# Emergency management

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**Disaster management** (or **emergency management**) is the creation of plans through which communities reduce vulnerability to hazards and cope with disasters.[1][2] Disaster management does not avert or eliminate the threats; instead, it focuses on creating plans to decrease the effect of disasters. Failure to create a plan could lead to human mortality, lost revenue, and damage to assets. Currently in the United States 60 percent of businesses do not have emergency management plans. Events covered by disaster management include acts of terrorism, industrial sabotage, fire, natural disasters (such as earthquakes, hurricanes, etc.), public disorder, industrial accidents, and communication failures.

## Contents

## Emergency planning ideals

If possible, emergency planning should aim to prevent emergencies from occurring, and failing that, should develop a good action plan to mitigate the results and effects of any emergencies. As time goes on, and more data becomes available, usually through the study of emergencies as they occur, a plan should evolve. The development of emergency plans is a cyclical process, common to many risk management disciplines, such as Business Continuity and Security Risk Management, as set out below:

- Recognition or identification of risks
- Ranking or evaluation of risks
  - Responding to significant risks
  - Tolerate
  - Treat
  - Transfer
  - Terminate
- Resourcing controls
- Reaction Planning
- Reporting & monitoring risk performance
- Reviewing the Risk Management framework

There are a number of guidelines and publications regarding Emergency Planning, published by various professional organizations such as ASIS, National Fire Protection Association (NFPA), and the International Association of Emergency Managers (IAEM). There are very few Emergency Management specific standards, and emergency management as a discipline tends to fall under business resilience standards.

In order to avoid, or reduce significant losses to a business, emergency managers should work to identify and anticipate potential risks, hopefully to reduce their probability of occurring. In the event that an emergency does occur, managers should have a plan prepared to mitigate the effects of that emergency, as well as to ensure Business Continuity of critical operations post-incident. It is essential for an organisation to include procedures for determining whether an emergency situation has occurred and at what point an emergency management plan should be activated.

## Implementation ideals

An emergency plan must be regularly maintained, in a structured and methodical manner, to ensure it is up-to-date in the event of an emergency. Emergency managers generally follow a common process to anticipate, assess, prevent, prepare, respond and recover from an incident.

### Pre-incident training and testing

Emergency management plans and procedures should include the identification of appropriately trained staff members responsible for decision-making when an emergency occurs. Training plans should include internal people, contractors and civil protection partners, and should state the nature and frequency of training and testing.

Testing of a plan's effectiveness should occur regularly. In instances where several business or organisations occupy the same space, joint emergency plans, formally agreed to by all parties, should be put into place.

A team of emergency responders performs a training scenario involving anthrax.

### Communicating and incident assessment

Communication is one of the key issues during any emergency, pre-planning of communications is critical. Miscommunication can easily result in emergency events escalating unnecessarily.

Once an emergency has been identified a comprehensive assessment evaluating the level of impact and its financial implications should be undertaken. Following assessment, the appropriate plan or response to be activated will depend on a specific pre-set criteria within the emergency plan. The steps necessary should be prioritized to ensure critical functions are operational as soon as possible.

## Phases and personal activities

Emergency management consists of five phases: prevention, mitigation, preparedness, response and recovery.
http://www.fema.gov/mission-areas

### Prevention

It focuses on preventing the human hazard, primarily from potential natural disasters or terrorist attacks. Preventive measures are taken on both the domestic and international levels, designed to provide permanent protection from disasters. Not all disasters, particularly natural disasters, can be prevented, but the risk of loss of life and injury can be mitigated with good evacuation plans, environmental planning and design standards. In January 2005, 167 Governments adopted a 10-year global plan for natural disaster risk reduction called the Hyogo Framework.

Preventing or reducing the impacts of disasters on our communities is a key focus for emergency management efforts today. Prevention and mitigation also help reduce the financial costs of disaster response and recovery. Public Safety Canada is working with provincial and territorial governments and stakeholders to promote disaster prevention and mitigation using a risk-based and all-hazards approach. In 2008, Federal/Provincial/Territorial Ministers endorsed a National Disaster Mitigation Strategy.

### Mitigation

Preventive or mitigation measures take different forms for different types of disasters. In earthquake prone areas, these preventive measures might include structural changes such as the installation of an earthquake valve to instantly shut off the natural gas supply, seismic retrofits of property, and the securing of items inside a building. The latter may include the mounting of furniture, refrigerators, water heaters and breakables to the walls, and the addition of cabinet latches. In flood prone areas, houses can be built on poles/stilts. In areas prone to prolonged electricity black-outs installation of a generator ensures continuation of electrical service. The construction of storm cellars and fallout shelters are further examples of personal mitigative actions.

On a national level, governments might implement large scale mitigation measures. After the monsoon floods of 2010, the Punjab government subsequently constructed 22 'disaster-resilient' model villages, comprising 1885 single-storey homes, together with schools and health centres.[3]

Disaster mitigation measures are those that eliminate or reduce the impacts and risks of hazards through proactive measures taken before an emergency or disaster occurs.

One of the best known examples of investment in disaster mitigation is the Red River Floodway. The building of the Floodway was a joint provincial/federal undertaking to protect the City of Winnipeg and reduce the impact of flooding in the Red River Basin. It cost $62.7 million to build in the 1960s. Since then, the floodway has been used over 20 times. Its use during the 1997 Red River Flood alone saved an estimated $4.5 billion in costs from potential damage to the city.[4] The Floodway was expanded in 2006 as a joint provincial/federal initiative.

### Preparedness

Preparedness focuses on preparing equipment and procedures for use when a disaster occurs. This equipment and these procedures can be used to reduce vulnerability to disaster, to mitigate the impacts of a disaster or to respond more efficiently in an emergency. The Federal Emergency Management Agency (FEMA) has set out a basic four-stage vision of preparedness flowing from mitigation to preparedness to response to recovery and back to mitigation in a circular planning process.[5] This circular, overlapping model has been modified by other agencies, taught in emergency class and discussed in academic papers.[6] FEMA also operates a Building Science Branch that develops and produces multi-hazard mitigation guidance that focuses on creating disaster-resilient communities to reduce loss of life and property.[7] FEMA advises citizens to

An airport emergency preparedness exercise

prepare their homes with some emergency essentials in the case that the food distribution lines are interrupted. FEMA has subsequently prepared for this contingency by purchasing hundreds of thousands of freeze dried food emergency meals ready to eat (MRE's) to dispense to the communities where emergency shelter and evacuations are implemented.

Emergency preparedness can be difficult to measure.[8] CDC focuses on evaluating the effectiveness of its public health efforts through a variety of measurement and assessment programs.[9]

### Local Emergency Planning Committees

Local Emergency Planning Committees (LEPCs) are required by the United States Environmental Protection Agency under the Emergency Planning and Community Right-to-Know Act to develop an emergency response plan, review the plan at least annually, and provide information about chemicals in the community to local citizens.[10] This emergency preparedness effort focuses on hazards presented by use and storage of extremely hazardous, hazardous and toxic chemicals.[11] Particular requirements of LEPCs include

- Identification of facilities and transportation routes of extremely hazardous substances
- Description of emergency response procedures, on and off site
- Designation of a community coordinator and facility emergency coordinator(s) to implement the plan
- Outline of emergency notification procedures
- Description of how to determine the probable affected area and population by releases
- Description of local emergency equipment and facilities and the persons responsible for them
- Outline of evacuation plans
- A training program for emergency responders (including schedules)
- Methods and schedules for exercising emergency response plans

According to the EPA, "Many LEPCs have expanded their activities beyond the requirements of EPCRA, encouraging accident prevention and risk reduction, and addressing homeland security in their communities" and the Agency offers advice on how to evaluate the effectiveness of these committees.[12]

### Preparedness measures

Preparedness measures can take many forms ranging from focusing on individual people, locations or incidents to broader, government-based "all hazard" planning.[13] There are a number of preparedness stages between "all hazard' and individual planning, generally involving some combination of both mitigation and response planning. Business continuity planning encourages businesses to have a Disaster Recovery Plan. Community- and faith-based organizations mitigation efforts promote field response teams and inter-agency planning.[14]

School-based response teams cover everything from live shooters to gas leaks and nearby bank robberies.[15] Educational institutions plan for cyberattacks and windstorms.[16] Industry specific guidance exists for horse farms,[17] boat owners[18] and more.

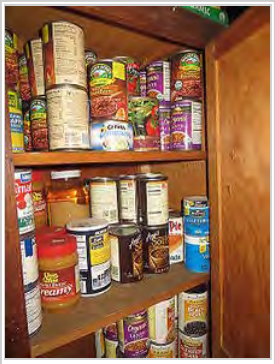

Classroom response kit

Family preparedness for disaster is fairly unusual. A 2013 survey found that only 19% of American families felt that they were "very prepared" for a disaster.[19] Still, there are many resources available for family disaster planning. The Department of Homeland Security's Ready.gov page includes a Family Emergency Plan Checklist,[20] has a whole webpage devoted to readiness for kids, complete with cartoon-style superheroes,[21] and ran a Thunderclap Campaign in 2014.[22] The Center for Disease Control has a Zombie Apocalypse website.[23]

Disasters take a variety of forms to include earthquakes, tsunamis or regular structure fires. That a disaster or emergency is not large scale in terms of population or acreage impacted or duration does not make it any less of a disaster for the people or area impacted and much can be learned about preparedness from so-called small disasters.[24] The Red Cross states that it responds to nearly 70,000 disasters a year, the most common of which is a single family fire.[25]


Kitchen fire extinguisher


Items on shelves in basement


Non-perishable food in cabinet

Preparedness starts with an individual's everyday life and involves items and training that would be useful in an emergency. What is useful in an emergency is often also useful in everyday life.[26] From personal preparedness, preparedness continues on a continuum through family preparedness, community preparedness and then business, non-profit and governmental preparedness. Some organizations blend these various levels. For example, the International Red Cross and Red Crescent Movement has a webpage on disaster training[27] as well as offering training on basic preparedness such as Cardiopulmonary resuscitation and First Aid. Other non-profits such as Team Rubicon bring specific groups of people into disaster preparedness and response operations.[28] FEMA breaks down preparedness into a pyramid, with citizens on the foundational bottom, on top of which rests local government, state government and federal government in that order.[29]

The basic theme behind preparedness is to be ready for an emergency and there are a number of different variations of being ready based on an assessment of what sort of threats exist. Nonetheless, there is basic guidance for preparedness that is common despite an area's specific dangers. FEMA recommends that everyone have a three-day survival kit for their household.[30] Because individual household sizes and specific needs might vary, FEMA's recommendations are not item specific, but the list includes:

- Three-day supply of non-perishable food.
- Three-day supply of water – one gallon of water per person, per day.
- Portable, battery-powered radio or television and extra batteries.
- Flashlight and extra batteries.
- First aid kit and manual.
- Sanitation and hygiene items (e.g. toilet paper, menstrual hygiene products).
- Matches and waterproof container.
- Whistle.
- Extra clothing.
- Kitchen accessories and cooking utensils, including a can opener.
- Photocopies of credit and identification cards.
- Cash and coins.
- Special needs items, such as prescription medications, eyeglasses, contact lens solutions, and hearing aid batteries.
- Items for infants, such as formula, diapers, bottles, and pacifiers.
- Other items to meet unique family needs.

Along similar lines, but not exactly the same, CDC has its own list for a proper disaster supply kit.[31]

- Water—one gallon per person, per day
- Food—nonperishable, easy-to-prepare items
- Flashlight
- Battery powered or hand crank radio (NOAA Weather Radio, if possible)
- Extra batteries
- First aid kit
- Medications (7-day supply), other medical supplies, and medical paperwork (e.g., medication list and pertinent medical information)
- Multipurpose tool (e.g., Swiss army knife)
- Sanitation and personal hygiene items
- Copies of personal documents (e.g., proof of address, deed/lease to home, passports, birth certificates, and insurance policies)
- Cell phone with chargers
- Family and emergency contact information
- Extra cash
- Emergency blanket
- Map(s) of the area
- Extra set of car keys and house keys
- Manual can opener

Children are a special population when considering Emergency preparedness and many resources are directly focused on supporting them. SAMHSA has list of tips for talking to children during infectious disease outbreaks, to include being a good listener, encouraging children to ask questions and modeling self-care by setting routines, eating healthy meals, getting enough sleep and taking deep breaths to handle stress.[32] FEMA has similar advice, noting that "Disasters can leave children feeling frightened, confused, and insecure" whether a child has experienced it first hand, had it happen to a friend or simply saw it on television.[33] In the same publication, FEMA further notes, "Preparing for disaster helps everyone in the family accept the fact that disasters do happen, and provides an opportunity to identify and collect the resources needed to meet basic needs after disaster. Preparation helps; when people feel prepared, they cope better and so do children."

To help people assess what threats might be in order to augment their emergency supplies or improve their disaster response skills, FEMA has published a booklet called the "Threat and Hazard Identification and Risk Assessment Guide."[34] (THIRA) This guide, which outlines the THIRA process, emphasizes "whole community involvement," not just governmental agencies, in preparedness efforts. In this guide, FEMA breaks down hazards into three categories: Natural, technological and human caused and notes that each hazard should be assessed for both its likelihood and its significance. According to FEMA, "Communities should consider only those threats and hazards that could plausibly occur" and "Communities should consider only those threats and hazards that would have a significant effect on them." To develop threat and hazard context descriptions, communities should take into account the time, place, and conditions in which threats or hazards might occur.

Not all preparedness efforts and discussions involve the government or established NGOs like the Red Cross. Emergency preparation discussions are active on the internet, with many blogs and websites dedicated to discussing various aspects of preparedness. On-line sales of items such as survival food, medical supplies and heirloom seeds allow people to stock basements with cases of food and drinks with 25 year shelf lives, sophisticated medical kits and seeds that are guaranteed to sprout even after years of storage.[35]

One group of people who put a lot of effort in disaster preparations is called Doomsday Preppers. This subset of preparedness-minded people often share a belief that the FEMA or Red Cross emergency preparation suggestions and training are not extensive enough. Sometimes called survivalists, Doomsday Preppers are often preparing for The End Of The World As We Know It, abbreviated as TEOTWAWKI. With a motto some have that "The Future Belongs to those who Prepare," this Preparedness subset has its own set of Murphy's Rules,[36] including "Rule Number 1: Food, you still don't have enough" and "Rule Number 26: People who thought the Government would save them, found out that it didn't."

Not all emergency preparation efforts revolve around food, guns and shelters, though these items help address the needs in the bottom two sections of Maslow's hierarchy of needs. The American Preppers Network[37] has an extensive list of items that might be useful in less apparent ways than a first aid kid or help add 'fun' to challenging times. These items include:

- Books and magazines
- Arts and crafts painting
- Children's entertainment
- Crayons and coloring books
- Notebooks and writing supplies
- Nuts, bolts, screws, nails, etc.
- Religious material
- Sporting equipment, card games and board games
- Posters and banners creating awareness

Emergency preparedness goes beyond immediate family members. For many people, pets are an integral part of their families and emergency preparation advice includes them as well. It is not unknown for pet owners to die while trying to rescue their pets from a fire or from drowning.[38] CDC's Disaster Supply Checklist for Pets includes:[31]

- Food and water for at least 3 days for each pet; bowls, and a manual can opener.
- Depending on the pet you may need a litter box, paper towels, plastic trash bags, grooming items, and/or household bleach.
- Medications and medical records stored in a waterproof container.
- First aid kit with a pet first aid book.
- Sturdy leash, harness, and carrier to transport pet safely. A carrier should be large enough for the animal to stand comfortably, turn around, and lie down. Your pet may have to stay in the carrier for several hours.
- Pet toys and the pet's bed, if you can easily take it, to reduce stress.
- Current photos and descriptions of your pets to help others identify them in case you and your pets become separated, and to prove that they are yours.

- Information on feeding schedules, medical conditions, behavior problems, and the name and telephone number of your veterinarian in case you have to board your pets or place them in foster care.

Emergency preparedness also includes more than physical items and skill-specific training. Psychological preparedness is also a type of emergency preparedness and specific mental health preparedness resources are offered for mental health professionals by organizations such as the Red Cross.[25] These mental health preparedness resources are designed to support both community members affected by a disaster and the disaster workers serving them. CDC has a website devoted to coping with a disaster or traumatic event.[39] After such an event, the CDC, through the Substance Abuse and Mental Health Services Administration (SAMHSA), suggests that people seek psychological help when they exhibit symptoms such as excessive worry, crying frequently, an increase in irritability, anger, and frequent arguing, wanting to be alone most of the time, feeling anxious or fearful, overwhelmed by sadness, confused, having trouble thinking clearly and concentrating, and difficulty making decisions, increased alcohol and/or substance use, increased physical (aches, pains) complaints such as headaches and trouble with "nerves."

Sometimes emergency supplies are kept in what is called a Bug-out bag. While FEMA does not actually use the term "Bug out bag," calling it instead some variation of a "Go Kit," the idea of having emergency items in a quickly accessible place is common to both FEMA and CDC, though on-line discussions of what items a "bug out bag" should include sometimes cover items such as firearms and great knives that are not specifically suggested by FEMA or CDC.[40] The theory behind a "bug out bag" is that emergency preparations should include the possibility of Emergency evacuation. Whether fleeing a burning building or hastily packing a car to escape an impending hurricane, flood or dangerous chemical release, rapid departure from a home or workplace environment is always a possibility and FEMA suggests having a Family Emergency Plan for such occasions.[41] Because family members may not be together when disaster strikes, this plan should include reliable contact information for friends or relatives who live outside of what would be the disaster area for household members to notify they are safe or otherwise communicate with each other. Along with the contact information, FEMA suggests having well-understood local gathering points if a house must be evacuated quickly to avoid the dangers of re-reentering a burning home.[42] Family and emergency contact information should be printed on cards and put in each family member's backpack or wallet. If family members spend a significant amount of time in a specific location, such as at work or school, FEMA suggests learning the emergency preparation plans for those places.[41] FEMA has a specific form, in English and in Spanish, to help people put together these emergency plans, though it lacks lines for email contact information.[41]

Like children, people with disabilities and other special needs have special emergency preparation needs. While "disability" has a specific meaning for specific organizations such as collecting Social Security benefits,[43] for the purposes of emergency preparedness, the Red Cross uses the term in a broader sense to include people with physical, medical, sensor or cognitive disabilities or the elderly and other special needs populations.[44] Depending on the particular disability, specific emergency preparations might be required. FEMA's suggestions for people with disabilities includes having copies of prescriptions, charging devices for medical devices such as motorized wheel chairs and a week's supply of medication readily available LINK or in a "go stay kit."[45] In some instances, lack of competency in English may lead to special preparation requirements and communication efforts for both individuals and responders.[46]

FEMA notes that long term power outages can cause damage beyond the original disaster that can be mitigated with emergency generators or other power sources to provide an Emergency power system.[47] The United States Department of Energy states that 'homeowners, business owners, and local leaders may have to take an active role in dealing with energy disruptions on their own."[48] This active role may include installing or other procuring generators that are either portable or permanently mounted and run on fuels such as propane or natural gas[49] or gasoline.[50] Concerns about carbon monoxide poisoning, electrocution, flooding, fuel storage and fire lead even small property owners to consider professional installation and maintenance.[47] Major institutions like hospitals, military bases and educational institutions often have or are considering extensive backup power systems.[51] Instead of, or in addition to, fuel-based power systems, solar, wind and other alternative power sources may be used.[52] Standalone batteries, large or small, are also used to provide backup charging for electrical systems and devices ranging from emergency lights to computers to cell phones.[53]

Emergency preparedness does not stop at home or at school.[54] The United States Department of Health and Human Services addresses specific emergency preparedness issues hospitals may have to respond to, including maintaining a safe temperature, providing adequate electricity for life support systems and even carrying out evacuations under extreme circumstances.[55] FEMA

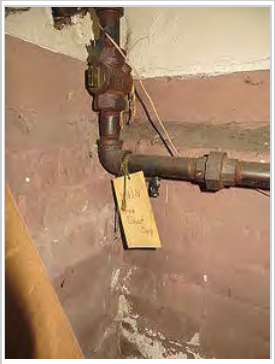
encourages all businesses to have businesses to have an emergency response plan[56] and the Small Business Administration specifically advises small business owners to also focus emergency preparedness and provides a variety of different worksheets and resources.[57]

FEMA cautions that emergencies happen while people are travelling as well[58] and provides guidance around emergency preparedness for a range travelers to include commuters,[59] *Commuter Emergency Plan* and holiday travelers.[60] In particular, Ready.gov has a number of emergency preparations specifically designed for people with cars.[61] These preparations include having a full gas tank, maintaining adequate windshield wiper fluid and other basic car maintenance tips. Items specific to an emergency include:

- Jumper cables: might want to include flares or reflective triangle
- Flashlights, to include extra batteries (batteries have less power in colder weather)
- First Aid Kit, to include any necessary medications, baby formula and diapers if caring for small children
- Non-perishable food such as canned food (be alert to liquids freezing in colder weather), and protein rich foods like nuts and energy bars
- Manual can opener
- At least 1 gallon of water per person a day for at least 3 days (be alert to hazards of frozen water and resultant container rupture)
- Basic toolkit: pliers, wrench, screwdriver
- Pet supplies: food and water
- Radio: battery or hand cranked
- For snowy areas: cat litter or sand for better tire traction; shovel; ice scraper; warm clothes, gloves, hat, sturdy boots, jacket and an extra change of clothes
- Blankets or sleeping bags
- Charged Cell Phone: and car charger

In addition to emergency supplies and training for various situations, FEMA offers advice on how to mitigate disasters. The Agency gives instructions on how to retrofit a home to minimize hazards from a Flood, to include installing a Backflow prevention device, anchoring fuel tanks and relocating electrical panels.[62]

Given the explosive danger posed by natural gas leaks, Ready.gov states unequivocally that "It is vital that all household members know how to shut off natural gas" and that property owners must ensure they have any special tools needed for their particular gas hookups. Ready.gov also notes that "It is wise to teach all responsible household members where and how to shut off the electricity," cautioning that individual circuits should be shut off before the main circuit. Ready.gov further states that "It is vital that all household members learn how to shut off the water at the main house valve" and cautions that the possibility that rusty valves might require replacement.[63]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### Response

The response phase of an emergency may commence with Search and Rescue but in all cases the focus will quickly turn to fulfilling the basic humanitarian needs of the affected population. This assistance may be provided by national or international agencies and organizations. Effective coordination of disaster assistance is often crucial, particularly when many organizations respond and local emergency management agency (LEMA) capacity has been exceeded by the demand or diminished by the disaster itself. The National Response Framework is a United States government publication that explains responsibilities and expectations of government officials at the local, state, federal, and tribal levels. It provides guidance on Emergency Support Functions that may be integrated in whole or parts to aid in the response and recovery process.

On a personal level the response can take the shape either of a *shelter in place* or an *evacuation*.

In a shelter-in-place scenario, a family would be prepared to fend for themselves in their home for many days without any form of outside support. In an *evacuation*, a family leaves the area by automobile or other mode of transportation, taking with them the maximum amount of supplies they can carry, possibly including a tent for shelter. If mechanical transportation is not available, evacuation on foot would ideally include carrying at least three days of supplies and rain-tight bedding, a tarpaulin and a bedroll of blankets.

Donations are often sought during this period, especially for large disasters that overwhelm local capacity. Due to efficiencies of scale, money is often the most cost-effective donation if fraud is avoided. Money is also the most flexible, and if goods are sourced locally then transportation is minimized and the local economy is boosted. Some donors prefer to send gifts in kind, however these items can end up creating issues, rather than helping. One innovation by Occupy Sandy volunteers is to use a donation registry, where families and businesses impacted by the disaster can make specific requests, which remote donors can purchase directly via a web site.

Evacuation sign

Medical considerations will vary greatly based on the type of disaster and secondary effects. Survivors may sustain a multitude of injuries to include lacerations, burns, near drowning, or crush syndrome.

### Recovery

The recovery phase starts after the immediate threat to human life has subsided. The immediate goal of the recovery phase is to bring the affected area back to normalcy as quickly as possible. During reconstruction it is recommended to consider the location or construction material of the property.

The most extreme home confinement scenarios include war, famine and severe epidemics and may last a year or more. Then recovery will take place inside the home. Planners for these events usually buy bulk foods and appropriate storage and preparation equipment, and eat the food as part of normal life. A simple balanced diet can be constructed from vitamin pills, whole-meal wheat, beans, dried milk, corn, and cooking oil.[64] One should add vegetables, fruits, spices and meats, both prepared and fresh-gardened, when possible.

## As a profession

Professional emergency managers can focus on government and community preparedness, or private business preparedness. Training is provided by local, state, federal and private organizations and ranges from public information and media relations to high-level incident command and tactical skills.

In the past, the field of emergency management has been populated mostly by people with a military or first responder background. Currently, the field has become more diverse, with many managers coming from a variety of backgrounds other than the military or first responder fields. Educational opportunities are increasing for those seeking undergraduate and graduate degrees in emergency management or a related field. There are over 180 schools in the US with emergency management-related programs, but only one doctoral program specifically in emergency management.[65]

Professional certifications such as Certified Emergency Manager (CEM)[66] and Certified Business Continuity Professional (CBCP) are becoming more common as professional standards are raised throughout the field, particularly in the United States. There are also professional organizations for emergency managers, such as the National Emergency Management Association and the International Association of Emergency Managers.

### Principles

In 2007, Dr. Wayne Blanchard of FEMA's Emergency Management Higher Education Project, at the direction of Dr. Cortez Lawrence, Superintendent of FEMA's Emergency Management Institute, convened a working group of emergency management practitioners and academics to consider principles of emergency management. This was the first time the principles of the discipline were to be codified. The group agreed on eight principles that will be used to guide the development of a doctrine of emergency management. Below is a summary:

1. Comprehensive – consider and take into account all hazards, all phases, all stakeholders and all impacts relevant to disasters.
2. Progressive – anticipate future disasters and take preventive and preparatory measures to build disaster-resistant and disaster-resilient communities.
3. Risk-driven – use sound risk management principles (hazard identification, risk analysis, and impact analysis) in assigning priorities and resources.
4. Integrated – ensure unity of effort among all levels of government and all elements of a community.
5. Collaborative – create and sustain broad and sincere relationships among individuals and organizations to encourage trust, advocate a team atmosphere, build consensus, and facilitate communication.
6. Coordinated – synchronize the activities of all relevant stakeholders to achieve a common purpose.
7. Flexible – use creative and innovative approaches in solving disaster challenges.

8. Professional – value a science and knowledge-based approach; based on education, training, experience, ethical practice, public stewardship and continuous improvement.

A fuller description of these principles can be found at[67]

### Tools

In recent years the continuity feature of emergency management has resulted in a new concept, Emergency Management Information Systems (EMIS). For continuity and inter-operability between emergency management stakeholders, EMIS supports an infrastructure that integrates emergency plans at all levels of government and non-government involvement for all four phases of emergencies. In the healthcare field, hospitals utilize the Hospital Incident Command System (HICS), which provides structure and organization in a clearly defined chain of command.

### Disaster response technologies

Smart Emergency Response System (SERS)[68] prototype was built in the SmartAmerica Challenge 2013-2014, a United States government initiative. SERS has been created by a team of nine organizations led by MathWorks. The project was featured at the White House in June 2014 and described by Todd Park (U.S. Chief Technology Officer) as an exemplary achievement.

The Smart America initiative challenges the participants to build cyber-physical systems as a glimpse of the future to save lives, create jobs, foster businesses, and improve the economy. SERS primarily saves lives. The system provides the survivors and the emergency personnel with information to locate and assist each other during a disaster. SERS allows to submit help requests to a MATLAB-based mission center connecting first responders, apps, search-and-rescue dogs, a 6-feet-tall humanoid, robots, drones, and autonomous aircraft and ground vehicles. The command and control center optimizes the available resources to serve every incoming requests and generates an action plan for the mission. The Wi-Fi network is created on the fly by the drones equipped with antennas. In addition, the autonomous rotorcrafts, planes, and ground vehicles are simulated with Simulink and visualized in a 3D environment (Google Earth) to unlock the ability to observe the operations on a mass scale.[69]

## Within other professions

Practitioners in emergency management come from an increasing variety of backgrounds. Professionals from memory institutions (e.g., museums, historical societies, etc.) are dedicated to preserving cultural heritage—objects and records. This has been an increasingly major component within this field as a result of the heightened awareness following the September 11 attacks in 2001, the hurricanes in 2005, and the collapse of the Cologne Archives.

A disaster plan book at Rockefeller University in a biochemistry research laboratory.

To increase the potential successful recovery of valuable records, a well-established and thoroughly tested plan must be developed. This plan should emphasize simplicity in order to aid in response and recovery: employees should perform similar tasks in the response and recovery phase that they perform under normal conditions. It should also include mitigation strategies such as the installation of sprinklers within the institution.[70] Professional associations hold regular workshops to keep individuals up to date with tools and resources in order to minimize risk and maximize recovery.

### Other tools

In 2008, the U.S. Agency for International Development created a web-based tool for estimating populations impacted by disasters. Called Population Explorer[71] the tool uses land scan population data, developed by Oak Ridge National Laboratory, to distribute population at a resolution 1 $km^2$ for all countries in the world. Used by USAID's FEWS NET Project to estimate populations vulnerable and or imd by food insecurity, Population Explorer is gaining wide use in a range of emergency analysis and response actions, including estimating populations impacted by floods in Central America and the Pacific Ocean Tsunami event in 2009.

In 2007, a checklist for veterinarians was published in the Journal of the American Veterinary Medical Association, it had two sets of questions for a professional to ask themselves before assisting with an emergency:

**Absolute requirements for participation:**

- Have I chosen to participate?

- Have I taken ICS training?
- Have I taken other required background courses?
- Have I made arrangements with my practice to deploy?
- Have I made arrangements with my family?

**Incident Participation:**

- Have I been invited to participate
- Are my skill sets a match for the mission?
- Can I access just-in-time training to refresh skills or acquire needed new skills?
- Is this a self-support mission?
- Do I have supplies needed for three to five days of self-support?

While written for veterinarians, this checklist is applicable for any professional to consider before assisting with an emergency.[72]

# International organizations

## The International Emergency Management Society

The International Emergency Management Society (TIEMS), is an international non-profit NGO, registered in Belgium. TIEMS is a Global Forum for Education, Training, Certification and Policy in Emergency and Disaster Management. TIEMS' goal is to develop and bring modern emergency management tools, and techniques into practice, through the exchange of information, methodology innovations and new technologies.

TIEMS provides a platform for stakeholders to meet, network and learn about new technical and operational methodologies. TIEMS focuses on cultural differences to be understood and included in the society's events, education and research programs. This is achieved by establishing local chapters worldwide. Today, TIEMS has chapters in Benelux, Romania, Finland, Italy, Middle East and North Africa (MENA), Iraq, India, Korea, Japan and China.

## International Association of Emergency Managers

The International Association of Emergency Managers (IAEM) is a non-profit educational organization aimed at promoting the goals of saving lives and property protection during emergencies. The mission of IAEM is to serve its members by providing information, networking and professional opportunities, and to advance the emergency management profession.

It has seven councils around the world: Asia,[73] Canada,[74] Europa,[75] International,[76] Oceania,[77] Student[78] and USA.[79]

The Air Force Emergency Management Association, affiliated by membership with the IAEM, provides emergency management information and networking for U.S. Air Force Emergency Management personnel.

## International Recovery Platform

The International Recovery Platform (IRP) was conceived at the World Conference on Disaster Reduction (WCDR) in Kobe, Hyogo, Japan in January 2005, as part of the *Hyogo Framework for Action (HFA) 2005–2015*. The HFA is a global plan for disaster risk reduction adopted by 168 governments.

The key role of IRP is to identify gaps in post disaster recovery and to serve as a catalyst for the development of tools and resources for recovery efforts.[80]

## The International Red Cross and Red Crescent Movement

The International Federation of Red Cross and Red Crescent Societies (IFRC) works closely with National Red Cross and Red Crescent societies in responding to emergencies, many times playing a pivotal role. In addition, the IFRC may deploy assessment teams, e.g. Field Assessment and Coordination Teams (FACT),[81] to the affected country if requested by the national society. After assessing the needs, Emergency Response Units (ERUs)[82] may be deployed to the affected country or region. They are specialized in the response component of the emergency management framework.

### Baptist Global Response

Baptist Global Response (BGR) is a disaster relief and community development organization. BGR and its partners respond globally to people with critical needs worldwide, whether those needs arise from chronic conditions or acute crises such as natural disasters. While BGR is not an official entity of the Southern Baptist Convention, it is rooted in Southern Baptist life and is the international partnership of Southern Baptist Disaster Relief teams, which operate primarily in the US and Canada.[83]

### United Nations

The United Nations system rests with the Resident Coordinator within the affected country. However, in practice, the UN response will be coordinated by the UN Office for the Coordination of Humanitarian Affairs (UN-OCHA), by deploying a UN Disaster Assessment and Coordination (UNDAC) team, in response to a request by the affected country's government.

### World Bank

Since 1980, the World Bank has approved more than 500 projects related to disaster management, dealing with both disaster mitigation as well as reconstruction projects, amounting to more than US$40 billion. These projects have taken place all over the world, in countries such as Argentina, Bangladesh, Colombia, Haiti, India, Mexico, Turkey and Vietnam.[84][84]

Prevention and mitigation projects include forest fire prevention measures, such as early warning measures and education campaigns; early-warning systems for hurricanes; flood prevention mechanisms (e.g. shore protection, terracing, etc.); and earthquake-prone construction.[84] In a joint venture with Columbia University under the umbrella of the ProVention Consortium the World Bank has established a Global Risk Analysis of Natural Disaster Hotspots.[85]

In June 2006, the World Bank, in response to the HFA, established the Global Facility for Disaster Reduction and Recovery (GFDRR), a partnership with other aid donors to reduce disaster losses. GFDRR helps developing countries fund development projects and programs that enhance local capacities for disaster prevention and emergency preparedness.[86]

### European Union

In 2001 the EU adopted Community Mechanism for Civil Protection, to facilitate co-operation in the event of major emergencies requiring urgent response actions. This also applies to situations where there may be an imminent threat as well.[87]

The heart of the Mechanism is the Monitoring and Information Center (MIC), part of the European Commission's Directorate-General for Humanitarian Aid & Civil Protection. Accessible 24 hours a day, it gives countries access to a one-stop-shop of civil protections available amongst all the participating states. Any country inside or outside the Union affected by a major disaster can make an appeal for assistance through the MIC. It acts as a communication hub, and provides useful and updated information on the actual status of an ongoing emergency.[88]

## National organizations

### Australia

Natural disasters are part of life in Australia. Heatwaves have killed more Australians than any other type of natural disaster in the 20th century. Australia's emergency management processes embrace the concept of the prepared community. The principal government agency in achieving this is Emergency Management Australia.

### Canada

Public Safety Canada is Canada's national emergency management agency. Each province is required to have both legislation for dealing with emergencies, and provincial emergency management agencies, typically called "Emergency Measures Organizations" (EMO). Public Safety Canada co-ordinates and supports the efforts of federal organizations as well as other levels of government, first responders, community groups, the private sector, and other nations. The Public Safety and Emergency Preparedness Act defines the powers, duties and functions of PS are outlined. Other acts are specific to individual fields such as corrections, law enforcement, and national security.

### Germany

In Germany the Federal Government controls the German *Katastrophenschutz* (disaster relief), the Technisches Hilfswerk (*Federal Agency for Technical Relief*, THW), and the *Zivilschutz* (civil protection) programs coordinated by the *Federal Office of Civil Protection and Disaster Assistance*. Local fire department units, the German Armed Forces (Bundeswehr), the German Federal Police and the 16 state police forces (Länderpolizei) are also deployed during disaster relief operations.

There are several private organizations in Germany that also deal with emergency relief. Among these are the German Red Cross, Johanniter-Unfall-Hilfe (the German equivalent of the St. John Ambulance), the Malteser-Hilfsdienst, and the Arbeiter-Samariter-Bund. As of 2006, there is a program of study at the University of Bonn leading to the degree "Master in Disaster Prevention and Risk Governance"[89] As a support function radio amateurs provide additional emergency communication networks with frequent trainings.

### India

The National Disaster Management Authority is the primary government agency responsible for planning and capacity-building for disaster relief. Its emphasis is primarily on strategic risk management and mitigation, as well as developing policies and planning.[90] The National Institute of Disaster Management is a policy think-tank and training institution for developing guidelines and training programs for mitigating disasters and managing crisis response.

A protective wall built on the shore of the coastal town of Kalpakkam, in aftermath of the 2004 Indian Ocean earthquake.

The National Disaster Response Force is the government agency primarily responsible for emergency management during natural and man-made disasters, with specialized skills in search, rescue and rehabilitation.[91] The Ministry of Science and Technology also contains an agency that brings the expertise of earth scientists and meteorologists to emergency management. The Indian Armed Forces also plays an important role in the rescue/recovery operations after disasters.

Aniruddha's Academy of Disaster Management (ACDM) is a non-profit organization in Mumbai, India with 'disaster management' as its principal objective.

### Malaysia

In Malaysia, The National Security Council has the responsibility to handle emergency and disaster events. Ministry of Home Affairs Malaysia, Ministry of Health Malaysia and Ministry of Housing, Urban Wellbeing and Local Government Malaysia are also having responsibility in managing emergency. Several agencies are involved in emergency managements are Royal Malaysian Police, Malaysian Fire and Rescue Department, Malaysian Civil Defence Force, Ministry of Health Malaysia and Malaysian Maritime Enforcement Agency. There were also some voluntary organisation who involved themselves in emergency/ disaster management such as St. John Ambulance of Malaysia, Malaysian Red Crescent Society and so on.

### New Zealand

In New Zealand, depending on the scope of the emergency/disaster, responsibility may be handled at either the local or national level. Within each region, local governments are organized into 16 Civil Defence Emergency Management Groups (CMGs). If local arrangements are overwhelmed, pre-existing mutual-support arrangements are activated. Central government has the authority to coordinate the response through the National Crisis Management Centre (NCMC), operated by the Ministry of Civil Defence & Emergency Management (MCDEM). These structures are defined by regulation,[92] and explained in *The Guide to the National Civil Defence Emergency Management Plan 2006*, roughly equivalent to the U.S. Federal Emergency Management Agency's National Response Framework.

New Zealand uses unique terminology for emergency management. Emergency management is rarely used, many government publications retaining the use of the term civil defence.[93][94][95] For example, the Minister of Civil Defence is responsible for the MCDEM. Civil Defence Emergency Management is a term in its own right, defined by statute.[96] And disaster rarely appears in official publications, emergency and incident being the preferred terms,[97] with the term event also being used. For example, publications refer to the Canterbury Snow Event 2002.[98]

"4Rs" is the emergency management cycle used in New Zealand, its four phases are known as:[99]

- Reduction = Mitigation
- Readiness = Preparedness
- Response
- Recovery

### Pakistan

Disaster management in Pakistan revolves around flood disasters focusing on rescue and relief. There is a dearth of knowledge and information about hazard identification, risk assessment and management, and disaster preparedness. Disaster management, development planning and environmental management institutions operate in isolation with no integrated planning, there being no central authority for integrated disaster management. State-level measures are heavily tilted towards structural aspects.

### Russia

In Russia, the Ministry of Emergency Situations (EMERCOM) is engaged in fire fighting, civil defense, and search and rescue after both natural and human-made disasters.

### Somalia

In Somalia, the Federal Government announced in May 2013 that the Cabinet had approved draft legislation on a new Somali Disaster Management Agency (SDMA), which had originally been proposed by the Ministry of Interior. According to the Prime Minister's Media Office, the SDMA will lead and coordinate the government's response to various natural disasters. It is part of a broader effort by the federal authorities to re-establish national institutions. The Federal Parliament is now expected to deliberate on the proposed bill for endorsement after any amendments.[100]

### The Netherlands

In the Netherlands the Ministry of Security and Justice is responsible for emergency preparedness and emergency management on a national level and operates a national crisis centre (NCC). The country is divided into 25 safety regions (veiligheidsregio). In a safety region, there are four components: the regional fire department, the regional department for medical care(ambulances and psycho-sociological care etc.), the regional dispatch and a section for risk- and crisis management. The regional dispatch operates for police, fire department and the regional medical care. The dispatch has all these three services combined into one dispatch for the best multi-coordinated response to an incident or an emergency. And also facilitates in information management, emergency communication and care of citizens. These services are the main structure for a response to an emergency. It can happen that, for a specific emergency, the co-operation with an other service is needed, for instance the Ministry of Defence, water board(s) or Rijkswaterstaat. The veiligheidsregio can integrate these other services into their structure by adding them to specific conferences on operational or administrative level.

All regions operate according to the Coordinated Regional Incident Management system.

### United Kingdom

Following the 2000 fuel protests and severe flooding that same year, as well as the foot-and-mouth crisis in 2001, the United Kingdom passed the Civil Contingencies Act 2004 (CCA). The CCA defined some organisations as Category 1 and 2 Responders, setting responsibilities regarding emergency preparedness and response. It is managed by the Civil Contingencies Secretariat through Regional Resilience Forums and local authorities.

Disaster Management training is generally conducted at the local level, and consolidated through professional courses that can be taken at the Emergency Planning College. Diplomas, undergraduate and postgraduate qualifications can be gained at universities throughout the country. The Institute of Emergency Management is a charity, established in 1996, providing consulting services for the government, media and commercial sectors. There are a number of professional societies for Emergency Planners including the Emergency Planning Society[101] and the Institute of Civil Protection and Emergency Management.[102]

One of the largest emergency exercises in the UK was carried out on 20 May 2007 near Belfast, Northern Ireland: a simulated plane crash-landing at Belfast International Airport. Staff from five hospitals and three airports participated in the drill, and almost 150 international observers assessed its effectiveness.[103]

### United States

Disaster management in the United States has utilized the functional All-Hazards approach for over 20 years, in which managers develop processes (such as communication & warning or sheltering) rather than developing single-hazard or threat focused plans (e.g., a tornado plan). Processes are then mapped to specific hazards or threats, with the manager looking for gaps, overlaps, and conflicts between processes.

Given these notions, emergency managers must identify, contemplate, and assess possible man-made threats and natural threats that may affect their respective locales.[104] Because of geographical differences throughout the nation, a variety of different threats accept communities among the states. Thus, although similarities may exist, no two emergency plans will be completely identical. Additionally, each locale has different resources and capacities (e.g., budgets, personnel, equipment, etc.) for dealing with emergencies.[105] Each individual community must craft its own unique emergency plan that addresses potential threats that are specific to the locality.[106]

This creates a plan more resilient to unique events because all common processes are defined, and encourages planning done by the stakeholders who are closer to the individual processes, such as a traffic management plan written by public works director. This type of planning can lead to conflict with non-emergency management regulatory bodies, which require development of hazard/threat specific plans, such as development of specific H1N1 flu plans and terrorism-specific plans.

In the United States, all disasters are initially local, with local authorities, with usually a police, fire, or EMS agency, taking charge. Many local municipalities may also have a separate dedicated office of emergency management (OEM), along with personnel and equipment. If the event becomes overwhelming to local government, state emergency management (the primary government structure of the United States) becomes the controlling emergency management agency. Federal Emergency Management Agency (FEMA), part of the Department of Homeland Security (DHS), is lead federal agency for emergency management. The United States and its territories are broken down into ten regions for FEMA's emergency management purposes. FEMA supports, but does not override, state authority.

The Citizen Corps is an organization of volunteer service programs, administered locally and coordinated nationally by DHS, which seek to mitigate disasters and prepare the population for emergency response through public education, training, and outreach. Most disaster response is carried out by volunteer organizations. In the US, the Red Cross is chartered by Congress to coordinate disaster response services, including typically being the lead agency handling shelter and feeding of evacuees. Religious organizations, with their ability to provide volunteers quickly, are usually integral during the response process. The largest being the Salvation Army,[107] with a primary focus on chaplaincy and rebuilding, and Southern Baptists who focus on food preparation and distribution,[108] as well as cleaning up after floods and fires, chaplaincy, mobile shower units, chainsaw crews and more. With over 65,000 trained volunteers Southern Baptist Disaster Relief is one of the largest disaster relief organizations in the US.[109] Similar services are also provided by Methodist Relief Services, the Lutherans, and Samaritan's Purse. Unaffiliated volunteers show up at most large disasters. To prevent abuse by criminals and for the safety of the volunteers, procedures have been implemented within most response agencies to manage and effectively use these 'SUVs' (Spontaneous Unaffiliated Volunteers).[110]

The US Congress established the Center for Excellence in Disaster Management and Humanitarian Assistance (COE) as the principal agency to promote disaster preparedness in the Asia-Pacific region.

The National Tribal Emergency Management Council (NEMC) is a non-profit educational organization developed for Tribal organizations to share information and best practices, as well as discussing issues regarding public health and safety, emergency management and homeland security, affecting those under Indian sovereignty. NTMC is organized into Regions, based on the FEMA 10 region system. NTMC was founded by the Northwest Tribal Emergency Management Council (NWTEMC), a consortium of 29 Tribal Nations and Villages in Washington, Idaho, Oregon and Alaska.

If a disaster or emergency is declared to be terror related or an "Incident of National Significance", the Secretary of Homeland Security will initiate the National Response Framework (NRF). The NRF allows the integration of federal resources with local, country, state, or tribal entities, with management of those resources to be handled at the lowest possible level, utilizing the National Incident Management System (NIMS).

#### FEMA's Emergency Management Institute

The Emergency Management Institute (EMI) serves as the national focal point for the development and delivery of emergency management training to enhance the capabilities of state, territorial, local, and tribal government officials; volunteer organizations; FEMA's disaster workforce; other Federal agencies; and the public and private sectors to minimize the impact of disasters and emergencies on the American public. EMI curricula are structured to meet the needs of this diverse audience with an emphasis on separate organizations working together in all-hazards emergencies to save lives and protect property. Particular emphasis is placed on governing doctrine such as the National Response Framework (NRF), National Incident Management System (NIMS), and the National Preparedness Guidelines.[111] EMI is fully accredited by the International Association for Continuing Education and Training (IACET) and the American Council on Education (ACE).[112]


Emergency Management Institute's Main Campus in Emmitsburg, Maryland

Approximately 5,500 participants attend resident courses each year while 100,000 individuals participate in non-resident programs sponsored by EMI and conducted by state emergency management agencies under cooperative agreements with FEMA. Another 150,000 individuals participate in EMI-supported exercises, and approximately 1,000 individuals participate in the Chemical Stockpile Emergency Preparedness Program (CSEPP).[113]

The *independent study* program at EMI consists of free courses offered to United States citizens in Comprehensive Emergency Management techniques.[114] Course IS-1 is entitled "Emergency Manager: An Orientation to the Position" and provides background information on FEMA and the role of emergency managers in agency and volunteer organization coordination. The EMI Independent Study (IS) Program, a Web-based distance learning program open to the public, delivered extensive online training with approximately 200 courses and trained more than 2.8 million individuals. The EMI IS Web site receives 2.5 to 3 million visitors a day.[115]

## See also

- Disaster medicine
- Water security and emergency preparedness
- Rohn Emergency Scale
- Public health emergency (United States)
- Emergency Communication System
- ISITEP
- Mass fatality incident
- Liquidator (Chernobyl)

**NGOs:**

- Catholic Relief Services[116]
- Consortium of British Humanitarian Agencies
- Disaster Accountability Project (DAP)
- GlobalMedic
- Humanitarian International Services Group (HISG)
- International Disaster Emergency Service (IDES)
- Médecins Sans Frontières
- NetHope

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## Further reading

- International Journal of Emergency Management, ISSN 1741-5071 (https://www.worldcat.org/search?fq=x0:jrnl&q=n2:1741-5071) (electronic) ISSN 1471-4825 (https://www.worldcat.org/search?fq=x0:jrnl&q=n2:1471-4825) (paper), Inderscience Publishers
- Journal of Homeland Security and Emergency Management (http://www.bepress.com/jhsem/) ISSN 1547-7355 (https://www.worldcat.org/search?fq=x0:jrnl&q=n2:1547-7355), Bepress
- Australian Journal of Emergency Management (http://www.ema.gov.au/ajem) (electronic) ISSN 1324-1540 (https://www.worldcat.org/search?fq=x0:jrnl&q=n2:1324-1540) (paper), Emergency Management Australia
- Karanasios, S. (2011). New and Emergent ICTs and Climate Change in Developing Countries (http://www.niccd.org/KaranasiosClimateChangeEmergentICTs.pdf/). In R. Heeks & A. Ospina (Eds.). Manchester: Centre for Development Informatics, University of Manchester
- The ALADDIN Project (http://www.aladdinproject.org/), a consortium of universities developing automated disaster management tools
- Emergency Management Australia (2003) *Community Developments in Recovering from Disaster*, Commonwealth of Australia, Canberra
- Plan and Preparation: Surviving the Zombie Apocalypse, (paperback), CreateSpace, Introductory concepts to planning and preparing for emergencies and disasters of any kind.

## External links

- *Emergency Management Training* (http://www.emergencymngr.com)
- *Emergency Management Australia* (http://www.em.gov.au/Pages/default.aspx)
- *Disaster Plan Workbook* (https://web.archive.org/web/20071113215722/http://library.nyu.edu:80/preservation/disaster/begin.htm)
- *The Disaster Mitigation Planning Assistance Website*. (http://matrix.msu.edu/~disaster/index.php)
- Public Health Management after Natural Disasters: Preparation, Response & Recovery (http://www.wilsoncenter.org/audiovideo/public-health-management-after-natural-disasters) – video, presentations, and summary of event held at the Woodrow Wilson International Center for Scholars, June 2008
- Emergency Response Resources (http://www.cdc.gov/niosh/topics/emres/) The National Institute for Occupational Safety and Health
- FAO in emergencies (http://www.fao.org/emergencies/en/)
- Resilient Livelihoods: Disaster Risk Reduction for Food and Nutrition Security - 2013 edition (http://www.fao.org/emergencies/resources/documents/resources-detail/en/c/157579/) published by FAO