1. Terrorism, Natural, and Technological Hazards – Leveraging Existing Knowledge

Protecting American communities from disasters, no matter what the source, depends on policymakers adopting an integrated, all-hazards approach to disaster risk reduction, drawing on existing knowledge from natural and accidental hazards combined with new information on risks associated with technological and terrorism events.

Dr. Kenneth Bloem of the Johns Hopkins University Center for Civilian Biodefense Studies has identified a number of parallel areas where preparing for terrorist incidents can be enhanced by decades of research in traditional disaster areas:

- Wildfires and arson
- Accidental explosions and bombs
- Floods and dam sabotage
- Chemical spills and chemical attacks
- Epidemics and biological terrorism.[31]

Planning and preparedness for one disaster may have unforeseen beneficial effects for another.

For example, the nation's experience in managing earthquake disasters is directly relevant to managing terrorist threats to the nation's buildings, transportation, and industrial infrastructure, commonly referred to as "the built environment." The widespread application of earthquake hazard reduction principles could improve the design and construction of the nation's buildings to standards that could better withstand the disastrous effects of explosive blasts.

Elements of Disaster Risk Reduction & Hazard Management

THE HAZARD RESEARCH AND MANAGEMENT COMMUNITY employs a range of terminology to describe its activities, but no definitive, comprehensive list of these terms and their definitions exists. However, hazard risk reduction and disaster management activities can be grouped largely under nine broad concepts: research and development, hazard identification, risk assessment, risk communication, prediction, mitigation, preparedness, response, and recovery. Each of these rubrics includes critical science and technology elements, and, taken together, they form the nation's toolbox for reducing vulnerability to disaster risk.

1. Disaster Process Research and Development (R&D)— the science activities dedicated to improving understanding of the underlying processes and dynamics of each type of hazard. R&D includes fundamental and applied research on geologic, meteorological, epidemiological, and fire hazards; development and application of remote sensing technologies, software models, infrastructure models, organizational and social behavior models; emergency medical techniques; and many other science disciplines applicable to all facets of disasters and disaster management.

2. Hazard Identification— determining which hazards threaten a given area. This includes understanding an area's history of hazard events and the range of severity of those events. The continuous study of the nation's active faults, seismic risks, and volcanoes are included in this category, as are efforts to understand the dynamics of hurricanes, tornadoes, floods, droughts, and other extreme weather events.

3. Risk Assessment— determining the impact of a hazard or hazard event on a given area. This includes advanced scientific modeling to estimate loss of life, threat to public health, structural damage, environmental damage, and economic disruption that could result from specific hazard event scenarios. Risk assessment takes place both before and during disaster events.

4. Risk Communication— public outreach, communication, and warning at every stage of hazard management. Risk communication includes raising public awareness and effecting behavioral change in the areas of mitigation and preparedness; the deployment of stable, reliable, and effective warning systems; and the development of effective messaging for inducing favorable community response to mitigation, preparedness, and warning communications.

5. Mitigation— sustained actions taken to reduce or eliminate the long-term risk to human life and property from hazards based on hazard identification and risk assessment. Examples of mitigation actions include planning and zoning to manage development in hazard zones, storm water management, fire fuel reduction, acquisition and relocation of flood-prone structures, seismic retrofit of bridges and buildings, installation of hurricane straps, construction of tornado safe rooms, and flood-proofing of commercial structures.

6. Prediction— predicting, detecting, and monitoring the onset of a hazard event. Federal agencies utilize weather forecast models, earthquake and volcano monitoring systems, remote sensing applications, and other scientific techniques and devices to gather as much information as possible about the what, when, and where of a potential hazard, as well as the severity of each threat.

7. Preparedness— the advance capacity to respond to the consequences of a hazard event. This means having plans in place concerning what to do and where to go if a warning is received or a hazard is observed. Communities, businesses, schools, public facilities, families, and individuals should have preparedness plans.

8. Response— the act of responding to a hazard event. Hazard response activities include evacuation, damage assessment, public health risk assessment, search and rescue, fire suppression, flood control, and emergency medical response. Each of these response activities relies heavily on information and communication technologies.

9. Recovery— activities designed to restore normalcy to the community in the aftermath of a hazard event. Recovery activities include restoring power lines, removing debris, draining floodwater, rebuilding, and providing economic assistance programs for disaster victims. As with response, the recovery process relies heavily on the availability of up-to-date data and information about the various community sectors, and on the technology to obtain and communicate that information.