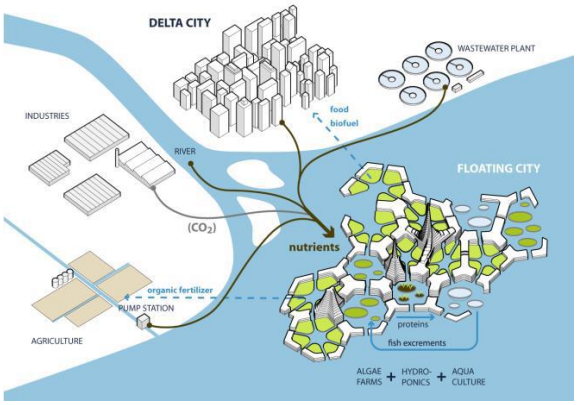
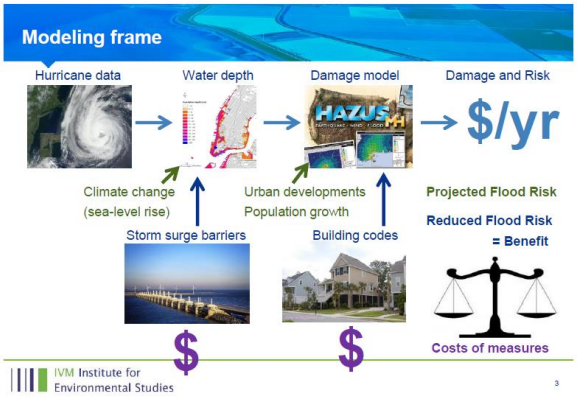
Deltas in Depth scientific sessions Deltas in Depth Theme 5. Urban adaptation to climate change		
DD 5.4 Economics of urban adaptation		
Chair	Prof.dr. Chris Zevenbergen, UNESCO-IHE, the Netherlands	
Presentations	•	Bart Roeffen, DeltaSync, the Netherlands
	•	Dr. Swenja Surminski, Grantham Research Institute on Climate Change and the Environment LSE, United Kingdom
	•	Dr. Hans de Moel, VU University Amsterdam, Institute for Environmental Studies, the Netherlands
	•	Laura Kleerekoper, Delft University of Technology, the Netherlands
	•	Mindert de Vries, Deltares - HZ U. of Applied Sciences, the Netherlands



Bart Roeffen starts of the session with his presentation "The potential of floating urban development and food production for coastal delta cities". Delta cities face rapid urbanization, rising food demand, land degradation and increasing biofuel demand which will put pressure on the available land. At the same time, these cities are threatened by extreme events and the effects of climate change. Blue Revolution is providing an alternative perspective to deal with these challenges, that includes the use of water as an alternative for land use. Floating urban expansion and floating food production can contribute to a solution for global land shortage. In order to achieve this, a radical change of ideas about urban systems is needed; a shift from conventional to cyclical urban metabolism. The concept of floating developments, where the city expands into the water and reuses industrial waste as nutrients for the city, was evaluated for the city of Rotterdam. The next step in implementation of the concept is small scale pilots in order to test the ideas.

Swenja Surminski addressed "The role of public-private partnerships to address climate risks: case of the London Climate Change Partnership". As climate risks continue to mount it is increasingly clear that managing these cross-cutting risks cannot be addressed successfully at any single institutional or spatial scale or by any one category of actor. As such, private sector, government and other sectors of society need to cooperate and develop well-functioning partnership approaches for supporting climate risk reduction and adaptation. The London Climate Change Partnership (LCCP) is used as a case study for understanding the effectiveness of public-private partnerships to address climate risks, specifically flood risk in the delta city of London. The case study forms part of the large EU-funded research project ENHANCE, that aims to develop and analyse new ways to enhance society's resilience to catastrophic natural hazard impacts and develop supportive multi-sector partnerships (MSPs).

The next presentation "Spatial cost-benefit analysis of flood-proofing buildings in New York City" is by Hans de Moel. In order to cope with flood risk caused by storms like Sandy, there are conceptually two options: preventing flood waters from reaching the buildings (using surge barriers, levees, etc.) and/or minimizing flood damage by adjusting the buildings (i.e. flood proofing). Currently, NYC has little coastal defence structures to keep flood waters out, making building codes an important part of flood risk management. In order to test the feasibility of water-proofing buildings in NYC a spatial cost-benefit analysis was performed, at the census-block level for three types of measures. A hazard and a risk modelling framework consisting of 549 storms were used, resulting in water levels and damages with different return periods to estimate flood risk and the benefit of the measures. Recommendations based on this study include:



- Currently it is cost effective to elevate all new buildings 4-6 ft
- Flood proofing existing buildings in combination with ongoing retrofitting could be worthwhile
- Delay investments in surge barriers; depending how climate change unfolds.

Results show that even when applying a measure throughout the city, it is not cost-efficient; it can be efficient in specific areas. The type of measure to apply differs spatially and a substantial amount of risk can be reduced through an optimal mix of damage-reducing measure at building level.

Laura Kleerekoper talks about "Urban adaptation to climate change in Rotterdam: from city to neighbourhood". Climate change is predicted to increase heat stress in cities and action is required to improve the quality of life of citizens, both in new and existing urban areas. To choose for certain climate adaptation measures, a better understanding is needed of the options to intertwine measures with a specific urban structure. Measures have local or widespread effects, therefore an important question is: where do you need a cooling effect? Spatial implications that climate adaptation measures have for various neighbourhood typologies were studied in case studies of Rotterdam and The Hague. First, analyses were done with the use of satellite imagery to identify areas where urban heat is accumulating. In the second step the selection of case study neighbourhoods is described based on their vulnerability to heat stress. The third step contains an analysis of the type of land use which adds facades as an urban surface. For each neighbourhood typology the potential gains in thermal comfort were described based on the urban surface analyses and the building typology. Different measures were modelled, and as a result a mixture of different measures was found to be most effective. There are many different effective measures for climate adaptation in urban areas, but it is very important to look at the context of the location.

Finally Mindert de Vries takes the floor with his presentation “Towards a cost-effective restoration of a vital community in a safe delta, design of the ‘New Meadowlands’, New Jersey”. The Meadowlands were hit hard by Sandy with high damage to infrastructure, economic activities and society. Sandy also exposed many vulnerabilities in the area combining flood risk with social vulnerability, vital network vulnerability, pollution risk. In a transatlantic consortium centred around MIT-CAU + ZUS + De Urbanisten, the ‘New Meadowlands’ design was developed. It articulates an integrated vision for protecting, connecting, and growing this critical asset to both New Jersey and the metropolitan area of New York. Firstly, primary protection against flooding is realized by a green multi-purpose berm that will protect against flooding from storm surges and which will safely connect the various economic and urban centres and provide new public space structure for mediating economic and societal growth (the Meadowband). Within the protected areas, substantial fresh-water basins will absorb rainwater, substantially reducing the storm water runoff into sewer pipes, almost eliminating local flooding from sewer overflow. Outside the berm, nature will flourish and provide additional services to increase flood safety and ecosystem quality. The cost-benefit analysis for this project, that is quite important for the decision makers in the area, yields a factor of 2 against a business as usual scenario.