

Water Urbanism to respond to Climate Change

(Geographic) study area (country/region):

Hanoi (Red River Delta) & Cantho (Mekong Delta), Vietnam

Context and objectives

Vietnam is particularly vulnerable to the severe impacts of climate change. According to a World Bank report investigating sea level rise in 84 coastal developing countries, Vietnam ranks first in terms of impact on population, GDP, urban extent and wetland areas. The impact of sea level rise from global warming could be catastrophic for Vietnam; up to 16% of area, 35% of population and 35% of GDP would be directly affected by a 5 meter rise while a projected 1 meter sea level rise already would subject 17 million people to flooding and cause damages of up to US\$17 billion, with substantial impacts penetrating inland and beyond the coastal zone (IPCC Technical Paper VI, p. 86).

The predicted rural to urban transformations of Vietnam will significantly alter the predominately agricultural nature of the landscape. The development of infrastructure networks, shift in use of the ground plane, and the strengthening of nodes within the network will result in vast expanses of asphalt, which will further alter the dynamic land-water relationship. The country's extensive water network is severely compromised by the scale, scope and speed of urbanization. The existing sectoral approach to master-planning – where the design, engineering and management 'solutions' are developed in isolation – is not sufficient. As the risk and severity of flooding increases due to climate change, such a severed approach will become even more hazardous.

The two proposed cases feed directly into current VIAP projects – the development of revised masterplans for the capital city (Hanoi) and for the western capital of the Mekong Delta (Cantho). In both cases, the primary issue of focus is the evolving relationship between water and the city. The development of complementary mitigation and adaptation measures is a fundamental component of both case studies. Therefore, the project objectives could be summarized as follows: (1) to address the multi-dimensional, the multi-disciplinary and the territorial/spatial nature of the water issue, in this case flooding caused by inappropriate urban growth and climate change; (2) to facilitate interpretative synthesis in terms of the strengths, weaknesses, opportunities and threats of a territory that faces the danger of flooding (3) to bridge the gap between sectors, between disciplines, between knowledge and policy by facilitating the formulation of territory-based strategic programs and projects that are capable to act as integrating devices; (4) to work with other departments and ministries to specify the nature and scale of impacts of climate change on the cities of Hanoi and Cantho. These projective will be specifically addressed by: (1) elaborating elements for a method of interpretative mapping, synthesis and diagnosis; (2) developing a cartographic methodology of scenario testing; (3) creating a cartographic toolbox to interact with stakeholders.

Methodology

WP1: A critical evaluation of existing approaches and models for a water-responsive urbanism in light of the specific context of contemporary Vietnam. This is done via a literature review and the visiting of best practices. It includes research into the:

- a) past/ traditional means of dealing with the flooding problematic in Vietnam and other Southeast Asian countries
- b) international contemporary best practices/ relevant case-studies for analysis, scenario testing, concept development, communication

WP2: Elaborate elements for a method of interpretative mapping of the problematic and normative parameters for a water-responsive urbanism, which seeks to bridge the gap between sectors, between disciplines, between knowledge and policy fields by developing:

- a) data collection: various data sources have been investigated and an overview is made of:
 - > reports and papers on climate change: sea level rise, increased severity of flooding from upstream, loss of absorptive surfaces in urban areas, etc.
 - > data on economic profiles, demographic predictions, social characteristics, etc.
 - > maps (historical and recent) of the 2 areas for detailed investigation
 - > meteorological and geographical data
- b) cartographies that are able to effectively communication to a variety of stakeholders
- c) critical parameters for physical planning and urban design that work with hydrological conditions and engineering norms;

WP3: Develop elements for a cartography that allows scenario testing

- a) assembling cartography tools for scenario building
- b) selecting and testing tools on case study material
- c) fine-tuning cartography tool kit by interpreting the experience of the testing phase

WP4: Develop 'building stones' for a water-responsive urbanism via specific research/ innovative design

strategies for three parallel themes/ issues that are omni-present in Vietnam:
a) development of new residential neighborhoods in low-lying peri-urban areas
b) new industrial platforms
c) new infrastructure

WP5: Create an organized and integrated interplay between the 'building stones' in a physical planning and urban design approach by combining engineering and design and integrating water management;
a) combining results of scenarios with concepts for neighborhoods, infrastructure with case study material
b) iteration of combination to achieve optimal integration

WP6: Develop elements for a cartographic tool-box to interact with stakeholders, feedback of appropriateness of new 'building stones' by testing in practice. The new physical planning and urban design approaches are tested in the on-going master-planning process (in the selected cities of the Red River Delta (Hanoi), Mekong River Delta (Cantho)).
a) mapping of stakeholders
b) development of new stakeholder coalitions
c) feedback workshop

WP7: Dissemination of findings.
a) closing conference
b) publication of the results

Scientific Results

WP1 presents an overview and critical analysis (in the form of a booklet) of different Southeast Asian and Vietnamese cities and their relation to water. A first part investigates traditional/ indigenous cases and critically evaluates both their successes and failures. The second part, of contemporary cases, primarily illustrates the great challenge that climate change brings for cities and their territories in close relation to or dependant on water, possible strategies that reveal the state-of-the-art of the existing approaches of water responsive urbanism. The cases presented serve multi-purposes. They are deconstructed to illustrate a step-stone in the rich legacy of urbanism, water management and hydraulic engineering. The cases provide new perspectives through projects at various scales. Together, the cases form a case-bank, each chosen for being innovative/ exemplary for a number of aspects. They also reveal a process of creating projects – from analysis to detailed design. Finally, conclusions make explicit the lessons/ relevance of the case for the Vietnamese context.

WP2 and **WP3** (resulting in an interpretative atlas) create insights through being a method of discovery, means of comprehension and, at the same time, a spatial instrument to guide future development for large-scale regions and territories. Interpretative mapping, combined with GIS, distils intrinsic logics and creates synergies between interdependent systems (natural and man-made) that (re)balance ecology, economy, growth (including urbanization and infrastructure development) and socio-cultural values. The emphasis of the interpretative mapping is clearly on climate change and the effect it has and will continue to have upon urbanization in the Red River Delta in the North (through the case of Hanoi) and the Mekong River Delta (though the case of Cantho). Interpretative mapping is done across scales – from the nation to the deltas to various urban tissues in the respective cities.

WP4 and **WP5** are in-depth investigations of projective design research which bridge new soft engineering, water management and integral planning approaches with urban design for a sustainable balance between the increasing water challenges and urban growth in Hanoi and Cantho. Each specific design research case (with a focus on residential, industrial and infrastructural issues) creates 'building step stones' and feeds more basic principles and policy recommendations for a novel approach to urban design in the context of climate change in Vietnam.

WP6 develops new stakeholder coalitions that complement the political will of the State and address the gaps in coordination between ministries. The coalitions specifically set out to safeguard the interests of marginalized sectors of the population and to protect the fragile environment. The new coalitions also propose an array of cooperation between various government sectors, academic research institutions and civic organizations, all involved in climate change initiatives at the national, regional and local scales.

(**WP7**), the dissemination of findings, has been occurring throughout the project's duration, in the form of peer-reviewed papers, international conference presentations and the authoring of book chapters by promoters. A research booklet will compile WP1-6 and a book (Water Urbanisms East) is being prepared in order to disseminate the results to a larger audience and to create a larger awareness of the challenges that water-based cities are facing (see section, products and service below).

Products and services

International conference proceedings:

* Anh, T. P., Shannon, K. **'Urbanization and Climate Change in Vietnam: a Case Study of Hanoi'** in International Symposium: Developing Countries Facing Global Warming: a Post-Kyoto Assessment Brussels: Royal Academy for Overseas Sciences United Nations Brussels, Belgium, 12-13 June 2009, pp. 203-222, ISBN 978-90-756-5247-5

* De Nijs, A., Shannon, K. **'Controlled Landscapes and (re) Designed Nature. Climate change knowledge and practices in the Mekong Delta, the case of Cantho'** in *11th N-AERUS (Network-Association of European Researchers on Urbanization in the South) Conference: The Production, Use and Dissemination of Urban Knowledge in Cities of the South*, KULeuven, ULB, ULG Brussels, Belgium, 28-30 October 2010, pp. 487-502, ISBN 987-94-6018-274-7

* Anh, T. P., Shannon, K. **'Water Management in Vietnam. Indigenous Knowledge and International Practices: The Case of the Red River Delta'** in *11th N-AERUS (Network-Association of European Researchers on Urbanization in the South) Conference: The Production, Use and Dissemination of Urban Knowledge in Cities of the South*, KULeuven, ULB, ULG Brussels, Belgium, 28-30 October 2010pp. 285-301, ISBN 987-94-6018-274-7

* Anh, T. P. **'Recovering the Day River, Hanoi, Vietnam. Interplays of infrastructure, urban development and agricultural production'** in 6th International Urbanism & Urbanization PhD Seminar: The Next Urban Question, IUAV, KULeuven, TUDelft, UPC, Venice, Italy, 27-29 October 2011

(peer review) Journal paper in preparation or published:

* Shannon, K., De Meulder, B., De Nijs, A. **From Above/ From Below: The Case of Cantho, Vietnam** in *New Geographies #4: Scales of the Earth*, Cambridge: Harvard University Press, August 2011, pp. 73-84, ISBN 1934510270

* Shannon, K., De Nijs, A. **(Re)forming Cantho's Canal-Landscape** in *Nordic Journal of Architecture*, No. 1, vol. 1, autumn 2011, pp. 54-63. ISSN 978-87-7407-412-0

* Anh, T. P., Shannon, K., Hong, T. D., Cuong, L. D **New dikes and new relations of infrastructure, urbanization, landscape and land filling. The case of the Red River Delta** (in progress)

Other publications (journal papers and book chapters):

* De Meulder, B., Shannon, K. **Orchestration of Nature in Urbanism** in S. Witzgall, F. Matzner, I. Meder (eds.), *(re)Designed Nature* Ostfildern: Hatje Cantz 2010, pp. 20-37

* Derden, D., De Meulder, B., Shannon, K. **Landscape Urbanism to Respond to Climate Change: Cantho, Vietnam** in *LA China (Landscape Architecture China)*, June 2010. pp. 16-23, ISBN 978-7-5388-6252-2/TU.639

* Shannon, K., De Meulder, B., De Nijs, A. **Ecological Structures to Guide Urbanization. Landscape Urbanism** in *Journal of Landscape Architecture #31: Landscape Urbanism*, New Delhi, April – June 2011, pp. 38-45, ISSN 0975 – 0177

* Shannon, K. **Eco-engineering: from soft to hard engineering and back** in *Resilience in Ecology and Urban Design: Synergies for theory and practice in the urban century*, S.T.A. Pickett, M.L. Cadenasso, B.P. McGrath (eds.) Rotterdam: Springer (forthcoming 2012)

* De Nijs, A., Anh, T. P. **Rising the Dykes and Taming the Swamp. Water Management in Vietnam's Red River & Mekong Deltas** in K. Shannon, B. De Meulder, *Water Urbanisms East – ufo3*, Amsterdam: Sun Academia (forthcoming 2012)

* De Meulder, B., Shannon, K. **Re-founding Cantho's Water Urbanism** in K. Shannon, B. De Meulder, *Water Urbanisms East – ufo3*, Amsterdam: Sun Academia (forthcoming 2012)

* Shannon, K., Anh, T. P., Hai, N. T. **Hanoi & its Dikes, a City on the Edge** in K. Shannon, B. De Meulder, *Water Urbanisms East – ufo3*, Amsterdam: Sun Academia (forthcoming 2012)

* Geenen, G., De Meulder, B. Shannon, K. **Banjarmansin: River & Road as Warp & Woof** in K. Shannon, B. De Meulder, *Water Urbanisms East – ufo3*, Amsterdam: Sun Academia (forthcoming 2012)

* Shannon, K. **South & Southeast Asian Indigenous Water Management** in K. Shannon, B. De Meulder, *Water Urbanisms East – ufo3*, Amsterdam: Sun Academia (forthcoming 2012)

> Research booklet:

Anh, T. P., Llach, I., Shannon, K., De Meulder, B., Hai, N. T., Cuong, L. D., De Nijs, A., Dens, S., **Water Urbanism Mapping and Projections for Hanoi (Red River Delta) and Cantho (Mekong Delta)'**

> Design research studios in the KULeuven MaHS MaUSP Program [Guidance by Prof. K. Shannon]: Hanoi's Red River and Lakes Studio (Spring 2009); Cantho Landscape Urbanism Studio (Spring 2010); Hanoi Landscape Urbanism Studio (Spring 2011); Landscape Urbanism Studio in Beijing's Periphery (Spring 2012)

----- **Ideas for future research** -----

> Detailed studies and water urbanism projects in the two case study cities (Hanoi & Cantho). The more general strategies and approaches have already resulted in design research proposals, but more detailed design research cases would be a possible continuation of the research.

> Other areas in Vietnam and the region are confronted with the severe consequences of climate change and sea level rise in relation to the challenges of urbanization. Therefore the research could continue for specifically sensitive urban landscapes with a strong but vulnerable relation to water.

Execution

Period: 1 June 2010 – 31 May 2012

Laboratory/network:

Belgium

Prof. Kelly Shannon & Prof. Bruno De Meulder
OSA – Research Group Urbanism & Architecture
KULeuven - Dept. ASRO (Architecture, Urbanism & Planning)
Kasteelpark Arenberg 1, B-3001, Heverlee
kelly.shannon@asro.kuleuven.be; bruno.demeulder@asro.kuleuven.be
www.asro.kuleuven.be

Vietnamese partners:

VIAP (Vietnamese Institute of Architecture & Planning):
Ngo Trung Hai (director), Luu Duc Cuong
37 Le Dai Hanh
Hanoi, Vietnam
ngotrunghai2006@yahoo.com.vn, luu_duc_cuong2002@yahoo.ca

Discipline

Urbanism
Urban & Environmental Planning