灾害
与公共管理

第四届两岸三地人文社科论坛论文集

童 星 张海波 主编

南京大学出版社

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序

2006年，南京大学、香港中文大学、台湾“中央大学”共同发起“两岸三地人文社会科学论坛”，由三校轮流主办，每年一次。2009年，第四届论坛又轮到南京大学主办。经三方共同商定，第四届论坛的主题定为“灾害与公共管理”，南京大学将承办本次论坛的重任交给人文社会科学高级研究院、政府管理学院、社会风险与公共危机研究中心共同承担。

灾害是一个古老的话题。千百年来，人类面临各种灾害的侵袭，对灾害的抗争和思考也从未停止过。在西方，早在基督教《旧约全书》中就有“诺亚方舟”的传说；在中国，华夏的文明史几乎从“大禹治水”开始。在同灾害抗争的过程中，人类对灾害的认识愈来愈全，灾害不仅包括自然的，也包括人为的，甚至还有社会正常运行的受阻；关注灾害研究的学科愈来愈多，自然科学、工程技术、管理学科、人文和社会科学界的学者们纷纷加入其中；防灾减灾的能力也愈来愈强，由救灾、防灾减灾、综合减灾等几个阶段，正迈向应急管理阶段，各国政府（国家）、企业（市场）、民间组织（社会）各界都高度关注救灾、减灾、防灾，并在救灾、减灾、防灾的过程中愈来愈形成合力，相互援助，众志成城。正是在这样的背景下，三校决定利用各自多学科交叉的优势，围绕大家共同关心的话题，探讨“灾害与公共管理”。

在三校领导、相关院系与部门以及参与论坛的各位教授学人的精心组织和共同努力下，本届论坛于2009年11月7—9日在南京举行。论坛特邀嘉宾、国际著名灾害研究专家、美国匹兹堡大学灾害研究中心主任路易斯·康福特(Louis K. Comfort)教授和中国行政管理学会副会长兼秘书长高小平研究员分别为论坛提供了题为《灾害恢复的动力机制——地震应急系统的恢复力与“熵”》和《有效应对灾害，创新公共管理》的主题学术演讲。论坛分为七个分论坛，与会者分别交流研讨了“政府灾害管理制度研究”“灾害应对的社会支持与社会动员”“灾后重建与恢复”“灾害的历史、文化与社会变迁”“灾害的文化、社会与网络传播”“建筑与空间技术在灾害管理中的应用”以及“灾害风险的预警与管理”。

现将本届论坛的相关论文编辑成集，予以正式出版。

童　星　张海波

2010年6月

突发事件的新特点与应急管理创新

高小平*

摘　要：当今世界突发事件呈现出数量增加、强度加大、损失和影响呈现叠加放大效应等的新特点，同时伴随着人类对灾害承受力的下降和认知敏感度的提高，应急管理模式从"常态--应急混合型"加"单灾种型"发展到了"综合化型"应急管理模式，并在我国应急管理的实践中呈现出了比较鲜明的创新特点。

关键词：应急管理；综合化应急管理；应急管理创新

一、突发事件发展变化呈现新特点

随着工业化、城市化、经济全球化等因素快速发展，当今世界突发事件呈现不少新的特点：一是数量增加。各类突发事件的数量都呈上升趋势。过去 30 年内，全球发生的自然灾害数量增加了近 5 倍。1975 年全球重大灾害发生不足百次，而 2008 年增加到了 485 次，受灾人数约为 30 年前的 10 倍。二是强度加大。工业化、城市化加大了突发事件受损的强度。举个例子，摩天大楼就是"灾害放大器"。由于高层建筑内各专业竖井林立，火灾时这些竖井就像高耸的烟囱，构成火势蔓延的主要途径，火势比低层建筑猛烈百倍。试验证明，烟气竖向扩散速度为 3～4 米/秒，在 100 米的超高层建筑中，只需要 25～35 秒左右，烟气即顺竖井从底层扩散到顶层，火势也随之蔓延。三是常常发生叠加现象。叠加是电学中的概念，是指在线性电路中，任一支路的电流（或电压）是电路中每一个独立支路的代数和。如同餐桌上"大丰收"，在常态下"各取所需"，在非常态中就成为"大烩菜"。2008 年 1 月，南方低温雨雪冰冻灾害，恰逢春运高峰，发生地域又是交通、电力、煤炭和其他物资运送的重要通道和人口稠密地区，因此，灾害造成的损失和影响呈现叠加放大效应。

另一方面，人们对突发事件的承受力和认识也在发生变化。一是人类对灾害的承受力在下降。对灾害的承受力我们用脆弱性来表示，出现增大趋势。脆弱性是指在危机冲击下，易于受到伤害并蒙受重大损失。由于自然、技术、人口、决策等综合因素，人类应对危机的脆弱性在增强。20 世纪 80 年代后，国际减灾学界开始重视脆弱性在减灾中的作用。1994 年，联合国第一届国际减灾大会制定了建立更安全世界的预防、防备和减轻灾害的指导方针，其目的就是通过实施有效的管理，降低脆弱性，提高人类在灾害面前的承载力。二是人的认知敏感度提高了。人的认知能力呈现逐步上升趋势，灾害对社会心理产生的影响越来越大。

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* 作者简介：高小平，中国行政管理学会执行副会长兼秘书长，研究员。

二、人类历史的危机认知发展促生“综合化应急管理”

历史上对危机认知模式有3种：远古时期是“灾害—牺牲”模式，人类消极悲观、被动等待灾害，一旦遇到大灾害，只有默默承受；在农业文明时期是“灾害—危害”模式，人们开始对灾害与人的关系进行思考，采取有效应对措施，以便减少对人和社会财产的危害；到了工业文明时期，进入了“灾害—损失”的模式，人类开始认识到需要对灾害的损失进行评估，需要用工业化的成果来对付灾害，比如用大量的工程设备、运输工具和材料等，投入到应对突发灾害中去，减少灾害的损失。

从世界范围看，应急管理经历了三个时期：工业化前的“常态—应急混合管理”，工业化初、中期的“单灾种应急管理”，20世纪70年代以来的“综合化应急管理”。在“综合化应急管理”中，一般注意加强以下几个方面：一是中央政府建立综合性应急管理机构，负责总体协调和决策。二是构建全政府型突发事件管理系统，以现有政府组织机构为依托，通过重新界定现有政府职能，优化职能结构，使各部门均履行应急管理职能。三是构建全社会型突发事件管理系统，通过政府和社会、公共部门和私人部门之间的良好合作，实现普通公民、社会组织、工商企业组织在突发事件管理中的高度参与。四是建立全面的突发事件准备系统，注重将应急管理关口前移，包括加强风险管理，发展应急产业，建立应急物资储备制度，配置应急救援设施，强化应急知识普及教育、培训和演练。五是建立应急协同机制，政府部门间、区域间、府际间通过优化业务流程和加强以知识为主的信息共享与沟通，来提升应急管理执行力。

三、综合化应急管理建设呼唤应急管理创新

新中国建立以来，我国经历从“常态—应急混合型”加“单灾种型”应急管理模式到“综合化型”应急管理模式的发展。

我国在“综合化应急管理”建设中，有以下比较鲜明的创新特点：一是政府将应急管理体系建设与加强党的执政能力建设结合起来，使之成为巩固党的执政地位，构建和谐社会，加强公共服务，增强行政执行力、公信力的重要内容，实现了“大综合”。因此，应急管理从以前的“略占地位”转变为“战略地位”。二是政府应急管理体系建设与行政管理体制改革结合，从以前转变职能主要是做“减法”，即把行政管理体制中不适应社会主义市场经济要求的职能减掉，转到既做“减法”又做“加法”，加强政府社会管理和公共服务职能。通过加强应急管理，推动了政府信息公开的法制化，促进多元治理结构的加速发育，形成了体制和机制并重的领导方法，增强了大众的危机意识和公共精神。加强应急管理成为了转变职能的有力抓手，也增加了行政管理体制改革的协调性。三是积极借鉴国际经验，广泛开展国际合作，变“关门应急”为“开放应急”。

The Dynamics of Disaster Recovery: Resilience and Entropy in Earthquake Response Systems

Louise K. Comfort*

Abstract: Disaster recovery involves a dual dynamic in communities exposed to recurring risk. First, there is a strong mobilization of effort to build resilience to risk in the immediate aftermath of disaster. This effort is soon countered by a second dynamic, entropy, as the urgency and interest in risk reduction fades after the damaging event, and daily concerns of the community intervene to demand attention and action. The challenge for policy makers and disaster managers is to achieve a balance between these two dynamics—resilience and entropy—in order to achieve sustainable risk reduction. This pattern can be observed over three decades in cities and communities exposed to seismic risk. I examine briefly the patterns of resilience and entropy that occurred following six earthquakes over three decades. The six earthquakes include: Mexico City, 1985; Northridge, California, 1994; Kobe, Japan, 1995; ChiChi, Taiwan, 1999; Gujarat, India, 2001, and Wenchuan, China, 2008. I conclude that well-designed information technology can facilitate the processes of information search, exchange, and organizational learning essential to maintain resilience and reduce entropy. It is a tool that communities can use to increase their knowledge of risk and to inform prudent actions for risk reduction against future threats.

Key words: resilience, entropy, disaster recovery, information technology, sustainable risk reduction

1. The Paradox of Disaster Recovery

The calls for "lessons learned" are widely heard following any disaster. Yet, the challenge of transforming the bitter experience gained from one devastating event into improved performance in response to the next threat is not easy. In the aftermath of disaster, changes are enacted in public policies and procedures to protect the damaged community from future threats. After action reports review operational performance and identify "lessons learned." Investments are made in new equipment and training to increase capacity of response organizations; disaster preparedness programs are initiated to inform the

* Louise K. Comfort, Professor and Director, Center for Public and International Affairs, University of Pittsburgh.

public in a concentrated effort to reduce disaster risk. Yet, over time, interest and action in disaster preparedness wane. Changes in resources, personnel, technologies, and organizational priorities shift the focus of the community away from risk reduction, and the community lapses into patterns of inaction and inattention that leave it vulnerable again to known threats.

This pattern represents a dual dynamic that can be observed in communities that experience disaster. It occurs repeatedly, frustrating those who seek lasting improvement in the capacity of communities to manage known risk. First, there is a strong mobilization of effort—by public, private, and nonprofit organizations—to build resilience to risk in the immediate aftermath of disaster. This effort is soon countered by a second dynamic, entropy, as the urgency and interest in risk reduction fades after the damaging event (Tong, 2008), and daily concerns of the community intervene to demand attention and action. The challenge for policy makers and disaster managers is to achieve a balance between these two dynamics - resilience and entropy - in order to achieve sustainable risk reduction.

Achieving an appropriate balance between resilience and entropy in any given community requires a systematic exploration of both dynamics. It is especially difficult to find this balance following earthquakes, which occur in any given location every 40 to 60 years for moderate events, and every 90 to 150 years for severe events. Such time spans are off the planning cycles for most governments that operate on annual budget cycles, or at the most 5 to 10 year planning cycles. Yet, major earthquakes occur with observable regularity around the globe, allowing inquiry into this dynamic to be done in a comparative framework. This approach requires analysis of the response and recovery processes following earthquakes in different locations and different nations. This is not trivial, as the degree of preparedness, response, and recovery differs among nations with different levels of economic development, technical advancement, policy and organizational practices, and cultural norms regarding risk. For this study, I examine briefly the patterns of resilience and entropy that occurred following six earthquakes over three decades. The six earthquakes include: Mexico City, 1985; Northridge, California, 1994; Kobe, Japan, 1995; ChiChi, Taiwan, 1999; Gujarat, India, 2001, and Wenchuan, China, 2008.

In this analysis, I explore the conditions that foster community resilience to disaster events, and examine the degree to which changes implemented in policy and practice after a damaging event enable a community to reduce risk from subsequent threats. Further, I seek to identify the indicators of entropy that inhibit organizational action following disaster, limiting innovations in policy and practice that may have been initiated immediately after the disaster event. In this preliminary exploration, I am seeking to document the recurring patterns of resilience and entropy following major disasters.

2. Resilience to Disaster Risk

The call for communities to develop "resilience" in disaster has taken many different forms. In an earlier study, we defined resilience as the "capacity for collective action in response to extreme events" (Comfort, Boin, and Demchak, 2010). These events may be sudden and urgent, as in earthquakes or explosions, or they may be slower onset events such as hurricanes or floods. The focus in reference to either type of event is on building awareness of the risk, sharing knowledge of threatening conditions among responsible organizations, increasing flexible options for adaptation to potential danger, and developing capacity for self organization at individual, organizational, and community levels of action. This concept of resilience depends upon ready access to information and the capacity of responsible actors to engage in timely search and exchange of information regarding threatening events. Resilience assumes a process of continual review, reflection, and redesign of actions taken in a changing environment; it means the capacity to update information and correct error as new information emerges from interactions among actors operating in dynamic conditions. Most importantly, resilience relies on the human capacity to learn and to act on valid information.

3. Social Entropy in Disaster Response

Social entropy derives from the concept, first identified by Enrico Fermi as the Second Law of Thermodynamics (Fermi 1956) that describes the dissipation of energy in an operating system over time. If we consider a set of emergency organizations engaged in coordinated activity to achieve the common goal of restoring a community to functional operations following a disaster as a 'system' of interdependent actors, the same concept of energy infusion and diffusion applies. The operation of an organizational system of actors also depends upon an influx of 'energy,' where energy in social organizations is construed as the flow of information and resources that enables the actors to make decisions, allocate resources, and take actions to address a common problem or to serve a shared goal. The 'state' of the social system undergoing change can be defined by essentially the same classic equation, $f(p,V,t)=0$ (Fermi 1956) in which the state of the system is a function of the pressure, volume, and temperature of heat, or energy that is driving the system. In the social context of a disaster environment, the 'state' of the response system can be defined as a function of p, pressure of time x V, volume of demands made upon the system, x t, defined in physics as temperature, but in response operations as performance of the system in meeting the volume of demands within given constraints of time and resources.

By adapting the concept of entropy developed to measure changes in the state of performance of physical systems to measure similar changes in the state of performance of organizational systems, we are able to assess more accurately the capacity of communities to manage risk. More importantly, we are able to identify the threshold points at which fresh 'energy' in terms of information, resources, and attention may need to be injected into operating emergency response systems to enable them to maintain their performance without slipping into significant dysfunction or 'phase change' in their capacity to manage risk. If we can model these dynamic interactions among component organizations in actual disaster response systems, we may gain insight into the steps needed to maintain response organizations for communities exposed to fluctuating levels of risk.

In summary, the concept of social entropy acknowledges the shift in attention and action in a disaster response system as other issues and actors enter the system, scattering the common focus on risk reduction, and triggering other types of interaction among the participating organizations. These entries into the system after a disaster event are part of the ongoing flux of operations in any community. Nonetheless, they increase the degree of heterogeneity and complexity within the system, and disperse the amount of energy that can be focused on disaster risk reduction. Like operating physical systems, however, this pattern of dissipating energy and slackening performance can be altered by 'negative entropy,' that is, a fresh injection of energy into the system. In an organizational system, negative entropy would be measured by the reverse of the components of entropy; that is, by actions that would reduce time pressure upon organizations, additional resources that would ease the demands placed upon the existing system, and increased information that would improve the performance of the system at given intervals or locations.

4. Measuring Change in Disaster Response Systems

Identifying the key parameters of resilience and entropy in actual disaster response systems requires a careful assessment of the region at risk before a disaster occurs. This task involves building a knowledge base of the existing organizational structure, policy processes, technical infrastructure for communication, coordination, search and exchange of information, as well as exposure to risk. This assessment provides a baseline for measuring resilience, as it outlines the existing capacity of a community to manage the risk to which it is exposed.

The second component of this assessment is to identify the parameters in the system that can or will vary under threat of disaster. These parameters include the: 1) number of potential actors in the response system (public, private, and nonprofit); 2) degree of heterogeneity among those actors in terms of access to resources, training, and prior experience in disaster response; 3) number of demands placed on each actor; 4) time pressure for action; 5) delay in completion of actions requested; 6) policy or procedural