

The edge

CoastNet



The magazine of CoastNet

Autumn 2007

Coastal cities



US/China Coastal
Cities Project

Ecological engineering
of seawalls

Climate change and
coastal cities

Cultural liaisons
in Tokyo



CoastNet – breathing new life into coastal matters

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CoastNet is a sustainable development organisation, set up to safeguard the world's coast and those coastal communities that depend upon it for their future. We work with communities, government and business to put sustainable development into action and believe that the unique complexity of coastal regions requires innovative solutions that reflect a balance between society, environment, and economy.

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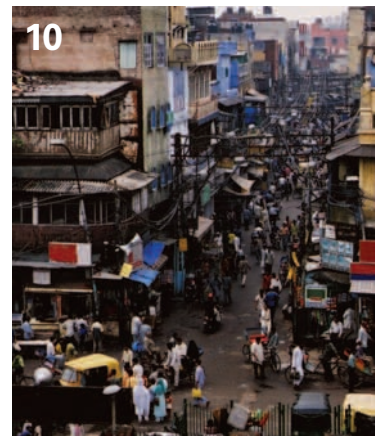
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From US to China: coastal city challenges and prospects for sustainability

Whether in New York or Shanghai, coastal cities around the globe are beginning to recognise the shared problems they face and the opportunities for joint working. Amy Jaffe, of the Coastal Cities project at Rice University, Houston reports on the most recent findings of a joint US/Chinese survey assessing public attitudes towards the major challenges facing their coastal cities.

Half of all humanity lives in or close to a coastal city. Currently over 50 per cent of Americans in the USA live in coastal counties, a figure projected to increase to 75 per cent by 2025. In China, it is much the same. Of its current one billion plus population, over 55 per cent reside in the coastal provinces and coastal cities of Shanghai and Tianjin. But whether in New York or Shanghai these coastal people will surely be the ones most severely affected by some of the 21st century's most pressing problems: global warming, violent weather, dangerous pollution. Now, coastal cities around the globe are beginning to recognise that they have much in common with one another – perhaps more than with other areas within their own countries. This has given rise to cross-country coastal city studies, of which one is currently up and running at Rice University's Shell Center for Sustainability. Here, they are working with various research institutions

in China and the US to assess the challenges facing these major, low-lying estuary metropolises.

The challenge of climate change

The Intergovernmental Panel on Climate Change (IPCC) has concluded that the global mean sea level has risen at an average rate of 1 to 2 mm during the 20th century with a further projected rise of 0.05 to 0.32 m between 1990 and 2050. Populations that inhabit small islands or low-lying coastal areas, according to the IPCC, “are at particular risk of severe social and economic effects from sea level rise and storm surges.”

Given the reality of global warming, coastal populations around the world will face severe challenges to their sustainability in the decades to come. Coastal cities are

particularly vulnerable to the long-term effects of warming, such as sea-level rise, flooding, air pollution, and severe storms. In addition, as industrial and commercial centres, many such cities are major contributors in their own right to high levels of greenhouse gas emissions, and therefore face the prospects of greater regulation and economic dislocation.

The challenges facing the world's largest coastal cities are very worrisome, notes Rice University sociologist Michael Emerson who is leading the study. “As populations of these industrialised coastal cities rise dramatically through immigration, policy leaders are going to have to address worsening environmental conditions and social dislocations stemming from rapid demographic changes,” Michael Emerson points out. “This is on top of the looming challenge being posed by severe storms.”

Public attitudes towards coastal challenges

The Shell Center for Sustainability at Rice University has begun a research programme on coastal cities which seeks to assess the dimensions of the challenges facing major, low-lying estuary metropolises. In its first phase, the study focuses on major US and Chinese coastal cities with a large petrochemical industrial base, including Houston, Los Angeles, New York, Shanghai, Tianjin and Shenzhen. Initial research activities included the development of a comprehensive and fully comparable survey of public attitudes and beliefs, conducted jointly in the United States and China. In all, 3,000 adults were surveyed, 500 from each coastal city.

Science and public opinion converge to intimate that important challenges face these coastal petro-economies. Their geography makes them particularly vulnerable to the long-term effects of

climate change, but in their initial survey research, the Rice University coastal cities group found that 70 per cent of Chinese respondents and over 75 per cent of Americans believed that sea level rise did not pose a serious problem for their city. In contrast, a substantial majority of respondents from the same cities believed that air pollution was a very serious challenge and were concerned about the effects of air pollution on their families' health.

Even in the face of the recent hurricanes, Rita and Katrina, only 33 per cent of Americans considered severe storms and flooding to be a serious challenge for their municipality while it was over 40 per cent for the Chinese respondents. More than 80 per cent of the Americans surveyed believed that normal activities, such as driving cars and running air conditioners contribute to harming the environment, but this was the case for only 56 per cent of the Chinese.

The coastal cities under study face rapidly-growing populations, with the associated increases in energy demand and human footprints and impacts including air and water pollution, increased greenhouse gas emissions, and run-off wastes. Sustainability and the prospect for future growth for such coastal cities may therefore depend on greater regulation of production systems, energy resources, and standards for health and environmental impact. The vast majority of Americans and over half of the Chinese respondents supported tighter environmental controls on urban development.

In assessing the prospects for such regulation and for the development of grassroots movements, the research also measured the reported participation of citizens in pro-environmental behaviours and found that only a small number of respondents had actively participated in



Five problems endemic to coastal cities

FLOODING

The increase of extreme weather events is likely to intensify existing water and control problems in many coastal megacities. The concreting and channeling of surface water has increased problems of run-off and flooding while increased salinity will likely become a problem in coastal aquifers and estuarine systems, threatening coastal agriculture, industrial plants and potable water systems. Existing structural solutions such as levies, bayous, and barriers and protection will need to be supplemented or replaced by non-structural flood alleviation strategies and flood plain management policy.

SEVERE STORMS

Global warming specialists predict that the occurrence of severe storms will increase in the coming decades. Warming ocean temperatures and sea level rise will make coastlines in our densely populated coastal cities particularly vulnerable in the future.

AIR POLLUTION

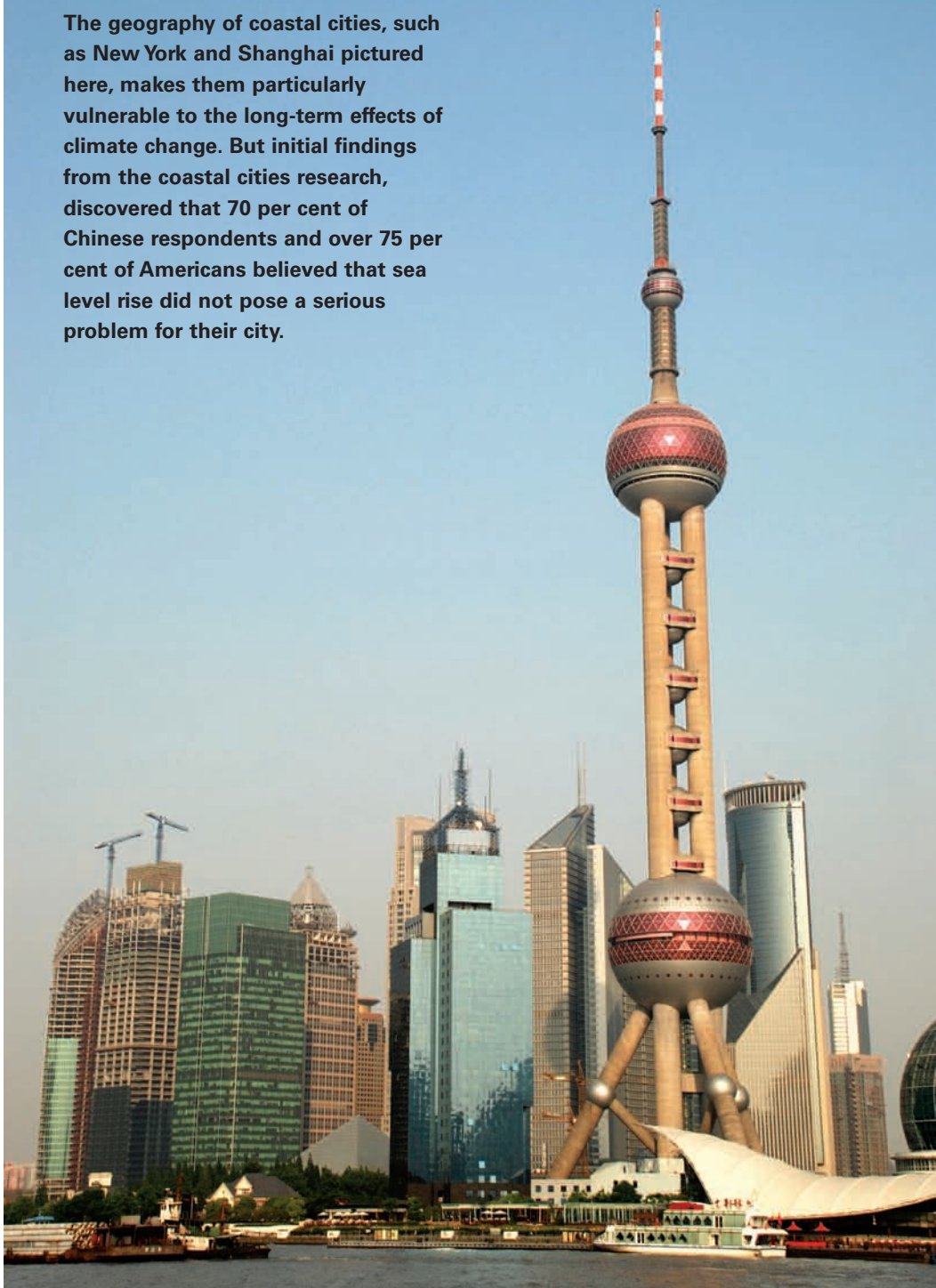
Coastal cities tend to attract industrial plants and petrochemical industries because of their excellent access to ports. This creates special challenges for regulating air quality, as seen in many US coastal cities, including Los Angeles, Houston, and New York, where air quality remains a major challenge. In China, nearly 45 per cent of cities being monitored (numbering more than 300) for air pollution couldn't attain national ambient-air-quality standards.

community environmental projects while a majority said they had purchased household appliances based on their environmental qualities such as energy efficiency. Americans were far more likely to say that they had avoided buying or using environmentally-damaging products than the Chinese respondents. Level of education appeared to be a factor in increasing the likelihood of American participation in pro-environmental activity, whereas the opposite was true in China. Upwardly mobile, more educated Chinese were less likely to report participation in pro-environmental activity than their less educated counterparts.

Researchers from Rice University plan to analyse the survey data to develop specific studies to explain the incidence with which individuals report participating in actions that assist the sustainability of the environment. These behaviours include: support for public policies designed to reduce global warming, joining environmental groups and working with others and engaging in personal behaviours that support and sustain the environment (eg, using mass transit, purchasing environmentally-friendly consumer products). Additional research will focus on how best to organise government for implementing policies designed to sustain and improve the environment.

The goal of the Rice University Coastal Cities programme is to foster international dialogue and cooperation in finding solutions to the major challenges of sustainable development for the world's largest coastal cities. It is hoped that the programme will be expanded over time to include other important international cities in Latin America and elsewhere.

The geography of coastal cities, such as New York and Shanghai pictured here, makes them particularly vulnerable to the long-term effects of climate change. But initial findings from the coastal cities research, discovered that 70 per cent of Chinese respondents and over 75 per cent of Americans believed that sea level rise did not pose a serious problem for their city.



CONGESTION

Population density in coastal cities is expected to rise significantly in the coming decades leading to massive congestion along crowded roadways. Congestion already causes more than 3.7 billion hours of travel delay each year in the US, according to the Texas Transportation Institute with the figure continuing to increase year on year. In China, it is much the same with the daily traffic volume in Beijing growing by 20 per cent a year. Holistic design will be a major tool to alleviate growing congestion problems in coastal cities.

ETHNIC TENSION

With increasing coastal city populations and a continuing influx of immigrants to port communities in search of jobs, the complexities of local racial and ethnic relations increases. Coastal cities will need to find ways to manage growing diversity, minimise harmful conflicts, harness the positives that come from population dynamism, and concentrate on quality education for all children. Doing so will require extensive cooperation across people groups.

About the project

The project is a research partnership between the Shell Center for Sustainability, the Center on Race, Religion and Urban Life (CORRUL), the Baker Institute for Public Policy at Rice University, and Horizon Survey Research of Beijing in China in relationship with Shanghai Academy of Social Sciences (SASS) and other Chinese institutions. For a copy of the survey and more information about the study visit <http://www.ruf.rice.edu/~soci/corrul/coastalcities.html>

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