

Forging Sustainable Urban Futures for Asian Cities through Urban Waterfront Regeneration: Comparative Studies in Colombo, Bangkok and Singapore

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Abstract

Urban waterways and waterfronts have always played an important role in the early development of Asian cities. However, over time, many of them have become polluted, abandoned and derelict. Nonetheless, they remain relevant to the social, economic and in many instances, political and cultural life of cities. The challenge for planners is not only to revitalize these areas to reclaim their rightful roles and functions in the city, but also to harness their potential positive contribution to a more sustainable future for Asian cities. In this paper, we develop and apply a conceptual framework to analyse and define what constitutes successful and sustainable outcomes of urban waterfront renewal, primarily through the lenses of community participation. Three case studies have been selected for this analysis from the cities of Singapore, Bangkok and Colombo. In examining these cases we asked how economic imperatives can be balanced with social and cultural sensitivity, while addressing critical environmental and infrastructural challenges, as well as the role of the local community in all these aspects. The paper concludes that local community involvement is important to forge a sustainable urban vision while recognizing that this can take many forms.

Keywords: *Urban regeneration, Colombo, Bangkok, Singapore, waterfronts, community participation*

Introduction

The intersection of land and waterways has always been a significant space for development within cities, whether it is for trade, transport, defence, industry, housing, recreational or other purposes. This space, the urban waterfront, is often also the site of continuous change and redevelopment in cities as economies continue to evolve and social development takes place. This is particularly the case in many Asian cities, where the rate of urban change is rapid, given the relentless pace of urbanization. The processes are complex straddling the economic, social, environmental and institutional dimensions. In this context of constant change and its wide-ranging implications, this paper seeks to examine what constitutes successful waterfront urban regeneration projects, as well as how they would contribute to urban sustainability in Asian cities. This paper has been developed out of a larger research project that involved in-depth comparative studies of urban regeneration projects drawn from a fairly large database of urban regeneration case studies in Asia. A conceptual framework has been developed by the research team which reviews the context, processes, outputs and outcomes of urban regeneration to help evaluate the success of urban regeneration projects in relation to the pillars of sustainable

development. Three cases which focus on waterfront redevelopment in Singapore, Bangkok and Colombo have been selected for detailed analysis by applying the conceptual framework.

Definition and Significance of Urban Waterfronts

Much of the current literature on waterfront regeneration which are derived from more developed cities in the West, has focused on major bodies of water, the sea, bays, rivers and port areas (Bergman, 2011, Krieger, 2004, Sairinen and Kumpulainen, 2006, Roberts and Sykes, 2000, Smith and Garcia Ferrari, 2012). Taking a broad definition of urban waterfronts as any space within an urban area where the land and water intersects, it would become clear that the complexities relating to the redevelopment of such areas are due in part to the wide variety of land uses that have evolved in and around these areas over many years, many of which are deeply entrenched, overlapping and inter-dependent. The wide range of waterfront land use typologies include deep sea ports, military bases and defence strongholds, industrial and warehouse developments, recreational parks and beaches, river promenades, floating markets, storm water management systems, and a host of other activities that may or may not be directly related to trading or sea transportation activities.

In many cities in Asia, these intersections of land and water have been long established as living communities, with both formal and informal housing, community networks and even agricultural uses. For example, the Singapore River in the 1970's and earlier displayed many of these overlapping uses including squatter housing, farms, boat yards, street hawkers, markets and wholesalers, and a variety of commercial uses relating to Singapore's mercantile functions (Figure 1).

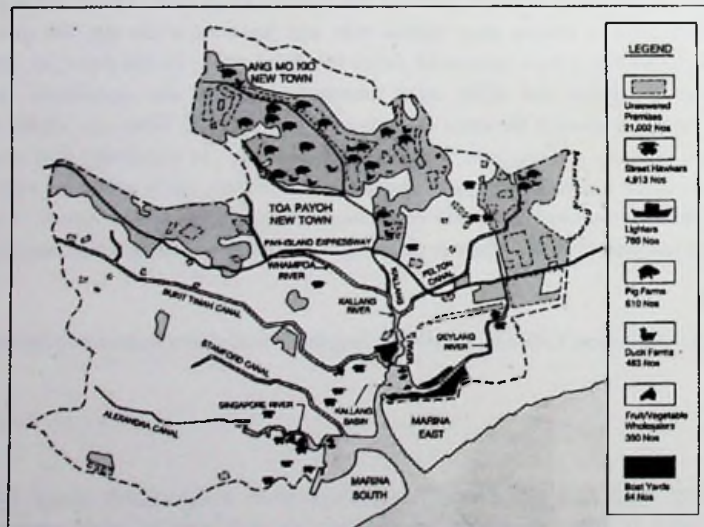


Figure 1: Map of land uses around the Singapore's River in the 1970's
Source: PUB 2010

In some Asian cities, instead of a single water body, waterfronts may be composed of a network of natural lagoons and streams, or various sizes of water bodies such as the sea, rivers, lakes, lagoons and canal systems. In Bangkok for example, there are a myriad of urban canal systems that are deeply ingrained into the entire cities' social and urban fabric (Figure 2). These canals not only provide a means of local water-based transportation, agriculture activities, as well as space for floating markets, but are also designed to manage flooding, although the 2011 floods across the city would seem to indicate that the system may no longer be adequate to fulfil this function in the face of severe storm events.

Apart from Bangkok, another city with such comprehensive waterfronts serving as storm water management systems is Colombo in Sri Lanka. Its Lunawa Lagoon is an example of a network of lagoons and streams, surrounded by formal housing, squatters and industries. This area has been the location of severe floods (Figure 3) and will be further studied in this research. Furthermore, in the more developed Asian cities such as Shanghai, Hong Kong and Singapore there are also major waterfront redevelopment projects in the city centre, focusing on economic revitalisation and urban renewal. Many of these projects take on a very different form from similar projects in western cities due to the rapid pace of urban development, the deeply entrenched urban infrastructure and their primarily government-led redevelopment efforts (Giblett and Samant, 2011).



Figure 2: Bangkok's Flood prone areas and canals
(Dark Blue = 0 m above sea level)

Source: Bangkok Flood Elevation Map

(<http://bkkbaseface.wordpress.com/2011/10/24/bangkok-flood-elevation-map/>)



Figure 3: Lunawa Lagoon Project Area

Source: Lunawa Environment Improvement & Community Development Project Office 2012

Relationship to Urban Sustainability

Given the multiple land uses and extensive economic and social linkages, waterfront redevelopment has always attracted the attention of both urban practitioners and scholars. The inherent connections to a city's history, economic structure and community life are well recognised. Jane Jacobs specifically noted that "(t)he waterfront isn't just something unto itself, it's connected to everything else" (cited in Kreiger 2004). However, these characteristics of historical, social and cultural relevance are the very qualities that have rendered them as "... one of the most complex and challenging urban lands in cities" (Butuner, 2006, cited in Giblett and Samant, 2012).

As cities grow, urban waterfronts are constantly subjected to the push and pull of urban change as a result of evolving economic and social priorities and competing physical land demands. Many cities have recognised that regenerating, repositioning and re-purposing waterfront land as imperative to mitigate urban decay. The priority given to such redevelopment efforts has been largely driven by three critical concerns. Firstly, urban waterfronts' environmental degradation and associated social problems have serious impacts on the economic life of cities. Secondly, from a more positive perspective, the proximity of waterfronts to the city presents numerous opportunities for growth and development in terms of available land, existing infrastructure and associated economic synergies. Thirdly, due to their economic, social and architectural

associations with a city's past, they are often seen as integral to a city's identity and intrinsically linked to the interests of the local community.


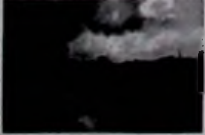
From the perspective of urban sustainability, regeneration of urban waterfronts offers a potentially positive pathway to attaining longer term social, economic and environmental goals. Giblett and Samant (2011) have noted that "the inclusion of the waterfront in urban development plans becomes essential when striving to improve the sustainability of a city". The contribution to sustainability is evident in several fronts. Waterfront regeneration enables land preservation through the processes of recycling and reuse of previously developed land, including abandoned ports and disused industrial areas. In the process, cities are able to develop in a more compact manner instead of spreading outward, while harnessing the opportunity to create more environmentally conducive environments to work and live. Also, revitalization of waterfronts offers opportunities for enhancement of architectural and aesthetic qualities, touristic values and social life in cities, often with tangible economic upsides and land value enhancement.


However, due to their significance in the physical realm and the mental space of a city, urban waterfront regeneration projects are undoubtedly most controversial in the social sustainability aspects. For example, in developed cities, there are numerous examples of redevelopment of derelict dockland areas which have today become some of the most exclusive commercial and residential locations in city centres, and many of these have been criticised for the inadequate attention given to existing communities and social sustainability. Thus, the conceptualisation of a better future offered by the process of regeneration is sometimes at odds with social and cultural systems that are already deeply ingrained in the subsisting living communities. Sensitive and guided conservation efforts in these regeneration projects may yet attain positive outcomes leading to overall better quality of city life (Sairinen and Kumpulainen 2006, Bergman, 2011), but maintaining existing social networks which are often at risk when redevelopment takes place, or rebuilding them, remains one of the most demanding challenges for such projects. This suggests that active engagement of the multiple stakeholders, in particular those representing the weaker segments of the affected community, becomes a key factor in the success of such waterfront regeneration projects.

Case Studies

The three cases studied in this paper, each in Singapore, Bangkok and Colombo, were primarily selected based on their rich and diverse experiences in terms of multi-actor redevelopment efforts that are amenable to scholarly research and analysis. The three projects are briefly described in Table 1. They are selected from a data base of over thirty (30) Asian urban regeneration projects which are compiled as part of a larger research project. These waterfront urban regeneration cases have been documented and analysed from a review of public documents and scholarly articles, site inventories and analysis, field observations, onsite interviews with key stakeholders and analysis of primary project documentation.

Table 1: Selected Case Studies

Singapore River		Singapore	Cleaning up the polluted Singapore River and its surrounding neighbourhoods, through a multi-agency approach which addressed the pollution at source and relocated polluting businesses and squatter residents, and in the process, promoting economic revitalisation along the river.
Bang Bua Canal and Community Regeneration		Bangkok, Thailand	An <i>in-situ</i> , informal settlement upgrading project carried out in collaboration between non-government organisations (NGOs), private consultants, the government and local residents.

Lunawa Environment Improvement and Community Development		Colombo, Sri Lanka	A project that simultaneously deals with cleaning up a polluted lagoon and its canal system, while seeking to improve the housing for the squatter communities within the lagoon's watershed, all through community participatory approach.
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Theoretical Framework for Analysis

In order to assess how successful an urban regeneration project is in achieving sustainability goals, a framework for analysis must take into account how well environmental, social and economic sustainability is integrated into the urban regeneration revitalization process. While internationally, many assessment tools are available which evaluate the sustainability of development projects, for example, LEED (USA), GreenMark (Singapore), and BREEAM (Europe), these are rating tools that are primarily designed to assess new projects and focus mostly on environmental factors. Also these tools typically tend to focus on built structures and rate the measurable environmental outcomes of the planning, design and construction processes. They do not comprehensively examine how projects deal with the existing social and economic conditions of a space and the complex processes involving multiple stakeholders that are involved, as urban regeneration projects must account for. Taking these considerations into account, and the existing theoretical discourse presented by other scholars (see, for example, Alterman, 1995, Doratli, 2005, Steinberg, 1996), the authors developed from first principles and theoretical knowledge, an assessment framework for sustainable urban regeneration projects (see Malone-Lee et al., 2013). The various aspects which comprise this framework are elaborated upon in this paper, with the framework diagrammatically presented in Figure 4.

This framework examines not only the physical and environmental aspects of urban regeneration projects, but also analyses the social and economic conditions. These four aspects are examined as components of the ongoing revitalization programs, and critically consider the motivations of the various stakeholders, the development and social pressures encountered, as well as the impacts of the redevelopment processes. This evaluative approach is comprehensive, and is not a one-off assessment of the state of the areas, nor only of the outcomes of the processes. The proposed factors that are considered in the assessment process were developed by reviewing approaches to historic preservation and upgrading projects similar to urban regeneration, and through in-depth comparative analysis of a large database of case studies (Doratli, 2005, Steinberg, 1996). See the blue "Program" portion in Figure 4.

Recognizing that the existing context of the city and redevelopment site greatly shapes the regeneration process, these are also accounted for in the framework. This would include consideration of the economic development drivers, the existing obsolescence of the site (Doratli, 2005), and the overall economic structures and urban profile of the city (Alterman, 1995) as they all have significant implications on the success or otherwise of an urban regeneration project. See "Site Context" and "City Context" in Figure 4.

The assessment framework also takes into consideration the implementation methods and strategies for urban regeneration, which can include numerous stakeholders and their roles, program methods and tools, as well as the legal and financing mechanisms (Doratli, 2005). Understanding that multiple methods can occur simultaneously the framework's "Implementation" portion considers quite a broad range of factors.

Next, the outputs, which are the tangible products, services, or facilities delivered through the program, must be clearly identifiable. These are evaluated together with the outcomes—which are the urban, environmental, and institutional changes, as well as benefits, including economic and social, to the existing systems—all of which must be discernible in order to determine its overall success or otherwise (Alterman, 1995).

Finally, one of the distinguishing characteristics of this framework is that it is not linear in structure but acknowledges that positive outputs and outcomes of the urban regeneration processes must feedback into the on-going revitalization activities, thereby supporting a project's contribution to the urban sustainable development. Represented by the orange arrows in Figure 4.

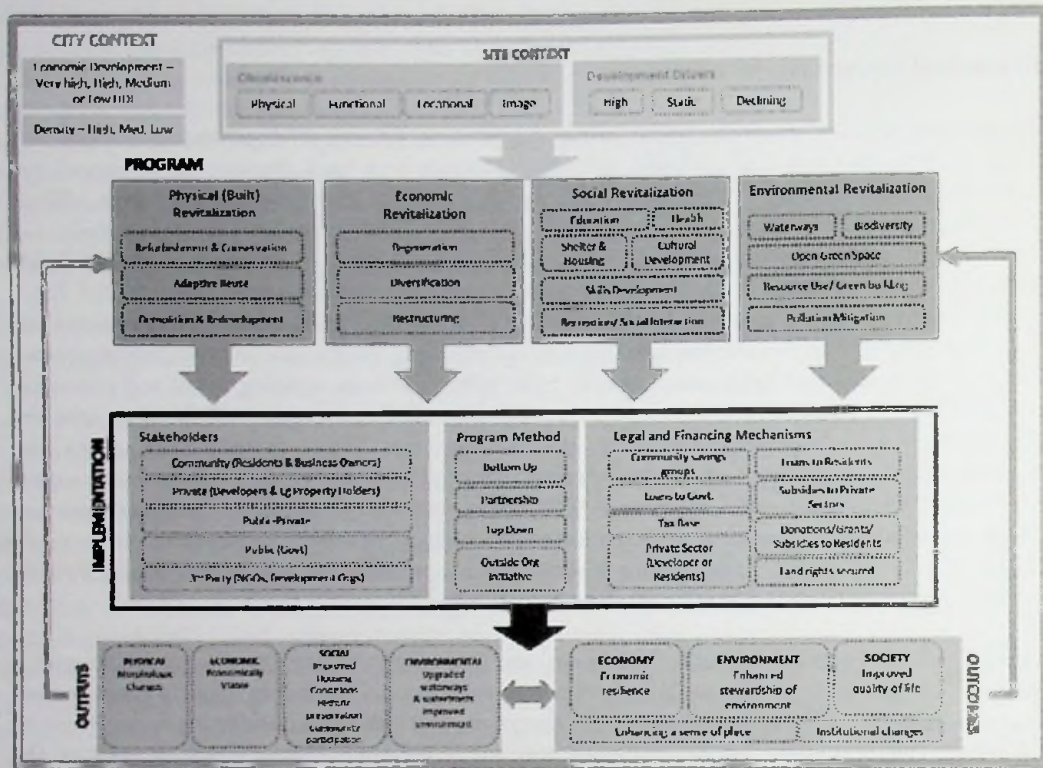


Figure 4: Assessment Framework for Sustainable Urban Regeneration Source: (Malone-Lee et al., 2013)

Application of Framework to Case Studies

In operationalizing the framework, we analyse each project to understand its site and environmental context, the types of revitalization programs that were utilized, how they were carried out, who the primary stakeholders were and their respective roles, how they were funded, and finally what were the outputs and outcomes of the respective projects. Each aspect represented in Figure 4 has been individually evaluated through a triangulation of methods, namely, field observations, interviews with stakeholders and finally published reviews and other available documentation. The process is evaluative, and the strength or intensity displayed by the factor considered, or if the project exhibits the condition under the context, or utilizes a certain program or method, the final assessment is qualitatively indicated as “X”, “XX” or “XXX”⁴³, as shown in Table 2. It is important to note that the evaluation is not intended to be quantitative, but seek only to present a systematic and rigorous process, to guide the investigation. The following sections use this framework to present an overall qualitative assessment of these three waterfront cases studies.

⁴³ In terms of method of implementation, several cases have multiple implementation modes, or use more than one program typology, and as such those that are more intensively used are indicated by “XX” or “XXX”. For example in the case of Bang Bua under “Social Revitalization” educational and health programs were provided along with some space for recreation in the community. However since provision of housing was the primary goal this is indicated with “XXX” which the other programs received an “X”

Table 2: Application of Assessment Framework to Case Studies

		Singapore River (Singapore)	Bang Bua Canal and Community Regeneration (Bangkok)	Lunawa Environment Improvement and Community Development (Colombo)	
City Context	Economic Development (HDI)	Very High	X		
		High			
		Medium		X	
		Low			
	Density	High	X		
		Medium		X	
		Low			
	Obsolescence	Physical	X	X	X
		Functional	X	X	X
		Locational	X		
Image		X	X	X	
Development Drivers	High	X			
	Static		X	X	
	Declining				
Program	Physical Revitalization	Refurbishment/Conservation	X		
		Adaptive Reuse	X		
		Demolition & Redevelopment	X		
	Economic Revitalization	Regeneration	X		X
		Diversification	XX	X	
		Restructuring	XXX		
	Social Revitalization	Shelter/Housing	XX	XXX	XXX
		Education		X	X
		Health	XX	X	X
		Cultural Development	XXX		
Skills Development				XX	
Environmental Revitalization	Recreation/Social Interaction	XXX	X	X	
	Waterways	XXX	XXX	XXX	
	Open Green Space	XX	X	X	
	Biodiversity	X		X	
	Resources Use/Green building	XX			
	Pollution Mitigation	XXX	XX	XXX	
Stakeholders	Community (Residents & Business Owners)	X	XXX		
	Private (Developers & Property Holders)	XX			
	Public-Private				
	Public (Govt)	XXX			
	3rd Party - NGO, Development Org				
Program Method	Bottom Up				
	Partnership				
Implementation	Top-Down				
	Outside Org. Involvement			XXX	
	Legal & Financing Mechanisms	Loans to Residents		XX	X
		Community savings Groups		XXX	
		Donations/Grants/Subsidies to Residents			X
		Tax Base	XXX	X	X
		Private Sector (Developer or Residents)	XX		X
		Subsidies to Private Sectors	X		X
		Loan to Govt			XXX
Land rights secured		XX	X	X	
Outputs	PHYSICAL: Morphological Changes	XXX	X	X	
	ECONOMIC: Economically Viable	XXX	X	X	
	SOCIAL: Improved housing conditions	XXX	XXX	XXX	
	SOCIAL: Historic Preservation	XXX			
	SOCIAL: Community Participation	XXX	XXX	XXX	
	ENVIRONMENTAL: Improved Environment	XXX	XXX	XXX	
	ENVIRONMENTAL: upgraded waterways & waterfronts	XXX	XXX	XXX	
	ECONOMY: Contributing to economic resilience	XXX	X	X	
Outcomes & Outcomes	Primary Changes to System	ENVIRONMENT: Enhanced stewardship of natural capital	XXX	XX	X
		SOCIAL: Improve quality of life	XXX	XXX	XXX
	Institutional Changes	Institutional Changes	XXX	XXX	XXX
		Enhancing a sense of place	XXX	XXX	XXX

(XXX = each characteristic is exhibited to a higher intensity or extent, XX = medium intensity, X = low intensity, Blank = does not display characteristic)

While each of the three case studies assessed have different contextual and methodological elements to their urban regeneration efforts, all three have begun with extensive physical and image-based obsolescence. They are all sited in areas known to be degraded sections of the city or "squatter" areas before regeneration. The extent of their physical deficiencies has, in all of the projects, required that government agencies and the community be fully engaged in the redevelopment efforts. However, each case is unique in the way these stakeholders went about working together or in different ways, giving rise to differentiated outcomes. The following sections provide an analysis of these three case studies based on the assessment framework presented.

The Singapore River

The project has been widely acknowledged by both local and international bodies as a "successful" urban regeneration project (UN ESCAP, 2003, UNEP, 2005), primarily for the efforts of transforming the site from a derelict brown field into an economically vibrant waterfront district within a relatively short period of time (See Figures 5 & 6). The key success factor was widely attributed to the adoption of an integrated management approach in a multi-sectoral institutional setting (Chou, 1998).

City and Site Context

The Singapore River revitalization project, beginning with the river clean-up in 1977, offers valuable insights as to how a top-down, multi-government agency approach can reinstate the role of the river as a quintessential part of the city's living heritage and later bring back economic life to the river and its surroundings. The urban regeneration program began as a River Clean-Up project, necessitated primarily as a consequence of the economic changes experienced by the port city in the 1970s, where the advent of container shipping had left the river in a state of physical and functional obsolescence. A secondary driver was the perceived incompatibility of unsightly polluted river and its dated infrastructure with the image of Singapore as a growing commercial hub and developing modern city (Chou, 1998). It also occupied land in an area where space was a high premium thus under-utilizing the economic potential for other investment opportunities if redevelopment did not take place.

Programs and Implementation

The strong government-led initiatives in the Singapore River Clean-Up project have focused on prevention of future pollution rather than enforcement alone, and this is done with collaboration amongst different government agencies, and leveraging the private sector's development strengths. The political will to carry out this project is most often attributed to the personal intervention by Singapore's then Prime Minister Lee Kuan Yew, who exhorted the civil servants to "clean up the river within ten years". This strong political support from the government leadership, the endorsement from Parliament and resultant financial support accorded are the key factors that has enabled such a large scale project to be made possible. The extensive coordination across the many government ministries and national agencies could be executed, due in part to Singapore's unique situation as a city-state where development decisions do not require the vertical integration that is so often lacking in cities where various levels of government are involved.

From the perspective of planning and implementation strategies, with the support of multiple agencies as key stakeholders, the project was able to develop and implement an integrated revitalization plan that focused on various physical, environmental, economic and social aspects. This plan was effective because it looked beyond the immediate state of the area to evaluate the

sources of the river's pollution and consider how changing the land uses throughout the entire catchment area of the river would prevent further pollution. The relocation and resettlement issues are complex and affected large sections of the urban eco-system. For instance, for each type of polluting industry that needed to be relocated, their individual spatial, functional and locational needs had to be considered when exploring the appropriate new facilities that must be provided. This relocation exercise straddles small workshops to formal factories, open street hawkers to newly built enclosed hawker centres, fruit and vegetable stallholders to wholesale markets. The multi-agency coordination needed was enormous, but a significant outcome of the exercise was that it laid the foundation for institutional changes toward a "whole-of-government" approach that has become the hallmark of many other large scale development projects that came after.

While the clean-up and relocation aspects of this project involved primarily the government agencies, the private sector stakeholders were subsequently drawn in for the redevelopment processes. Through the land sales programme, private sector entrepreneurship and capital were brought into play, as the planners began the tasks of allocating new land uses to the area based on a comprehensive master plan with newly defined urban design guidelines for the river and its surrounds. By leaving the redevelopment of this land, including adaptive re-use of the historic buildings, to the private sector, the land holders and other developers had the opportunity to respond to market demands which are, in alignment with their economic expectations and profit motivation. This promulgated a positive investment climate that provided the entire project with a push to proceed at a faster pace than would have been the case if the government were to undertake the development within the limits of its financial, professional and other resource capacities. This divestment approach is particularly evident in the redevelopment of Clarke Quay, a section of the River, in 2006, into a food and entertainment destination for tourists and young urban professionals, under the management of CapitaLand, a large private enterprise that won the land for redevelopment under an open bid system.

In this project, while environmental and economic development has been well-addressed through capital investment with direct implementation of new projects and infrastructural improvements, social sustainability was primarily addressed through rehousing the residents and preserving/restoring the historic shop houses along the river. In total, 26,000 families were relocated from squatter huts to new Housing Development Board flats (Chou, 1998). For historic conservation, the shop houses were restored and adapted to new uses according to urban design guidelines that were developed by the Urban Redevelopment Authority (URA, 2004).

Outputs and Outcomes

Overall, while the Singapore River Revitalization Project has been assessed to be successful in terms of the physical and economic transformation, there were criticisms revolving around local cultural issues, including lack of references to the river's past through historic preservation efforts, over-emphasis on the global versus local identity dichotomies, and the privatization of public space (Chang and Huang, 2011). Additionally others have criticized the river restoration as a "very economically driven and very functional" approach by the government and private enterprise, with less attention on the social aspects, particularly the needs of the people who had lived near or enjoyed the urban space near the river (President, Singapore Institute of Architects, *The Straits Times*, 11 May 2007 quoted in Chang and Huang, 2011). The follow-up efforts by the Singapore Tourism Board to making it a thematic zone with a focus on the tourism sector is also seen another manifestation of this orientation toward economic outcomes in terms of employment, business activity and an income generator (Savage and Huang, 2004).

Finally it can also be said that there was a general lack of direct community involvement in the urban regeneration process due to the single-minded pursuit of physical improvement and economic revitalisation, through a zealous and effective bureaucracy. Various documentations have nonetheless shown that the affected community has been resettled in new housing estates

and business locations. Overall, it can be said that the enhanced sense of ownership on the part of the Singapore resident pursuant to the river's rebirth as a clean waterway and the reinstatement to its rightful place as a central piece of the city's natural and cultural capital may not have been so evident at the point of completion of the project. Some writers have expressed the opinion that while many of the historical buildings have been physically restored, the symbolism of the urban transformation may not have struck at the core of the ordinary citizen's sense of the place, its cultural references and collective memories (Chang and Huang, 2005, Chang et al., 2004, Kong, 2007).



Figure 5: Robertson Quay, the Singapore River in the 1970s
Source: Urban Redevelopment Authority



Figure 6: View of the Financial District after Singapore River regeneration from Boat Quay 2009
Source: Urban Redevelopment Authority

Bang Bua

The case of the Bang Bua community and canal project demonstrates an essentially bottom-up approach to informal housing upgrading and environmental improvement that embraces the values of self-help and resilience. The project serves as a significant example of canal-side, community-led urban regeneration. It is also well known as Bangkok's first ever case of public land being leased to a network of canal-side squatter communities (Angel, 2000, Asian Coalition for Housing Rights, Satterthwaite, 2004, UN HABITAT, 2009a). The analysis of this case presents a positive narrative of community self-help, beyond this project's achievements in housing outcomes. It also reveals a strong community-driven development process that has helped to improve this body of water and its surrounding environment.

City and Site Context

Set on the outskirts of Bangkok, the Bang Bua community is a relatively poor community, composed mostly of squatters who work or formerly worked at the neighbouring military facility. Being in a flood prone area along the canal the development drivers in this area were relatively static. However the functional, physical and image obsolescence drove the community to improve their own space for the sake of safety and for security of tenure.

Programs and Implementation

This project is considered successful primarily due to the early establishment of a community organization, which led the improvement programs and other community projects before, during, and after the upgrading project. In addition, this community sought to revitalize not only their personal homes, but also their surrounding environment while developing other social benefits for the disenfranchised community in the form of skills development, education, welfare

programs, and even rental units subsidized by the rest of the community. Therefore this project used a combination of social, environmental and physical revitalization programs, with the primary focus on providing shelter and housing for the affected community.

Before other organizations, such as the government or local university, became involved in this project, members of the Bang Bua community organization in 2003, led by a very strong community leader, began cleaning up the canal in front of their respective homes. To the government authorities, this community-led clean up indicated how important this location was to these "informal" residents as they invested their personal time and money into a place that they did not actually own. This community also used its strong networking power to start community-based savings groups with the end goal of upgrading the housing for the entire community. Due to these community-led environmental and economic efforts, local and national government programs were subsequently more willingly to invest in this project through the Community Organizations Development Institute (CODI) which is a public organization that administers the Baan Mankong Program upgrading financing program (Boonyabancha, 2009, Boonyabancha, 2004, Boonyabancha, 2005). The collective action of the community led to an enhanced sense of stewardship for both their natural and built environment, as early outcomes of this project proceeded to shape the revitalization programs that were implemented later on with the assistance of government stakeholders.

Outputs and Outcomes

Noticeable environmental improvements have been made to this portion of the canal, including removing trash from the canal itself, designating new centralized community trash receptacles (see Figure 8), and constructing a permanent two meter access road/sidewalk along the canal (see Figure 9) to prevent further erosion and to provide better accessibility within the community. However, there are still other larger environmental concerns in this area as a whole which demonstrated the need for further government involvement. Importantly, the community-led canal clean up and upgrading to elevated cement houses has not solved the problem of severe flooding. During the 2011 floods, which threatened the whole of Bangkok and shut down businesses for months, the Bang Bua Canal communities also suffered. Residents recalled that they had standing water in or around their homes ranging from a few centimetres to one meter for a period of two months (see Figure 7). Observations also revealed that there are problems with maintaining a canal clear of trash. This range of long-lasting problems indicate that further partnerships between the local community organization and strong government agencies' involvement would be necessary in the future if the canal clean-up process were to expand. As the Singapore River case shows, a comprehensive clean-up process requires multiple parties to be actively involved in addressing the pollution sources in and around the entire river catchment, as well as active enforcement of the flow of the waste in it.



Figure 7: Flood line on Bang Bua homes from 2011 floods



Figure 8: New trash receptacles in the community



Figure 9: Two meter access road/sidewalk in Bang Bua Communities



Figure 10: A new alleyways with vegetable gardens in Bang Bua

Source: Melissa Reese, August 2012

The community of Bang Bua stands out among its neighbours in its ability to maintain a strong community network under the direction of a strong and committed leader for over ten years. One might observe that the strong and consistent leadership of the community head plays a very crucial role in the success of this project. His leadership style not only consisted of negotiating with outside agencies but he also led by example. For instance many people did not completely trust that the housing upgrading would come through, so as the community leader he volunteered to have his house demolished first and reconstructed last, so that he and his family had to occupy temporary housing longer than any other residents. Given this strong and committed leader, the question arises as to how replicable its success would be without a similar amount of political will.

The Bang Bua Community's upgrading effort demonstrated how a community-led approach worked as a case that incorporated government assistance which offered a wider scope for the upgrading exercise. Although this community made much progress on its own prior to the offer of a large government program to help, government support facilitated the raising of enough capital to fully complete the upgrading process in a comprehensive manner. Likewise government intervention in the provision of loans to the community alone would not have been as successful without a strong existing community organization that had already developed the values of disciplined savings and thrift. As other scholars of informal settlement upgrading and relocation programs in Bangkok have noted in order to ensure "long-term sustainability of the project," the government and project leaders should focus not just on the physical revitalization and financing mechanisms, but also "community empowerment, sense of togetherness and belongingness" (Viratkapan and Perera, 2006). This is exemplified in Bang Bua, where the extensive and deep existing community networks and bonds further helped these residents to be invested with a sense of commitment and ownership in the process of regenerating their portion of the city. While neighbourhood level networking in this community is exemplary though, further efforts could be made to enhance cooperation between upper level institutions to deal with the larger urban regeneration issues surrounding this community and the rest of Bangkok (Usavagovitwong, 2005).

Lunawa Environment Improvement and Community Development Project

In Colombo, the Lunawa Environment Improvement and Community Development Project is assessed as an example of a successful waterfront project that is led by multiple institutions and supported by the public, all collectively pursuing the goals of economic revitalization and social integration. Unlike the Singapore River project which began as a government-led project, or the

Bang Bua project which was initiated as a community-driven project, Lunawa is an example of joint efforts across government agencies, UN Habitat and NGOs to find a solution for upgrading their homes and lagoon near to which they live.

City and Site Context

The Lunawa Lagoon is located just south of Colombo, straddling the border of two municipalities: Dehiwala-Mt. Lavinia and Moratuwa. The regeneration project examined the entire watershed around the lagoon which included 18,112 households and over 360 industries. The householders were comprised of a mix of upper and middle class formal households and low income squatter householders. The original conditions of the area included about four to six major floods per year, leaving the area functionally obsolete as well as an eyesore to the neighbouring middle and upper income housing area. Being located on the edge of the city in a very flood prone area the original development drivers were relatively static.

Programs and Implementation

For this project, community participation began as a result of the initial survey of the residents' physical property and their views on upgrading or relocation (Hewawasam, 2009, Perera, 2006, Dassanayake, 2011). As a consequence, the project management decided to modify the plan to allow for single story, single family dwelling units, as well as providing many options for the communities to choose, for example, whether they would like to be relocated within the same area or to take their entitlement package to purchase property elsewhere.

Although the resettlement aspects of the project has not been fully completed due to delays in the process of land surveying, valuation and acquisition, the community participation and consultation processes used to plan for resettlement and upgrading have been lauded as successful by UN HABITAT (UN HABITAT, UN HABITAT, 2009b). Most notably, the process of using existing NGOs to work with communities and creating a community-based organization which did not initially exist was very helpful in building mutual trust between project stakeholders. Furthermore, the project leaders worked to develop a Community Information Centre (CIC), an innovative "one stop shop" for community members to come forth to facilitate the paper work or to raise concerns where they occur. The CIC served as the project office, and brought together a team of staff from Sri Lankan government agencies, volunteers from Japan which are connected to project funding from the Japan International Cooperation Agency (JICA), NGO representatives, and UN Habitat representatives into one physical space. Unlike other projects in Sri Lanka where government officials would be juggling multiple projects at once while working from different agency headquarters, having a dedicated project office with a fully-committed team was in itself innovative. It serves as an example of institutional improvement which is arguably a positive outcome from the project. This system was effective only because the staff themselves, especially those of a higher management level, were willing to place themselves within such easy reach of public. This was a positive move to gain the respect of residents who had come to the office to vocalize their concerns about the project and expecting to meet officials.

Outputs and Outcomes

With regard to the physical improvements, the technical aspects of the project have also been regarded as successful because the project area has not seen any large-scale flooding to date. This is so as even in the destructive floods in 2010 when other parts of Colombo, including the Parliament building were underwater, the Lunawa catchment area was able to adequately discharge the raging storm water (Figure 11).

However, the environmental aspects of the catchment area are still of concern for many officials and community members (Figures 12 & 13). One community member both praised the clean-up process for effectively attracting diverse bird life into the area, but also raised concern that trash from households and businesses has appeared to re-emerge in the environment (Guneratne, 2010). Field studies show that there could be three types of pollution still affecting the lagoon and canals, namely, household solid waste, sewage overflow, and industrial wastewater. Although all three could be dealt with at the pollution source before they have the opportunity to enter the water body, a coordinated effort to enforce existing pollution regulations is needed, and this will require intervention at multiple levels of the government as the case of Singapore has exemplified. Hence, while community involvement has been instrumental in project initiation and implementation, longer term maintenance of successful waterfront regeneration requires more wide-ranging institutional reforms within a larger framework of urban sustainability.



Figure 11: The main canal in 2010 during a major flood in Colombo, successfully diverting storm water
Source: LEI&CDP Office, obtained August 2012



Figure 12: Trash along the Lagoon



Figure 13: Grey water draining directly into the canal

Source: Melissa Reese, August 2012

Hence, an important follow-up would be to promulgate the idea of a larger community who takes responsibility for the well-being of the catchment and its residents, and in the process promotes environmental stewardship among a broader citizenry. Notwithstanding the positive role of all parties in the present waterfront regeneration project, the longer term need for maintaining the canal and lagoons is for all residents and industries to collectively recognize the importance of not polluting the water body and assuming shared responsibility, rather than rely on the maintenance and upkeep work of the Municipal Councils.

The Lunawa Project has contributed significantly to improve the water catchment area both physically and socially. Currently, the project is lauded from the perspectives of environmental

improvement, community development, and stakeholders' integration, and some degree of institutional change. For the future, and in the context of urban sustainability, collective care for the entire catchment is necessary to forge a culture of stewardship so that natural capital can be effectively preserved for future generations.

Lessons Learned

As highlighted earlier in this paper, the main impetus for many waterfront regeneration projects is environmental degradation and associated social problems which have serious impacts on the economic life of cities. Yet, the economic imperatives must also be recognised due to the location of many of these areas close to the city, their development potential represents a vast pool of inherent economic wealth of the city waiting to be tapped. In addition, with their historical, architectural and social associations with a city's past, waterfronts are often regarded as part and parcel of a city's identity and intrinsically linked to the interests of the local community. All of these issues are conceptually related to urban sustainability as an overarching concept built upon the concerns of environment, economy, people, culture and the future. By applying the proposed framework for evaluation to these cases the balance of the physical, environmental, economic and social approaches to urban regeneration can be better distilled, while highlighting the linkages between these areas of sustainability. Furthermore, the framework allows the various drivers behind the revitalization programs as well as the implementation mechanisms to be examined while expressing the linkages between all of the elements of a regeneration project. The three case studies chosen demonstrate many of these linkages strongly.

In Asian cities, waterfront areas are some of the most complex and challenging urban landscapes, and successful waterfront urban regeneration projects that can effectively balance the three aspects of sustainability, namely, environmental, economic and social, can present many useful lessons to guide future waterfront redevelopments in other Asian cities. Some of the lessons learned from these case studies include the following:

Firstly, waterfront regeneration projects that improve the natural and built environment of the waterways can also benefit the local economy, with potentially-wide spread improvements of social well-being. This is demonstrated in the Luwana and Singapore River projects where physical improvements are accompanied by economic revitalisation through inclusive planning policies. The Singapore River project harnessed the resource capacities of the business community, and in the process, contributed to large scale urban renewal that advanced the local economy and improved the quality of life of the city's residents. The Lunawa project demonstrated a waterfront project that was able to improve the physical environment, while engaging the key government stakeholders and incorporating the concerns for the local community. As noted by Giblett and Samant (2011), successful waterfront cases in the West specially provide for "...increase in public space" and "improve resident's quality of life". This principle is likewise demonstrated in the preceding case studies in Asia but their execution has required different approaches that relate to the local and institutional context. Both the case studies are essentially top-down interventionist processes, with the Singapore River drawing upon the bureaucratic powers of government agencies to deliver positive community outcomes, and the Luwawa project harnessing the collective efforts across government agencies and international development organizations, both of which actively consulted the public toward a common good.

Secondly, engaging the local community is particularly important when considering how historic areas are taken care of given that the "prominence of community consultation will generate a sense of ownership and identity, while promoting ideas of heritage and preservation" (Giblett and Samant, 2011). The Bang Bua case study effectively demonstrated that an enhanced sense of ownership of the project can help promote community stewardship for the natural environment. On the other hand, in the Singapore River and Lunawa cases, the communities which did not have as much involvement in initiating the physical clean-up and as such there was some concern that the projects could be less likely to engender a lasting sense of ownership to be in alignment

with urban sustainability principles and aspirations. Nevertheless, since the completion of these projects, the transformed landscapes, particularly in the case of the Singapore River, has engendered a reinforcement of its links to the city's past through the conservation and adaptive reuse efforts and hence, in its own way, preserved the sense of history and local interest.

Finally, community involvement is recognisably a key element in all three of these cases in forging a sustainable urban vision for the waterfront redevelopment. These cases demonstrated that community involvement can take on many forms, including grass-root community organizations, harnessing the resources and profit interests of the business community, as well as multi-actor collaboration across various stakeholder groups, from both government and non-government. Regardless of the methodology applied, they all upheld the principle that "waterfront land is too valuable in Asian cities to allow developers to continue to dominate regeneration" (Giblett and Samant, 2011). The Bang Bua project exemplified this as it began as a community group-led project which subsequently attracted the attention and support of government housing upgrading programs and financing. In the case of the Singapore River which is primarily led by government agencies, engaging private land holders and developers is a form of participatory engagement. The lack of involvement of the affected community may be seen as a weakness of this project (see Chou, 1998), but given the urgency of the tasks at hand, it may also be viewed more positively as an expeditious pathway toward wider improvement to quality of life in the city. Lunawa presents a third procedural approach, as it was led by a coalition of government agencies and international development groups that recognized the importance of community participation in various activities during which the community's views and concerns were sought out, as well as helping to create community-based organizations where none had existed before.

Conclusion

In conclusion, for waterfront urban regeneration projects to contribute to urban sustainability in Asian cities, two key principles can be drawn derived from the case studies. Firstly, a balanced approach that takes into account all three pillars of sustainability is necessary in that projects that are focused on improving the natural and built environment of the waterways must also deliver benefits to the local economy while ensuring wide-spread community well-being. Secondly, where projects have to be implemented in a top-down manner, the process must include forms of community engagement that are appropriate to the social, cultural and political context. The broader aim is to bring about the meaningful outcomes of collective ownership, institutional improvements, enhanced capital investments and long term preservation of natural and cultural capital.

The importance of community involvement in forging a sustainable urban vision for waterfront urban regeneration projects cannot be underestimated. However, no one method of participatory involvement can be prescribed as the best solution for Asian cities. As these three cases have demonstrated there are multiple methods of involvement that can lead to more sustainable cities. While the case of Bang Bua took a bottom-up approach with the community leading the project, the Singapore River presented an approach of a government-led project that sought the engagement of private land holders and developers as a form of participatory engagement necessary for the implementation and maintenance of the project. Finally Lunawa was led by a coalition of government agencies and international development groups that sought out the community's views and concerns from the beginning.

Hence, the assessment framework as validated in this study can be very useful, primarily because it is comprehensive, and includes evaluation of the specific site and city social, political and economic contexts that affect the implementation methods, programs and eventually the outputs and outcomes of each project. Urban regeneration can be a positive pathway towards a more sustainable future for Asian cities, if its urban waterfronts are effectively harnessed to meet the wider environmental, economic and social goals of the city.

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