

CATEGORY 4

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Can Puerto Rico Rebuild for Greater Resilience?

By Patricia Alex

PUERTO RICO WAS ALREADY ON ITS HEELS when Hurricane Maria inflicted its destruction in September 2017. The US territory—home to 3.4 million American citizens—was bankrupt and depopulating. Nearly half the island’s housing didn’t meet code, its rickety power grid was inefficient and unreliable, and the economy was hobbled by staggering debt and a bloated public payroll.

The massive Category 4 hurricane made landfall against that backdrop, damaging or destroying most homes, knocking out telecommunications, and decimating infrastructure on virtually the entire island. Most of Puerto Rico lost electrical power for more than six months, cell service was spotty, and residents and leaders complained of poor federal disaster response.

A Harvard study published in the *New England Journal of Medicine* estimates that at least 4,645 deaths can be linked to the hurricane and its immediate aftermath—70 times the official estimate (Kishore et al. 2018).

By May 2018, power finally returned to all but about 20,000 people—albeit unreliably—and the federal government announced that Puerto Rico would receive \$18.5 billion from the US Department of Housing and Urban Development to rebuild its battered housing and infrastructure. The grant, the largest in the agency’s history, added to \$1.5 billion already committed to Puerto Rico from HUD and more than \$3 billion allocated for response and recovery by other federal entities such as the Federal Emergency Management Agency (FEMA) and the Army Corps of Engineers.

The west coast town of Rincón sustained heavy damage in Hurricane Maria. Credit: cestes001 (iStock/Getty Images Plus)

But the total falls far short of the \$94.4 billion that Governor Ricardo Rossello requested from the federal government to rebuild the island, where blue tarps—slow in coming to begin with—still draped roofs months after permanent repairs had been made to hurricane-ravaged states on the mainland.

By spring 2018, Puerto Rico was attempting to pivot—however unsteadily—from the massive response and relief phase of the disaster to mid- and long-term planning for recovery, even as another hurricane season loomed. But what will recovery look like on an island that was so compromised to begin with? How does the insolvent commonwealth, which experienced a post-hurricane exodus of an estimated 200,000 residents, address improvements in debt restructuring, tax collection, land use planning, flood control, and energy distribution?

It's still very much an open question. "It seems the planning process doesn't have a leader," Ruben Flores-Marzan, former president of the Puerto Rico's island-wide planning board, told a group assembled at Centro—the Center for Puerto Rican Studies at Manhattan's Hunter College—for a recent "diaspora summit" on rebuilding the island. "Who's in charge here?"

Six months after Hurricane Maria, sections of Utuado, in the island's mountainous interior, had no electricity. Credit: Laura Galarza/Montclair State University



The answer is still shaking out on the island—and in the corridors of power on the mainland—as community groups, developers, financiers, and government officials jockey for influence and primacy over the process.

"Lack of clarity is a big problem right now," said Robert B. Olshansky, a professor of urban and regional planning at the University of Illinois at Urbana-Champaign. "They are certainly hoping to build back better. That includes a more resilient electrical grid, a new building code, and improvements in governance and public finance, among other things. . . . I am sure that some improvements will be made, but it's far too early to tell what."

In *After Great Disasters: An In-Depth Analysis of How Six Countries Managed Community Recovery*, published by the Lincoln Institute, Olshansky and coauthor Laurie A. Johnson suggest that disaster reconstruction can offer a unique opportunity to fix long-standing problems (Johnson and Olshansky 2017).

Surely Puerto Rico, suffering from more than a decade of decline, needs a big fix and a robust plan for resiliency as the effects of climate change are likely to continue to batter the island. US government forecasters have predicted an active 2018 hurricane season with as many as nine hurricanes expected.

Planners were often ignored as Puerto Rico's infamous urban sprawl and informal rural land development proceeded apace over many decades. They are hoping for more of a voice now. "Slowly there is a realization that planning has a lot to offer, and we should be part of the process," Carmén M. Concepción Rodríguez of the Institute for Social Research at the University of Puerto Rico told the summit at Hunter, via videoconference from the island.

Flores-Marzan, who is now planner for the town of Ware, Massachusetts, hopes the island will also tap into its émigrés as it tries to recover. Nearly six million Puerto Ricans now live on the continental United States. "You see where they could be making small victories if they involved the diaspora, and they're just not doing that," he said. Still, there is hope: "We have to be hopeful because otherwise we will lose the island."



A pickup truck and a cluster of houses damaged by a storm surge remain partially submerged half a year after Hurricane Maria in Mayagüez, on Puerto Rico's west coast. Credit: Natalie De La Rosa/Montclair State University

First, Power

Restoring power is the first order of business. The prolonged absence of electricity has taken its toll on Puerto Rico, hampering recovery and exacerbating the misery on the ground. Particularly in the rural areas, people spent months powering medical equipment with noisy, polluting generators, and hauling water from streams because about half the island's water delivery depends on electricity.

"I don't know what was worse, being without power or having the generators run all night," said Ruth Santiago, whose home in Salinas was dark for seven weeks following Maria. She slept with a mask to mitigate the generator fumes.

The island's electrical grid was in trouble even before the storm. It was old, vulnerable, and inefficient when Hurricane Irma knocked out a portion of it in early September, leaving more than a million residents in the dark. The Puerto Rico Electric Power Authority (PREPA)—mired in \$9 billion in debt—was seeking bids to repair that damage when Hurricane Maria struck two weeks later, virtually wiping out the island's remaining electrical infrastructure.

Like other aspects of the disaster recovery, PREPA's rebuild has been marked by question-

able decisions and missteps, such as the early \$300 million repair contract—soon canceled amid controversy—with Whitefish Energy, a small, inexperienced utility company from Montana.

The vast majority of the island is powered by PREPA, whose hulking and rusting generation plants in the South run on fossil fuels and rely on old-school utility poles, wires, and transformers to traverse the mountainous interior in order to deliver power to populated areas like San Juan in the North. It's an outmoded and balky system, but it's being "hardened" with more hurricane-resistant replacement parts as Puerto Rico comes back on-line.

In some areas, like the town of San Sebastian, residents and town officials tired of waiting for PREPA, took it upon themselves to bypass the utility by getting a bucket truck and restringing the town's downed electrical wires. So the integrity of the repaired grid is by no means assured.

The Department of Energy estimates it will take \$17.6 billion to rebuild the system. About \$2 billion has been committed to the effort to date. Even after more than 90 percent of power had been restored to the island in early spring, Puerto Rico suffered from intermittent blackouts, underscoring the fragility of the grid.



A car parked on a partially repaired mountain road in Utuado. Credit: Laura Galarza/Montclair State University



Many of the roads in Utuado were destroyed by Hurricane Maria, and incomplete repairs created hazardous driving conditions. Credit: Laura Galarza/Montclair State University

The island's electricity is expensive too—about double the cost on the mainland—since it relies on fossil fuels that have to be imported. But the 1988 Stafford Disaster Relief and Emergency Assistance Act authorizes government agencies to restore only existing utility service. Skeptics doubt that a plan promoted by the governor to privatize PREPA will infuse the utility with the capital needed to substantially improve its efficiency. For now, it seems that renewable sources like solar and wind aren't likely to replace the grid, even on a sunny Caribbean island with year-round trade winds, because overhauling the mode of energy-transmission island-wide would require a significant public investment. Puerto Rico is broke, and Washington seems reluctant to increase its aid.

Some say political will is also lacking. "There's a thing called the oil cartel. Somebody is cashing in, and a lot of those people are very influential," said Flores-Marzan, the former planner for the island.

But a number of efforts are underway. A \$750,000 federal block grant will go to the University of Puerto Rico to develop a Resilience Innovation Program to look for innovative solutions to promote home-based renewable energy generation and energy storage. The

grant will also fund the study of community-wide resilience measures, home design, and construction methods (PRDOH 2018).

The biopharmaceutical company AbbVie recently announced a \$50 million donation to the nonprofit group Direct Relief to equip more than 60 community health centers and local healthcare facilities with solar power, battery storage, and generators, and to enable them to power pumps that would ensure clean water supply. The group will also work over the next three years to rebuild the battered medical supply chain and fund telemedicine programs at select hospitals and health centers.

And there are smaller, grassroots initiatives pending. "Municipalities are tired of waiting for PREPA, so a lot of the push for resiliency and energy independence is coming from them," said Flores-Marzan.

A group called Resilient Power Puerto Rico is fundraising to bring solar microgrids to the island and recently received a \$625,000 grant to bring solar to 200 community centers.

If the PREPA grid failed, the microgrids could be used to power essentials like water pumps and medical devices. "We are rebuilding in a grassroots way. We're not challenging or replacing PREPA" said Jonathan Marvel, a New York architect who leads the group.

With some funding from nonprofits on the mainland, Santiago and her neighbors in Salinas, who live in the shadow of two smoke-belching PREPA plants, are also working on plans for community-based solar micro grids that can at least provide a backup for essential services like water pumping and running medical devices, should PREPA power fail.

"PREPA is the provider of power to 95 percent of the island, but we want it to change its way of distribution. It's not in the best public interest to do it the way it was done before," said Santiago, a lawyer who lived in The Bronx before returning to Puerto Rico. "Developing energy infrastructure at the community level is not an easy thing to do, but we don't have a choice. The old grid is unreliable—it's killing us in the South."

Recovering While Broke

Puerto Rico's economic crisis looms large over any long-term planning and recovery efforts. Just four months before Hurricane Maria, the commonwealth declared a form of bankruptcy as it struggled under more than \$74 billion in debt and \$49 billion in pension obligations. The combined \$120 billion debt made it the largest municipal bankruptcy in the United States, dwarfing Detroit's \$18 billion filing in 2013.

The territory's cash solvency and liquidity problems and austerity measures imposed through economic and fiscal reforms inhibited its ability to provide services, notes Lourdes Germán, director of International and Institute-Wide Initiatives at the Lincoln Institute. "This dynamic significantly contributed to the humanitarian crisis that was building before the disaster and clearly continues," she said.

Beginning in the 1970s, the island's government had become more reliant on debt financing, and that crisis continued to unfold for decades. The bonds securing that debt—however risky—were easy to sell because they were exempt from federal, state, and local taxes

thanks to a provision in the 1917 federal law that also granted Puerto Ricans American citizenship.

"People who invested in Puerto Rican bonds didn't look at the credit risk. They just looked at the fact that they could get a high interest rate," said Desmond Lachman, an economist and senior fellow at the American Enterprise Institute (AEI). "Puerto Rico didn't have trouble borrowing money. Until it did. It kept borrowing until the music stopped, and that's where we are now."

Despite this common perception, Puerto Rican securities continue to trade, even a year after the island entered its de facto bankruptcy. The market activity among investors demonstrates that the risk profile is affecting the pricing and trading activity around the securities and resulting in new patterns of investor interest and segmentation. These factors will influence the island's ability to attract outside capital and investment as well as the cost of capital, according to Germán. "The trading activity continues because there is a secondary market. Investors are looking at these securities and pricing risk while evaluating the potential for returns. Last April, for example, Bloomberg reported that Puerto Rico's bonds emerged as a top performer in the US municipal market—gaining more than any other dollar-denominated debt in the world," she explained.

Tax-supported debt is now 55 percent of the Gross Domestic Product in Puerto Rico, as opposed to the US average of 2.67 percent according to figures released in April by the Financial Oversight and Management Board for Puerto Rico. The island is confronted with ever more volatile and challenging capital markets while it works through its bankruptcy, and opinions vary regarding how best to resolve the stalemate with investors.

AEI's Lachman, for one, is unequivocal. "The debt has to be written down big time. That's just basic math," he said. "Creditors didn't do due diligence when lending, so I don't see why we should feel sorry for them or ask taxpayers to foot the bill when the creditors also messed up."

Debt in the Aggregate

Puerto Rico accumulated unsupportable levels of debt in the form of general obligation bonds, which are secured by the territory government's full faith and credit, and revenue bonds, which are secured by specific revenue sources, such as fees or specific taxes. Puerto Rico's constitution provides guarantees for general obligation bonds.

"The heart of the problem is an inability to support their general obligation-backed bonds, which are subject to constitutional protection," Germán explained. "And then you have the added problem of revenue bonds, which have been issued by over a dozen separate public and quasi-public entities in ways that are not sustainable. Puerto Rico's revenue debt is secured by many different revenue sources—including, for example, sales taxes—which could have otherwise been used to fund current government operations. This combination was a recipe for disaster."

Historical Context

Critics blame a bloated public sector, mismanagement, and corruption, but many believe the roots of the crisis lay in the island's colonial history. Puerto Rico has had an often-fraught relationship with the federal government since the former Spanish colony was ceded to the United States at the end of the Spanish-American War in the late 1800s.

Puerto Ricans were granted American citizenship in 1917—just in time to serve as US forces in World War I. In 1920, the Jones Act required all goods ferried between US ports to be carried on ships built, owned, and operated by Americans. The mandate makes shipping more expensive, especially in Puerto Rico, where most commodities—even those needed for disaster relief—must be imported.

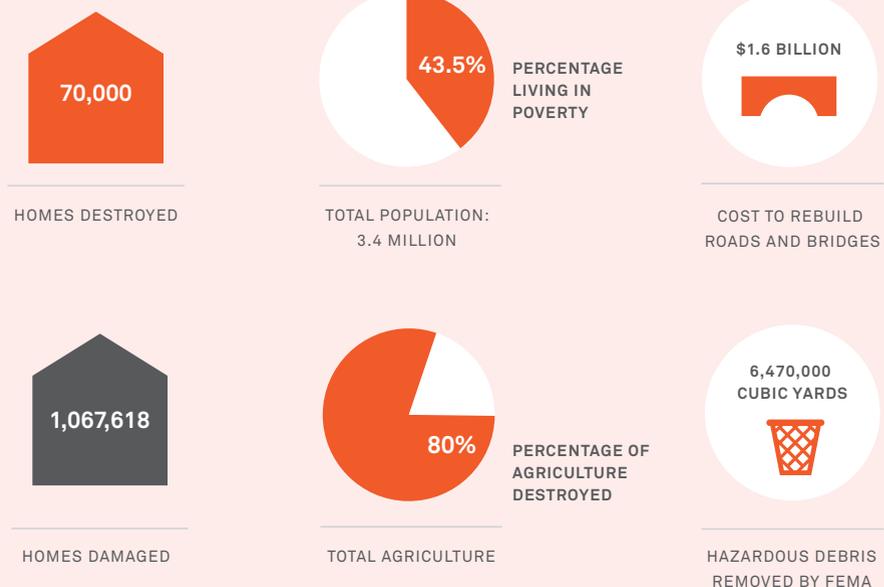
In 1996, the federal government began a 10-year phase-out of corporate tax breaks—Section 936 of the tax code—that were designed



This road in Mayagüez, on Puerto Rico's west coast, remained unrepaired six months after it was damaged by the storm. Credit: Natalie De La Rosa/Montclair State University

Table 1
Post-Maria Puerto Rico
by the Numbers

Source: PRDOH 2018.



to spur manufacturing growth on the island. Puerto Rico lost 40 percent of its manufacturing jobs in the subsequent decade ending in 2006, according to the Bureau of Labor Statistics.

The island's tax base shrank, and the next blow came in fairly quick succession with the dawn of the Great Recession of 2008. Puerto Rico's government continued to borrow to meet its obligations, and many of the island's most employable citizens—the young and healthy—emigrated in large numbers to the mainland United States.

From a 2004 high of 3.8 million, the population in Puerto Rico fell to about 3.4 million last year (Table 1), and it is expected the island will lose nearly half a million more residents by 2023, according to the Financial Oversight and Management Board for Puerto Rico (FOMB 2018). The board was created by Congress under the Puerto Rico Oversight, Management and Economic Stability Act (PROMESA) signed into law in June 2016.

The oversight board paints a grim picture for the island's economy in the near term: fully 100 percent of the Gross National Product this year will come from the expected \$62 billion in public and private disaster relief.

The panel in April approved a series of austerity measures aimed at "aggressive structural reform" in Puerto Rico, such as scaling back employee benefits unheard of on the mainland, like mandatory Christmas bonuses and allowing for "at will" employment. The recommendations also included loosening labor laws and implementing pension and welfare reform. Critics say the "reforms" are punitive and rely on unrealistic growth projections. As economic policy, they say the austerity measures are the last thing Puerto Rico needs as it struggles to recover.

"Can Puerto Rico be rebuilt under that plan? Not much," said Carlos Vargas-Ramos, director of policy for Centro.

But proponents say it's the best way to address the underlying fiscal crisis so the island can move forward. "From a community planning point of view, we are in the crossfire. . . . At this moment, the big question is, 'What is going to happen with this government and the debt?'" said Frederico Del Monte Garrido, a government planner, vice president of the Puerto Rican Planning Association, and Hunter summit attendee. "The principal point is we need to accept this fiscal plan."

One factor clouding Puerto Rico's prospects has been its inconsistent classification under US law as a territory. Some past court decisions and US policies have treated Puerto Rico as a foreign jurisdiction and excluded it from certain sections of the US Code, Germán noted. "Part of what has made this very difficult is that our own laws are unclear. For example, Puerto Rico was not authorized to seek protection under the part of the US bankruptcy code, Chapter 9, that provides relief for some insolvent governments, and it's unclear why it was excluded. PROMESA attempted to fix some of these issues, providing Puerto Rico with a remedy similar to Chapter 9 to enable it to adjust the debt problems that are at the heart of its insolvency."

Taxation and Land Use

The panel also recommended implementing tax initiatives that many experts believe are essential to righting the ship. They include creating a unified payment system, reducing corporate taxes with the goal of increasing investment, broadening the tax base, and improving compliance.

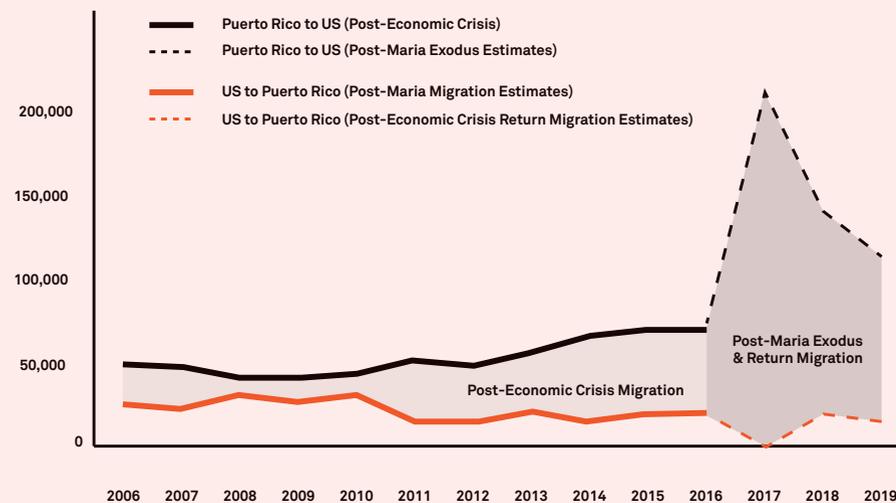
Puerto Rico's chaotic land development has, of course, led to a haphazard system of property taxation. In many rural areas, land has been handed down for generations, and there is no paperwork or deeds—a barrier for as many as 60 percent of the 1.1 million claimants seeking FEMA aid, according to the financial oversight board.



Families gather at the edge of the broken boardwalk in Cabo Rojo. Credit: Laura Galarza/Montclair State University

Figure 1

Post-Maria Migration from Puerto Rico to the United States (2006–2016 and 2017–2019 Estimates)



Note: Lower bound estimates are double the lowest number of migrants registered during the prior three years. Upper bound estimates are three times the highest number of migrants registered during the prior three years. Since the American Community Survey estimates are based on random sampling of the population, the smaller the numbers reported in this table, the larger the margin of error for the estimates.

Source: American Community Survey, various years.

By some estimates, as many as half of Puerto Rico's 1.6 million housing units may have been constructed "informally"—an umbrella term that includes illegal subdivisions. Entire communities grew informally, such as Villa Hugo, a makeshift settlement of 6,000 residents who were forced from their homes by an earlier hurricane, for which the community is named.

Most of the informal homes don't have insurance of any kind. Many don't have addresses and don't show up on the tax rolls. An equitable property tax base—a staple of healthy communities—is absent in many parts.

"They haven't done a great job in capitalizing on land value," said George W. McCarthy, president and CEO of the Lincoln Institute. "They've done a very poor job of even collecting property taxes."

By improving land registration systems, establishing property values, and enforcing taxation, Puerto Rico can tap an important revenue source needed for rebuilding, he said.

The fiscal oversight board found no workable assessments for "tens of thousands" of properties on the island and estimated that more than \$800 million could be raised by improving tax compliance, registering properties not on the rolls, and capturing back taxes.

The issue is critical, said Flores-Marzan. "It's an immense problem and an important issue to address right now," he said. "A lot of lawyers in Puerto Rico—people with the skills to address this problem—are probably out of work now."

Over the next five years, the nonprofit housing group Habitat for Humanity International, which also received a \$50 million grant from AbbVie, will partner with families to repair and rebuild housing and to address so-called "land tenure" issues that have substantially hindered housing recovery, said Bryan Thomas, head of public relations for the Georgia-based group. "A large portion of the housing was built without clear title, and that has caused huge delays," said Thomas. Habitat will also work with government officials to look for ways to address the problem on a systemic level, he said.

Thomas said Habitat encounters similar issues in many of the less-developed countries where it builds. "Puerto Rico is in many ways sort of a hybrid—it's part of the US but doesn't operate under the same systems or laws," he said. Habitat also plans to train construction workers, since many left the island as the economy plummeted.

McCarthy said Puerto Rico could also benefit from the creation of more public land bank authorities as it grapples with what to do with tens of thousands of abandoned properties. Such mechanisms helped rebuild in Japan and Germany after World War II and more recently in Detroit, he said.

Land banks aggregate and pool property and then design more efficient use. They can promote economic development by leveraging loans and grants for an area. The public Detroit Land Bank Authority owns about 100,000 pieces of property in the city, much of which was in foreclosure.

When Maria hit, Puerto Rico was already in the midst of a foreclosure crisis, with rates that were three times higher than on the mainland. Tens of thousands of properties have been abandoned, and there are an estimated 40,000 vacant properties in the San Juan area alone, planners say. San Juan created a land bank for its most densely populated neighborhood, Santurce, in 2016 (Vélez 2016).

Puerto Rico will also need to demolish or repurpose hundreds of school buildings.

A quarter of the island's schools have been shuttered because of the exodus to the mainland. The territory's education department this spring announced plans to close another 265 schools. This would leave Puerto Rico with one-third fewer public schools than it had at the outset of the 2017–2018 academic year, potentially accelerating the out-migration (Mazzei 2018).

"I don't see a path forward unless they can rationalize their land use," said McCarthy. "It all hinges on effective leadership. It's going to require somebody who is both charismatic and visionary."

But the path seems anything but clear-cut on the ground. "Everything in Puerto Rico has become really complicated. There's a perception of an anarchic environment," David J. Carrasquillo-Medrano, president of the Puerto Rican Planning Society, told a panel at the recent "diaspora summit" in Manhattan. "The narrative of the government is that Puerto Rico is a blank slate, and you can go do what you want to do," he said, referring to the courting of developers. "In Puerto Rico, it's not that we don't have planning; it's that there's no real estate regulation."



The tourist town of Cabo Rojo, in southwest Puerto Rico, was forced to fend for itself in the storm's aftermath, as the Puerto Rican and federal government were slow to respond. Credit: Laura Galarza/Montclair State University

Housing, Infrastructure, and the Return of the Cruise Ships

Many planners are deeply concerned that desperation and expediency will upend any planning already in place and thwart innovative rebuilding in Puerto Rico. Zoning and planning vary across the island. Del Monte Garrido said much of the reconstruction in poorer areas has been makeshift. Flores-Marzan said there are island-wide zoning codes and plans in place in 30 of 78 municipalities, but enforcement often is lacking, as is regional planning.

In 2011, Puerto Rico adopted a uniform building code that required structures to be built to withstand winds of up to 145 miles per hour. But most homes on the island were built informally before then.

To date, there are few concrete plans for new housing; an "action plan," drafted by the federal government when it awarded the Community Development Block Grants, was more a statement of need than a plan. There are enormous price tags for righting the island: \$375 million for debris removal, \$1.5 billion to repair and rebuild roads and bridges, \$8 billion for public buildings.

Puerto Rico is poor: before the storm 43.5 percent of the population lived below the poverty line. The island is home to the second-largest US public housing authority, with over 55,000 units across 340 properties. More than a quarter of those units were damaged, and initial damage claims totaled over \$119 million in public housing alone.

In all, a million homes were affected by the storm; 472,000 sustained "significant damage" and 70,000 homes were completely destroyed, according to government estimates. The preliminary federal action plan estimates that rebuilding for greater resilience could cost \$34.3 billion.

Foundation and nonprofit funding could be important. Groups like the Resilient Puerto Rico Commission, supported by the Rockefeller and Ford foundations, have been working with community groups to assess the damage and look for sustainable solutions. Rockefeller also has supported an island-wide public engagement campaign called Reimagine Puerto Rico. Still, many feel ignored after a lagging federal response and much confusion in the aftermath of Maria.

"I represent the people, and nobody is listening to us. We're still being told 64 people died, and it's over 1,000," said Rev. Jose Antonio Oquendo, growing visibly agitated during a discussion at the summit at Hunter. Oquendo is a Catholic priest in the diocese of Caguas, and his parishioners had no electricity or running water for six months. "We say on the island that it is going to take us 10 years to set up again."

Carrasquillo-Medrano, who heads the Puerto Rican Planning Society, said too much information is missing, such as accurate flood maps, to make informed planning decisions. And he cautions about the rush to build rather than rehabilitate housing. "We don't need new homes; we have 326,000 vacant units on the island."

Storm-damaged house in Adjuntas, a town of roughly 20,000 in the interior of the island. Credit: Babe Garcia/Montclair State University



Most planners agree that communities will probably have to be relocated from areas particularly vulnerable to the flooding and mudslides that affected the mountainous interior and coastal lowlands of the 35-by-100-mile island. More than 50 rivers and 60 watersheds surged with flood waters when Maria hit, according to the government.

Agriculture has nearly been wiped out and industry is flagging, but tourism is rebounding. Puerto Rico resumed cruise operations just two and a half weeks after Hurricane Maria, and 1.7 million passengers are expected for the 2018–2019 season, according to forecasts included in the federal government action plan. Traffic at the Luis Muñoz Marín airport is expected to reach pre-Maria levels this summer. And most hotels are back in business; the government estimates that the tourism sector has spent or planned for \$1.9 billion in new developments and renovations.

McCarthy points to Puerto Rico's estimable amenities—it is a Caribbean island after all—and said perhaps the island can look to New Orleans and Detroit, which have stabilized, if not rebounded, from decline and calamity. "It's not like Puerto Rico is going to stay vacant for long. The question is, who is going to develop it?" said McCarthy. "Can you build a thriving economy in Puerto Rico beyond tourism?"

At the recent summit in Manhattan this spring, panelists and attendees seemed humbled by the work ahead. "We still need a lot of information. There is still a sense of the enormity of the task at hand," said Hunter College's Vargas-Ramos. "Rebuilding Puerto Rico is going to take decades, so we need to think short-term, medium-term, and long-term." □

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