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Mainstreaming disaster resilience attributes in local development plans for the adaptation to climate change induced flooding: A study based on the local plan of Shah Alam City, Malaysia

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ABSTRACT

The threat of natural hazards in urban areas are typically addressed through land-use zoning and building regulations. Climate change phenomenon compel urban planners to devise comprehensive measures to adapt for more frequent and intense hazards. The paper argues for mainstreaming disaster resilience attributes in local development plans as an overarching adaptive measure. The aim of this paper is to assess the extent to which the local development planning system in Malaysia has responded to the vulnerability reduction and resilience improvement needs of the civil society in order to adapt to climate change induced flooding. It is based on a social survey involving a purposive sample of 250 households to identify the adaptation needs of the civil society, and an analysis of the contents of Shah Alam Local Development Plan to verify the response of the planners to those needs. The findings indicate that the planners have been fairly sensitive to the flood risks faced by people and incorporated policies and strategies in the local development plan to minimize exposure of the people and property to flood hazard and improve the adaptive capacity of the urban settlements. However, the sector based organization of the plan prepared by the federal level planners was found to be not adequately incorporating the indigenous knowledge of coping strategies. Therefore, the paper calls for strengthening the participatory planning and development capacity of the local authorities for more resolute mainstreaming of disaster resilience in local development plans.

Introduction

Urban local governments play a key institutional role in shaping the physical development of cities, towns and other urban settlements. The main instruments used for this purpose include statutory plans, structure plans, local plans and action area plans, depending on the urban-planning system in the respective country. Some countries use a hierarchy of development plans comprising a national physical plan, sub-national structural plans, district-level local plans and action area plans to guide urban development (Taib et al., 2008). Until recently, the focus of these plans was limited to development control through planning and building regulations (Maidin and Ali, 2009). The most prominent development control measures were land-use and building-use regulations. The notion of development promotion was gradually introduced to these plans by incorporating incentive measures in parallel with regulatory measures (Berke et al., 2006). In the latter part of the 20th century, sustainable urban development became the overarching goal of many development plans (Muhammad, 1995; Atkinson et al., 1999; Klein et al., 2003; Campanella, 2006; Cutter et al., 2008; UNDP, 2008).

In the 21st century, also known as the 'century of the city', many scholars have begun to call for reforms in urban planning and development processes to address issues related to climate change that severely affect the sustainability of cities (Godschalk, 2003; Brooks and Adger, 2004; Campanella, 2006; Davoudi et al., 2010). This is because urban areas are major sources of greenhouse gas (GHG) emissions that cause global warming and consequently climate change. The impact of climate change is more pronounced in urban areas due to the high concentration of populations, infrastructure, assets and economy (UNHSP, 2008). Climate change also represents a far more serious challenge to the contemporary realm of development planning due to the capitalistic approach to the use of natural resources, production, consumption, and also ever

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increasing disposal of waste. Economists like Newell and Paterson (2010) have highlighted the urgent need for responding to climate change impacts within development planning realm for improving the economic resilience of cities. Therefore, scholars have called for mitigation and adaptation measures to climate change to be mainstreamed in the development planning and implementation processes (Smit and Wandel, 2006; Cutter et al., 2008; Saavedra and Budd, 2009). The need to mainstream disaster-risk reduction in development planning was also highlighted in the Hyogo Framework for Action (HFA) 2005–2015 (ISDR, 2005), which, has been adopted by 168 nations and international organizations. Here, mainstreaming means, disaster preparedness become a part and parcel of development planning as exemplified by the first strategic goal of the HFA; which is "more effective integration of disaster risk considerations into sustainable development policies, planning and programming at all levels with a special emphasis on disaster prevention, mitigation, preparedness and vulnerability reduction" (ISDR, 2005). In the context of climate change, scholars urge urban planners to take concerted actions against climate-induced disasters (Godschalk, 2003; Saavedra and Budd, 2009; Kithia and Dowling, 2010). Therefore, climate-change mitigation and adaptation are essential knowledge areas for urban development planners.

Climate change directly and indirectly affects almost all countries at all stages of development. According to UN-Habitat (2008), 3351 cities are in the global Low Elevation Coastal Zone (LECZ) and 64% of them are located in developing countries. They are the most vulnerable to climate-change induced sea-level rise. The majority of these cities do not have adequate planning measures to cope with climate change-induced disasters (UN-Habitat 2008). Bosher et al. (2007) argue that appropriate urban-planning measures have the dual functions of mitigating GHGs that induce climate change and reducing the direct and indirect effects of climate change. Furthermore, well-planned cities can significantly reduce both the causes and effects of climate change. Given the fact that many developing countries are not major emitters of GHGs, but are victims of climate change, attention tends to be focused on measures to adapt to climate change, rather than on measures to mitigate it (Phong and Rajib, 2007; Tanner et al., 2009). Pelling (2006) explains that cities in developing countries are at particular risk of climate change-induced disasters due to their high population densities, lack of urban infrastructure capacity, ubiquitous informal settlements and urban sprawl to vulnerable areas. Godschalk (2003) points out that the increased frequency of climate change-induced disasters, coupled with rapid urbanization, places increased strain on the urban-planning and management capacity of local authorities when they attempt to respond to the vulnerability of their communities and assets. For the local authorities that respond to disasters, incorporating proactive measures against climate change-induced disasters into urban-planning strategies is a challenging task (Shaw, 2008; ADPC, 2008). These authorities require a clear understanding of the relationship between the vulnerability of local government areas to climate change-induced disasters and the resilience of these areas against the forces of such disasters (Godschalk, 2003; Campanella, 2006; Kithia and Dowling, 2010). In other words, understanding the issues of vulnerability and resilience is a key requirement for contemporary urban planners and managers (Lawrence and Thomas, 2005). However, the ambiguity of the concepts such as risk, vulnerability and resilience, and insufficient knowledge about processing pertinent data, and the technical complexity of scientific research, have deterred urban planners and managers from addressing the factors that contribute to climate change and safeguarding vulnerable communities through urban-planning measures and decision-making processes (Bosher et al., 2007; Cutter, 2009).

Urban planning is a multi-faceted process leading to overall urban development. One of its products, the 'local plan', is the primary instrument used to guide physical development at the local-authority level (Ling, 1999). Contemporary urban-planning practices are becoming more participatory, as they involve stakeholders in decision-making. Saavedra and Budd (2009) have emphasized the importance of understanding the inherent resilience of local areas and enhancing this resilience through strategic interventions involving stakeholders. Inherent resilience is the natural capacity of people, communities and habitats to cope with and adapt to disastrous events (Satterthwaite et al., 2007; Ernstson et al., 2010). For example, inherent resilience exists when people are sensitive to their vulnerability to hazards, minimize their exposure to hazards by physical or other means, and strengthen community organizations to face recurrent hazards. The civil society's indigenous knowledge on the nature of hazard and coping mechanism to live with it also indicate inherent resilience (Cutter et al., 2008; Smit and Wandel, 2006). According to Klein et al. (2003), in the face of a range of potential environmental stresses including climate change induced hazards, the inherent resilience of the civil society and its adaptive capacity form the first line of defense. In other words, when the civil society and its organizations become adequately sensitive about their vulnerability to hazards and minimize their exposure and strengthen their capacity to face the hazards, which means they are more resilient to environmental stresses. Therefore, Godschalk (2003), Wamsler (2004), Campanella (2006) and Ernstson et al. (2010) have pointed out the importance of a participatory approach in urban planning and the utilisation of indigenous knowledge of inherent resilience in formulating urban planning strategies to adapt to climate change. However, little empirical evidences exists on the extent to which urban-planning practices and products (i.e., plans) have incorporated inherent resilience or have improved resilience through strategic interventions derived from a participatory urban-planning process. Therefore, the central research question addressed by this article is to what extent local development plans have incorporated the attributes of resilience, in consultation with local stakeholders to adapt to climate change-related disasters. Here local stakeholders include civil society in general, which represents the demand side of disaster-risk reduction. The urban authorities, in general, and the urban planners and managers, in particular, represent the supply side. Accordingly, the overall objective of this article is to develop an understanding of the civil society's needs to enhance the resilience of urban areas. This article also aims to assess the extent to which urban authorities have responded to those needs in their planning and development instruments. The next section identifies the attributes of disaster-resilience that should be mainstreamed in development plans for adaptation to climate change.

Development planning hierarchy and the references to disaster resilience

The literature provides several perspectives and interpretations of resilience that tend to relate the resilience of a city to its physical, ecological, social, infrastructure, and economic systems (Cutter, 2009). International Strategy for Disaster Reduction (ISDR) defines resilience as 'the capacity of a system, community or society that is potentially exposed to a hazard, to adapt to it by resisting or changing so that it reach and maintain an acceptable level of functioning and structure' (ISDR, 2002). For instance community resilience is measured by the degree to which the social system is capable of organizing itself to increase its capacity to learn from past disasters for future protection and improves risk-reduction measures (Folke et al., 2002). Godschalk (2003) defines resilient city as a sustainable network of physical systems and human communities that are capable of adjusting to hazards with minimum disturbances. The physical systems (including roads, buildings, infrastructure,