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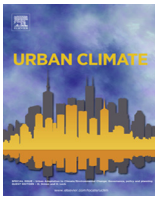

Interfacing citizens' and institutions' practice and responsibilities for climate change adaptation

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ABSTRACT

Climate change poses a serious challenge to sustainable urban development, placing many cities at risk. Climatic conditions are changing to such an extent that the capacity of urban institutions and associated governance systems to deal with climatic extremes and variability is being reduced. New approaches for urban climate change adaptation are thus urgently needed.

There is an increasing consensus that local-level capacities are critical for successful adaptation to climate change and the achievement of sustainable development. However, knowledge about local-level capacities is scarce, and regulatory frameworks are often ambiguous in terms of assigning (complementary) responsibilities for adaptation to institutions and citizens. Against that background, the paper investigates the adaptive practice of Swedish citizens and how this relates to local municipalities' adaptation efforts and to the 'interface' between citizens' and institutions' legal responsibilities. By theorising the interplay between the adaptive practice of citizens and institutions, it demonstrates that adaptive capacity at the local level does not automatically translate into adaptation itself, thus showing the requirement for planned and more complementary interventions. The outcomes suggest the need for more distributed urban risk governance systems and people-oriented planning to foster an adaptive and sustainable transformation of cities. The potential scope of action for more people-oriented adaptation planning is presented.

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1. Introduction

Climate change poses a serious challenge to sustainable urban development and places many cities at risk. Sweden is no exception. According to the Swedish Committee on Climate and Vulnerability (SCCV, 2007), the country will face an increasing number of hazards in the future due to changes in climate mean and variability. It is predicted that the mean warming will be greater in Sweden than the global average (a mean rise of 3–5 °C in Sweden compared to 1.8–4 °C globally by the end of the century (SCCV, 2007)),[1] and that extremely warm temperatures will become more commonplace. This will result in higher mortality rates for vulnerable population groups; in fact, nationally, the number of deaths per year in heatwaves is estimated to increase by 1000 until the end of the century (SCCV, 2007), and cities are especially at risk (SCCV, 2007; Rocklöv et al., 2008). Average and maximum wind speeds are also likely to increase throughout the country (SCCV, 2007). In combination with a rainier climate (with mean rainfall per month projected to be 38–50 mm higher in the winter and between 30 mm lower and 30 mm higher in the summer by the year 2100 (SCCV, 2007)) and a related increase in landslides and erosion (SCCV, 2007), this is likely to impact road and railway networks. For instance, bridges will be damaged, roads washed out, and railway tracks distorted by heat. Pollen seasons will be prolonged and more houses will be affected by mould, resulting in more people suffering allergies and asthma (Rocklöv et al., 2008). There will be a greater risk of electricity outages due to trees being blown on to power lines, and also due to floods and landslides (SCCV, 2007). More flash floods and basement flooding will occur as a result of overburdened sewage systems (SCCV, 2007; Westlin et al., 2012). City stormwater management will come under further pressure from rising water levels (SWWA, 2012). Extreme low temperatures and related problems are another plausible impact of climate variability (Liu et al., 2012; Francis and Vavrus, 2012). Greater precipitation and longer periods with temperatures at and below zero will expose some buildings, roads and railways to increased ice-related damage, and accidents will occur due to icy streets and falling ice (SCCV, 2007; SMHI, 2012). In summer, parts of Sweden will be exposed to longer dry spells, with associated fire risks (relating to the decrease in summer rainfall stated above) (SCCV, 2007; Carlsson-Kanyama, 2012). Drinking water is also expected to be affected. Heavy rain, extreme temperatures and dry spells can cause water scarcity and a higher risk of chemical and microbial contamination of drinking water sources, leading to potentially large numbers of people being affected by water-borne diseases (Rocklöv et al., 2008; Carlsson-Kanyama, 2012; SMI, 2010).[2] Climate change can also lead to a surge in vector-borne diseases with, for instance, greater numbers of ticks and, consequently, a higher incidence of tick-borne encephalitis and Lyme disease (SOU, 2007a).

The capacity of urban institutions and associated governance and social security systems to deal with climatic extremes and variability is being reduced because of the extent of the changing climatic conditions (Bosher, 2008; Davoudi et al., 2010; Romero Lankao, 2008). In fact, it is predicted that climate change in Sweden will strongly undermine the effectiveness of the institutional responses designed to be applied in the event of known 'common' and more 'predictable' hazards and associated impacts (Westlin et al., 2012; Carlsson-Kanyama, 2012; Mobjörk, 2011; MSB, 2012; Pettersson-Strömbäck et al., 2012). For instance, climate change will increasingly require Swedish institutions to be able to handle several crises at a time, with correspondingly less time to recover in between crises (Mobjörk, 2011). The Swedish Civil Contingencies Agency predicts that increased demands will be placed on rescue services, local management, coordination, and information services, and that existing resources will need to be prioritised (MSB, 2012). In addition, dry periods and heat increase the risk of forest fires, and this may reduce preparedness for other threats. Extreme heat can furthermore affect the physiological and psychological health and decision-making of police and rescue services and reduce the capacity of health workers to treat patients (Carlsson-Kanyama, 2012).[3] New approaches to urban climate change adaptation are thus urgently needed.

[1] The indicative ranges of projected climate change in this section are all compared to the reference period 1961–1990.

[2] Water scarcity is predicted to become increasingly common and occur earlier during summer periods, due to the warmer winters and earlier snow melt. This is especially true for households that use water from their own wells (SvD, 2012). Around 1.2 million people in Sweden use water from private wells at their permanent residence (Maxe, 2007).

[3] Examples of the latter include hospitals that become overloaded during heatwaves, medication being damaged by heat, or home care staff who use bicycles as a means of transport and cannot swiftly reach their patients (Carlsson-Kanyama, 2012).