



OXFAM REPORT

THE WEIGHT OF WATER ON WOMEN

THE LONG WAKE OF HURRICANE MARÍA IN PUERTO RICO



OXFAM

AUTHOR INFORMATION AND ACKNOWLEDGMENTS

This document is based on a report from a team of researchers who worked together in Puerto Rico in early 2018.

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OXFAM AMERICA'S PROGRAM IN PUERTO RICO

On September 20, 2017, Hurricane Maria dealt a devastating blow to Puerto Rico. The damage to the island was widespread, and deep. For months, people struggled to survive day to day: power was out, water was unreliable, food was scarce, roads were impassable, and communication was difficult if not impossible.

Oxfam began a program to respond to the emergency needs of the people, largely through supporting local organizations and leaders who had the most profound understanding of the communities and the nimblest capacity to respond effectively.

A year later, conditions on the island are improving, but there is a long way to go. Oxfam continues to work on programs that support long-term recovery and resilience.

Oxfam is particularly concerned with empowering the most vulnerable, especially in bolstering their resilience and preparedness in anticipation of further climate disasters. We work in poorer communities in the rural highlands, and we focus on women, children, the elderly, and the disabled.

METHODOLOGY

Oxfam worked with researchers from the University of Cambridge (UK) and the University of Puerto Rico over the course of two weeks in early 2018. The team used a mixed-methods approach of focus group discussions (FGDs) and interviews with 119 participants from eight municipalities, as well as observations by the researchers. In the FGDs, organized by community leaders, the genders were kept separate to provide a safe space for sharing potentially sensitive information among the participants.

The data collected allows for both qualitative and quantitative analysis. Qualitative data was analyzed for content, both at a basic level—describing what was said by the women and men—as well as at a latent level, allowing for a more interpretive analysis to understand why something was said.

The research aimed to answer questions around gendered impacts of Hurricane María on practices around water, sanitation, and hygiene (WASH) in rural Puerto Rico.

The full report, *Identifying and analyzing the gendered impacts of Hurricane María on WASH practices in rural communities of Puerto Rico*, is available on the Oxfam website. Please refer to: www.oxfamamerica.org/WASH-gender-Puerto-Rico.

THE WEIGHT OF WATER

“BEING WITHOUT WATER IS TOTAL CHAOS.”

—*Woman in Algarrobo, in the municipality of Aibonito, without water for five months*

Hurricane María underscored that natural disasters deliver a disproportionate blow to women. In Puerto Rico, the disruption of modern water and electrical infrastructure cast this phenomenon into stark relief: as households lost the most basic services, it fell more to women to do the arduous labor of caretaking and maintaining households without water and power. In the rural highlands, Oxfam found women shouldering extraordinary physical, financial, and emotional burdens—but also leading the way to new approaches to sustainable and resilient alternatives.

Water is perhaps the most elemental need for individuals—and for households. It’s vital for drinking, cooking, laundry, personal hygiene, toilets, and more. In developed countries, people rarely consider what it means to have a water system inside the home—and what it would mean to lose it. The average person in the US uses 80–100 gallons of water each day, at a weight of roughly 800 lb.¹ Imagine if each person had to find, transport, and filter that amount of water each day. Now imagine doing it every day for weeks and months.

That is what happened in Puerto Rico in 2017, when Hurricane María knocked down the aging power grid and disabled water systems across the island. In the weeks following the storm, millions of people were left without reliable access to potable water.² In many communities, especially in the central highlands, it was months before the water came back.

As the crisis dragged on, Oxfam, which had mounted an emergency response effort on the island, wanted to find the answers to some urgent questions: How did the sudden loss of water impact daily life? More specifically, did the sudden loss of water supply affect women differently from men?

The answer, it turned out, was simple: Yes. In fact, the impact was substantially disproportionate for women. Because women are usually managers of the household—responsible for taking care of people and domestic systems—they were the ones who shouldered most of the burdens of managing water needs. Men did indeed feel the pinch—especially around finding and transporting water—but they were typically not the ones carrying the full physical and emotional weight of managing all the household demands.

Women were usually the ones who spent hours wringing sodden towels by hand and hanging them to dry, carrying containers of water into the kitchen, bathing children in buckets, or washing floors with rainwater collected in cans. It was exhausting, and demoralizing. In dozens of conversations and focus group discussions, every person said that being without water was much worse than being without power—and that the worst thing about it was, simply, “todo” (everything). Many people emphasized that “water is life,” and that without it, life slowed to a long, smelly, arduous crawl. An ordeal that could, in fact, be dangerous and even life-threatening.

“It was like somebody got a four-by-four and just whacked us,” says María Concepcion, program director of Oxfam in Puerto Rico, in describing the impact of María on the island. “We’re all still so exhausted.” Another woman, an attorney who helps low-income residents in applying for reconstruction help, notes, “The whole island is living with PTSD” [post-traumatic stress disorder].

At the same time, though, the women of Puerto Rico showed remarkable strength, resilience, inventiveness, and community devotion in the wake of the hurricane. While they were weighed down by the physical and emotional burdens, they also devised innovative solutions, cared for extended families and multiple households, and retained a spirit of humanity and humor. As Martha Thompson, Oxfam program director of the emergency response in Puerto Rico, says, “In Puerto Rico, people have an unusual degree of generosity and solidarity. The sense of community survived the disaster intact—and helped many families endure.”

WOMEN IN THE WAKE OF DISASTERS ACROSS THE WORLD

In nearly every society, women bear more of the responsibility for caretaking, of both the home and the family.³ They manage household needs (such as laundry, cooking, and cleaning), and they take care of children, the elderly, and the ill and disabled (ensuring that everyone has food, water, shelter, and health care).

When disasters strike, it's been shown that gender inequalities are reinforced, perpetuated, and increased.⁴ Moreover, these gender disparities extend beyond the acute phase of the disaster, to long-term recovery periods.⁵ Much of the reason lies in the impact on home life. Disasters create circumstances that require women to spend extra time in unpaid domestic work.⁶

At the same time, ironically, it's common to see a cultural expectation in the wake of disaster that says men will rescue and protect women.⁷ In fact, women may find themselves more dependent on men than previously.⁸ Men have more upper-body strength, more access to vehicles and tools, and higher levels of employment and income.

In an interesting twist, it sometimes happens that women in more-developed regions end up even more disproportionately impacted after a disaster. "Development" usually includes access to modern systems such as indoor plumbing of potable water, reliable supply of electricity, and access to health care treatments that control chronic diseases. A disaster tears through these essential systems—and puts women to work, doing arduous and relentless tasks to fill in for the conveniences. In one simple example: when the washing machine fails, women usually have to spend hours scrubbing laundry by hand, wringing it out, and hanging it to dry.

In a basic sense, a disaster reverses the advances of development, and reverses progress for women as well. What happened in Puerto Rico in the wake of Hurricane María illustrates this phenomenon.⁹

HURRICANE MARÍA IN PUERTO RICO

In September 2017, Puerto Rico was hit by the one-two punch of Hurricanes Irma and María. The island suffered catastrophic direct physical losses, damages, and suspension of services, including the electrical system (generation, transmission, and distribution), and water-treatment facilities and wastewater infrastructure islandwide.

Five months after Hurricane María, when the initial research for this report was conducted, water service in many communities was still not restored.¹⁰ As of this writing, in September 2018, water has been restored in most communities. However, the power grid and the water system continue to be fragile;

Women were usually the ones who spent hours wringing sodden towels by hand and hanging them to dry, carrying containers of water into the kitchen, bathing children in buckets, or washing floors with rainwater collected in cans. It was exhausting, and demoralizing.

supplies of both electricity and water are frequently interrupted, and many people refer to their anxiety that another major storm could easily inflict similar damage.

While, at this point in Puerto Rico's history, power and water are available to nearly all households, these systems are relatively recent in some areas¹¹ (where services arrived in the 1960s or 1970s). Elderly men and women often mention that the conditions after the hurricane reminded them of the realities of life years ago. One older woman says, "Elderly people lived in a time when there wasn't water, so we knew what it was like. It was very hard [after the hurricane] for young people to cope." Another older resident says, "It brought back memories of my childhood, when we'd go to the river to do the washing."

The literature about historic gender relations in Puerto Rico (especially in the central mountainous regions) paints a picture of a patriarchal society in which women take on the role of the family's "backbone." The tasks that these women do most often—associated with caregiving and domesticity—are often water-intensive.

To determine how lack of access to water affected households and communities, Oxfam interviewed well over 100 women and men in Puerto Rico in early 2018. In general, women reported problems that hit more frequently and more deeply than did men. They spent much more time and effort doing household maintenance work: laundry, cleaning, and cooking. They also took on worries about the water supply in the household: the uncertainty of water availability, and the need to allocate limited water carefully and effectively. In addition, women took on much more work in taking care of others: children, the elderly, the bedridden, and the disabled; in some cases, the amount of additional work was overwhelming (for example, the need to wash sheets every day).

Men were more likely to be responsible for tasks that aligned with gender stereotypes, often relying on strength, tools, or machinery. They found and retrieved water from an outside source, loaded it into containers, and helped transport it around the house.

WHAT HAPPENS WHEN WATER SYSTEMS FAIL?

CHALLENGES FACING HOUSEHOLDS WHEN WATER SERVICE FAILS

- Obtaining and storing sufficient water for the household: Finding, evaluating, and transporting water to the home, and moving it around within the house.
- Ensuring potable drinking water: Using bottled water; chlorinating, boiling, filtering water.
- Doing laundry: Washing, wringing, moving, and drying clothes, sheets, and towels.
- Personal hygiene: Bathing/showering, hand-washing.
- Cooking and cleaning up afterward.
- Toilets: Minimizing odors, keeping clean, flushing, managing water.
- Housecleaning: Washing surfaces, bathroom and kitchen, floors.
- Bearing additional financial burdens, especially in the face of reduced income.
- Ensuring water for animals.

IMPACTS ON PHYSICAL AND MENTAL HEALTH

Research participants reported a wide range of health issues related to the shortage of water, among them:

- Persistent and acute pain in the back, shoulder, and knee, as well as muscle spasms—all related to increased physical work, especially carrying water.
- Exacerbation of existing conditions, especially arthritis, osteoporosis, fibromyalgia, and serious back conditions, also related to increased manual work and physical strain (especially carrying water and washing clothes by hand).
- Extreme fatigue.
- Skin conditions (dermatitis, allergies, rashes, and itching), related to washing clothes by hand, and to showering with rainwater (or contaminated water).
- Urinary infections related to limited water consumption, infrequent showering, and insufficient laundering.
- Gastritis related to unsafe water.
- Depression, anxiety, and stress related to the aftermath of Hurricane María, as well as anxiety about future hurricane events.

After Hurricane María struck the hilly town of Comerío in the rural highlands of Puerto Rico, Olga Labrador Maldonado (l) and her husband endured four months without water, and seven and a half months without power. Olga says that during these months, “no fue nada fácil” (not a thing was easy).

In August 2018, Oxfam’s Pamela Silva (r) visited Olga at home to show her how to use a bucket washer (see page 12), and how to make tablets to disinfect the toilet.
Mary Babic / Oxfam



“NO FUE NADA FÁCIL.”

“NOT A THING WAS EASY.”

—*Olga Labrador Maldonado, four months without water, seven and a half months without power*

As she relates the details of how difficult it was to survive without water for four months after Hurricane María, Olga Labrador Maldonado tears up frequently. She recalls the relentless process of trying to obtain water: to get it delivered to her house from the truck passing by, or to retrieve it from the community “oasis” (a central supply in town, usually located in a truck or cistern). Sometimes, she says, water was delivered to people who had money and access to communications. One time when she and her husband heard the truck going by, they yelled for it to stop—but it went by their house without pause. As she relates this moment of frustration and powerlessness, Olga begins to cry; at that moment, their water reserve was very low, and they feared running out.

Olga, 67, lives with her elderly husband in the hilly town of Comerío in the central highlands of Puerto Rico. She suffers from acute arthritis, which makes it difficult for her to walk or stand; he has prostate cancer, which impedes him from lifting anything heavy. Their daughter lives in the US, where her young daughter has access to vital medical care; their son passed away. What bothers Olga most today is the sense of isolation from her family and community; “We’re old and alone,” she says.

After the hurricane, Olga and her husband endured four months without water, and seven and a half months without power. During that time, Olga says, “no fue nada fácil” (not a thing was easy).

Laundry was a major challenge. “I would spend hours and hours doing laundry,” she says. “Then a little rest, then start again.” She notes, “I cried when I had to wash laundry; I cried and cried. I tried sitting down, and standing up, but it was all a tortura [torture].”

The pain in her hands prohibited her from rubbing the washing with her hands, so she used a brush to scrub laundry. “It caused me so much pain, I just couldn’t move,” she says. She would leave laundry to soak, then shift it to another tub with cleaner water to rinse. It was very difficult to wring the clothes, but she and her husband squeezed the water out. She hung laundry on the railing, and flipped it over again and again to get it exposed to the sun.

She relates with a smile that she did not wear light or white clothes for months on end, but instead wore dark colors to hide the dirt.

When Oxfam staffers demonstrate a manual washing machine made from two buckets and a plunger, Olga is surprised and delighted. “Why didn’t you teach me this before? You should show this on TV.”

Managing the household day to day without water became daunting, if not impossible. Immediately after the hurricane, Olga bought three bottles of Lysol; she used wipes and Clorox to keep counters clean, and a Swiffer to clean floors. She kept a plunger in Clorox in an effort to keep it clean; still, the toilet became very smelly.

It was also difficult to cook—and to store food. Olga says they ate a great deal of canned food, such as corned beef and tuna. To bathe, she put water in a bowl, and then threw it on herself.

She also recounts how long and uncomfortable the days became. Although it was consistently hot and humid, there was no way to run fans or air conditioners; she had a small battery-operated fan that helped, and she’d lie down on wet towels. Without power, there was no TV, no internet, no radio; she did jigsaw puzzles to keep herself occupied.

Olga, who suffers from sleep apnea, was unable to run the CPAP (continuous positive airway pressure) machine for several months; she reports that she “dormía muy poco” (slept very little) throughout those months.

Like many Puerto Ricans, Olga is grateful for what she didn’t lose from the storm; her house is mostly intact, and she now has water and power. However, also like many people, she and her husband live in fear of another hurricane. She says that her husband was always afraid of flying; now he’s so afraid of hurricanes that he wants to fly away.

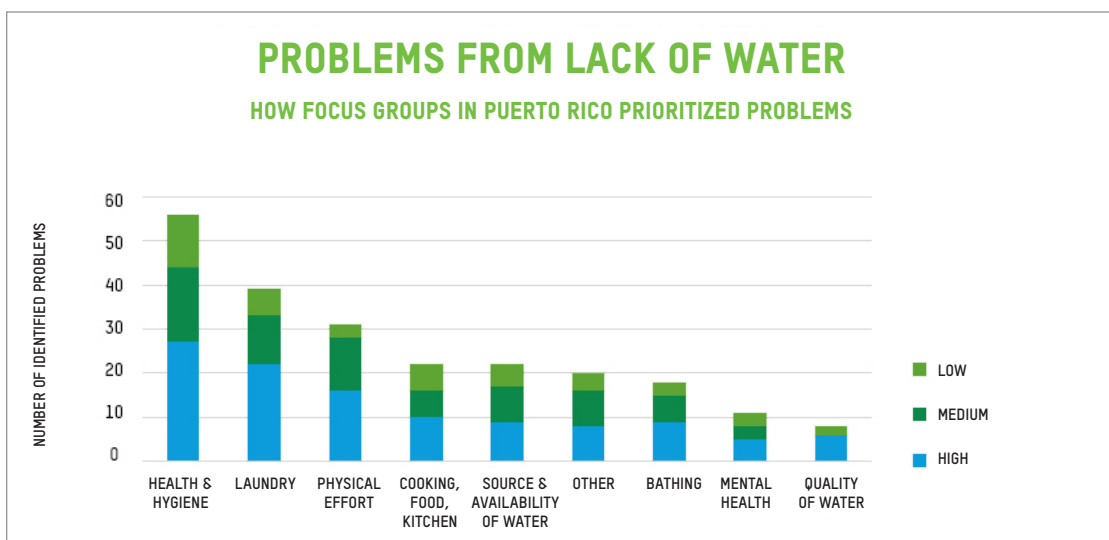
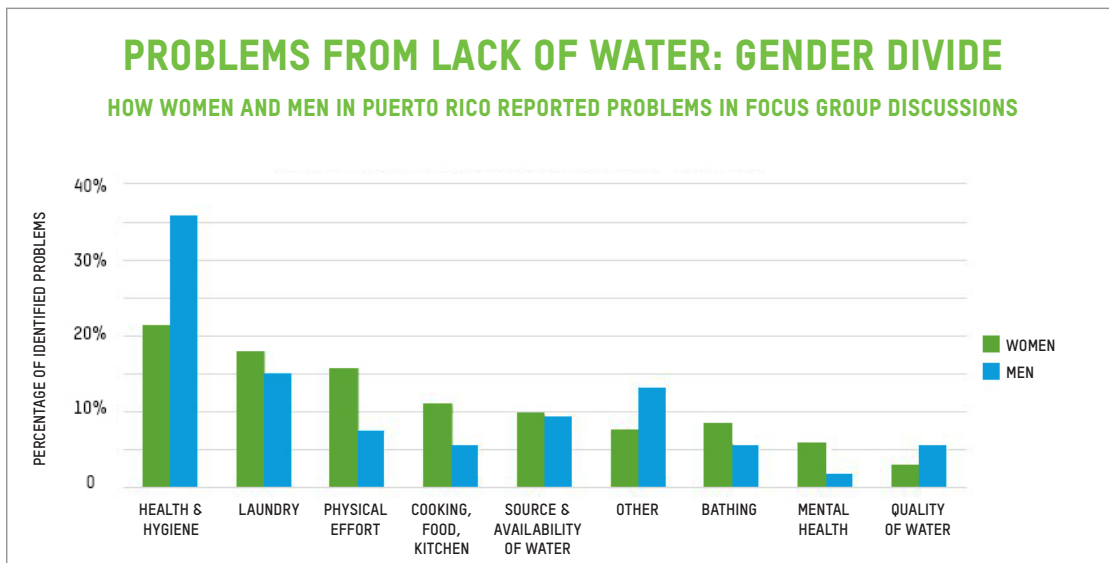
WITHOUT WATER, CHAOS

After Hurricane María knocked down the power grid and halted the water supply in Puerto Rico, households that had previously enjoyed the benefits of indoor plumbing were suddenly cut off. You could no longer turn the tap and get any water, clean or otherwise. The impact was immediate; the work was overwhelming; and the duration stretched into weeks, and then months.

The first task was searching for, finding, collecting, and transporting water back to the household. Then moving it around within the house—including storing it, and setting up for showers, cooking, cleaning, and toilet flushing. Then doing chores, such as laundry, by hand. Then testing the quality of drinking water, and, if necessary, filtering. Finally, managing the supply of water: rationing, refilling, and storing.

While these tasks fell to both genders, it was hardly an equal divide. Men tended to do tasks outside the home that involved vehicles and upper body strength. Women tended to do tasks at home, with “old-fashioned” methods that were physically demanding and time-consuming.

In the focus group discussions, a disproportionate impact became clear.





Millie Reyes and her husband Eduardo consider themselves fortunate in many ways, even though the hurricane hit them hard and left them without water for five months and without power for seven months. When asked to describe what was the worst aspect of the time without water, Millie replies, “todo era lo peor” (everything was the worst).

Not only did they struggle to maintain their household (in the hilly town of Comerío) without water, they also had responsibility for the household nearby where Eduardo’s elderly father (94 years old) and sister (69 years old and suffering from schizophrenia) live. Every two days Eduardo and his brother got water from the oasis truck and carried it in buckets to their house.

Millie and Eduardo prepared for the hurricane by filling their pool with water, and they stockpiled supplies. They devised a variety of solutions to a host of problems. They made a rudimentary shower by attaching a spigot to a large plastic detergent container and suspending the container over the bathtub. To make it easier to agitate wet laundry in a bucket, they drilled holes in a soda bottle and attached a broomstick; they also had access to an industrial mopping bucket with a lever that made it easier to squeeze water from the laundry. (l) Elizabeth Stevens / Oxfam (r) Mary Babic / Oxfam



Families stored water in any containers they could find, from old detergent bottles to paint buckets.

Water can easily become contaminated while being stored. Many people reported chronic problems with skin rashes, gastritis, allergies, and more.

Pamela Silva / Oxfam

THE DAILY GRIND

“I ALMOST CRIED EVERY TIME [I HAD TO GO GET WATER].”

—*Woman in a hill town that lost water for four months*

During interviews and focus group discussions, women and men identified a wide range of daily tasks made enormously challenging by the lack of running water. These challenges are listed here, and are described in terms of specific challenges, problems, how people coped, and recommendations.

OBTAINING SUFFICIENT WATER

Before the hurricane, most households in Puerto Rico enjoyed indoor plumbing and reliable running water.¹² When the electricity and the water failed, the roughly 3.3 million people on the island faced an immediate crisis. Because water is absolutely vital to a household, the first and primary challenge was to make sure there was a consistent supply.

PROBLEMS

The work of finding, collecting, and transporting water fell to men more than women, but women sometimes went by themselves or accompanied men to the water source.

Both genders report that getting water was time-consuming, stressful, inconvenient, and arduous; many people suffered from back and shoulder pain from carrying heavy loads of water. One woman says, “I almost cried every time I had to do it—because it was a lot of work for something so basic [getting water].”

In addition, no matter the source of the water—springs, rivers, community delivery—the quality was suspect. Any exposed water was vulnerable to contamination, especially from animals that died during the hurricanes. Bacterial waterborne diseases became more common; one estimate is that 26 people died of leptospirosis.¹³

HOW PEOPLE COPED

People located water in a variety of places: clean water provided by the community; open water from rivers, streams, or ponds; and groundwater from springs or wells. Many people drove to a water source, loaded up containers, and delivered them to homes. Some said they always carried containers in the car, in case they came across water while driving.

One woman reports that, twice a week, her husband woke up early in the morning, drove to the water source, and brought water home before going to work—three roundtrips each time. Another woman says her family spent one to two hours on each trip to the community “oasis” (a central supply in town, usually located in a truck or cistern).

Natural water sources. People retrieved water from streams and rivers, especially for cleaning and washing clothes. In some cases, people installed pipes in a mountainside where they would find a spring.

Rainwater. Many people collected rainwater in any available containers, and used it for household activities (except drinking, cooking, and sometimes bathing). One family in the town of Comerío was fortunate to have a pool in their backyard; they filled it with clean water in anticipation of the storm. Once the pool was emptied, they let it fill with rainwater, which they used for household tasks.

Water from the municipality. In many communities, the municipality delivered water. The trucks sometimes delivered directly to households, filling containers (such as water tanks and buckets), or they created an “oasis” by positioning the truck in a central location or filling a community water tank.

However convenient, trucks carrying water did not come close to filling the need, as the deliveries were infrequent. Households were often without water, especially poorer ones that did not have water tanks capable of storing sufficient quantities. Moreover, the trucks sometimes parked in locations that were inaccessible for people with disabilities and for the elderly; it was nearly impossible for these people to carry heavy loads of water to their houses, especially on steep roads in mountainous terrain.

One elderly woman says that the truck could not go up the steeply inclined road leading to her house. She says it was the same as not having access to water at all, because she was physically unable to go down the road to retrieve it.

Some municipalities took the time to identify individuals with greater need (such as the elderly and the bedridden); these municipalities made sure such people received delivery of water in bulk as well as bottled water.

In more than one case, neighbors and relatives report delivering water on a regular basis to households in need. One man was nicknamed “Don Cisterna” (“Mr. Cistern”) because he regularly distributed water to his neighbors.

RECOMMENDATIONS

- Install rainwater-harvesting tanks at each house, with a filter at the outlet to purify the water (to avoid issues like skin rashes or diseases).
- Provide an alternative energy supply (power generator or solar panels) to help deliver water directly to houses or to higher ground, so water can be delivered via a gravity system.
- Hold workshops to empower communities to organize themselves to provide water transportation services for houses that are inaccessible to the municipality water truck; to provide mental health services for residents to vent their problems and feel solidarity; and to host gatherings where neighbors can share concerns, share resources, and come up with solutions together.

TRANSPORTING WATER WITHIN THE HOUSE

Even when a household garners and stores a sufficient supply of water, the next step is to transport it within the household. People need to use water in the bathroom (to bathe, brush teeth, and flush the toilet), in the kitchen (to clean and cook), and elsewhere.

PROBLEMS

Water is heavy and bulky. People report back, shoulder, arm and hand pain from carrying it around, as well as exhaustion and frustration.

While women were more likely to carry water from room to room, men were more likely to set up household plumbing or to assemble tools for domestic water distribution.

HOW PEOPLE COPED

Among the homemade solutions that people invented for transporting water: using wheeled mechanisms, such as a stroller, a handtruck, or a cooler; rigging a pulley system to bring outdoor containers into the house; and putting a rope onto a water container, hanging it from one’s neck, and holding it close to the chest. Many people installed additional water tanks and rearranged home plumbing.

In the rural town of Algarrobo, an elected committee of local women are in charge of the well that supplies water to the community. The town worked with a coalition of organizations (including Oxfam) to repair the pump that powers the well. *Mary Babic / Oxfam*



RECOMMENDATIONS

- Distribute handtrucks, carts, and other equipment.
- Encourage organizations and government institutions to prioritize the prevention and treatment of muscular, back, bone, and joint conditions.
- Host workshops where community members can share their ergonomic water-carrying techniques, strategies, and inventions.

ENSURING POTABLE DRINKING WATER

After María hit, people quickly became concerned about consistent access to safe drinking water.

PROBLEMS

Many people were compelled to resort to bottled water for drinking and cooking. However, prices skyrocketed in most places after the hurricane (for example, the price for a pack of 24 half-liter bottles jumped from \$4 to as much as \$15); this price increase imposed a huge financial burden on many families. Fortunately, many people reported that they had access to bottled water that had been donated.

People grew anxious about the unreliable supply of water. One woman reported that while she offered bottled water to her children, she drank water directly from the river. Another woman noted that she reduced her water intake from three bottles to one bottle per day (including water she needed to take medication).

HOW PEOPLE COPED

Bottled water: Families preferred to rely on bottled water as much as possible.

Filtering: While many people received filters, use was inconsistent. Some filters are difficult to use properly, and people doubted their efficacy.

Chlorination: Few households reported chlorinating the water they collected. One woman said she miscalculated the quantity she used to purify the water, and was sickened by the chlorine.

Boiling: When possible, some families boiled water to purify it; several people reported that they continued to do this even after the water flow returned to their house.

Collecting from springs: Across the island, people continue to hold onto the belief that water from springs and wells is pure and healthy. This is only sometimes the case.

RECOMMENDATIONS

- Continue delivering water filters, but accompany with profound and personalized education around the value of filtering water. For example, run a test for *E. coli* before and after filtering to show effectiveness.
- Hold workshops to show that even water coming from springs might be contaminated.
- Hold workshops on how to effectively purify water using chlorination; some people use it effectively while others did not use it at all as they didn't like the smell/taste.

PERSONAL HYGIENE: SHOWERING/BATHING

Bathing—from hand-washing to showering—became a serious challenge when indoor plumbing failed.

PROBLEMS

Most people carried water in buckets to the bathroom, and then bent to splash the water up or used a cup to pour it onto themselves. The water was nearly always cold. Some people who had operational stoves (gas or generator-powered) heated the water in the kitchen, and then carried it to the bathroom. This process was not just arduous, but dangerous. Some people tried using rainwater, which often caused skin rashes (rainwater is easily contaminated).

The scarcity of water and its implications for hygiene were stressful for women. Women were typically responsible for allocating limited water sources to every family member; this became challenging when children used more water (due to their playfulness and not understanding the need to conserve), and when caring for elderly, ill, and disabled people who had special needs for cleanliness.

In general, bathing took much more time and impacted daily routines; people needed to wake up earlier and plan more carefully. One woman says she allocated almost two hours a day for heating water for family members to bathe.

Finally, while women were specifically asked about feminine hygiene, few expressed any strong concerns or indicated health issues. A number of women referred to it being “more complicated to deal with,” and reported increased discomfort due to the inability to shower frequently. One woman noted, “I cried every time I had my period.”

HOW PEOPLE COPED

- Some people constructed rudimentary shower spigots and hung containers in the bathroom to provide a shower. One family attached a faucet to a large plastic box; others drilled holes in the lids of large plastic bottles. The main problem was that someone had to fill the container by lifting up a large bucket and pouring water into the container. This process posed dangers—even more so if the water was hot.
- Many people bathed in a nearby river, either clothed or naked. If they were not wearing clothes, they’d ask children to keep watch, making a game out of it. When the kids yelled, “Car coming!,” bathers ducked down into the water so they were covered to their neck.

- Some households constructed a system with gravity-fed plumbing so no electric pump was required.
- One family filled a large detergent bottle with water and used the pump to wash their hands and rinse dishes.
- Many people used wipes and hand sanitizers extensively.

RECOMMENDATIONS

- Organize workshops for community members to share and demonstrate do-it-yourself (DIY) solutions they implemented in their houses; train people in how to construct their own showers.
- Install solar water-heating systems. Although relatively expensive, these systems provide long-term solutions that are environmentally friendly and sustainable.
- Install water tanks on roofs. Such tanks can be used for showering using gravity. While an electric pump is necessary to fill the tank, in the event of a power outage, the municipality can directly fill them (provided workers carry a power source with them).

It’s not unusual in rural areas of Puerto Rico for the bathroom to be located in a separate building. In many cases, the main house was built at a time when there was no indoor plumbing or electricity. This structure, outside a house in Adjuntas, contains the toilet, shower, sink, and washer and dryer. *Mary Babic / Oxfam*



THE LAUNDRY PROBLEM

Washing machines and dryers depend on a supply of both electricity and water. After the hurricane, people had to do laundry manually. This is no easy task; it requires agitating heavy wet cloth (clothes, towels, and sheets), wringing out the water, and then hanging to dry.

PROBLEMS

Laundry nearly always fell to women in the household. Among the physical problems they encountered from doing laundry by hand: fatigue, pain in backs and shoulders, dry and cracked skin on hands (from contact with detergents). Most people reported it took two to four hours of actual labor to do a load of laundry by hand; it was much longer if travelling back and forth to a body of water (such as a river). Many women say it was emotionally draining to manage the time demands and scarce water resources.

The most challenging things to wash were bedsheets and towels, which were extremely heavy when wet. This became a serious issue for the elderly, the disabled, and the bedridden—and for the women who care for them. Women caretakers report that the burden of doing laundry for more than one household was sometimes overwhelming. If the bedridden person was incontinent, the caretaker was washing and drying sheets—by hand—every single day.

“It really was an exponential overburden,” says Pamela Silva, one of the researchers. “Women were washing constantly.”

Many people also reported that drying laundry was a challenge, especially with the rainy weather that followed the hurricane.



After Oxfam held a focus group discussion in the town of Comerío, the researchers returned some months later to lead a workshop on a variety of homemade solutions. One was the bucket washer, a device that makes it much easier to do laundry without a machine.

The device is made from two buckets (one left intact, and one with holes drilled in it); a plunger with holes drilled in it, a broomstick for a handle; and a lid. When this is constructed, it's possible to stand and agitate the wet laundry with relative ease. Then, you reverse the position of the buckets, so the water leaks out of the bucket with the holes; and you sit on the intact bucket, to squeeze out even more water.

The women in the workshop were delighted with the device, and insisted that it be shown to the whole island on TV.

In addition, the workshop demonstrated how to make tablets that could disinfect the toilet, and how to construct a hand-washing station.

As the island faces upcoming hurricane seasons that threaten the fragile power and water systems, communities need to be prepared with off-the-grid methods. *Mary Babic / Oxfam*



Older homes on the island often retain equipment from the years before indoor plumbing and electricity.

This house in Adjuntas has a built-in sink (*pileta*) and washboard (*tabla*) made of concrete. The family used the sink when the water was out, but they noted that “it destroys your fingers.” *Mary Babic / Oxfam*

HOW PEOPLE COPED

People invented a number of solutions, primarily focused on preventing the need to bend while scrubbing, and on using leverage to help wring out water.

- In older homes that still had equipment from the time before plumbing was installed, there might be an outdoor sink (*pileta*, often carved out of stone) with a washing board (*tabla*) built into it. Women report this washing board made it easier to stand while doing laundry. However, they also say that “It destroys your fingers,” and that laundry detergent causes dehydration of the skin.
- Some women did laundry in a bucket, standing up while agitating with a plunger or soda bottle with holes drilled into it.
- People with access to an industrial mopping bucket, with the wringing lever built in, used it to wring the water out of laundry.
- Many women put laundry in containers large enough that they could step in and march on the laundry, both to agitate and to squeeze out the water.
- Some women worked together to wring out sheets and towels: each held an end, and they’d gradually twist the ends to squeeze out the water.
- Because most households got water back before the power returned, washing machines could not be operated. One woman reported she would simply step into the shower with her clothes on. After her clothes were clean, she’d wring them out and hang them up.

- Some households still had hand-crank wringers stored away; these were very useful for squeezing out the water.

RECOMMENDATIONS

Oxfam recommends a combination of solutions.

High-tech, more expensive, medium-scale, long-term solution

Solar-powered, community laundromats: Despite the relatively high capital cost, community laundromats provide a long-term solution. Solar panels ensure that the laundromat can function during failures of the grid, and they avoid the high maintenance and operating costs associated with generators (as well as the pollution).

- Ensure solar-powered laundromats are placed near vulnerable populations (elderly, disabled, sick, bedridden, families with autistic children).
- Make sure the laundromats are located so they can serve several households, and encourage these households to extend a helping hand beyond the neighborhood.
- Choose washing machines that accommodate water poured into them manually.

Low-tech, cheap, DIY, emergency solutions

- Teach people how to make simple solutions such as the bucket clothes washer. Avenues include workshops, social media, videos, vocational schools.
- Make hand-crank wringers available.
- If appropriate, distribute off-the-grid washing machines (and/or dryers); these are available online.

COOKING, FOOD, AND KITCHEN ACTIVITIES

Water plays a vital role in food preparation, cooking, and cleaning up. The lack of running water, and the scarcity of supply, made it extremely difficult to provide nutritious meals.

PROBLEMS

Responsibility for cooking and cleaning the kitchen primarily falls on women in Puerto Rico. As it became more difficult to wash food (especially produce), to cook (especially rice), and to clean up after a meal, women's ability to fulfill their roles as food providers was impaired.

It took much more time and effort to prepare meals and to wash pots, plates, and utensils.

People resorted to canned and packaged food: for example, tuna, corned beef, sausages, crackers, and apple sauce. After weeks, and then months, this diet started to take a toll on people's health; results included higher blood pressure and cholesterol, stomach issues, and weight gain and loss.

HOW PEOPLE COPED

In addition to relying on packaged food, many people reported using disposable cutlery and plates in order to avoid washing up. Many felt guilt about generating so much extra waste, but they couldn't justify using bottled water to wash utensils and plates.

TOILETS

In the absence of running water, a conventional toilet can be "flushed" by pouring sufficient water into the bowl.

HOW PEOPLE COPED

Most people kept water buckets next to the toilet and poured water into the bowl or the tank when it became urgent. They most often used rainwater or water recycled from cleaning.

In addition, most people refrained from flushing the toilet after every use (in order to conserve water). This waiting resulted in bad odors, as well as hygiene issues. Many people complained about the overwhelming stench, especially in high heat and humidity.

One older woman who suffered from arthritis flushed the toilet only once a day; she wanted to avoid carrying water and using up the rainwater she was storing.

Many men, especially those who work outside, admitted that they relieved themselves in the open; such action had the potential to exacerbate odor problems and to contaminate water sources. Women rarely said they practiced open sanitation (even when specifically asked)—in general, they wanted a higher degree of privacy and safety.

RECOMMENDATIONS

- Equip households with small wheel-carts that can be used to transport water buckets around the house.
- Hold workshops to show DIY equipment to lift buckets to be able to flush the toilet.
- Provide sanitizing tablets that neutralize odors between flushing or hold workshops to train people how to create their own.

HOUSECLEANING

The lack of a water supply compromised housecleaning on numerous levels.

PROBLEMS

In general, people said they were troubled by smells, pests, and uncleanliness; in many cases, people worried about the impact on their health. At least one woman reported that her asthma worsened as a result of the accumulation of dust.

Women continued to be more responsible for, and troubled by, the task of cleaning. When men worked outside the home, but women did not, women felt the weight of this responsibility especially keenly. One woman said, "My husband brings the money. My job is to look after the house."

One woman noted, "The only thing men think they need to keep clean is the car. It needs to be shiny and beautiful." Another said, "Men care, but women do the cleaning."

HOW PEOPLE COPED

Many people made heavy use of products such as Lysol, bleach, and wipes to clean surfaces (such as counters and sinks). Some people used products like Swiffers to wash floors (rather than mops and water).

RECOMMENDATIONS

- Distribute hand sanitizer, cleaning wipes, detergents, air fresheners.
- Hold workshops to show simple solutions, such as the method to clean the floor with a spray bottle and a mop.



A woman collects water from a natural spring created by the landslides in a mountain next to a road in Corozal, west of San Juan, Puerto Rico, on September 24, 2017. Before the hurricane, most households in Puerto Rico enjoyed indoor plumbing and reliable running water. When the electricity and the water failed, the roughly 3.3 million people on the island faced an immediate crisis. Since water is absolutely vital to a household, the first and primary challenge was to make sure there was a consistent supply. *Ricardo Arduengo /AFP/Getty Images*

OTHER CHALLENGES

FINANCIAL BURDENS

Research participants reported a wide range of financial problems, among them:

- The need to buy bottled water for drinking and cleaning.
- The need to drive to water sources (fuel, maintenance).
- The need to buy/use generators (purchase, fuel).
- The need to stay home to maintain the household/family (rather than run small businesses or go to work).

MENTAL AND PSYCHOLOGICAL PROBLEMS

Many people reported sadness, depression, and frustration, especially as the months wore on.

One elderly woman became distressed when reflecting on the first weeks after the hurricane when she didn't get water from the municipality truck and she struggled (due to age and health issues) to get water from the oasis. Another woman mentioned

that she "doesn't feel like the same person anymore" after being constantly worried about the lack of water.

Another admitted to visiting a psychologist to "deal with the stress of the situation [of having no water] and the frustration [of everything being so much more difficult]," while also needing to drive her husband, who suffers from high blood pressure, to the hospital for chest pain because he was "too stressed with the water situation."

It was like somebody got a four-by-four and just whacked us. We're all still so exhausted.

MARIA CONCEPCION, PROGRAM DIRECTOR OF OXFAM IN PUERTO RICO

CONCLUSIONS

What happened in Puerto Rico can offer insights into how more industrialized countries might be better equipped to cope when essential infrastructure systems are damaged or broken. Most households in Puerto Rico rely on technological appliances and sanitation facilities for their daily routines: specifically, piped water, toilets, and washing machines. When the hurricanes struck the island in 2017 and these appliances became inoperative, women and men fell back into traditional methods of performing household tasks, and gender roles around the burden of domestic work were largely reinforced.

Oxfam maintains that understanding the full impact of the storms enables communities to better prepare for future emergency responses, both locally and internationally. This report highlights the importance of considering the level of infrastructure and technological development of affected populations during a disaster (stemming from natural hazards, displacement, or conflict), and the subsequent lifestyle change that is caused by these events.

Similarly, local gender norms and customs must be evaluated and accounted for during an emergency response and recovery plan, as well as within disaster risk reduction strategies. The approach to these interventions should be an inclusive one, where the realities of men and women of different age groups are equally represented in decision-making efforts.

DISASTER RISK REDUCTION IN PUERTO RICO

The subtext in this report is the “why.” Why has infrastructure failure persisted so long in the rural areas of Puerto Rico, while other parts of the country have had their water restored?

Unfortunately, the time frame and priorities to repair the infrastructure have been opaque. Oxfam recommends that the government and FEMA improve the efficiency, effectiveness, and speed of infrastructure repair across the island, and give as much priority to communities on nonstate water systems as to communities on the state water system.

If it is not possible to repair the infrastructure system rapidly, the government should prioritize stabilization measures or mid-term activities. These include installing easily accessible solar laundries, providing more robust support in supplying water to rural households, distributing large plastic tanks to hold water, and subsidizing solar water pumps.



While the hurricane dealt a smashing blow to the infrastructure of Puerto Rico, the resilient and strong spirit of the people survived intact.

The label on this bottle of water states: “A hurricane can’t keep us down.” *Mary Babic / Oxfam*

NOTES

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- 3 Nawal N. Nour, "Maternal Health Considerations During Disaster Relief," *Reviews in Obstetrics & Gynecology* 4, no. 1 (2011): 22.
- 4 United Nations, *Gender Responsive Disaster Risk Reduction: A Contribution by the United Nations to the Consultation Leading to the Third UN World Conference on Disaster Risk Reduction* (Second Version, November 2014) https://www.preventionweb.net/files/40425_gender.pdf.
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- 6 Luke Juran and Jennifer Trivedi, "Women, Gender Norms, and Natural Disasters in Bangladesh," *Geographical Review* 105, no. 4 (2015): 601–11, <https://doi.org/10.1111/j.1931-0846.2015.12089.x>.
- 7 Moreno-Walton and Koenig, "Disaster Resilience."
- 8 This phenomenon is complicated in single-headed households, which are generally more vulnerable in social and economic aspects.
- 9 It should be noted that most emergency aid WASH (water, sanitation, and hygiene) response is geared toward resource-poor environments; a WASH response in more-developed areas needs to be adjusted to people's different but real needs.
- 10 Alice Thomas, *Keeping Faith with Our Fellow Americans: Meeting the Urgent Needs of Hurricane Maria Survivors in Puerto Rico* (Refugees International, 2017), https://static1.squarespace.com/static/506c8ea1e4b01d9450dd53f5/t/5a37d01bec212d3032461511/1513607203969/RI_Puerto+Rico_Advocacy+Report+R3.pdf.
- 11 The water system in Puerto Rico is managed by PRASA (Puerto Rico Aqueduct and Sewer Authority). However, of the 1.26 million households in Puerto Rico, roughly 76,000 people in over 200 communities across the island rely on water from pumps and wells and on surface water—all not connected to the PRASA system. See Environmental Protection Agency (EPA), "EPA Teams Up with Non-Governmental Organizations to Help Restore Drinking Water to Communities in Puerto Rico," news release, December 12, 2017, <https://www.epa.gov/newsreleases/epa-teams-non-governmental-organizations-help-restore-drinking-water-communities-puerto>.
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- 13 John D. Sutter and Omayra Sosa Pascual, "Deaths from Bacterial Disease in Puerto Rico Spiked After Maria," CNN, July 3, 2018, <https://www.cnn.com/2018/07/03/health/sutter-leptospirosis-outbreak-puerto-rico-invs/index.html>.

COVER: A woman washes clothes with water funneled from a mountain stream in Utuado, Puerto Rico. Across the island, households struggled to endure without access to running water or electricity for months after Hurricane María struck on September 20, 2017. Especially in the central highlands, Oxfam found women shouldering extraordinary physical, financial, and emotional burdens—but also leading the way to new approaches to sustainable and resilient alternatives. *Mario Tama / Getty Images*



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