URBAN DESIGN LAB
THE EARTH INSTITUTE AT COLUMBIA UNIVERSITY

New Urbanization Paradigms: Challenging Given Knowledge

Alliance Program EDF Workshop
11 October, 2011

THE EARTH INSTITUTE
COLUMBIA UNIVERSITY

GSAPP
Graduate School of Architecture, Planning and Preservation

Ecologic Economy in Transition: The Urban Case
Building Institutional Capacity

1.0 New Regional Paradigms

2.0 New Urban Paradigms

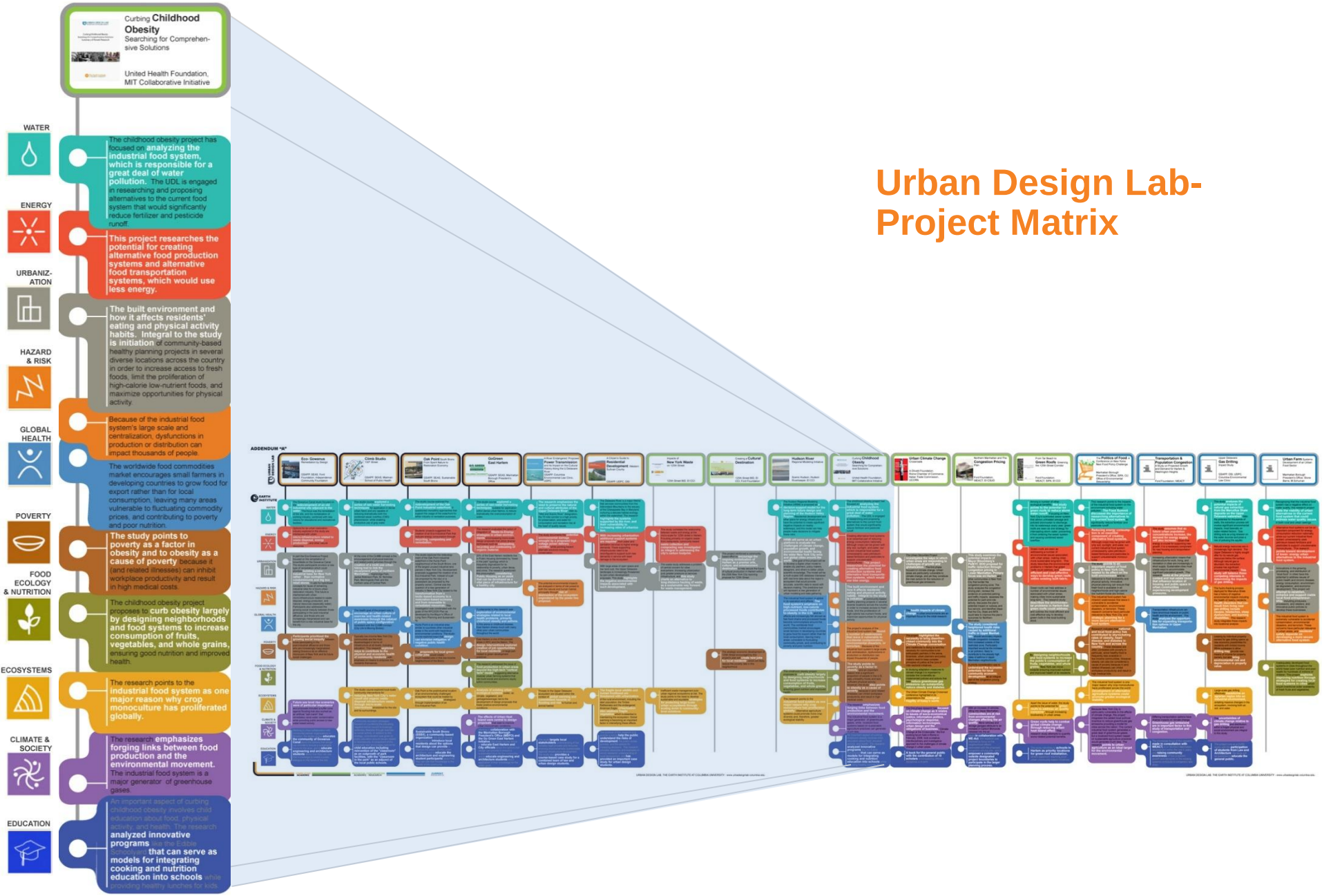
3.0 Economies of Waste

4.0 Economies of Water

5.0 Economies of Energy

6.0 The Health Equation

Urban Design Lab- Project Matrix



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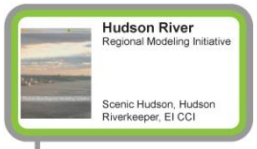
1.1 New Regional Paradigms

Hudson Regional Modeling



WATER

ENERGY

URBANIZ-ATION

HAZARD & RISK

GLOBAL HEALTH

POVERTY

FOOD ECOLOGY & NUTRITION

ECOSYSTEMS

CLIMATE & SOCIETY

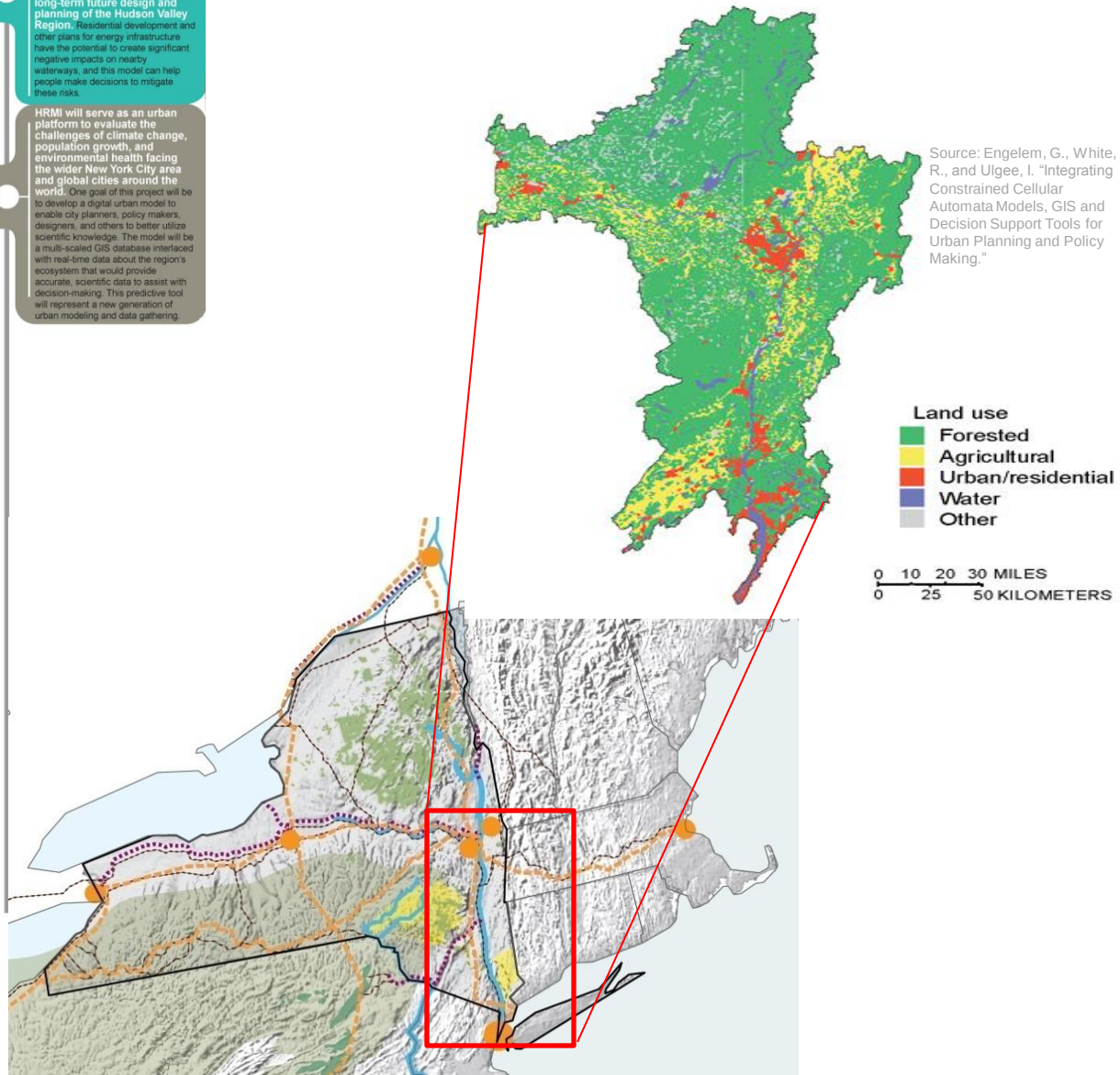
EDUCATION

The Hudson Regional Modeling Initiative (HRMI) is proposed as **a decision-support model for the long-term future design and planning of the Hudson Valley Region.** Residential development and other plans for energy infrastructure have the potential to create significant negative impacts on nearby waterways, and this model can help people make decisions to mitigate these risks.

HRMI will serve as an urban platform to evaluate the challenges of climate change, population growth, and environmental health facing the wider New York City area and global cities around the world. One goal of this project will be to develop a digital urban model to enable city planners, policy makers, designers, and others to better utilize scientific knowledge. The model will be a multi-scaled GIS database interlaced with real-time data about the region's ecosystem that would provide accurate, scientific data to assist with decision-making. This predictive tool will represent a new generation of urban modeling and data gathering.

Description

A proposed density-saturation model for the long-term future design and planning of the Hudson Valley Region.



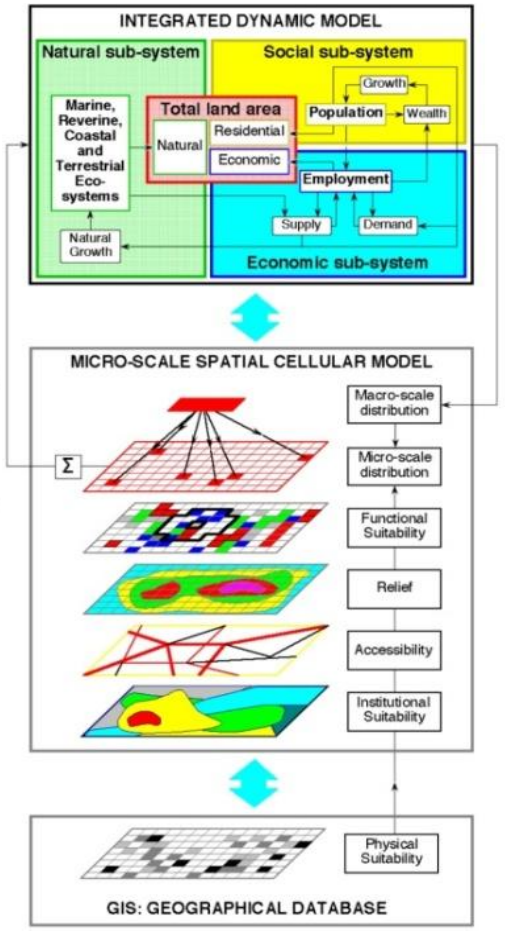
Source: Engelem, G., White, R., and Ulgee, I. "Integrating Constrained Cellular Automata Models, GIS and Decision Support Tools for Urban Planning and Policy Making."

Collaboration

Scenic Hudson
Hudson Riverkeeper
CIESIN
Lenfest Center
NASA GISS
LDEO

Support

Earth Institute CCI



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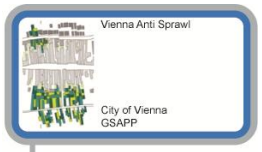


WATER

ENERGY

URBANIZ-ATION

With significant projected growth encouraged by changing regional political boundaries, **URBANIZATION OF THE VIENNA EASTERN REGIONAL PERIPHERY WAS THE CENTRAL EXPLORATION OF THIS RESEARCH.**

HAZARD & RISK

GLOBAL HEALTH

POVERTY

FOOD ECOLOGY & NUTRITION

ECOSYSTEMS

Urban densification was explored as a **STRATEGY FOR ENHANCED DEVELOPMENT OF THE REGIONAL ECOSYSTEM COMBINING DENSITY WITH SUSTAINABILITY.**

CLIMATE & SOCIETY

EDUCATION

Working with the municipal planning authorities of the City of Vienna this post-profeate Urban Design Studio **ALTERNATIVE APPROACHES TO DENSIFICATION OF THE URBAN PERIPHERY FOR PURPOSES OF PUBLIC DEBATE WITHIN THE METROPOLITAN REGION.**

1.2 New Regional Paradigms

Vienna Anti-Sprawl

Description

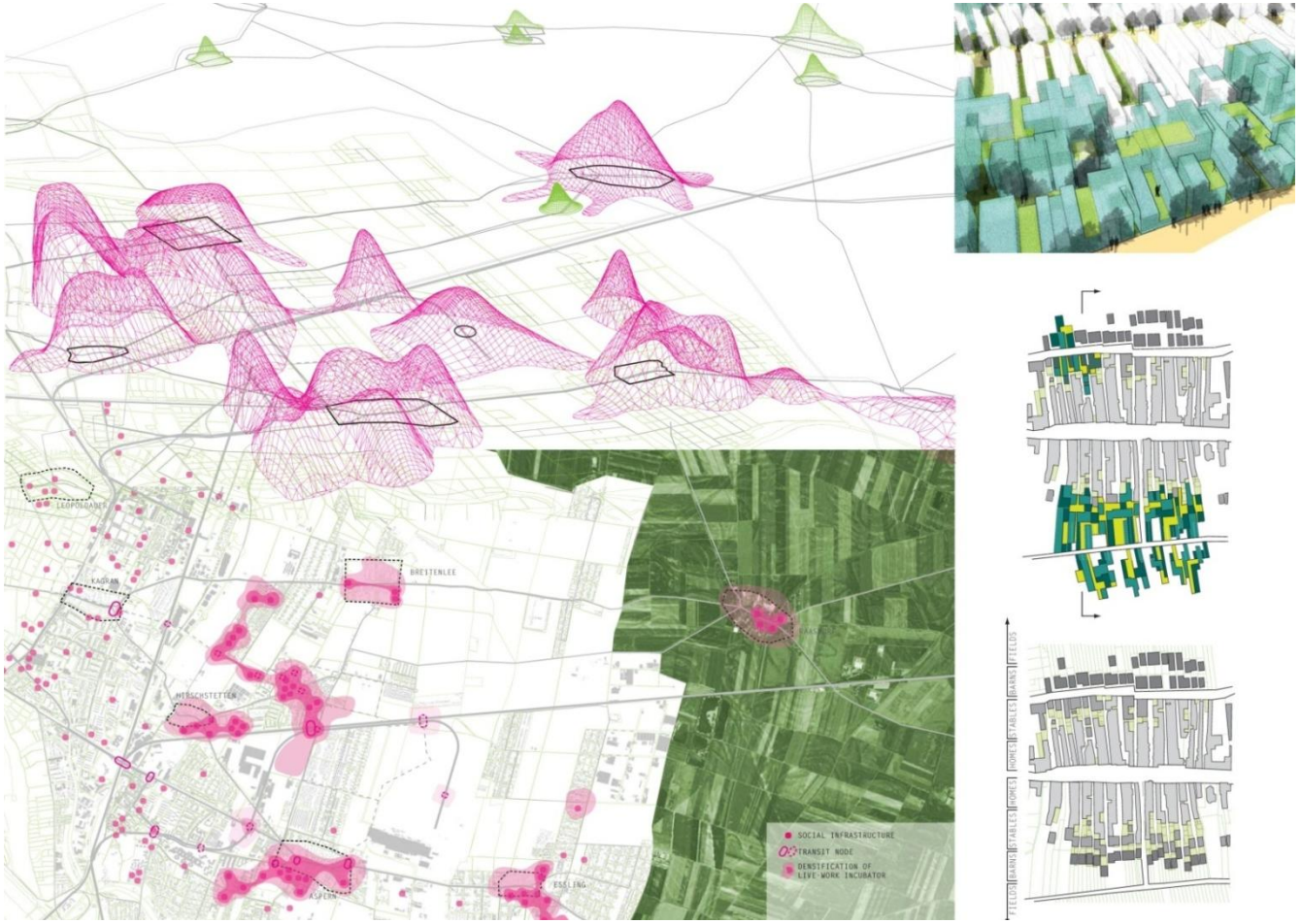
This design studio considers **urban housing fabric generation and renewal** in the underdeveloped northeast quadrant of the city. Vienna's Planning Dept. projects 300,000 new residents for this area in the next 15 years.

Collaboration

City of Vienna, Dept of Urban Development and Planning
GSAPP, UDL

Support

City of Vienna
2008 European Year of Architecture



Project by Emily Weidenhof, Vivian Ngo, Nuo Xu, Marta Pastrian MSAUD 2009

1.3 New Regional Paradigms

Economic, Ecological Risks: Hispaniola

Description

With the recent events of natural disasters taking effect in forms of earthquakes, tsunami's, hurricanes, and rain storms, habitats are effected as **natural occurrences impacts communities and individuals**. Such events have been witnessed recently in Haiti and the Dominican Republic.

Collaboration

Presidency of the Dominican Republic
Permanent Mission of the Dominican Republic to the United Nations

Support

Columbia Engineering
Lamont Doherty Earth Observatory

WATER

Large regional dams coincide with the most vulnerable areas for seismic activity such that water-related resources are a central focus of hazards inventory and planning.

ENERGY

URBANIZ-ATION

Rapid informal sector urbanization in the Dominican Republic makes resilience of the built environment or particular importance to this study.

HAZARD & RISK

The Haiti earthquake underlined the high-risk exposure for all of Hispaniola including the Dominican Republic. This study entails natural hazards planning, with particular emphasis on the vulnerability of regional infrastructure for water, energy and transport, as well as building construction standards.

GLOBAL HEALTH

POVERTY

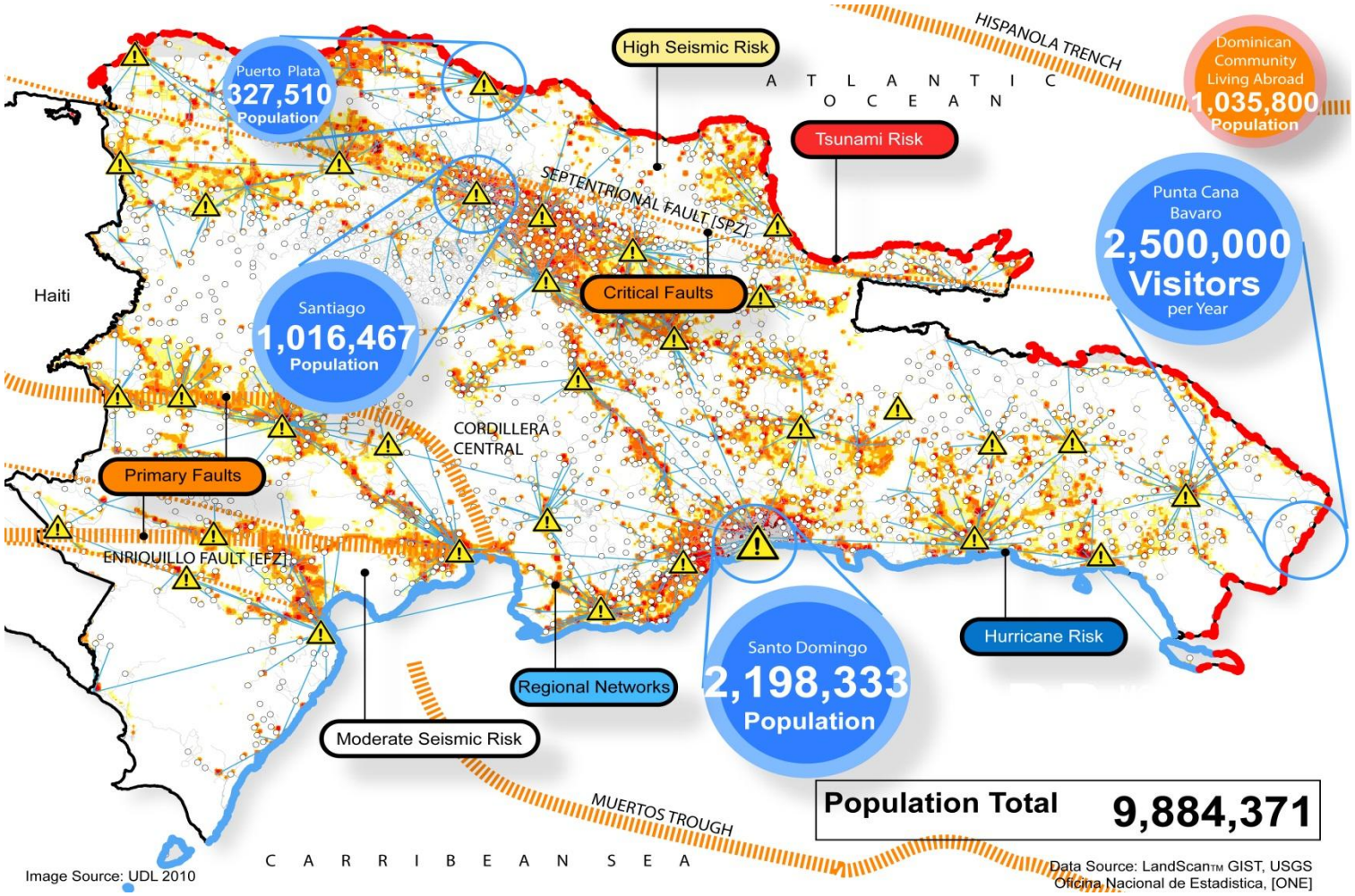
FOOD ECOLOGY & NUTRITION

The regional areas of food production coincide with the most vulnerable areas for seismic activity raising issues of food scarcity relative to natural hazards risk.

ECOSYSTEMS

CLIMATE & SOCIETY

EDUCATION



1.4 New Regional Paradigms

Description

Bring together experts in **public health, medicine, business, economics** and design to apply a "big-picture" perspective while identifying and analyzing issues on a **variety of scales.**

On-going explorations of the factors affecting the long-term environmental survival of a crucial regional watershed.

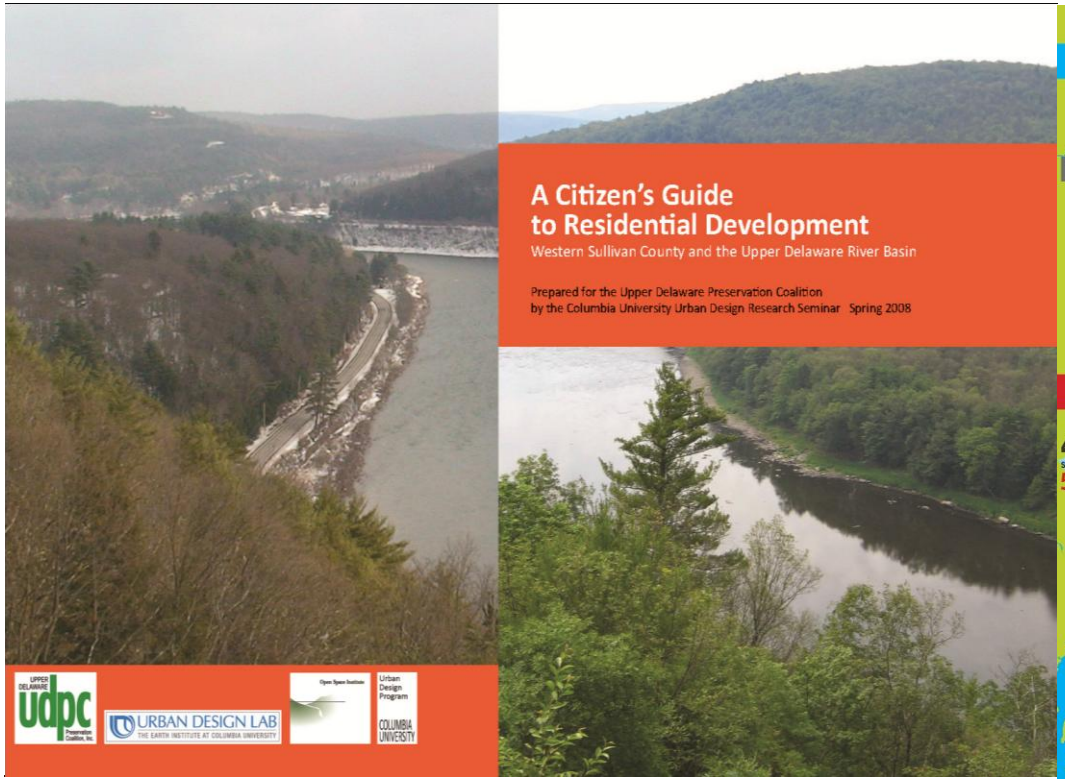
Education Central to this initiative has been the **engagement of local stakeholder groups** and the visualization of diverse developmental impacts on their environment.

Collaboration

GSAPP, Urban Design Program. UDL
Open Space Institute

Support

Catskill Mountainkeeper
Upper Delaware Preservation Coalition



1.5 New Regional Paradigms

Description

This student research looks at the **impacts of gas drilling** as it effects the rural landscape, subsurface geology and health impacts to residents and the community at large.

On-going explorations of the factors affecting the long-term environmental survival of a crucial regional watershed.

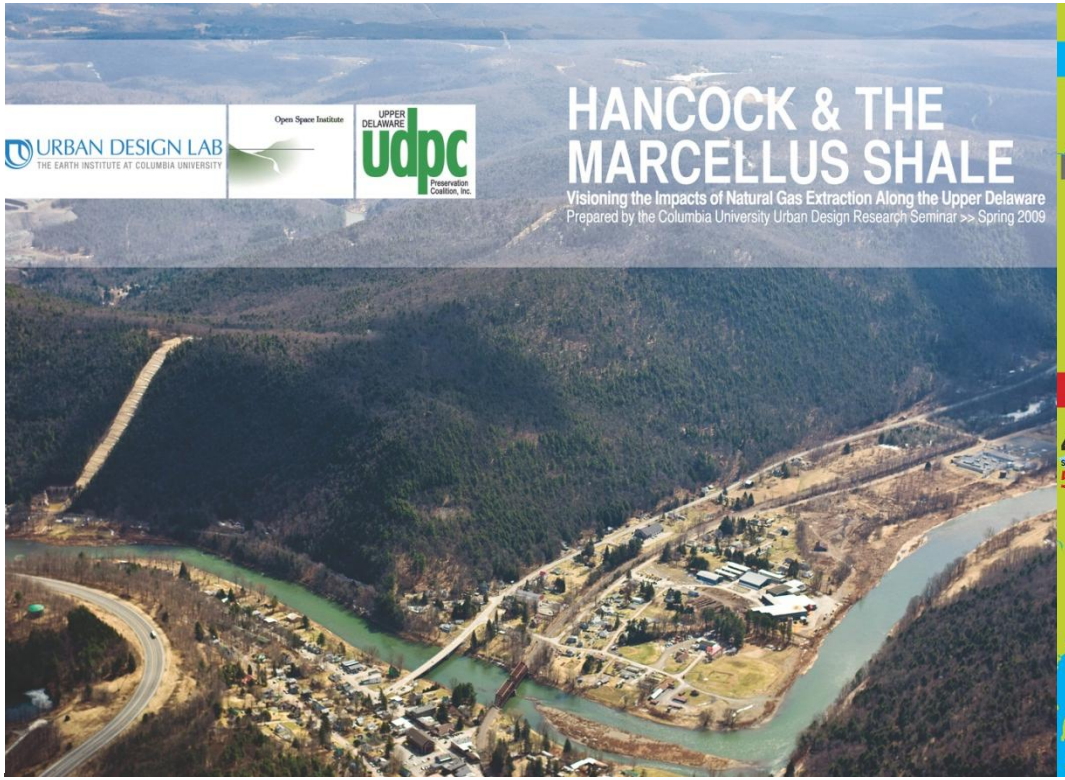
Education Central to this initiative has been the **engagement of local stakeholder groups** and the visualization of diverse developmental impacts on their environment.

Collaboration

GSAPP, Urban Design Program, UDL
Open Space Institute

Support

Norcross Foundation
Catskill Mountainkeeper
Watershed Agricultural Council
Upper Delaware Preservation Coalition



1.6 New Regional Paradigms

Description

In modern assessments of urban issues, understanding a city's relationship with its supporting communities - those which provide workers, energy, water, food, supplies, and waste disposal- is a necessary precondition for designing sustainable urban systems. Perhaps nowhere is this more apparent than in the relationship of farms to their markets. On-going explorations of the factors affecting the long-term environmental survival of a crucial regional watershed

Education Central to this initiative has been the **engagement of local stakeholder groups** and the visualization of diverse developmental impacts on their environment.

Collaboration

GSAPP, Urban Design Program, UDL
Open Space Institute

Support

Norcross Foundation
Catskill Mountainkeeper
Watershed Agricultural Council
Upper Delaware Preservation Coalition

2.1 New Urban Paradigms

Harlem Cultural Zoning

WATER

ENERGY

URBANIZ-ATION

This project reinforced a community-based effort to **encourage the ongoing revitalization of Harlem as a premier arts, culture, and entertainment destination** to help secure the future of cultural production in Harlem within the 2006 New York City rezoning proposal for 125th Street.

HAZARD & RISK

GLOBAL HEALTH

POVERTY

The strategic economic development of 125th Street encouraged by this project's plan will **create new jobs for local residents**, which will likely reduce the poverty rate in this neighborhood.

FOOD ECOLOGY & NUTRITION

ECOSYSTEMS

CLIMATE & SOCIETY

EDUCATION

Description

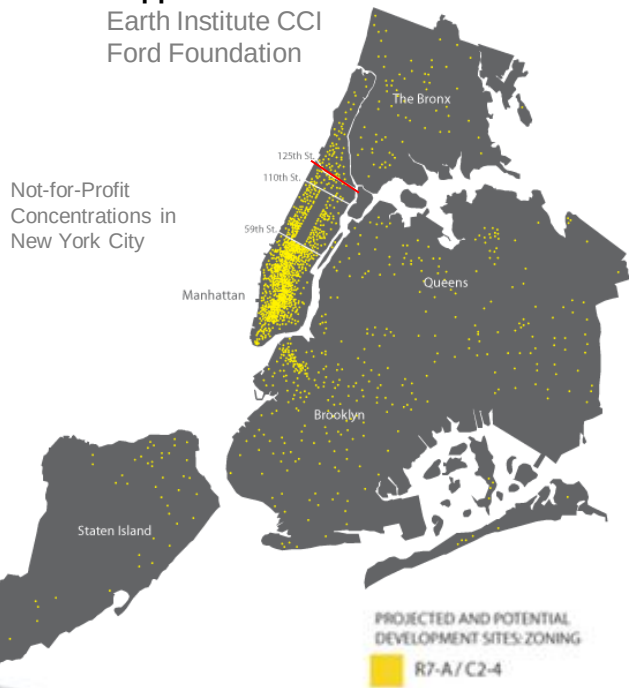
This study presents a community-based vision, to help secure **the future of cultural presentation** and production in Harlem.

Collaboration

125th BID

Support

Earth Institute CCI
Ford Foundation



2.2 New Urban Paradigms

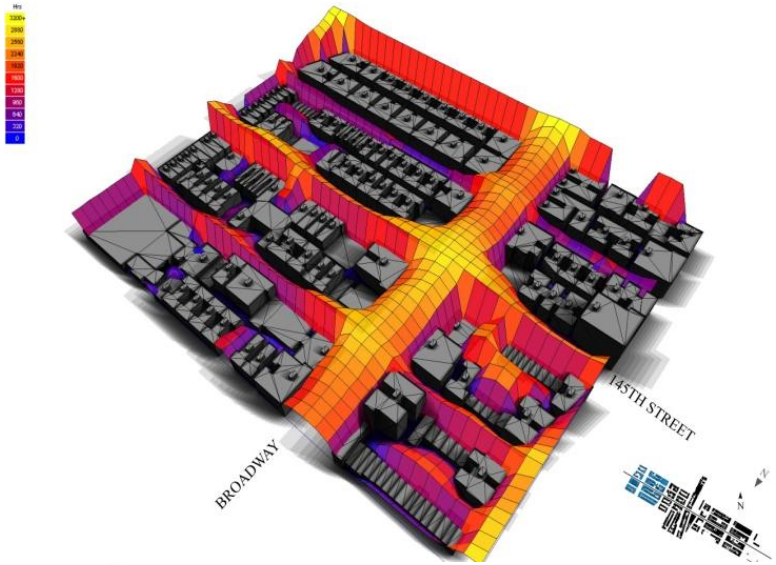
Harlem: 145th Street Corridor

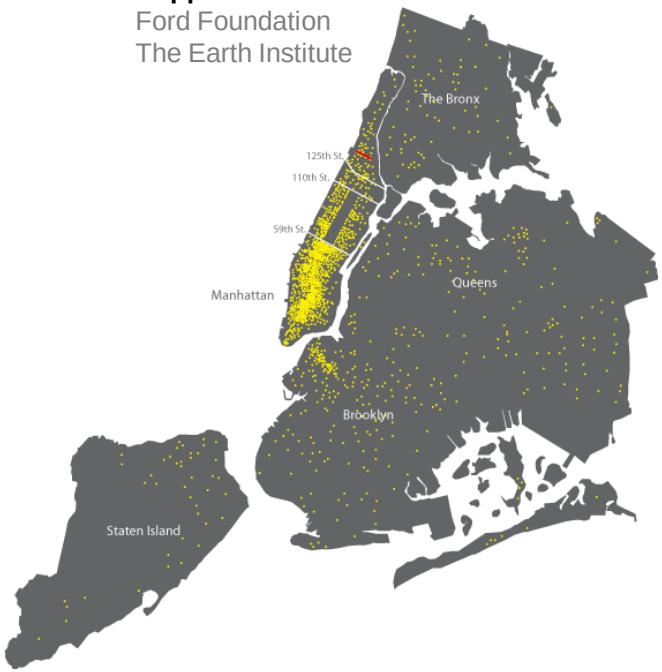
Transportation & Population Congestion
A Study on Projected Growth and Demand for Harlem & Washington Heights
Ford Foundation, WEACT

Description

An analyses of existing physical parameters for change and implementation.

Collaboration
WEACT
Support
Ford Foundation
The Earth Institute





WATER

ENERGY

This study assumes that as future urban population concentrations increase, the demand for energy supply will also increase. Given that energy is crucial for supporting new growth, it is a necessary component for new housing and transportation planning.

URBANIZ-ATION

Increasing urbanization means that infrastructure for work, living, and recreation in cities are increasingly in short supply. Sustainable cities must create ways to accommodate significant population growth. This research looks at the physical context and real estate trends that influence location of housing and public space in urban communities experiencing development pressures.

HAZARD & RISK

GLOBAL HEALTH

Transportation infrastructure can have enormous impacts on public health and the environment. This study analyzes the opportunities for expanding transportation options in Upper Manhattan.

POVERTY

FOOD ECOLOGY & NUTRITION

ECOSYSTEMS

CLIMATE & SOCIETY

Differing transportation options have diverse impacts on climate change. Greenhouse gas emissions are in important factor in this study of transportation and congestion.

EDUCATION

The immediate focus of this research, made in consultation with WEACT, is on Northern Manhattan development within the next 5 years, and raising community awareness of how projected growth and demands on the existing systems contribute to congestion and strain.

2.3 New Urban Paradigms

Science Innovation Hub

Ultra-Ex: Micro Infrastructures, Worm Team

National Science Foundation
GSAPP, SEAS
Office of Environmental Stewardship

Description

Prototype study for New York City Science Innovation Hub, incubation of science based academic research and development programs within the urban community.

Collaboration

Columbia Engineering, CUNY

Support

Columbia Engineering
City University of New York

WATER

ENERGY

URBANIZ-ATION

Sustainable urban waste infrastructure requires graduated scales such that long-distance disposal is not a requisite, and micro-scale systems can augment macro-scale. This study explored micro-scale innovation.

HAZARD & RISK

GLOBAL HEALTH

POVERTY

FOOD ECOLOGY & NUTRITION

Emphasis was placed on developing strategies for productive use of organic waste for food production through innovation in urban composting techniques.

ECOSYSTEMS

Inefficient waste management systems put urban regional ecosystems at risk. This study points to the need to develop sustainable and equitable strategies for protecting large-scale urban ecosystems through scaling down to community level solutions.

CLIMATE & SOCIETY

EDUCATION

This studio worked in collaboration with the Columbia University Office of Environmental Stewardship to develop demonstration projects toward increasing public awareness of the efficiencies of micro-scale urban infrastructure.

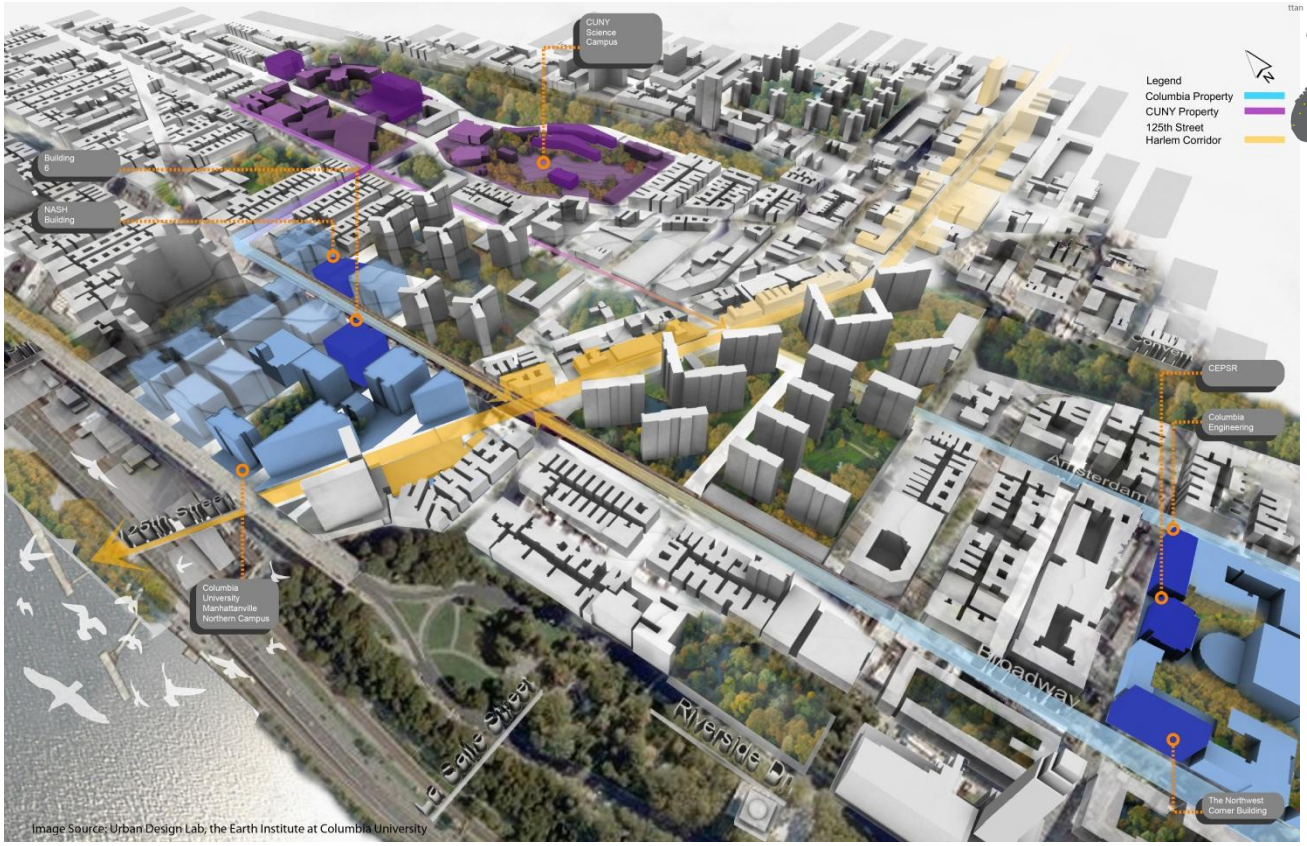


Image Source: Urban Design Lab, the Earth Institute at Columbia University

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WATER

Provision of adequate **domestic water infrastructure** is a pressing needs within the Accra development context, together with adequate **infrastructure for handling of storm water**

ENERGY

URBANIZ-ATION

Within the rapidly urbanizing context of Accra, Ga Mashie and Nima represent two aspects of the **pressure for densification of older established formal and informal communities** with unresolved questions related to **overcrowding and displacement** as well as basic spatial inadequacy of the dwellings and services

HAZARD & RISK

GLOBAL HEALTH

Provision of **sanitation infrastructure is the single most important factor** to improving public health conditions.

POVERTY

Accra poverty levels are consistent with developing urban economies in poor countries everywhere. The focus of the studies includes **encouraging the intense entrepreneurial activities** found in both focus communities.

FOOD ECOLOGY & NUTRITION

ECOSYSTEMS

CLIMATE & SOCIETY

As a sea-level city in rapid development, Accra requires anticipation of **climate-related exigencies in the retrofitting of its infrastructure**

EDUCATION

2.4 New Urban Paradigms

Urban Fabric Upgrading Accra, Ghana

Description

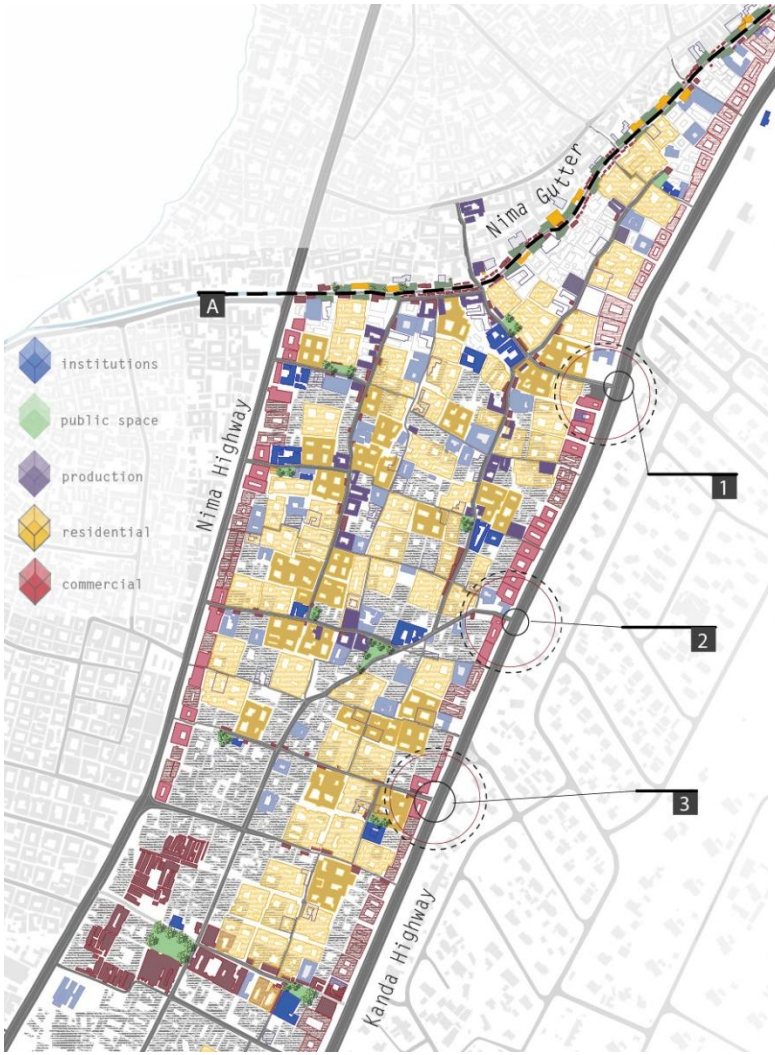
Focus on provision of basic infrastructure need for the GaMashie and Nima communities within an overall context of **rapidly growing pressures for densification of the existing urban fabric**.

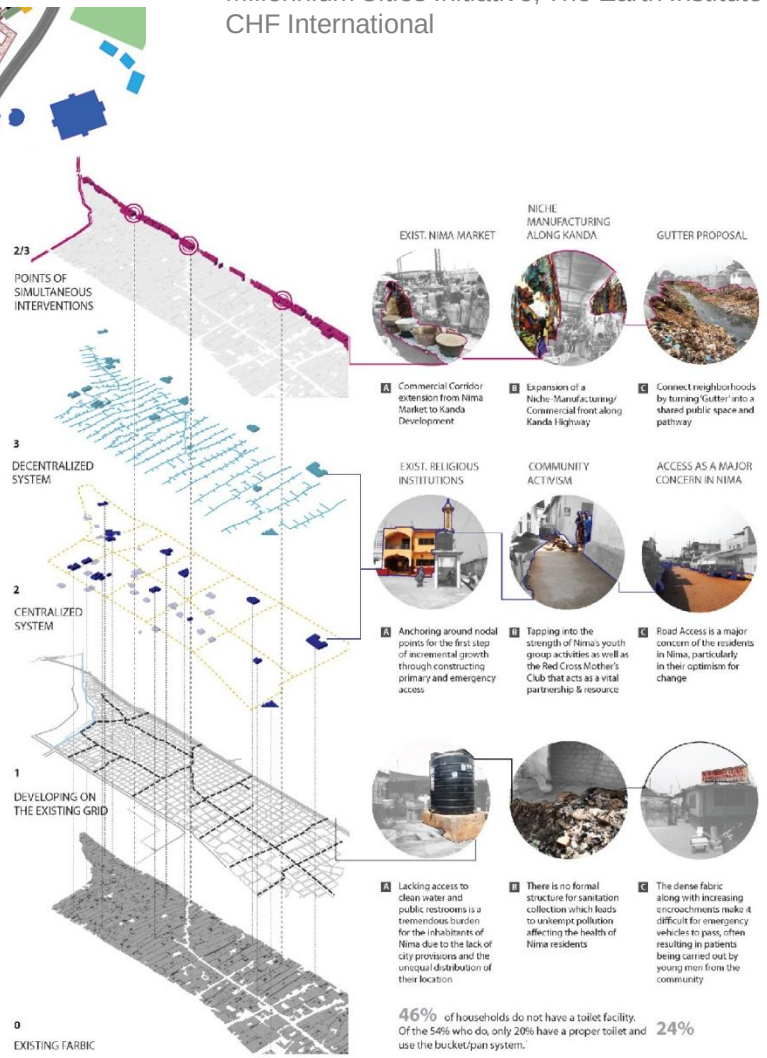
Collaboration

GSAPP, Urban Design Program
GSAPP, Urban Planning Program
Accra Metropolitan Assembly

Support

Millennium Cities Initiative, The Earth Institute
CHF International





Project by Kathy Kurtak, Mansi Sahu, Yezhou Yi, Tarana Hafiz: MSAUD 2011

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2.5 New Urban Paradigms

Green Plan, Gulin New Town, PR China

Ultra-Ex: Micro Infrastructures, Worm Team

National Science Foundation
GSAPP, SEAS
Office of Environmental Stewardship

WATER

ENERGY

URBANIZ-ATION

Sustainable urban waste infrastructure requires graduated scales such that long-distance disposal is not a requisite, and micro-scale systems can augment macro-scale. This study explored micro-scale innovation.

HAZARD & RISK

GLOBAL HEALTH

POVERTY

FOOD ECOLOGY & NUTRITION

Emphasis was placed on developing strategies for productive use of organic waste for food production through innovation in urban composting techniques.

ECOSYSTEMS

Inefficient waste management systems put urban regional ecosystems at risk. **This study points to the need to develop sustainable and equitable** strategies for protecting large-scale urban ecosystems through scaling down to community level solutions.

CLIMATE & SOCIETY

EDUCATION

This studio worked in collaboration with the Columbia University Office of Environmental Stewardship to develop demonstration projects toward increasing public awareness of the efficiencies of micro-scale urban infrastructure.

Description

Development of a new town extension of the existing city with emphasis on **green approaches to infrastructure** while recognizing traditional urban cultural values.

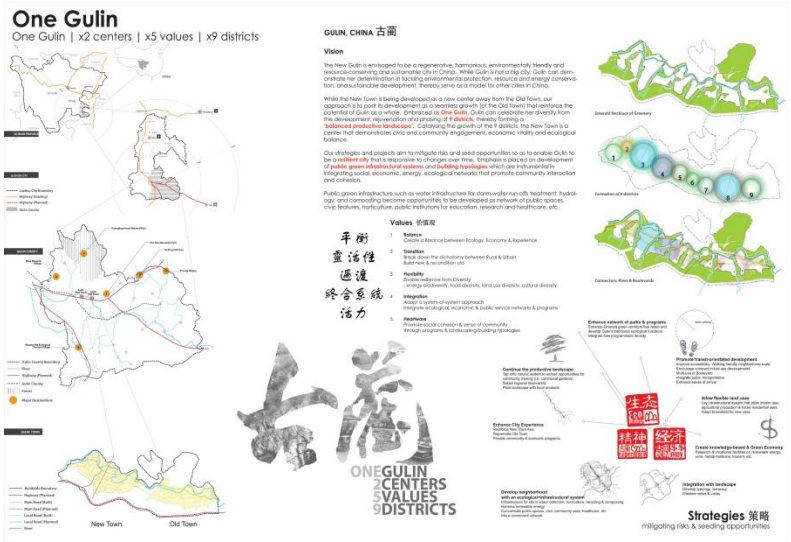
Within the context of the new urbanization of Gulin, the traditions related to usage of water in the countryside are crucial to understand and reinterpret.

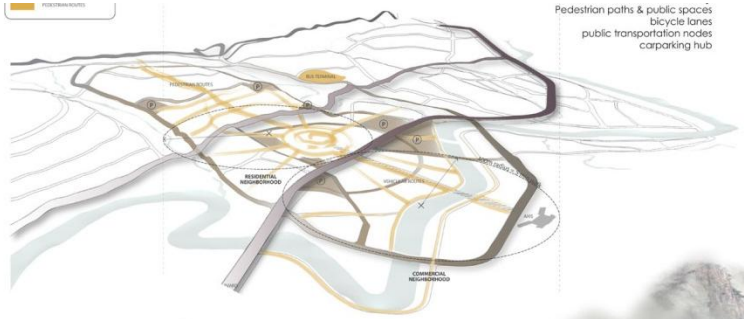
Collaboration

GSAPP, Urban Design Program
Central Academy of Fine Arts, Beijing

Support

Gulin County, Sichuan Province, PR China
Columbia University Global Center, Beijing





Project by Helen Cheuk, Jaeil Jeon, Juan Correa, Lay Bee Yap, Paul Yoo, Shiu K Tang, Shui He: MSAUD 2011

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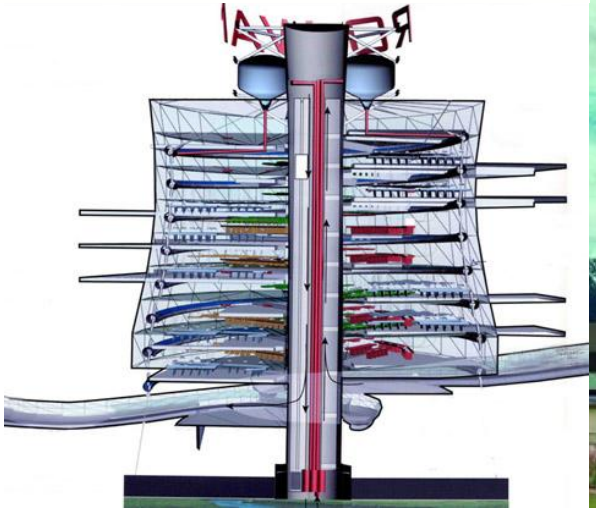
3.1 Economies of Waste

Description

Studio participants envisioned a continuity of use: from the present period of industrial abandonment to a phase of remediation, research and development, and then to a period of new industry driven by spin-offs from the remediation technology. This strategy prioritizes gaining a new “industrial” base for New York after many decades of neglect.

Collaboration

GSAPP, UDL
Columbia Engineering
Gowanus Canal Community Development Corporation



3.2 Economies of Waste

Brownfield Remediation by Design II

Description

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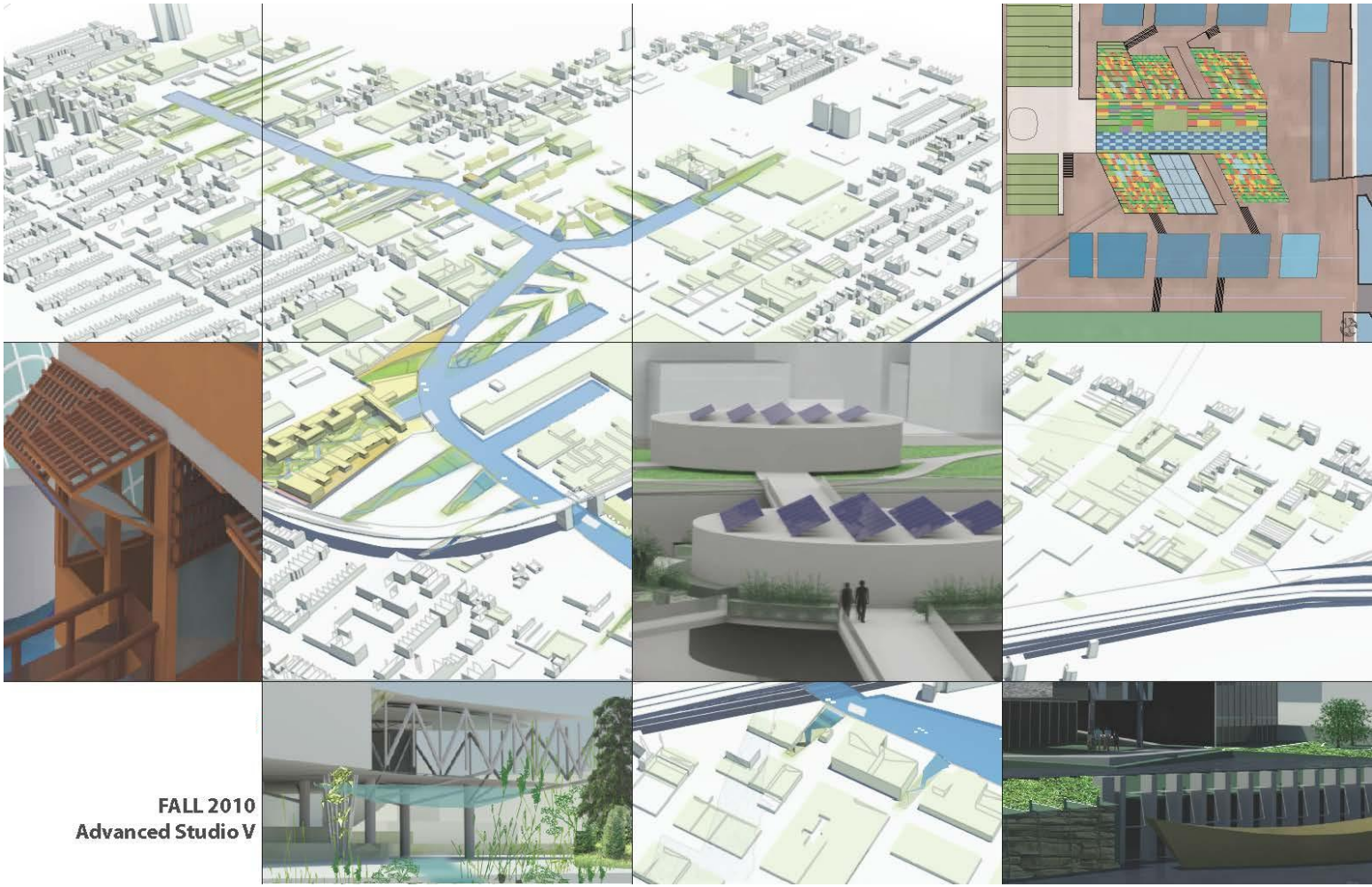
Collaboration

GSAPP
Columbia Engineering
F.R.O.G.G.
Environmental Protection Agency

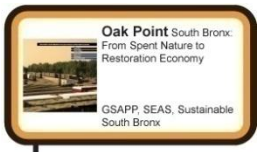


FALL 2010
Advanced Studio V

Projects by Nelly Chang, Yihan Hao, Eun Ki Kang, Ul Yong Moon, Hye Lee Oh, Hyun-Jae Nam

3.3 Economies of Waste

New Restoration Economy: South Bronx



WATER

The studio course explored the **redevelopment of the Oak Point industrial waterfront.** It questioned monolithic approaches that support the usage of the waterfront for either industry or recreation purposes.

ENERGY

Students' projects suggested the creation of an Eco-Industrial Park that reduces energy consumption through **recycling, composting and remediation.**

URBANIZ-ATION

The studio explored the redevelop-ment of the Oak Point industrial waterfront in the Hunts Point neighborhood of the South Bronx, one of the largest unused industrial land parcels in New York City. Development proposals suggested the creation of an Eco-Industrial Park; instead of a jail (as proposed by the city) or a powerplant (as proposed by the property owner). Central was the question of a new generation of industry in New York City related to the **transformation from a biotic-based economy to a restoration-based economy and from renewable to remediated resources.** This investigation was coordinated with the goals of the NYC2030 Plan as developed by the Mayor's Office of Long-Term Planning and Sustainabil-ity.

HAZARD & RISK

Hunts Point is an industrial area similar to countless other industrial areas in the world with hazardous environmental conditions. The studio course explored ways that **design can envision mitigation of negative public health condition.**

GLOBAL HEALTH

The **proposals for local green collar jobs** would create much-needed jobs in this low-income neighborhood of the Bronx.

POVERTY

FOOD ECOLOGY & NUTRITION

ECOSYSTEMS

Oak Point is the postindustrial location of an environmentally challenged ecosystem that could be healed by **remediative systems** strategized through implementation of an Eco-Industrial Park.

CLIMATE & SOCIETY

EDUCATION

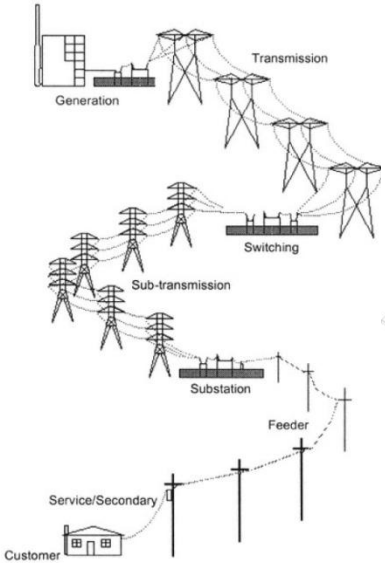
Aligned in collaboration with **Sustainable South Bronx (SSBX), a community-based organization** the studio course endeavores to **introduce local residents about the options that design can provide** to improve the area's harmful urban conditions, and to **educate the architecture and engineering student participants** about how they can use their knowledge to the benefit of the community.

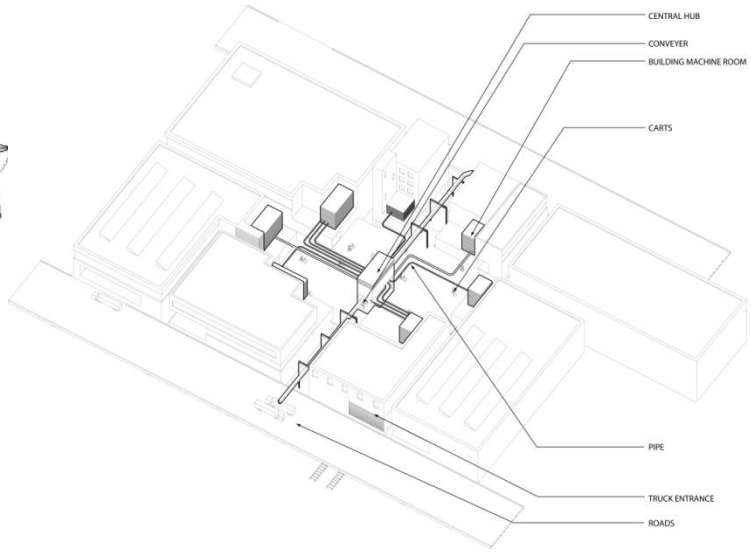
Description

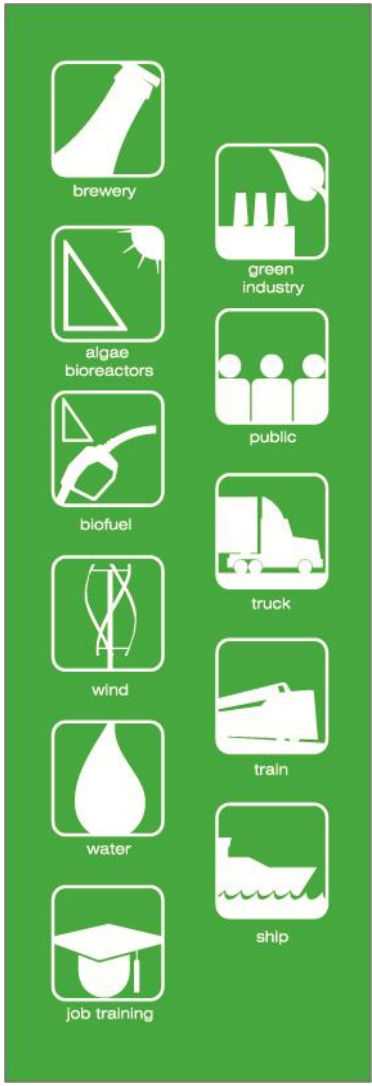
A Design Studio that explored **a new generation of industry** in New York City related to the transformation from a biotic-based economy to a restoration-based economy and from renewable to remediated resources.

Collaboration

GSAPP
Columbia Engineering
Sustainable South Bronx (SSBX)







Project by Tat Lam AAD 2008 with Angel Eng

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3.4 Economies of Waste

Urban Agriculture Economy

GoGreen
East Harlem

GSAPP, SEAS, Manhattan Borough President's Office

Description

The neighborhood is key to understanding how cities can respond and adapt to new demands related to **urban ecology, public health and economic development**. Through these elements, the studio explored **design proposals** for the neighborhood of East Harlem

Collaboration

GSAPP
SEAS
Manhattan Borough President' Office
Go Green East Harlem Initiative

WATER

This studio course explored a **series of rain-water harvesting techniques** suitable for application within dense urban fabrics, to reduce dramatically the overconsumption of water.

ENERGY

The research evaluated the option of integration of **Waste-to-Energy strategies in urban environments** encompassing micro-scale design proposals that utilize diverse techniques such as **composting, recycling and combusting of organic material.**

URBANIZATION

20% of the East Harlem residents live in Public Housing dominated by "tower in the park" typology which is frequently stigmatized for its relationship to poverty, urban decay and crime. The research questioned this presumption, **considering Public Housing as an asset that can be developed as a vital piece of infrastructure for a healthy city.**

HAZARD & RISK

GLOBAL HEALTH

Fundamental to this research was **exploration of environmental strategies related to local health problems, primarily childhood obesity and asthma.** In this arena or childhood disease, East Harlem shares much with many other poor urban communities throughout the world.

POVERTY

East Harlem is one of the poorest areas in NYC and the Nation. The **design interventions explored creation of job opportunities for local residents**, in large part related to green development practices.

FOOD ECOLOGY & NUTRITION

The research addressed the issue of **food production in urban areas beyond the high-tech "vertical farm" model**, suggesting alternative modular urban farming systems that can build social and economic equity within communities.

ECOSYSTEMS

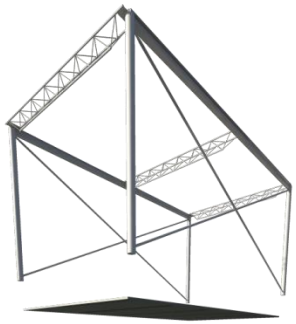
Analysis of existing urban ecological systems (water, air, climate, vegetation, and garbage/sewerage) led to the development of design proposals that foster positive environmental conditions.

CLIMATE & SOCIETY

The effects of Urban Heat Island were central to design proposals that seek to improve urban microclimatic conditions.

EDUCATION

Working in **collaboration with the Manhattan Borough President's Office (MBPO) and the Go Green East Harlem Initiative**, the studio course strove to **educate East Harlem and City officials** about the options that design can provide to ensure a sustainable future for the community, and to **educate engineering and architecture students** about application of their knowledge for the public good.



Project by Andres Serpa AAD 2009 with James Banner, Ivan Hilbarger

3.5 Economies of Waste

Green Tech Innovation

GoGreen
East Harlem

GSAPP, SEAS, Manhattan Borough President's Office

Description

The neighborhood is key to understanding how cities can respond and adapt to new demands related to **urban ecology, public health and economic development**. Through these elements, the studio explored **design proposals** for the neighborhood of East Harlem

Collaboration

GSAPP
SEAS
Manhattan Borough President' Office
Go Green East Harlem Initiative

WATER

This studio course explored a **series of rain-water harvesting techniques** suitable for application within dense urban fabrics, to reduce dramatically the overconsumption of water.

ENERGY

The research evaluated the option of integration of **Waste-to-Energy strategies in urban environments** encompassing micro-scale design proposals that utilize diverse techniques such as **composting, recycling and combusting of organic material.**

URBANIZATION

20% of the East Harlem residents live in Public Housing dominated by "tower in the park" typology which is frequently stigmatized for its relationship to poverty, urban decay and crime. The research questioned this presumption, **considering Public Housing as an asset that can be developed as a vital piece of infrastructure for a healthy city.**

HAZARD & RISK

GLOBAL HEALTH

Fundamental to this research was **exploration of environmental strategies related to local health problems, primarily childhood obesity and asthma.** In this arena or childhood disease, East Harlem shares much with many other poor urban communities throughout the world.

POVERTY

East Harlem is one of the poorest areas in NYC and the Nation. The **design interventions explored creation of job opportunities for local residents**, in large part related to green development practices.

FOOD ECOLOGY & NUTRITION

The research addressed the issue of **food production in urban areas beyond the high-tech "vertical farm" model**, suggesting alternative modular urban farming systems that can build social and economic equity within communities.

ECOSYSTEMS

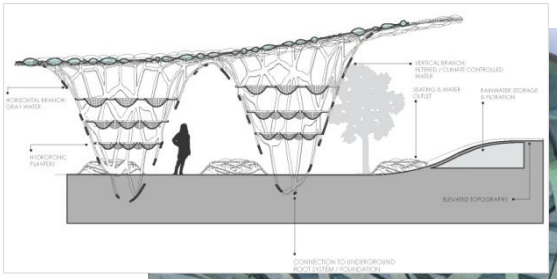
Analysis of existing urban ecological systems (water, air, climate, vegetation, and garbage/sewerage) led to the development of design proposals that foster positive environmental conditions.

CLIMATE & SOCIETY

The effects of Urban Heat Island were central to design proposals that seek to improve urban microclimatic conditions.

EDUCATION

Working in **collaboration with the Manhattan Borough President's Office (MBPO) and the Go Green East Harlem Initiative**, the studio course strove to **educate East Harlem and City officials** about the options that design can provide to ensure a sustainable future for the community, and to **educate engineering and architecture students** about application of their knowledge for the public good.



3.6 Economies of Waste

Micro-Infrastructure Innovation

Ultra-Ex: Micro Infrastructures, Worm Team

National Science Foundation
GSAPP, SEAS
Office of Environmental Stewardship

WATER

ENERGY

URBANIZ-ATION

Sustainable urban waste infrastructure requires graduated scales such that long-distance disposal is not a requisite, and micro-scale systems can augment macro-scale. This study explored micro-scale innovation.

HAZARD & RISK

GLOBAL HEALTH

POVERTY

FOOD ECOLOGY & NUTRITION

Emphasis was placed on developing strategies for productive use of organic waste for food production through innovation in urban composting techniques.

ECOSYSTEMS

Inefficient waste management systems put urban regional ecosystems at risk. This study points to the need to develop sustainable and equitable strategies for protecting large-scale urban ecosystems through scaling down to community level solutions.

CLIMATE & SOCIETY

EDUCATION

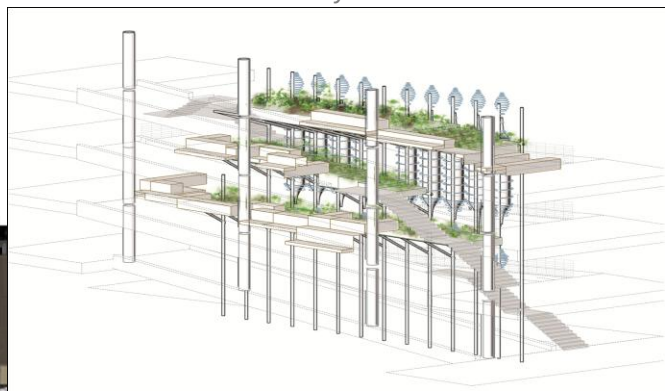
This studio worked in collaboration with the Columbia University Office of Environmental Stewardship to develop demonstration projects toward increasing public awareness of the efficiencies of micro-scale urban infrastructure.

Description

The Ultra-Ex (Urban Long Term Research Areas- Exploratory Research) pursues developing understanding of “the dynamic interactions between **people and natural ecosystems in urban settings**”, toward the goal of improving eco-system functionality in urban environments.

Collaboration

National Science Foundation
GSAPP
SEAS
Office of Environmental Stewardship,
Columbia University



Project by Ruth Mandl AAD 2010 with Sari Ancel, Diana Lima, Daniel Marasco, Alan Radvinsky

WATER

South Korea is currently the world's 5th largest importer of potable water. With a low annual rainfall, a small percentage of the surface water is collected and treated for consumption use. Municipal water filtration infrastructure is out dated; Water will be an increasingly valuable commodity in the years to come.

ENERGY

Rapid new development in housing, workplaces and shopping centers in producing a record demand for energy. As national development moves forward, a focus on alternative energy strategies must be developed to reduce South Korean oil dependency.

URBANIZ-ATION

The growth of the City of Seoul is planned as regional center nodes such as a Seoul mega city region connected by advanced road, mass transportation and telecommunications infrastructure.

HAZARD & RISK

GLOBAL HEALTH

POVERTY

With the rapid growth of Seoul, supportive systems such as food and water must service a densifying population. Agriculture is a vital component of urban living, with a symbiosis between urban, suburban and the rural regions need to coexist. Importation of food from outside the country will be a costly option in years to come.

FOOD ECOLOGY & NUTRITION

ECOSYSTEMS

To address the environmental concerns regarding Climate Change, Global Warming and Carbon Emissions, a new typology of urban development must foster ecological living systems to enhance the vegetative characteristics of cities. Incorporating green roofs and walls, water retention ponds, and green public spaces are the first steps to develop livable neighborhoods for the 21st century.

CLIMATE & SOCIETY

EDUCATION

4.1 Economies of Water

Green Infrastructure

Description

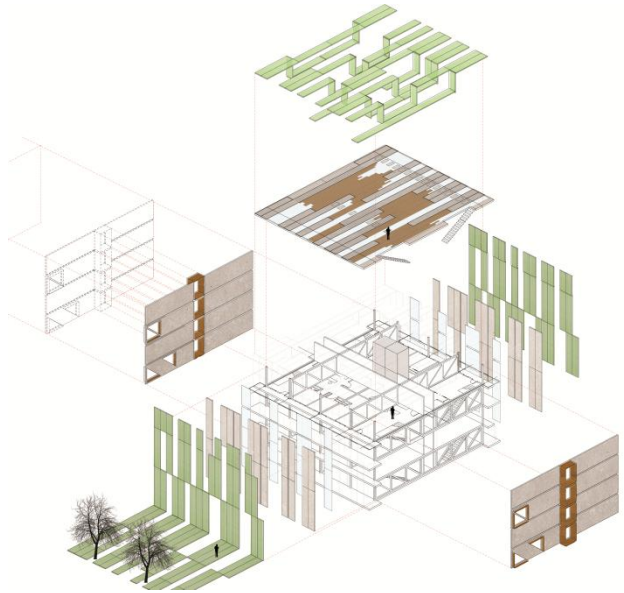
At the request of the Korean Land Institute, the UDL is in the process of **coordinating a study of a new town development** for Dongtan, South Korea.

Collaboration

University of Korea
Gyeonggi-do Province

Support

Korea Planners Association
Government of South Korea



5.1 Economies of Energy

Upper Delaware: Water/Energy Conflicts

Upper Delaware:
Gas Drilling
Impact Study

GSAPP, OSI, UDPC,
Columbia Environmental
Law Clinic

WATER

This study analyses the potential impacts of natural gas extraction from the Marcellus Shale deposits on the Upper Delaware watershed. With the potential for thousands of wells, the extraction process will involve significant environmental impacts, most basically on water-related factors. Gas drilling acts as a big stressor on the water sources and pose a risk of polluting the aquifer.

ENERGY

Natural energy resources are in increasingly high demand. The Upper Delaware is highly sought after for its natural gas resources below the surface. Although natural gas is abundant, the extraction process has significant environmental impacts. **This study will balance these competing interests in determining the impacts of gas drilling.**

URBANIZ-ATION

HAZARD & RISK

The hydro-fracking process deployed for Marcellus Shale has a history of negative environmental impacts including the health of nearby residents. **Health disorders that can result from living near gas drilling include nausea, headaches, sleep dysfunction, and learning disabilities.** This research study integrates these impacts into locational analysis.

GLOBAL HEALTH

POVERTY

Leasing by individual property owners for gas drilling opens up new economic possibilities for residents with limited income. While subleases to allow **drilling may** provide new means of income for property owners, but also **bring environmental risk and depreciation in property value.**

FOOD ECOLOGY & NUTRITION

ECOSYSTEMS

Large-scale gas drilling effectively **transforms an agrarian region into an industrial environment,** entailing massive changes in the ecosystem, involving both air, soil, and water.

CLIMATE & SOCIETY

The **uncertainties of climate change relative to gas drilling** and distribution within a fragile physical and social environment are integral to this study.

EDUCATION

The project runs as a CU/EI studio with the **participation of students from Law and Architecture** and seeks to **educate the general public.**

Description

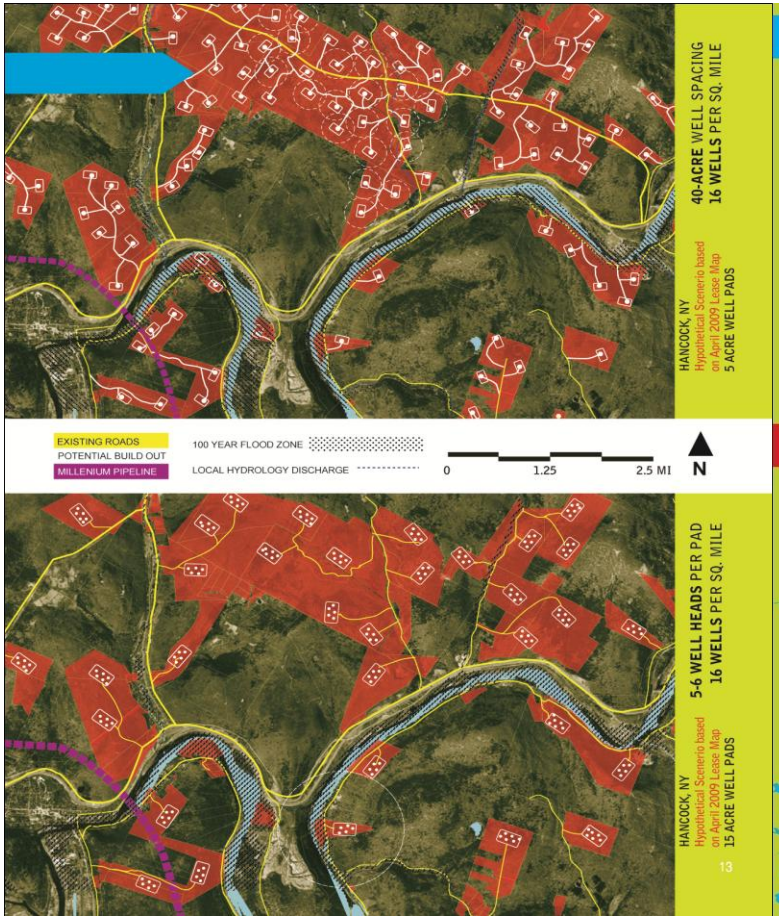
This student research looks at the **impacts of gas drilling** as it effects the rural landscape, subsurface geology and health impacts to residents and the community at large.

Collaboration

GSAPP
Columbia Environmental Law Clinic

Support

Open Space Institute
Upper Delaware Preservation Coalition
Norcross Foundation



6.1 The Health Equation

National Food System

Description

Bring together experts in **public health, medicine, business, economics** and design to apply a "big-picture" perspective while identifying and analyzing issues on a **variety of scales**

Collaboration

Collaborative Initiatives at MIT

Support

United Health Foundation
Anonymous Donor

WATER

The childhood obesity project has focused on **analyzing the industrial food system, which is responsible for a great deal of water pollution.** The UDL is engaged in researching and proposing alternatives to the current food system that would significantly reduce fertilizer and pesticide runoff.

ENERGY

This project researches the potential for creating alternative food production systems and alternative food transportation systems, which would use less energy.

URBANIZATION

The built environment and how it affects residents' eating and physical activity habits. Integral to the study is initiation of community-based healthy planning projects in several diverse locations across the country in order to increase access to fresh foods, limit the proliferation of high-calorie low-nutrient foods, and maximize opportunities for physical activity.

HAZARD & RISK

Because of the industrial food system's large scale and centralization, dysfunctions in production or distribution can impact thousands of people.

GLOBAL HEALTH

The worldwide food commodities market encourages small farmers in developing countries to grow food for export rather than for local consumption, leaving many areas vulnerable to fluctuating commodity prices, and contributing to poverty and poor nutrition.

POVERTY

The study points to poverty as a factor in obesity and to obesity as a cause of poverty because it (and related illnesses) can inhibit workplace productivity and result in high medical costs.

FOOD ECOLOGY & NUTRITION

The childhood obesity project proposes to **curb obesity largely by designing neighborhoods and food systems to increase consumption of fruits, vegetables, and whole grains,** ensuring good nutrition and improved health.

ECOSYSTEMS

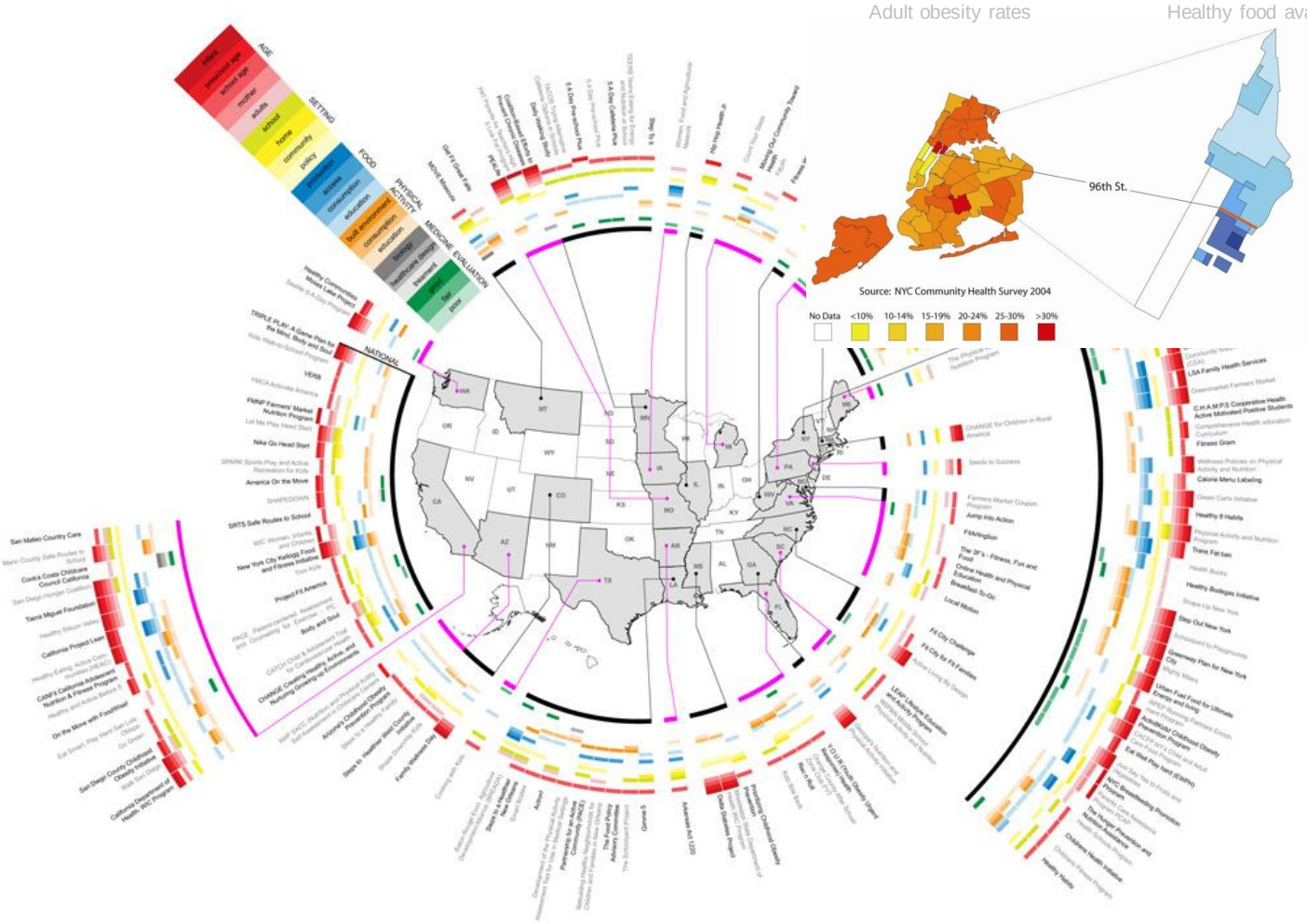
The research points to the **industrial food system as one major reason why crop monoculture has proliferated globally.**

CLIMATE & SOCIETY

The research **emphasizes forging links between food production and the environmental movement.** The industrial food system is a major generator of greenhouse gases.

EDUCATION

An important aspect of curbing childhood obesity involves child education about food, physical activity, and health. The research **analyzed innovative programs** like the Edible Schoolyard **that can serve as models for integrating cooking and nutrition education into schools** while promoting healthy lunches for kids.



Urban Design Lab
WWW.URBANDESIGNLAB.COLUMBIA.EDU

6.2 The HEALTH Equation

Regional Food System

The Politics of Food: A Conference on New Yorks Next Food Policy Challenge

Manhattan Borough President's Office, SIPA, CU Office of Environmental Stewardship

WATER

This research points to the impacts of the industrial food system on the environment including water pollution. **The Food Summit discussed the importance of researching alternatives to the current food system** to significantly reduce fertilizer and pesticide runoff.

ENERGY

Reducing energy consumption is an essential component of creating alternative food systems. Although crops may be grown with only soil, sunlight, and water, our current industrial food system unnecessarily uses petroleum-based fertilizers and pesticides to support unsustainable monocultures.

URBANIZATION

The study points to an **important aspect of food policy in New York City related to its effect on the built environment** and its relevance to food availability and physical activity. Innovative physical planning can ensure that fresh food is available in all neighborhoods and high-calorie low nutrient foods are limited.

HAZARD & RISK

The industrial food system has inherent weaknesses that leave it vulnerable to accidental contamination, environmental disasters, or terrorism. These research concerns have particular relevance to New York City, and **strategic planning for a more secure alternative food system.**

GLOBAL HEALTH

Obesity, heart disease, and diabetes are often correlated with poverty. In particular, since healthy food is frequently less available in low-income communities. However, obesity can also be considered a cause of poverty because it (and related illnesses) can inhibit workplace productivity and result in high medical bills.

POVERTY

By **designing neighborhoods and food systems to increase the public's consumption of fruits, vegetables, and whole grains,** New York can move towards ensuring improved nutrition and improved health of its residents.

FOOD ECOLOGY & NUTRITION

The industrial food system is one major reason why crop monocultures have proliferated across the world. **Development of alternative agriculture systems could promote greater ecological stability.**

ECOSYSTEMS

Because New York City is particularly vulnerable to the effects of climate change, this project integrates this added local political incentive to reduce greenhouse gas emissions providing a model for cities across the nation. The current industrial food system generates a great deal of greenhouse gases, but a localized food system based on sustainable agriculture practices would generate much less. The research **points to urban agriculture as an ideal target for the environmental movement.**

CLIMATE & SOCIETY

EDUCATION

Description

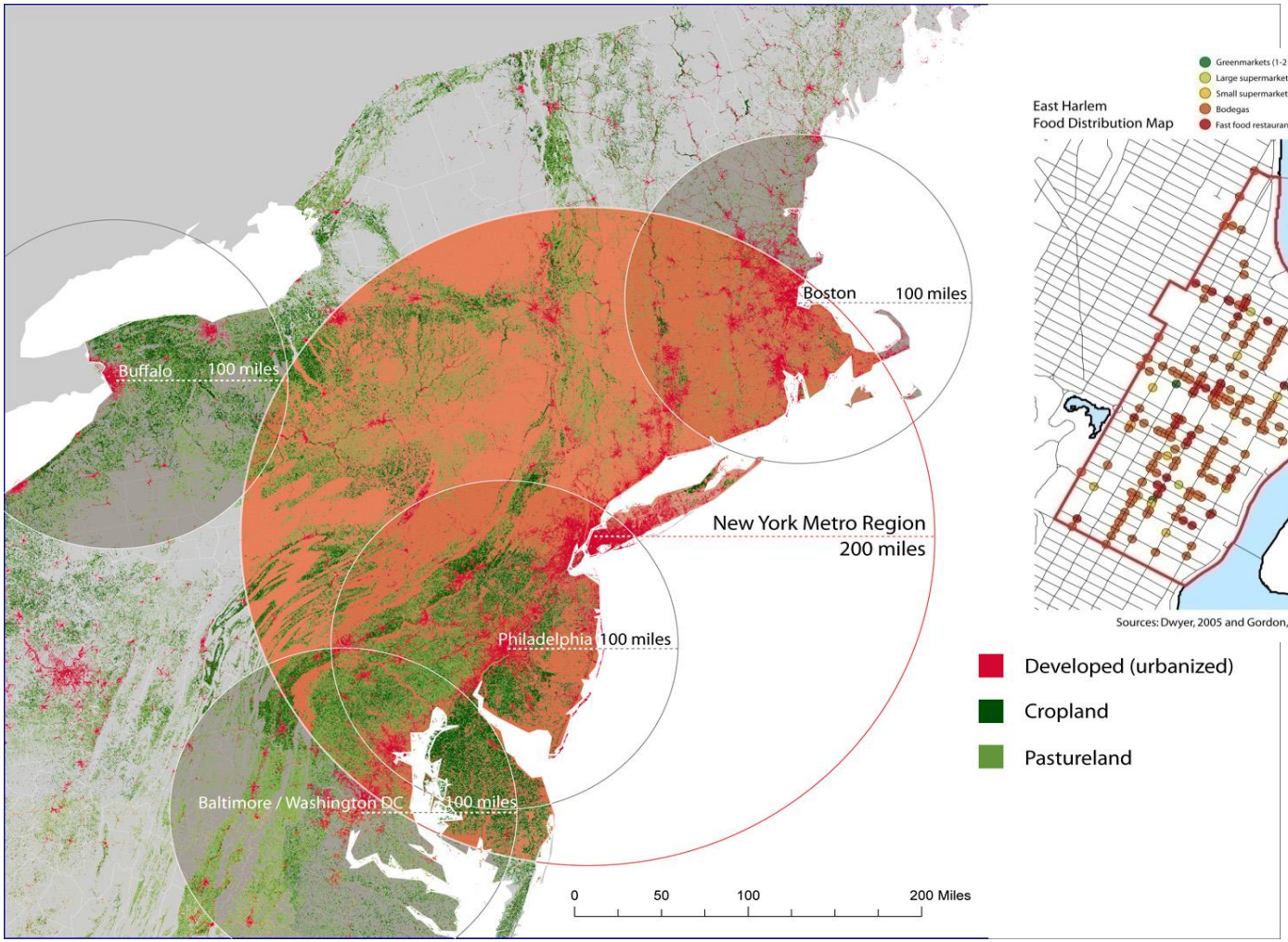
An analysis of New York City's food origins, distribution systems, and consumption patterns

Collaboration

Manhattan Borough President's Office
Stone Barns Center for Food and Agriculture

Potential Support

USDA
NYSERDA



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6.3 The HEALTH Equation

New York Regional Foodshed

Description

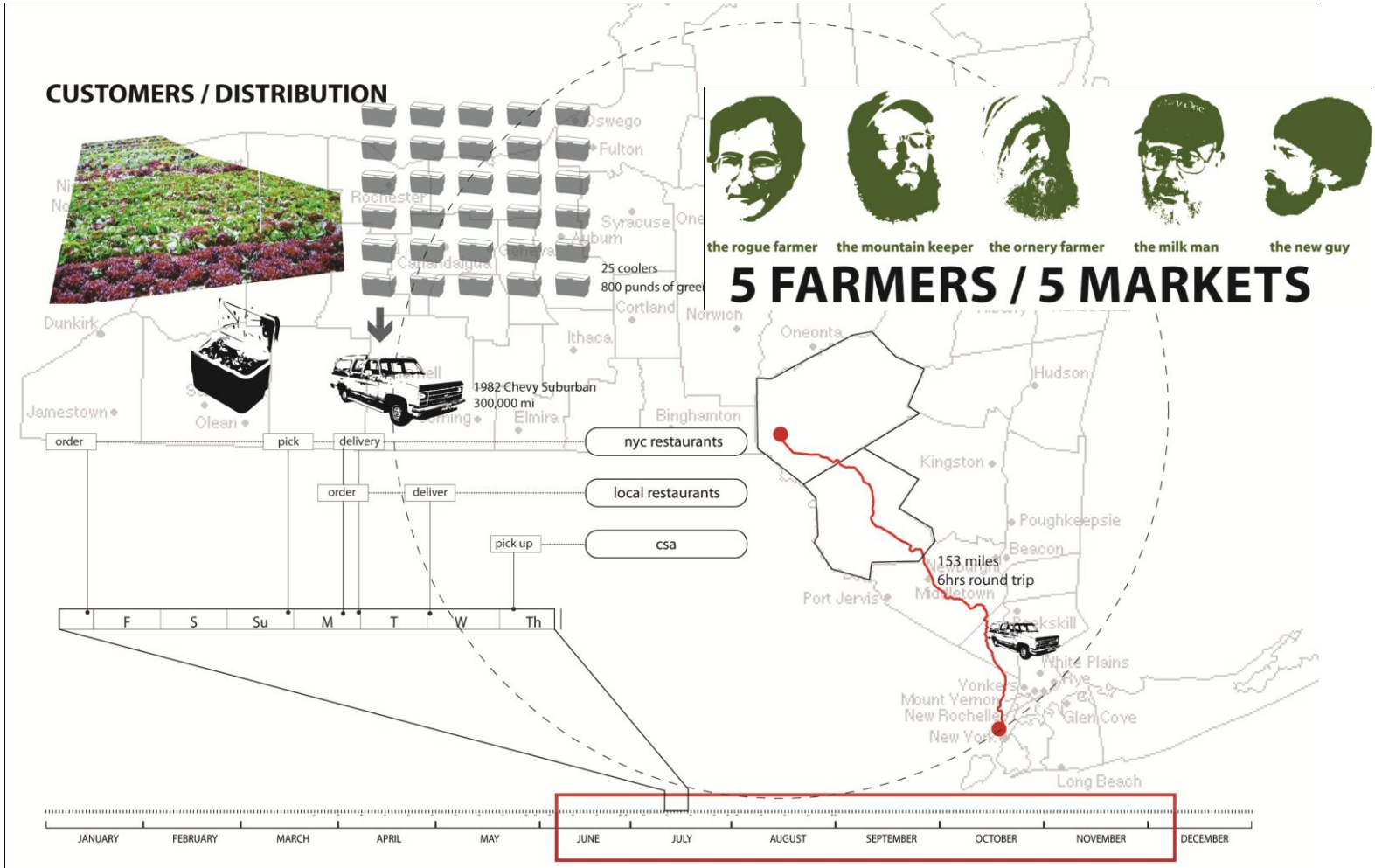
In modern assessments of urban issues, understanding a city's relationship with its supporting communities - those which provide workers, energy, water, food, supplies, and waste disposal- is a necessary precondition for designing sustainable urban systems. Perhaps nowhere is this more apparent than in the relationship of farms to their markets.

Collaboration

GSAPP

Support

Open Space Institute
Upper Delaware Preservation Coalition
Norcross Foundation



WATER
ENERGY
URBANIZ-ATION
HAZARD & RISK
GLOBAL HEALTH
POVERTY
FOOD ECOLOGY & NUTRITION
ECOSYSTEMS
CLIMATE & SOCIETY
EDUCATION

6.4 The HEALTH Equation

Urban Food Deserts

GoGreen East Harlem

GO GREEN East Harlem

COLUMBIA UNIVERSITY GSAPP, SEAS, Manhattan Borough President's Office

Description

Bring together experts in **public health, medicine, business, economics** and design to apply a "big-picture" perspective while identifying and analyzing issues on a **variety of scales**

Collaboration
Collaborative Initiatives at MIT
Support
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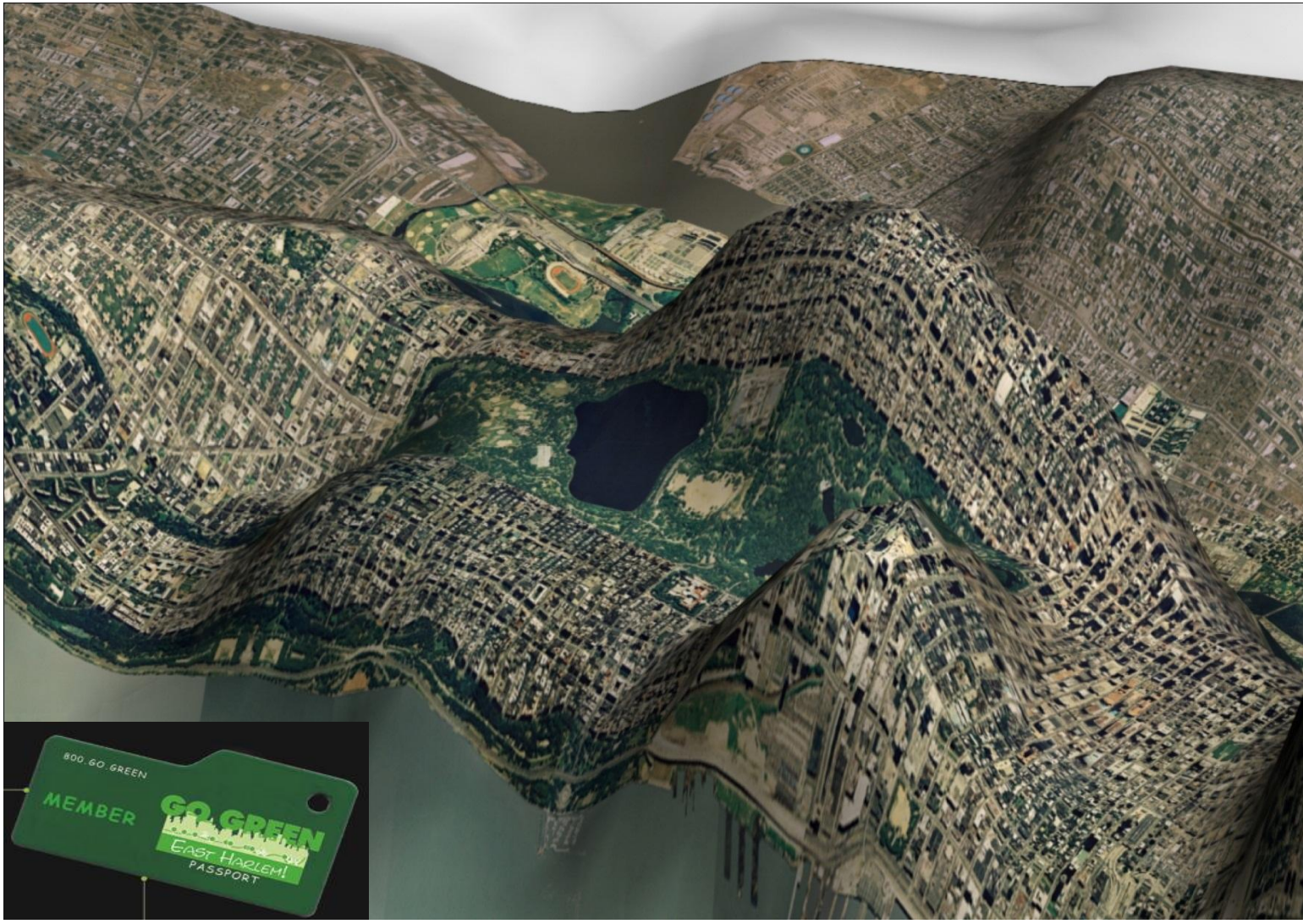

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