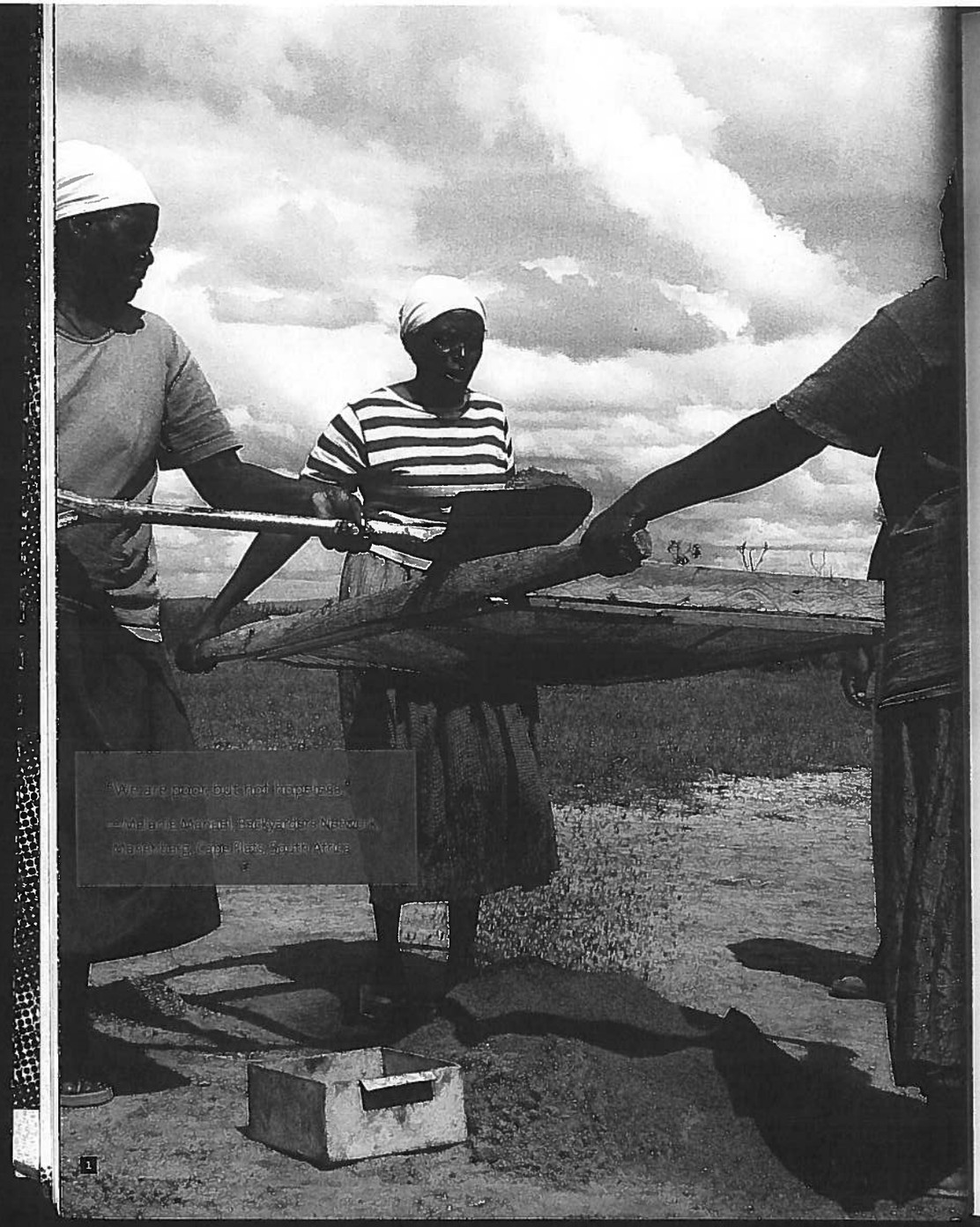

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Designing Inclusive Cities

Cynthia E. Smith
Curator of Socially Responsible Design, Cooper-Hewitt, National Design Museum

Hybrid Innovations

I was on my third liter of water; dirt and sand covered me as I walked in blowing wind next to the largest dumpsite in Dakar, Senegal. I had just come from seeing the efforts of a team of Senegalese and Canadian architecture students,[1] who designed and built with local artisans a series of mosaic-clad community wells for the growing peri-urban settlement of Malika (fig. 2). We took an hour's journey back to the center of the city, passing building after building under construction, emblematic of this city's rapid growth.

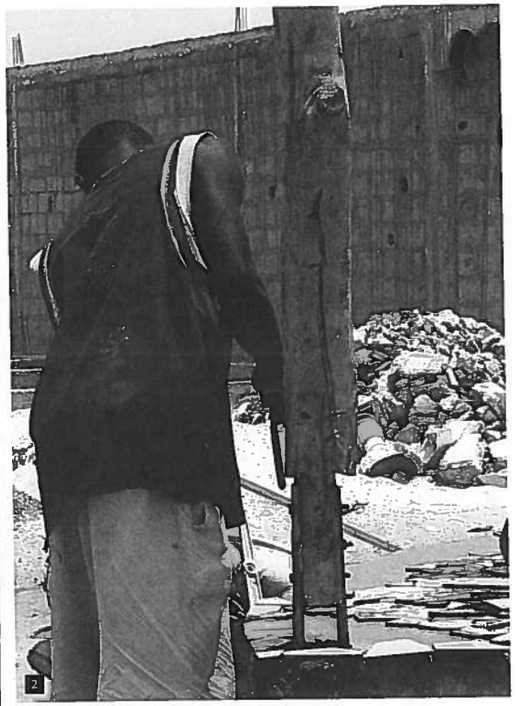
This would be my last interview after a year of field research in fifteen different cities in Asia, Africa, and Latin America. "What have you discovered in your travels?" asked Oumar Cissé, Executive Director of the African Institute for Urban Management. I told him I had set out to find successful design solutions to rapidly expanding informal settlements, and had found that the most innovative were hybrid solutions that bridge the formal and informal city.[2] Oumar affirmed, "Formal mechanisms are not adequate to tackle this rapid informalization of the city. We are not able to make services available as quickly as the growth. We should make our process more appropriate for this new reality by creating an interface between the formal and informal."

Clogged streets and overloaded public transport are typical in many of the cities I visited, and Dakar was no exception. A sea of motorbike taxis wove in and out of traffic. Often illegal and unregulated, motor-taxis, with minimal start-up costs, meet the growing demand[3] for cheap transport in many cities in the Global South. Rather than banning these illegal taxis, Oumar described an alternative system in which local governments register the drivers and provide brightly colored and numbered vests to identify them (fig. 3). Through this low-cost solution, motorbikes require no alterations, and their new visibility improves their perception and value within the city.[4] In Bangkok, Thailand, the government is going one step further with Prachawiwat, meaning "Progress of the People," a new evolving program where drivers and other informal workers get benefits like Social Security and bank loans.[5]

Designing with People

In 2007, the first exhibition in Cooper-Hewitt's series on humanitarian design, *Design for the Other 90%*, helped spark an international dialogue

1. Community residents prepare building materials for manufacture, Kaputiei New Town, Kisaju, Kajiado District, Kenya.



Naval Settlement, Diadema, Brazil, 2008

UN-HABITAT'S SLUM INDICATORS[6]

UN-Habitat has developed a definition of a slum household in order to use existing household-level surveys and censuses to identify slum dwellers among the urban population. A slum household is defined as one which lacks any one of the following five elements:

Access to sufficient water (for family use, at an affordable price, available without extreme effort)

Access to sanitation (access to an excreta-disposal system, either a private toilet or a public toilet shared with a reasonable number of people)

Security of tenure (documentation to prove secure tenure status or de facto/ perceived protection from evictions)

Durability of housing (permanent, adequate structure in nonhazardous location)

Sufficient living area (no more than two people sharing the same room)

about how design could improve the lives of poor and marginalized communities around the world. Professional designers have traditionally focused on the 10% of the world's population that can afford their goods and services, but that has dramatically changed in this new millennium. This new wave of designers, architects, engineers, NGOs, and philanthropists is working directly with people with limited resources, collaborating across sectors to find solutions, and utilizing emerging technology that "leapfrogs" poorer communities into the twenty-first century. They are proving that design can play a significant role in solving the world's most critical problems.

For the first time in history, more of us are living in cities than ever before. This massive urban migration into crowded, unhealthy informal settlements is the leading challenge of this century pushing beyond the capacity of many local institutions to cope. *Design with the Other 90%: CITIES* was conceived to broaden exchanges of knowledge among the people living in our growing cities and architects, engineers, designers, planners, policy-makers, and nongovernmental and funding organizations to generate healthier, inclusive cities. Placing people at the center of the solution is paramount to gaining the required insight to meet this challenge. In his *Triumph of the City*, Edward Glaeser remarks, "Cities don't

2. A local artisan creates a mosaic on a community well, Diamalye informal settlement of Malika area, Dakar, Senegal.
3. Registered Prachawiwat motorbike taxi, Bangkok, Thailand.

> The United Nations Habitat Program defines informal settlements as "residential areas where a group of housing units has been constructed on land to which the occupants have no legal claim, or which they occupy illegally; or unplanned settlements and areas where housing is not in compliance with current planning and building regulations (unauthorized housing)."

make people poor; they attract poor people. The flow of less advantaged people into cities from Rio to Rotterdam demonstrates urban strength, not weakness."[6] The participation of slum dwellers and the urban poor is changing the dynamics of design at all levels.

Migrant Cities

Almost one billion people live in informal settlements, commonly called slums, around the world.[7] That number is projected to double by 2030. Most of the growth will be in emerging and developing countries of the Global South, in an increasingly climate-challenged world.[8] This massive urban migration signals a historic shift in our civilization. There are over 400 cities with one million inhabitants, more than twenty cities with ten million inhabitants, and three cities with at least twenty million.[9] In Latin America, close to 80% of the population live in urban areas,[10] and in Brazil, 90% are city dwellers. By 2030, all "majority world countries"[11] will have more people living in cities than in rural villages.[12] There are an estimated 200,000 slums around the world,[13] with dense living conditions; in Dhaka, Bangladesh, for example, 70% of the population live on only 20% of the city's land.[14] (fig. 4)

Close to 200,000 people are pulled to cities each day,[15] enticed by the possibility of finding work, greater social mobility and freedom, and a better life for their families. They are also pushed from their villages by rising waters, expanding deserts, and refugees from local conflicts. These migrants

erect housing from the materials at hand in leftover, often precarious space. They arrive to divided cities typified by "inclusion and exclusion, integration and marginalization, wealth and poverty, equality and inequality."[16]

Adaptive Solutions

According to John Beardsley of Harvard University, "Slums are now the dominant form of urban land use in much of the developing world."[17] Under constant transformation, cities are complex, with distinct physical features, geographies, cultures, and histories, whose social, economic, and political structures evolve over time. Successful designs adapt to existing conditions. Amidst the extreme geography of Caracas, Venezuela, settlements were built in the vertical mountains that surround the central city. The architecture firm Proyectos ArquiS, working with the San Rafael Unido community in Caracas's La Vega settlement, designed a network of stairs and public landings that incorporate water and sewage systems throughout the settlement. Families were able to remain in their homes, which was critical to maintaining social cohesion.

Coastal cities throughout Asia, with large populations of urban poor, which face changing temperatures, rainfall declines, rising sea levels and flooding, erosion, and salt intrusion, are piloting long-term, citywide measures.[18] India's Surat City engages a range of stakeholders, including industry, academia, and government, via online resources to increase climate-change resilience among poor and vulnerable communities. In the Philippines, My Shelter Foundation solicited designs for a multiuse structure that could withstand typhoons. The winning structure is engineered so that high winds easily pass through it. Located on a hill above the flood line and constructed from locally grown, sustainable bamboo, it doubles as a public school and emergency shelter for the surrounding community (fig. 5).Understanding and utilizing local knowledge are critical for successful design. In Diadema, once one of Brazil's most violent cities, the murder rate dropped from a high of 140 per 100,000 in 1999 to 14 per 100,000 by 2009. In 1983, three out of ten people lived in squatter communities, or *favelas*; by 2010, only three out of every one hundred dwellers lived in them.[19] Using participatory planning and budgeting, the citizens of Diadema drew up plans and allocated the resources necessary to achieve these results. Certificates of tenure,[20] based on right of access for ninety years, were delivered so people could feel secure enough to invest in their future. In contrast, the Savola Ghevra slum-resettlement scheme I visited, twenty-five miles (approx. 40 km) from the center of New Delhi, India, was an isolated urban island. Longstanding poor communities were moved from the center of the city and given small plots of land (less than 18 square meters, or 200 square feet, per resident), dismissing the importance of their established socioeconomic networks and physical proximity to their places of work. In response to this dire situation, the Center for Urban and Regional Excellence (CURE) develops new income-generating solutions such as sewing cooperatives and waste-collection enterprises with residents, especially women and youth (fig. 6). They also share safer design and construction solutions to vastly improve the quality of these families' lives.

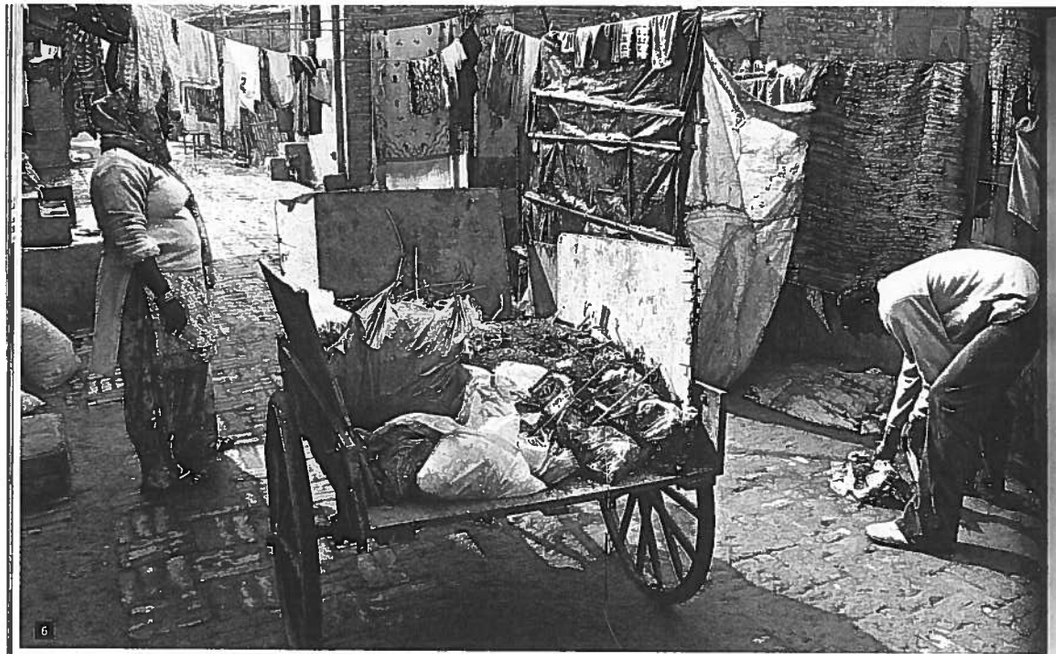
4. Residents of the dense Korail informal settlement, Dhaka, Bangladesh, access their community via boats.

In Medellín, Colombia, city plans integrate a cable public-transportation system that links the poorest neighborhoods with the rest of the city. Its Integral Urban Plan introduced safe public spaces, world-class libraries, business centers, and improved schools and medical facilities. This long-term design vision, in direct collaboration with citizens, reduced poverty and violence and improved local capacity and environmental sustainability. As such, it is a replicable model for other cities facing similar conditions.

Right to the City

Anna Kajumulo Tibaijuka, UN-Habitat's former Executive Director, states, "Urban inequality has a direct impact on all aspects of human development, including health, nutrition, gender equality and education."[21] The largest slum in Southeast Asia, Dharavi, in Mumbai, India, is often referred to as "a city within a city." A fishing village in the 1960s, it was transformed into a

5. The Millennium School Bamboo Project design is low-cost, uses local, sustainable materials, can withstand 150-kph (93-mph) winds, and incorporates natural light and ventilation, Camarines-Sur, Philippines



6. In Savoia Ghevra, Delhi, India, a resident cleans the streets and generates income, one local livelihood solution developed by CURE.

diverse slum of migrants with a vibrant informal economy of globalized exports. In *Urban Revolution*, Jeb Brugmann describes Dharavi as an "engine of urban poverty reduction" for several reasons: high density; low transportation costs, since most workers in Dharavi also live there; high property usage, as buildings are used twenty-four hours a day for housing and workshops. Moreover, manufacturers, suppliers, and retailers are next door to each other, and there is a strong migrant affiliation within micro-industries.[22] Once outside the city, Dharavi now sits on valuable land as the formal city has expanded around it. Families face eviction, either to the periphery of Mumbai or to alternative housing they cannot afford, where they confront a new poverty, moved far from their means of livelihood, where the cost of living outpaces any potential benefits. Local residents formed Shack/Slum Dwellers International to bring attention to their and others' plight in cities around the world. Renowned anthropologist David Harvey calls for "another type of human right, that of the right to the city"[23] for all citizens via new modes of urbanization that do not dispossess the poor when the land they have settled on increases in value.

Current versions of "world-class cities" consume land at a social, economic, cultural and ecological cost, displacing the urban poor in order to compete in the global marketplace, building airports, technology hubs, highways, golf courses, malls, high-end hotels, and gated communities.[24] Laila Iskander of CID Consulting proposes an alternative approach which draws on traditional methods and culture rather than importing systems more suited for the more economically developed Global North cities. In Cairo, Egypt, CID cooperates with the Zabaleen, a community of minority Coptic Christians who are the primary waste pickers, to maintain an effective pro-poor system of waste management. Daily door-to-door retrieval and sorting recycle 80% of the collected waste while providing income for the pickers. CID has developed innovative partnerships with the Zabaleen to meet the demand for plastic among local and international industries. This system of waste

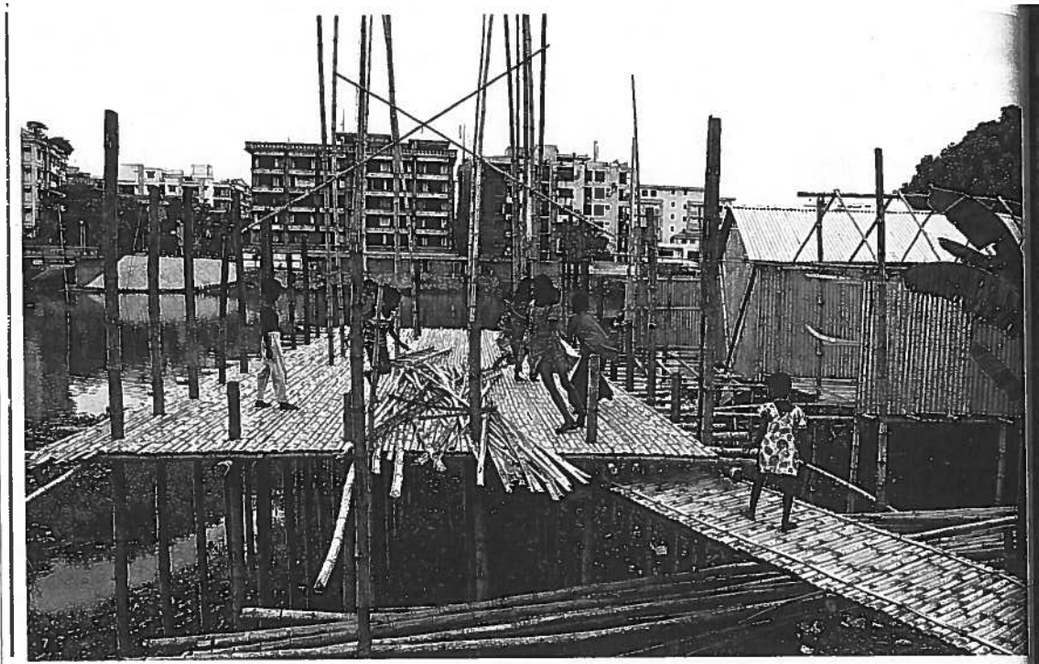
removal has spread to other countries, including Peru, Colombia, and Brazil.[25]

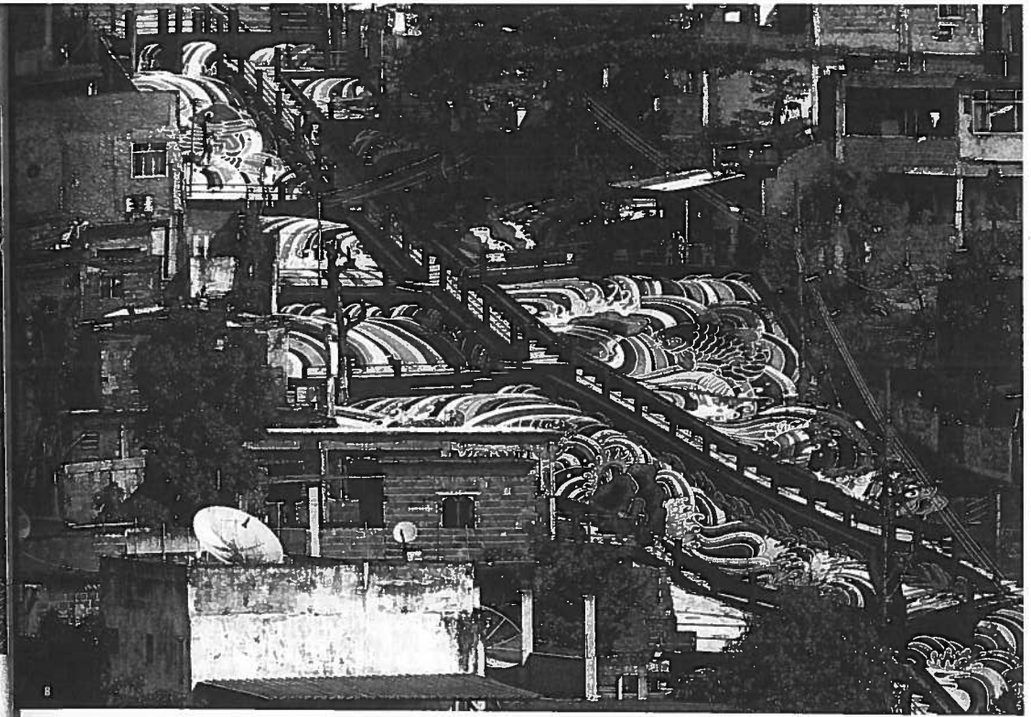
In Asia, particularly India, migration is accelerating due to reduced rural economic activity. Rather than occurring at a slower generational pace—in which the first generation moves to a nearby town, the second to a large city, and the third to an international network of cities—all three movements will occur simultaneously.[26] Urban sociologist Saskia Sassen notes that cities are systems of power and laws, suggesting we need to change our systems of authority to meet this challenge.[27] Land-use reforms and securing tenure for informal settlers require cooperation from local authorities and private owners. In Cape Town, South Africa, the government provides public land for urban agriculture next to squatter settlements. An architect in Bangkok designed an equitable tenure solution called "land sharing," in which private land is shared with urban squatters. Reflecting Thai customs of compromise and sharing, the owners develop the street front for commercial use while slum dwellers receive legal tenure and improved housing.[28]

Rather than pushing the poor to the outskirts of the city, policy makers in São Paulo have devised a "compact city" strategy that builds support capacities and infrastructure, mixed-use housing closer to work opportunities, and increased social inclusion and diversity.[29] The São Paulo Municipal Housing Secretariat (SEHAB) was the first city agency in Brazil to publish a public central database, HABISP, with information and statistics about the city's settlements. Architect Elisabete França, SEHAB's Social Housing Director, coordinates programs addressing slum upgrading, water sourcing, and land-tenure regularization.[30] By providing tenure titles (as opposed to property titles)[31] the city has created "planning laws that give the social function of land priority."[32] In an effort to create common ground between top-down planning and bottom-up initiatives, the housing agency partnered with Venezuelan-based Urban Think Tank on the São Paulo Architecture Experiment, inviting Brazilian and international universities to design and implement new housing types and construction technologies in a dozen of the city's settlements.[33]

New Urban Strategies and Practices

New inclusive urbanism approaches respond to subtleties of local culture. URBZ's Mathias Echanove and Rahul Srivastava's action-based urbanology places local users' experience above the trained expert.[34] In their Urban Typhoon workshops from Tokyo to New Delhi, local residents collectively author their urban visions with small multidisciplinary teams. The Indian Institute for Human Settlements (IIHS), in consultation with MIT, Stanford, and Harvard Universities and design firms Arup and IDEO, is creating a new profession. "Urban practitioners," grounded in practice, are taught a set of interdisciplinary skills enabling them to deal with rapid and complex urban growth—just in time, as India's 5,000 urban centers are projected to quadruple to a staggering 20,000 cities by 2050.[35] In Mumbai, Partners for Urban Knowledge's (PUKAR) Youth Fellowship Project democratizes research by bringing together international students with local youth, with the philosophy that "MBAs can learn much from rag pickers." Using research as a transformative tool for advocacy and education, PUKAR's "barefoot researchers" explore their own communities while breaking down class and gender barriers through the student partnerships.[36] A number of international collaborations and initiatives are tackling sustainable urban development. A global coalition of cities called City Alliance is providing investment, planning, and support for poverty reduction, slum urbanization, and future growth, partnering with multilateral organizations like UN-Habitat and the World Bank, nongovernmental groups such as Slum Dwellers International, and ten countries, including the United States, Sweden, South Africa, and the Philippines. C40 Cities is a network that shares solutions for reducing emissions and energy use in urban areas, which produce 70% of the world's CO_2 emissions and consume two-thirds of its energy. In 1992, the





United Nations set Agenda 21, and participating countries agreed to a set of common goals for sustainable development in the twenty-first century. The long-term plan called for local actions that support the environment, social inclusion, and poverty reduction via a broad participatory planning process.[37]

Sustainable and Resilient Cities

As the world's population expands and resources diminish, we need our cities to become more sustainable and resilient, especially in response to increased climate-related activity. For millennia, people have settled along river deltas due to their fertile land and their strategic locations for transport. TU Delft's Room for the River project adapts to river overflows within a densely populated delta region by creating park areas and new building typologies for controlled flooding. Working with local farmers, it designed a "calamity polder," in which cows graze in a green area, and when the water rises, the animals are moved to new artificial "hills" until it recedes. These ideas have implication on a larger scale since dense informal settlements are the most vulnerable to rising water and changing weather. TU Delft's urban-design students are mapping vulnerable deltas around the world[38] to observe evolving urban ecological systems and formulate more resilient city strategies.[39]

The world's urban centers play a decisive role in reducing our carbon output. The challenge of the twenty-first century—and the third wave of globalization—will be to design effective systems of production, consumption, and habitation. The economic systems set up during the first two waves of global migration—in the nineteenth century as a result of the Industrial Revolution, when the world's population was only one billion; the second at the end of the twentieth century—ran first on coal, then on coal and oil. As these sources of energy become less viable, renewable energy will be needed. Delhi's IIHS is designing an Atlas of Urban Transformation that visualizes global expansion in relation to economic growth and ecological footprint. Dynamic visuals help compare trends: China currently imports natural resources from around the globe to match its rapid growth; Brazil is utilizing local sugarcane for energy; Europe is designing more compact cities; American cities are testing smart technologies to reduce consumption; and India, due to its unique settlement structure, may be able to "tunnel through" this transition period. Even though it may quadruple its urban population, India's carbon footprint may not increase due to its dispersed urban landscape of many cities (rather than just a few large ones) and the availability of rural food supplies near its urban centers.[40]

7. Children play on the Platform of Hope, above Gulshan Lake, Dhaka, Bangladesh.

Insights and Ingenuity

Gulshan Lake separates Dhaka, Bangladesh, from Korail, its largest slum. It lies directly across from the twenty-story headquarters of BRAC, the world's largest development NGO. While living with a local family, architect Khondaker Kabir constructed the bamboo Platform of Hope above the water. Local children gather on it to play and share the fruits and vegetables from the thriving compact garden Khondaker planted between squatter shacks. We arrived in Korail by bike rickshaw to visit the platform. We walked once the street turned to narrow paths dense with people and vibrant markets, passed small schoolrooms, stepped over open sewage, and made our way to where the slum met the water. Standing on the platform, we realized it created a quiet, open urban space floating between two cities. The low, dense informal city fell away behind us, and the formal city's skyscrapers rose in the distance across the stagnant water (fig. 7).

Other architects, designers, journalists, and artists have resided in informal settlements, and the experience provides them with firsthand insight and changes how they come up with potential solutions. Robert Neuwirth, author of *Shadow*

8. A mural by community youth and artists Haas&Hahn, Vila Cruzeiro favela, Rio de Janeiro, Brazil.

Cities, lived for a time in four sprawling squatter communities in Brazil, Kenya, India, and Turkey, and found them to be thriving centers of ingenuity. Dutch artists Jeroen Koolhaas and Dre Urhahn of Haas&Hahn took me to the gang-controlled favela Vila Cruzeiro, in Rio de Janeiro, where they lived for a year while painting a series of public murals (fig. 8) in an effort to bring international attention to the favelas' living conditions. Bullet holes riddled nearly all of the youth center's walls except for its impenetrable granite-walled stairwell, a safe harbor designed by Dutch architects for children during the frequent gun battles between Rio's police and gangs.

Journalist Steven Otter moved into a makeshift shack in a dense informal settlement miles from the center of Cape Town to confront his own perceptions of race and culture in post-apartheid South Africa. The resulting book, *Khayelitsha, uMlungu in a Township*, exposed the adverse living conditions and, more important, the resourcefulness and strong social fabric of the million people who reside in Khayelitsha, just one of the many slums surrounding Cape Town.[41]

Collective Voices

In Buenos Aires, Argentina, I met with squatter families who mobilized, after being evicted from their homes, to form the Movimiento Territorial de Liberación (MTL) cooperative. Rosa Batalla of MTL described a sort of epiphany, when she "started to realize the answer is not an individual, but a collective solution."[42] The 326 families designed and constructed their own housing with the help of a prominent architect. The group has been so successful that it now builds social housing for similar cooperatives, employing construction workers and its own architects.

Reimagining a settlement or *villas de emergencia* (emergency dwellings) on the southern side of Buenos Aires, architect Flavio Janches used games to gain youth participation for the design of a new public space. A starting point for the revitalization of the community, a playground features on one side large wall murals painted in memory of those lost to violence by local youths with earlier records of violence, artists, and social workers, giving expression to the socially and spatially isolated Villa Tranquila neighborhood.[43] (fig. 9)

Trash and pollution cause many social and health problems in the Kibera settlement in Nairobi, Kenya. The Community Cooker (*Jiko ya Jamii*), designed and engineered by the Nairobi architectural firm Planning Systems, is a large-scale oven that uses trash, collected by local youth for income, to power a neighborhood cooking facility (fig. 10). Community members bring collected trash in exchange for use of the cooker, one hour or less to cook a meal, or twenty liters of hot water. Elsewhere in Kibera, a collective of local artisans and groups, landscape designers, architects, and engineers has reclaimed a dumping site next to a stream that runs through the slum. The Kibera Public Space Project incorporates a variety of uses, including micro-enterprises, a community pavilion, youth playground, and gardens for composting.

9. A new playground and mural by local youth commemorate those lost to violence, Villa Tranquila neighborhood, Buenos Aires, Argentina.

INFORMAL HUMAN SETTLEMENTS: NAMES AND TERMS[59]

Informal squatter settlements and slums occur in many countries around the world, and different cultures use different words to describe these precarious settlements. Some terms are used by authorities, others by the community. Terms change and evolve over time, as do attitudes.

Inadequate housing

Informal settlement

Marginal settlements

Non-permanent structures (definition varies from country to country)

Precarious settlements

Squatter town

Unconventional dwellings (inappropriate for human habitation)

Unplanned settlements

Villas de emergencia: "emergency dwellings" (Argentina)

Villa miseria: "poor city" (Argentina)

Ukumbashi: "squatters, people without shelter" (Bangladesh)

Sukumbashi basti: "homeless people's settlement" (Bangladesh)

Favela (Brazil)

Sahakhum: "poor settlement" (Cambodia)

Campamento (Chile)

Barrio marginal (Ecuador)

Dambo muro: "underground cardboard settlements" (Japan)

Huho sengkyo: "illegal occupation" (Japan)

Tento muro: "tent village," i.e., temporary vinyl houses built by homeless construction laborers (Japan)

Sweepers' colonies, butchers' colonies, etc., named for inhabitants' traditional tasks (Nepal)

Muhoga Chongchakji: "settlement without permission," city planners' legal and technical term (Korea)

Daldongne: "moon village," settlement on undevelopable hilltop (Korea)

Sandongne: "mountain village," settlements built on the steep hill slopes (Korea)

Amchi wasti: "for our settlement" (India)

Kampong kumuh: kampong ("village") with legal tenure but bad living conditions (Malaysia, Indonesia)

Kampong liar: "illegal settlement" (Malaysia, Indonesia)

Hak milik: "rights owned by the people," a new term for informal settlements (Malaysia)

Asentamiento irregular (Mexico)

Chapro: shack or poor-quality house (Nepal)

Squatter settlement: Official term for illegal settlement (Nepal)

Slum: official term for poor settlement with legal tenure (Nepal)

Katchi abadi (Pakistan)

Basti: "small settlement" (Pakistan)

Colony (big settlement, Pakistan)

Barriada (Peru)

Bidonville (Tunisia)

Turgurios (San Salvador)

UmKhuku: "chicken coop" in Zulu, describing shacks and shack settlements (South Africa)

uMjondolo: "shack" in Zulu (South Africa)

Shack settlements (South Africa)

Palpath: "shanty settlement," official term emphasizing illegality; not used by community (Sri Lanka)

Watta: "garden," euphemism for shanty or squatter settlement (Sri Lanka)

Chumchon bukberk or chumchon: "pioneering community" (Thailand)

Chumchon Aai-aat: "crowded community," official government term (Thailand)

Barrio (Venezuela)

Khu nha o chuot: "settlement of rat's houses" (Vietnam)

Nhaa tam bo: "temporary house," legal term (Vietnam)

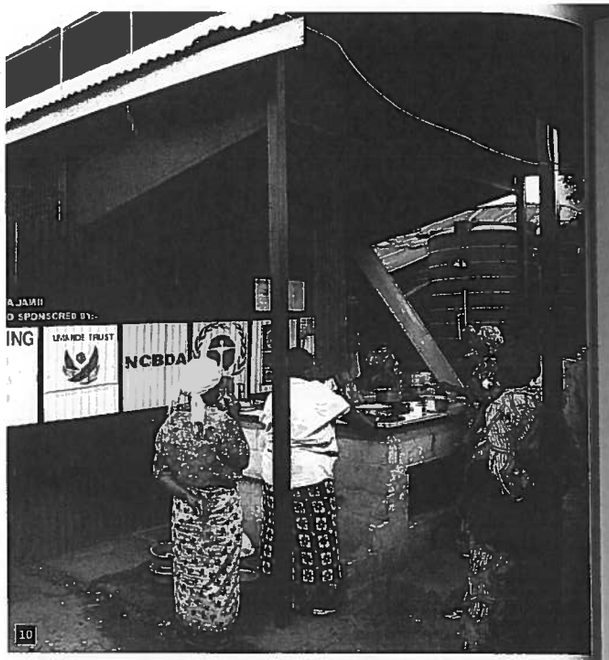
Nhaa lup xup: "precarious house," legal term (Vietnam)

Visible Settlements

A fundamental step in gaining better living conditions in an informal settlement is to understand its circumstances. In Nairobi, no one could tell me exactly how many people lived in Kibera—anywhere from 750,000 to 1.5 million. The slum is roughly two-thirds the size of New York City's Central Park, making it one of the largest informal settlements in eastern Africa.[44] But technology is helping to visualize what actually exists in these blank spots on the official map. In Bangladesh, Venezuela, and Kenya, Google Map satellite images help display the density of settlements. Using open-source mapping software, GroundTruth works with local youth to pinpoint water and sanitation locations, security problems, and health clinics via Map Kibera.[45] Other slum dwellers use enumeration and mapping in an effort to understand who lives in the settlement and what services are lacking, an early step in upgrading. In Cape Town, I interviewed women community leaders from Manenberg's Federation of the Urban Poor and SDI, who had been invisible to the municipality but now live in improved housing. In the townships (the South African term for slums), families often rent out their backyards to the newest squatters, the "hidden backyarders," who were revealed in a new survey of the overcrowded neighborhood (fig. 11). A new organization formed the West Cape Backyarders Network to improve the conditions of these families living without water, electricity, and toilets, often sleeping four to a bed in makeshift shacks.

Informal Exchanges and Incremental Design

Denied the basic services, proper shelter, jobs, and other advantages cities offer, informal settlers are discovering new forms of exchanges and collaboration to meet their needs. In Manila, I met with the Payatas Scavenger Association, mostly women that are "no longer waiting for the government."[46] An affiliate of Shack/Slum Dwellers International, it formed a micro-saving group and pooled money to move its members away from Payatas's mountain of garbage, which had killed close to 2,000 people when a landslide



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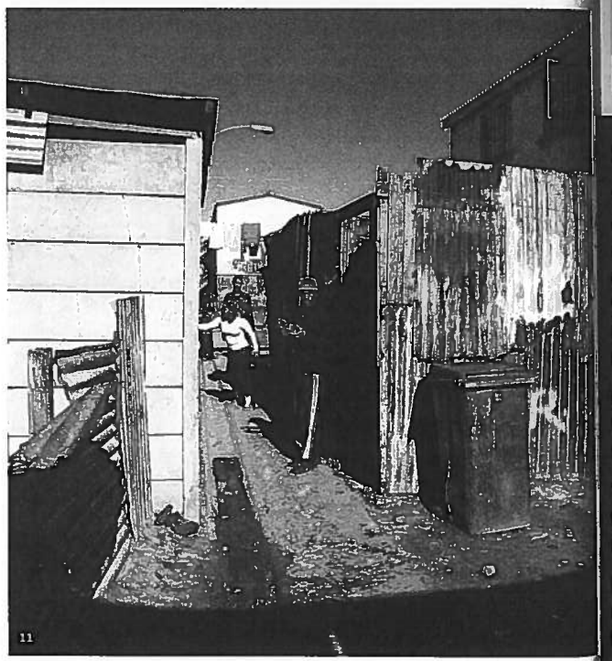
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SHACK/SLUM DWELLERS EXCHANGES[60]

When professionals are the agents of change, the focus of learning is taken away from the community. Most rituals of "participation" actually seek to ensure the consensus of the group to the ideas suggested by the professionals. As a result, three problems arise:

Communities are unable to advance their own strategies and approaches to their own problems.

The ability to create genuine federations and networks of poor urban communities is denied.

Solutions driven by professionals are often too expensive and inappropriate to the needs of the poor.

engulfed a section of the slum after heavy rains. Purchasing land, they designed housing with help from volunteer architects and learned the skills to purchase materials and construct new homes themselves. They are currently turning the new community, Miraculous Hills, into a sustainable "eco-village". This innovative approach to building a pro-poor city started in Mumbai, India, and has spread to thirty-four countries in Asia, Africa, and Latin America via Shack and Slum Dwellers International exchanges (fig. 12). Fundamental to this process is the belief that people deserve the information to choose where to go and how to live safely.

Alternatively, a group of families who used to beg on the streets of Nairobi saved enough money to purchase land 43.5 miles (70 km) outside the city and are manufacturing their own building

10. Kibera residents make use of the Community Cooker, Nairobi, Kenya.
11. Squatters in Manenberg settle in the backyards of other familie Cape Flats, Cape Town, South Africa.
12. Mahila Milan discusse saving as a group to a loc community in the slum settlement of Pune, India.

13

13. A bicycle fabricated using the Design With Africa bicycle modules, Rustenburg, South Africa.

materials (fig. 1). They formed the Jamii Bora Trust and worked with architects to erect Kaputiei New Town, a safer, cleaner village with over 700 houses and temporary storefronts, primary and secondary schools, churches, factories, and a town generator.[47]

Basic urban planning and design knowledge are shared with newly arriving squatters in Argentina. Architects from the University of Buenos Aires' Secretary of Community Action program designed, produced, and distribute a free workbook, *Manual de Urbanismo para Asentamientos Precarios* (*Urbanism Manual for Precarious Settlements*), on how to build in safer, more strategic locations that anticipate their future. Other initiatives overcome limited available resources to find a solution. In South Africa, industrial design group ...XYZ[48] demonstrated to me the Design With Africa initiative, which uses local context and culture to design products for Africa. Rather than deliver a highly specialized, fully made product, they conceived a minimal, low-cost armature, which includes parts local artisans can easily manufacture, and can be transformed for many uses—in this case, a bike, cart, or taxi (fig. 13).

To meet the exploding demand for housing, Chilean architects Elemental designed half-built "incremental houses," which include the basics such as the roof, kitchen, and bathroom, leaving the occupants to build the rest.

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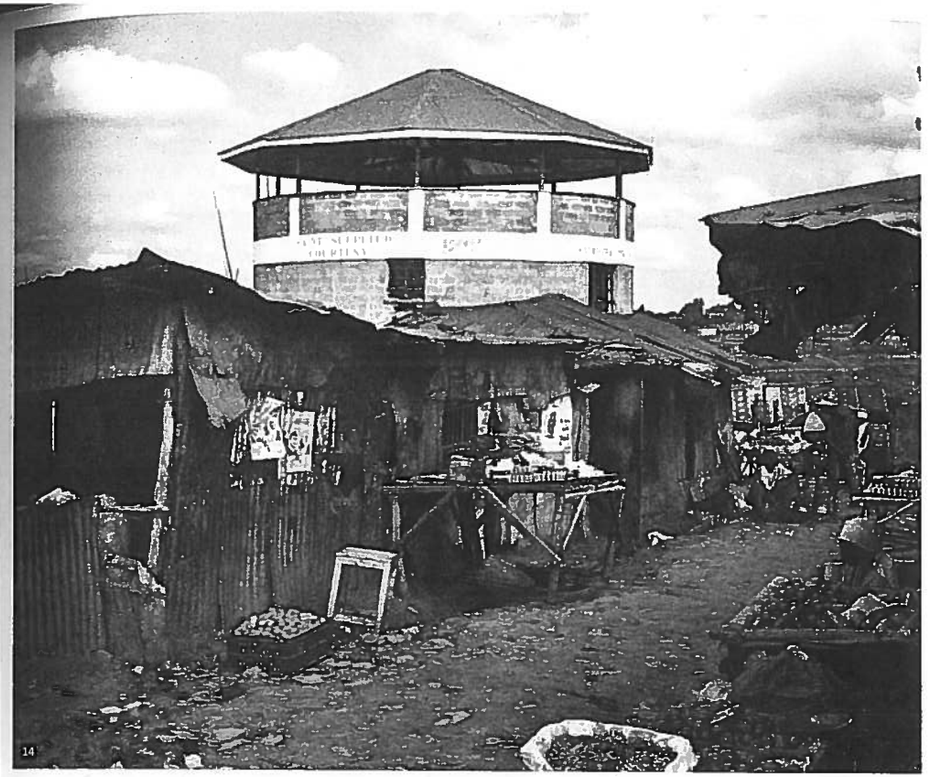
Mzonke Poni, organizer of Abahlali baseMjondolo, a grassroots movement fighting for better conditions in South Africa, walked me through narrow passages between small shelters in QQ Section Site B of Khayelitsha. As we turned a corner past outdoor hair salons and makeshift saloons, the air filled with the smell of frying chicken feet and sounds of vuvuzelas blowing in the distance in anticipation of the soccer World Cup. Mzonke showed me where the small shacks, built on land much lower than the road, flood regularly. He explained that the local electrical company refused to provide electricity—a necessity, not merely an option, for residents of informal settlements around the world if they are to participate in the world economy. In Manila, the local utility, Meralco, electrified dense settlements by bringing distribution lines to the edge of the slums and creating "elevated meter centers" that provide power and protect lines from unsafe connections.

Slipping and sliding at times, stepping over open sewage, we made our way to several shower and latrine blocks constructed by local NGO Maji na Ufanisi, whose motto is "Water is life; sanitation is dignity." Part of K-WATSAN (Kibera Integrated Water, Sanitation & Waste Management Project), in Soweto East, one of the twelve villages in Kibera, it worked with the UN-Habitat/World Bank Cities Alliance and the Government of Kenya to build eight such sanitation blocks. Users pay a small fee to the community-based organization, which runs the sanitation block and maintains the clean water, showers, and toilets. Also in Nairobi, Ecotact has created Ikotoilet Malls, which provide similar services for the urban poor and business community. Users' nominal costs are offset by local enterprises, such shoeshine booths, mobile-phone services, newspaper vendors, barbers, and



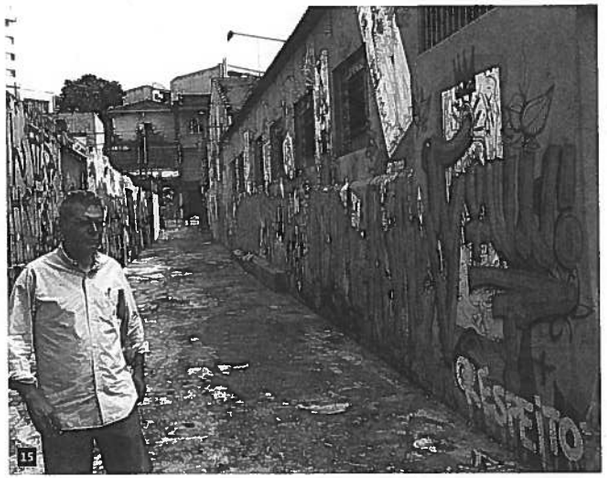
14

14. BioCentre c latrine block, c by Umande Tru Nairobi, Kenya

snack shops, and by advertising. Biogas from human waste is used to generate light and hot water. Unmade Trust designed fourteen BioCentre community latrine blocks in Kibera. Three stories high, they feature toilets and showers accessible to the disabled and free "child-only" toilets; kiosks selling affordable clean water; and a community center and offices on the top two floors (fig. 14). A biogas-generating latrine block treats human waste in situ without requiring sanitation infrastructure. Built with locally available technology and unskilled labor, it requires minimal maintenance and has no movable parts.

In Kampala, Uganda, I met merchants from the Kalarwe Market, who formed a micro-savings group, Zibulaatudde Savings and Development, which is unusual in that it formed around a market rather than a neighborhood. When asked what they were saving for, most responded, "Proper education for our children." In Mumbai's slums, the organization Pratham, working with UNICEF, runs schools in nontraditional spaces such as temples and homes, helping first-generation learners gain basic literacy and numeracy skills. It targets poor urban communities, or *bastis*, for universal elementary education, and has thus far established programs in 4,000 bastis. Their learning-by-doing method was designed to significantly impact the students in four to eight weeks.[49]

Using the neighborhood streets of Villa Madalena in São Paulo, Gilberto Dimenstein and *Bairro Escola* (Neighborhood as School) engage the community by forming a network of resources, such as a theater, school, cultural centers, and businesses. At school, children hone their creativity and skills by designing books, stools, and media.[50] (fig. 15)



15. The Bairro Escola in the Villa Madalena neighborhood, São Paulo, Brazil.
16. The Guangzhou Bus Rapid Transit system serves 8,500 passengers an hour and helps cut carbon emissions and reduce congestion, Guangzhou, China.

This innovative model has spread to five hundred Brazilian cities in partnership with local and federal agencies.[51] To improve access to transportation, the new Janmarg Bus Rapid Transit system in the growing city of Ahmedabad, India, raised platforms for at-grade boarding and pre-ticketing, greatly reducing boarding time. We easily entered the bus and quickly moved through the congestion of motorbikes, cars, bicycles, and rickshaws on either side of us. Our fellow passengers were a cross-section of the population: the elderly and disabled, people heading to work, young students. Abhijit Lokre from the Centre for Excellence in Urban Transport at CEPT University explained how one poor minority community far from the center is now connected to the rest of the city via this initial BRT route.[52] The city, which expects its population to double from five to ten million by 2030, plans to create a fifty-five-mile network of Janmarg ("the people's way") BRT lines linked to different modes of transport.[53] Another Indian city, Chennai, is working on an integrated regional transportation plan that accommodates growth in surrounding cities. In rapidly urbanizing China, Guangzhou's high-capacity BRT system comes close to what Sue Zielinski of SMART (Sustainable Mobility & Accessibility Research & Transformation) calls "multi-modal forms of transport, commuter trains linked to bus rapid transit and bike lanes that provide a door-to-door, seamless system enhanced by information technology."[54] Handling one million passenger trips a day, Guangzhou's dedicated BRT corridor connects to the subway at six stations and 8,000 bikes via 150 bike-sharing stations; information technology is still on the horizon.[55] (fig. 16)

Innovative Urban Solutions

Urbanization is perceived by some to be the problem; paradoxically, it can be the solution because it can provide "pathways out of destitution"[56] and opportunities for a better future. Rather than disrupt, ignore, or neglect the poor, cities should build their capacity, pulling all segments of the city together toward improving their lives. Design is giving form to ideas generated in partnership with all of the cities' stakeholders. Yet more is needed to meet this growing challenge.

For those still living or migrating to precarious settlements in the next decades, innovative measures to improve security of tenure, basic amenities, and livelihoods will be required, such as CODI's land-sharing in Thailand, ENDA's sustainable wastewater system in Senegal, and the COOPA ROCA collective's entrepreneurial efforts in Brazil. This will require creating new systems for sharing successful models like these, adapted for local culture and place; scaling up for wider implementation; helping authorities at the local level improve infrastructure; redefining what constitutes a sustainable, inclusive, competitive, world-class city; preparing for increased climate activity; and developing a "knowledge web for urban infrastructure."[57]

Countries' economies are linked to cities; in the United States, 90% of the GDP comes from urban areas.[58] Establishing thriving, sustainable cities in the Global North as well as in the Global South is imperative during this period of urban migration, climate change, and economic expansion. We need to show a new generation of practitioners how to design for density, mixed use, and social inclusion through mixed-income cohabitation, long-term investment in multi-modal public transportation, and collaborative regional approaches. We can all learn directly from developing and emerging economies how to create innovative solutions from limited resources and challenging environmental requirements. Urban Think Tank's Vertical Gym, designed for the violent slums of Caracas, can easily be translated for the dense borough of Queens in New York City; and Planning System's Community Cooker can serve those in remote locations in Canada.

It will be difficult to meet the extraordinary challenges that our urban areas face from the massive population shift from villages to cities. We need to plan for transformative change, include people in the planning, and educate for urban complexity. The projects included in *Design with the Other 90%: CITIES* explore new social, spatial, and economic structures. It is critical we find ways to share this information—the urban success stories, ways to implement and sustain these efforts, and their impact over time. This will require a more inclusive urban design; responsible economic and environmental policies; establishing new institutions; transparent governance; improved equity and security; and land reform for a more just and humane urban world.

Notes

1. Field research with design/build team of students and Denise Piché and André Causult, Professors of Architecture, University of Laval, Quebec City, Canada, and students from the Collège d'Architecture de Dakar, in the peri-urban area of Malika in Dakar, Senegal, June 24, 2010.

2. Carlos Brillembourg, "José Castillo," in *BOMB* 94 (winter 2005–6).

3. Meeting with Oumar Cissé, African Institute for Urban Management, Dakar, Senegal, June 24, 2010.

4. Ibid.

5. "Thailand's Motor-bike Taxis: Enter the Orange Shirts," in *The Economist* (February 17, 2011): 42–43.

6. Edward Glaeser, *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier* (New York: The Penguin Press, 2011): 9.

7. Pietro Garau, Elliott D. Sclar, and Gabriella Y. Carolina, *A Home in the City: UN Millennium Project, Task Force on Improving the Lives of Slum Dwellers* (London: Earthscan, 2005): 12.

8. "Slum Dwellers to Double by 2030: Millennium Development Goal Could Fall Short," in UN-HABITAT: Twenty-first Session of the Governing Council, April 16–20, 2007, http://www.unhabitat.org/downloads/docs/4631_46759_GC%2021%20Slum%20dwellers%20to%20double.pdf (accessed 3/15/11).

9. 2009 statistics: 376 cities between 1– 5 million; 32 cities 5–10 million; 21 cities with at least 10 million; 3 cities with at least 20 million (Tokyo, Delhi, SãoPaulo). "Urban Agglomerations 2009," in United Nations, Department of Economic and Social Affairs, Population Division, http://esa.un.org/unpd/wup/Documents/WUP2009_Wallchart_Urban-Agglomerations_Final.pdf (accessed 5/3/11).

10. "World Urbanization Prospects: The 2009 Revision," in United Nations Department of Economic and Social Affairs/Population Division 9, 9–10, http://esa.un.org/unpd/wup/Documents/WUP2009_Highlights_Final.pdf (accessed 5/3/11).

11. Less economically developed countries where most people of the world live.

12. UN Habitat, *State of World's Cities 2010/2011: Bridging the Urban Divide* (London: Earthscan, 2008): viii.

13. Mike Davis, *Planet of Slums* (London: Verso, 2006): 26.

14. Ibid., p. 95.

15. "Every year, close to 70 million people leave their rural homes and head for the cities. That's around 1.4 million per week, 200,000 a day, 8,000 each hour, 130 every minute." Robert Neuwirth, in *Shadow Cities: A Billion Squatters, a New Urban World* (New York: Routledge, 2006): xiii.

16. UN-Habitat, *State of the World Cities 2010/2011*, back cover.

17. John Beardsley, "A Billion Slum Dwellers and Counting," in *Harvard Design Magazine*, no. 27 (fall 2007–winter 2008).

18. Sarah Opitz-Stapleton et al., eds., *Asian Cities Climate Change Resilience Network (ACCCRN): Responding to the Urban Climate Challenge* (Boulder: Institute for Social and Environmental Transition, 2009).

19. José de Filippi, "Diadema, SP, Brazil: Housing, Urban Design and Citizenship," in *ReVista, Harvard Review of Latin America* IX, no. 2 (spring/summer 2010): 25–26.

20. Mário Realie and Sérgio Alli, "The City of Diadema and the City Statute," in *The City Statute of Brazil: A Commentary*, 38 (São Paulo: Cities Alliance and Ministry of Cities, 2010).

21. Eduardo Lopez Moreno, "UN-Habitat: State of the World's Cities Report 2008/9," http://www.un-ngls.org/site/article.php?id article=590 (accessed 4/26/11).

22. Jeb Brugmann, *Welcome to the Urban Revolution: How Cities Are Changing the World* (New York: Bloomsbury Press, 2009): 98, 99.

23. David Harvey, "The Right to the City," in *New Left Review* 53 (September–October 2008), http://www.newleftreview.org/?view=2740 (accessed 4/26/11).

24. "IIHS in Conversation with Prof. Yves Cabannes, Development Planning Unit, University College of London," in Indian Institute for Human Settlements, https://sites.google.com/a/iihs.co.in/iihs/interviews-and-videos/yves-cabannes (accessed 5/1/11).

25. E-mail correspondence with Laila Iskandar, CID Consulting, December 14, 2010.

26. Brugmann, pp. 41, 42.

27. Saskia Sassen, "Bridging Cities: Social and Ecological Systems," lecture at Cities and Eco-crises Conference, Columbia University, New York, NY, October 1, 2010.

28. Meeting with Somsook Boonyabancha, Asian Coalition for Housing Rights, Bangkok, Thailand, January 14, 2010.

29. Remarks by Domingo Pires, Secretary of Housing of São Paulo and SP Urbanismo, at "Debating Poverty Reduction (II), Design and Planning Strategies" panel, organized by Columbia University, New York, NY, April 12, 2011.

30. E-mail correspondence with Gabriella Carolini, Edward J. Bloustein School of Public Planning, Rutgers, the State University of New Jersey, February 13, 2010.

31. Edesio Fernandes, "Regularising informal settlements in Brazil: By Legalization, Security of Tenure and City Management," paper presented at the ESF/N-Aerus Annual Workshop, Leuven, Brussels, May 23–26, 2001).

32. E-mail correspondence with Gabriella Carolini, February 13, 2010.

33. Alfredo Brillembourg, Elisabete Franca, Elton Santa Fe Zacarias, and Hubert Klumper, "São Paulo - Projeto de Urbanização de Favelas (Sao Paulo Architecture Experiment)" (São Paulo: HABI - Superintendencia de Habitação Popular/Secretaria Municipal de Habitação; New York: Columbia University Graduate School of Architecture, Planning and Preservation SLUM Lab, 2010): 6.

34. E-mail correspondence with Matias Sendoa Echanove, March 09, 2011.

35. Meeting with Aromar Revi, Indian Institute for Human Settlements, New Delhi, India, January 22, 2010.

36. Meeting with Anita Patil Deshmukh, PUKAR, Mumbai, India, January 29, 2010.

37. Agenda 21 was formulated at the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro, Brazil, June 3–14, 1992. "Agenda 21," UN Department of Economic and Social Affairs, Division of Sustainable Development, http://www.un.org/esa/dsd/agenda21/index.shtml (accessed 4/18/11).

38. TU Delft U-Lab's Urban Delta program: Rhine-Meuse Delta (Netherlands), Mississippi Delta (US), Yangtze Delta (China), Pearl River Delta (China), Parana River Delta (Argentina), Mekong Delta (Vietnam), Kaoshiung Delta (Taiwan); email correspondence with Han Meyer, TU Delft, August 17, 2011.

39. Meeting with Han Meyer, Urban Design Department, TU Delft, Delft, Netherlands, January 7, 2010.

40. Meeting with Aromar Revi, January 22, 2010.

41. Steve Otter, *Khayelitsha: uMlungu in a Township* (South Africa: Penguin, 2007).

42. Meeting with Rosa Batalla, Movimiento Territorial Liberación, Buenos Aires, Argentina, April 1, 2010.

43. Meeting with Flavio Janches, B&J Architecture, Buenos Aires, Argentina, April 2010. See also "Designing Urban Opportunities," in *ReVista, Harvard Review of Latin America* IX, no. 2 (spring/summer 2010): 24.

44. Adam W. Parsons, *Megaslumming: A Journey Through Sub-Saharan Africa's Largest Shantytown* (UK: Share the World's Resources, 2009): 28.

45. Meeting with Erica Hagen, GroundTruth Initiative, Nairobi, Kenya, June 14, 2010.

46. Meeting with Philippine Action for Community-Led Shelter Initiatives and Homeless People's Federation Philippines, Manila, Philippines, January 10, 2010.

47. E-mail correspondence with Elector Atieno, Jamii Bora Trust, May 23, 2011.

48. Meeting with Roelf Mulder and Byron Qually, ...XYZ Design, Cape Town, South Africa, June 8, 2010.

49. "Pratham: Every Child in School and Learning Well: History," http://www.pratham.org/M-13-2-History.aspx (accessed 4/30/11).

50. Meeting with Gilberto Dimenstein, Apprendiz, São Paulo, Brazil, March 30, 2010.

51. Gilberto Dimenstein, "The City as School," in Harvard Business Review Blog (April 22, 2011), http://blogs.hbr.org/revitalizing-cities/2011/04/the-city-as-school.html (accessed 4/30/11).

52. Meeting with Abhijit Lokre, Centre for Excellence in Urban Transport, CEPT University, Ahmedabad, India, January 25, 2010.

53. Meena Kadri, "People's Way: Urban Mobility in Ahmedabad," in *Design Observer* (April 19, 2010), http://places.designobserver.com/feature/peoples-way-urban-mobility-in-ahmedabad/12918/ (accessed 5/3/11).

54. Cooper-Hewitt public program: "Food and Transportation: New Systems Approach to Transforming Cities Sustainably," New York, NY, October 19, 2010.

55. E-mail correspondence with Stephanie Lotshaw, Institute for Transportation & Development Policy, May 24, 2011.

56. Glaeser, p. 90.

57. Meeting with Michäel Lindfield, Asian Development Bank, Manila, Philippines, January 11, 2010.

58. Statement by Derek Douglas, Special Assistant to the President for Urban Affairs, White House, at the 2011 Regional Assembly "Innovation and the Global City," New York, NY, April 15, 2011.

59. Asian Coalition for Housing Rights, "Housing by People in Asia," in *Newsletter of ACHR* no. 12 (April 1999): 22. See also "The Slums of Asia: An Etymological Tour around Asia," in Asia Society, http://asiasociety.org/policy-politics/social-issues/human-rights/slums-asia (accessed 4/30/11).

60. "Exchange Programmes," in Shack/Slum Dwellers International, http://sdinet.org/rituals/ritual5.htm (accessed 4/4/11).

61. "The UN Millennium Declaration and its Goals: UN-Habitat's Slum Indicators," in UN-Habitat, http://ww2.unhabitat.org/mdg/ (accessed 3/15/11).