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**ADAPTATION RESEARCH MEETS
ADAPTATION DECISION-MAKING**



Programme and Abstracts

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3.2.3 Towards legitimate governance arrangements for adaptive flood risk management in urban areas

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In recent times a shift has occurred from traditional flood management focused on the prevention of flooding (reduction of the probability) only, to more adaptive strategies focused on the reduction of the impacts of floods as a means to improve the resilience of occupied flood plains to increased river discharge levels and sea level rise. This shift has had implications for the public-private divide in flood risk management. In many countries flood prevention strategies reside under the exclusive responsibility of the government, since measures such as dikes and other types of technological barriers are regarded as public goods from which all people (in a certain geographical area) benefit. With the introduction of adaptive strategies such as the wet- or dry-proofing of buildings non-state actors such as developers, housing corporations and residents also may have to bear responsibility for adaptation. This necessitates multi-actor collaboration, often facilitated in the form of policy networks and other types of public-private governance arrangements. Private involvement may lead to more innovative and efficient adaptation measures. However, the multiplicity of actors and potential controversies regarding adaptation goals and solutions is expected to have implications for the legitimacy of new arrangements. In this paper we introduce a conceptual framework to analyze and evaluate governance arrangements for adaptive flood risk management. We then apply this framework to a case study involving an urban regeneration project in an un-embanked area in which adaptive flood risk management strategies have been integrated as a means to enhance the resilience to climate change. We analyze the governance arrangement for Heijplaat, Rotterdam, the Netherlands in terms of the division of responsibilities among public and private actors, and clarify this arrangement in terms of the key considerations behind this division of responsibilities. Finally we evaluate the input, throughput and output legitimacy of this multi-actor arrangement.

3.2.4 Climate change considerations in urban planning

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This presentation introduces recent studies on climate change considerations in urban planning. The aim of the studies is to promote adaptation to and mitigation of climate change in urban planning and, thereby, to reduce damages caused by floods and storms as well as to reduce greenhouse gas emissions. The focus in this presentation is on adaptation to climate change. The research was based on ongoing planning processes in six study locations in Finland. Plans were considered on the basis of local climate conditions and of the microclimate they will form. The bases for analyses were estimations about essential impacts of climate change in the case localities. Predictions of climate change with regards to extremes and certain average changes in the next hundred years were made for all the study localities. The predicted variables concerned temperature, wind speed, precipitation, snow cover and sea ice cover. Changes in many variables are significant and differences between localities are great. Important issues in plans at general levels are mapping of flood risk areas and avoiding location of functions in such areas. Wind conditions and increasing precipitation form challenges to detailed planning. Near shore areas, sea level rise and splash of waves, as the sea will be open longer, form special challenges. Results of the project are recommendations

of practical procedures and means for taking climate change into account in urban planning and impact assessment. Control of and adaptation to climate change should be an established practice in urban planning.

Parallel Session 3.3: Natural resource management I

3.3.1 Adaptation of management of Norway spruce stands to changing climate

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Forest sector has successfully used stand simulators in forest planning; e.g. different forest management options are tested and regional harvest potential estimated with the help of stand simulators calibrated on empirical data. One of the current challenges in forestry is to understand how various ecosystem services, such as carbon sequestration and timber production, can be managed in the changing climate, i.e. how to adapt to conditions from where we do not have observations. Developed process-based models should be applicable for such analysis. The objective of this study is to assess adaptation options of forest management in changing climate. We will focus our analysis on management of Norway spruce stands, since the response of spruce stands to changing climate is the most debated issue in the management of boreal forests. In addition, spruce stands are susceptible to wide range of forest management options from conventional management practices and bioenergy harvesting to maintenance of biodiversity of fungi in decaying spruce logs. We simulated the development of an even-aged spruce stand in current and changing climate with a process-based growth model that is integrated with models describing soil nutrient cycling and soil water dynamics. With model simulations, we evaluated differences between alternative management scenarios in terms of timber production, bioenergy harvests and forest carbon sequestration (both in the trees and the soil). Our results show that both tree growth and potential carbon sequestration capacity will increase with the climate change. In the changing climate, growth of trees is increased both due to favorable climatic conditions and due to accelerated nutrient cycling. Since growth of trees and litter production are accelerated more than the decomposition of soil organic matter, boreal forest soils will act as a carbon sink mitigating changing climate. Enhanced stand growth allows more intensive harvesting and/or shorter rotation length. Results of the simulations will directly serve forest owners and forest extension services by providing information on effects of different management options in changing climate.

3.3.2 Spruce forests on their southern boundaries: to adapt or not to adapt

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Based on empirical evidence from Belarus, this paper looks at the role of adaptive approaches for enhancing bio- and landscape diversity governance in spruce forests. Spruce forests, covering 3.6% of the country's area, are unique for their ecosystem diversity and their southernmost location in lowland Europe. These forests provide a habitat for a number of animals, including the Black Stork (*Ciconia*