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Reporting on the Seminar - Risk Interpretation and Action (RIA): Decision Making Under Conditions of Uncertainty

The World Social Science (WSS) fellows on Risk Interpretation and Action (RIA) include the core writing team of this report (alphabetical after leads): Emma E. H. Doyle¹, Shabana Khan², Carolina Adler³, Ryan C. Alaniz⁴, Simone Athayde⁵, Kuan-Hui Elaine Lin⁶, Wendy Saunders⁷, Todd Schenk⁸, Fabiola Sosa-Rodriguez⁹, and Victoria Sword-Daniels¹⁰, which has been written on behalf of the wider group that attended the seminar (in alphabetical order): Olayinka Akanle¹¹, Marie-Ange Baudoin¹², Chiung Ting Chang¹³, Karianne De Bruin¹⁴, Riyanti Djalante¹⁵, Christine Eriksen¹⁶, Hsiang-Chieh Lee¹⁷, Jyoti Mishra¹⁸, Victor O. Okorie¹⁹, David R Olanya²⁰, Goda Perlaviciute²¹, Naxhelli Ruiz-Rivera²², Suzanne Vallance²³, Xinlu Xie²⁴, Lun Yin²⁵.

The organisers and scientists that also attended the RIA Fellows seminar included (in alphabetical order): Sarah Beaven²⁶, Charles Ebikeme²⁷, Richard Eiser²⁸, David Johnston²⁹, Christine Kenney³⁰, Tony Liu³¹, Douglas Paton³², Sarah Schweizer³³, Vivi Stavrou³⁴.

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Abstract

The paper reports on the World Social Science (WSS) Fellows seminar on Risk Interpretation and Action (RIA), undertaken in New Zealand in December, 2013. This seminar was coordinated by the WSS Fellows program of the International Social Science Council (ISSC), the RIA working group of the Integrated Research on Disaster Risk (IRDR) program, the IRDR International Center of Excellence Taipei, the International START Secretariat and the Royal Society of New Zealand. Twenty-five early career researchers from around the world were selected to review the RIA framework under the theme of 'decision-making under conditions of uncertainty', and develop novel theoretical approaches to respond to and improve this framework. Six working groups emerged during the seminar: 1. the assessment of water-related risks in megacities; 2. rethinking risk communication; 3. the embodiment of uncertainty; 4. communication in resettlement and reconstruction phases; 5. the integration of indigenous knowledge in disaster risk reduction; and 6. multi-scale policy implementation for natural hazard risk reduction. This article documents the seminar and initial outcomes from the six groups organized; and concludes with the collective views of the participants on the RIA framework.

Keywords: interpretation, action, decision making, uncertainty, communication, interdisciplinary, workshop

The International Social Science Council (ISSC) World Social Science Fellows Programme aims to “create the next generation of social science leaders. Those who can ask the questions that matter — and answer them” (World Social Science, 2014). Seminars bring Fellows together to identify pressing research questions related to global challenges, design *innovative interdisciplinary research strategies*, and form international research collaborations to enhance their careers. The Risk Interpretation and Action (RIA) seminar was the third seminar in the series, and was hosted by Massey University in Wellington, Te Rūnanga o Ngāi Tahu (the tribal council of the Māori iwi Ngāi Tahu¹), and the University of Canterbury in Christchurch, New Zealand.

The RIA seminar² was co-sponsored by: the Integrated Research on Disaster Risk (IRDR) programme³; the IRDR International Center of Excellence, Taipei⁴; the International START Secretariat⁵; and the Royal Society of New Zealand⁶. The Integrated Research on Disaster Risk (IRDR) research programme is a global initiative that seeks to address the challenges brought about by natural hazards, mitigate their impacts, and improve related policy-making mechanisms⁷. The IRDR has four working groups, which bring together diverse disciplines to conceptualize new approaches to Disaster Risk Reduction (DRR). One of these working groups is focused on Risk Interpretation and Action⁸, and the December 2013 RIA seminar was explicitly held to explore the key themes of the framework established by this working group in 2012.

The RIA Framework

The RIA working group of the IRDR aims to improve our understanding of how individuals and groups make decisions when confronted with risk (IRDR, 2012), by integrating a range of academic disciplines to address key unanswered questions relating to:

- *How can risk reduction policies and practices be generalised across hazards or to combinations of hazards, as well as across cultures?*
- *How much emphasis should be placed on risk forecasting versus communication?*
- *Why and when do local citizens' evaluations of risk diverge from scientific forecasts?*
- *How do people's decisions, perhaps due to social norms and perceived or actual constraints on their freedom of choice, diverge from their evaluations of such risks?*
- *Within policy and planning, what priority is given to protection and restoration of existing infrastructure, rather than redesign for greater resilience or prevention?*

(IRDR, 2013, p.12)

A series of RIA workshops and meetings in 2011 led to a position paper by Eiser et al. (2012) that specifies the kind of research that needs to be conducted to address the above questions, and outlines a conceptual framework to understand risk interpretation and responses to natural hazards. The paper brings forth a number of key elements from the study of human behaviour and decision-making, including: 1. the definition of risk; 2. the definition of uncertainty; 3. characterising previous research on risk in interpretation and decision-making; 4. individual decision-making under uncertainty, beyond ‘rational choice’; 5. heuristics; 6. decisions from experience; 7. learning; 8. trust in others; and 9. complexity, scale and social context. It concludes that the judgements underlying risk interpretation and action are not merely personal, but also interpersonal, and that while the literature behind these concepts is varied and extensive, it is not well integrated. More research that explores the interactions between human actors, social groups and natural hazards is required (Eiser et al., 2012).

Eiser et al. (2012) caution that much of the research in the social and behavioural sciences has progressed in “rather abstract contexts”, and thus it is important to critically examine the paradigms employed by those studies, as they may not incorporate the factors that are crucial and relevant to real-life decision-making. In addition, the authors point out the need to explicitly consider our ‘social dependence’ upon one another in shaping our physical and social environments, as these

- 1 See <http://ngaitahu.iwi.nz/te-runanga-o-ngai-tahu/> (last accessed 28th March 2014).
- 2 See www.worldsocialscience.org/activities/world-social-science-fellows-programme/seminars/new-zealand-risk-interpretation-action/ (last accessed 5th Feb 2014).
- 3 See www.irdrinternational.org/about/ (last accessed 5th Feb 2014).
- 4 See <http://irdr-icoe.sinica.edu.tw/about.html> (last accessed 5th Feb 2014).
- 5 global change SysTem for Analysis, Research, and Training. See <http://start.org/> (last accessed 5th Feb 2014).
- 6 See <http://www.royalsociety.org.nz/> (last accessed 5th Feb 2014)
- 7 See <http://www.icsu.org/what-we-do/interdisciplinary-bodies/irdr> (last accessed 5th Feb 2014)
- 8 See <http://www.irdrinternational.org/>(last accessed 5th Feb 2014)

interactions exert an influence on our vulnerability and resilience to natural hazards and disasters.

Since the publication of the RIA framework, a further RIA workshop was held in London in 2013 to discuss unanswered questions in the analysis of risk communication and perception, and the gaps in research, practice and funding. Topics discussed included:

- Can placing learning in the centre of science and policy lead to a paradigm shift for understanding and acting on resilience and transformation?
- What are the practical obstacles to a more flexible and knowledge rich humanitarian and development sector and professional practice?
- How much emphasis should be placed on risk forecasting versus communication?

(RIA, 2013, p.1)

From their working discussions, RIA workshop participants concluded that “there is a real danger of a growing disconnect between the empirical reality of natural hazard exposed populations and the ways in which this is represented by science and so imagined and addressed by policy makers” (RIA, 2013, p. 2). Issues flagged by participants include: a general need to look at multiple risks, to communicate uncertainty in science, and focus on learning rather than the production of information; the lack of integration of local knowledge; need to ensure access of knowledge for those who most need it; urgency to work within local decision-making contexts to target opportunities for learning; and the need to find ways to bring different knowledge sources together.

In conclusion, the participants found that that an integrated, interdisciplinary and multicultural approach to risk requires capacity building and field guidelines for knowledge exchange and engagement with local communities, and that a paradigm shift is necessary to break down the distinction between the processes of knowledge production, policymaking and implementation. They cautioned that this framing must not lose sight of the social structures that determine vulnerability and risk. They also identified a need to develop programmes that build capacity among different actors for integrated approaches to risk, and to document and share experience for advancing social sciences research and practice. The outcomes of the London workshop provided insights to the RIA seminar

on ways of sharing and integrating different disciplinary and cultural perspectives while working towards a common goal. The concluding remarks also highlight the benefits of initiatives like the RIA seminar as fora for enabling emergent learning.

The 2013 RIA Seminar Process

The goal of the RIA seminar, held in December 2013 in New Zealand, was to explore “if and how the RIA-IRDR conceptual framework for response to natural hazards can be integrated across disciplines and cultural contexts” (ISSC, 2013, p. 1). Twenty five early career research scientists from various disciplines, including psychology, sociology, economics, geography, public policy and planning, anthropology, political science, law, and environmental and geological sciences, were selected through a competitive application process to participate in the seminar.

The seminar was facilitated by leaders in the field of risk interpretation and action, including David Johnston (Massey University/Institute of Geological and Nuclear Science and IRDR), Christine Kenney (Edith Cowan University and Massey University), Richard Eiser (Sheffield University), and Douglas Paton (University of Tasmania), together with representatives and coordinators from the sponsoring organisations, including Tony Liu (International Centre of Excellence Taipei), Charles Ebikeme (ISSC), Vivi Stavrou (ISSC), and Sarah Schweizer (START).

The first three days of the seminar featured a series of lectures related to various aspects of the RIA framework, which were presented by two of the framework’s core authors, Eiser and Paton, and indigenous researcher Kenney. Five-minute presentations from each fellow, describing their work and how it relates to the RIA framework, were interspersed between the lectures. This phase was followed by a collective group discussion to identify the key issues that emerged from the lectures and introductions. After taking time to reflect on these issues, a series of working groups were formed with a focus on addressing the issues and developing research agendas and future work plans. From then on, the structure and scope of the seminar were largely left open to allow the fellows to self-organise.

The exception to self-organisation was a two-day visit to Christchurch, New Zealand, which included a unique opportunity for the fellows to be welcomed on to the Rēhua Marae (Ngāi Tahu) and discuss the role of Māori

community leadership and disaster recovery in Ōtautaki Christchurch since the earthquake sequence that started in 2010. The visit provided a valuable opportunity to step back from the theory discussed in the first three days and reflect on real world aspects of risk interpretation and action, including the social and cultural contexts of disaster recovery in New Zealand.

Time was made available in Christchurch for group work to continue. Each group also presented their working ideas to the lecturers and their peers for feedback, guidance and advice. Participants could join more than one group to engage in various topic discussions relevant and of interest to them. Each group was asked to develop a summary of their mission statement, research agenda, future research plans and planned research outputs by the end of the week. The seminar concluded on day seven with a facilitated feedback session on the processes undertaken throughout the week, the collective themes emerging from all groups, and the nature of undertaking interdisciplinary and multicultural research.

Outcomes of the 2013 RIA Seminar: Working Groups

The six working groups that emerged from this seminar developed specific research agendas based on their reflections on the RIA framework. These research agendas have a number of overlapping and interconnecting principles to address the issues linking risk interpretation and action (see Figure 1). Although these research agendas do not include all

of the topics that could be addressed or stimulated by the RIA framework, the outcomes below do reflect the thinking, knowledge exchange, and learning processes that took place among the fellows during the seminar, and the emergent themes that they view as critical, unaddressed in the current literature, and/or that link to their own research.

Assessing Water-Related Risks in Megacities in Developing Countries Under the RIA Framework – Authored by F.S. Sosa-Rodríguez, X. Xie, S. Khan and O. Akanle

Rapidly increasing growth of cities from developing countries has reshaped the urban world (Ezcurra and Mazari-Hiriart 1996). Megacities in the developing world are particularly exposed to varied water-related risks that endanger people’s lives and the operation of these urban settlements. This group aims to understand both current and future water-related risks in megacities from the developing world, and to identify the main factors that determine stakeholders’ perceptions, interpretations and actions by using the RIA framework. To meet this objective four case studies (Mexico City, Mexico; Beijing, China; New Delhi, India; and Lagos, Nigeria) have been identified in order to study their commonalities and differences in terms of their urbanisation characteristics, the water-related risks they face, the current water management practices to address water-related risks, and the main factors that determine the way policy makers identify, interpret and act to cope with water-related risks. The group also aims to answer the following questions: What does building resilience

mean for megacities? How useful could the RIA Framework be in building urban resilience? What are the common current and future water-related risks for megacities? What are the governmental responses to cope with these risks? How do factors identified by the RIA Framework influence water management decisions? Finally, what are the new challenges for water management in megacities? We also ask whether the findings can further guide the RIA Framework.

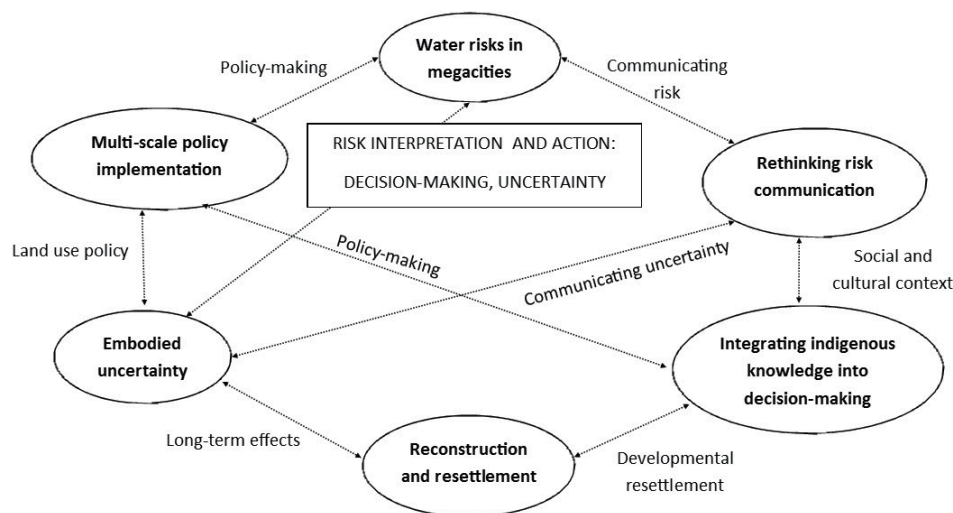


Figure 1. The six working groups of the ISSC IRDR WSS RIA Fellows, as formed in December 2013, and their interconnected principles.

Rethinking Risk communication: Problems and Solutions - Authored by C. T. Chang, E. E. H. Doyle, S. Khan, J. Mishra, D.R Olanya, G. Perlaviciute, F. S. Sosa-Rodriguez, and X. Xie

Communication of uncertainty has gained salience in climate change literature, however, it has remained a less addressed issue in the studies of natural hazards and disaster responses. It is noted that research on communications in the latter field is often focused on warning, prevention and recovery, and has not attended to issues relating to communication in-depth particularly during disaster response when it is most crucial for saving lives (Hale, Dulek, & Hale, 2005). Further, more research has focused on the communication (information flow) among the responders (Chen, Sharman, Chakravarti, Rao, & Upadhyaya, 2008; Netten & van Someren, 2011) from different agencies rather than between responders and the public, including affected individuals in particular. Scientists, on the other hand, are mostly driven to publish in scientific and professional journals of limited audience, and frequently have little interest and/or incentives for communicating their findings to non-scientists (Tribbia & Moser 2008).

Lipshitz, Klein and Carroll (2006) argued that to understand a dynamic situation, laboratory studies for research in decision making are not suitable, rather how information is communicated and how decisions are made in real scenarios must be studied. It is often assumed in practice that if people are given “sufficient” information, they will make the “right” decisions. However, people may interpret risk information differently than had been expected by information providers, and consequently respond to those risks in unexpected ways. Although Eiser et al. (2012) talk about communication in the RIA framework, the framework doesn't place adequate emphasis on communication for its role in mediating risk interpretation and action. It rather sees it as a means to achieve an outcome wherein risk interpretation and action inform risk communication and public engagement. This group is exploring the role of communication and highlights its significance not just as a means to an outcome, but also as a factor influencing both risk interpretation and action along with various other factors discussed in the RIA framework.

This group also aims to identify key barriers in effective risk communication and ways to overcome these barriers. Communication is effective when people are able to adequately realise the risks and respond to them appropriately. The ultimate goal of this research group

is to develop an integrated conceptual framework of risk communication, to be used by scientists (for the future research of this topic and for their role as information providers) as well as by practitioners (mainly for their role as information providers). The group will also test this framework for various types of risks and for cross-cultural communication.

Embodied Uncertainty, Part 1: The Concept of Embodied Uncertainty – Authored by C. Eriksen, V. Sword-Daniels, E.E. H. Doyle, R. Alaniz, C. Adler, T. Schenk, and S. Vallance

The RIA framework calls for further research to understand how past experiences, feelings, values, beliefs, social norms and individual and community characteristics, may shape risk interpretation and decision-making under conditions of uncertainty (Eiser et al., 2012). This group coined the term *embodied uncertainty* to move beyond the conventional understanding of uncertainty as a measurable metric to one that frames it as a lived experience that embraces complexity (Stirling, 2010). This term moves us towards an acceptance of uncertainty rather than attempting to reduce it to controllable conditions. Embodied uncertainty is distinguished from ‘objective’ uncertainty by being located within the bodies of individual people (Kavanagh & Broom, 1998; Mol, 2004). The group defines the embodiment of uncertainty as relating to the subconscious internalisation, subjective interpretation, and ways of making personal meaning out of uncertainty related to risk. It is built upon the notion that uncertainty is a holistic product of many factors, both shared and individual (Elliott & Pais, 2006; Epstein, 1994; Feldman, 2004; Kavanagh & Broom, 1998; Loewenstein, Weber, Christopher & Welch, 2001; Patt & Dessai, 2005; Taddei, 2012; Van Asselt, 2000).

Embodied uncertainty is framed as a verb not a noun. It is constantly enacted. People make patterns out of chaos. It is the lived experience of both known and unknown uncertainty. Embodied uncertainty is not passive. Uncertainty is embodied, for example, in human subjectivity and everyday life. There is embodied uncertainty through the aggregation and production of knowledge, in institutional structures, in decision-making, in communication processes, in evaluation and assessment processes (e.g. Adler & Hirsch Hadorn, In Press). Uncertainty is furthermore individually embodied and intertwined with our social identities. Embodied uncertainty also becomes embedded into

broader societal processes, which then shape how uncertainties are embodied by others at different levels, as it frames how they perceive and engage with, for example, risk. The embodied is the subconscious and the embedded is the conscious short-term. They are both dialectical in nature. Consciously embedded norms can become embodied subconsciously over time within longer timeframes. These concepts are currently being explored further in a conceptual paper and other ongoing collaborations.

Embodied Uncertainty, Part 2: Integrating Knowledge for Collective Risk Management - from Technical Rationality to Procedural Credibility and Legitimacy – Authored by T. Schenk, C. Adler, S. Vallance, R. Alaniz, E.E. H. Doyle, C. Eriksen, and V. Sword-Daniels

Decision-making that is wise, fair and effective must find ways of incorporating diverse forms of knowledge and recognising persistent, embodied uncertainty. Knowledge is co-produced and imperfect, yet we need to use tangible heuristics and models to support collective decisions for effective risk management (Tversky & Kahneman, 1974; Walker et al., 2003). The challenge is that integrating and assessing multiple forms of knowledge (including traditional ecological knowledge, TEK) is difficult, contested and inconsistent (Adler & Hirsch Hadorn, 2014; Beck, Borie, Chilvers, Esguerra, Heubach, & Hulme et al., 2014). In response, this group calls for the use of different epistemic standards that are salient, legitimate and credible to all stakeholders when processing knowledge and making decisions in the face of uncertainty. That is, for a shift in focus from a singular *technically rational* to a plural and *procedurally valid* approach, as exemplified in the concept of adaptive governance (see Brunner & Lynch, 2010).

The litmus test for assessing the procedural validity rests on a revision of epistemic standards that rejects a *one size fits all* prescription of which tools are best. This group argues instead, that different tools will be more or less appropriate in different contexts depending on the problem in question, values at stake and degrees of nuanced uncertainty, ambiguity and ignorance that are considered (see Stirling, 2010). This group collaboration seeks to elaborate and learn from various tools and practical approaches for managing multiple and diverse knowledge systems and translating knowledge into action, while accommodating uncertainty in different contexts. Tools and approaches are situated along

two axes: The degree of complexity involved, and the relative heterogeneity among the various stakeholders. Heterogeneity may depend on the number of actors and stakeholders, inter- and intra-group diversity, and cohesion of interests. Complexity may depend on the number of moving pieces and dynamism, including urgency, knowledge and understanding. This group collaboration aims at supporting a turn from decision-making that is built on the notion of scientific rationality to one that incorporates multiple sources of knowledge and accepts uncertainty, in addition to exploring how this can be operationalised in practice.

Communication Influences on Decision Making in Disaster Recovery and Reconstruction: Implications for the RIA Framework – Authored by K-H. E. Lin, S. Khan, D.R Olanya, S. Vallance, and R. Alaniz

The RIA working group has been developed with the intention of analysing and improving our understanding of how people, both decision-makers and ordinary citizens, make decisions, individually and collectively, in the face of risk (McBean, 2012). RIA has asked some critical questions, which highlight the reflection and critical turn of the international disaster research communities: stepping from pursuing big sciences to strategically emphasising the practical needs for a deeper understanding about the interfaces and interconnectedness among various parties of scientists, practitioners and policy makers regarding disaster reduction. However, to answer the questions or to formulate the ways to approach the questions is still challenging. Pelling (2013) stated that perspectives from social theory, psychology and learning theory all look into the interfaces but the independency of the whom has led to a number of discontinuities in the analysis of risk communication and perception, and gaps in research and practices. He proceeded to propose two overarching concerns to settle those questions: the scope of communication among science, policy and practice communities, and the vested interests in each group and the norms and values that shape dialogues. In its latest release, the RIA framework provides a critical overview of the theories on the relationships between risk interpretation and action (Eiser et al., 2012). The framework pushes forward, from the psychological perspective, to a theoretical boundary about risk interpretation beyond rational choice and broadens the scope of attention on complexity, interpersonal dynamism and social context that implicitly influence or alter personal risk interpretation and action. However,

this framework is inclined to focus on the personal and individual mechanisms that frame these processes, and seems to lack sufficient discussions on the interactions among the individual and collective levels, as risks are interpreted and lead to certain decision-making and actions.

This group aims to fill this gap by investigating a critical but dynamic element – communication; and further put the discourse in the less-studied field of disaster reconstruction and resettlement. Communication, as discussed here, focuses on the dialogue among individuals, communities, organisations and governments in the reconstruction and resettlement phases after disasters. It is embedded in the broader political, social, and cultural context of the respective country or region (Lin, Tsai & Chang, 2011; Marx et al., 2007; Morton, Rabinovich, Marshall & Bretschneider, 2011; Russill and Nyssa, 2009; Vogel, Moser, Kasperson & Dabelk, 2007). Our research highlights interactions across social and temporal scales with an explicit aim to focus on the individual and collective level interactions, especially the communication among various parties, along with norms and values inherent in the dialogues, and the cultural, institutional and legislative settings that support the processes. As a nature of its internationality, this group includes scholars from Taiwan, India, Uganda, Honduras, and the Philippines to look at case studies in these countries regarding the natural disaster reconstruction and recovery. The internationality of the project allows critical comparison among the countries to address how the communication has been produced, evolved or even hindered in the national social and political contexts, and how certain (non-) communication processes influence policy making and result in post-disaster recovery and reconstruction practices.

The Role of Indigenous Peoples and Indigenous Knowledge in Disaster Risk Reduction and Climate Change Adaptation – Authored by S. Athayde, M-A. Baudoin, V. Okorie, L. Yin and S. Lambert⁹

In a world facing increased uncertainty and risk from hazards and climate change, Indigenous Peoples are among the most vulnerable groups. Nevertheless, Indigenous communities around the world hold relevant knowledge to be applied in disaster risk reduction (DRR) and climate change adaptation (CCA) research, initiatives and policies. There is widespread recognition

that Indigenous Knowledge systems (IK) are vital components of environmental management, biodiversity conservation and sustainability (Gadgil, Berkes and Folke, 1993; Berkes, Colding and Folke, 2000; Posey and Balick 2006; Heckenberger, Russel, Toney and Schmidt, 2007; Maffi and Woodley, 2010; Schwartzman et al., 2013). According to Mercer, Kelmen, Taranis and Suchet-Pearson (2010), there has also been increased recognition of the importance of IK systems for coping with and adapting to environmental hazards and disasters (see also Cronin, Gaylord, Charley, Alloway, Wallez and Esau, 2004, Cronin, Petterson, Taylor and Biliki, 2004; Dekens, 2007a, 2007b; Shaw, Uly and Baumwoll, 2008). Nonetheless, practical and conceptual articulations or bridges between Indigenous peoples, scientists, politicians and society at large in knowledge production, sharing and integration are often poorly developed (Mercer et al., 2010, Raymond et al., 2010, Bohensky and Maru 2011). The gap between policy-makers, scientists, practitioners and indigenous peoples is large: it reflects a lack of effective communication and coordination among these actors, related to misunderstanding, power imbalances and essential differences in epistemological orientations (Agrawal 2002). Approaching risk interpretation and action in different contexts and across diverse cultures deserves further synthesis and evaluation. This group's research will review, analyse and aid the integration of IK into DRR and CCA.

This group proposes to develop a multi-scale and multi-actor framework drawing from literature review as well as from experiences and challenges faced by indigenous peoples in China, New Zealand, Brazil, and Nigeria. Such a framework should be flexible and respectful of local knowledge, practices, values, beliefs and approaches to risk, reflecting the specificities and dynamics that are flourishing among, and within, Indigenous communities (see Shaw et al., 2008 for a compilation of best practices and experiences on DRR in the Asia-Pacific region). Connecting, fostering exchange of ideas and experience, and facilitating training among representatives of indigenous communities who face natural, industrial and climate change-related hazards is also a main goal of this collaborative work. The project will research the nuances of *risk perception* and *risk interpretation* among Indigenous communities in different countries and contexts, as well as their creative responses or *risk action*. While researching these issues, it is important to step away from scientific knowledge conceptualizations of risks, in order to embrace the fact

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that risk might be interpreted and enacted differently across Indigenous communities, and the fact that their subsequent responses and strategic adoptions may enable better risk actions for other communities (Shaw et al., 2008, Mercer 2010, Mercer et al., 2010).

Multi-Scale Policy Implementation for Natural Hazard Risk Reduction – Authored by W. Saunders, H-C. Lee, N. R. Rivera, and K. de Bruin

One of the key dimensions of any process of Risk Interpretation and Action relates to how disaster risk reduction policies are designed and implemented in different national settings. The objective of this project is to improve the understanding of the multi-scale policy implementation for natural hazard risk reduction in four countries, as a key dimension of risk interpretation and action at the political level. The focus of the project is an international comparison between New Zealand, Mexico, Norway, and Taiwan. While these countries represent the collaboration formed at the RIA seminar, they are also susceptible to similar natural hazards, in particular floods, landslides, earthquakes, and climate change. They represent countries within the geographical locations of Australasia, Latin America, Europe, and Asia, with a diversity of political systems and institutional strengths and weaknesses. The methodology is a comparative design content analysis (based on Krippendorff, 2013) of published emergency plans and land use plans at the national, regional, and local levels. The methodology of assessing plans is underpinned by similar research undertaken by: Berke, Smith and Lyles (2012); Berke and Godschalk, (2009); Ericksen, Berke, Crawford and Dixon (2003); and Lyles, Berke and Smith (2012). Issues such as uncertainty, knowledge communication and learning from previous lessons are also included when analysing the plans. Identifiable opportunities, barriers and lessons that can be learned will be presented, with a critical reflection of the possible improvements to the policy making process on each of the analysed contexts.

The theoretical framework for the project is taken from legal geography. According to Clark (1989), the geographies of law have been progressively addressing diverse dimensions between space and law. Firstly, they addressed: the spatial consequences of formal regulatory instruments such as laws, rules and programmes; the spatial ideologies underneath the formulation of these instruments, for example environmental conservation, economic freedom, social justice and property; and how

the categories contained within the legal framework naturalized social and political inequalities (Blomley, 2002; Sivak, 2013). Recently, there have been several studies that address how these ideological components have different effects on the type of spatial policy that is implemented (e.g. including definitions of contentious or blurred concepts such as *resilience*, *public good* or even *vulnerability*) or even the type of institutional capacities and regulatory environments that are generated around those principles (e.g. levels of decentralisation, public participation or law enforcement) (Sterett, 2013). There is also an emerging field of empirical studies about policy implementation, particularly regarding the scalar interactions in decision making, law enforcement and social action (e.g. Osofsky, 2007). This background supports this enquiry on the nature of emergency management systems and risk reduction policies.

The use of these conceptual approaches in this project complements the RIA framework by particularly focusing on the structural dimension of social action, by exploring how the different state agents create and implement multi-scale disaster risk reduction policies in different countries. Follow-up studies will include case studies of plan implementations, which include local capability assessment (see for example Saunders, Beban, & Coomer, 2014). This research supports the RIA framework by providing an empirical study of risk interpretation through policy to implementation as well as posing questions for future research including: 1. How are DRR policies implemented at the local level, including land use changes, emergency management and civil protection?; 2. What are the opportunities and barriers for improving implementation of policy at multiple levels?; and 3. What can be learned from how different countries are implementing DRR policies?

Conclusions: Full Group Reflections on the RIA Framework

These working groups are only starting to frame their research and collective writing. However, a set of preliminary observations have already emerged, based on the work conducted during and after the seminar, including the following:

One, the starting point for the seminar was a largely individual psychological perspective on risk interpretation and action, and fellows quickly noted that risks are framed and only have meaning within socio-cultural systems, which involve particular, context-specific, ways

of processing information. The interpretation of risks is inherently subjective, based on many factors, thus heterogeneity, complexity, and plurality in perspectives must be adequately structured and embraced. Interpretations, actions and responses to risk are built on local values and norms, and depend on disciplinary frameworks.

Two, the effective communication of risks fits into various policy domains, with the goal of effectively informing individual decision-making. There is thus a key role for researchers to understand how to interpret, conceptualise, communicate, and act upon risk and how emergency managers can improve communication about these risks. That said, there is a continual need to shift from *risk communication* to *risk engagement*, with a new appreciation for the need to actively engage stakeholders in the generation of, and sharing of, information being communicated to them.

Three, risks must be explored collectively as well as individually, including responses to these risks chosen via processes that incorporate information from various sources (i.e. communities, organisations, and individuals), accounting for different concerns, goals, and perspectives. It is important to recognise that advancing research on risk interpretation and action must involve multi- and trans-disciplinary research and action, as well as to consider diverse socio-cultural contexts. It is also vital to account for the multiple actors involved and scales inherent to risks, the interdependence between them, and the issue of cascading risks as impacted communities become more exposed to a range of future risks.

The collective group plans to revisit these three topics and others. We will assess the interconnectivity of our topics and relationship to RIA related activities, through a follow on collaborative exercise in 18 months. The goal is to ensure the longevity of the working relationships established between this group of 25 fellows over the longer term.

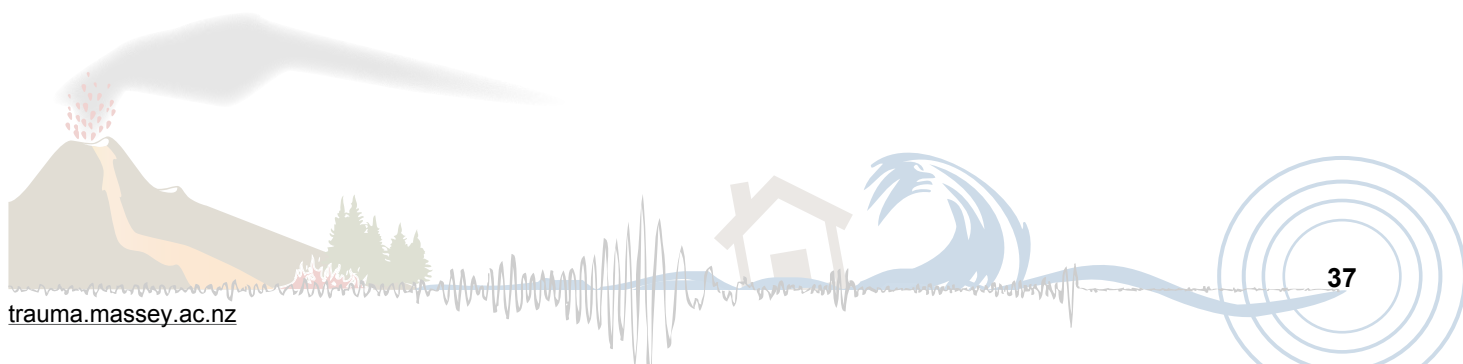
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