ECOLOGICAL URBANISM AS A MEANS TO CONSIDER THE NEW CITY, THE OLDER CITY AND THE SHRINKING CITY

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ABSTRACT

With the aim of projecting alternative, humanistic and sustainable forms of urbanism, landscapes and future cities, the lecture will address the following issues: what are the key humanistic issues of an ecological urbanism? How might they be organized? And what role might design and planning in landscape architecture play in the process? The lecture will explore whether, and how, new, older and shrinking cities can be sustainable and socially just including addressing an understanding of ecology beyond the environmental to include the societal, political, and the cultural. These questions will be explored through the examination of an international planning and design conference and exhibition at Harvard University titled ‘Ecological Urbanism: Alternative and Sustainable Cities of the Future’ held last year in April, 2009 at the Graduate School of Design. Questions, issues, discussion and case studies presented at the conference will be critically examined as a potentially new paradigm in the design planning and management of the urban environment in addition to case studies drawn from the presenters own professional experience. The lecture examines how designers and planners can use their projective capacities to imagine better futures and in particular urban landscape futures. Whether confronting increasing pressure to respond positively to current global conditions such as biodiversity loss, climate change, overdevelopment and urban population densification, aggressive disasters of disease, public health and social inequality and the effects of economic recession, or capitalizing on global achievements such as ease of trans-continental movement, technological advancement, social freedoms, and bio-political knowledge, designers and planners have recently been compelled to assume a more speculative posture and to lead in imagining better environmental futures. The lecture will look at the instrumental role that ecological urbanity or urban design plays in propelling projective thinking. It will also ask questions about technological determinism and how technology has often propelled the imagination of better futures through form.

key words: urban landscape design, landscape regeneration, developing countries, informal cities, urbanization, ecology
“There will soon be more people living in the city of Bombay (Mumbai) than on the continent of Australia. URBS PRIMA IN INDUS reads the plaque outside the Gateway of India. It is also the Urbs Prima in Mundis, at least in one area, the first test of the vitality of a city: the number of people living in it. With 14 million people, Bombay is the biggest city on the planet of a race of city dwellers. Bombay is the future of urban civilization on the planet. God help us.”

Suketu Mehta
Maximum City, Bombay Lost and Found. (1)

OVERVIEW

This paper examines how designers and planners can use their projective capacities to imagine better futures and in particular urban landscape futures for new cities, old cities and cities that are shrinking in population. Whether confronting increasing pressure to respond positively to current global conditions such as biodiversity loss, climate change, overdevelopment and urban population densification and movement, aggressive disasters of disease, public health and social inequality and the effects of economic recession, or capitalizing on global achievements such as ease of trans-continental movement, technological advancement, social freedoms, and bio-political knowledge, designers and planners have recently been compelled to assume a more speculative posture and to lead in imagining better environmental futures.

The author aims to trace some of these contemporary themes and the means by which architects and planners have responded to the contemporary city through reporting and reflections on the recent International Design Conference and Exhibition (2) held recently at Harvard University in April 2009. The paper will look at the instrumental role that ecological urbanity or urban design plays in propelling projective thinking. It will also ask questions about technological determinism and how technology has often propelled the imagination of better futures through form. In the same vein, the discussion of Ecological Urbanism will attempt to put into perspective the ecological and the developmental crises and their respective design and planning responses. The paper will also examine the seeming monopoly of engineering and management platforms in design and planning and will reflect on the way in which landscape architecture can be the locus of imagining alternative futures through the lens of Ecological Urbanism.
INTRODUCTION

Of the discourses within the discipline of design, landscape and landscape architecture remains one of the most elusive and generative. As a term that concerns space and culture, the word ‘landscape’ currently finds tremendous currency across fields of knowledge that range from the everyday and low-brow to the highly specialized and technical. Yet, with such an abundance of applicability, there is a dearth of research and thinking regarding the immense variety of design practices that engage landscape in fundamentally different ways. Today, as concerns about the design of the built environment particularly in the modern city gain greater focus within the consciousness of the public at large, it is exceedingly relevant to redefine the prospects of landscape and landscape architecture with a measure of criticality. Landscape architects and other design disciplines must have the ability of setting very high goals for the future of the city and creating more beautiful, humanistic, ecologically sound and socially enriched environments. Yet, the most important design challenges faced today - from the creation of more integrated transit infrastructures to rethinking relationships between nature, home, and industry - escape the exclusive purview of traditional professional urban expertise. Many of the current approaches to rethinking, designing and developing our cities and towns are unable to adequately address these challenges. These approaches include for example new urbanism theories outlined by architects, Andreas Duany and Elizabeth Plater-Zyberk (3), Landscape Urbanism as defined by architect Charles Waldheim and others (4) and ‘New Geographies’ as defined by the ‘urbanist’ and architect Hashim A. Sarkis. (5) Ecological Urbanism is a title for a world that contains and thrives on opposites. It contends that the urban environment has failed to take account of the differences and complexities of human life, traditional practices, and natural conditions and sustainable processes. Thus within Ecological Urbanism landscape space and built spaces should be interactive, not opposed, not separated into city on the one hand and country on the other. It needs open space and buildings that would not, as Mohsen Mostafavi, Dean of the Harvard Design School has noted “be merely visual, but would deal with the human body, with health, with a world that is lived in, an environment that we breathe, smell, that encourages social interaction, participation and even disagreement” (6)

While sustainable tower buildings, ‘green’ technologies and low impact architecture have become increasingly topical, the sustainability of the whole city is much less developed. The Ecological Urbanism symposium on the subjects of productive urban landscapes, the human management and design of resources such as water, waste, air and daylight, mobility and infrastructure, and the ecologies of scale is based around the premise that an ecological approach is urgently needed both as a remedial device for the contemporary city (that is to repair, reconnect and regenerate existing urban fabric whether in a state of growth or decline) and as an organizing principle for new cities to be built from scratch.

LANDSCAPE ARCHITECTURE: PAST AND PRESENT

Landscape Architecture as a distinct and separate professional field began to emerge in the middle of the 19th century around the practical and philosophical concerns of the ideal American city. New York like many urban centers in North America was a place of great vibrancy, productivity and attraction yet without much social amenity. The possible role of public open space and parks in addressing social
issues was part of a larger public debate of what a city should be, which included, for example the roles of sanitation, public works and civic resources such as libraries, botanical gardens and schools all for the betterment of human society. After Olmsted and Vaux won the Central Park competition in 1859, their pursuit of a far-reaching social agenda to be realized in the creation of a new park laid the groundwork for the practice of landscape architecture as a publically oriented profession. Further north, the City of Boston owes a particular debt of gratitude to Charles Eliot, who had a genius for articulating a conceptual and physical framework for the preservation of remnant wild lands and scenic resources in the Boston metropolitan area. His involvement came at the end of the 19th century, precisely at that moment when major shifts in technology, city making and the old social order were occurring, as well as an unparalleled population expansion that was reshaping the national landscape. The evolution of landscape architecture in the early years of the 20th century reflected the growing importance of the profession as something wholly distinct from architecture and involved in an entirely different scale of design. Also admirable and noble is the argument that landscape architecture as a discipline had, from its inception to the present engaged in a critical way with society, ameliorating the environment and proposing courses of action that reconciled the interests of profit with the public good. This suggested separateness from pure architecture, which had by contrast, declined such positive and constructive societal engagement due to certain theoretical stances concerned with for example, geometry, tectonics and artistic production.

AN INTEREST IN THE LANDSCAPE WORK OF PATRICK GEDDES

A good example of the critical engagement with a humanist approach to urbanism is shown in the life and work of Patrick Geddes, (1854- 1932) a Scotsman who is often cited as one of the founders of modern land and urban planning through his work on the intimate relationship between social processes and spatial form. Geddes pioneered a sociological approach to the study of urbanization; discovered that the city should be studied in the context of the region; predicted that the process of urbanization could be analyzed and understood; and believed that the application of such knowledge could shape future developments towards life enhancement for all citizens. There is little doubt that Geddes was a formidable intellectual and polymath and drew on a wide and diverse set of intellectual influences, but he made important practical connections between them in interpreting his notion of a 'human ecology'. Geddes united ideas from, and between, botany and the natural sciences, sociology, regionalism, urban design, economics, history, art, politics, literature, gardening, philosophy, education, printing, mathematics, public health, housing, music, and poetry. He correlated the humanities and sciences with their corresponding practical applications in the arts and technologies; a blend of art and science that continues to underpin urbanism. Geddes was described as both an active thinker and a practical doer and his main legacy was his ability to engender a sense of the wonder of life. He sought to put his ideas into action, and confronted many of the practical issues associated with the implementation of ideas on ensuring the sustainability of the urban fabric. Furthermore, his interdisciplinary interests shaped what we recognize as a generalist vision for the study of cities and culture and the roots of Ecological Urbanism. His legacy and approach identified and assessed the physical and social factors that may be considered to contribute to human health - such as housing, employment, air quality, water supply, the
availability of gardens or natural areas, and the nature of cultural traditions and identity. Geddes stressed the need to identify the links between the different factors, and, where deficiencies existed, the search for appropriate solutions. These would often require political, social, and physical intervention. His early approach to urbanization was based on a holistic and dynamic appreciation of the whole environment, and particularly the connections between work, place, and people. His approach was one that sought to better respect the 'organic unity' of cities, and both to take into account the historic past and to identify the future potential.

What is particularly exciting about the early work of Geddes is that his interests encapsulated both the theoretical and practical aspects of land use and development. He encouraged involvement by local people, for example, in his attempts to improve housing conditions in the Old Town of Edinburgh, Scotland. He appreciated the need to link ideas relating to design and layout to their effective execution, particularly in his development efforts. Geddes was involved in, and drew on, a wide range of international comparative experiences. His work in such places as Ireland, India, Palestine, and France, reveals an intellect constantly seeking to self-improve and understand. His interests in regionalism, for example, examining the wider spaces in which society is organized and linked to natural resource development, was important in the later design of specific regional economic development initiatives, such as the Tennessee Valley Authority. Moreover, along with other influential thinkers of the time (such as John Muir and Frank Fraser Darling), Geddes contributed to our modern understanding of sustainable development, natural resource development, and environmental management. In this sense he was a pragmatic visionary, anticipating the challenges and issues associated with planning and the environment. Arguably, this focus on implementation finds its modern expression in the emphasis in Ecological Urbanism on site description, analysis, policy and implementation. Yet, for Geddes, theory and practice went hand in hand. His interventions reveal considerable respect for the older urban fabric, enacted by putting into effect the vernacular tradition, while saving old structures by re-using them. His emphasis turned on the interaction between people and place - in the context of time. He anticipated modern conservation practice, which places an emphasis on the understanding of what is significant about an asset. Indeed, for Lewis Mumford, it was Geddes' interest in 'potentiality and purpose' that was among his most important contributions. For example in his many reports on the planning of cities in India he first carried out a 'diagnostic survey' addressing the geological, physical, social, religious and cultural urban and town conditions in minute detail. District mappings, plans, sections and detailed recordings of every tree, well, pond, lane, house and street were carried out. In addition health, disease and population dispersion were addressed. From this analysis, design ideas for 'conservative surgery' were proposed addressing food production, land supply, infrastructure, open spaces, water tanks ponds and places of gathering for women and children as insertions into the existing fabric.

Geddes, as a generalist, would no doubt have endorsed much of the contemporary search in Ecological Urbanism for inter-professional and inter-disciplinary working. His was not a fragmented vision. Indeed, Mumford noted, for example, the importance of Geddes’ ‘organic methods of thought and action. No doubt Geddes would have connected with the analysis of the current environment and the centrality of ecological problems in prevailing modern life and thinking. Moreover, he would also have put all his energies behind the values that underpin practical endeavors such as the Indian town projects, which seek a realistic solution to sustain the future of a historical legacy for all citizens benefit. Such 'conservative surgery' surely represents the means whereby cities in periods of growth or decline can be
kept alive while retaining their original character.

LANDSCAPE LEADERSHIP

While the subsequent history of the landscape field has been luminous in parts we cannot take leadership in the planning and design of the natural and built environment for granted. What is critical to acknowledge about this moment in the history of the landscape discipline is the degree to which the field also has moved in the last three decades from its foundations in the preservation and construction of landscapes, both rural and urban and from more recent practices of a version of modernist landscape design that engaged with varying success the spatial concerns and often times minimalist aesthetics of design modernism. Three strands of thinking have accompanied this evolution

First: Landscape Architecture has moved far beyond the stylistic based approaches of landscape modernism. Current thinking makes design itself a kind of research and uses models that are as much scientific as artistic, focusing on the metrics of a site, ecological factors and the inevitable interaction with natural and manmade systems, ultimately transformed within the studio into synthetic and formal products that are the hallmarks of any design approach. The emergence of this heuristic approach and the embrace of opposing and contradictory forces are especially well suited to the finding of solutions to the open-ended and complex environmental and urban problems of our time.

Second: The very old idea of nature as sacred and fixed and the scientific conception of the natural world to which the profession of landscape architecture is often aligned, underwent dramatic changes in the 1970’s. The idea of an orderly progression of landscape toward an ideal climax condition has been abandoned. Dynamic ecology, characterized by constant change and cross influence is the paradigm today and decisively shapes where landscape architecture is going.

Third: The capacity of landscape architects to work at multiple scales, to solve environmental problems, and to collaborate with or lead collaborative teams of urban planners, engineers and architects are increasingly the skill sets that the planning and design problems of our century require. These skills wielded so effectively by Olmsted, Eliot and Geddes must be developed and taught if landscape architecture is to make unique contributions.

The recent global upheaval in economic markets and the effect that it will have on development construction and ultimately the work that is done by designers or available for them to do, make clear the types of ways that urban landscape today is subject to forces of change that are distinctly of our own time. It recognizes the real, if sometimes nascent imperative that the responsibilities of landscape architects include the need to address and synthesize present complex environmental and social issues in their work.

ECOLOGICAL URBANISM CONFERENCE AND EXHIBITION

What will the cities of the future look like and be like? Natural systems and their human uses are of central importance in urban regions where diverse green spaces and built spaces of essentially equal value intertwine. Urbanism also begins at home- the water we drink, the food we eat; the cars we drive all
have spatial origins and results. Yet urbanism simultaneously starts on a regional and indeed global scale. Today, more than half of the world’s 6 billion people live in cities — and by 2050 two-thirds will dwell in energy-intensive urban areas. At the same time, certain cities and Durban regions are declining in population and some cities face continued pressures related to health, climate change, air pollution, traffic, and reliable supplies of energy and water. Landscape architects and other designers can help reduce the environmental impact of cities. The energy to light, heat, and cool urban buildings accounts for nearly half the globe’s burden of greenhouse gases. In the United States, a majority of the country, more than 280 million people live in urban areas. There is an invitation here to turn crisis into opportunity.

Cities can save energy, with loop-like “industrial symbiosis” regional systems of sharing excess materials and energy such as the example of Kalundborg, Denmark. Garbage is burned for energy and waste streams from industry are “repatriated” for other uses.

Another example of the hope and potential in the built environment was Masdar, a $22 billion planned city near Abu Dhabi in the United Arab Emirates (UAE). It has been designed from scratch to be a solar-powered, low-carbon city of 2.5 square miles of reclaimed desert. Hot desert winds will be channeled along short shaded streets and cooled through finger-like parks irrigated with wastewater. There are limitations, however including the realization that solar power will not be enough to fill the little city’s needs. Energy-efficient structures can go up “anywhere in the world” — at a price. A 50 percent reduction in energy use (compared to a conventional building) would require a premium of as much as 15 percent; an 80 percent reduction might cost a builder up to 30 percent more. Any efficiency gains depend on occupant behavior and the way occupants act can more than double the energy a building saves, or double the energy it uses.

Yet at the same time new cities are being conceived and planned, older ones are in serious decline—consider Detroit for example. A 138-square-mile city, Detroit’s former population of 1.85 million has drastically shrunk to just 912,000 people. Approximately one third of the city is empty or unused, and this is an area about the size of San Francisco. Detroit’s sparse population and vacant spaces means that the city is receiving much less revenue from taxes and other sources, but it has to support municipal services, like fire, police, sanitation, and schools, that are way too spread out. Realizing that the city’s population isn’t going to grow any time soon, Detroit either has to become denser, or it has to decentralize power, water, and waste services to the block level. Densifying Detroit is problematic, because it involves moving people in ways that could be forceful and unpopular. On the other hand, decentralizing services offers a great opportunity. Vacant lots can be turned into small farms. Vacant streets can turn into greenways. People can learn how to build and run micro-water, waste, and energy facilities. Low-cost lifestyles can ease the work burden on people who can then reinvest extra time back into their community.

The two events held at Harvard University and curated by Dean Mostafavi and faculty – the Ecological Urbanism Conference and Exhibition were considered both separate with their own identity and intentions yet inter-bound in broad coverage of the subjects and material.
Ecological Urbanism Conference, Graduate School of Design (GSD)

More than 50 speakers and nearly 500 students, academics, and practitioners attended the Ecological Urbanism Conference held at the Harvard Graduate School of Design in Cambridge, April 3-5, 2009. Participants and attendees included experts in landscape architecture, urban design and planning, public health, social epidemiology, architecture, public policy, engineering, art and allied professions, who explored the complexity of myriad issues and systems related to creating alternative and sustainable cities of the future. Alternate patterns of urbanization including sprawl were presented and discussed from the perspective of nature and city populations referring to principles extracted from the fields of landscape ecology, transportation planning, hydrology, artistic production, urban studies and the humanities. Themes of the conference were;

- Interdisciplinary Perspectives
  Introductory comments by faculty from Harvard University graduate schools and undergraduate college on the contemporary city.

- Productive Urban Environments
  Urbanism carries a carbon footprint well beyond the physical limits of the city. Future cities will need to aspire to be carbon negative, including offsetting the city’s embodied energy. What is the potential for cities to increase the production of energy, food and good public health?

- Curating Resources
  The management and design of resources such as water, waste, air and daylight needs to be radically rethought in light of the needs of the future city, with the word ‘curation’ being suggestive of the role of design in their management.

- Mobility, Infrastructure and Society
  What does the future hold in terms of mobility, how does this affect the sustainability of low-density suburbs and rural areas what potential new fuels can support future mobility’s and how and what sustainable infrastructures can support them?

- Ecologies of Scale
  What alternative designs will make a more sustainable urbanism possible, what new materials are likely to change the way we design, adapt and build the city of the future and how is that sustainability measured?

- Engineering Ecology
  Looking both at the design of new eco-cities as well as the retrofitting of existing and future cities, this theme asked- what will the future city be like, how will it look, how will it smell, how will it feel?

- What Next?
  Reflections by Harvard Design School Faculty and design visitors to the GSD
Ecological Urbanism Exhibit, GSD Lobby

Visions of that future could be seen in a colorful exhibit on display at the Graduate School of Design for the duration of the Conference. Featured projects in the exhibition focused not so much on the formal boundaries of the urban condition but extended beyond and within to its ecological, cultural and social limits. There were small-scale marvels, including energy harvesting textiles and electric cars that stack like shopping carts. There were grand, wistful visions of the future, too. In a mural of “vegetal cities,” bicycles wheeled along grassy roadways under trellis-like wooden bridges and in the shade of buildings roofed with vegetation. ‘Archiborescent’ cities rose wave-like at the water edge or nestled in canyons. Five examples of documented work from the Ecological Urbanism exhibition of most interest to the landscape field were Urban Regions by landscape ecologist Professor Richard Forman, the Port Lands Estuary Landscape Proposal, Toronto, Canada by landscape architect Michael Van Valkenburgh and Associates, Cambridge, MA with Transolar, Urban Agriculture by landscape architects, Dorothee Imbert and Sheri Fultineer, Smells of Mexico City by Sissel Tolaas, GSD Rouse Visiting Artist 2009 (7) and Masdar City, Abu Dhabi by architects Foster and Partners with Transolar

URBAN REGIONS

As modern cities grow up and out, what sustainable systems will deliver food, energy, and water? How will cities deal with noise, light, and odor? To reduce the urban carbon footprint, how should new open spaces and buildings be built and old ones fixed?

Maps of urban regions reveal new ecological readings of the city beyond its physical and political limits, documenting aspects as diverse as water resources, biodiversity and aircraft noise. Cities consume their hinterland and surrounding regions, but can that relationship be made more mutually supportive? In the study ecology and planning beyond the city combines the fields of urban planning and ecological science in examining thirty-eight urban regions around the world. In the exhibition a selection of eighteen maps from the study are presented. The core aim of the selected maps was to discover common or distinctive patterns of importance for natural systems and their human uses. The red in the maps represents built up metropolitan areas of different sizes, dark green signifies forest and woodland. Notice the proximity of city and major wooded areas, the forests providing context for recreation, streams, slope protection and clean cool air. The spigot icons on the maps represent water supply, the owls stand for biodiversity, strawberries for market gardening and the sound symbols represent the noise of the flying aircraft.

PORT LANDS ESTUARY LANDSCAPE PROPOSAL, TORONTO, CANADA

The plan results from the winning solution of an intensive eight-week design competition with an international team of designers, engineers, and ecologists, headed by the landscape architects. The Port Lands Estuary proposal applies an evolutionary approach rooted in ecological principles and Public Health to the emergence of new neighborhoods. The plan draws extensively on the varied site histories,
ecologies, surrounding context, and potentials for future use. Employing an integrated landscape-based methodology of city building developed in close collaboration with a diverse client group, the plan reaches across disciplinary lines to link the client's goals of introducing urban development, native ecologies, and public infrastructure to an obsolescent industrial site in order to transform it into a vibrant new sustainable community for Toronto.

The Port Lands Estuary proposal heralds a new relationship between the urban and the natural. Developed by an integrated team of designers, engineers, and ecologists, the plan introduces urban development, native ecologies, and public infrastructure to 280 acres of Toronto's post-industrial Port Lands. This planning framework for a vibrant new mixed-use riverfront and lakefront neighborhood is developed through a landscape-based approach that unifies the goals of ecological restoration and urban design with potentially transformative effects. Major world cities such as Toronto are in transition, needing to re-integrate strategically important post-industrial landscapes while reframing their interactions with the natural environment. The Port Lands Estuary proposal is unique among these efforts by virtue of its size, scope, and complexity. In this proposal, the engine of transformative urbanism is a radical repositioning of natural systems and attendant landscapes, transportation networks, and urban environments all under the theme of public health. The imperative of sustainable flood control leads to relocating the river mouth and a renewed recognition of the functional and experiential benefits of river ecology makes it the symbolic and literal center around which new neighborhoods can be constructed.

A significant part of the urban analysis included understanding how the origins of Toronto's two dominant park typologies - rectilinear parks shaped by the urban grid and irregular parks shaped by the topography of the extensive ravines - might be used as precedents for the kind of urban/park relationship that was going to be established in the Lower Don Lands neighborhood. Instead of creating naturalized banks along the straight course of the existing channel connecting the Don River with the lake, as was originally suggested in the project brief, the Port Lands Estuary proposal keeps the Keating Channel as an urban artifact and neighborhood amenity and creates a new mouth for the river that flows logically from the upstream source, bypassing the abrupt right turn created by the channel. A large new meandering riverfront park becomes the centerpiece of a new mixed-use neighborhood.

**URBAN AGRICULTURE**

Urban agriculture is the practice of cultivating, processing and distributing food in, or around a town, city or urban center. Urban farming is generally practiced for income-earning or food-producing activities though in some communities the main impetus is recreation and relaxation. Urban agriculture contributes to food security and food safety in two ways: first, it increases the amount of food available to people living in cities, and, second, it allows fresh vegetables and fruits and meat products to be made available to urban consumers. Harvard University is developing as part of the proposed Allston Campus Expansion and Development on the adjacent banks of the Charles River the introduction of urban agriculture for food production, community outreach and a teaching tool for the Design School, the School of Public Health and the Engineering and Science Departments of the undergraduate college.

A common and efficient form of urban agriculture is the bio-intensive method. Because urban agriculture promotes energy-saving local food production, urban and peri-urban agriculture are generally
seen as sustainable practices. Social benefits that have emerged from urban agricultural practices are; better health and nutrition, increased income, employment, food security within the household, and community social life. UPA can be seen as a means of improving the livelihood of people living in and around cities. In addition they can be used as a "living campus" where students get real-world, hands-on agriculture experiences that cultivate both healthy habits and environmental leadership.

Taking part in such practices is seen mostly as informal activity, but in many cities where inadequate, unreliable, and irregular access to food is an occurring problem; urban agriculture has been a positive response to tackling food concerns. Households and small communities take advantage of vacant land and contribute not only to their household food needs but also the needs of their resident city. Some community urban farms can be quite efficient and help women find work, who in some cases are marginalized from finding employment in the formal economy. Studies have shown that participation from women have a higher production rate, therefore producing the adequate amount for household consumption while supplying more for market sale. Examples of urban centers where urban agriculture has been developed include Cairo, Egypt, Havana, Cuba, Mumbai, India, Shenzhen, China and New York City, New York.

The benefits that Urban Agriculture brings along to cities that implement this practice are numerous. The transformation of cities from only consumers of food to generators of agricultural products contributes to sustainability, improved health, and poverty alleviation.

- Assistance to close the open loop system in urban areas characterized by the importation of food from rural zones and the exportation of waste to regions outside the city or town
- Transformation of wastewater and organic solid waste can be transformed into resources for growing agriculture products: the former can be used for irrigation, the latter as fertilizer.
- Reuse of Vacant urban areas in declining cities for agriculture production.
- Conservation of natural resources. The use of wastewater for irrigation increases the availability of freshwater for drinking and household consumption.
- Preserves bioregional ecologies from being transformed into cropland.
- Allows savings in transportation costs, storage, and in product loss, that results in food cost reduction.
- Improves the quality of the urban environment through greening and thus, a reduction in pollution.
- Improving the quality of the environment to make the city a healthier place to live.
- Facilitates the access to food by an impoverished sector of the urban population making it a very efficient tool to fight against hunger and malnutrition UPA provides food and creates savings in household expenditure on consumables, thus increasing the amount of income allocated to other uses.
- Education of the community to see agriculture as an integral part of urban life and an effective educational tool to teach kids about healthy eating and meaningful physical activity.
SMELLS OF MEXICO CITY

This project by artist Sissel Tolaas from Berlin researches the smells of Mexico City and focuses on smell as urban information and as a human system of communication. It asks the key question how can a heightened consciousness of smell be significant to the established social, physical and moral order in Western culture?

In modern culture the topic of smell is repressed and its social history ignored. This start devaluation has had a lasting effect on its status. Even on the rare occasions when smell is the subject of popular discourse, for example in certain contemporary works of fiction, it tends to be presented in terms of its stereotypical association with moral and physical degeneracy. Smells have been eliminated from society and then reintroduced as agents of fantasy, a means of recreating an identity, an urban world from which one has already been irrevocably alienated. In pre-modern cultures smells were thought of as intrinsic ‘essences’ revelatory of inner truth. Smells cannot easily be contained; they escape and cross boundaries, blending different entities into wholes. This rich sensory model contrasts with our modern, linear worldview emphasizing privacy, discrete divisions and superficial interactions.

The sense of smell plays an important role in the relations between individuals. Smell is not simply a biological and psychological phenomenon, though. Smell is cultural, hence a social and historical phenomenon, even though it and its social history are repressed in the modern world. Smells are invested with cultural values and employed by societies as a means for defining and navigating the world, for communicating and interacting with it. The intimate, emotionally charged nature of the smell experience ensures that members of society interpret value-coded smells in a deeply personal way. My passion and dedication to the topic of smell is an investigation into the essence of human culture.

MASDAR, ABU DHABI

Masdar is a proposed planned city in the United Arab Emirates. It is an initiative by the Government of Abu Dhabi and designed by the British architectural firm Foster + Partners, the city will rely entirely on solar energy and other renewable energy sources, with a sustainable, zero-carbon, zero-waste ecology. The city is being constructed 17 kilometres east south east of the city of Abu Dhabi, beside Abu Dhabi International Airport. Initiated in 2006, the project is projected to cost US$22 billion and take some eight years to build, with the first phase scheduled to be complete and habitable in 2009. The city will cover 6 square kilometres (2.3 sq mi) on a site 6.4 km² (2.5 sq mi) in size and will be home to 50,000 people and 1,500 businesses, primarily commercial and manufacturing facilities specializing in environmentally-friendly products, and an expected 40,000 workers will commute to the city daily. It will also be the location of a university, the Masdar Institute of Science and Technology, which will be assisted by the Massachusetts Institute of Technology. Automobiles will be banned within the city; travel will be accomplished via public mass transit and personal rapid transit systems, with existing road and railways connecting to other locations outside the city. The city will be walled, to keep out the hot desert wind. The lack of cars will allow for narrow, shaded streets that will also funnel breezes from one side of the city to the other. Masdar will employ a variety of renewable power sources. Among the first construction projects will be a 40 to 60 megawatt solar power plant, built by the German firm Conergy,
which will supply power for all other construction activity. This will later be followed by a larger facility, and additional photovoltaic modules will be placed on rooftops to provide supplemental solar energy totaling 130 megawatts. Wind farms will be established outside the city's perimeter capable of producing up to 20 megawatts, and the city intends to utilize geothermal power as well. In addition, Masdar plans to host the world's largest hydrogen power plant.

Water management has been planned in an environmentally sound manner as well. A solar-powered desalination plant will be used to provide the city's water needs, which is stated to be 60 percent lower than similarly sized communities. Approximately 80 percent of the water used will be recycled and waste water will be reused "as many times as possible," with this grey water being used for crop irrigation and other purposes. The city will also attempt to reduce waste to zero. Biological waste will be used to create nutrient-rich soil and fertilizer, and some may also be utilized through waste incineration as an additional power source. Industrial waste, such as plastics and metals, will be recycled or re-purposed for other uses.

CONCLUSIONS

Contemporary issues of practice, research, and representation in Landscape Architecture must confront ecology and traditional culture at all levels. For example touching on the economic value of ecology in the urban environment - addressing the ever-increasing value of defining ecosystem services and the potential for urban ecology to provide an infrastructural role in the city.

Ecology Revisited

A street tree is not just a tree but also a critical element of the city, cleaning air, sequestering carbon, diminishing the urban heat island effect, and providing environmental and economic benefits to the city. Indeed, a city of trees therefore would be a more livable city - ecological or otherwise. The potential of landscape to function as a water filtration mechanism exists, and to be both more cost effective and attractive than traditional systems of civil engineering. In the examples that they raised in the Conference, landscape functions as infrastructure - an idea that fits nicely into the more abstract idea of Ecological Urbanism. Landscape infrastructure should therefore be a fundamental component of the Ecological City.

Ecological Urbanism includes not only this infrastructural landscape approach, but that is goes beyond the landscape, it is more pluralistic and encompassing of multiple disciplines. Ecological Urbanism is design that impacts the city at all its scales, and attempts to do so in a way that learns from nature or is harmonious with its principles. For the most part, design practitioners remain uninterested in the specific conditions and causes for this abundance, even less so in the profound transformations of the world which make their professional opportunities possible. In glossing over the deeper truths underpinning this moment of landscape design hyper-activity, the landscape field need to grasp the real potential of their own competences, strategies, methods, commitments and priorities to address issues of larger ecological, social, artistic, political, cultural and intellectual significance beyond the single project, the stand-alone site or the singular design idea and acknowledge the emergence of Ecological Urbanism.
as a new but for the most part latent paradigm in design today—and to articulate it and bring it to bear effectively on the re-emergent social role of landscape design.

**Concerns and next steps**

The questions, issues, discussion and case study presentations of the Ecological Conference and Exhibition raised a series of topics that could form the basis for the next steps in education, research and practice. These questions basically focus into three areas of urgent investigation that are tightly intertwined:

1. **Questions of Ecology**
   
   What is the potential of ecological thinking in ecological urbanism and how will the theory of ecology inform urbanism in the future? The dichotomy of the pristine landscape and the city is an antiquated model. We know that the ideal of a closed system where all parts are in equilibrium is antiquated. Plants grow and die, tidal waves change urban coastlines, floods change riverbeds, on a more dramatic scale hurricanes, mudslides and firestorms flatten cities and forests.

   How can we learn from the open-ended systems of ecological processes that are characterized by disturbances, spatial dynamics and change? How can we a dynamic way of thinking into urbanism be integrated into research and practice? One important lesson in the conference was examples of how badly informed modes of representation in landscape architecture ignore the dynamic nature of the landscape, which eventually lead to misinformed build-out of the urban environment. This suggests an important field of research in investigating the knowledge of dynamic ecology and its representation.

2. **Questions of Power**

   The question of “total design” was raised in Conference discussion. Similar questions can be asked about all the new city expansions we were reviewed in the presentations. These models seemed to indicate that the designer is in total control of the future city. The reality is that cases where the designer is in control is minimal. In many cases no single entity is in control. We know that one third of all cities in the world are unplanned. One billion people live there and half of our new urban growth in the next twenty years will be in the informal sector. What holds the promise of ecological urbanism for the informal city? What are the modes of operation in these situations? No matter whether the city is formal or informal how can design tactics be developed that successfully operates with the forces of economy, politics and demography?

3. **Questions of Scale**

   What do landscape architects do in which scale is probably the most critical questions for designers. In the Conference there was the development of a new humbleness, which believes in the power of traditional culture and detail. A number of people, believe that declining cities like Detroit need a new, modern industry to get the city on its feet. Yet monocultures, even in economies, are ill-advised. Detroit’s auto-centric history can attest to that. Besides, with an unemployment rate of 28.9 percent, the city needs something more drastic than hydrogen fuel cell car factories or car factories converted into wind farm manufacturing facilities. Detroit’s strength is in its weakness. The city affords many opportunities to
artists, entrepreneurs, urban homesteaders, and people who do not want typical 9-to-5 lifestyles. Large, vacant commercial space may be rented out to start-ups at basement sale prices. People can buy homes and land for almost nothing, grow their own food, and form communities of similarly minded people. Residents can be given financial or technical assistance to build farms, solar panels, micro turbines, grey water systems, vermiculture compost systems, and other household-level or block-level amenities that local government can no longer afford to provide. Not only is the government relieved to pursue more pressing problems, like education and crime, but people are empowered to run their own communities. In turn, people are relieved of having to join the 9-to-5 workforce – with no mortgage, no car payments and insurance, little-to-no utility payments, and a small food bill from farming, people can use their time to invest in their community. The weak city was therefore described where small projects such as these act as ‘soft’ agents that have a greater impact than the muscular approach of a master plan. In a similar move Rem Koolhaas honored the humble vernacular work of Maxwell Fry and Jane Drew, his former teachers who worked in Africa and Asia in the 1960’s. No detail of city life was too low to be considered. This thinking was best illuminated in the section of a simple street curb combined with a drainage channel that can be cleaned by a broom and a smart street curb which took on the new role of charging electric vehicles propelling us into the 21st century. This thinking might suggest that we bravely reinvent the mundane details of our urban existence, - the street curb, the trashcan, the streetlight, the sidewalk, and the bicycle.

On the other end of the spectrum ‘mega proposals’ are encountered like the large centralized energy production schemes, the wind-farms in the North Sea of Europe and the solar farms currently in Spain. In contrast, Ecological Urbanism so far has believed in the decentralization of large infrastructure, self-sufficiency is a key word. As much as possible should be handled on a project scale for example storm and wastewater, energy, food and waste such as in Kalundborg, Denmark. This is more than just an isolated case in industrial recycling, the extensive regional landscape of Denmark – both on land and offshore is proving durable as a test bed for waste synergies and energy synchronicities fueling urban economies in the 21st century.

What do we handle on a global, national, regional, urban, project and nano scale? The answer is probably that we do as much as we can at each scale. In order to avoid serious mistakes designers have obviously have to work in teams of experts of many scales and knowledge. Interdisciplinarity is not a comfortable affair and a culture of communication has to start in education and efforts have to increase in that direction.

Finally in the retrofit of the existing cities, the challenge in North America is suburbia and the declining cities, the challenge in the rest of the world is the informal city. China has to build the equivalent of seventy-five Shanghai’s in the next twenty years. Which is more important, building city expansions, addressing shrinking cities or new cities? Ecological Urbanism needs to be socially just, environmentally beneficial and culturally literate. In these times one might also add economically prudent. The goals seem pretty clear, the more difficult question for the landscape architecture field is how to realize them.
CASE STUDIES

An example of a substantive theme that has particular relevance to Ecological Urbanism is public health and the role of nature. I want to use the following landscape design project and research to investigate the role of the public health theme for the contemporary urban environment and its potential use in structuring the evolution of the city. The case studies that follow elaborate on the framework and the theme of public health through two emerging landscape projects—the Port Lands Estuary, Toronto, Canada, and Mumbai Matters: an urban landscape research project located in Mumbai (formerly Bombay), India carried out by graduate students in the Department of Landscape Architecture, Harvard Design School.

CASE A: PORT LANDS ESTUARY, TORONTO, CANADA

Project Background

The Port Lands Estuary proposal describes a new type of neighborhood for Toronto, one that is designed to interact with the river and the lake in a dynamic and balanced relationship—an urban estuary. Integrating the contributions of design, engineering, environmental specialists and economic advisors, the proposal stakes out an integrated approach to reclaiming 280 acres of abandoned port lands in the heart of the city. An extensive and intensive permitting process is now taking place and construction of the new river and associated parkland-ecologies is anticipated in 2010. The Don River is one of two rivers bounding the original settled area of Toronto, Canada along the shore of Lake Ontario, the other being the Humber River to the west. The Don is formed from two rivers, the East and West Branches, that meet about 7 kilometers (4 mi) north of Lake Ontario while flowing southward into the lake.

Design Proposal

This master plan unites innovative design approaches from landscape architecture and urban design with innovative scientific approaches to natural reclamation at the scale of the city and the region. Within this plan to recycle 280 acres of Toronto's waterfront, the Port Lands Estuary proposal fuses the client's major programmatic initiatives into a single framework that will simultaneously make the site more natural (with the potential for new site ecologies based on the size and complexity of the river mouth landscape) and more urban (with the development of a green mixed-use district and its integration into an evolving network of infrastructure and re-connection). Both the urban and the natural elements of the landscape introduce complex new systems to the site that will evolve over the course of many years, creating interim conditions, each interesting in its own right, which give form, focus, and character to the development of the neighborhood.

The site is located on a former wetland (the largest on the Great Lakes) created by the Lower Don River as it emptied into Lake Ontario but filled in the early 20th century. Existing conditions include an abundance of impermeable surface, a river diverted into a canal, rail lines and an elevated highway that create a barrier between the Port Lands and the remainder of the city. Devoid of natural features,
public infrastructure, and neighborhood amenities, the site is fundamentally incapable of supporting new urban growth. Building on initiatives that were being undertaken elsewhere along the waterfront, the client, a public redevelopment agency formed by the federal, provincial, and municipal governments, sought to transform the site into new mixed-use neighborhoods that would meet strategic development goals while demonstrating a new attitude toward the health of the river and the harbor through the creation of a naturalized mouth to the currently channelized and abused Don River.

The current mouth of the Don River is an artificial remnant of an era of city building in which a land filled industrial port was considered the highest priority, although the Depression and changes in marine technology frustrated that goal. In addition, major transportation corridors had created a vacuum between the struggling industrial port and historic and newly emerging city neighborhoods on the other side of major rail and highway barriers. Reflecting a vastly different set of values, the competition sought an integrated solution that would provide a new naturalized mouth to the river serving the environmental needs and health of the river and the lake, remediate contaminated sites, provide flood control for a large area of downtown Toronto, and forge a compelling new identity for a Lower Don Lands neighborhood. Given the unprecedented opportunity to transform the city's relationship to the river, the planning team approached the commission with two initial questions: “Where does the mouth of the Don River want to be?” and “What form and new health can the river give to the new neighborhoods it traverses?”

The overall framework for the new neighborhood is supported by the detailed information provided and the intense analysis undertaken by the landscape architect team leaders, urban designers, architects, river hydrologists, regional ecologists, micro-ecologists, climate engineers, bridge engineers, traffic and transportation engineers, and civil and marine engineers. The team used these combined resources to explore issues of public health, infrastructure, recreated nature, neighborhood identity, and urban environments in a series of rapid and integrated iterations rooted in the scientific realities of the project's environmental ambitions and constraints. The analysis of hydrology and flood control was used to understand how the landscape needed to function in both flooded and non-flooded conditions. An examination of how to employ the river's sediment deposits inspired plans to improve the river's function by dredging, while also providing the project with inexpensive materials for establishing a new topography on the flat and featureless man-made port landscape. Ecological analysis was paired with an understanding of microclimate as a means of creating new habitat for plants and animals alongside new recreational opportunities that would support a new urban life on the site.

The team's relocation of the mouth of the "new" Don River estuary makes it highly visible from other points around Toronto Harbor, reasserting the river's lost presence in the city and allowing it to become a new symbol of the revitalization of the Lower Don Lands as a whole. The shifting of the river's mouth also creates a highly desired setting for new urban development, reinforced by stronger links to the existing and emerging new neighborhoods north of the tracks, as well as associated development elsewhere along the Don. In this way, naturalizing the mouth of the river not only creates a richer site ecology, but also has powerful positive impacts on the urban form of the Lower Don Lands, adding kilometers of park front and waterfront property, as well as a sustainable “urban estuary” of great richness and complexity on multiple and mutually reinforcing levels: spatial, ecological, functional, economic, and social.

Within this unique setting, the Port Lands Estuary proposal envisions the sequential development of a series of distinct neighborhoods with a range of block patterns and building typologies
on sites formed by the river and the harbor. The team's goal was to enhance the qualities of exciting new kinds of places to live, work, shop, recreate, and visit in Toronto, where city, parkland, estuary, the preservation of key historic artifacts including historic silos, and an active recreational harbor all contribute to unique neighborhood identities, each with the complete DNA of a vibrant city: a mix of life-cycle housing, commercial, cultural, and work spaces, public realms, parkland, and access to water.

In the vision for the park at the heart of this urban estuary, the social program was recognized as important as the ecological one. As proposed, the landscape will teem with activity: active sports in the four regulation-size fields, informal pickup games, kite-flying on the mound overlooking the Inner Harbor, jogging and in-line skating on the trails, and bird-watching, strolling, and contemplation along the more secluded paths. Within each neighborhood, the proposal envisions multiple opportunities for social interaction on broad tree-lined sidewalks, in cafés, in the squares, and during games on the play fields that are tucked in throughout the park. Rock climbing, markets, festivals, and restaurants will energize the impressive colonnade under an elevated expressway that had previously cut the site off from the city, providing a memorable backdrop for a new expression of urban life.

The plan is broad in its vision as a framework with the capacity to evolve, but also very specific in its attention to the quality of the public realm. Individual neighborhoods are discussed in detail with particular attention paid to views within the district and beyond, the provision of social infrastructure - schools, daycare, community centers, local shopping and amenities, and the way that the new development will interact with the site's industrial history. The plan is anchored by a holistically conceived three-dimensional public realm in which buildings and open spaces are partners of equal importance in safeguarding the quality of the environment by ensuring adequate solar exposure and wind protection, and circulation networks that favor pedestrians and cyclists. By mandating built-form that meets stringent environmental standards, the plan will ensure a green civic-minded architecture through solicitations to developers in keeping with the broad environmental public health and sustainability goals adopted by the client and the City.

CASE B: MUMBAI URBAN LANDSCAPES, MUMBAI, INDIA

Cities are increasingly at the centre of global flows of people, capital, culture and information. Over the last thirty years their role as financial command centers has expanded, creating a new type of sprawling, often multi-centred, urban agglomeration. There are now over twenty mega-city regions with more than ten million people living there. There are also nearly four hundred and fifty city regions with over one million residents. Together they house more than one billion people in a relatively small surface of the earth. As they expand even further, into urbanized regions of over fifty million inhabitants, their footprint will have a direct impact on climate change and the ecological balance of the planet, as well as on the lives of existing and new city dwellers. The second initiative concerns the evolution of a research practicum in the Department into the contemporary urban landscape of mega-cities and in particular the intense environments and potentials of overcrowded urban centers on the Indian sub-continent such as Delhi, Calcutta and first, Mumbai, formerly called Bombay.

Perched on the sea and yet anchored to the soil of the Indian Continent, fabulously rich yet achingly poor, a historic trading seaport and now a modern global corporate center as well as home to
multiple local street micro-enterprises, grossly overcrowded with social fragmentation and yet tolerant of
the multiplicity of diverse ethnic backgrounds and religions, with a core of civic landscapes and heritage
buildings yet overwhelmed with an overburdened infrastructure - sewers, water supply, roads and
railways and proliferated with slums on marginal lands, the City of Mumbai still holds sway as India’s
industrial and financial capital- one that is geographically rich, ecologically adaptive, creative,
industrious, stressed- a dense complex unsanitary urban land set in a sultry environment, drenched by the
monsoon rains and currently in economic and cultural flux with “……dizzying promise and
turbocharged ambition” (8)

The Island City of Mumbai, originally formed from seven islands is perched on the peninsula of
Salsette Island on the western coast of India and creates a metropolitan area along with the Bombay
Suburban District and Eastern Suburbs including New Bombay. The fact that India is in a period of rapid
economic growth and expansion of population in its mega-cities is fairly well understood and
documented. Nowhere is this activity more in evidence than in the Island City of Mumbai. The city with
a population of 14 million has an overall density of 17,550 people per square mile set within a Greater
Mumbai with a population of 21 million. Some parts of central downtown Mumbai have a population
density of 1 million people per square mile, the highest number of individuals massed together at any
spot in the world. The population within the Island City alone is projected to rise from 14 to 21.9 million
by 2015. Overpopulation is a leading if not the design issue to be addressed among other pressing issues –
such as transportation, shelter, public health, urban flooding and sanitation

It is a hard-worked land; a city encumbered by fragile yet resilient populations, constrained by
the sea, bestowed with a sacredness by many, saturated with the sweat of labor and monsoon rains and
encumbered by devastated natural systems and a crumbling and a dilapidated built fabric that as VS
Napaul has written- “continues to be cherished but continues at the same time to be used with no regret
attached to its disintegration” (9) It is also a grossly inhospitable urban environment where access to the
fundamentals of shelter, water, power, sanitation, open space, clean air, efficient transportation cannot be
taken for granted by a majority of the inhabitants, and where over 60% of the total city population have
no formal housing. Instead 52,000 slums hold 8 million urban households at densities of over 525,000 per
square mile. The remaining households who fall within the 60% live on the streets as pavement dwellers.
Even for those who have access to one room apartments, public transport and sanitation, the city is
currently vastly overcrowded with totally inadequate infrastructure, terrible traffic congestion, and
threadbare open space. Mumbai ranked 163 out of 218 cities worldwide in the Forbes’ quality of life
survey and 124 out of 130 cities in the Economist Intelligence Unit’s hardship ratings.

There have been four tendencies perceived in the response the city has previously made to
reshape its physical fabric, buildings, infrastructure and landscape space.
The first is focused on the rich trading and economic prominence and history of this narrow island city
shown by this image of the Port Lands in the 19th century and the resulting expansion of the city in
successive waves to the north and eastwards.

The second tendency is administrative. After the formation of states in India in the mid 1960s,
Mumbai became the capital of Maharashtra. The landscape of the city was characterised by the
construction of mass housing colonies commercial districts and infrastructure. It was at this time that
slums started to appear in the city- zones of dense settlements governed by porous legalities, popular
politics, and tactical negotiations over space and survival.
The third tendency and one which often goes counter to its economic ascendancy are the social agendas and welfare and public health actions needed to address the needs of the local population and often more regional issues of the divides of wealth.

The fourth tendency is an emphasis on the importance for the future city of new large-scale engineering and infrastructural changes such as the recent Bandra- Worli Sea Link, over less visible yet more significant local renewal activities.

While these four tendencies have or are taking an appropriate role in the evolution of the city, that there are other design activities that have a greater effect on the future form of the city at the ground level. Among these are the efforts to regenerate the sites of the 58 former textile mills located in the city center and to rebuild and renew about a quarter of the city area that is occupied by housing lands belonging to the State.

**Mill Lands**

The fate of 600 acres (240 hectares) of lands generated by the closure and current abandonment of 58 historic cotton textile mills in the center of the City of Mumbai was the subject of a research practicum in Fall 2006. At the heart of the project was an exploration of environmental processes as a generator of form in urban conditions with limited resources but with extremes of population density, physical deterioration and spatial demarcation. The Mill lands had been the subject of continuous public speculation, acrimonious newspaper articles and intense private scrutiny by professional designers, engineers, government officials and heritage organizations. At stake for the Mill lands are three major issues.

The Mill lands strategic location and role in the continued growth and expansion of the urban fabric and infrastructure of Mumbai within the regional geography and ecology of the Western Gnats and the Sea.

The need to reconsider the structure and urban landscape systems of the Girangaon district (the ‘village of mills’) where the majority of the Mill lands are located.

The nature of regeneration efforts of individual Mill sites as models for growth and development in other parts of the City.

Absent from the current planning and engineering efforts was recognition of the urban landscape and considerations of its ongoing design as an organizing system for the city.

**Housing Renewal Lands**

The practicum subject in 2007 was housing renewal lands located in the Island City. Most of the housing developments are between 40 to 60 years old; typically low rise with a maximum amount of undefined open space around them and house tenant society’s as well as municipal or public employees. However most of the buildings and surrounding local streets, lanes, gardens, ‘maidans’ and public open spaces and recreation fields are dilapidated, crumbling and are in immediate need of urban regeneration and infill. A number of the lands also contain run-down chawls (or workers housing) and illegal slums and pavement dwellers on their sites. These renewal lands are now the most desired and contested urban landscapes by all classes, from land-less squatters, pavement dwellers and working slum-dwellers to
established tenants and the middle classes in colonies and estates.

**Research into Carrying Capacity**

A research aspect of this study into both classes of site is concerned with an exploration of ‘carrying capacity’ as applied to the supportable population of urban sites in Mumbai given available necessities such as an infrastructure of water, power, sanitation, community amenities and food. India and Mumbai survive because they use every material resource including land to its ultimate capacity and therefore can be considered more sustainable as a result of basic necessity compared to the North America or European condition. But sustainability as we are finding has its limits of use as a measure of quality of life and health. The rate of growth and increasing urban densities tax the land and ultimately the population itself beyond hopes of reversal. The real question remains- how much productive land, water resources environmental systems and waste management are required to support Mumbai's population indefinitely at the current consumption level? What happens to these urban systems with increased consumption as the urban population grows at an accelerated rate? In attempting to address these questions a more fundamental issue arises - what constitutes overpopulation within the Mumbai context? Carrying capacity as it can be applied to an urban condition like Mumbai is the number of inhabitants who can be supported in a given area within its natural resource limits without degrading the natural, social, cultural and economic environment for present and future generations. Carrying capacity for any given area is not fixed but may be altered or improved by technological means. However, once an environment is degraded, the carrying capacity shrinks, resulting in an environment that can no longer support the initial population it once did.

Within this context the research advances this idea to determine if the carrying capacity of individual districts and estates can provide a model that can be integrated into the details of the new 2011 Metropolitan Plan. However it raises the question of whether it is possible to define a measure of sustainability that does not already contain implicit assumptions about the solution to the problem of resource over-use and environmental degradation.

Ultimately, this research practicum is about using a range of creative landscape planning and design approaches and tools to rethink the Island City and to counter urban scale ills and geographically expansive collapses of natural resources and systems. It is less about beauty, less about gratuitous form making and the creation of individual paradigms, rather it is to focus on everyday peoples lives. The purpose is to understand and include the City’s physical and social margins, to address the question of urban subsistence for the majority of the population, to employ broader boundaries as definitions for improvements and renewal, to incorporate the marginalized populace, to plan beyond the economic limits, and to question social definitions.
REFERENCES


(2) The Conference and Exhibition is one of a series of research initiatives Harvard University Graduate School of Design (GSD) has recently launched about alternative futures. These initiatives build on the intellectual and creative resources of the GSD to take on the challenges of projective thinking. They focus on imagining the ways in which technology and the media impact the shape of future cities and buildings. They also highlight questions about environmental change and the role that architecture and planning can play in redressing ecological problems. In so doing, these initiatives prepare students to become leaders in speculative thinking and in generating imaginative solutions. Through these initiatives, the GSD aspires to build a truly multi-disciplinary platform that reaches out to the rest of the university to help mobilize the creative dimension of the different schools at Harvard and their abilities to imagine better futures and better living and workplaces, schools, hospitals, infrastructures, and environments.

(3) Andres Duany and Elizabeth Plater-Zyberk are co-founders of the Congress for the New Urbanism (CNU). The movement advocates and promotes the universal principles of traditional planning and design.

(4) The term ‘landscape urbanism’ is used as defined by Charles Waldheim as the view of landscape that is brought to bear in an analysis and interpretation of the urban condition.

(5) Sarkis the Aga Khan Professor of Landscape Architecture and Urbanism at Harvard Graduate School of Design


(7) Sissel Tolass studied mathematics, chemical science, linguistics and languages, and visual art 1981 - 1988: Oslo Royal Academy and Oslo University; Warsaw University; Moscow University; St Petersburg University; Oxford University, Princeton University. Working actively and concentrating on the topic of SMELL / SMELL & LANGUAGE - COMMUNICATION since 1990, within different sciences, fields of art and other disciplines.

(8) *Time Magazine* in June 26, 2006 in a cover story on the re-emergence of India as a global economic and cultural force urged “if you want to catch a glimpse of the new India, with all its dizzying promise and turbocharged ambition then head to its biggest, messiest, city- Bombay (Mumbai)”.


(10) Maidans are open grassed city spaces that accommodate playing fields and impromptu sports areas- most famous is the Oval in Mumbai.

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[Short Biography]

Niall G. Kirkwood is an architect, landscape architect and urban designer and has been Professor of Landscape Architecture and Technology of the Graduate School of Design at Harvard University since 1992. He is an international expert and consultant on urban development and design and the regeneration of post-industrial land. From July 2003 to June 2009, he was the Chair of the Department of Landscape Architecture, the oldest such program in North America founded in 1901 by Frederick Law Olmsted Jr. and Arthur Shurcliff. He was appointed the Gerald O’Hare Visiting Professor, School of Environmental Studies, University of Ulster, Northern Ireland, a Fellow of the Kew Guild, London, England, a Fellow of the American Society of Landscape Architects and a faculty member of the Center for Environment and the Center for Health and the Global Environment at Harvard University. He is the founder and Director of the Center for Environment and Technology, (CTE) a research, advisory and executive education initiative at Harvard University. Currently the Center focuses on reclamation, regeneration and urban development issues on sites in North America, Asia, Europe and the Middle East. Prior to joining the Harvard faculty Kirkwood worked fifteen years in the private sector as a registered landscape architect (United Kingdom and the United States) urban designer and architect (United Kingdom) carrying out urban reclamation and redevelopment projects in Europe, the Middle East and the USA. These included land reuse in the 1970’s in the United Kingdom, the regeneration of the London, and Barcelona waterfronts in Europe in the 1980’s and the reclamation of industrial sites in Mexico and the United States in the 1990’s. Projects he worked on include Canary Wharf, London Docklands, Royal Albert Docks, London, Vila Olimpica, Barcelona Waterfront, Bishopsgate, City of London and Banyoles, Barcelona, Spain.


He is currently on sabbatical as a distinguished overseas visiting professor at Korea University, Seoul, Korea for the Spring Semester 2010.