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Pain of Sustainability: Limiting the Number of Times Homeowners Can Receive Disaster Relief

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Abstract: A sustainable future for communities that are highly vulnerable to natural hazard events means not locating new sensitive land uses, requiring existing land uses to be retrofitted in order to obtain insurance, and implementing other restrictive policies. Our objective was to measure the willingness of U.S. adult residents of New Jersey, a state devastated three times by major tropical storms in 1999, 2011, and 2012, to agree with a very restrictive policy—placing a limit on the number of times homeowners may receive financial disaster relief from natural hazard events. Using random digit dialing for landline (65%) and cell phone (35%), the authors collected 875 surveys of New Jersey residents in 2013, four months after Hurricane Sandy devastated much of New Jersey. Fifty-nine percent of respondents agreed with this painful policy. They disproportionately were older males who were fiscally conservative, and they took this stance despite personally believing that global climate change-related natural hazard events are real and are a threat. In New Jersey and other states, officials and others responsible for securing public agreement with these programs face a difficult challenge of implementing these programs because of public mistrust of state and federal government as initiators and implementers.

Keywords: limiting access to disaster relief funds; reducing vulnerability; tropical storms Sandy and Irene

1. Introduction

A sustainable future requires that government and industry develop and promote policies and programs that will benefit future generations [1,2]. However, long-term progress depends upon public acceptance or at least acquiescence to behavioral changes, some of which may be painful. This paper is about one of these changes—a policy that would not provide disaster relief to residential property owners if their property has been devastated by natural hazard events on multiple occasions.

The context for the first author began in 1998, when he visited Pattonsburg, Missouri (population then was 502, now about 350). Most of the houses in this hamlet had been destroyed in 1993 by floods that made parts of the Midwest of the United States look like another great lake. In 1998, the author observed foundations, boarded up houses, and a few occupied units. During the 20th century, Pattonsburg, according to residents, had been flooded 30 to 40 times [3].

Pattonsburg was not going to be rebuilt again because the Federal Emergency Management Agency (FEMA) decided that it was no longer willing to pay to have it rebuilt. A more sustainable option was to build “new” Pattonsburg, about two miles away. FEMA helped those who did not want to move to new Pattonsburg to relocate elsewhere. The Pattonsburg experience was excruciatingly painful for many people to whom the first author spoke, and it left him with an emotional response of sympathy for those who had to leave the place where they had lived all or most of their lives and a cognitive response, which was later to praise the director of the local FEMA headquarters for making a prudent decision [3].

The Pattonsburg experience has been re-enacted several more times [4,5] in relatively small towns that frequently have been devastated. However, until storms struck parts of Florida, Louisiana, New Jersey, New York, North Carolina, and Texas causing massive damage on multiple occasions, it was difficult to contemplate that a tough-minded policy about restricting reimbursement for damage could be applied in populous areas with middle class and higher economic status.

Hurricane Floyd struck the U.S. east coast in December 1999, Hurricane Irene hit in August 2011, and Hurricane Sandy late October 2012. In New Jersey, in addition to deaths and injuries, estimates of Sandy-related damage are in the \$30–\$40 billion range [6,7]. Many homes were damaged and others completely destroyed, and a year after Sandy many people remain displaced and suffering mental health symptoms [8]. After three massive tropical storms in a little over a decade, actions to reduce vulnerability and increase sustainability must be considered by responsible officials, even though tens of thousands of homes are at risk compared to only dozens at Pattonsburg. Government, especially FEMA, Department of Housing and Urban Development (HUD), Environmental Protection Agency (EPA), Department of Transportation (DOT) and other large federal and their state progeny are engaged in implementing buy-outs, increasing building requirements, building dunes, and in other ways trying to increase the sustainability of housing and other structures in the vulnerable areas [9–15].

Policies that have been put on the table for increasing sustainability of vulnerable areas, include offering buyouts, requiring upgrading of existing units, building dunes and other engineering structures, not allowing new residential and other structures facilities, and others (see below). However, what we call the Pattonsburg policy, that is, denying rebuilding funds for repeatedly damaged units, is arguably the most difficult for the general public to accept because it removes a safety net from homeowners who may have lived with their family in their unit or the area for their

entire lives. In the United States, individuals and local governments have historically made the decisions about what to do with their property, and they have come to expect federal disaster relief, and their state and local government and charitable organizations to come to their rescue. Logic suggests, however, that short of building enormous engineered structures, which may not always work, across the United States, the sustainable solution is to reduce vulnerability by implementing restrictive policies, including the Pattonsburg one.

As we were constructing the survey used here, the authors informally spoke with residents and found a wide variety of responses to the policy options considered for a survey. However, the Pattonsburg one appeared to elicit the most discomfort because people assume that government support was guaranteed, no matter how often they were assaulted by wind, rain, mud, and other natural elements.

Using a telephone survey administered four months after Hurricane Sandy, the objective of this research was to answer two research questions:

- (1) What proportion of New Jersey residents would support a policy of limiting the number of times homeowners may receive financial disaster relief?
- (2) What factors help us understand the proportions found in response to question 1?

2. Context and Expectations

Two parts of the literature were the foundation for the study. One was about global climate change. The sense of the literature is that the U.S. public and others have increasingly been acknowledging global climate change [16–20]. However, scholars concluded that while the public gave verbal lip service to global climate change and sustainability in surveys, global climate change was too psychologically distant from them, and the gap would only decrease if people felt personally at risk [21–25].

The psychological distance should have narrowed because of costly impacts from natural hazard events have markedly increased, especially in the United States and specifically along the Atlantic Ocean and Gulf Coast [26,27]. With a cost estimated at over \$100 billion, Hurricane Katrina in 2005 has been the most costly storm in U.S. history [28,29]. Florida, New York and New Jersey have been struck multiple times during the 21st century [6–8,30–34]. New Jersey Governor Chris Christie reported that Sandy, which bludgeoned the state in late October 2012, had damages of \$30–40 billion, and cost 8000 jobs. Notably, the Governor estimated that 346,000 homes were damaged or destroyed [6,7]. Prior to Sandy, tropical storms Floyd (1999) and Irene (2011) had caused severe damage across almost the entire state.

Federal, state, and local officials, businesses, and not-for-profits have been developing and implementing programs to rebuild the state, and these include buyouts, requiring structures to be modified by raising them and using more resistant building materials, building dunes and other structures to reduce risk, turning vulnerable land into open space, and in general increasing sustainability by focusing on prevention and building in resilience [9–15]. Public support for these efforts has been strong, with various surveys showing 2/3 to 4/5 of residents agreeing with policies that government can require housing in some areas to be built to resist natural disasters, not permit development in places that are needed as buffers, and should relocate infrastructure away from vulnerable areas [8,30–34]. Clearly, in New Jersey the psychological distance from the need to build in

more sustainable ways has shrunk. Hence, our expectation was that respondents who believe that global climate change is occurring and is a risk would support government actions to restrict land uses in vulnerable areas and would be more likely to support restrictions on funds to property-owners who have received funds on multiple occasions because the policy while painful is protective of resources.

Concern about global climate change is, we expected, necessary but not sufficient to support the Pattonsburg policy. If you trust scientists who have built a case that global climate change is occurring and federal, state and local officials to competently implement the policy, and then communicate about it, then you are more likely to support it [35–38]. If you do not trust that global climate change is occurring and that government can implement restrictive programs, then you would be opposed to the Pattonsburg policy.

We also expected recollections and reactions to natural hazard events to be predictors. Strong emotional reactions to Sandy, Irene, and Katrina were expected to lead to opposition to the Pattonsburg policy because the policy implies rejection of the needs of those harmed by major natural hazard events on multiple occasions. As described below, we measured a cognitive *vs.* an emotional reaction using so-called “flashbulb memory” recollections and the words respondents used to describe their responses to Sandy [39–43]. Those who had responses that were cognitive and did not have vivid long term memories of these events were expected to demonstrate support for the Pattonsburg policy.

The second major grounding of the study was public views about the social safety net, that is, programs that benefit economic and socially disadvantaged populations. For a home-owner living in a floodplain or another vulnerable area, the assumption is that if you have insurance, you will receive some reimbursement for damages, whether damage has occurred once, twice or however many times. The expansive literature on safety nets shows that public support for helping those who have lost their jobs, are poor, and in other ways disadvantaged has declined, and that there is considerable pressure on government to control expenditures.

A 2012 Pew study [44] reports that government has lost credibility and decline in support for the social safety net has followed falling from 69% support in 2007 to 59% in 2012. The Pew report shows that support for the safety net has reached a level not seen since 1994. It shows large differences among those who identify with the two major political parties (Democrats much more supportive). The younger population is found to be much more likely to believe that government can efficiently manage the safety net than older population. Almost 70% of 65+ year old respondents of seniors agree with the statement that something run by government is usually inefficient and wasteful compared to 47% of those 18–29 years old. Overall, the strongest supporters of the safety net for education and health care are 18 to 29 year old, women, self-identified Blacks, and the poor. While the report indicates that partisan political differences appear to be the strongest differentiating factor, demographic factors cannot be discounted. Hence, those who favor the Pattonsburg policy, we expected, would disproportionately identify as Republican or Tea Party members, be senior, male, White, and higher socioeconomic status. They should not only support the Pattonsburg policy but also not favor additional expenditures for health care and education (see also [44–46]). Also, these supporters should display individualistic not collectivist/egalitarian worldviews, in other words, they disproportionately are not supporters of programs that redistribute resources to the needy [47].

3. Methods

This section describes the questions, sampling design, and methods of analysis we used.

3.1. Questions

With respect to the key policy question we asked, “Some people are talking about efforts to try to reduce New Jersey’s vulnerability to hurricanes. ... Do you strongly agree, somewhat agree, are neutral, somewhat disagree, or strongly disagree” with the following policy option: “Limit the number of times homeowners in high risk areas may receive financial disaster relief.” The question did not indicate an upper limit on number of times the homeowner could receive relief, and it was limited to homeowners. Also important is that this restrictive policy option was only 1 of 7 provided to respondents. As noted below, some of the others were included in this analysis [34]. The order of the questions was randomized in the survey in order to prevent order bias.

With regard to understanding the responses, we developed two sets of predictors. Twelve were related to global climate change. Three of these were options that we assumed would be associated with the response to the willingness to withdraw support. These were (1) allow local governments to prohibit housing in some areas; (2) require housing in some areas to be built to resist natural disasters; and (3) have the federal government and state government purchase property in vulnerable areas and turn it into open space. The expectation was that those who supported the above three policy options were likely to support the target policy because all four restrict vulnerable housing in high risk areas.

Supporting these policy options should come with several pre-conditions. One of these is the belief that global climate change is occurring and is associated with threats such as storms with strong winds. We also asked if the respondent has changed from not believing that global climate change was occurring to questioning that belief. Respondents who agreed were expected to support the Pattonsburg policy to limit risk to future generations.

It is hard to believe that anyone would support denying relief unless they trust the science that supports the argument that global climate change is occurring and the people that administer policies to reduce vulnerability and increase resilience. If you did not believe the scientific consensus that global climate was occurring, logically you would not endorse what could be considered unwarranted interference in personal choices. Even if you did believe the scientific consensus, you should trust the federal and state government officials that are going to be deeply involved in funding, monitoring and otherwise implementing the program. Hence, we asked three trust-related questions about trust of scientists and government)

Two more sets of global-climate change variables were included to measure cognitive or emotional response. We asked respondents to state the first emotion that came to mind when they remembered Sandy. Responses included strong emotional ones, such as terror, anger, fear, and devastation and the more cognitive ones such as concern, worry, sorrow and loss. These last four were our surrogates for a more cognitive response and hence greater likelihood of supporting the analytical decision to limit the number of times someone could receive compensation.

Another of the 12 global climate change indicators was a metric of flashbulb memories as described earlier. We asked respondents to recall if they had flashbulb memories of Katrina, Irene, and Sandy.

A flashbulb memory was defined as remembering not only a great deal about the storm but also where you were when you first learned about it [39–43]. A score ranging from 0 (no flashbulb memories) to 3 (flashbulb memories of all 3 storms) was created. Few, if any, flashbulb memories, we expected to be associated with more support for the Pattonsburg policy.

Ten measures of values and demographic attributes were included in the survey. Our assumption was that respondents who support this restrictive policy would not be supporters of health care and education as priorities as part of their overall fiscal conservatism. In addition, worldviews include the extent to which respondents believe that people expect government to do things for them that they should do for themselves [47]. Those who strongly agreed with that statement were expected to support the policy.

Respondents were asked for political party affiliation. Those who identify with the Republican and Tea Parties were assumed to be more supportive of the policy. We also asked for respondents to identify their age, income, racial/ethnic identification, educational achievement, and housing status. Those who identified as older, male, relatively lower income, self-identified as White, with less educational achievement, and home owners, as described earlier were expected to be more supportive of the Pattonsburg policy.

3.2. Sampling Design

Shortly after Hurricane Sandy struck on 29 October 2012, several decisions were made about when and how to conduct the survey. In order to reduce the emotional impact of the event on these responses, we waited until about four months after Sandy to start the survey. Four months after the storm hit, many remained deeply emotionally involved in the follow-up of the storm. But four months later and with attenuated media coverage gave people an opportunity to reflect on what had happened and how to respond.

A second decision was how to conduct the survey. We picked a hybrid of cell phone and land-line surveys. Cell phone surveys are much more expensive to conduct because there are many responses of ineligible young respondents and many people retain their cell phone numbers after they move to a different location. However, cell phone surveys are essential to avoid an age bias in the results [48,49]. This survey was 65% landline and 35% cell phones. The sample size was 875 and the population was non-institutionalized persons 18 years and over living in New Jersey. The results were weighted to minimize limited bias in the sample (see below). American Association for Public Opinion Research's protocols were applied, which eliminated telephones not in service and exclude businesses and other inappropriate landline numbers, such as those cell phone respondents who no longer live in New Jersey.

We offered cell sample respondents a \$10 cash incentive to increase their response rate. More generally, we both cell and landline numbers were called as many as 8 times in order to increase response and cooperation rates. For context, the response rate is the number of complete interviews divided by the number of eligible respondents (18+ years old and New Jersey resident). The cooperation rate is the proportion of completed interviews divided by the number of completed, partial interviews, number of refusals and breakoffs. Phone calls were made at different times of the day and days of the week, including weekends, to further reduce bias.

3.3. Analysis

Three statistical tools were used to analyze the data. The first was descriptive statistics to answer the first research question. The second research question required regression analysis. The dependent variable to be examined has 5 categories. They are ordinal, which is 1, 2, 3, 4 or 5. Hence, ordinal regression can be used and was tested, as was multinomial regression. After preliminary testing we used the multinomial because it illustrates differences among all five categories. Also, cross tabulations between the dependent and some of the independent variables were used to make preliminary evaluations and screen out some indicators that clearly were multicollinear with others, such as does global climate change lead to more concern about wind, floods, tornadoes. We chose wind. We also tried a factor analysis to collapse some of the predictors into fewer linear dimensions. However, the factors that were produced obfuscated some of the relationships. Hence, in cases where the collinearity was not too strong, they were retained, for example, college education and family income.

4. Results

After pretesting the survey, which led to minor word adjustments to improve clarity on some questions, data gathering started on 15 February 2013, and ended on 27 March 2013. A total of 875 surveys were collected by Abt-SRBI. Sample attributes were compared with the state population baselines for differences by age, race, and gender using the 2009–2011 American Community survey, and the cell phone use information came from the January–June 2012 National Health Interview Survey. While weighting helps reduce sample bias, it cannot eliminate survey bias that results from question wording, question order, and other survey design elements. Approximately 3% of the sample opted to complete the interview in Spanish.

The response rates were 19.4% and 17.4% for the land line and cell surveys, respectively. The cooperation rates were 37.5% and 34.0%, respectively.

Question 1: Support for Restricting the Number of Times Disaster Relief is Provided

Table 1 shows that 37.8% of respondents “strongly agreed” with the policy and another 21.1% “somewhat agreed”. In contrast, 18.9% “strongly disagreed” and another “9% “somewhat disagreed”. The remaining respondents were “neutral” or provided no answer. Overall, 59% of respondents supported the policy of limiting the number of times someone could receive disaster relief. This support is less than others reported in the literature cited earlier, which ranged from 85% in support of local government requiring that housing in some areas to be built in ways highly resistant to natural disasters to 61% in favor of the federal and state government purchasing property in vulnerable areas and turn it into open space [8,34].

Table 1. Proportion of respondents who favor the policy of limiting the number of times homeowners may receive financial disaster relief, telephone survey of New Jersey residents, 13 February–27 March 2013.

Response	Frequency (<i>n</i> = 868)	Percent %
Strongly agree	328	37.8
Somewhat agree	184	21.1
Neutral	100	11.5
Somewhat disagree	78	9.0
Strongly disagree	164	18.9
Don't know or refused	15	1.7
Total	869	100.0

Table 2 presents the results of the multinomial logistic regression. The dependent variable is strongly or somewhat agreed with the policy, strongly disagreed or somewhat disagreed, or was neutral. The table contains two pieces of data. The *B*-values show the strength and direction of the relationship. The asterisk indicates statistical significance, which is measured by the Wald Statistic.

Table 2. Relationships between support for the policy and six sets of predictors telephone survey of New Jersey residents, 13 February–27 March 2013, numbers in table are *B*-value multinomial regression estimates.

Variable# (<i>n</i> = 854)/Sample Group	Strongly Agree	Some-What Agree	Neutral	Some-What Disagree
Climate Change and Related Issues				
Strongly agree that a risk associated with global climate change is more heavy winds (1 = strongly agree)	0.397	−0.072	−0.170	−0.368
Global climate change is not occurring (1=strongly agree)	−0.875 **	−0.195	−0.431	0.078
Five year priority is to redevelop areas of NJ devastated by Sandy (1 = very important)	−0.854 **	0.036	−0.560 *	0.013
Allow local government to prohibit housing in some areas (1 = strongly agree)	0.964 **	−0.049	0.058	−0.028
Allow local government to require housing in some areas to be built in ways that make them highly resistant to natural disasters (1 = strongly agree)	0.094	−0.500 *	0.869 **	0.739 **
Have the federal and state government purchase property in vulnerable areas and turn it into open space (1 = strongly agree)	−0.232	−0.094	−0.490	0.303
International scientific community understands the science behind global climate change (1 = strongly agree)	0.047	−0.402	−0.745 **	−0.570
Our state and local officials understand the implications of global climate change for my region (1 = strongly agree)	−0.186	−0.296	−2.061 **	−0.379
Chose federal or state government as most trustworthy to administer redevelopment of the NJ shore (1 = chose state or federal government)	0.134	0.128	−0.039	0.140

Table 2. Cont.

Variable# (<i>n</i> = 854)/Sample Group	Strongly Agree	Some-What Agree	Neutral	Some-What Disagree
I used to not believe that global climate change was occurring, but the recent hurricanes have made me question that belief (1 = yes)	0.262	0.243	0.869 **	−1.623 **
First emotion that came to mind about Sandy was sorrow, loss, concern, or worry (1 = yes)	0.407	0.675 **	−0.211	−0.406 *
Number of flashbulb memories of Katrina, Irene, & Sandy (0–3)	−0.615 ⁽³⁾	−1.013 *	−0.694	−0.506
	−0.400 ⁽²⁾	−0.440	−0.054	−0.446
	−0.079 ⁽¹⁾	−0.242	0.228	−0.545
Values and Demographic Attributes				
Five year priority improve access to health care (1 = very important, 0 = not)	−0.784 **	−0.604 *	−0.566	−0.367
Five year priority improve education (1 = very important, 0 = not)	−0.566 *	−0.263	−0.403	0.364
Agree that people rely on government to do things that they should do for themselves (1 = strongly agree)	0.205	−0.033	−0.542 *	−0.252
Self-identifies with Republican Party or Tea Party (1 = yes)	0.261	0.358	−0.250	0.043
Aged 55+ years (1 = yes)	1.156 **	0.680 **	0.140	−0.183
Male respondent (1 = yes)	0.305	0.229	−0.361	−0.203
Annual family income < \$75,000	0.378 *	−0.028	−0.012	−0.703 **
Self-identifies as White (1 = yes)	−0.106	−0.272	0.232	0.276
Did not attend college (1 = yes)	0.506 **	0.302	−0.244	−0.621 *
Own home they live in (1 = yes)	−0.276	0.117	−0.377	0.347
Constant	−2.426	0.096	3.250	5.297
Nagelkerke pseudo-R ²	0.384			

** $p < 0.05$; * $p < 0.10$. p -values determined by the Wald test. #With the exception of the flashbulb memory variable, all the predictors were dichotomies (1 = yes, 0 = no). (3) had 3 flashbulb memories; (2) 2 flashbulb memories; (1) 1 flashbulb memory.

With that context, 14 of the 22 predictors were statistically significant predictors at $p < 0.10$ for at least one of the dependent variable categories. Nine of 14 were from the global climate change set of variables, and the remaining five were from the values and demographic set. The B -values are compared to the ‘strongly disagreed’ group.

Those who “strongly agreed” with the policy were disproportionately older ($B = 1.156$ with age 55+), had not attended college ($B = 0.506$ with no college), and had an annual family income of less than \$75,000 ($B = 0.378$). They believe that global climate change is occurring ($B = -0.875$ with it is not occurring), and they are willing to allow local government to prohibit housing in some areas ($B = 0.964$). Clearly, however, they have a major concern about allocating resources. For example, they did not agree that a five year priority was to redevelop areas devastated by Hurricane Sandy ($B = -0.854$), and they did not agree that access to health care ($B = -0.784$) or education ($B = -0.566$) should be major priorities. This group was the largest part of the sample (32%), and the importance of age in defining it is critical. Age was, by far, the strongest predictor, with a Wald value double any

other. Table 3 shows the influence of this single indicator. Eighty-two percent of those 75+ years old favored this policy compared to only 48% who were 18–34.

Table 3. Association of age with support for a policy to not provide disaster relief to residential property owners if their property has been devastated by natural hazard events on multiple occasions.

Age Group, Years	Strongly Agree with Policy, %	Somewhat Agree, %	Neutral, %	Somewhat oppose, %	Strongly Disagree with Policy, %
18–34	21	27	14	17	22
35–54	36	19	13	9	24
55–74	51	22	9	4	14
75+	62	20	5	4	8
Total	38	21	12	9	19

The second largest group (21% of responses) was “somewhat” supportive of the policy. The group also disproportionately is older and did not go to college, but it is distinguished from the others by its lack of emotional response to the hurricanes. The first emotion that came to mind about Sandy was one of the cognitive responses ($B = 0.675$) and the group collectively did not have an emotional response to the three hurricanes, as indicated by a statistically significant B -value. These respondents had a slight tendency to identify with the Republican and Tea parties (68% of those who identified with the two political groups supported the policy compared to 58% of those who did not). These somewhat supportive respondents did not favor improving access to health care as a priority ($B = -0.604$), despite their older age, nor did they want to local government to require housing to be built to be more resistant to natural disasters.

The policy “neutral” group demonstrated associations that help us understand why they were neutral. They do not believe that people rely on government to do things that they should do for themselves ($B = -0.542$), which should lead to rejection of this policy. Yet, what stands out is their lack of trust of scientists or government: $B = -2.061$ with state and local officials understand the implications of global climate change; and $B = -0.745$ with international scientific community understands the science behind global climate change). Disproportionately, they indicate that they did not think that global climate change was occurring, but the recent hurricanes have made them question their belief ($B = 0.869$). While they support the idea of allowing local government to build storm resistant housing ($B = 0.869$), they do not think that redeveloping the devastated areas should be a five year priority ($B = -0.560$). They truly are ambivalent.

The last of the four groups is the “somewhat” disagrees with the restrictive policy. This group is perhaps the most predicable. First, they are relatively affluent ($B = -0.703$ with income $< \$75,000$), college educated ($B = -0.621$ with did not attend college), and they are home-owners ($B = 0.347$). The hurricanes have not changed their views about global climate change ($B = -1.623$) and this is because this group overwhelmingly believes that global climate change is real and the recent hurricanes have “strengthened that belief”. This group also had an emotional response to the recent hurricanes ($B = -0.406$ with cognitive responses). Across the five groups, as emotional reactions increased, support for the restrictive policy decreased, albeit the numbers are not remarkably different.

More specifically, using a cross-tabulation, we compared the emotions of the respondents who strongly agreed and strongly disagreed with the policy to summarize the role of emotional response. Those who strongly agreed with the policy disproportionately chose the words “sorrow”, “concern(ed)”, and “worried”. Those who strongly disagreed with the policy, in contrast, chose “fear”, “devastated”, and “scared”. (Table 4)

Table 4. Association of emotional response to hurricanes with support for a policy to not provide disaster relief to residential property owners if their property has been devastated by natural hazard events on multiple occasions.

Age Group, Years	Strongly Agree with Policy, %	Somewhat Agree, %	Neutral, %	Somewhat oppose, %	Strongly Disagree with Policy, %
Average number of flashbulb memories (range 0–3)	1.51	1.49	1.54	1.73	1.90
Responded with cognitive response to Hurricane Sandy, %	16	16	13	12	10

5. Conclusions

Fifty-nine percent of respondents indicated that they supported a policy of not providing further assistance to those who already had received funds on multiple occasions. While a statistically significant majority supported this painful policy, the level of support is less than that observed for stronger building codes, allowing government to exclude development in vulnerable areas, building dunes and several other options; it was the least acceptable policy for sustainably rebuilding vulnerable areas.

Post-hoc analysis suggests that the state and federal governments framed post-hurricane Sandy recovery as a bipartisan political effort to help home owners and large and small business, and they strengthened that frame by showing photos of the Republican governor with the Democrat president of the United States and with senior elected officials who were Democrats and Republicans [50–54]. That broad framing, we believe, built wide public support for a range of tough-minded policies with the goal of quickly rebuilding devastated areas in ways that would make the areas more sustainable in the long run, and it also was associated with approval rates for the governor of New Jersey from more than 3/4 of the voters [52,54]. A few years later, the media are reframing the efforts as partisan aimed at helping selected business interests not even located in devastated areas rather than homeowners, and if one takes the media coverage at face value the public perspective on rebuilding is being ignored, especially where the storm inflicted the most damage [54]. The governor’s approval ratings have markedly fallen from 76% to 48% and along with it we believe their support for rebuilding in sustainable ways ([see also [54–56]).

The fact that disproportionately older males are not supporting what is a homeowner safety net policy is both consistent with their lack of support for social safety net programs and their lack of trust in government programs to competently manage programs. In a real way, they may be canaries for what is slowly happening among the general adult population, which is the reframing of the

post-Sandy redevelopment as partisan politics as usual. In New Jersey, New York, as well as Florida, Texas and other areas seriously harmed by major storms, for a year or two after the event, there exists, we believe, a rare opportunity that coincides with devastating events to rethink about a sustainable future and implement policies that normally would be considered unwelcome government interference in the rights of property owners and local government land use management rights. There is no denying that the storms have led many individuals to be better prepared, and they have forced local government and utilities to rethink their land use and investment strategies [4,5,8–15]. However, if the general public has become disillusioned as the most recent survey data suggest, then unfortunately the people of this state will need to wait until another devastating event occurs before having another chance to make more forward thinking sustainable choices in vulnerable areas.

Chamlee-Wright and Storr [57] suggest that public expectations of government intent and capacity in response to disaster can range from optimistic to pessimistic, and these expectations are important in their acceptance. In this post-Sandy case in New Jersey, we find that the public immediately after the event was prone toward optimism in regard to intent and was willing to be optimistic about capacity, that is, it was willing to trust government. In mid-2014, less than two years later, polls [8,54–56] show that much of the public has become pessimistic about both intent and capacity, but especially intent.

The paper has implications for theory development and policy implementation. The ongoing set of painful hazard events is an opportunity to better understand why some, at least now, support policies that much of the public has historically resisted. Unfortunately, there will be many more opportunities for surveys like this one. I routinely check for lists of notably hazard events. Between 8 June 2014 and 23 June 2014, I found eight hazard events in eight countries that directly killed 150 people, necessitated the evacuation of 350,000 and caused billions of dollars of damage [58]. While there has been no shortage of opportunities, there has been an absence of government organization to provide resources and access to those willing to conduct these kinds of studies, a constraint that in the United States is being addressed by the National Science Foundation.

The policy implications are uncertain. First, is this a good policy or a bad one? If you believe that it is our obligation to provide a sustainable environment for future generations, then you must conclude that it is not sound policy to continue to spend money on locations that will be damaged again and again. It is better to buy out people, build dunes and walls, turn vulnerable land into open space, forbid any location of nursing homes, congregate facilities, and other sensitive land uses on vulnerable lands, and require any currently existing in vulnerable places to raise them, and/or use better materials, and in other ways, spend limited resources wisely so that they have an extended life. In strong contrast, the historical record of many countries, like the United States, is that people have the right to do what they want to do with their property, as long as they do not overly jeopardize others and stay within local zoning and building ordinances. There is no way around the reality that the restrictive policy studied here is viewed by many as a taking of rights, and for some it represents obliterating their history.

The second debatable policy question is who should determine and implement restrictive policies. Goodspeed [59] summarized the literature on sharing of responsibility among different levels of government and proposes a model to assess the appropriate allocation of authority and resources. The framework he offers is a good way of thinking about and experimenting with options. The fact that the federal and state governments in multi-jurisdictional countries exercise a great deal of power makes the policies more unpalatable to many people who have little trust in the federal government,

especially its elected officials [8,60]. This New Jersey case presented here and others illustrates that the public wants as little federal and state government participation as possible; if there has to be a government role, they prefer it to be local government. The bottom line challenge, we believe, is gaining and maintaining trust. Even if every dollar requested by state and local government was received, there is going to be distrust of the federal and often state government's intent and capacity to fairly distribute resources [57,58,60].

That being said, we suggest the following order in implementing policy options as the best way of building public trust and moving forward a sustainability agenda. We would start with structural adjustments that are economically cost effective and offer to buy out individuals in high risk areas. Next, forbidding new high risk land uses, such as nursing homes, assisted living and congregate facilities, along with police stations, medical facilities, and schools are tough policy options that will be challenged by some but would improve sustainability and resonate with many. Allowing local governments to require upgrading to reduce the probability of damaging events is a third policy set, which will face stiff opposition that can be softened by lowering insurance and providing low interest loans. Finally, only after suffering repeated events, and demonstrating an unwillingness to be bought out or upgrade to dramatically reduce the risk, should the policy of making it abundantly clear that government will not bail out the owner be implemented as a last resort.

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Author Contributions

Michael Greenberg developed the idea for the study, wrote the first draft of the questions, analyzed the data, and wrote the paper. Marc Weiner edited all the questions, collected the data, reviewed the analysis, and rewrote sections of the paper. All authors read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

References

1. Committee on Incorporating Sustainability in the U.S. Environmental Protection Agency; Science and Technology for Sustainability Program (STS); Policy and Global Affairs (PGA); National Research Council. *Sustainability and the U.S. EPA*; National Academy Press: Washington, DC, USA, 2011.
2. Committee on Sustainability Linkages in Federal Government; Science and Technology for Sustainability Program (STSP); Policy and Global Affairs (PGA); National Research Council. *Sustainability for the Nation: Resource Connections and Governance Linkages*; National Academy Press: Washington, DC, USA, 2013.
3. Greenberg, M. *Restoring America's Neighborhoods: How Local People Make a Difference*; Rutgers University Press: New Brunswick, NJ, USA, 1999.
4. Schwab, J. *Hazard Mitigation: Integrating Best Practices into Planning*; American Planning Association: Chicago, IL, USA, 2010.
5. Schwab, J.; Topping, K.; Eadie, C.; Deyle, R.; Smith, R. *Planning for Post-Disaster Recovery and Reconstruction*; American Planning Association: Chicago, IL, USA, 1998.
6. Drewniak, M.; Roberts, K. Christie Administration Releases Total Hurricane Sandy Damage Assessment of \$36.9 billion. Office of the Governor, Press Release, 28 November 2012. Available online: <http://www.nj.gov/governor/news/news/552012/approved/20121128e.html> (accessed on 22 May 2013).
7. Mantell, N.; Seneca, J.; Lahr, M.; Irving, W. *The Economic and Fiscal Impacts of Hurricane Sandy in New Jersey*; E.J. Bloustein School of Planning and Public Policy: New Brunswick, NJ, USA, 2013.
8. Greenberg, M. *Protecting Senior against Environmental Disasters: From Hazards and Vulnerability to Prevention and Resilience*; Routledge: New York, NY, USA, 2014; in press.
9. Witt, J.L. Expert: Hurricane Sandy Recovery will Be Long, Challenging. *Star-Ledger*, 10 November 2012. Available online: http://blog.nj.com/njv_guest_blog/2012/11/expert_hurricane_sandy_recover.html (accessed 14 June 2013).
10. Jordan, B. State will rethink its development plan. *Home News Tribune*, 14 November 2012, p. 2.
11. Spivey, M. NJ orders utilities to better prepare for big storms. *Home News Tribune*, 27 January 2013, pp. 1–6.
12. Higgs, L. NJ Transit Eyes 2 New Train Yards. *Home News Tribune*, 28 January 2013, p. 1.
13. Bates, T. Is Retreating Best Option for the State? *Home News Tribune*, 26 December 2012, p. c5.
14. Pollack, W. After Sandy, Just Rebuilding won't Be Enough. Regional Plan Association, 2012. Available online: <http://www.rap.org/2012/12after-sandy-just-rebuilding-wont-be-enough> (accessed on 19 December 2012).
15. Larsen, E. Line in the Sand. *Home News and Tribune*, 17 January 2013, p. 9.
16. Reynolds, T.W.; Bostrom, A.; Read, D.; Morgan, G.M. Now what do people know about global climate change? Survey of educated laypeople. *Risk Anal.* **2010**, *30*, 1520–1537.
17. Hamilton, L.; Keim, B. Regional variation in perceptions about climate change. *Int. J. Climatol.* **2009**, *29*, 2348–2352.

18. Leiserowitz, A. American risk perceptions: Is climate change dangerous? *Risk Anal.* **2005**, *25*, 1433–1442.
19. Lorenzoni, I.; Pidgeon, N. Public views on climate change: European and USA perspectives. *Clim. Change* **2006**, *77*, 73–95.
20. McCright, A. The social bases of climate change knowledge, concern, and policy support in the US general public. *Hofstra Law Rev.* **2008**, *37*, 1017–1046.
21. Pidgeon, N. Climate Change risk perceptions and communication. *Risk Anal.* **2012**, *32*, 951–956.
22. Spence, A.; Poortinga, W.; Pidgeon, N. The psychological distance of climate change. *Risk Anal.* **2012**, *32*, 957–972.
23. Johnson, B. Change Communications: A Provocative Inquiry into Motives, Meanings, and Means. *Risk Anal.* **2012**, *32*, 973–991.
24. Kahan, D.; Peters, E.; Braman, D.; Slovic, P.; Wittlin, M.; Larrimore Oulette, L.; Mandel, G. *Tragedy of the Risk-Perception Commons: Culture Conflict, Rationality conflict, and Climate Change*; Yale Law School: New Haven, CT, USA, 2012.
25. Malka, A.; Krosnick, J.A.; Langer, G. The association of knowledge with concern about global warming: Trusted information sources shape public thinking. *Risk Anal.* **2009**, *29*, 633–647.
26. Michel-Kerjan, E.; Kunreuther, H. Paying for Future Catastrophes. *The New York Times*, 25 November 2012, p. SR7. Available online: <http://www.nytimes.com/2012/11/25/opinion/sunday/paying-for-future-catastrophes.html> (accessed on 14 June 2013).
27. Kunreuther, H.; Michel-Kerjan, M. *At War with the Weather*; MIT Press: Cambridge, MA, USA, 2009.
28. Knabb, R.; Rhome, J.; Brown, D. Tropical Cyclone Report: Hurricane Katrina 23–30 August 2005. National Hurricane Center: Miami, FL, USA, 2006. Available online: http://www.nhc.noaa.gov/pdf/TCR-AL122005_Katrina.pdf (accessed on 3 May 2013).
29. Burton, L.; Hicks, M. Hurricane Katrina: Preliminary Estimates of Commercial and Public Sector Damages. Marshall University Center for Economics and Business Research: Huntington, WV, USA, 2005. Available online: <https://cms.bsu.edu/-/media/WWW/DepartmentalContent/MillerCollegeofBusiness/BBR/Publications/disasterStudies/katrina2005.pdf> (accessed on 3 May 2013).
30. Wang, X.; Kapucu, N. Public complacency under repeated emergency threats: Some empirical evidence. *J. Public Adm. Res. Theory* **2007**, *18*, 57–78.
31. Spoto, M. Jerseysans Say Hurricane Sandy Victims Should Follow FEMA Rules or Return Aid. *The Star Ledger*, 19 March 2013. Available online: http://www.nj.com/news/index.ssf/2013/03/poll_says_jerseyans_want_resid.html (accessed on 11 July 2014).
32. Murray, P. Sandy's Impact on New Jersey. Press Release, Monmouth University. Available online: <http://www.monmouth.edu/polling> (accessed on 10 December 2012).
33. Murray, P. Sandy Recovery Slow but Steady in Jersey. Press release, Monmouth University. Available online: <http://www.monmouth.edu/assets/0/32212254770/32212254991/32212254992/32212254994/32212254995/30064771087/fb7d69241efd43989ca5bc024ccc99b8.pdf> (accessed on 20 February 2013).
34. Greenberg, M.; Weiner, M.; Noland, R.; Herb, J.; Kaplan, M.; Broccoli, A. Public support for policies to reduce risk after Hurricane Sandy. *Risk Anal.* **2014**, *34*, 997–1012. doi:10.1111/risa.12203. Available online: <http://www.ncbi.nlm.nih.gov/pubmed/24708068> (accessed on 11 July 2014).

35. Peters, R.G.; Covello, V.T.; McCallum, D.B. The determinants of trust and credibility in environmental risk communication: An empirical study. *Risk Anal.* **1997**, *17*, 43–54.
36. Siegrist, M. The influence of trust and perceptions of risks and benefits on the acceptance of gene technology. *Risk Anal.* **2000**, *20*, 195–203.
37. Siegrist, M.; Cvetkovich G. Perception of hazards: The role of social trust and knowledge. *Risk Anal.* **2000**, *20*, 713–719.
38. Slovic, P. Perceived risk, trust, and democracy. *Risk Anal.* **1993**, *13*, 675–682.
39. Brown, R.; Kulik, J. Flashbulb memories. *Cognition* **1977**, *5*, 73–99.
40. D'Andrea, W.; Chiu, P.H.; Casas, B.R.; Deldin, P. Linguistic predictors of post-traumatic stress disorder symptoms following 11 September 2001. *Appl. Cognit. Psychol.* **2012**, *26*, 316–323.
41. Kvavilashvili, L.; Mirani, J.; Schlagman, S.; Kornbrot, K. Comparing flashbulb memories of September 11 and the death of Princess Diana: Effects of time delays and nationality. *Appl. Cognit. Psychol.* **2003**, *17*, 1017–1031.
42. Er, N. A new flashbulb memory model applied to the Marmara earthquake. *Appl. Cognit. Psychol.* **2003**, *17*, 503–517.
43. Altmann, E.M. Reconstructing the serial order of events: A case study of 11 September 2001. *Appl. Cognit. Psychol.* **2003**, *17*, 1067–1080.
44. Pew Research Center for the People & the Press. Values about Government and the Social Safety Net. 4 June 2012. Available online: <http://www.people-press.org/2012/06/04/section-4-values-about-government-and-the-social-safety-net/> (accessed on 22 May 2014).
45. Fothergill, A.; Peek, L. Poverty and disasters in the United States: A review of recent sociological findings. *Nat. Hazards* **2004**, *32*, 89–110.
46. Palm, R.; Carroll, J. *Illusions of Safety: Culture and Earthquake Hazard Response in California and Japan*; Westview Press: Boulder, CO, USA, 1998.
47. Kahan, D.; Braman, D.; Gastil, J.; Slovic, P.; Mertz, C.K. Culture and identity-protective cognition: Explaining the white male effect in risk perception. *J. Empir. Leg. Stud.* **2007**, *4*, 465–505.
48. Blumberg, S.J.; Luke, J.V. Wireless Substitution: Early Release of Estimates from the National Health Interview Survey, January–June 2010. National Center for Health Statistics: Atlanta, GA, USA, 2010. Available online: <http://www.cdc.gov/nchs/data/NHIS/earlyrelease/wireless201112.htm> (accessed on 24 August 2011).
49. CTIA. Wireless Quick Facts. Available online: <http://www.ctia.org/advocacy/research/index.cfm/aid/10323> (accessed on 5 August 2011).
50. Watson, S. Post-Sandy Poll Shows New Jersey Residents Favor Assessing Future Flood Risks over Rebuilding. Press of Atlantic City: Atlantic City, NJ, USA, 2013. Available online: http://www.pressofatlanticcity.com/news/breaking/post-sandy-poll-shows-new-jersey-residents-favor-assessing-future/article_12394200-763b-11e2-920e-001a4bcf887a.html?mode=jqm_com (accessed on 18 February 2013).
51. Schoonejongen, J. Trenton, Sandy proving to be a Bipartisan Storm. *Home New Tribune*, 2 December 2012, p. F1.

52. Murray, P. Governor Christie Job Approval at All-time high. Press release, Monmouth University. Available online: <http://www.monmouth.edu/assets/0/32212254770/32212254991/32212254992/32212254994/32212254995/30064771087/824557aa9b964a5cb70ed9813edd8089.pdf> (accessed on 4 December 2012).
53. Diamond, M. Gov: Recovery is No. 1 Priority. *Home News and Tribune*, 12 December 2012, p. C5.
54. Friedmann, M. Public less Satisfied with NJ hurricane Sandy Recovery Effort, Poll Finds. *The Star-Ledger*, 17 April 2014. Available online: http://www.nj.com/politics/index.ssf/2014/public_losing-faith_in_nj_hurricane_sandy (accessed on 23 May 2014).
55. Nelson, T.; Kinder, D. Issue frames and group-centrism in American Public opinion. *J. Polit.* **1996**, *58*, 1055–1078.
56. Jacoby, W. Issue framing and public opinion on government spending. *Am. J. Polit. Sci.* **2000**, *44*, 750–767.
57. Chamlee-Wright, E.; Storr, V. Expectations of government's response to disaster. *Public Choice* **2010**, *144*, 253–274.
58. Recent Natural Disasters. Available online: <http://www.disaster-report.com> (accessed on 26 June 2014).
59. Goodspeed, T. Decentralization and Natural Disasters. Social Science Research Network. Available online: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2244825 (accessed on 30 June 2014).
60. Greenberg, M. Energy Policy and Research: The Underappreciation of Trust. *Energy Res. Soc. Sci.* **2014**, *1*, 152–160.

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