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Urban flooding and Resilience: concepts and needs

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During the recent years, a growing interest for resilience has been expressed in the natural disaster mitigation area and especially in the flood related events. The European Union, under the Seventh Framework Programme (FP7), has initiated several research initiatives in order to explore this concept especially for the urban environments.
Under urban resilience is underlined the ability of system potentially exposed to hazard to resist, respond, recover and reflect up to stage which is enough to preserve level of functioning and structure. Urban system can be resilient to lot of different hazards. Urban resilience is defined as the degree to which cities are able to tolerate some disturbance before reorganizing around a new set of structures and processes (Holling 1973, De Bruijn 2005). The United Nation's International strategy for Disaster Reductions has defined resilience as "the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase this capacity for learning from past disasters for better future protection and to improve risk reduction measures."(UN/ISDR 2004). According to that, system should be able to accept the hazard and be able to recover up to condition that provides acceptable operational level of city structure and population during and after hazard event. Main elements of urban system are built environment and population. Physical characteristic of built environment and social characteristic of population have to be examined in order to evaluate resilience. Therefore presenting methodology for assessing flood resilience in urban areas has to be one of the focal points for the exposed cities.
Strategies under flood management planning related to resilience of urban systems are usually regarding controlling runoff volume, increasing capacity of drainage systems, spatial planning, building regulations, etc. Resilience also considers resilience of population to floods and it's measured with time. Assessment of resilience that is focused on population is following bottom-up approach starting from individual and then assessing community level. Building resilience involves also contribution of social networks, increasing response capacity of communities, self-organization, learning and education and cheering adaptation culture. Measures for improving social side of resilience covers: raising public awareness, implementation of flood forecasting and warning, emergency response planning and training, sharing information, education and communication.
Most of these aspects are analyzed with the CORFU FP7 project. Collaborative Research on Flood Resilience in Urban areas (CORFU) is a major project involving 17 European and Asian institutions, funded by a grant from the European Commission under the Seventh Framework Programme. The overall aim of CORFU is to enable European and Asian partners to learn from each other through joint investigation, development, implementation and dissemination of short to medium term strategies that will enable more scientifically sound management of the consequences of urban flooding in the future and to develop resilience strategies according to each situation. The CORFU project looks at advanced and novel strategies and provide adequate measures for improved flood management in cities. The differences in urban flooding problems in Asia and in Europe range from levels of economic development, infrastructure age, social systems and decision making processes, to prevailing drainage methods, seasonality of rainfall patterns and climate change trends. The study cases are, in Europe, the cities of Hamburg, Barcelona and Nice, and in Asia, Beijing, Dhaka, Mumbai, Taipei, Seoul and Incheon.