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Presentation title: Integrated Land Use Planning for Resilient Urban Communities

Abstract:

Integrated land-use planning is a central key to land use decisions and zoning extensions; a better land use management and integrated urban planning strategy, involving all levels of governance and local communities are essential to improve the current and future resilience and overall adaptive capacity of vulnerable urban regions in emerging Asia.

Keywords:

Asian Megacities, Ho Chi Minh City, Land-use Planning, Urban Resilience, Vietnam

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Integrated Land Use Planning for Resilient Urban Communities

1 The Role of Land Use Planning in Adapting to Climate Risks

Resilience to climate change must become a mainstream consideration when preparing land use plans, reviewing urban planning proposals, or making decisions about future urban infrastructures and services. As well as better preparing urban areas for potential impacts associated with climate change, there are undervalued opportunities for cities to benefit from optimized urban planning strategies that improve climate resilience but also have important overall environmental, social and economic benefits for the local neighborhoods (Storch et al. 2011).

Improving the local capacity and practice for urban land-use planning in the times of climate change reduces the potential economic losses arising from future exposure to climate change risk. Strategic urban planning and land-use zoning and restrictions to facilitate carbon neutral and climate resilient urban forms and functions also provide for cities the economic opportunities associated with climate change actions plans. Many climate appropriate responses to the new challenges faced by vulnerable communities reinforce the natural asset base on which urban areas depend for quality of life and overall risk reduction. Furthermore climate-proofed strategies of land-use planning can contribute to sustainable and cohesive urban communities. A climate sensitive approach can promote planning ahead for reconstruction and development in more safer and less exposed locations (Storch and Downes 2011b).

New forms of climate resilient new and decentralised urban infrastructures and services offer environmental and economic benefits to urban communities, especially on neighborhood scale in the field of renewable energy, and water conservation, retention and reuse facilities at site.

Improving urban land-use planning for climate change offers new opportunities to engage a cross section of residents in deliberating about urban development goals, land-use planning goals and protective zoning requirements by highlighting the benefits of these responses to climate change mitigation and adaptation (Storch et al. 2011).

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Leading practice in urban land-use planning for climate change resilience will not arise by itself. Most local government areas, particularly those in rapidly urbanising emerging countries, cannot develop appropriate responses without appropriate assistance. Rather, local governments will need considerable policy advice, practical planning guidelines, and technical or financial support in developing, implementing and extending work needed to adapt to climate change impacts. Planning now for climate change will certainly improve medium and long term resilience, but will also result in visible economic, environmental and lifestyle benefits for urban communities today (Labaeye et al. 2012).

2 Asian Coastal Megacities at Climate Risk

Asia is currently undergoing a process of unprecedented urbanisation, represented both in its rapidly expanding and growing number of megacities. However this uncontrollable urban expansion can act as an important driver, contributing to an increased vulnerability to disasters. This is especially true for many of Asia's coastal megacities, where urban areas are experiencing an ever-increasing risk from the adverse effects of climate change. Since globally Asia is seen as one of the most disaster-prone regions, the impacts of climate change-induced disasters are also disproportionately higher than compared to other regions.

The main factors that account for this heightened risk are namely the high population density in Asian cities that increases the number of people exposed to climate-induced disasters and who are consequently affected, and the concentration of assets in the affected areas, which results in higher economic losses. Here, there is serious concern that the targets of creating climate resilient cities in Asia cannot be effectively achieved unless disaster risk reduction is prioritised within current urban development planning (Storch and Downes 2011a).

Climate change is affecting Asia's megacities with changes seen in temperature, precipitation and consequent changes in the frequency and intensity of flooding events. Yet within the mega-urban regions themselves, the future impacts of climate change hazards will be unevenly distributed, with settlements on marginal or unstable land, such as coastal areas, flood plains or those of urban slums exhibiting the highest exposure. These climate-related impacts exacerbate the existing vulnerabilities and contribute to an urban-risk divide which enhances the existing development disparities.

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3 Assessing the Impacts of Rapid Urbanisation Processes

There is a necessity for urban governments to become fully aware of the current and future climate-related urban risk patterns in order to enhance the overall resilience of urban systems and communities. Hence the need to develop a spatially-explicit assessment framework that can effectively integrate the processes of rapid urban development together with the associated climate-related risks (Storch et al. 2007). Therefore our assessment framework links two different approaches: land-use and climate change.

The increase in the degree of impervious surfaces covering highly-dense Asian megacities, due to both their expanded and intensified urban land-use, aggravate the flood risks associated with the seasonal nature of heavy precipitation in tropical regions, causing an extreme alteration to the local water balance and a significant increase in the volume of surface run-off. These urban-derived flood waters cause a multitude of consequences even in highly-lying areas. We propose to adopt our assessment approach to explore the vulnerability of rapidly growing urban areas to both changes in climate and land-use. Here, building volumes, the densities of the urban structures, the degree of surface sealing, the volume of runoff, the existence of urban green, and the overall urban land-use patterns together with an array of social-economic indicators, such as the distribution of population and the economic household status all play an important role in the ability of the urban system as a whole, to cope and adapt to a changing climate (Storch 2007).

Our research is focused on the future administrative area of the rapidly emerging megacity of Ho Chi Minh City (HCMC). The city is typical for many in Asia in both its development trends over the past two decades and its ultimate climate change vulnerabilities (Labaeye et al. 2012). Employing Geographical Information Systems methods, the aim is to spatially assess the connections between urban land-use change and shifts in environmental indicators relevant for climate risk assessments (Downes et al. 2011).

The results can be represented on a spatial scale appropriate for both urban development and land-use planning. Urban areas are spatially classified into urban structure type (UST) units with varying urban land-use patterns and parameters within which the building typology is homogeneous, allowing core environmental, social, and economic indicators to be coupled (Gill et al. 2008). High-resolution remotely sensed data was utilised for the initial UST

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classification, but further core indicators are mainly derived from long-term data sets from the regional and local authorities and research institutions.

4 Summary

Our assessment results highlight that over the next two to three decades, the extraordinary urban growth and development of the future HCMC will be a key factor attributing to the increases in both urban and coastal flood risks over a city-wide scale (Storch and Downes 2011b). Moreover, population growth and urban development are clearly the dominant drivers of increases in exposure and the risk to climate-related impacts, which future global climate change will acutely worsen. The concentration of exposure to urban flooding events in rapidly developing mega-urban regions like HCMC urgently underscores the need to integrate climate change assessment procedures into both urban flood risk management and urban development strategies.

Given the aggregation of people and assets in these high-risk mega-cities, failure to develop effective land-use planning procedures and urban adaptation strategies would inevitably have national economic consequences. Even if urban flood protection levels will be higher and more effective in the future, the significance of a large population and assets exposed is likely to translate directly into the regular occurrence of flooding disasters throughout the future urban region of HCMC. While global mitigation and policies may slow the effects of changing climate conditions and in the best-case create precious time for HCMC to implement adaptation measures into its urban development planning, our results highlight the urgency for the implementation of risk-informed adaptation strategies at the urban level (Storch et al. 2011).

5 Acknowledgments

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