Subscribe to **HDR Publications**

Resiliency – **A Global Movement**

By Bob Beduhn, PE, ENV SP
Civil Works Director, Omaha, NE

© iStockphoto.com/HDR

The concept of community resiliency was borne out of the broad-reaching concerns regarding human-induced climate change and social consequences of natural disasters. The modern resiliency movement can trace its roots to December 1999, when the United Nations General Assembly adopted the International Strategy for Disaster Reduction and formed the United Nations Office for Disaster Risk Reduction (UNISDR) Secretariat to ensure its implementation.[1] UNISDR was formed to implement the "Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters."[2]

At the center of the Hyogo Framework, there are three main goals:

- Integration of disaster risk reduction into sustainable development policies and planning
- Development and strengthening of institutions, mechanisms and capacities to build hazard resilience
- Systematic incorporation of risk reduction approaches in the implementation of emergency preparedness, response and recovery programs

In March 2015, the mandate of the UNISDR was updated by passage of the Sendai Framework for Disaster Risk Reduction 2015-2030.[3] The Sendai Framework is built upon lessons learned from the Hyogo Framework. Lessons learned from the Hyogo Framework identified several social needs that rely on infrastructure resiliency to serve the community long-term. Most notably, the recognition that short-term community sustainability gains — in terms of reductions in poverty, improvements in public health, and reliability of food, energy, education systems, and jobs — can be set back by a lack of infrastructure resiliency when a disaster strikes. The underpinning of a stable society is a resilient infrastructure system.

A more recent international trend, in addition to the UNISDR, is the increasing interest of nongovernmental foundations, investment and insurance entities in promoting and supporting the resiliency movement. Private sector interest is driven by business metrics such as supply chain management, business continuity and an increasing concern in worker protections. These interest groups include, among others, the Rockefeller Foundation's 100 Resilient Cities initiative, the R!SE Disaster Risk Sensitive Investments initiative, Global Infrastructure Basel (GIB) Foundation, and the U.S. Business Council for Sustainable Development. A brief summary of each organization's mission and goals follows:

100 Resilient Cities (100RC) – This initiative is "dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century. 100RC supports the adoption and incorporation of a view of resilience that includes not just the shocks — earthquakes, fires, floods, etc. — but also the stresses that weaken the fabric of a city on a day to day or cyclical basis."[4]

R!SE Disaster Risk Sensitive Investments – "The R!SE Initiative is an ambitious global response to a daunting global challenge, a new way of collaborating, to unlock the potential for public and private sector actors who are ready and willing to make a step forward and take leadership on disaster risk reduction."[5]

Global Infrastructure Basel (GIB) Foundation – This organization is a "Swiss foundation based in Basel working to promote sustainable and resilient infrastructure through sustainable infrastructure design and financing on a global scale."[6]

U.S. Business Council for Sustainable Development – The council is "an action oriented and member-led nonprofit business association that harnesses the power of collaborative projects, platforms and partnerships to develop, deploy and scale solutions to ecosystems, energy, materials and water challenges."[7]

These organizations, among others, demonstrate the global nature of the resiliency movement. The movement crosses geopolitical boundaries through coordination at the United Nations to improve the lives of affected people, and it involves an international finance, business and insurance system that focuses on business continuity and reductions in catastrophic losses resulting from disasters.

A recent report by PricewaterhouseCoopers predicts global economic growth at around 3 percent annually.[8] The report highlights that the global economy will double by 2037 and nearly triple by 2050.[9] That growth will occur in combination with ongoing global urbanization, marked by an increase from 54 percent of people living in urban areas today to 66 percent living in urban areas by 2050. According to the United Nations, this combination of economic growth and increasing urbanization will likely mean that over 50 percent of the infrastructure needed to meet the global population in 2050 has not yet been designed.[10]

The world is looking at U.S. disasters such as Hurricane Katrina and Superstorm Sandy and realizing it must do better to compete in an increasingly global economy. Economic and investment decisions will be made based on a community's or a country's overall resiliency and sustainability ratings. The winners in the global economy will be those communities and countries that demonstrate an ability to be resilient, to prevent business disruptions, to maintain continuity of services in spite of shocks and to overcome chronic social stresses.

President Barack Obama has been particularly active in addressing resiliency concerns by issuing or re-issuing several executive orders on the topic. These include Executive Order 13514 (Federal Leadership in Environmental, Energy, and Economic Performance), Executive Order 13653 (Preparing the United States for the Impacts of Climate Change), Executive Order 13677 (Climate-Resilient International Development), and a re-issued Executive Order 11988 for public comment (Executive Order 13690, Establishing a Federal Flood Risk Management Standard).

At a federal level, these executive orders are driving a re-examination of our approach, potentially changing it from relying on design life to designing for future adaptation and climate resiliency. The static assumption of past shocks being a reasonable estimate for future conditions is no longer considered valid by many political leaders in the United States, if not the world. As evidence, the U.S. Conference of Mayors updated their Climate Protection Agreement in 2014 to include climate resilience as one of the needed responses to climate change.[11]

Engineering and community leaders should be aware of several major resiliency activities spurred by international non-governmental organization, private sector and governmental activity. These include the Rockefeller-HUD Natural Disaster Resilience Competition, the National Institute of Standards and Technology (NIST) Community Resiliency Guidebook, and the American Society of Civil Engineers' new Infrastructure Resilience Division. The major theme of these efforts is to increase the focus on critical infrastructure systems, specifically those that are considered lifeline systems for human health and safety during a shock event.

For example, the Rockefeller Foundation and U.S. Department of Housing and Urban Development's (HUD) competition has allotted $1 billion in awards to fund the implementation of innovative resiliency projects created by communities recently struck by natural disasters.[12] The hope is to creatively distribute the remaining Community Development Block Grant disaster recovery (CDBG-DR) funds remaining from the 2013 Disaster Relief Appropriations Act.

The NIST Community Resilience Planning Guide for Buildings and Infrastructure Systems reflects a growing trend to integrate social, economic and infrastructure systems into a resilience-based design.[13] The approach goes beyond pure economics or loss of life design approaches and instead integrates those into a broader community sustainability context.

In addition, the American Society of Civil Engineers, in establishing its Infrastructure Resilience Division, has broken its efforts into five committees.[14] These include:

- Civil Infrastructure and Lifeline Systems
- Disaster Response and Recovery
- Emerging Technology
- Risk and Resilience Measurements
- Social Science, Policy, Economics, Education and Decisions

The Infrastructure Resilience Division is a good start to broadening the discussion of resilient design. Relative to overall community resiliency and sustainability considerations, critical water, power, transportation, healthcare and communication systems are considered too important to fail. These systems form the backbone of a community wanting to survive a shock event. A resilient infrastructure backbone allows a community to live in a sustainable manner day to day, knowing its investments in sustainability are secure and will provide the support network needed to rebound quickly following a shock event.

There is much work to be done to find an economic model that will support revitalizing United States' levee, flood control and water infrastructure that addresses this new design paradigm. No matter how high we build flood walls, or how much steel and concrete are placed, there is always the potential for a bigger event.

Considering community resilience to major shocks is a process that can lead to viewing infrastructure in a different light. Profound discoveries that identify cascading failures, fatal flaws and underlying weaknesses in a community's infrastructure system can be converted into strengths through adaptive design. These infrastructure strengths will then be the foundation that propels a community forward into an uncertain future, with the necessary strength to take on the climate challenges that lie ahead.

[1]UNISDR. (2015). "Our Mandate." www.unisdr.org/who-we-are/mandate.
[2]UNISDR. (2015). "Hyogo Framework for Action (HFA)." www.unisdr.org/we/coordinate/hfa.
[3]United Nations. (2015). "UN World Conference on Disaster Risk Reduction: 2015 Sendai, Japan." www.wcdrr.org.
[4]Rockefeller Foundation. (2015). "100 Resilient Cities." www.100resilientcities.org
[5]UNISDR. (2015). "RISE Disaster Risk-Sensitive Investments." www.preventionweb.net/rise/home.
[6]Global Infrastructure Basel. (2015). "What is Global Infrastructure Basel (GIB)?" www.gib-foundation.org.
[7]U.S. Business Council for Sustainable Development. (2015). "United States Business Council for Sustainable Development." www.usbcsd.org.
[8]PricewaterhouseCoopers. (2015, February). "The World in 2050: Will the shift in global economic power continue?" www.pwc.com/gx/en/issues/the-economy/assets/world-in-2050-february-2015.pdf.
[9]United Nations, Department of Economic and Social Affairs, Population Division. (2014). "World Urbanization Prospects: The 2014 Revision, Highlights." http://esa.un.org/unpd/wup/Highlights/WUP2014-Highlights.pdf.
[10]See footnote 9.
[11]United States Conference of Mayors. (2014). "The U.S. Mayors Climate Protection Agreement." *82nd Annual U.S. Conference of Mayors Meeting*. http://usmayors.org/climateagreement/Final%20USCM%202014%20Mayors%20Climate%20Protection%20Agreement.pdf.
[12]Rockefeller Foundation. (2015). "HUD Launches $1 Billion National Disaster Resilience Competition." www.rockefellerfoundation.org/about-us/news-media/hud-launches-1-billion-national/.
[13]National Institute of Standards and Technology. (2015). "Community Resilience Planning Guide." www.nist.gov/el/building_materials/resilience/guide.cfm.
[14]American Society of Civil Engineers. (2014). "Infrastructure Resilience Division." www.asce.org/infrastructure-resilience/infrastructure-resilience-division/.

For more information about this article, please contact Bob Beduhn, Bob.Beduhn@hdrinc.com