiming at improving resilience.

(c) Preparation to extreme events

24. Full safety against climate change effects is unrealistic; therefore measures should be taken to prepare for these effects in order to be better able to cope with them, e.g. awareness-raising and

⁵ Available at <http://www.unece.org/env/water/publications/pub74.htm>.

hydrosolidarity⁶ (the principle of a equal sharing of water resources⁷), and governance issues such as legislation, institutional arrangements and information provision. The document will describe possible arrangements and measures and will give examples.

(d) Response to extreme events

25. At the appearance of an extreme event, it is important that the response is well organized. This includes issues such as evacuation measures, emergency medical care, and safe drinking water distribution. The document will provide arrangements for hazard management and the accompanying governance aspects such as a regulatory framework, institutional set-up, emergency training, and information dissemination. Examples will be given.

(e) Preparedness for recovery or aftercare

26. After an extreme event, a quick recovery is important for society to rebuild itself. Such recovery includes rehabilitation options such as reconstruction of infrastructure and includes governance aspects such as legislation on e.g. insurance, a clear policy for rehabilitation, proper institutional settings, rehabilitation plans and capacities, and information collection and dissemination. The document will provide potential arrangements and will give examples.

IV. Evaluation of adaptation strategies

27. Adaptation strategies need to be assessed to identify barriers and constraints to their implementation and to assess their results and their economic efficiency. The document will provide guidance on this step and include examples.

Relevant activities and background material

28. The document will be developed taking into consideration relevant experience gained so far in this field, including the following activities and materials:

- European Union (EU) Green Paper: Adapting to climate change in Europe – options for EU action⁸
- National studies and water adaptation strategies, such as the one developed in the Netherlands, “Towards a climate-proof Netherlands”,⁹ strategy ARK,¹⁰ and Assessing dangerous climate impacts for the Netherlands¹¹
- Conclusions from the International Symposium “Time To Adapt. Climate Change and the European Water Dimension”, organized under the German Presidency of the EU¹²

⁶ See Falkenmark, M. Towards hydrosolidarity: ample opportunities for human ingenuity: Fifteen-Year Message from the Stockholm Water Symposia. (www.siw.org/downloads/www-Symp/Towards_Hydrosolidarity_web.pdf) and Stockholm International Water Institute (SIWI), 1999. Towards upstream/downstream hydrosolidarity; A SIWI/International Water Resources Association seminar, Stockholm, August 14, 1999 (<http://www.siw.org/downloads/Reports/Report%205.pdf>).

⁷ On the catchment scale, the upstream/ downstream water-sharing is impossible to avoid and calls for development of a catchment hydrosolidarity that is based on an ethically supported, delicately balanced orchestration of seemingly incompatible land, water and ecosystem related activities. On the cross-national scale, the upstream/downstream water sharing in transnational river basins is a similar type of hydrosolidarity but which is being superimposed by political aspects, i.e. where the sanctioned discourse perspective is a strong barrier to be overcome (SIWI: The History of “Hydrosolidarity” (www.siw.org/downloads/WF%20Articles/WF%20History%20of%20Hydrosolidarity.pdf)).

⁸ Also available in Russian at: http://ec.europa.eu/environment/climat/adaptation/index_en.htm.

⁹ Available at:

http://www.programmaark.nl/Activiteiten/Versnellingsdagen+2006/dochome/Downloads_GetFileM.aspx?id=17491.

¹⁰ Programma Adaptatie Ruimte en Klimaat (<http://www.programmaark.nl/Internationaal/default.aspx>).

¹¹ Available at www.mnp.nl/bibliotheek/rapporten/500102007.pdf.

¹² (<http://www.climate-water-adaptation-berlin2007.org/>).

- EEA Technical report No 2/2007 – Climate change and water adaptation issues¹³
- Guidelines on Sustainable Flood Prevention and Model provisions on transboundary flood management developed under the Water Convention
- Reporting and national adaptation plans under the United Nations Framework Convention on Climate Change and activities under the Nairobi work programme on impacts, vulnerability and adaptation to climate change
- Outcomes of The Third International Conference on Climate and Water; September 2007, Helsinki
- Work done by EXCIFF (European Exchange Circle on Flood Forecasting and Early Warning) and EXCIMAP (European Exchange Circle on Flood Mapping)
- Any available studies on impact of climate change in and countries of Eastern Europe, Caucasus and Central Asia (EECCA) and South-Eastern Europe (SEE)
- The replies to the survey carried out by the Task Force in EECCA and SEE countries.

¹³ (http://reports.eea.europa.eu/technical_report_2007_2/en).