



Delft University of Technology

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Meyer, VJ

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Han Meyer

## URBAN DELTAS - AN INTERNATIONAL ISSUE

### INTRODUCTION

The position of the Netherlands as a highly urbanized delta region is by no means unique in the world. Far from it. In fact, all around the world, deltas are sites of strong urban and economic growth. What is unique about the Netherlands, however, is the high level of flood protection, which has ensured that no serious flooding disaster has taken place for over sixty years. Most other urban deltas lack such protection systems and have to contend with high levels of vulnerability.

For Delta Interventions, TU Delft's multi-disciplinary graduation studio, this was a reason to focus on urbanized deltas in regions beyond the Netherlands. It organized two collective studies, one on New York (2013-2014) and one on Houston (2014-2015). In addition, various students chose to do individual design-driven assignments on delta regions beyond the Netherlands, such as the Mississippi River Delta and the Mekong Delta.

The vulnerability of these deltas was revealed by the flooding disasters and near-disasters that recently took place. In 2005, New Orleans on the Mississippi River was hit by Hurricane Katrina. Many levees in and around the city gave way, a large part of the city was flooded, and more than 1,800 people lost their lives. A few years later, in 2008, Hurricane Ike swept across the same region and almost resulted in a massive disaster for the city of Houston. Then, in 2012, Hurricane Sandy hit the East Coast of the United States, leading to flooding in New York, among other places. Similar disasters have not occurred in recent years in the Mekong Delta, where the vulnerability to flooding has a more insidious character: in this region, a number of smaller and medium-sized floods occur every year. Due to increasing urbanisation and industrialisation, the consequences of this flooding are becoming more and more serious, and a need has emerged for more structural solutions.

Although urbanized deltas have a common vulnerability to flooding, this is not to say that the solution should be the same everywhere. Studying the specific situations of international deltas reveals physical-spatial and societal contexts that are often very different from those in the Netherlands; different kinds of solutions are therefore required.

The Netherlands is unusual in that it is precisely the low-lying delta land that has seen a high degree of urbanization. This is a situation that we also encounter in the Mekong Delta, where – curiously enough – roughly the same number of people (c. 20 million) live in an area that is the same size as the Netherlands (c. 40,000 km<sup>2</sup>). The major difference, however, is that the Mekong Delta is also the world's largest rice-producing region. Small-scale flooding is actually beneficial to the paddy fields as a form of irrigation. The majority of the population lives in houses built on dikes or on piles, alongside the many canals used to transport agricultural produce. However, some smaller and medium-sized urbanized centres, such as Can Tho and Cao Lanh, are finding it increasingly difficult to deal with the frequent flooding. The question is whether it is possible to develop tailor-made solutions that both allow people to live safely in these cities and guarantee the continuity of the agricultural economy.

To a certain extent, the Mississippi River Delta is also comparable with the Dutch lowlands. The Mississippi River Delta is a very young delta region, largely formed by sediment that was transported by the Mississippi for thousands of kilometres and deposited in the estuary. In the middle of what is still a very sparsely populated and largely 'wild' delta, the city of New Orleans forms an urban enclave, surrounded by a system of levees that proved to be inadequate during Hurricane Katrina. Many of these levees have since been improved, but New Orleans continues to face problems. Since the city's rapid expansion in the 20th century, urban growth has led to the draining of the marshland around the older parts of the city that were built in the 18th and 19th centuries. While it was possible to build on the marshlands, drainage also led to a high degree of subsidence, meaning that enormous pumping capacity is needed in order to keep low-lying parts of the city dry during what are sometimes extremely heavy downpours, with up to 20 centimetres of rainfall in a single day. This subsequently creates a need to pump even harder, meaning that the ground level sinks even further, and so on. It is now recognized that this development has to be stopped and that new forms of urban

development along with new forms of water management are needed. How this might be achieved is exactly the design question.

Strictly speaking, the city of Houston is not located in a delta, but it is situated in low-lying land that was formed from the silt of a series of smaller rivers that flow into the Gulf of Mexico. The coastline itself consists of a series of elongated islands, comparable to the Dutch Wadden Islands. There is a certain similarity between Galveston Bay, a large lagoon behind these islands, and the position of Houston on Galveston Bay, and what was previously the Zuiderzee and Amsterdam. The major difference is that there is practically no tidal flood protection in Houston and the surrounding area, while during hurricanes there is a risk of waves rising eight meters above the average sea level. In this case, the question is whether an intervention comparable with the Afsluitdijk would provide an adequate and feasible solution, or whether other measures should be considered. Like New Orleans, Houston also faces the problem of extreme rainfall, meaning that large parts of the city are also frequently flooded. Houston is one of the wealthiest and fastest-growing cities in the United States. The question is how the use of smart interventions might allow this growth to be combined with greater security.

New York is not a delta either, strictly speaking, nor is much of the city on low-lying ground. The city mostly lies on older, higher land that was formed during the Pleistocene. Despite this, in the 19th and 20th centuries large areas along the Hudson River were filled in and marshlands were drained, creating low-lying areas that proved extremely vulnerable to flooding during Hurricane Sandy. Many of these parts of the city also found themselves facing economic decline, following the departure of port businesses and industries. In addition, the coastal area lying directly on the Atlantic Ocean was badly affected. For both types of area, the task is to combine better flood protection with new prospects for economic development and a strengthening of the quality of the beach culture of the coastal area.

The solutions that emerge for international cities are often anything but the application of 'Dutch' concepts. On the contrary, analysing these foreign deltas frequently leads to completely different types of solution, which in turn can lead to fresh and innovative perspectives on the situation in the Netherlands.