Promoting tropical architecture by implementing design control in zoning regulation

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Abstract. Globalization has led to uniformity in the city images. The ubiquitous “modern” buildings have dissociated the local climate and cultural context. Frampton’s Critical Regionalism postulate saw this phenomenon as the destruction of the creative nucleus of a great civilization and great culture. Postcolonial countries, like Indonesia which inherit colonial cities, facing issues to define their identity, namely in terms of performing Tropical Architecture principles and enforcing it institutionally. The private building’s architectural design is seen as a private domain that cannot be regulated, thus the building owner’s need to present themselves as a "modern and progressive" party shall not be restricted. This paper tries to examine how urban planning can help modern tropical city image actualization by implement supporting regulations. A qualitative approach with stakeholder analysis is conducted to seek the design control implementation opportunity by the municipal government that met with private interest. A content analysis of Landscaping for Urban Spaces and High-Rises (LUSH) Programme from Singapore’s Urban Redevelopment Authority (URA) also studied as a success story. The result is that a design control, to achieve a more contextual approach in architecture design practice, could be performed with incentive and bonus schemes in the building permit process and zoning regulations.

1. Introduction
In the age of globalization, where the physical boundary is no longer relevant, the exchange of information happens almost instantaneously. This media-driven flow of information had shaped a consumer culture that lives in a hyper-reality situation where meaning is difficult to attain [1]. Indonesian architecture is not an exception with this tendency where images of modern buildings worldwide were crammed into our living room and encouraged by the capitalism of property industries [1]. A ubiquitous city image of glass and steel block building were created where some considered to be ignorant of the true meaning and value of vernacular architecture [2]. Frampton’s postulate of “critical regionalism” tried to balancing progressive means, such as environmental sustainability demand, and local-traditional principles of the building to reach social and psychological aspect benefit [3]. Reinterpreting tropical-vernacular architecture by practicing bioclimatic design, including the internal courtyard, thermal comfort, indoor air quality, daylighting and landscape features, to address environmental aspects, such as land topography, climate, and method of construction is considered the most appropriate approach in an urban contemporary context [4]. This cultural and climate-sensitive approach currently relies on the architect’s vision and creativity and acceptance of well-informed clients [1].
The government’s involvement in promoting tropical architecture could be traced from the New Order era. The presents of vernacular elements, i.e. “pendopo”, in official buildings were imperative as a means to socially engineer Suharto’s image of Indonesian identity [5]. In the more recent free-market era, climate-sensitive building with a passive design approach gaining little interest from private clients due to extra cost for extensive analysis at the design stage and uncertainty about long term benefit compared to “no-cost solution” from technology approach [6]. Much research on a climate-sensitive related tropical architecture focused on building performance aspects [7], meanwhile the image of the city aspect only been reviewed from the perspective of cultural and socio-political history in architectural styles [3]. Only a few have utilized urban design regulation as a tool for shaping the urban environment in climatic and cultural aspects, most of them per heritage conservation [8].

The purpose of this paper is to examine how an urban design regulation can be applied to promote tropical architecture in Indonesia. Rather than an imperative approach to embed picturesque and symbolism aspects of vernacular architecture, this research tries to propose a development incentive in performing tropical architecture principals, especially in a large commercial building. The incentives suggested could be in the form of tax relaxation, awards, and additional / exemptions of GFA (Gross Floor Area) and FAR (Floor Area Ratio) that can be embedded in zoning regulations of the spatial plan. This incentive mechanism of design control makes it plausible to meet the financial and economical aspect of development with the social and cultural needs of tropical city identity.

2. Methodology

Applying a regulation in urban development requires an analysis of stakeholders involved. The dynamic of individual perception on a particular issue is an important thing to consider before formulating a policy. Therefore, this kind of information is crucial to comprehend to formulate an appropriate design control regulation to promote tropical architecture [9].

This paper using qualitative-descriptive analysis by conducting content analysis from the spatial plan, building codes, books, journals, and multiple news outlets (newspaper, magazine, webpage, etc.) regarding the application of tropical architecture in Indonesia. Best practice abroad also studied to acquired lesson-learned on regulating urban design aspects of tropical architecture.

The result from content analysis then used to conduct a stakeholder analysis to explore perceptions of each stakeholder and searching for a recommendation on implementing design control to promote tropical architecture. The stakeholders identified are:

- Government (Municipal Head, Spatial Planning Agency/Building Code Agency/Development Permit Agency)
- Landowner (individual and developer)
- Experts (IAI, TABG/TPAK)
- Academician

Stakeholder analysis resulting in an analysis of which parties will be involved, who is shared the same interest, which stakeholders have resources and who is capable of formulating policy.

3. Results and discussion

3.1. Landscaping for Urban Spaces and High Rises (LUSH) program

An example of urban design regulations and design control utilization to promote tropical architecture and environmental sustainability is the Singapore Urban Redevelopment Authority’s (URA) Landscaping for Urban Spaces and High Rises (LUSH) program. This program to strengthen Singapore’s identity as tropical City-in-a-Garden has undergone several updates in the 2009-2017 period by the addition of several initiatives [10]. Most of the initiatives are urban design-related guidelines and recommendations.
3.1.1. **GFA Incentive.** The incentive tool that often used in LUSH is the Gross Floor Area (GFA) bonus or calculation exemptions. Definitions of GFA according to URA are as follows: “All covered floor areas of a building, except otherwise exempted, and uncovered areas for commercial uses are deemed the gross floor area of the building for purposes of plot ratio control and development charge. The gross floor area is the total area of the covered floor space measured between the centre line of party walls, including the thickness of external walls but excluding voids. Accessibility and usability are not criteria for exclusion from GFA”.

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\text{GPR} = \frac{\text{Gross Floor Area (GFA)}}{\text{Gross Site Area}}
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URA has several GFA incentive schemes, but that does not mean that it can be given repeatedly and without limitation. The addition of GFA means increasing the building mass and intensity beyond the control of the local Master Plan GPR. If GFA incentives are not restricted, it can burden public infrastructure and services in the area. Therefore, URA made several provisions to get a GFA bonus, namely:

- The maximum GFA bonus is 10% of the Master Plan Gross Plot Ratio (GPR) that is accumulative from existing GFA incentive schemes.
- The developer has the right to choose which scheme(s) is best suited for their business to get a maximum 10% GFA bonus.

3.1.2. **Design control on LUSH.** One of the earliest initiatives in the form of urban design regulations on LUSH is “GFA Incentive for Balconies in Residential and Hotel Developments”. A balcony is a cantilevered space that serves to shade a semi-outdoor space. The design of balconies in high-rise buildings is recommended to create a garden city atmosphere that Singapore wants to achieve. The balcony floor area is basically included in the GFA calculation. GFA incentives for balcony provision are given in order to facilitate the design of space for plants and add greenery to high-rise buildings.

The balcony GFA can be calculated exceeding the conditions set in the Master Plan Gross Plot Ratio (GPR), a maximum of 10% of the total GFA of the building including the planter box if any. Balcony GFAs that exceed a 10% bonus will be subject to Development Charge (DC) or other applicable conditions. Existing buildings that have met the maximum intensity (maximum GPR) and want to make a balcony are entitled to participate in this program and get a maximum GPR bonus of 10% of the existing GPR. This GFA Bonus is only given if it meets the following conditions:

- The balcony must have an open perimeter that is at least 40% of the circumference. This is to ensure the balcony does not alter into an indoor space
- Not an inward-oriented balcony, a balcony for utilities or service areas (e.g. drying clothes)
- It does not prevent continuous natural ventilation
- Can be fully opened and closed
- In residential developments (flats & condominiums)
- For residential components in mixed-use and hotel development
- If the building meets the requirements in the Master Plan, Building Height Plan or Special and Detailed Control Plan

This scheme makes it possible to realize the tropical City-in-a-Garden vision by encouraging tropical architecture elements in private buildings while met with the financial feasibility aspect by allowing an additional saleable area.

3.1.3. **Design control to promote tropical architecture in Indonesia.** Explored perceptions reviewed from the stakeholder analysis imply that most of the educated and well-informed stakeholders, such as architects and academicians agreed that tropical architecture is the most appropriate approach that should be notable as Indonesian city’s identity. However, this perception does not share equally for the
public in general. Although private housing has long realized the benefit of large opening provision, protection from daylight and rain, and extensive greenery, the motivation is simply to reduce electric bills for air conditioning and lighting. Tropical architecture preceptor from this party is almost identical to picturesque and symbolical of vernacular architecture. Meanwhile on a large-scale development, providing additional tropical architecture elements such as sun shading and balconies considered inefficiency of materials and maintenance. Technological advancements such as double-glazed windows, air conditioning, energy-saving LED lighting is more preferable as instant solutions that still meet with green building performance regulations.

A more detailed urban design guidelines and design control on permit phase are needed to encourage more tropical identity in urban space. Although the regulation platform for Urban Design Guidelines (UDGL) has been stated the ministry level by-law, UDGL drafting is still an uncommon practice at the municipal level. However, the development incentive mechanism has been made possible in most cities’ Spatial Plan and Zoning Regulations in the form of Bonus Zoning. Bonus Zoning allowing the landowner to build exceeding allowed FAR/GPR as an exchange of providing a public facility. Recently only the Provincial Government of Jakarta has implemented Bonus Zoning, but in conversion with financial value. Calculation of bonus FAR is given after the developer providing public amenities [11].

Such a scheme as LUSH could be applied in Indonesian cities’ Zoning Regulations by utilizing the Bonus Zoning incentive mechanism. In a dedicated Bonus Zoning area, all building construction proposed is encouraged to apply Indonesian tropical architecture principles. These principles should be an agreement between academicians, experts, and government that most reflect the city identity. Technical requirements should be provided for applicants who wish to use this incentive scheme. The municipal government can conduct Design Control procedures in the building permit process. Many major cities in Indonesia nowadays have had an advisory board of building experts which can assess applicants’ eligibility to receive an FAR bonus by evaluating their compliance with the technical requirements. The bonus given could be in the form of retribution permit relieves, additional GFA/FAR, technical/experts support, awards, publications, and promotions.

![Figure 1. Flow chart of proposed bonus zoning procedures.](image)

| Stakeholders | Goals                                      | Roles                                          | Perceptions                                                                 |
|--------------|--------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------|
| Government   | • Realizing national development goals     | • Owners, managers, and implementers of        | • The government states 3 categories of green building implementations:        |
|              | • Ensuring environmental sustainability    | development programs                           | mandatory, recommended, and voluntary based on building complexity.          |
|              | • Ensuring orderliness in urban development| • Formulating spatial plan and policies        | Possibility to provide incentives in the form of retribution permit relieves, |
| (Municipal    | • Providing legal certainty in land        | • Formulating urban design guidelines and      | additional GFA, technical/experts support, awards, publications, and        |
| Head, Spatial| development                                | design control                                 | promotions.                                                                 |
| Planning     |                                           | • Issuing land development and building permit |                                                                             |
| Agency /     |                                           | • Issuing Certificate of Proper Function       |                                                                             |
| Building     |                                           |                                               |                                                                             |
| Code Agency  |                                           |                                               |                                                                             |
| / Development|                                           |                                               |                                                                             |
| Permit Agency|                                           |                                               |                                                                             |
### Table 1. Cont.

| Landowner          | Having space for basic needs (living), secondary needs (working) or tertiary needs (investment, leisure) | Developing land | The public view of tropical architecture is limited to the architectural style of a residential building with a considerable amount of opening and greenery. | A community could be given incentives in the form of retribution permit relieves, infrastructure upgrading, technical/experts support, awards, publications, and promotions |
|--------------------|--------------------------------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Individual         | Maximize investment return and minimize risk                                                            | Developing land | The developer used “greenery” as a marketing strategy and branding.                                                              | Bonus zoning could be acceptable if the amount of GFA can increase the significant salable area to compensate for construction cost. |
|                    | Selling products that meet with market demand                                                            | Providing public property needs | Market trends for commercial buildings more favor modern and minimalist architecture.                                                  |                                                                                                                                |
|                    | Maximize investment return and minimize risk                                                            | Driving the economy in the property sector | The application of tropical architectural form (i.e. terrace, balcony, sun-shading) most often inefficient in construction cost, therefore viewed as a bad investment. |                                                                                                                                |
|                    | Maximize investment return and minimize risk                                                            | Providing public property needs | Performance-based guidelines could be complied with by technological applications.                                                   |                                                                                                                                |

| Experts             | Designing buildings to satisfy clients’ needs                                                          | As champions to promote locally-contextual modern tropical architecture | Architects generally agreed that tropical architecture is most suited for the Indonesian context, however uninformed and uneducated clients become the obstacles. | Architects community has promoting modern tropical architecture in an exhibition as a public education effort. |
|---------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Professionals (IAI, architects) | Ensuring good design (legally permissible, technically possible, socially acceptable, financially feasible, and environmentally sustainable) | As champions to promote locally-contextual modern tropical architecture | Architects generally agreed that tropical architecture is most suited for the Indonesian context, however uninformed and uneducated clients become the obstacles. | Architects community has promoting modern tropical architecture in an exhibition as a public education effort. |
| Advisory board (TABG, TPAK) | Ensuring building permit proposed to comply with all technical requirements | Giving technical recommendations to local government on public buildings and large-scale development permit | n/a | n/a |

| Academicians        | Producing well-educated and skilled architects                                                        | Developing architecture knowledge by education, research, and community services | Academician generally agreed that tropical architecture is a local ingenuity that needs to preserve and develop in a more contemporary context. | Extensive research is needed on a passive design approach to generate design principles of affordable tropical architecture. |
|---------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|

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4. Conclusion
To implement urban design regulations and design control on promoting tropical architecture in Indonesia, the municipal government can utilize existing regulations tools. Incentive schemes in zoning regulations could be taken and embed in the building permit process. However general agreements about what architectural elements to encourage should be achieved and the technical requirements should be drafted for public use. The procedures to apply for development bonuses may vary in every city depends on the type of instruments and agencies of municipal government.

Controlling and law enforcement on building construction and operation phase is another thing to consider to make this scheme work. As in recent development in Singapore, a significant property owner has altered their balcony into an extension of the living room due to space demand.

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