

Appendix A

Results Tables

Table A1. Socio-Economic and Housing Conditions in Research Sites

Municipality	Community	Poverty Rate (%)	Employment Rate (%)	Median Household Income (\$)	Median Property Value (\$)	Vacant Properties
Aguas Buenas		46.6	32.7	19,279	116,200	2,210
	Pueblo	49.1	36.4	17,875	87,200	250
	Caguitas	51.1	38.2	15,125	112,000	134
	La Jacana	45.3	43.4	20,929	110,800	501
	Las Corujas	45.3	43.4	20,929	110,800	
	Santa Clara	45.3	43.4	20,929	110,800	
Barceloneta		48.6	26.9	17,154	104,600	2,053
	La Boca	56.5	37.9	13,146	95,300	
	Mameyes	48.9	39.8	16,832	104,300	1,260
	Palenque	48.9	39.8	16,832	104,300	
	Palmas Altas	56.5	37.9	13,146	95,300	
	Verdum	56.5	37.9	13,146	95,300	
Culebra		31.0	55.3	25,658	161,700	1,046
	Pueblo	46.8	48.2	25,500	84,800	
	Flamenco	26.1	67.7	30,972	146,300	371
Hormigueros		43.6	30.7	15,943	98,700	1,394
	El Hoyo	56.3	56.7	20,489	117,800	
	Guanajibo	40.5	39.6	17,441	102,000	450
	Hormigueros Campo	31.4	47.0	21,227	99,900	191
	Pueblo	49.5	43.7	22,196	97,700	104
	Jaguitas	56.3	56.7	20,489	117,800	148
	Lavadero	46.8	50.6	21,195	94,700	442
	San José	46.8	50.6	21,195	94,700	
	San Romualdo	40.5	39.6	17,441	102,000	
	Valle Hermoso Sur	40.5	39.6	17,441	102,000	
Isabela		55.7	25.3	16,540	102,200	5,588
	Corchado	48.7	42.2	14,691	93,900	1,065
	La Marina	53.9	41.8	15,464	102,000	241
	Parcelas Jobos	50.3	33.5	17,531	107,000	475
	Villa Pesquera	53.9	41.8	15,464	102,000	
Manatí		47.0	26.9	18,502	106,100	3,735
	Urban Center	66.5	37.7	11,172	97,400	717
	Villa Rosa	66.5	37.7	10,359	97,400	

Municipality	Community	Poverty Rate (%)	Employment Rate (%)	Median Household Income (\$)	Median Property Value (\$)	Vacant Properties
San Juan		40.1	52.3	23,642	151,500	48,427
	Rio Piedras Urban Center	57.6	43.9	13,060	126,700	1,788
Toa Baja		36.5	36.7	25,105	122,300	7,292
	Camasey	38.7	48.8	25,010	118,200	
	Campamento	50.5	43.9	16,888	88,800	1,097
	Candelaria	38.7	48.8	25,010	118,200	1,436
	La Vega	32.5	51.8	26,673	126,000	
	Levitown (2nd Section)	32.5	51.8	26,673	126,000	
	Los Magos	32.5	51.8	26,673	126,000	
	Palo Seco	23.6	52.1	19,688	83,800	81
	Sabana Seca	32.5	51.8	26,673	126,000	4,323
	Pueblo	56.6	57.0	19,292	93,900	64
	Toaville	50.5	43.9	16,888	88,800	
	Villa Kennedy	32.5	51.8	26,673	126,000	
	Villa Marisol	32.5	51.8	26,673	126,000	
Vega Baja		45.2	27.4	19,617	106,600	5,891
	Cabo Caribe	49.3	37.3	17,721	96,300	525
	Colinas de Marques	49.3	37.3	17,721	96,300	
	Ext. Catoni	49.3	37.3	17,721	96,300	
	Urb. Monte Carlo	49.3	37.3	17,721	96,300	
	Urb. San Vicente	49.3	37.3	17,721	96,300	
	Urb. Villa del Rosario	49.3	37.3	17,721	96,300	
	Urb. Villa Real	49.3	37.3	17,721	96,300	
	Pueblo	44.6	39.1	15,208	90,600	181

Table A2. Community Type and Other Environmental Conditions in Research Sites

Municipality	Community	Community Type and Context	Designated Flood Zone	Near Water Body	Near Industrial Activity
Aguas Buenas	Pueblo	Borough Low Density Urban Low informality	Yes	Yes	No
Aguas Buenas	Caguitas	Borough Rural High Informality	Yes	Yes	No
Aguas Buenas	La Jacana	Settlement Rural High informality	No	No	No
Aguas Buenas	Las Corujas	Settlement Rural High informality	No	No	No
Aguas Buenas	Santa Clara	Settlement Rural High informality	No	No	No
Barceloneta	La Boca	Settlement Coastal High Informality	Yes	Yes	No
Barceloneta	Mameyes	Settlement Suburban High informality	No	No	No
Barceloneta	Palenque	Settlement Rural High informality	No	No	No
Barceloneta	Palmas Altas	Borough Suburban Low informality	Yes	Yes	Yes
Barceloneta	Verdum	Settlement Coastal High informality	Yes	Yes	Yes
Culebra	Pueblo	Borough Low density urban	Yes	Yes	Yes
Culebra	Flamenco	Borough Suburban	Yes	Yes	No
Hormigueros	El Hoyo	Settlement Rural High informality	No	No	Yes
Hormigueros	Guanajibo	Borough Suburban High informality	Yes	Yes	No
Hormigueros	Hormigueros Campo	Borough Rural High informality	Yes	Yes	No
Hormigueros	Pueblo	Borough	No	No	No

Municipality	Community	Community Type and Context	Designated Flood Zone	Near Water Body	Near Industrial Activity
		Low density urban Mid-level informality			
Hormigueros	Jaguitas	Borough Rural High informality	No	No	No
Hormigueros	Lavadero	Borough Suburban	Yes	Yes	No
Hormigueros	San José	Settlement Rural High informality	Yes	Yes	Yes
Hormigueros	San Romualdo	Settlement Suburban High informality	Yes	Yes	Yes
Hormigueros	Valle Hermoso Sur	Settlement Low density urban High informality	Yes	Yes	No
Isabela	Corchado	Settlement Low density coastal	No	Yes	No
Isabela	La Marina	Settlement Low density coastal	Yes	Yes	No
Isabela	Parcelas Jobos	Borough Suburban	Yes	Yes	No
Isabela	Villa Pesquera	Settlement Suburban	Yes	Yes	No
Manatí	Urban Center	Borough Low density urban Mid-level informality	No	No	No
Manatí	Villa Rosa	Informal Settlement Low density urban High informality	No	No	No
San Juan	Rio Piedras Urban Center	Borough High density urban Low informality	No	Yes	No
Toa Baja	Camasey	Settlement Low density suburban High informality	No	No	No
Toa Baja	Campamento	Settlement Low density suburban High informality	Yes	Yes	No
Toa Baja	Candelaria	Borough Extremely high-density suburban	No	No	No
Toa Baja	La Vega	Settlement High density suburban Low informality	Yes	Yes	No

Municipality	Community	Community Type and Context	Designated Flood Zone	Near Water Body	Near Industrial Activity
Toa Baja	Levitown (2nd Section)	Urbanization Extremely high-density suburban Low informality	Yes	Yes	No
Toa Baja	Los Magos	Urbanization Mid-density suburban Mid-level informality	Yes	Yes	No
Toa Baja	Palo Seco	Borough Abandoned Company Town High informality	Yes	Yes	Yes
Toa Baja	Sabana Seca	Borough Low Density Suburban High informality	Yes	Yes	No
Toa Baja	Pueblo	Borough Mid-density urban Low informality	Yes	Yes	No
Toa Baja	Toaville	Settlement Low density urban High informality	Yes	Yes	No
Toa Baja	Villa Kennedy	Settlement High density urban Mid-level informality	Yes	Yes	No
Toa Baja	Villa Marisol	Settlement High density suburban Mid-level informality	Yes	Yes	No
Vega Baja	Cabo Caribe	Borough Mid-density suburban Mid-level informality	Yes	Yes	Yes
Vega Baja	Colinas de Marques	Settlement Mid-density suburban Mid-level informality	Yes	Yes	Yes
Vega Baja	Ext. Catoni	Settlement Mid-density suburban Mid-level informality	Yes	Yes	Yes
Vega Baja	Urb. Monte Carlo	Settlement Mid-density suburban Mid-level informality	Yes	Yes	Yes
Vega Baja	Urb. San Vicente	Settlement Mid-density suburban Mid-level informality	Yes	Yes	Yes
Vega Baja	Urb. Villa del Rosario	Settlement Mid-density suburban Mid-level informality	Yes	Yes	Yes

Municipality	Community	Community Type and Context	Designated Flood Zone	Near Water Body	Near Industrial Activity
Vega Baja	Urb. Villa Real	Settlement Mid-density suburban Mid-level informality	Yes	Yes	Yes
Vega Baja	Pueblo	Borough Mid-density urban Mid-level informality	Yes	Yes	No

Appendices from: Alvarado, M., Carrasquillo, D., Gallardo, L., & Chopel, A. (2022). The Public Health Implications of Abandoned Spaces in Post-Maria Puerto Rico. *Natural Hazards Center Public Health Grant Report Series, 25*. Boulder, CO: Natural Hazards Center, University of Colorado Boulder.

Table A3. Municipal Responses to Abandonment

Activities	Percent of Municipalities
Approved ordinance in the past four years	67
Intention to approve ordinance in near future	37
Privatized nuisance abatement program	74
Formerly declared a nuisance in the past two years	59
Inventoried possible nuisances	61
Cleaned lots	57
Boarded up or cleaned buildings	28
Demolished a structure	28
Purchased a property	15
Foreclosed a property	2
Eminent domain of a property	28
Sold a property	9
Carried out community meetings	54
Donated a property to a non-profit	11
Rehabilitated a property	15
Coordinated clean-up with a community	43
Inventoried nuisances with a community	26
Created a community plan for reuse	30

Note. N= 46. Data are from the municipal survey.

Table A4. Municipal Priorities for Abandoned Spaces

Priority	Percent of Municipalities
Community Development Block Grant- Disaster Recovery (CDBG-DR) recovery	33
Generate municipal income	41
Public use	37
Affordable housing	74
Promote economic development	76
Other	22

Note. N=46. Data are from the municipal survey.

Table A5. Community-Based Survey Results

Measure		Percent of Respondents Agreeing with Statement	
		Active Communities ^a (n=51 respondents)	Inactive Communities ^b (n=83 respondents)
Change in abandonment since the 2017 hurricanes	Abandonment increased	65%	70%
	Abandonment about the same	30%	22%
	Abandonment decreased	6%	0%
Municipal involvement in addressing abandonment	Municipal staff met with the community	69%	24%
	Municipal staff understood the concerns of the community	75%	40%
	Respondent trusts municipal process to address abandonment ^c	57%	23%
Collective action	After María, community members have worked together to rescue abandoned buildings	22%	Could your community enjoy more services or activities if an abandoned building were rescued? 65% yes 22% no
	If yes, was this happening before the hurricanes or is it new?	20% before 35% new	
Principal health problems in the community	Intrafamilial violence	13.25%	9.8%
	Criminal violence	18.07%	13.73%
	Chronic illnesses	25.3%	41.18%
	Mosquito-born illnesses	25.3%	21.57%
	Mental illnesses	26.51%	43.14%
	Sexually-transmitted or drug use-related illnesses	12.05%	11.76%

Appendices from: Alvarado, M., Carrasquillo, D., Gallardo, L., & Chopel, A. (2022). The Public Health Implications of Abandoned Spaces in Post-Maria Puerto Rico. *Natural Hazards Center Public Health Grant Report Series, 25*. Boulder, CO: Natural Hazards Center, University of Colorado Boulder.

Measure		Percent of Respondents Agreeing with Statement	
		Active Communities ^a (n=51 respondents)	Inactive Communities ^b (n=83 respondents)
Changes in health before and after (in active communities before and after collective action to address abandonment, in inactive communities before and after 2017 hurricanes)	Self physical health before	20% Poor 51% Regular 18% Good	17% Poor 27% Regular 28% Good
	Self physical health after	2% Poor 59% Regular 16% Good	11% Poor 31% Regular 24% Good
	Self mental health before	20% Poor 57% Regular 10% Good	5% Poor 28% Regular 33% Good
	Self mental health after	12% Poor 49% Regular 16% Good	7% Poor 37% Regular 24% Good
	Neighbors physical health before	22% Poor 57% Regular 8% Good	6% Poor 30% Regular 30% Good
	Neighbors physical health after	10% Poor 53% Regular 14% Good	10% Poor 41% Regular 14% Good
	Neighbors mental health before	16% Poor 65% Regular 6% Good	10% Poor 30% Regular 23% Good
	Neighbors mental health after	12% Poor 47% Regular 16% Good	14% Poor 37% Regular 14% Good
Health behavior changes	Change in produce consumption	45% more 16% less	25% more 40% less
	Change in exercise	33% more 25% less	29% more 46% less
Social capital	Percent reporting they know their neighbors more now compared to before there was collective action	40% yes 43% no	

Appendices from: Alvarado, M., Carrasquillo, D., Gallardo, L., & Chopel, A. (2022). The Public Health Implications of Abandoned Spaces in Post-Maria Puerto Rico. *Natural Hazards Center Public Health Grant Report Series, 25*. Boulder, CO: Natural Hazards Center, University of Colorado Boulder.

Measure		Percent of Respondents Agreeing with Statement	
		Active Communities ^a (n=51 respondents)	Inactive Communities ^b (n=83 respondents)
Health risks associated with abandonment that have increased	Mosquitos/ standing water		55%
	Trash in and around the area		63%
	Violence or crime		22%
	Drug consumption		29%
Community assets associated with rescue of abandoned buildings and lots	Educational services	45%	
	Entrepreneurial opportunities	43%	
	Community gardens	49%	
	Sociocultural events	55%	
	Organized sports or space for exercise	51%	
Does abandonment impact your sense of pride, happiness or community feeling?	Percent answering yes	76%	58%
	Percent answering yes across both communities	77.68% of those who answered, 64.93% of total sample	

Note. To reduce the amount of information, non-answer percentages were not included. Raw data are available upon request. Non-answers were higher on the second page, as surveys were printed front-to-back on one page and administered in person. See Appendices for both instruments.

^a Surveys were administered in five active communities.

^b Surveys were administered in two inactive communities.

^c Restricted to respondents whose communities were part of a municipal program to address public nuisances.

Appendix B

Review of Puerto Rico Municipal Code (2020)

We closely reviewed the Puerto Rico Municipal Code (2020) to evaluate the policies regulating the acquisition and disposition of abandoned properties. These policies are a crucial component for the permanent elimination of long-term risks associated with abandonment, including health risks. Our review demonstrated that the primary methods of disposition of nuisance properties were through the foreclosure of liens related to nuisance abatement or eminent domain with private capital. An explanation of these aspects of the municipal code and how municipalities have applied them follows.

To foreclose liens, municipalities must carry out court action and request that the property be auctioned (§ 7634). These liens are established either through direct municipal involvement in mitigation efforts (as seen in the boarding up of properties, their clean up, or demolition), fines, or a combination of both. This process presumes the availability of municipal funding or capital to carry out direct mitigation efforts. In addition, the public nuisance chapter of the Municipal Code provides very little flexibility with fines, enabling a single fine which is issued when a municipality carries out mitigation efforts. A municipality having to cut a vacant lot's grass multiple times, for example, cannot repeatedly fine the property or its owner again under this statute, thus disincentivizing them from more than one abatement effort. In order to pressure property owners to comply with abatement efforts, some municipalities have devised additional fines, either through Public Order codes or by creating an administrative fine through ordinances.

Eminent domain is also a central theme of the Municipal Code (§ 7636) and many ordinances. Per the current Code, private purchasers – primarily investors – consign the value of the property with the municipality, who in turn carries out nuisance declaration efforts and condemns the property. Despite the legislative emphasis on this mechanism, a review of closed and active condemnation cases regarding nuisance properties demonstrated that its usage was not widespread (nor was any nuisance acquisition method for that matter) and it was often limited to private real estate facilitators through public-private partnerships with municipalities. Similar to the lien foreclosure process, this method of acquisition too required a ready purchaser with the property's appraised value in cash.

Beyond the methods of acquisition and disposition outlined in the Municipal Code's nuisance chapter, other alternatives exist, such as property passing to the municipality in cases where owners pass away without heirs (Puerto Rico Civil Code, § 11439, 2020), revocation of usufruct or surface rights of properties on municipal-owned land (Puerto Rico Municipal Code, § 7191), or condemnation with abatement- and tax-related debts being deducted from the fair compensation value (§ 7634(d)). These acquisition methods require that the properties pass through the municipality first, thus granting wider flexibility for the establishment of reduced sales prices or outright donation, terms for disposition or re-use, non-cash financing, and other activities that could directly benefit affordable housing or community-based projects. Promoting and facilitating these alternate methods of acquisition and disposition of nuisance properties are crucial to assure community-control and increased affordable housing options.