

Global aerotropolis versus local aqua-community: conflicting landscapes in the extended Bangkok Metropolitan Region, Thailand

S. Nasongkhla¹ & S. Sintusingha²

¹*Department of Landscape Architecture, Faculty of Built Environment, University Technology Malaysia, Malaysia*

²*Landscape Architecture Program, Faculty of Architecture Building and Planning, University of Melbourne, Australia*

Abstract

Samutprakan province, located in the alluvial flood plain that once formed part of the pre-existing mangrove forests of the lower Chao Phraya River, has been affected by rapid urbanization from Bangkok since the 1980s, which has had significant impacts upon the hydrological system. Today, Samutprakan could be further transformed by the discourse of global city branding through the initiative of the Suvarnabhumi Aerotropolis. We conducted a time-series analysis of aerial photographs of the Bang Pli and Bang Pla districts of Samutprakan province to investigate how the landscape has been changed over time and the results indicate that the intensified industrial and higher density residential developments exacerbated the deteriorating ecological conditions of the waterway. Despite the proposal of an environmentally friendlier alternative of aquatic modern living, the strong tendency is that traditional aquatic cultural livelihoods and urban agriculture are being displaced and gentrified by the new town development.

Keywords: environmental sustainability, landscape change, local livelihoods, city branding, urban expansion.



1 Introduction

Panitchpakdi [8] noted that the ribbon development in the eastern region of Bangkok is highly significant in terms of population, industrial growth and national economic development that link to the Eastern Sea Board Project further down the Gulf of Thailand's east coast. The area experienced peak accelerated growth – measured by the increase of built-up areas – from 1987 to 1996, which coincided with the country's period of highest GDP growth rates. The growth manifested in patterns of urban sprawl characterized by leapfrog development encompassing diverse socio-economic settlements and housing developments, industrial estates, mega infrastructure, the pre-existing agricultural patterns, and remnants of the natural mangroves along the coast. While rapid industrial growth and infrastructure development concentrated along the Bangna-Trad highway, lower land prices have attracted developers and investors southward, further encroaching into the ecological sensitive coastal areas.

The announcement of a new development plan in conjunction with the new Suvarnabhumi International Airport caused land prices to increase by more than 200%. According to the plan, emerging corridors, clusters, and spines of airport-linked businesses are to give rise to a new urban form and land-use complex – the aerotropolis – stretching as much as 30 kilometres from the airport. The Thai cabinet, on July 20, 2006, approved in principle a draft bill to set up 'Suvarnabhumi Metropolis' or '*Nakorn Suvarnabhumi*' as a local administration with status equal to a province. The metropolis is to be an aggregate of some districts of the Bangkok Metropolitan Region and Samutprakan province with a total area of 130,448 hectares. This urban development will replace fertile lands that are suitable for agriculture, flood plains and water retention of the whole region.

2 Industrialization and suburbanization in Bangkok Metropolitan Region

Bangkok was founded as a predominantly water-based settlement along the Chao Phraya River in 1782, integrated together by an extensive canal network that functioned as both transportation and irrigation systems. Influenced by imported land-based modernization from the late 19th Century, the built-up area of the city has since expanded, via roads, into pre-existing aqua-communities. The built-up area generally follows major transportation corridors, giving rise to what has become known as 'ribbon development'. The urbanized area extends up to 100 km into the city's hinterland, forming an irregular intermix of rural and urban land uses (McGee [5]).

The Greater Bangkok Plan the first city plan of Bangkok – integrating an adjacent province – was formulated by an American expert in 1960 for an estimated population of 4.5 million by 1990. While the plan has never been implemented, ensuing development, particular the major roads and highways was generally consistent with the plan. The population sharply increased with the absorption of the left bank of the Chao Phraya River, Thonburi, into the Greater Bangkok in 1970.



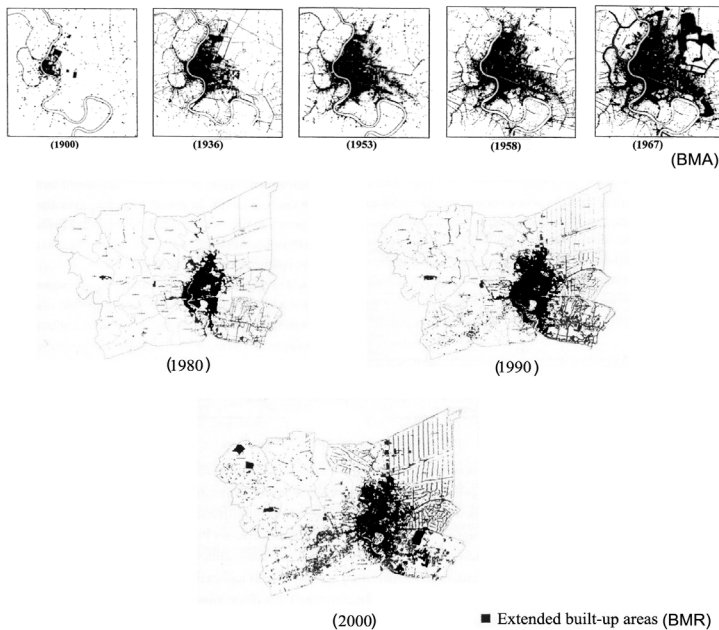


Figure 1: Extended built-up area of the Bangkok Metropolitan Region.
Source: Department of Public Works and Town & Country Planning (DPT) [2], p. 2-43.

In 1980, the Bangkok Metropolitan Region (BMR) with an emphasis of a regional linkage to national economic zones of Eastern Seaboard and Northern Industrial zone was established, administratively absorbing conurbations in the surrounding provinces. As the 1st to 8th National Economic and Social Development Plans (1961–2001) focused on the country's development through export-oriented industries, Bangkok became the centre for economic development accompanied by rapid population growth. Today Bangkok Metropolitan Region dominates the country's economy, contributing 44% of GDP with 25% of its total population 64 million (NESDB [6, 7]).

Rüland [22] observed that a characteristic of emerging megacities is the increasing saturation of inner-urban areas in terms of population growth while adjacent suburban areas are growing by leaps and bounds. Data for Bangkok shows that urban growth in the inner-city districts had slowed down coinciding with the out-migration to adjacent suburbs. Residential subdivisions and industrial plants increasingly move to suburban areas due to the lower land price, affordable housing, and less regulated land use. Bangkok is now almost 100% urbanized while Samutprakan, Prathum Thani and Nonthaburi have a ratio between urban and rural of 1:0.6, 1: 1.4 and 1:0.8 respectively (Department of Public Works and Town & Country Planning (DPT) [2]).

Bangkok's official population increased from 2.1 million in 1960 to 3.1, 4.7 and 6.3 millions in 1970, 1980 and 2000 respectively. The growth rate was

higher than 3% per annum during 1960–1970, and declined rapidly during the last 20 years. The growth rate during 1970–1980 was approximately 2.27% per annum and was reduced to 0.66% per annum during 1990 – 2000. This decline corresponded with suburbanization and rapid population growth in the five provinces surrounding Bangkok – Nonthaburi, Pathumthani, Samutprakan, Nakhonpathom, and Samutsakorn where the growth rate has been much higher than that for Bangkok (Choiejit and Teungfung, 2003). Between the years 1990–2000, the annual growth rate of BMR population rose up to 1.16% and the density was about 1,300 persons per km², while beyond the BMR in Thailand's central region, the density was less than 140 persons per km² (Geyer [3]). Thailand's National Economic and Social Development Board (NESDB) has proposed an “extended Bangkok Metropolitan Region” – with a projected population of 17 million by 2010.

3 An evolution of urban forms in Bang Pli-Bang Pla precincts

This section analyzes the urban form evolution of the country's most fertile flood plain in the outskirt of Bangkok Metropolitan Region. The analysis covers the study area of Bang Pli and Bang Pla districts in Samutprakan province (figure 2) from the late 1940s to early 2000s.

3.1 Natural and water-based settlement patterns in the 1940s–1960s

The study area was once covered by mangrove forests, criss-crossing canals, and dispersed farmlands, mainly paddy fields with low-density linear settlements

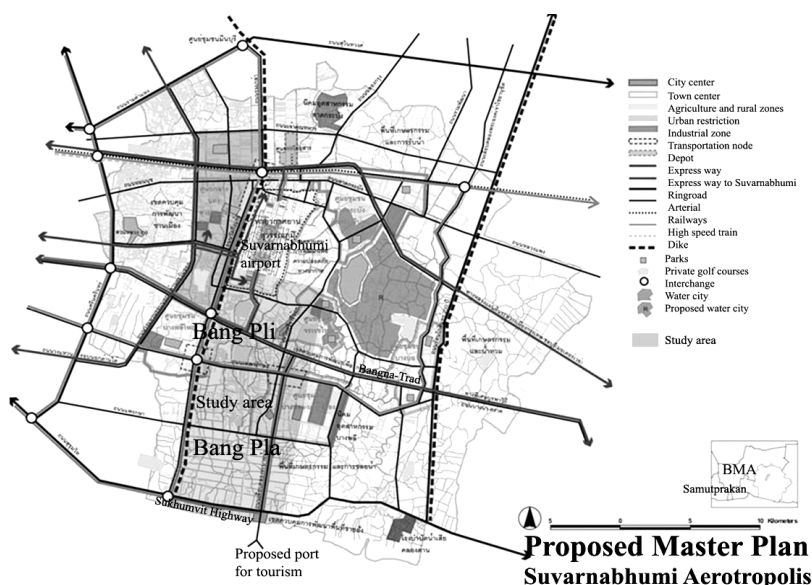


Figure 2: Study area mapped on modified Suvarnabhumi plan. Source: Nasongkhla, 2009.

along the canals and local roads (Figure 3). Small agricultural industries were found along the coast adjoining the only main road transportation of Sukhumvit highway. Historically, this area was settled by ethnic minorities such as people from Laos, Mon and Thai Muslims who were granted land to cultivate by King Chulalongkorn (r.1868–1910) to supply agricultural produce to Bangkok's inner city (Samutprakan Province [9]; Sukhum [10]). Most paddy patches were scattered amongst inland waterways with access to fresh water. An interview with an old Muslim man, who was born and lived in the province since 1946, indicated that the mangrove forests along the coastal areas began to be diminished after the completion of Sukhumvit road in 1936. The emergence of agri-business along the highway such as shrimp and fish farms gradually cleared and damaged mangroves (Figure 4). This coincided with the city's broader development, and by 1960, Bangkok was in the process of a significant transformation from a moderately sized metropolis of some 1 million in 1950 to a large diversified and growing industrial city of some 3 million by 1970.

3.2 Water-based settlements and aquaculture during the 1970s–1980s

The Greater Bangkok's total population growth rate rose steadily over the years from 9 percent per year in 1970, to 11 percent in 1980 (DPT [2]). By the late

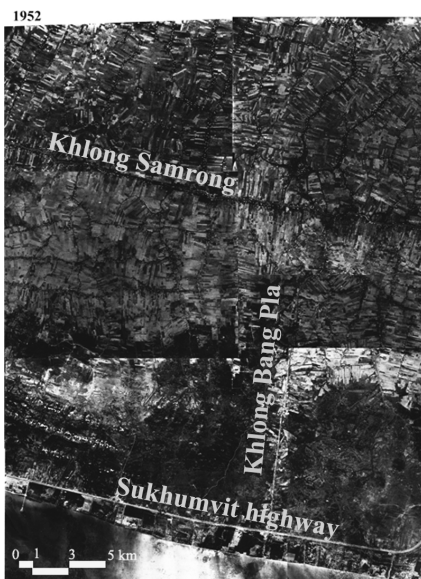


Figure 3: Coastal areas were covered by large mangrove patches along the Sukhumvit highway and waterways in the 1940s. Source: Adapted from the Royal Thai Survey Department.

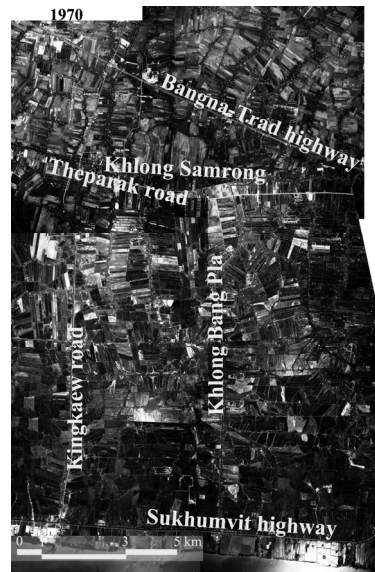


Figure 4: The mangroves were replaced by shrimp farms and fishponds in the late 1960s. Source: Adapted from the Royal Thai Survey Department.

1980s, it had grown to more than 8 million people. The development of industrial and residential subdivisions began along the main Bangna-Trad highway in mid 1970s. It is evident that large-scale mangrove forest patches along Sukhumvit highway were increasingly replaced by fishponds and shrimp farms. Many small fishponds were eventually utilized for shrimp production as they made more profit and as a result of government's policy to boost agricultural export (NESDB [6]).

In time, the mangroves were rapidly reduced into a strip corridor along the shorelines and became highly fragmented along the canals. However, settlements adapted to aquatic life style still persisted where, for instance, famous wholesale freshwater fish products made at Bang Pla and Bang Bo communities were considered more organic and environmental friendly than the commercial shrimp farms that create soil salinity. Culturally, local communities along the canals annually celebrated sacred water-based rituals such as '*Rub Bua*' (Lotus receiving) in October and '*Loy Kratong*' or full moon festival in November on the waterways. These rituals represented the sustained Mon cultural ties to the original settlers.

3.3 Accelerated transformation in the 1990s–2000s: commercial farms, golf courses, industry and air transportation

The Town and Country Planning Act of 1975 and rural migration boosted and accelerated industrial and urban growth in Lad Krabang district of Bangkok and Bang Pli and Bang Bo districts of Samutprakan. Bangkok Metropolitan built-up areas rapidly extended to Samutprakan with the weak land use control at the time enticing developers. Industrial and high-ended residential estates also boomed as a result of the boosted export industry and overseas investors, which often including property speculators.

Bang Pli and Bang Pu industrial estates were established in 1988 and 1990 respectively. Low cost housing surrounding the estates was constructed to accommodate migrant workers from the countryside and neighbouring countries, who were attracted by wages that were significantly higher in BMR when compared to other rural provinces. The period from 1985 to 1995 witnessed the emergence of middle to high end master planned housing estates with golf courses and sport centres in leapfrog developments along the main highways near Suvarnabhumi airport (then under construction). These industrial and housing developments, more often than not, lacked proper waste and sewage management, which resulted in severe environmental degradation. More recently, many affected communities raised their grievances to a newspaper that their fishponds and shrimp farms were contaminated from solid waste dumped onto the waterways from industrial and housing estates. The locals had to live with polluted water needed for their everyday life usage and bemoaned that the waterways are unsuitable for their water rituals. Some inhabitants reported to the responsible authority but it was ignored.

In terms of environmental issue, Bangkok's intensified urban development and sprawl led to further need for extensive provisions of new infrastructure to manage water supply and sanitation, often considered lower in priority by urban



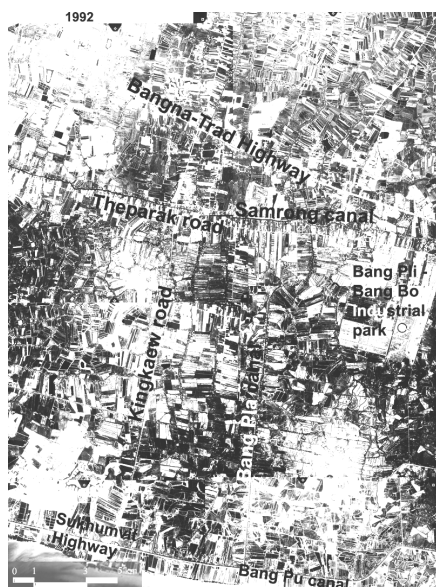


Figure 5: The boom of industrial parks and high-income housing estates with golf courses and sport facilities in the 1990s. Source: Adapted from the Royal Thai Survey Department.



Figure 6: The new canal megaproject known as 'the 2nd Chao Phraya' has been dug parallel to Bang Pla canal. Source: Adapted from the Royal Thai Survey Department.

administrators and hence is delivered after the settlements have sealed roads, electricity, and piped water services. However, once whole cities are built, as in the case of Bangkok, it is much harder to plan for and build sanitation services (UNEP [11]). As a result, the pollution of waterways in the Bangkok Metropolitan Region (BMR) has reached extreme hazardous level because of inadequate sanitation for domestic toilet waste and the direct discharge of non-toilet wastewater from multiple sources to the waterways (Asian Development Bank [1]). Kittiprapat [13] found that in the mid-1990s of 3,351 factories in Samutprakan 2,180 were found to be failing to comply with pollution standards and regulations stated in the National Factory Law of 1992. Some 75% of the nation's chemical producing factories are in the BMR.

4 Suvarnabhumi aerotropolis: city branding for the Southeast Asian aviation hub

Nakhon Suvarnabhumi aerotropolis, located to the east of Bangkok and covering an area of 10 kilometres radius around the international airport, has been

proposed to become a new province of Thailand within the next three decades. Intensive industrial and business related to logistic and residential activities are designated around the airport. The planned province is to cover Lad Krabang and Prawes districts of Bangkok, and Bang Pli district and Bang Sao Thong sub-district, in Samutprakan province. A development unit in cooperation with DPT is to be established to jointly manage Nakorn Suvarnabhumhi according to a Thai Cabinet resolution passed in May 11, 2004 (NESDB [7]). According to the bill approved by the Cabinet in July 2006, for the first four years the province will be run by a governor appointed by the Interior Ministry and supervised by an administrative board chaired by the prime minister before becoming a special administrative zone, having an elected governor like Bangkok and Pattaya. However, the draft bill was put on hold after the 2006 coup that removed Prime Minister Thaksin Shinawatra's government.

Consistent with the narratives of city branding in the context of global competition, former Deputy Interior Minister, Somchai Sunthornvut, stated that *"Suvarnabhumhi province will be as big as Singapore but it will be more modern with a special administration team to run the new city and the airport"* expecting that Nakhon Suvarnabhumhi will become the country's new economic centre that rivals Singapore in competitiveness (Nation [18]).

While the plan was strongly supported by the Thaksin government and Samutprakan governor, the former Bangkok governor who was aligned with the opposition party and academics from major universities opposed the project [18]. The top-down megalopolis plan was to be implemented with an extensive budget for infrastructure and urban development to accommodate future rise of population and industry along the Eastern Sea Board corridor. Sumet Jumsai, a prominent Thai architect and planner, asserted that the project would possibly result in further significant loss of biodiversity and rich ecological functions of the coastal mangrove forests. The major constraint of this development is that the area is located in the flood plain of the Chao Phraya River, which faces periodical inundations that complement the aquaculture of the local inhabitants. Annually for three months, flood water from the north and northeast drains into the central plain coinciding with the annual sea rise. A huge body of water forms around Bangkok that remains in place until the sea level subsides in December. The swamp, where the development project is planned, acts as a natural water retention area on the east side of Bangkok, modulating the flow of water into the sea of its own accord (Jumsai [16]). Residents and workers in the high-density urban accommodation and intensive industrial zones will also be exposed to the noise and pollution of the airport.

On this Jumsai [16] critical of both modern planning and political intervention that characterized the conception of Nakorn Suvarnabhumhi lamented:

"In contrast, much present-day town planning adopts a myopic parameter and pays little respect to nature, let alone Nature in the Platonic or Hindu-Buddhist sense. Of course, implementation has very little to do with planners anyway, the profession being often compromised by politicians who in the end carry out their own "planning". I refer in particular to Suvarnabhumhi, the name of the new



airport and its associated "new town", which was unfortunately marketed preemptively under the name of aerotropolis, leading to speculation and land grabs. The Suvarnabhumi development in Cobra Swamp is the sum total of everything that should not have been done... Huge investments in infrastructure work became necessary, mainly as corrective measures in an area that is basically a 5,200-sq-km lake. It also meant building on top of the worst subsoil conditions, and a watery terrain that will eventually be three metres below the mean sea level. This event is projected to take place in three generations' time and the factors involved are global warming and rising seas, and the subsidence of the swamp... We might then speculate on the solution to the problem of an aerotropolis three metres below the sea. The solution presupposes a level of hydraulic and societal discipline that suited the Dutch over the centuries, but not the Thai psyche, which is anti-discipline and long-term planning."

Hence, the physical development plan consists of an accelerated completion of a large-scale drainage system for the entire eastern floodplains to effectively solve the inundation problem in Nakorn Suvarnabhumi. A new 78 meters wide and 10.5 kilometres long canal was dug from Samrong canal southward to the Gulf of Thailand as the drainage solution for the airport and its vicinity. The heavily engineered mega-project was designed to pump water at a rate of up to 100 cubic metres per second from the lowland retention areas. As it approaches the gulf, the canal is lifted up to the height of 12 metres in order to cross over Sukhumvit Highway and be discharged into the sea (Figure 7). Although the cost for the canal is Bt 8.4 billion, the perpetual energy bill to pump water over the highway was not factored [16]. As the canal was constructed lined on both side by multilane roads making the land accessible for development, land prices along the canal dramatically rose by up to 200% from 1980s value. A lot of this land has fallen into the hands of prominent developers and allegedly investors and speculators with close ties to politicians (Bangkok Post [14]; Srimalee [21]). In fact Minister Somchai expected that "... land prices there were destined to jump drastically. Perhaps, a hundred fold," he said [18].

5 "Damage control" for Bang Pli and Bang Pla

"Sumet said he and his colleagues were doing their best to perform "damage control" on the government project..." (Hongthong and Srimalee [16]).

In 2006, architects and planners, SJA+3D led by Jumsai, proposed a water-based city concept to the DPT, expressed through the juxtaposition of the notion of 'Venice of the East town for tourism' and urbanism to compliment the pre-existing natural system (DPT [2]; Pantumsinchai [19]). The precinct, which covers an area of 24 km², is planned for a population of 100,000 with a density 4,375 person/km². The plan will emphasize Bang Pli district's cultural heritage, industrial parks and low cost housings. The new precincts of Bang Pla and part of Bang Sao Thong sub-district are designated to be an industrial zone and marine related museum. The 30 km² area will accommodate more than 200,000 people with a density about 3,750 persons per km². However, due to a huge number of target population and activities, this new development will give rise to a new urban form as parts of the Aerotropolis.



6 Conclusion

Our spatio-temporal analysis reveals extensive natural and cultural landscape changes. In effect, suburban sprawl fragmented agricultural patches and diminished ecological value of the pre-existing mangrove forests. Along with intensive industrial development in the case study, fish ponds and shrimp farms have been abandoned due to the environmental contamination and Thailand economic crisis in 1994. The loss of urban agriculture will cause future food crisis. Socio-cultural interactions with the waterways have also diminished as an effect of the degraded water quality. Over the last decade, Suvarnabhumi airport and the planned aerotropolis has been the catalyst for a water drainage mega-project for the area. Aware of the fundamental conflicts in land use and



Figure 7: The canal is lifted across Sukhumvit highway to drain into the gulf of Thailand. Source: Nasongkhla, 2008.

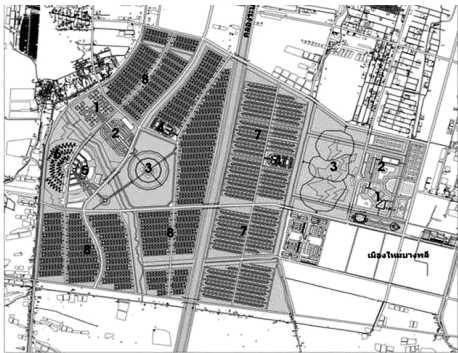


Figure 8: Proposed master plan for BangPhli-Bang Pla precinct: 1) community centre, 2) new commercial zone, 3) public park, 4) village recreation, 5) cultural centre 6) hotel, 7) condominium 8) semi-detached houses. Source: DTP [2].

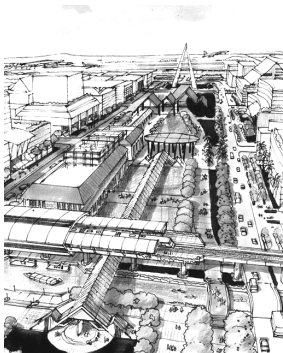


Figure 9: Artistic impression of future development in the new towns in Bang Pli (right). Source: DTP [2].



ecological patterns, Jumsai's concept of 'Water-based city' attempts to mitigate hydrological problem and impacts from mega-projects. While the project is on hold due to political uncertainties in Thailand, further studies in terms of how this development works in detail, environmental and socio-cultural impacts and public participation in the planning process are needed. Moreover, the planning is geared for new inhabitants and hence, the local, indigenous voice has been unheeded and the persistence of their aquatic livelihoods is in doubt. While all is not lost and there are incremental evidences that, countrywide, local rights are improving (Prateepchaikul [20]), this may be much too late.

Hough [4] noted that little attention was paid to the understanding of natural processes that contributed to the physical form of the city, which in turn have been altered by the city's development. In the ideal scenario, natural processes and human interaction with nature and how these natural and human processes will be changed and affected by new development should be clearly examined and understood before any new urban activities are considered. This is in stark contrast with real practices discussed here and planners are often reduced to performing 'damage control' against the powerful forces of global economy—of which competitive city branding and modern mega-projects are manifestations. We pose the question: is the notion of ultimate urban sustainability for Bangkok Metropolitan Region merely just that – damage control?

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