

## Issues as Revealed by Hurricane Katrina: A New Federal Disaster Management Plan

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When Hurricane Katrina, a Category 3 hurricane, first struck New Orleans on August 29th, 2005 many citizens were initially relieved that more damage did not occur. But as levees began to fail, eventually flooding up to 80% of New Orleans, the true level of the disaster began to be realized. Over the next few months, the inadequacies of the United States' coastal disaster management policy were revealed in a catastrophic manner: 1,836 people dead and over \$100 billion in damages<sup>1</sup>. As a result of Hurricane Katrina, as well as other recent coastal disasters, it is evident that current policies are neither effective nor economically beneficial. A new policy needs to be implemented which not only addresses the flaws and shortfalls revealed by recent disasters but also identifies possible future issues. This paper attempts to identify the issues associated with coastal disaster management, discuss current policies, and propose a new coastal disaster management plan for the United States. Throughout this paper, case studies are highlighted which exemplify those areas in need of change as well as previously sound management decisions. As a result of this research, it is clear that an adapted, comprehensive, multi-level natural disaster management plan is needed. The proposed policy would combine both government and private insurance in a way that is both economical and financially viable for all citizens.

Hurricane Katrina's impact on the United States was not only devastating but was also, to some degree, preventable. The economic, budgetary, environmental, health, and social effects of Hurricane Katrina were profound and many areas are still recovering four years later. Economically, Hurricane Katrina cost the United States government well over \$100 billion dollars, making it the most expensive natural disaster to date and plunging the National Flood Insurance Program \$23.5 billion in debt to the U.S. Treasury<sup>2</sup>. The interest payments on this debt will be approximately \$1 billion per year, half of all NFIP profits<sup>3</sup>. Environmentally, pesticides, heavy metals, and toxic chemicals were released into flood waters, later seeping into the earth and contaminating ground water<sup>4</sup>. Industrial and medical waste, raw sewage, and oil also spilled into flood waters further increasing health risks to citizens of New Orleans. Additionally, flood waters resulted in increases in mold and viruses, overall creating an inhospitable environment for humans. Socially, whole communities were destroyed with many citizens having to decide between relocation and rebuilding, not knowing what decision their neighbors and local businesses would make. Individuals lost houses, personal possessions, jobs, and family members. Today, thousands are still displaced and many more are recovering from the financial, emotional, psychological, and physical strains Hurricane Katrina caused.

The tragedy of Hurricane Katrina not only demonstrated the damage hurricanes can cause but also exposed the inadequacies of current United States disaster management plans. In retrospect, many of the issues associated

with Hurricane Katrina were not only predictable but also preventable. Stricter building codes, better enforcement, more accurate flood-plain lines, improved land-use planning, and higher, maintained levees all would have been ways for New Orleans to reduce the disastrous damage Hurricane Katrina caused. Additionally, stricter enforcement of insurance regulations and increases in the number of flood insurance policy holders would have helped to decrease both individual and government economic losses. As a whole, Hurricane Katrina has served to show that a new federal disaster management plan is needed to address the inadequacies of the old.

Although many types of natural disasters exist, for the purposes of this paper and proposed management plan, floods and hurricane damage will be the sole focus. According to the National Flood Insurance Program, floods are the most common disaster in the United States<sup>5</sup>. They are also one of the most expensive and least insured with flood insurance not covered under Standard Homeowners insurance. A mere 1 – 4 inches of flooding can cost an individual \$7,800<sup>6</sup>. Sources of flooding include tropical storms and hurricanes, spring thaws, problems with levees and dams, flash floods, drainage issues created by new development, and heavy rains. Tropical Storm Allison, which hit Houston in 2001, resulted in over 30 inches of rain, flooding more than 70,000 houses and destroying 2,744 homes<sup>7</sup>. The West Coast faces additional risks due to heavy rains and wildfires which have changed the landscape. Many areas of the West Coast are also protected by levees which, as demonstrated in New Orleans, can fail.

Moreover, due to increasing numbers and values of real estate along the coastal and water regions of the United States, the probability of another natural disaster that will equal or even surpass Hurricane Katrina is high and the need for a new management plan that addresses all of these issues is great.

### **Issues with managing natural disasters**

When it comes to managing natural disasters and proposing a comprehensive management plan, several levels of issues hinder effective management and must be compensated for in the new management plan. The first level deals with inadequacies in government policy, research, and enforcement when planning for natural disasters. One example arises from the situation in New Orleans. When planning *ex ante* measures, risk managers and engineers looked at the past ten years of hurricanes vs. the past 100 years, causing them to underestimate the probability of a serious hurricane and to not plan accordingly. Another issue arises from the problem of hyperbolic discounting with policy makers more likely to spend money in the present rather than on levees and other preventative measures that may or may not have future benefits. Overestimating a city's preparedness, underestimating recovery time, and feedback issues can all create problems when managing natural disasters. Inaccurate, outdated flood maps and lax enforcement of current flood maps and building regulations can also create unnecessary risk.

The second level of issues concerns the public and their perception of risks associated with natural disasters. On the whole, the public tends to underestimate and underprepare for natural disasters. This phenomenon stems from the fact that learning often takes place based on short-term feedback and many view the future as an extrapolation of the present<sup>8</sup>. Additionally, there is excessive discounting of future rewards vs. short-term costs, causing many at risk citizens to go uninsured. There is also the mentality that if an individual's house, car, etc. survived the last hurricane then the house, car, etc. will survive the next one. Levees, although beneficial, also promote a false sense of security and can attract people to live in dangerous places. Bad heuristics cause individuals to not prepare for and/or expect natural disasters.

The third level of issues concerns misunderstandings between experts and the public. On the whole, there is a lack of understanding and communication between government, experts, and the public with regards to the risks of, ways to prepare for, and insurance coverage for natural

disasters. As Fischhoff argues, engineers and other experts often misunderstand the public and there is a need for social science experts when managing and preparing for natural disasters<sup>9</sup>. Expert overconfidence and insurance misunderstandings are two additional issues. Many citizens do not understand or know existing risks. This information may also have been ineffectively conveyed to them or experts may have underestimated their risks. This has partly led to fewer people having insurance than necessary or an inadequate amount of coverage. It is also confusing for individuals to figure out what exactly is covered by their insurance, for example, insurance does not cover flooding caused by storm surge. On the other hand, many insurance premiums are too low and do not reflect actual risks. This encourages people to live in high risk areas and discourages them from reinforcing their homes. Additionally, federal disaster relief sends the wrong signals to citizens, causing them to believe that they will be bailed out should a natural disaster occur. Overall, there is a need for increased information flow between federal and state governments, experts, and the public.

### **Issues associated with current management and policies**

Over the years, government regulations and policies relating to floods and other natural disasters have changed. As a result of Hurricane Betsy in 1965, the National Flood Insurance Act of 1968 was passed, creating the National Flood Insurance Program which provides low-cost flood insurance to homeowners. The Flood Disaster Protection Act of 1973 further extended the National Flood Insurance Program to all homeowners<sup>10</sup>. This program and current government policies prohibit mortgages in the 20 year flood plain and require owners of mortgaged houses in the 100 year flood plain to possess flood insurance. This program called for houses to pay "actuarial rates" and predicted that the National Flood Insurance Program would break even over the long run. However, as discussed earlier, the National Flood Insurance Program is currently \$23.5 billion in debt due to inadequate assessment of the risks and costs.

One issue is the fact that only 10-20% of at risk properties have insurance<sup>11</sup>. There is also political pressure for the federal government to provide relief after floods; further encouraging individuals to believe they will be bailed out by the government and do not need to buy flood insurance. For example in the 1993 Mississippi floods, \$6.4 billion in federal relief was provided vs. \$250 million in insurance payouts<sup>12</sup>. Additionally, insurance

costs are priced below actuarial rates due to political pressure, out of date flood maps, and the changing frequency and severity of coastal storms. Repetitive losses are also a problem with 1% of insured properties producing 30% of claims with repeat losses totaling \$200 million per year. In some cases, repeat insurance payouts exceed the value of the house. For example, one house in Houston that was worth \$114,000 received over \$800,000 in flood claims<sup>13</sup>. These issues need to be addressed in the new federal disaster management plan.

One example of a sound flood management plan took place after the 1993 Mississippi floods. According to the plan, homeowners were required to sell their high-risk properties to the government in order to receive insurance payouts. This land was then managed and used in a way to create wetlands and prevent future floods. Measures such as this are needed in a new natural disaster management plan.

### **Possible policy options**

Current management plans are one example of a policy option. However, as demonstrated by Hurricane Katrina, a new, revised natural disaster management plan is needed. When analyzing the various policy alternatives that are possible, in general, four major types of options exist which combine varying levels of government and private involvement. These four types include: a policy which calls for limited or no government involvement, relying instead on private insurance companies, a policy which calls for a comprehensive government insurance plan with limited private involvement, a policy which calls for no insurance and relies solely on ex ante and ex post management, and a fourth and final policy which combines aspects of the three previous policies. All four policies focus on different fundamental objectives with each one placing varying degrees of emphasis on each of the five basic goals. These five fundamental objectives, as identified by Trebilcock and Daniels, are: libertarian, corrective justice, economic efficiency, distributive justice, and communitarian objectives<sup>14</sup>. When analyzing these four types of management options, the fundamental objectives, strengths, and weaknesses of each policy will be taken into account as well as the overall feasibility as an effective policy.

The first management option is one which relies solely on private insurance. This would focus on economic efficiency and libertarian objectives with limited or no government involvement. One benefit of a management plan that focuses on private insurance is that the cost of flood

insurance may decrease due to free market competition. Additionally, insurance companies would have increased incentives to market and sell flood insurance since rates would reflect true actuarial rates. Therefore, private insurance companies may be able to reach a larger audience and increase the number of citizens with flood coverage. Furthermore, U.S. tax dollars would not go towards government subsidies or the NFIP, decreasing the government's economic costs associated with managing natural disasters. However, on the other hand, there is the possibility that the private insurance market could fail. For example, after Hurricane Betsy in 1965, private insurance companies decided to stop selling flood insurance based on the fact that it is difficult to assess flood risks. In addition, floods represent correlated risks and there is an increased threat of bankruptcy should a disastrous event occur. Since then, a reinsurance market has emerged, relying on catastrophe bonds. Although reinsurance decreases the chances that the private insurance market will fail, this risk still exists. In addition, a libertarian, private insurance plan would decrease government focus on preventative measures, again, increasing the risk of damage, both to property and individuals. Private insurance is also not financially possible for all citizens and the lack of any form of distributive justice is unappealing. There is also no focus on communitarian objectives and the absence of both of these goals seems to dehumanize natural disasters and ultimately makes a libertarian, private insurance plan improbable.

On the opposite end of the spectrum, a comprehensive government insurance plan is another option. This plan would cover all hazards including hurricanes, tornadoes, floods, earthquakes, etc. It would create smaller variance due to the fact that earthquake premiums would subsidize hurricane costs should a major hurricane occur in a particular year but not a major earthquake. However, the payouts would also be larger since the insurance plan would cover all risks. For example, in Hurricane Katrina, the insurance payouts were small because flood insurance does not cover storm surge. Under a comprehensive insurance plan, these payouts would dramatically increase. However, under this same premise, the number of insurance lawsuits would significantly decrease. If this plan charged risk-based premiums it would provide incentive for people to move elsewhere, decreasing individual and government risk. However, this would also disrupt communities thereby defeating any communitarian objectives. If risk-based premiums were not charged, adverse selection comes into play. A comprehensive insurance plan

would also increase the risk of moral hazard by decreasing an individual's incentives to take measures to lower their risks, for example, flood-proofing their house. Moreover, because this plan would be comprehensive in nature, the premiums would undoubtedly be high and would not be affordable to all members of society, again negating any distributive justice goals. A comprehensive plan would also meet with resistance from individuals who only need coverage for one specific disaster, for example wind damage, and do not want to pay extra for coverage for all disasters. If this plan were mandated, it would meet with even more resistance and would significantly reduce individual autonomy. Overall, a comprehensive government insurance plan would most likely meet with resistance and is not feasible at this point in time.

The third policy option solely relies on ex ante and ex post measures with no natural disaster insurance, government or private. This plan would focus on mitigation and preventative measures. It would include stricter building codes, increased building regulations in high risk areas, and preventative measures such as building levees, dams, and barriers. It would also include plans for disaster relief, including loans for businesses to recover, rebuilding measures, and emergency food and shelter should a natural disaster occur. The 1997 Grand Forks Flood illustrates the benefits of ex ante management. In Canada, \$63 million was spent on a floodway and levees to prevent floods. When the 1997 flood occurred, Winnipeg, Canada had a mere \$37 million in damages vs. an estimated \$5-7 billion without the floodway<sup>15</sup>. Success stories such as this would happen more often if there was a focus only on ex ante and ex post management. However, a lack of insurance would increase the risk not only for individuals but also for the government. Should a major disaster occur and ex ante measures fail, for example the levees' failure during Hurricane Katrina, millions of individuals could be left with thousands in damages and no insurance to help cover the costs. This would dramatically increase the amount of ex post spending necessary by the government and would introduce a huge amount of risk. Therefore, focus solely on ex ante and ex post measures with no natural disaster insurance is not a desirable or probable management plan.

#### Policy proposal

The fourth and final policy represents a combination of the three discussed above. This policy will combine varying degrees of four of the five fundamental objectives: economic efficiency, distributive justice, communitarian, and libertarian objectives. It will include arrangements

for increased insurance coverage, regulations, and protection for all citizens, regardless of income. It combines private insurance, government regulations, ex ante and ex post measures, and research initiatives to form a comprehensive, multi-level natural disaster management plan that addresses previous and future issues. Possible weaknesses and objections to the proposed plan will be discussed.

The proposed plan will employ private insurance, supported by government initiatives. Private insurance companies will sell flood insurance, encouraging free market competition and lower insurance rates while still using actuarial based premiums. This will decrease the risk of adverse selection. In order for this plan to be effective, new flood maps must be developed which accurately portray risks. FEMA, in conjunction with individual state and city governments, will take the lead on this, developing new, accurate flood maps over the next 10 years with high-risk areas taking priority. Private insurance companies will offer different types of flood insurance including coverage of buildings and their contents. They will also offer general flood insurance as well as comprehensive hurricane insurance, covering all associated risks including storm surge. This will decrease public confusion over insurance coverage as well as reduce the number of lawsuits.

In order to encourage this type of coverage and account for the high risk associated with natural disaster insurance, the federal government will reinsure private insurance companies similar to the Price-Anderson Nuclear Industries Indemnity Act. This reinsurance will rest on various stipulations. Companies must offer comprehensive hurricane insurance and it is recommended that they provide economic incentives for customers who decrease personal flood risks. This could include reducing premiums for customers who take measures to flood-proof their home. However, economic incentives do not have to be offered for vacation homes, commercial buildings, and non-primary residences. In addition, private insurance companies must also possess a specified amount of outside reinsurance and catastrophe bonds. Once these stipulations are met, the federal government will promise to cover all insurance claims above a specified amount should a catastrophic natural disaster occur. Moreover, for the next five years, the federal government will provide economic incentives for private insurance companies to increase flood insurance advertisement, educational initiatives, and flood-insurance sales. To account for low-income families, the federal government will subsidize insurance for these customers. A one-time payment to relocate will also be offered. Because

insurance will rest with private insurance companies, the insurance company would need to be allowed to refuse continued coverage prior to rebuilding those houses with repeat claims. This would go a long way towards encouraging people to relocate from dangerous areas.

As stated above, new flood maps need to be developed in order for insurance companies to accurately assess risks and offer risk-based premiums. These maps need to include 20, 100, and 500-year floodplains. They also need to include areas that would be affected should a levee or dam failure occur as well as potential storm surge areas. These maps need to take into account coastal erosion, sediment and mud flow, and ice-affected sections and accurately portray those regions that would be affected<sup>16</sup>. Based on these maps, specific federal regulations will exist and will be strictly enforced. There will be no building in the 20-year floodplain and all buildings in the 100 and 500-year floodplains will be required to have flood insurance, although with different premiums. In addition, all buildings in risk areas next to levees and dams will be required to possess insurance. If a building does not have coverage within a specified amount of time, their owners will be fined. This will allow owners enough time to relocate if desired. A one-time relocation payment will also be offered.

These policies may meet with resistance from individuals as well as members of Congress. Once new floodplains are drawn, many new properties will be affected. To account for this, “grandfathering” principles will hold whereby, for a limited time, individuals may purchase insurance based on the old floodplain maps, thereby decreasing their premiums. However, these decreased premiums will only hold for a five year period at which point they will gradually increase until true, risk-based premiums are expressed. Members of Congress may be opposed to these measures because of constituent pressure. Nonetheless, these policies may be necessary for effective flood management. In the past, enforcement of floodplain regulations has been lenient and redrawing floodplain maps has even been postponed due to constituent pressure. However, as demonstrated by Hurricane Katrina, stricter enforcement is necessary, not only from an economic perspective but also for the sake of individual lives and livelihoods. In the future, there must be an overall commitment to abstain from floodplain development.

In addition to floodplain requirements, ex ante and ex post measures must be employed with an emphasis on state government involvement. For the purposes of this plan, focus will be on ex ante procedures with limited ex

post management plans discussed here. As far as ex ante measures are concerned, stricter building regulations and wiser land use will be enforced. Mitigation and preventative techniques will also be utilized. Levees, dams, barriers, floodway diversions, and stream channelization will all be researched and built where appropriate. As far as ex ante procedures are concerned, there is a need for limited government bailouts with regards to natural disasters. This information needs to be disseminated to the public to further promote insurance coverage. In addition, should a natural disaster occur, the federal government will focus on buyouts and relocations. This will allow the area to return to its natural wetland state, further preventing future floods. This type of ex post management was used in the 1993 floods in Mississippi. As part of ex post measures, immediate disaster relief for emergency housing, food, etc. will be necessary. Furthermore, city and state governments need to develop specific evacuation plans ahead of time. These plans must include details on how to evacuate low-income families, the sick, and the elderly and where to evacuate them to. One objection to ex ante and ex post measures may be that the costs involved are too great. However, economic efficiency will be evaluated when determining which specific measures to implement.

Beyond general management plans, research needs to be done to assess possible future risks. This could include research on the effects global warming will have on natural disasters and projections of future natural disaster trends. As Fischhoff argues, engineers and other experts often misunderstand the public and there is a need for social science experts when managing and preparing for natural disasters<sup>17</sup>. Therefore, social scientists need to be employed and research about effective communication methods between experts and the public needs to occur.

In conclusion, Hurricane Katrina exposed various issues associated with natural disaster management and demonstrated that a new federal management plan is needed. The proposed plan is one example that attempts to address both past and future concerns. This comprehensive, multi-level plan spreads out the risks posed by natural disasters and involves the public, government, and private industry.

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## Endnotes

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