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Daniel Fouladi, Kathryn Ayres MA RD LD/N

^a *West Coast University*

^b *West Coast University*

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Graphical Abstract

	Operations and Support	Procurement, Construction, and Improvements	Federal Assistance	Disaster Relief Fund	National Flood Program
2017 Budget of \$16.5 Billion	\$927,524,000	\$35,273,000	\$2,518,277,000	\$7,348,515,000	\$6,154,479,000
Proposed 2018 Budget of \$15 Billion	\$1,000,000,000	\$1,000,000,000	\$3,000,000,000	\$3,000,000,000	\$7,000,000,000

Abstract.

Natural disasters are an inevitable annual occurrence. Every year there is billions of dollars in damages and hundreds of casualties. Out of all the natural disasters in the United States, floods are the most prevalent. FEMA is the government agency that is charge of managing disaster in the nation. The main problem with FEMA is the time that they take to respond to natural disasters and increased spending. Currently many homes and public infrastructures such as roads, levies and bridges in disaster prone areas are ill equipped to handle natural disasters such as floods. Flood insurance companies often times underpay policy holders in claims or sometimes do not pay them at all.

This paper offers proposed legislative reformations as answers to these problems. The

proposed legislative reformation for FEMA is to readjust their budget for more spending on the National Flood Program while saving \$1.5 billion overall. In addition to readjusting the budget the proposed reformation also includes increasing training for natural disaster relief and responsiveness by 25%. Another proposed reformation is to eliminate flood insurance companies from the National Flood Program. Reinforcing homes by elevating them or rebuilding them and making public infrastructure more flood and storm resistant is another proposed reformation.

With the passing of the proposed reformations, there will be significant positive financial and social outcomes. The cost of property and infrastructure damage will decrease by more than half with the reinforcement of infrastructure. The amount of casualties will also decrease by more than half as well. As a result of FEMA becoming more efficient and the elimination of insurance from the National Flood Program, responses to natural disasters will be quicker and homeowners will see less damages to their homes and more money received on claims much quicker.

Introduction

Introduction

Natural disasters are an inevitable part of life. It does not matter where or when a natural disaster occurs, the aftermath is always devastating. From property damages to loss of life, the losses can be substantial. Fortunately, insurance does exist to cover these losses, although insurance does not always work out perfectly in the business of disaster.

The most common natural disasters in the United States are storms and floods (SAMHSA, 2015). Storms range from tropical storms to a Category 5 hurricane. Tropical storms are storms that are formed from tropical depressions that intensify. Tropical storm wind speed varies from 39 mph to 73 mph (University of Illinois, 2010). Although tropical storms are much less powerful than hurricanes, they still can cause many problems due to heavy rainfall that is associated with them (University of Illinois, 2010).

Hurricanes are massive storms that are derived from tropical storms (Department of Homeland Security, n.d.). Storms are classified as hurricanes once wind speed exceeds 73 mph (University of Illinois, 2010). Due to the severe amount of wind and storm surge that hurricanes bring, hurricanes have caused a great deal of property damage and loss of life throughout history (University of Illinois, 2010). Hurricane Andrew, a Category 5 storm, hit South Florida in 1992 and destroyed over 25,000 homes and damaged more than 100,000 homes (Landsea, Franklin, McAdie, & Beven, 2004).

Hurricane Katrina, the costliest hurricane in the history of the United States and the third deadliest, hit Florida, Mississippi and New Orleans in 2005 and left \$80 billion in damages and killed approximately 1,750 people (The University of Rhode Island, 2015).

Another natural disaster that is less common in the United States but still occurs are wildfires. Most wildfires that occur in the United States is man caused, either by negligence or arson (National Wildfire Coordinating Group, 2017). Fire meteorologists have realized that a major number of wild fires happen under specific patterns of weather (Huang, Lin, Kaplan, & Charney, 2009). An example of this occurrence is the fire that took place in Southern California in 2003 that was caused by human intervention and was made worse by the Santa Ana winds (Huang, Lin, Kaplan, & Charney, 2009). There were a total of 14 substantial fires that happened from the 25th of October to the 2nd of November 2003; there were 22 casualties, 225 injuries and billions of dollars in damages (Huang, Lin, Kaplan, & Charney, 2009).

Insurance companies are designed to support the policy holder in case of an incident or disaster, but due to insurance companies caring more about profits than the customer, this is not always the case. As with all types of insurance, the insurance company has a limited supply of resources that can be allocated equally. This limited amount of resources creates pressure for insurance companies, particularly flood insurance companies, to do whatever they can to not exceed over the proposed budget set by management (Young, 2015). Due to this, insurance companies in some claims falsify documents and say no damage exists, even though there is damage (Young, 2015). For example, in one report, all the damage was listed, even pictures of the damages were included, but at the end of the report it stated no damage was found (Young, 2015). Another tactic used by insurance companies to deny coverage for damages such as flooding is using the earth movement exclusion (Young, 2015). The earth movement exclusion states that the insurance does not cover any damage that was previously done due to the natural movement of the earth that affected the home's structure (Young, 2015). By falsifying documents and using the earth movement exclusion act, insurance companies underpaid many home owners (Young, 2015). As a result of underpaying home owners for damage claims,

insurance companies still make a considerable profit. For example, all insurance companies in the National Flood Program made \$400 million in profit after Hurricane Sandy, but there were many homeowners who were underpaid in their claims or received no money at all (Young, 2015). Doug Quinn, one of these many people, had a \$250,000 flood insurance policy on his house, but the insurance company only paid him \$90,000 (Young, 2015).

The Congressional Act of 1803 was the first disaster legislation passed that provided relief for the fires that went through Portsmouth, New Hampshire (Anna Maria College, 2017). After the fire of Portsmouth, there were 100 more pieces of disaster legislation passed in an ad-hoc approach of disaster relief (Anna Maria College, 2017). By 1950, there were laws in place that allocated money from the federal government for the rebuilding of public facilities, highways, and bridges that were destroyed or damaged by natural disasters (Anna Maria College, 2017). In 1974 the Disaster Relief Act was passed that set up a process for presidential declarations of national disasters (Anna Maria College, 2017). FEMA, the Federal Emergency Management Agency, was created in 1979 from an executive order from president Jimmy Carter (Department of Homeland Security, 2017). FEMA's mission is to prepare, prevent, respond and recover the nation from disasters (Department of Homeland Security, 2017).

FEMA's spending has increased significantly over the past few years (Edwards, 2014). In 2013, FEMA has spent \$22 billion and \$10 billion in 2014 (Edwards, 2014). In response to some major disasters, FEMA has been sluggish, unsystematic, and wasteful (Edwards, 2014). Hurricane Katrina of 2005 showed how the country was not fully equipped to react to disastrous catastrophes (Carafano & Weitz, 2005). FEMA's responses and activities have been detrimental in some cases where it has denied the relief efforts of other organizations (Edwards, 2014).

Even though the purpose of insurance is to provide coverage in case of an incident, this is not always the case. As natural disasters are increasing and insurance companies are paying out more money for losses, the pressure for insurance companies to lowball their insured is also increasing (Young, 2015). Due to weather changes, particularly in climate, and an increase in the frequency and strength of rainfall, flooding is going to increase in coastal and inland areas as well (Fan & Davlasheridze, 2016). Risk exposure can also increase inadvertently because of public investment in protective structures, along with the repetitive reconstruction of disaster-prone areas (Fan & Davlasheridze, 2016). Even though the risks of flooding are well known, flood risk maps are often inaccurate and misrepresent areas where actual flooding occurs (Oliver, 2017). Consciousness of risk and familiarity of potential hazards can also stimulate private adaptive behavior, including deciding to move away from flood prone areas, although this is not common (Fan & Davlasheridze, 2016). People choose to live in high risk areas, such as the coast for many reasons, some like the view, some like it for the exclusivity and there are some that like it for peace and isolation. Whatever the reason people chose to live by the water and other areas prone to risk, it is clearly evident that these areas pose more risk of destruction from natural disasters than in other places. Because of this high risk exposure, it is important for buildings and transportation infrastructure to be resilient against natural disasters. Currently, there are still many buildings and infrastructures that are not natural disaster ready (Young, 2015).

Hurricane Sandy in 2012 destroyed many homes that were close to the water (Young, 2015). In response to the destruction caused by Hurricane Sandy, New York City implemented a program called Build It Back (Young, 2015). The program by no means was an over the night solution to fixing all the damaged homes, however it was a start. Some homes were elevated, other homes were rebuilt again on floor level and some have not been worked on after 2 years of the introduction of the program (Young,

2015) In many cities, as well as New York, more than half of infrastructure systems lie within areas that are prone to damage from floods and other natural disasters (Aerts & Botzen, 2011). Many of these infrastructures are not flood or storm resistant and have to be improved to be more resilient to natural disasters (Aerts & Botzen, 2011).

Natural disaster can happen anywhere and anytime. Being proactive and resilient to natural disasters is crucial to preventing large scale damages from natural disasters. In order to accomplish this monumental task of being more prepared for natural disasters, several things must change, FEMA should reorganize themselves to be more efficient and allocate their budget more effectively. Insurance companies should be eliminated from the National Flood Program. And strategies should be implemented to have more resilient buildings and infrastructure systems that will be natural disaster ready.

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Materials and Methods

. Proposed Reform

Legislation reformation is the way of changing current rules and regulations into better and improved ones. There is a sea of bureaucratic red tape that has to be crossed and a lot of hurdles to jump over. While it seems like legislation reformation is nearly impossible to do, it is not. The reason why current legislation regarding natural disasters should change, is that current legislation is not providing adequate support. Many homeowners receive little, if any, relief from the government and their insurance policy in the case of a natural disaster. A change that increases the amount of support and aid homeowners receive is paramount.

FEMA has done a poor job of aiding victims hit by natural disasters thus far, and can do better. The main dilemma with FEMA now is that every year they spend more money, but there are still many homeowners who are not seeing any aid come their way. A solution to this is that FEMA can do an analysis of their current budget and see what their major expenses are and if they are vital or not. Expenses such as labor and capital expenses, such as facilities and vehicles are of course necessary and cannot be altered. Expenses that can be changed however, are those such as the fees paid to insurance companies. Insurance companies all together made \$400 million profit right after hurricane Sandy (Young, 2015). It is not necessary for insurance companies to make 1/3 profit, while people such as Doug Quinn suffer and lose money.

Since insurance companies cost the government and taxpayers a substantial amount of money, elimination of the insurance companies in the National Flood Program is a logical choice. With the elimination of insurance companies from the National Flood Program, FEMA can focus more on supporting natural disaster victims than making insurance companies more rich. Instead of having a middle man, like the insurance companies, FEMA will handle and process all damage claims. Instead of paying insurance companies for flood insurance, home owners will pay FEMA directly for coverage.

Another change that needs to be made, is the strength and resistance of infrastructure. Buildings can be elevated, more sewers can be made, and levy walls will need to be strengthened and maintained. In New Orleans when Hurricane Katrina hit in 2005, many homes got a substantial amount of flooding due to levies breaking (History, 2009). In Puerto Rico, Hurricane Maria knocked out power on all the

island this year (O'Hara, Hurricane Maria, 2017). Currently in flood prone areas, some buildings are elevated, some are not. Mandatory legislation to make homeowners living in flood zones to elevate their properties 6 feet above the ground within 5 years or rebuild their homes is a possible solution. The initial cost of this plan might be a burden to some home owners, but to alleviate this problem, the government can give tax credits to those homeowners that start elevating or rebuilding their homes within the first two years of that 5-year deadline.

By building more sewers when flooding occurs, more water will be drained faster. This plan will decrease the amount of time that roads, fields and lots stay inundated with water. In some places in the country building more sewers and drains is not a possible solution due to low elevation. For these areas, canals can be made to divert water from floods. The expenses of these costs can be covered from whatever is left in FEMA's annual budget at the end of each fiscal year.

In places where there are dams and levees, the issue is that levy walls are not strong enough to endure the pressure from all the flood water. To alleviate this problem, a plan can be made to fortify all existing levy walls with steel reinforced concrete walls. Steel reinforced concrete might be a little costlier than normal concrete walls but the money saved from the walls not breaking in the future, far outweighs the initial cost of building the walls.

Reformation in the preparedness for natural disasters is daunting, but the outcomes will be worth it. FEMA can be reorganized to be more streamlined and more efficient. The government can regulate insurance companies to limit the amount of profit the companies' make, ensure that policy holders receive a fair amount for their claims and audit reports to make sure they are legitimate and not fraudulent. Existing infrastructure and buildings can be strengthened and made more resilient to reduce damage from future floods and natural disasters. Damage and destruction cannot be eliminated with these proposed reformations of legislation but it can be greatly reduced.

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Results and Discussion

Projected Outcomes

FEMA's Current Budget for 2017 VS Proposed Budget for 2018

Currently the budget for FEMA is \$16.5 billion (Department of Homeland Security, 2017). The area where FEMA currently spends the most is on disaster relief (Department of Homeland Security, 2017). Given the fact that floods are the most common natural disaster in the nation, it makes more sense for FEMA to allocate more of its budget toward the National Flood Program. Another area where it makes sense to increase FEMA's budget in is procurement, construction, and improvements. Since disaster relief includes all natural disasters, including floods, it is logical to lower the budget on that fund. The new proposed budget plan for 2018 lowers the budget by \$1.5 billion dollar while still increasing funds for construction and the national flood program.

Current VS Projected Outcomes

So far in 2017, there have been 15 natural disasters, each exceeding a billion dollars in damage. There has not been this many natural disasters since 2011. With this trend in natural disaster, the amount of natural disasters for 2018 is expected to rise. There is an estimated cost of \$100 billion worth in damages and 282 casualties this year from natural disasters (NOAA, 2017). This estimation of \$100

billion is modest and the actual cost of damage is higher, Irma alone was predicted to cause \$40 billion in damages (Rodriguez, 2017). With the proposed reinforcements to infrastructure, damages for 2018 are expected to be more than half of this year. As a result of the improved infrastructure, casualties are expected to be less than half this year as well. The way these figures were reached is by assuming infrastructure damages will be reduced by 50% or more given all the improvements and reinforcements, casualties and costs will also be reduced by 50% or more. The way this percentage was reached is by an analysis of similar past events and reformations.

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Conclusions.

Conclusion

With the legislation changes and proposed budget for 2018, there will be many positive changes. There will be more peace of mind and more fairness. The general public would be looking forward to saving money with the reinforcements of infrastructure and no more flood insurance payments with the removal of insurance companies. The industries most affected by these policy changes include the insurance industry since there will no longer be flood insurance and contractors and companies which specialize in reinforcing infrastructures.

In 2017 alone, Hurricane Harvey, a category 4 hurricane that hit and affected an area just south of Houston in August of 2017 cost nearly \$200 million in damages (Hicks & Burton, 2017). Most of the damages inflicted by Harvey were due to flooding (Hicks & Burton, 2017). There were \$26 million dollars worth of damage to commercial structures, \$46 million of damage to commercial equipment, \$77 million of damage to residential structures, \$36 million damage in residential content, \$6 million damage in commercial revenue, \$350,000 damage to electrical utilities, \$3.85 million in damage to highways and nearly \$2 million in damages to the sewer system (Hicks & Burton, 2017). The effects of Hurricane Harvey are similar with other major hurricanes. In addition to the damage listed above, there will also be a short term spike in unemployment claims and loss of business around the Houston area. Another major hurricane that also hit this year is hurricane Maria. Hurricane Maria hit Puerto Rico on September 20, 2017 (O'Hara, 2017). Maria is the strongest hurricane to have hit Puerto Rico in over 80 years (O'Hara, 2017). The storm demolished hundreds of homes, caused a power outage for the whole island, and produced heavy flooding (O'Hara, 2017). Hurricane Maria hit Puerto Rico as a

category 4 storm with winds up to 155 mph (O'Hara, 2017). After a week of hitting Puerto Rico, Maria diminished off into the Atlantic. Hurricane Maria left over 51 casualties in Puerto Rico (O'Hara, 2017).

Puerto Rican authorities estimate there was approximately \$75 billion in damages to infrastructures and the power grid (O'Hara, 2017). Congress had approved only \$5 billion in aid to Puerto Rico so far (O'Hara, 2017) . As of now, there is still a lack of basic necessities such as clean drinking water and food (O'Hara, 2017). Hospitals and homes still remain damaged from flooding. There are estimates that most of Puerto Rico can be without power for another six to nine months (O'Hara, 2017).

As with any natural disaster, the effects felt by Hurricane Harvey and Hurricane Maria were and continue to be devastating. With the proposed reformation of legislation of improving FEMA to be more efficient, reinforcing public infrastructure and eliminating insurance companies from the flood program, the future outlook for natural disasters is looking more favorable. As a result of these legislation changes there will be less damage to infrastructures, storm victims will receive quicker relief, while saving the government money on disaster relief. If these reformations were already in place from the beginning of 2017 there would have been less damage inflicted from major storms this year.

In addition to victims of natural disasters facing less damage to their homes and the infrastructure around them and receiving more aid with the proposed reformation, there will also be more jobs available due to the reinforcement of infrastructure. There will be more workers needed to assess what reinforcements need to be made and how much they will cost. There will be also more workers needed to install the reinforcements. This will create American jobs for those that lost their jobs due to companies employing people overseas and for those that are coal miners. Another benefit that will arise from the reformations is the elimination of coal mining since it will no longer be necessary with the improvements done to electrical infrastructure systems. With the elimination of coal mining, there will be less natural disasters since coal mining contributes to global warming (Green Peace, 2016).

With reformations, there will be people opposed to it, in this case the insurance companies. Insurance companies will be opposed with the proposed legislation reformations since they will no longer be part of the flood program. Insurance companies will argue that they are needed to provide relief to homeowners in the case of flooding. With the amount of fraud that flood insurance companies have committed in the past years and the amount of profit they have generated while underpaying home owners on their claims, it is difficult to see any benefit of including insurance companies in the flood program. By FEMA handling claims exclusively they will have cut out the middle man. By doing this FEMA will be able to save money and process claims faster, thus flood victims will be provided with relief sooner.

Implementing the proposed reformation of legislation to make FEMA more efficient, improve and reinforce infrastructure and eliminate flood insurance companies will reduce the amount of money the federal government will spend and increase the amount of money victims will receive from damages. The legislation will also create more jobs since more workers will be needed to implement reinforcements to existing infrastructure. The reformations will also improve the health of everybody, since there will be less stress produced. It is the duty of professionals in the health care industry to honor the Nightingale pledge and by reducing overall stress, people will stay healthier and encounter less new health problems. By congress implementing these reformations everybody will benefit.

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