

Controlled Landscapes and (re) Designed Nature

Climate change knowledge and practices in the Mekong Delta, the case of Cantho

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XI

URBAN KNOWLEDGE
in
CITIES OF THE SOUTH

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Introduction

The specificity of the southern part of Vietnam is the Mekong Delta, a dynamic landscape and region which is determined by the course of the mighty Mekong River and its trajectory (through nine branches) towards the East Sea. The richness of its inherent dynamic nature embodies a series of often contradictory natural and man-made processes. A water-prone and extremely productive landscape is the reality of the estuarine triangle that is undergoing rapid territorial (rural and urban) transformations alongside great environmental challenges.

Unlike the northern and the central parts of the country, the Mekong Delta has only been occupied by the Vietnamese for about three centuries. Nevertheless, this relatively short history has been a period of changing regimes, warfare and (r)evolution. The latter, is marked not only political, but also by economical and spatial transformations. The accumulated knowledge of the historical layers of water management in the delta is the basis for the state-of-the-art for addressing new challenges. Molle and Tuan have stated that enormous transformations have taken place in the landscape in order to tame the delta: "Therefore, the development of the deltas has corresponded to an often recent, continuous and colossal effort by humankind, committed to transforming and shaping the environment" [Molle and Tuan 2006: 145]. Many of the most prominent interventions in the Mekong Delta have dealt with the water management system and have had large-scale effects upon the territory, as well as more subtle shifts in the attitudes towards the treatment of the landscape.

Cantho's landscape (the largest city in the heart of the Mekong Delta) can be read as a palimpsest¹ of diverse logics and knowledge levels (considering the water management system). The contemporary identity of Cantho, as an urban and rural territory, reflects both pre-colonial and colonial influences, top-down and bottom-up management, engineering and more natural approaches [Shannon 2004]. Stated differently: "a combination of natural and social forces has produced the Mekong Delta" [Biggs, Miller, Hoanh, Molle 2009: 203]. The very specific and unique water-based landscape was built up by a historical mix of different approaches. Nowadays, many challenges force the Delta landscape to adapt once again to new conditions. The question remains however, if there has to be a strategy of more control or rather adaptation, or as Mira Käkönen states "the Mekong Delta is now at the crossroads" [Käkönen 2008].

As global warming and climate change cause drastic changes in the water regime (primarily through sea level rise), there is the need for a new thinking and collaboration of water engineering/ management and design. This enormous present-day challenge induces a new flow of knowledge in the Delta (and in the country and in the region). A considerable amount of research concerning climate change in Vietnam is taking place, but in how much of it is this actually tackling the core issues and reaching

¹ The term palimpsest is derived from André Corboz' essay on 'The Territory as a Palimpsest' from 1983, where he describes how systematically the traces of interventions in history are conserved and how they unveil themselves in the landscapes of today. Parts of history stay in the contemporary urban territory and unconsciously guide its new development. The idea of 'traces' is evidently applicable to the Mekong Delta's water management landscape.

sustainable solutions? The proposed revision to the Cantho masterplan to 2030 project² illuminates a possible strategy to reconcile urban growth and the predicted consequences of climate change. The discussion of the case study also illustrates how the current climate change knowledge is produced and disseminated and moreover, how it is used to anticipate problems regarding flooding.

Indigenous water management knowledge of the Mekong Delta

Although the French interventions in the hydrological landscape of the delta are often regarded as its major transformations, a river-water or canal-creek civilization was in existence long before through the intensive use of drainage canals [Biggs 2004]. The delta population was composed of people with many different backgrounds and in that sense *Nam Bo*³ has always been known as an area "inherently open to external influences, subject to ceaseless dynamism and constituted by processes of cultural hybridization" [Taylor 2001: 90]. Due to the many external influences, the area has known transformations of very different origins throughout its pre-colonial history [Shannon and De Nijs 2010].

The impressive number of waterways that shape the delta were not only the base for transport and irrigation/ drainage purposes, but also structured settlement. Long lines of dwellings grew along the banks of the waterways, indicating the close interrelation of the water with everyday life [Taylor 2006: 38; Tuan and Molle 2006: 162]. Due to the presence in daily habits and use and the dependence on the water for agricultural purposes, the pre-colonial inhabitants of the Delta were not only confronted with the advantages of the wet landscape, but also with its disadvantages and threats. The benefits are undeniably the fertility water brings for the soil and thus the agricultural production. The most severe threats in the region are floods in the wet season and water scarcity combined with saline intrusion in the dry season. Therefore, a large awareness was created and the farmers were "impelled to draw on their ingenuity to cope with these multiple environmental risks, resulting in the development of adaptive technologies and production regimes uniquely suited to the alternating wet and dry seasons, and variable water and soil conditions. This approach is reflected in the local saying 'shaking hands with the flood', which indicates a perspective of acceptance rather than resistance to potentially catastrophic risks" [Miller 2006: 176]. Käkönen also recognizes this indigenous adaptive attitude towards the water-related threats in the Delta: "... the society has had to learn how to live with the changing flow regime of the Mekong River caused by the monsoon climate and with the changing periods of both too much and too little water. For a long time, livelihoods and farming systems were characterized by adaptation to the changing environmental conditions" [Käkönen 2008: 205]. This attitude of living with the floods is in sharp contrast with the long-existing tradition of protection and dyke-building in the Red River Delta in the North. Different reclamation processes and different ecologies have not only shaped different societies in the Red River Delta and the Mekong Delta, as Tuan and Molle argue [Tuan and Molle 2006: 162], but more specifically, they developed a different type of environmental knowledge. While the Red River has always been an enemy in the sense that Hanoi and other settlements always had to protect themselves intensively against the water, the Mekong (due to its less violent character [Popkin 1979: 172]) has mostly been a donor of success in agriculture. From pre-colonial times onwards, the knowledge on how to tame the water has thus evolved differently according to the conditions: dykes and protective engineering have been part of the Northern water management, while the Southern logics were more based on accommodation.

2 The proposed revision of Cantho masterplan to 2030 was a collaboration between OSA + WIT + Latitude [Team members: Kelly Shannon, Bruno De Meulder, Guido Geenen, Cati Vilquin, Daan Derden, Annelies De Nijs, Phebe Dudek and Remi Van Durme] with SIUP (the Southern Institute for Urban and Rural Planning, HCMC). Attention was drawn to the climate change problematic in finding a sustainable projection for the city's growth.

3 *Nam Bo* is the traditional denomination of Vietnam's most Southern region, which includes the Mekong Delta. According to Philip Taylor, this particular characteristic creates a condition of a territory which is in the constant process of modernization, especially under the French rulers. "Southern Vietnam experienced the greatest impact of capitalism, commercialisation, urbanisation and a bustling traffic in new intellectual movements" [Taylor 2001: 17].



[fig.1] Building the Cho Gao Canal

The Cho Gao was an important French-built canal (1875) constructed with *corvée* labour (unpaid workers) which provided a direct link between the inner delta and Saigon. Communes of the delta maintained dykes and canals in return for relative autonomy.

[Emile Gsell. Albumen photo on paper, presented to Governor Le Myre de Vilers by the Colonial Council in 1882. Donated to the Foreign Affairs Library in 1894. Ministry of Foreign Affairs Archives, Paris, "Le Myre de Vilers" No. A000760.]

The particular identity of the 'rice basket of Vietnam'⁴ is due to the organizational system that structured society and provided irrigation systems in order to support prosperous farming activities, owing to the fact that paddy rice receives most of its nutrition from the irrigation system rather than from soil [Lewallen 1971:21]. The specific Asian mode of production has been termed by Karl Wittfogel as a *hydraulic civilization* (radically differing from the Western feudal civilization or industrial civilization) and it involves a specific type of division of labor [Wittfogel 1957: 22]. Although rainfall in the Mekong Delta is more even than in other areas (whereas wet-rice production elsewhere requires local water storage ponds and canals within each village, an acceptable quality of irrigation in South Vietnam comes from rainfall alone) [Popkin 1979: 172], the intrinsic characteristics of a hydraulic civilization are applicable on the organization of the Delta. The surplus (labor or products) of the inhabitants is needed in order to maintain the complex system of such a state, consisting of large-scale preparatory (within the purpose of irrigation) and protective (mainly against flooding) operations, leading to Wittfogel's view towards despotism. In the indigenous organizational system, as well as in the later colonial and post-colonial interventions, the major aspect of the State's role is common: taming the thus far unknown landscapes.

Colonial expertise, an imprint on the landscape

Although the area has known many external influences, the most radical one would without doubt be the colonial interventions of the French. Slowly, they enlarged their influence and territory, conquering an area called 'Indochine', which included not only Vietnam, but also parts of Laos and Cambodia. Starting from 1862, they assembled this colony over a thirty-year period. The three provinces of Cochinchina (Nam Bo) nearest Saigon came first, the other provinces in the South of what had been the ancient Empire of Vietnam, followed in 1885 by Tonkin (Bac Bo, the northern part of Vietnam), Annam (Trung Bo) in the center, then the separate kingdoms of Cambodia and Laos [Wright 1991]. The ambition of the colonists however, was not only found upon an aim for agricultural improvement (which would lead towards a commercial success for the country), but as Osborne says: "Cochinchina was impaled on a trident of French missionary zeal, imperial ambition, and commercial hope" [Osborne 1997: 32]. Miller emphasizes that the large-scale delta was driven by territorial expansion of

4 The Mekong Delta has the label of rice basket of the country. The extreme fertile soil and the omnipresence of the water creates the favorable condition to have wet-paddy cultivation with 3 crops of rice a year, while the rest of the country can only produce 1 to 2 crops.

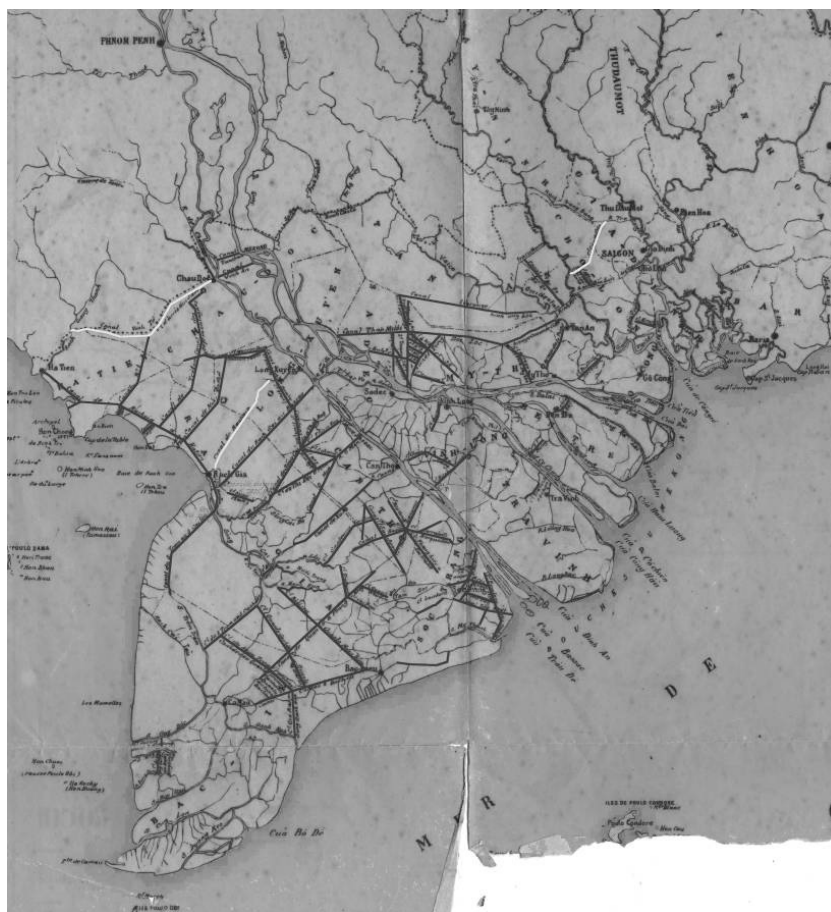
the Nguyen Dynasty (1802-1862) [Miller 2006], while Biggs stresses the importance of the rice cultivation [Biggs 2004], which according to Popkin the area of cultivable land quadrupled under French reign [Popkin 1979: 173]. A large interest had grown for the fertile soils of Nam Bo and as Biggs indicates, the main goal as well for Vietnamese as for French colonizers was to “turn wilderness into civilization” [Biggs 2004: 48].

The massive dredging and engineering works, created a new nature in the flood-prone delta. Although these French waterworks were of great importance, it cannot be denied that the Mekong Delta had already been the decors since centuries for a constant evolution in and adaptation of the water system, with which life has always been intimately interwoven [Shannon, De Meulder, De Nijs 2010]. The question remains then if “the French *oeuvre* (dredging canals and building the agricultural economy) could be considered as an extension to the existing Vietnamese mode of human-environment interaction (with exceptions for new technologies)?” [Biggs 2003: 80]. Was the new expertise introduced by the French a Western interpretation of the Vietnamese technical experience? Generally spoken, both the pre-colonial and colonial projects shared common features, not only in scale, but also in terms of socio-economic goals. The works and projects never were isolated, but rather served larger purposes [Biggs 2003: 80]. For the larger colonial enterprise, the waterworks were merely part of the infrastructural exploits on the territory to transform the swampy lands into a productive economy.

[fig. 2] **Extensive canal network**

The immense quantity of canals dug during the French period (darker color) are a multiplication of what was begun during the Nguyen-era (light color). The French *oeuvre* could therefore be seen as an extension of the Vietnamese tradition, but with the introduction of new technologies in order to create a highly productive landscape and to complete their ‘mission civilisatrice’.

[De Nijs 2010, adapted from colonial era map (source unknown)]



The French engineers were involved in large State projects, while interventions with a more local focus, remained the work of Vietnamese hands (the *public works* engineers). A clear difference between the two was both a political and spatial question. According to Biggs, “colonial engineers worked almost exclusively within the conceptual spaces of topographic maps and the political spaces of the colonial métropole, Saigon. Their goal was to link the capital with colonial towns in the delta, drawing canals as lines across a blank representational space on the maps. Over

time, they envisioned that these “blank” spaces would be filled with plantations, roads, waterways, and homesteads. Public Works engineers wanted to convert the blank spaces of the delta into an endless horizon of rice” [Biggs 2004: 68-69]. Miller agrees that the French interventions served a different goal than the local works: “From the beginning the French canal-building drive in the delta held the strategic and military concerns of settlement and transport of higher importance than concerns for drainage, irrigation and flood control” [Miller 2006: 175].

In addition to the distinction between French and Vietnamese hydraulic engineers, Biggs also identifies a contrasting attitude amongst the French engineers before and after the great colonial conquest (1858-1867) in the way their knowledge fit within the State. Various French advisors worked within the world of the Nguyen Court, where their ideas in mapmaking, citadel design and military strategy meshed with older Vietnamese military and geomantic practices [Biggs 2004: 56]. This more or less invisible attitude disappeared in 1967, when the French Navy formally took possession of Cochinchina. From this point onwards, the French intellect was imposed as the new ideal: “a new cadre of military men and technical specialists engaged in a reversed translation of Vietnamese knowledge about the landscape and water into French language and French ideas about hydraulics, politics, and history” [Biggs 2004: 57]. Despite subsequent French attempts, the dredging campaign in the Mekong Delta never achieved a “final form”, though the (hydraulic) landscape was dramatically altered and a clear layer was added to the territory. “From the air, the astonishing Cartesian geometry of the Mekong Delta’s canal system is readily apparent. The hydraulic engineering of the delta bears the imprimatur of French colonialism” [Taylor 2001: 5]. Without a doubt the engineering works fundamentally changed the nature of the delta and significantly altered the dynamics and ecologies of the landscape. In an era of increased environmental awareness, there is growing discussion concerning the altered state of the delta and its ecologies and the balance between economy and environment. Miller has identified a large modification of the water distribution throughout the delta, resulting in a new spatial distribution of water-related environmental risks⁵ [Miller 2006]. Nevertheless, the colonial period should be seen as an important stage in the knowledge production of water management and construction techniques in south Vietnam.

When discussing colonial influences on the landscape and the knowledge created in the Mekong Delta, it is important to recognize the internal colonization that also characterized the territory. This was the result of the Great March South (or *Nam Tien*) from the northern and central regions of Vietnam [Miller 2006: 175], making Nam Bo Vietnam’s new frontier [Taylor 2001: 90]. According to Taylor, “a century prior to French colonization, the Nam Bo region already had a multi-racial character. It was the confluence of many cultural currents and their hybridization proceeded apace” [Taylor 2001: 103]. An example of an internal colonial migration layer on the landscape is represented by the village-structures proposed around the 1930s during the agricultural crisis. The northern logics for the spatial organization of the agricultural landscape were imposed on the swampy nature of the southern Mekong Delta. The *casier*⁶ configuration, initially from Red River Delta region, was implemented in the south during the period of the agricultural crisis. The configuration of a *casier* was that of a cluster of houses protected by a bamboo hedge, posed in the middle of the agricultural fields. The protection of the village was on a social level, but served as well as an environmental protection. Biggs recognizes such attempts as quasi-colonial exercises that were incompatible with the landscape: “the creation of *casiers*

5 Apparently the French were rather concerned about the drainage of some areas, but at the same time did not take into account the effects of their systems. “These new canals allowed the drainage of floodwaters from some areas, yet brought floodwaters to other areas previously little – or un- affected by floods, as well as creating new channels for the inflow of saline water from the coast” [Miller 2006: 177].

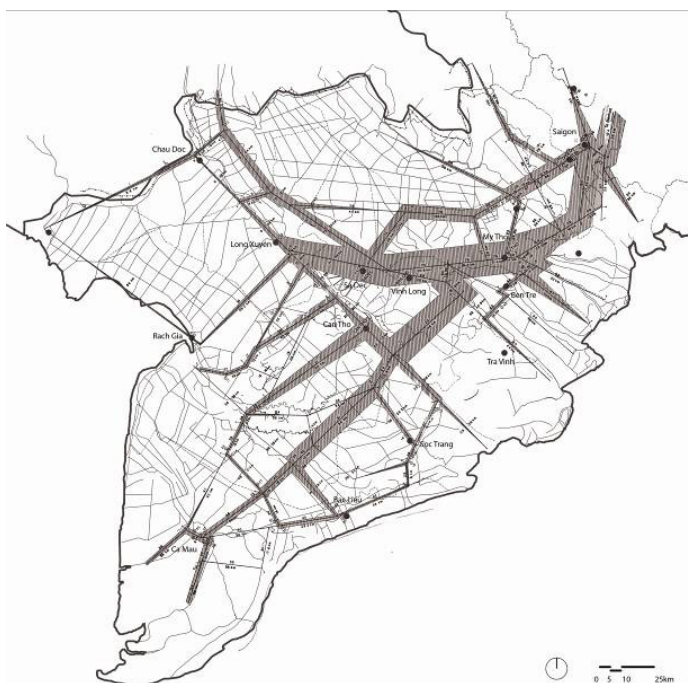
6 The term *casier* is used for the typical nucleus-like organization of agricultural villages in the Red River Delta. There, the protection of the village cluster, surrounded by the cultivated land, was more important than the direct link with the waterways.

could be seen as a new kind of constructed landscape in the 1930s and 1940s. The political expediencies of settling landless farmers upset by the crisis required some form of response. The result, these *casiers* in the flooded western plains, were based on colonial ideas of peasants and nature as observed in *traditional* agricultural landscapes such as the Red River Delta” [Biggs 2004: 121-122].

[fig. 3] **Inland waterway traffic in the Mekong Delta (1938)**

The canals functioned as important transport routes and were extensively used for both the flows of goods and of people. The various cities in Cochinchina were well connected via a mainly water-based traffic routes.

[De Nijs 2010, adapted from UN 1959:annex II]



Post-colonial State-projects

Once Vietnam expelled French colonial rule via a violent war, it was almost immediately subject to another intensive war period. American carpet-bombing of cities in the north and of landscapes in the south resulted in drastic flows of people and massive destruction of urban and rural landscapes alike. In the Mekong Delta there were a number of State-initiated projects. The idea of civilizing nature thus continued in the figure of model-realities. Following the principles of James Scott, these ideas were not only intended to improve the human condition, but were the creation of a more easily controlled micro-order, reflected in model villages/ cities and model farms, a process that Scott denominates as miniaturization [Scott 1998: 4]. The plans that represent this vision most obviously, are the strategic hamlets⁷, initiated as a pacification process for the rural areas and intended to become the ideal rural settlement, consisting of a clustered village surrounded by a defense wall (one could see a fortified *casier* figure in this scheme). Again, the scale is of importance. The strategic hamlets were seldom configured in isolation, as the program was intended to structure the entire countryside as a controllable productive territory. Linked again to Scott’s theory, such designed social order is necessarily schematic [Scott 1998: 6] and therefore not foreseen and developed with precise contextual specificities. Another example of the social ordering project, were the collective farms⁸ that were set up throughout the Delta, of

7 The Strategic Hamlet program of the South Vietnamese Government had social and political goals in addition to military importance. According to Milton Osborne, the program never had the success which was claimed in official circles. The Strategic Hamlet program was based on the former Agrovillage-project, which was initiated around 1959 in the Cantho area and which resettled the rural population into protected areas in order to maintain control. However, there was active and strong resistance from the farmers. Strategic hamlets were introduced in 1961 to improve the general economic and social situation in Vietnam. In physical character they were smaller than the agrovilles (<1000 people) and were meant to be developed from both resettlement and consolidation of existing communities [Osborne 2002].

8 The socialist state farms, which also operated as near autonomous settlements, were another attempt to restructure and collectivize the countryside. The main goal was not to control the rural inhabitants, but merely to start a well-organized state-economy based on agriculture. The benefits of grouping the collective infrastructure and provision of a social network could be seen as the success of these farms

which the Song Hau State Farm in Cantho is an example. The transformed natural and agricultural structures were meant to control the landscape, but as well society. In order to design such a scheme, a profound practical knowledge was necessary, in order to sufficiently tame and profit from the landscape and to keep the social engineering structure in place (Scott discusses this as the *metis*) [Scott 1998: 6].

At this stage in the history of the Mekong Delta, the (social) landscape became even further constructed. The *made* landscape, how Biggs et al. describe the region [Biggs et al. 2009, Shannon, De Meulder, De Nijs 2010], could be interpreted as a landscape that was improved to be further inhabited (and more productive) in a more controllable manner. The importance of the State progressively became more evident and the individual farmer's role subsided. Tuan and Molle emphasize the 'artificialization' of the landscape initiated by State-initiatives. While they recognize the often harsh motivations and means employed to translate them into action, the State interventions clearly brought progress as well (land development, roads and dams, public security and overall policies) [Tuan and Molle 2006: 160].

Trends towards more control

Over the decades, and the past few years in particular, the water management in the Delta has shifted enormously from adaptation ("shaking hands with floods") towards control. Furthermore, decisions are moving away from the farm-level and being taken by the State. This leads to the fact that "the Vietnamese Mekong Delta is currently one of the most human-regulated water regimes of the basin" [Käkönen 2008: 205]. Referring back to Wittfogel's terminology, it could be argued that the Mekong Delta was transformed into a modern hydraulic society, in which hydraulic management holds a fundamental role for economic development [Evers and Benedikter 2009: 9]. With a peak of hydraulic interventions only after the Second Indochina War in 1975, the modern hydraulic civilization is only today reaching its full growth. The 1986 *Doi Moi* policy of economic reform has had its effects in the Delta and is evident in the water management systems. Even if the Red River Delta used to be the most controlled water system historically, the Mekong Delta now is catching up. Today, the Mekong Delta is dependant upon on an interplay between new water management logics and socio-economic changes. Irrespective of new technologies that are developed in the field of hydraulics and dyke building, the question remains regarding which type of control of the landscape is most suitable.

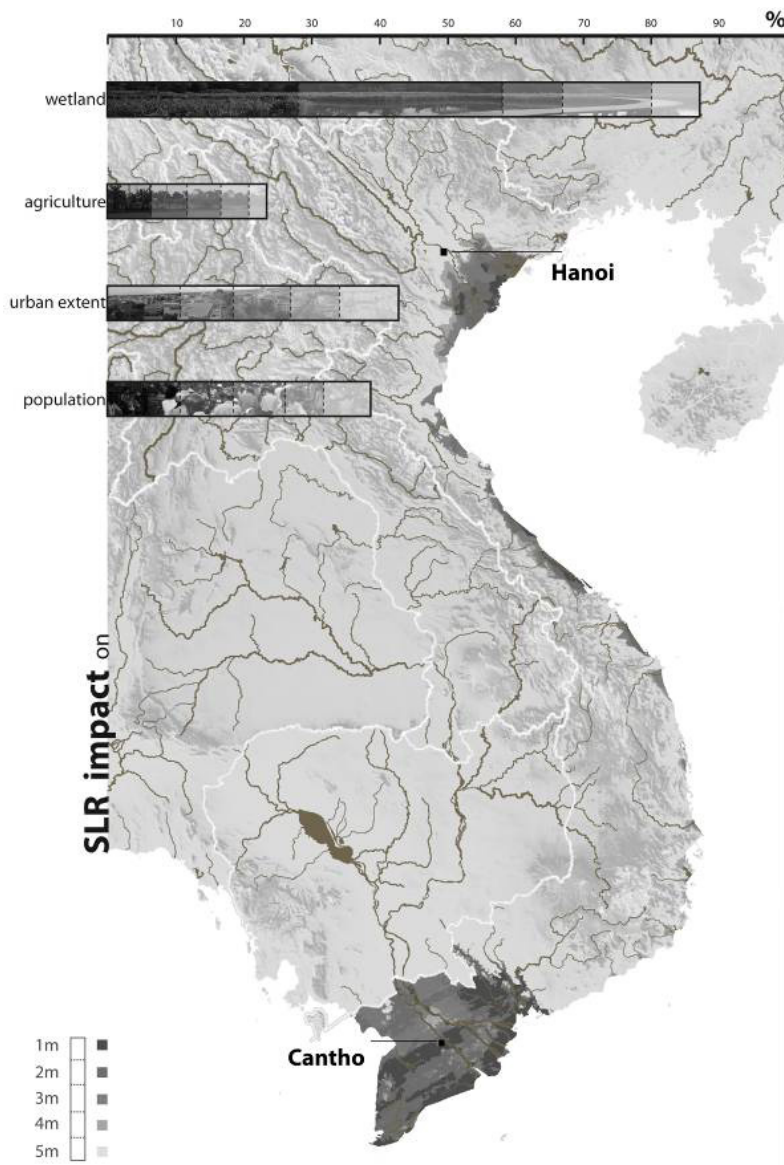
New urban questions and rising waters

Human mastery over nature and the waters of the Mekong Delta is reflected in new development initiatives. At the same time, there are new development challenges through global warming and the predicted correspondence of sea level rise and inland flooding. The inherent wet condition of the region and of Cantho as a delta city requires an increased awareness regarding water-based urbanism in relation to new environmental challenges. The relationship of the water landscape and rapid urbanization is crucial in the search for sustainable solutions that respond to the projected consequences of climate change. As Fuchs argues, appropriate risk-reduction measures have not been implemented or even seriously considered in many Asian coastal cities [Fuchs 2010: 5]. However, results from different international agencies indicate potentially possible disastrous effects that climate change will bring. Reintroducing again the concept of the palimpsest, over time, sea level rise could occur with such vastness and intensity, thereby erasing several existing layers of today's territory. Therefore, the challenge that the world deltas (the regions that are at the highest risk according to the Intergovernmental Panel on Climate Change (IPCC))⁹ are facing, is to proactively introduce a new logic that reflects the intelligence of the

in the 1970s, but corruption and scandals were linked to the structures.

⁹ The IPCC is the Intergovernmental Panel on Climate Change, established by the United Nations and forming the fundamental force in the scientific research in climate change and the formulation of mitigation and adaptation strategies.

In Vietnam, the impact of climate change is expected to result primarily from rising water levels, due to increased sea level rise and increased precipitation. According to Dasgupta et al. “the consequences of SLR are potentially catastrophic, mostly for Vietnam, A.R. of Egypt and The Bahamas” [Dasgupta et al. 2007: 2]. The World Bank states that on a global scale, East Asia is likely to be the region most severely affected by sea level rise. A projected 1-meter SLR could lead to a 2% loss of GDP and 1% agricultural land depletion. Anything higher would have an even more significant impact on urban areas and wetlands. Vietnam is amongst the four most affected countries in this region [World Bank 2008: 14]. An important factor determining the vulnerability of the country is its configuration as a land of two large deltas, literally ‘opening up’ to the rising sea. In addition to that, the country’s geography of an elongated coastline of 3260 km indicates a high risk for inundation for most of the low-lying coastal cities. Vietnam will also suffer from issues that will more generally effect other largely populated Asian Deltas, namely troubles related to subsidence [Nicholls et al. 2007: 326]. Many settlement areas in such deltas are subject to flooding from both storm surges and seasonal river floods [Nicholls et al. 2007: 327]. According to a study conducted by the World Bank on the impact of sea level rise, Vietnam is the most affected country in the world in relation to percentage of urban extent with a 1 meter SLR and therefore in urgent need of strategies that tackle the problematic of the rising waters [Dasgupta et al. 2007: 31,41].



[fig. 5] Impact of Sea Level Rise on Vietnam

The impact of sea level rise on the country is the most manifest in the two deltas. A large part of Vietnam’s wetlands will be affected and a significant part of its agriculture, urban extent and population will be influenced as well.

[De Nijs 2010, based on data from Dasgupta et al. 2007; Monre 2009]

Vietnam has not signed the Kyoto Protocol to reduce greenhouse gases. However, it has initiated its own policy for sustainable development and set limits on emissions across sectors as it develops its economy [Iponre 2009: 102]. Due to a new Law on Science and Technology (released in 2000), science and technology organizations in Vietnam were for the first time “granted autonomy in the development of ideas and research topics” [Waibel 2010: 4]. Key players in the governmental structure related to water management include the Ministry of Agriculture and Rural Development (MARD), which holds responsibility for water-related issues since 1995. In 2002, when the linkages between water and environmental policies became more evident, water resources management became the task of a new Ministry of Natural Resources and Environment (MONRE). In 1993, the Law on Environment Protection stated that ‘the Government of Vietnam is ready to carry out its international commitments and responsibilities in terms of environment protection that the nation entered into agreements before’.

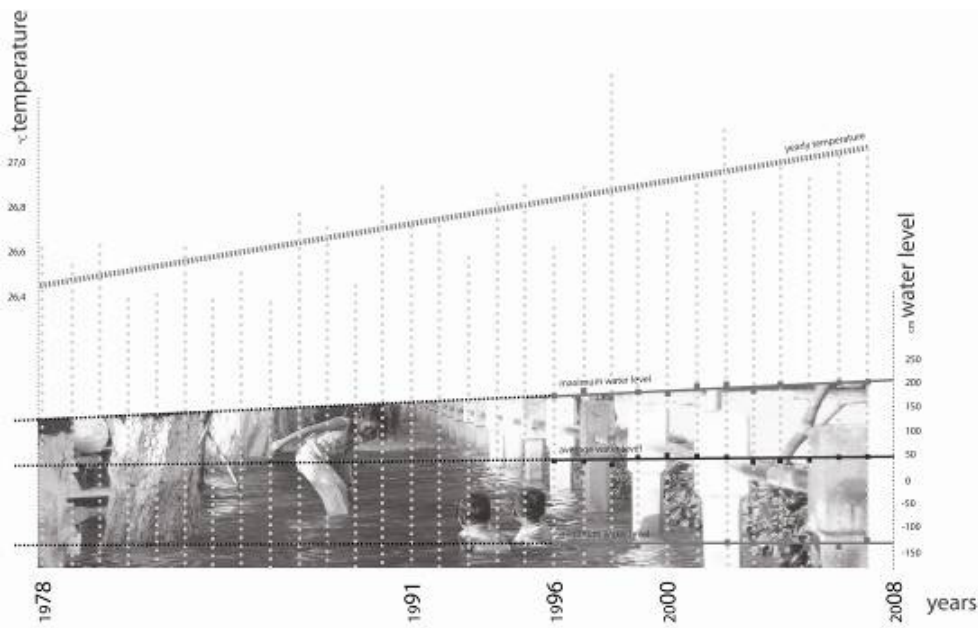
In December 2007, it set up a ‘National Target Program to respond to Climate Change (NTP-CC)’ to develop policies to respond to climate change impacts and risks. The government set up climate change experts in all the line ministries at the national level. Such a commitment (that had started on a legal trajectory since 1994) is unique for a developing country that is not bound on a legal base to Kyoto Protocol or the Copenhagen Accord. The NTP-CC summarizes the major impacts of climate change expected to affect the nation as follows: 1] Temperature: In all regions, the annual average temperature is expected to increase by 2°C in 2050. Until 2100, the temperature is projected to rise by 3°C; 2] Rainfall: Rainfall varies in different regions. It may increase by 0-10% in the rainy season and decrease by 0-5% in the dry season, and it will undoubtedly become more variable; 3] Sea level rise: It is estimated that the average for the entire coastal area of Vietnam that the sea level may rise by 100 cm in 2100 [MONRE 2008: 10].

As mentioned previously, the deltas are by far the most vulnerable parts of the country. Iponre as well indicates that the South of Vietnam, including the Mekong Delta, is to be the most affected area. The projected rise in sea level (at a rate of 0.5-0.6 cm per year) is the most significant expected consequence of climate change [Iponre 2009: xvii]. Also according to Iponre, the higher sea level along the coastline in the future, will bring about salinity intrusion and salt water inundation. More than one-third of the delta, where 17 million people live and nearly half the country’s rice is grown, will suffer according to the current predictions. During peak storms, the water would rise further, bringing salt water and pollution further inland. Furthermore, an estimated 85 percent of inhabitants in the Mekong Delta are presently in the agricultural sector, which gives an indication of the potential scale of humanitarian disasters that sea level rise could eventually be related to [Iponre 2009: 84]. Investigations of the Start Centre of Chulalongkorn University in Thailand predict that the water level in the Mekong Delta could rise twice as high as the estimated sea level rise, due to the combination of five important elements: upstream flood, local rainfall, sea level rise, northeast wind and the spin from the equator. The particular location of the Mekong Delta can thus lead towards severe consequences in the climate change discourse.

Initiatives in Cantho

Cantho, with a central position in the Delta, will intensively be affected by such changes in its water landscape and in the overall balance of the territory’s water resources and dynamics. Studies that are made at various research institutes indicate that the more general trends are also occurring on the city-level. The very specific consequences for the city itself are still under investigation, but according research already carried out, there are serious implications for the future of the city. The maximum and the minimum temperature will change, with a clear increase in the yearly average temperature (based on measurements between 1978-2007). As for rainfall, an increase has been recorded at the end of the wet season (September), while a large decrease has been

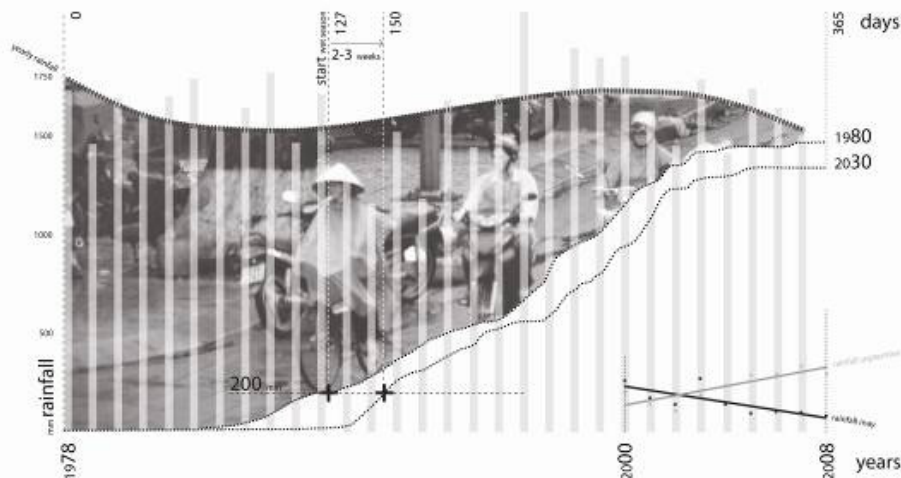
measured at the end of the dry season (May). Overall however, there has been a decrease in the yearly rainfall in Cantho, a phenomenon that is predicted to decrease approximately 20% from its present quantity by 2030. Related to this, there is also a notable shift in the timing of the seasons. It is predicted that in 2030, the rainy season will start 2-3 weeks later than it does today (determined by calculating by the first day that has more than 200 mm of accumulated rain) [Dragon Institute 2009].



[fig. 6&7] Trends for Cantho: water level, temperature & rainfall

The data confirms national and international climate change trends, while the temperature shows a very clear increase over the last decades and the rise in water level is more subtle. The yearly rainfall in Cantho has a large fluctuation, with a decreasing quantity in the past years. Over the past eight years, rainfall in September has increased, while the rainfall in May has significantly decreased. Such numbers indicate a shift in the timing of seasons (eventually effecting agricultural regimes). Predictions for the rainfall for 2030 confirm this trend, showing that the wet season (indicated by the accumulated rainfall > 200 mm) would eventually start 2-3 weeks later.

[De Nijs 2010, based on data from the Dragon Institute 2009]



According to the structure and legal framework of the Vietnamese government, State agencies and the Communist Party maintain a rather prominent role in water management policies and projects. At the same time, however, more and more work is delegated to private and non-governmental organizations. While in the past, private sector participation in water resources management has been relatively limited, its role is now changing [Waibel 2010: 4]. In Cantho, one can recognize several institutions that are involved in climate change research, its consequences and resilience of the city. Besides the governmental bodies, there is also a large inflow of international donors, who perform research activities and different scaled projects in the Cantho area. Amongst the international organizations, there is the World Bank, Asian Development Bank, Rockefeller Foundation and Ford Foundation. In addition to those

main groups, there are a number of research groups from various universities from all over the world that are carrying out investigations in Cantho, including the University of Bonn (Wisdom-project), University of Technology from Sydney, and Institute for Water Education from UNESCO-IHE. All of these institutions work in close dialogue with a local research institutes related to Cantho University and in particular with the Dragon Institute¹¹. The research it is engaged in is of primary importance for the city, whereas the researchers have access to local data and precise on-site measurements of qualities and quantities of flooding, saline intrusion etc. that can then be run through modeling scenarios. Evidently such a process is necessary, but according to Fuchs, not very common-place in Asian coastal cities, where a top-down process global and regional climate models prevails [Fuchs 2010: 6].

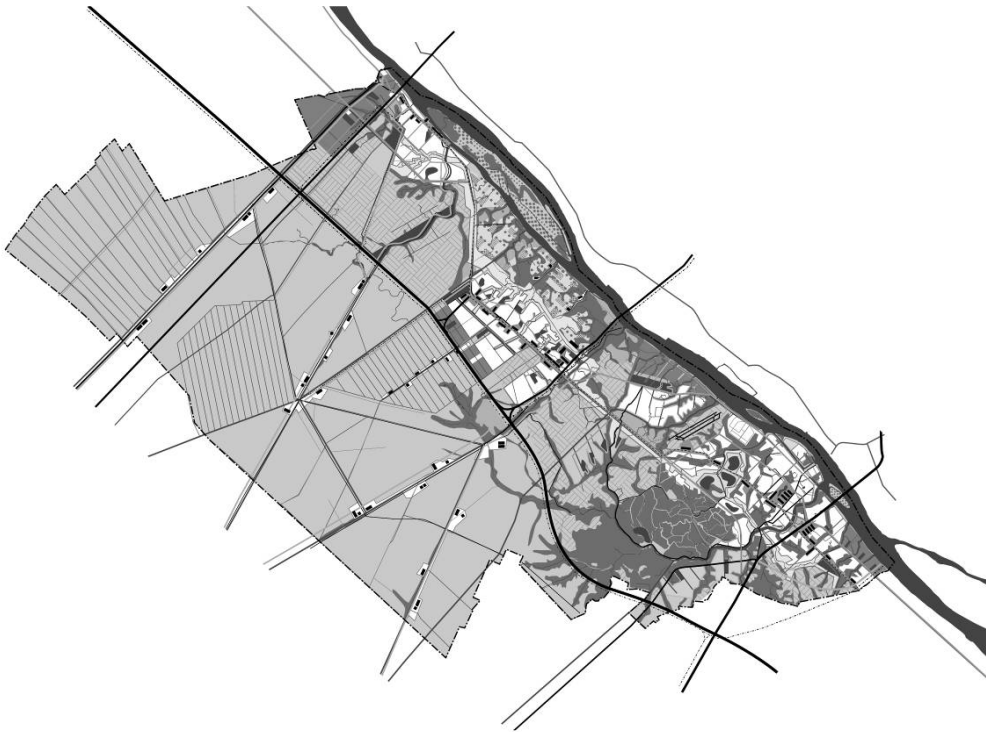
The 2009 Local Resilience Action Plan (LRAP) initiated by the World Bank sought to unite different groups, institutes and research centers in Cantho. It is 'a planning document to help a city government improve its resilience to the potential effects of climate change and natural disasters as part of its broader future growth and development objectives' [World Bank 2009: 1]. The collaboration between the World Bank and the Cantho Steering Committee on Climate Change (CT SCCC) involved most of the relevant departments of the Cantho's People's Committee. Moreover, a link with the Cantho University and the Dragon Institute was made through a consultancy position. Such an effort reveals an intention to group forces and give a frame for climate resilience actions in the city. There are, however, some weak points as well. Several issues stayed underdeveloped and the key points or projects that got identified never reached the point of execution. The LRAP project thus stayed too much in the safe zone of inventory and intention definition, but lacked action and concrete projects. Without extra fund raising, the proposed projects will therefore not be implemented, which is clearly a missed opportunity.

Another striking element in the different climate change initiatives in Cantho, is that there are a number of social projects on the priority list (capacity building, awareness projects, education, etc.). On the contrary, spatially related projects are rather underdeveloped. A reason for that could be the large costs that usually go hand-in-hand with large spatial (ecological, infrastructural, residential, etc.) projects or the longer timeframe that is needed for implementation. The initiatives on the research side and the investigations on the modeling of climate change scenarios are the most convincing component of Cantho's commitment of the climate change challenge and the close collaboration between CTU (Cantho University) and governmental institutions is promising. The results are quite precise and are a first step towards action. The latter however is still a difficult issue and needs more coordination.

11 The Dragon Institute (Delta Research And Global Observation Network) was established in November 2008 as a joint initiative between the American and Vietnamese governments and is based in the University of Cantho. Its mission is to provide knowledge and experience in the impacts of climate change in major river deltas and to enhance the resilience of delta communities and ecosystems.

Proposed revision of the 2030 MP: merging different approaches

An underlying premise for the formulation for a new masterplan for Cantho was that climate change had to be taken into account, as did its city's new administrative status as a 'first class' city in the Vietnamese urban classification hierarchy. The proposed revision of the 2030 Cantho Masterplan takes into account the projections for new urbanization and climate change in the Mekong Delta, in general, and Cantho, in particular. The structure for urban growth, the frame for the city to develop in response to climate change was developed as a collaboration between a Western, academic-based international team and the Southern Institute for Urban and Rural Planning (SIUP).



[fig. 8] Proposed revision of Cantho's 2030 masterplan

The proposed revision of Cantho's masterplan, emphasizes the rich qualities of the deltaic landscape without neglecting the coming threats. Urban growth is structured within several dense urban centers that are interwoven in a green and blue network structure. The water problematic is tackled as well on the side of water quantity (flood pockets, storm water retention, irrigation & drainage) as on the qualitative aspect (purification and sewage). Main structuring elements cover the whole of Cantho's territory: a high-tech agricultural area, a linear park and a civic spine, linking the different urban cores and providing recreational space mixed with public infrastructure elements.

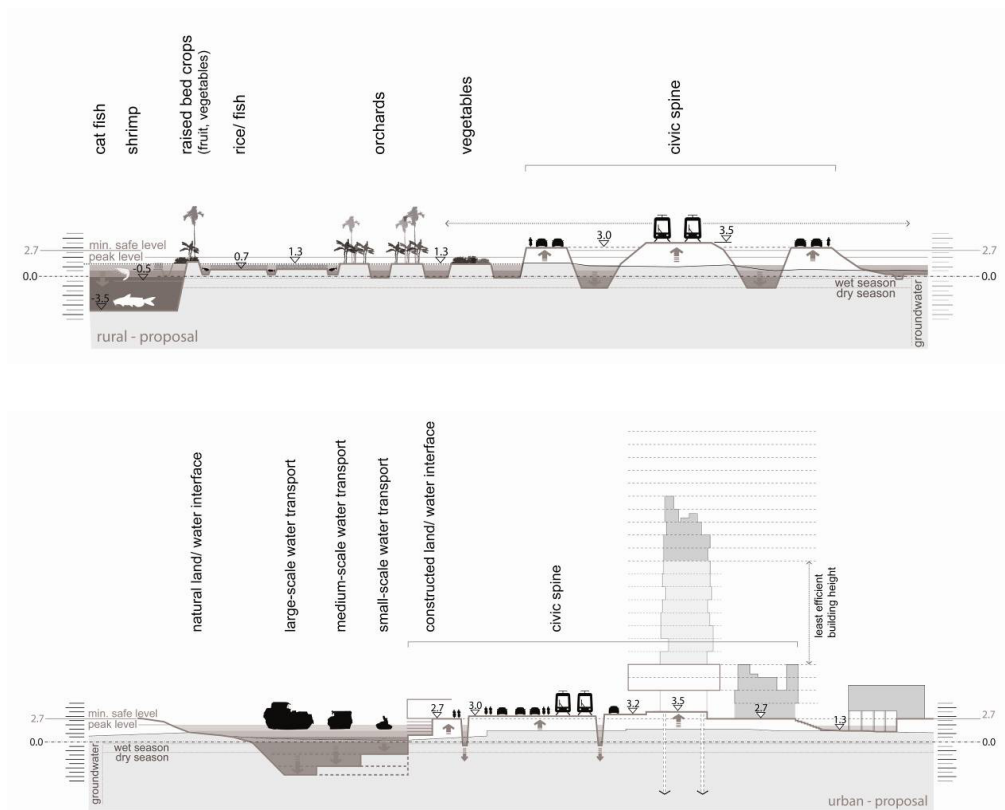
[OSA/ WIT/ LATITUDE 2010]

The proposal for the revision of the masterplan approaches city planning in a different manner than the present-day practice in Vietnam. Rather than merely following the traditional land use zoning norms and regulations, the work began from building upon the inherent logics existing in the territory. The existing subtle low- and high-lands, orchard and paddy-fields, fine-grained water and road networks and settlement structures were the basis for the development of new spatial structuring concepts to ensure a sustainable overall structure to then frame the development of smaller scale projects. As Fuchs argues: "Instead of attempting conventional, detailed land use zoning, which has proven to be both expensive and ineffective, a 'more appropriate and dynamic tool for developing countries' would be to focus on the location of major new infrastructure investments as the key to guiding private sector growth" [Fuchs 2010: 9]. One of the newly developed major infrastructures in Cantho is the so-called 'civic spine': an infrastructural backbone linking the different centers of the districts, combined with public transport. The civic spine is simultaneously an axis of flows and a collector of city life, linking social infrastructure and public space. A second infrastructure is the water infrastructure, being of major importance not only for agriculture and transport, but functioning as well in light of climate change. Flood pockets, retention basins, water purification plants and canal links provide a solid network on which a reinterpreted and modernized water-based society can emerge. Very specific themes of green and blue landscapes create the main framework for the design.

[fig. 9&10] Manipulated Topographies

In order to address the issue of flooding, a strategy is developed from precise topographical knowledge and manipulation. The design tool of 'cut & fill' balances the newly elevated ground that safeguards urban and rural areas with productive, water-absorptive low-lands.

[OSA/ WIT/ LATITUDE 2010]



The approach to the design of the proposed revision of the masterplan is of a different nature than the traditional Vietnamese plan. Leaving the land-use zoning behind and thinking in strategies to ensure a sustainable backbone for the city's growth is a way to ensure the overlap between ecology, economy and infrastructures. The knowledge of the Vietnamese city-building however, was present through collaboration with SIUP, where landscape concepts had to be translated into legal Vietnamese planning norms and regulations. The difficulties encountered in this process reflects the transitional state that urban planning and design is momentarily encountering in Vietnam. Although there is general consensus amongst the stakeholders and People's Committee in Cantho with the conceptual ideas as proposed in the revision of the masterplan, the translation into the legal instrument – the land use plan – proves difficult, as a number conceptually developed spatial/ programmatic notions are not even existing as land use categories. The proposed revision of the masterplan reacts upon landscape logics that prevail in the territory and reconciles them with new technologies in order to re-create nature and in order to anticipate the rising waters. The proposal respects the historical layers in the system builds upon them to create a landscape-sensitive, soft-engineering strategy.

The urgent need for an integrative project

The climate change problematic requires an urgent re-interpretation of the hydraulic society, where a framework can be created at the larger scale and in which the smaller strategies can be filled in more locally. The water challenges of today, in the Vietnamese context, severely threaten the land and its population and demand an interplay between different actors and between various practices. Renewed cooperation amongst sectors can re-establish the once known balance (between hydraulic, ecological, agricultural, industrial and urban land use) of the hydraulic society of the Mekong Delta.

Already in 1996, the World Bank concluded in its first 'water resources sector review' that Vietnam needed an integrated management approach, which should be developed in form of a national water resources framework plan [World Bank 1996]. The strategy of an integrated management approach is becoming reality but

still has quite a long way ahead. There is a pressing need for an innovative water system design, engineering and management. Such integrative projects should be contextually embedded and relate the urban question to environmental challenges. Eventually, a trajectory of discussion and reflection between planning, urban design and environmental engineering is substantial when discussing climate change mitigation or adaptation. An overall strategy of embracing urban design, hydraulic engineering and environment should be the start of a renewed urban landscape. Knowledge is ever adapting to the current situation, feeding the ground and creating palimpsest urban land/ waterscapes. Today, the Mekong Delta is indeed at a crossroads, but the question for more control or adaptation could be slightly modified: How to embed a sustainable strategy of more control into a landscape of merely adaptation?

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