

# Innovation *on the* fringes



How slums, favelas and shantytowns are solving the world's most pressing problems. BY GREG NICHOLS

**K**IBERA IS THE SLUM, THE SHANTYTOWN that—in the Western mind, at least—defines the grotesque poverty of the developing world.

Rusting corrugated roofs sprawl to the horizon. More than 200,000 people live here on the outskirts of Nairobi, Kenya. Residents walk alongside open sewers and learn to navigate a mazelike arrangement of shacks and semipermanent lean-tos. In some areas, construction is so dense that corridors must be taken sideways.

But these narrow alleys also give way to small plazas that bustle with vendors and teem with the smells and sounds of an active community. Women pick vegetables from crops that slant out of large, soil-filled sacks; they are portable gardens that require minimal land and no tilling. In one section of the slum, a shared oven burns waste oil and refuse at temperatures in excess of 1,000 degrees Fahrenheit (538 degrees Celsius). Unlike the open trash fires that burn near the river, the oven's intense heat minimizes choking black smoke. Others cook with

RESIDENTS OF SLUMS LIKE THIS ONE IN ASUNCIÓN, PARAGUAY HAVE BEEN FORCED BY CIRCUMSTANCES TO BECOME MASTERS OF IMPROVISATION AND INNOVATION.

PHOTOGRAPH: MICHAEL EDWARDS/LAMY

RESIDENTS OF YERWADA IN PUNA, INDIA, DISCUSS PLANS FOR IMPROVING THEIR NEIGHBORHOOD WITH THE LOCAL COMMUNITY ORGANIZATION.



IN KIBERA IN NAIROBI, KENYA, RESIDENTS MAKE PORTABLE GARDENS BY PLANTING VEGETABLES IN SOIL-FILLED SACKS.

dilemma we're now facing."

With consciousness about the complexities of slum societies growing, the picture of slum dwellers is changing from one of victimization and stagnation to one defined by creativity and an incredible capacity to solve problems. Social development workers in the 21st century, then, should view slum dwellers less as people to be rescued and more as partners with a creative stake in the improvement of their communities. Governments, NGOs and social entrepreneurs need to find ways to harness and encourage the problem solving already occurring in slums, work to scale solutions developed locally to areas of high population growth, and begin to adapt slum thinking to problems of sustainability in poor and wealthy nations alike.

Here are a few examples of how that could work.

#### INNOVATIVE PARTNERSHIPS

Like other women in her indigenous family, Luisa Daniel Perez has long used the fibers of the maguey plant, a type of agave, to weave clothes and make handicrafts. Venturing beyond the borders of her impoverished community in the Mexican state of Hidalgo, the mother of two uses basic wooden tools to harvest the strong fiber and a simple handloom to create bags, clothes and durable slippers. The artistry of her products is singular, and the creative use of local materials keeps costs low. For years, however, Perez made little money from her handicrafts, which she traded for basic goods or sold for a pittance to intermediaries who resold them elsewhere.

This situation is common in slums and settlements, where informal markets operating on a mix of currency exchange and trade can provide sustenance but offer residents little opportunity to save money or grow businesses. Branching out beyond the slum economy is difficult and often means long hours hawking wares on busy streets. Heavy traffic, theft and police harassment make this type of work perilous, especially for women.

Perez caught a stroke of luck when she encountered Pro Mujer, an organization that extends traditional microloans and offers business training, health education and affordable primary health care to poor women in five countries in Latin America. Perez received small loans to employ family members to produce her handicrafts

in greater quantities. Pro Mujer workers in her community helped locate expos and art shows and assisted her with travel plans and necessary applications. In Pro Mujer seminars and classes, she learned how to market her products by highlighting their organic origins. As revenues increased, Perez hired other artisans from her community. Her collective now has 31 members. Perez has reinvested her savings and is erecting a large building near her home where production can be centralized and streamlined.

Successful community-based organizations like Pro Mujer tend to use services like health care, financial support and specialized education to facilitate the growth of existing community models. "What struck me going around to some of the places for *Learning from the Extremes*," says Leadbeater, "is that the things that seem to work in the slums and favelas don't have big infrastructures. Importing solutions from the West, which are high cost and hierarchical, into these settings simply won't work." Plan-and-build approaches, which lend themselves to outcome measurements and corporate-style budgets, often hinder the organic spread of ideas and initiatives along natural slum networks.

M-PESA, a mobile money transfer platform designed by Kenya's two largest cellular operators, has successfully penetrated slums and rural villages by taking advantage of the peer-to-peer exchanges that define slum economies. M-PESA works by linking banking and exchange services with the SMS technology available on most cell phones. Residents who are unable to access traditional banks visit M-PESA kiosks to deposit money into accounts linked to their cell numbers.

Pay-per-minute phones are ubiquitous in Africa, even among the poor. Cell users with M-PESA accounts can send money to other M-PESA users, receive instant payment for goods and services and pay monthly bills without formal checking accounts or fixed addresses. Mobile exchange services have found particular success in Africa because they imitate and adapt the practice, common among poor Africans, of swapping the numerical information on calling cards via text message as a form of currency.

In Rio de Janeiro, the government has had success working to identify and encourage what it sees as positive slum practices. The city's economic development branch opened a dialogue with merchants in the infamous

kerosene bought in jerricans from neighborhood vendors or with gasoline collected from illegally tapped pipelines.

Where public toilets are scarce, residents scavenge plastic bags, nicknamed "flying toilets" for their propensity to soar unannounced from open doors. Video parlors thrive where household electricity is uncommon. With no police, vigilante groups deter crime. When rains turn the unpaved slum to sludge and send rivers of muddy water cascading through narrow alleyways, enterprising children scavenge boards and branches to build temporary toll bridges, a nice source of pocket change. Others set up shoe-washing stations or use sheets of plastic to funnel water into cans and bottles. Vendors who brave the rain and leave Kibera for a day's work are rewarded by snaking traffic jams full of idle customers looking for something to nibble.

It's easy to think of slums like Kibera only in terms of the hardships their residents confront: ad hoc shelters, inadequate sanitation, rape and other violent crimes. These challenges abound and life in slums and informal settlements is difficult and at times nightmarish.

But that isn't the whole picture. Slum dwellers, confined by tough environments and often untouched by municipal oversight, have also proven themselves masters of improvisation and innovation. Now governments, non-governmental

organizations and social entrepreneurs are paying attention to this creativity and working alongside slum dwellers to tackle a host of challenges on both sides of the developmental divide. The solutions they're coming up with are innovative, sustainable and scalable.

That's a good thing, because urban poverty is a pervasive and growing problem in the developing world. By 2050, the combined population of the world's poorest countries will climb to just less than 8 billion, an increase of 2.2 billion inhabitants. Most of this growth is expected to take place in informal settlements, as existing slums expand and impoverished rural dwellers migrate to the peripheries of urban areas. Governments are being overwhelmed by this growth. "There's an inherent difficulty that goes along with government action," explains Tom Fries, editor of [futurechallenges.org](http://futurechallenges.org), a Bertelsmann Foundation-funded website that studies the effects of policy issues on global challenges. "And that is that it's extremely slow, in part by design."

Compounding the problem is the tenuous relationship that often exists between the formal city and its informal settlers. "There's a lot of ground-level information that gets lost on its way up to policy-makers," says Fries, who sees the most promising social development solutions incubating at the community level where problems are more easily identified and prioritized.

In Nairobi, where the local government has not provided basic services to slum dwellers and relocation campaigns have proven controversial and minimally effective, some organizations are making headway by engaging existing slum economies. In Mukuru, a slum that sprawls over an industrial area south of the city, population fluctuation combined with pressures on children to bring in money makes traditional schooling largely ineffective. A group of Catholic nuns known as the Sisters of Mercy, however, has had success delivering education services to previously unreachable residents. Dressmaking and hairstyling are valued entrepreneurial skills in slums, passed down from mothers to daughters or acquired through informal apprenticeships. The Sisters of Mercy combine free classes that teach these skills and others alongside more traditional instruction to enable slum dwellers to seek employment and advance beyond primary education.

Charles Leadbeater, a leading researcher on innovation and coauthor of the Cisco-sponsored report *Learning from the Extremes*, a study of radical approaches to education around the world, has found a number of successful initiatives like this that rely on community-based problem solving and challenge the wisdom of top-down interventions. "What is now increasingly important," Leadbeater explains, "is that solutions that are going to work at scale in these places

need to be designed for, with and by these places." One example of innovative problem solving that Leadbeater highlights in *Learning from the Extremes* is a walking school in Brazil that moves to different homes in the community each day. No physical infrastructure is needed in this model, which exploits strong community ties that state schools often ignore.

While discussion around slum innovation understandably tilts toward the developing world, solutions originating in slums are becoming increasingly relevant in wealthy nations. Congested roads, high unemployment and inadequate water supplies are problems that residents of the U.S. and Western Europe are starting to contend with, though they find decades-old corollaries in the slums of India and Kenya.

Cynthia Smith, curator of socially responsible design at the Smithsonian's Cooper-Hewitt National Design Museum in New York City, unveiled the exhibition *Design with the Other 90%: Cities* in 2011, to highlight projects born of exchanges between slum dwellers and professional designers. Though the exhibition focuses on innovative projects within slums, Smith has noticed that slum solutions are also working their way back across the developmental divide. "There's a South-North exchange," Smith explains, "and it's happening because these innovative solutions are being devised based on limited resources, which is the

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Cidade de Deus slum. Though many of these merchants had been operating informally or illegally, the government recognized them as a powerful economic force in the community. When conversations between the economic development team and local merchants revealed that retail profits had been waning, a result of increased competition with nearby chain stores and commuters shopping closer to work for convenience, the city partnered with residents to establish a community bank that prints and circulates its own currency.

Participating Cidade de Deus merchants offer a 10 percent discount to customers using the new currency, the CDD. Merchants benefit from increased volume, consumers from cheaper goods and the community from strengthened business zones that boost employment and keep buildings occupied. The CDD is backed by the community bank and can be exchanged for Brazilian *reais* at any time, though residents have begun to prefer the local currency.

“The most successful projects,” says Cooper-Hewitt curator Smith, “are ones that involve an exchange between the formal city and the informal city.” Solutions arising from these exchanges, whether practical ideas or innovative approaches to service delivery, tend to take hold quickly within slum communities. For governments, NGOs and social entrepreneurs in the formal city, the next step is to encourage the spread and adaptation of innovative solutions across slum communities and especially to areas of high population growth.

#### SPREADING SOLUTIONS

An anonymous slum dweller from Brazil, surely a worthy entry into the annals of great inventors, figured out at some point that a two-liter bottle filled with water can provide as much light to a dim shack as a 50-watt bulb. The idea is simple: Shack dwellers cut a small hole in their corrugated metal or plastic roofs and then secure the bottle so that it partially protrudes into the room below. Sunlight diffuses through the water and lights up the interior.

With a spoonful of bleach to suppress algae growth, the bottles are maintenance free. Importantly, this setup reduces the need to run overhead bulbs, which are often spliced illegally into local power grids. This is very dangerous, it accounts for a large number of devastating slum fires.

African Slum Journal, a Kenyan news organization that trains slum dwellers in multimedia journalism, included the so-called bottle bulb in a story about alternative energy solutions in the slums of Nairobi. African Slum Journal began when Dutch social entrepreneur Pim de Wit of the Voices of Africa Media Foundation teamed with Kenyan videographer Kennedy Odhiambo Onyango to bring slum perspectives into the media landscape. African Slum Journal reporters produce stories using cell phones, consumer cameras and basic editing software. Westerners can access the content through an online subscription service while slum communities around Nairobi view stories in free public screenings. “Our reporters educate people from the slums,” says Onyango, who was born in the Nairobi slum of Majengo. “I show a video from my slum, activities that have been happening. For sure they learn. They see, ‘Okay, this is the way they drain their toilet. Why can’t we do that?’”

In a story about alternative energy solutions, slum dwellers saw footage of the bottle bulb and learned about a biogas toilet that can be built using cheap, locally available materials. The captured biogas is piped through the slum and used by residents for cooking and heating. African Slum Journal is helping to sow innovative ideas that have proven successful on a small scale with the hope that slum communities around Nairobi will adopt them.

The pooling of intellectual resources and the diffusion of innovation among slum communities have helped slum dwellers increase their political influence and resolve local crises like eviction and slum relocation. Shack/Slum Dwellers International (SDI) is a worldwide network that brings together community organizations and federations of the urban poor to share successful problem-solving strategies and to lend strength to local advocacy efforts.

“There has long been a system whereby government officials, NGO professionals and academics are constantly traveling all over learning from each other,” explains SDI consultant Benjamin Bradlow. “But they’re learning about what should be done with the poor. The poor are never traveling and never getting these opportunities to talk about things that are affecting them.”

SDI, which grew out of a dialogue between South African community activists and members of an established alliance of

community organizations in India, enables this kind of transnational exchange. One of the most powerful tools that SDI affiliates have developed is enumeration, a process by which local residents systematically count businesses, buildings, people and other components of their communities. This type of surveying is possible because slum dwellers have necessary access and localized knowledge. Enumeration enables impoverished residents to raise specific challenges before local governments, which are often in the dark about the realities of slum life.

In India, enumeration efforts in various slums have focused on the ratio of residents to publicly accessible toilets. Presented with concrete numbers, local governments have proven willing to respond. SDI affiliates have supervised the installation of more than 300 toilet blocks—clusters of up to 20 public toilets—in the slums of Mumbai and more than 100 in the settlements of Pune.

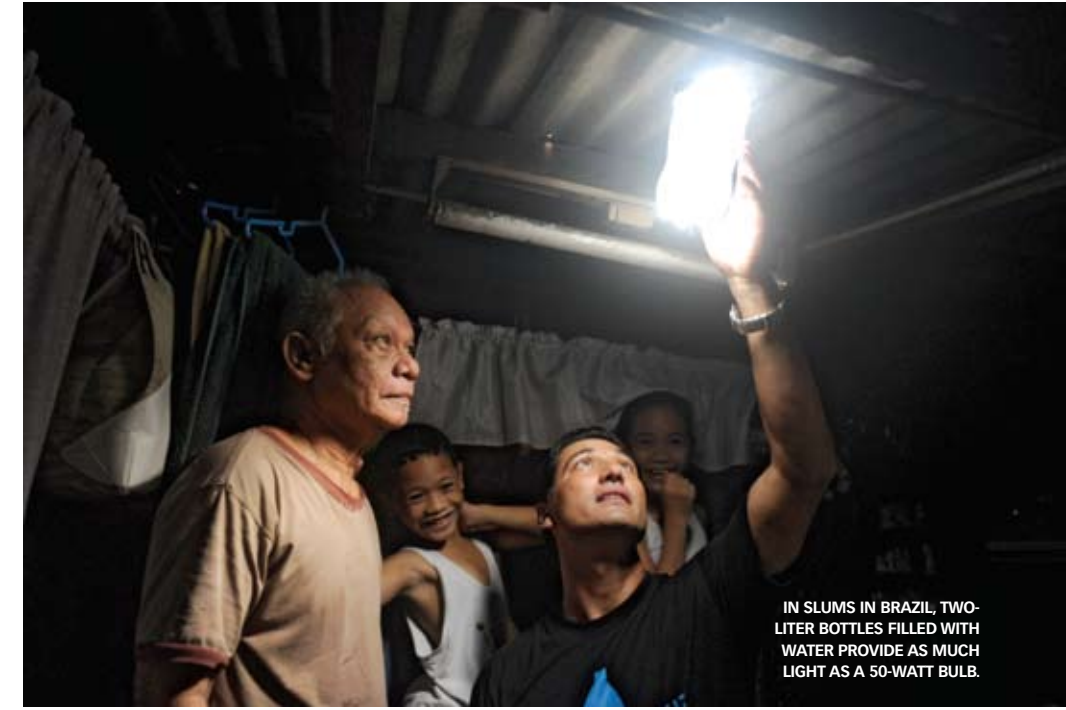
Enumeration efforts also play a key role in negotiations between transportation authorities and informal communities, which often sprout on the undeveloped land alongside railroad tracks. Enumerations in India have successfully convinced local transportation agencies to shrink no-build zones near railroad tracks and to opt instead to erect safety barriers. When the Kenya Railways Corporation wanted to upgrade one of its lines, an action that called for the eviction of slum dwellers living beside the tracks, the Slum Dwellers Association of Kenya began an enumeration to find out how many people would be affected. Estimates came back as high as 50,000. The government decided to slow development and SDI facilitated an exchange between officials in the Kenya Railways Corporation and their counterparts in Mumbai, where similar standoffs had been resolved to the mutual benefit of slum dwellers and transportation officials. Negotiations in Kenya are currently under way and the slum dwellers have a seat at the table.

#### SOUTH-NORTH EXCHANGE

A public housing project in Chile illustrates just how capably slum designs can travel. When the Chilean architectural firm ELEMENTAL needed ideas for a government housing project in the city of Iquique, it took inspiration from the incremental building practices common in slums. Concrete buildings crowned with rebar skeletons are a common sight in well-established slums



LOCALS CAME TOGETHER TO BUILD A TOILET IN MUMBAI, INDIA.



IN SLUMS IN BRAZIL, TWO-LITER BOTTLES FILLED WITH WATER PROVIDE AS MUCH LIGHT AS A 50-WATT BULB.

PHOTOGRAPHS: DINODIA PHOTOS/ALAMY, JAY DIRECTO/STRINGER/GETTYIMAGES.COM

all over the world. Slum dwellers who are tight on materials strategically build essential portions of their houses first, leaving room for alteration and expansion down the road. ELEMENTAL adapted this practice for low cost, half-finished housing units. The units were move-in ready, and families were encouraged to expand and individualize them as their incomes allowed. Unlike most public housing, these units, which are resident-owned, are expected to increase in value. ELEMENTAL designed a similar project in Nuevo León, Mexico, in a middle class neighborhood.

Eric von Hippel, professor of technological innovation at MIT’s Sloan School of Management, looks to the market economy to explain what makes fringe areas so ripe for innovation. Standard economic thinking holds that market innovations originate with manufacturers, that is, large companies able to spread the costs of research and development over a number of customers. “So my research and that of my colleagues,” Von Hippel recalls, “said, ‘Well, I don’t believe that’s worth a damn. Let’s actually start to look at what consumers do.’ And when we did that we found them innovating all over the place.”

Consumers whose needs aren’t met by products designed for mass appeal come up with their own solutions, often anticipating the needs of larger markets by several years. In his 2006 book *Democratizing Innovation*, Von Hippel calls these ahead-of-the-curve innovators “lead users” and suggests they’re responsible for a great many innovations that manufacturers eventually adopt for distribution. This line of thinking and the growing body of research that supports it, while upending our understanding of innovation in

the market economy, is no surprise to those investigating the creativity emerging from slums. “I think there’s a huge urgency,” says Leadbeater of the potential to learn from slum dwellers, “because all of our biggest challenges globally, the biggest humanitarian, economic, environmental challenges, will find their roots in the biggest, fastest growing, most unequal cities of the world.”

Architects have taken the lead in learning from slum dwellers. Slum-inspired designs gaining credibility in the West include incremental housing projects and multi-use live/work structures. Resource-sharing schemes in slums—communal kitchens and bathrooms, cooperative gardening—are starting to make their way into new developments and urban planning models.

Efforts to re-envision slums and slum dwellers are not without controversy. When architects Pavlina Ilieva and Kuo Pao Lian wrote the article, “What So-Called Slums Can Teach American Cities” for *THE FUTURIST* magazine, they were surprised by the passionate reactions it elicited. In the article Ilieva and Lian argue that members of self-generative communities like slums live more sustainably and in greater cooperation than members of planned communities in the U.S. In online comments, critics complained that the architects were romanticizing slum life, a charge that Ilieva and Lian deny. “No doubt life in slums is hard,” says Ilieva. “But people have found ways to deal with hardship and thrive, so it’s recognizing

that. It does no good to ignore that.”

Through their studio, PI.KL, Ilieva and Lian are advocating new design approaches that leave room for spontaneity and adaptation. One challenge to these projects has been the strict municipal oversight common to urban development in the U.S., where developers are forced to identify, and therefore limit, the potential uses of their structures.

In Baltimore, where PI.KL is based, row housing is an example of the shortcomings of single-purpose design. When jobs associated with steel processing and auto manufacturing dried up, row housing, built to function as part of an industrial society, became unsupportable. It’s possible that more flexible designs could have lent themselves to community resource pooling or to the creation of sustainable neighborhood economies, common practices in slums.

Growing urban populations and waning resources will define global challenges in the 21st century. Slums, which are dangerous and dirty, are set to multiply. For social development workers, the question is not whether slums can be contained or eliminated, but whether life in slums might improve. The answer is coming from enterprising slum dwellers themselves, who are finding creative ways to survive and thrive in the face of enormous obstacles. ■

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