

## V – Health and Urban areas

### Parallel session A – Monday 10<sup>th</sup> March 14:00-15:30

**ID N°:** [94]

**Title:** THE VULNERABILITY FACTOR CARD GAME - A BOTTOM-UP METHODOLOGY FOR IDENTIFYING AND ANALYSING VULNERABILITY OF PEOPLE AND FORMULATE MULTI-LEVEL ADAPTATION STRATEGIES

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Although climate change and extreme weather events affects everyone, exposure, sensitivity and adaptive capacity vary among different population segments and vulnerability is disproportionately distributed in a society. The "Vulnerability Factor Card Game" was developed to enable a research study exploring how key stakeholders in municipalities construct social vulnerability in relation to climate change.

Four groups of planning and operational staff and one group of elderly citizens in a large Swedish municipality each created 2 fictive vulnerable individuals. These individuals were then exposed to heat and flood, and the impacts analysed. Moreover, possible adaptation responses at different levels (individual/household, municipal operations and strategic planning) were explored.

Results show that there is a substantial amount of contextualized knowledge about vulnerability drivers and inter-relations between social factors and vulnerability. The most vulnerable fictional individuals were old women with low income, various health conditions living in social isolation. Moreover, single factors were not perceived to directly affect vulnerability, but rather *the combination of factors, or multiple inequalities*. Regarding adaptation measures, local decision-makers defined a wide range of possible adaptation measures at different levels.

The Vulnerability Factor Card Game was a valuable tool for stimulating discussion in the focus groups. This type of physical intermediary, or boundary object, has served the purpose of facilitating interactions between researchers and practitioners in several earlier studies. In this case, the cards represented vulnerability drivers retrieved from scientific literature which informed and to some extent steered the discussions, but empty cards were available at all stages to allow participants to define new possible factors. A few such factors were suggested and added to the lives of the fictive persons. The stepwise use of the cards structured the discussion, and also formed a visual representation of each individual for the group to gather their insights around. A similar approach with a slight modification could easily be used as a working-tool for practitioners in for example municipalities or organizations concerned with health care. Existing GIS-based tools for vulnerability analysis need complements that can mine and systematize bottom-up knowledge about vulnerability drivers and possible adaptation measures. The use of the tool could enhance the understanding of uneven distribution of exposures and other factors driving vulnerability, as well as contribute to the mainstreaming of for example gender issues in practical adaptation responses so as to avoid re-enforcing social inequalities. It could also increase understanding of vulnerability in general and help highlighting areas within an organization that might need plans for certain event and increase knowledge and mental preparedness among the staff.

#### Presenter

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**ID N°:** [273]

**Title:** **INTEGRATED RISK MANAGEMENT – A KEY STRATEGY IN CLIMATE CHANGE ADAPTATION. AN EXAMPLE FROM AUSTRIA.**

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Our changing climate will strongly affect all future decisions made by public authorities and cause substantial changes in the risk landscapes around the globe. At the same time, the number of critical infrastructure facilities keeps skyrocketing. In combination with the effects of climate change, this leads to increasing social, economic and cultural vulnerabilities of countries and municipalities, their inhabitants and economies.

The Provincial Early Warning and Emergency Management Centre of the Tyrol, Austria together with the alpS – Centre for Climate Change Adaptation developed a hands-on method for risk assessment in the public sector that follows the latest scientific findings as well as the needs of public authorities. It enables Austrian cities to respond to the increasing number of climate risks by implementing a blended risk assessment method that combines expert- and community-based approaches and considers multi-hazard risks and cascading effects as well as the principles of local participation and cost efficiency. With the aim of creating a sense of ownership, expert teams conduct workshops with each municipality in the Province. This guarantees a high-quality risk assessment that allows for an efficient adaptation to climate change-related as well as man-made risks. As of December 2013, more than 400 workshops have been run in municipalities with 53 to 120 000 inhabitants and 7600 risks have been identified. More than 3500 local experts and community members have been involved and a team of 10 risk-management experts has been working on the province-wide risk assessment. For these achievements in creating a sustainable, local solution, the Province of the Tyrol was chosen as a role model for community-based risk assessment, management and reduction of the 2010-2015 World Disaster Reduction Campaign: Making Cities Resilient: "My city is getting ready", run by UNISDR.

Although this risk management approach has been designed in a post-industrialized society, it can be adapted to differing cultural, social and technical settings and requirements. The cost- and time- efficient blend of expert- and community-based approaches increases local participation in disaster risk reduction and constitutes an alternative to highly sophisticated top-down approaches that are applied in many countries at the national level. These approaches often lack acceptance within local, district and regional governments and public authorities. The expertise in applying DRR approaches as a key strategy in CCA has been shared and workshops held in, inter alia, Algeria, Jordan, Kuwait, Indonesia, China, South Korea, Argentina, Germany, Switzerland, Sweden, Norway and Italy.

This presentation will give insights into the applied method. The costs and benefits of an implementation will be highlighted and a brief overview of the results and future applications given. Finally, the nomination as a role model region within the UNISDR campaign will be addressed.

**Presenter**

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**ID N°:** [35]

**Title: SIMULATING FUTURE CHANGES IN THE URBAN HEAT ISLAND EFFECT BASED ON AN INTEGRATION OF SOCIO-ECONOMIC AND CLIMATE SCENARIOS**

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Many examples exist of studies that aim to measure the urban heat island effect using different data sources such as satellite images, weather stations and mobile devices. Yet, few studies explain local variation in the observed temperatures and apply this knowledge to downscale global scenarios related to both climatic and socio-economic changes. This paper analyses the strength of the urban heat island effect in a temperate climate, explains local variation in the observed temperatures and quantifies how this urban heat island effect may develop in the coming 30 years due to projected climatic and socio-economic changes. The analysis is based on our own measurement of the urban heat island effect that we define as the maximum temperature difference between local urban temperatures and a rural reference station observed during a 24 hour period.

We describe current urban heat island patterns based on two separate analyses. *Spatial variation* in urban temperatures is measured along a route using mobile measurement devices and then explained using regression analysis and spatially explicit explanatory variables, while *temporal variation* is described based on local temperature measurements derived from amateur weather stations.

To assess potential future changes we build on existing scenario studies and a land-use simulation model. Using observed relations between maximum daily temperatures and observed urban heat island values we are able to assess the impact of climate change on local heat island values. The land-use change model allows the translation of macro-level socio-economic changes into potential future urbanisation patterns and thus the assessment of increased urbanisation on urban heat island effect. Our measurements for the Amsterdam region in the Netherlands show that the urban heat island effect induces maximum temperature differences with the surrounding countryside of over 3 degrees Celsius on moderately warm summer days with a maximum daytime temperature of 20 degrees. The observed temperature difference between urban and rural areas increases by about 0.13 degree for each degree increase in maximum daytime temperature.

The simulations of potential future changes in urban heat island patterns indicate that strong local temperature increases are likely due to urban development. Climate change will, on average, have a limited impact on these changes. Large impacts can, however, be expected from the combination of urban development and potentially more frequent occurrences of extreme climatic events such as heat waves.

**Presenter**

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**ID N°:** [101]

**Title: IDENTIFYING TRADE-OFFS BETWEEN ADAPTATION AND MITIGATION IN COPENHAGEN AND HELSINKI**

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There is an assumption in the literature that by enhancing positive synergies between adaptation and mitigation, efficiency of cities' responses to climate change might be improved. However, previous studies have identified problems when trying to implement both adaptation and mitigation strategies simultaneously in urban areas and hindrances have been found in attempts to translate climate policies to practices. This study identifies the interrelationships, particularly the tradeoffs that are being made between adaptation and mitigation, and conflicts that can sometimes be unavoidable. This study presents a case study of two Nordic capitals, Copenhagen, Denmark and Helsinki, Finland and examines their climate governance. Since the case cities have nearly the same size, both are part of the European Union, and both are assumed to have similar climate governance structures, institutional arrangements and resources. They are also expected to have equal capacities to respond to climate change, either by implementing adaptation or mitigation strategies. The data are based on semi-structured stakeholder interviews, review of scientific literature, and policy documents of the case cities. The findings indicate that both synergies and conflicts can be identified in the case study cities, and the conflicts result in trade-offs that are made between policy objectives.

**Presenter**

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