



Waterfront Development Concepts in Indonesia from the Perspective of Urban Planning and Environmental Sustainability

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ABSTRACT

Rivers, lakes, beaches or other public water bodies have substantial and precious environmental values, and if properly managed, they can be a tremendous element towards a sustainable city. Within the context of urban planning and environmental sustainability, the harmonious balance between built and natural environment could not be avoided. The riverfront development concepts attempt to accomplish this balance by developing the necessary built environment while keeping the natural environment intact and provides ecological service. Since the concept of riverfront development is new to Indonesia or to most cities in Indonesia, it would be a good initiative to promote this concept. The riverfront development concept would bring the positive multiplier effects to urban development and ultimately to the well-being of urban citizens. This paper attempts to address the possibilities of riverfront development concept for its existence from the viewpoint of urban planning and environmental sustainability. This thought is based on personal lookout as well as relevant references. The study was carried out by observing some examples of waterfront development in some cities. Assessment on the regulations of riverfront related development was also undertaken. The study found that present approach on rivers or lakes or other public water bodies as the backyard of the development has brought to various environmental degradation. The riverfront concept is expected to reverse the situation for its numerous social, economic and environmental advantages. We suggest that this concept must be implemented elsewhere in Indonesia due to foreseeable returns towards sustainable urban development and sustainable cities.

1. Introduction

All roads lead to Rome! This idiom was based on the fact that the ancient Roman Empire developed road system radially from the Capital City of Rome towards different directions (Schaff, 1867). Thus, there were many ways to go to Rome. The same principle goes to property business. Many competitive advantages [of the property] must be propagated to the customers to considerably boost the sales of property market. Mountain View, Beachfront, Golf Course View, Lake View, and Riverfront, for example, have been sold for the competitive advantages of the property, and in the end, for the profit of developers. But this is not the case. The fact is that whether or not the beachfront view, lake view or riverfront view as a branding of the property contributes to the sustainable urban development or sustainable city and environmental sustainability. Urban waterfront development has been one of the major tendencies in current development (Wang and Lu,

2001), and it responds to new challenges in housing market (Gordon, 1997), since waterfront is a unique resource (Yasin et al., 2017). The ecological civilization has brought a waterfront development a promising urban development (Shen et al., 2016).

River, lake and other wetlands are some examples of environmental resources, which are not readily available in any place (World Bank, 2007). They certainly have environmental values, which may include direct, indirect, optional, bequest and existence values (Plottu and Plottu, 2007). From urban planning and environment viewpoint, riverfront, beachfront or other hydrographic related environment have at least three environmental values that is direct, indirect and bequest values. Direct value is needed because we need the water resources to support the urban life. The indirect value is also important for the provision of beautiful scenery, and certainly we wish our future generation will enjoy also the presence of the resources as our legacy

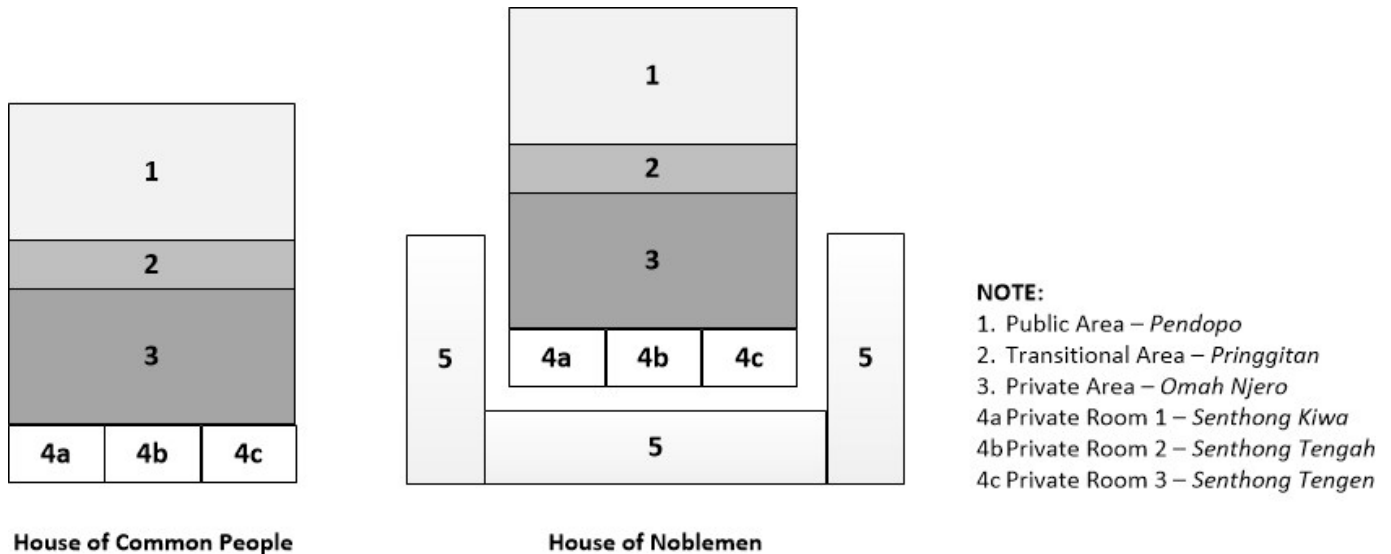


Figure 1: Traditional Javanese House, Joglo.

(Tietenberg and Lewis, 2012). The property developers sell this competitive advantage and explore the indirect value of the resources.

Because of the above reasons, the waterfront or riverfront or beachfront or any other hydrographic environment becomes a center of interest in urban development standpoint, and becomes a selling point from the view of property developers (Real Estate, 2011; Zhang et al., 2017). We agree with the avowal of the American Society of Landscape Architect who stated that: “Urban development should be guided by a sustainable planning and management vision that promotes interconnected green space, a multi-modal transportation system, and mixed-use development. Diverse public and private partnerships should be used to create sustainable and livable communities that protect historic, cultural, and environmental resources. In addition, policymakers, regulators and developers should support sustainable site planning and construction techniques that reduce pollution and create a balance between built and natural systems” (ASLA, 2016).

Waterfront, riverfront or beachfront can be one among many mandatory elements towards sustainable city. According to SustainableCityCollective (2014), a sustainable city possesses normally the characteristics of (a) affordable housing supporting pride and self-reliance, (b) diversified economic development, (c) life-long learning, (d) a self-governing, self-organizing community, and (e) stewardship of the environment. In this regard, the riverfront development may contribute to the urban environment, if properly managed. The reason why the position of river or other hydrographic features matter (i.e. whether in the front yard of a house or otherwise in the backyard) is because of the fact that for most Javanese and Sundanese or perhaps most Indonesian sub-races the most important part of a house is front part. Thus, placing the river at the backyard means more water pollution can be expected. Take a look of a Javanese house philosophy as exhibited in Figure 1. Rivers are normally in the backyard of the house. The backyard would normally discharge the household wastes as a result of food processing and other anthropogenic activities. The laziness and unawareness of people to dispose the waste, unaffordability to provide wastewater treatment, and the presence of natural water body for disposal just in the backyard are three key factors that contributed to the river environmental degradation in the cities in Indonesia.

In Javanese or Sundanese philosophy, kitchen, toilet and other part of the house that discharges the pollutants is in the back part of the house. It is then sensible if a river or other public water body becomes a backyard of the house, we can expect more pollution stems from the domestic waste water would be received by the river or other water bodies. Due to the practicality and unavailability of the communal or individual waste water treatment facility, discharging domestic waste water to river or other public water body at the backyard can be an economical choice, but on the other hand, it is not an environmentally sustainable attitude. A sustainable city must minimize the pollution level at an acceptable limit, while maximize the economic opportunity for the citizens and stimulate the citizens’ well-being.

2. Fundamental Concepts of Sustainable Cities and Environmental Sustainability

2.1 Generic Concept of Sustainable Development

The sustainable development concept was firstly coined by Brundland Commission which defines the sustainable development as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). It contains two key concepts of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs (Kaufmann, 2016).

Sometimes, a sustainable development concept can be depicted as a Venn diagram of the intersection among Social, Environmental and Economic Aspects (Figure 2). One accomplished sustainability if the development of three aspects is in a harmonious balance. However, the state of ‘harmonious balance’ could not be determined exactly. To what extent the development of social, environment and economy should be accomplished? A real example on sustainability is the development of Singapore. Many people, politicians, policy makers, academics, researchers, decision makers and the likes agreed upon the achievement of Singapore as a sustainable country or city.

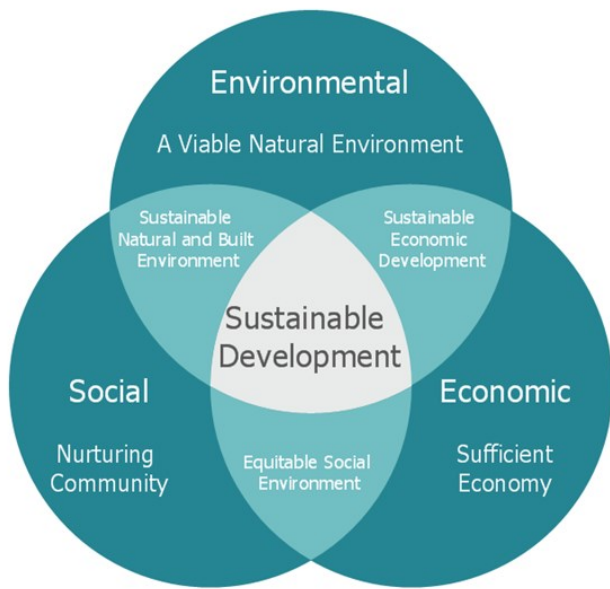


Figure 2: Sustainable Development Concept
 (Source: www.conceptdraw.com/examples/sustainability-venn-diagram)

The argument on Singapore's sustainability is seen from the fact that Singapore is an economically advanced country with high social welfare of the citizens, and with strong attention to the conservation of environment within their country. However, is it truly Singapore's accomplishment as a sustainable country confirmed if Singapore got water from Johor Malaysia, and got sand from Myanmar, Indonesia and the

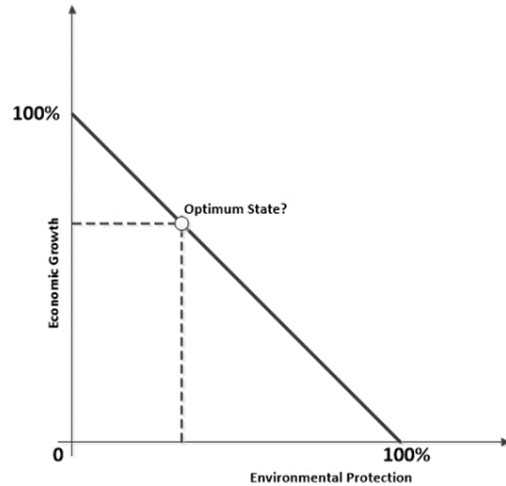


Figure 3: the Economic-Environmental Sustainability Dilemma

Philippines? Getting natural resources overseas would not leave an ecological footprint in Singapore rather in Indonesia, Malaysia, Myanmar, Philippines or any other places. Singapore enjoys the development and high economic growth, but other countries suffer from environmental degradation. This is the fact. We may not be able to absolutely accomplish sustainability. Observe Figure 3 as a dilemma of economic growth and environmental conservation.

At the initial stage, all countries regardless of the level of development, may require natural resource development to promote economic

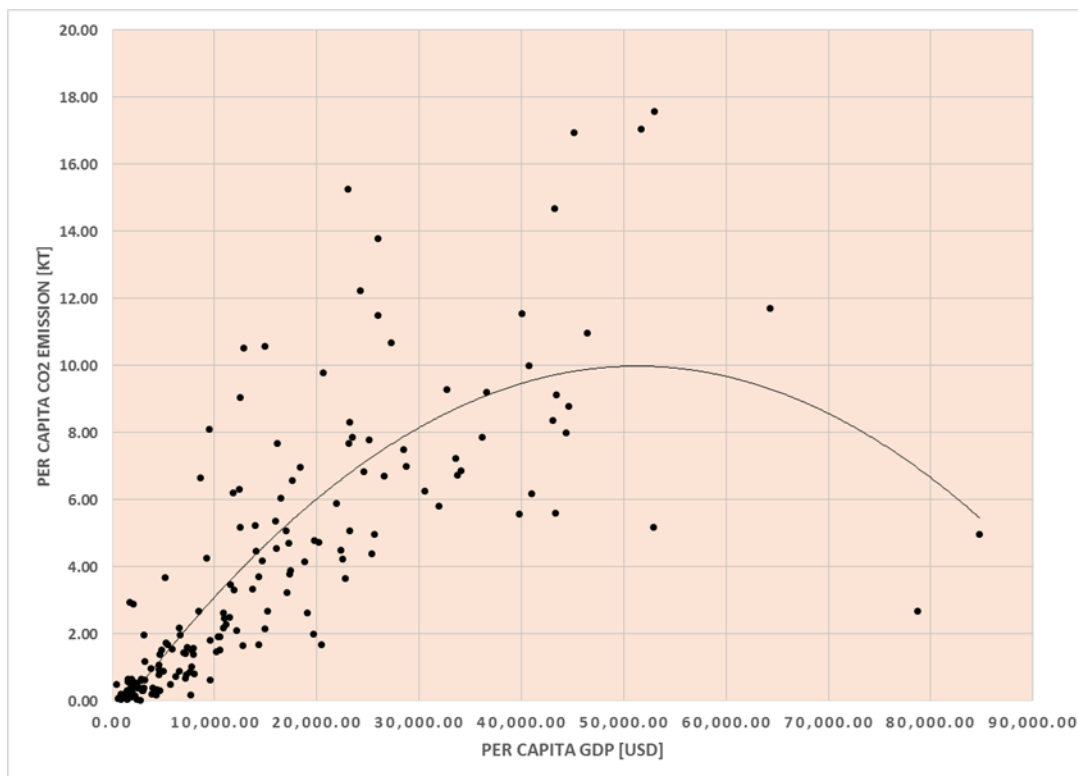


Figure 4: Kuznet Curve of Development

growth. Thus, the country's economic growth would be accompanied by environmental degradation. As the countries are getting developed, the dependency on natural resources to promote the economic growth is minimized and the capacity to abate the environmental degradation and pollution is increased. This situation can be observed through an indicator of Kuznet Curve, as shown in Figure 4. A Kuznet Curve perfectly exhibits the sustainability dilemma along with the level of economic development of a country.

At initial stage of development, a country will utilize more natural resources to accomplish certain level of economic growth. At this stage, the per capita GDP is still low, and the environmental degradation is considerably high as more natural resources use takes place. As the country is advancing, the GDP increases so as the environmental degradation. In this case, the environmental degradation is reflected by the quantity of CO₂ emission for simplification. This continues up to certain level of development where GDP is high, the capacity of the country to employ green industries increases, the capacity to abate the environmental pollution and degradation increases, the dependency on the use of natural resources is perfectly replaced by the high capacity of natural resources. At this stage, the GDP increases but the environmental pollution decreases. This makes the situation of two different ends with same level of environmental pollution. A good example, Luxemburg with per capita GDP of USD 90,000+ and with per capita CO₂ emission of 6.25 kT, compared with Chad with per capita GDP of USD 2,400 and per capita CO₂ emission of 6.20 kT. This sometimes generates the sentiment of developed vis-à-vis developing countries. All countries have experienced with the initial stage of development, but nowadays while the developed countries enjoy high economic growth with low environmental pollution, the developing countries suffer for the poverty and environmental degradation.

2.2 Sustainable Cities

The sustainable city concept comes from the developed country, thus the concept largely influenced by the thought of developed country. The one who firstly coined the concept of sustainable city or eco-city was Richard Register (1987) on his Book on *Ecocity Berkeley: Building Cities for a Healthy Future*. According to Register (1987), a sustainable city is a city designed and dedicated to minimization of environmental impacts, minimization of required inputs of energy, water and food, and waste. As the schools of thought expand, the concept has been magnified to also cover the welfare of the communities and supported by good governance (SustainableCityCollective, 2014).

The goal of sustainable cities would not be accomplished without sustainable urban development during the process. According to ASLA (2016) a sustainable urban development should be guided by a sustainable planning and management vision that promotes interconnected green space, a multi-modal transportation system, and mixed-use development. Diverse public and private partnerships should be used to create sustainable and livable communities that protect historic, cultural, and environmental resources. In addition, policymakers, regulators and developers should support sustainable site planning and construction techniques that reduce pollution and create a balance between built and natural systems.

From the viewpoint of riverfront concept, either sustainable urban development or sustainable cities fostered community welfare and low environmental pollution. For Indonesia's case, this goal can partly be achieved by riverfront development concept, since this concept would

be able to conserve water resources, reduce water pollution and promote community well-being, if properly and carefully implemented. The riverfront development concept promotes particularly the indirect and bequest values river as the natural resources while preventing the community to pollute the river. This issue will be discussed in the other sections.

2.3 Environmental Sustainability

Daly (1990) defined environmental sustainability from three different perspectives i.e. renewable, non-renewable resources and pollution. According to him, the environmental sustainability is the rates of renewable resource harvest, pollution creation, and non-renewable resource depletion that can be continued indefinitely. The environmental sustainability requires that the environment will continuously and constantly serve the human life, and in return human being must be able to preserve the environment. Environmental Sustainability promotes sustainable engineered systems that support human well-being and that are also compatible with sustaining environmental systems (NSF, 2016).

River and other water bodies are notable natural resources, which have direct, indirect, use and non-use values. River and other water bodies provide water resources and environmental values as well. Accomplishing environmental sustainability means keeping the



Figure 5a: A heavily polluted river in Jakarta—when river as front yard (past) Source: letterview.com



Figure 5b: A heavily polluted river (backyard) Source: detik.com

ecological function of the river for the citizens continuously and constantly. On the other hand, in urban areas of Indonesia and other developing countries, the rivers usually exist at heavily polluted condition because of domestic and industrial pollutions.

Figure 5a and 5b similarly exhibit heavily polluted rivers. The pictures were taken in 2012 in Jakarta when local government commitment on environmental sustainability was very weak. The pictures show similar situation regardless the river was in front yard (with riverfront view, Figure 5a) or in backyard (Figure 5b). The problem, in this case, was very low awareness of the citizens and lack of actions from the local government at that time to clean-up the rivers.

Figures 6a and 6b clearly distinguish the situation where a river as a front-yard in a community or as a back-yard. Figure 6a where a river is situated immediately in the front of the houses, we can expect the less polluted river with less or no garbage at all. In contrast, Figure 6b shows a river as a back-yard of a community. Less awareness citizens will easily and carelessly dispose the garbage into the river. People will dispose the garbage to the river and forget. With lack of government control, this situation will accumulate towards a heavily polluted river. The river will have no value at all rather will function as a long garbage bin. The front-yard concept provides better environmental condition given less control of the authority. People themselves will act as the vigilant citizens to enforce the rule of law against lawless people. Figure 7 of Code River Yogyakarta provides a good example of environmental cleanliness that carries indirect and bequest values of the river.



Figure 6a: River as front yard (source: wikiwand.com)



Figure 6b: River in the back yard (source: republik.co.id)



Figure 7: Code River in Yogyakarta (a front yard concept) (Source: viaviajogja.com)

3. The economic values of conserved Environment

In a natural resource economics, the environment has economic values. For example, a river as a water resource contains (1) direct value, as we can use the water provided by the river, (2) indirect value, as river provides an ecological service that may be useful for the people (3) existence value, as we wish to keep the river exist (4) altruistic value, as we want to keep the river provides ecological services to people, and (5) bequest value, as we want our future generation will enjoy the existence of the river (Figure 8). Some values can be monetized through a valuation process, but some others cannot because of irreplaceable or precious value.

For their heavily polluted and over-exploited rivers as water resources, it seems that most rivers in Java Island have lost much of their economic values. Amid providing water resources for hydropower, irrigation, water supply, and recreation, most primary rivers in Java Island such as Bengawan Solo, Brantas, Cimanuk, Citanduy, Ciliwung and Cisadane generated annual floods that devastate the environment. The ratio between maximum discharge and minimum discharge of these rivers may be incredible. For instance, according to Kuntjoro et al (2011), based on discharge data of 1992-2011, the ratio between maximum

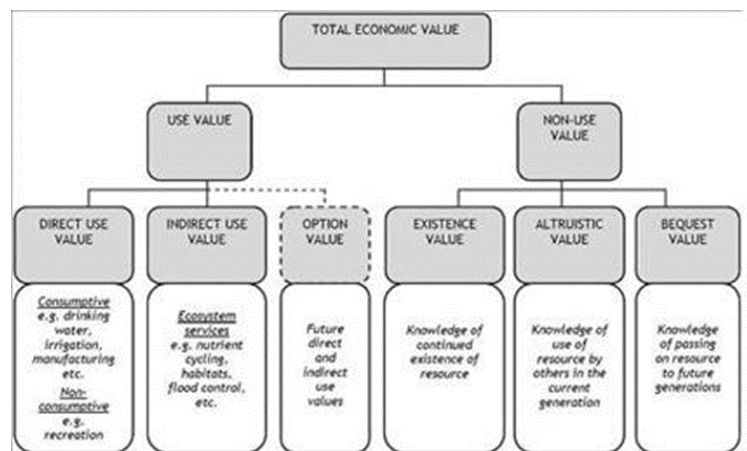


Figure 8: Economic Values of the Environment (Source: ecrr.org)

discharge and minimum discharge of Brantas River at Mojokerto was about 221. Brantas River is a well-managed river basin in Indonesia with a series of reservoir in the upstream and middle-stream of the river, but still the figure shows very bad river regime.

The economic values of the rivers or other public water bodies can be restored through river restoration program. This is a precondition of the river when it will be integrated into city planning as one of the selling points of a city or property. Otherwise, river will generate flood and devastates the environment during the high discharge, or will totally dry-up and discharge only waste water flowing in the river. An intermittent river or a dormant river will not be appropriate for the development of riverfront city. A perennial river with relatively constant discharge and small ratio between maximum and minimum discharge is an idealistic situation for the development of riverfront city. Beachfront or lake with less fluctuated High Water Mark and Low Water Mark will be an ardent environment for the development of waterfront or riverfront city. If Surakarta is considered in the middle reach of Bengawan Solo, the occurrence of non-ideal ratio between maximum and minimum discharge, the flood and zero discharge are then possible. In this case, it must be emphasized that the figure of maximum and minimum discharge ratio must be ideal and maximum discharge can be properly controlled through flood control and water management program towards the waterfront development.

4. Steps toward Waterfront City Concept

A river or other water bodies, if properly managed, will create high direct, indirect, use and non-use values, which in return will contribute to the well-being of the citizens. The well-being of the citizens is the ultimate goal of a sustainable city. Even though with small number of sample, our research in Johor Bahru, Malaysia on house price shows that environmental quality, amenities and facilities of a housing neighborhood determined the house price. A multi-variate linear regression of house price is described by the following formula.

$$Y = 8,157.39 X_1 + 46.16 X_2 + 14.69 X_3 + 56,002.45 X_4 + 92,950.32 X_5 + 3,364.46 X_6 + 29,239.07 X_7$$

Where:

- Y House price in RM
- X₁ Type of house (1: Terrace House, 2: Semi-detached, 3: Bungalow)
- X₂ Greenery in hectare
- X₃ Open spaces in hectare
- X₄ Perceived air quality (1: bad, 2: neither bad nor good, 3: good)
- X₅ Road Network (1: insufficient, 2: neither insufficient nor sufficient, 3: sufficient)
- X₆ Drainage (1: insufficient, 2: neither insufficient nor sufficient, 3: sufficient)
- X₇ Water Supply (pressure, continuous, water quality)

The independent variables consist only of fundamental facilities and amenities such as road, drainage and water supply. Meanwhile the environmental quality was assessed through three variables i.e. the presence of greenery in their neighborhood, the provision of open space such as playground, and perceived air quality. Air quality was measured based on the perception of the respondents as the air quality monitoring station was unavailable at the neighborhoods. Normally, the stations were placed at certain point, particularly at roadside.

Table 1: Statistical Properties and Constants of the Model

Elements of House Quality	Coefficients	Standard Error	t Stat	P-value
Intercept	0	#N/A	#N/A	#N/A
Type_of_House	8,157.39	19,469.25	0.42	0.68
Greenery	46.16	9.21	5.01	0.00
Open_Space	14.69	5.65	2.60	0.01
Air_Quality	56,002.45	36,523.61	1.53	0.13
Road_Network	92,950.32	53,461.29	1.74	0.09
Drainage_Network	3,364.46	47,442.41	0.07	0.94
Water_Supply	29,239.07	19,824.97	1.47	0.15

Although the model contains substantial shortcomings i.e. small number of sample, limited variables involved and some variables were based on the perceptions, but the point is that, the environmental quality, infrastructure, facilities and amenities play very essential roles in determining the house price. This example signifies that waterfront or riverfront as amenities or quality of the environment can be a selling point for property developer, and in general, a notable amenity towards sustainable city. This issue must be carefully deliberated by the developers or by the city authorities when planning a property or city.

Subscribing to the Project for Public Spaces (PPS) steps in planning and creating a great waterfront city, the following steps can be followed but adjustment may be necessary depending on the situation. The steps considered the idealistic situation where no substantial issues arisen (source: PPS, 2016).

Step 1: Make Public Space Prevail and Interconnected

In planning a waterfront development, city authority (the customers are citizens) or a developer (the customers are property buyers) should begin by envisioning a network of well-connected, multi-use public spaces that fit with the community's shared goals (City Visions). By orienting waterfront revitalization around public spaces, new construction will enhance the quality of existing destinations and result in a whole that is greater than the sum of its parts.

While streets may be appropriate on some waterfronts, pedestrian connections should be given top priority, making large parking lots and auto-oriented development out of the question.

Step 2: Make Sure Public Goals are the Primary Objective

Even though city authority or a company has different goal, make sure that the ultimate goal of all development within a city must emerge towards a public single goal. It does not create a silo effect or sectoral egotism, it must be synergistic efforts. Waterfronts everywhere are too valuable to simply allow developers to dictate what happens there. This is not to say that private development is unwelcome and should be discouraged – on the contrary, it is often necessary to the future of a healthy waterfront. But the best solutions for revamping waterfronts put public goals first, not private short-term financial objective. As long as redevelopment plans adhere to the notion that the waterfront is an inherently public asset, it will be relatively easy to follow the rest of the steps here. Community engagement – and, ultimately, local ownership and pride – depend on this basic premise.

Step 3: Build on Existing Assets & Context

After establishing the public spaces and public goals, begin the public visioning process with the existing assets and surrounding context.

Start with the historical form and function of the site to foster a locally grounded identity by channeling former vibrancy into a variety of uses. Existing industrial uses should be preserved when compatible with human activity on the waterfront. Surrounding neighborhoods should be integrated into the waterfront to strengthen connectivity between destinations. And new development should embrace its waterfront context with appropriate orientation and usages.

Step 4: Create a Shared Community Vision – Usually City Vision

Unlike a master plan, a community visioning (or city vision) process does not lock a project into a prescribed solution. It is a citizen-driven initiative that outlines a set of goals—ideals to strive for—that set the stage for people to think boldly, make breakthroughs, and achieve new possibilities for their waterfront. Because a vision is adaptable and can be implemented gradually, starting with small experiments, it often becomes more powerful through time as public enthusiasm for making bold changes gains support.

Step 5: Create Multiple-use Destinations by Tapping the Power of 10

This focus on destinations, rather than “open space” or parks, enables a genuine community-led process to take root. Residents, businesses, community organizations and other stakeholders all join in to help identify the key destinations and then define the uses and activities they want to see at each place. After using the Power of 10 to create great destinations throughout a waterfront, the same principle should be applied at each destination to come up with a list of ten activities for that spot. A wealth of things to do broadens the appeal of the destination, encouraging round-the-clock use.

Step 6: Connect Destinations along the Waterfront

Destinations should be connected to one another and incorporated into a vision for the waterfront as a whole. A waterfront that is continuously walkable with a variety of activities along the way will successfully link destinations, allowing the appeal of each one to strengthen the place as a whole. Creating these seamless connections is a fascinating challenge that involves mixing uses (such as housing, recreation, entertainment and retail) and mixing partners (such as public institutions and local business owners). Another key element is attracting people to the waterfront on foot or bike, rather than just in their cars.

Step 7: Maximize Opportunities for Public Access

It is essential that the waterfront be accessible for everyone to the greatest extent possible. Here too, the goal of continuity is of paramount importance. Waterfronts with continuous public access are much more popular than those where public space is interrupted. Even small stretches where the waterfront is unavailable to people greatly diminish the experience. Access also means that people can actually interact with the water in numerous ways—from swimming and fishing, to picnicking dockside and feeding the ducks. If it is not possible to actually dip their hands in the water, people should have access to another type of water nearby—such as a fountain, spray play area or a swimming pool that floats next to the shore.

Step 8: Balance Environmental Benefits with Human Needs

While a wide variety of uses can flourish on a waterfront, many successful destinations embrace their natural surroundings by creating a close connection between human and natural needs. Marine biologists and environmentalists today promote the restoration of natural shorelines — at least where marine uses do not dominate — and advocate replacing crumbling bulkheads with natural vegetation that will improve water quality, and revive fish and wildlife habitat. But this natural restoration should not preclude human use. Boardwalks, interpretive displays, and even more active uses such as playgrounds and picnic areas can be incorporated into the shoreline design without sacrificing environmental benefits.

Step 9: Start Small to Make Big Changes

Good public spaces do not happen overnight, and no one has all the answers about improving a place right at the outset. Placemaking is about doing more than planning. Many great plans get bogged down because they are too big, too expensive, and simply take too long to happen. Short-term actions, like planting flowers, can be a good way not only to test ideas, but to also give people the confidence that change is occurring — and that their ideas matter.

The above idealistic steps are not necessarily easily found in the real situation. In case of Indonesia, many things need to be done prior to reclaiming the rivers, lakes or beaches for waterfront development purposes. The primary rivers in Java Island, for example, are encountering the problems of floods and droughts, water quality, squatters, and lack of riparian zone management. The formal regulation as reflected by Government Regulation No. 38/2011 just came into force recently while the problems have been in place long time ago. City governments are struggling with social issue and political rivalry to gain the momentum of ‘properly managed’ riparian zone. A good example is the situation of Jakarta at present days. Current Governor of DKI Jakarta is struggling to properly manage the riparian zone due to social conflict and disobedience created by political rivalry towards the election of new Governor of Jakarta in 2017. The bottom line is that most social and environmental problems of the riparian zone must be settled prior to the development of Waterfront of Riverfront City. This is the mandatory precondition, otherwise the development will not be smoothly undergoing. Since the development of riverfront city is relatively a new concept in Indonesia, it will be good if the concept can adopt the concept elsewhere with local-specific adjustment to suit the socio-cultural aspects of Indonesians. Some successful examples of the riverfront development are discussed here.

5. Some Global Best Practices of Waterfront

Riverfront development in Indonesia will bring into a multiplier effect such as better management of riparian zone, stringent control on squatters, stronger flood control and management, healthier urban environmental quality, improved awareness, increased water quality, increased water availability, increased food security, and ultimately improved citizens well-being. Better management of riparian zone, for instance, will lead to improved water quality, environmental quality and less flooding problems. Improved urban environmental quality will lead to healthier living of citizens and increase of life expectancy. This is just few examples of the multiplier impacts of the riverfront development. In contrast, current development that makes the rivers or other public water bodies as the backyard of the community housing has led to the degraded quality of the environment. Thus, the development concept must be supported.



Figure 9: Louisville Waterfront Park, KY, USA (Source: RIL, 2011)

5.1 Louisville Waterfront Park, Louisville Kentucky, USA 2009 (RIL, 2011)

The key concept of Waterfront Park, Louisville Kentucky USA was laid on the provision of a buffer zone that will provide and enhance green infrastructure, storm water management practices, improved trail access and improved habitat corridor as well as increased tree canopy, open space amenity, integrated design of waterfront access and hardscape elements, marina access, and provision of ecosystem services. All buildings incorporated the elements of green-building design (Figure 9).

Protected river edges by using riprap or retaining walls can be a significant concern because they disrupt the natural fluctuations of water that support a riparian plant environment. Commercial barge and recreational boat traffic contribute wave action against the shoreline, making it more difficult for young vegetation to establish at the immediate river edge.

With people living, working, and playing closer to the river, there is a natural tendency toward removal of trees and vegetation in order to give better views of the river. The unintended consequence of this removal is the degrading of the riverfront ecology, effectiveness of storm water management, and bank stability. Therefore, promoting harmonious balance between built and natural environment must be taken into account.



Figure 10: Guadalupe River Bank, San Jose, California, USA (Source: RIL, 2011)

5.2 Guadalupe River Bank, San Jose, California, USA 1990 (RIL, 2011)

This is an example of integrating flood control project and the development of recreational park while conserving the wild habitat. The recreational river park consists of the topography for the flood-control channel itself. It provides the structural spine of the River Park. Undulating terraced banks and landforms create the obviously manmade and river-influenced backbone for the native riverbank landscape. The second level, or River Park overlay, consists of the plan for open spaces, events and habitat restoration along the channel; these places make clear the relationship of humankind, technology and nature (Figure 10).

5.3 Bangkok, Chaopraya River, Thailand

The development of Chaopraya riverside in Bangkok Thailand is an example of revitalizing the riverside through urban development particularly to support the tourism development. Thailand is a good example of tourism management, for example, almost everyone in this world knows Pattaya. Pattaya is well-known not due to its scenery or uniqueness, rather due to remarkable tourism services and promotion. Because of the riverfront concept, Chaopraya River is free from garbage (Figure 11). Waterfront development in Chaopraya River can be a role model for similar development in Indonesia as the levels of



Figure 11: Chaopraya Riverside, Bangkok, Thailand (Source: mandarinoriental.com)

development of both countries are almost similar. The only significant different of Indonesian and Thai is discipline. Thais are seemingly more discipline than most of Indonesian as they believe in Karma. Thus, most Thai believe that if they do a good thing to others, they will receive good things from others. The believing Thai will never do harmful to others including environment.

6. Way forward the Waterfront Development in Indonesia

Waterfront development will bring various positive impacts on urban development and environment. The development will also generate environmental values to the city and property, which so far is absence. When observing an advertisement of a property in a city elsewhere in Indonesia, the values offered by a property are very traditional ones if not primitive points.

Figure 12 shows two examples of advertisement of a property in particular cities in Indonesia. The left picture tries to sell its value of



Figure 14: Examples of Advertisement of a Riverfront Property in Indonesia: Selling the Green and Riverview

'green' and 'river city' to convince the buyers on the competitive advantages of the property in comparison to others at the same price level. The left picture shows a very aboriginal selling point of 'strategic location', 'closeness to schools', 'passed by public transport' and the likes. Sometimes 'flood-free area' also becomes selling point of a property, or 'mountain view', 'river view', 'lake view', 'golf [course] view' and other view. If these selling points will be able to convince the buyers, then riverfront development becomes a lucrative property business while promoting environment and perhaps sustainable city.

By this assumption, riverfront development concept becomes important issue in urban development in Indonesia as it is believed to have positive multiplier effects. However, prior to implementing the concept, the existing river management, particularly riparian zone management, must not leave hydrological and environmental problems such as floods and drought (larger ratio of max and min discharge), maintenance of the zone, squatters, water quality, and sufficient support from infrastructure and utilities.

Because the riverfront development is somewhat a revolutionary approach amid longtime tradition of river-in-the-backyard practice, awareness of people who are living in the river banks or along the river or traditionally connects to river on changing of habits must be improved, and it is not an easy task. Then, continuous and synergistic efforts from the stakeholders will be necessary.

References

ASLA (2016). Professional Practice: Sustainable Urban Development. American Society of Landscape Architects. Available online at <https://www.asla.org/sustainableurbandevelopment.aspx> Accessed on 29 September 2016.

Daly, H. E. (1990). Toward some operational principles of sustainable development. *Ecological Economics* 2:1–6.

Gordon, D. L. (1997). Financing urban waterfront development. *Journal of the American Planning Association*, 63(2).

Kaufmann, R. I. (2016, February). The Politics of Sustainable Development: Theory, Policy, and Practice within the European Union edited by Susan Baker, Maria Kousis, Dick Richardson, and Stephen Young. London:

Routledge Publishers, 1997. In *Geography Research Forum* (Vol. 20, pp. 112-114).

Kuntjoro, H. Wahyudi, D. Hariyanto (2011). Trend fluktuasi debit dan trend perubahan geometri sungai Brantas (Trend of Discharge Fluctuation and River Geometry of Sungai Brantas). Seminar Nasional Aplikasi Teknologi Prasarana Wilayah 2011.

NSF (2016). Environmental Sustainability. Available online at https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501027 Accessed on 3 October 2016.

Plottu, E and B. Plottu (2007). The concept of Total Economic Value of environment: A reconsideration within a hierarchical rationality, *Ecological Economics*, 61(1):52-61

Project for Public Spaces, PPS (2016). 9 Steps to creating a Great Waterfront. Available online at <http://www.pps.org/reference/stepstocreatinggreatwaterfront/> Accessed on 4 October 2016.

Real Estate (2011). Buying Beach Front Property – Mistake. The Truth about money and government. Available online at <http://political-economy.com/buying-beach-front-property/> Accessed 29 September 2016.

Register, Richard (1987). *Ecocity Berkeley: Building Cities for a Healthy Future*. North Atlantic Books.

RIL, Regenerating Immediate landscape (2011). 10 Waterfront Regeneration Projects around the World. Available online at <https://intermediatelandscapes.com/2011/10/26/10-waterfront-regeneration-projects-around-the-world/> Accessed at 4 October 2016

Schaaf, P. (1867). Ante-nicene fathers: The Apostolic fathers, Justin Martyr, Irenaeus [Roberts, A. & Donaldson, J, Eds]. [Electronic reprint] Grand Rapids, MI, USA: CCEL, v.1 p.1

SHEN, Z., TANG, S., & ZHANG, J. (2016). Research on the Development Strategy of Waterfront Zone of Nanjing Jiangbei New District based on the Concept of Ecological Civilization. *Modern Urban Research*, 5, 003.

SustainableCityCollective (2014). 21 Features of Sustainable Cities. Available online at <http://www.sustainablecitiescollective.com/david-thorpe/285946/21-features-future-sustainable-city> Accessed on 29 September 2016.

Tietenberg, TH and L. Lewis (2012). *Environmental and Natural Resource Economics*. Pearson, 9th Edition.

WANG, J., & LU, Z. (2001). A Historic Review of World Urban Waterfront Development. *City Planning Review*, 7, 010.

WCED (World Commission on Environment and Development). 1987. *Our Common Future*. Oxford University Press: Oxford

World Bank (2007). *Strategic Environmental Assessment and Integrated Water Resources Management and Development*. Environment Department, World Bank, Washington DC.

Yassin, A. M., Ramlan, R., Razali, M., & Najib, M. (2017). Assessing Opportunities and Challenges in Waterfront Development in Malaysia. *Advanced Science Letters*, 23(1), 511-513.

Zhang, W., Wang, F., Barchers, C., & Lee, Y. (2017). The Impact of Transit-Oriented Development on Housing Value Resilience: Evidence from the City of Atlanta (No. 17-06266).

Internet Sources:

Personal Blogspot (2016), available online at

www.akucintanusantaraku.blogspot.my, accessed at 3 October 2016.

<http://www.letterview.com/newsfeed/read/201509-0039/basuki-btp-pak-ahok-kami-ingin-sungai-di-jakarta-bening-dan-ada-ikannya-seperti-ini>. Accessed on 3 October 2016.

<http://news.detik.com/berita/2013947/foke-minta-sungai-sampah-di-jaktim-dibersihkan-bersama>. Accessed on 3 October 2016.

http://www.viavajogja.com/detail-travel.php?id_travel=45. City Walk Kali Code. Accessed on 3 October 2016.

http://www.wikiwand.com/ms/Sungai_Ciliwung. Accessed on 3 October 2016

<http://www.republika.co.id/berita/nasional/jabodetabek-nasional/15/06/17/nq3jz7-dinas-kebersihan-kesulitan-bersihkan-sungai-jakarta>. Accessed on 3 October 2016

<http://www.ecrr.org/RiverRestoration/Economics/tabid/2613/Default.aspx>. Accessed on 3 October 2016