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RESEARCH ARTICLE



Autogestión and water sharing networks in Puerto Rico after Hurricane María

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ABSTRACT

Puerto Rico's residents were left without water services for up to nine months in the wake of hurricanes Irma and María (2017). Further, it was clear that there were no viable plans for addressing water provision gaps in anticipation of future hazards. In response, Puerto Ricans initiated *autogestión*, a strategy to secure survival through self-provisioning. Utilizing mixed methods, we reveal two different emergent forms of *autogestión* water self-provision in three differently serviced Puerto Rican communities. These provide an informed reflection on the trade-offs and pitfalls of reliance on *autogestión* for water security in the wake of disaster.

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Household water insecurity; water sharing; disaster; self-management; *autogestión*; Puerto Rico; qualitative social network

Introduction

In 2017, hurricanes Irma and María devastated the Puerto Rico archipelago, a US colony in the Caribbean. With estimates between US\$16 billion and US\$20 billion in damages (Estudios Técnicos, 2017) the disaster response would not be either quick or robust. There were delays in federal and state aid distribution of food, water and other services (i. e., emotional support) to both urban and rural communities (Clement et al., 2018; Garriga-López, 2019; Willison et al., 2019). Then-US President Donald Trump even mentioned 'selling the island' (Cole, 2020). Further, colonial policies such as the 1917 Merchant (Jones) Act limited aid from other countries to Puerto Rico. These compounding factors resulted in the death of more than 1000 residents (with estimates suggesting more than 4000 deaths from these events) (Kishore et al., 2018; Robles et al., 2017).

In the wake of Hurricane María, the Puerto Rico Aqueduct and Sewer Authority (PRASA) – the public utility responsible for providing drinking water to 97% of the population – faced various challenges to provide drinking water, including the system's dependency on the Puerto Rico Electric Power Authority which experienced an island-wide power outage following Hurricane María (Preston et al., 2020). As a stopgap measure, municipalities, the Federal Emergency Management Agency (FEMA) and the US military provided water tanks in city centres. Simultaneously, community

organizations, non-profits, churches and other emergent autonomous groups distributed bottled water, hot meals and non-perishable foods to those who the inadequate government services failed to provide for (Garriga-López, 2019; Laguarda Ramírez, 2018; Lloréns & Santiago, 2018; Soto-Vega, 2019). Nonetheless, households too were forced to engage in *autogestión* (self-management) to provide safe drinking water for themselves. In this context, this article details forms of self-organizing in the aftermath of the disaster.

To understand how households on Puerto Rico's large island coped with water insecurity in the wake of these events, we examine *autogestión* through an ethnographic lens of social networks and interhousehold water sharing – that is, gifts, exchanges and other transfers of water that occur between private households (Wutich et al., 2018) – to understand how self-provisioning emerges in times of water crisis. The specific questions are:

- Who shared household water, and how?
- How does *autogestión* fit with water-sharing practices and otherwise assist household and community water provisioning?
- How does *autogestión* fit within the larger political-economic dynamics in the archipelago in the wake of hurricanes Irma and María?

This approach allows us to consider how Puerto Rican households had to fend for themselves due to the relegation of the state's role and responsibilities. Likewise, this allows us to explore new household challenges and opportunities and how these fit within the current colonial and neoliberal context of the archipelago's contemporary austerity policies.

Background: colonialism and neoliberalism

Here we view the relationships between the state, markets and society through the lenses of colonialism, neoliberalism, and the household and community counterstrategy of *autogestión*. Colonialism refers to the political process of 'the control by individuals or groups over the territory and/or behavior of other individuals or groups' (Horvath, 1972, p. 46).

While colonialism is not monolithic (political, economic and cultural practices of colonialism vary widely; Dirks, 1992) (e.g., settler colonialism and franchise colonialism), what remains consistent across all colonial projects is a hierarchical economic and political system that is rooted in an extractive practice: the colonial power exerts control over resources and colonial subjects. In contemporary times, as Grosfoguel (2003) describes it, colonialism is a 'cultural, political, and economic oppression with or without the existence of colonial administrators' (p. 146). Through policy, for example, colonial practices continue to be present in colonies or unincorporated territories such as the archipelago of Puerto Rico (Backiel, 2015). A clear and recent example of Puerto Rico's colonial context is the federal appointment of the Oversight Management and Economic Stability Act (PROMESA) in 2016 (ironically meaning 'promise' in Spanish). PROMESA established a federally run financial control board to guarantee payback of government debt to bondholders through austerity measures and the board is based in New York City (more than 1000 miles from Puerto Rico) (Rhode & Hernandez Rivera, 2017). PROMESA, regardless of local government claims, has the authority to raise water and electricity tariffs, impose cuts on public health services, and facilitate the sale of public land and natural resources, among others (Rhode & Hernandez Rivera, 2017).

Utilizing a similar extractive logic, neoliberalism is a political philosophy and economic practice that ‘promotes not just the withdrawal of the state from market regulation, but the establishment of market-friendly mechanisms and incentives to organize a wide range of economic, social and political activity’ (Venugopal, 2015, p. 172). Neoliberalism can be traced to British philosophers and critiques of feudalism in the late nineteenth century but which gained attention during the Second World War and the economic reforms enacted by British Prime Minister Margaret Thatcher and United States President Ronald Reagan in the 1980s (Harvey, 2007; Henry, 2010). Neoliberal policies typically promote individualism, private property rights, deregulation, free markets and free trade. Under neoliberal thought, the role of the state is primarily to create and maintain the contexts and structures that support the creation and ‘proper’ functioning of markets and protections for individuals (e.g., military, defence, police, and legal structures and functions required to secure private property rights) (Harvey, 2007). Additionally, Harvey states, ‘if markets do not exist (in areas such as land, water, education, health care, social security, or environmental pollution) then they must be created, by state action if necessary. But beyond these tasks, the state should not venture’ (p. 2). In other words, the state works first and foremost for the well-being of the markets, which are viewed as better positioned than the state to manage public resources (Ong, 2006). The focus on individualism implies the prioritization of freedom while accepting the inequalities resulting from market well-being preference (Tyner, 2016).

‘Only the people can save the people’: practices of *autogestión*

Under conditions of colonialism and neoliberalism, individuals with limited political and economic power are forced to devise various strategies as countermeasures aimed at survival. As one of the practices for crafting good, liveable lives and surviving away from violent, oppressive, neglectful or authoritarian states, the concept of *autogestión* has developed from the experiences in peasant and socio-economically impoverished urban communities as well as in the maroon communities comprised of runaway enslaved Africans in the Americas (Johnson, 2019; García-Quijano & Lloréns, 2017; Scott, 2009). Examples of *autogestión* emerged in socialist societies, such as during Yugoslavia’s separation from the Soviet Union and in Cuba as a reaction to authoritarian communism (Gagnon, 1976; Massari, 1977; Méndez & Vallota, 2006; Schteingart, 1991). From these experiences, *autogestión* developed a political perspective in which organizing production, services, administrative activities and decision-making are carried out directly by those participating in these processes (Schteingart, 1991, p. 133). Soto-Vega’s work on *autogestión* in Puerto Rico for example, expresses it as a strategy of ‘counter-praxis survival’ (Soto-Vega, 2019). This means that *autogestión* emerges to create radical forms of decentralized resistance to disinvestment and resource extraction resulting from the state’s active disinvestment in public services, privatizing them instead, promoting the deregulation of protective environmental policies and compromising the land as well as the people who live on it (pp. 40, 45).

In recent times, another perspective on *autogestión* is how it is mobilized as part of the culture created by neoliberal development schemes (Ortiz, 2010, 2013, 2014). Ortiz’s research in Mexico and Chile and the World Bank shows that the neoliberal development model provides ‘indirect’ support to self-management because policies covertly sustain the

state's neoliberal practices and discourse. Under the neoliberal model, the state is responsible for providing support (through policy and state actions) to the well-being of the markets, while in terms of social assistance, individuals must play a more active role in generating their own safety net and well-being. Therefore, as the state abandons the ethics of social responsibility, individuals develop a culture in which they must be able to solve their problems and look for options to ensure their well-being (Ortiz, 2010, 2013, 2014; Paley, 2001; Schild, 1998). At the same time, such problem-solving is expected not to alter the existing neoliberal hierarchical structures required for transformation (Ortiz, 2013).

Ortiz (2013) also claims that under the neoliberal self-management model individuals are in an unstable position and situate their personal space as the only one where their actions have a real impact and from where they can strategize to survive external living conditions. The 'bootstrap' narratives endorsed by the state blame marginalized individuals for their own precarity and failure for not making the 'right' decisions for success. In other words, 'the poor are poor because they don't work hard enough', instead of acknowledging the structural inequities and power asymmetries put in place that determine the distribution of wealth and quality of life (p. 6). The promotion of freedom and citizen participation in their own environments is used to justify even further the withdrawal of the state's safety net. Additionally, since there are not always socio-political causes that bring together large groups, individual and community initiatives do not seem to present significant threats to existing power structures (Ortiz, 2013). These distinct forms of *autogestión* raise critical questions on what happens when the elites directing the state fail (or refuse) to deliver on their coercively co-opted roles such as when the United States (a colonial power) refused to deliver the aid and protections to Puerto Ricans (US colonial subjects) in the event of a major natural hazard (Golshan, 2019).

Water sharing: a new approach to self-managed interhousehold water allocation

Water is a human right, and water insecurity challenges mental and physical health (Wutich et al., 2020). Generally, water scholars, policymakers and activists agree that the primary drivers of water insecurity are state-level issues, including poor governance, misaligned incentives and poor allocation of resources – not the lack of water itself (Araral & Wang, 2013; Briscoe, 2009; Biswas & Tortajada, 2010; Cosgrove & Rijsberman, 2000; Rogers & Hall, 2003; Brewis et al., 2019). To cope with inadequate or inequitable access to clean, safe or affordable water, households adapt as best they can. Common strategies include digging private or community wells, buying water, developing mini-water schemes, rainwater harvesting and using water-saving techniques (Adeniji-Oloukoi et al., 2013; Ostrom, 1990; Pacheco-Vega, 2019). Households may also pool labour and resources to collectively run water-related infrastructure (Donnelly et al., 2012). One age-old and widespread – but recently documented strategy – is private household-to-household water sharing (Wutich et al., 2018; Zug & Graefe, 2014; Wutich, 2011).

Household water sharing – loaning or gifting private water to others – is a practice of reciprocity, often embedded within religious or symbolic beliefs, moral values, obligations and/or broader systems of social insurance (Beresford, 2020; Brewis et al., 2019; Wutich & Beresford, 2019). Households engage in water-sharing activities for different reasons: moral obligation, ties of social solidarity, climate aridity and desire to build community-based prestige, political capital or resistance (Beresford, 2020; Brewis et al.,

2019; Harris et al., 2020; Pearson et al., 2015; Stoler et al., 2019; Wutich et al., 2018). Some may engage for-profit; others expect later returns in kind (Brewis et al., 2019). Households may temper sharing according to values they hold for different types of water (e.g., surface water versus groundwater) (Walker, 2019), or social identities of those asking for water (Pearson et al., 2015). However, water sharing has not yet been documented in a disaster context; research is needed on how disaster-based water sharing is shaped by larger political-economic dynamics such as colonialism and neoliberalism. This work intends to contribute to such conversations.

The contexts of neoliberalism, colonialism, and *autogestión* for water in the US Puerto Rico archipelago

As an unincorporated territory of the United States, Puerto Rico has a 43.5% poverty rate, double that of Mississippi (the highest in the continental United States) (Backiel, 2015; US Census Bureau, 2020). Puerto Rico's colonial status provides Congress plenary powers to sell or trade Puerto Rico without islanders' consent (Backiel, 2015). Along with a colonial government, Puerto Rico has been governed through the implementation of neoliberal practices. Since the 1990s, the New Progressive Party (which was in power during the periods 1993–2001, 2009–13 and 2017–present) agenda has reduced the government through various events. For example, this administration fired one-third of the public workforce in 2010, has grounded discourses of 'state emergency' to promote and justify the privatization of public services such as electricity and water services, and sold (in total or partial) state properties such as the telephone company, airport and highways (Backiel, 2015; Ramos, 2019). As a response to state mismanagement and austerity policies, some environmental justice grassroots movements have adopted traditional *autogestión* approaches in their organization (Atilés-Osoria, 2014; Concepción, 1995; García-López, 2018; López, 2015; Lloréns & Stanchich, 2019; De Onís, 2021; Torres-Abreu, 2015). For example, Casa Pueblo (House Town), founded in 1995, seeks alternative forms of development through alliances with other grassroots organizations and ally organizations in Puerto Rico and outside of the archipelago. Their agenda is based on solidarity, self-governance and working outside of current political promises to offer transformational alternatives in environmental challenges such as fossil fuel dependency in Puerto Rico (García-López, 2015; Massol-Deyá, 2019; De Onís, 2021).

In the water sector, the Puerto Rico Aqueduct and Sewer Authority (PRASA) is the public corporation responsible for the drinking water quality of 97% of the population (Preston et al., 2020). The remaining 3% of the population relies on smaller drinking water systems known as non-PRASA (Preston et al., 2020). PRASA was created in 1945 and has been facing management challenges since the 1970s (López, 2003; Preston et al., 2020). By 1995 under the New Progressive Party, ex-Governor Pedro Roselló declared a state of emergency and justified the privatization of PRASA with narratives of optimizing water services. This process was cancelled in 2002 by ex-Governor Sila María Carderón (Ramos, 2019). However, PRASA continued to face different challenges, including leaks, poor enforcement of rate collection and limited financial investment (Preston et al., 2020). Along this, PRASA violated the US Clean Water Act Section 301 in 2015 by not following the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) and releasing illegal pollutants in both wastewater treatment and drinking treatment plants (Environmental Protection Agency, 2015). This and other charges related

to operation and maintenance provisions resulted in a US\$9 million fine; the largest criminal fine to a utility that has violated the US Clean Water Act (Environmental Protection Agency, 2016). Furthermore, in 2016, the US Geological Survey (whose role is to collect, monitor and report on water resources from surface water to rainfalls) also announced that it would no longer monitor water resources in Puerto Rico because of the substantial debts (Coto, 2016, p. 1; Preston et al., 2020). In turn, one of the outcomes has been ongoing evaluations to privatize PRASA's services (Ramos, 2019).

When hurricanes Irma and María struck Puerto Rico, compounding water challenges became more evident. The impacts of both hurricanes left one-third of residents without water services (Belluz, 2017; Burgos, 2017). Ageing infrastructure, a debt of US\$1.8 billion and drinking water treatment plants dependent on the Puerto Rico Electric Power Authority all significantly contributed to the water insecurity (Preston et al., 2020). Moreover, when comparing Puerto Rico's federal response with the emergency response afforded to the states of Florida and Texas, the colonial archipelago was allocated fewer federal employees, food, water, tarps and helicopters (Willison et al., 2019).

As part of the responses, PRASA recommended that Puerto Ricans boiled water (with limited energy access island-wide) or use chlorine tablets as their water treatment plants were out of service (Belluz, 2017). However, to obtain water, Puerto Ricans were often forced to use unsafe surface water (e.g., rivers, wells); leptospirosis killed at least 26 people (Sutter & Pascual, 2018). The government's mismanagement was further illustrated nearly a year after the hurricanes when residents found thousands of water bottles unopened and expired in a remote small plane landing strip in the municipality of Ceiba (Lapin, 2018). Three years later, residents also found hurricane relief aid, including water, in a governmentally managed warehouse in the municipality of Ponce (Perret, 2020). Again, these events showed state negligence and the necessity of self-reliance to secure water, food and other provisions. Meanwhile, *autogestión* efforts and PRASA's critical infrastructure failures have been leveraged to support plans for privatization (Johnson, 2019; Ramos, 2019). In this context, the combination of neglectful events pre- and post-disaster raises questions to examine how households addressed these (in)actions, including *autogestión's* role as self-reliance or neoliberal strategy as seen through water-sharing experiences.

Data and methods

Site selection

The sites selected for this work were the municipalities of Rincón, Añasco and Mayaguez, Puerto Rico, located in the western part of the main island (Figure 1). Contemporary scholarship on Puerto Rico usually focuses on the metropolitan area of San Juan where resources are centred (Soto-Vega, 2019). Given our focus, we examined the self-organized disaster response in other parts of the island that have less (formal) political and economic power. We selected these three municipalities because they have similar socio-ecological systems and similar socio-economic conditions, but vary in terms of their diverse geographies and water systems – urban, peri-urban and rural – as we discuss below:

- Mayaguez (urban; PRASA water supply): an urban centre and one of the largest municipalities of Puerto Rico. After Hurricane María, approximately 9000 homes were

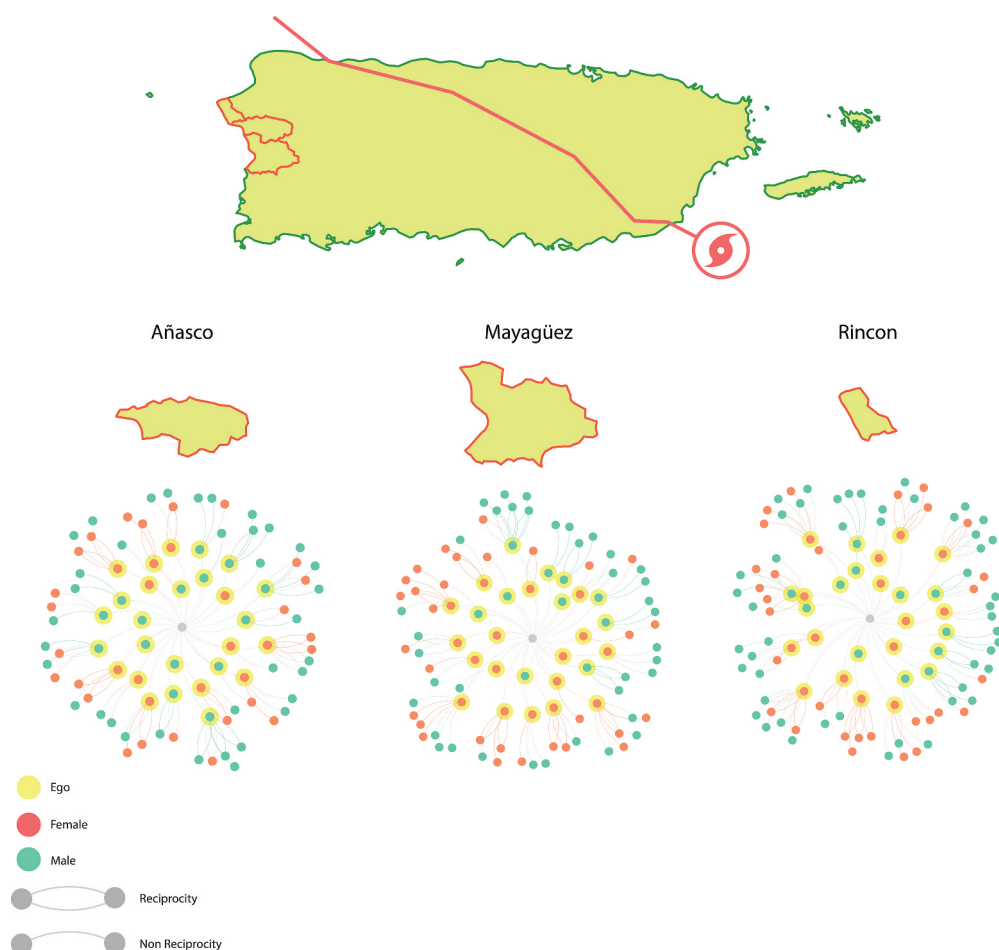


Figure 1. Map of Puerto Rico showing the three selected sites and participants' egocentric networks. Source: Sketch by graphic designer Jan Cordero.

destroyed, and 3000 were partially destroyed and lacked a robust emergency management response due to its distance from the Capital (*El Nuevo Día*, 2017).

- Rincón (peri-urban; PRASA water supply): a town best known for tourism and surfing. In the wake of Hurricane María, Rincón's coastal houses were severely damaged and the sea took some; three significant challenges were water (river dependency after potable water ran out), communications and petrol (there was no fuel for water tankers) (*El Nuevo Día*, 2017).
- Añasco (rural; PRASA and non-PRASA water supply): a rural municipality in western Puerto Rico. It was one of the most affected municipalities by Hurricane María: 1300 families lost their homes; 140 bridges and roads were impassable; landslides trapped some for days; and water was scarce (*El Nuevo Día*, 2017).

Data collection

To characterize *autogestión* at the start of data collection, we used the first author's field notes from participant observation between December 2018 and January 2019 (Roque et al., 2020). Participant observation (Bernard, 2017) included living in western Puerto Rico

before, during and after hurricanes Irma and María, participating in disaster response, and informally interviewing residents about post-disaster needs. Data collection included a structured interview protocol with respondents in 81 households across the three study sites in mid-2019. The interviewees were selected purposively based on their experiences with water insecurity during Hurricane María, maximizing variability on gender, age and access to alternative water sources. The sample size was set at 24 in each site, based on empirical evidence for minimum sample sizes needed in comparative qualitative research (Guest et al., 2006; Hagaman & Wutich, 2017). Final sample sizes in each study site were: 27 Mayaguez (urban), 27 Rincón (peri urban) and 27 Añasco (rural). Approval for data collection was received from the Institutional Review Board of Arizona State University.

The interviews included a prompted personal/egocentric social network approach (McCarty et al., 2019) with recall-based responses. Our approach systematically elicits the respondent's personal network members and in-depth qualitative data on respondents' interactions with each network member (Varda et al., 2009). Our name generator was: 'Who gave you water after Hurricane María?' We probed deeply on each network member's water-sharing relations and an in-depth description of water-sharing events. To explore how individuals self-organized to gather water for those outside of their household, we also asked each respondent who they gave water to outside of their home, the circumstances and why they gave water.

Data analysis

The participant-observation data informed the interview protocol questions by providing context on the water experiences after Hurricane María in western Puerto Rico. These data were additionally used as triangulation to inform and validate the interpretation of the primary analysis (Flick, 2004). For the data analysis, we conducted a thematic identification from the interview transcripts focusing on the questions as part of the egocentric network descriptions such as: from whom the interviewee received water, to whom they gave water outside of their household, what were the circumstances and why they gave water. For theme identification, we utilized MAXQDA12 software (VERBI Software, 2011); the thematic analysis was guided by the strategies presented by Ryan and Bernard (2003) and Bernard et al. (2017). All names given in the results section are pseudonyms. To evaluate the egocentric network structures (e.g., number of ties, gender and relationships of these ties) and visualize the egocentric networks by the municipality, we organized the data in Excel and utilized the social network mapping software of Kumu. Graphic designer Jan Cordero sketched the image of Puerto Rico with the egocentric networks by site using the data visualization from Kumu.

Results

Household *autogestión*

In each research site – urban, peri-urban and rural – water sharing focused on sharing labour to acquire water or sharing water obtained from dispersed efforts. Most of the participants did not plan for water sharing and thus engaged in spontaneous arrangements for water. As the participants were giving and seeking safe drinking water in different formal (e.g., municipality

water tank and non-governmental organization (NGO) donations) or informal (e.g., wells and river streams) sites, many themes around *autogestión* for water sharing focused on labour cooperation. At the household level, cooperation took different forms, from logistics to informal water sources, the division of tasks within the household to collect water from different places, to visiting municipal tap water tanks together to grab as much water as possible for the household and limit the visits to the centres.

To provide an example from these experiences, Marta (all names are pseudonyms), from the municipality of Añasco, shared how her home approached cooperation for water. Marta is a 44-year-old woman who received water from two people outside of her home: a family member and a neighbour. Marta would go to the river or the municipal water tanks with her husband every other day to obtain water. Those who shared water with her knew that she needed water mainly for her two children at home. When discussing how her household organized getting water, she mentioned how she and her sister-in-law (who at the time lived with them) would create plans to split up and find water for the household. As she explains:

She is my husband's sister, my sister-in-law, and she was not working at that time so she was in charge of looking for supplies and she would share them with me. She would go out in the morning and if she found a place selling water, she would buy it and share it. I did the same thing; I would buy and bring home to share.

A similar experience is brought by Adrian, an elder from Añasco who lived with his daughter and baby grandson. Adrian addressed how they coordinated by explaining that 'one day she [daughter] would go and the next day I would go to get water because sometimes water was given in different places like churches and chapels'. Furthermore, Adrian also shared that he would take care of his grandson when his daughter would go out to fetch water. In this way, household *autogestión* included shared responsibility to obtain water and arrangements within the household to facilitate doing so.

In addition to describing their household water-sharing arrangements, participants talked about their frustrations during the process of searching for water in different places as they felt they were living 'day to day' with great uncertainty and especially suffering from governmental inaction. For example, interviewees shared the challenges of obtaining water from places such as the local municipality as stressful, worrisome and having to deal with the municipal's government incompetence, which could have grave implications for their households. Carla, a 32-year-old from Mayaguez, provides an example: 'It was tiresome, I lined up for almost 3 hours to get 6 bottles [8 oz] of water from the municipal donations and that was unacceptable to me.' Some participants also shared the physical burden of standing in extensive lines for water, visiting river streams for water to bring back home, as well their worries for friends, family or neighbours for the sudden and overwhelming load. Along with this, some participants discussed how they frequented the same places to collect water or sought additional sources of water within their networks. The magnitude of the disaster was such that water was a major concern among several others, including lack of electricity, housing challenges, unemployment, children's schooling and elderly healthcare, among others. With the delay of formal coordinated government support, labour cooperation played an important coping mechanism at the community level.

Community *autogestión*

When addressing community dynamics for water, several participants talked about their *autogestión* throughout their logistics to get water for people outside their households, such as the elderly, people in rural areas and the broader public. These interviewees talked about creating plans with neighbours, family, members of social groups (church, fraternity, NGOs) or friends in the wake of María to gather water for those in their neighbourhoods or communities because they were aware by conversations ‘mouth to mouth’ (the storms damaged communication systems) that official assistance was not reaching these populations in western Puerto Rico. A typical exemplar of these experiences was José from the municipality of Rincón. José is a 46-year-old head of his household of five. He received water from four people outside of his household (friends, family, neighbours, co-workers). José, who owned a truck, narrated how he, his sons and neighbours organized assistance for elderly residents in his community as well as in the nearby neighbourhood because these elders whose relatives lived in other parts of the island did not have the physical ability or the transportation to fetch water for themselves from various sources. He recounted how he organized his neighbours to collect gallons of water and drive to the spring three times a week to obtain water for the neighbourhood. The following quotation summarizes their efforts:

At that time we were all in the same boat, and we helped each other [...] we were loading water for everyone. First we loaded for him [family member] and then my sister’s house, my house, and my sister-in-law’s house and then to the other houses (neighbours and friends). It was mutual help. [...] We all filled water tanks, together we all went down to the site [the spring] and came back. We worked hard.

This happened several times till water was restored to their neighbourhoods two months after the event.

In Mayaguez, water collection for community needs was also present. Blanca, a 23-year-old college student, had five people from whom she received water. During this time Blanca worked along a group of volunteers in a community centre giving water and ice (hard to find at that time) and other supplies to nearby residents. One of the people from whom Blanca received water was an emergent organizer who had seen the lack of supplies in Mayaguez and worked with them for two weeks. While she worked in the logistics to get and transport water to the different *barrios*, she also acknowledges that helping others was positive for her emotional state. Similarly, Pedro, a 48-year-old man from Mayaguez, presented another self-management initiative through his fraternity. His fraternity met up and evaluated how their organization could provide water, food and other supplies to communities across western Puerto Rico. Fraternity brothers with connections to metropolitan suppliers bought in water, especially for the rural *barrios*, some of which were adjacent to informal water sources but faced transportation challenges to go to formal water sources. The fraternity brothers met and also shared resources amongst them as Pedro stated ‘the fraternity met for 3 weeks to distribute water. After we gave [water to] the people, Arnaldo [leader of the group] gave me a box [of water]’. Experiences such as Pedro’s, Blanca’s and José’s are a glimpse into how the dynamics at the state level pushed participants to secure water for their households and households in their communities they perceived to be in vulnerable positions.

Discussion

This study has significantly expanded our contextual understanding of household water-sharing practices by exploring these in a disaster context. Prior literature focused on household water sharing in contexts of chronic water insecurity and defined it as exchanges of privately held water between households. Our research expands our understanding of household water sharing in a disaster context by encompassing not just the exchanges of water but also the broader labour cooperation networks that make this water sharing possible. In doing so, our work enables us to conceptualize water sharing as a form of *autogestión*.

Our participants described household and community water sharing as *autogestión*, or a self-organized response to hurricane-induced potable water challenge. This highlights how individuals drew on social and community networks to secure water for their and other households. The self-organized response presents some elements of the conventional understanding of *autogestión* as a radical transformation of society. For example, people were able to mobilize their limited resources to address survival needs. They did this without monetary expectations. Individuals directly impacted by the disaster decided to utilize resources at their disposals, such as having a car or the physical ability to get water resources offered by the state at centralized locations and redistributing them amongst those who needed it. Even those with fewer resources, such as the elderly and households without transportation, shared their surplus water with family members and neighbours. Therefore, individual and community *autogestión* helped ensure a human right to water even in state abandonment.

While it is important to recognize the potentially transformative implications of *autogestión*, our findings also highlight some of the challenges and their implications under neoliberalism and colonialism. For instance, households that engaged in post-disaster spontaneous arrangements – without the proper capacity and skill-building – were exposed to significant risks, including emotional distress and risks from drinking untreated water. With the domino effect from the impact of this hazard on built environments, households were juggling water, food and energy insecurity simultaneously. These responses became a sticking plaster in the face of macro-political and economic problems. Without a counteractive political agenda, *autogestión* in these experiences mainly amounted to coping responses without challenging the possibility for structural change. Nevertheless, the involvements of emergent organizers as discussed above could provide space for future political action. For the moment, the implications of this sticking plaster are multifold, including individuals' emotional burdens, new logistics for water security, and larger political-economic critiques emerging from people's frustrations from slow governmental aid.

These dynamics at the household and community level represent the negligence by the design of both the government of Puerto Rico and the United States before and in the wake of this event. Our work presents self-management as a double burden for communities that have been abandoned by state policies that prioritize capital accumulation, often through deregulation and corruption enacted and enabled at both the federal and local levels of governance (e.g., Santiago et al., 2020, Villanueva, 2019). Under the logic of neoliberal government practices, residents have a responsibility to be in charge of their well-being without considering the structural inequalities that position them in need to engage in self-reliance in the first place. By producing critical infrastructure failures through mismanagement – and leveraging these crises to argue for privatizing public

goods – we see a manufactured crisis developed in the archipelago (Ramos, 2019). In a colonial government, this is further exacerbated by its limited power in decision-making and promoted ventures that mostly benefit outside investors. Such neoliberal and colonial practices in Puerto Rico threaten the human right to water for residents.

In this study, we agree with Ortiz's (2014) propositions of how other entities (e.g., international organizations and the state) use the concept of *autogestión* to maintain control while pretending there is a transfer of power to marginalized low-income communities through self-sufficiency. Thus, co-opted by the neoliberal state, the quintessentially human adaptive tool of engaging in flexible provisioning and well-being-enhancing tactics for the benefit of kin and close social relations – what people have always done but we nowadays call '*autogestión*' – can perpetuate mismanagement and neglect in state societies. In this way, it plays an important part in the neoliberal and colonial agenda since social responsibility is transferred to households and communities, while the state focuses on benefiting foreign investors and developing new markets through a smaller government and privatization agenda. This is contrasted with other ongoing self-organization initiatives in which communities have already come together to work against political, economic and/or environmental disasters and are thus able to activate their networks as well as to create new networks to purposefully engage in strategies against colonization, and who work to build capacity and sustainable development (Santiago et al., 2020).

Water insecurity after Hurricane María was a manifestation of inequitable political and economic systems. As a tool of neoliberalism and colonialism, these *autogestión* acts can multiply the burden on households that might only have sufficient resources for their immediate family members. Likewise, as a process that requires social networks and cooperation that creates additional workloads, disproportionately burdening women, the disabled and the elderly (Smyrilli et al., 2018). Being forced into marginal environments by neglect presents consequences for those who cannot engage in this form of organizing (e.g., people with disabilities, elders and those with transportation challenges), which adds another layer of vulnerability. Here, more research is needed to understand how network dependency might influence intrahousehold sharing and *autogestión*.

This calls critical attention to how the state 'champions' the ability of communities to respond and endure multiple and mounting crises while presenting significant delays on social assistance and general negligence in water assistance. This case is just one glimpse of how state (in)actions serve to open new markets (with a narrative of efficiency) in the water sector by privatizing a utility. Meanwhile, individuals and communities face challenges to secure their human right to safe water. Hence, to ensure water security for human and environmental well-being in the wake of a hazard impact, the neoliberal and colonial governance model needs to be counteracted by a new model that supports transparency, works towards decolonization, prioritizes local well-being, public participation, and provides access to clean and safe water to households during normal times and in the aftermath of extreme weather events while de-emphasizing hierarchical relationships in control over resources.

Conclusions

The combination of US colonial policies that limit aid, neoliberal practices that dismantle public critical infrastructures, and the austerity politics and policy in the Puerto Rico

archipelago minimized both disaster preparedness and proper response; it developed a scenario in which water insecurity has been made visible, nationally and internationally, due to the hazard's impact on critical infrastructure. Our analysis illustrates that self-reliance was enacted through water sharing and social connections in the wake of a large-scale disaster, connecting interhousehold and community dynamics to much larger neoliberal political and economic forces. By looking at the enacting of *autogestión* as a tool of the colonial and neoliberal agenda, we can observe how the neoliberal state in Puerto Rico has co-opted self-organization, resulting in a double burden for vulnerable citizens: being governed – and limited – by the state while doing the extra work as a means to subsist. Although self-organization through this neoliberal and colonial lens does not (yet) challenge hierarchical structures, the labour cooperation that occurred through the activation of *autogestión* was significant to overcoming the immediate humanitarian crisis and opens possible pathways for political action.

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