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## **Innovations in Emergency Management: Making Governments Flexible and Responsive**

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### **Setting the Context**

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In the brief history of the twenty-first century, a number of searing events have focused attention on society's capacity to respond to emergencies. These include natural catastrophes like the Pakistan earthquake, the Asian tsunami in 2004, Hurricane Katrina in the United States in 2005, and paralyzing snows in China in 2008. There have also been outbreaks of new, threatening diseases like Severe Acute Respiratory Syndrome (SARS) in 2003, and the perceived threat of avian influenza. Technology failures and industrial accidents have occurred, such as mine cave-ins in the United States in 2006 and those that regularly occur in China; and major transportation disasters such as the foundering of an Egyptian ferry in stormy seas that took the lives of more than 1000 people in 2006. Finally, terrorist attacks such as the fateful 9/11 assaults on the World Trade towers and the Pentagon, the anthrax-laced letters that closely followed in 2001, the train bombings in Madrid in 2004, and the London subway and bus bombings in 2005.

Disasters, some more dire than these, have always plagued human society. But, the scale, density, and interconnectedness of modern life magnify the impact of present day catastrophes. The relative ease of modern transportation means that some potential emergencies, most notably, emergent infectious disease or terrorism, can travel very rapidly within a single country or across national boundaries. Those immediately in the path of a major emergency are severely affected, but others linked by family or social ties or by connections to disrupted economic networks also experience the disaster in different ways. Many individuals who suffer no harm directly may nonetheless live in fear that future catastrophes will affect their families; others empathically identify with the pain of victims. Society, moreover, pays high monetary costs in reconstructing damaged physical infrastructure—through public budgets and charitable and personal resources—struggling to restore community vitality, and rehabilitating disrupted lives. With increased realization that such disasters are truly linked in terms of their societal consequences comes recognition that greater personal, organizational, national and international efforts are needed to prepare for future catastrophic events.

There are several possible areas of focus in efforts to confront the threat of disaster. We can try to prevent, mitigate, respond to, and recover from such events. This panel looks at several dimensions of this problem through innovations in three countries: India, China, and the United States.

Mihir Bhatt focuses on mitigation and response by reporting on a campaign in India to prepare schools for the impacts of the natural disasters such as earthquakes and cyclones that frequently strike his country. This effort to promote the adoption and implementation of improved safety practices in schools began in Gujarat and has spread to other jurisdictions.

Xue Lan reports on an innovation in Nanning, the capital city of the Guangxi Autonomous region of southern China, to integrate telecommunications capability for citizens to report emergencies and to get appropriate response quickly to the scene. By thinking in an “all hazards” mindset and establishing the communications systems that can support that approach, the city has reduced the burden on citizens to know the correct ways to notify different groups of responders, such as firefighters, police, and emergency medical technicians. The integrated system has improved the speed and effectiveness of their operations.

Jim Schwartz will describe how in a major catastrophe, Incident Command Systems enable diverse groups of responders to integrate and operationally coordinate their actions. He utilized the approach in commanding the emergency response to the terrorist attack on the Pentagon in 2001, and the system was, in turn, institutionalized and diffused under Congressional mandate as the National Incident Management System.

**Arnold M. Howitt** is Executive Director of the A. Alfred Taubman Center for State and Local Government at the Harvard Kennedy School, where he also co-directs the Program on Emergency Preparedness and Crisis Management. He teaches in a number of Kennedy School executive programs, including serving as faculty co-chair of the Crisis Management program, chair of the state health commissioners program, and co-chair of the program for senior officials from Beijing. For four years, he directed the Kennedy School's research program on domestic preparedness for terrorism. Dr. Howitt served on an Institute of Medicine panel that authored *Preparing for Terrorism* and currently serves on a National Research Council/Transportation Research Board panel on emergency evacuation. He is coauthor of the forthcoming book, *Managing Crises: Responses to Large-Scale Emergencies* and is coauthor and coeditor of *Countering Terrorism: Dimensions of Preparedness*. Dr. Howitt's other research focuses on transportation and environmental regulation. In addition, he wrote *Managing Federalism*, a study of the federal grant-in-aid system, and was coauthor and coeditor of *Perspectives on Management Capacity Building*. He received his bachelor's from Columbia University and his master's and doctorate degrees in political science from Harvard University.

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Making Governments Flexible and Responsive  
**A Campaign for Safer Schools**

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**What was the problem?**

Unsafe schools are an unfortunate reality. With the spread of education, more and more children go to schools that are vulnerable to fires, earthquakes, pollution, cyclones, food poisoning, stampedes and more. In India, schools and education are under government control, yet when it comes to school safety, officials do not have sufficient technical expertise to reduce many risks their students face. The months following a disaster provide an opportunity to promote mitigation and preparedness efforts to reduce the impact of subsequent hazards. However, following the 2004 tsunami there were hardly any demonstration projects on school safety in partnership with the Government of Tamil Nadu. This challenge was similar to that following the 2001 Gujarat earthquake. There was a clear need to focus on non-structural mitigation measures beyond constructing new school buildings or upgrading existing ones. Without a comprehensive and up-to-date approach to school preparedness, officials could not and cannot perform their duties. Furthermore, children have a right to education, but their right to safe schools is not recognized or even articulated.

**What was the innovation?**

The objective of the innovation was to institutionalize school safety activities within the state education department.

The National Campaign on Child's Right to Safer Schools, launched by the All India Disaster Mitigation Institute (AIDMI) following the 2001 Gujarat earthquake, built a partnership with the District Education Department of the Government of Tamil Nadu to cover the 28 schools affected by the tsunami in the Villupuram District. This was designed as a pilot project to provide:

- a) Training on school safety and first aid.
- b) Insurance coverage for students.
- c) First-hand experience on building evacuations and fire drills.
- d) Preparation of school safety plans.
- e) A wide range of educational material on school safety in Tamil, the local language.

- f) The pilot reached over 400 teachers through trainings on school safety and first aid; it covered over 6,000 students with micro-insurance; it prepared school safety plans; and, included school safety issues in the educational curricula.

**What were the obstacles?**

India is a large country. Schools cannot be made safe in a year; it is an ongoing process. Upscaling and replicating success from one block to an entire district takes both time and resources. The pace of the joint initiatives undertaken by local authorities and civil society organizations is slow. The drawn out process of attracting the interest of state authorities and policymakers is always slow due to the bureaucratic setup of state decision-making. There cannot be instant results. Endless exchanges of letters can be trying. A much bigger threat is that donors lose patience with the slow progress of such projects or that a political turnaround leads government to focus on other politically driven agendas before achieving an appropriate scale of operations.

**What were the results?**

AIDMI started this work in 2001 together with the European Union and the Government of Gujarat after the earthquake. Work during the pilot stage generated awareness materials of high quality and made these available to schools and higher authorities. Based on the demand from the government, the National Campaign on Child's Right to Safer Schools has now expanded to cover 200 or more non-tsunami-affected schools in the district of Villupuram. Through its national campaign, AIDMI—by request of the education department—will spread school safety activities across all the 2,200 schools of the Villupuram district in the next two years. Local NGOs and international UN agencies have picked up on the idea. The district level campaign is gaining momentum in terms of increasing demand for school-specific trainings, materials, and demonstrations. AIDMI is expanding teams and exploring resources to support this massive demand. The education department participates actively and ensures support to cover every single school in the district. Their aim is to demonstrate that it is possible to mainstream safety in schools and in the education system. Beyond the pilot area, in four other states of India, and three neighboring countries, schools are showing interest in working with the campaign to promote safety in their own schools.

**Mihir R. Bhatt** studied and practiced architecture and city planning in Ahmedabad and Delhi, India, and later in the United States, in Cambridge and Washington, DC. On returning to India in 1989, he initiated a project on disaster risk mitigation which is now the 63 member-strong All India Disaster Mitigation Institute (AIDMI), working in five Indian states and three countries in South Asia. Mr. Bhatt studied at the Massachusetts Institute of Technology, received a Russell E. Train Institutional Fellowship from the World Wildlife Fund in 1997,

an Eisenhower Fellowship in 2000, and has been an Ashoka International Fellow since 2004. He has set up the risk transfer initiative—including Afat Vimo, a life- and non-life disaster insurance and mitigation program—for the microenterprise beneficiaries of Livelihood Relief Fund of AIDMI. Recently, he evaluated tsunami recovery for the UK's Disaster Emergency Committee; became a member of the UK's Core Management Group of Tsunami Evaluation Coalition; evaluated the Oxfam International response in South India and Sri Lanka; and helped the UNDP mainstream disaster risk reduction in Sri Lanka. Currently, Mr. Bhatt is reviewing the Asian Development Bank's work on disaster risk reduction in Asia. He is a Senior Fellow at Humanitarian Initiatives at Harvard University (USA), a Full Member of ALNAP (Active Learning Network for Accountability and Performance in Humanitarian Action), and a Member of the Advisory Committee for the ProVention Consortium. Mr. Bhatt is also working on integrating the findings of the independent Tsunami Evaluation Coalition into the recovery efforts, upscaling the micro-insurance program, and promoting risk reduction training and learning in key Asian universities.

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Making Governments Flexible and Responsive

**Incident Management Systems (IMS): An Organizational Template for Operational Coordination**

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**What was the problem?**

Large-scale emergencies, like the terrorist attack on the Pentagon and World Trade Center on 9/11, frequently bring together thousands of responders under conditions of confusion and great danger to the public and themselves. Often no one can predict when, where, and in what ways disaster will strike. The responders, who mobilize to face these situations, coming from diverse professional disciplines, different agencies, and many jurisdictions, may not have worked together before and therefore may lack a basis for factoring the problems faced, organizing their response, and coordinating actions to alleviate the emergency. Without a systematic method of operational coordination, they risk wasting effort, failing to help the victims of catastrophe, and perhaps endangering the lives or safety of fellow responders.

**What was the innovation?**

The Incident Command System (ICS), originally developed in California in the 1970s to address the problem of operational coordination in forest firefighting, is an organizational

template. Its clear definition of emergency response roles, lines of command, and procedures makes it possible for emergency response professionals to learn the system, train and exercise in its use, apply it “in the small” to ordinary response operations, and then utilize it effectively under catastrophic conditions. Over several decades, this organizational innovation spread across professional disciplines and geographically around the United States. It expanded through the wild land fire profession, to urban and structural firefighting, and to other professional fields, including emergency medical services and hospital emergency operations.

At the Pentagon in 2001, with the Arlington County, Virginia, Fire Department in the lead, emergency responders and law enforcement personnel were able to confront and manage the disaster. They launched a massive rescue and fire suppression operation at a huge structure, burning fiercely from the crash impact of a jetliner loaded with fuel, which was simultaneously a major fire site, a crime scene, and the still-operational national military command headquarters. In 2002, to ensure readiness for potential catastrophes of any type, the US Congress mandated that ICS become the basis of a National Incident Management System (NIMS) to be adopted for all emergency response in the United States, irrespective of disaster type or the responders’ professional field, jurisdiction, or level of government.

**What were the obstacles?**

To disseminate this innovation widely, even with many agencies already using its techniques, particularly in firefighting and emergency medical services, requires a massive diffusion effort, to inform, train, exercise, and develop high levels of competence in a complicated operational system. Notwithstanding the Congressional mandate, doubts remain in some quarters as to whether this approach is wise. The diffusion effort thus requires persuading members of some professions—notably law enforcement—that NIMS makes sense for their purposes as well, and not only for firefighters. This requires an educational campaign in professional fields like transportation, public works, and social services that rarely thought of their role as emergency responders. The massive in-service training necessary to implement the Congressional mandate is expensive, time consuming, and competitive with other priorities faced by emergency response organizations. Opportunities to practice its techniques in advance of a crisis, especially in exercises that involve multiple agencies, jurisdictions, and even states, are few and far between. Full national diffusion and operational implementation of this innovation is seen as at least a decade-long process.

**What were the results?**

Those jurisdictions that have committed to making NIMS a reality have experienced enhanced ability to respond and operationally coordinate efforts in emergencies. Opportunities to build skills have proved useful. The coordination required has contributed to

building stronger personal and operational bonds among different professional groupings and between jurisdictions. Experience has led to some adaptation of the system to fit the needs of professions that had not previously utilized ICS techniques. Momentum, shaped by the federal regulatory imperative, seems to be building for even more widespread replication.

**James Schwartz**, Fire Chief, Arlington, Virginia, served as Incident Commander at the Pentagon on 9-11 and became the new Fire Chief of Arlington County, Virginia, on June 28, 2004. Mr. Schwartz joined the Arlington Fire Department in 1984 as a fire fighter. He was the first line fire fighter (non-officer) to serve as an instructor at the Arlington Fire Academy, a position he held for two years. He rose through the ranks to Lieutenant, Captain, Battalion Chief, and Assistant Fire Chief. In 1998, Mr. Schwartz was named Assistant Chief of Operations, overseeing all response-related activities, including fire, emergency medical services, hazardous materials and technical rescue response, and incident management and operational training. When he became Chief he said, “Our primary focus will continue to be providing extraordinary service in our prevention and public education programs, as well as emergency response. In addition, our focus on terrorism and disaster preparedness response will not waiver, nor will the Department's commitment to the professional development of its members.”

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Making Governments Flexible and Responsive

### **Reporting and Responding to Emergencies in Nanning City, China**

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#### **What was the problem?**

It had been standard practice in China to have separate phone numbers for citizens to report different types of emergencies: 110 for police, 119 for fire, 120 for medical emergencies, 122 for traffic accidents, and in some cities, 12345 for complaints and discussions with the mayor. In Nanning City, the capital of Guangxi Autonomous Region, government agencies could only handle about 800 calls for their four emergency numbers in a coverage area of about 80 square kilometers. Additionally, citizens were often confused about which number stood for what kind of emergency and they often made errors when reporting their problems.

**What was the innovation?**

City officials realized they had to improve the efficiency and effectiveness of the city's ability to respond. In 2001, they decided to adopt a system based on the C4I (command, control, communication, and computer) concept, which uses digital and network technologies. The new system, which was provided by Motorola, not only integrated the current emergency phone numbers into the same platform, it also expanded the city's ability to include phone numbers related to flood control, earthquake, and other basic infrastructure emergencies. The system became operational on May 1, 2002.

Adoption of the new technology required organizational innovation. City agencies had to learn to pool resources, including sending experienced personnel to the emergency response center, and to coordinate efforts to respond to the emergency calls. Relevant government agencies no longer had to deal with emergencies separately. No matter which of the four numbers people called, the call went to the emergency response center that dispatches the appropriate response team to the site. For major incidents, the system also informed the Mayor's office for further actions.

**What were the obstacles?**

One set of problems was related to technical issues. It took some time for the system to get up and running smoothly. The other challenge was overcoming barriers that existed among government agencies that were unwilling to share resources. Finally, changing the public's behavior was also a challenge. There were proposals for combining all four numbers into one single number to simplify the system, but the public was accustomed to the existing four numbers, a habit which would be difficult to change. So currently, all four emergency numbers are still in use.

**What were the results?**

The system currently in use in Nanning City is the most advanced system in China; the response time is only 2–3 seconds, much faster than the 10–15 seconds norm. It also has a GIS system that automatically detects the location of the phone call for over 1 million phones registered in the system. This allows for much more accurate responses, which saves time and resources. The citywide system can now handle over 6,000 calls a day. It plays a major role in safeguarding major international events held in Nanning, including the China-ASEAN Expo in 2004. It has become a model that is being followed by many Chinese cities.

**Dr. Lan Xue** is Professor and Executive Associate Dean of School of Public Policy and Management at Tsinghua University in Beijing. His teaching and research interests include public policy analysis and management, science and technology policy, and crisis management. Dr. Xue holds a doctorate in Engineering and Public Policy from Carnegie



Mellon University, and previously taught at George Washington University in the US before returning to China in 1996. He has served as a policy advisor for many Chinese government agencies and has consulted for the World Bank, the Asia Pacific Economic Cooperation Council, the International Development Research Center, and other international organizations. He is a recipient of 2001 National Distinguished Young Scientist Award. He serves as a Vice President of the China Association of Public Administration and as Vice Chairman of the Chinese National Steering Committee for MPA Education, among others. In 2007 and 2008, he is at Harvard Kennedy School's Ash Institute as a Visiting Research Scholar, while on leave as a member of the Visiting Committee to the Harvard Kennedy School. Dr. Xue will continue his research on the current reforms in the public policy process in China. His focus is on the roles that social institutions have played in these processes, and the impacts and limits of these reforms on the political development in China, in terms of building infrastructure for democracy.

