**Supporting Resilient, Flood Adapted Communities in Jakarta**

A Spatial Planning Approach to Living with Floods and Preventing Disasters

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## ABSTRACT

Many low-lying coastal cities face a future of increasingly unpredictable flooding, due to climate change. In this context flood adaptation approaches, that can understand flooding as not always destructive and embrace some positives, provide an opportunity to reduce flood damage and disruption through the development of amphibious urban environments. In Jakarta, Indonesia, flood adaptation approaches are currently a lower priority than flood control approaches, the latter being considered cheaper and easier to develop while also recognised as failing to prevent regular flood disasters. Formal development with flood adaptation is largely absent. However, communities in Jakarta, especially those living in urban villages or kampungs, have local flood experiences and knowledges that offer great potential for realising effective flood adaptation efforts. Spatial planning in Indonesia, that not only directs infrastructure development by public and private sectors but also has mechanisms for incorporating communities' ideas and aspirations, could be key to realising a flood-adapted built environment across Jakarta city. This study reports on an investigation of five North Jakarta case study kampungs, which addresses the following questions:

1. Why does flooding hazard occur, what is the flooding situation like for the case study communities, and how are these communities currently adapting to their flood situations?
2. To what extent are a flood adaptation paradigms accommodated in Indonesian spatial planning law and regulations for flood management? How appropriate are flood adaptation approaches developed elsewhere in the world for an Indonesian context?
3. How can spatial planning approaches be used along with tools to create more flood adapted built environments in the case study kampongs of north Jakarta?

To investigate the above questions, several qualitative research methods are used to explore spatial planning policies and flood adaptation approaches implemented by communities in Jakarta. Systematic review and policy analysis are used to examine how spatial planning law and regulations that exist in Jakarta manage flooding through guided city development. Other research methods, including semi-structured interviews, focus groups and design charrettes, are used to investigate present flooding and possible flood adaptation scenarios in the case study areas.

Initial findings indicate that spatial planning law and regulations in Jakarta largely frame flooding as 'hazard' and 'disaster'. Hence, flood control infrastructure is emphasised as the urban development path to avoid excess water. The idea of a flood adapted built environment is excluded from development practices. Even more, the existence of kampungs in wetland areas, such as in the case study communities, is deemed illegal under spatial planning regulations since they inhabit flood-prone conservation areas.

Results indicate the importance of built environment form. Flooding occurs when communities create or alter settlement forms that, unlike water-oriented traditional forms, are land-oriented modernized forms. This built environment transformation is ill suited to wetland situations and eventually causes destructive flooding in the case study areas. Flooding is also aggravated by spatial planning regulations that consider the kampungs as illegal settlements. This illegal status allows the government to avoid providing basic municipal infrastructure, including wastewater systems, in order to discourage further kampung development. The absence of a decent sewer system within kampungs leads to polluted flood waters, with negative effects such as disease epidemics.

There are some neighbourhoods that have adapted to flooding through built environment development. These communities are able to reduce the negative effects of flooding because they build settlements using local knowledge and available, sustainable resources. We have also found that other communities have local knowledge about flood adaptation but are not able to exercise this knowledge yet, due to multifaceted institutional and economic constraints. The participatory planning process, through design charrettes and focus group meetings in this study, shows that if these communities are given opportunities to channel their aspirations, they are able to formulate flood adaptation strategies that incorporate their local knowledge.

Finally, this study finds that if spatial planning is more attentive to flood adaptation paradigms and participatory planning approaches involving communities, then the development of a flood-adapted built environment in Jakarta is possible. Such improvements may not affect deprived communities like those in the case study areas though, unless any future spatial planning systems also embrace the situation of the kampung, tackling questions of legality and socio-economic exclusion.