Deltas in Depth scientific sessions		
Deltas in Depth 11. Decision support tools and risk assessment		
DD 11.3 Decision support and risk assessment in Asian deltas		
Chair	Prof.dr. Richard Klein, Stockholm Environment Institute, Sweden	
Presentations	•	PhD Thang T.X. Nguyen, School of Earth and Environment Sciences, GeoQuest University of Wollongong, Australia
	•	PhD Hisamichi Nobuoka, Ibaraki University, Japan
	•	Matthias Garschagen, United Nations University Institute for Environment and Human Security, Germany
	•	PhD J. Craig Jenkins, Ohio State University, USA
	•	PhD Atilla Lazar, University of Southampton, United Kingdom

More than the half of Vietnam is vulnerable for flooding. For his research, "Coastal assessment vulnerability a case study of the Mekong river delta in Vietnam", ThangT.X Nguyen focused on the local scale in Kien Giang, coastal province, Vietnam. First she focused on the biocal aspects to know the potential impacts. The potential impacts are based on the exposure, sensitivity and adaptive capacity. The first step of the method is the shoreline analysis from the year 1973 till 2003, which shows the influence of the movement of the shoreline. The second step is to use the geographic information system. Both steps finally lead to the exposure map, consisting of three maps: Flood, Shoreline change and seawater intrusion. The exposure maps and the sensitivity map show the potential impacts for the area. The map 'adaptive capacity' is based on nine variables: Income, education, health, poverty, irrigation, electricity, house, road and telephone. The variables are combined in three sub-components: socio-economic, technological and infrastructure. In short, the exposure-, sensitivity- and adaptive capacity maps will lead to the final exposure map. For the case study they found that on the local scale vulnerability maps differ little from the potential map. The research needs more detailed study at finer scale, focusing on predicted vulnerable hotspots.

Hisamichi Nobuoka did an "Assessment of adaptation scenarios of coastal protections under global warming, in case of Mekong Delta" to draw lessons from the tsunami disasters in Japan. The research question was: ''*How and when should we construct dikes to adapt to higher impact and to reduce hazards of the coastal flooding?''.* He computed probability flooding maps to get insights in the potential water levels and future flooding of the area. One meter of flooding is the maximum for the flooding scenario. At this moment there are no dikes constructed in the area. He designed and tested the design dikes level for the future. He used the medium scenario for sea level rise and simulated this scenario with storm surges in past 60 years to get to know the return period. Several influences, such as design level dike, storm surge scenario and population growth are taken into account. After that he used different formulas and statistic analyses. The outcomes were used to map and graph the return periods of floods on the coast line. It also shows the vulnerability to flooding of the area where the population lives. Based on the literature and the scenarios, he designed an assessment map with various time scales. The big unknown with regards to the impacts of the design level 1/50 is the population growth.

In his "Evaluation of adaptation to water-related risk in the Mekong Delta: A multi-criteria analysis of response decisions" Matthias Garschagen designed an adaptation approach in five steps: 1. understanding

risk x vulnerability, 2. identifying potential adaptation strategies, 3. identifing criteria that determine success/failure of strategies that need to be considered to ensure sustainability, 4. Evaluating selected adaptation strategies based on criteria and 5. comparing MCA results with vulnerability implications of selected strategies. To apply the five steps he uses the Mekong delta as a case study. The Mekong Delta consist of coastal and urban areas. Both areas have different social-economic vulnerabilities, which should be analysed first. The analysis must take into account the direct and indirect influences. It is important to distinguish between rural and urban areas. After that, he defined the criteria for household-level adaptation decision-making. The next step is to collect data in the area and apply these criteria. A multi-criteria analysis provides a profound basis to assess local priority setting and acceptance of MCA.

Craig Jenkins' presentation is called "BanD-AID: Mitigating Bangladesh Delta coastal vulnerability due to sea-level rise, & integrated natural & social framework". The study aims to develop a stronger, social sided assessment for flooding. The key question of the research is: Does flooding reduce village resilience? How do villages adapt to flooding risks? And is migration an adaptation measure to reduce climate risk? To answer those questions it is important to use the satellite data. The next steps are to refine regression analysis, interviewing villagers and integrate all this in a scenario analysis. Jenkins looked during the research at the relationship between flooding and population: what is already known and do they know what the future brings. In this research the scenarios focus on flood risk, but even more on the movements of the population and population growth, during and after flooding.

Atilla N. Lazara talks about the ESPA delta project (2012-2016) "Integration of bio-physical and livelihood dynamics for analysis of poverty in coastal Bangladesh". The research looks at how rural population can deliver ecosystem services. The project wants to develop something for national decisions makers. The study looks at different scales, different river basins, Bay of Bengal, exogenous drivers and governance. Also it looks at the social aspects.