

Climate-proofing Jakarta

Global climate change is threatening the delta city of Jakarta. More than two thirds of the world's largest cities are vulnerable to rising sea levels and unpredictable extreme rainfall patterns (Connecting Delta Cities, n.d.). Jakarta itself has been sinking partly below the mean sea level, with accelerated subsidence rates due to excessive long-term groundwater abstraction, as the fresh surface water currently available only covers 30 percent of water demand, as confirmed by the Public Works Ministry in 2011. Thus, it is no wonder that the city is always inundated perennially, though there is neither significant heavy rainfall nor any notable height in sea water levels during the spring-tide cycles. We must accept the fact that Jakarta's hydrological balance has degraded over past decades due to the city's rapid urbanization being unsupported by adequate capacity in water infrastructure. Moreover, Jakarta has experienced uncontrolled urban land-use mismanagement, where many open, public, waterscape and green areas have been sacrificed to become commercial land plots. A higher amount of built-up areas with decreasing green areas will accelerate rainwater runoffs, lessen water evaporation, and reduce rainwater infiltration to groundwater (Hoyer et al., 2011). The city's lack of urban green areas tends to degrade Jakarta's hydrology system, as well as trigger more severe urban water-related issues and heat-island effects in the city (Chryssilla, 2014). Developed countries currently adopt a general green space standard of 20 square meters per capita (Sukopp et al., 1995; Wang, 2009). Therefore, to accommodate Jakarta's approximately 9.5 million inhabitants, the city should supposedly provide at least 19,000 hectares (ha) of green space, or 28.7 percent of city (Chryssilla, 2014). Given the city's current scarcity of land and its culture of commercialized urban development, which perceives that available open spaces are worth too much to be utilized merely as landscapes, where to find these 19,000 ha?

The city government is in the middle of its regular attempt to solve Jakarta's water-related problems, which included perennial floods, freshwater shortages, groundwater-related land subsidence and water pollution. However, to hypothetically revitalize this huge megacity requires a massive interdisciplinary approach and long-term commitment. Jakarta's ongoing flood prevention programs and initiatives are mostly large-scale centralized solutions that depend on the capacity and funding of the city government in manifesting action, namely Jakarta's giant sea walls, the National Capital Integrated Coastal Development (Dutch Water Sector, 2013) or multipurpose deep tunnel projects. Jakartans wish for a more sustainable city, but probably would not be willing to pay the external costs that result from their own unsustainable habits. Therefore, the agenda to revitalize Jakarta into livable city is undeniably a chicken-egg dilemma. Jakarta actually has the capacity to reduce its catastrophic floods and land subsidence, by looking into possibilities of increasing water retention space and green zones. The Jakarta government continues to explore robust and trial-and-error solutions, without respect to Jakarta's existing urban fabric, which has been established over more than four centuries (Chryssilla, 2014).

To cope with flooding, the city totally relies on canal systems previously built by the Dutch (Simamora, 2007). During the colonial period, the Dutch copied Amsterdam's urban and water infrastructure in a one-to-one planning principle, without considering Jakarta's specific tropical characteristics or predicting that the city would grow into a megacity. Now it has become apparent that the Dutch canal systems were not appropriate for the tropical climate. Considering Jakarta's existing organic urban structures in most areas of the city, Jakarta could have at least 21,170 ha of pocket land — currently home to environmentally degraded kampung, slums, as well as unmanaged open green spaces and water spaces — the locations of which are decentralized, and dotted throughout the city (Chryssilla, 2014). Having decentralized urban fabric with different characteristics from one district and another requires a decentralized approach to spatial solutions. In dealing with Jakarta's urban water-related problems, Jakarta's urban water management needs a paradigm shift from a centralized to decentralized approach, which should be spatially integrated into urban design for the whole city's urbanization process. The general theory behind decentralized water management is to convert threats into opportunities, and waste into resources, where the objective is to bring the urban cycle closer to a natural one by applying ad hoc spatial and landscape planning strategies that are adapted to the specific local basic conditions (Hoyer et al., 2011; Schuetze & Chelleri, 2013).

For example, Jakarta actually has abundant rainwater resources provided by its tropical monsoonal characteristics and annual average precipitation of 1755 millimeters per year (Climatemps, n.d.). If the said 21,170 ha of land could be revitalized through decentralized urban storm and rainwater management, in the long term this approach would naturally slow down the city's stormwater runoff and retain more rainwater, to encourage more evaporation. This would reduce the perennial flood risk, as well as independently provide more fresh water infiltration to recharge the previously exploited groundwater basin, which has caused the sinking-land behavior. Additionally, if being replicated on a city scale, this approach would also generate new urban learning landscapes in adopting a new urban lifestyle; that is, living with water. The neglected and decentralized 21,170 ha of land would potentially become cityscape assets, which would maintain the hydrological equilibrium of the city, as well as enable all of Jakarta's urban structures to become one urban entity. Therefore, I highly encourage any stakeholders who are in charge of developing this darling city to consider decentralized urban water management as Jakarta's main water and spatial planning agenda in the future. On its journey to becoming a sustainable and climate-proof city, Jakarta's adaptability will always depend on how we strategically and creatively utilize our available resources and convert the city's internal and external threats to opportunities.

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