

The Congress of Local and Regional Authorities



SPRING SESSION
CG(14)33REP
13 February 2008

STANDING COMMITTEE
COMMITTEE ON SUSTAINABLE DEVELOPMENT

Climate change: building adaptive capacity of local and regional authorities

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Explanatory Memorandum
Committee on Sustainable Development

Summary:

Climate change is no longer a distant threat but a very real phenomenon that affects our environment and social and economic wellbeing. Resolute public action is required to strengthen the adaptive capacity of local and regional authorities to protect people, property and resources and generally to decrease vulnerability to the consequences of meteorological hazards. Adaptation strategies at all levels of governance must be combined with mitigation policies that will reduce greenhouse gas emissions.

Adaptation is a progressive approach that seeks to anticipate future change. Strategies must be based on risk and vulnerability assessments that identify risk prone areas and sectors. They should adopt a transversal rather than sectoral approach. Dynamic planning that enables responsive, rapid and flexible decision-making is required.

Since European regions will suffer differently from the adverse effects of climate change, incentives and burden sharing mechanisms should be developed to support the adaptation challenge.

Given the proven link between human activity and climate change, and in view/light of inherent and uncertainties in climate change scenarios, awareness-raising to improve citizens' understanding of what is at stake is crucial to successful adaptation towards climate-proof cities and regions.

R: Chamber of Regions / L: Chamber of Local Authorities
ILDG: Independent and Liberal Democrat Group of the Congress
EPP/CD: Group European People's Party – Christian Democrats of the Congress
SOC: Socialist Group of the Congress
NR: Member not belonging to a Political Group of the Congress



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The Congress Secretariat should like to thank Mr. Jürgen Kropp, Consultant, *Potsdam Institute for Climate Impact Research*, for his contribution to this report.

Foreword

This report of the Congress of Local and Regional Authorities is a part of its ongoing commitment to address the issue of climate change. It offers an introduction to the issue of adapting to climate change and is a continuation of the work of the Congress since 1993, and in particular of its 2007 report¹ which focused on the need for territorial authorities to introduce climate change strategies. The Congress has adopted a recommendation and a resolution on this issue which emphasizes the role of territorial authorities and offers recommendations for practical action.

The conclusions of the Intergovernmental Panel on Climate Change (IPCC)² on the scientific issues, impacts, vulnerability and adaptation underline, more strongly than ever, the extent and urgency of the problem. The time has come to develop comprehensive policies to combat climate change and its consequences.

Appendix 1 offers some definitions and Appendix 2 presents a bibliography and list of web sites which address adaptation to climate change.

This report draws upon the presentations and debates at the workshop on adaptation to climate change which was held in Strasbourg on 11 September 2007 (see Appendix 3 for the programme).

The Committee on Sustainable Development will continue its work with the elaboration of a further report on a new energy culture and through common work with the European and Mediterranean Major Hazards Agreement (EUR-OPA) of the Council of Europe in 2008 and 2009.

1. The challenge of climate change

Humankind contributes to global warming by emitting greenhouse gases coming from fossil fuel combustion. During the 20th century the climate became gradually warmer and wetter, but with large geographical differences. The Fourth Assessment Report on human impacts on the earth's climate system of the Intergovernmental Panel on Climate Change (IPCC) highlights the dimension of the problem future generations will have to cope with. It shows the potentially dramatic developments for the next decades and stresses the need of immediate action. It provides important facts regarding recent developments particularly that the last 12 years have seen the warmest 11 years since 1850. In addition global warming is accelerating, since the 100 year trend (1906-2006) is about 0.74 °C while those in the Third IPCC Report (1991-2001) was of 0.6 °C. Over the last 50 years the decadal warming rate doubles that of the decades before. At the same time, we see rapidly melting glaciers and a possibly underestimated sea-level rise. These and other effects make clear that humanity have to face serious, but in some cases, also beneficial consequences. Nevertheless, if humankind is not able to change behaviour, in particular the profile of fossil fuel use and our lifestyle, increases in the global mean temperature could approach values of 5-6 °C by 2100. Such a value was never seen since the end of the last ice age, but then it happened over some thousand years, while humans have reached this in one century. Therefore it is most likely that Europe will not be spared from serious consequences, on the contrary.

2. Towards adaptation strategies

Regional scenarios to respond to the adaptation challenge

Focussing on the adverse consequences of climate change in the future is not easy from a point of view of a decision maker facing information of climate scenarios. Climate is a scientific concept dealing with thirty year averages of meteorological variables modelled for grid cells of approximately 110km². This spatial scale of climate scenarios produced from global climate models is unsatisfactory and not suitable for adaptation decision making at local and regional levels.

¹ "Climate Change: approaches at local and regional level", Rapporteur Amrit Mediratta, United Kingdom (L, EPP/CD) Recommendation 215 (2007) and Resolution 236 (2007)

² <http://www.ipcc.ch>

Some clarifications are necessary in order to make clear what the challenges are. Climate change scenarios are projections not forecasts of potential future climatic conditions. Therefore the information content of these scenarios must be interpreted in a sense of potential developments under specific assumptions. These hypotheses are included in certain forcing storylines that represent different demographic, social, economic, technological and environmental developments. Development trends in these fields significantly influence the development of greenhouse gas emissions and therefore climate modifications. IPCC published a set of scenarios in 2001 (IPCC SRES scenarios).

Four different storylines represent diverging future development tendencies, taking into account a more economic or environmentally driven development as well as a path focussing more on globalisation or regionalisation³. Each of them impact on potential climate developments directly based on humans' current and future behaviour. These development trajectories and their associated emission paths are fed into the large climate models calculating the future corridor of climate developments. A crucial point in this context is the regional resolution of these scenarios. By the help of so-called regional models a downscaling to grid sizes of approximately 15km² is possible. But each scenario has limits, which are related again to the averaging process (spatially and temporally). In particular climate scenarios currently cannot represent extreme events adequately. Therefore for any kind of assessment there is a need to use the information provided by scenarios together with those offered by empirical observations. For example the hot summer 2003 and its consequences (water scarcity, death toll, yield loss, etc) provided a lot of information about the things to come when temperature increase proceeds. In this particular case an exceptional event like this could become common beyond 2050.

Nevertheless regional climate scenarios are very important for regional impact studies. While the general trends of development is clearly expressed in the recent IPCC report and already demands determined action, the question remains: how can the adaptation challenge be tackled? A few factors in this context are important although with respect to local adaptation it is not easy to make recommendations as the interpretation and usage of local scenarios depend on the specific question to be solved.

In principle, regional impact studies can be divided in two types: research-oriented and advice-oriented. For the adaptation challenge the latter approach is important. Policy-oriented research can address various questions, but will usually be aimed at providing advice on the range of possible climate change impacts on a system so that possible adaptations may be planned. Because the output of such research is linked to decision-making (clients will be mainly government and industry), it is very important that the scenarios be plausible and that key uncertainties be represented in the output. This also implies that development alternatives should be made clear, since climate scenario outputs are nothing more than a set of potential pathways. On the other hand it should be clear to the stakeholders that the physics of weather and climate is well-known and that the source of major uncertainty regarding the actual and future development is mainly humankind's behaviour.

Thus the future of our entire earth depends on decisions now. With respect to local decision making this implies two things. Firstly, the technological innovations leading to carbon-reduced societies, and which are needed urgently to keep climate change constrained to an acceptable level, must be implemented locally and rapidly. Secondly, in order to guarantee safe limits for communities, adaptation measures must be developed in order to cope with the local consequences of climate change. With respect to climate scenarios this implies that potential development paths should be described so that stakeholders are able to perform their own local risk assessments.

Pay tomorrow for damage or adopt an adaptation strategy

Combating climate change has two different dimensions. On the one hand, further efforts for greenhouse gas reduction (mitigation) are obligatory, since otherwise the consequences may lead to uncomfortable living conditions in several regions worldwide. There is growing concern that climate

³ These forcing assumptions are narrative descriptions highlighting the main development characteristics and dynamics of humankind for the next 100 yrs. An example which is representative for our current development, but which may lead to a tripling of preindustrial CO₂ concentration is the A2 storyline. It assumes a heterogeneous world with continuously increasing global population (approx 15 bn by 2100) and regionally oriented and fragmented economic growth. Less emphasis is directed on economic, social, and cultural interactions between regions. The income gap between now-industrialized and developing parts of the world does not narrow. On the other hand the B2 world will allow us to stabilize CO₂ concentration on a level of 450ppm and therefore to approach the 2 °C of the European Union. Here the emphasis lies on a convergent world with a global population of 7 bn by 2100, but with rapid changes in economic structures toward a service and information economy, with reductions in material intensity, and the introduction of clean and resource-efficient technologies, i.e. environmental and social consciousness combined with a globally coherent approach to a more sustainable development.

change is now unavoidable and empirical measurements have shown already a warming of approximately 1° C for the northern hemisphere during the 20th century. A warming of an additional 0.8 °C is unavoidable by 2020. Linked to these developments, changes to regional rainfall amounts and patterns were also observed.

Thus increasing regional impacts, either positive or negative, show the need for responses from local and regional authorities and spatial planners. The certainties we have from climate research indeed create certain urgencies and inaction is not appropriate in this context. Nevertheless proactive adaptation strategies are still in their infancy, unlike mitigation strategies. Adaptation has a stronger local and regional bias and represents a separate activity. These should be based on institutional inventories of risk and take into account local and regional data. Environmental constraints might be different from one region to another.

The debate whether that it will be cheaper to pay for damages in the future instead of taking action to mitigate and adapt already now has been concluded very recently, particularly since the publication of the report of Nicholas Stern in 2006⁴. Recent calculations on adaptation measures to combat sea-level rise and river floods, or for costs of the introduction of renewable energies, as well as prominent examples (e.g. hurricane Katrina) show that the benefits of taking good decisions could be enormous. Therefore proactive action is obligatory not only from an economic point of view, but also for the safety of our societies.

3. Towards new territorial planning and management practices

Feasibility is a crucial point in the development of adaptation measures. Several studies show that local decision makers are mainly interested in how to cope with the consequences of extreme events. To address these and other issues of climate change is a problematic point. On the one hand, climate extremes are not weather extremes and climate models can only provide information where the general weather regime will change and therefore whether extremes are more likely. On the other hand, institutional responsibilities are currently too static to respond adequately to climate related disasters. This has mostly to do with two challenges:

- concrete disaster situations and associated consequences show that people were already living in conflict with the environment. This is often a result of badly adapted planning targets and unsuitable assessments, for example built-up areas in flood prone zones. Potential solutions are often not on the agenda of the institution responsible.
- the second point is closely related to the first, but focuses more on economic interests. Adaptation as understood by stakeholders often implies that they are seeking strategies which guarantee current standards of living and therefore which continue to increase environmental stress. Thus before discussing adaptation concepts, the aim of these strategies must be clear. In several regions adaptation to climate change might be impossible, or not without tremendous costs. Therefore the willingness to pay is an essential one, but there is also an essential need for planned adaptation to have in mind long-term targets which could involve suggesting retreat. Therefore it is essential to change current planning and management practices in Europe.

Therefore, an integrated management and governance approach should be based on adaptation cycles instead of long-term planning. These call for a continuous review process which takes into account the most updated information and threat scenarios.

Awareness raising among stakeholders and citizens

Raising awareness and the level of understanding is a central point in the whole adaptation process. The vulnerability to climate change of populated areas, or to singular events, like flooding, is partly a consequence of decades of mal-adaptation or ill-defined planning which as not taken adequate account of environmental risks. . The acceptance of new and smart planning concepts and other actions to be taken will increase if the upcoming climate change related problems are easily understandable. This holds for decision makers themselves and for the affected citizens. Here science can provide a lot of input, but the major challenges are to reinforce vertical and horizontal integration of knowledge. While the first demands for concerted instruments at different administrative levels in a

⁴ http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm

region or country or even at European level, the latter addresses the issue of sharing experiences to solve specific problems.

Identification of risk prone areas and sectors to target adaptation

Many legal instruments which have an environmental impact already exist although they were not designed to address climate change in particular. Since climate change will be an enormous task facing future societies, this issue should be explicitly included in national, regional and local policy instruments. For all applied adaptation concepts it is essential to make clear the adaptation target and the respective timescale which can vary depending on the problem to be solved. For example, when addressing the impact of heat waves on human health, concrete actions like the greening of cities can be rapidly introduced into towns and cities. Improvements to flood protection of buildings, such as sea or river dikes, or lifestyle changes, require a longer time scale and need structural works and an adequate legal basis. For any action, a public authority must clearly identify the sector concerned, supported by impact analyses, because it is essential to know which region is the most vulnerable.

Identifying risk prone areas is only a first step, since, from a broader European view, regions will suffer from climate change very differently. In particular this holds for the poorest already living in marginal areas. It should be expected that climate change will aggravate economic and social disparities further. Therefore adaptation to climate change also involves sustainable development of regions.

Sharing information horizontally is important here, since future climate stimuli will affect several sectors and regions and lead to many additional side effects. Therefore a variety of administrative and political authorities have to be involved in combating the adverse effects of climate change. Thus rapid knowledge exchange and harmonised action is of vital importance.

An integrated management cycle to overcome sectoral views and strengthen cooperation

Climate change will affect various sectors, regions and actors. Some adaptation strategies can have contrary effects between different sectors or regions. For example, the re-fortification of dikes can protect one area against the threat of floods whilst maybe increasing the risk of flooding in other areas downstream. Therefore trans-sectoral and interdisciplinary views are vital in the development of adequate strategies. Cooperation and integration is necessary across regions, countries, sectors and administrative levels. Actors need to be aware of the benefits of cooperation to gain positive long-term effects instead of decisions focusing only on short-term benefits. But the discussion of climate change and its impacts is also driven by different interests and values. A *conflict of interests* between different stakeholders and sectors on future development priorities is inevitable in pluralistic societies. Therefore, adaptation to climate change impacts is a cross-cutting issue – not only across sectors or administrative levels, but also across different groups in society and across national borders. Cooperation and communication are key words in processes addressing climate change impacts.

Substituting static planning by a more dynamic process

A shift can be observed in recent decades regarding the management and planning of the environment. While during the 1990s environmental hazards were mainly addressed by concepts of emergency planning, this has evolved in recent years. This is an outcome of the awareness that disasters like the Elbe flood in 2002, the heat wave in 2003, or hurricane Katrina in 2005 will increase in frequency and intensity in the coming decades. Nevertheless there are a lot of pitfalls, some of which are related to planning systems being too static. In many European countries land is often associated with specific functions: housing, agricultural or industrial use. This is normally fixed for a long-term and cannot change very easily. A prominent example occurred in Germany after the river Elbe flood in 2002. Several buildings built in – known - flood prone areas were destroyed completely, but due to legally binding spatial planning decisions, many of them were reconstructed in the same areas.

Another point concerns the institutions themselves. Several examples show that natural disasters and climate change do not stop at administrative borders. Therefore the responsibilities of authorities, both their institutional preparedness and their horizontal integration, should be shared and adequately organised in order to achieve the best benefit for the population. Things could change and be further improved by implementing some kind of “climate proof” label.⁵ For this, public authorities should:

⁵ Up to now no legislative instruments exist that allows for well-defined climate proofing. This must be a matter of debate and research in the coming years.

- provide legislative, regulatory and judicial instruments which control, limit or simply forbid undesirable activities;
- promote appropriate action and behaviour through strong price signals in the form of fiscal instruments (taxes, subsidies, ...);
- foster coordination and the development of an integrated approach by optimising procedures and relations internally and between different institutions;
- support awareness raising and changes to human behaviour through information, education and participation.

Scientific support for adaptation strategies

Science should provide information for the public. However, it is obvious that in many cases scientific information and public demands do not meet. This is a challenge, particularly for city elected representatives, water managers, town planners, and scientists, since in the adaptation challenge they must guarantee the populations' safety. Early adaptation to climate change greatly reduces the financial and humanitarian risks potentially involved. Planned adaptation will also greatly increase quality of life, by sustaining current recreational possibilities and creating new ones. This underlines not only the need for societal, but also of adequate management responses in order to steer regions to safe limits.

Since regional impact analyses are a matter of scientific endeavour, concepts are needed to bring together stakeholders' knowledge (e.g. regional/local setting, problem awareness, societal needs) and scientific expertise (relating to vulnerability assessments, interpretation and evaluation of climate scenarios, and technical solutions), as well as transnational/national adaptation programmes (e.g. funding for adaptation, policy guidelines). In other words, a combination of bottom-up and top-down is needed, while at the interface scientists and decision-makers should communicate about concrete problems and develop common problem-solving strategies. This requires a new understanding between science and stakeholders and demands a tighter cooperation between these two groups. Scientists can provide support for decision-making by offering the following:

- regional climate scenarios and an interpretation of these regarding the problems which need to be solved (preparation of regional risk assessment);
- assessment of adaptation mechanisms and bad adaptation in terms of impacts in order to identify win-win or no-regret options;
- estimation of vulnerability thresholds and of possible adaptive capacity;
- knowledge of potential actions and possible responses which would reduce costs for research and development of adaptation strategies;
- A structured website for European stakeholders providing information on sources and strategies which are adapted to different concrete problems and possible solutions;
- impact analyses which do not only focus on technical solutions, but also on socio-economic issues such as poverty reduction and increasing the resilience of local authorities.

The strategic role of the vulnerability concept

The previous points highlight that the concept of adaptation is closely linked to the *concept of vulnerability*. The more vulnerable a region, sector or a society is, the more severe the consequences of climate change are. Therefore vulnerability analysis helps to identify where adaptation should take place. Several dimensions should be taken into account regarding the degree of vulnerability: not only exposure to certain climate stimuli, but also the awareness of societies to the issue (insufficient precautions or the capacity for adequate reaction). Specific groups might be more vulnerable due to health problems, age or disabilities.

Some regions are more vulnerable than others as a result of their geographic position, for example coastal and mountainous areas, or as a result of human activities such as controlling river flow and deforestation. Thus the vulnerability concept enables identification of risk prone areas or hot spots which require action. For local and regional authorities it is easier to make decisions when they have comparable situations at hand. Unfortunately at least two common vulnerability concepts co-exist and

might confuse decision makers to some extent. However, both concepts are complementary but focussing on different aspects of the problem (cf. glossary).

Scientists and researchers addressing climate change focus on the long-term development taking into account the specific setting and inventory of a region or sector, including their coping capabilities. Scientists addressing disaster mitigation are event-oriented and try to estimate human risk regarding a concrete hazard (disaster) and often a one-dimensional physical vulnerability (e.g. hill slope). Nevertheless vulnerability is a very valuable concept. Although all vulnerability assessments are to some extent subjective - each assessment is question-oriented asking which part is vulnerable to what and relies on the expertise of the investigator - this concept of vulnerability is useful in supporting decision makers' actions. By using the definition of the climate change scientific community, aspects like thresholds for adaptive capacity can also be addressed. For example it enables comparisons to be made between regions and sectors and the public can be informed by maps and or illustrative graphs. All these measures can increase acceptability in the case of unpopular actions.

4. The need for a paradigm shift

Spatial and regional planning tends to associate specific areas with specific functions, either to respond to demands expressed by the public (new land for housing), or with reference to normative protection targets (building or raising a river or sea dike). In any case, the relevant areas have economic value, or the investments aim to improve protection of areas and valuable assets. Concerning this, decision makers are often trapped in the tension between economic imperatives (short/long-term benefits/costs) and risks.

Since nobody can forecast exactly climate development or humankind's behaviour for the next 100 years, new concepts of management and planning should be considered. Decision makers should be aware that they only have limited knowledge. Under these circumstances, the precautionary principles for adaptation issues should be observed. Analyses trying to identify more and more details of a system are neither effective nor necessary. Nevertheless, science is progressing regarding the accuracy of regional climate scenarios. But due to the general limits of the system as described above, more and more detailed analyses will waste money. A lot of information required to undertake adequate action is already available. The ultimate goal of adaptation policy must be to prevent unacceptable outcomes in a region or sector. With the right planning response and good mechanisms formidable progress can be imagined. From this point of view, adaptation to climate change is also part of security policy. In this area a solid experience has been accumulated in recent decades. These experiences must now be implemented at local level and to resolve environmental issues.

From local and regional problems to coordinated action

The challenge of climate change does not only require a holistic view on problems, it also needs cooperation (horizontal and vertical) between the different institutional levels. Heavily interwoven, local, regional, national, and transnational networks should be established sharing the very diverse information on current adaptation efforts. These networks could also be used as a communication platform between public authorities and spatial and urban planners at national, regional or local level. Nevertheless, there is still some way to go as efficiency measures for adaptation concepts are still lacking. Theories on how to enable authorities to act quickly and efficiently are also missing. These issues are a matter of scientific research, but also for public planning. Since climate change is already an observable and ongoing process, we must develop concepts for an existing problem. At this stage, learning from examples and drawing the right conclusions is very important. In addition to coordinated action of different levels of governance, science can provide a lot of information and knowledge in this area.

Integrated actions

Climate change is a cross-cutting issue. Consideration of adaptation needs should be seen as a vital contribution to sustainable development, but adaptation is not a priority in all European regions. This position is very worrying as future damages will be expensive for society. Hence, adaptation to climate change impacts should not be regarded independently, but instead mainstreamed into all policies and spatial planning. Mainstreaming is addressed in several points in the text above. It comprises, for example, the following:

- Assessing vulnerability and risk;

- Definition and implementation of adaptation needs;
- Formal and informal instruments supplementing regulation;
- Inter-departmental exchanges and cooperation
- Education and training.

Recommendations for policy makers

- Adaptation is an inter-sectorial and cross-cutting issue. This implies that several social groups and actors must be involved. Decision makers and public bodies play a key role, since they have to guarantee society's safety. Even when they do not take concrete action, they must raise awareness amongst the population and foster responsibility so that adaptation to climate change can move forward through a mix of top-down and bottom-up approaches.
- Spatial and urban planning concepts must be integrated and dynamic in the future. Currently, spatial planning favours static spatial functions. This should be substituted by more dynamic planning structures which allow for an immediate response in the case of climate induced disasters. An open question is the development of instruments enabling public bodies to choose "climate proof" planning and decision making which integrate adaptation and mitigation issues. This is particularly important, since urban regions account for approximately 80% of greenhouse gas emissions.
- Europe-wide instruments should be developed to allow compensation payments in cases of climate induced disasters. It is a major characteristic of climate change that it will not occur equally either in space or time. Therefore it is very likely that European regions will suffer from its consequences differently. The compensation funds should also remunerate local adaptation efforts in order to set incentives for sustainable planning.
- Wherever possible, adaptation and mitigation concepts should be integrated. While obligatory transnational efforts to reduce greenhouse gas can be supported (financial support for insulation of buildings or installation of small-scale photo-voltaic equipments), adaptation should mainly guarantee security (building dikes and changes in water usage profiles). Both approaches should go hand in hand where possible; for example, the construction of a photo-thermal plant produces clean energy and its waste heat could be used in parallel for seawater desalination.
- Adaptation is a progressive approach which should include risk and vulnerability assessments in order to determine risk prone areas and sectors. These concepts should be supported by monitoring and success criteria and each adaptation strategy combines a mix of top-down and bottom up approaches. Science can be involved in problem solving and in strategy development.

5. Adaptation: a marginal position still to be reinforced

The assessment of climate change adaptation policies shows that this concept is still in its infancy. This holds in particular if we evaluate concrete adaptation measures or if we look for concrete solutions to current problems. At European level, some initiatives integrate the implications of climate change and the first policies are emerging. The European Commission has recently produced its Green Paper on "adaptation to climate change in Europe - options for EU action", and has been accompanied by a vast consultation process⁶. Countries such as Finland, the United Kingdom, France and Germany have initiated national adaptation strategies. The involvement of local and regional authorities is not yet very frequent with the exception of those faced with a major catastrophe. It should be noted that some have joined together with the European projects AMICA or ASTRA which have developed interesting tools to allow authorities to examine their vulnerability and elaborate strategies and first adaptation measures to climate change. (see the internet sites in Appendix 2).

However, most national, regional, and local actors have not yet implemented the first recommendations which would allow them to sufficiently integrate climate change impacts into their actions. This is particularly the case when addressing the threat of rising sea-levels. It is also the case when focussing on potential benefits of climate change in particular regions in Europe. Much remains to be done and science must provide better and more demand oriented local assessments where potential impacts will be at stake in the future. The concept of vulnerability plays a key role in this

⁶ http://ec.europa.eu/environment/climat/adaptation/index_en.htm

context, not only because it shows where the potentially risk prone areas are but it can also show where the benefiting areas or sectors are.

Two of the main obstacles encountered during examination of various examples were the partly missing distinction between adaptation and mitigation strategies, as well as the problem of obtaining more detailed information about the extent to which climate change impacts are considered. Most policies refer to climate change only in terms of mitigation. It is clear that adaptation has not yet been taken into account in a general way by the local or regional levels and that the identified actions should be subject to evaluation

Although the problems regarding local adaptation are known widely, there are still challenges to overcome when addressing climate change. Uncertainties in the projection of future climate change remain. Climate change impacts and adaptation needs concern various sectors and regions in diverse ways.

Different interests have to be coordinated and moderated. Cooperation among regions, sectors as well as of administrative levels is required. Despite the current public debate on climate change, awareness of adaptation is still not sufficient, nor is there an adequate understanding of the need for a radical change in behaviour. Resolute and targeted awareness-raising should be undertaken by public authorities. Strong measures directed towards the future should support a positive attitude towards adaptation to climate change. Territorial authorities should make maximum use of the tools available, from legislation to communication, to put in place adapted actions which improve their region's resilience and activities regarding the consequences of climate change.

Appendix 1 - Glossary

Note, in planning contexts nowadays, two communities are involved, the disaster mitigation and the climate change community. Both deal with similar issues in the field of adaptation, but use partly different definitions. The major reason for that are different time scales; while climate impact research focuses on long-term developments, the disaster mitigation community is more interested in the risks of concrete events. In case of varying definitions this highlighted below.

Adaptation

Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, particularly anticipated or reactive adaptation, public or private adaptation and autonomous or planned adaptation.

Adaptive Capacity

The ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities or to cope with the consequences.

Climate Change Scenario

A plausible and simplified representation of the future climate, based on consistent assumptions about humankind's behaviour for the next century. A "climate change scenario" is the difference between a climate scenario and the current climate.

Mitigation (Climate Change)

An anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases.

Sensitivity

Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate-related stimuli. These stimuli encompass all the elements of climate change, including mean climate characteristics, climate variability, and frequency and magnitude of extremes.

Sustainable Mitigation (Disaster Mitigation), same as adaptation in climate impact research

Vulnerability (Climate Change)

The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.

Vulnerability (Disaster Mitigation)

Risk = hazard x vulnerability. This definition includes hazard as an event, i.e. this implies that a probability for its occurrence can be provided. For climate change this is difficult, since it is a slow process.

Appendix 2 - Further reading

EC (2007): *Adapting to climate change in Europe – options for EU action*. Green Paper from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions – COM (2007) 354.

Eisenack K, Tekken V, Kropp, JP (2007): Stakeholder Perceptions of Climate Change in the Baltic Sea Region. *Coastline Reports* 8 245-255.

EEA (2005): *Vulnerability and adaptation to climate change in Europe*, EEA Technical report No 7/2005

Lim B, Spanger-Siegfried E, Burton I, Malone E, Huq S (eds) (2005): *Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies, and Measures*, Cambridge University Press

Nakićenović, N. et al. (2000): Special Report on Emissions Scenarios, Intergovernmental Panel on Climate Change, Geneva.

IPCC (2007): *Climate Change 2007 – Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the IPCC, Cambridge University Press.

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Kropp JP (2008): Klimawandel: Verwundbarkeit, Bewältigung von Folgen und Anpassung [Climate Change: Vulnerability, Coping, and Adaptation] *Raumentwicklungsstrategien im Klimawandel*, [Spatial planning Strategies in the Light of Climate Change] (Ed.) Bundesministerium für Verkehr, Bau und Stadtentwicklung, Berlin

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Stern, N. (2007): *The Economics of Climate Change*, - The Stern review, Cambridge University Press.

Schellnhuber HJ, Cramer W, Nakicenovic N, Wigley T, Yohe G (eds.) (2006): *Avoiding Dangerous Climate Change*, Cambridge University Press

Willows, R.; Connell, R. (eds.) (2003): *Climate Adaptation: Risk, uncertainty and decision-making*. UKCIP Technical Report, UKCIP, Oxford.

Websites for further information

- The Intergovernmental Panel on Climate Change (IPCC/GIEC): <http://www.ipcc.ch>
- European Environmental Agency: <http://www.eea.europa.eu>
- UNFCCC database of coping strategies: <http://maindb.unfccc.int/public/adaptation>
- Developing Adaptation Strategies in the Baltic Sea Area, EC INTERREG IIIB Project ASTRA. <http://www.astra-project.org>
- European Spatial Planning: Adapting to Climate Events (ESPACE, INTERREG): www.espace-project.org
- Nova Scotia Climate Change Adaptation Initiative: <http://www.climadapt.com>
- Climate Alliance, EU INTERREG IIIC Amica: <http://www.amica-climate.net>
- Munich Climate Insurance Initiative: <http://www.climate-insurance.org>
- United Kingdom Climate Impact Programme: <http://www.ukcip.org.uk>
- Competence center on adaptation of the German Federal Environmental Agency (only German) : <http://osiris.uba.de/gisdienste/Kompass/>
- Assessing the adaptive capacity of the Finnish environment and society under a changing climate (FINADAPT) : <http://www.ymparisto.fi/default.asp?contentid=227544&lan=FI&clan=en>
- Adaptation to Climate Change in Morocco: <http://www.pik-potsdam.de/~kropp/accma/>
- New Zealand Quality Planning: <http://www.qp.org.nz/plan-topics/climate-change.php>
- Climate Change Planning in Australia: <http://www.csiro.au/science/ClimateChangePlanning.html>

The Congress of Local and Regional Authorities



Committee on Sustainable Development

Workshop on Adaptation to climate change: Building adaptive capacity of local and regional authorities

Programme

11 September 2007 (9:30 am – 6 pm)
Strasbourg, *Palais de l'Europe*, Room 11

Simultaneous interpretation provided in English, French, German and Russian

- 9:30 - 10:00 a.m. **INTRODUCTION**
- Gaye DOGANOGLU, Chair of the Committee on Sustainable Development of the Congress of the Council of Europe
- *The importance of adapting to Climate change – challenges and opportunities*
Chris WEST, Director, UK Climate Impacts Programme (UKCIP)
- 10:00 - 11:00 p.m. **DIFFERENT GOVERNMENTAL LEVELS OF RESPONSIBILITY IN ADDRESSING ADAPTATION TO CLIMATE CHANGE**
- Chair: Svetlana ORLOVA, Congress' Co-Rapporteur on Adaptation to climate change
- Moderator: Chris WEST, UKCIP
- *The region as a driving force*
Andreas DRACK, Akademie für Umwelt und Natur, Upper Austria Region, Austria
 - *The integrated action of a metropolitan city*
Geneviève ANCEL, Private office of the President of Greater Lyon (France)
 - National policy approaches:
The Russian example:
Svetlana ORLOVA, Vice-President, Federation Council of Federal Assembly (Russian Federation)
The German example:
Ingrid FRANZEN, Vice-President, Schleswig-Holstein Regional Parliament (Germany)
- Discussion
- 11:00 - 11:30 p.m. *break*
- 11:30 - 12:30 p.m. **IMPROVE KNOWLEDGE OF THE IMPACTS OF CLIMATE CHANGE, RAISE AWARENESS AND IMPROVE RESPONSES: METHODS AND PARTNERS**
- Chair: Ingrid FRANZEN, Congress' Co-Rapporteur on Adaptation to climate change
- Moderator: Jürgen KROPP, Expert on adaptation to climate change, Potsdam Institute for Climate Impact Research (PIK) (Germany)
- *The networks' support to local and regional authorities in setting up initiatives for improved resilience*
National level:
The UK example and the Nottingham Action Pack: Laurie NEWTON, UKCIP
European / international level:
Holger ROBRECHT, ICLEI - Local Governments for Sustainability
- Discussion
- 12:30 - 2:00 p.m. *Lunch break*

2:00 - 3:30 p.m.

CASE STUDIES OF ADAPTATION MEASURES IMPLEMENTED BY LOCAL AND REGIONAL AUTHORITIES

Chair: Svetlana ORLOVA, Congress' Co-Rapporteur on Adaptation to climate change

Moderator: Chris WEST, UKCIP

- *Rising sea water levels*
The City of Venice (Italy), Cristiana SCARPA, Environmental Department
- *River Flooding*
The Upper Austria Region (Austria), Andreas DRACK, Akademie für Umwelt und Natur
- *Heat waves and urban overheating*
Greater Lyon (France), Pierre CREPEAUX, Urban Ecology Department

Discussion

3:30 - 4:00

break

4:00- 5:30 p.m.

A RISK BASED AND INTEGRATED APPROACH TOWARDS ADAPTATION

Chair: Ingrid FRANZEN, Congress' Co-Rapporteur on Adaptation to climate change

Moderator: Laurie NEWTON, UKCIP

- *Adaptation options and experiences from case studies in Germany, the Baltic region and Northern Africa*
Jürgen KROPP, PIK Potsdam
- *The ESPACE project - Climate Change, Risks and River Catchment Planning*
Jane KORCK, Bavarian Environment Agency (Germany)
- *Combining adaptation and mitigation goals*
Pirita LINDHOLM, AMICA – Climate Alliance

Discussion

5:30-6:00 p.m.

CONCLUSIONS

by Jürgen KROPP, PIK Potsdam