

**Synthesis ECCA conference session**  
**'Building robust strategies for a climate proof fresh water supply'**

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Introduction

Hydrological patterns will change across Europe. In many countries socio-economic and climate change cause water supply and demand to be out of equilibrium, asking for adaptation at several scales. Combining these adaptation actions at several scales into a coherent and robust fresh water adaptation strategy is a challenging task for policy-makers. This is further complicated by several types of uncertainty raising the question what sort of strategies are most successful in coping with an uncertain future? The goal of this session was to exchange experience on fresh water policy formulation and policy dilemmas among European countries. During the session we shared experience of four case studies in Europe: The Netherlands, France, Spain and Denmark.

The Netherlands

The Deltaprogram, is a governmental program aiming to safeguard flood risk management and freshwater supply in the future. The sub-program Fresh Water Supply is one of the two generic programs, with the goal to develop a long-term strategy for a sustainable and economically effective freshwater supply in the Netherlands. The Netherlands has been endowed with plenty of rainfall and a large and reliable input of river water via the Rhine. So at present, a shortage of freshwater is very much an exception. For crisis situations of low rainfall and/or low Rhine discharge, there is a scheme of rationing of water. With future climate change and socioeconomic development various water supply problems are expected. The fresh water supply programme distinguishes between several key choices, that will give input for the policy formulation:

- To what extent is freshwater supply a public or a private responsibility
- Do we aim at facilitating demand, or do we aim at accepting the given supply
- Are the necessary investments financed from the public budget or by those who profit?
- Should we aim at safeguarding present water rights, or should we add flexibility and redistribution?

Governmental and private actors take different positions. Governments are pro-active, and consider water users to take their responsibility. Whereas water users are content with the current water supply and view water supply as a governmental responsibility. Based on the responsibility of the government and water users, two contradicting strategies emerge:

1. Facilitate if possible, adjust if necessary (efficient, danger of lock-in)
2. Adjust if possible, facilitate if necessary (raises awareness, enhances private initiative, more flexible)

To find a way out of this dilemma, the concept of a provision level is considered.

This is the level of water provision from the perspective of the government. It includes the provision of water from the national water system to the regional systems and the provision from the water systems to water users.

France

Policy is far from implementing adaptation measures today. However, adaptation is an issue that has progressively emerged in the policy debate, leading to the increasing references made by sector policies to adaptation, the adoption of the National Adaptation Plan and the obligation to account for adaptation in different strategies and plans. Two communities are concerned

with climate change adaptation: 1. the adaptation front and 2. the water front. These communities have their own disciplinary roots, scale of analysis, governance system and instruments. Even though both communities have to common goal to develop knowledge and to raise awareness, cooperation among these two communities is limited causing fragmentation in initiatives, projects and policies. During the presentation this is illustrated with several initiatives at different geographical scales.

ZOOM 2070 is a two year national project carried out by the Ministry of Ecology. The aim of the project is to enhance knowledge on the impact of climate change on water and adaptation strategies. The project has a systemic approach including several disciplines and water types. The project investigates a selected number of adaptation (supply and demand) strategies and develops and integrated tool to assess the potential impacts. The results are discussed with representatives of public bodies in order to demonstrate the potential of the integrated tool and to initiate debates on the adaptation strategies at lower scales. There is limited interaction with private actors.

Adaptation is an emerging issue at the river basin district scale and considered very qualitatively in finalizing the first Water Framework Directive basin plans. Two examples are the Garonne 2050 initiative of the Adour-Garonne water agency and the adaptation plan of the Rhone-Mediterranean and Corse water agency.

At the trans-border level, the Pyrenees adaptation guide for decision-makers was initiated by the Working Body of the Pyrenees. Among other issues, river flows are expected to decrease by 20 percent on average in this region with potential impacts on several types of water users. However the adaptation guide gives very limited guidance for action.

From these examples and experiences several issues can be distinguished. First, current knowledge misses out on socio-economic changes in behaviour and the ecological dimensions of resilience. Second, policy responsibilities remain unclear and there are difficulties in taking decisions under uncertainty, and third, there is fragmentation in the governance of fresh water issues since there is a lack of political interest and private operators formulate their own (disconnected) strategies.

### Spain

In Spain, climate change projections show that water supply issues become more frequent and severe in the future. However, the current financial crises and fear for terrorism set the policy agenda; there is less interest in drought risk management and climate change.

Water management can be characterized by its complexity. Currently in Spain, there is a culture of cooperation that exists already for more than 100 years, and has its roots in laws from the Arabic time. The society has changed since that time, but the laws have shown to be rigid and have remained the same. Furthermore the adaptation process is hampered by disproportionate political power.

With regard to the future there are several reasons to be optimistic: the technology is developing and there is cooperation. Considering prices, there remain mixed feelings concerning whether it promotes the right spirit for adaptation. With regard to European Policy the feeling is pessimistic; there are limited policies based on sciences and objective knowledge.

From an academic or scientific point of view we need to understand better the institutional and private adaption motivation and barriers. Furthermore, current knowledge has a poor understanding uncertainty and of the connection between scales.

A case study of the Tagus river basin illustrates some of the above-mentioned findings. The Tagus river basin is shared between Spain and Portugal. A lot of models have been applied to study the effect of climate change on the hydrology within the basin. However, we do not

understand so well the behaviour of water users. At the national and local level, private parties know how to deal with changes and cooperate. However, there are reasons for concern considering the action of public authorities and the EU: there is a lack of budget, there is a lack of political will, there is no transparency and current policy is dominated by land use policy.

### Denmark

Adaptation action responsibilities are assigned to the central government and local authorities. The central government, sets the framework of adapting laws and regulations and takes care of the coordination and information. The local authorities are responsible for developing and implementing climate adaptation plans. These adaptation plans include: 1. background and assumptions, 2. risk assessment, 3. structure and guidelines (sets the vision for adaptation), and 4. action plan for climate adaptation.

Danish water consumption has been going down and stabilized for the last ten- twenty years. The water price has done the reverse; the price is 6-7 euro per cubic meter. Main challenges for the future concern increasing precipitation, increasing sea water levels, groundwater level increase and increased runoff. Urgent phenomena are cloud burst; an event in 2011 set the political/policy agenda.

In the future, it is expected that urbanization will occur from the west to the east of Denmark. This trend is accompanied by an increase in water demand from households and businesses in cities in the west. More than 98% of the country's drinking water comes from ground water resources. There exists a political agreement that drinking water should not be treated besides aeration and sand filtering. Therefore, water is abstracted in rural areas in the west of Denmark, causing regulation (and restrictions) on land-use. The dilemma for the future is the question how to overcome this dilemma.

### Discussion

The dilemma's addressed in the presentation all touch upon the division of responsibilities and the connection between scales. From the case studies we have seen, for example, that there is a lot of knowledge available within these countries, but that this knowledge remains fragmented among different private and public actors at different geographical scales. Key question and dilemma is how to overcome this fragmentation; do we treat the challenge at the right scale?

In Spain the general opinion on solving the fragmentation issue is pessimistic. The fragmentation is big and the distrust in politics in Spain is striking. The cooperation at the local level is very valuable. River basin authorities, who are responsible for the discussion of adaptation measures, work with protocols. These protocols are very well established, there should be an indicator to investigate the problems and based on these indicators there is a discussion on the actions. But, there protocols might work well with climate variability, but not with climate change.

Perhaps the way forward is not to try to tackle all the issues on all scales, but to focus on the most relevant or urgent scale. Prioritize to focus on one scale and overcome by that the abundance of measures. The selected measures should be internalized into policy.

In Denmark the water problems are different from the other countries. Perhaps they could see the downpours as resources instead.

A key issue related to water supply management is food security. Food security can also be characterized by the fragmentation of responsibilities among public and private actors and

across scales. However, in the food system the market is regulating, whereas water supply is publicly regulated. There are some examples of cases where the market mechanism plays a role in water allocation. For example, the water pricing system in Denmark is very effective. Putting a price on water has two sides. On the one hand farmers will use their water more effectively, on the other hand they might take measures that are bad for the environment. The market mechanism is not always a good mechanism to coordinate resource allocation. External effects and subsidies distort the market.