WATER RESILIENT URBAN AND REGIONAL DEVELOPMENT: Transforming City Regions & the Urban Research Network

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The City-Water Connection: A Symbiosis

Water is central to urban life. Throughout human history, water has influenced peoples in their decisions on where they dwell and how to design their settlements, the organization of their social life and their economic activity. However, water has a Janus-faced quality. While it can sustain the growth of urban centers, cities are planning for a new reality in this symbiosis: climate change and a lack of preparedness are making water a dangerous element to urban existence. In light of these growing complexities, the Water Resilient Urban and Regional Development, held from 16 to 18 February 2017 at the German Consulate General/German House New York, brought together an interdisciplinary body of global experts and practitioners to address the links between resilience, water and urban-regional development. Over the three-day symposium, participants held presentations, thematic panel discussions, special workshops and field visits, which sought to address the question of a changing human-water relationship from a multi-disciplinary and international approach.

Even before the concerns of climate change that arose in the 21st century, our relationship to water had been anything but static. In pre-industrial times, water not only gave us essential and cheap mobility, but also provided city dwellers relief from hunger and food insecurity with accessible sources of nourishment and work. By the mid-19th and throughout the 20th century, water and urban centers became synonymous with industrialization, the rise of heavy industry and global commerce, replacing those prior held notions. While cities grew as industrial centers and vibrant trade hubs, relentless pollution tainted water and devastated food sources, affecting everything from living spaces to public health. Simply stated, human activity, both social and economic, negative and positive, is symbiotically linked to all that water provides for our growing cities.

21st century climate challenges are now profoundly altering the ways in which humans perceive water and therefore organize urban centers. Over the course of the three-day symposium, a set of central questions emerged from this logic:

- In what ways is the symbiosis changing in light of growing climate stressors, storm intensification, rapid urbanization and poor governance
- How are cities adapting to changes in the water-urban-region relationship?
- How are factors like sea-level rise and underlying risk drivers like poverty, knowledge gaps and social exclusion further changing this relationship?

Answers to these pressing questions lay at the heart of the symposium. Organized by the University Alliance Ruhr and its co-sponsors, the symposium captured this timely subject in critical fashion by drawing on the latest lessons learned and best practices from global cities and regions, like New York City, Vancouver, and Dortmund and Duisburg from the German Ruhr Region. Research from academic institutions, such as City College of New York, Rutgers University, the University of Virginia, Simon Frasier University, and the Technical University of Dortmund played a central role in the symposium, as did contributions from private sector consulting entities, like RESILIÉNT/CITY, LLC. After opening words from Peter Rosenbaum, Executive Director of the University Alliance Ruhr in New York, Ambassador and Deputy Permanent Representative of Germany to the United Nations, Jürgen Schulz, offered his reflections on the importance of water in the context of the Sustainable Development Goals, namely SDG 6's benchmark on the accessibility of safe and potable water for all. Linking his upbringing the Ruhr Region to the symposium, Ambassador Schulz remarked on the future of water and its relationship to public safety, resilience, and climate events: "water has become a political factor that is causing conflicts in some regions and, because of climate change, devastating communities through drought, flood and storms in other global regions." Hence, the "Water Resilient Urban and Regional Development" symposium comes at a critical and timely juncture for municipal, national and global policy.

The Urban Future: Resilience, Water and the Rise of the City

The timing of the University Alliance Ruhr symposium reflects, on the one hand, a growing interest about how cities function as shared economic, cultural and living spaces, while engaging in equitable and inclusive governance. On the other hand, global development actors, national governments and municipal leaders are faced with a unique and pressing concern: every global region is experiencing levels of rapid urbanization as yet unseen in human history. Future projections point to staggering a level of urban growth and with it new risk profiles, whose successful navigation will require new types of municipal

administration, creative governance and, most especially, greater city-to-city information sharing.

What does the future of urbanization look like? According to the United Nations *World Cities in 2016* and *World Urbanization Prospects: A 2014 Revision* reports, cities are in an unprecedented state of rapid growth. In 2016, there were slightly more than 500 cities with one million or inhabitants; by 2030, over 660 cities are projected to house at least one million.[1] Of the 45 global cities that have between five to ten million inhabitants, ten of these are projected to reach 'megacity' status, while another 29 urban centers will cross the five million mark, fifteen of which are in Asian states and ten in Africa.[2]

But urbanization is not only affecting already-established medium and large cities. By 2030, the number of cities with one to five million inhabitants is projected to increase to 559; an additional 731 small- to medium-sized cities are to reach the half-million to one million threshold.[3] In short, the world is urbanizing and cities, large or small and mostly in the developing world, are growing at rapid rates. This places us before a growing set of diverse challenges.

The social phenomenon of accelerated urbanization is coupled with exposure to natural disasters and the increased effects of climate change and sea-level rise. From the standard set of common disasters (cyclones, floods, droughts, earthquakes and seismicity, landslides and volcanic activity), the vast majority of growing cities are vulnerable to at least one of these major hazards. Approximately 15% of current coastal cities are faced with exposure to two or more types of natural disaster, which, when aggregated, suggests that 1.4 billion people live in areas of high multi-hazard vulnerability and are therefore exposed to risk of increasing economic asset loss and higher mortality rates.[4] Hence, as urbanization accelerates, so too increases the percentage of cities with a complex multi-hazard profile of hydrometeorological events.[5] Stated simply, water is a threat to cities.

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[1] The United Nations, *The World's Cities in 2016: Data Booklet*. United Nations Publications, 2016: 4
[2] Ibid, 4.
[3] Ibid, 4.
[4] Ibid, 5
[5] The World Bank, *Five Feet High and Rising: Cities and Flooding in the 21st Century*. Policy Research Working Paper Series, 2011: 1-3.

Shifting Urban Identities: City-to-City, Region-to-Region Lessons Learned

Knowledge transfer and exchanging best practices are among the keys of achieving greater urban resilience and enhanced understanding of how to deal with and overcome the complexity of future challenges emanating from water. For this symposium, cities and their metropolitan regions engaged in a rich, comparative exchange on how global urban centers have identified problem areas and engaged in implementing successful projects. Throughout the three-day event, university researchers, municipal representatives and project managers working in New York City and metro New Jersey, Vancouver, Dortmund and Duisburg from Germany's Ruhr Region and New Delhi discussed the challenges of project implementation as it relates to their unique histories, trajectories of economic development and their relationship to water and hydrometeorological hazards.

Three common thematic streams emerged over the course of the Water Urban Resilient symposium. Firstly, urban centers and their regional areas are actively changing their physical landscapes as they adapt to climate stressors, sea-level rise and urbanization. Secondly, community-level perceptions in how urban residents see their cities and their economic and social livelihoods therein are shifting. A third common theme centers on community-based approaches. All the cases presented at the symposium point to a correlation of the successful implementation of resilience-based water projects and levels of civic engagement and the inclusion of civil society actors. Let us turn more specifically to the empirical cases.

Pippa Brashear, Director of Planning and Resilience at SCAPE, addressed the threats of climate change and the challenges of designing resilience projects with a focus on the effects of Hurricane Sandy. Her presentation on SCAPE's Living Breakwaters, funded by Rebuild By Design, was a testament to how local communities in New York City's Staten Island, which was devastated by Hurricane Sandy in 2012, are psychologically re-thinking and physically re-designing their co-existence with flood and storm surge risk in an urban-coastal context. By integrating submerged, reef-life breakwaters along the Staten Island coast as a natural ecosystem defense, rebuilding wetlands and marshes and planting oyster beds to improve local water quality, vibrant civic engagement at the community level is reconnecting Staten Island residents to New York City's dynamic history as a 'water city.'

New York City afforded the symposium additional evidence in shifting perceptions of urban life. Kai-Uwe Bergmann, Partner at BIG NYC, presented New York City's "Big U" project, concluding the second day of the symposium. Bergmann presented the city's current and future efforts to reduce the risk of sea-level rise and climate change. According to Bergmann, New York is "defensively looking at water as a threat." The RBD-funded project relies on information derived from local residents' inputs through interviews and community surveys. The Big U will link a series of flood defenses from Manhattan's East Side to the Hudson River coastline through a series of terraced storm surge defenses, integrated green spaces and accessible parks and recreational spaces that double as resilient spaces. The intention of the Big U is primarily one of water defense, but it combines additional elements that local residents expressed in community-based interviews – better air quality, reduced noise effects from traffic and accessible green and recreational spaces for residents.

Looking less at natural disaster, Dr. Uli Pätzel, CEO of Emschergenossenschaft and Lippeverband, laid out a similar historical path of water needs of the once heavily industrialized Ruhr in Germany's northwest and its conversion from "grey to blue water." After the collapse of the decades-old mining, steel and heavy chemical industries, the urban water infrastructure, which services over 50 municipalities in the region, was heavily polluted. In many stretches of the network, public sewage was open and posed health threats to the local population. In a successful case of public-private engagement, the municipalities and the Emschergenossenschaft rolled out a series of projects over the last two decades that slowly but surely reclaimed and redefined the regions cultural and economic relationship to water. Today, the region now boasts over 300km of renaturalized waterways, bicycle paths and an extensive network of water treatment plants. Moreover, the once economically depressed area has created thousands of new jobs in the hydrological and green architecture economies.

The Ruhr Region's positive transformation of the urban-water relationship was further detailed by Christa Reicher, Professor of Urban Design and Land Use Planning at the Technical University of Dortmund. In recent years, Germany has experienced several periods of unusually heavy rains, flash floods and damaging floods. Reicher highlighted Germany's psychological pivot of perceiving "water as a foe, for which city planners and urban designers will have to prepare. Parallel, according to Reicher, water brings a transformative quality of beauty to urban areas. She highlighted the Phoenix Lake project in the Ruhr Region, which

successfully re-purposed an industrial park into an urban lake with residences and cultural activities in an area of Dortmund. While the city struggled with a decline in population, the Phoenix Lake project, according to Reicher, reversed the trend by also attracted businesses and arts and cultural, all of which altered the way residents lived alongside and interacted with water.

The symposium's thematic emphasis on resilience also include the often under researched topic of suburban resilience. To strengthen this weakness, Professor Wolfram Höfer of Rutgers University combined the importance of risk mapping in suburban areas of metro New Jersey by underscoring the importance of parks management as a strategy of suburban resilience. Many smaller municipalities in coastal and Northern New Jersey were devastated by Hurricane Sandy's damaging rains and winds and continue to suffer more floods from increasingly intense rain events and a lack of resilience mechanisms. This, in turn, is pushing smaller cities and towns to also better understand their relationship with water, an element that, in alignment with the symposium, local municipalities perceive as a threat and source of potential economic disruption.

The symposium closed with a set of city-region experiences from the developing world. Dr. Ila Berman, Dean of the University of Virginia's School of Architecture, moderated a discussion on New Delhi's historical and current relationship with water from the Ganges as it flows southward from the Himalayas through agricultural areas and floodplains. Anthony Acciavatti and Iñaki Alday presented original field and design research that laid to bare the cultural and religious role of water, as well as the local economic challenges of tub wells in rural areas to the severe public health and ecological issues faced by New Delhi and the nearly 500 million people who access the Ganges basin for water.

The Future of Water Urban Resilience: Current Discussions and Future Impacts

Water will challenge urban cities in ways yet unseen in the history of urban development. As this symposium demonstrated, the very identity of many global cities, either directly or indirectly, is linked to water. Climate change, urbanization, antiquated infrastructure and gaps in governmental understanding are changing two things: how municipalities re-think their relationship to water; and, more importantly, how cities and regions will be able to meet the future challenges of this new set of variables.

While the debate around cities, regions and water is not a new one, climate resilience is a new part of this equation. Within the last five years, the founding of the Rockefeller

Foundation's 100 Resilient Cities global platform and the United Nations Making Cities Resilient campaign brought light to the topic of creating communicative links between cities and offer valuable information on implementing greater resilience practice. In 2015, the Sendai Framework for Action and Sustainable Development Goals, which served as the basis for the opening of the symposium, and the 2016 Habitat III conference in Quito further emphasize that the future will be much more urbanized than ever before. This, in turn, will necessitate more debate and discussion about urban resilience.

In comparison, the Water Resilient Urban and Regional Development symposium was unique in that it brought together academic disciplines that have historically been separated from interdisciplinary collaboration. Social scientists, architects, urban planners, engineers and environmental researchers, who contributed to the symposium, discovered that few other topics can bring together such a diverse set of academic traditions and research methodologies toward common goals, namely, understanding urban and regional development through the prism of water and resilience.

Much research remains on better understanding these links. The Water Resilient Urban and Regional Development symposium made a serious contribution to this work and hopefully will inspire future such collaborations in other global regions where urban center require greater knowledge about resilience and water.