



## Nutritional Considerations in the Aftermath of Disasters: A Global Look

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Disasters are increasing in prevalence and virulence. According to the National Oceanic and Atmospheric Administration, 2018 was one of the costliest years on record for billion-dollar disaster events within the United States, the other events happening within the same decade in 2017, 2011 and 2016 [1]. The damage to infrastructure and lives was tremendous. While quantification of the damage to infrastructure, rebuilding costs etc. are often the focus of articles, what is sometimes overlooked are the impact to countries regarding the residual effects and aftermath of disasters. These effects have short term and long-term implications to include nutritional considerations for their respective populations.

The US National Oceanic and Atmospheric Administration [2] reported that while 2018 was one of the costliest years on record, 2017 was the worst year in recorded history for natural disasters. NOAA reported 16 weather and climate disaster events with estimated losses to exceed \$1 billion each across the United States, including 1 drought, 2 major floods, 1 major freeze event, 8 severe storms, 3 tropical cyclones, and 1 major wildfire. In total these natural disaster events resulted in approximately 362 deaths. They estimate that the average number of annual catastrophic events in the past five years was 11.6, double the annual average in the 35 preceding years. The cumulative damage of these events totaled \$306.2 billion, shattering the previous U.S. annual record cost of \$214.8 billion. On a global scale, it is difficult to estimate the amount of damage, as residual effects such as those experienced by Puerto Rico are still ongoing. NOAA also identified 710 natural catastrophes around the globe, significantly higher than the annual average of 605.

The impact of disasters is so far reaching, but they especially impact third world countries, overall detriments include; loss of

surface vegetation, forced human displacement, loss of livestock and other productive systems. Additionally, secondary threats may be related to damaged infrastructure, such as leakage from fuel storage facilities. Reconstruction efforts may be affected by deforestation and waste pollution. Sanitation is a serious threat, as food borne illnesses may become prevalent without running or potable water with which to drink, cook with and bathe. Diseases such as cholera, dysentery, *E. coli* and other disease may affect crops, ingestion of food source and result in malnutrition, dehydration, immunosuppression and other diseases.

Loss of power and utilities, and displacement from homes, and unavailability of food sources to contribute to malnutrition. Inability to cook, food and water borne pathogens pose a significant threat to public health.

Examples of disaster events in 2017 include: South Asia had 1,200 deaths due to flooding and landslides in Bangladesh, India & Nepal, overall affecting more than 41 million. In Sierra Leone, deaths were due to flooding and mudslides and affected more than 6,000 people. In Colombia 300+ deaths were due to a massive landslide, followed by another landslide which resulted in displacement, homelessness, water contaminated by sewage and body disposal. In Sri Lanka, 213 deaths were due to heavy rainfall and strong monsoon winds. Flooding and landslides affected 415,600, 30% of which were children [3].

In our southern border, Central Mexico experienced a 7.1 Magnitude Earthquake that killed 370 people and was preceded by an 8.2 magnitude quake and left 2.5 million in need of aid.

The middle east was not spared from devastating event either, Afghanistan experienced a massive avalanche and took the lives of 156

people, most were women & children. China, Zimbabwe and Vietnam also have similar stories [3].

The United States and its territories were not spared either, as many states experienced massive rains from hurricanes and tropical storms. Hurricane Harvey dumped over 50 inches of rain in the Houston area and resulted in long term renovations, displacement of individuals and disruptions of utility services. Florida's hurricane Irma, a Category 4 hurricane left 6.8 million people without power.

Even now in Puerto Rico, and the Dominican Republic, lifestyles have had to necessarily change as power outages continue to disrupt everyday activities. As a result of hurricane Maria over 129 people are dead, and the death toll continues to rise due to the residual effects of the storm, such as lack of food, devastation of infrastructure and absence of utilities. Hurricane Maria was the strongest storm in 80 years, the power outage is still ongoing, it is estimated \$45-95 billion in damages to power grid and infrastructure [4].

The environmental Impact of such disasters often have devastating and environmental implications such as

- Loss of vegetation cover and wildlife habitat
- Short-term heavy rains and flooding inland
- Mud slides and soil erosion
- Saltwater intrusion to underground fresh water reservoirs
- Soil contamination from saline water
- Damage to offshore coral reefs and natural coastal defense mechanisms
- Waste (some of which may be hazardous) and debris accumulation
- Secondary impacts by temporarily displaced people
- Impacts associated with reconstruction and repair to damaged infrastructure (e.g. deforestation, quarrying, waste pollution)
- Ground water pollution through sewage overflow and waste accumulation
- Loss of productive fisheries and coastal forest/plantations

- Destruction of coral reefs
- Coastal erosion and/or beneficial deposition of sediment on beaches/small islands
- Marine pollution from back flow of wave surge
- Loss of crops and seed banks
- Secondary impacts by temporarily displaced people
- Impacts associated with reconstruction and repair to damaged infrastructure (e.g. deforestation, quarrying, waste pollution).

The implications of natural and man-caused disasters are vast, and it is imperative for countries, cities, villages etc. to have a mitigation plan or strategy that addresses every conceivable scenario. Governments, both state and local municipalities should conduct an All-Hazards analysis common (or uncommon, such as high-risk, low-volume) to their localities, practice scenarios and prepare their citizens for the "worse-case" scenarios. Hospitals and first-responders should be involved in these events. Dieticians and nutritionists should also be part of this planning process and propose protein dense foods to help sustain their citizens through such events. They should identify what foods might be most at risk for destruction especially if local populations are highly reliant of these foods. They should work with city governments to create a cache of food and potable water for their citizens, and sanitation plans that help mitigate the health issues associated with such disaster events such as Cholera, and other gastrointestinal illnesses that spread quickly among vast and vulnerable populations. When drills are conducted, an after-action review should be done to determine what was lacking and what could be done better next time.

All individuals should be encouraged to create an emergency backpack with at least 3 days of non-perishable, and nutrient dense food and water for each of their family members. People should be encouraged to have a plan, have a meeting place for loved ones, and a contingency plan, just in case Plan A fails. There is no way to prevent natural disasters, but there are ways to mitigate the events and aftermath by being prepared, thinking ahead and understanding the issues. There is never a convenient time to practice these events, but better to be prepared than to suffer the consequences of poor planning [5].

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