Reintroducing Urban Wildlife through Green Façade Technology in Vertical Housings

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Abstract. This paper explores the importance of implementing green spaces not only horizontally, but also vertically, particularly in residential buildings. Cities around the globe, including Jakarta have planned to provide decent number of open spaces. However, this two-dimensional way of planning is not sufficient in providing living spaces for wildlife. Through literature and case exploration method, this paper argues the importance of green façade implementation of residential buildings.

1. Introduction

With massive urbanization, comes significant number of people living in cities. By 2035, 68% of Indonesians live in urban areas, primarily in 12 metropolitans and 20 other big cities [1]. 2 of the many problems arising from this phenomenon are environment and settlement problems. With the massive alteration of natural land into built environment, the wildlife which once flourished across marshes, coastlines, rivers, and forests across Jakarta, has significantly decreased to the point where we can barely see common undomesticated animals roaming along the streets [2,3]. And on the other hand, the massive verticalisation of settlement has provided Jakarta a chance to develop 30% open space policy. Will this number, if it is reachable, be sufficient to give spaces for wildlife to reenter the urban realm?

2. Jakarta Policies on Green Spaces and Settlements

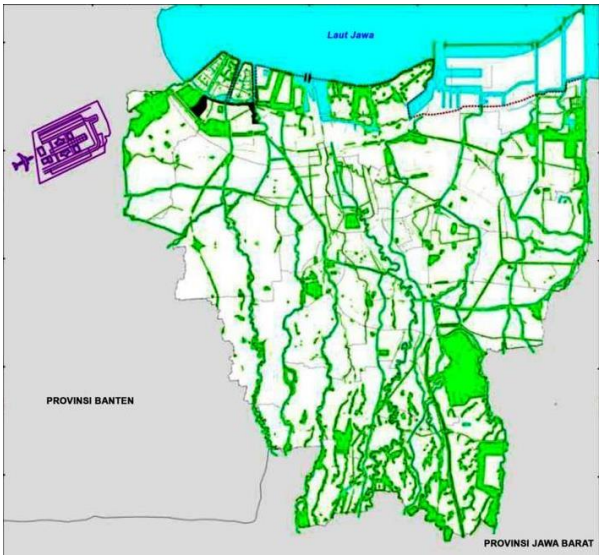

Figure 1. Plans of the Jakarta Green Spaces 2030.
Source: RTRW 2010-2030.

The Government of Jakarta has been targeting 30% of approximately 670km^2 of its land to be turned as green space by 2030. The green spaces spread primarily in the west and central coastal areas and in the southern part of the city. However, by 2019, only 14,9% of the province is now utilized as open green spaces [4]. Around 2/3 of it (or roughly 9,98% of the whole percentage) is in the form of community parks, urban forests, or city parks.

The rest of the number comes from housings as site area outside of Floor Area Ratio (FAR). The 4,12% of housings green spaces are so tiny compared to the area which is purposed for housings in Jakarta. The government planned 48,1% of Jakarta land as housings, both horizontal and vertical. This means, generally only 8,5% of each housing site is optimized as green space.

However, the number is not enough. Wildlife now can be found more in 3 animal markets in Jakarta than in these actual green spaces [2]. Even small insects like butterflies are diminishing in numbers [5]. Soon we will find more wild animals in museums, zoos, and galleries than in their natural habitat. Even if we eventually succeed in providing the rest 15,9% planned green spaces by 2030 – which will consume extreme efforts -, the number will probably not be able to reintroduce animals back into the city. There are some reasons why. **First**, our green spaces stretch horizontally, and our policy does not include its verticality. **Second**, the green spaces come divided into each site rather than in big entities. **Third**, the way we plan and design these green spaces tends to extremely side with human needs and behavior rather than those of natural wildlife.

3. Human Basic Needs: Dwelling in the Fourfolds

One of the most important philosophers of modern time, Martin Heidegger, once introduced the term dwelling [6,7]. He insisted that human needs to dwell, and dwelling is the final purpose of the act of building (as in architecture). Besides that, the Green Open Space acts as a symbol of respect towards the boundaries, add a sense of belonging, and strengthens the resident's communal bonding [8]. To dwell means to save, to preserve, and to stay in the fourfolds: the earth, the sky, the divinities, and the mortals. By dwelling, he says, a man needs to be able to let the earth be earth, the sky be sky, by preserving the wildlife and nature as they are. We are not to destroy nature by the act of building. To create a living space, men need to compromise their needs among nature, which has been there before we do.

Many more thinkers of the contemporary ages resound the same message as Heidegger. One of them is William McDonough. He coined the 3Es of sustainability: economically, equally, and ecologically friendly [9]. We are to build without having to spend unnecessary amount of money (economically friendly). And we are to build without discriminating both humans (equally friendly) and nature (environmentally friendly) alike.

Reflecting upon these thinkings, planners, architects, and even common people must rethink the way we build our buildings, especially our living spaces. If we continue how we practice today, surely, we are faced with the extinction of wildlife. Green spaces will turn into lifeless formalities that offer false images of nature. With the coming of an era in which men live in urban vertical housings, we need to rethink how we plan our green spaces.

4. Learning from Singapore

Indonesia's neighboring country, Singapore, has displayed a marvelous and distinct attempt in presenting nature. They are persistent in their motto: *City in a Garden*. 46.5% of their landmass has now been converted into green areas [10]. It is worth noting that Jakarta and Singapore are of similar sizes. But what is interesting is how they incorporated these green areas not only through planning horizontally but also vertically. Primarily, these vertical green spaces come in the form of green façades.

One worth noting is the existence of these green facades proves to be successful in reintroducing wildlife once thought to be extinct. WOHA, an architecture atelier based in Singapore, once published an observation of Himalayan Griffon Vultures mating on the façade of Oasia Residential Complex in Downtown Singapore [11]. The birds do not generally nest in Singapore due to the lack of cliff habitats. Hence, the façade of the vertical residentials serves as cliff-like vertical structures that is suitable for big birds to nest.

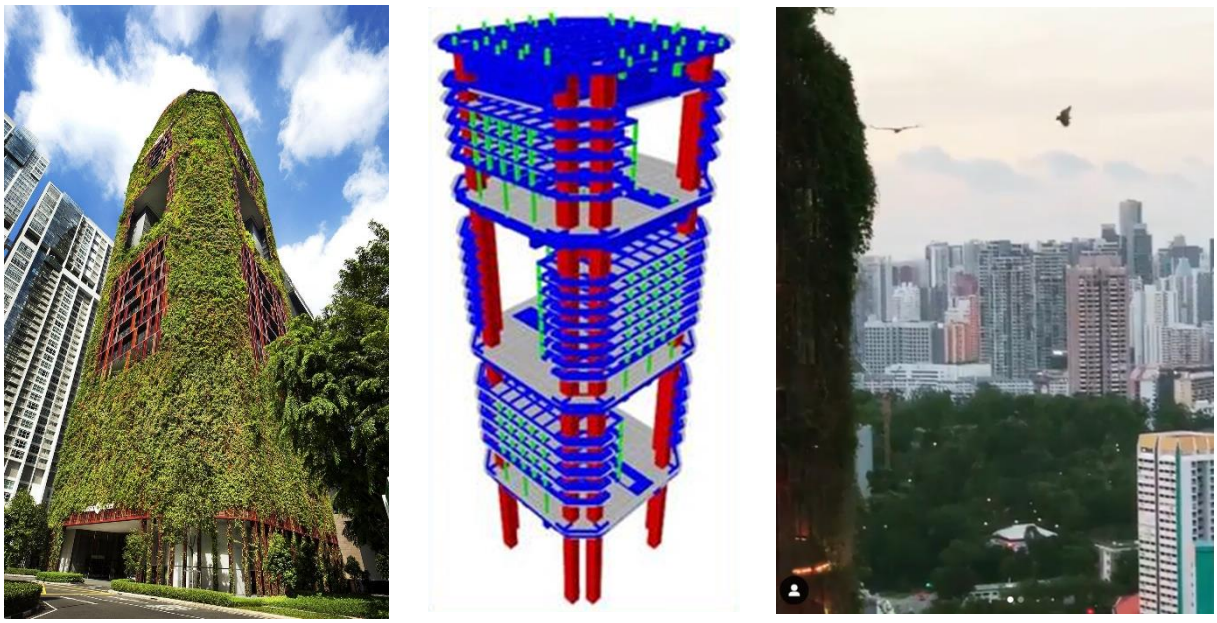

Figure 2. (a) Green Façade of Oasia Downtown Singapore; (b) Structure of Oasia Downtown, (c) Griffon Vultures nesting on Oasia Downtown Green Façade
Source: archdaily.com; Instagram @woha_architects, 2019

Oasia Downtown was designed not to rely on external vistas for visual interest, but instead, creating layers of sky gardens as urban verandah. The sky garden and garden façade not only provide shelters for animals but also ensure indoor thermal comfort. The overall Green Plot Ratio (GPR) of this building reaches 750%. However, the sky gardens occupy almost 60% of the total building volume, thus leaving around 30% for ideal living spaces, a number which would challenge developers economically.

5. Challenge on Implementing Greener Technology

Considering Indonesia as a developing country, it would be hard (but probable) to vision our settlements to integrate a greener method in developing its façade. Jakarta has been building vertical housing for the sake of both shortages of living spaces and economic return of interests.

Developers of vertical housings (private and state-owned) aim for 100% occupied space for better result in economic value.

Another challenge in incorporating these technologies is its maintenance. Building green facades in an apartment complex places green spaces in private higher areas, where building maintenance services would not be able to reach frequently. Developer can not rely on unit owners to take care of the plants growing on their exterior walls. Even if we succeed in overcoming these two barriers, we are faced with high maintenance fee that is not equal to the overall economic state of the city. Hence, the technologies can only be applied for an extremely pricey apartment complex.

The problem we seriously face is indeed economic values. Studies show that people tend to overestimate that going green in architecture was 300% more costly than what they were [12]. If we are to compare a greener material compared to conventional ones, usually they cost only 5% more. However, a more extreme approach like what they did in Singapore will indeed cost approximately 17% more expensive. The number 5% looks small, but if we are to see the actual money it costs, it is understandable why owners prefer non-green technology. The numbers will then be applied to the maintenance cost of the building paid by the users. This is a serious challenge in reintroducing wildlife into our communities. However, our economic state has yet to provide the equity needed.

Even if we can not afford the said expensive technology, we can still build our habitat in a greener sense by implementing roof garden, a concept dating as old as Le Corbusier's way of thinking in the 1920s [13]. By having an alternate green space on our houses as compensations for occupied green spaces underneath, we preserve nature. A creative way of implementing roof garden is displayed by OMA, a Dutch atelier in their project in Singapore, the Interlace. The Interlace is a Housing Development Board (HDB) residential apartment complex incorporating a significant number of green areas among levels of housing units.

Figure 3. The Façade of Interlace, Singapore
Source: archdaily.com

Figure 4. Roof Gardens of the Interlace as compensation of the built ground
Source: archdaily.com

As planners and architects, we need to provide optimum spaces for not only us but also wildlife and nature. There are many ways for us to do so. And only when we have freed us from the mindset of building for ourselves, we would have built for humanities and the future. If we are to learn from developed countries like Singapore, it is apparent that two-dimensional way of planning green spaces is not enough. We can do more by applying green technologies on the facades of our building. There are some weaknesses, for example, user behavior adaptation and increasing maintenance fee. However, if we are to learn to build for the future, a more extreme way should be implemented as soon as possible.

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