Lines of Resilience and Interdependence in Kampung Melayu, Jakarta

A growing megacity of 10 million, which stands at the core of an urban region of 28 million, and the capital of the world's largest archipelago nation, Jakarta, Indonesia, also marks the confluence point of thirteen rivers that flow from Java's volcanoes into the Java Sea. ("Jakarta Population 2013.") As its government, residents, and rivers vie for ownership of the ground—which here is equal to establishing an individual's 'right to live in the city'—new migrants seeking to get a foothold in Jakarta must cope with varying legalities of tenure status. (Leaf 1992) Living in the city's margins, they face extreme conditions such flooding and rising sea levels, often with little or no municipal services or infrastructure.

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While Jakarta's complex urban issues have been studied at a larger urban scale, this studio aimed to document the impacts of these competing forces by studying a very small area. Our hypothesis was that by looking at a precise point where the lines demarcating property ownership, administration and flooding met, we could understand the larger complexities of this sprawling megacity. Rather than presenting design proposals, we wanted to document and learn from the techniques that residents use to resist pressure from the city and the river. Unlike in our Western system of property ownership, the rights and administration over the ground are constantly in question here. Using precise architectural drawing methods and personal interviews, we traced lines on the ground—from individual plot boundaries, to flood levels, to common space—to document how the intersection between water, ground and property changes. As we studied the residents' calculated acts of risk and resilience with the river, our research revealed typologies of interdependence between them.

THE CENTRAL AND MARGINAL URBAN KAMPUNG

Jakarta was historically formed through an aggregation of self-organized informal settlements known as *kampungs*, the "traditional, spontaneous, fine-grain, and diverse form of indigenous urban settlement," which has emerged "locally, organically and incrementally over many years without planning guidance or regulations, building codes or the centralized and coordinated provision of services." (Sihombing 2002) As "the morphology through which cities have absorbed the massive urbanization of the past half-century," these areas are where the megacity registers the most growth. (Dovey 2013) The kampungs still comprise two-thirds of the city's housing. (Leaf 1992) While not all of the people living in kampungs are deemed "squatters" nor are all kampungs of poor quality, this research focused on urban kampungs which are "interstitial or marginal to the city" and whose residents, typically migrants seeking jobs who have recently arrived in the city, are considered marginal citizens. (Dovey 2013)

The term kampung is colloquially interchangeable with the city's smallest administrative level of land called RT, *Rukun Tetangga* (Neighborhoods). Above the RT, there are five additional

levels of administrative districts: the highest level, or the city itself, is called *Daerah Khusus Ibukota (DKI) Jakarta,* or Special Capital City District of Jakarta; below that are five *Wilayah Kota* (Provinces); 30 *Kecamatan* (Subdistricts); 260 *Kelurahan* (Administrative Villages), which each contain 10–15 RWs, led by a city official. RW stands for *Rukun warga* (neighborhood), which consists of about ten RTs. The city hierarchy uses a Western system of managing property, but below the RT level, property administration changes to a communal, village system. "RT is owned communally, and administered by an RT chief, who is appointed / elected by the residents and acts as 'the gatekeeper between the resident and the city'." (Simone 2009)

Like their rural counterparts, the residents of Jakarta's urban kampungs own their property collectively. They are self-governed with the direction of a village chief, whom they appoint to coordinate shared responsibilities and settle disputes. Within the kampung, residents use a social agreement to administer property, but outside its borders, they struggle to legitimize their claims. At a municipal level, the system of land ownership more closely resembles a Western model of ownership. These residents "fall somewhere along a continuum from legal to illegal occupation of land … dependent upon such factors as patterns of land ownership, degree of governmental ownership of land, physical characteristics of land, local traditions of land alienation and transfer, and the range and degree of enforcement of the various land use, subdivision and building regulation." (Leaf 2009) As such, kampung residents often supplement their village claim with some municipally-recognized documentation such as *girik* rights, identifiable by a tax letter and a corresponding label over the front door of each house. Leaf recognizes that "all but a few home-owning households have some legitimate claim to their land" and as a consequence are kept from "full participation in the life of the city." (Leaf 2009)

The kampung's density and proximity to job opportunities promises a better way of life that continues to draw migrants from other parts of the archipelago, despite Jakarta's "closed city" policy that was adopted in the late 1970s. (Ford 1993, Rukmana 2014) "Flows of goods and info rely on an informal spatial construct: high density, walkable, transit-oriented… The 'informality' allows for various types of land use, including small-scale businesses and recreation, that are necessary for the kampung to sustain itself; these are not possible in formal constructs of residential land zoning." (Dovey 2013) The residents' role in the economy of the megacity is all too often diminished, and their permanence is threatened by infrastructural and spatial challenges. "While [Jakarta] is incredibly dense—estimates place it as high as 100,000 people per square kilometer in some areas … The mostly low-rise, primitive structures in kampungs are jammed together with little or no open space or greenery. Health problems are rampant because sewers are not covered, and canals and trenches receive the effluent of the entire metropolitan area." (Ford 1993)

During the rainy season, "flooding is a major problem, and many streets become impassable. Traffic noise, congestion, and smells add to the unpleasant conditions." (Ford 1993) More frequent and intensive flooding exacerbates these issues. (Figure 1) "The floods of February 2007 were the worst in the history of the Indonesian capital. Almost 60 percent of the urban area was affected; In Kampung Melayu, located near the main Ciliwung River, the water level reached as high as 11.20 meters from the thalweg."[1] (Gaillard, Texier, and Texier 2008) On the other hand, "freshwater from wells is nonexistent and piped water is mainly available only at communal taps. Most people must buy [drinking] water from street vendors, so it is expensive and minimal." (Ford 1993) Residents' drilling of groundwater wells to compensate for an insufficient municipal water system reduce the water table. This in turn contributes to more frequent flooding, as some parts of the city sink as much as ten centimeters per year. (*The Jakarta Globe*, April 24, 2010, quoted in Rakmana 2014)

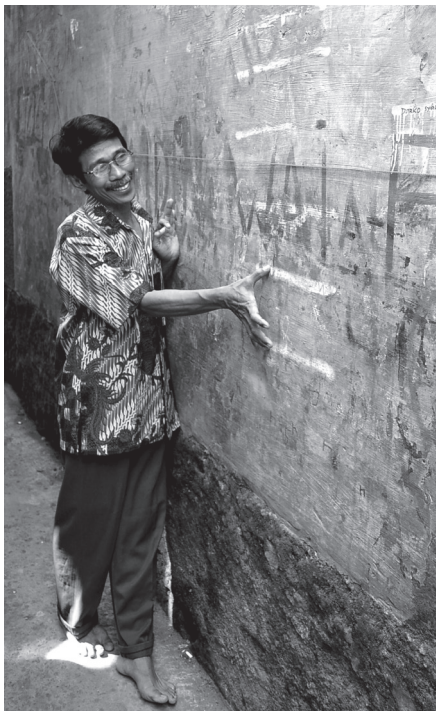

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Figure 1: A kampung resident shows marks indicating rising flood levels of the Ciliwung River, Kampung Melayu, Jakarta, August 2013.

RESEARCH METHODS: LOOKING CLOSELY AT THE GROUND

Our chair at the ETH Zürich investigates collective form and its physicality as a result of historical and contemporary processes, as well as projective and speculative conception at a scale bigger then a building but smaller than a city. The methodological analysis of collective form does not only include comparative observations and critical commentary, but also the search for strategic tools that can be used to shape our built environment in order to produce specific public qualities as cumulative effects. Our methods were inspired by the architect Aldo Rossi's research on the hill towns in the Ticino canon of Switzerland, where he used the precision of architectural drawing to capture informal urban morphology in minute detail. (Rossi et al 1979) Like Kampung Melayu, the towns in Ticino were constructed incrementally, without plans, such that their current form is their only means of documentation.

We sited our research in an area where kampung residents face extreme conditions. On the eastern-central side of Jakarta, Kampung Melayu and Bukit Duri, which each contain about 50 households, lie in a floodplain the banks of the Ciliwung River where it forms a dramatic "S" curve. Although these kampungs suffered some of the worst impacts of the historic 2007 flood, many residents resolved to stay. We were interested in how the river temporarily questions property ownership, and when it had forced residents to relocate because the conditions had become unbearable. We sought to find out how they attempted to hold the rising river back from their homes, what they had learned from the extreme flood, and what changes they had made in the time since. Since no cadastral plans of the kampung exist, and the tree canopy obscures the ground on any aerial maps, the only accurate means of documentation was through grounded research.

Because our drawing technique incorporates more detail and has a higher resolution than many mapping or plot survey techniques, it enables us to precisely document the kampung's changing form and occupancies. Over five days, two research teams of six Indonesian and foreign architecture students went house by house to interview residents, take photographs, and measure plot boundaries, while drawing the elevation and plan of each house. The research teams based their work on rough site drawings made by previous studios. Because we were able to enter houses, we also documented the use of interior spaces, materiality, and furnishings, down to the scale of the cats in the alley and the cups on the table. The village chiefs approved of our presence, and residents were put at ease by the presence of the Jakartan members of our team.

TRACING THE LINES OF WATER LEVEL, OWNERSHIP AND TRANSGRESSION

The compiled drawing incorporates lines imposed by the different agencies acting on the kampung—plot boundaries, the river's typical and changing flood levels, and the changing structures and programs built by residents—into a unified architectural language. (Figure 2) The plan became a document of the kampung's morphological and historical development, and a survey of how residents responded to the other forces acting on their territory. We could see how they questioned administrative lines like plot boundary to reclaim more space, or built higher up to resist flooding. In its indifference, the plan makes it possible to read the kampung's current state as a singular moment in one ongoing process.

Economic and physical survival necessitate the acts of questioning the lines imposed by external factors like the rising river, which forces residents to expand or improve their individual spaces. These two motivations could be read into the same act. For example, residents might add steps or plinths at the ground floor to create an outdoor space for temporary occupancy; these same parts also raise the thresholds of doorways to keep the flooding river at bay for a few more hours. On the one hand, the addition of a second floor expands the household for the resident's family or possible tenants, but it also provides them safe refuge from extreme flooding. We witnessed some residents who had abandoned their ground floor

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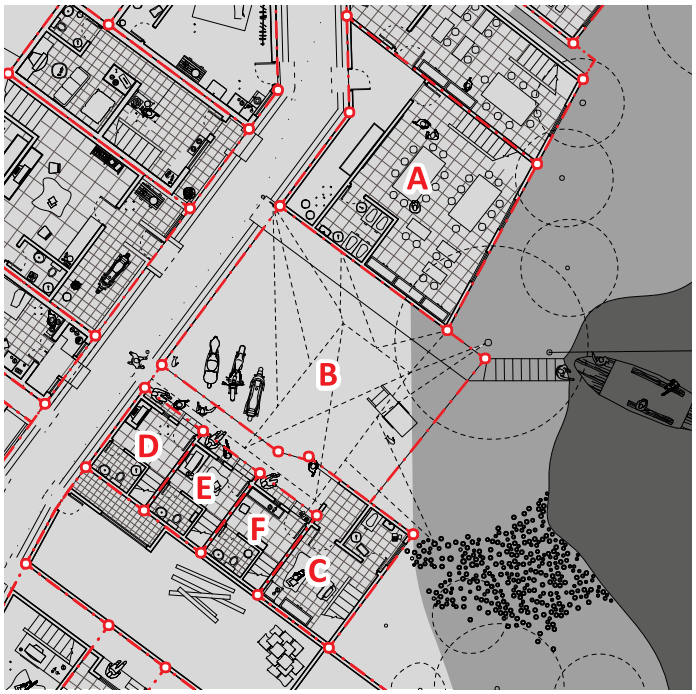
entirely because of repeated flooding. These spaces might be used as temporary storage or given over to collective use. Like many informal settlements, kampung residents “only put money into the house as it is available, a situation which is in accord with the sporadic earning patterns of most kampung households.” (Leaf 1992) On the other hand, sometimes residents chose to give up entirely, meaning that they decided not to rebuild after flooding or fire. Other kampung residents repurposed these abandoned spaces for collective use in recreation or gardening—no space lies fallow for long here.

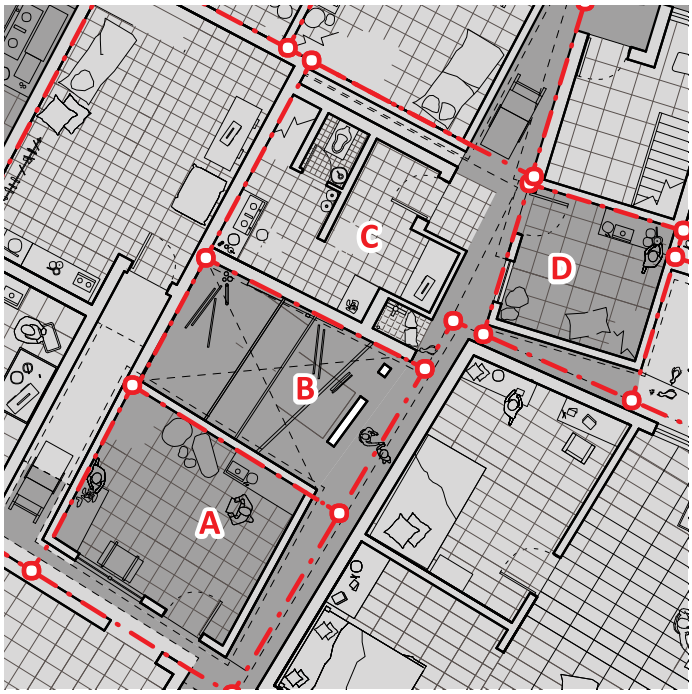
As a collective entity, the kampung operates on its own hybrid system of land tenure, such that each resident can adjust his original plot boundaries by ad hoc, unspoken negotiations. This flexibility can be attributed to the kampung’s social code known as gotong royong, or mutual self-help, which allows residents confront the spatial and infrastructural challenges of urban life together in spite of little municipal support. Together, residents use incremental building processes to build and maintain their collective infrastructure, from streets and alleys, to water collection and drainage, to mobile distribution of goods and services. Many of the thoroughfares denoted in our plan lie not on ‘public’ land but cross over private plots. As we could read in the plan, some spaces were understood to be ‘sacred’ by all residents, meaning that an individual could not build on them for personal use. For instance, we found a house that had clearly been infill between the walls of two other houses—the resident only needed to build a front and back wall—but this was only permitted because it would not block a thoroughfare.

As much as the residents cooperate through the kampung’s social codes, each homeowner had a clear picture of what space ‘belonged’ to him. If we assume that every person needs his territory (even in the kampung), the use of permanent materials or addition of a second story become ways of asserting ownership. The research team read the incremental building process as an instrumentality for claiming space, based on the shared social code, without creating conflict. Likewise, owners would sometimes build balconies or steps that crossed over into his neighbor’s land. While each owner knew the fixed extents of his property, the way they operated within them seemed to be flexible.

Figure 2: Compiled architectural plan Kampung Melayu, Bukit Duri and the Ciliwung River, showing plot lines, changing river levels, structure, programming, and materiality.

The drawing also revealed common patterns of materiality, such as use of ceramic tile. We learned that for residents, such improvements are not only aesthetic; they allow for quicker cleanup and recovery after a flood. Thus, materials like concrete and ceramic tile represent a mindset of permanency and resilience. In contrast, structures built with wood or scrap, such as a lean-to shop added to the front of a house, or the wooden rooftop structures used as flood shelters, can be understood as temporary. Use of impermanent building materials may make it easier for residents to (temporarily) overstep their boundaries.





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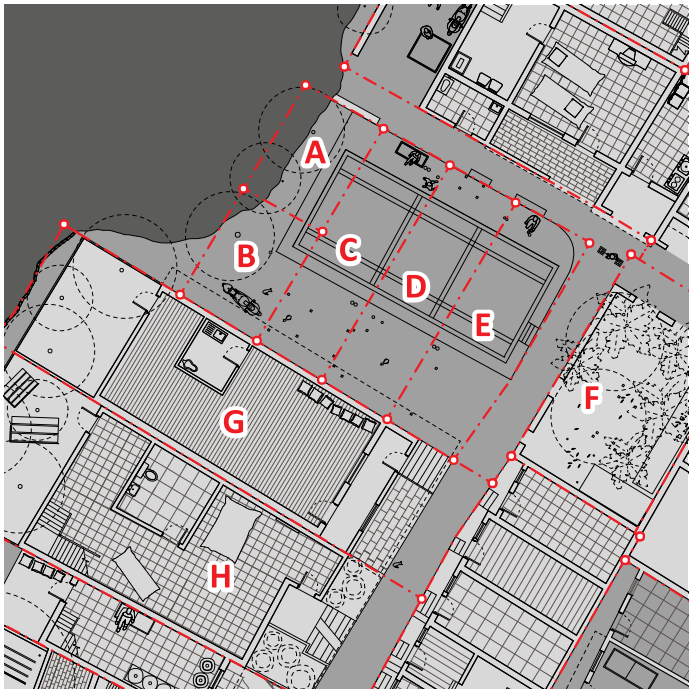

Figures 3A, 3B, and 3C: Plan details depicting typologies of interdependence.

EMERGENT TYPOLOGIES OF INTERDEPENDENCE

We could clearly read transgressions of plot lines by fluctuating river levels and by neighbors at both individual and collective levels. Through the research, we identified patterns of interdependence and resistance between different groups: individuals plot owners and the collective; between neighboring plot owners; between individuals or the kampung as a whole and the river. These changes were sometimes permanent, but more often a temporary means for surviving the annual floods. These are a few of the cases we identified. (Note that the titles for each type and descriptive terms used here—Neighbor A, plot B—are not administrative, but used for illustrative purposes only.)

Figure 3A: The Village Chief and his three sons

Type of interdependence: collective infrastructure and subdivided plots.

Case: Three plots, subdivided into seven, with street and river frontage.

Plot A houses a neighborhood school. Neighbor B, in the center, decided not to rebuild after a fire, so Plot B became an informal town square, where Neighbor C, this area's RT chief, stretched a tarp canopy for shade. Plot B is used by school children as a playground, and a place for villagers to meet outside the chief's house. More importantly, Plot B is where the ferry crosses to Bukit Duri. There is no bridge between the two riverbanks, so the ferry offers a very important thoroughfare for residents from both sides of the river. During times of flooding, the ferry landing moves with the advancing shoreline, sometimes reaching all the way to the street on its Western bank. The village chief (Neighbor C) subdivided his plot among his three sons and their families (Neighbors D–F). They each have separate land certificates, and front doors that face the 'vacant' Plot B, whose elevated plinth still exists, and acts as a kind of shared front yard. The built-up exterior plinth along the front of the house serves as a front stoop for socializing in dry season, and keeps the river at bay during the rainy season. Neighbor C has to cross his sons' subplots to reach his front door. Neighbor F owns the building behind, which was a tofu factory until a major fire, which has yet not been rebuilt.

Figure 3B: Lean on me

Type of interdependence: Structural support and flood safety.

Case: Four neighbors dependent on one plot.

The houses on the first two plots (A and B), were haphazardly built of found materials and are not structurally sound. The house on the last plot (C) is newer and was built of concrete block. After repeated flooding, Neighbor B decided not to rebuild. Neighbor A got permission from Neighbors B and C to stretch bamboo poles across empty plot B to get structural support from the house on plot C. In addition, Neighbor C has built his plinth up higher to better resist flooding. Neighbor D, whose house is across the alley from Neighbor C, has not built up his plinth, and his house floods more quickly. When the water is high, Neighbor D can reach C by climbing over their adjacent balconies, which stretch across the alley. Neighbor C allows neighbor D to wait out the flood in his higher, drier house.

Figure 3C. The neighborhood recreation center

Type of interdependence: collective space and erosion resistance.

Case: Several plots with street and river access combined into one common space; two plots cooperating to resist erosion.

After a major fire in 2007, and ongoing erosion from the river, the owners of Plots A–F decided not to rebuild their houses. The kampung collectively decided to combine Plots A-E into a badminton court and keep the ruins on Plot F to act as a walled garden. Owners of the adjacent Plots G and H continue to fight the natural erosion of the river by building up a wall of scrap and found material at the river edge, or cantilevering balconies on their second floors, which residents can use to get across the plots during the flood.

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Figure 4: Installed plot lines and water levels at the village chief's house (see plan in Figure 3A).

Figure 5: A kampung resident questions the line.

QUESTIONING REPRESENTATION: DO AS THE KAMPUNG DOES

In reviewing the compiled cadastral plan, we realized that it was too divergent from the physical artifact of the kampung to provide a real comparison. It left out important sectional lines such as flood levels and plinth heights, which were equally important parts of the kampung's form. In addition, as multiple agencies are perpetually changing the kampung's ground, the plan itself would be quickly rendered obsolete. Not only is this a reversal of the architect's typical drawing to building process; in this case, the built form is more dynamic, and the drawing, more fixed. We wondered, could we mobilize the plan as the different agencies would, by acting explicitly on the physical space of the kampung? We decided to conduct an experiment. Identifying the most interesting cases of interdependence, we used white tape to mark out the lines on the site. The resulting three-dimensional network of lines illustrated negotiations between the kampung's different agencies at a 1:1 scale. The white tape became a visual language which everyone could understand, and which treated all the agents equally. (Figure 4)

The straightforward nature of the installed lines made explicit the negotiations that were happening without the need to draw them. Without these lines, kampung residents have the freedom to define property lines and rights in real time and at a fine scale. Plots no longer suitable to building homes because of flooding or fire are re-coded for collective recreational use; plots near shared infrastructure, such as ferry landings, are coded for common access and transgression. Their individual and collective acts shape the ground according to present need rather than past administrative codes. In a way, their responses to changing lines create a flexible code that changes with use. "By staying outside of the formal system, owners of unregistered parcels are able to avoid many of these controls-including subdivision requirements, minimal lot sizes, building setback regulations, and the need for construction permits-which may significantly raise the costs of building development." (Leaf 1992) Every square centimeter of land is used, sometimes more than once. The overlapping delineations of ownership differentiate the kampung from more formalized urban morphologies, where municipal infrastructure delineates public from private spaces. The high resolution of our investigation helps to disprove the misconception that 'informal' settlements are disorganized and chaotic. The installed tape plans clarified that land use inside the kampung is, in fact, highly formalized, albeit via social rather than administrative practices.

OUTCOMES: A DIFFERENT KIND OF AGENCY, A DIFFERENT FORM OF THE CITY

Through this experiment, the kampung became a live demonstration of the ground-rights issues faced by residents in many overcrowded cities: control, administration, permanence, structural integrity, and spatial interdependence. As a completely normal practice within the kampung, where "social relationships and land rights are closely linked," such flexibility of use would be impossible to imagine in any Western system of property ownership. (Leaf 1992) While the kampung residents reacted with interest to our initial measuring, drawing and interview process, they were indifferent to the installation of the lines. Unfortunately, such fixed lines become necessary when relating the kampung to its larger urban context; the flexibility of their social code allows outsiders to reduce them to "squatters" due to their perceived "lack of permanence." (Ford, 1993) This mindset makes it too easy to push them off of their land. For these residents, owning even poor-quality, sometimes-submerged land is better than renting; many are "reluctant to become tenants again, as in public housing programs." (Dovey, 2013) As much as these processes of incremental building and improvement demonstrate residents' desire to establish themselves in the kampung, they aim to eventually move to higher ground or to a more established, wealthier kampung.

ACKNOWLEDGEMENTS

This studio was a collaboration between the National University of Singapore (NUS) Department of Architecture and the ETH Singapore Future Cities Laboratory (FCL). With thanks to Professor Joerg Rekittke, NUS Master of Landscape Architecture program; Muhammad Yazid Bin Ninsalam, FCL; the University of Indonesia (UI) School of Architecture; the NUS and UI students who participated in the studio; and the residents of Kampung Melayu and Bukit Duri. FCL is funded by the Singapore National Research Foundation and the ETH Zurich as a project at the Singapore-ETH Centre for Global Environmental Sustainability, under the programme of the Future Cities Laboratory (NRF FI number 370071002).

BIBLIOGRAPHY

Dovey, K. (2013). "Informalising Architecture: The Challenge of Informal Settlements." *Architectural Design* 83 (6): 82–89.

Ford, L. (1993). "A Model of Indonesian City Structure." *Geographical Review* 83 (4): 374–96.

Gaillard, J-C. Texier, P. and Texier, P. (2008). "Floods in Jakarta: When the Extreme Reveals Daily Structural Constraints and Mismanagement." *Disaster Prevention and Management: An International Journal* 17 (3): 358–72.

"Jakarta Population 2013." (2014). World Population Statistics. Retrieved from http://www.worldpopulationstatistics.com/jakarta-population-2013/ on 11 Sept 2015.

Leaf, M. (2009). "Land Rights for Residential Development in Jakarta, Indonesia: The Colonial Roots of Contemporary Urban Dualism." *International Journal of Urban and Regional Research* 17 (4): 477–491.

Leaf, M. (1992). "Land Regulation and Housing Development in Jakarta, Indonesia: From the' Big Village' to the' Modern City'." University of California, Berkeley.

Rossi, A. et al. (1979). Costruzione del territorio e spazio urbano nel Cantone Ticino. Lugano: Fondazione Ticino Nostro.

Rukmana, D. March 29, 2014. "The Megacity of Jakarta: Problems, Challenges, and Planning Efforts." Retrieved from http://indonesiaurbanstudies.blogspot.sg/2014/03/the-megacity-of-jakarta-problems.html.

Sihombing, A. (2002). "Living in the Kampungs: A Firsthand Account of Experiences in Jakarta's Kampungs." *FORUM* 7: 15–22.

Simone, A. (2009). *City Life from Jakarta to Dakar: Movements at the Crossroads*. First edition. New York: Routledge.