

2013 – Davos, Switzerland

The 2013 conference focused on how increased environmental and socio-technology threats challenge a nation's abilities to mitigate and recovery from major events. As we grapple with the increased frequency and magnitude of these events, it is essential that prior planning and policies be in place that will make communities and populations more resilient to large-scale disruptions. The fourth annual conference on Community Resiliency addressed a central question: How can nations collectively address how to construction national strategies to ensure that the contextual factors are integrated into local actions required to meet national resiliency imperatives?

Building resiliency into critical infrastructures of a nation requires concerted action that integrating physical, social and political systems in ways that enable nations to create cultures of resiliency that, while unique, are based on international goals. Three central questions guided the discussions:

1. Can new science and technologies improve the resiliency of our critical infrastructures?
2. How do we create effectively translate national strategies into local actions that enhance the resiliency in communities and thus collectively enhance the resiliency of a nation?
3. How do we best incorporate social, technical and cultural elements into frameworks that will improve resiliency at all scales – global, national, and local – and across all sectors?

Program

Welcoming Address

Walter J. Ammann, President, Global Risk Forum GRF Davos, Davos, Switzerland

Keynote Speakers

- Charles Steger, President, Virginia Tech
- Saifur Rahman, Director, Advanced Research Institute, Virginia Tech

- Martin Powell, Head of Urban Development, Siemens AG, London
- Lauren Alexander Augustine, Associate Executive Director, Division on Earth and Life Studies, National Research Council of the U.S. National Academy of Sciences
- Mauro Dell'Ambrogio, Secretary of State for Education and Research, Berne, Switzerland
- Thierry Courvoisier, President, Swiss Academy of Arts and Sciences
- Ortwin Renn, Professor and Chair, Environmental Sociology and Technology Assessment, University of Stuttgart
- Dirk Helbing, Professor, Chair of Sociology, in particular of Modeling and Simulation, ETH Zurich, Zurich, Switzerland
- Carlo Jaeger, Chair, Global Climate Forum (Germany), Co-chair of IHDP-IRGP, Beijing, P.R. (China)

Panel: International Disaster and Risk Reduction, Sustainability and Resiliency

Chair: Walter Ammann, President and CEO, Global Risk Forum GRF Davos, Davos, Switzerland

- Jerry Velasquez, UN ISDR
- Wolfgang Kroeger, ETH Zurich

Panel Description

The earth is facing a growing set hazards at a national and even international scale, such as those resulting from climate change and cyber-catastrophes, but thinking must be expanded to include all sets and combinations of hazards. In order to make resiliency operational, performance measures must be defined, from pure prevention to mitigation; from pure technical to social-organizational-technical measures. Emphasis was placed on the need for the development of a set of standards for resiliency. Following up it was noted that goals and indicators related to sustainable development apply to all developed and undeveloped countries. One challenge to achieving these goals remains competing interests. There is no one solution to all problems. There is a great need for risk mitigation but the question of resources necessary to effect such mitigation is ever present. There is no shortage of possible action that could reduce interruption of services in disaster situations but the question of who should pay remains a challenge.

Panel: Approaches to Infrastructure Resiliency in Different National Contexts

Chair: Paul Knox, University Distinguished Professor, Virginia Tech

- Ralph Hall, Assistant Professor, Urban Affairs and Planning, Virginia Tech
- Krishna Vatsa, Regional Disaster Risk Reduction Advisor, South Asia, UN Development Programme
- Jaffer Khan, Director, MARG Institute of Design and Architecture Swarnabhoomi –MIDAS
- Dr. Daniel Kull, Senior Disaster Risk Management Specialist, World Bank

Panel Description

Panel II highlighted some of the gaps and opportunities in developing more resilient and sustainable infrastructures, focusing mainly on the context of South Asia. Many countries do not have the tools, expertise, and instruments to factor the potential impacts of adverse natural events in their investment decisions. There is a need to provide university graduates with the multi-sector skills necessary to address infrastructure development and management challenges facing both urban and rural areas.

In relation to flooding, for example, there is an urgent need to develop policies and measures that are centered on improving natural drainage, early warning systems, and floodplain management, rather than simply relying on protective infrastructure such as holders, levees and embankments. Similarly, because of the interdependent, multi-sector processes involved in urbanization, communities need to respond to the threat of disruption to critical infrastructures in an integrated manner. Government ownership and leadership are prerequisites for building resilience. Strong institutions, policies and regulations provide the essential framework for integrating risk reduction into infrastructure modernization and construction programs. By quantifying risks and anticipating the potential impacts of hazards, governments, communities, and individuals can make informed prevention decisions to set priorities for development and adaptation strategies, sector plans, programs, projects, and budgets. A core argument is that sustainability cannot be achieved without resilience, and resilience cannot be achieved without sustainability.

Panel: Appropriateness of Resiliency as a National Strategy

Chair: Jack Harrald, Associate Director, Global Forum and Urban and Regional Resilience

- Stefan Brem, Head, Critical Infrastructure, Swiss Federal Agency for Civil Protection
- Susan Cutter, Hazards and Vulnerability Research Institute, University of South Carolina
- Joao Riberio, Instituto Nacional de Gestao de Calamidades Direccao Geral, INGC/CENOE
- Simin Davoudi, Professor, Environmental Policy and Planning, Newcastle University

Panel Description

Panel III participants addressed the implementation of a resilience based national strategy from diverse perspectives. One emphasis was on the distinction between an engineering concept of resiliency (return to original function) to an evolutionary concept of resilience (adaptation to a new state) and warned that evolutionary resilience is not as amenable to human intervention. Another panelist provided a case study of resilience in Mozambique, describing the government programs to relocate and house large populations from flood zones by providing government assistance in drought areas. A structuring process for estimating risk and vulnerability was presented. And finally, it was stated that a description of resilience as a concept that linked disaster risk management/disaster reduction and sustainability has a known recipe for building resilience. What is missing is investment in the ingredients.

Panel: Translating National Strategies to Practice

Chair: James Bohland, Professor Emeritus, School of Public and International Affairs, Virginia Tech

- Gerry Galloway, Research Professor, Department of Civil and Environmental Engineering University of Maryland
- James Kendra, Director, Disaster Research Center, University of Delaware
- Buan Khazai, Center for Disaster Management and Risk Reduction Technology, Karlsruhe Institute of Technology
- Pedro Basabe, UNISDR

Panel Description

In Panel IV the focus was on implementation of resilience planning and policies across different countries – Germany, United States and several African Countries. Subject matter focus was on forensic analysis of disaster response (particularly sheltered

housing), behavioral services in a post event environment, water related disasters, and a variety of events in Africa related to water or weather.

In the USA the challenge of federalism making it difficult to coordinate between all levels of government and across jurisdictions was described. The key is to develop a set of rules to clearly define roles and relationships. What seems to work best is to allow local governments to develop rules in conjunction with federal oversight. In addition, the general theme that local government can do best is not always true was highlighted. Looking at behavioral health services in two states, considerable problems arose due to the lack of capacity present at the local level. Another presenter focused on response to national disasters across national boundaries in Africa. Variations in response capabilities were evident and can be attributed to governmental structures and capabilities as well as differences in the nature and magnitude of the events. And finally a focus on post-event forensic analysis, a field typically ignored because of political issues as well as technical capabilities was suggested. A case study of post-disaster shelter policy reveals the information to be gained from a forensic approach that can be applied to future events.

Panel: Building Critical Public Private Sector Partnerships

Chair: Stefan Brem, Head, Critical Infrastructure, Swiss Federal Agency for Civil Protection, Berne Switzerland (invited)

- John Zeppos, head Business Continuity management, Cosmote Telecom, Athens, Greece
- Susanne Krings, Federal Office of Civil Protection and Disaster Assistance, Bundesamt für Bevölkerungsschutz und Katastrophenhilfe
- Roland Friedli, Risk Engineering Services Casualty, RE

Panel Summary

Panel V was charged with providing insight in practical experiences in varied critical infrastructure sectors and outlining the potential in public-private partnerships for enhancing resiliency. An example – Connecting the Dots-provided three instances of how the private sector engaged with the public sector:

- An act of terrorism in Greece where a private sector firm was able to contribute to the successful apprehension of the perpetrators through telephony records.

- How positive improvements to infrastructure were enacted after several forest fires interrupted service.
- How a private sector firm prepared to substitute the national currency overnight if necessary.

All action possible only possible with public-private sector cooperation and

- Functioning business continuity plan
- Information sharing between public and private sector
- Common approach to goals and interests

The next panelist noted that within the public sector of Germany, resiliency was not yet registered in the German national strategy and no definition yet exists in official documents. However, she did reiterate the familiar theme we have heard throughout-information sharing across all levels of government, industry and other support agencies is critical to successful outcomes.

A panelist highlighted the cascading effects of catastrophic incident with examples of the volcanic eruption in Iceland and intentional power line interruption in Germany. His comparison of a modern oil refinery with all the technical advantages and a Siberian plant with mechanical infrastructure was surprising in that the mechanical plant suffers fewer interruptions due to its ability to implement maintenance plans at more frequent intervals. He concluded that insurance can facilitate risk management with stakeholders. This should include: assessment, requiring risk based maintenance and resilient design. Insurance should also provide incentives for risk mitigation such as premium discounts.

And finally, public agency contributions to the area of resiliency through training and certification programs facilitating interaction between private enterprise and government agencies were described as a powerful tool. Additionally, the need for a glossary across nations standardizing terminology as a tool to better communication was outlined and a framework for success in the area of resiliency was posited:

- Communication (relationships must be developed prior to events-not post)
- Information sharing
- Capacity building
- Personal preparedness
- Exploitation of technical opportunities

Panel: Creating a Scientific Base for Resiliency – the Road to HFA2

Chair: Charles Steger, President, Virginia Tech

- Chris Barrett, Virginia Bioinformatics Institute, Virginia Tech
- Reginald DesRoches, Professor, School of Civil and Environmental Engineering, Georgia Institute of Technology
- Merle Missoweit, Fraunhofer Institute for Technological Trend Analysis
- Dennis Wenger, National Science Foundation

Panel Summary

Panel VI noted that the manipulation of “big data” and high speed computation should be an integral part of the measurement process of resilience within systems.

Gaps in resiliency research through the lens of engineering were also noted to be:

- Improved vulnerability models
- Infrastructure interdependency models
- Enhanced remote sensing data
- Damage-functionality models
- Improved data management systems
- Ubiquitous sensing
- Leveraging citizens’ sensors
- Making case for resilience: cost/benefit

And Germany’s focus on Crisis Management has led to the decision to provide a space for ongoing experimentation and testing. CM is as complex as resilience and has similar characteristics.

- CM responses must be modular, flexible and adaptive (this is costly)
- New systems must respect legacy systems in terms of interoperability (also costly)
- Needs solution on how to provide investment decision support and to foster innovation in resilience

The hope is that by creating a space for experimentation and testing CM, acceptance will result; and sustainable tools for evidence-based capacity building and better shared understanding of CM will result. Finally, although resiliency is not the same as crisis management – similar issues apply:

- Addressing possible scenarios
- How to measure success
- How to develop evidence-based decision base for investment
- How to bridge long term benefits of resiliency with CM

In summary, new approaches regarding physical infrastructures that include processes are needed. Because resilience is so vaguely defined and tries to include everything, we need clear dependent variables to develop cogent theory.

Panel: Resiliency and Social Systems

Chair: Liesel Ritchie: Hazard Research Center, University of Colorado

- Daniel Aldrich, Associate Professor, Purdue University and Fulbright Research Professor, Tokyo University
- Keith Shaw, Professor of Politics, North Umbria University, UK.

Panel Summary

Panel VII included three very different formal presentations. The keynote address examined risk and disaster governance, focusing on the need for inclusive risk and disaster management. The second speaker discussed three ways in which social capital works in a post-disaster context: elevating voice and suppressing exit; overcoming barriers to collective action; and providing informal insurance. The final speaker suggested reframing resilience as “transformative” and that it represents “ordinary magic.” In this sense, resilience exists within each of us, and enables individuals and communities to make sense of unfamiliar or chaotic situations. As such, resilience represents a crucial resource.

The first speaker offered the following conclusions:

- There is a need to transition toward inclusive risk and disaster management
- There is a need for adaptive risk and disaster management approaches based on decentralized operations and centralized coordination
- A Deliberative-Analytic Model of risk and disaster management would facilitate a functioning system in times of crisis

The second speaker offered the following research-based conclusions with respect to building social capital that provides support in the event of a disaster:

- Know your neighbors
- Get involved in community events
- Hold regular focus group meetings
- Incentivize community participation

The third and final speaker highlighted the following:

- Resilience should be reframed as “transformative”
- Human agency matters – don’t reduce people to variables or to the aggregate; we must understand communities
- Resilience must start from within, at the individual and neighborhood and community levels; it should be seen as “ordinary magic” that lies within each of us

Like the term “resilience,” the term “social capital” is complex. It has become a catch-all phrase for what is, in reality, a multi-dimensional concept that manifests itself differently in different communities.

Panel: Governance and Resiliency

Chair: Jack Harrald, Interim Director, Center for Community Security and Resilience, Virginia Tech

- James Kendra, Director, Disaster Research Center, University of Delaware
- Jack Brown, Director of the Arlington County Office of Emergency Arlington County, VA
- Badaoui Rouhban, GFR, Davos
- Deborah Brosnan, Department of Biology, Virginia Tech

Panel Summary

Panel VIII, Governance and Resiliency, was the concluding conference session. The first panelist provided a summary of the threats and challenges facing society in its quest for resilience. He then compared the societal and behavioral change we face today with the environmental challenge of the 1970’s that resulted in international, national, and local policy and behavioral changes. He concluded with his opinion that we are lacking in a theory based implementation science. The second panelist provided an overview of how an urban county in the US is approaching the resilience challenge. He described potential activities and benefits of a VT/Arlington living Lab. The third panelist provided an overview of the evolution of Disaster Risk Reduction efforts and their relationship to

the emergence of resilience as a governance issue. He summarized the resilience related efforts that organizations within the UN system are making. And the session and conference concluded with a reminder from a very different perspective, marine biology, that resilience can imply transformation. With rich examples from biology and ecology she demonstrated that resilient systems are adaptive systems and can change as needed to survive and thrive.

Conference Summary

Prepared by Dr. Badaoui Rouhban, Global Risk Forum GRF Davos

(with the support of: Kyle McDaniel, Andrea Morris, and Denise Orden)

The 4th Conference on Community Resiliency – Building the Critical Infrastructure for Resiliency, was held in Davos, Switzerland on 29-30 August 2013. It was organized by the Global Forum on Urban and Regional Resiliency at Virginia Tech and the Global Risk Forum GRF Davos and endorsed by the US National Academy of Sciences, with support from DRI international, Leica Geosystems, and Intergraph. The Conference addressed how new science and technologies improve the resiliency of critical infrastructures, how national strategies are effectively translated into local actions and how to best incorporate social, technical and cultural elements into frameworks that will improve resiliency at all scales and levels – global, national, and local – and across all sectors. The deliberations and discussions of the Conference have recalled the threats and challenges facing society in its quest for resiliency. As the trends in poverty, social unrest, urbanization, climate change impact, and terrorism continue to rise, risks and disasters will impact on how societies, communities and cities behave. The Conference underlined the need for creating a culture of resiliency. It highlighted the international dimensions of resiliency and revealed the need to establish international goals for resiliency. While the building of the critical infrastructure for resiliency to risks is an imperative, gaps and opportunities in developing more resilient and sustainable infrastructure are diverse. Risks are also the challenges that communities and cities must “tackle” in order to be competitive and remain attractive for business and the private sector.

The Conference provided an overview of a wide range of concepts of resiliency. The discussions underlined the links and intersections between disaster risk reduction, resiliency and sustainability. They argued that sustainability cannot be achieved without resilience, and resilience cannot be achieved without sustainability. They concluded that resiliency requires new approaches, integrated responses and innovative technologies which should be designed and applied in the context of local community engagement. The “trans” paradigm is of paramount importance: Trans-disciplinary knowledge

generation and translation; trans-sectoral interdependency; trans-global understanding. Resiliency also requires international, national, and local policy and behavioural changes. These approaches and changes should offer incentives for community participation. Resiliency must start from within the society, at the individual, neighbourhood and community levels. Emphasizing that whoever owns the responsibility for a resiliency policy or whatever the definition of resiliency might be, the Conference warned that time to act is now.

In order to make resiliency operational, performance measures must be defined, from pure prevention to mitigation; from pure technical responses to a mix of social-organizational-technical solutions. Emphasis was placed on the need for the development of a set of standards and indicators for resiliency.

Government ownership and leadership are prerequisites for building resiliency. Strong institutions, policies and regulations provide the essential framework for integrating risk reduction into infrastructure modernization and construction programmes. By quantifying risks and anticipating the potential impacts of hazards, governments, communities and individuals can make informed prevention decisions to set priorities for development and adaptation strategies, sector plans, programmes, projects, and budgets.

Participants addressed the implementation of a resiliency-based national strategy from diverse perspectives. Implementation of resiliency planning, policies and experiences across different countries was reviewed. While many countries do not have the tools, expertise and instruments to factor the potential impacts of adverse events in their investment decisions, they should be supported in building their capacities for resiliency. They must be encouraged to foster good and inclusive governance.

Among others, the following considerations were also identified and discussed: the potential in public-private partnerships and cooperation for enhancing resiliency; the need to be able to analyze, synthesize and assess available information on risks, to share it across all levels of government, industry and other support agencies and turn it into targeted policies and actions; the need to involve the insurance and reinsurance sector, the need for adaptive risk and disaster management approaches based on decentralized operations and centralized coordination; the critical importance of education and public awareness, the need to involve social networks, as well as the development of multi-sectoral skills in higher education; and the development of low-cost and natural resiliency measures when costly and complex measures are unaffordable.

The above-summarized outcome of the 4th Conference on Community Resiliency is presented as a contribution to the consultations that are already underway with the aim of developing a post-2015 international framework for disaster risk reduction. This framework will be the successor to the Hyogo Framework for Action (HFA) and will be expected to come together at the United Nations Conference on Disaster Risk Reduction scheduled to take place in Sendai, Japan on 14–18 March 2015.

The 5th Conference on Community Resiliency will again be held in Davos and will be organized back to back with the 5th International Disaster and Risk Conference IDRC Davos 2014, both to be held between the 21–28 August 2014. The outcomes of both conferences will also be fed into the HFA-2 process.

Keynote Addresses

The following is a summary of the keynote addresses which were made and the panel discussions which took place at the Conference:

Charles Steger, Virginia Tech President, opened the conference with a reflection on the seminal writings of Rachel Carlson in Silent Spring. Forty years ago the world was cautioned that human actions (or inaction) upon the environment would have catastrophic consequences. And for 40 years there has been a slow movement to meet those environmental challenges. However, we don't have another 40 years. Nature and interconnectedness of the world demonstrate this. We must model resiliency. The ideas exchanged in the course of this two day meeting are meant to define for us how best to achieve an understanding of resiliency and bring us closer to a shared vision of what, where and how to proceed.

In addition to Charles Steger's plenary address, the welcoming statements of **Walter Ammann, Presidents and CEO, Global risk Forum GRF Davos** and **James Bohland, Co-Director, global Forum on Urban and Regional Resilience & Interim Vice President, Virginia Tech's National Capital Region**, there were seven distinguished speakers presenting throughout the course of the conference.

Saifur Rahman, Joseph Loring Professor of Engineering and Director, Arlington Research Institute, Virginia Tech, spoke on international goals for resiliency, focusing on examples of disasters and best options for recovery. He suggested that high on the recovery option list is „Plan B“ or redundancy in systems. Decentralized systems were also suggested using stand-alone facilities such as the Arlington research center facility which can operate from its solar panels should a major disruption occur. Add to that the ability to share power in an emergency and the recovery spreads. Saifur Rahman's emphasis on recovery is based on the fact that we cannot predict the location

and severity of a large disaster but we can take a broad approach to preparedness through redundancies in infrastructure and systems.

Thierry Courvoisier, President, Swiss Academy of Arts and Science, concluded in his keynote that the most important work of public policy is to plan and create policy to avoid disasters, although he questioned the designation of “natural” disasters due to his position that man causes most of the consequences of these natural events. He emphasizes that when looking at national approaches to resilience, the national government is the most important actor on the scene. However, upon detection of hazard, actions engaged to avoid impact are from a national government perspective whose response is to their people and only on the behalf of that nation’s citizens. To that end, Thierry Courvoisier suggests that actions should be taken at a global scale. Less focus should be on national scene and more on a global scale, which could be most important to resiliency.

Lauren Alexander Augustine, Associate Executive Director, Division on Earth and Life Studies, National Research Council of the U.S. National Academy of Sciences, Washington D.C., USA. “The National Imperative”. Lauren Alexander Augustine declared, “The resilience landscape is messy” and that “ownership” in the United States is unclear”. Emphasizing that whoever owns the responsibility for a resiliency policy or whatever the definition of resiliency, the time to act is now. She stated that building a national strategy for resilience requires a base set of parameters commonly acknowledged. In the USA this was undertaken by the National Academy and resulted in the publication “Disaster Resilience: A National Imperative” putting fourth four recommendations: measure resilience, build coalitions, communicate and manage, share information and data. Moving forward, the National Academies are building on the resilience study and developing a new program on resilience. There has been strong interest in finding ways to test, implement, and enact the pillars of the report; finding new ways to build coalitions across jurisdictions and decision makers; and maintaining coalitions. The expected outcomes of this work are to understand baselines, how goals are set, design in flexibility for management, improve resilience measurement, and document and share information.

In conclusion she acknowledged that this is not the only strategy, its one approach. The need is to ground resilience in real world decision-making.

Martin Powell, Head of Urban Development, Siemens AG, London, “The Resilient City of the Future – a Public and Private Affair!” focused on local initiatives as opposed to national strategies to make cities resilient and competitive. He stated that cities behave, govern and respond differently to challenges; therefore they must find their

own set of ideas and strategies of how cities work. He continued by saying that as the trends in poverty, urban unrest, urbanization, climate change, and terrorism continue to rise, they will impact how cities behave. These are also the areas that cities must tackle in order to be competitive and attract business. Martin feels that innovation is key.

Dirk Helbing, Professor, Chair of Sociology, in particular of Modeling and Simulation, ETH

Zurich, Zurich, Switzerland. "The System Approach in Resiliency" emphasized the dangers of the centralization of systems as they can result in cascading effects. "This approach is not sustainable. Decentralized can outsmart centralized control." An effect often starts locally and then becomes large scale. "How can it be a global financial crisis and no one is responsible for it? Is it possible that small imbalances add up to something that has a devastating effect on our globe?" As coupling gets stronger, system behavior can change completely, causing systemic instability. We must watch for "interaction affects" and engineer "breaking points" to stop cascading effects. The question is do we have the right kinds of institutions to overcome 'tragedies of the commons?' One mechanism that has been tested and proven effective because it is good for sellers and buyers, is the reputation system used by such companies as Amazon and Ebay. Reputation systems introduce a feedback loop that creates an incentive toward higher quality. Sellers can sell at a higher price if it has a good reputation and buyers get better service and feel good about the deal they received. Dirk Helbing asked why it wasn't enough to use reputation systems. He responded that although there are recommender systems, it is currently companies that decide what is good for us and/or what fits our tastes. This creates a type of "filter bubble" that obscures and manipulates our view of the world and can undermine the wisdom of crowds, which he holds as the basis of institutions like democracy. He cautions that we must be careful not to manipulate decisions or opinions. Instead Dirk Helbing states we need pluralistic reputation systems, where buyers decide what reputation filter to use to obtain recommendations that match their needs. In this way, buyers are allowed to mine reputation data in the way that works best for them. They share their filter with others, who then modify the filter for themselves; they then share their filters, and so on. He holds that we can build an "information ecosystem" that informs and uses data for decision making. Creating diversity is important and pays off, if we learn to deal with it. Global problems call for a joint, global effort. We must create suitable institutions for the 21st century.

Ortwin Renn, Professor and Chair, Environmental Sociology and Technology Assessment,

University of Stuttgart, Stuttgart, Germany. "Social Capital and Resiliency".

According to Ortwin Renn, the main objectives during a crisis are to guarantee functional continuity of services, limit the extent of losses and impacts if services are discontinued, ensure fast recovery if a provider of services is unable to continue to provide them, and if a community cannot maintain services, determining if it can recover them quickly. In order to meet these objectives, he posits there must exist a clear intersection between structural governance and social capital—what he calls "Inclusive Governance". Ortwin Renn identifies "four major systems to collective decision making":

1. All political institutions and agencies as they lend legitimacy, due process, and resilience as criteria for determining processes;
2. Economic systems through their efficiency and productivity;
3. Expert systems, the people that carry important, specific knowledge that enable us to make changes toward coping mechanisms; and
4. Civil society, i.e., empathy, understanding, input of fairness, social justice, and equity.

There must be a system of checks and balances that allows each to contribute what they do best. Ortwin Renn holds that "Inclusive Governance" is important because of the "plurality of modern living conditions" that can often lead to an "incompatibility of approaches". Through decentralized operations and centralized coordination, keys to "inclusive governance" that transition toward "adaptive risk and disaster management", communities are best equipped to maintain systems functions.

Carlo Jaeger, Chair, Global Climate Forum (Germany), Co-chair of IHDP-IRGP, Beijing, P.R.,

China, "Governance and Resiliency". Carlo Jaeger outlined the need to understand the paradigm of "scarcity to coordination" as affluence around the globe rises and along with it, the dynamism in the "character of risk". He believes this paradigm is at core of the resilience challenges we face and acknowledges the difficulties we have with governance in socio-ecological systems, global governance and resilience. In order for governments to better manage resilience across the globe he offered three guides to foster effective systems:

- Make it simple
- Ensure loose couplings
- Cherish debates

Concluding that all three “rules” are usually neglected and disaster can often be explained by their absence.

Hopefully, in 21st century, the center-periphery model of global governance will give way to a new pattern. Territorial structures like nations will find new couplings with functional structures like professional associations-finding explicit roles for groups that have the know-how is critical for nation-states. He suggests that we “cross the river by touching the stones,” feeling our way across-not necessarily seeing the next stone-and being prepared to start anew if necessary. The world is in the process of discovery. We must be open, yet with caution and learn fast.