COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels,
SEC(2009) 388/2

COMMISSION STAFF WORKING DOCUMENT

accompanying the

WHITE PAPER

Adapting to climate change: Towards a European framework for action

SUMMARY OF THE IMPACT ASSESSMENT

{COM(2009) 147}
{SEC(2009) 386}
{SEC(2009) 387}

EXECUTIVE SUMMARY

1. INTRODUCTION

This report is the executive summary of the Impact Assessment Report[1] on the Commission's White Paper on Adapting to Climate Change[2], the objective of which is to develop further the discussion at European level of the effects of climate change and to take steps to ensure that the EU and Member States are fully able to respond at the levels of both policy definition and practical implementation of solutions, bearing in mind that most adaptation initiatives need to be taken at national, regional or local level.

The Commission adopted a Green Paper on Adaptation to climate change in Europe in 2007[3], which was followed by a broad public and inter-institutional consultation[4]. The Impact Assessment benefited from the 4th IPCC report[5], the EEA/JRC/WHO report on the impacts of CC in Europe[6] and from a long list of reports and research projects on climate change impacts and adaptation. It is complemented by sectoral papers on water, coasts and marine issues[7], agriculture[8] and health[9].

2. CLIMATE CHANGE ADAPTATION: A NEW AGENDA FOR PUBLIC POLICY

2.1. Key Concepts

Vulnerability (IPCC,2007) is the degree to which a system is susceptible to, and 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 change and variation to which a system is exposed, its sensitivity, and its adaptive capacity (Figure 1). Conversely, **resilience** (IPCC, 2007) is the ability of such system to absorb disturbances while retaining the same basic structure and ways of functioning.

This means that pro-active adaptation policies should not be restricted to an analysis of the impact of Climate Change and the uneven sensitivity of different sectors, regions or social groups. For some sectors, regions and groups climate change might provide opportunities for innovations in processes, technology and governance.

Biodiversity, ecosystems, the population and economic agents may adapt autonomously, if other conditions are favourable, without interference from a central authority moderating the

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1 SEC(2009) 387. The Impact Assessment report provides more detail at sectoral and geographical level

2 COM(2009) 147.

3 COM(2007) 354, http://ec.europa.eu/environment/climat/adaptation/index_en.htm

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

5 Alcamo et al., Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, available on http://www.ipcc.ch/ipccreports/assessments-reports.htm

6 Impacts of Europe's changing climate - 2008 indicator-based assessment, EEA Report No 4/2008, http://reports.eea.europa.eu/eea_report_2008_4/en/

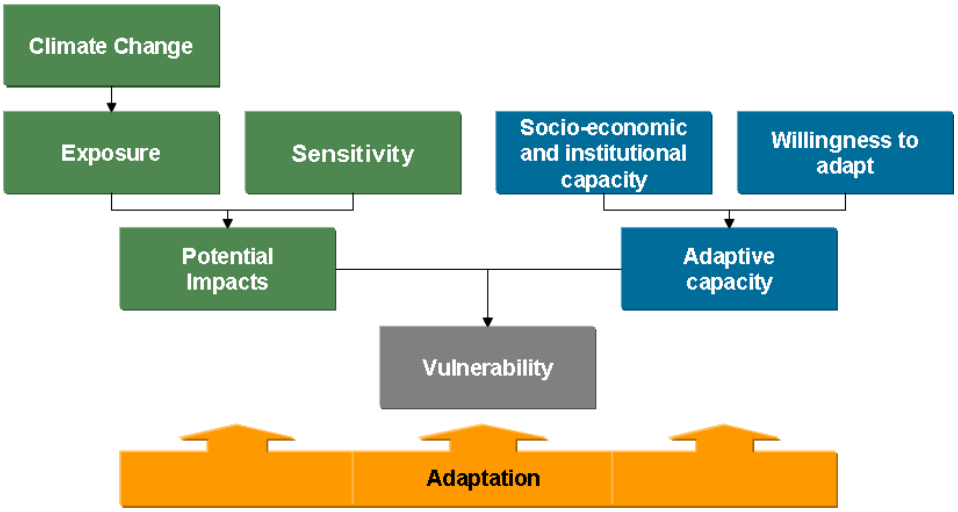
7 SEC(2009) 386.

8 SEC(2009) 417.

9 SEC(2009) 416.

final impact of climate change and also exploiting climate change "opportunities", whilst triggering another layer of economic, social and environmental impact and shifting the climatic impact elsewhere.

Figure 1 Conceptual diagram for climate change vulnerability and adaptation. Source: EEA (2008).

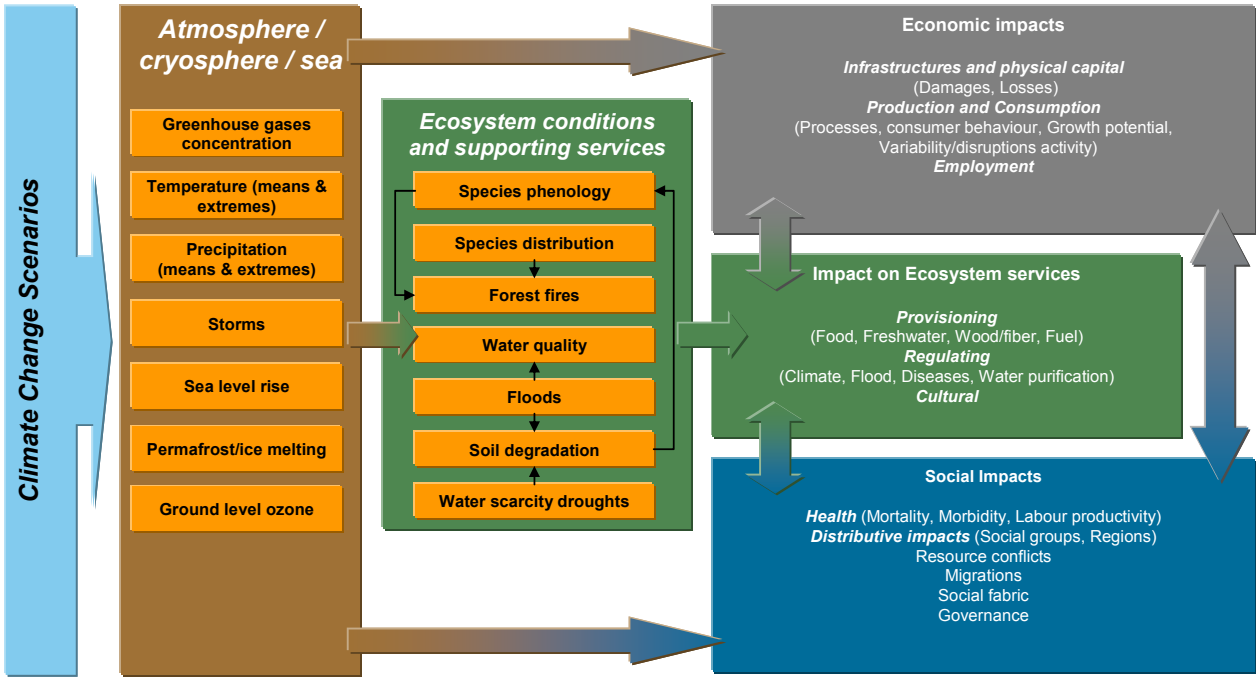


Planned adaptation measures will therefore be needed to provide a **multi-sectoral approach** aimed at improving the resilience of the natural and economic system and/or facilitating specific adaptation, often with a **medium- and long-term approach**. Public action will also target the production of public goods and the provision of a level playing field for information on climate vulnerability and on costs and benefits of adaptation options.

The major uncertainties over the future baseline for adaptation favour the implementation of flexible or adaptive management, assessing the robustness of alternative strategies against a wide range of scenarios[10]. The analysis of the Impact Assessment is based on a holistic evaluation framework which goes beyond the direct impacts and economic repercussions of climate change, and takes on board the role of ecosystem services and the social dimension of climate change (Figure 2). This provides a basis for the further integration of the existing information on the potential impacts that may occur given alternative projected changes in climate, without and with autonomous adaptation. So far the knowledge is still extremely fragmented, and research projects under the 6th or 7th Framework Programme are progressing in defining a set of consistent scenarios designed for the further integrated assessment of adaptation and mitigation policies.

[10] Hulme M. (2008), "Is Climate Prediction a Limit to Adaptation?", Lecture at European Commission, 22 May 2008 - School of Environmental Sciences, University of East Anglia

Figure 2: Chain of Potential Impacts from Climate Change. Source: DG Environment, based on based on (EEA, 2008) and (IPCC, 2007). Potential impacts are all impacts that may occur given a projected change in climate, without considering adaptation.



2.2. Identifying the most vulnerable EU sectors and regions

The most vulnerable areas in Europe (EEA 2008) are Southern Europe, the Mediterranean Basin, Outermost regions and Arctic region. Furthermore, mountain areas, in particular the Alps, islands, coastal and urban areas and densely populated floodplains are facing particular problems. In Northern and Western Europe a more complex balance between negative and positive effects is projected for moderate levels of climate change.

The potential impact of Climate Change is higher in sectors which rely on ecosystem services, water availability and climatic conditions, such as agriculture and forestry, fisheries and aquaculture, energy and tourism.

The most vulnerable groups (elderly people, children, disabled, chronically ill, etc) are likely to face greater difficulties in adapting. This poses a potential problem of equity and distribution. It also raises the issue of whether planned adaptation should specifically try to target such groups, or apply a distributional analysis to ensure an equitable adaptation strategy. While a lack of resources for the most vulnerable is often cited as a barrier to effective adaptation, other financial mechanisms and market failures reduce the potential effectiveness of adaptation.

Work is already ongoing at the European Commission to assess the feasibility and provide options for the design of a (set of) vulnerability indicator(s), at sectoral and regional levels, that could be used to assess further EU-wide adaptation policy packages. It would require bringing together indicators at economic, social and environmental levels for different climate scenarios, to represent the levels of risks that different sectors and regions are facing.

2.3. Need for a better co-ordination of action at different levels

Some Member States are well advanced in their thinking on adaptation and already have policies in place, while others are still at the phase of identifying the problems or debating the direction that action should take. In existing national adaptation plans, it is recognised that coordination between Member States is needed and benefits in approaching adaptation in an integrated, coordinated manner at EU level are recognised. The reasons for taking action at EU level are set out below:

- Climate change will result in **cross-border impacts** and will require adaptation measures based on cooperation between different Member States and coordination with relevant non-Member States (e.g. upstream flood protection measures);

- A sense of **solidarity** must be enshrined in the adaptation strategy, as the effects of climate change will differ geographically and be highly variable meaning that the impact across the EU could vary considerably.

- To avoid **mal-adaptation** (adaptation action shifting the impact to or exacerbating the problem in another area, country, sector or social group)**,** it is often best to take action at cross-border or European level;

- Climate change will have a major impact on sectors that are well integrated at EU level through the **single market and common policies**. Adaptation can be taken into account in **EU spending programmes** to complement the resources spent by the Member States.

- As regards external action, the move towards increased negotiating power at EU, rather than Member State, level may give the EU a **leading role** in adaptation in some sectors.

3. OBJECTIVES OF THE WHITE PAPER

The specific objective of the Communication on Adaptation is to identify policy instruments at EU level and establish a work plan for the short and medium term, by:

– Improving the knowledge base on CC vulnerability (impacts and adaptive capacity) and on the costs and benefits of adaptation options;

– Ensuring early implementation of no-regret and win-win measures and avoid mal-adaptation, by mainstreaming adaptation into EU policies;

– Putting in place a process to better co-ordinate adaptation policies and assess next steps, including launching a debate on future funding.

4. SCREENING POTENTIAL OPTIONS

In order to take forward the objectives set out above, two levels of options need to be distinguished:

– The overall approach to pursue adaptation policy at any level.

– The framework for action at EU level.

4.1. Options for the approach to adaptation

There will be a plethora of public adaptation strategies, plans and projects, each one requiring an assessment of vulnerability and an evaluation of the cost and benefit. It is, however, possible to classify adaptation options into three broad categories based on the overall approach:

- **"Grey" infrastructure approaches**, which are physical intervention or construction measures using engineering services to make **buildings and infrastructure** that are essential for the social and economic well-being of society more capable of withstanding extreme events;

- **"Green" structural approaches**, which contribute to increasing **ecosystems' resilience** and, while aiming to halt biodiversity loss and the degradation of ecosystem and restore water cycles, at the same time use the functions and services provided by the ecosystems to achieve a more cost-effective and sometimes more feasible adaptation solution than relying solely on grey infrastructure.

- **"Soft" non-structural approaches** are designing and applying policies and procedures, land-use controls, information dissemination, and economic incentives to reduce or prevent disaster vulnerability. They require more careful management of the underlying **human systems**.

4.1.1. Assessment of options

The diversity of vulnerability across EU-27 and sectors and the scope for adaptation options cannot be addressed in this Impact Assessment. Moreover, this report does not select one preferred approach, as all 3 approaches defined above have to be part of any policy portfolio.

An assessment of the ***cost and benefit of adaptation*** policies requires considering the full picture of EU and national measures (CAP and cohesion policy funds, environmental, health and enterprise policies, etc.) and should consider how re-focusing or reformulating a broad range of policies can help to make adaptation action more cost-effective, quicker and flexible. The uncertainty inherent in climate change projections can make it difficult to take early targeted action in all sectors. However, early action can bring clear economic benefits by anticipating potential damages and minimising threats to ecosystems, human health, economic development, property and infrastructure. For certain investment, which will still be fully operational when the impact of climate change could fully materialise, the current direction of climate change predictions should play a role in decision-making now.

Autonomous and planned adaptation options may trigger **environmental costs**, which will need to be addressed in sustainability assessments. In particular it is essential to perform an integrated assessment of mitigation and adaptation strategies: while mitigation strategies (both energy and land-use) should fully integrate their vulnerability to climate change, some options for adaptation (in particular water supply and cooling) merit a careful assessment. This confirms the importance of integrated land and water assessment to ensure the optimal allocation of scarce natural resources (land, water). Other environmental impacts must also be explored as soon as possible to design a sustainable adaptation policy and avoid "mal-adaptation".

Regarding the **social impact**, a strategy for adapting to climate change has to be socially fair, especially regarding the consequences on employment, equity and distribution. A strong emphasis on human capital should be introduced; ranging from awareness of the challenges linked with adaptation to climate change to investment in education and training to ensure that Europeans have the skills and competences to adapt to climate change. Adaptation strategies must facilitate structural changes when required and harness new opportunities for economic development and the creation of "green jobs", while acting in solidarity with vulnerable groups.

4.1.2. Prioritisation of adaptation measures

There is a range of adaptation measures that must be undertaken either because they pay off in the short term irrespective of uncertainties in forecasts ("no regret"); or because they are beneficial for both mitigation and adaptation ("win-win"):

- Avoiding infrastructure development and building in high-risk areas (e.g. flood plains, water scarcity) when locating or re-locating;
- Designing infrastructures and buildings to minimise energy and water consumption and improve the water retention and cooling capacity in urban areas;
- Flood and coastal management that includes creating or re-establishing flood plains or salt marshes, which increase flood/sea level rise management capacity and support biodiversity and habitat conservation objectives;

- Improving preparedness and contingency planning to deal with risks (including climate).

4.2. Options for action at EU level

In light of the above objectives, there are three main "strategic" options for a future EU adaptation policy:

– **Option A (Baseline)** implies that the development of adaptation strategies is restricted to autonomous adaptation and to action at national level, while EU policies are unchanged. This would expose a number of gaps and potential for mal-adaptation. This option was therefore discarded at an early stage

– **Option B (Incremental and responsive action towards an EU adaptation strategy)** implies that the findings of this report are used to take the EU adaptation strategy a step further. Priority would be given to tapping the potential of on-going initiatives, in particular at national level, or co-ordination and awareness raising schemes and to screen in detail the whole range of EU policies and instruments, while putting in place the "governance" of the EU adaptation policy as a way to monitor progress and lay the ground for future action.

– **Option C (EU Adaptation Action Plan)** would complement the former, by giving priority to new legislative initiatives to promote sustainable adaptation actions. National and regional adaptation strategies would be revised and streamlined. However, the current level of uncertainty on vulnerability to impact and on the costs and benefits of adaptation measures does not allow setting out in advance a definitive blueprint for action. Moreover, the case for action at EU level (e.g. for land-use or forestry) needs to be assessed in a more systematic way, and a wide range of adaptation measures is of national or local competence. Finally, this option is considered premature before political priorities for the new multi-annual financial framework 2013-2020 have been set.

Option B is selected given the current situation, this option provides an adequate mix between the need for a strategic vision to develop an EU adaptation policy and the need for a flexible and responsive choice of policy priorities. This corresponds therefore to a **Short term strategy** (up to 2012), starting with the current state of implementation of EU *acquis* (including ongoing initiatives that have not yet achieved their objectives) and the development of adaptation strategies and corresponding schemes by EU Member States driven from their obligation under the UNFCCC. Assuming that autonomous or MS guided adaptation actions will take place, it proposes the use of soft instruments and support action that in the short term can boost adaptation, prevent some forms of mal-adaptation and create EU added value for the schemes.

5. MONITORING AND EVALUATION

The European Commission, together with the European Environment Agency, has undertaken the development of Adaptation indicators, to provide information on the vulnerability of a certain sector or region and to give feedback on how policies and schemes are tackling the problems, evaluating their adequacy, efficiency and flexibility.

This European-wide key adaptation indicators based on agreed definitions will assist the Commission in reporting on the progress made and ensure a flexible approach to policy-making. The first adjustment could take place after the UNFCCC agreement on further mitigation actions have been concluded, as the level of ambition of further action to reduce emissions will influence the scale of adaptation across the EU.

The reporting schemes will be defined at a later stage. They will build on the Clearing House Mechanism, and will be based on a harmonised approach to minimise the administrative burden.