HHR
Health and Human Rights Journal

Prioritizing Health: A Human Rights Analysis of Disaster, Vulnerability, and Urbanization in New Orleans and Port-au-Prince

JEAN CARMALT

Abstract

Climate change prompts increased urbanization and vulnerability to natural hazards. Urbanization processes are relevant to a right to health analysis of natural hazards because they can exacerbate pre-disaster inequalities that create vulnerability. The 2010 earthquake in Port-au-Prince and the 2005 hurricane in New Orleans provide vivid illustrations of the relationship between spatial inequality and the threats associated with natural hazards. The link between urbanization processes, spatial inequality, and vulnerability to natural hazards is important in terms of an analysis of the right to health; in particular, it provides a basis for arguing that states should prioritize equitable land use and development as a matter of human rights. This article draws on work by geographers, disaster specialists, and international legal scholars to argue that inequitable urbanization processes violate the obligations to respect, protect, and fulfill the human right to health in disaster-prone regions.

Jean Carmalt, JD, PhD, is Assistant Professor of Law and Society in the Department of Political Science at John Jay College of Criminal Justice (CUNY), New York, NY, USA.

Please address correspondence to Jean Carmalt, Department of Political Science, John Jay College of Criminal Justice, New York, NY 10019. Email: jcarmalt@jjay.cuny.edu

Competing interests: None declared.

Introduction

THE PURPOSE OF this article is to link the international legal obligations associated with the right to health to the understanding of vulnerability that has been developed by geographers, disaster specialists, and others.[1] The right to health, as the Committee on Economic, Social and Cultural Rights has explained, is not the right to be healthy, but should instead "be understood as a right to the enjoyment of a variety of facilities, goods, services and conditions necessary for the realization of the highest attainable standard of health."[2] The right to health encompasses both the underlying preconditions to health and the availability, accessibility, acceptability, and quality of health goods and services. Therefore, it provides a legal link between urbanization processes that increase risk (be it through ecological degradation, misplaced planning priorities, or something else) and the impact on people who live in places that are likely to experience a hazard that will become disastrous. Climate change contributes to increased rural-to-urban migration, and therefore increases the vulnerability of urbanized regions to natural hazards. Natural hazards that become disastrous may therefore be a human rights concern, and should not be viewed as merely unavoidable events that negate legal obligations.

In 2011, there were 3.6 billion people living in urban environments, with 89% of those people living in places that had a high risk of experiencing a natural hazard.[3] However, the risk of experiencing a hurricane, earthquake, or other natural hazard is not the same thing as being vulnerable to that hazard. Vulnerability is a broader term: it encompasses risk, but it also includes the political, economic, social, and historical processes that increase the likelihood that particular people in particular places will experience negative effects associated with hazards.[4] Moreover, the concept of vulnerability is inherently spatial: although there are obvious spatial dimensions to physical risk (e.g., the movement of tectonic plates or weather systems), vulnerability also includes the more subtle and complex spatial dimensions of socially constructed processes like corruption, poverty, and discrimination.[5] These processes construct (and are constructed by) urban regions, and those regions are of particular concern when it comes to ensuring the highest attainable standard of health in the context of natural hazards. Given the sheer number of people living in urban environments, a right to health approach requires attention to the way in which urbanization and vulnerability relate to one another.[6] My focus in this article on urban regions is not meant to exclude the importance of embedded risk in rural areas. Just as the landscape of urban areas is socially constructed, so too is the landscape of rural areas (indeed, they are often shaped by the same processes, as can be seen with rural-to-urban migration). Therefore my focus here on urban areas is simply a matter of space; a similar sort of analysis could also be done for rural areas.

In order to examine how urbanization processes can embed vulnerability into specific landscapes, I rely on two concrete examples of recent disasters—Hurricane Katrina and its associated flooding in New Orleans, USA (August 2005) and the 7.0 magnitude earthquake that struck Port-au-Prince, Haiti on January 12, 2010. These disasters took place in extremely different contexts. The first occurred in New Orleans, a low-income city in a wealthy country that had known for years about the threats associated with hurricanes, and which had several days' warning that Hurricane Katrina was headed directly for the city. Approximately 1,100 people died in Louisiana, mostly from drowning; more than a million were displaced.[7] The second disaster occurred in Port-au-Prince, Haiti. Unlike New Orleans, Port-au-Prince is the primary city in an extremely poor country. Although there was general knowledge that a fault line ran under

Port-au-Prince, there was no warning that an earthquake would occur on January 12, 2010. The result was disastrous in every sense of the word: more than 200,000 people died—thousands of whom would probably not have died if they had received prompt medical care—and more than a million were displaced; the city itself, including all government buildings that might provide emergency services, was flattened.[8]

I draw on these two examples because although they are extremely different, they both illustrate a confluence of vulnerability, risk, and governmental actions that directly or indirectly interfered with the right to health for thousands of residents. In both places, too, there is evidence of how state policy and practices failed to make residents more resilient through urbanization processes and how they failed to protect residents from the detrimental actions of third parties. Finally, comparing Port-au-Prince with New Orleans provides an opportunity to highlight the fact that human rights obligations are just as relevant for 'developed' nations as they are for 'developing' nations.

While there was some discussion of human rights and disasters in the early 2000s, it was the 2004 Indian Ocean tsunami that prompted increased conversation on the topic.[9] In conjunction with the scholarly discussion was the rapid development of a number of soft law instruments related to disasters. Two years after the tsunami, the UN Inter-Agency Standing Committee (IASC) adopted Operational Guidelines on Human Rights and Natural Disasters, and in 2008, the Brookings Institution (working with the Representative of the Secretary General on the human rights of internally displaced persons) produced a Field Manual to help practitioners translate the Guidelines into practice.[10] That literature has grown over the past decade, and it continues to provide important guidelines and standards that apply to disasters. That said, there has been very little discussion of how human rights obligations apply to disaster risk reduction (DRR) as opposed to disaster relief. For example, the leading set of standards on DRR, the Hyogo Framework for Action, spells out crucial measures of reducing risk, but does not frame those measures in terms of human rights obligations. To date, there has been no legal analysis of the scope of state obligations regarding the right to health in the context of reducing vulnerability to natural hazards. This article therefore focuses on a legal analysis of the human right to health specifically, and asks whether the scope of legal obligation pertaining to the right to health can encompass ongoing practices of urbanization that embed vulnerability into specific landscapes. For that reason, I do not directly engage with the ongoing, and important, discussion about rights-based responses to disaster.

This article is organized along the three dimensions of state responsibility regarding the right to health: the obligation to respect, or refrain from interfering with health (directly or indirectly), the obligation to protect the health of populations against third party actions, and the obligation to fulfill the right to health by implementing measures that will ensure that residents achieve the highest possible standard of physical and mental health.[11] The article concludes that a right to health perspective should be prioritized within planning and urbanization practices in order to minimize vulnerability to natural hazards, along with the way in which this approach might be useful for local advocates.

The obligation to respect

The obligation to respect requires governments to refrain from enacting policies that directly or indirectly interfere with the human right to health.[12] As the Committee on Economic, Social and Cultural Rights explained in General Comment 14, a state violates its obligation to respect when its "actions, policies or laws… contravene the standards set out in article 12 of the Covenant and are likely to result in bodily harm, unnecessary morbidity and preventable mortality."[13] For example, the state violates the obligation to respect health when its policies

or practices result in "the denial of access to health facilities, goods and services to particular individuals or groups as a result of de jure or de facto discrimination."[14] This standard applies to the availability, accessibility, acceptability, and quality of health goods and services, as well as to the underlying determinants of health.

The underlying determinants of health include ecological or environmental factors. Article 12 of the Covenant specifically requires that states work to improve "environmental and industrial hygiene."[15] Although "environmental hygiene" is a broad term that could be interpreted in multiple ways, it is clear that this provision at least calls on states to refrain from implementing laws and policies that actively produce pollution or other forms of ecological degradation damaging to human health.[16] Therefore, if a state enacts a law that not only results in ecological degradation, but which also creates a situation that is "likely to result in bodily harm, unnecessary morbidity and preventable mortality," then the state has violated the obligation to respect the right to health as it has been articulated by the Committee.[17] Earthquakes, volcanoes, floods, hurricanes, and tsunamis are all hazards that, when they come into contact with people, will result in bodily harm and/or unnecessary death. Hazards also result in preventable mortality, since there are typically situations in which people could have been (but are not) rescued, protected by secure structures, or evacuated in advance of the event. Therefore, if a state enacts a law or policy that increases the vulnerability of residents to a natural hazard (through land use practices, for example), that state has violated the obligation to respect the right to health.

Hurricane Katrina and the US government's failure to respect the right to health

In relation to Hurricane Katrina, the US government violated the obligation to respect health by building a shipping canal that substantially increased the threat of flooding in New Orleans, Louisiana. In 1956, the US Congress authorized construction of the Mississippi River-Gulf Outlet (MRGO, commonly known as "Mr. Go") in order to promote economic development through shipping commerce and to protect national security by creating a "safer and shorter" route from New Orleans to the Gulf of Mexico.[18] The canal was 75 miles long and crossed 45 miles of marshland in Orleans and St. Bernard Parishes, with an additional 30 miles of dredged channel in Breton Sound.[19] The project had been decades in the making; the local Dock Board (Commissioners for the Port of New Orleans) had pushed for it as far back as the 1920s, though they gained little traction until the post-WWII political environment added a national security dimension to their claims of economic benefit.[20] Members of the Dock Board—who were largely selected by a group of elite businessmen in New Orleans—tended to embrace an ideology of modernization that prioritized commercial development; they therefore viewed the natural environment, including the wetlands, as something to be subjugated in order to achieve that development.[21] The suggested canal was locally controversial, however, since many residents argued (correctly, as it turned out) that the canal would be as much of an inlet for seawater as it was an outlet for shipping vessels.

The decision to build MRGO provides an example of how the government of the US built vulnerability into the urban landscape of New Orleans in such a way as to interfere with the ability of New Orleans residents to enjoy the right to health. MRGO increased the vulnerability to flooding for New Orleanians in two ways. First, the canal's existence destroyed protective wetlands, both because of the digging required to create the channel and because of the subsequent increase of saltwater in wetland areas. Constructing MRGO entailed the removal of approximately 16,000 acres of marshland.[22] The material dredged out of the canal was largely disposed of in nearby wetland areas, which killed the plant and animal life living in those places and re-introduced a variety of heavy metals to the surface environment, including lead and mercury.[23] Disposal areas built up the land near the canal and disrupted water

flow in the marsh area. These problems were ongoing, and they worsened with each dredging of the canal. Wetlands began to disappear at an alarming rate—approximately one American football field every 38 minutes (about 6500 yards^2 or 5350m^2)—as saltwater killed the fragile plants that held wetlands in place.[24] Between 1968 and 2005, the MRGO was regularly dredged in order to maintain the appropriate depth for the shipping industry; the dredging was necessary in part because the wetlands were slipping into the canal itself as the plants that had previously held them in place died and floated away. To add insult to injury, the economic grounds on which the canal was justified substantially failed to materialize.[25]
In addition to destroying wetlands, the MRGO increased the vulnerability of residents in New Orleans by serving as a funnel that caused the storm surge to enter New Orleans at a faster and higher rate than it would have otherwise done.[26] Starting as early as Hurricane Betsy in 1965, local residents had started referring to the MRGO as "Hurricane Highway" because of its role as an inlet for storm surges that came from the Gulf.[27] This anecdotal evidence was later backed up by post-Katrina studies of the region. One such study ran models to see how Hurricane Katrina would have behaved if not for the funnel-like opening of the MRGO.[28] The model showed that the storm surge was increased 300% by the existence of the canal, and that without the MRGO, the flooding would have been lessened by 80%.[29] State actors (both local and national) were aware of the flood risk posed by the MRGO.[30]

Importantly from a rights-based perspective, the ecological damage and associated threats to health, life, and well-being arising from the MRGO did not impact all members of the population equally.[31] Instead, there was a disparate impact on African-Americans living in New Orleans.[32] As one survivor put it, "Being black, just being poor—I guess that's our crime. Just being a regular working person's not good enough in the United States."[33] The statistical evidence bore her out: African-American residents in New Orleans were significantly more likely to live in a neighborhood that flooded in the aftermath of Katrina, and they were more likely to die because of the floods.[34] The infamous flooding of the Lower Ninth Ward—a neighborhood that was 96% African-American before Katrina—was one of the most vivid examples of this disparate impact.[35] The US enacted land-use policies that were discriminatory in effect, and which resulted in ecological degradation for the financial benefit of a few at the expense of health and well-being for many. Therefore, the US violated its obligation to respect the right to health.

Port-au-Prince and the Haitian government's failure to respect the right to health

A very different example of a government's failure to respect the right to health in the context of urbanization processes and natural hazards comes from Port-au-Prince, Haiti. Port-au-Prince is a large and rapidly growing city with a staggering amount of poverty. By 1996, Haiti had the most concentrated population on Earth, and the vast majority of that population lived in Port-au-Prince.[36] When the earthquake struck on January 12, 2010, there were approximately 2.7 million people living in the city, with an additional 75,000 new migrants arriving in the city every year. About 85% of those migrants moved into informal or illegal settlements.[37] Hundreds of thousands of people therefore lived wherever they were able to find space; usually this was on steep hillsides or in flood-prone ravines. UN-HABITAT defines a "slum" as lacking any one of the following: durable housing, sufficient living space, access to sufficient water, or secure land tenure.[38] In Port-au-Prince, the informal settlements lack all of these characteristics. Indeed, the buildings themselves were so far from being ready to face an earthquake that one post-earthquake engineering report referred to them as, "a nightmare of diabolical proportions."[39] Some have explained the high death toll as being almost entirely a product of shoddy engineering.[40]

Poor engineering was one part of a larger picture of urban vulnerability that involved high rates of internal migration and historical shifts in Haiti's

economic and political geography. Likewise, the lack of a coherent land tenure system was one part of a larger picture of poorly constructed buildings. Although there are many reasons that the slums of Port-au-Prince were built in the way they were, one important reason involves the legal landscape onto which the structures were constructed. The land tenure system in Port-au-Prince therefore provides one example of how Port-au-Prince residents are made more vulnerable to the effects of a natural hazard through government actions. Graham Tipple provides a succinct summary of the relationship between land tenure and vulnerability to natural hazards:

> A well-functioning land allocation system, in which there is good information and clarity of title, and a regulatory environment in which low-income households can afford to build, are prerequisites for housing development which reduces vulnerability.[41]

Port-au-Prince, which is one of the most densely populated cities in the world, and which faces severe and regular threats from a variety of natural hazards, has neither a well-functioning land allocation system nor a regulatory environment that allows low-income households to build safe structures in which to live. In Haiti before the earthquake, there were a number of laws in place that were meant to protect security of land tenure.[42] Notably, these laws adhered to international standards and were, at least on the books, in line with principles of international human rights law.[43] In practice, however, land tenure was an informal practice that largely revolved around local notaries, whose written approval of documents regarding property rights substituted for the formalized governmental process. This informal process emerged because the formal process was so resource-intensive that it functioned as a barrier to anyone who could not afford to pay the many people involved or spend years (even decades) on the gaining legal tenure.[44] For government-owned land, the process was even more cumbersome; formal recognition required 111 bureaucratic steps, none of which was transparent.[45] One report estimated that going through the process could take up to 19 years.[46] As a consequence, before the earthquake, it was nearly impossible for non-elite owners or tenants of land to have formal title recognition by a governmental body.[47] Like everything in Haiti, the complex land tenure system must be also be explained as part of the country's history of slavery, rebellion, land use, and structural violence.[48] After the first successful slave rebellion in history, Haitian leaders inherited the "finely tuned plantation machine" left by the French in 1804.[49] The plantation economy came with a specific legal geography that required large, contiguous plots of land that allowed the owners to maximize export-oriented production of sugar cane and coffee. Haitian leaders urged newly free Haitians to embrace the land use model, despite the fact that many—unsurprisingly—did not want to maintain the economic and environmental structures of their former slave-owners. Resistance emerged in the form of the "counter-plantation system," which was run largely by women using small plots of land to simultaneously grow subsistence and export crops.[50] The system prompted fragmented ownership rights, and its legacy has contributed to a complex legal system surrounding land rights and land tenure that purposefully makes it difficult to consolidate land into larger (plantation-like) plots.

Nonetheless, there are drawbacks to relying on an informal land tenure system, particularly in the context of an earthquake. One drawback is that the informal structure of land tenure meant that there was little security of tenure and no structure through which the government could enforce regulations regarding building standards, transportation networks, or zoning concerns. Indeed, there were no such regulations in place before the earthquake, and it would have been nearly impossible to introduce effective regulations given the chaotic, unplanned growth of the city around informal claims to land.[51] In addition, however, the informality of the land tenure system produced a highly chaotic

environment after the earthquake that directly impeded the ability of aid workers to provide emergency medical care because it was difficult even to know where tents or emergency facilities could be reliably located.[52] Thousands of lives could likely have been saved in the immediate aftermath of the earthquake if injured people had been able to access medical care.[53] Although there were many reasons that they did not receive that care, one reason is that the Haitian government interfered with the ability of residents to have secure land tenure, and this impeded the provision of post-earthquake emergency care.[54]

The historical and political complexity of land tenure in Port-au-Prince does not negate the fact that there are barriers to health and well-being that are exacerbated by Haiti's cumbersome requirements related to land ownership. The laws contribute to the lack of regulation and planning that exists in the slum areas of Port-au-Prince. People who live in these places do so without regular or reliable access to government services, and without security of tenure.[55] The crowded informal residential settlements have no building codes, sewage system, or transportation network. Those living in them do not have contracts governing landlord-tenant relations, and they typically have poor access to potable water, and a lack of sanitation. Haitians living in these areas of Port-au-Prince were therefore more vulnerable to natural hazards than residents who live in places built in safe places that enjoy basic sanitation, along with access to water, electricity, and emergency or health services. Therefore, the laws related to land tenure in Haiti provide one example of the way in which a state can violate its obligation to respect health by building vulnerability into the urban landscape.

Legally, the negative obligation to "refrain from interfering" is the strongest and best-enforced dimension of the right to health.[56] Litigation on the obligation to respect has succeeded in legal venues that range in type of law, geographic location, and interpretation of health rights. Nonetheless, there are also arguments to be made in relation to the right to health and the obligations to protect and fulfill. For each level of obligation, there are ways in which urbanization processes incorporate vulnerability in such a way as to turn natural hazards into human disasters.

The obligation to protect health

The obligation to protect health has traditionally been defined as the state's duty to ensure that third parties, such as private actors and corporations, do not violate the right to health. As is the case with the right to health overall, the obligation to protect applies to the underlying preconditions to health, including a healthy environment. According to the Committee on Economic, Social and Cultural Rights, Article 12 of the ICESCR requires states to engage in "the prevention and reduction of the population's exposure to…environmental conditions that directly or indirectly impact upon human health."[57] Urbanization processes related to land use, infrastructure, poverty, and corruption are all part of environmental conditions. Therefore, when a state fails to prevent a third party actor from participating in harmful land-use practices that produce vulnerability, the state has violated its obligation to protect the right to health.

State failure to protect Louisiana wetlands from third party actors

The obligation to protect health in the context of urbanization and natural hazards requires protection from actions that change the physical environment in ways that increase the vulnerability of the population. In Louisiana, the state failed to do this because it allowed third party actors—oil companies, in this case—to further degrade the protective wetlands between New Orleans and the Gulf of Mexico. As discussed in the previous section, wetland loss in Louisiana is directly related to the vulnerability of New Orleans residents in a hurricane. Hydrocarbon development has, in conjunction with the MRGO, had a significant and negative impact on the wetlands because it has caused subsidence.[58] As one study concluded, "Hydrocarbon production can introduce surface

subsidence (and to some extent fault slip) on the order of the observed surface elevation change locally."[59] Subsidence causes further wetland loss because it makes the wetlands more likely to be inundated with saltwater.

The subsidence associated with hydrocarbon activity is part of subsidence in the region more broadly. The city of New Orleans and the environment in which it exists, in other words, are sinking into the Gulf. However, this means that the Hurricane Protection System is sinking along with the city, and it is doing so just as the sea level is rising. Therefore, the subsidence rates and wetland loss that arise in conjunction with hydrocarbon development are part of a larger picture of ecological degradation that produces vulnerability throughout the region. The actions of oil companies are interfering with the right to live in a healthy environment, particularly in terms of the level of protection that environment previously provided against hazards.

International actors and the implementation of damaging policies in Haiti

In Port-au-Prince, as well, the government failed in multiple ways to protect its residents from threats posed by third parties. International actors, in particular, have spent hundreds of years interfering with the ability of Haitians to enjoy the highest attainable standard of mental and physical health.[60] In terms of the vulnerability of Port-au-Prince, the most relevant interference from international actors is the degree to which they have imposed structural economic change on Haiti and, by so doing, have fundamentally altered the demographics of the country. Specifically, interventions that have imposed agricultural policies on Haiti have consistently produced a migratory flow to Port-au-Prince, which has in turn (and in combination with the lack of land use) resulted in extreme overcrowding on unsafe terrain.

The first of these was the French imposition of the plantation system; however, during the early 1900s, the American intervention prompted industrial modernization efforts that focused on prioritizing urban-based industry over rural agricultural production. By the 1960s, Haiti's economy was focused on Port-au-Prince's factory work instead of agricultural production.[61] From 1957 to 1986, father-and-son dictators François and Jean-Claude Duvalier systematically tortured, murdered, and impoverished most of the Haitian population. Both dictators also implemented tax- and investment-related policies that focused on urban economic growth at the expense of the rural areas.[62] By the 1980s, multinational corporations were moving to Port-au-Prince to find cheap labor (prompted by the policies of international institutions and the US, in particular) and the flow of migrants from the rural areas to Port-au-Prince had risen exponentially. Structural adjustment programs (SAPs) were imposed on Haiti by international lenders and the US government in the 1990s, which not only undermined the ability of Haitian farmers to grow more nutritious local crops, but also directly related to the rapid increase in rural to urban migration that created the slum neighborhoods in Port au Prince.[63] SAPs required Haiti to expand its export crops, keep its wages low, and focus its economic activities on providing low-wage factory work for multinational corporations. By the early 2000s, between 80 and 90 percent of Haiti's exports were footwear and clothing.[64] As the economic activity shifted from high-labor agricultural practices to high-input manufacturing practices, rates of migration to Port-au-Prince skyrocketed.[65] The rapid increase in population resulted in the growth of informal settlements like Cité Soleil, which was built on steep hillsides without secure tenure, functional infrastructure, or public services like water, sewage, and electricity.[66] Residents of these areas soon became even less resilient to hazards because they had no work; companies that had been producing clothing or other goods in Haiti began to scatter across the Caribbean Basin, leaving many Port-au-Prince residents unemployed.

Although international actors are primarily responsible for the construction of vulnerability within Port-au-Prince, the Haitian government

is also implicated because of the pervasive corruption that exists throughout governmental structures.[67] Corruption is deeply embedded in the judiciary, which means that it can be extremely difficult to use the court system effectively to achieve justice. In addition, and relevant to urbanization processes, corruption in the construction industry resulted in highly unstable structures that exhibited "every possible mistake" in terms of earthquake safety, including:

> brittle steel, coarse non-angular aggregate, weak cement mixed with dirty or salty sand, and the widespread termination of steel reinforcement rods at the joints between columns and floors of buildings where earthquake stresses are highest.[68]

These buildings killed many people living in Port-au-Prince, and they provide evidence for the conclusion that "corruption kills" in the context of natural hazards.[69]

The policies related to industrialization have caused internal migration that has prompted the unsafe building of unregulated slums in Port-au-Prince. However, the government of Haiti has also failed to protect residents of Port-au-Prince from third party actors that force harmful industrialization policies on the country. Despite Haiti's limited political and economic power, the endemic corruption within the country has contributed to a political and economic climate that has made those international actors all the more influential.

Obligation to fulfill the right to health

The obligation to fulfill the right to health requires a government to undertake "actions that create, maintain, and restore the health of the population."[70] In the context of urbanization, vulnerability, and hazards, the obligation to fulfill translates into an obligation to prioritize health in the context of policy decisions related to land use and planning. In other words, governments should assess the degree to which specific policy decisions can increase or decrease the vulnerability of specific residents, and should prioritize those that build healthier, more resilient cities. All other considerations, such as the profitability of a particular policy, the degree to which a policy is politically beneficial, or even the degree to which a policy meets other beneficial goals, are less significant than the question of how much vulnerability is being built into the landscape.

In Louisiana, the known threat of hurricanes meant that the state should have prioritized the protection of wetlands over the financial benefits of creating a secondary shipping canal. In addition, however, the state should have constructed protective infrastructure—including levees and floodwalls—that would lessen the vulnerability of residents to the risks associated with living in the region. Instead, the state built a flood protection system that was woefully inadequate. When the storm surge was funneled into New Orleans, it overwhelmed the Hurricane Protection System (HPS), breaching it in 50 different places.[71] Only four of the breaches resulted from water that broke through a floodwall that had not yet filled to capacity.[72] For example, the levees breaks on the 17th Street and London Avenue canals, just south of Lake Ponchartrain, showed high water lines that were well below the tops of the levees. Tellingly, the third levee that faces Lake Ponchartrain—the Industrial Canal levee—was overtopped, meaning that the canal that was so full that water flowed over the top of its walls. This means that the canal connected to the MRGO had a significantly higher water level than comparable canals that did not connect to the MRGO.[73] Overtopping, however, was not a gentle process; often, it would wash the entire wall down and erode the clay and soil on the interior (populated) side.[74] Having levees washed away because of overflow was both predictable and easily remedied, for example, by adding a concrete splash pad that would reduce the likelihood of erosion. This particular type of breach was associated with some of the most destructive flooding after Hurricane Katrina, including the floods that virtually obliterated the Lower Ninth Ward neighborhood.[75]

In addition to the failure to fulfill the right to

health for New Orleanians through an adequate levee system, the state also failed to implement a nondiscriminatory evacuation plan. The hurricane evacuation plan for New Orleans was carried out effectively and safely.[76] However, the evacuation plan failed to provide transportation for New Orleans residents who had no access to a private automobile, which meant that all of those people who wished to evacuate went to the only official shelter in the city: the Superdome.[77] Race and income correlate to car ownership in New Orleans, which means that a plan that was primarily dependent on private car ownership effectively discriminated against African Americans and those living in poverty.[78] The single emergency shelter in the city, the New Orleans Superdome, was woefully ill-prepared to provide shelter to the many thousands of people who needed it.[79] The result was as disastrous as it was discriminatory, and it therefore violated the obligation to fulfill the highest available standard of health for residents of New Orleans.

The failure to protect people's health in Port-au-Prince is also directly connected to the failure to prioritize health. In order to fulfill the right to health, the Haitian government would first need to engage its residents in a participatory process that could plan how best to create coherent transportation networks and secure land tenure. There are some preliminary efforts to do this in terms of securing land tenure through participatory processes that involve notaries and residents.[80] However, the state must consider how it will address the deeply systemic problems of corruption, inadequate planning, and international interference before it will be able to build a more resilient city.

In Port-au-Prince, many places are still filled with rubble. Fulfillment of the right to health is not impossible, however, even in the challenging and complex Haitian context. Indeed, there is already an example of how Haiti, together with local non-governmental actors, is fulfilling the right to health through urbanization processes. After the earthquake, the Haitian government decreed that a park would be built on 17 privately held parcels—the last wooded land in Port-au-Prince.[81] The decree was prompted by the work of FOKAL, a Haitian non-governmental organization that works on structural approaches to solving challenges in Haiti.[82] The park is named after the neighborhood in which it sits, Martissant, and it provides a peaceful physical space in which community members connect with one another, including through the implementation of participatory, health-based initiatives.[83] Just as vulnerability is built into the landscape, so too can physical and mental well-being be built into an environment through participatory urbanization processes. Martissant Park provides one hopeful example of how the right to health may be fulfilled through urbanization processes that prioritize health in the context of construction and rebuilding.

Conclusion

Urban landscapes are constituted by—and constitute—specific configurations of economic, political, and social power. This means that any given disaster has multiple root and immediate causes.[84] Everything from the time of day an earthquake occurs to the level of corruption present in the local government can play a role in the level of devastation that occurs in relation to a natural hazard. However, the processes associated with urbanization also entail the physical manifestation of vulnerability: those ways in which injustice can be woven into an urban landscape. From a rights-based perspective, this is significant because these factors—unlike, for example, the risks associated with the time of day an earthquake occurs—can be mitigated by prioritizing issues of human health and well-being within the planning process itself.

Climate change contributes to rural-to-urban migration and increases the vulnerability of people living in all regions. The lessons learned from Port-au-Prince and New Orleans are crucial in the context of climate adaption and mitigation. Urbanization processes can exacerbate the inequitable distribution of vulnerability to health

threats from natural hazards. That relationship means that natural hazards should not negate legal liability as they have often done in other legal arenas through, for example, "Act of God" provisions: they should instead prompt a right to health approach in the context of disaster risk reduction. The right to health recognizes the importance of linking underlying determinants of health, including a healthy environment, to the ability of humans to enjoy the highest attainable standard of health. This link is essential, since it highlights the importance of urbanization processes that embed vulnerability to hazards into urban landscapes. A right to health approach would instead require urban planning processes to prioritize health, and to examine how health may be improved, rather than infringed upon, through specific land use policies or practices.

References

1. G. White, Human adjustment to floods. (Chicago: University of Chicago Dissertation, 1945); B. Wisner, "The political economy of hazards: More limits to growth?" *Environmental Hazards* 20 (2000), pp. 59-61; B. Wisner (ed.), *At risk: natural hazards, people's vulnerability and disasters* (Psychology Press, 2004); M. Pelling and K. Dill, "Disaster politics: Tipping points for change in the adaptation of sociopolitical regimes," *Progress in Human Geography* 34/1 (2010), pp. 21-37; M. Pelling and K. Dill, *Natural disasters as catalysts of political action*, ISP/NSC briefing paper 06/01 (London: Chatham House, 2006).

2. Committee on Economic, Social and Cultural Rights, General Comment No. 14, The Right to the Highest Attainable Standard of Health, UN Doc. No. E/C.12/2000/4 (2000).

3. G. K. Heilig, "World urbanization prospects: the 2011 revision." (presentation at the Center for Strategic and International Studies (CSIS), Washington, DC, June 2012).

4. Wisner (2004, see note 1).

5. C. Katz, "Bad elements: Katrina and the scoured landscape of social reproduction," *Gender, Place & Culture: A Journal of Feminist Geography*, 15/1 (2008), pp. 15-29.

6. UNFPA, UNISDR, AND UN-HABITAT, Linkages between Population Dynamics, Urbanization Processes and Disaster Risks: A Regional Vision of Latin America 10 (2012); J. Carmalt and C. Haenni-Dale. "Human rights and disaster." In B. Wisner, JC Gaillard, I. Kelman, *The Routledge handbook of hazards and disaster risk reduction*. Oxon: Routledge (2012), pp. 55-64.

7. S. Jonkman, B. Maaskant, E. Boyd, and M. L. Levitan, "Loss of life caused by the flooding of New Orleans after Hurricane Katrina: analysis of the relationship between flood characteristics and mortality," *Risk Analysis* 29/5 (2009), pp. 676-698; E. Mueller, H. Bell, B. B. Chang, and J. Henneberger, "Looking for home after Katrina: postdisaster housing policy and low-income survivors," *Journal of Planning Education and Research* 31/3 (2011), 291-307.

8. P. Farmer, *Haiti after the earthquake* (Public Affairs Store, 2012); W. B. Millard, "Starting from scratch: Haiti's earthquake and disaster planning," *Annals of Emergency Medicine* 55/5 (2010), pp. A17-A22; M. Jagannath, N. Phillips, and J. Shah, "Rights-based approach to lawyering: legal empowerment as an alternative to legal aid in post-disaster Haiti," *Northwestern Journal of International Human Rights* 10 (2011), p. 7.

9. G. Kent, "Short communication: The human right to disaster mitigation and relief," *Environmental Hazards: Human and Policy Dimensions* 3/3 (2001), pp. 137-138; B. Wisner, "Are we there yet? Reflections on integrated disaster risk management after ten years," *Journal of Integrated Disaster Risk Management*, 1/1 (2011).

10. Inter-Agency Standing Committee. Protecting persons affected by natural disasters: IASC Human rights and natural disasters: Operational Guidelines on human rights and natural disasters 3 (2006). *Human rights and natural disasters: Operational Guidelines and Field Manual on human rights protection in situations of natural disaster* 22 (Brookings-Bern Project on Internal Displacement ed., Pilot Version, 2008).

11. Committee on Economic, Social and Cultural Rights (see note 2)

12. Ibid.

13. Ibid, ¶50.

14. Committee on Economic, Social and Cultural Rights (see note 2)

15. International Covenant on Economic, Social and Cultural Rights (ICESCR), G.A. Res. 2200A (XXI), Art. 12. (1966). Available at http://www2.ohchr.org/english/law/cescr.htm, art. 12(b)(2).

16. P. Hunt, "Implementation of General Assembly Resolution 60/251 of 15 March 2006 entitled 'Human Rights Council: Report of the Special Rapporteur on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health.'" Human Rights Council. Fourth session. Item 2 (2007); Yanomami Case, Case 7615, Inter-Am. C.H.R. Res. No. 12/85, OEA/Ser.L/V/II.66, doc. 10, rev. 1, 24 (1985).

17. Committee on Economic, Social and Cultural Rights (see note 2)

18. Public Law 84-455; W. Freudenburg, R. Gramling, S. Laska, and K. Erikson. "Disproportionality and disaster: Hurricane Katrina and the Mississippi River-Gulf Outlet." *Social Science Quarterly* 90/3 (2009), pp. 497-515.

19. R. Seed, R. Bea, R. Abdelmalak, A. Athanasopoulos, G. Boutwell Jr, J. Bray, J.L. Briaud et al. "Investigation of the performance of the New Orleans flood protection system in Hurricane Katrina on August 29, 2005." NSF Independent Levee Investigation Team, Report No. UCB/CCRM-06/01 (2006), pp. 1-690.

20. Freudenburg et al. (see note 18)

21. B. L. Azcona, "The razing tide of the Port of New Orleans: power, ideology, economic growth and the destruction of community," *Social Thought & Research* (2006), pp. 69-109.

22. G. Shaffer, J. Day Jr, S. Mack, G. P. Kemp, I. van Heerden, M. Poirrier, K. Westphal et al. "The MRGO Navigation Project: a massive human-induced environmental, economic, and storm disaster." *Journal of Coastal Research* (2009), pp. 206-224; USACE, New Orleans, Louisiana District Office, *Final Composite Environmental Statement for Operation and Maintenance on Three Navigation Projects in the Lake Borgne Vicinity Louisiana.* (Washington, D.C.: United States Government Printing Office, 1976).

23. Ibid.

24. *ScienceDaily*. Louisiana State University (2008, January 4). *Louisiana's wetlands are being lost at the rate of one football field every 38 minutes.* Available at http://www.sciencedaily.com /releases/2008/01/080104112955.htm.

25. Freudenburg et al. (see note 18)

26. Seed et al. (see note 19); Shaffer et. al. (see note 22), citing J.P. Kemp, "Mississippi River Gulf Outlet effects of storm surge, waves, and flooding during Hurricane Katrina." *Expert Report* 4. (New Orleans, Louisiana: Office of Bruno & Bruno, 2008), pp. 228.

27. Freudenburg et al. (see note 18)

28. Kemp (see note 26); Shaffer et al. (see note 22)

29. Ibid.

30. Shaffer et al. (see note 22); USACE (see note 22)

31. C. Colten, "Vulnerability and place: flat land and uneven risk in New Orleans." *American Anthropologist* 108/4 (2006), pp. 731-734.

32. Freudenburg et al. (see note 18); P. Sharkey, "Survival and death in New Orleans: an empirical look at the human impact of Katrina," *Journal of Black Studies* 37/4 (2007), pp. 482-501.

33. D'Ann, R. Penner, and K. Ferdinand. *Overcoming Katrina: African American voices from the Crescent City and beyond* (Vol. 83). (New York: Palgrave MacMillan, 2009), p. 137.

34. Sharkey (see note 32)

35. R. Green, M. Kouassi, and B. Mambo. "Housing, race, and recovery from Hurricane Katrina." *The Review of Black Political Economy* (2013), pp. 1-19.

36. K. Tobin, "Population density and housing in Port-au-Prince: historical construction of vulnerability." *Journal of Urban History* (2013), pp. 1050.

37. UN-HABITAT, "Strategic citywide spatial planning: A situational analysis of metropolitan Port-au-Prince, Haiti" (United Nations Human Settlements Programme, 2009). Available at http://www.unhabitat.org/pmss/getElectronicVersion.aspx?nr=3021&alt=1.

38. UN-HABITAT, "Slums: some definitions" (United Nations State of the World's Cities 2006/7). Available at http://www.unhabitat.org/documents/media_centre/sowcr2006/SOWCR%205.pdf.

39. R. Bilham, "Lessons from the Haiti earthquake." *Nature* 463/7283 (2010), pp. 878-879.

40. N. Ambraseys and R. Bilham, "Corruption kills." *Nature* 469/7329 (2011), pp. 153-155.

41. G. Tipple, "Housing and urban vulnerability in rapidly-developing cities." *Journal of Contingencies and Crisis Management* 13/2 (2005), pp. 67.

42. R. Iwerks, "This land is my land: protecting the security of tenure in post-earthquake Haiti." *Fordham Int'l LJ* 35 (2012), 1844

43. Ibid.

44. Ibid.

45. Ibid.

46. UN-HABITAT (see note 34)

47. Iwerks (see note 42)

48. P. Farmer, *Pathologies of power: health, human rights,*

and the new war on the poor: with a new preface by the author (Vol. 4). (Berkeley: University of California Press, 2005).

49. L. Dubois, *Haiti: the aftershocks of history*, (New York: Metropolitan Books, 2012), p. 16

50. Ibid, p. 33

51. Iwerks (see note 42)

52. Ibid.

53. Millard (see note 8)

54. Iwerks (see note 42)

55. H. Reimer and R. Theodat, "Haiti: housing rights. Submission to the United Nations Universal Periodic Review" The Lamp for Haiti Foundation (2011). Available at http://lib.ohchr.org/HRBodies/UPR/Documents/session12/HT/LHF-LampHaitiFoundation-eng.pdf.

56. D. Marcus, "The normative development of socioeconomic rights through supranational adjudication," *Stan. J. Int'l L.* 42 (2006), p. 53.

57. Committee on Economic, Social and Cultural Rights, ¶15 (see note 2)

58. A. Chan, and M. Zoback, "The role of hydrocarbon production on land subsidence and fault reactivation in the Louisiana coastal zone." *Journal of Coastal Research* (2007), pp. 771-786.

59. Ibid, p. 783

60. Dubois (see note 49)

61. Tobin (see note 36)

62. Ibid.

63. Ibid; P. Farmer, *Haiti after the Earthquake*. (PublicAffairs Store, 2012).

64. Tobin (see note 36)

65. Ibid.

66. Millard (see note 8); Iwerks (see note 42)

67. N. Roc, "Haiti: the bitter grapes of corruption" *Fride, Comment* (March 2009). Available at http://www.fride.org/download/COM_Haiti_bitter_grapes_ENG_mar09.pdf.

68. Bilham, 878 (see note 39)

69. Ambraseys and Bilham (see note 40)

70. Committee on Economic, Social and Cultural Rights, ¶37 (see note 2)

71. G. L. Sills, N. D. Vroman, R. E. Wahl, N. T. Schwantz, "Overview of New Orleans levee failures: lessons learned and their impact on national levee design and assessment" *Journal of Geotechnical and Geoenvironmental Engineering* 134 (2008), pp. 556-565.

72. Freudenburg et al. (see note 18)

73. Ibid.

74. Sills et al. (see note 71); Seed et al. (see note 19)

75. Seed et al., pp. 735 (see note 19)

76. L. Sullivan, "How New Orleans' evacuation plan fell apart" *National Public Radio*. September 23, 2005. Available at http://www.npr.org/templates/story/story.php?storyId=4860776.

77. Ibid.

78. C. Colten, "Vulnerability and place: flat land and uneven risk in New Orleans." *American Anthropologist* 108/4 (2006), pp. 731-734.

79. C. McKinney, "A failure of initiative: final report of the select bipartisan committee to investigate the preparation for and response to Hurricane Katrina. Appendix 8. Supplementary report to the select bipartisan committee to investigate the preparation for and response to Hurricane Katrina. Rep. Cynthia A. McKinney" U.S. House of Representatives, 102nd Session (February 2006).

80. Iwerks (see note 42)

81. FOKAL (*Fondation Connaissance et Liberté / Fondasyon Konesans Ak Libète*). Available at http://www.fokal.org/en/.

82. Ibid.

83. Ibid.

84. Wisner et al. (2004, see note 1)