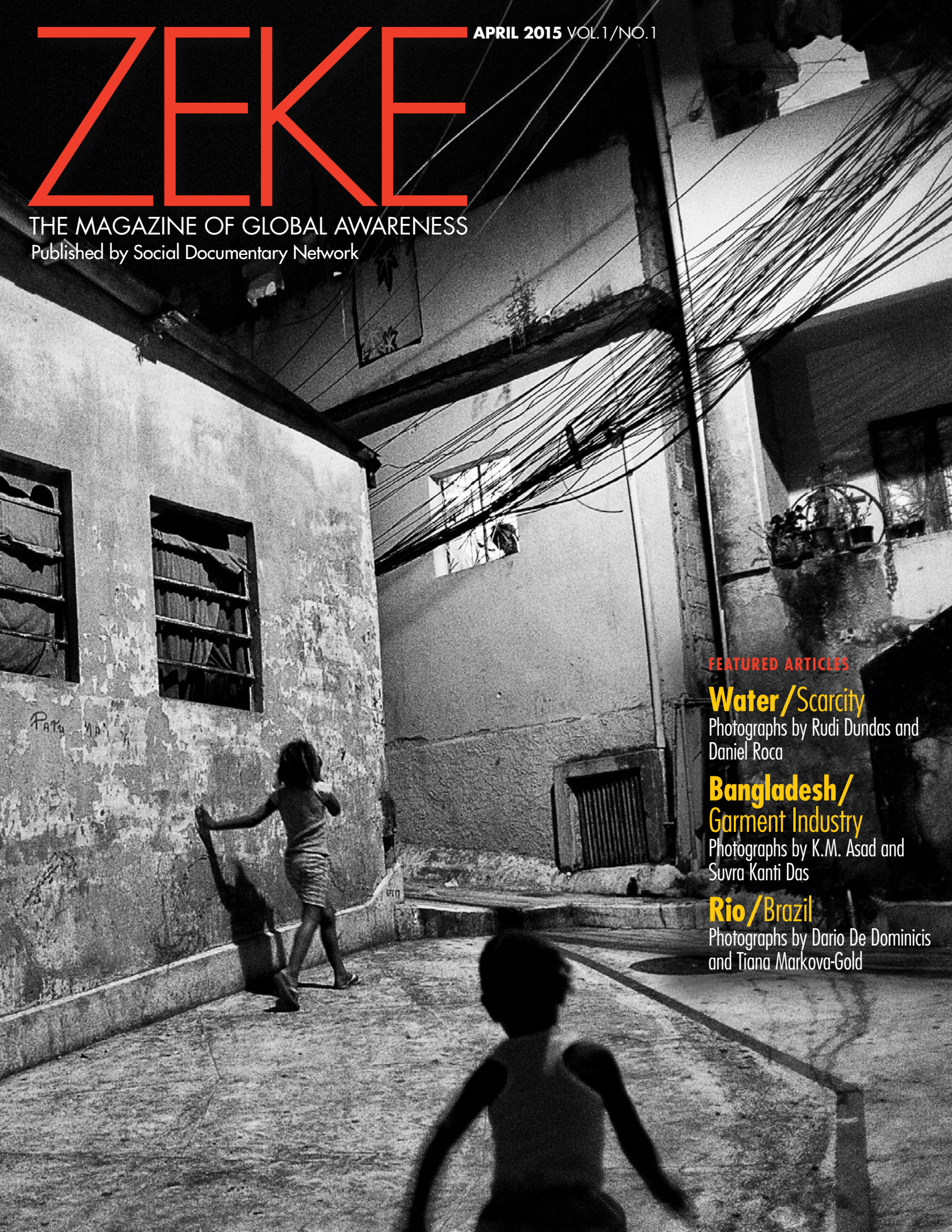


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WATER / SCARCITY

Photographs by Rudi Dundas
and Daniel Roca

Access to safe drinking water remains one of the largest problems faced by undeveloped societies today and one of growing concern as climate change increases the number of regions affected by water scarcity. Throughout the last century, water use has grown at a rate twice that of population increase as both natural and human-made causes deplete and spoil the earth's limited freshwater supply.

A fine art photographer focused on social change and environmental issues, Rudi Dundas spent five years traveling and documenting communities grappling with water scarcity. Seen here are her images of the tribal people of Sub-Saharan Africa: communities forced to abandon centuries-long ways of life in the face of government-sanctioned programs. In Myanmar's Dala township, a lack of government intervention has led to the exhaustion of the area's only freshwater source, forcing a tightly rationed system on citizens, seen here in photographs by Daniel Roca, a freelance photographer.

The works of Dundas and Roca are a striking reminder that the continued negligence of those who overuse water—whether through waste, pollution, or mismanagement—sentences one fifth of the world's seven billion people to disease, labor, poverty and missed opportunities.

For the past five years, Rudi Dundas has traveled to over 15 countries making portraits of people affected by lack of clean water, including the Samburu in north Kenya, whose portraits here bring a human face to the story of how each person has been affected by the water crisis. "We found Evelyn pumping water from their new well at Lbaa Onyokia", says Dundas, "and she told us that she was so pleased to be able to have clean clothes for the first time in her life in the dry season." Before the well, she often had to walk five to six hours a day for water.

Photo by Rudi Dundas





Hundreds of locals, some of them walking up to three miles, queue up to receive their water ration. Recent infrastructure investments by the local government have brought water pipes and tanks to 20 of the 23 surrounding townships for the first time. Although this solves the issue of daily access, water supplies are still limited, especially during the dry season.

Photograph by Daniel Roca



Joanna Lipper. From *Seaweed Farmers, Zanzibar*, SDN. The thin thread that connects seaweed farmers in Zanzibar to the global economy is growing more fragile by the day as poverty levels rise and environmental and economic activities like seaweed farming become increasingly unsustainable.

abundant but unfit for human consumption—most often due to pollution, eutrophication, and salinization—are considered economic water scarcity.

SUB-SAHARAN AFRICA FACES UNIQUE CHALLENGES

But no matter its cause, lack of water security drains communities' resources, forcing them to exhaust financial and human capital in pursuit of safe water. Hours spent carrying 40 lb. jerry cans of water or lost to sickness can be hours spent in a classroom learning to read and write, to breaking a circle of poverty fueled by

pronounced than in Sub-Saharan Africa, a crossroads of political instability, widespread poverty, and extreme climate. According to the World Bank, only 58% of its population had access to safe drinking water in 2005, and 115 African people die from diseases every hour linked to poor sanitation and contaminated water. By 2025, the World Bank projects that at least half of the countries expected to face water shortages will be African, with 48% of Africans living in either water-scarce or water-stressed areas.

Every hour, 115 African people die from diseases linked to poor sanitation and contaminated water.

—World Bank

annual rainfall is comparable to that in temperate regions like Europe, higher evaporation rates mean precipitation replenishes only 20% of renewable water sources. Additionally, receding wetlands, salinization caused by over-pumping, industrial and agricultural waste, and the eutrophication of lakes choked by invasive plant species pollute above-ground freshwater, suggesting the continent's water scarcity problem is an economic, not physical one.

Africa boasts 17 major rivers and over 160 large lakes. A recent study by the



Kenshiro Imamura. From *Water Security Action Team by JICA Volunteers* SDN.

British Geological Survey estimates that total groundwater storage in Africa is as much as 660,000 km³, almost 30 times the total volume of North America's Great Lakes, the Earth's largest freshwater body. "Largely, it's an issue of development and exploitation, not natural environmental conditions," says Mohamed El Azizi, director of the African Development Bank Group's water and sanitation department. "We have the resources but not the tools and ability, and so they go unutilized."

The U.N. estimates that Africa's three major water consumers—agriculture, communities, and industry—tap into just 3.8% of total annual renewable resources. This figure underscores the underlying problems afflicting Africa: infrastructure, development, and government cooperation, not supply.

DISTRIBUTION, NOT AVAILABILITY, IS THE PROBLEM

Of these the most crucial obstacle hindering Africa from becoming water secure may just be Africans themselves. Characterized by a strained and tangled web of relationships among its 47 countries, the continent's political atmosphere poses difficulty in coordinating regional responses. The Nile River basin alone encompasses ten countries, and 80 of the continent's rivers cross international boundaries. Nearly every country shares water resources with at least one other, but many, like Guinea which is intersected by 12 international rivers, share multiple.

"National interests outweigh shared interests," says Azizi. "With water scarcity projected to increase in the coming years, many expect political conflicts to intensify as well."

With potential for magnified conflict, an opportunity for international cooperation among countries arises as well, and with a handful of such successful models already paving the way, teamwork may just be the likelier outcome. Thirteen countries in the Southern African Development Community region have ratified a Protocol on Shared



Jake Belvin. From *Clean Water for Better Health*, SDN. A Maasai boy operates the rope pump in his village.

Watercourse Systems to "improve cooperation to promote sustainable and coordinated management, protection, and utilisation of transboundary watercourses." Other similar albeit smaller programs like the Nile Basin Initiative, the Lesotho Highlands Water Project, and the Kornati Basin Project signal the potential for partnership as the norm rather than the exception.

For every \$1 invested in water and sanitation, there is an economic return of upwards of \$34.

—World Health Organization

"Solving a problem of such epic proportions would require an equally tremendous investment," says Patrick Alubbe, regional director in east Africa for the nonprofit Water.org. "A sustainable, economic, and reliable system [in Africa] isn't just a matter of building a well but of providing infrastructure that accounts for the future and is adaptable to climate change as well as economic and population growth."

Putting in place the necessary infrastructure to supply

Africa with adequate water access would demand an annual contribution of \$50 billion for the next 20 years and an additional \$30 billion annually for the 30 years following that. However, considering the World Health Organization's estimate that for every \$1 invested in water and sanitation brings an economic return of upwards of \$34, water scarcity may just be a problem worth solving, one with the possibility of immense returns in not just economic but human capital.

WATER / AFRICA

A CONTINENT STRUGGLING TO ALLOCATE OUR MOST PRECIOUS RESOURCE TO 1.2 BILLION PEOPLE

Water scarcity is both a cause and a consequence of poverty.

—Daniela Peis
International Water and
Sanitation Centre

We clean with it and cook with it, drink it and flush it away. And an average American family of four uses 400 gallons of it each day. But for the 1.2 billion people lacking access to it, clean drinking water is a precious and often unattainable commodity.

Experts divide water scarcity into two categories. The first, physical water scarcity, applies to cases where the necessary water supply simply isn't enough to meet demand, like in areas affected by desertification or overpopulation. Instances when water is in fact

inadequate access to clean water and sanitation. Water scarcity largely characterizes areas afflicted by poverty. But with it comes a host of additional problems, such as increased disease and decreased agricultural development, which in turn decreases societies' productivity.

"Water scarcity is both a cause and a consequence of poverty," says Daniela Peis, a program funding officer for the International Water and Sanitation Centre.

Nowhere are the devastating conditions inflicted by lack of water access more

This all comes at a cost not only to individuals but to the continent's overall wealth. Annually, 5% of Africa's GDP is lost as a direct result of poor water sanitation and infrastructure. In Sub-Saharan Africa alone, each year citizens spend 40 billion hours collecting water, the equivalent of a year's worth of labor by France's entire workforce.

While in other areas of the world a few specific and thus more manageable factors affect water insecurity, Africa faces a multitude of both man-made and natural challenges. Although the continent's

FOR MORE INFORMATION

International Water and Sanitation Centre:
www.ircwash.org

Africa Development Bank Group: www.afdb.org

Water.org: www.water.org

World Bank:
www.worldbank.org

World Health Organization:
www.who.int

RIO / BRAZIL

Photographs by Dario De Domenicis
and Tiana Markova-Gold

Rio de Janeiro's winning bid to host the 2016 Summer Olympic Games has drawn both praise and much criticism as citizens question who exactly the games will benefit. The communities that stand to lose the most are favelas, their stereotype as dangerous, overcrowded urban slums considered by many a stain on the city's otherwise handsome image.

Italian documentary photographer Dario de Domenicis transports viewers to Providencia Hill, Brazil's oldest favela. His images detail this vibrant and complex community, nearly a third of whose homes are slated for removal to accommodate proposed construction for the upcoming Olympics. Among Providencia Hill's most vulnerable population are women whom poverty, unemployment, and disease affect at disproportionately high rates. Tiana Markova-Gold documents Centro de Estudos a Ação Excola, a training program certifying 20 women annually as beauticians. By providing essential health and counseling services, it's one place advocating empowerment and cultivating long-term positive change for the favela's women.

In an effort to improve security ahead of the 2014 World Cup and 2016 Summer Olympics, the city established permanent police presence, the Pacifying Police Units (UPP), within 174 of Rio's communities. The move intended to neutralize gang authority within areas like Providencia Hill, but critics claim gangs continue dominating from the shadows.

Photograph by Dario De Domenicis



Cleyde washes her younger sister's hair. Unfortunately, the training program has faced financial setbacks: the salon's rent was two months behind when this photograph was taken, and no funding had been secured to provide students additional training in business management.

Photograph by Tiana Markova-Gold



Residents of Madureira neighborhood rehearse their samba dance in preparation for Carnival in Rio de Janeiro, Brazil, on Sunday, January 13, 2013. Photograph by Lianne Milton from *Right Side of the Wrong Life* on SDN.

massive construction projects and questionable public security programs—all directed at the favelas—are turning global attention away from the allure of sandy beaches and onto the city's massive wealth gap and deeply-rooted class divides.

SLAVE-ERA HISTORY OF BRAZIL'S FAVELAS

Favelas date back to the late 1800s when newly emancipated slaves created their own *bairros africanos*, or African neighborhoods by putting up makeshift homes on unclaimed land bordering Rio de Janeiro's center. Lacking the education and employ-

ment eventually resulted in a new Afro-Brazilian culture with its own customs, religion, dance, music, and art.

Today, approximately 1.4 million people occupy Rio de Janeiro's 600 favelas. The same focus on community and self-reliance from which the favelas originally emerged characterizes their people to this day. "It's incredible, the level of ingenuity and resourcefulness they have," said Dave Zirin, author of *Brazil's Dance with the Devil: The World Cup, the Olympics, and the Fight for Democracy*. "People rally around bare land and within months install plumbing for the whole neighborhood and they do it all without the resources of a centralized government."

This absence of authority allowed organized crime groups called *milicias* to flourish in favelas, bringing with them violence and a burgeoning drug trade. By some estimates, drug sales within Brazil's favelas bring in upwards of \$150 million each month. Competition is fierce in such a lucrative market where rival gangs and bystanders become victims. Six thousand people are killed in Rio de Janeiro each year—twelve times the homicide rate in Chicago—making it the most dangerous city in the world's seventh most violent country.



The glass roof of the new cable car station. Photograph by Dario De Dominicis from *The Favela Hill* on SDN.

ment necessary to partake in Brazilian society, they instead created their own self-sufficient and self-regulated communities. Offering freedom and fraternity, the area, known as Providencia Hill, continued drawing former slaves and lower class Brazilians. Generations of communal living among these two groups

"PACIFICATION" AND THE UPCOMING OLYMPICS

Brazil's government could not ignore such alarming figures for long, especially as media scrutiny increased with the Olympics' approach. In 2008, as part of its largest and most controversial program, they established the Pacifying Police

Units (UPPs). Inspired by a similar program in Colombia, these specially trained, armed forces "pacify" favelas by bridling gang activity with their permanent presence.

The UPPs have proven effective on some fronts. Since the program's inception, the World Organization Against Torture has noted a drop in Rio's homicide rates. Additionally, analysis of 2012 election results show that UPP-controlled areas exhibit greater variance in candidate selection than favelas lacking police presence, suggesting a decrease in democratic corruption.



Rio's Elite Special Forces Police Unit Batalhão de Operações Policiais Especiais, or BOPE, patrols the Parque Alegria favela. Photograph by Lianne Milton from *Right Side of the Wrong Life* on SDN.

"The Pacifying Police Units are meant to contain violence, but you have civilians caught in the crossfire ... between police and gangs."

—Alexandre Ciconello
Amnesty International Brazil

But the program has drawn much criticism by some, including Alexandre Ciconello, a human rights adviser at Amnesty International Brazil, calling it a "military occupation." "The UPPs are meant to contain violence, but you have civilians caught in the crossfire of these shoot-outs between police and gangs," he says.

The UPPs' over-aggressive policing tactics, racial profiling, and unwarranted searches are well documented. Additionally, while the country's overall homicide rate has decreased, a demographic breakdown reveals a Brazilian's chances of being killed varies wildly by race. While in the past decade homicides have decreased 24% among whites, they've increased 40% among blacks, who make up over nearly 70% of favelas' population.

While homicides have decreased 24% among whites, they've increased 40% among blacks.

Residents have good reason to be mistrustful of authority. A military dictatorship in the 1970s resulted in aggressive eradication policies that displaced hundreds of thousands of residents. Even seemingly well-intentioned programs in the past have proved disappointing. At one point, favela residents were relocated to public housing projects that, without necessary support, investment, and maintenance by the government, quickly deteriorated, becoming new favelas.

"There are three players at hand here: the government, the gangs, and the people," says Ciconello. "The government's preoccupied with public security, but that's a war against the gangs. The millions of residents, they're overlooked. There's no effort with them."

Rio's favela population has increased by nearly 28% in the past decade, compared to just 3.4% population increase within the city as a whole. The



View of São Conrado merges with Rocinha, the biggest favela in Brazil, with over 100,000 residents. Photograph by Lianne Milton from *Right Side of the Wrong Life* on SDN.

government's failure to provide much needed public services—health, education, and infrastructure—is exacerbated in the face of a growing problem.

Rather than use the influx of publicity and capital that come with hosting the Olympic games as an opportunity to invest in its largest population, Rio's gentrification efforts threaten entire neighborhoods. Some 19,000 families have already been displaced to make way for development projects such as trolley systems and housing. In total, construction is projected to affect nearly 260,000 households by 2016, many of them headed by residents old enough to remember the forced relocations of the 1970s. Additionally, the UPP project has only secured funding through 2016, worrying some that it's in fact a public relations campaign meant to placate tourists and the media until the closing ceremonies. But in the government's perhaps most telling move, recent construction has included installment of strategically placed walls around the favelas, seemingly to hide them from public view.

"It's a shame," says William Reis of the AfroReggae Cultural Group, a nonprofit organization promoting black culture in Rio's favelas. "People don't hire you if you live in a favela, don't trust you." Decades of negligence and discrimination in favelas by the government have caricatured their public image, type-casting the population as the base inhabitants of lawless shantytowns pervaded by drugs and violence. According to one survey, 79% of people who have never visited a favela reported having a negative view of them. But of those that had experienced the very communities Rio officials are building walls to hide, 72% responded positively.

"But we have much beauty too. Neighbors watch each other's kids, dance together, help build homes...It's a family," Reis says. "That's what you can't see."

FOR MORE INFORMATION

Centro de Estudos a Ação Excola: www.excola.org.br

Amnesty International Brazil: www.amnesty.org/en/region/brazil

AfroReggae Cultural Group: www.afroreggae.org