

# INCREASING FLOOD RESILIENCE IN NEW YORK CITY THROUGH SANDBAG GIVEAWAY AND EDUCATION PROGRAMS

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## Thesis

New York City should build on its Rain Barrel Giveaway program by providing sandbags and flood education to vulnerable residents in low-income communities. Doing so would help protect these communities from the escalating impacts of climate change.

## Background Analysis

Due to the acceleration of the climate crisis, New York City faces increasing vulnerability to flooding. According to one study, the annual rainfall in New York City could increase by as much as 87.2 percent by 2047, making it one of the most at-risk cities in the world for flood damage.<sup>1</sup> Flood preparation is especially important given that 1.3 million NYC residents already live in or near flood zones.<sup>2</sup> Moreover, not all NYC residents are equally vulnerable: As of 2017, 56 percent of the residents within or directly adjacent to the floodplain identified as non-white.<sup>3</sup> Given the progression of the climate crisis, the actual number of flood zones and vulnerable residents within them is likely already higher and will continue to increase.

Flood damage already disproportionately impacts low-income communities and communities of color. For example, when Category 1 Hurricane Sandy struck New York City in 2012, the New York City Housing Authority (NYCHA) reported that 402 of its buildings and 35,000 of its residential units were damaged by the storm<sup>4</sup>—almost 20 percent of its total residential units citywide.<sup>5</sup>

The damage wasn't limited to NYCHA housing. According to the NYC Department of Buildings, over 60 percent of the homes in Queens were damaged or affected by the storm.<sup>6</sup> Far Rockaway's peninsula, which is home to more than 120,000 people,<sup>7</sup> was particularly vulnerable. There, 84 percent of residential units were located in Sandy's storm surge area, and 22 percent of those residents lived below the poverty line.<sup>8</sup>

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1 Zahmatkesh, Z., Karamouz, M. An uncertainty-based framework to quantifying climate change impacts on coastal flood vulnerability: case study of New York City. *Environ Monit Assess* 189, 567 (2017). <https://doi.org/10.1007/s10661-017-6282-y>

2 Taba, Tyler. "Our Right to Know – Disclose Flood Risk in New York and New Jersey." Waterfront Alliance, February 25, 2022. <https://waterfrontalliance.org/2022/02/24/our-right-to-know-disclose-flood-risk-in-new-york-and-new-jersey/>

3 Ibid.

4 "Sandy's Effects on Housing in New York City." NYU FURMAN CENTER. Accessed March 20, 2023. <https://furmancenter.org/files/publications/SandysEffectsOnHousingInNYC.pdf>.

5 Ibid.

6 "SANDY AND ITS IMPACTS." Sandy and Its Impacts. Mayor Bloomberg Administration/Special Initiative for Rebuilding and Resiliency. [https://www.nyc.gov/html/sirr/downloads/pdf/final\\_report/Ch\\_1\\_SandyImpacts\\_FINAL\\_singles.pdf](https://www.nyc.gov/html/sirr/downloads/pdf/final_report/Ch_1_SandyImpacts_FINAL_singles.pdf).

7 Ferré-Sadurní, Luis. "Could the Rockaways Survive Another Sandy?" *New York Times*, July 13, 2017. <https://www.nytimes.com/2017/07/13/nyregion/rockaways-beaches-hurricane-sandy.html>.

8 "PubMed Central Image Viewer." National Center for Biotechnology Information. U.S. National Library of Medicine. Accessed March 19, 2023. [https://www.ncbi.nlm.nih.gov/core/lw/2.0/html/tileshop\\_pmc/tileshop\\_pmc\\_inline.html?title=Click+on+image+to+zoom&p=PMC3&id=6181816\\_11524\\_2018\\_280\\_Fig1\\_HTML.jpg](https://www.ncbi.nlm.nih.gov/core/lw/2.0/html/tileshop_pmc/tileshop_pmc_inline.html?title=Click+on+image+to+zoom&p=PMC3&id=6181816_11524_2018_280_Fig1_HTML.jpg).

The most recent severe storm, Hurricane Ida<sup>9</sup> in the summer of 2021, caused at least 16 deaths in the greater New York City metro area—most of them low-income, people of color.<sup>10</sup> Many of these deaths were provoked by a mix of inadequate flood preparation and illegal or exploitative housing conditions. Thirteen people out of the reported 16 deaths died from being trapped in a flooded basement.<sup>11</sup> One family had an autistic 14-month-old baby, who drowned inside the basement of their rental home in Woodside, Queens.<sup>12</sup> The storm flooded the first floor and the basement of the home, trapping the family inside.<sup>13</sup>

## Policy Idea

New York City's Department of Environmental Protection should restart its DEP Rain Barrel Giveaway Program and add sandbag distribution to its process. Sandbags would be disposed of through regular waste management processes—a different process than recycling. Each eligible household could collect a proportionate amount of sandbags, with eligibility defined by (1) classification as a residential complex, (2) identified entrances and windows vulnerable to leaking, and (3) the residence's proximity to vulnerable entrances and windows.

As with the DEP Rain Barrel program, sandbags would be distributed in bulk to New York City Council members' district offices with priority given to offices that serve low-income communities located within a floodplain. In practice, each office would be responsible for distributing the bags to eligible district households on a first-come, first-serve basis during government-run events in the months leading up to hurricane season.

Instructions for installation and educational pamphlets about flood preparation should be distributed alongside the sandbags. This would include information about safety guidelines in flood zone areas, how to prevent flooding during hurricane season, dos and don'ts when using the sandbags, and further information about post-storm resources.

## Policy Analysis

Adding sandbags to the DEP Rain Barrel program would be a cost-efficient and quick way to provide more flood protection for the city's most vulnerable residents. The DEP Rain Barrel Giveaway Program—which the city temporarily paused during COVID-19<sup>14</sup>—is part of New York City's Green Infrastructure Plan, which is a \$2.4 billion investment in green infrastructure projects.<sup>15</sup> The cost of sandbags is relatively low, ranging from \$1.50 to \$60,<sup>16</sup> but is especially low compared to how much it can cost to repair buildings after flood damage. By comparison, it's estimated that just one inch of flooding can cause \$25,000 worth of damage to a home.<sup>17</sup>

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9 Jesse McKinley, Nate Schweber. "New York Flooding: Flooding from Ida Kills Dozens of People in Four States (Published 2021)." *New York Times*, October 13, 2021. <https://www.nytimes.com/live/2021/09/02/nyregion/nyc-storm>.

10 Ibid.

11 Newman, Andy, Luis Ferré- Sadurní, Tracey Tully, Jonah E. Bromwich, and Eliza Shapiro. "New York Storm Updates: As Ida Deaths Rise, N.Y. Leaders Look toward Future Storms (Published 2021)." *New York Times*, March 1, 2023. <https://www.nytimes.com/live/2021/09/03/nyregion/nyc-flooding-ida>.

12 Kriegstein, Brittany, Wes Parnell, Theodore Parisienne, Molly Crane-Newman, John Annese, Thomas Tracy, and Larry McShane. "Hurricane Ida NYC Death Toll Rises to 13, Including Infant and Senior Citizen, after Record Rains and Lethal Flooding." *New York Daily News*, September 2, 2021. <https://www.nydailynews.com/new-york/nyc-crime/ny-hurricane-ida-rain-flooding-dead-20210902-moja6dep2renjlivacy3vyk6qi-story.html>.

13 Ibid.

14 According to twitter correspondence from NYC Water.

15 "Dec and DEP Announce Groundbreaking Agreement to Reduce Combined Sewer Overflows Using Green Infrastructure in New York City." DEC and DEP Announce Groundbreaking Agreement To Reduce Combined Sewer Overflows Using Green Infrast. Accessed March 19, 2023. [https://www.nyc.gov/html/dep/html/press\\_releases/12-17pr.shtml#.ZBfUTi-B0pE](https://www.nyc.gov/html/dep/html/press_releases/12-17pr.shtml#.ZBfUTi-B0pE)

16 "Pre Filled Sandbags for Flooding (30 Lbs Each) - Size: 14-Inch x 26-Inch - Woven Polypropylene." Sandbaggy. Accessed March 19, 2023. <https://sandbaggy.com/products/pre-filled-sandbags-30-lbs>.

17 Crane, Emily. "Here's What It Could Cost to Clean up Hurricane Ida Damage in NYC, NJ." *New York Post*, September 3, 2021. <https://nypost.com/2021/09/03/what-it-could-cost-to-clean-up-hurricane-ida-damage-in-nyc-nj/>.

Adding this program to an existing distribution process would capitalize on funding already in place, making this a low-cost, easy-to-implement source of flood protection.

Sandbags will not *stop* flooding or prevent the escalation of the climate crisis, but they are an important, easy defense for residents to deploy. They reduce flood damage by diverting water flow and preventing water from entering the inside of buildings and residences.<sup>18</sup> A low-cost program like this could prevent billions of dollars of damage, and even reduce the housing insecurity faced after severe weather.

While other policies are focused on macro-level solutions, extra flood protection is an immediate action the NYC government can take to protect homes and save lives.

## Talking Points

- NYC experiences flooding from severe weather every year. Residents, especially those in vulnerable and low-income communities, need a speedy defense against the impacts of severe storms—which are becoming stronger and more frequent.<sup>19</sup>
- In conjunction with the DEP Rain Barrel program, New York City should distribute sandbags through city council offices with a priority of reaching residents in vulnerable areas. Educational pamphlets on how to combat flooding damage would be included with the sandbags.
- Sandbags can reduce the damages caused by flooding, and are a cost-effective method for preventing water from entering homes.<sup>20</sup>
- NYC's flood zone areas are increasing in number due to the climate crisis. Residents need a solution to protect themselves and their homes during severe weather.

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18 “Flood Fighting: How to Use Sandbags Emergency Management ... - Seattle.” Flood Fighting: How To Use Sandbags, March 22, 2001. <https://www.seattle.gov/Documents/Departments/SPU/Services/DrainageSewer/FloodFightHowtoUseSandbags.pdf>.

19 Staletovich, Jenny, Nick Underwood, Jaclyn Jeffrey-Wilensky, Rosemary Misdary, and Jacob Fenston. “These Hurricane Flood Maps Reveal the Climate Future for Miami, NYC and D.C.” *NPR*, July 28, 2022. <https://www.npr.org/2022/07/28/1107518744/nyc-miami-dc-climate-change-flooding>

20 “Flood Fighting: How to Use Sandbags Emergency Management ... - Seattle.” Flood Fighting: How To Use Sandbags, March 22, 2001. <https://www.seattle.gov/Documents/Departments/SPU/Services/DrainageSewer/FloodFightHowtoUseSandbags.pdf>.



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