Discussion Note to develop an OECD Policy Guidance on:

# Integrating Climate Change Adaptation into Development Co-operation for the Water Sector

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Contribution to OECD Joint DAC-EPOC Task Team on Climate Change and Development Co-operation 12-13 October 2010 in The Hague, The Netherlands

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# Acknowledgements

This Discussion Note with the aim to develop an OECD Policy Guidance on: “Integrating Climate Change Adaptation into Development Co-operation for the Water Sector” is a result of the work undertaken by a team existing out of Peter Droogers (FutureWater), Margje Soet (FutureWater), Henk van Schaik (Cooperative Program on Water and Climate) and Maria Witmer (The Netherlands Ministry of Foreign Affairs).

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# 1 Introduction

## 1.1 Relevance

The objective of this Discussion Note is to initiate a process to explore the need on the development of an OECD Guidance on "Integrating Climate Change Adaptation into Development Co-operation for the Water Sector". This Discussion Note is to be used at the OECD Task Team meeting on 12-13 October, 2010.

## 1.2 Context

The OECD Environmental Policy Committee (EPOC) and the Development Assistance Committee (DAC) combined their expertise to develop a Policy Guidance on Integrating Climate Change Adaptation into Development Co-operation. The report was published in 2009. The OECD did this in follow up of the commitments set out in the 2006 OECD Declaration on Integrating Climate Change Adaptation into Development Co-operation, as it recognized that developing countries are particularly vulnerable to the impacts of climate change because of their high dependence on natural resources and their limited capacity to cope with the impacts. Developing countries will have to ensure that their development policies and strategies are resilient to a changing climate. International donors have a critical role to play in supporting such efforts. The Policy Guidance was a product of over two years of close collaboration between the two committees mentioned and reflects the state of the art in confronting the challenge of integrating adaptation within core development activities. The Policy Guidance outlines priorities for both international donors and developing country partners alike.

In January 2010 the OECD Joint DAC-EPOC Task Team on Climate Change and Development Co-operation discussed the possibility to develop in-depth guidance at sectoral level. The Netherlands offered to do this for the water sector. It was agreed that *a review of existing information and an annotated outline of the guidance* would be presented at the next meeting of the Task Team that will take place in The Netherlands 12-13 October, 2010. The present Discussion Note fills in this agreement.

## 1.3 Output

The final output will be an *OECD Policy Guidance on Integrating Climate Change Adaptation into Development Co-operation for the Water Sector* in its broadest sense: integrated water management, water quantity and water quality, surface water and groundwater, drinking water and sanitation, coastal planning and protection; and cross-references to implications for related sectors: agriculture, forestry, rural and urban planning, energy (e.g. hydropower), infrastructure, disaster risk reduction.

The proposed Water Guidance[1] will be filled in as far as possible with existing knowledge, combining and harmonizing the existing information and resulting in a 'standard'. The Water Guidance will include experiences on best practices so far, cases and references to tools and methods. The Water Guidance will follow as much as possible the 2009 *OECD Policy*

[1] "Water Guidance" is used to refer to the "OECD Policy Guidance: Integrating Climate Change Adaptation into development Co-operation for the Water Sector".

*Guidance: Integrating Climate Change Adaptation into Development Co-operation* (hereafter referred to as Overall Guidance[2]).

As the Water Guidance is meant to be used for development co-operation, core development activities are point of departure for the Water Guidance. Special attention will be given to those with greater vulnerability across regions and countries:

- Geographical areas most at risk, e.g. coastal zones;
- Least developed countries, Small island Developing States, African states affected by drought, floods and desertification;
- Within countries vulnerable communities and groups.

Also special attention will be given to synergies and multiple benefits: with the Rio Conventions on Biodiversity and Desertification, gender, disaster risk reduction and management (e.g. Hyogo Framework for Action).

The initial idea of the Water Guidance is to be set up according to planning and implementation methods and tools for development co-operation at different scales: from regional, national, sectoral to local and project scale. For the water sector this is: planning and programming for cross-border river basins; national water management planning and programming including cross-over with the water related other sectors; investment programming for the water sector in its broad meaning; rural and urban water management planning and programming; designing and realization of projects. Other useful and complementary approaches will be described in Chapter 2.

## 1.4 Target audience

In line with the Overall Guidance, the target audience of the Water Guidance are development co-operation agencies in donor countries, and policy makers and practitioners in developing country governments at all scale levels; given that co-operation is organized around partner countries' institutions and processes, in line with the Paris Declaration on Aid Effectiveness. The Water Guidance aims at the actors in the water sector as well as in other, water related, sectors, as water availability is an important condition for many other sectors.

While development practitioners in the water sector are the core audience, the Water Guidance can also help inform climate change negotiators, practitioners and policy analysts about the development processes and governance contexts within which decisions to implement adaptation in the water sector will eventually be taken.

**BOX: Key players in water management and their functions.**
*Source: Levina, E. (2006), Domestic Policy Frameworks for Adaptation to Climate Change in the Water Sector. Part II: Non-Annex I Countries, Lessons Learned from Mexico, India, Argentina and Zimbabwe. OECD, Paris.*

- The Water Ministry
    - Overall planning, policy formulation, coordination and guidance in the water resources sector.
    - To develop policy, planning and regulatory frameworks for the national, or sub-

[2] "Overall Guidance" is used to refer to the "OECD Policy Guidance: Integrating Climate Change Adaptation into development Co-operation".

national level on various issues such as irrigation, environment, equitable access, etc.
    - To allocate sustainable financing for national and sub-national water management; and
    - Technical guidance, scrutiny, clearance and monitoring of projects.
- Water management and planning boards
    - To provide technical inputs into planning processes;
    - To facilitate monitoring; and
    - To oversee implementation of national policies/regulations
- National water authorities/councils
    - To facilitate inter-sector/state and level (national to sub-national) co-ordination, conflict-resolution and exchange of information.
- Water commissions
    - To facilitate trans-boundary exchange of information and co-operation on treaties.
- National association of water users
    - To enhance negotiating power of water user associations at the national level.
- Donor agencies
    - To provide financial and technical assistance to develop capacity, formulate policy and planning frameworks, dissemination and education.
- Urban water and sewage companies
    - Due to urbanization increasing role of these private entities.

## 1.5 Status of the Water Guidance

The intended status of the document might be that of an OECD Policy Guidance published on the responsibility of the Secretary-General of the OECD, or an OECD Technical Report. Decisions on the status will be made during the process of drafting the Water Guidance.

As the Guidance aims to be a 'standard' for integrating climate change adaptation into development co-operation, broad support is needed. Stakeholders must be involved from donor as well as developing countries, governments and other organizations that work in the water sector in developing countries and knowledge institutes. Members of the Joint Task Force are asked to use their networks for a broad consultation.

# 2 Approach

## 2.1 Introduction

The Water Guidance will be based on three basic principles:

- Water can be considered as a separate sector, but given its dominant role in development it is a clear **cross-sectoral** issue.
- The Guidance should pay specific attention on **mainstreaming** climate adaptation in existing planning rather than on climate-driven approach only. The Guidance aims at 'climate compatible development'.
- Different **axes of climate adaptation** should be defined and described clearly: scales, decision chain, geographical areas, and disciplines.

These three points will be discussed in the following paragraphs.

## 2.2 Water sector and water as cross-sectoral issue

The water sector is a primary sensitive sector for climate change. This counts for water management and irrigation, water quality management, drinking water supply and sanitation, as well as planning and protection of coastal zones.

The importance of freshwater to our life support system is widely recognized, as can be seen clearly in the international context (e.g., Agenda 21, World Water Fora, the Millennium Ecosystem Assessment and the World Water Development Report). Freshwater is indispensable for all forms of life and is needed, in large quantities, in almost all human activities. Climate, freshwater, biophysical and socio-economic systems are interconnected in complex ways, so a change in any one of these induces a change in another (Figure 1). Anthropogenic climate change adds a major pressure to nations that are already confronting the issue of sustainable freshwater use. The challenges related to freshwater are: having too much water, having too little water, and having too much pollution. Each of these problems may be exacerbated by climate change. Freshwater-related issues play a pivotal role among the key regional and sectoral vulnerabilities. Therefore, the relationship between climate change and freshwater resources is of primary concern and interest.

Climate change leads to the following trends or step changes that change groundwater and surface water quality and quantity:

1. Increase in average air temperature, leading to higher water temperature of fresh water bodies, seas and oceans, and increased evapotranspiration. This leads to changes in chemical and ecological water quality and may change the fish stock. Increased evapotranspiration increases water scarcity and changes vegetation, with possible increase of erosion, land degradation and increased sediment loads in rivers, lakes and coastal zones.
2. Sea level rise with increased risks of floods and salt intrusion. It also obstructs drainage in delta rivers.
3. Melting of glaciers and ice, leading to changes in discharge regimes of rivers and streams e.g. the dry season minimal flow.
4. Changes in global and regional precipitation averages, intensities and/or distribution. On global scale, it is expected that the hydrological cycle will intensify and average rainfall will increase, but this differs for parts of the earth, some become wetter, and

others dryer. Climate models disagree on which parts become wetter or dryer, so one should reckon with uncertainties.

5. Changes in weather: frequency, intensity and timing of rainfall, storms and droughts. This is the least known and least predictable part of climate change, as it happens at regional and local scale, not well described by global models. It is expected that weather becomes rougher with more and more intense rainstorms and longer and more intense droughts. Changing weather influences frequency, timing and intensity of peak flows, dry season minimal flow and water availability. It may also change the recharge of shallow groundwater and the groundwater level, with consequences for vegetation, agriculture and water availability in wells.

Water is – besides air temperature - the primary medium through which climate change impacts will be felt by humans and the environment - this is stated in the IPCC Technical Paper on Water and Climate Change (Bates et al., 2008). Water is also critical in relation to climate change mitigation, as many mitigation actions rely on water availability for their long-term success.

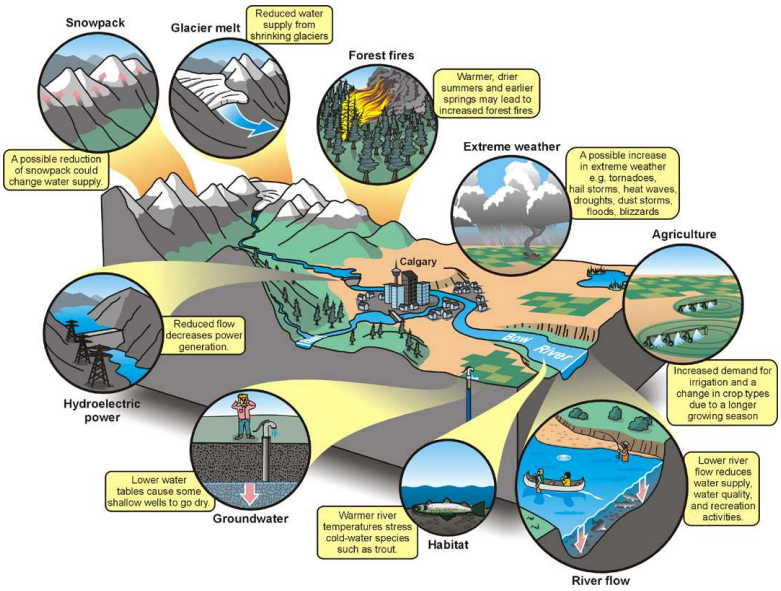


**Figure 1. Impact of climate change on water as cross-sectoral issue. (Source: www.nrcan.gc.ca).**

**BOX: The Stockholm Message from World Water Week to the COP-15**

The World Water Week 2009 in Stockholm made a strong statement that the importance of water must be properly and adequately reflected within the COP-15 agreement, and in processes beyond COP-15.

- Water is a key medium through which climate change impacts will be felt. Managing the resource effectively, including through well-conceived IWRM (Integrated Water Resources Management) approaches and at a transboundary level, is central to successful adaptation planning and implementation, and to building the resilience of communities, countries and regions;
- Adaptation is a prerequisite for sustainable development and poverty reduction. Adaptation measures thus need proper integration within broader development goals and objectives, including the Millennium Development Goals;

- Integration of water with land and forest management is key to effective adaptation. We strongly endorse the Nairobi Statement on Integrated Land and Water Resources Management for Climate Change Adaptation; we also emphasize that water-related adaptation can and should support global mitigation actions;
- Ecosystem protection and sustainability is fundamental to adaptation and human development. We therefore urge increased efforts towards and investment in the protection and restoration of natural resources—including water—as an essential part of any adaptation process;
- Higher-quality information that is more effectively shared will strengthen responses. In particular there is a critical need for the water and climate communities to increase the sharing of information at all levels of policy and practice—from global to local, and from local to global;
- Vulnerability assessments and risk management are critical to sound adaptation practice. Knowing where and how the impacts of climate change are most likely to affect populations and ecosystems through the water cycle will help in the identification of areas for early intervention or 'hot spots'; these include arid regions, areas highly dependent on groundwater, small island developing states, low-lying deltas and fragile mountainous areas;
- New and additional funds are essential. It is imperative that additional funding is allocated in support of developing adaptive strategies for vulnerable groups and ecosystems; there is a need for an initial mobilization of finance to assist vulnerable, low income countries already affected by climate change, followed by the establishment of a well-resourced mechanism for funding adaptation as part of ongoing climate negotiations.

A recent publication, "Compendium on methods and tools to evaluate impacts of, and vulnerability and adaptation to, climate change" (Tearfund, 2010) summarized the importance as cross-sectoral topic in climate adaptation at a very detailed level for the main sectors:

- water supply & sanitation
- agriculture
- infrastructure
- health
- education
- energy

Other topics that could be interesting to consider include:

- gender aspects of vulnerability and adaptive capacity[3]
- industry: water demand for production, product specialization
- river basin management
- population dynamics and spatial planning
- forestry
- disaster risk management
- nature and biodiversity
- water pricing
- insurance

[3] See box "Gender aspects of vulnerability and adaptive capacity

## 2.3 Mainstreaming adaptation in existing planning

Some of the recently published Guidances (such as the UNECE Guidance on Water and Adaptation to Climate Change, UNECE, 2009) on climate change assessments follow a climate-driven[4] approach (Figure 2). These Guidances are presently being used at operational level. Though it is early to comment on the effectiveness of these Guidances, it is clear that they do not link up to water resources and water services planning procedures such as the IWRM process. The challenge is how to integrate climate change adaptation strategies and plans such as the NAPAs into the regular ongoing planning processes for water resources management and water services development: 'doing things different' instead of 'doing different things'.

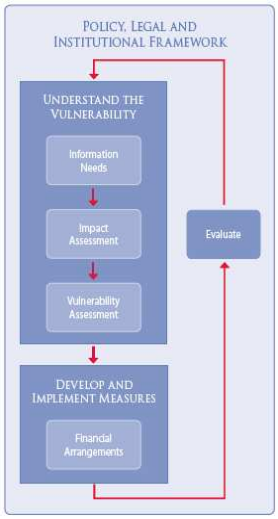


**Figure 2. Framework and steps for a climate-driven approach to develop adaptation strategies. (Source: UNECE, 2009).**

**Box: "Climate-Driven" versus "Mainstreaming" adaptation**

Climate Change adaptation approaches can be broadly divided into climate-driven and mainstreaming. Terminology is often not clear to specify in what direction the adaptation refers to.

Traditionally, climate change adaptation followed a climate-driven approach: climate change projections → downscaling projections → impact assessment → adaptation policies → actions/implementation. This approach is sometimes referred to as "top-down"; in order to avoid confusion the term **climate-driven** will be used in this note. Results of a climate-driven approach often indicated that enormous investments were required to take the action/implementation step, and as such this last step was usually unfeasible for developing countries.

In contrast to this climate-driven approach, there is a growing consensus that climate resilience and adaptation need to be integrated in non-climate plans, programs, policies and projects at all scale levels (national, sectoral and project, and local levels). Different terminology has been used for such an approach, e.g. climate lens, bottom-up approach, streamlining. In this note we use the term **mainstreaming**.

[4] See box "Climate-driven versus mainstreaming adaptation"

Thus there is a need to mainstream (integrate) climate resilience in sectoral water planning processes, programs and projects. Climate change in those cases should be mainstreamed into processes in which non-climate factors are usually dominant. Since most available methods and tools have been designed for the classical climate-driven impacts analysis, developing a methodology in which these tools can be applied in a different, mainstreaming setting or developing specialized tools is likely to provide new opportunities for policy-relevant research, applications and implementation (Figure 3).

There is a clear complementary connection between the climate-driven and mainstreaming approaches. The climate-driven approach creates rising awareness and sets the scene for including climate adaptation in policies, but will hardly result in actual implementation. The mainstreaming approach, in contrast, leads to actual implementation and the recognition of the importance of climate change. Hence both climate-driven and mainstreaming approaches are required.

In summary, in contrast to many climate-driven studies and related adaptation options, examples of “concrete” actions in the water sector to adapt specifically and solely to a changing climate are very rare (Bates et al., 2008). This is partly because climate change may be only one of many drivers affecting strategies and investment plans (and it may not be the most important one over the short-term planning horizon), and partly due to uncertainty in projections of future hydrological changes.

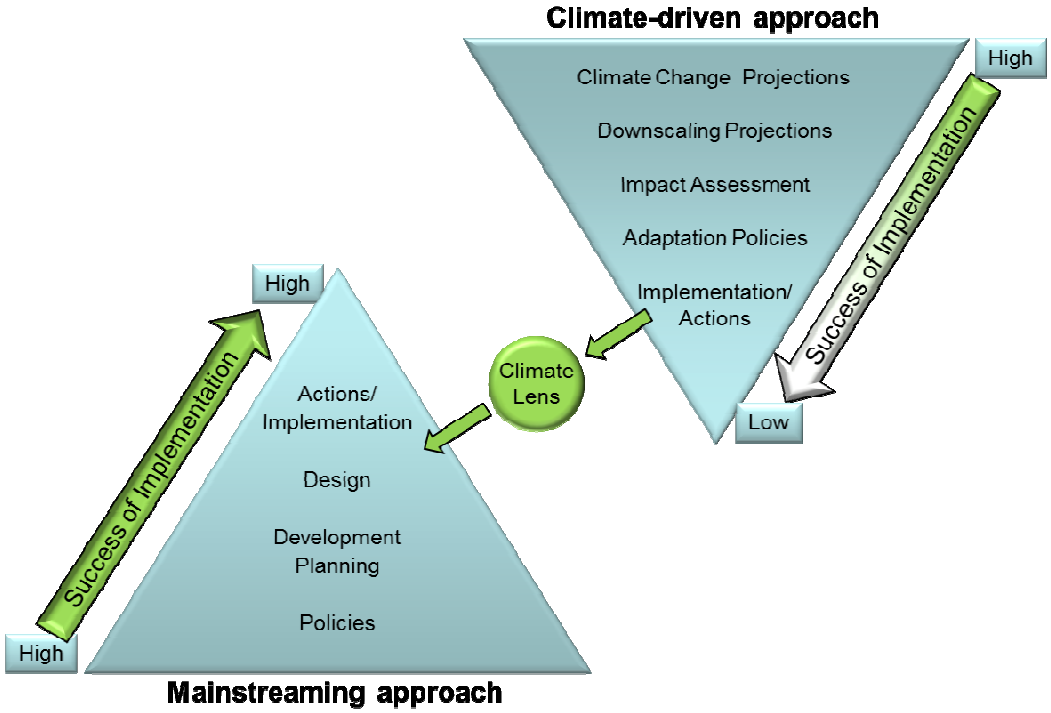


**Figure 3. Climate-driven approach vs. mainstreaming adaptation.**

**Box: Applying a climate lens**

*Source: OECD Policy Guidance: Integrating Climate Change Adaptation into development Co-operation*

A climate lens is an analytical process/tool to examine a policy, plan or programme.
The application of a climate lens at the national or sectoral level involves examining:

1. the extent to which the policy, strategy, regulation or plan under consideration could be vulnerable to risks arising from climate variability and change;
2. the increase / decrease of emissions of green house gasses resulting from implementation of the policy / plan or regulation;
3. the extent to which climate change risks have been taken into consideration in the course of programme formulation;
4. the extent to which the policy, strategy, regulation or plan could lead to increased vulnerability, leading to mal-adaptation or, conversely miss important opportunities arising from climate change; and
5. for pre-existing policies, strategies, regulations or plans which are being revised, what amendments might be warranted in order to address climate risks and opportunities

A first application of the climate lens should enable a policy maker to decide whether a policy, plan or programme is at risk from climate change. When it is deemed that there is no risk, no further work is required. However, for a policy, plan or programme that is at risk, further work is required to identify the extent of the risk, assess climate change impacts and adaptation responses in more detail, and identify possible recommendations and "downstream" actions.

An important component of mainstreaming climate change adaptation into existing planning is knowledge and capacity building. As effects of climate change at national and sub-national scale are uncertain, knowledge has to be updated frequently and maximum flexibility is required. Therefore capacity building should focus on flexibility and develop structures, networks and tools to exchange and share the latest knowledge and information[5]. The capacity to find and gather knowledge and information is as important as the knowledge itself.

In many countries, Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) gain ground as a legal mechanism for integrating environmental considerations into policies, plans and programs. The framework provided by SEAs and EIAs offers opportunities for mainstreaming climate adaptation measures into policies, plans and programmes[6].

[5] See box "Climate and Development Knowledge Network"
[6] See box "Integrating Climate Change into Planning and Decision Making by SEA / EIA"

**Box: Climate and Development Knowledge Network**
*Source: www.cdkn.org*

The Climate and Development Knowledge Network (CDKN) is a new initiative, launched in March 2010, designed to support developing countries in tackling the challenges posed by climate change. CDKN aims to help decision makers in developing countries design and deliver climate compatible development. It will do so by providing demand-led research and technical assistance, and channelling the best available knowledge on climate change and development to support policy processes at the country level.

**Box: Integrating Climate Change into Planning and Decision Making by SEA / EIA**
*Source: Ludwig & Swart, 2010*

Environmental Impact Assessment (EIA) has three objectives:

- Information: vulnerability assessment, adaptation options, estimation of uncertainty and how to cope with it
- Dialogue: inter-agency and public debate on climate change mitigation and adaptation
- Influence: transparency, accountability and monitoring on climate related issues

For integrating climate change concerns, a three-step approach can be followed:

- Screen whether climate change is relevant
- Analyse and present adaptation options
- Cope with uncertainties

## 2.4 Climate adaptation axes

The Overall Guidance takes a “partner country perspective”. It discusses in detail how to assess and address climate risks and opportunities and integrate adaptation responses at key decision making levels: (i) national, (ii) sectoral and project and (iii) local level (Figure 4). Although relevant as such to focus on these decision making levels, many more “climate adaptation axes” exist and should be considered to be included in the proposed Water Guidance. These axes could then be used as a basic framework to develop climate adaptation policies and implementation.

The following climate adaptation axes could be considered:

- Spatial and corresponding governance scale:
    - Transboundary (international water commissions), National (water ministry, other ministries, other national authorities), Sub-national (province, district, county), Local (municipal, community),
- Decision authority:
    - Government, NGO, community, private enterprises
- Physical geographical target areas:
    - Arid, mountains, small islands, delta’s, coastal zones
- Disciplines:
    - Technical, social, economic, governance, geographical
- Adaptation principles:
    - Resilience (poverty eleviation), resistance (economic growth)

- Vulnerability
    - Physical, economic, social (e.g. gender)

A Water Guidance where these axes will be specifically mentioned provides a unique opportunity for donors to make their often implicit principles of climate adaptation policies more visible. This will enable them to better scope their implementation plans.

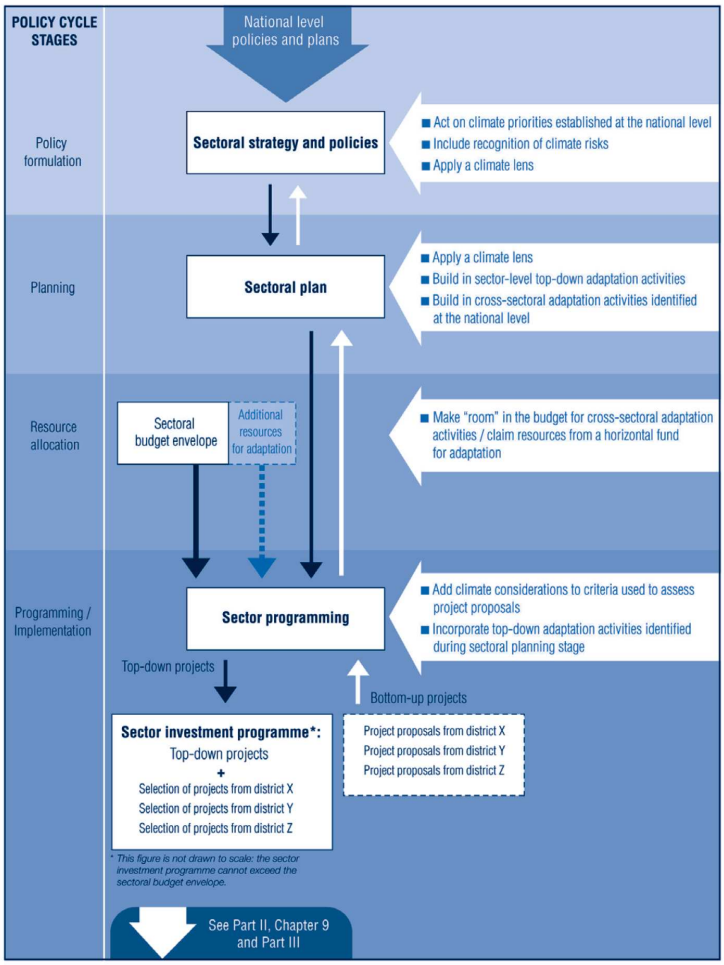


**Figure 4. Sectoral level governance architecture with key interventions for adaptation. (Source: OECD, 2009).**

# 3 Review of existing information

## 3.1 Literature overview

The proposed OECD Water Guidance will be filled in as far as possible with existing knowledge. Although the number of publications on climate change adaptation and water is substantial, only a limited number focuses specifically on water and development. Summaries of the more recent and relevant publications are presented hereafter. These provide valuable and extensive input for the next phase of developing the Water Guidance. A more extensive list of publications is provided at the end of this report.

- Integrating Climate Change Adaptation into Development Co-operation: Policy Guidance. OECD, 2009
- Guidance on Water and Adaptation to Climate Change. UNECE, 2009
- Vision 2030: The Resilience of Water Supply and Sanitation in the Face of Climate Change. WHO / DFID, 2009
- How to Integrate Climate Change Adaptation into National-Level Policy and Planning in the Water Sector: A Practical Guide for Developing Country Governments. Tearfund, 2010
- Managing the Water Buffer, for development and climate change adaptation: Groundwater recharge, retention, reuse and rainwater storage. F. van Steenbergen & A. (main authors), 2009
- Adapting to Coastal Climate Change: A Guidebook for Development Planners. USAID, 2009
- Climate Change and Water. Technical Paper of the Intergovernmental Panel on Climate Change. IPCC, 2008
- IWRM and SEA joining forces for climate proofing. CPWC, 2009.
- A Stitch in Time: Lessons for Climate Change Adaptation from the AIACC Project. AIACC Working Paper No. 48. Leary et al., 2007.
- Climate change adaptation in the water sector. London, Earthscan. Ludwig, F. et al., 2009.
- Inventory and assessment of methods and tools for supporting the development and implementation of adaptation plans addressing climate change impacts on water management. Wageningen UR, Ludwig, F. & R. Swart, 2010.

## 3.2 Literature summaries

**Integrating Climate Change Adaptation into Development Co-operation: Policy Guidance. OECD, 2009**

The Policy Guidance provides information and advice to policy makers and practitioners in development co-operation agencies on how to mainstream climate change into development. This Guidance uses a mainstreaming approach, starting from the methods and viewpoints of development cooperation. It is ordered according to spatial and governance scales. The objectives of the Guidance are to:

- Promote understanding of implications of climate change on development practices and the associated need to mainstream climate adaptation in development co-operation agencies and partner countries.
- Identify appropriate approaches for integrating climate adaptation into development policies at national, sectoral and project levels and in urban and rural contexts
- Identify practical ways for donors to support developing country partners in their efforts to reduce their vulnerability to climate variability and climate change.

The first part of the guidance introduces human-induced climate change and puts it within the context of weather and natural climate variability, followed by a discussion of the implications of climate change on key sectors and regions. It introduces the concepts of adaptation and mitigation, and outlines a generic approach for integrating adaptation to climate change within development policies, plans and projects.

The second part takes a partner country perspective and discusses in detail how to assess and address climate risks and opportunities, and how to integrate adaptation responses within development at key decision making levels: national, sectoral and project. For each of these levels, the policy guidance first provides an introduction to the level and its relevance to climate change adaptation. Next the decision making architecture is outlined and entry points and interventions are identified for integrating adaptation considerations within existing processes.

The third part examines the specific challenges and opportunities arising from climate change in urban and rural contexts and discusses how to incorporate adaptation considerations within government- and community-level processes at the local level. Entry points have been identified to facilitate the integration of climate change adaptation into local development planning processes.

At the different decision making levels, the role of donors in the integration process is discussed and some priorities outlined to foster greater integration of adaptation considerations.

The Water Guidance will use a similar approach and framework. Specific parts and text boxes from the Overall Guidance which are relevant for the water sector will be included in the Water Guidance.

**Guidance on Water and Adaptation to Climate Change, UNECE, 2009**

This UNECE Guidance aims to spur climate change adaptation that takes into account the transboundary dimension of water management. Based on the concept of IWRM (Integrated Water Resources Management), it provides advice to decision makers and water managers on how to assess impacts of climate change on water quantity and quality, how to perform risk assessment, how to gauge vulnerability, and how to design and implement appropriate adaptation strategies. The Guidance uses a climate-driven, technical approach with the water sector as starting point.

The UNECE guidance is set up along the steps of (i) establishing the policy, legal and institutional framework, (ii) understanding the vulnerability of society, (iii) develop, finance and implement an adaptation strategy, (iv) evaluation. The main results for each step are:

i) Adaptation should build upon water management measures which are already available and implemented. Policies should be developed within the context of IWRM, integrated

coastal zone management and integrated flood management, with effective transboundary cooperation ensured at all relevant stages of decision-making, planning and implementation. Adaptation should also include a disaster risk reduction strategy, grounded in local knowledge and communicated broadly. Spatial planning is an important basis on which to develop policies that take into account all sectors.

ii) Adaptation to climate change requires a multi stakeholder approach to identify data needs according to the principles of IWRM. Data collection should cover all aspects of the hydrological cycle and explicit information on water uses. Scenarios and models are tools that help to incorporate uncertainty on future events into planning. Riparian countries should develop common scenarios and models to develop a joint understanding; common scenario development also permits a more rational use of the limited financial resources available.

iii) Adaptation strategies and measures should be based on the results of vulnerability assessments as well as on development objectives, stakeholder considerations and available resources. To adopt a cross-sectoral approach when formulating and evaluating options, strategic environmental assessment (SEA) is a useful tool. In financing, the private sector typically engages in adaption in cases where it can directly benefit from its investments. Insurance and re-insurance also have an important role to play in adaptation to climate change.

iv) Evalution is needed to determine relevance, efficiency, effectiveness and impact of the adaptation strategies in light of their objectives, carried out during implementation, at completion and some years after. Learning by doing is very important (pilot projects).

This UNECE Guidance provides valuable input and examples for the Water Guidance. A number of text boxes, e.g. about the inter-relation between climate change and other water stressors, vulnerability assessments, data requirements and joint transboundary monitoring or enhancing resilience of ecosystems, are relevant for the Water Guidance.

**Vision 2030: The Resilience of Water Supply and Sanitation in the Face of Climate Change, WHO / DFID, 2009**

The Vision 2030 focuses on how climate change will affect the drinking-water and sanitation situation. It aims to help policy makers, planners, operators and communities to improve the resilience of their water and sanitation services. The Vision 2030 presents the results of a technology projection study, providing projections of access to drinking water and sanitation in both urban and rural areas for 2020. Water supply and sanitation technologies are categorized according to their resilience to climate change.

Conclusions are that achieving resilience will have significant policy implications if ongoing and future investments are not to be wasted. Integrated water management provides an approach to assessing and negotiating agreement among competing demands, so there is an urgent need to reflect drinking-water and sanitation in IWRM policy and practice. The Vision 2030 also indicates the impact on achieving the Millenium Development Goals (MDG 7 target: halve the proportion of the population without sustainable access to safe drinking water and basic sanitation by 2015).

The Vision 2030 is of particular interest for the Water Guidance on the themes of drinking water supply and sanitation, as well as cross-sectoral issues. The categorization of technologies

according to their climate change resilience, competing demands in IWRM and the impact on achieving MDG7 are relevant for the Water Guidance

**How to Integrate Climate Change Adaptation into National-Level Policy and Planning in the Water Sector: A Practical Guide for Developing Country Governments, Tearfund, 2010**

The Guide has been produced for use by developing country governments, in particular least developed countries, small island developing states and countries in Africa affected by drought, desertification and floods. It is also for donor institutions wishing to support the integration of adaptation through development cooperation, as well as for civil society organizations. It aims to be practical, pragmatic and based on existing knowledge, skills, capacity and observed climate change impacts and risks. The Guide uses a mainstreaming approach focuses at vulnerable countries and geographical areas at national governance scale.

The Guide is divided into four tasks, each with a set of sub-tasks. A sequence of steps is given to help the user accomplish each sub-task, as well as indicating crucial stakeholders and the potential role of donors. Throughout the guide, examples and case studies are included. The four main tasks are:

- Establish an understanding of climate change risk and key actors.
- Strengthen national policy frameworks.
- Develop and implement a climate-resilient action plan for the water sector.
- Track performance, adjust to changes and make improvements.

This Guide is useful to work out the national scale section in the Water Guidance. As it focuses on a more practical level than the Water Guidance, it provides useful insights on how a Water Guidance may be drawn upon for further use.

**Managing the Water Buffer, for development and climate change adaptation: Groundwater recharge, retention, reuse and rainwater storage, Frank van Steenbergen & Albert Tuinhof, 2009**

This publication focuses on managing buffer functions as part of basin management and climate change adaptation. The buffer function in a region, through groundwater storage and rainwater harvesting, may be used to deal with the larger variability in peaks and lows that are expected to come with climate change. The outlined 3R approach (recharge, retention, re-use) is applicable in both arid and humid areas and may generate benefits for water security, development and sustainability of livelihood. The publication uses a technical, climate-driven approach at different scales.

In the document, 19 cases are presented of existing 3R applications from different locations and at different spatial scales. It is concluded that optimal use of water resources through recharge, retention and reuse provides options for coping with climate variability and 3R techniques should increasingly be incorporated into planning, design and operational concepts, since they will create resilience against the vagaries of climate change.

The approach described in this publication may be included as an optional strategy in the Water Guidance, with case studies at different scales showing best practices.

**Adapting to Coastal Climate Change: A Guidebook for Development Planners, USAID, 2009**

This Guidebook provides a detailed treatment of climate concerns in coastal areas based upon a mainstreaming approach. It proposes a five-step vulnerability and adaptation approach consisting of: (i) assess vulnerability, (ii) select course of action, (iii) mainstream coastal adaptation, (iv) implement adaptation and (iv) evaluate for adaptive management.

Climate change will impact the health, function and productivity of coastal ecosystems, thus impacting the health and welfare of coastal communities and the billions of people that depend on these natural resources. Coastal areas most vulnerable to climate change are low-lying islands, coastal areas and deltas; countries subjected to hurricanes and typhoons; and less developed countries.

Planned adaptation aims to address the full range of coastal climate change hazards in ways that meet social objectives. The guidebook includes practitioner briefs on 17 coastal adaptation measures and strategies. Adaptation responses will often include bundles of adaptation measures and require additional consideration in evaluating multiple measures.

Climate change adaptation on the coast must be mainstreamed into coastal policy at all levels. Guidelines and policies for mainstreaming climate concerns and adaptation responses into capital investment plans and project cycles are recommended. A two-track approach combining local level, community-based adaptation with national level enabling policy, finance and legal frameworks is an effective approach to adaptation implementation.

This Guidebook provides input for the sections on coastal zones in the Water Guidance. A selection of the practitioner briefs may be included as examples of ‘best practices’.

**Climate Change and Water. Technical Paper of the Intergovernmental Panel on Climate Change, IPCC, 2008**

This technical paper explores the relationships between climate change and freshwater, as set out in IPCC Assessment and Special Reports. Its objectives are to improve our understanding of links between climate change/adaptation/mitigation and water related issues and to inform policymakers and stakeholders about the implications of climate change for water resources and climate change response options. The paper is based on a climate-driven, technical approach.

Observational records and climate projections provide abundant evidence that freshwater resources are vulnerable and have the potential to be strongly impacted by climate change, with wide ranging consequences for human societies and ecosystems. Climate model simulations for the 21$^{st}$ century project that:

- precipitation increases in high latitudes and parts of the tropics, and decreases in some subtropical and lower mid-latitude regions
- annual average river runoff and water availability increase at high latitudes and in some wet tropical areas, and decrease over some dry regions at mid-latitudes and in the dry tropic

- increased precipitation intensity and variability increase the risks of flooding and drought in many areas
- water supplies stored in glaciers and snow cover decline
- higher water temperatures and changes in extremes affect water quality.

Globally, the negative impacts of future climate change on freshwater systems are expected to outweigh the benefits. Changes in water quantity and quality are expected to affect food availability, stability, access and utilisation. Climate change affects the function and operation of existing water infrastructure as well as water management practices. Current water management practices may not be robust enough to cope with the impacts of climate change. Adaptation options designed to ensure water supply during average and drought conditions require integrated demand-side as well as supply-side strategies.

Mitigation measures can reduce the magnitude of impacts of global warming on water resources, in turn reducing adaptation needs. Water resources management clearly impacts on many other policy areas, Several gaps in knowledge exist in terms of observations and research needs related to climate change and water.

This IPCC Technical Paper provides numerous facts and figures on projected changes in the hydrological cycle and adaptation strategies at regional scale for the Water Guidance.

**IWRM and SEA Joining Forces for Climate Proofing. CPWC, 2009.**

The paper summarizes recent food production and food security trends and provides an overview of how climate change, through impacts on global hydrology, could impact food production and consequently food security in some key farming systems. However, as climate change is but one of many drivers of agriculture, climate change impacts need to be appreciated in relation to specific farming systems in order to identify appropriate adaptation measures. The paper highlights key drivers and presents possible responses, emphasizing that the scope of policy response will need to be broad if water institutions are to be effective in coping with climate change.

The mechanisms of IWRM and SEA are discussed. It is concluded that both instruments have a complementary scope of work, and there is a clear opportunity to further elaborate the added value of bringing IWRM and SEA together when discussing the implementation of climate change adaptation.

Information on adaptation strategies for food production and the combination of IWRM and SEA are of interest for the Water Guidance.

**A Stitch in Time: Lessons for Climate Change Adaptation from the AIACC Project. AIACC Working Paper No. 48. Leary et al., 2007.**

The international AIACC project (Assessments of Impacts and Adaptations to Climate Change) seeks to enhance capabilities in developing countries for responding to climate change by building scientific and technical capacity, advancing scientific knowledge, and linking scientific and policy communities. In this paper, results for part of the project focusing on examining adaptation strategies are presented. These are based on case studies from a wide variety of

regions, including assessments of agriculture, rural livelihoods, food security, water resources, coastal zones, human health and biodiversity conservation.

The general recommendations are: (1) adapt now, (2) create conditions to enable adaptation, (3) integrate adaptation with development, (4) increase awareness and knowledge, (5) strengthen institutions, (6) protect natural resources, (7) provide financial assistance, (8) involve those at risk, and (9) use place-specific strategies.

The paper promotes a mainstreaming approach and can provide input on several issues of adaptation strategies for the Water Guidance.

**Climate change adaptation in the water sector. London, Earthscan. Ludwig, F. et al., 2009.**

The main purpose of this book is to inform water managers and decision makers about climate change, its impacts and how to adapt to these changes. It provides a compendium of specific strategies to show advanced students and professionals in the water sector how to adapt to climate change and variability, thus enabling them to feel comfortable in using climate data in decision support and in managing water resources.

The first part of the book describes theoretical and methodological aspects of the climate system, and what options are available for climate change adaptation in the water sector. The second part contains specific case studies drawn from a wide range of contrasting countries.

The overall information on the climate system and adaptation strategies provides general input for the Water Guidance.

**Inventory and assessment of methods and tools for supporting the development and implementation of adaptation plans addressing climate change impacts on water management. Wageningen UR; Ludwig, F. & R. Swart, 2010.**

This report summarizes an inventory of methods and tools for assessing climate change impacts, vulnerability and adaptation options in the water sector, from a Dutch perspective. The main conclusions are that many tools assisting in climate change adaptation are available but most of them with limited applicability. In the Netherlands, all steps of the adaptation development cycle are covered in principle, but not in practice. Existing Dutch capacity has to be further mobilized for international applications; integration and packaging of existing knowledge may provide better opportunities for international application rather than developing new tools. Foreign methods and tools can provide very useful new insights and inspiration for strengthening Dutch approaches.

Parts of this publication emphasizing on climate-driven versus mainstreaming approaches and the need for innovative approaches may be relevant for the Water Guidance.

## 3.3 Conclusions

All relevant publications in the context of the Water Guidance are summarized above. Additional, less relevant publications, are listed in Chapter 6. Most of the reviewed publications use a climate-driven approach, however only few start from development co-operation. The added value of the Water Guidance will be that it combines a mainstreaming approach with development co-operation as starting point.

The overview of available literature shows that for a subset of water related topics information is available whereas e.g. little information is available on socio-economic vulnerability to climate change. Existing literature also provides numerous case studies from different areas and different spatial scales. To which extent the Water Guidance can be filled with existing texts and where additional text needs to be developed, depend on the decision about the set-up and contents of the Guidance.

# 4 Annotated contents of Guidance

The **objectives** of this proposed Water Guidance are based on the Overall Guidance and are defined as to:

- *promote understanding* of the implications of impact of climate change on the water sector in the context of development practices and the associated need to mainstream climate adaptation in the water sector in development co-operation agencies and partner countries;
- identify *appropriate approaches* for integrating climate adaptation for the water sector into development policies at national, sectoral and project levels and in urban and rural contexts;
- identify practical ways for donors to *support* developing country partners in their efforts to reduce their vulnerability to climate variability and climate change with respect to the water sector.

Based on these three objectives the Water Guidance will be, similar to the Overall Guidance, focus on various decision making levels, and will be divided into the following parts and chapters:

**Part 1: Introduction, objectives and scope**

1. Introduction
    - Context
    - Objectives and scope
    - Target audience
    - Mainstreaming vs. Climate-driven approaches
    - Water sector and cross-sectoral
    - Guidance focus on Mainstreaming

**Part 2: Water-Climate: science, policies, practice**

2. Core principles and approaches
    - Weather, climate variability, climate change, impacts upon the hydrological cycle, water resources and water services
    - Vulnerability assessments (technical and socio-economic)
    - What is adaptation and what is it not (no Regret, Low Regret, climate specific adaptation)
3. Water related international commitments and national commitments on water and climate
    - UNFCCC
    - Trans-boundary water management organizations
4. Water related policy
    - Governance
    - Integrated Water Resources Management (IWRM)
    - Integrated Coastal Zone Management (ICZM)
    - Water rights, rights to water
5. The story of uncertainty
    - Power and limitations of climate models
    - Hydrological models
    - Impacts and uncertainties

6. Water related development and water related adaptation
7. Monitoring and evaluation. Learning from practice.
8. Costing and financing adaptation supportive strategies

**Part 3: Mainstreaming climate change adaptation**

9. Development of adaptation and water-related development strategies at transboundary level
    - Issues: Physical geographical vulnerable regions
    - Actors: Water ministry, water commissions
    - Broad scoped climate proofing
    - Climate and hydrological scenario studies, need for tailoring
    - Vulnerability assessment for priority setting
    - River basin management
    - Integrated Coastal Zone management
    - Integrated Groundwater system management
    - Cross-sectoral: Hydropower, infrastructure
    - Monitoring and evaluation, learning by doing
    - Funding
10. Development of specific water adaptation strategies at national and sub-national level
    - Issues: Vulnerability and adaptive capacity; Physical geographical and socio-economic incl. gender; Cross-sectoral
    - Actors: Water ministry, Ministry of Finance, Ministry of Planning, National water authorities, National associations of water users, Donor agencies, Private enterprises, Water management and planning boards
    - Climate and hydrological scenario studies, need for tailoring
    - Vulnerability assessment for priority setting
    - Adaptation portfolio development
    - Cross-sectoral: Agriculture, Water supply and sanitation, Health, Energy, Education, Nature and biodiversity
    - Monitoring and evaluation, learning by doing
    - Funding
11. Development of climate sensitive water related development strategies at national and sub-national level (no regret and adaptation supportive strategies).
    - PRSP and spatial planning
    - SEA and EIA
    - Disaster risk management
    - Cost and optimization studies
    - Water pricing
    - Development portfolio development
12. Development of adaptation and water-related development strategies at local and project level
    - Issues: Vulnerability and adaptive capacity; Priorities
    - Actors: Local authorities, Urban water and sewage companies, Local entrepreneurs
    - Climate and hydrological scenario studies, need for tailoring
    - Vulnerability assessment for priority setting
    - Adaptation portfolio development
    - Monitoring and evaluation, learning by doing

- Examples of best practices
- Insurance
- Funding

**Part 6: The way forward**

13. Key challenges and priorities for actions

The Water Guidance will include a large number of informative **Boxes** on relevant projects and planning of mainstreaming and adapting to climate change in the water sector. During the process of developing the Water Guidance a substantial number of Boxes will be identified and relevant ones will be included in the Water Guidance. Ample attention will be given to proper references/websites to ensure that readers will get access to the full descriptions. Examples of boxes that can be included based on existing projects:

- Adapting to climate change in the water sector: Assessing the effectiveness of planned adaptation interventions in reducing local level vulnerability. (Ethiopia and the Nile region).
- Nairobi work programme on impacts, vulnerability and adaptation to climate change, (UNFCC)
- United Kingdom Climate Impacts Programme UKCIP
- Climate and Water Atlas (NL)
- Waterproof development (Watertoets, NL)
- Regional Partnerships for Climate Change Adaptation and Disaster Preparedness (Regional, ADB info)
- Strengthening the Resilience of the Water Sector in Khulna to Climate Change (Bangladesh)
- Coastal and Marine Resources Management in the Coral Triangle of the Pacific (Regional)
- Integrated Citarum Water Resources Management (Indonesia)
- Glacial Melt and Downstream Impacts on Indus-Dependent Water Resources and Energy (Afghanistan/India)
- Climate Change and Adaptation for Water Resources in the Yellow River Basin, China (ADB Info)
- Snow and glacier melt impact on water resources Asia.
- Gender issues in water and climate.
- Water pricing: impact on water demand as well as on available funding for improving infrastructure.
- Water-energy nexus and impact of climate change.
- Relocation of industries relocation as a means to improve water availability.
- Economics of climate change adaptation.

# 5 Discussion Results and Roadmap Forward

This Discussion Note was presented at the meeting of the Task Team in Amsterdam on October 12, 2010. Following a review of existing work on water and climate and an outline of the proposed table of contents for a Water Guidance, the discussion focused on the issues of mainstreaming versus a climate-driven approach and on the need for a Water Guidance.

From the discussions it became clear that the use of the terms mainstreaming and climate-driven is not presented clearly. Development work should take a mainstreaming approach but both approaches are necessary and complementary. In further work, it is suggested to avoid the suggestion that these are separate, contradicting approaches.

Task Team members commented that there is still a need for operation guidance, even though there is a considerable amount of documents available. However, the general feeling among members was not in favour of a Water Guidance as proposed in Chapter 4. Instead of a comprehensive guidance document, structured according to the Overall Guidance, there was a call for advisory notes limited to around 15 pages on specific water related subjects. This modular approach could offer a series of notes to decision-makers at specific levels (e.g. river basin authorities, municipalities, water ministries, etc.) on how they could factor in climate change and adaptation considerations in their decision-making.

These series of notes should be rather practical and tailored to the need of the users. Therefore, possible users should be incorporated in the early stages of the development of these series of advisory notes

**Box: Integrating Climate Change Adaptation into Development Co-operation in the Water Sector**

*Source: Draft minutes of Task Team meeting, Oct 12 2010*

6. Two presentations were made followed by discussions on the next steps for the drafting of the *Policy Guidance on Water*. *Sonja Koeppel (UNECE Secretariat)* gave a presentation on the *UNECE Guidance on Water and Adaptation to Climate Change*. The guidance however focuses only on transboundary contexts.
7. *Peter Droogers (FutureWater),* as a representative of the group of consultants commissioned by the Dutch Government, presented a review of existing work on water and climate, and outlined the proposed table of contents for developing an OECD guidance on water and adaptation.
8. In the discussion Task Team members highlighted that while there is considerable amount of material on water, there is still a need for operational policy guidance. At the same time, there was not much appetite for a comprehensive guidance document. Task Team members instead called for a modular approach that offered a series of advisory notes to decision-makers at specific levels (e.g. river basin authorities, municipalities, water ministries, etc.) on how they could factor in climate change and adaptation considerations in their decision-making. In developing this modular approach, participants highlighted the value in incorporating possible users of the guidelines in the early stages of its development.
9. The Secretariat will work with the Dutch government and consultants to flesh out this modular approach and report back to the Task Team. Any comments on the Water Guidance should be submitted by the 30th of October.

Taking into account the outcome of the discussion at the Task Team meeting, suggestions are made for a possible roadmap forward. The OECD office, through Dr. Shardul Agrawala, suggests to build upon the currently proposed outline, especially part 3 of the table of contents, but in a modular fashion to incorporate the feedback from the Task Team members. In this adjusted outline, two outputs should be developed:

(i) **An overarching framework paper**, that identifies key functions related to water resource management, how climate change might affect these functions, and identifies some of the key actors (or decision-scales) where adaptation considerations might need to be operationalised. This document need not be more than 20-25 pages.

For example, a previous OECD report (Levina & Adams, 2006) argues that good water management includes consideration of 3 key tasks:

1. Development of long-term water resources management strategies;
2. Regulation of water abstraction, supply and demand;
3. Minimizing the risk from floods and droughts.

One possible approach to an initial framework paper would be to examine these 3 key tasks with reference to 4 questions:

1. What are the implications of climate change on each of the 3 key tasks?
2. What are the broad adaptation responses to each of the tasks?
3. Who are the key actors for each of the 3 tasks and what should they do?
4. At what scale do they function?

When examining who the key actors are, it might be useful to differentiate between centralized and decentralized government structures, since the institutional framework will influence the adaptation process in the water sector. In centralized countries, more responsibility lies with the central government for long-term strategic planning, information flows, funding, and in ensuring that regional and local priorities are incorporated into national plans. Decentralized governance allows for more flexible solutions tailored to local needs and situations, but may result in a lack of consistency across the country. Different sub-national approaches are particularly challenging when a water body is shared among several regions.

**(ii) Modular Guidance Note(s):** The framework could then be complemented by one or several modular guidance notes in the 15-20 page range that could focus on one of the key functions or actors or decision-levels. Possible modules for guidance notes may include:

- Cities
- Agriculture/rural development
- Energy sector
- Infrastructure
- Planning and regulation.

There clearly has to be close coupling between the framework paper and the chosen modules. These modules could examine more in-depth what the implications of climate change are, the adaptation options, entry points into existing decision-processes, and how to incorporate adaptation.

A proposal for further steps in the process of developing an OECD Water Guidance will soon be discussed within the Dutch Ministry of Foreign Affairs.

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