Institutional Vulnerability and Governance of Disaster Risk Reduction: Macro, Meso and Micro Scale Assessment

(With Case Studies from Indonesia)

Dissertation

zur

Erlangung des Grades

Doktor Ingenieur

(Dr.Ing.)

der

Hohen Landwirtschaftlichen Fakultät

der

Rheinischen Friedrich-Wilhelms-Universität

zu Bonn

Vorgelegt am 24 November 2010

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Tag der mündlichen Prüfung: 28-02- 2011

Erscheinungsjahr: 2011

Abbreviations

AIT:	Asian Institute of Technology
AusAID:	Australian Agency for International Development
APBN:	Annual National Development Budget
APBD:	Annual Local Development Budget
ASEAN:	Association of Southeast Asian Nations
Bakornas:	National Coordination Agency for Disaster Management (old) in Indonesia
BMG:	Indonesian Meteorological and Geophysics Agency Indonesia
BNPB:	Indonesian National Disaster Management Agency
BDPB	Indonesian Local Disaster Management Agency
CDA:	Critical Discourse Analysis
CBDM:	Community-based Disaster Management
CBDRM:	Community-based Disaster Risk Management
CRED:	Center for Research on the Epidemiology of Disasters
CSO:	Civil Society Organizations
DAAD:	German Academic Exchange Service
DM:	Disaster Management
DNPI:	National Council for Climate Change of Indonesia
DPR:	National Legislation Council (Indonesian Parliament)
DPRD:	Local Legislation Council (provincial/district parliament)
DRG:	Disaster Risk Governance
DRGF:	Disaster Risk Governance Framework
DRM:	Disaster Risk Management
DRR:	Disaster Risk Reduction
ECLAC:	Economic Commission for Latin America and the Caribbean
ECHO:	European Commission for Humanitarian Aid & Civil Protection
EID:	Encyclopedia of International Development
EMDAT:	Emergency Event Database
ESDM:	Ministry of Energy and Mineral Resouce
ESG:	Earth System Governance
GAR:	Global Assessment Report
GDP:	Gross Domestic Product
GFDRR:	Global Facility for Disaster Reduction and Recovery
GEF:	Global Environmental Facility
GITEWS:	German-Indonesian Tsunami Early Warning System
GR:	Government regulations
GTZ:	German Agency for Technical Cooperation
HFA:	Hyogo Framework for Action
IBC:	International Building Codes
ICC:	International Code of Councils
ICM:	Indonesian Concrete Manuals
IRCI:	Institutional Resilience and Capability Index
ICT:	Information and Communication Technology
IDNDR:	International Decade for Natural Disaster Reduction
IDR:	Indonesian Rupiah

IDRL:	International Disaster Response Laws
INGO:	International Non-governmental Organizations
IFRC:	International Federation of the Red Cross
IJMED:	International Journal of Mass Emergency and Disasters
IDPs:	Internally Displaced Peoples
IDRL:	International Disaster Response Laws
ISO:	International Standard Organization
IVI:	Institutional Vulnerability Index
ITB:	Bandung Institute of Technology, Indonesia
IVA:	Institutional Vulnerability Assessment
KAM:	Knowledge Assessment Methodology
Keppress:	Presidential Decree
Kepmen:	Minister Decree
MDGs:	Millennium Development Goals
MPBI:	Indonesian Disaster Management Society
MRI:	Multi-risk Index
MSR:	Multi-strategy Research
NAP:	National Action Plan
NGO:	Non Governmental Organizations
NTT:	East Nusa Tenggara Province
NU:	Nahdatul Ulama
OFDA:	Office of U.S. Foreign Disaster Assistance
PD:	Presidential decree
Perda:	Local regulation
Perkada:	Head of region's regulation
Perpress:	Presidential Regulation
Permendagri:	Interior Minister Regulation
PermenPU:	Minister of Public Work's Regulation
PP:	Government Regulation
PMPB:	Disaster Management Association Kupang
PMB-ITB:	Pusat Mitigas Bencana – Bandung Institute of Technology
PMI:	Indonesian Red Cross
PRA:	Participatory Risk Assessment
RAN:	National Action Plan
RAN PRB:	National Action Plan for Disaster Reduction
RENAS:	National Planning
RGF:	Risk Governance Framework
RPJMD:	Local Medium-Term Development Planning
RPJMN:	National Medium-Term Development Planning
Satlak:	District Level Coordinating Agency for Disaster Management (old)
Satkorlak:	Provincial Level Coordinating Agency for Disaster Management (old)
SC-DRR:	Safer Community through Disaster Risk Reduction
SKPD:	Local Government Working Units (province and district)
UBC:	Uniform Building Codes
UN:	United Nations
UNDP:	United Nations Development Program
UNDP-ERA:	United Nations Development Program Early Recovery Assistance

UNDRO:	United Nations Disaster Relief Organization
UNESCO:	United Nations Education, Science and Culture Organization
UNICEF:	United Nations Children's Fund
UNISDR:	United Nations International Strategy for Disaster Reduction
UNOCHA:	United Nations Office for the Coordination of Humanitarian Affairs
UNU-EHS:	United Nations University Institute for Environment and Human Security
UII:	Islamic University of Indonesia
USAID:	United States Agency for International Development
WHO:	World Health Organization
WCDR:	World Conference of Disaster Reduction
WGI:	World Governance Indicators
ZEF:	Center for Development Research (University of Bonn)

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ACKNOWLEDGMENTS

This PhD has been funded by the German Academic Exchange Service (or *Deutscher Akademischer Austauschdienst*: DAAD) and is part of the German-Indonesian Tsunami Early Warning System (GITEWS) project, which has been carried out by scientists and engineers from Germany and Indonesia. I gratefully thank DAAD and GITEWS for their great support during this PhD research.

My great respect and grateful thanks go to Prof. Dr. Ing. Janos Bogardi for all the valuable support including faith in this PhD research that he has shown, from the beginning to the end. Special thanks to Prof. Peter Mollinga for his guidance on interdisciplinary research at Zentrum für Entwicklungsforschung (ZEF) during October-November, 2007, and his kind support as a PhD supervisor. Special thanks to Prof. Theo Kötter for his constructive comments and service as an examiner of this PhD research. Special thanks also go to Prof. Prof. Ernst Berg for chairing the defense.

Many thanks also go to Prof. Bogardi, Prof. Dr. -Ing. Torsten Schlurmann, and Dr. Koko Warner for having faith in me after the interview in Bonn, November, 2006. This PhD research would not have succeeded without endless assistance from Ms. Helga Islam (2008-2010) and Ms. Susanne Kammüller (2007-2008) from DAAD, and astonishing support from Dr. Thomas Zschocke and Ms. Evalyne Katabaro at the UNU-EHS, as well as Frau Rosemarie Zabel and Dr. Guenter Manske at the Zentrum für Entwicklungsforschung (ZEF). Thank you for all your kind support. Thanks also to Dr. Fabrice Renaud for all the logistics support provided through UNU-EHS. Thanks to Dr. Juan Carlos Villagran who kindly supported this research during its early stage and kindly suggested the topic of the role of disaster reduction in the context of decentralization in Indonesia. Thanks to Dr. Dusan Sakulski for being “the backstop” for sometime for this research.

I would also like to acknowledge all my ZEF 2007 batch colleagues and friends from the interdisciplinary courses where I have rediscovered the importance of interdisciplinarity and interdisciplinary research – thank you for your friendship. My research has also been enriched by the many scientific discussions with the multidisciplinary team formed from UNU-EHS’s GITEWS PhD students and colleagues: Neysa Jacqueline Setiadi, Niklas Gebert, Denis Chang Seng, Widjo Kongko, Ade Anggraini, Widodo Pranowo, Pachochenko Jintasarae, Raveloson Adrimiarto, Sumaryono, and Rokhis Khomarudin.

I would like to thank my brothers/sisters in the NTT Academia Forum, who are scattered around the planet: Dr. Dwantoro Hardjito, Dominggus Elcid Li, Rm. Leo Mali, Dion Bata, Syalomi Natalia, Matheos Mesakh, Wilson Therik, Dr. P. Gabriel Faimau, Andre Therik, Dr. Ermi Ndoen, and all the members who have taken part in constructive debates on NTT social problems. Thanks also to Neil Rupidara, Don Marut and Emanuel Bria and NTT Academia colleagues on recent debate on theories of institutions. I would also like to give thanks to Katharine Haynes at the RMIT for all the the opportunities, and supports. I also wish to thank my Indonesian friends who have helped and supported my research: colleagues at the Indonesian Disaster Management Society and colleagues Yulius Nakmofa, Djoni Ferdiwijaya, Hening Purwanti, Dr. Eko Teguh Paripurno, Avianto Amri, Patris Usfomeny, Vanda Lengkong, John Djonga, Affan Ramly, Malikah Amri, Tsu Babies, Roni So, Sebastian Saragih, Herman Kelen, Yos Boli and many more who have helped me with my fieldwork and desk research in Aceh, Padang, Sikka, Ende, Yogyakarta, Bandung, and Jakarta, including fellows in MDMC Garut and Padang. Special thanks to Agustinus Uria for sharing brotherhood in Bonn and all the moral support from Indonesian colleagues in Bonn. To all my DAAD 2007 colleagues, thank you for sharing the papers.

Thanks to Dr. Yanuar Nugroho at the Manchester Business School for introducing me to Social Network Analysis and the International Network on Social Network Analysis. Thanks to Dr. Saut Sagala for all the wild discussions regarding the future direction of disaster risk sciences in Indonesia.

I would also like to thank Papa and Mama (Alex and Domina), my parents-in-law (Erens and Ester), and all my brothers/sisters/brothers-in-law/sisters-in-law in West Timor and Surabaya for all their prayers and encouraging support.

DEDICATION

To Axcelictho, Inskcy, and Linda

Thank you Linda for all your love, sacrifice, care, and prayers.
Thank you Axcelictho and Inskcy for your love, smiles, and prayers.

ABSTRACT

This PhD research addresses two central questions: How should institutional vulnerability that shapes disaster risks and disaster reduction policy be assessed? How does the quality of institutions and governance influence the level of disaster risk and disaster reduction policy? In this dissertation, institutional vulnerability at global and local levels is analyzed and an answer to such questions is pursued. General vulnerability assessment frameworks on the global scale and local scale have limitations in measuring how and to what extent institutions in all countries can reduce risks. This PhD dissertation is pioneering in that it assesses global institutional vulnerability using an index-based approach on a national/local scale by employing mixed methods such as social network analysis complemented by qualitative approaches (e.g. participant observation and literature reviews) and quantitative approaches (simple regression, scatter plots and simple descriptive statistics). In this dissertation, it is hypothesized that the countries with greater institutional quality tend to have better governance over disaster risks, which leads to a higher level of disaster risk resilience.

Risk assessors have often overlooked institutions. In fact, when one assesses vulnerability, for example, social/human vulnerability (such as using health, education, human development indices), physical vulnerability (quality of physical housing and infrastructure), economic vulnerability (income, economic production), and environmental vulnerability (land degradation, environmental quality indicators), the assessor essentially measures the "outcomes" of the institutions rather than the institutions directly. Institutional vulnerability to disaster risk is defined here as both the context and the process by which formal institutions (regulations, rule of law, constitutions, codes, bureaucracy, etc.), informal institutions (culture, norms, traditions, etc.), and governance are either too weak to provide protection against disaster risk or are ignorant of their duty to provide safety and human security. Central to this argument is the concept that institutions are designed, among others, to reduce risks. In this research, the focus is on disaster risks. This suggests a hypothesis that nations will fail to reduce risks owing to institutional and governance factors that modify their vulnerabilities and resilience.

The findings show that both qualitative and quantitative methods at different scales of governance can assess institutional vulnerability and the governance of disaster risk reduction. At a global level, a quantitative approach to measuring institutional quality and governance disaster risk reduction is possible thanks to recent global data on countries' implementation of the Hyogo Framework for Action; however, more efforts are required in the future. At the meso- and microlevels, this work describes the history of institutions for disaster risk management in Indonesia from the colonial period until the present challenges of decentralized governance. The main message is as follows: without considering institutions, institutional quality, and specific governance of disaster reduction at macro-, meso-. and microscales, disaster risk reduction will not be sustainably implemented.

Kurzfassung

Diese Doktorarbeit befasst sich mit zwei zentralen Fragen: Wie sollte institutionelle Vulnerabilität von Massnahmen zu Katastrophenrisiken und -vorsorge beurteilt werden? Wie beeinflusst die Qualität von Institutionen und Governance den Grad der Katastrophenvorsorge? Diese Dissertation analysiert institutionelle Vulnerabilität auf globaler und lokaler Ebene, um eine Antwort auf diese Fragen zu geben.

Allgemeine Beurteilungssysteme von Vulnerabilität auf globaler und lokaler Ebene sind in ihrer Aussagekraft darüber begrenzt, wie und in welchem Umfang Institutionen in allen Ländern Risiken tatsächlich reduzieren können. Diese Dissertation ist eine grundlegende Arbeit dahingehend, indem sie globale institutionelle Vulnerabilität mittels eines Index-basierten Ansatzes auf nationaler / lokaler Ebene misst ergänzt durch gemischte Methoden wie soziale Netzwerkanalyse sowie qualitative (z.B. teilnehmende Beobachtung und Literaturrecherchen) und quantitative Ansätze (z.B. einfache Regression, Scatter-Plot, einfache deskriptive Statistik). In dieser Disssertation wird die Hypothese aufgestellt, dass die Länder mit der höchsten institutionellen Qualität eine bessere Governance von Katastrophenrisiken haben, was zu einer höheren Widerstandskraft gegen Katastrophenrisiken führt.

Risiko-Assessoren haben oftmals Institutionen übersehen. Im Falle der Messung von Vulnerabilität, z.B. soziale / menschliche Vulnerabilität (wie z.B. Gesundheit, Bildung, Indizes der menschlichen Entwicklung), physische Vulnerabilität (Qualität der physischen Behausung / Gebäude und Infrastruktur), ökonomische Vulnerabilität (Einkommen, Wirtschaftsproduktion) und Umweltvulnerabilität(Landverödung, Umweltqualitätindikatoren), misst ein Assessor eigentlich nur das "Resultat" von Institutionen, aber nicht die Institution direkt.

Institutionelle Vulnerabilität gegenüber Katastrophenrisiken wird hier definiert als der Kontext wie auch der Prozess, durch die formale Insitutionen (Verordnungen, Gesetz, Verfassungen, Vorschriften, Verwaltung usw.), informelle Institutionen (Kultur, Normen, Traditionen usw.) sowie Governance so geschwächt werden, dass sie entweder keinen Schutz gegenüber Naturkatastrophen bieten oder zu Ignoranz gegenüber ihrer Aufgabe führen, für Sicherheit und menschlichen Schutz zu sorgen. Ein zentrales Argument ist die Vorstellung, dass Institutionen u.a dafür gestaltet wurden, um Risiken zu reduzieren. In dieser Forschungsarbeit wird der Schwerpunkt auf Katastrophenrisiken / Naturkatastrophen gelegt. Dies führte zu der Hypothese, dass Nationen nicht in der Lage sind, aufgrund institutioneller Faktoren und Governance, die ihre Vulnerabilität und Fähigkeit zur Abpufferung ändern, Risiken zu reduzieren.

Die Ergebnisse zeigen, dass qualitative sowie quantitative Methoden auf verschiedenen Ebenen der Governance institutionelle Vulnerabilität und Governance der Katastrophenvorsorge messen können. Auf globaler Ebene ist die Anwendung eines quantitativen Ansatzes zur Messung der Qualität von Institutionen und Governance zur Reduzierung von Naturkatastrophen möglich dank der zur Verfügung stehenden globalen Daten aus Ländern, die das Hyogo Framework for Action eingesetzt haben. Trotzdem sind stärkere Anstrengungen in der Zukunft nötig. Auf der Meso- und Mikroebene beschreibt diese Arbeit die historische Entwicklung von Institutionen zur Katastrophenvorsorge in Indonesien von der Kolonialzeit bis zu den aktuellen Herausforderungen einer dezentralisierten Verwaltungsstruktur. Die wichtigste Aussage ist die Tatsache, dass Katastrophenvorsorge nicht nachhaltig implementiert werden kann, ohne Insitutionen, die Qualität von Institutionen sowie die spezifische Governance der Risikoreduktion auf der Makro-, Meso- und Mikroebene zu berücksichtigen.

Chapter 1. Introduction

1.1. Introduction

The Emergency Event Database (EMDAT) shows an increase in disaster fatalities, people affected, and estimates of damage due to natural hazards during the period 1975-2009. Although the average number of people killed in natural disasters declined (although this was not always the case for Indonesia, Haiti, and Myanmar, among others) during the last 30 years, the trend of economic losses due to natural disasters increased in absolute terms[1] equivalent to the increase in wealth.[2] In view of the predicted changes in climate, coupled with demographic, social, and economic changes, the likelihood of natural hazard events becoming disasters is significantly higher.

The Global Assessment Report (GAR) 2009 on disaster risk reduction noted an uneven distribution of disaster risk, in which the developing world and its sources of rapid economic growth, people, and their economic assets are moving closer to the spotlight of natural hazards; this contributes to an increase in disaster risks, which is growing faster than the rate of resilience building or capacity development achieved by these countries. The GAR 2009 notes that, even if the number of hazard incidents remains constant globally, there is still an increasing trend of disaster risks, which exacerbates the already uneven risk distribution between wealthier and poorer countries and between the wealthy and the poor in those countries. For example, mortality levels relative to hazard exposure to cyclones are currently much higher in low-income countries than in Organization for Economic Cooperation and Development (OECD) countries.

One of the key findings is that poorer countries with weaker institutions and governance are the places where global disaster risk is highly concentrated. Developing countries are still exposed to a great deal of high risk (UNISDR 2009:6). The governance arrangements for disaster risk reduction in many countries do not facilitate the integration of risk considerations into

[1] See the data online at http://www.emdat.be/natural-disasters-trends - last accessed on 3 Jan, 2010.

[2] Please treat global disaster statistics with care. Global Wealth Assessment 2000: On average, each person in the world owns US$95,000 (a total of US$639 billion - World Bank 2006). The trend of global disaster losses in absolute terms are increasing but the losses in proportion to the total wealth is decreasing. There have been scientific debates on whether there have been more wealth produced on earth that are placed in hazard prone areas or there is an increase in hazard incidents due to global change including climate change. Bouwer et. al. (2007) and Pielke (2006) question some of the non-peer reviewed statistics produced by some insurance industries tend to claim an increase in disaster losses, including strong claim on an increase in climate change induced hazards that lead to disaster losses.

development. In general, the institutional and legislative arrangements for disaster risk reduction are weakly connected to development sectors. The last key finding shows the importance of institutions. It states that an institutional "failure to address the underlying risk drivers will result in dramatic increases in disaster risk and associated poverty outcomes. In contrast, if addressing these drivers is given priority, risk can be reduced, human development protected, and adaptation to climate change facilitated" (UNISDR 2009:3-4).

1.2. Research Problems

The UNDP (2004:11) defines vulnerability as a condition or process resulting from physical, social, economic, and environmental hazards that determine the likelihood and scale of damage from the impact of a given hazard.[3] The UNU-EHS promotes the concept of multi-dimensionality, which asserts that vulnerability encompasses "exposure, susceptibility, and coping capacity"[4]. From these perspectives, disaster risk reduction means reduction in physical, social, economic, and environmental vulnerabilities and hazard management. The main discourse behind this is the following simple formula: Risks = Hazards (H) X Vulnerability (V. economic, social, environmental, physical, etc.).

There are at least two well-known global-scale vulnerability assessment frameworks: the Disaster Risk Index (DRI) and the Disaster Hotspots approaches. The Disaster Risk Index (DRI) developed by UNDP in 2004 is known as the first human vulnerability assessment exercise on a global scale, namely, a country-by-country comparison of human vulnerability and exposure to earthquakes, tropical cyclones, and flood hazards. The DRI consists of two indicators: the first is the Relative Vulnerability Index (RVI), which compares national data for exposed populations with recorded mortality. The second is the socio-economic indicators of vulnerability at the national level, which refer to GDP per capita and density of population (Pelling 2004).

Global Disaster Risk Hotspots (GDRH) is another model developed for the sub-national scale for individual hazard analysis. The GDRH model includes assessment of disaster mortality data,

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3 UNDP 2004 "Reducing Disaster Risk: A Challenge For Development A Global Report", Bureau for Crisis Prevention and Recovery, United Nations Development Program, New York.

[4] See the paper http://www.wider.unu.edu/publications/working-papers/research-papers/2008/en_GB/rp2008-50/ [last accessed 14 Aug, 2010].

economic losses, and the risk of economic loss as a proportion of GDP. In addition to these indicators, GDRH includes social-economic vulnerability indicators such as gross domestic product per inhabitant at purchasing power parity, Human Poverty Index (HPI), total debt serviced (% of the exports of goods and services), inflation, annual food prices, and unemployment (% of total labor force) (see Arnold et al. 2006).

However, it is insufficient to measure socio-economic-physical-environmental vulnerability. What has not been overlooked is the fact that when one measures vulnerability, such as social/human vulnerability (using health, education, or the Human Development Index, for example), physical vulnerability (quality of buildings and infrastructure), economic vulnerability (income, economic production), and environmental vulnerability (land degradation, environmental quality indicators), the assessor essentially measures the outcomes of institutions. Disaster vulnerability assessors often miss the insight to be gained from studies of institutions and governance, especially those on the roles of institutions in determining economic performance when measured by GDP, country income, infrastructure, and environmental quality (e.g. North 1993). Social economic indicators such as GDP, income per capita, and employment and demographic conditions are certainly the outcomes of institutions. For the use of these outcomes to measure countries' vulnerability to natural disasters and risks, there are technical difficulties regarding how to measure material/immaterial goods and infrastructure that help human agents to reduce vulnerabilities.

Furthermore, the prevailing vulnerability assessment framework at the global scale (and even at the local scale) still has limitations in measuring how and to what extent institutions in all countries can reduce risks. Conventional wisdom in risk management suggests that risk reduction starts with risk assessment, and one important aspect of risk assessment is vulnerability assessment. However, actions cannot be taken until the respective institutions decide to take them.

This PhD dissertation is pioneering in its assessment of global-scale institutional vulnerability using an index-based approach and that at national/local scale using mixed methods such as centrality test of social network analysis complemented by other qualitative/quantitative approaches. In this dissertation, it is hypothesized that the countries with a higher level of institutional quality tend to have better governance of disaster risks, which also leads to better

social-economic capacity. Consequently, they tend to have better capabilities with more effective disaster mitigation, early warning systems, and disaster preparedness and response systems.

The Global Assessment Report 2009 (in addition to UNDP 2004) is probably the first global-scale report that substantially promotes the roles of governance and institutions in ensuring the sustainability of disaster risk reduction. Limited institutional and governance indicators were mentioned such as *voice*, *accountability*, and *government effectiveness* (UNISDR 2009:44). The report argues that richer countries "tend to have better institutions, more effective early warning, disaster preparedness, and response systems, and more open government is more supportive of disaster risk reduction" (UNISDR 2009:19).

Global-scale vulnerability assessment depends very much on data availability. Few scientific studies on institutional vulnerability are available and there is still a lack of institutional vulnerability assessment frameworks.

1.3. Research Objectives

The main objective of this dissertation is to provide a new vulnerability assessment framework in order to understand the roles of institutions and governance in dealing with disaster risk. At the macro level, evaluation of global-scale assessment of institutional vulnerabilities is herein attempted using a quantitative approach. This will be repeated at meso- (national/provincial) and microlevels (local level) using a case study approach for Indonesia. In addition, how to improve the quality of institutions to reduce vulnerability and the role of governance in institutional change towards sustainable disaster risk reduction will be shown.

The following are the specific objectives of the study:

- To provide a new framework and method for institutional vulnerability assessment at global and local scales.
- To understand governance and the role of institutions in disaster risk reduction at all levels.
- To understand the conditions that enable and impede steady improvement towards less disaster risk in the countries.
- To understand the linkages of global, national, and local disaster risk reduction.

1.4. Research Questions

This PhD research addresses two research questions: How should institutional vulnerability that shapes disaster risks and disaster reduction policy be assessed? How does the quality of institutions and governance influence disaster risk level and disaster reduction policy?

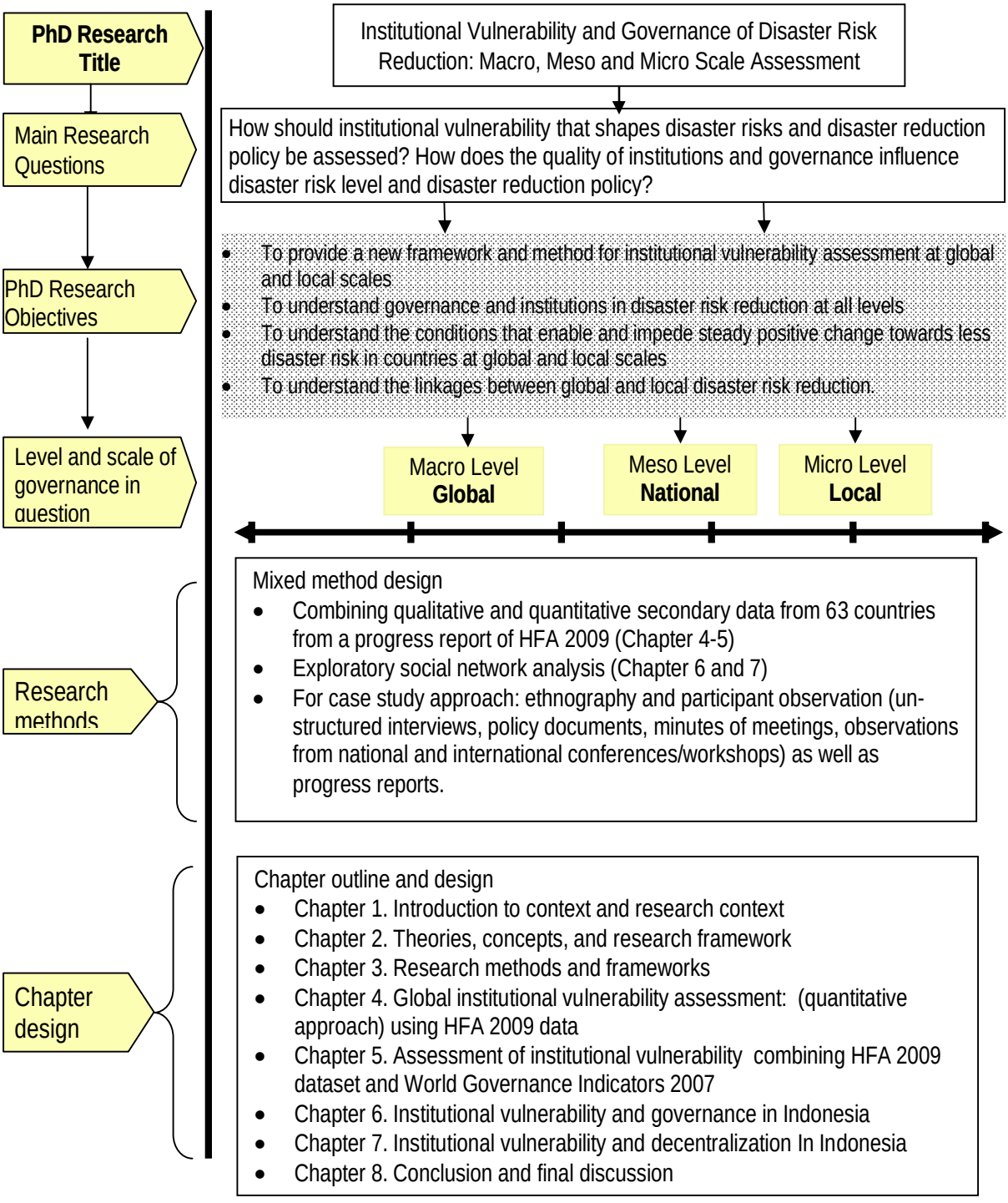
Some of the sub-questions derived from the main research questions are as follows:

- To what extent can institutional vulnerability be measured at the global scale?
- What are the roles of governance (and decentralized governance) in reducing (or increasing) vulnerability to natural hazards and disaster risks?
- What are the processes undertaken by formal and informal institutions and their interplay in reducing risks?
- Can a risk governance framework offer a better explanation of how to address the underlying causes as stipulated by the Hyogo Framework for Action?
- How can vulnerability be reduced when institutions and governance are vulnerable and barely change towards better risk management?

1.5. Research Outline

Figure 1 outlines the overall research structure. Chapter 2 contains a discussion of the basic theories and concepts on institutions and governance of disaster risk reduction. The selected research methods are presented in Chapter 3 together with the overall research framework. Chapter 4 provides empirical observation on institutional vulnerability assessment based on a global dataset derived from the implementation reports of the Hyogo Framework for Action 2009. Chapter 5 demonstrates the roles of governance and institutional quality indicators in measuring institutional vulnerability reduction. Chapters 6 and 7 provide evidence on institutional vulnerability assessment at the microlevel in the case of Indonesia. Social network analysis is used to demonstrate the polycentric nature of DRR governance. Chapter 8 contains conclusion on the whole study and presents a final discussion and recommendations.

Figure 1 PhD Research Outline



Chapter 2. Theories and Concepts of Institutions and Governance

2.1. Introduction

One of the lasting scientific explanations on the causation of disaster risk is from O'Keefe et al. 1976 who argued that disaster risk marks the interface between an extreme physical event and a vulnerable human population (O'Keefe et al. 1976:566). This has been frequently confirmed by many scientific endeavors such as Lewis et al. (1976), Westgate & O'Keefe (1976), Alexander (1993), Blaikie et al. (1994), Wisner et. al. (2004), Pelling (2004), Bogardi (2004), and Tierney (2007) (see also editorial compilation by Birkmann 2006). Almost all agree that disasters occur because of interaction between natural events that cause them and social, political, and economic vulnerabilities that structure the lives and the livelihoods of different groups of people (Blaikie et al. 1994:4 and Pielke 2006:138). Vulnerability has been accepted as one of the main factors for the causation of disasters. This view has emerged as a 'consensus' among disaster risk management scholars over the last two decades (Pelling and Wisner 2009:34)

The Global Assessment Report on Disaster Risk Reduction 2004 and 2009 also designates vulnerability as the main explanation of disaster risk. Birkmann (2006:21) observes that "the concept of vulnerability has been continuously widened and broadened towards a more comprehensive approach encompassing susceptibility, exposure, coping capacity, and adaptive capacity, as well as different thematic areas, such as physical, social, economic, environmental, and institutional vulnerability". While there are more and more academic efforts to explain physical, social, economic, and environmental vulnerability, on the other hand, there has been little effort in understanding institutional vulnerability.

The content of earlier works on institutions involved in risk reduction and institutional vulnerability is implicit in the work of O'Keefe et al. 1976, which shows the differences between richer and poorer countries in terms of disaster impacts; unfortunately, their work only compared the produced economic assets of nations. The view that "richer countries" tend to have "better institutions" and not the vice versa is exactly like the previous debate in Natural Science regarding "heliocentric versus geocentric" during Copernicus era. The truth is of course heliocentric, i.e. the sun is the central in the solar system. The author maintain that institutions is the heliocentric whereas the social-economic-environment-physical vulnerabilities are "the geocentric."

More recent works such as Blaikie et al. 1994 (which was later revised in Wisner et al. 2004) noted the importance of access to resources and the political economic arrangements that shape vulnerability and risks. Even though Blaikie et al. 1994 and Wisner et. al. (2004) implicitly promote the value of inclusive governance, and their work have been considered as a breakthrough in disaster risks studies, more should be done to explain the roles of institutions in disaster risk governance.

UNISDR (2009) and UNDP (2004) show that developing countries experience more deaths related to natural disasters than the developed world (see also Peduzzi et al. 2009, Dao and Peduzzi 2005). Countries with a high level of human development experience lower numbers of deaths associated with natural disasters. In actuality, the Global Assessment Report of Disaster Risk Reduction 2009 is probably the first global report that substantially argues about the roles of governance and institutions for the sustainability of disaster risk reduction. Institutions and governance received more space in the Global Assessment Report 2009 than in *Living With Risk: A Global Review of Disaster Reduction Initiatives* supported by UNDP in 2004. This is probably due to the growing availability of global datasets that are updated annually, such as the World Governance Indicators 1998-2008.

Previous works such as Schneiderbauer and Ehrlich 2006 use the terms "institutional quality" or "institutional setting" when talking about the formal administrative community. Haase (2009) investigates "administrative resilience" while Grieving (2006) briefly refers to "institutional weakness". Birkmann (2006) notes governance as the institutional aspects of DRR.

UNISDR (2009:44) mentions institutional quality components such as "voice & accountability" (to represent participation and press freedom), and "government effectiveness". The report argues that richer countries "tend to have better institutions, more effective early warning, and disaster preparedness and response systems, as well as more open government that tends to be more supportive of disaster risk reduction" (UNISDR 2009:19).

A fuller discussion that provides a basic understanding of institutions and governance will be presented in the rest of Chapter 2.

2.2. Understanding Institutions of Disaster Risk Reduction

2.2.1. Introduction

In defining institutional vulnerability, Lebel et al. 2006 argue that institutions not only define what and who will be at risk, but also amend the way disaster risks are defined, perceived, and acted upon. Institutions are significantly important to disaster reduction because they make life and death decisions (Mary Douglas 1986). It has been considered that institutions are, among others, created to deal with disaster risks. "Modern governance occurs in and through institutions. Institutions matter *not only* [emphasis added] because they form such a large part of the political landscape" (Bell 2002:363), but also because they form a large part of the social, economic, and specifically risk and vulnerability landscape as well.

The idea of institutions in disaster studies is rather a "black box concept" because previous academic work on this issue is considered to be lacking. Conventional awareness appeared in many policy documents (e.g. during the International Decade for Natural Disaster Reduction 1990–1999) as recognition of the importance of the political will that can lead to disaster legislation, which is actually already an indication of the need for institutions to tackle disaster risks.

The field of institutional theory is divided into "old" and "new" schools of thought about institutions. The old school emphasizes analysis of the formal-legal and administrative arrangements of government and the public sector (Bell 2002). The "new" school of thought is divided into four categories: rational choice approach, historical pathways approach, sociological approach, and finally discursive approach (Schmidt 2008).

2.2.2. Rational Choice Critics on Institutions

The rational choice paradigm suggests that 'ideal' risk management policies and strategies are planned ex-ante disaster events. Therefore, disaster risk reduction activities are divided into the so-called disaster management cycles, consisting of a sequence of activities from emergency, relief intervention, rehabilitation, mitigation, prevention, disaster preparedness, early warning systems, and back to emergency again in a full cycle. Alternatively, sometimes the strategies are broken down into simpler categories: before, during, and after disaster risk management. Furthermore, in many occasion, risk management often understood as a simple complete

management cycle with an order that begins with risk identification, then risk analysis, risk management planning, risk reduction intervention, risk communication, and finally risk evaluation, and back to the risk identification.

The logic of rational choice persists in many domains of public policy including disaster reduction policy. Rational choice critics strongly disagree with the notion that people at risk and those that make decisions affecting them are rational agents with perfect knowledge (Ensminger 2002). Herbert Simon argues that there are limits to the human ability to be rational because "boundedly rational agents experience limits in formulating and solving complex problems and in processing (receiving, storing, retrieving, transmitting) information" (Hage 2007:106). Thus, people are not able to gather all information they need to make a completely rational choice: "And even if they did have every bit of information needed, their cognitive ability is also limited" (Hage 2007:106; Furubotn and Richter 2005,). Critics of rational choice theory often gloriously cite the attacks on the theory by at least two Nobel laureates, namely, Herbert Simon (1978)[5] and Daniel Kahnemann (2002)[6], which have provided mounting evidence that each individual (including social, economic, and political actors or even scientists) has limited rationality, often resulting in foolish decisions due to several limitations (such as imperfect information, limits of cognitive-ability, time-boundedness).

2.2.2.1. New Institutional Economics Theory

This theory asserts that "institutions matter because they form the incentive or disincentive structure of a society" (North 1998:247). This suggests that institutions provide incentives that may drive actors' decisions and preferences to reduce/produce or amplify/attenuate disaster risk. Therefore, the making and unmaking of disaster risk reduction is heavily dependent on institutional regimes (old/new, formal/informal) or enforcement of existing formal/informal rules. This theory is often called new institutional economics theory. In this dissertation, the incentive structure is understood as referring to more than monetary value but to also include social, cultural, political, and symbolic incentives.

North (1998:249) argued that "If institutions are the rules of the game, organizations and their entrepreneurs are the players." This line of thought suggests that institutions are exogenous to

5 http://nobelprize.org/nobel_prizes/economics/laureates/1978/simon-lecture.pdf [accessed on 20 Sept 2009].

6 http://nobelprize.org/nobel_prizes/economics/laureates/2002/kahnemann-lecture.pdf [accessed on 20 Sept 2009].

agents (organizations, individuals). In another interpretation, as suggested by Shepsle (2006), one may not interpret institutions as exogenously *given*, or "automatically exogenous", because other rules of the game may be provided by the players themselves: "they are simply the ways in which the players want to play" (ibid). This argument is very abstract to some. If there were formal institutions (sound laws/regulations), however, corrupt bureaucrats might create different rules, and therefore might, to the detriment of society, create incentive of illegal tax for housing permits, for example.

"Institutions are the humanly devised constraints that structure human interaction (e.g. among human and human-nature interaction), which are made of: formal constraints (i.e. rules, laws, constitutions), informal constraints (i.e. norms of behavior, conventions, self-imposed codes of conduct), and their enforcement characteristics" (North, 1998:248). Alternatively, in the context of DRR, institutions are an admixture of formal rules, informal norms, and enforcement characteristics that shape (North 1998:255) the landscape of disaster, disaster risk and disaster risk reduction policy, and implementation.

The benefit of quoting North (1998) in a study of disaster risk is that there are many implications of transferring risk reduction strategies that work well in developed countries to the Third World in the form of formal strategies such as laws, building regulations and seismic codes, insurance market, risk assessment, and land use and hazard planning policies, among others. This is simply because the developing countries are neither homogeneous nor exhibit the same institutional constraints that affect how risk reduction strategies should be formulated since every one of them has their own institutional constraints. This suggests that revolutionary change of formal rules will not always result in better risk reduction because the everyday decision making on land use, risk-sensitive spatial planning, housing quality, risk transfers and sharing, as well as risk assessment and risk management, is still heavily influenced by informal institutions.

In the field of risk management, including disaster risk reduction, rational choice institutionalism helps to explain that institutional change (risk regulation, policy, early warning systems, etc.) can be made when actors are motivated by incentives and/or disincentives provided by formal/informal institutions. In addition, people's preference to disaster reduction will be driven by their expected utility maximization (through several technical means: risk mitigation, risk transfer mechanisms, responding to early warning systems, rebuilding or building fixed assets such as buildings in less risky areas once information is available etc.)

The case of the devastating Haiti earthquake on 12 January, 2010, demonstrates perfectly the problem of institutions. There is a box of "Best Practice" of the National Risk and Disaster Management Plan from Haiti in 2001 from the UNDP (2004:77), which noted that "This National Plan was published in 2001 and established a highly decentralized Institutional National System on Risk and Disaster Management, in line with the importance accorded to participation of the population in the 1987 Haitian Constitution." In fact the investment in risk reduction during the late 1990s in the country had little effect on the actual risk reduction because, as will be demonstrated in the Chapters 4 and 5, the institutions are too vulnerable and fragile to tackle risks.

2.2.3. Theory of Pathways

The theory of Historical institutionalism also known as "historical path dependency" theory. In selecting a definition of "pathways", Kaag et al. (2003) are very insightful. If translated to the context of disaster risk reduction strategies, they suggest that the term "pathways" points to the fact that insecure conditions and risky environments (such as unsafe conditions and the presence of those unprotected from disaster risk because of circumstances including poverty and livelihood uncertainty) often make it difficult for local actors to make strategic decisions of disaster reduction in advance. "Instead, their strategies unfold as they interact with the changes in this dynamic production environment" (ibid, p. 14).

Therefore, the concept of historical pathways provides the critics of rational choice approach with the argument that what is often called a strategy in fact turns out to be path dependency. In other words, instead of a detailed ex-ante institutional design and strategy development, institutions of risk reduction emerged as rather regularized patterns and routinized practices, "which are the often unintended outcomes of purposeful choices" (Schmidt 2009:127). The hypothesis that follows is that the pattern of disaster risk reduction strategies in developing countries such as countries bordering the Indian Ocean can be predicted not on the basis of formal written ex-ante DRR strategy as currently being drafted, but instead on the basis of previous policy development paths where participation has been limited, in which heavy reliance on a small elite persists even though there is formal regulation regarding participation in formal policy making. Therefore, strategic policy written in papers may turn out to be de jure institutions while actual institutions are based on existing historical paths, which tend to promote business as usual.

The logic of path dependency suggests that DRR strategies at the local level are more a result of historical interactions than of anything planned in advance. Should there be any written disaster management strategy papers, they may at best serve as legitimate procedures more than actual plans to be implemented. At the national level, this view could be used to argue that DRR strategies (national action plans, disaster reduction plans as being enforced by Hyogo Framework for Action) may not be pure ex-ante disaster reduction plans, but instead a result of national-international interactions built on the pre-existing donor-driven policy, especially in the context of developing countries where institutions are arguably weaker. One can hypothesize that the gap between actual practices and formal strategies (i.e. what is written in policy and planning documents) or between what is actually needed and what is actually implemented may arise owing to the fact that the former is the translation of the dominant discourse in trans-national interactions while the latter simply follows the old paths where homegrown risk reduction initiatives are less likely to be carried out and the sustainability of risk reduction will disappear once international support stops.

2.2.4. Anthropological Approach to Institutions in Disaster Risk Reduction

Oliver-Smith and Hoffman (1999) and Hoffman and Oliver-Smith (2001) are probably the key sources on the notions of institutional change, culture, and disaster risk. These books share an understanding of cultural change in relation to disasters. They do not focus directly on institutions but rather provide a broad analysis of culture. However, they can contribute to the study of institutions because cultures are difficult to change and can last for millennia. On the other hand, work by Prince (1920) showed how social institutions change after disasters (especially in the context of the Halifax explosion), which has been regarded as the earliest sociological approach to disaster research (see Nigg and Tierney 1993).

The challenge is reflected in the old paradox mentioned by Hoffman (1999:304): "The more things change, the more they stay the same." Hoffman argued that the variables that may cause change are as follows: scales of events (magnitude of disaster, population mass, and amount of damage), time, the structure of cultural institutions (such as norms, customs, traditions).

Lessons to be learned from Hurricane Katrina in the Gulf Coast of the U.S. and from the Indian Ocean tsunami of 2004 in Aceh, as pointed out by Alex de Waal, that *"the impact of human*

disaster imprinted in social forms."[7] This suggests that, beneath the fault lines of social differences, such as culture, religion, gender, age, class, and race, lies the secret of past and future disaster risk distribution patterns.

One should be mindful of the argument that culture should not be used as "an omnibus concept, a catch-all for all sorts of social traits and dispositions, from folkways to religious rituals and beliefs, from norms and values to traditions of law, from conversation habits to dress codes" (Meyer 2003:197) including gender relations, among others. Notwithstanding institutions, there clearly exists "cultural dependency", and this has long been acknowledged by many scholars including those in disaster research communities. 'Natural' disasters together with existing policy prescriptions do not happen out of context but are embedded in a cultural context as well (Bankoff 2003).

The case of the *Smong* culture, that is, the cultural practice of a tsunami early warning system that saved people on the island of Simelue during the 2004 Indian Ocean tsunami is a positive example of the impact of cultural institutions on risk reduction (see Yogaswara and Eko 2008). In this case, the established practices of *Smong* (meaning tsunami) warning developed over a century on the island are a product of cultural institutions. Therefore, culture can play a good or bad role in risk reduction as it may disable or enable the agents (the people at risk) to reduce disaster risks.

2.2.4.1. Religions as Informal Institutions

According to Chester (2005:319), "religion is an essential element of culture and must be carefully considered in the planning process and not simply dismissed as a symptom of ignorance, superstition, and backwardness". Campbell-Nelson (2008:4) argued that "Categorizing disaster by cause is further complicated when we take the interpretive role of religion into account. From a secular point of view we could construct a continuum from purely natural causes on one end to human-induced (political, social, economic) causes on the other. However, religious perspectives introduce other possible agents that may seem highly realistic to local populations."

[7] http://understandingkatrina.ssrc.org/deWaal/ (last accessed 20 Feb 2010).

Religions in themselves are institutions that play an important role in actors' understanding of the earth's dynamics (see Chester 2005), including institutional prescriptions to disaster risk reduction. A useful framework within which to consider the role of religion in risk consciousness can be borrowed from Paulo Freire's *Conscientizacao*, which stratifies consciousness at three levels: *magical, naïve,* and *critical*.[8] In regard to disaster risk, a *magical* consciousness may assume that "volcanoes and disasters are acts of God". A *naïve* consciousness may be represented by the assumption that "humans are too small to deal with forces of nature". Religion may shape peoples' understanding in a way that leads to a *magical* and/or *naïve* consciousness in regard to risk. A *critical* consciousness, by contrast, can be exemplified by the notion that the disasters in connection with powerful earthquakes may have been prevented if houses had been built to withstand the shocks.

Garcia-Acosta (2001) noted a variety of views of disasters in the context of Mexico, where previous religious responses to earthquakes as acts of God consisted of massive processions after disasters and mass prayers as protection against earthquakes, especially in the 19th century; however, this changed with the growing secularization of Mexican society. In the context of the Oakland firestorm in California in 1991, where property damage reached US$1.5 billion, Hoffman (2001:132) showed that the at-risk community in Oakland reiterated the belief long rooted in Western and Judeo-Christian thought "that disasters have occurred on a regular basis throughout time and take place because of moral malfeasance." The belief that disasters occur owing to the demonstration of divine power and divine intervention still prevails in many areas of the world. The beliefs shown in Mexico and Oakland were also demonstrated during recent disasters such as the Indian Ocean tsunami and recent earthquakes in Indonesia.

Religions as institutions deal with risk using their own narratives. In addition, public officials are bounded by the narrative of their religion. Trust in the narratives is often higher than that in science, which makes it very difficult to impose knowledge based on DRR policy. Therefore, DRR policy change requires actions within and without religious institutions to promote disaster risk reduction. This means that instead of religions being considered as sources of magical consciousness to risk that in some ways hinder disaster risk reduction policy, they should be regarded as institutions that are starting to play roles in reducing risk. Recent research on disaster

8 See William Arthur Smith (1976) "The meaning of Conscientizacao: the Goal of Paulo Freire's Pedagogy", Center for International Education, University of Massachusetts.

and religions noted the need to consider "religion as a resource rather than a hindrance in the planning of disaster risk-reduction" (Gailard and Texier 2010:83).

Table 1 Illustration of timeframe of institutional change

Disciplinary Interests e.g.	Management Regime	Change Frequency	Risk Management Purpose
Anthropology and Sociology	Embeddedness: informal institutions, customs, traditions, norms, religion	Hundreds to a thousand years	Inbuilt path dependency, cultural dependency
Sociology and Political Science	Formal institutions: formal rules of the game, constitutions, risk-related laws, policy, bureaucracy,	Tens to a hundred years	Get the institutional environment right: "Strong basis for DRR implementation".
Political Economy, and Policy Studies, Governance Studies	Governance: variety of game plays (projects, transactions, contracts, aligning governance structures with transactions)	< ten years	Get the governance structure right
Technical Sciences (Economics, Risk Management, Engineering, Finance etc.)	Incentives and resource allocation (finance, budgeting, capital, price, labor, technical knowledge, and innovation)	Shorter timeframe (annual, monthly)	Get the resource allocation right on a periodic basis

Adapted from North 1998.

2.2.5. Timelines of Institutions: Simplified Framework

Table 1 above explains the timelines of formal and informal institutions and the level of inquiries that each institution tries to answer. Informal institutions such as customs, traditions, norms, and religion[9] tend to endure and seldom vanish in less than hundreds of years and even a thousand years. Formal institutions such as constitutions tend to persist for decades, and the architecture of sectoral governance tends to change within years. This classification is of course not a rigid timeframe, but is rather flexible as it serves as an illustration that institutional change scenarios should be carefully understood, as North (1998) warned that rapid changes in formal regulations and policy do not necessarily lead to practical improvements in grassroots decision making and real life on the ground may still be influenced by norms or even by religion rather than shaped by formal institutions. In risk reduction contexts, incentives and resource allocation (e.g. financial capital, budgeting, and knowledge) are still largely the focus of technical sciences within which the focus is on technical knowledge and how to get resource allocation right according to the rationale of natural science calculation. One of the weaknesses of the timeframe is that it

[9] Religion is assumed as informal institutions.

inherently represents a deterministic view of institutions and thus could generate misinterpretations and pessimistic views on the possibility of institutional change.

2.2.6. How Institutions Change

Despite their power in explaining how institutions matter to society, the critical disadvantage of all approaches to the study of institutions (e.g. rational choice, and historical and cultural-anthropological approaches) is that they do not provide adequate explanations of how institutions change owing to their embedded assumption that institutions are external to agents (actors or organizations). In contrast, a discursive approach to institutions (i.e. discursive institutionalism) assumes that institutions are "simultaneously structures and constructs internal to agents" whose abilities (such as knowledge, ideas, and "discursive abilities") make for a more dynamic, agent-centered approach. (Schmidt 2008:305).

Table 2 Types of institutions, change, and continuity

Types of approach	Agents – Institution Continuum	Reason for change or continuity	Remarks
Discursive approach	institutions are internal to agents	Through discourse or ideas/ideation	a.k.a. dynamic institutions or agent-centered approach
Rational choice approach	institutions are external to agents	Through incentives	a.k.a. New Economic Institutionalism theory
Pathways approach	Institutions are external to agents	Through historical pathways	a.k.a. pathways theory
Cultural approach	institutions are external to agents	Through norms, religions etc.	a.k.a. anthropological approach

Adapted from Schmidt (2008)

The three approaches above (rational choice, historical and cultural-anthropological approaches) treat institutions as given, that is, institutions are external to agents or organizations whether as continuing structures, historical regularities (pathways), or as a cultural context within which agents act. They presume that "institutions are thereby external to the actors collectively. Continuity of institutions in the world is driven whether by way of incentives that structure action, paths that shape action, or norms/beliefs that frame action" (Schmidt 2008:313–314). Actions in institutions in the three older approaches conform to a rule-following logic, whether an

interest-based logic of calculation, a norm-based logic of appropriateness (cultural institutionalism), or a history-based logic of *path dependence*. Schmidt (2008) further challenges as follows: “But if everyone follows rules, once established, how do we explain institutional change?”

Without agents (e.g. individuals, organizations, actors), institutions have neither meaning nor presence. Therefore, agent-centrism is perhaps embedded in institutions. The position adopted in this dissertation is that institutional reforms and institutional change are the result of a complex interplay of both institutions and agents as both relatively external to and internal to each other. In the sectoral domain, such as disaster risk governance, institutional change is hypothetically a result of interplays between institutions and agents. In order to understand the landscape of institutions at any level, there are some identified variables that shape institutional change (whether there is change or no change at all as business as usual). The role of discourse or ideas/ideation in explaining policy change such as the institutionalization of new alternatives or approaches within an already established institutional stream can be explained by discursive institutionalism. A summary of this notion can be seen in Table 2.

2.2.7. Institutional Plurality and DRR

Risk management strategies to avoid or to limit adverse effects of hazards can be in the form of engineering approaches and non-engineering measures such as land-use planning, building codes, and risk transfers and sharing. What is often ignored is the fact that, for every risk management option, there is a legal context in which such risk reduction activities take place and have legal implication. The context of legality in one country is different from that in others.

The context of legality within Southeast Asian countries such as Indonesia is distinct from that of the developed world owing to the fact that the legacy of the colonial legal system may still co-exist with traditional, religious, or new legal reform systems. In other words, there is institutional plurality that manages sectors such as land use, coastal zones, economy, agriculture, and specifically disaster risk. Fitzpatrick (2008) showed empirical evidence of legal plurality in Aceh in the context of agrarian and land use management, while Lee-Peluso (2005) noted how land use and local territorializations in West Kalimantan, Indonesia, have been exercised by actors during the last century.

The relevance of understanding institutional plurality for risk reduction strategy is very much connected to the issues of governance and institutions, termed by the HFA as a "strong basis for implementation." For instance, the issue of land use policy arrangements when confronted with hazards, risk mapping, and zoning theoretically could not be managed through one single form of institution such as formal law but may co-exist with traditional laws. In addition, risk management exercises such as risk assessment and mapping are powerful but are ignored by technicians (see Lee-Peluso 2005). In theory, ignoring the fact of institutional plurality will lead to institutional clashes, which would hinder the implementation of risk reduction.

Research on legal pluralism is globally shared in part through the *Journal of Legal Pluralism*, supported by the global community through the "Commission on Legal Plurality".[10] One of the consequences of this legal pluralism is that it has an impact on local actors' behavior because individuals/organizations tend to advocate their legal rights or claims under the system that offers the best benefits. This is already implicit in the rational agent approach. The basic argument for the necessity of legal pluralism—in this regard for the sustainability of disaster risk management—is that "no formal system of law can hope to survive unless it is supplemented by multiple informal mechanisms" (McGinnis 2006:9). Therefore, it is important to note that the legal drafting process at both national and local levels does not necessarily provide a strong basis for implementation, as advocated in the HFA, simply because there are many institutional aspects of implementation and they do not co-exist in harmony but instead conflict with each other.

Ostrom noted that diversity is the real challenge to understanding institutions. In fact, institutions emerge as "the prescriptions that humans use to organize all forms of repetitive and structured interactions including those within families, neighborhoods, markets, firms, sports leagues, churches, private associations, and governments at all scales"; simply illustrated, "opportunities and constraints individuals face in any particular situation, the information they obtain, the benefits they obtain or are excluded from, and how they reason about the situation are all affected by the rules or absence of rules that structure the situation" (Ostrom 2005:3). Such a situation includes disaster risk.

10 Ref. http://www.commission-on-legal-pluralism.ch/index.html [last accessed on 1 July 2009].

2.2.8. Bureaucracy as Institutions and Governance

The Global Governance Survey (GGS) project[11] includes bureaucracy as one of six arenas of the realm of governance (i.e. civil society, political society, executive, bureaucracy, economic society, and judiciary). GGS defines *bureaucracy* as an arena that refers to "all state organizations engaged in formulating and implementing policy as well as in regulating and delivering services" (Hyden et al. 2003:1).

In spite of the fact that formal institutional reform may take place and that bureaucracy is not isolated from other arenas of governance, the GGS project concludes that bureaucracy has proved to be the hardest arena to reform. Bureaucracy matters because it turns out to be either disabling or enabling conditions for overall disaster risk management performance, and embedded within it is a certain institutional quality.

Publications on disaster and bureaucracy such as Henderson (2004) have stated that pervasive risk is a continuing challenge to the capacity of operation of public bureaucracy for disaster preparedness and response. "Bureaucracy must coordinate and orchestrate many actors very quickly and very effectively to minimize both loss of life and loss of control at disaster sites" (Henderson 2004:106). He further stated that there are more challenges to bureaucracy when a set of ex-ante disaster risk management measures such as mitigation, preparedness, and responses to warning systems are taken into account. Henderson focused on developing countries' bureaucracies, however, he treated bureaucracy as a rather homogeneous and he only deals with the issue of bureaucracy in the post disaster context but his ideas can be developed for "bureaucratic preparedness" and the need for proactive bureaucracy to deal with *ex-ante* disaster risk management interventions such as mitigation.

Takeda & Helms (2006) use Weberian approach to argue that the main feature of bureaucracy is based on clearly defined objectives where in the case of a disaster, it is also designed to facilitate "rational" response in a highly irrational and chaotic set of circumstances." In fact, there are many types of bureaucracies as the Table 3 suggests different forms of bureaucracy. Evers (1987)

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11 Overseas Development Institute noted that "the project was initiated in 1999 by Julius Court when he served as Program Officer at the United Nations University (UNU). Together with Goran Hyden, who was invited to serve as joint coordinator, they developed the World Governance Survey (WGS) project. The pilot phase was carried out from 2000 to 2002. The survey focused on three main questions: How can we best measure governance? How does governance performance differ across time and space? Which are the most critical issues of governance?" Please consult http://www.odi.org.uk/projects/00-07-world-governance-assessment/Index.html (accessed 10 Jan 2010).

suggested that each bureaucracy model is not given but rather designed according to certain assumptions. Therefore, there is actually bureaucratic plurality that needs to be understood, especially in developing country contexts. Evers's (1987) "The Bureaucratization of Southeast Asia" provides some basic features of bureaucracy such as the Parkinson model, which suggests an increase of government personnel as a programmatic approach to increase power and influence rather than the quality of public services; and the Orwellian model, which suggests bureaucracy as a means of power control under management of "suspicion" like a "big-brother" approach, as there is no right to privacy (see Table 3).

Table 3 Bureaucracy plurality in DRR in the developing world context

No	Type of bureaucracy	Core features	Examples (estimates)
1	Weberian	Penetration of rational principles of organization through government administration.	International aid donors including UN bureaucracy
2	Technocracy	Technocracy holds power through its control over data, information, and knowledge. It may be a governmental technical body.	Government technical agencies
3	Parkinson	Growth in number of government personnel	Some local governments in Southeast Asia
4	Orwellian	Tight control bureaucracy with "Big-Brother" approach	Authoritarian states
5	Corporate	Citizens as customers who lack the vision of a rights-based approach	Insurance companies, corporate philanthropies
6	Populist	Informal, closer proximity, open house approach	Local and grassroots NGOs
7	Religions	Informal-formal – hierarchical approach	Buddhist bureaucracy in Thailand, Church bureaucracies, Islamic clerics etc.
8	Hybrid	Mixture of more than one type of bureaucracy	Mixed types of bureaucracy such as 1, 5, and 6 together.

Adapted from Evers (1987)

For a particular type of bureaucracy, such as Parkinson, Orwellian, and Populist, recruitment of bureaucrats is rarely based on merit. In addition, "bureaucrats are seldom to be accountable and the operations of the civil services often lack real transparency" (Hyden 2003:25). In this thesis, the diverse features of bureaucracy that need to be understood by disaster risk reduction managers is recognized, especially in the context of governance, where different kinds of institutional bureaucrats interact to work on responses to disaster risk.

The hypothesis is that, in reality, bureaucrats involved in disaster management as players may play by different rules or simply not follow the rules because of two factors. Amid weak institutions and complex contexts, by chance, there may be few creative bureaucrats exist out there in a particular context of time and place. Therefore, it can be said that creative bureaucracy is often not a by-design product, but rather an accidental fact within a specific context (see for example work by Laube 2009 on the existence of creative bureaucracy concerning irrigation in Ghana). In the context of disaster risk, bureaucracy is defined as a form of mental model and rationality that shapes the structures that comprise a set of regulations put in place to control disaster risk and disaster risk management.

2.3. Theories and Concept of Governance

In the paper entitled *Interdisciplinarity in Governance Research,* Brunnengräber and colleagues (2006) claim that if there were a contest of "Top Ten" terms used in social science at the beginning of the 21st century, "governance" would be the one that is used most. Renate Mayntz argues that governance theory began by "being concerned with the steering actions of political authorities as they deliberately attempt to shape socio-economic structures and processes." However, recently, "governance" has been used in ways that differ from political steering. Firstly, it is used as an alternative mode of governing that is distinct from the hierarchical control model, namely, "a more cooperative mode where state and non-state actors participate in mixed public/private networks." Secondly, it is used to mean different models of coordinating individual actions or basic forms of social order (Mayntz 2003:27).

Mayntz (2003) further claims that modern governance after World War II arose from the growing aspiration of governments to steer their nations towards better defined goals of social and economic development. The first phases of this are as follows: Firstly, in the late 1960s, the trend began with a large boom of theory of planning for (and how to steer) economic development. Secondly, in the 1970s, as the planning euphoria declined, empirical analysis became preferable for policy development; this directed attention to contextual factors influencing policy development, in particular executive government organization. Different policy instruments were discussed, in particular the rule of law. Finally, in the second half of the 1970s, policy implementation became a new research focus. As Mayntz (2003:29) noted, "the first paradigm of

governance concept was thus concerned with policy development and policy implementation and it adopted a top-down or legislators' perspective."

The failures of governments to govern (Mayntz 1993) towards "development as freedom" as advocated by Amartya Sen (1998), and the failure of the World Bank's structural adjustment, which promoted pro-market reform including privatization of many basic social services in the developing world including Africa, led to a reflection that the underlying cause of poor economic outputs/outcomes in the past has been the failure of public institutions. In other words, the failure of state institutions is due to "bad governance", which refers to a "political system where power is highly centralized, government intervention is excessive, corruption is rampant, and civil servants are not skilled enough to meet the demands of the people …. the absence of accountability and transparency in public affairs, lack of clarity in their legal framework related to the roles of private sectors in development" (Forsyth 2006:290). Therefore, in order to change the development machinery in weaker states to produce better development outcomes, "good governance" was called into the fore as the main enabling condition.

Empirical evidence of governing failures could actually be seen globally during the 1970s and 1980s. Mayntz (1993, 2003) gives examples from Germany while Sen (1998) also provides evidence from the 1970s and 1980s of government failures to guarantee peoples' entitlements to food security in Asia and Africa.

Mayntz (1993) asserted that failures of governance are due to failures of government to perform duties (e.g. to ensure economic performance, which can include disaster reduction and protection of human security), such as "the problem of implementation", "the inability to establish rules", "the problem of motivation", "legitimacy of the rules", "the problem of knowledge", and "governability." Therefore, there has been a shift of discourse from "strong state" during the post-World War II era that went through the crisis of the "welfare state" (see Mayntz 1993) towards the emergence of the "cooperative state" and the recent arrival of the "moderating state" (Messner 1998 in Brunnengräber 2006:5). This explains the history of governance concept, which shows institutions and institutional problems, where there were multiple severe problems in both developed and developing/underdeveloped worlds. Governance emerged from the development concept that initially viewed government as the only decision-making power but later added other actors to solve development problems.

The *International Encyclopedia of International Development* (first edition, Forsyth 2006) defines "governance" as an inclusionary means of politics: it is not merely a formal body of government (either elected or un-elected); instead, it refers to a process of decision making and policymaking that "includes bodies more than just 'government' as it is a process that, ideally, implies willing participation within politics by all citizens." It does not mean that government is totally left out but that there are additional relevant actors who are involved in shaping public policy.

Therefore, it can be concluded that the origin of the concept of governance is a concern for both political and economic governance, which then moved towards more sectoral governance, such as environmental governance. Rechkemmer (2006) noted the rising trend of global environmental governance, supported by a comprehensive list of more than 200 multilateral environmental agreements from 1933 to 2005 plus 19 UN resolutions and agreements from 1972 to 2005.

The increased importance of the governance concept within many sectoral studies, such as environmental management science, has brought about calls for greater participation and reliance on local informal institutions (including knowledge), thus creating conditions that are removing emphasis from the dominant technocratic approach and top-down approach (Hilhorst 2004).

The UN Commission on Global Governance's report entitled Our Global Neighborhood defines governance as "the sum of the many ways individuals and institutions, public and private, manage their common affairs. It is a continuing process through which conflicting or diverse interests may be accommodated and co-operative action may be taken. It includes formal institutions and regimes empowered to enforce compliance, as well as informal arrangements that people and institutions either have agreed to or perceive to be in their interest" (The Commission on Global Governance 1995; Chapter 1)[12]. Even though this definition is considered sufficient for this research, this dissertation will also demonstrate the role of the networked governance model in disaster risk reduction.

The network governance (or networked governance) model criticizes the old assumption in structural analysis in social science (including economics and engineering), that development outcomes simply arise from the sum of efforts from agents, namely, individuals and organizations/institutions. When it comes to analysis, governance researchers tend to scrutinize

12 See www.libertymatters.org/chap1.htm [last accessed 1 Sept 2009].

the relations and correlations between variables. Network governance research tries to advocate a new approach based on the fact that agents and institutions exist and co-exist more in the form of networks. This is the main argument, which is based on the emerging form of governance as networks of individuals and organizations/institutions (see Jones et al. 1997, Stoker 2006, and Crawford 2006).

Inside governments themselves, as Goldsmith and Eggers (2004) noted in their famous book "Governing by network: the new shape of the public sector", there are rapidly growing spaces where governments purposefully network with networks of providers (of public goods) to enhance the delivery of public goods to meet their policy goals. The defined networks could involve third-party government, that is, private firms and NGOs, or joined-up government in the form of multiple and multilevel government agencies.

2.3.1. Application of the Concept of Governance to Disaster and Risk Research

Disaster risks are actually driven by a number of unresolved, underlying causes such as vulnerable rural livelihoods, poverty, poor urban governance, lack of good governance, declining ecosystem services, and power inequality, which eventually lead to an uneven distribution of risk both socially and spatially, thereby "increasing the risks faced by the poor and further amplifying poverty" (UNISDR 2009). Efforts to reduce disaster risks often face barriers not only from limited or absent political will from the government, but also from other competing social problems in the priority lists of formal/informal actors and different perceptions on existing risk that lead to different prioritizations.

It is obvious that there is no risk-free society. Every society (i.e. individual, household, village, district, or country) has its own stock of risks. Sources of risks can be either exogenous or endogenous to the society. Exogenous agents are considered indeterminate agents that may bring risk to human beings: natural hazards such as earthquakes, volcanic activities, tsunamis, and cyclones. Hazards that fall into the endogenous agent category include terrorism, war and conflict, chemical agents, biological agents, and technological hazards. A combination of both exogenous and endogenous agents could take the form of composite hazards such as health epidemics or a combination of war and drought that leads to the risk of famine and starvation. In reality, such hazardous agents may co-exist in certain spatial contexts, and the interplay of co-

existing hazardous agents (chemical, biological, natural, etc.) can create serious consequences for livelihood assets and sustainable development.

The United Nations International Strategy for Disaster Reduction (UNISDR) defines *disaster risk management* as a "systematic process of using administrative decisions, organization, operational skills, and capacities to implement policies, strategies, and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters." This definition does not explicitly show the importance of institutions and governance as part of a "systematic process" beyond administrative decision making.

Proponents of risk governance frameworks, such as of the Institute of Risk Governance Council (IRGC) suggest that risk governance includes risk assessment, risk management, and risk communication, which requires understanding of formal and informal institutions, social-economic contexts within which risk is evaluated, and the involvement of actors and stakeholders who represent them in political and policy arenas that range from the local to the global level (Renn and Walker 2008:334, Renn 2008a). The stakeholders and actors range from grassroots communities, to civil society organizations, executive government and legislators, international financial institutions, and United Nations and university-based experts or academics. Renn and Walker (2008) and IGRC's "risk management escalator and stakeholder involvement" defines four classifications of risk problems based on "knowledge characterization", such as simple risk, complexity-induced risk, uncertainty-induced risk, and ambiguity-induced risk. It suggests involvement of actors as follows: Firstly, for simple risk, actors can be instrumental, such as simply agency staff; secondly, complex risk problems require epistemic actors such as external experts and agency staff; thirdly, uncertain risk problems require reflective actors such as external experts, agency staff, and limited stakeholders (industry and directly affected groups); fourthly, ambiguous risk problems require fuller participation, including the aforementioned actors plus the general public (Renn and Walker 2008).

There is a lack of explanation regarding from where these categories - simple, complex, uncertain, or ambiguous - have been derived? These categories (simple, complex, uncertain, or ambiguous) are problematic when applied to natural hazard-driven risks, especially in the context of developing and under-developed countries where "simple" knowledge of natural hazard mitigation, such as seismic knowledge that has been available for decades, has not been put into practice by or for people at risk. The inclusion of the general public and the people at risk in

disaster risk reduction should be seen as creating opportunities to reduce the risks. In reality, especially in developing nations, participation in risk management depends very much on the governance and institutional context. In some particular governance context, institutions tend to exclude actors and decide themselves on which actors should be included.

Rayner (2007:165) suggests that "risk plays a central role in the displacement of governmental responsibility to private sector and NGO actors at the same time as facilitating government control over citizens." He further argues that "control by government is seen to have been supplemented, if not replaced, by a more distributed form of governing usually referred to by the term 'governance'—defined as the management of a system, usually political or organizational, involving mutual adjustment, negotiation, and accommodation between the parties involved rather than direct control."

The first advanced effort is probably from the UNDP Global Report in 2004 entitled "Reducing Disaster Risk: A Challenge For Development", which offers rich and bold understanding of the governance concept for disaster risk reduction. This report views governance as "the exercise of economic, political, and administrative authority to manage a country's affairs at all levels. It comprises the mechanisms, processes, and institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations, and mediate their differences. It brings together the actions of state, non-state, and private sector actors."

In addition, in this report, UNDP (2004) divided disaster risk governance into three categories: Firstly, *economic governance*, which means decision-making processes that affect a country's economic activities and their implications for equity, poverty, and quality of life. Secondly, *political governance*, which is the process of decision making to set legislative processes, formulate laws, regulation, and policies, and which is referred to by HFA as strong institutional basis for implementation. Lastly is *administrative governance*, which is defined as the system of policy implementation that requires the existence of well-functioning government organizations at the national and local levels, and which play roles as enforcers of regulations related to disaster mitigation, building code enforcement, land use planning, environmental risk, and human vulnerability monitoring and safety standards (see UNDP 2004:1975). When it comes to the practical level, the meaning is simply the application of "good governance characteristics" such as participation, rule of law, transparency, responsiveness, consensus orientation, equity, effectiveness, efficiency, accountability, and strategic vision in regard to disaster risk reduction

(UNDP 2004:75). UNDP views good governance as the commitment to sharing decision-making power among the stakeholders in disaster risk reduction, where government remains a critical actor in reducing risk as well as in the broader development context, based on its capacity as a mediator between private and public interests and as well as the people at risk, ranging from the local to the international level.

Good governance is the very heart of development means and outcomes as well as disaster risk reduction means and outcomes. "The failures of urban planning, building regulation, environmental control, and regional development… can all be described as governance failures" |(UNDP 2004: 75-76). The conclusion is that risk reduction at all levels heavily depends on institutional innovation in governance. In order to move towards "good governance" in disaster reduction, UNDP (2004:89) argues that "There is a need for institutional systems and administrative arrangements that link public, private and civil society sectors and build vertical ties between local, district, national and global scale actors." One of the first step towards new institutional system, it argues for the need of legislative reform (i.e. exactly the Hyogo Framework for Action Priority 1st).

This dissertation views "disaster risk governance" as a complement to *disaster risk management* (DRM) frameworks by showing the route of disaster risk management within heterogeneous institutional and governance contexts beyond both ordinary "good governance principles" and conventional disaster risk management models.

As a concept, *disaster risk governance* (hereafter DRG) has not been adequately defined; therefore, this dissertation takes the opportunity to define it. However, before going into further detail to define DRG, the author takes the opportunity to reflect that combining *disaster risk* and *governance* together as a concept is actually a rather new academic exercise. DRG is about being mindful of a multifaceted, multi-level, multi-stakeholder approach and cross-scale dynamics (see Cash et al. 2006). In addition, it strongly calls for consideration of balancing both contextual formal institutions (laws, regulations, policy) and informal institutions (norms, culture, customs) and the inclusion of agencies and actors (local-national-global with consideration of gender, age, and class), as well as different perceptions and types of knowledge of disaster risk reduction.

The embedded meaning of *governance* attached to *disaster risk* is that it acknowledges new alternative forms of policy and regulation that are distinct from traditional hierarchical

government activity and implies an alternative form of governance, which is more inclusive to diverse actors and diverse knowledge. It does not mean that government no longer has a role because, in fact, governments are expected to steer the conditions of inclusive governance. In other words, any form of governance of disaster reduction is subject to government approval. DRG also refers to steering privileges that are no longer the monopoly of (the still relevant) "governmental agencies, but [are] de facto (and in many cases also de jure) the common responsibility of a variety of agencies, representing governmental bodies, market agencies, and civil society organizations" (Arts and Leroy 2006:13) in reducing disaster risk. At operational levels, from the global level to the national level down to the village level, there are a range of actors involved in reducing risk, ranging from state actors (executive and legislative agencies), United Nations agencies, Red Cross, NGOs/INGOs, grassroots organizations, professional associations, and private businesses. This is actually true for both developed and developing/underdeveloped countries. The difference is that the former may create a context for governance by the state actors creating a "steering deficit by design" (see Walls et al. 2005) while the latter (i.e. developing/underdeveloped countries) must deal with *steering deficits* due to lack of capacity in many dimensions (just to mention a few: financial capacity, human resources, weak institutions, lack of information and data).

DRG can be defined as the way society as a whole, regardless of the form of clear cut entities/units such as individual/household/district/country or networked agents/institutions, manages the full array of its disaster risks that may be triggered by geological hazards (such as earthquakes), climate change and hydro-meteorological hazards (such as floods and cyclones), conflict, and war risks. It promotes the notion that there are many overlapping arenas (or centers) of authority for decision making and responsibility for disaster risk reduction. These arenas exist at all scales and levels from individuals, local community groups, to national governments (executive and legislative), and international institutions and organizations. The arenas may emerge as networks. For instance, in developing countries where the vast majority of houses were built by house owners directly with limited or absent building codes, decisions on building earthquake-resistant housing are in the hands of hundreds of millions of house owners.

Risk governance encompasses a broader spectrum of politics, policies, and polity of disaster reduction at different scales and levels from global to local. It recognizes the polycentric nature of disaster risk reduction (sometimes a.k.a. disaster risk management) as there are many

overlapping arenas (or centers) of authority and responsibility for disaster risk reduction. Polycentric governance refers to the nature of decision making on risk management as functioning across many centers and domains and across scales and levels. The evidence of polycentric governance also appears in the context of emergency management today, especially under the concept of cluster approaches[13], as currently promoted by international actors.

Disaster risk governance (shortened to *disaster governance*) is a concept that emerges from political science, policy studies, natural resource management, development studies, and recently from global environmental governance, studies of the human dimension of global environmental change, and earth system sciences. Again, DRM is not dismissed, but in fact is embedded in the *disaster governance* concept. In comparison to DRM, what is actually new in DRG is greater emphasis on the decision-making process regarding disaster reduction policy and regulations with greater acknowledgement of the complexity, conflicts, and interests of actors, multi-dimensionality and interplay of various institutions and actors at multiple levels as well as the polycentric nature of decision making regarding disaster risk reduction. DRG in other words provides the framework within which DRM is to be implemented.

2.3.2. Decentralization and "Decentralized Governance"

Decentralization is one form of governance aspects. Therefore, it is probably not a good idea to talk about governance without linking it to decentralization, sometimes termed as "decentralized governance." The term sounds tricky; nonetheless, it still falls into the definitions provided above regarding being mindful of the inclusion of multiple stakeholders such as local actors (government, communities, local market, NGOs etc.). UNDP uses the term "decentralized governance" to mean "a situation of power sharing between the central and local governments that is based on the principle of subsidiarity and that transcends government to also include the private sector and civil society."

The knowledge of decentralization in use worldwide, especially under the auspices of multilateral organizations such as UNDP, often refers to Robertson Work's (2002)[14] paper entitled *The Role of Participation and Partnership in Decentralized Governance: A Brief Synthesis of Policy Lessons and Recommendations of Nine Country Case Studies on Service Delivery for the Poor*.

[13] Cluster approach is basically sectoral responsibility of actors during humanitarian emergency response.

[14] "Work" is the family name of the author.

This paper has been cited numerous times by many authors. Work (2002) distinguishes four types of decentralization[15], which are reproduced here for clarity:

- Administrative decentralization aims at transferring decision-making authority, resources, and responsibilities for the delivery of a select number of public services from the central government to other lower levels of government, agencies, and field offices of central government line agencies. In day-to-day work of DRR within government, this means that authority to reduce risks has been transferred from central government to local government and from local government to its specialized agencies. This transfer implies two steps:
    - Step 1: Deconcentration, that is, transferring authority and responsibility from one level of the central government to another while maintaining the same hierarchical level of accountability from the local units to the central government ministry or agency that has been decentralized.
    - Step 2: Delegation, that is, the redistribution of authority and responsibility to local units of government or agencies that are not always necessarily branches or local offices of the delegating authority. While some transfer of accountability to the sub-national units to which power is being delegated takes place, the bulk of accountability is still vertical and to the delegating central unit.
- Political decentralization "refers to situations where political power and authority have been decentralized to sub-national levels." The manifestations of this type of decentralization are elected and empowered sub-national forms of government ranging from village councils to municipality/city/district/provincial levels. This implies that local political processes are very important as they may discourage or encourage disaster risk reduction.
- Fiscal decentralization cuts across all forms of decentralization; some level of resource reallocation is made to allow local government to function properly. Decentralizing responsibilities, authority, and accountability without assignment of adequate levels of resources to the decentralized units does not work. This stage is vital in disaster risk reduction as transfer of financial resources may have been earmarked according to central government

[15] See the details at: http://unpan1.un.org/intradoc/groups/public/documents/un/unpan006230.pdf [last accessed 4 Feb 2010].

interest, while local governments, especially those in the developing world, face shortages of financial resources.

- Market decentralization transfers government responsibilities and authority to non-public entities where planning and administrative responsibility or other public functions are transferred from government to voluntary, private, or non-governmental institutions with clear benefits to and involvement of the public. This can be in the form of a disaster risk insurance market.

2.3.3. Scale of Disaster Risk Governance

One example of the global scale of disaster risk governance is the creation of the *Global Platform of Disaster Risk Reduction* under the United Nations International Strategy for Disaster Reduction (UNISDR), which serves to consolidate efforts of disaster reduction at global and national levels. The UNISDR itself can be considered as a form of global disaster risk governance.

The DRR platforms (at national/global level) are formed by a wide range of actors such as state actors (executive and legislative powers), UN agencies, NGOs, Red Cross organizations, universities, and scientific and technical experts. Presumably, at lower levels, local platforms with inclusion of grassroots organizations are seen by many to be vital to make local level risk reduction more robust and make risk reduction a reality.

The illustration of scales is shown in Table 4. There are at least 11 categories of scales, divided into hierarchical and non-hierarchical. There is no specific reason why there are four hierarchical scales at each category. The hierarchical are spatial scales (e.g. from global to patches), temporal (annual to minutes/hours)[16], jurisdictional (from international to local), formal institutions (from constitutions at the macro level to standard operational procedures or SOPs at the micro level), management scales, and scales of networks. Non-hierarchical scales consist of four categories, namely, informal institution time scales (e.g. the cultural norms that last longer than a hundred years or simply long-established practices), level of stakeholder participation (from full

16 The importance of minutes in the time scales is major in the case of tsunami early warning systems because institutions and organizations need to be designed to respond to very limited “lead time”.

participation to no participation), age scale (from senior citizens to children), and knowledge system (from science as global knowledge towards local knowledge).[17]

Table 4 Illustration of Scales of Disaster Risk Governance

Scales	Hierarchical scales ← →				Remarks
Spatial	Global	Regions	Landscapes	Patches	Geography
Temporal	Annual	Seasonal	Daily	Minutes-hours	fast-slow & short-long continuum
Jurisdictional	International	National	Provincial	Local	Administration
Formal Institutions	Constitutions	Laws	Regulation	Standard operational procedures –SOPs	
Management vision	Strategic plan	Program	Project	Tactical plan	Planning
	Non-hierarchical scales				
DRR networks	Trans-networks	State and interstate actors	Non-state actors	Intra community and inter community	Links
Density of DRR networks	Dense and complex	Thick or dense network	Moderate	Thin and sparse	Network architecture
Informal institutions	Norms	Religion	Customs	Established practices	
Stakeholder participation	Full participation	Partial participation	Targeted participation	Top-down approach	Inclusive versus exclusive
Individual actors (age)	Senior citizens	Adults	Youth	Children	Age classification
Individual (gender)	Men/boys	transgender		Women/girls	Gender classification
Knowledge System	Science as global knowledge	Professional knowledge	Local knowledge	Indigenous knowledge	General-specific and universal-contextual 'truth'

Source: adapted from Cash et al. 2006

Institutions clearly have boundaries when arranged along scales such as jurisdictional and temporal, as well as those of bounded actors or stakeholders. Haynes et. al. (2010) argues that what is often called as 'community' in the disaster risk reduction often turned out to be men (indication of gender bias); while boys are viewed as stronger than girls which negate the capacity of girls in risk communication; There is also argument of age classification as often senior citizens and children were left out in the disaster management policy design. These bias in

17 Local knowledge is often misunderstood as indigenous knowledge. It is defined here as locally adopted knowledge that may be derived from either science or indigenous knowledge.

terms of gender, age, at different scales have been actually shaped by institutions (Haynes et. al. 2010:22, See also Goode 1994:700)

However, it is no easy task to place clear boundaries on formal institutions. In accordance with Table 4, governance can be defined as a form of authority exercised through formal and informal institutions at all scales. The inclusion of stakeholders can range from full participation to the most undesired form of governance, which is state-only organizations. Governance also emerges as networks, for example, trans-society networks to kinships and family networks. The earlier understanding as discussed at length in the previous section is that institutions differ from organizations despite their overlapping boundaries. For instance, the World Bank is seen as an institution since its power enables it to create development policy, while at the same time, it is also an organization.

Lastly, the governance of disaster risk reduction may appear in the form of networks that can be classified according to their nature: extra- or intracommunity networks, networks of professional affiliation, state and non-state actors, and transnetworks of actors/community/government. (Nooy, Mrvar, and Batagelj 2005)

2.3.4. Polycentric Nature of Disaster Risk Reduction

The global response to disaster risk in the 21st century can also be seen in the greater integration of global and regional early warning system infrastructures (such as for earthquakes and tsunamis) and the governance of space. There is more evidence that disaster risks are now managed through dense global-local interaction and networks of actors and institutions. Table 5 and Figure 2 indicate the polycentric nature of disaster risk reduction as there are many overlapping arenas (or centers) of authority and responsibility for disaster risk reduction.

Furthermore, this dissertation argues that the footprints of global institutions of DRR can actually be found at local levels. In other words, local level implementation of DRR is not fully separated nor isolated from global processes and interactions. For instance, seismic risk reduction is actually achieved through several processes at global levels, including global networks of earthquake instruments and scientific cooperation. These measures include non-governmental actors' rules of the game such as International Building Codes stipulated by the International

Code Council[18], which were later adopted by national standardization bodies in countries like Indonesia. These processes are often considered incomplete when there is neither local level adoption nor enforcement.

Disaster risk mitigation requires coordination and cross-coordination at the local, national, and global scales (see Table 5). One of the reasons for such coordination or cross-coordination is the fact that the root causes of a global scale of contemporary risk "are often distanced in time and space from its impacts" (Pelling 2003:1). However, there are many governance regimes that have a vested interest in reducing risk at global and local levels.

Table 5 Illustration of Risk Reduction Regimes

Risk Reduction Regimes		Jurisdictional Scales		
		Global	National	Province/local
General and broader risk reduction regime	Broader Disaster Risk Reduction	HFA, IDRL, GFDRR, WCDR	Constitution and set of risk reduction-related laws	Local laws and regulation, SOPs etc.
	Humanitarian Disaster Emergency	Sphere Charter [19], IDRL,	Constitutions and set disaster response laws	
	Climate risk reduction	GEF, Kyoto Protocols, HFA	Constitution, environmental laws, regulation	Local level regulation and enforcement policy
	Market mechanism such as insurance and reinsurance	Global reinsurance industry	General and specific risk cover	Local insurance market
	Market mechanism: ISO 13,000 on Risk Management	ISO 13,000	National Standards for Risk Management adoption.	
Specific hazard risk reduction	Tsunami risk reduction	Global TEWS networks	National DRM agency and National Warning Centers incl. laws and regulations	Local Warning Centers, Local DRM agency, Local SOPs
	Seismic risk reduction	Global Earthquakes networks, International Building codes etc.	National DRM agency, laws and regulations, National building codes,	Local level building regulation, building permits etc.

Climate governance regimes, disaster governance regimes (e.g. the Hyogo Framework for Action and international humanitarian institutions) also work through global-local pathways. Therefore,

18 Please see the ICC site at http://www.iccsafe.org/Pages/default.aspx - last accessed 10 Jan 2010.

[19] A global humanitarian charter, stipulated by a range of international actors, promoting rights to humanitarian aid intervention. Please consult http://www.sphereproject.org/. Accessed on 10 Jan 2010.

coordination in a broader sense should also consider cross-boundaries of regimes of disaster risk reduction. Disaster early warning systems do not work in isolation but work through existing pathways from international to local levels.

2.4. Towards a New Concept of Institutional Vulnerability to Disaster Risk

Institutional vulnerability is not a new term as its earlier usage can be traced back to the early 1950s, as can be seen in Selznick (1951). Selznick defined institutional vulnerability as the condition where institutions such as culture and traditional institutions are prone to social change. The nature of traditional institutions with their support of a top-down approach was too fragile to respond to the social change, such as the start of the mass participation era, which emerged in the 1950s. In other words, changing the form of governance from traditional government towards inclusive governance also creates problems because anarchy may arise and status quo institutions are often too fragile to respond to change.

In its application to disaster research, earlier work such as that of Cannon et al. (2003) claimed that "risk management requires a system of control (institutional structure) and an actuation system (public policies and actions) to implement the changes needed." Even though Cannon et al. (2003:6) are accurate to say that "institutions… determine the distribution of safety and vulnerability in society," they treated institutions as merely organizations responsible for disaster reduction (see for instance p. 13).

Birkmann (2006:33) quoted Cannon et al. as a reference for assuming that institutions are organizations. Despite efforts to partly distinguish organizational and institutional aspects of vulnerabilities, including the acceptance that understanding both organizations and institutions is as important as physical vulnerabilities, Birkmann (2006:35) claimed that "they should be analyzed within the three thematic spheres (economic, social, and environmental)". On one occasion he cites institutional aspects such as "good governance, appropriate early warning, and appropriate legislation" (Birkmann 2006:64). In the view of any institutional analysis as noted in the previous section, all domains of vulnerability such as physical, social, economic, and environmental vulnerabilities as summarized by Birkmann (2006) are indeed outcomes shaped by institutions.

Again, economic vulnerabilities are the outcomes of institutions, which can be asserted on the basis of ample evidence from new institutional economics studies including the well-regarded

work of at least four Nobel laureates, North (in 1993), Simon (in 1978), Ostrom (in 2009)[20], and Williamson (in 2009)[21]. Interesting findings on the roles of institutions on environmental outcomes have been shown consistently by many, such as Ostrom (2005). Physical vulnerability such as vulnerable building structures in developing countries is further shaped by institutions rather than incomes alone, as will be shown later.

Kahn's (2005) empirical work using the comparative method shows that "good institutions" and institutional quality matter, especially in their intrinsic ability to reduce disaster risks. His basic conclusion is that "democracies and nations with higher quality institutions suffer less death from natural disaster" (p. 271). Raschky (2008) pioneered a conceptual exercise, some of the conclusions of which are as follows: higher income alone (as often falsely seen as less economic vulnerability) does not necessarily lead to better protection against natural disasters. This is supported by the fact that substantial infrastructure owned by private actors in recent earthquakes in Haiti and Indonesia simply could not stand against earthquake hazards. Raschky reiterates the numerous facts presented in the empirical works of many who have compared economically advanced countries in the North with stronger institutions and failed and vulnerable states in the South, which have experienced more casualties in recent disasters.

In the disaster research community, Handmer and Dovers' *Handbook of Disaster and Emergency Policies and Institutions* was probably among the first efforts to tackle the issue of institutions and their relation to disaster risk management. They argue that all actors and organizations in disaster reduction policy processes will be enabled or constrained by the institutional system within which they operate (Handmer and Dovers 2007:56). Institutions may play roles as factors that enable or disable learning from experience or managing risk. They further state that institutions can either be "effective or not, constructive or destructive, democratic or autocratic, well informed or ignorant, formal or informal, in fact, they are persistent, predictable arrangements, laws, processes, or customs, serving to structure transactions and relationships in a society. These transactions include political, social, cultural, economic, personal, legal, and administrative matters. …. Institutions allow organized, collective efforts around common concerns and reduce the need for constant negotiation of expectations and behavioral contracts.

[20] http://nobelprize.org/nobel_prizes/economics/laureates/2009/ostrom-lecture-slides.pdf [last accessed 20 April 2010].

[21] http://nobelprize.org/nobel_prizes/economics/laureates/2009/williamson-lecture-slides.pdf [last accessed 20 April 2010]

Although persistent, institutions constantly evolve and adapt" (Handmer and Dovers 2007:145–146).

Boris Porfiriev (2007:372) narrowly views institutional vulnerability as simply associated with crisis communication and organizational coordination (page 372). Hochrainer (2006) talks about the macroeconomics of risk and the context of governments in developing countries. He views institutional vulnerability as the existence and robustness of institutions to deal with natural disasters.[22]

Haanpää and Peltonen (2007) developed a scorecard of institutional vulnerability to climate change in the Baltic Sea region by measuring the following five categories: national capacity to conceptualize and formulate policies, legislation, strategies, and programs; capacity of local actors to implement policies, legislation, strategies, and programs; capacity to engage and build consensus among all stakeholders; capacity to mobilize information and knowledge including individuals; and the capacity to monitor, evaluate, report, and learn; In conclusion, Haanpää and Peltonen (2007) understood institutional vulnerability as the context where there is capacity to create formal institutions related to climate change, enforcement mechanisms or the implementation of policy and regulation, stakeholder participation, and inclusion of actors as well as administrative capacity in regard to climate change mitigation/adaptation.

One of the central arguments of this thesis is that the "DNA code" of all vulnerabilities is laid by institutions; therefore, institutional vulnerabilities are hypothetically the main problem of not only resilience to, but also resistance, coping, and adapting to natural hazards. Institutional vulnerability to disaster risk is defined here as both the context and the process where formal institutions (regulation, rule of law, constitutions, codes, bureaucracy, etc.) and informal institutions (culture, norms, traditions, religion) are either too weak to provide protections against disaster risks or are ignorant of their duty to provide safety and human security. Centered on this argument is the logic that institutions are designed, among others, to reduce risks, which in this particular research field are disaster risks.

22 Mechler (2004) which defined social vulnerability as the ability of a society to cope with the impact of a natural disaster and the susceptibility to damage of physical assets such as houses, dams, roads, and bridges. Economic vulnerability is the financial capacity to endure finance losses caused by a disaster and the ability to return to a previously planned path of activity. This includes private individuals, companies, as well as governments. Mechler cited APDC's Glossary – i.e. Workshop Urban Disaster Mitigation, 23-27 Oct 2000, University of Karlsruhe.

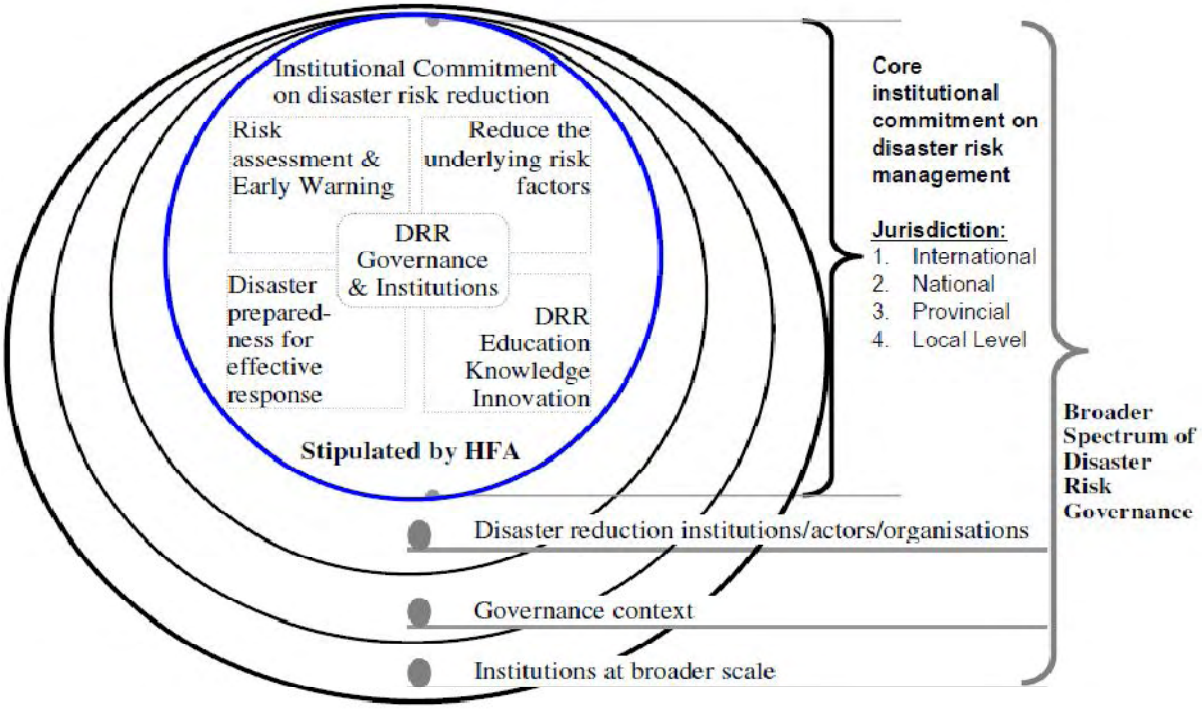
Chapter 3. Research Frameworks and Methods

3.1 Research Frameworks

3.1.1 Introduction to Overall Research Frameworks

In this section, the framework of this PhD research is introduced. Figure 2 presents the disaster risk governance framework. The inner circle of Figure 2 shows the "core institutional commitments on disaster risk management" based on five priorities of the Hyogo Framework for Action (HFA), as elaborated in Table 11. The HFA is a non-legally binding institution that drives each member state to set five core agendas of disaster reduction. At the very heart of the institutional commitment to governance and institutions for disaster risk reduction is the need to "Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation." The next agendas are as follows: to identify, assess, and monitor disaster risks and enhance early warning systems; to use knowledge, innovation, and education to build a culture of safety and resilience at all levels; to reduce the underlying risk factors, and lastly to strengthen disaster preparedness for an effective response at all levels.

Figure 2 Disaster Risk Governance Framework for Macro, Meso and Micro Analysis.



The five macroindicators (a.k.a. priorities) above have been broken down into 22 sub-indicators of progress. Every member state is required to submit a national progress report. The Hyogo Framework for Action (HFA) for disaster risk reduction—stipulated by the World Conference of Disaster Reduction in 2005 in Kobe—has served as a non-legally binding international institution and the worldwide framework signed by 168 member states that will continue to shape global and local policies and efforts in reducing disaster risk towards 2015.

The framework explicitly envisions the member states integrating climate change adaptation and mitigation into their disaster risk reduction activities. It brings together institutions and organizations from the humanitarian aid community, disaster risk reduction community, and climate change adaptation community, as well as many more. Furthermore, there are emerging indications of cross-fertilization of global institutions concerned with disaster risk reduction, humanitarian crises, and climate risk from market-based groups such as the insurance industry, global humanitarian groups, non-governmental organizations, member states, and the United Nations. Figure 3 (left) shows how conventional risk management has now expanded to cover a much broader spectrum of perspective that is needed to solve the increased risks globally.

Figure 3 Old Disaster Risk Management vs. HFA Disaster Risk Governance Spider

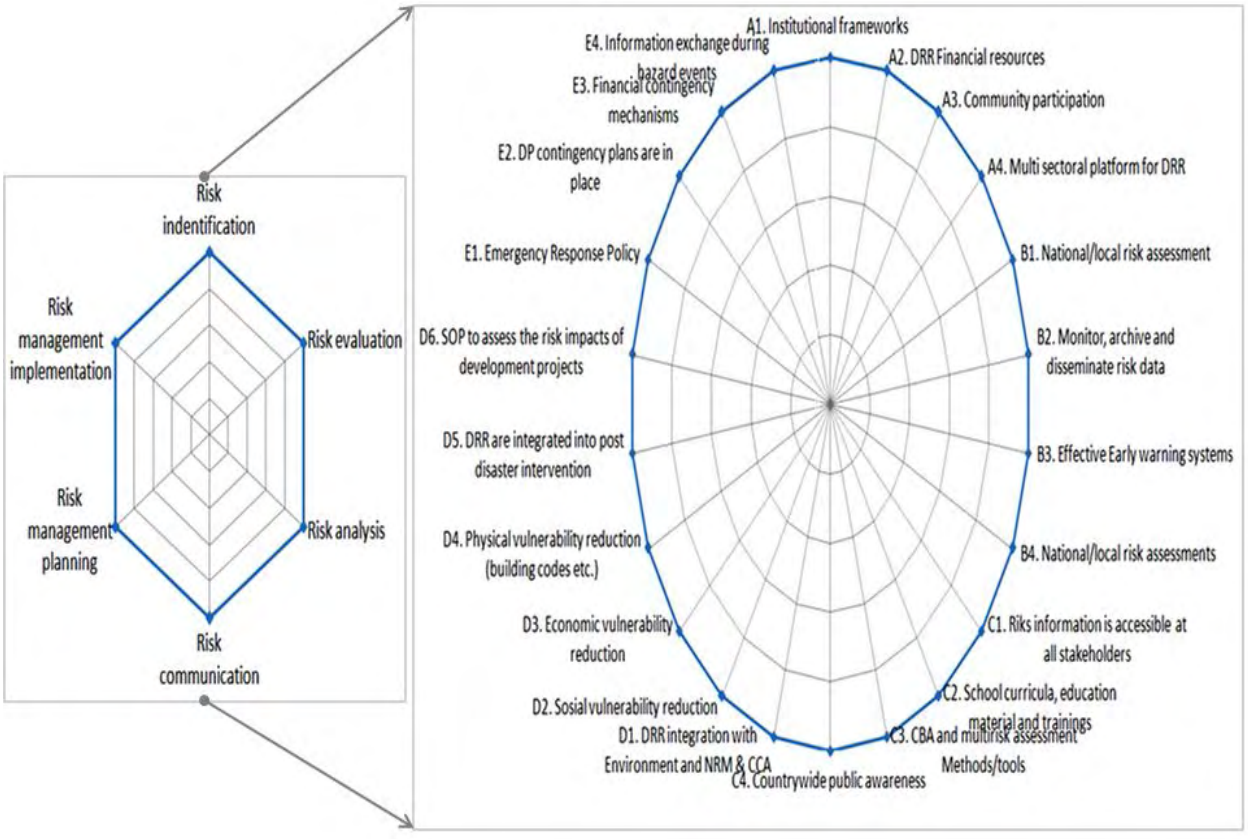


Table 6 and Figure 3 show the agenda of disaster risk reduction during the International Decade for Natural Disaster Reduction (IDNRD) 1990–1999, which provided nine focus issues for disaster reduction. The IDNDR was considered a success in its pioneering roles at the international level to facilitate the setting up of 130 national level disaster management committees/focal points (van Niekerk 2005). It is an empirical fact that IDNDR itself emerged as a soft institution that encouraged countries to move to reduce their disaster risks. The follow-up by the Yokohama Strategy for a Safer World in 1994 brought 17 issues to the list,[23] and today's 22 indicators for DRR under the auspices of the Hyogo Framework for Action (HFA) 2005–2015 signal the need for new institutional arrangements including attempts at institutional change (a.k.a. reforms) to be able to reduce overall disaster risk.

Table 6 Disaster Risk Reduction Agenda under Different Regimes

IDNDR 1990-1999*	Yokohama Strategy 2000*
1. Mitigation capacity of each country 2. Assessment of disaster damage potential esp. in developing countries 3. Establishment of EWS 4. Establishment of disaster-resilient structures when and where needed. 5. Development of appropriate guidelines and strategies for applying existing scientific and technical knowledge 6. Foster scientific and engineering endeavors aimed at closing critical gaps in knowledge 7. Disseminate technological information related to measures for assessment, prediction, and mitigation 8. Technical assistance and mitigation technology transfer 9. Education and training tailored to specific disasters and locations	1. Political commitment through legislation and policymaking implementation 2. Mobilization of domestic resources 3. Enforcement of rules, standards, etc. 4. Strengthen the institutional capacities 5. NGO participation at the local level 6. Risk assessment program 7. Endeavor to document all disasters 8. Cost-effective DR technologies incl. EWS 9. Knowledge transfers and training 10. Educational and information programs 11. Application of traditional knowledge, practices, and values of local communities for disaster reduction 12. Countrywide public awareness 13. DRR integration into socioeconomic development planning 14. Incorporating development plans and conducting Environmental Impact Assessments with a view to disaster reduction 15. National disaster management plans with emphasis on disaster reduction 16. Stimulate genuine community involvement and empowerment of women and other socially disadvantaged groups 17. Emergency plans focusing efforts on disaster preparedness & response

*Modified from formal documents on Yokohama Strategy 1994 and IDNDR 1990–1999

23 Please consult http://www.unisdr.org/eng/about_isdr/bd-yokohama-strat-eng.htm [last accessed on 22 Sept 2009].

The outer circle of Figure 3 reflects the broader spectrum of Disaster Risk Governance such as the governance context and the quality of the institutions of a nation. Operational arena means the actual or real world context where disaster risk reduction agendas are being implemented.

3.1.2 Disaster Risk Governance Indicators at National Scale

In this dissertation, a new framework to analyze disaster risk governance at the national level (country by country) as well as at the community level is introduced. At the national level, the DRG indicators are developed on the basis of the institutional commitment of each individual country in implementing the Hyogo Framework for Action. In short, there are 22 individual indicators as shown in Figure 3 and Table 11 (in Chapter 4). The 22 individual indicators are broken down into five aggregate indicators. In this case, HFA Progress Indicators will serve for direct measurement of institutional vulnerability and quality of DRG at the national level.

In addition, a global dataset from the Worldwide Governance Indicators (WGI) project developed by the World Bank will also be used. The WGI data serves as the information of local context based on six factors such as regulatory quality, government effectiveness (including bureaucracy), political stability, corruption control, rule of law and participation and media freedom. It is almost impossible to manage disaster risk if the government is not effective in carrying out public administration, where regulatory quality is poor, where corruption control measures are absent, and where the rule of law and participation are discouraged. It is obvious that disaster reduction is impossible in the context where internal conflict and civil war are taking place and there is a lack of political stability. WGI views governance as "consist[ing] of the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored, and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them."

3.1.3 Country Level Institutional Vulnerability Assessment

Hochrainer (2006) claims that institutional vulnerability refers to the existence and robustness of institutions to deal with natural disasters but maintains that it is difficult to quantify. In contrast, in this dissertation, both quantitative methods as well as qualitative methods will be used to measure institutional vulnerability to "natural" disasters at different scales.

Institutional vulnerability to disaster risk is defined as the context where formal institutions (regulation, rule of laws, constitutions, codes, etc.) and informal institutions (culture, norms, traditions, religious values[24]) are either too weak to provide protection against disaster risks or ignorant of the necessity of their duty to guarantee human security. Furthermore, as a matter of term, institutional vulnerability may be associated with terms such as weak institutions, lack of good governance, poor institutional quality, and bad governance.

For global scale analysis, institutional vulnerability framework is developed on the basis of both the HFA Progress Indicators and the World Wide Governance Indicators. In addition, governance/institutional aspects such as bureaucracy as suggested by The Global Governance Survey (GGS) project above will also be taken into account (Table 7).

Table 7 Institutional Vulnerability Assessment at different scales

Chapter No	Scale	DRG Indicators	Remarks
Chapter 4, 5	Global	Institutional commitments on DRR based on HFA indicator of progress	Quantitative approach
Chapter 5	Global	Compare institutional commitments on DRR based on HFA indicator of progress and World Governance indicators	Quantitative approach
Chapter 6	National (Indonesia)	Disaster risk management policy and practice	Qualitative and quantitative indicators
Chapter 7	National and Local (Indonesia)	DRR planning, policy and practice	Qualitative and quantitative approach
		Governance volatility	

Since institutional vulnerability especially at the country level will be measured using an index approach or a quantitative approach, informal institutions such as norms/customs/values are considered embedded in the indicators. For instance, when "government effectiveness" is ranked in a range 1-10, it does not tell which kind of norms or culture is being in operation but it gives level of quality of bureaucratic services from 'perfect' at 10 scale to the absence of effectiveness (closer to 0). Assessment at national and local scale (from the context of Indonesia) will be also done using both qualitative and quantitative approach.

[24] The context of state religion such as Vatican is considered here as a formal institution.

3.2 Research Methods

The selected methods are based on the scales and the levels of research. Institutional Vulnerability Assessment (Chapters 4 and 5) will use quantitative analysis. Chapter 6 will be based on mixed methods, namely, combining a set of multiple methods such as quantitative methods (including network analysis), desk research using secondary data, as well as ethnographic research (including e-ethnographic research such as participants observation through mailinglist of disaster management professionals in Indonesia), and documents of participatory risk assessment from villages. Chapter 4 will combine qualitative and quantitative secondary data from the progress reports of 63 countries from the HFA 2009. Chapter 5 will compare the dataset of 2007/2008 from World Governance Indicators with the HFA Indicators described in Chapter 4. For the case study approach (Chapters 6, 7), ethnography and participant observation (unstructured interviews, policy documents, minutes of meetings, observation in national and international conferences/workshops) as well as progress reports are used.

Table 8 Utilized Research Methodology

Methodological Approach/Tools		Scale of data collection			Remarks
		Global	National	Local	
Quantitative methods	Global dataset from Global Governance Indicators and other additional datasets	X 63 countries			Chapter 5
	Country reports on progress of HFA implementation	X 63 countries			Chapter 4
Case Study Approach: Indonesia	Unstructured interviews (DRR stakeholders)		X	X	Chapters 6 & 7
	Disaster reduction policy documents and reports		X		Chapters 6 & 7
	Multi-stakeholder workshops	X	X	X	Chapter 6
	Participant observations (on the ground as well as four selected major mailing lists of disaster management community in Indonesia)		X		Chapters 6 & 7
	Social network analysis using Pajek software-derived formal reports and DM-related laws and regulations.		X		Chapters 6 & 7
	Disaster risk assessment documents (national and local).		X	X	Chapters 6 & 7
	Focus group discussions in four pre-selected districts			X	Chapters 6 & 7

The motivation behind using mixed methods (Table 8) is the assumption that a mixed method is superior to a single method. It allows the author to utilize some data collection in answering the same research questions, which is in itself an effort to validate the findings. The other benefit is that the study can evaluate multiple spheres and polycentric governance of disaster risks. Mixed methods can help to improve the quality of the research in three ways: firstly, they make use of triangulation, which refers to 'the use of quantitative research to corroborate qualitative research findings or vice versa'. Secondly, they involve facilitation that 'arises when one research strategy is employed in order to aid research using another research strategy'. Lastly, it offers complementarities when 'two research strategies are employed in order that different aspects of an investigation can be dovetailed' (for more explanation related to multiple strategy research, see Alan Briman 2004:455).

3.2.1 Quantitative Methods

3.2.1.1 Descriptive Statistical Analysis

According to the standard statistical textbooks, **descriptive statistics** basically analyze the *mean* and *confidence interval*. The mean measures the "central tendency" of the selected variable, reported along with its confidence intervals. [25]

3.2.1.2 Correlation Tests and Multiple Regression

Correlation tests measure "the strength of a certain type of relationship between two measurement variables" while regression gives "a numerical method for trying to predict one measurement variable from another" (Utts 2005). A simple regression measures one dependent variable with one independent variable, whereas multiple regression measures one dependent variable with many (more than two) independent variables.

3.2.1.3 Social Network Analysis

It is assumed that Social Network Analysis (SNA) can be used to demonstrate the network of disaster risk governance at any level of governance. It is argued that SNA provides a new thinking that institutions (including DRR institutions) do exist in a network rather than the sum of laws/regulations/codes therefore the structure of DRR regulatory network should be seen as a proxy of institutional quality and vulnerability. In Chapter 6 and 7, the network analysis is used

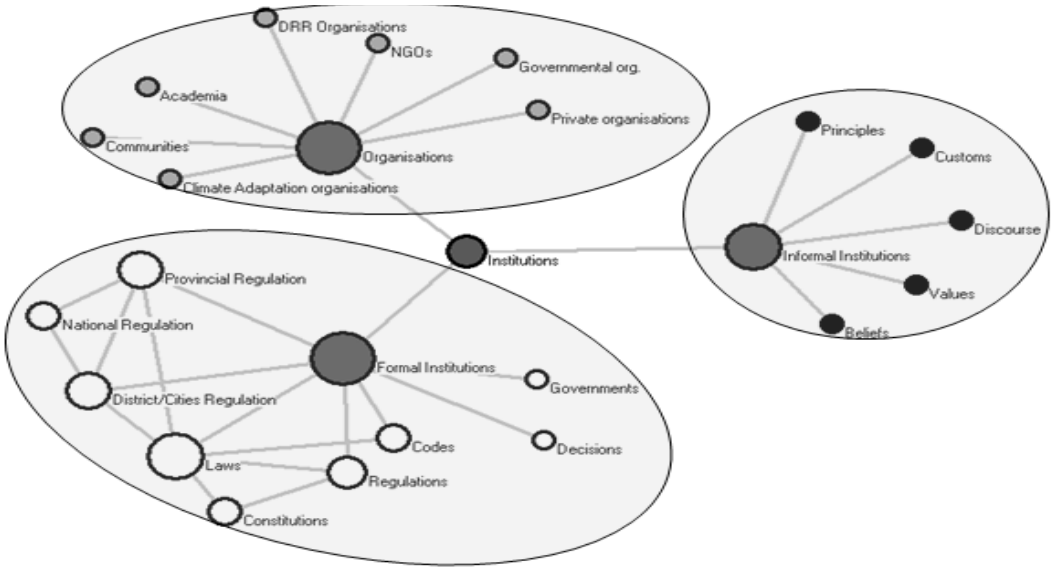
[25] http://www.statsoft.com/textbook/basic-statistics/#Descriptive%20statistics [Last accessed 10 Feb 2010].

to demonstrate the idea of polycentric nature governance of DRR, DRR regulatory quality, and also the discourse behind the DRR reform with a case studies from Indonesia.

Mark Granovetter (in Nooy, Mrvar, and Batagelj 2005). argues that network analysis presents a better explanation of social behavior "by reference to relations among such concrete entities as persons and organizations". SNA assumes a society is by no means merely a sum of individuals – instead society actually comprises of networks of individuals, organizations, and institutions. Nooy, Mrvar, and Batagelj (2005) stated that SNA focuses on ties among people, groups of people, organizations, and countries. Together, these ties form networks. Hence, SNA detects and interprets patterns of social ties among actors (Nooy, Mrvar, and Batagelj 2005:5).

The network is also known as a *graph* (see Figure 4). "A *graph* is a set of vertices and a set of lines between pairs of vertices. A *graph* represents the structure of a network; all it needs for this is a set of vertices (which are also called points or nodes) and a set of lines where each line connects two vertices." A *vertex* (singular of vertices a.k.a. a *node*) is the smallest unit in a network and can represent either an agent (e.g., an organization, an adult female/male, an object) or, as this dissertation argues, an institution (e.g. a policy, a regulation, or a specific law). Furthermore, a node/vertex can be identified by a number or a label. A line connects two nodes in a network, which can represent any relational quality. "A *line* is defined by its two endpoints, which are the two vertices that are incident with the line" [Nooy, Mrvar, and Batagelj 2005:6].

Figure 4 Example of Social Network Graph of "Institutions" – Degree Centrality Test



Chapters 6 and 7 focus only on the three types of *centrality* analysis, namely, ***degree centrality, betweenness centrality***, and ***closeness centrality*** analyses. *Centrality* analysis refers to positions of individual vertices (or nodes) within a network. For instance, each individual node in Figure 4 represents a key word related to institutions. *Degree centrality* is the easiest to measure as it is the number of vertices adjacent to a given vertex– or number of ties connected to a given node or "the number of nodes that the focal node is connected to" (Opsahl, Agneessens, and Skvoretz 2010). Equation [1] is the mathematical explanation of *degree centrality*:

$$C_D\,(Si) = \sum_j^N Sij/\,N \qquad [1]$$

Here, i is the focal vertex (node), j represents all ties (or links), and N is the total number of nodes in the given network. From Figure 4, it is obvious that the *degree* of "Informal Institutions" is 5, calculated from the number of ties. Since N (number of nodes) is 25, *degree centrality* is 5/25 or 0.20.

To determine the institutional leader(s) in a network (to represent the lead institution/organization or individual leader of a unit of community or institutions), one can identify the highest value of ***betweenness centrality.*** Arbesman and Christakis (2010:6) rewrite the equation as follows:

$$C_B\,(Si) = \sum_j^N \left(\frac{Pi(kj)}{P(kj)}\right)/(N-1)N-2)/2 \qquad [2]$$

Pi(kj) is the number of geodesics (a.k.a. the shortest path) between k and j that i lies on and *P(kj)* is the total number of geodesics between *k* and *j* (Arbesman and Christakis 2010). For instance, from Figure 4, "institutions" is intuitively the center of the network. The reason for saying this is that the centrality of "DRR institutions" depends on the extent to which it is needed as a tie that facilitates the spread of power within the network. Nooy, Mrvar, and Batagelj argue that the more a node is a go-between, the more central its position in the network. If it were an actor in the geodesics of Figure 4, it can mean that the more a node possesses dense relational ties between other nodes (agents/actors and or institutions) the more important the node is to the flow of any resources in the network. The ***betweenness centrality*** has a value between 0 and 1. The higher the value the higher the centrality of the node in the network, which is an indication of leadership. From the Figure 4 analysis, after running Pajek, *Institutions* are ranked as the most important (0.681), with *Organizations* coming second (0.507). The lowest value is 0; therefore, the highest value is 0.681, indicating that *Institutions* are the "leader" in the network.

The equation for ***closeness centrality*** is as follows:

$$C_C(Si) = (N-1) / \sum_j^N I(i,j) \qquad [3]$$

In terms of ***closeness centrality*** of the network above, after running the Pajek software (with total nodes N=24), *Institutions* receive the highest score (0.511), *Formal institutions* are the second highest (0.451). (The lowest value is 0.258 and the highest value is 0.511; Figure 4 reflects the closeness centrality values – the size of the nodes is proportional to the real value of closeness centrality.) Insights from Figure 6.4 are that *Organizations* and *Informal* and *Formal Institutions* are important nodes. *Provincial regulations* seem to have roles as a connector of national regulations, laws, and district regulations, among others.

3.2.2 Research Scales and Locations

The global dataset is derived from the reports from 63 countries regarding the implementation progress of the Hyogo Framework for Action in 2009. The selected countries are basically representatives from throughout the continents of Africa, Asia and the Pacific, Europe, and North and Latin America. The work was carried out with a base at the United Nations University Institute for Environment and Human Security, Bonn, Germany, in June-December, 2009.

3.2.2.1 Geography of Data Collection

Table 9 below gives the geographical mobility of the research process. The base station was in Bonn, where desk research was carried out in March-December, 2009. The visited areas were the places where participant observations were carried out during 2008/2009 (See the Map in Annex 6).

Table 9 Geography of data collection process

Country	Regency/City	Agenda	Duration	Remarks
Global	Bonn, Germany	Global dataset on disaster risk governance	Jan-Dec 2009	Desk research
Switzerland	Geneva	2nd Global Platform for Disaster Reduction June 2009 – participant observation	June 2009	Participant observation
Indonesia	Denpasar, Bali	Asian Disaster Reduction Conference Nov. 2008 – participant observation	Dec 2008	Participant observation
		1. CBDRM Conference 2008 2. National Workshop on Risk Assessment February 2009	August 2008 Feb 2009	Participant observation

Indonesia	10 Cities	Field data collection in 10 cities (Banda Aceh, Jakarta, Bandung, Yogyakarta, Kupang, Sikka, Ende, Rembang, Padang, Garut) – participant observation, FGDs, unstructured interviews, five conference presentations and document collection)	June – Dec 2008; Feb 2009 and March 2010.	Participant observation

3.3 Case Study Approach

The global scale analysis has been made possible by the availability of global scale reporting on DRR progress of implementation; This later encouraged the author to develop the methodology for institutional vulnerability analysis at the global scale. However, this needs to be complemented with meso and micro scale assessment for a specific country. Since the author has been part of the German-Indonesia Tsunami Early Warning System (GITEWS') research group at the United Nations University Environment and Human Security, who is responsible for researching the institutional dimension of disaster risk reduction, Indonesia has been pre-selected since the beginning of the research.

3.3.1 Ethnographic Research and Participant Observation

In terms of research method, ethnography is synonymous with participant observation. According to Hammersley and Atkinson (2007), ethnography usually involves the "researcher participating, overtly and covertly, in people's daily lives for an extended period of time, watching what happens, listening to what is said, and/or asking questions through informal and formal interviews, collecting documents and artifacts—in fact gathering whatever data are available to throw light on the issues that are the emerging focus of inquiry" (p. 3). This could be characterized both qualitatively and quantitatively (Schensul 1999).

Ethnographic experts often suggest that access to communities (e.g. of certain spatial localities, professional communities, e.g., DRR communities and communities at risk) is the key to success in ethnographic research (Briman 2004 and Hammersley & Atkinson 2007). This research benefited much from the author's existing links and networks in Indonesia, such as the Indonesian Disaster Management Society and DRR-related civil society organizations, which were advantageous, especially during data collection.

Table 10 Classification of Ethnographic Research

	Involvement ⟷ Detachment

Gold's classification	Complete participant	Participant-as-observer	Observer-as-participant	Complete observer
Gans' classification	Total participant	Participant-Observer		Total observer

Source: Adapted from Briman 2004

Table 10 above explains the flexible options for researchers to clarify their level of involvement in the field. Gold's classification of the "involvement-detachment" continuum indicates that a researcher can act as a complete participant, either participant-as-observer or observer-as-participant, or even exhibit full detachment as a complete observer. Gans' classification is simpler as it suggests only three options, total participant, participant-observer, or total observer. This research falls into the participant-observer (either observer-as-participant or participant-as-observer) category.

3.3.2 Unstructured Interviews

One feature of ethnography is informal and unstructured interviews. The author carried out several unstructured interviews with individuals engaged at the national and local levels. Interviews are considered important and strategic in fieldwork because they provide the opportunity for the researcher to ask questions not explicitly related to the research design. In addition, considering that the author was personally involved in the advocacy group and has written many articles on DRR policy in Indonesia (of which some were critical of some of the stakeholders) for national and local newspapers, the author viewed unstructured interviews as the best option for open access to many stakeholders. Therefore, in anticipating resistance during interviews, unstructured interviews (and at the same time informal interviews and in most cases informal chats) were carried out during breaks and spare time with the consent of the interviewees.

3.3.3 Policy Documents as Sources of Data

It is common and widely accepted by social science researchers that documents are sources of data for many different types of analysis (e.g., discourse analysis, content analysis [Briman 2004], or policy change analysis [Marston 2004]). The documents can be personal documents, official documents from government and/or non-governmental organizations, private organizations, mass media, and the internet (Briman 2004), and can be in the form of manuals

and guidelines. What are defined as “documents as sources of data” are the materials that can be read, have not been produced specifically for the purpose of social research, and are preserved so that they become available and are relevant to the concerns of the social researcher (Briman 2004:381).

3.3.4 Multi-Stakeholder Workshops/Conferences

Owing to the increased investment in DRR activities by international actors (e.g. INGOs and United Nations agencies), the author had some opportunities to participate in national/international and local workshops. I attended at least four district/provincial workshops, six national workshops, and two international conferences (i.e. Asian Disaster Reduction Conference in Bali in November, 2008, and 2nd Global Platform for DRR in Geneva, June, 2009), in which agents active on the Indonesian national level were involved, thus facilitating the performance of ethnographic research at the same time. In all six national workshops/conferences, the author was officially invited as a guest speaker and had the privilege of documenting and accessing the minutes and proceedings (including editing one set of proceedings as a means to collect data).

3.4 Software for Data Analysis

Three sets of software for quantitative approaches are used. The statistical softwares are the Excel Spreadsheet Statistical Function and SPSS 18th). The software helps in the research process by enabling analysis of the index of institutional vulnerability based on both the available global dataset and the newly developed global dataset on subjective measurements of institutional implementation of disaster reduction.

Secondly, the software named Pajek is used (available at http://vlado.fmf.uni-lj.si/pub/networks/pajek/). This is known as the best open-source program for Large Network Analysis by its users among members of International Network for Social Network Analysis (ISNA). This software helps the mapping of actors and institutions involved in disaster risk reduction at the national level in Indonesia (Chapters 6 and 7).

For qualitative data processing on institutions and governance of disaster reduction in Indonesia, Atlas-ti Version 6 is used as the main software for qualitative analysis because it is very useful for ethnographic research compared with other software.

Chapter 4. Introduction to Institutional Vulnerability Assessment

4.1. Introduction to Overall Framework

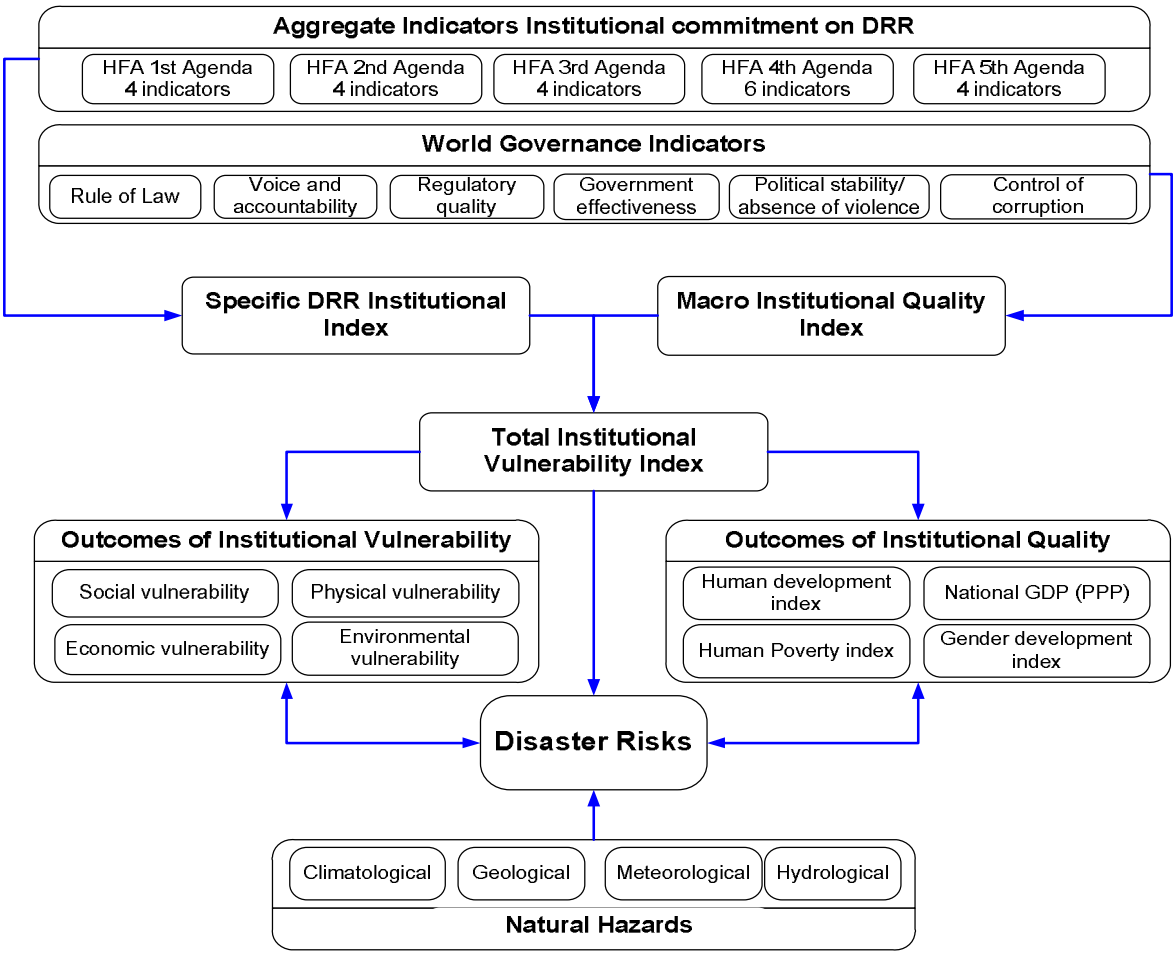
Since no existing framework is available to assess institutional vulnerability to disaster risks at the global scale, this work aims to pioneer a method for this. Chapters 4 and 5 introduce Institutional Vulnerability Assessment (IVA) framework. The IVA Framework suggests that institutional vulnerability to disaster risks depends on two factors: First, institutions either fail or succeed to reduce disaster risks in systematic ways. This approach measures institutional commitment to progress in DRR policy design and implementation according to the five HFA priorities (22 indicators in Table 11). Figure 5 suggests that the aggregate of the HFA priorities are the "specific DRR institutional index". This will be thoroughly discussed in Chapter 4. This has become possible thanks to the availability of global data that was recently produced in 2008-2009.

Secondly, "macro-institutional quality" (Figure 5) data is derived from World Governance Indicators. The indicators have been annually updated during the last ten years, are used to measure the influence of "the governance templates" or "the enabling/disabling environment" where DRR policy and specific DRR governing exercises are taking place. This is based on the assumption that disaster risk management institutions are not isolated from the context of governance and general institutional quality, and hypothetically, DRR institutions are processed and shaped by the governance context, in which together they form "total institutional vulnerability" to disaster risks. However, it is true that institutions and governance also form the capacities and capabilities to deal with disaster risks. In order to support this hypothesis, Chapter 5 will present the results of statistical analysis on institutional and governance quality. The used dataset only covers 63 selected countries, namely, those countries that voluntarily sent their standardized progress report to the UNISDR in 2009.

Total institutional vulnerability consist of two factors: the *specific DRR institutional* based on the HFA concept and the *macro institutional quality* context. The framework (Figure 5) is further used to explain that **disaster risk** is a function of four key factors: First *institutional vulnerability* context that lead to the second: the multi-dimensional vulnerability (e.g. physical, social, economic, and environmental) And the third: "Outcomes of institutional quality" (i.e. development outcomes that are often measured by a series of development indicators such as the

human development and human poverty, income per-capita level, and so on); The fourth factor is the natural hazards components (climatological, hydrological, meteorological, and geological). IVA framework (Figure 5) also suggests that there are reciprocal relationships between disaster risks and the institutional quality outcomes (such as national GDP, human development, gender development index etc) and the social, economic, physical vulnerability at the other hand.

Figure 5 Institutional Vulnerability Assessment Framework



In this dissertation, the debates regarding the difference between institutional capacity and institutional resilience are not addressed, but instead a simplistic view is taken that both are the opposite of institutional vulnerability and could mitigate the consequences thereof.

4.2. Data and Analytical Methods

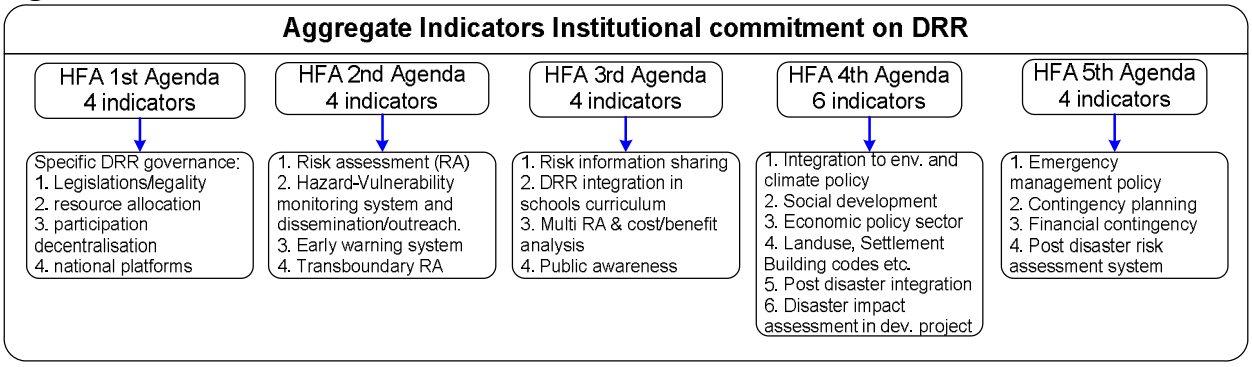
The remainder of Chapter 4 starting from this section demonstrates the institutional vulnerability assessment at the country level, mainly by using countries' self-assessment for the Hyogo

Framework for Action (HFA) implementation update. The Hyogo Framework for Action suggests five large nexuses related to specific institutional commitments for DRR, as seen in Table 11.

The dataset on institutional commitment to implement comprehensive disaster risk reduction at the country level is taken from self-assessment reports from 63 countries on HFA progress of implementation 2008-2009 available at www.preventionweb.net/english/hyogo/progress/reports/. At the end of the Chapter 4 (Section 4.3.4. page 65), Disaster risk index from the UNDP (2004) is used to demonstrate the correlation between disaster risk index with building codes using proxy from HFA Priority 4, Indicator 4th.

The data scoring for HFA progress of implementation is on a scale from 1-5 as per the original. A score of 5 reflects that there has already been comprehensive institutional achievement, with the commitment and capacities to sustain efforts at all levels. Level 4 reflects substantial achievement, but with some recognized deficiencies in commitment, financial resources, or operational capacities. Level 3 denotes some institutional commitment and capacities to achieving DRR but progress is not substantial. Level 2 reflects that achievements have been made but are relatively small or incomplete, and while improvements are planned, the commitment and capacities are limited. Lastly, Level 1 indicates that achievements are minor and that there are few signs of planning or forward action to improve the situation.

Figure 6 HFA Breakdown of Institutional Commitments on DRR



Based on HFA Progress Indicators.

Table 11 provides the key features of the institutional efforts to implement disaster risk reduction. It is clearly a survey format, in which every responsible actor in each country was asked to judge the indicators. In some countries, the practice of filling in the form (scale of 1-5) has been carried

out on a consensus basis and, for each indicator, the responders were asked to provide evidence that corresponds to the level of reported achievement.

Table 11 Institutional Commitment for HFA Implementation

HFA Priorities	Self-evaluation Indicators	Scale 1-5
1: Ensure DRR is a national and a local priority with a strong institutional basis for implementation	i. National institutional and legal frameworks for disaster risk reduction exist with decentralized responsibilities and capacities at all levels.	1, 2, 3, 4, 5
	ii. Dedicated and adequate resources are available to implement disaster risk reduction plans at all administrative levels.	1, 2, 3, 4, 5
	iii. Community participation and decentralization is ensured through the delegation of authority and resources to local levels.	1, 2, 3, 4, 5
	iv. A national multi-sectoral platform for disaster risk reduction is functioning.	1, 2, 3, 4, 5
2: Identify, assess, and monitor disaster risks and enhance early warning.	i. National and local risk assessments based on hazard data and vulnerability information are available and include risk assessments for key sectors.	1, 2, 3, 4, 5
	ii. Systems are in place to monitor, archive, and disseminate data on key hazards and vulnerabilities.	1, 2, 3, 4, 5
	iii. Early warning systems are in place for all major hazards, with outreach to communities.	1, 2, 3, 4, 5
	iv. National and local risk assessments take account of regional/trans-boundary risks, with a view to regional cooperation on risk reduction.	1, 2, 3, 4, 5
3: Use knowledge, innovation, and education to build a culture of safety and resilience at all levels.	i. Relevant information on disasters is available and accessible at all levels, to all stakeholders (through networks, development of information sharing systems).	1, 2, 3, 4, 5
	ii. School curricula, education material, and relevant training include risk reduction and recovery concepts and practices.	1, 2, 3, 4, 5
	iii. Research methods and tools for multi-risk assessments and cost benefit analysis are developed and strengthened.	1, 2, 3, 4, 5
	iv. Countrywide public awareness strategy exists to stimulate a culture of disaster resilience, with outreach to urban and rural communities.	1, 2, 3, 4, 5
4: Reduce the underlying risk factors	i. Disaster risk reduction is an integral objective of environment-related policies and plans, including for land use, natural resource management, and climate change adaptation.	1, 2, 3, 4, 5
	ii. Social development policies and plans are being implemented to reduce the vulnerability of populations most at risk.	1, 2, 3, 4, 5
	iii. Economic and productive sectoral policies and plans have been implemented to reduce the vulnerability of economic activities.	1, 2, 3, 4, 5
	iv. Planning and management of human settlements incorporate disaster risk reduction elements, including enforcement of building codes.	1, 2, 3, 4, 5
	v. Disaster risk reduction measures are integrated into post-disaster recovery and rehabilitation processes.	1, 2, 3, 4, 5
	vi. Procedures are in place to assess disaster risk impacts of all major development projects, especially infrastructure.	1, 2, 3, 4, 5
5: Strengthen disaster preparedness for effective response at all levels.	i. Strong policy, technical, and institutional capacities and mechanisms for disaster management, with a disaster risk reduction perspective, are in place.	1, 2, 3, 4, 5
	ii. Disaster preparedness plans and contingency plans are in place at all administrative levels, and regular training drills and rehearsals are held to test and develop disaster response programs.	1, 2, 3, 4, 5
	iii. Financial reserves and contingency mechanisms are in place to enable effective response and recovery when required.	1, 2, 3, 4, 5
	iv. Procedures are in place to exchange relevant information during disasters and to undertake post-event reviews.	1, 2, 3, 4, 5

Source: HFA Progress Indicators

4.3. Results of Statistical Analysis

HFA Progress Indicators are the variables to be analyzed, using statistical software SPSS 18. The main statistical techniques are descriptive statistical analysis, correlation tests, and simple regression analysis. In total, there are 22 indicators as variables (Table 11 and Figure 6), with 63 cases (countries). All HFA priorities are to be read as perceived progress (or self-assessment) of the countries according to the authorized national agencies/responders. The analysis could clearly be undertaken and in principle the scope of the study is a global survey on DRR progress as reported voluntarily by relevant national authorities.

Table 12 Basic Descriptive Statistics Global HFA 1-5

HFA Priorities	N	Min	Max	Mean	SD
DRR governance and institutions (HFA 1)	63	2.00	4.75	3.35	.689
Risk assessment, information, and EWS (HFA 2)	63	1.50	5.00	3.18	.807
DRR knowledge and education (HFA 3)	63	1.25	5.00	3.04	.841
Efforts to tackle underlying risk factors (HFA 4)	63	1.00	4.83	3.05	.767
Disaster preparedness (HFA 5)	63	1.25	5.00	3.41	.820

Apparently, the widest gap is in HFA Priority 4 (the lowest is 1 and the highest is 4.83), while substantial gaps also occur in HFA Priorities 3 and 5 (minimum 1.25 and maximum 5). Descriptive statistical analysis as summarized in Tables 12 and 13 shows institutional achievements in general, on the scale of 1-5, with the average level of achievement around level 3, which denotes “some institutional commitment and capacities to achieving DRR but progress is not substantial.” Achievements have been varied across the regions and countries. OECD countries have been consistently above average in all five HFA priorities – the rounded-off figures are close to Level 4, which reflects “substantial achievement, but with some recognized deficiencies in commitment, financial resources, or operational capacities” (see Figure 7).

Over all HFA priorities, OECD countries (and high-income nations such as Singapore) have experienced more progress. In terms of HFA Priority 1 (aggregate values of DRR-specific regulations, DRR financing, stakeholder participation, and existence of national DRR platforms), the OECD countries appear to be the highest achievers, followed by Arab states/West Asia

(Figure 7),[26] Latin America, Central Asia/Eastern Europe, Africa, and Indian Ocean/South Asian states. Even though high variation occurs in Africa, Latin America, and Indian Ocean/South Asian states, these are the worst performers in terms of HFA 1 implementation (see Table 13). In the African country group, Swaziland is the bottom outlier (Figure 7).

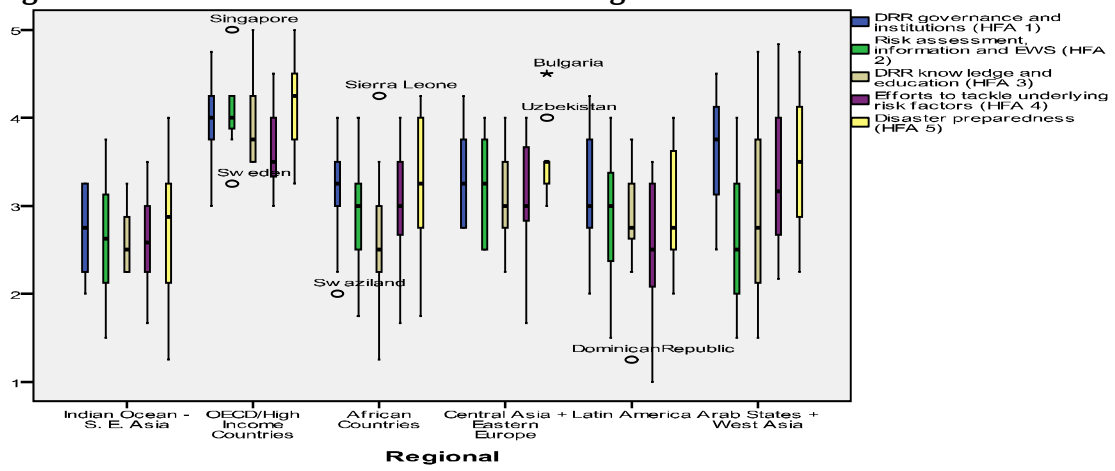
Table 13 Sample Size by Regions and missing values

Regional	Cases					
	Valid		Missing		Total	
	N	%	N	%	N	Percent
Indian Ocean - S. E. Asia	8	100.0%	0	.0%	8	100.0%
OECD/High Income Countries	15	100.0%	0	.0%	15	100.0%
African Countries	17	100.0%	0	.0%	17	100.0%
Central Asia + Eastern Europe	9	100.0%	0	.0%	9	100.0%
Latin America	11	100.0%	0	.0%	11	100.0%
Arab States + West Asia	3	100.0%	0	.0%	3	100.0%

Note: N = number of countries (total 63); no missing values.

In terms of HFA Priority 2 (aggregate values for risk assessment, risk information, and early warning system), some countries in Latin America like Dominican Republic stayed at the bottom. Rich countries including OECD countries still enjoy the highest average with the least variation, while Singapore stays on the top as an outlier (5 on the scale of 1-5) and Sweden is the bottom outlier of the group (still above 3 on the scale of 1-5). Indian Ocean/South Asian states, Africa, and Latin America exhibit more or less the same variation with different mean values (see Figure 7). For Arab states/West Asia, HFA Priority 2 is the least well achieved.

Figure 7 Box Plot HFA Priorities between Regions



[26] See Table 13. This is a representative problem for Arab states. The data for 2009 needs more improvement for 2011.

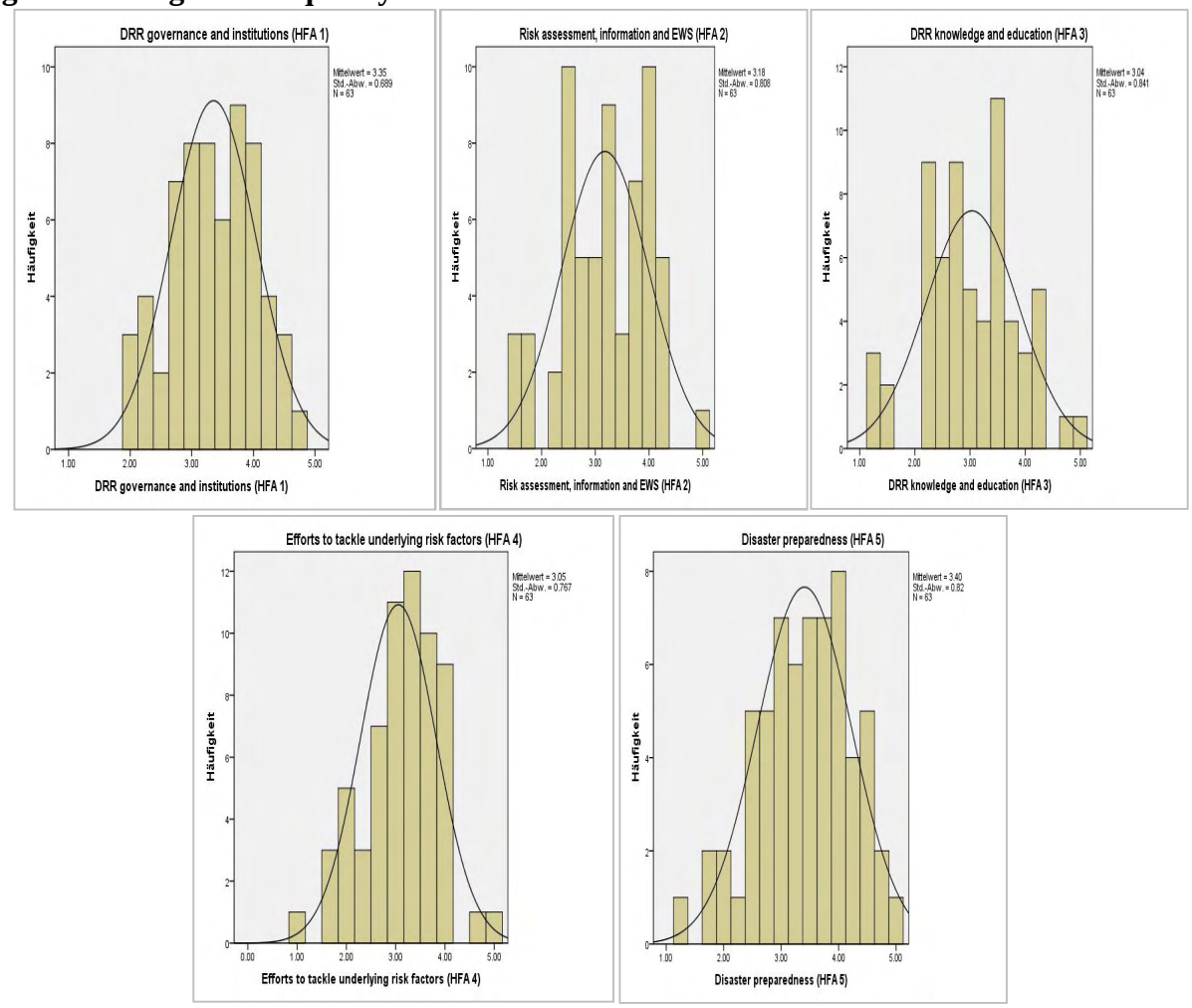
In terms of the average value for HFA Priority 3 (DRR integration in education curriculum, public awareness, risk information sharing, etc.) Africa achieved the lowest, as a few of its states reach the bottom level, followed by the Arab states and the Latin America and Indian Ocean groups. In the African group, Sierra Leone serves as a top outlier but overall it still remains below most of the OECD states. OECD countries are in a better position than the rest of the world. Even their lowest spike is still higher than the highest level of Indian Ocean and African states. The highest variation is in the Arab states/West Asia, followed by Africa. Overall frequency distribution can be seen in Figure 7 where the SPSS 18 histogram frequency distributions are based on average values of each HFA priority (Figure 8).

HFA Priority 4 is the least well-achieved sector in the OECD group. This is indeed a surprise as in general, people tend to think that the OECD countries have paid enough attention to aspects such as mitigation. However, the OECD group still shows better results than the rest of the regional groups in the HFA Priority 4.

The same can be said for HFA 5, as OECD countries tend to see themselves as more prepared than the rest of the regions, such as Indian Ocean states, African states, and Latin America. In Central Asia/Eastern Europe, Bulgaria and Uzbekistan serve as the outliers of the group. The benefits of showing the outliers are many as will be presented in the rest of the chapters. The outliers (either top or bottom) might have overestimated/underestimated their level of progress in disaster reduction policy therefore they trigger curiosity and further investigation.

On average, both HFA Priority 3 and HFA Priority 4 are the areas where the least progress occurs (Table 12). The bottom outliers (Figure 9) such as Dominican Republic (1:3 and 1:4) together with Kazakhstan (Figure 9, HFA 1:4) and Senegal (HFA 1:3) probably exhibit additional factors that may cause Priority 3 and 4 values to be the worst overall. The descriptive analysis in Tables 12 and 13 suggests that many countries view themselves as being better off in terms of disaster preparedness and emergency response (i.e. HFA Priority 5) but still fail to invest in knowledge and public education of DRR, as well as still showing limited efforts in mitigation policy and other root causes (HFA Priority 4).

Figure 8 Histogram Frequency Distribution for HFA 1-5

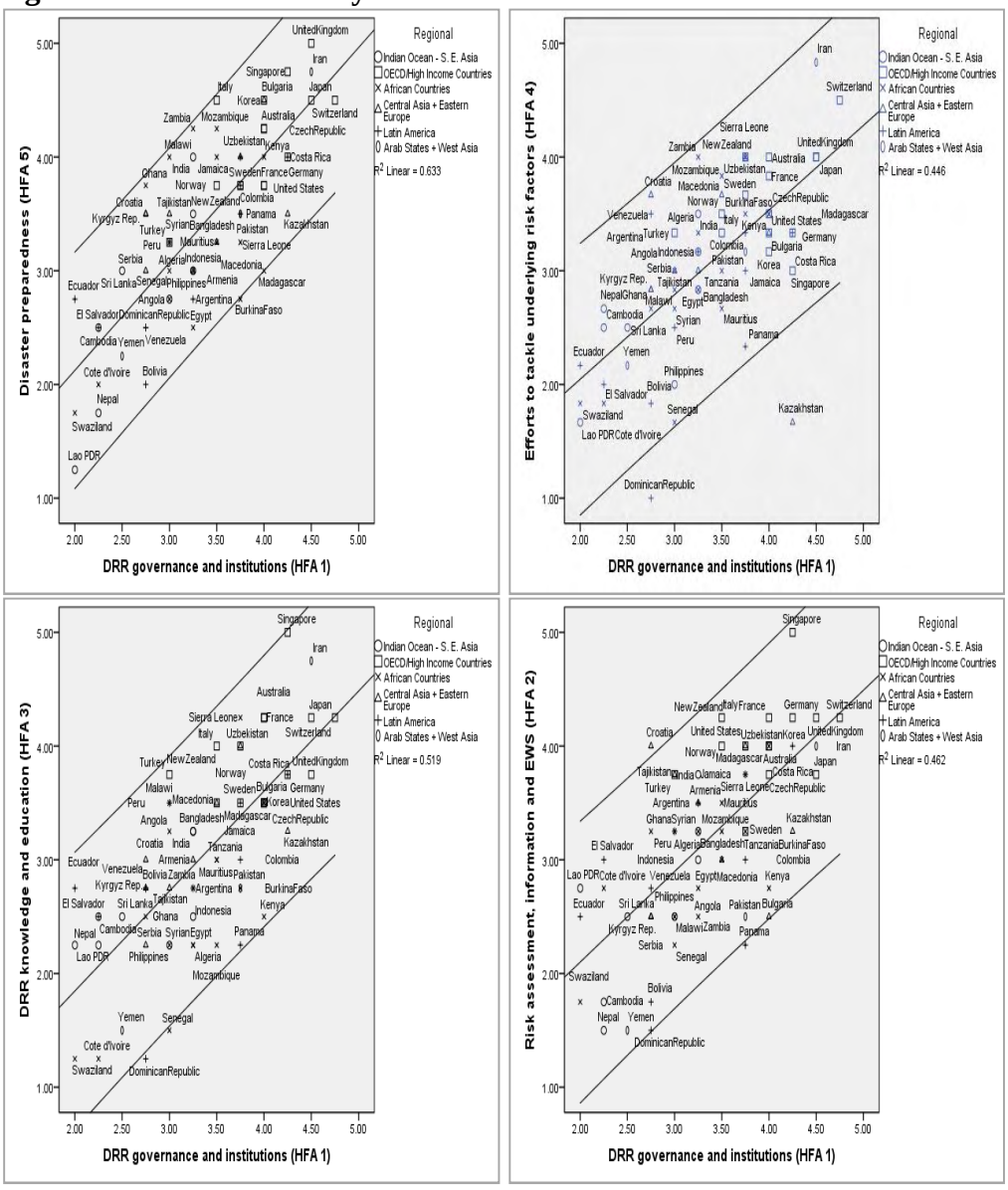


There is strong correlation between investment in DRR regulations/institutions (HFA Priority 1) and the activities in HFA Priority 2 (risk assessment, risk information, and early warning system) with a correlation value R = 0.68 (at 0.01 significance, two-tailed). Even stronger correlation occurs between investment in HFA Priorities 1:3, 1:4, and 1:5 (0.72, 0.67, and 0.79, respectively).

Figure 9 demonstrates that investment in institutions (disaster management laws and regulations, including governance, i.e., stakeholder participation, a national platform, etc., including institutional commitment to HFA Priority 1) eventually associates with the implementation of HFA 2-5. For example, Japan's disaster preparedness sits well on the regression line. Lao PDR's low investment in DRR governance/institutions has resulted in a low (the lowest among all the countries above) preparedness level, accompanied by those of Swaziland and Nepal. Indonesia's

moderate level of DRR governance also correlates with the level of preparedness. However, exceptions occur, such as Italy (as an outlier in the HFA 5:1 scatter plot above) as a country that might be helped by the long-term existence of a civil protection agency responsible for disaster preparedness and civil emergencies.[27]

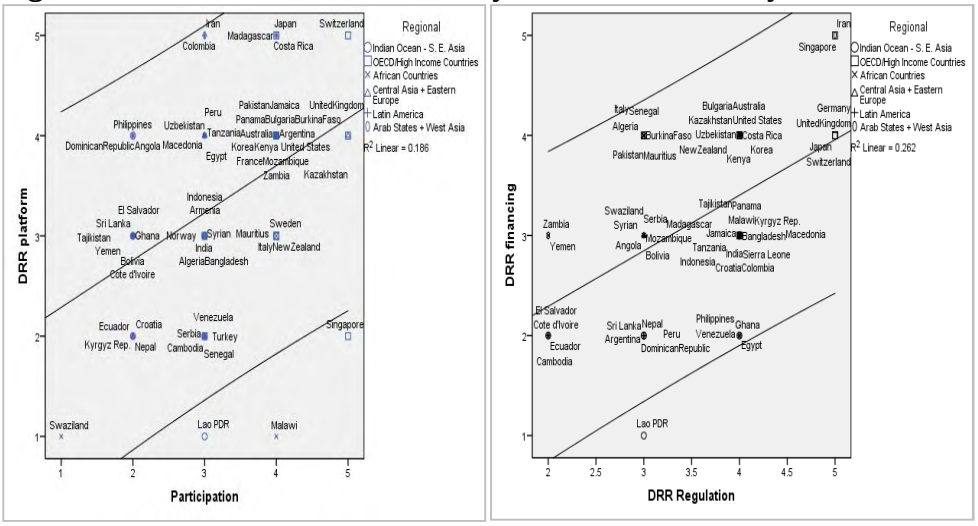
Figure 9 Scatter Plot Analyses HFA 1 vs. HVA2-5



[27] The Italian Civil Protection Service is based on the Law No. 225 of February 24th, 1992 Please consult: http://www.preventionweb.net/files/8480_Italy%5B1%5D.pdf. See also English version of the system at http://www.protezionecivile.it/cms/attach/brochuredpc_eng2.pdf. Accessed on 10 Oct 2010.

The scatter plot for HFA 4 – HFA 1 (Figure 9 above-right) shows an interesting point. Most OECD countries are divided into two groups. Switzerland, United Kingdom, Australia, New Zealand, and others are located above the regression line, which claim stronger DRR governance/institutions consistent with their institutional commitment to reducing the root causes of disaster risks (HFA 4). On the other hand, below the regression line, Germany and Singapore[28] seem to invest less in HFA 4 despite their reportedly high DRR regulatory system. Clearly, there are exceptions, as seen from the bottom outliers, for instance, Kazakhstan, which claims to have very good disaster management regulation but the investment in HFA Priority 4-related activities is very low. Less extreme examples are Panama, Senegal, and the Philippines, with DRR regulatory conditions that are moderate but with very low investment in DRR education.

Figure 10 Selected Scatter Plot Analysis for HFA Priority 1



4.3.1. Selected Statistical Results for HFA 1

The scatter plot in Figure 10 presents selected plotted variables. At the left, the plot serves as a good model to show that the likelihood of creating a DRR platform depends on the level of DRR stakeholder participation in countries. Singapore, Lao PDR, and Malawi are the bottom outliers. Singapore tends to neglect the need for a DRR platform while claiming its high stakeholder participation in DRR. Swaziland is consistent and fits to the model (95% confidence) as the country's low public participation in DRR is strongly associated with the absence of DRR platform at the national level.

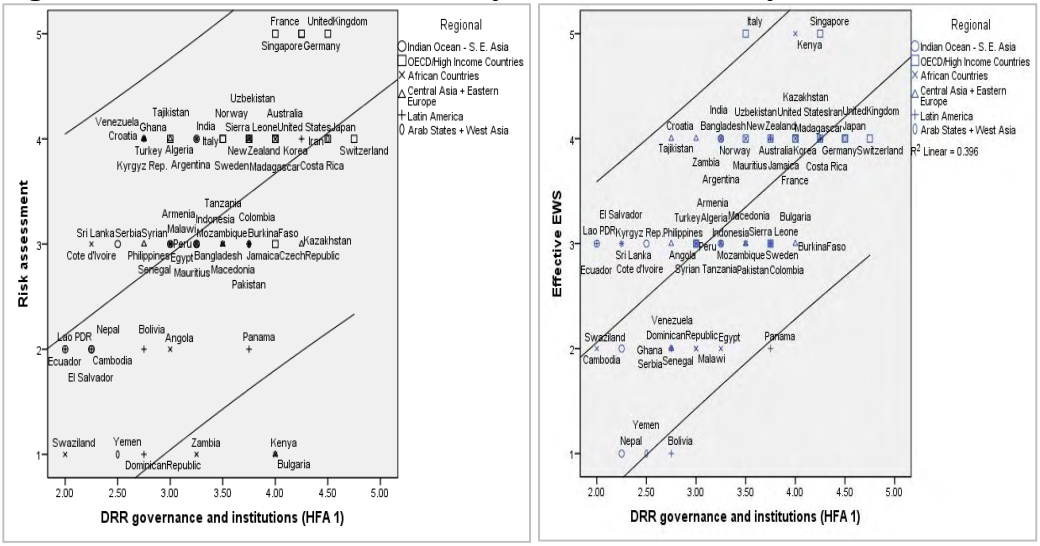
[28] Not an OECD country but included in the group as a high income country.

Lao PDR is a consistent bottom outlier in both models in Figure 10. It claims to have moderate participation; however, no platform emerges at the national level. Therefore, it seems to suggest that the existence of DRR platform (for multi-stakeholders engagement) has no association with community participation and vice versa because the former can be a top down arrangement.

4.3.2. Selected Statistical Results for HFA 2

An approach similar to that followed in Section 4.3.1 is now used in this section. The HFA Priority 1 serves as the "strong basis for implementation" of HFA 2-5 (see Chapter 3.1 Research Framework). Apart from giving a good correlation (significant at the 0.05 level), the plot in Figure 11 can serve as a model to predict the level of countries' commitment to risk assessment (left) and the insistence of having an effective early warning system for multiple hazards (right) based on the composite indicator of HFA Priority 1.

Figure 11 Selected Scatter Plot Analysis for HFA Priority 2



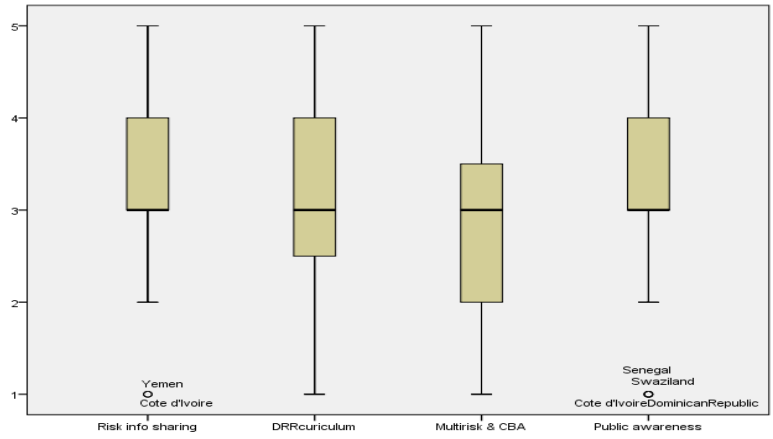
The bottom outliers are Zambia, Kenya, and Bulgaria (left), as well as Bolivia and Panama (right). The results for these countries (except Bolivia) suggest that having a good level of investment in HFA 1 does not necessarily make a country willing to invest in risk assessment. Kenya is one example as it suggests that the country has managed substantial achievements (level 4 on a scale of 1-5) for all indicators in HFA Priority 1, but it failed to invest in risk assessment. It also failed to invest in risk information although this is somewhat of an anomaly as it later

claims to have a good effective early warning system (Figure 11 right).[29] For the feature that "Systems are in place to monitor, archive, and disseminate data on key hazards and vulnerabilities" (HFA 2.2), the level of progress is 1, which means that there has been "Minor progress with few signs of forward action in plans or policy."[30] This, however, is contradicted by Kenya claiming to have a perfect early warning system (5 on the scale of 1-5), but with neither hazard information/monitoring nor risk assessment. Italy serves as an outlier in Figure 11 (right) as it is indicated as having low investment in DRR governance and institutions but the country is stated to already have an effective early warning system (5 on a scale of 1-5).

4.3.3. Selected Statistical Results for HFA 3

HFA Priority 3 is about the use of "knowledge, innovation, and education to build a culture of safety and resilience at all levels", which comprises four main aspects that can be summarized as follows: risk information sharing, integration of DRR into curriculum/education, development of multirisk assessment and cost benefit analysis, and public awareness, which are hereafter defined as HFA 3.1, HFA 3.2, HFA 3.3, and HFA 3.4, respectively.

Figure 12 Selected Box Plot Analysis for HFA Priority 3



Overall, on the basis of Figure 12 and Table 14, HFA Priority 3.3 (research and development on multi-risk assessment and cost benefit analysis) is the variable that has been achieved the least. Both risk information sharing and public awareness are better than the other indicators. Yemen

[29] Please find the discussion on the scoring on the progress of HFA implementation at Section 7.7.1. Discrepancy between expert knowledge and non-expert knowledge on the scoring system will be discussed from the context of Indonesia.

[30] See the report at http://www.preventionweb.net/files/7432_finalkenya.pdf [last accessed 7 July 2010].

and Ivory Coast are the bottom outliers for HFA 3.1 while Senegal, Swaziland, Ivory Coast, and Dominican Republic are the bottom outliers for public awareness (HFA 3.4).

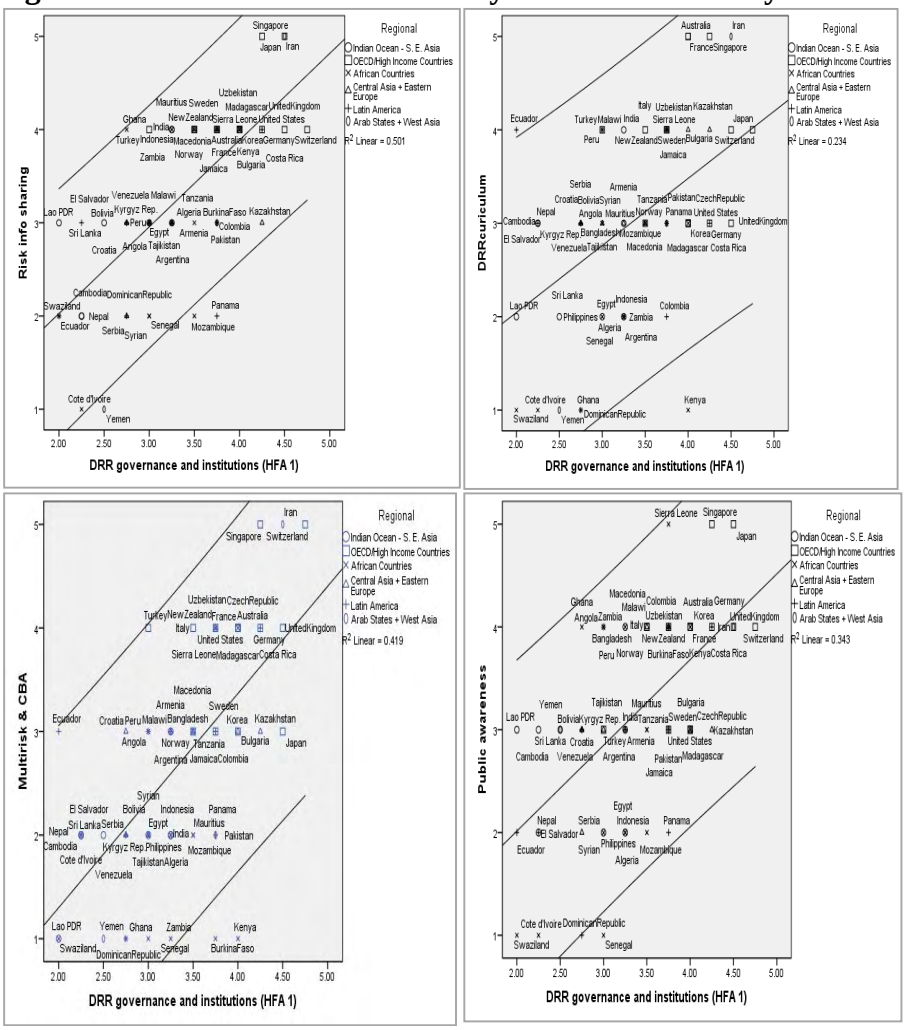
Table 14 Descriptive Statistics HFA 3

	Mean	Std. Deviation	N
Risk info sharing	3.29	.906	63
DRR curriculum	3.02	1.024	63
Multirisk & CBA	2.70	1.102	63
Public awareness	3.14	.981	63

Correlations tests					
		Risk info sharing	DRR curriculum	Multirisk & CBA	Public awareness
DRR governance and institutions (HFA 1)	Pearson Correlation	.708**	.483**	.647**	.586**
	Sig. (two-tailed)	.000	.000	.000	.000
	N	63	63	63	63

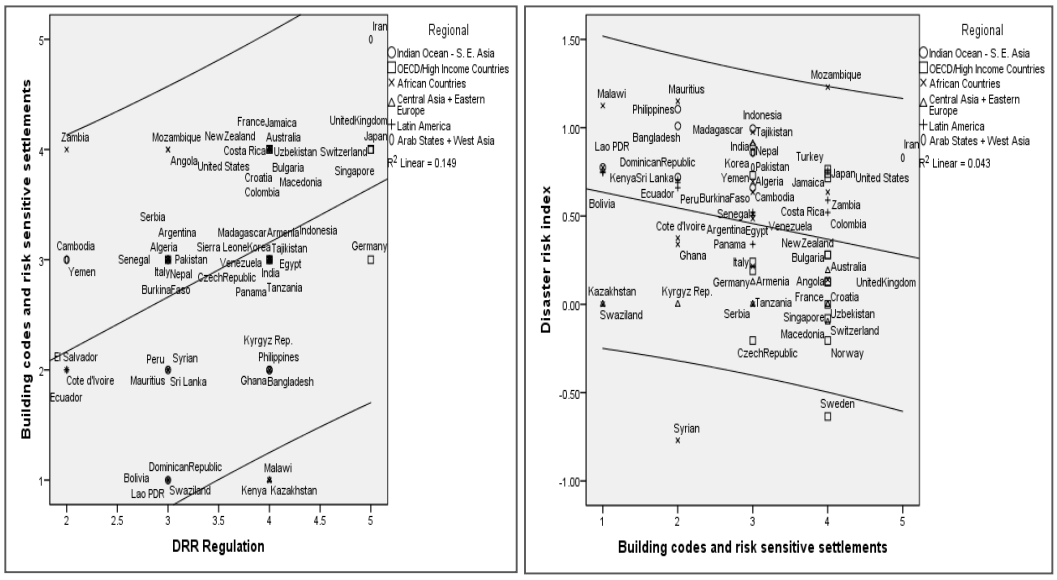
Note. ** Significant at 0.01 (two-tailed).

Figure 13 Selected Scatter Plot Analysis for HFA Priority 3



Kenya and Burkina Faso are the countries where there has been substantial achievement in formal DRR regulations (HFA 1) but clearly investment in research and development for multi-risk and CBA analysis has been close to non-existent (level 1 on a scale of 1-5). For Kenya, it was also noted that the achievements in DRR regulations have not been accompanied by good risk information sharing, and there has been no integration of DRR into the local curriculum. On the other hand, Ecuador is a top outlier as it has a poor disaster management policy; however, its investment in DRR education seems to be substantial. The remaining countries are arranged in the model within the 95% confidence interval, as shown in Figure 13.

Figure 14 Selected Scatter Plot Analysis for HFA Priority 4



4.3.4. Selected Statistical Results for HFA 4

Figure 14 (right) presents a slightly different style of comparison to the analyses above. Disaster risk index (DRI) and HFA 4.4 (indicator for building codes and the existence of risk-sensitive settlement planning) exhibit a negative correlation, which means that an increase in one variable may eventually cause a reduction in the other variable. This seems to suggest that investment in general in HFA 4.4 “pays off” at lower DRI. There are the exceptions of Sweden and Syria. Sweden is a country with a very low DRI; however, its “success” in having a low risk must be due to a factor other than HFA 4.4 – such as the exposure factor or other institutional variable (as will be discussed in Chapter 5). The same explanatory exercise also applies to Syria, in which

there is poor DRR policy and regulation but low risks; this must be due to some factor related to the level of exposure but it is likely not because of an absence of institutional vulnerability. However, in general, the correlation in this figure seems to be low. Iran for example exhibits a high level of adoption for both DRR regulation and building codes (Figure 14 left), but the outcomes of these regulations/codes seem to have a low correlation, as seen for example by its level of disaster risk index. Mozambique claims to have a good level of building codes and settlement policy as well as moderate DRR policy and regulation; however, its disaster risk index is the highest in the scatter plot.

The left panel of Figure 14 shows some interesting phenomena. The outliers clearly indicate that the claims to have good DRR regulations/institutions (HFA 1), such as in the cases of Malawi, Kenya, and Kazakhstan, do not necessarily imply the vision to have good building codes. The same can be said for earthquake-prone countries, such as the Philippines, for which substantial achievement in DRR regulation was claimed, but with a failure to invest in HFA 4.4 and its outcomes being highlighted by the very high disaster risk index.

4.3.5. Selected Statistical Results for HFA 5

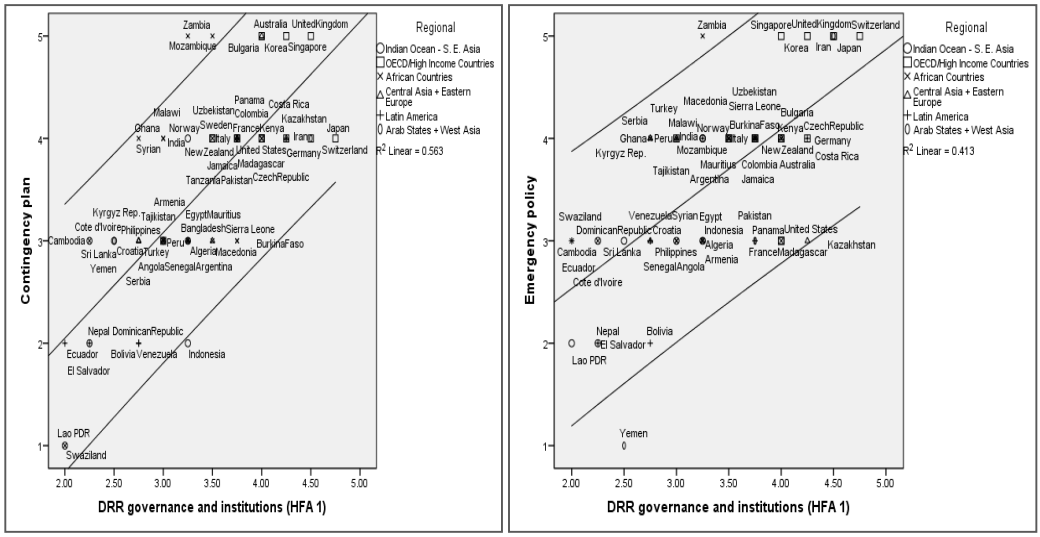
The absence of a national contingency plan may have nothing to do with DRR regulation. Personal observation from Indonesia shows that, occasionally, non-state actors (NGOs, CSOs, and the UN) facilitate processes at the national and selected local levels related to contingency planning in cases where there are no disaster management laws or other similar legislation. This is the case for Zambia and Mozambique (the top outliers). Interestingly, for Indonesia, the opposite seems to have occurred (the only bottom outlier in Figure 15 left), where moderate achievement in HFA Priority 1 has not necessarily led to the establishment of a national emergency contingency plan, as reported in 2009.[31]

The results in Figure 15 (right) are counterintuitive because past experience suggests that countries tend to emerge from having emergency-oriented or reactive emergency-oriented policy (including enforcement) towards a prevention- and mitigation-oriented DRR policy (See Petak 1985, see also long debate in Perry and Quarantelli 2005 and Quarantelli 1998) as stipulated in

[31] Another reason can be that, in the reported period, transitions took place and such activity had not yet been carried out. See also Indonesian Report 2009 to the UNISDR.

HFA Priority 1. Therefore, HFA Priority 1 can be a dependent variable (Y) while emergency policy can become an independent variable.

Figure 15 Selected Scatter Plot Analysis for HFA Priority 5



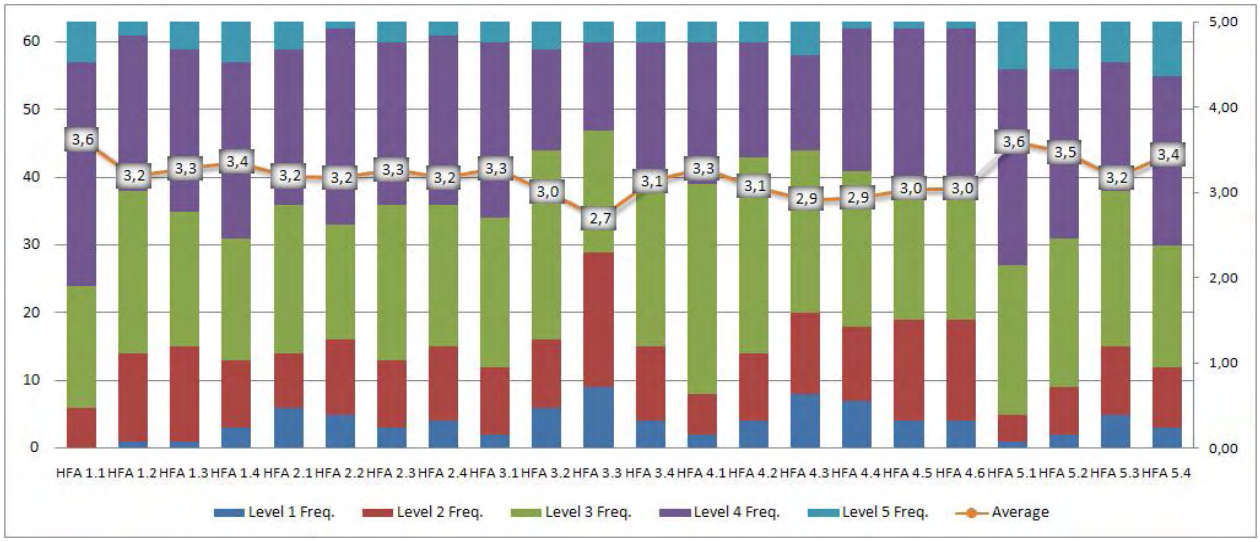
It is particularly interesting to see that, for all the countries claiming to have moderate emergency policy (level 3 on a scale of 1-5), there is substantial variability in terms of HFA 1 implementation. Swaziland, Dominican Republic, Cambodia, Ecuador, and Sri Lanka invest more in emergency policy than in strong DRR regulation and policy (HFA 1). More contradictory results are shown for Serbia, Peru, Ghana, and Mozambique, as well as Tajikistan and the Kyrgyz Republic, for which very high results for emergency response accompany low results for HFA 1. Nevertheless, Figure 15 still demonstrates the general relationship between HFA 1 implementation and HFA 5 implementation (for both contingency planning and emergency policy).

4.4. Discussion

All the selected scatter plots (HFA 1:2 to HFA 1:5) can be used to explain that HFA 1 can reflect the institutionalization of disaster reduction through a specific DRR regulatory framework, which eventually enables countries to progress to having comprehensive disaster risk management. Most of the models indicate that the investment in HFA Priority 1 (composed of indicators for DRR regulation, financing, and participation in DRR) is likely to trigger better

planning, risk assessment, early warning system, integration of DRR education, and disaster preparedness.

Figure 16 Frequency Level and HFA 22 Indicator Average (N=63)



Note: See also a similar figure with N=60[32]

It is very simplistic to claim that DRR investment in any given country should have clear policy and regulation which enable the country to create enabling conditions, such as by creating a specialized organization to take leadership in managing disaster risks. The policy and regulation later enable the country to allocate financial resources to fund disaster risk reduction activities. Since disaster risks are too broad and versatile to be tackled by the government alone, stakeholder participation is imperative, which together with the government works in a polycentric way (as broad as the HFA 22 indicators of progress).

It appears that, overall, significant progress has been achieved in HFA 1.1 i.e. (national policy and legal framework for disaster risk reduction) and HFA 5 (disaster preparedness and response, mainly HFA 5.1 and HFA 5.2) (see average value in Figure 16). It is also interesting to see that HFA priorities have served as driving forces to create national platforms for DRR (HFA 1.4) and this achievement is similar to the achievement of HFA 5.4 (post-disaster risk assessment) with an average value of 3.4 on a scale of 1-5.

[32] See GAR 2009, Chapter 5, Page 120. The mean or average value for each variable is different owing to size differences. See http://www.preventionweb.net/english/hyogo/gar/report/documents/GAR_Chapter_5_2009_eng.pdf [last accessed 10 July 2010].

However, the investigation above mainly focuses on the roles of the existence of formal institutions (e.g. DRM laws). In fact, not all DRM laws are seen by the member states as sufficiently effective. Ghana claims that its status for HFA 1.1 is level 4, while at the same time explaining that Act 517 - 1996 regarding the National Disaster Management Organization (NADMO), which is responsible for DRR at all levels of government, has shortcomings because the act impedes the inclusion of other vital stakeholders in DRR activities.[33]

In Sri Lanka, the Disaster Management Act enacted in 2005, which was claimed to have been achieved through a high level of participation[34], is now being challenged and reviewed owing to some deficiencies alongside arguments that the powers vested in the Disaster Management Agency are insufficient to implement DRR policies. The Philippines admitted divergence from DRM regulation enacted in 1978 and recently succeeded in ratifying a new DRM Act in June, 2010.

Abundant evidence reported by the member states shows that, for the progress of HFA implementation, especially in many developing countries, DRR policy reform does not occur in isolation. For instance, Turkey benefits from the support of international actors (both state and non-state actors) as its representatives accept that multi-stakeholder participation (including key organizations, academia, and local administrations) is a key factor in risk and vulnerability mapping as well as data collection at the national level[35].

4.4.1. Conclusion

The HFA progress reports provide some evidence of risk governance, but not all the countries share real processes on the ground, apart from the specific DRR governance-related indicators. For instance, the Philippines and many African states clearly mention the role of international actors (INGOs and donors) that are involved on the ground (see evidence for Indonesia in Chapters 6 and 7).

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[33] See the detail report from Ghana at http://www.preventionweb.net/files/7431_finalghana.pdf. Last access on 20 Feb 2010.

[34] Please consult all the minutes of meeting between all the stakeholders prior to the endorsement of the Act 2005. Apparently, the actors are a mixture of governments, donors, academia, and other stakeholders. www.srilankanparliamentonnaturaldisasters.org [last accessed Jan 2010].

[35] Please consult http://www.preventionweb.net/files/7460_Turkey.pdf [last accessed 20 August 2010].

An interesting case for disaster risk management practice is from Central America, especially the Flood Early Warning System (FEWS) after Hurricanes Mitch and George in 1998, where some organizations have continued to support FEWS up to the present. There have been at least 80 registered FEWS units, of which 50% are in operation; of these, 84% are operated with the support of NGOs/INGOs, 12% are managed by the Meteorological Office, and the rest are run by private organizations. Gonzales noted that 85% of the FEWS in operation lack information on hydrology (Pablo Gonzales 2010).[36] Gonzales continued in stating that, in the Americas, there are institutional challenges: Firstly, there is a lack of public policy, strategies, and guidelines (HFA Priority 1.1). There is also a lack of hydrological studies and low coverage in small valleys, namely, observation and monitoring networks designed for different purposes such as monitoring hydropower and irrigation (HFA Priority 3, HFA Priority 2). There is a lack of coordination amongst NGOs, which hampers the replication and the optimization of information (HFA Priority 1.3). Furthermore, there are physical and geo-political challenges: a predominance of flash-floods with short concentration times and transboundary basins (HFA 4). Sustainability relies mainly on international financial aid (HFA 1.2) and there is overlap of competencies in operating the different components, such as contingency planning and preparedness (HFA Priority 5). Finally, there is a limitation on the use of high technologies (HFA Priorities 2 and 3).

Measurement of institutional vulnerability for the HFA implementation progress can be undertaken with some adjustment. Overall tests of the scatter plots of HFA progress of implementation from the 63 countries in this chapter strongly demonstrate the following features of the Hyogo Framework for Action: that institutions and governance (including disaster risk management laws/acts/policy/regulation (HFA Priority 1) are the basis for risk assessment and risk information (HFA Priority 2); DRR education (HFA Priority 3); multi-sector vulnerability reduction (the underlying root causes – HFA Priority 4); and, finally, emergency management policy and practice (HFA Priority 5).

The quality of data entry appears to be a problem in some countries. Some countries appear to be inconsistent. Kenya, for instance, judged its level of progress in HFA 1.1 at level 4. However, it

[36] Pablo Gonzales 2010 "Community-centered Flood Early Warning Systems: the Central American Experience." Davos GFR IDRC 2010. PowerPoint Presentation, via personal contact (email). The author was also able to visit Jamaica from 26 April – 4 May 2010. Jamaica is one of the knowledge hubs for DRR knowledge in the Caribbean. Based on personal interviews with the key person at the Centre for Disaster Risk Reduction, University of East Indies and DRR stakeholders in Jamaica It was clear that the willingness of the governments within the region to invest in DRR is very low.

was found that it has just referred to a recent delivery of the Disaster Management Policy to the cabinet office. This causes Kenya to often appear as a bottom outlier in many regression models as presented above. This is clearly a technical problem in which the quality of self-evaluation should also be advanced by proper training.

Malawi is another example of inconsistency in results as it judged its HFA 1.1 at level 4 (substantial achievement); however, its representatives stated that it does not have a DRM policy as it is just about to enter the processes of formulation. Its recent works in DRR are clearly based on an ad hoc organization (Malawi Report on HFA Progress 2009). Malawi is not alone, but it is crucial that any country that has passed new laws on DRM must also prove its level of enforcement at different levels to give a balanced overview on the actual level of progress.

Iran is a country that claims to be excellent (Figure 17). This is noteworthy, even though it is not an outlier in statistical terms (based on 95% confidence interval as seen in Figure 14). Iran views its progress as comparable only to that of UK (in the cases of HFA Priorities 1 and 5), Switzerland (HFA Priorities 1 and 4), and Singapore (HFA 1 and 3). In terms of progress in HFA 2 (risk assessment and early warning system), Iran is placed at the same level as the majority of OECD countries, such as Japan, United States, Norway, Australia, and South Korea. Iran will receive special attention in Chapter 5, especially in terms of how the DRR regulatory quality (HFA Implementation) is dependent on/independent from the regulatory quality and institutional quality context.

While countries provide technical reasons for perceived progress, besides the old reasoning that every context is unique, there are things need to be improved. It therefore requires effort to improve the way that countries evaluate their progress to fill the gap between perceived progress and the reality of implementation. However, it is argued that, although such a gap can be reduced, it is impossible to completely eliminate it. Continued reporting for the next couple of years is suggested, while also encouraging more countries to voluntarily issue regular report.

Owing to the scale of analysis, there is a triangulation (or cross-examination) problem for in depth validation of the findings. Apart from the qualitative explanations and indicators given in the reports, extensive investigation of countries' DRR policies is very time-consuming. However, in the next chapter, a challenge is made to the claims of the countries given the

"objective" realities of governance in the broader sense, the volatility of institutional quality, and other factors, which arguably play roles to disable or enable DRR implementation.

Chapter 5 Institutions and Governance Assessment

5.1. Introduction

The IVA framework defines institutional vulnerability to disaster risk as "both the context and the process where formal institutions (regulation, rule of laws, constitutions, codes, bureaucracy etc.) and informal institutions (culture, norms, traditions, religion) are either too weak to provide protections against disaster risks or ignorant of their duty to provide safety and human security. This suggests that countries and states would fail to reduce risks due to institutional factors modifying their vulnerabilities" (taken from Chapter 2).

This chapter shares the same IVA framework as Chapter 4 (see Figure 5) by explaining the governance context where the DRR policies and practices (in Chapter 4) have been exercised.

5.2. Data Source

This research specifically uses 63 selected countries from the 202, for which data (longitudinal observations) from the World Governance Indicators (www.govindicators.org or http://info.worldbank.org/governance/wgi/index.asp or). The number of 63 is the same as the countries that voluntarily sent their subjective measurements in the standardized format to the UNISDR in 2009 (see Table 15 for details).

Table 15 Source of Governance Data

Assessment Indicators	Source of Data
1. Institutional commitments on DRR based on HFA Progress Report See Chapter 4	Spreadsheet generated from global reports on HFA implementation – 63 countries using data from 2009.
2. World Wide Governance indicators • Voice and Accountability • Political Stability • Government Effectiveness. • Regulatory Quality • Rule of Law • Control of Corruption	Global dataset from World Governance indicators – World Bank – using data from 2008. www.govindicators.org and http://www.worldbank.org/kam Note: Definitions are provided in Box 1.
3. Disaster risk index	Peduzzi´s (2009) supplemental data are available at the permanent link http://www.nat-hazards-earth-syst-sci.net/9/1149/2009/nhess-9-1149-2009-supplement.pdf)

Box 1 Working Definition of Selected World Governance Indicators

Voice and Accountability measures the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

Political Stability, 2007 This index combines several indicators that measure perceptions of the likelihood that the government in power will be destabilized or overthrown by possibly unconstitutional means and/or violent means including domestic violence and terrorism. This index captures the idea that the quality of governance in a country is compromised by the likelihood of wrenching changes in government, which not only have a direct effect on the continuity of policies, but also at a deeper level undermine the ability of the citizens to peacefully select and replace those in power.

Government Effectiveness measures the quality of public services, **bureaucracy**, and the quality of the civil service, as well as the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Regulatory Quality measures the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

Rule of Law measures the extent to which agents have confidence in and abide by the rules of society, in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence.

Control of Corruption measures the extent to which public power is exercised for private gain, including petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Source: World Governance Indicators and KAM Database.

Table 16 Source of Data

		Regulatory Quality	Rule of Law	Government Effectiveness	Voice and Accountability	Political Stability	Control of Corruption
N	Valid	63	63	63	63	63	
	Missing	0	0	0	0	0	
Mean		4.6	4.5	4.6	4.9	4.5	4.5
Std. Deviation		2.88	2.91	2.87	2.73	2.89	2.85
Minimum		.34	.14	.27	.3	.07	.41
Maximum		9.8	10.0	10.0	9.9	9.8	9.8

5.3. Results

5.3.1. Descriptive Analysis

All the governance indicators in Table 16 are based on standardized values from 0-10. The HFA-related indicators still use the range of 1-5. The cases number 63 in total with no missing values. The mean of the variables varies between 4.5 and 4.9. The maximum standardized value is 10 and the minimum is greater than 0.

Figure 17 shows a gross discrepancy between overall DRR quality (policy and practice measured by HFA implementation progress) and institutional quality in general. Iran is ranked as the highest performer based on self-evaluation by its DRR authority. Of the top 20 countries, apparently Iran, Uzbekistan, Sierra Leone, and Madagascar represent developing countries. Interestingly these four countries are also ranked very low in terms of average institutional quality index (composite of rule of law, regulatory quality, voice and accountability, corruption control, government effectiveness, and political stability). Therefore, there are big discrepancies between specific DRR regulatory quality/practice and the reality of institutional quality in almost all non-OECD countries. Only a few non-OECD countries such as Swaziland, Egypt, El Salvador, Sri Lanka, and Senegal have been relatively consistent in the two categories. Furthermore, in terms of developing countries, only Mauritius and Dominican Republic have rated institutional quality higher than DRR-specific governance and institutions.

Figure 17 Average Perceived HFA Implementation vs. Institutional Quality (N=63)

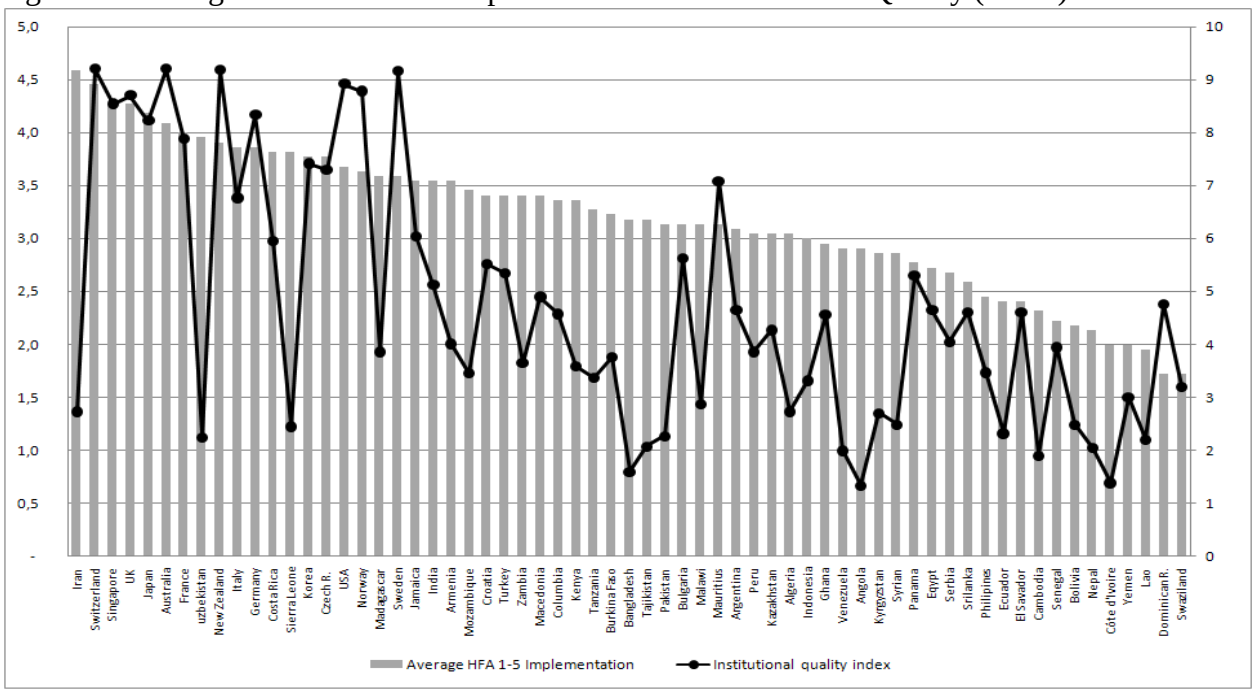


Figure 18 below provides the frequency distribution of selected governance indicators, which shows the variability of all six selected variables; not one is exactly the same as another variable. Apparently positive *skewness* (asymmetry of the frequency distribution) can be seen for the *rule of law* variable (Figure 18 top-middle) and *government effectiveness* (Figure 18 top-right).

However, qualitatively, this can be neglected because the discrepancy of mean-median is relatively low.

Figure 18 Frequency distribution of governance indicators

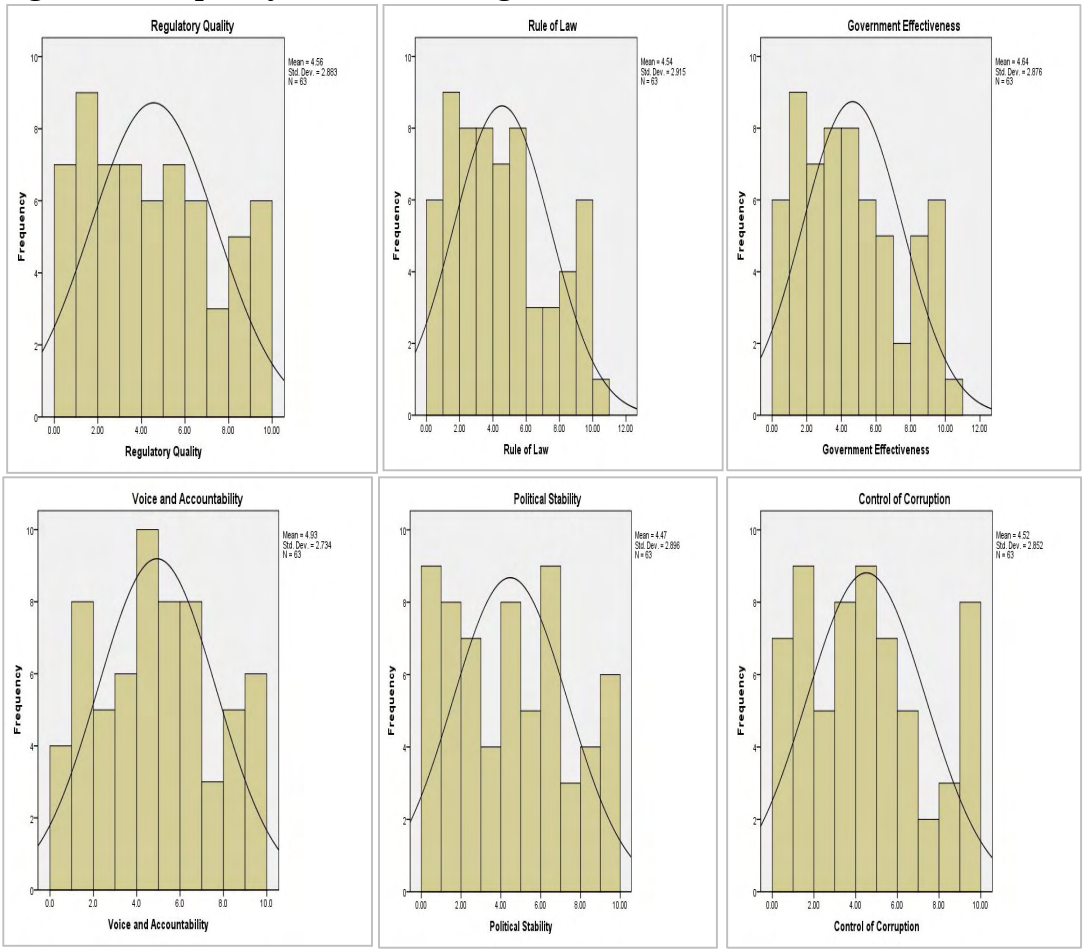


Table 17 Pearson Correlation Test (N = 63 Countries)

Correlation tests		G1 Regulatory Quality	G2 Rule of Law	G3 Government Effectiveness	G4 Voice and Accountability	G5 Political Stability	G6 Control of Corruption
HFA 1***	Pearson Correlation	.562**	.561**	.596**	.483**	.509**	.534**
	Sig. (two-tailed)	.000	.000	.000	.000	.000	.000
DRI (Disaster risk index)	Pearson Correlation	-.280*	-.296*	-.269*	-.184	-.374**	-.277*
	Sig. (two-tailed)	.026	.019	.033	.150	.002	.028

, Correlation is significant at the 0.01 level (two-tailed). *, Correlation is significant at the 0.05 level (two-tailed). *, Value is based on the average rate of HFA Priority 1

5.3.2. Selected Correlation Tests

The results of Pearson correlation test in Table 17 suggest that there is a significant correlation between HFA Priority 1 and countries' regulatory quality (R=0.562, at 0.01 significance) and, apparently, there is a strong association between DRR governance and government effectiveness (0.596, significant at 0.01). The correlations between DRR governance and *rule of law, control of corruption*, and *voice and accountability* are 0.561, 0.534, and 0.483, respectively, all of which are significant at 0.01.

The disaster risk index (DRI) is based on an index calculated using standardized mortality rate due to natural hazards measured on an annual basis per 1 million people. The reason for using DRI is because, globally, DRI is based on the natural hazard-based mortality and the data are considered to be the most reliable data on the global scale (Peduzzi et al. 2009).

For all the tests between DRI and the selected governance indicators, there is a negative correlation, which suggests a significant association between good governance and disaster risk index. An increase in good governance is associated with a reduction in disaster risk. This test gives "the magic value" of 0.05 significant for all selected variables. DRI is even more sensitive to political stability (correlation -0.37 with significance at 0.01).

5.4. Volatility in Governance

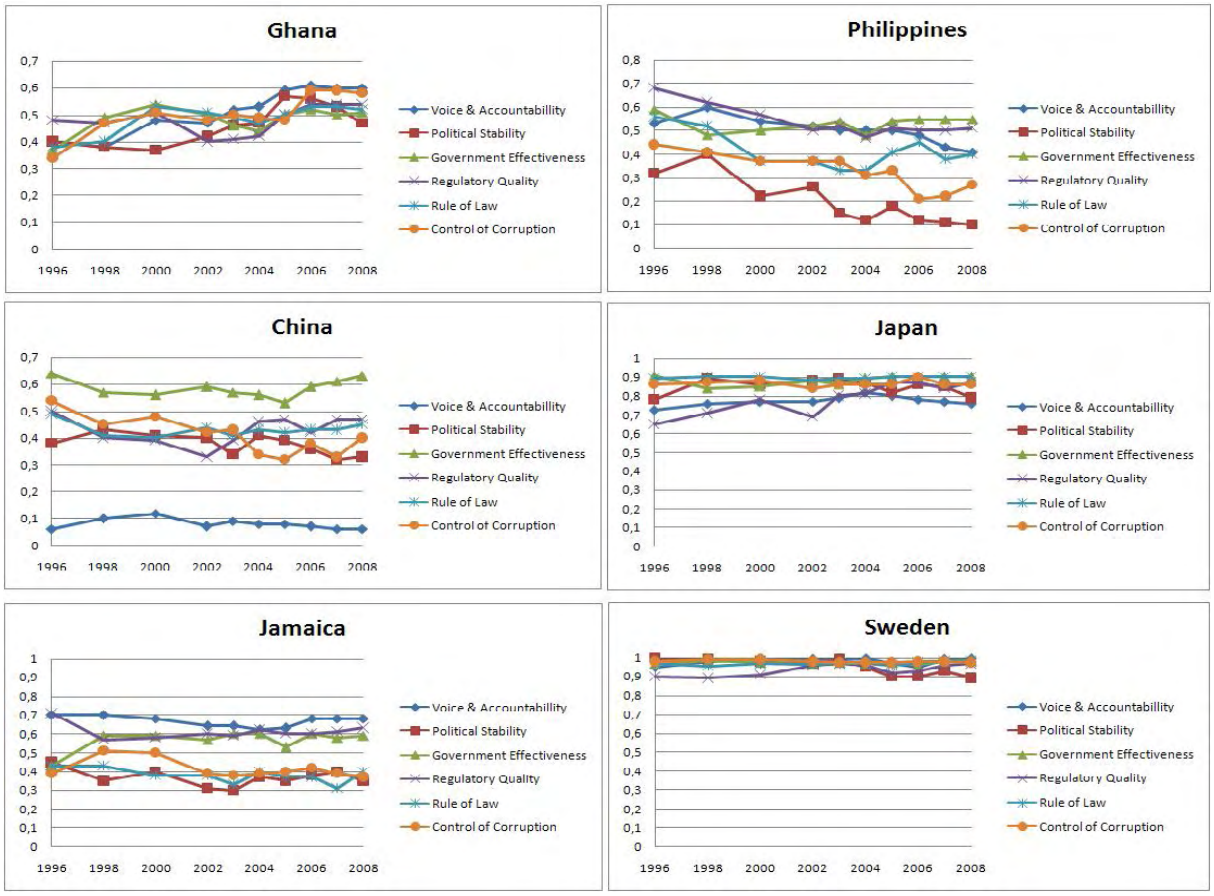
Before showing the results of simple regression test with disaster risk reduction indicators, the notion of volatility in governance is briefly dealt with in this section. This concept is important because disaster risk reduction will be difficult to achieve when volatility in governance prevails, which may in fact increase multi-dimensional vulnerability and disaster risks.

The Philippines is an example where governance quality has been markedly reduced during the last decade. The Philippines government's level of effectiveness has remained at a moderate level but it still suffers much from a lack of control of corruption, high political instability, and low regulatory quality. Its rule of law has been volatile while voice and accountability show a negative trend (see Figure 19). In this context, especially during its present disaster risk management reform and after the endorsement of the 2010 Disaster Management Act, [37] how can

[37] See the information at http://ndcc.gov.ph/home/index.php [last accessed 10 June 2010].

HFA implementation be independent of the larger context of governance and institutional quality? The rest of Section 5.4 will demonstrate this concern.

Figure 19 Selected Cases of Volatility in Governance Indicators



A more promising trend can be seen in Ghana. However, China still suffers from a lack of voice and accountability. Jamaica has been volatile in terms of control of corruption, which shows a negative trend. Meanwhile, Sweden and Japan are relatively well off and enjoy high stability in all governance indicators.

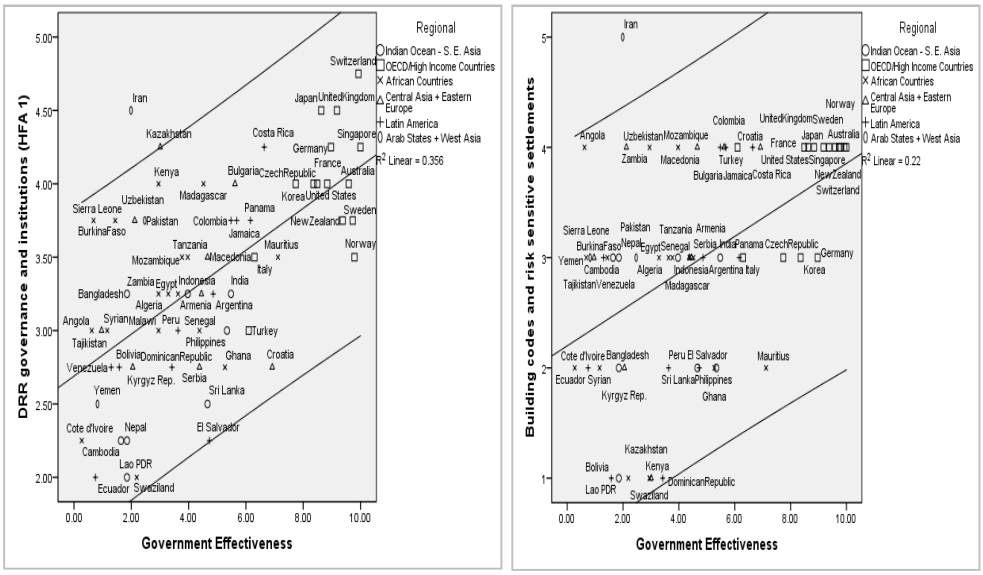
5.4.1. Government Effectiveness and Disaster Risk Reduction

Kaufmann, Kraay, and Zoido (2009) explained that the primary focus of the "government effectiveness" index is the relevant inputs essential for a government to generate and implement good policies. They called it "government effectiveness", comprising the perception of public service provision, the quality of bureaucracy, the competence of civil servants, and the independence of the civil service from political process, as well as the government's commitment

to policies. In this case, the index is used as a proxy for how governments generate and implement disaster reduction policy, which received a great deal of emphasis in the Hyogo Framework for Action 2005.

There is a strong correlation between government effectiveness and the level of DRR regulation/policy (r=0.596), which is significant at the level of 0.01. However, in reality, for any good policy on DRR, the government must play a central role in the enforcement of DRR-related regulation. While enforcement is related to the rule of law, success should be determined by the quality of bureaucracy and the quality of government delivery of basic social services, which in this section is termed government effectiveness.

Figure 20 Government Effectiveness Plots

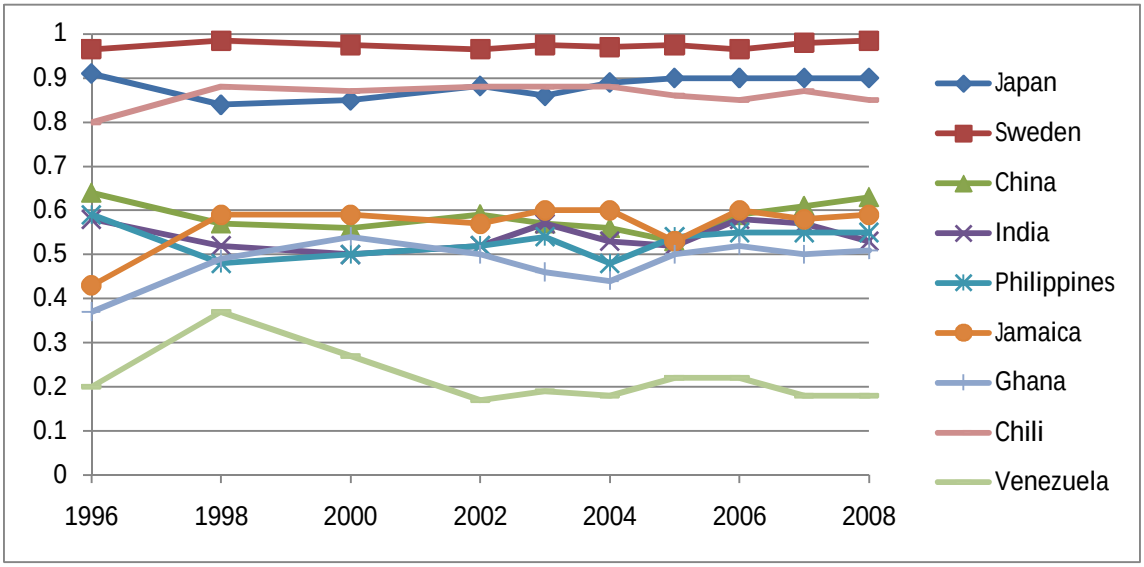


If Iran claims a perfect match between investment in DRR policy and DRR governance, as described in Chapter 4 (e.g. Figure 14), then Iran can be described as an outlier in this section as it claims to have excellent policy on DRR; however, on the basis of both exercises above (Figure 20), it is likely that, owing to low government effectiveness (including bureaucracy), it is able to enforce neither building codes and all HFA 4.4-related regulation and practice nor DRR regulation in general (HFA 1). The plots above suggest that, given the low level of government effectiveness, the real-world implementation of DRR in Iran (and also Kazakhstan) is very likely to be low.

Apart from the outliers, it is also apparent that a number of countries, such as Sierra Leone, Kenya, Uzbekistan, and Pakistan, as well as Angola, Bangladesh, and Mozambique, need not

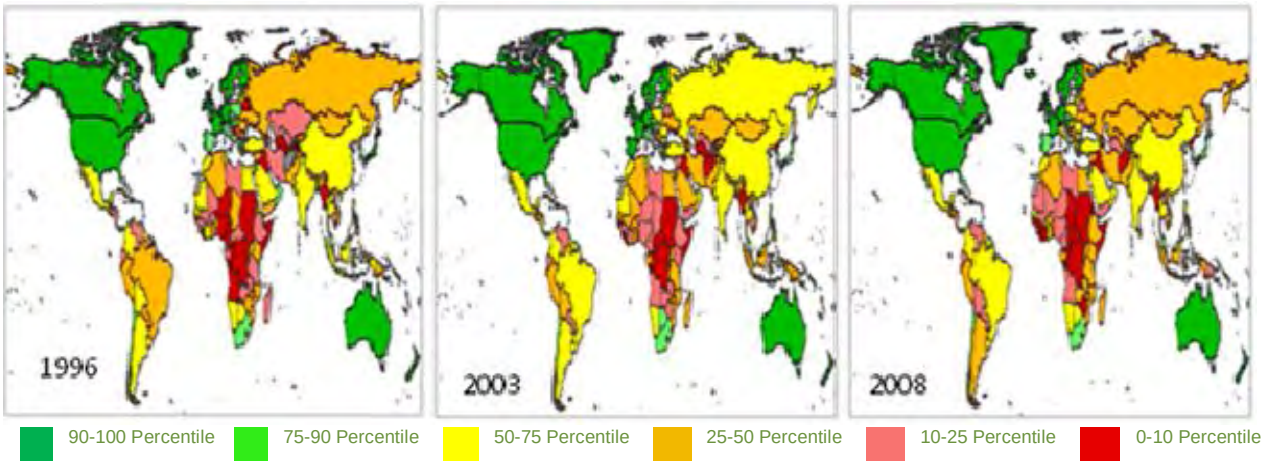
only reform their disaster risk management policy but also reform the way in which the government provides basic services, which should include bureaucracy reform. The plots above suggest that, without the latter, the former is very likely to involve a serious challenge.

Figure 21 Government Effectiveness Overtime



Note. The data is based on the views on governance of survey respondents and public, private, and NGO sector experts worldwide. For more information please consult Kaufmann et. al. (2010)

Figure 22 Distribution of Government Effectiveness



Source: Kaufmann, Kraay, and Zoido (2009)

Figure 21 suggests that government effectiveness in some parts of the world is not stable. While DRR sectors under the driving force of the Hyogo Framework for Action appear to be moving across the globe, the *government effectiveness* data show that quality in government services is highly volatile in some regions of the world, while in some regions (the green areas in the maps in Fig. 22) it exhibits relative stability. Russia, for instance, was perceived as moderate in 2003

but in 2008 its level returned to that of 1996. The same can be said for Indonesia, China, and certain Latin American states (see also Figure 22).

5.4.2. Corruption and Disaster Risk Reduction

Conventional understanding suggests that corruption challenges governments not only by depleting development resources, which in the end leads to poor development outcomes, but also by increasing vulnerability to disaster risks.[38] The correlation test above clearly shows that there is a correlation between disaster risk index and the control of corruption. A negative correlation (r = -.277 with confidence at 0.05%) indicates that an increase in the level of corruption control is associated with a decrease in disaster risk and vice versa (Table 17, see also Figure 23).

The overall institutional commitment to tackling underlying risk factors (HFA Priority 4) face real challenge including corruption. Figure 23 indicates that there is a significant correlation between corruption control and HFA 4 implementation (r = .415, significant at 0.01). Furthermore, results from Figure 23 below show that the greater the level of *corruption control*, the higher the quality in HFA 4 sectors (DRR through building code enforcement, risk-sensitive settlement planning including reduction in social-economic vulnerability, etc.).

The good news from the map (Fig. 24) is that some countries have managed to move from a state of high-level corruption to one of low-level corruption (indicated by an increase in corruption control). On the other hand, the bad news is that some countries could not manage to reduce corruption, as seen in Central Asia, Russia, and some African countries.

[38] See the views of James Lewis in Global Corruption Report 2005 p. 23.

Figure 23 Plot of Corruption and HFA 4

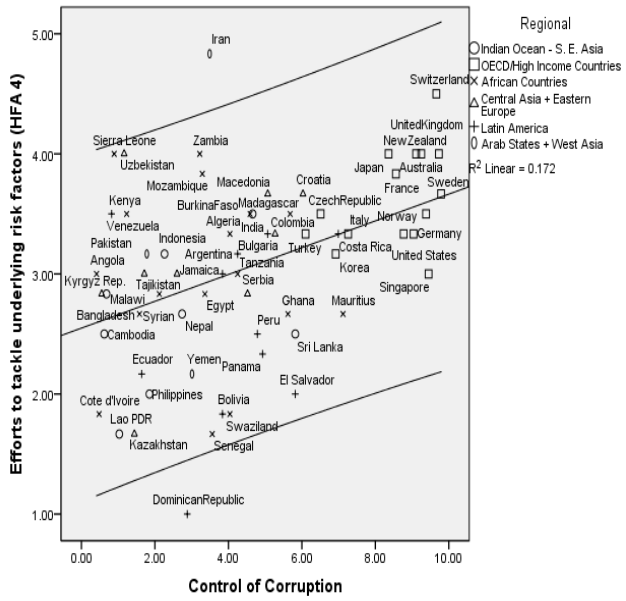
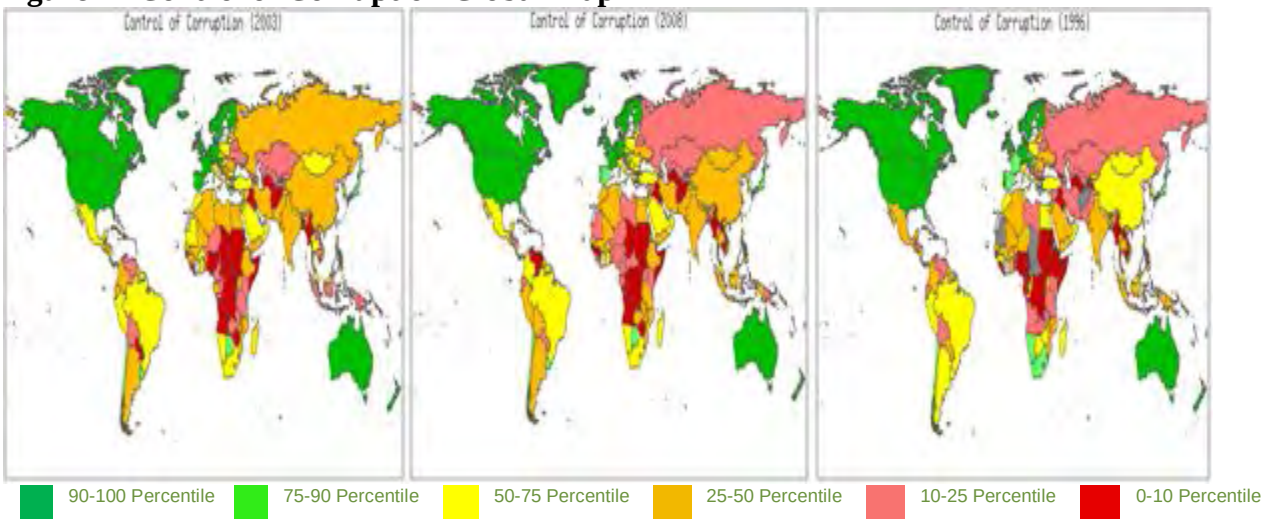


Figure 24 Control of Corruption Global Map



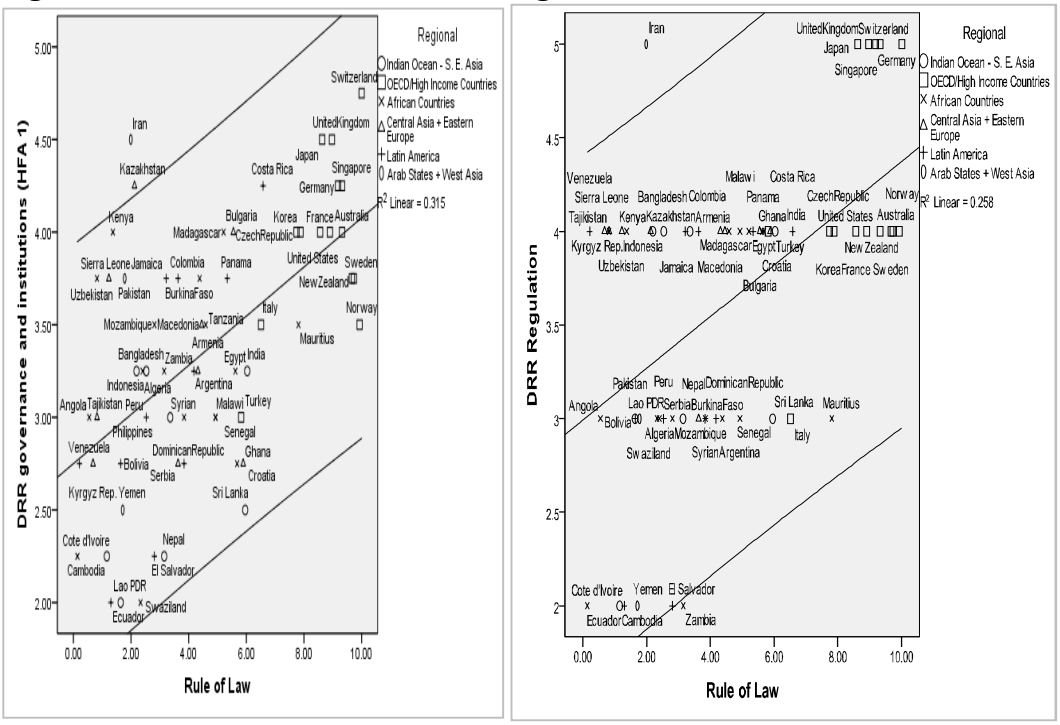
Source: Kaufmann, Kraay, and Zoido (2009)

5.4.3. Rule of Law and Disaster Risk Reduction

Rule of law is a very strong proxy indicator of the level of policy and legal enforcement because it relates to the quality of legal enforcement, the police, and the courts, among others. The plots below are based on rule of law standardized index of selected countries relative to the level of HFA priority 1 (i.e. DRR governance and institutions) as well as specifically HFA 1.1 (DRR Regulations). Apart from the outliers, Figure 25 (right) shows clearly that countries such as

Tajikistan, Venezuela, Indonesia, Bangladesh, and Colombia, along with many others, experience a serious lack of law enforcement. This brings a clear message that the achievement of legal formal laws/regulation of disaster risk management is one thing. However, the enforcement of DRR laws/regulation is quite another. Impediments to law enforcement including DRR laws/regulations are often influenced by the quality of the rule of law.

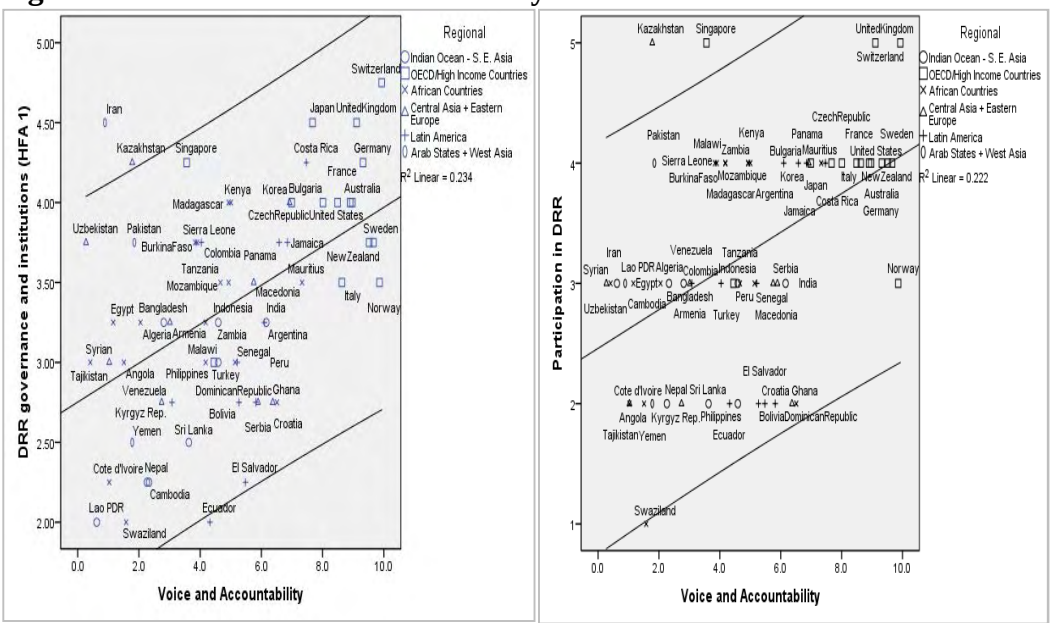
Figure 25 Plot Rule of Law vs. DRR Regulations



5.4.4. Voice and Accountability and Disaster Risk Reduction

The plot below (Fig. 26 right) is very insightful as it suggests that the overall trend of public participation in a country (coded by WGI as voice and accountability) strongly associated with the level of stakeholder participation in DRR sectors.

Figure 26 Plot Voice and Accountability vs. DRR Governance



Singapore is known to many as an undemocractic country where press freedom is low. However, the claim of its representatives that DRR sectors encourage stakeholder participation needs further investigation in order to determine how it becomes isolated from the macro setting where institutions tend to constrain press freedom and freedom of expression. The same can be said for Iran and Central Asia (Fig. 26 left and right). The plots suggest that improvement in participation in DRR sectors is less likely unless there is also improvement in the macroscale institutional setting regarding public participation in decision making and innovative approaches, such as community-based disaster risk reduction, as reported by some of the member states.

5.4.5. Regulatory Quality and Disaster Risk Reduction

"Regulatory quality" measures the capacity of the government to create and implement regulations/laws/policies that permit and promote sustainable development. Under the Hyogo Framework for Action, there is a global commitment to encourage the establishment of public–private partnerships (a.k.a. PPP) to better engage the private sector in DRR activities, such as by encouraging disaster prevention including through the allocation of resources to risk assessments and early warning systems.[39]

[39] See http://www.unisdr.org/eng/hfa/hfa.htm [last accessed 20 March 2010].

One can be sure that the countries' regulatory quality shapes the DRR regulatory quality. Overall, OECD countries enjoy better regulatory quality but do not always seek to improve DRR regulatory quality, as can be seen in Figure 27. Again, the discrepancy for Iran between its regulatory quality and the overall picture of the country's regulatory quality showed the widest gap among all the countries. The plot suggests that DRR regulatory quality is not independent from the countries' regulatory quality.

Figure 27 Plot Regulatory Quality vs. DRR Regulations

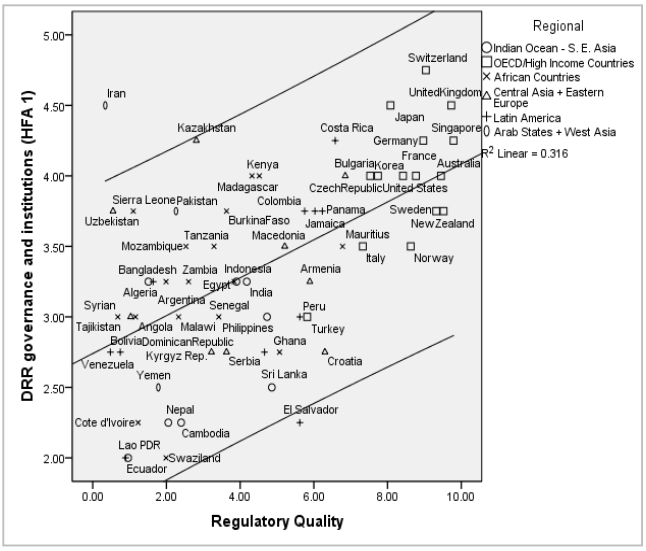
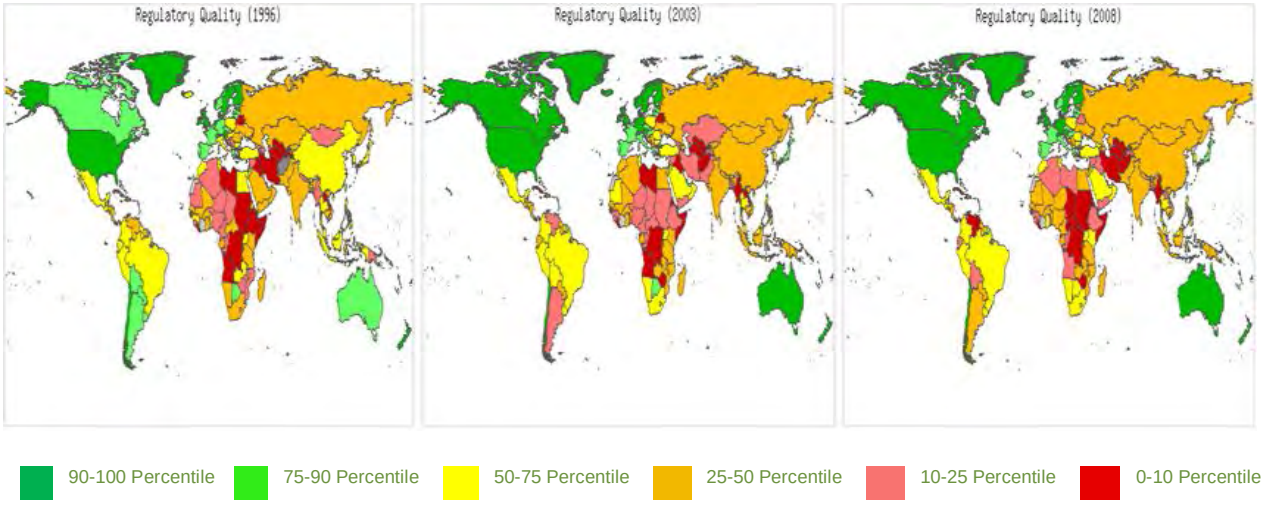


Figure 28 Regulatory Quality – Global Map



Source: Kaufmann, Kraay, and Zoido (2009).

Figure 28 shows that some countries emerged from a low level of regulatory quality in 1996 and 2003 to higher quality in 2008. Examples of this are Belarus, Libya, and Angola. However, other countries have regressed, such as Chad and Zimbabwe. Indonesia, Argentina, Bolivia, and Kazakhstan are some examples of middle-income countries that have experienced fluctuations in regulatory quality. The rest of Central Asia, Western Asia, and some African countries have also shown fluctuating patterns. Among the OECD countries, South Korea and Turkey are still located in the intermediate level for the regulatory quality index. Canada has moved to a much higher level today compared with that a decade ago.

5.5. Simple Regression Analysis for Institutional Vulnerability Index

Figure 29 is based on a model that predicts countries' institutional vulnerability index in the absence of information regarding DRR-specific institutions and governance. The "Specific DRR Institutional Index" is taken from the average value of 22 indicators of HFA Priorities 1-5. "Institutional Quality Index" is the average value from all six governance indicators. It suggests that even though some countries have claimed that their level of DRR policy and practice is very high (such as Iran, Uzbekistan, Sierra Leone, and many more), in fact, their actual level of enforcement should be questioned.

Annex 1 gives the regression model, which can be summarized as follows: $y = a + bx$, where intercept $a = 2.485$, constant $b = 0.153$, and x = Institutional Quality Index. Therefore, y or (Institutional Resilience Index) = 2.485 +0.153* Institutional Quality Index. A detailed result of this Institutional Quality Index can be seen in Annex 4.

Figure 29 shows the result of such an exercise. In this case, Institutional Vulnerability Index is the inverse value of Institutional Resilience and Capability Index (IVI = 1/IRCI).

This research uses the institutional/governance context where the DRR policy takes place in the vulnerability analysis. Figure 29 shows that, even when countries possess a good level of disaster management regulation, this does not reflect the total institutional resilience and capability of the country. In fact, countries can have excellent DRR regulations but, in terms of Institutional Vulnerability Index (measured by the inverse value "Institutional Resilience Index"), they can posit at a very low level that may reflect the prospects of implementation of countries' DRR policy. In this case, Figure 29 can be used to predict that Iran, Uzbekistan, Sierra Leone, and others must face serious questions regarding the implementation and enforcement of their disaster

management policy. Consequently, their disaster risk index is not likely to decrease, except perhaps for countries such as Syria for which more investigation is needed because information on Syrian's disaster risks and hazard exposure is very limited.[40]

Figure 29 Scatter Plots of Institutional Resilience, DRR Quality and DRI

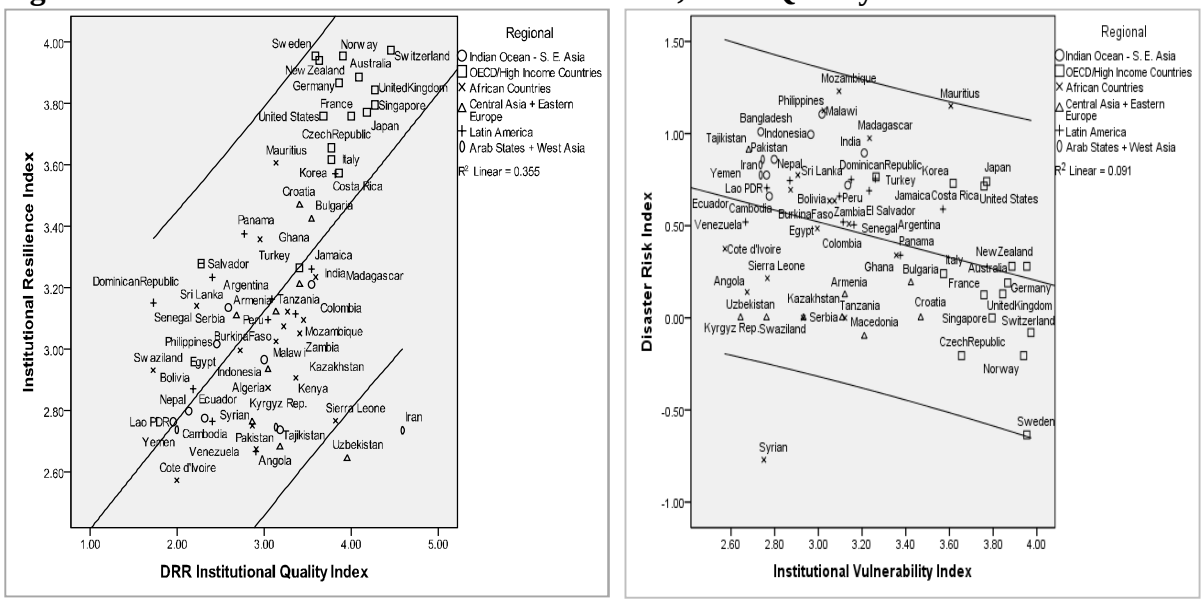


Figure 29 (right) above presents disaster risk index in relation to institutional vulnerability index (low value means high vulnerability, high value means low vulnerability). The correlation is good (r=-0.301, significant 0.05). Therefore, it can now be easier to predict the level of DRI on the basis of the institutional vulnerability index.

5.6. Discussion

Some evidence from the Caribbean (including Jamaica) can be interesting as Williams (2010)[41] has shown limited regulations on DRR in this region. Even though DRR legislation does exist, it is ineffective on action planning and actual implementation in disaster risk management. Furthermore, some national disaster management agencies do not have enough authority to

[40] Please consult the report from Ministry of Local Administration and Environment of Syrian Arab Republic at the link: http://www.preventionweb.net/files/7497_Syria.pdf. (Last access 10 Feb 2010).

[41] Williams, Michelle-Ann (2010) "Good Governance in Disaster Management in the Americas: Experiences from the Caribbean Emergency Legislation Project. IDRC Davos 2010.

implement policies. There is a greater need for information sharing on the risks and vulnerabilities associated with disasters generally. There is a lack of cohesion among response agencies and a need to strengthen the supporting agencies. In addition, there is a lack of national building codes and little or no direct allocation of funds for "natural disasters", even though the region is considered to contain middle-income countries.[42]

From the theoretical view of institutions, especially perspectives based on the New Institutional Economics, such as those of North (1998), corruption is seen as a variable that increases the transaction costs in reducing risk, such as through building code enforcement. Heinemann and Coppola (2007) maintain that corruption may amplify vulnerability in the sense that a building inspector may be bribed to neglect violations of building codes, the approval on poor building materials may result in structural weakness, and government officials may be redirecting funding earmarked for disaster mitigation or preparedness.

Corruption in formal systems of government has often been mentioned as the main factor that amplifies vulnerability to disaster risk (see UNDP 2004, Peduzzi 2009). Corruption has been considered as the root cause of the absence or poor enforcement of disaster reduction policy. DFID (2006:7) associated corruption with poor governance, which influences the ability of a country to mitigate and manage disaster risks as it claims that the so-called "natural disasters" are political, regardless of the naturalness of the hazards that trigger them. Furthermore, it argues that with corruption at the local level, especially in the case of the enforcement of building codes and land use planning, disaster mitigation cannot be achieved (DFID 2006:12).

Returning to Iran, the country is not the worst in terms of corruption control as there many more countries threatened by endemic corruption. From Figures 23 and 24 one can claim that it is still better to have a good disaster management policy, as Iran does, while maintaining a similar level of corruption control in comparison to countries such as Bolivia, Senegal, or the lowest placed Dominican Republic. This suggests that, even though corruption is bad and increases

[42] During one informal interview on 2 May 2010 at the Port Royal, near the capital Kingston, the author asked one of the tourist guide at the King's Royal Naval Dockyard whether the community have been prepared for the next earthquake or tsunami, given the freshness of earthquake in Haiti recently. The answer was "Lets pray that God will not do that." One week after the visit in Jamaica, there were riots as CNN broadcasted the condition. There was also nice reflection about how risk can be prioritized in Jamaica, as one Nepali professional argued: that people will be more willing to invest in live security (through paying security companies) as it is an everyday problem rather natural hazards such as tsunami or earthquake that comes in its 'cyclical' period.

vulnerability, the "second-best" option demonstrated by Iran is reasonable: try to set the best policy as you can on paper while gradually challenging endemic corruption.

But the disaster in Turkey in 1999 is often used as a great reminder of the role of corruption and its association with weak enforcement of building codes (see Kreimer, Arnold, and Carlin 2003 and Özerdem 2003). Stuart Millar[43] focused on the notion of "building mafia" to stress the role of corruption in the collapse of a school building in Turkey in 2003. In this case, corruption goes hand in hand with the context of rule of law (i.e. law enforcement) and government effectiveness. Of course, Turkey is not alone in this, as Wisner et al. (2004: 348) also mentioned El Salvador, India, and Japan in this context.

The collapse of 100,000 buildings in Haiti demonstrates how weak states (indicated by low regulatory quality, lack of rule of law, ineffective government) hampered by endemic corruption coupled with the absence of building codes eventually led to a perfect example of how institutional vulnerability may create conditions for higher disaster risks. It is also important to note that many sources have previously underlined the relationship among disaster risks, disaster mitigation policy, and the practice of corruption in the implementation of building codes (see DFID 2006, Heinemann and Coppola 2007, Kreimer, Arnold, and Carlin 2003, UNDP 2004, Ahrens and Rudolph 2006).

Nepal's HFA Report 2009 identified political stability as the highest obstacle. Nepal assessed its HFA achievement at Level 3, which means "Institutional commitment attained, but achievements are neither comprehensive nor substantial." It reflects that the status quo of its reactive response to disasters has been rooted in the Natural Disaster Relief Act in 1982, but the country experienced a painful social-political transformation during the last 15 years and there is a "lack of designated institutional mechanisms to address the DRR from national to local levels." However, to solve this problem, the country's representatives suggested that political stability should come first, while political commitment to DRR comes later along with activities such as "formulation and enactment of a new comprehensive act related to DRR" and specific DRR institutional reform.

To conclude this section, it is worth mentioning the complex interplay of all selected governance indicators, such as regulatory quality and government effectiveness, rule of law, participation,

[43] http://www.guardian.co.uk/world/2003/may/04/turkey.stuartmillar [last accessed 10 May 2010].

and press freedom on the one hand and the disaster risk reduction policy on the other hand, which together determine the quality of DRR institutions. It appears that governance variables are volatile in some context such as the Philippines and Indonesia (see also Chapter 7). From Figure 19 and 20 concerning the volatility of observed governance variables in some countries, one interesting conclusion can be made: the higher the institutional vulnerability, the more volatile the governance variables.

Chapter 6. Institutions and Disaster Risk Governance in Indonesia

6.1. Introduction

Indonesia is the largest archipelagic state in the world, with at least 17,000 islands, of which more than 7,500 have already been named[44] and about 6,000 are inhabited. Its unique position on the Pacific Ring of Fire leads to high exposure to recurrent natural hazards, such as earthquakes, tsunamis, and volcanic eruptions. About 10% of the world's volcanoes are situated in Indonesia.[45] Indonesia has a total population of 234 million[46] and nearly half of these inhabitants are now living in cities near or on the coast, which is associated with high exposure to coastal hazards such as tsunamis and floods, including coastal floods and storm surges.

6.1.1. Introduction to Hazard and Risk Context in Indonesia 1960-2009

On the basis of the Mortality Risk Index (hereafter MRI, i.e., the number of people killed per million inhabitants per year and people killed per year in absolute numbers), Indonesia has been classified as a high-risk country together with India, China, Bangladesh, and Myanmar, among others. The modeled multi-hazard MRI shows that Indonesia is a high-risk country that experiences disaster mortality greater than 1,000 deaths per year and annually more than 10 people killed per million inhabitants. The Mortality Risk Index (MRI) below is based on four composite hazards (earthquakes, cyclones, floods, and landslides – see Figure 30).

The increased disaster risks triggered by both geological and hydro-meteorological hazards, coupled with anthropogenic drivers throughout the Indonesian archipelago during the last 30 years, have caused at least US$21 billion in economic losses, affected 18 million people, and led to total casualties of 190,000, about 85% of which were caused by one single event, the Indian Ocean tsunami in 2004.[47] In the last 50 years, the total monetary loss is estimated at about US$24 billion, and at least 95% of the total loss occurred in 1996-2009. The highest losses were due to the 1997 forest fire and drought, for which direct economic losses almost double those of

[44] Source: Ministry of Home Affairs, http://www.depdagri.go.id/konten.php?nama=DataWilayah [accessed 1 Nov 2009].

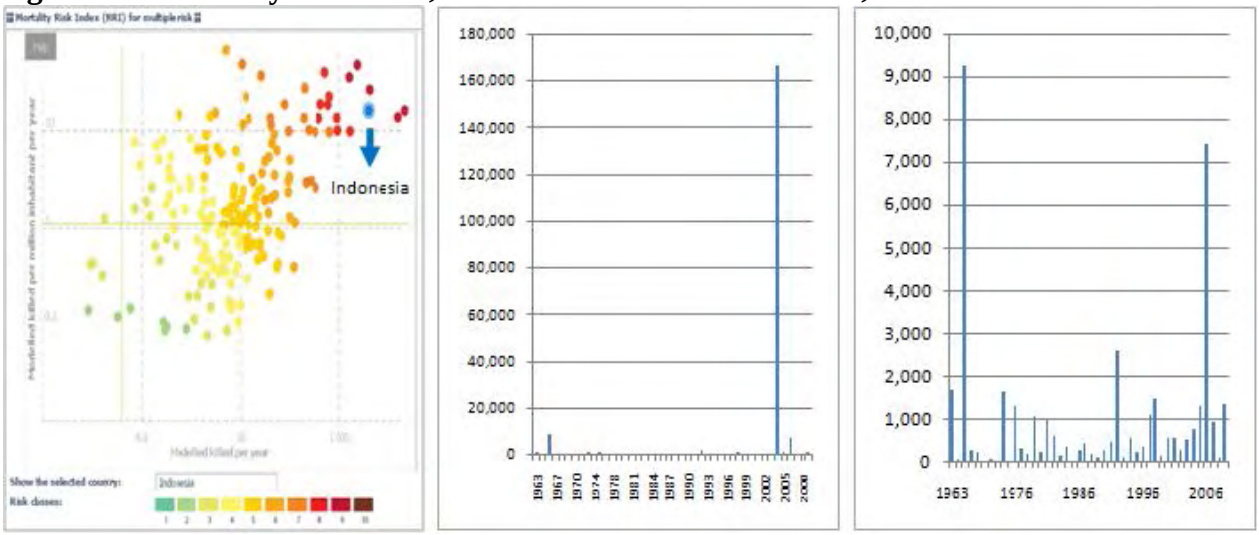
[45] See for instance: http://www.volcano.si.edu/world/region.cfm?rnum=06. [last accessed 6 June 2010].

[46] The formal figure is based on an estimated figure of 234.18 million people. Cited from Trends of Selected Socio-Economic Indicators of Indonesia by National Bureau of Statistics, October 2009.

[47] This data was developed from an online disaster database available at www.emdat.be managed by the Center for Research on the Epidemiology of Disasters (CRED) and combined with existing data available at the National Disaster Management Office 2009.

the Indian Ocean tsunami in 2004 in Aceh were reported. Going further back in history, the available disaster mortality statistics, such as CRED 2010, suggest that Indonesia's disasters peaked notably in 1966 (triggered by drought events that killed a total of 8,000 people and a volcanic eruption that killed more than 1,000).

Figure 30a Mortality risk index; b. recorded deaths 1960s-2009; c. without tsunami 2004



Source: GRDF 2009, Source: Data from CRED – EMDAT 2010.

The Indian Ocean tsunami in 2004 marked the highest recorded disaster mortality during the last 50 years, which killed about 170,000. Two years later in 2006, Indonesia experienced a devastating earthquake in Yogyakarta, which killed almost 6,000 people. Apart from the two big disasters known internationally, there were actually recent events that caused other big losses, such as in Aceh province alone, where flood hazards in 2006 affected more than 500,000 people (assessment report—World Bank 2007) and displaced 90,000 people from 757 villages, 46 sub-districts, and 7 districts. This produces a record in that, in 2006 alone, at least 1.5% of the more than 76,000 villages in Indonesia[48] were affected by flood hazards, which caused the death of at least 1,000 people nationally (own calculation)[49]. However, global databases such as CRED do not capture such events.

[48] In Statistical Book of the Year 2009 the figure was 76,546 villages.

[49] The calculation is based on the available database in the CRED combined with national data available from the disaster management office, combined with private data sources.

Recent policy documents such as the National Action Plan 2010-2012 and the National DRR Planning 2010-2014 document confirm Indonesia as a disaster-prone country. Both documents claim that, of about 490 cities/districts, at least 184 cities/districts are heavily exposed to earthquake risks, 60 cities/districts are prone to tsunami risks[50], 75 cities/districts are highly prone to volcanoes, 174 cities/districts are prone to both flood and landslide risk, and more than 150 cities/districts are prone to drought. Even though these figures seem to be a rough estimate and can potentially be misleading as disaster risks neither respect administrative boundaries nor exist because of hazard exposure alone. Almost all cities/districts are exposed to more than a single hazard. Vulnerability in terms of exposure to natural hazards is the main recognition of disaster risks in the public policy sphere.

6.1.2. **Vulnerability Context in Indonesia**

The size of Indonesia's economy has been maintained during the last ten years. In 2005, the GDP per capita (in terms of US$ purchasing power parity) was US$3,712. There has been a slight decrease in the poverty level during the last five years: 2005 (18% lived under the poverty line), 2006 (17.75%), and 2007 (16.58%). In 2008, those living in poverty comprised 15.42% of the total, with the actual number of poor people numbering 12.8 million in urban areas and 22.2 million in rural areas.[51] At least 6.7% of the people may not survive to the age of 40; this is equivalent to 14 million people.[52]

Eight percent of the adult population, namely, those aged 15 and above, are illiterate; this number is almost double the Belgian population or equivalent to 17 times the total population of East Timor today. About 40 million people or 20% do not have access to a clean water source.[53] There were 21 million children under 5 in 2008. In 2009, the Bureau of Statistics noted that a total of 28% of children under 5 are underweight, which is equivalent to at least 5 million.

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[50] This number is very conservative because in the "General Guidelines for Mitigation of Natural Disaster in Coastal Areas and Small Islands: Special Focus on Tsunami," published in 2003, it was clearly noted that around 60% of cities/towns (290 out of 490 cities/towns) are situated in earthquake-prone regions. Proceedings of International Seminar and Workshop on Tsunami: In Memoriam 120 Years of Krakatoa Eruption – Tsunami and Lessons Learned From Large Tsunamis. 26-29 August 2003 in Jakarta/Anyer (p. 195).

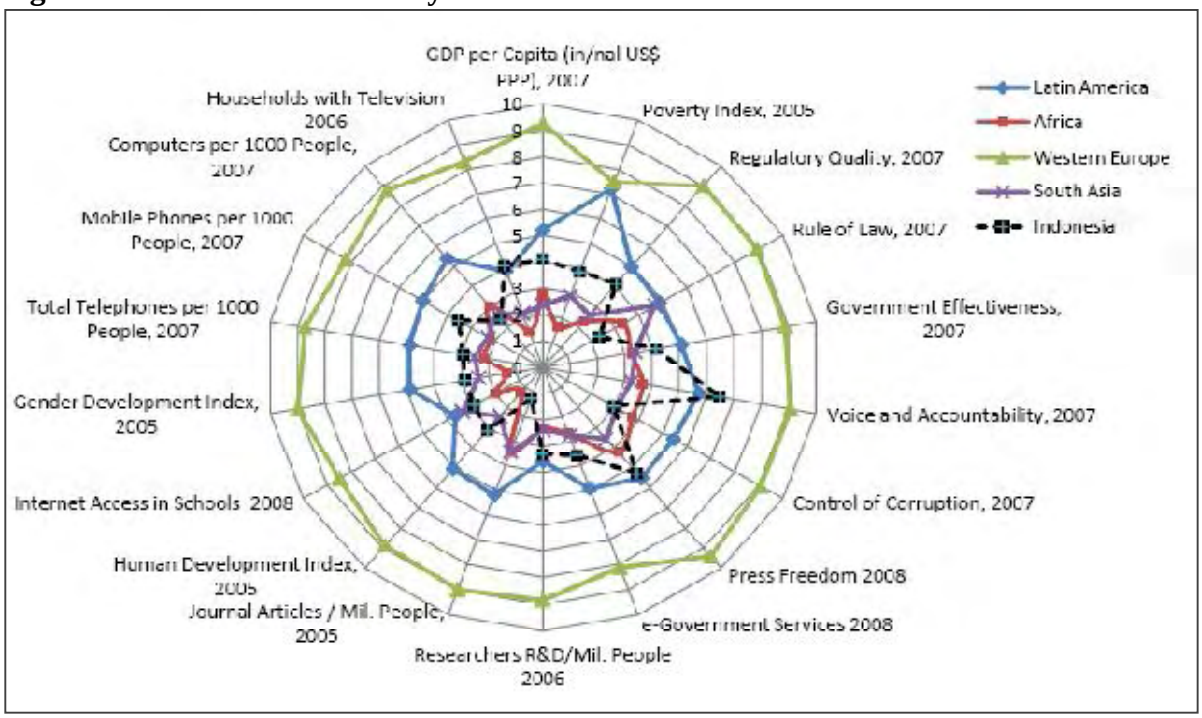
[51] Source: Data and Information Poverty, BPS 2009.

[52] One provocative question is that, if these deaths were to happen altogether in a particular time and place, would this be called a disaster or simply vulnerability, and why should this not qualify as a disaster?

[53] http://hdrstats.undp.org/en/countries/country_fact_sheets/cty_fs_IDN.html [accessed 1 June 2010].

As far as the human development index is concerned, Indonesia belongs to the medium group (after both very high and high human development groups). The country's Human Development Index (HDI) is 0.73, ranked 111 out of 158 countries in 2007. Life expectancy has shown a steady increase over the years and, for 2007, Indonesian life expectancy at birth was 70.5 years. The combined gross proportion enrolled in education is 68.2%, which is modest. In contrast to HDI, the Gender Development Index (GDI) was 99% of HDI in 2004. In terms of the Gender Development Index, Indonesia is better off than countries such as Afghanistan and most African countries, and slightly better off than the rest of South Asia. Still, there is a gender gap: although life expectancy at birth (for females as % of that of males) is 105.8, adult literacy at ages 15 and older (for females as % of that of males) is 93.3%. Fewer girls experience schooling compared to boys (relative proportion for combined primary, secondary, and tertiary gross enrolment is 96%). In terms of the ratio of female to male income, on average women enjoy only 44% of a man's salary (compared with Norway 77%, Singapore 53%, Saudi Arabia 27%, Jamaica 58%, for example). [54]

Figure 31 Selected Vulnerability and Resilience Indicators



Source: data from Knowledge Assessment Methodology and WGI 2009

[54] See the UNDP Report on Gender Empowerment Measure and its Components 2009 available at http://hdr.undp.org/en/media/HDR_2009_EN_Table_K.pdf. Last accessed 2 June 2010.

Figure 31 shows loosely defined multiple vulnerability and resilience indicators: the inward direction towards a score of 0 denotes vulnerability; the outward direction towards a score of 10 denotes resilience. In terms of telephones and mobile telephones per 1,000 people, Indonesia's value is greater than those in the rest of Africa and South Asia. On the other hand, there is a big gap to the rest of the world in Western Europe and Latin America. There are only three indicators where Indonesia is at the same level or higher on average than Latin America, which include values for TV ownership and press freedom. The importance of mentioning the context of information and telecommunication technology (ICT) is because in the existing vulnerability assessment, especially in the hazard research context such as tsunami early warning system, ICT plays important roles in both knowledge and information dissemination and disaster warning services (see for instance Birkmann 2006).

Another aspect of both vulnerability and resilience that is often overlooked and needs to be valued is the availability of e-government services[55]. The internet is available but there is limited use in government offices in various regions. Given the fact that there are about 6,000 occupied islands out of 17,000 in Indonesia), information and communication technology (ICT) can help to shorten the distances provided that the government and local government make use of available ICT for public services. On a scale of 1-7, Indonesia's e-Government Services Index is 3.55. In fact, Indonesia has almost 14 million Facebook members already[56], which is clearly an indication of the potential of e-government services (e.g. for disaster early warnings etc.). However, as predicted, e-bureaucracy is a new development that the government is about to implement. However, given the geographical difficulties of delivering risk knowledge and information services at low cost, e-government should be discussed.

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[55] This aspect received greater attention and reflection after fieldwork on Flores Island in Indonesia, especially in the Sikka district in June 2008, where the author visited the Kesbangpol Office for issuance of permission for research (i.e. Office for Political Development Unit - which was sometimes, especially in the 1990s, the host of the local disaster management response office). The author had a dialogue with the head of the office who admitted that the office had neither the copy of the Disaster Management Law 24/2007 nor was aware of the legislation process of Disaster Management Regulation at the provincial level for 2008. Therefore, the author shared the PDF files of the law with the office. As a result, the research permit was issued quickly after the PDF file sharing. In a recent visit to the district (during 29 Oct – 2 Nov 2010), it was found that local DRR stakeholders still do not have the files. In a visit to a new local disaster management office, the head of prevention unit admitted that till today, the copy of the law and new local regulation concerning disaster management have been barely available in the office due to limited resources.

[56] The Facebook's function as social network tool that facilitate disaster warning and post disaster community response especially the case of Merapi volcano eruption in late October till mid November 2010 has been remarkably mentioned by many Indonesia friends and colleagues who were based in Yogyakarta city.

The extent to which the institutional quality indicators (such as rule of law, voice and accountability, press freedom, government effectiveness, regulatory quality, and corruption control) have implications for the overall vulnerability and disaster risk reduction have been discussed in the previous chapters.

Figure 32 Administrative Map of Indonesia

Source: www.mapsofworld.com

It is clear that Indonesia needs improvement in reducing its social-economic vulnerabilities and that, in order to do this, it needs changes in its institutions or new institutional arrangements where social-economic problems can be reduced and where social-economic capacity can be built towards resilience to disaster risks. What is also important is that institutions place such resources (human, economic, social-cultural, infrastructure assets) gained from development processes in risk-exposed areas without taking measures to reduce the risks.

6.2. Phases of Indonesia Disaster Management Institutions

Disaster risk management (DRM) policy in Indonesia can be divided into six different eras. The first era is the colonial emergency policy created at the end of the 1930s. The second era is demarcated from independence in 1945 until the early 1960s (see Table 18). The 1960s-1990 can be considered as the third period. The fourth era started in 1990, at the beginning of the formal

IDNDR period. At the end of the IDNDR era, Indonesia entered its fifth phase of DRM policy during 2000-2007.

Table 18 Phases of Disaster Risk Management Policy and Regulation in Indonesia

Phases	Name of Law/Regulation	Remarks
Colonial Emergency Policy 1930s - 1945	Regeling op de Staat van Oorlog en van Beleg a.k.a. SOB 1939. This was later formally cancelled 12 years after independence through Law 74/1957	This regulated war emergencies and extraordinary emergency wars. Officially, it co-existed with Emergency Law 6/1946 for 11 years till 1957.
1945-1960	Law 6/1946 on Emergency Situation (or *Bahaya*), The amendment of Emergency Situation Law 1/1948, and Law 30/1948 on Transfer of Full Sovereignty to the President during Danger Situation	Regulated emergency situation due to war and **natural disasters** – the original law 6/1946 acknowledged civil society actors as an alternative power to deal with emergency.
1960-1990	Keppres* 54/1961; 312/1965 regarding Central Committee for Natural Disaster Shelter; Keppress* 256/1966 and Cabinet Presidium Decision 14/U/Kep/1/1967 on Coordinating Team for Natural Disaster Management Implementation; Advisory Agency on Natural Disaster Management Keppres 256/1966; Keppres 28/1979 - National Coordinating Agency for DM	Ad hoc emergency response committees for **natural** disasters – government-centric. Three revisions of DM regulation during 1965-1967 due to large-scale and nation-wide impact of El Nino-driven drought as well as the eruption of a volcano
1990-2000	Keppres 43/1990 - National Coordinating Council for Disaster Management; Keppres 106/1999 - National Coordinating Council for Disaster Management	A shift to re-acknowledge manmade disasters. It suggested considering both natural and manmade disasters. This coincided with the IDNDR period.
2001-2007	Perpres** 3/2007 on Amendment of Perpres** 83/2005 National Coordinating Council for Disaster Management; Perpres 83/2005 - National Coordinating Council for Disaster Management; Keppres 111/2001 Amendment of Keppres 111/2001; Keppres 3/2001 - National Coordinating Council for Disaster Management and Internally Displaced People	2001 amendments of Presidential Decree were made to accommodate the need for aid distribution to internally displaced people during 1998-2002. The 2007 amendments were related to catastrophic events such as the Indian Ocean tsunami in 2004 and the devastating earthquake in Yogyakarta in 2006.
2007 onwards	Disaster Management Law 24/2007 enforced at national level through Presidential Regulation 08/2008 regarding NDMA; PP*** 23/2008 regarding Roles of International Agency and INGOs in DM; PP*** 22/2008 on Budgeting and Management of Disaster Aid and PP 21-2008 DM Implementation/Operational	Long deliberative processes since 2005 with hundreds of meetings/public debates/hearings/consultations. Drafts provided by many different sources, with local and international support behind the scenes. See section 6.5 for more detail explanation.

*Keppres = President's Decree; **Perpres = Presidential Regulation; ***PP is Government Regulation.

The year 2007 onwards is known as the Indonesian DRR reform era because there were dramatic shifts in the form of regulation, evidence of a big push to implement the new disaster management law, and, for the first time, the government started to set a clearer vision of disaster risk management as it clams to depart from reactive response to be more proactive in reducing

risks *ex ante* disaster emergency events.[57] The following sub-sections describe the details of each phase of DRM policy in Indonesia.

6.2.1. **Disaster Management Institutions in Colonial Period**

The colonial emergency management policy was also known as *Regeling op de Staat van Oorlog en van Beleg* (a.k.a. SOB 1939). It was an important piece of legislation that determined disaster management and emergency policy in Indonesia for the next 20 years after independence in 1945 and its influence can be tracked during the New Order period (see 6.2.3). The SOB 1939 regulated states of emergency that might arise from acts of external agents (mainly external siege by foreign forces in the beginning of World War II). SOB 1939 distinguished between two different situations: the *Staat van Oorlog* (SvO) declared an ordinary war situation and the *Staat van Beleg* was activated under extraordinary conditions of a war emergency.[58]

For both conditions, the general governor had no obligation to seek permission from volksraad or legislative body (see fuller discussion in Hariyono 2008:24-34) in times of emergency. The links between emergency and mitigation policy in the Netherlands and its colony of the Netherlands East Indies (i.e., Indonesia) will not be discussed; however, study of such links is well recommended for further scientific investigation.

In the Bulletin of Volcanology,[59] December, 1949, the former leader of the Netherlands East Indies Volcanological Survey, Mr. van Bemmelen, published a "Report on the Volcanic Activity and Volcanological Research in Indonesia during the Period 1936–1948". It was somewhat incomplete for the whole East Indies but relatively comprehensive when compared with other colonial affairs data, as all information on Java was complete, including the activities of its volcanoes. At least 33 volcanic eruptions during 1936-1948 were recorded with at least 38 written reports. In fact, the Indonesian Geological Agency still maintains and improves the data

[57] See DM Law 24/2007. See also the White Paper in Pujiono 2005.

[58] The original term was *bahaya*, which means danger. However, in today's language, 'emergency' is used instead of 'danger'. Hariyono (2008) is based on a PhD thesis dedicated to investigating the implementation of emergency status in Indonesia during colonial times and after independence.

[59] This journal is published under the auspices of the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI), which was established 85 years ago. See http://www.iavcei.org/ [accessed 7 May 2010].

produced in the early 1940s. Out of 80 Category A volcanoes[60] known today, 71 had been reported in 1941 (see also the detailed report from van Bemmelen 1949). Recent data on volcanoes in Indonesia according to the classification system of A, B,[61] and C[62] are as follows: 80 (71 in 1941), 28 (38 in 1941), and 21 (40 in 1941), respectively.

This research did not seek evidence on how the colonial institutions made use of volcano risk knowledge to undertake mitigation. However, a few notes from van Bemmelen explained how thankful the Resident of West Timor to the Bureau Chief of Mines in Batavia (now Jakarta) in June, 1948, was for the services of the Volcanological Survey scientist to calm down "the alarmed population, and for the efficient precautionary measures proposed … … to the local government officers" (van Bemmelen 1949:28).

In terms of investment in science, the colonial government was far more advanced in comparison with the later new government of Indonesia, especially during the period of 1945-1960s. It was not simply the lack of human resources but also the radical change in the organizational and institutional "template" (e.g. leadership, bureaucracy's epistemic culture[63], national institutions etc.) that set back the young state for quite some time.

Another obvious reason for the discontinuity of institutions dealing with geo-risks is the multiple displacements of the Geological Agency and its volcanological survey over a period of more than 30 years. The Geological Agency during 1945-1946 was under the management of the Ministry of Public Works. During 1946-1947, it went under the management of the Wealth Minister. During 1949-1950, it went under the remit of the Wealth and Industrial Ministry. During 1952-1957, it went under the remit of the Ministry of Economy. During 1957-1959, it went under the remit of the Industrial Ministry and, in 1966-1974, it went under the remit of the Department of Ministry of Trade and Mining. It enjoyed stability during 1974-1992 as it was administered by

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[60] Volcanoes that, since 1600 A.D., showed magmatic eruptions or periods of increased volcanic activity.

[61] Volcanoes in fumarolic stage since 1600 A.D. No magmatic eruptions have been registered.

[62] No registered activity but can be considered active with weak indications of *solfatara* (volcanic gases dominated by sulphur) and *fumarola* (a.k.a. hotspring i.e. the an opening in the neighborhood of volcano that emits steam and gases). See Global Volcanism Program at http://www.volcano.si.edu. Last accessed 15 October 2010.

[63] See Epistemic Cultures are "cultures that create and warrant knowledge" and according to Knorr-Cetina (1999). "the premier knowledge institution throughout the world is, still, science." This means that science only one out of many the knowledge institutions available. Traditions and religion can partially be other type of knowledge institutions. To the author's knowledge, no study available regarding the Epistemic Culture within the Geological Agency during and after the colonial era. But it can be said that epistemic culture in both colonial and post colonial era must be very different.

the Ministry of Mining. In 1992, the government changed this institution from the Ministry of Mining to the Ministry of Energy and Mineral Resources.

One issue that is almost forgotten is the case of Krakatoa in 1883, which is probably one of the largest emergency relief operations in the Dutch colonial government's history, in terms of post-natural disaster emergency response. It would be incorrect to say that the Netherlands East Indies government disregarded the importance of dealing with natural disasters given the absence of specific notes in the SOB 1939 to cover natural disasters. In fact, the opposite might be the case in that the colonial government learned from the Krakatoa eruption on 27 August, 1883: one month after a catastrophic eruption and tsunami, while people were still dealing with the emergency operations, such as burying dead bodies and clearing ruins, rebellion actually took place in Serang, Banten Province. Such a rebellion reemerged at greater intensity five years later. Winchester (2003) asked the question of whether social change after the Krakatoa disaster (e.g. the fading of the influence of the colonial government, the loss of its self-confidence after the Krakatoa disaster, and the rise of Banten peasant's revolt backed up by Islamic teachers and *hajjis*) in Banten, which later propagated the spirit of anti-colonialism elsewhere, might have triggered movement in the rest of Java (see Winchester 2003:334-445). The teachers and *hajjis* applied religious explanations about divine punishment to the colonial government as well as the Banten people who served this non-believing government. Kartodirdjo (1966) stated that the revolts were due to the misery directly caused by exploitation through the colonial system and later severely amplified by the Krakatoa tsunami in 1883 that swept through Banten's coastal communities.

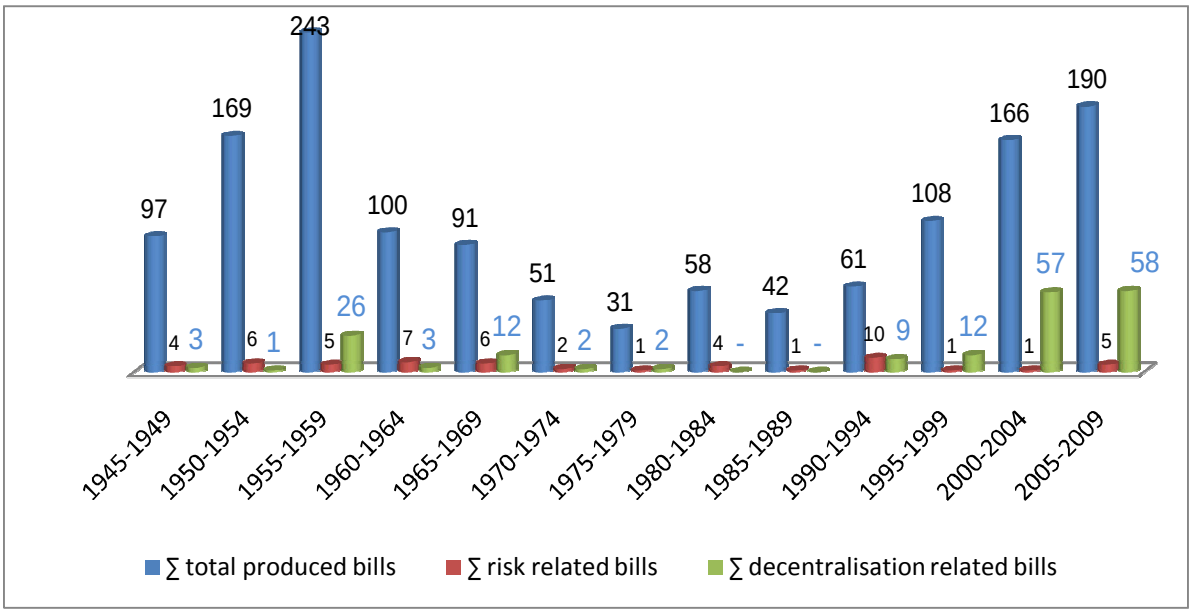
In other words, disasters weaken institutions; in addition, vulnerable institutions may lose their power after disasters, which can initiate a vicious circle. In fact, in the United States during the 1960s, government-supported disaster sociologists tried to understand people's behavior during disasters, which was to enable the government to take measures and provide remedies to reduce the surprise effects and people's aggression towards government institutions after disasters.[64]

6.2.2. Indonesian Disaster Management Policy 1946-1960s

[64] See for instance the pattern of war approach and military orientation of disaster inquiry during the Cold War period as noted by Claudia Gilbert (2005).

One year after independence in 1946, the young state started to regulate emergency management by taking natural disasters into account in addition to manmade emergencies through National Law 6/1946. There are important lessons from Law No 6/1946. Firstly, surprisingly, from early on and before the nation experienced its first authoritarian regime, in the so-called Old Order period, the government acknowledged the power of civil society actors, especially the prominent Islamic organizations, as civil stakeholders to deal with emergencies. Furthermore, as another interpretation to the law, it accepted a great deal of influence of civil bureaucrats and early civil society organizations in the drafting of the law by bringing in other actors to tackle potential *bahaya*[65] and there were demands not to hand all the power to the military in emergencies (including those caused by natural disasters; see Hariyono 2008:39).

Figure 33 Laws and Risk-Related Laws Produced During 1945-2009



Source: data derived manually from Supreme Court Legislation Database

Law 6/1946 marked the first attention paid by the very young government to natural disasters, and their assignment as the fourth external agent that might be a threat to the young nation (along with external attacks by foreign military, potential attacks by a latent enemy, and riots that might take place beyond the civilian government's capacity to control). The law gave the authority for emergency management the National Defense Council which comprised of the prime minister[66]

[65] The direct translation is *danger* but can mean *emergency*.

[66] In its early period, Indonesia had a prime minster, but this system has not been in use for 60 years.

and relevant ministries, three civil society organization representatives (mainly faith-based), and the military commander. It stated that the president could declare a dangerous situation to the nation that may arise from natural disasters.[67] However, Law No. 6/1946 was short-lived and soon became redundant, an example of 'institutional mortality', a term coined here to explain either abandoned laws produced by the government (hence, waste investment) or the absence of law enforcement at all levels. When the first regime under President Sukarno became authoritarian, the law was amended by Law 1/1948 and later Law 30/1948 regarding the transfer of full sovereignty to the president during states of national emergency.

This can be considered the second form of disaster governance in Indonesia, when the design of emergency laws was driven by post-Second World War logic, and when emergency management heavily focused on attacks from either foreign powers and/or civil war. There was very little paradigm shift towards the need for natural hazard management (pre and post disasters) because, during this period, apart from a large-scale eruption of Kelud volcano[68] in 1951, which only attracted scientists, there were no significant "focusing events" that triggered a policy and political response (see Birkland 1996)[69] towards the management of natural hazards.

During the period of 1945-1959, the focus of the national governments was fully on building a nation state and most priorities were focused on the *nitty-gritty* of various sectoral legislation developments and legislation products related to the formation of new administrative units throughout Indonesia: as Figure 33 shows, at least 30 pieces of legislation related to regional formations were produced during 1945-1959. During this period, the legislative authorities produced a total of 509 laws, the highest number in Indonesian history, of which dozens were risk-related laws, including laws on accidents, emergency pharmacy, and states of emergency law. All laws had to refer to the Indonesian Constitution of 1945 as the highest law in the country[70], which still holds today, as the legal basis for any legislation. In such a transitional

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[67] See Article 1-d, UU 6/1946 about dangerous situations.

[68] Situated in East Java, see the map in Chapter 6.

[69] See the theory of disaster as a focusing event by Thomas Birkland (1996) p. 221-243.

[70] According to the formal institutional hierarchy (i.e., hierarchies of formal laws and regulations) in Indonesia, the highest of all legal formal products is the National Constitution of the Republic of Indonesia 1945, often called UUD 1945. Below the constitution are the laws – the first steps created to achieve the vision of the constitution – often products created by both executive and legislative branches of government. To make the laws operational, horizontal enforcement at the national level is needed through several mechanisms, via the creation of presidential regulation,

period, the national institutions were very vulnerable, therefore, in order that the nation to be resilient to external shocks, institution building through formal laws and regulations can be seen as a necessity to national resilience building.

In the mid-1950s, the government produced a Five Year Development Plan 1956-1960 document, one of the earliest development policy documents that revealed early recognition of disaster risk within a development context.[71] There are at least two important written messages: an awareness regarding the roles of forest ecosystem services to mitigate disaster risk[72] and post-disaster policy mandated to the social service sector to provide assistance for the people affected by natural disasters, conflicts, wildfire hazards, displaced persons, and the victims of attacks by dangerous animals and beasts.[73]

Changes occurred in the 1960s when some regulatory tools related to disaster response were produced. At least five organizations related to disaster response were produced during this period, such as the Central Committee for Natural Disaster Shelter[74], the Advisory Agency on Natural Disaster Management[75], and the Coordinating Team for Natural Disaster Management Implementation.[76] All these agencies were ad hoc in nature. However, in practice, things stayed the same because these agencies were merely reactive to disaster events; there is barely evidence that they comprised an ad hoc structure that could act prior to events.[77] (See Pujiono 2005)

6.2.3. Indonesian Disaster Management Policy 1960s-1990

national government regulation, or presidential decrees. Without this horizontal enforcement, any enacted law remains paralyzed or useless (see Box 2).

[71] Five Year Development Plan (FYDP) 1956-1960 in UU 85/1958 signed by President of the Republic of Indonesia on 27 Dec 1958 (Jakarta) Source: LN 1958/161; TLN No. 1689.

[72] FYDP1956-1960 Page 27. It does not mention flood mitigation but simply disaster.

[73] (FYDP) 1956-1960 143

[74] See Presidential Decree - hereafter Kepress - No 54/1961 and 312/1965 and also Presidential Decree 256/1966.

[75] Based on Keppres 256/1966.

[76] The Cabinet Presidium Decision 14/U/Kep/1/1967.

[77] Workshop Proceeding: Increasing Efforts for Natural Disaster Management. Jakarta 12-14 July, 1976. Published by Direktorat Urusan Korban Bencana Alam, Direktorat Jenderal Bantuan Sosial, Department Sosial, Jakarta 1976

During the 1960s there were some natural hazards with catastrophic effects, such as the Mount Agung eruption in Bali (see Bali in Figure 32 above), which killed about 1,600 people in February 1963; the severity of El Nino drought-related events resulted in about 8,000 deaths in 1966; in the same year, Mount Kelud erupted again, which resulted in the deaths of about 200 people.[78] Its eruption in 1966 was far less intense than the eruption in 1856, when lahars[79] were emitted that killed 10,000 people. The different numbers of deaths are not because of better policy or better capacity in volcano preparedness in 1966, but simply different scales and characters of the eruptions; clearly, the magnitude and characteristics of hazards play roles in shaping the risks (See e.g. Alexander 1993).

There was a paradigm shift from war/conflict to "natural" disasters during the 1960s, which can be considered an achievement of institutional change, the main cause of which was probably an increase in the number of natural hazard events that drew some attention from the government. However, in terms of manmade disasters, this was probably the worst period in the nation's history. The second half of the 1960s was a bad time in Indonesian politics. With the fall of the Old Order regime under Sukarno's presidency and the coming of the New Order regime under General Suharto, Indonesia experienced a high level of political instability during 1965-1970. During 1965-1966, many political scientists have asserted that political conflict caused a total of about 500,000 deaths[80], especially among those associated with the Indonesian Communist Party. Such a catastrophic number is obviously greater than the result of any single natural hazard that has occurred in Indonesia, and even worse than the combination of all the total losses of life triggered by natural hazards during the last 50 years in the country.

It is understandable that knowledge on disaster risk management during the 1960s was lacking as elsewhere in the world and more lacking in the developing world. Few scientific conferences took place during this period, but some international reports regarding geological expeditions in

[78] In CRED database 2006, it is claimed that there were about 1,000 deaths from the 1966 eruption. However, this figure cannot be confirmed by many sources related to volcano studies.

[79] Lahar is an Indonesian term for a volcanic mudflow, which has become an internationally recognized term. Please consult http://www.geology.sdsu.edu/how_volcanoes_work/Lahars.html [last accessed 18 August 2010].

[80] Between 100,000 and 2 million people deaths occurred according to McGregor 2009. However, she preferred to follow one estimate of 500,000, which is the most common estimate. See McGregor, Katharine (2009) The Indonesian Killings of 1965-1966.Online Encyclopedia of Mass Violence: www.massviolence.org/IMG/article_PDF/The-Indonesian-Killings-of-1965-1966.pdf (last accessed 1 June 2010).

Indonesia during the 1960s are available. For instance, a volcanological mission from UNESCO[81] studied volcano-associated risks in Indonesia. At the national level, knowledge accumulation was achieved at a very low rate and one of the problems was that the government of the 1960s was not able to capitalize on all the knowledge produced by technical agencies such as the Geological Agency (established in the 1850s, which later created its volcanological research division (*Volcanologisch Onderzoek*), in 1922 as well as a the meteorological office, established in 1866). The Geological Agency emerged from the "Volcanological Survey of the Netherlands East Indies." [82] In addition, these kinds of technical organization suffered with the discontinuity of support from the Dutch Government, which occurred at the end of 1949 after the handover from the Dutch government following the decision to grant full independence after an agreement in 1949.

Natural events such as volcanic eruptions during the 1970s did not appear to be on the same scale (in terms of impacts such as loss of life and damage) as those in the 1960s. However, it was mainly that all large-scale natural hazards in the 1970s happened on remote islands or away from Java; the major event that was closest to the country's administrative and population centers was in Bali, while others happened on Flores and in the West Papua region (see map in Figure 32)[83]. In the Flores region in 1973, there was a cyclone that killed about 1,600 people according to EMDAT 2006.[84] In 1976, there were modest earthquakes in Bali and West Papua, which in sum caused over 1,000 casualties. In July, 1979, there was a large-scale event of a landslide-triggered tsunami on Lembata Island, Eastern Flores, which killed more than 500 people according to different sources. Five months before that, less than 100 kilometers away and also in the Eastern

[81] See Haroun Tazieff, Giorgio Marinelli, Gorshkov (1966) Indonesia Volcanological Mission, A Preliminary Report. Unesco Paris.

[82] Please consult http://www.bgl.esdm.go.id/ (last accessed Feb 2009).

[83] During 1979, West Papua and Papua regions were in the same administrative unit of West Papua.

[84] See the history of cyclone tracking from the Australian Met Office: http://www.bom.gov.au/cgi-bin/silo/cyclones.cgi (last accessed 1 June 2010).

Flores district, flash floods and *lahars*[85] swept away 50% of Larantuka Town situated beneath the dormant Ile Mandiri volcano mount.[86]

Given the history of ASEAN Cooperation on Disaster Management, disaster policymaking in Indonesia during the 1970s was not completely isolated from regional and international processes. In 1971, disaster management experts in the ASEAN region formed the ASEAN Expert Group on Disaster Management (AEGDM) and met every two years. In five years, the issue of regional cooperation in the field of disaster management was adopted as one of several ASEAN objectives and principles stipulated in the Declaration of ASEAN Concord I. This was further manifested as the ASEAN Declaration on Mutual Assistance on Natural Disasters in June, 1976.[87]

The Declaration of ASEAN Concord (Bali Concord I), adopted on 24 February, 1976, further stressed the need for cooperation in disaster management within ASEAN. One of its eight principles and objectives was as follows: "natural disasters and other major calamities can retard the pace of development of member states; therefore, they shall extend, within their capabilities, assistance for relief of member states in distress." The agreement was known as ASEAN Declaration on Mutual Assistance on Natural Disasters – signed in Manila on 26 June, 1976. Looking at the driver behind these initiatives, it was partly in the United States' interest to fund such kinds of declaration as soft mechanisms to control the influence of communism in the region in this Cold War period (See e.g. Buszynski 1992).

Indonesia's approach to the structure of disaster risk management shared a similar history to those of other Southeast Asian countries, such as the Philippines. In the Philippines, following the earthquake of 1968, the Civil Defense Administration was pushed to create an ad hoc structure called the "National Committee on Disaster Operation" (based on the Administrative Order No. 151, 1968). This was later changed following the Sening typhoon that devastated the Bicol Region and inundated metropolitan Manila for almost three months, which placed great pressure

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[85] United States Geological Survey recognized this as an Indonesian term which means "mudflows and debris flows that originate from the slopes of a volcano" http://vulcan.wr.usgs.gov/Glossary/Lahars/description_lahars.html - (last access on 10 Oct 2010).

[86] For Lembata, CRED gave a death toll of 539. The International Herald Tribune of 23 July, 1979, reported 700 deaths and revised the figure a day later to 539 based on the formal report from the local government of 539 deaths with 364 missing (see Jeffery 1981:1). Another field source mentioned 84 deaths and 322 missing. For Larantuka and Lembata disasters, please consult http://ntt-academia.org/nttstudies/LLlassa2009.pdf [last accessed 1 Jan 2010].

[87] http://www.disaster.go.th/html/ricb/foreign/2006/acdm/background/acdm_tor.html [last accessed June 2009].

on the government to create a National Disaster Control Center. The Civil Defense Administration era was superseded by the new Office of Civil Defense, which was to ensure protection of people during calamities. However, in 1978, a presidential decree (No. 1566) provided a new milestone for the establishment of a structure of disaster management, namely, the National Disaster Coordination Council (NDCC) including regional and local structures. The NDCC under the presidential decree lasted for 32 years until the country changed its institutional structure (namely, the National Disaster Risk Reduction and Management Council) through the new Disaster Risk Reduction and Management Act in February, 2010.[88]

Returning to Indonesia in July, 1976, one of the first recorded national multidisciplinary workshops on disaster risk management was held in Jakarta, and was attended by stakeholders such as the National Development Planning Ministry, the Health Department, the Finance Minister, the Office of Meteorology and Geophysics, the Geological Survey, the Indonesian Red Cross, and international players such as the United Nations Development Program and USAID - one of the main sponsors of the ASEAN agreement.[89] Only one multilateral agency, the UNDP, presented a paper related to "pre-disaster planning and relief instruction" and some national organizations started to argue on the need for disaster mitigation.[90]

Table 18 seems to suggest a shift of institutional focus from manmade disasters (such as war/conflict) in the earlier period to natural hazards (often misperceived as natural disasters) in the 1960s, which lasted to 1990. This can be interpreted as a dramatic change of focus towards natural hazards, especially when a presidential decree was finally issued in 1979. The 1979 disaster management regulation placed emphasis on natural disasters. Disaster risk management activities during this period were reactive emergency response and recovery as indicated by the decree. The structure often got activated after disasters (Pujiono 2005). The organizational format of the "National Coordination Agency" lasted for almost 30 years (with different names from time to time – either "National Coordination Agency" or "natural disaster management", or "disaster management" or "disaster management and internally displaced people."), but it was

[88] See the information at http://ndcc.gov.ph/home/index.php [last accessed 10 June 2010].

[89] This is indicative of some conference proceedings and meetings in the 1970s and the early 1980s.

[90] See page 14 Workshop Proceeding: Increasing Efforts for Natural Disaster Management. Jakarta 12-14 July, 1976. Published by Direktorat Urusan Korban Bencana Alam, Direktorat Jenderal Bantuan Sosial, Department Sosial, Jakarta 1976.

succeeded by the new format of the National Disaster Management Office in 2008 as stipulated in Disaster Management Law 24/2007, three years after the Hyogo Declaration.

The national disaster management institutions were partially dormant because of either a lack of natural disaster events during the 1970s or the remoteness of the events from Jakarta that did occur. There was no significant institutional change from the second half of the 1960s until the end of the 1970s, when, in 1979, the government suddenly produced a presidential decree regarding the National Coordinating Council[91] on Natural Disaster Management (a.k.a. Keppres 28/1979).

From ignorance of the need to manage natural hazards before the 1960s, it was now committed to more serious actions. This was an indirect product of a discursive change on the need to have a fixed structure to manage natural disasters, which had some roots in the ASEAN regional workshops on disaster management during the 1970s. The details of how this change happened are subject to further academic investigation, but the organizational change only happened at the surface with a shift from ad hoc committees to a coordinating body that could organize all disaster cycles (in accordance with Cuny and Abrams's cycles of prevention, mitigation, preparedness, emergency, rehabilitation, and reconstruction – See Cuny and Abrams 1983). Presidential Decree 28/1979 had the noble objective of taking natural hazard management more seriously than the Old Order regime by recognizing the need for systematic emergency management triggered by natural events. The departure from war/conflict towards a post-natural disaster focus was not by chance. Nevertheless, enough evidence suggests that national-international interaction since the early 1970s had managed to place this agenda on the table of the government.

The sudden change of disaster management policy in Indonesia in 1979 was based on discursive change made through national-international interactions. The persistence of the old disaster management policy before 1979 was due to the fact that the previous fatalistic paradigm on disaster went unchallenged. However, in principle, disaster management institutions in Indonesia did not change significantly during the 1960s until 1990. This was a long period when the disaster management discourse was embedded in ad hoc structures and the actions were reactive

[91] Direct translation from Bahasa is *badan koordinasi*, which means *coordinating body*. However, the term council is preferred instead of *body* because, in practice, for 30 it was clearly of a council and not a specific type of organizational body to execute a specific mandate.

responses. Some evidence for this is shown in Figure 33, which indicates that few risk-related bills were produced during this long period.

The New Order of Indonesia brought political stability during the period of 1970s-1990, during which manmade disasters such as conflict and civil war were not considered a big deal because the New Order regime was very coercive in silencing sources of civil society power and rebellions that might challenge the authority of the government. The only factor that could not be fully controlled was the element of surprise of natural disasters. This was one explanation for the New Order regime simply correcting the 1960s disaster management policy by making the ad hoc committees into a single more stable entity, namely, the National Coordinating Council for Natural Disaster Management, in 1979, which lasted until 1990.

In the 1990s, at the same time as the start of the International Decade for Natural Disaster Reduction (IDNDR), the government corrected the 1979 decree arguing that a focus on only natural disasters, with a purely humanitarian emergency and post-disaster response-oriented policy, was not enough. It suggested reconsideration of non-natural hazards and, for the first time, formal recognition of the need to work in accordance with disaster management cycles, the famous before-during-after disaster management. In Presidential Decree 43/1990 on "National Coordinating Council for Disaster Management," it was argued that the country needed to manage disasters (both natural and manmade) in different phases, such as prevention, mitigation, emergency response, rehabilitation, and reconstruction.

The 1992 Flores disaster has been remembered as one the largest-scale disasters in Indonesia at the end of the 20th century; it taught important lessons to the central government, as stated by a former Minister of Finance that "Flores goes back to the pre-development era before 1970" because the destruction of the fruits of investment from a quarter century development had set the region back to poverty in only a few hours. This awareness is well recorded in a local newspaper.[92] However, this national disaster was not translated into a nationwide transformation of disaster mitigation and preparedness, which did not happen for almost 15 years.

At the end of the IDNDR period in 1999, a new presidential decree was issued to correct the one made in 1990, which was justified by stating that the National Coordinating Agency for Disaster Management had not been mandated to deal with disasters that arose from riots and mass

[92] See Ministry of Finance's explanation in Tabloid Dian, January 1993.

violence. This change was partly a reactive response to the fall of the New Order regime in 1998, when violence suddenly spread in many parts of Indonesia, which was caused by many internally displacement persons (IDPs). However, the 1999 regulation[93] did not regulate the IDPs even though it was coincident with the crisis in Timor Leste together with the East Timorese refugees' influx to West Timor in 1999.

6.2.4. Indonesian Disaster Management Policy 2000-2007

The answer to the call for a more serious approach to IDPs (at least on paper) took place in 2001 with two sets of revisions: the first was the revision of the 1999 regulation to revise the name to the National Coordinating Council for Disaster Management and Internally Displaced People (Keppres 3/2001); this was revised again in the same year with the same title held until 2005.[94]

Based on personal observation, the nature of this revision was probably related to the introduction of the "Guiding Principles on Internal Displacement" by United Nations Commission of Human Rights. In Indonesia, this guideline has been translated in early 2000 by civil society organizations such as Oxfam.[95] Furthermore, the issue of IDPs came to the fore in 2001 when prominent international and multilateral agencies dealing with the refugees from East Timor in West Timor were removed from their operation in the year 2000 owing to the killing of three staff of the United Nations High Commissioner for Refugees (UNHCR) in August, 2000. With the dearth of resources to meet the basic needs of the refugees (for the East Timorese who resided in Indonesia) and IDPs (e.g. East Timor-born Indonesians and other IDPs throughout Indonesia produced by conflicts in several regions), the national government needed a new justification for financing humanitarian responses. This partly forced the government to create new rules to be legally and politically appropriate for dealing with both IDPs and refugees. Therefore, Law 3/2001 on "National Coordinating Council for Disaster Management and IDPs" was signed. For the first time, the Minister of Transmigration was included in the structure of national disaster management (i.e. Bakornas) in Presidential Decree 3/2001.

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[93] Keppres 106/1999 - National Coordinating Council for Disaster Management.

[94] Namely Keppres 111/2001.

[95] This has been based on personal observation since 2000 as the author also involved in the humanitarian operation during 2000 in West Timor and later on dealing with the issue of IDPs triggered by local conflicts in the Eastern Indonesia during 2002-2004.

The 2000-2007 period was noted for a willingness to increase the legitimacy of the Bakornas by giving power to the vice president in terms of direct responsibility to command the system of disaster management in all four versions of Presidential Decree (Keppres) 3/2001, Keppress 111/2001, Perpres 83/2005, and Perpres 3/2007.

The notion of carrying out disaster reduction beyond the government, namely, governance, emerged notably after the fall of the Suharto regime. In 2003, in the opening remarks of the *International Seminar and Workshop on Tsunami: In Memoriam 120 Years of Krakatoa Eruption – Tsunami and Lessons Learned From Large Tsunamis,* the former coordinating minster of social welfare (later a vice president in 2004-2009) noted the following: "Disaster is our responsibility. Not merely government responsibility but also that of the private sector and society." This view of shared responsibility to manage risks of disasters is not new as it has existed in practice, notably since the 1990s. The speech was given exactly a year before the catastrophe of the Indian Ocean tsunami. As the Head of Bakornas, Mr. Kalla reflected on the history of catastrophic tsunamis, including the recent ones in Flores-NTT in 1992, East Java in 1994, West Papua in 1996, and Central Sulawesi in 2000, not to forget the tsunami triggered by the Krakatoa volcanic eruption in 1883. He further noted that "it is difficult to predict when tsunamis will occur. Scientists have predicted that tsunamis can happen in a few minutes (5-20) after being triggered by earthquakes. Therefore, considering the limitation of time, there are steps that need to be taken, such as the identification of tsunami-prone areas by means of hazard and risk mapping, socialization of preventive measures for example to persuade people to stay away from risky areas, an increase in public awareness, and improvement and development of early warning systems for all kinds of hazards, especially earthquakes and tsunamis." [96]

In one of the papers of the conference in August 2003 entitled "General Guidelines for Mitigation of Natural Disaster in Coastal Areas and Small Islands: Special Focus on Tsunami," it was clearly noted that around 60% of cities/towns (290 out of 490 cities/towns) are situated in earthquake-prone regions (page 195) and the vast majority of these cities are a potential 'target' for a tsunami. It was added that, in order to mitigate tsunami risks, there was a need for the

[96] See Page 6, the Opening Remarks by Coordinating Minister for Peoples' Welfare and Daily Chairman of National Coordinating Council for Disaster Management and Displaced Persons, Mr. Yusuf Kalla. Proceedings of International Seminar and Workshop on Tsunami: In Memoriam 120 Years of Krakatoa Eruption – Tsunami and Lessons Learned From Large Tsunamis. 26-29 August 2003 in Jakarta/Anyer. This conference was hosted by the Meteorological and Geophysics Agency (BMG) in cooperation with other related national technical agencies such as Ministry of Research and Technology.

integration of three approaches: integrated coastal zone management, integrated fisheries management, and integrated coastal hazard management.

Responding to this, in the second last paragraph of his remarks, Mr. Kalla suggested that "On this occasion, I ask you to increase our attention to the efforts to undertake prevention and disaster mitigation, not only by talking, but also by doing. On the basis of all the experiences we have in this country and abroad, we can draw lessons for the future." With this statement, it was clear that the political will was there for an idea that had not been translated into the existing structure of government during that period.

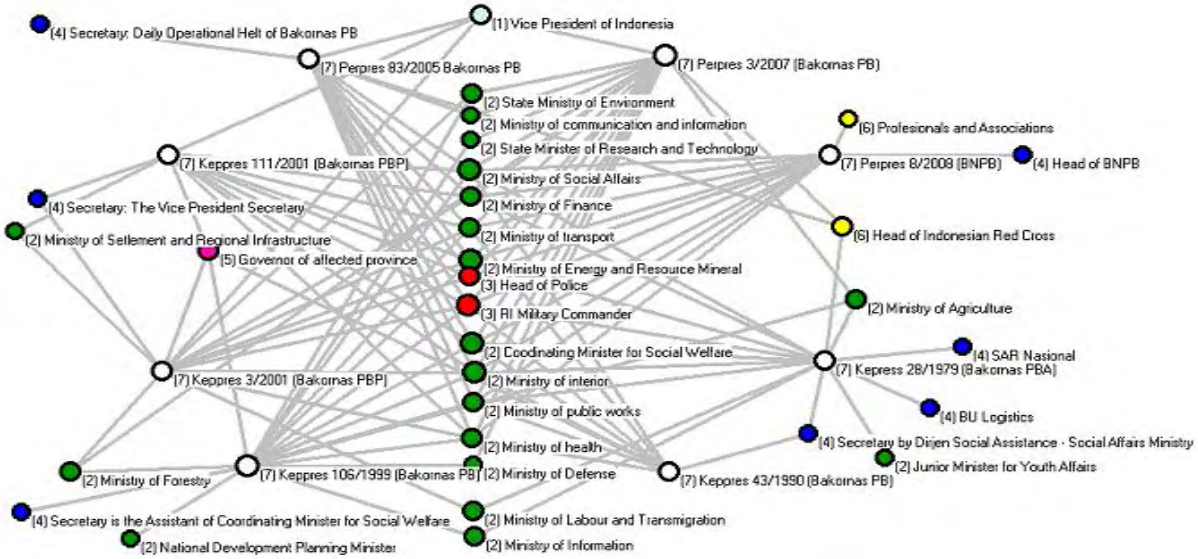
How did local policymakers see the problems during this period? In a reflection on an earthquake event that scaled between VII-VIII MMI[97] on 4th June, 2000, in Bengkulu Province (in Sumatra, Indonesia) and that killed 93 people and caused 3,339 houses/buildings collapsed (not including a total of 13,756 houses heavily damaged and 29,090 houses with medium-light damage), the Bengkulu governor asserted the root causes of the damage and losses: "The shifts from wooden and bamboo house structures to masonry, while the collapsed masonry was due to the quality of the materials, the quality of joint elements of house structures such as beam-columns; each element moved not according to a single mass acceleration, and there was no stiffness in the houses; most of the buildings are situated by the fault lines of earthquakes."[98] In the last reflection of the paper, especially on how provincial policy would respond to the situation, he maintained that mitigation and risk reduction measures could make structures earthquake-proof by going back to the previous building/housing patterns (wooden and bamboo structures including the use of aluminum roofs), as well as no longer building houses exactly at already recognized earthquake/fault lines or on unstable areas (hence the recognition of land use policy design, monitoring, and enforcement; in line with HFA Priority 4th); the need for new risk analysis and mapping of earthquake risks including seismic zoning in the whole province (Hyogo

[97] MMI is known as the Modified Mercalli Intensity Scale, ranged I-XII, The lower scale is measured by the situation in which the earthquake is felt by people while the higher scale are based on observed damage of structures caused by an earthquake. Scale VII means "Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken" while Scale VIII means "Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned." See for more detail explanation is available from http://earthquake.usgs.gov/learn/topics/mercalli.php. (last accessed 20 Oct 2010)

[98] Zen, Hasan (2003) "Masalah Gempa Bumi" - Bengkulu Governor. In Proceedings of International Seminar and Workshop on Tsunami: In Memoriam 120 Years of Krakatoa Eruption – Tsunami and Lessons Learned From Large Tsunamis. 26-29 August 2003 in Jakarta/Anyer (pp. 241-249).

Priority 2nd); increasing the practical knowledge on post-disaster response to the whole society as well as recognition and greater appreciation of the embedded mitigation measures in the existing local knowledge and technology such as wooden and bamboo structures (Hyogo Priority 3rd). Such awareness and vision of risk management in many instances was unfortunately not often found in the regions where recent disasters took place. However, before Disaster Management Law 24/2007, there were hardly any policy instruments available that enabled actors with "good political will" to clearly change the knowledge into action.

Figure 34 DRM Regulatory and Organizational Network 1979-2007



Coded from regulation on Bakornas 1979, 1990, 1999, 2001, 2005, 2007 and regulation on BNPB 2008.

Figure 34 shows the network of regulation of disaster management and the organizational ties over the period 1979-2008. Every dot represents either a regulation or an organization. The analysis is based on six different regulations and the organizational ties required by each regulation. In this analysis, qualitative explanation and quantitative explanation of the graph are important because of the interest in looking at the actors and forms of governance utilized in each period.

Visually, one can guess the "leaders" or lead organizations from 1979-2008. The size of nodes explains their closeness centrality (see Section 3.2.1.3) .The calculation can be seen in Figure 35 (closeness centrality). Apparently, the Ministry of Interior and the Military Commander have the highest score (0.56) as they existed in all regimes of the Bakornas (National Coordinating

Council) system from 1979-2007, as well as after the reform. This obviously reflects the discourse in the public where the military are still seen as an important group even after the reform, given the limitation of logistical resources within civil organizations, such as today's National Disaster Management Office, and the still weak local disaster management offices. The figure also suggests that the Ministry of Interior is always involved in the business of disaster risk management in Indonesia. In fact, the minister is key to successful enforcement in the form of local endorsement of reform.

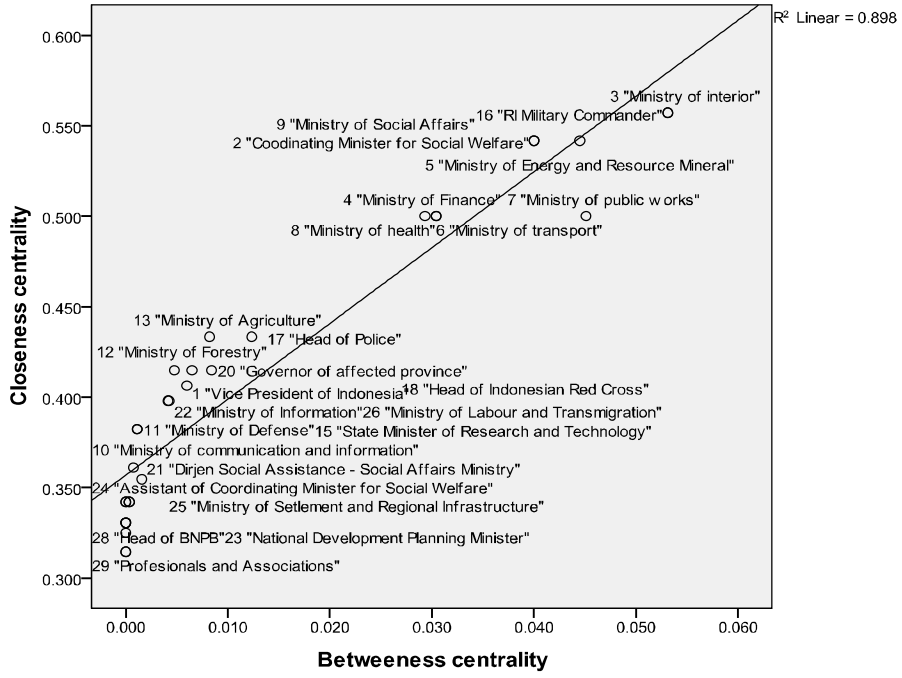
Box 2 Selected Definitions of Indonesian Laws/Regulatory Terms

- Legislation is written rules established by state agencies or authorities and is binding in general.
- Law is the legislation that is established by the House of Representatives by agreement with the President (a.k.a. Acts or *Undang Undang*).
- Government Regulation in Lieu of Law is the legislation that is established by the President (a.k.a. *Peraturan Pemerintah* – a form of national level enforcement).
- Government regulation is the legislation that is established by the President to carry out the Law as it should be carried out (a.k.a. *Keppres* – a form of national level enforcement).
- Presidential Regulation is legislation made by the President (a.k.a. *Perpres* – a form of national level enforcement).
- Presidential Instruction (a.k.a. Inpres– a form of national level enforcement).
- Ministerial Regulation (a.k.a. *KEPMEN*– a form of national level enforcement).
- Provincial Regulation is legislation that is established by the legislature with approval along with the head province (a.k.a. *Perkada or Perda* – a form of provincial level enforcement).
- City/District Regulation is legislation that is established by the legislature with approval along with the head city/district (a.k.a. *Perkada or Perda* – a form of city/district level enforcement).

The Ministry of Social Affairs and the Coordinating Ministry of Social Affairs as well as the Ministry of Energy and Mineral Resource each got 0.54. This shows their importance in the disaster management system in Indonesia. The Ministry of Social Affairs used to be the long-term leader in the early form of Bakornas in 1979 and its membership in Bakornas was consistent; the Coordinating Ministry of Social Welfare took over the leadership quite a few times before it was taken under the remit of the vice president's office in 2001. The importance of the Ministry of Energy and Mineral Resources was due to its control of the Geological Services and Volcanological Survey since the 1970s. The involvement of the Ministry of Foresty in the Bakornas system was notable since 1999 owing to the forest fire problems during the El

Nino year of 1997/8. The Ministry of Public Works contributes to the system through its dual roles in the disaster management system, such as providing logistical services for post-disaster intervention such as rehabilitation and reconstruction as well as its roles in mitigation and spatial planning. The Ministry of Finance has good ties to the system because of its roles in providing support to it.

Figure 35 Selected Centrality Test for Organizations/Institutions 1979-2008 (N=28)



There are other insights from Figure 34. The involvement of the Indonesian Red Cross in the system started with the establishment of Bakornas in 1979. However, it disappeared and re-appeared again in 2005. The inclusion of civil society in the structure started just after the reform in 2007.One of the recent surprises found during this research was that the current government tends to work outside the existing institutional pathways, but not always with good reason. For instance, in Figure 34, the Coordinating Ministry of Social Welfare can be seen to be involved during the last 28 years and was the host of Bakornas during the 1990s. However, in early 2010, things suddenly changed as Presidential Instruction No. 1 2010 simply neglected the structure under reform by putting disaster risk reduction under the remit of the Coordinating Ministry of

Economic Affairs.[99] This shift of policy went unnoticed among the public and the professional community. However, this needs further investigation, especially in terms of how such a change happened and whether the influence of politics may have outweighed the need for professionalism, especially in recruiting experts who have prescribed such a radical change in policy.

6.3. Disaster Management Law 2007

Many agreed, especially among the reformists, that the main reason for the need for reform, including establishment of a new disaster management law, is that the power of the old structures that had been preserved since 1979 should be reformed. The old structures at all levels, such as the National Disaster Management Council (Bakornas) and the Satkorlak (Provincial Council on Disaster Management), as well as city/district disaster management councils (Satlak), had been extremely ineffective in dealing with not only future disaster risks but also disaster risks in the past. These old structures almost always became active when emergencies took place and the government was always caught by surprise by natural hazards. Even now, after the reform in 2007, the government is always caught by surprise.[100]

One can argue that, even without the first DRM reform such as the Bakornas system in 1979, the response quality might have always been the same because somehow the government would always respond (significantly or not) to disaster events and because the vast majority of the people still subscribe to the "naïve" or "magical consciousness" and the perception of disasters and catastrophes as a form of divine intervention and punishment (See Haynes et. al. 2010, See also Annex 5, a baseline survey conducted in 2008), so the government would barely change its disaster management strategy in substance, just superficially.

The Krakatoa eruption in 1883 triggered a 40-meter-high tsunami that killed approximately 36,000 people on the Java-Sumatra coastlines; there was a generous response from the Dutch

[99] Based on Instruction of the President Indonesia Republic No 1/2010 on the acceleration of the implementation of National Development Priority 2010.

[100] Based on personal observation during the last three years, as disaster emergencies occurred (such as Padang earthquake 2009, West Java earthquake 2009, the failure of warning system in the case of Merapi Volcano eruption in 2010 that caused more than 160 casualties which in principle should not happened because by definition the preparedness have been made available since 2006. Indonesian news paper such as Kompas' special coverage on Merapi (http://lipsus.kompas.com/merapimeletus) indicate that the national disaster response system and preparedness should be substantially corrected as suggested by recent scientific investigation (such as Sagala 2009)

colonial government for relief afterwards, including a 6,000-mile trip by the Dutch king from The Hague to Batavia, which served as a model for all *ex-post* event responses: qualified catastrophic events have triggered a generous response accompanied by standard compassion from a king/queen or president. For quite a long time, there have been 'back and forth" visits of Indonesian presidents to disaster sites, from Flores in 1992, East Java tsunami in 1994, Aceh in 2004, and Yogyakarta earthquake in 2006, Padang earthquake 2009, West Java earthquake 2009, Papuan flood 2010 and Merapi volcano eruption October 2010. Such kind of visits have been normally valued as a perfect symbol of good leadership as recently demonstrated by the Chilean's president Mr. Pinéra.[101] However, in Indonesia there is mixed feeling about such kind of visits because the visits required an extra budget from the local government to host the presidential team – in a recent visit to a district in East Java, civil society and the media raised the concerned of a decision from a local district government to shift allocated disaster response funds to welcome the President while there were huge demand in the humanitarian emergency needs in three disaster regions that occurred almost simultaneous in October 2010.[102]

One can rightly claim that the old structure added very little value to reduce disaster risk. *De facto*, the Bakornas system made very limited efforts in mitigation, risk reduction, and disaster management planning in systematic ways.[103]

The energy for change was finally adopted by the recent disasters during 2004-2006. Some of the visions for disaster risk reduction stipulated in the Hyogo Declaration and Hyogo Framework for Action have been borrowed in the Disaster Management Law 24/2007. However, the term "Disaster Management", which has been considered as "old" and often signals a reactive-oriented paradigm, is still in use after the reform to encompass the whole aspect of disaster risk reduction as stipulated by the HFA. Nonetheless, this was an achievement as some of the drafters and negotiators argued that "it was difficult for the legislators to opt for risk reduction-oriented terms, as suggested in one of the drafts, so instead they ended up keeping the term "disaster management."[104]

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[101] http://www.guardian.co.uk/world/2010/oct/14/chile

[102]"Disaster funds shifted for the visit of Mr. President" – http://infokorupsi.com/id/korupsi.php?ac=7634 (last access 15 Nov 2010)

[103] This has been clearly stated in the draft academic paper 2005 version that produced by the Indonesian Society for Disaster Management.

[104] Recurrent communication with Dr. Eko Paripurno and Mrs. Hening Parlan, some of the key experts behind the scenes. Both are part of the Indonesian Disaster Management Society.

The disaster risk management reform process in Indonesia is probably not unique in the sense that similar efforts have occurred in other Indian Ocean countries, such as Sri Lanka[105] in 2005 as well as India in 2005.[106] One of the driving forces behind the reform and change was a form of global disaster risk governance, such as national compliance with the Hyogo Declaration as voluntarily endorsed by Indonesia together with 168 countries. As the Hyogo Framework for Action suggested (in Chapter 3), disaster legislation is seen as the foundation that provides a strong basis for planning and directing of the whole spectrum of disaster risk reduction. In one of the BNPB (National Disaster Management Agency) and UNDP joint publications entitled "Lessons Learned: Disaster Management Legal Reform – The Indonesian Experience" it was admitted that the process of reform is "based on international policy direction" (BNPB-UNDP 2009a:9).

UN agencies and INGOs supported civil society advocacy under the lead of MPBI (see also BNPB-UNDP 2009:12-13) to carry out "exhaustive" (see Pujiono 2005) consultation processes with international partners, politicians, national legislators, and government, especially Bakornas and civil society at large. Consultation processes with international actors were known as the Convergence Group, which was later supported by UNDP to form a working group for a background academic paper for law drafting. The Working Group members were all international organizations such as the United Nations Children's Fund (UNICEF), CARDI[107], ECHO, Coordination of Humanitarian Affairs (OCHA), and International Federation of the Red Cross (IFRC). International aid interests have been successfully accommodated in the law, which was later enforced through a specific regulation, namely, Government Regulation 21/2008 on International Cooperation in Disaster Management (see BNPB-UNDP 2009:13).

Some positive outcomes of the international and non-state actors' involvement in the drafting of the law lie in the details of the DM Law document. The law recognizes the government's responsibility: (a) to reduce disaster risks and integrate risk reduction in development programs; (b) to protect people from disasters; (c) to guarantee provision of rights of people affected and displaced by disasters according to minimum standards; (d) recovery from the impact of disasters; (e) allocating budget for disaster management in the country's Annual Development

[105] See http://www.srilankanparliamentonnaturaldisasters.org/ [last accessed 30 January 2010].

[106] Please consult http://www.nidm.gov.in/DM_act2005.pdf [last accessed 15 June 2010].

[107] Consortium for Assistance and Recovery towards Development in *Indonesia.*

Budget; (f) allocating contingency budget for disaster response, and (g) authentic and credible documentation of hazards and impact of disasters.

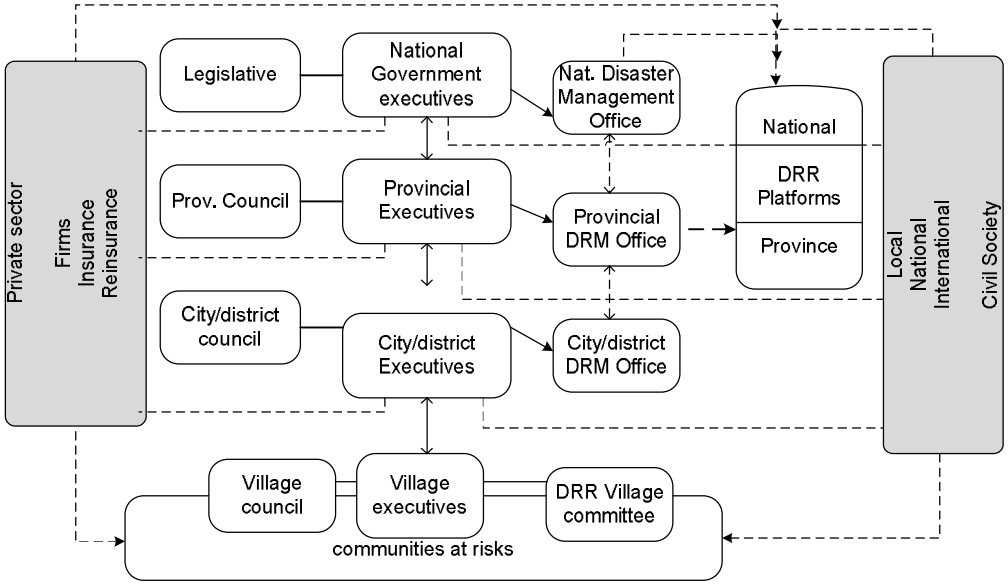
6.3.1. Disaster Risk Management Structure

At the surface level, disaster risk management structure in terms of an organigraph does not change much. At the national level, the National Disaster Management Agency superseded the *Bakornas* secretariat. At the provincial and district levels, both *Satkorlak* and *Satlak* have been replaced by Local Disaster Management Agency. Figure 36 is the design of the disaster management system in Indonesia after the reform combining actual compliance with the Hyogo Framework for Action. At the national level, there is a National DRR platform, which is indeed a predecessor of a multi-stakeholder forum formed in 2005 with the purpose of advocacy for the drafting of the disaster management law.

At all levels, the legislative agency should play roles not only for bill drafting and DRR budgeting but also for monitoring the implementation of the law. The national legislative body used their initiative rights for drafting the disaster management law, it was merely as a response to the call from non-state actors to create the law in 2005, and, as many commentators believe, such initiative rights have seldom been used by Indonesian legislators. The legislative response to the call for reform was indeed conditioned by large-scale disasters, which affected the national budget during 2005-2007. It may sound like an exaggeration to expect Indonesian legislators to play a critical role in the ruling government because the practice of political opposition is not yet fully developed, even though it is possible by law or in the words of experts, opposition practice in Indonesia "remains structurally weak and divided."[108]

[108] See Edward Aspinall's PhD thesis entitled "Political Opposition and the Transition from Authoritarian Rule: The Case of Indonesia" at the School of Pacific and Asian Studies of The Australian National University (2000). Available at http://dspace.anu.edu.au/handle/1885/46054 (accessed 10 Jan 2010)

Figure 36 Indonesia Disaster Management System



Control and monitoring of the quality of disaster risk reduction may come from civil society organizations (as recognized in Figure 36 above) and the media. At the local level, especially at the provincial level, a similar structure is used. A provincial platform is seen as the key to sustain the efforts in risk reduction. The very idea of such a platform is rooted in the Hyogo Framework for Action (Priority 1.4) and this is an ideal structure that when it is expected to materialize in 33 provinces needs a really big policy demand. In fact, the DRR National Platform has not been really functioned regulary as it is supposed to be and in the provinces, the DRR platform can only be active where there are either international NGOs or a United Nation agencies in the respective provinces.[109]

At the district level, a similar structure is utilized without requiring a DRR platform. The disaster risk management structure recognized the roles of civil society organizations as well as the need for a strong partnership with private organizations. The next sections will show how such an 'ideal' structure is made operational in the real world.

[109] As of 10 November 2010, there were only three news reported by the platform as it has been dormant since June 2009 (please see http://www.planasprb.net). Recent reports regarding the provincial platform for DRR come from only a few provinces where international actors are present for post-crisis and post-disaster responses, such as in Padang, Yogyakarta, NTT province and West Papua. In Papua, the DRR platform has been made active due to the support from the Oxfam – However, it was found that such a platform is not easy to maintain.- see also http://www.mpbi.org/content/menguat-dukungan-pembentukan-forum-prb-papua -accessed 15 Nov 2010).

The National Disaster Management Agency (or BNPB - see its structure in Annex 2) reports directly to the President of Indonesia, but is not (yet) a member of the cabinet. There are also discussions whether the agency needs to be part of the cabinet member in order to give greater power as Indonesian experiences many more disastrous events occur during the last 6 years.[110] However, there has been no study on whether it should be part of the cabinet to increase its legitimacy and power, as is the case in some countries where disaster risks are very high and persistent, such as Sri Lanka,[111] New Zealand,[112] Bangladesh,[113] and Uganda[114].

6.4. **Policy Flashback 1930-2010: Discontinuity and Continuity of Institutions**

Combining the evidence in Section 6.2-6.3 and the result network analysis in Figure 34, which gives a simplified diagram showing the chronological order of events (see Figure 37), may provide a new understanding of the forms of disaster risk governance in each period. For about 50 years, since the colonial government at the end of the 1930s till 1979, basically very few changes were made in terms of formal stakeholders, as shown by many formal documents.

Even though civil society organizations have been recognized since 1946, such a recognition had been barely implemented for political reasons. This was because Indonesia experienced three historical phases of authoritarian regimes: The first was from the colonial period until 1945; the second authoritarian period was during 1945-1965, and the third was from 1967-1998. During these periods, military power was either superior or considered superior to civil governmental organizations, such as disaster management committees in the 1960s-1970s, because disaster may have been seen as an agent that could create instability in the territory. Civil society organizations, at least on paper, now enjoys a steering power in the new structure of National Disaster Management Office (BNPB), as seen in Figure 35, which was regulated under a presidential degree concerning BNPB in 2008. However, *de facto*, the emerging roles of

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[110] See http://www.tribunnews.com/2010/11/07/komisi-viii-dpr-usulkan-bnpb-jadi-kementerian. (last access 10 Nov 2010)

[111] Please consult http://www.dmhr.gov.lk/english/index.php [last accessed 15 June 2010].

[112] Ministry of Defense and Emergency Management at http://www.civildefence.govt.nz/memwebsite.nsf [last accessed 15 June 2010].

[113] Please consult http://www.dmb.gov.bd/ [last accessed on 15 June 2010].

[114] Uganda has a Minister of State for Relief, Disaster Preparedness, and Refugees. No website to consult.

multilateral actors since the 1970s-1990s brought new insights into the practice of disaster management in Indonesia. As shown by sources written in *Bahasa*, little was known regarding the roles of United Nations Disaster Relief Coordinator (UNDRO)[115] during the 1970s. In the second half of the 1980s, UNDRO supported "institution building" for disaster management systems in Indonesia. *Bakornas* failed to perform following the eruption of Galungung *stratovolcano* in West Java in 1982. Because of this, UNDRO later joined with UNDP and other international agencies, creating the Indonesian Disaster Management Center. Creative investment in human resource development on mitigation and preparedness was undertaken. This was achieved by investing seriously in human resources for the Ministry of Social Affairs (the host of *Bakornas* secretariat 1979-1990), including for some relevant ministry staff seconded to the center, and conducting selected hazard research led by national experts in 1986. The output from the multidisciplinary research on disaster mitigation was planned to be integrated with Medium-Term National Development Plan (also known as *Pelita*) 1987-1992.[116] Such processes took place in 1986-1987, the same year in which the IDNDR was formally declared to begin in 1990.

However, the technically sound approach in capacity building had been disadvantaged by the unexpected change in the structure, especially when the president changed the host of *Bakornas* from the Ministry of Social Affairs to the Coordinating Ministry of Social Welfare in 1990. There is a lack of information regarding what happened with the trained individuals and their career building in the field. Nevertheless, it was clear that a change in policy, even with a very good reason to shift from "natural disaster" stipulated in 1979 towards "disaster" in general (to regain command over the non-natural ones) in 1990, and to place such a mandate under a coordinating minister, in theory, might promote multi-agency efforts. Such a change was mainly a response to the IDNRD movement. However, unexpected organizational (or leadership) change from the Ministry of Social Affairs to the Coordinating Ministry of Social Affairs had encouraged discontinuity of human resources, as the new ministerial host started human resource development from scratch, which caused the 1980s "Indonesian Disaster Management Center" to become irrelevant.

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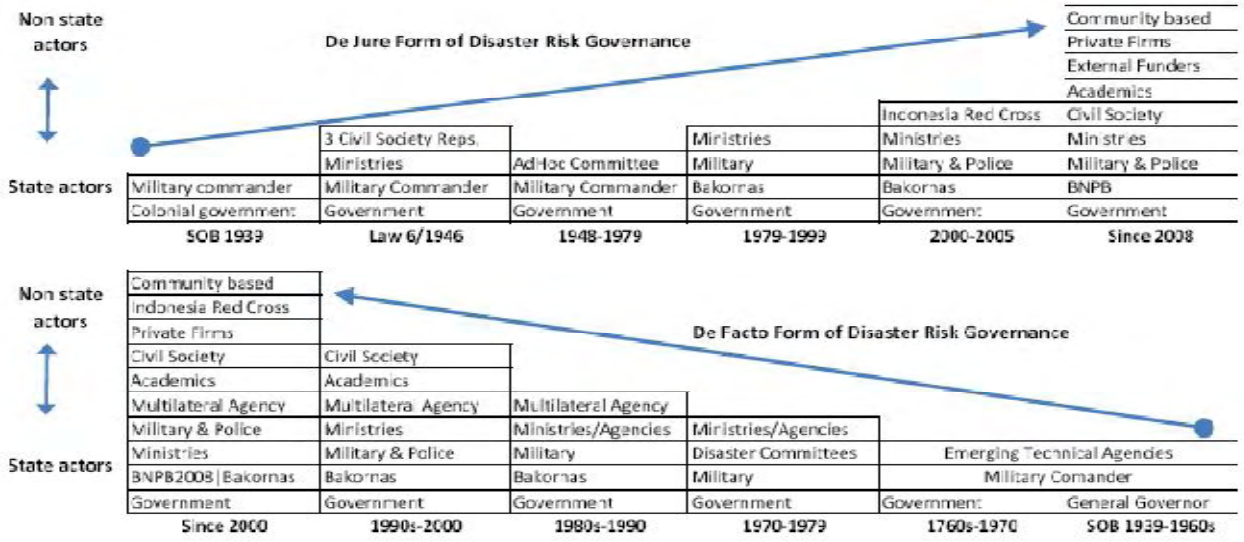
[115] In the written reports in Bahasa Indonesia during 1970s-1980s (i.e. the active period of UNDRO - **United Nations Disaster Relief Coordinator**), the national actors often mention UNDP. UNDRO was established in 1965, which mainly dealt with relief but also managed to invest in mitigation and preparedness.

[116] Wong Arthur (1986) Strengthening Disaster Preparedness and Disaster Management in Indonesia" First Technical Report for Project INS/82/020 Government of Indonesia UNDP/UNDRO - USAID Project. Dated November 1986.

Catastrophic events during the 1990s did not bring change to the national disaster management system. One example was the first declaration of *national disaster* status after the Flores tsunami in 1992, - which, for the first time (at least based on all accessible formal documents) since the formation of the National Coordinating Council in 1979 - did not actually trigger any disaster management policy change at either local or national level.

The reason that the government declared the Flores tsunami in 1992 as a national disaster was that the tsunami had caused "suffering, loss of life, and enormous material losses to society. Considering the impact of such a disaster and the need for response efforts and recovery, it is deemed necessary to establish the national disaster status." [117] This editorial text was exactly used again following the tsunami on 26 December, 2004, with additional text to give a National Day of Mourning.[118]

Figure 37 Trends in Indonesia DRR Stakeholders



Nevertheless, it may be a mistake (and almost always a mistake) if one assumes that policy makers are fully rational/reflective agents (both the executive and the legislative bodies) in Indonesia. The change in the disaster management policy is due to a dual process: the risk context where catastrophic events provide legitimacy for the government to change its strategy with some

[117] See Presidential Decree No 66/1992 on Decision on Status of Flores Natural Disaster as National Disaster. Page 1 points a and b.

[118] See Government Decision 112/2004 signed on 27 December, 2004, one day after the disaster.

sort of "anticipated initiatives" coming from outside government. International processes such as the International Decade for Natural Disaster Management in the 1990s and later the International Strategy for Disaster Reduction (ISDR) era, which started in 2000, have facilitated discursive change. For example, in the Asian context, the disaster management policy discourse has been formally channeled through the Asian Disaster Reduction Centre (ADRC), which was established in 1998 and Indonesia has been a member state together with 28 countries;[119] The ADRC's annual conference has served as an regional platform where the member states report their progress of disaster risk reduction on annual basis.[120]

Disaster management policy reform that started in 2007 was not fully initiated by the formal institutions and policymakers. The reform itself has actually been a result of very complex processes involving quite diverse actors within civil society and non-stakeholder actors' initiatives to call for the legislative agency to exercise power. The reform arose from a complex set of networks that transacted new ideas, information, and knowledge back and forth from local to international levels. This is very well documented in many publications. Pujiono (2005) for instance documented 39 meetings, many of them at the national level, from only 11 Feb – 16 June, 2005, which involving international actors, civil society, the media, and individuals from non-governmental organizations.[121]

6.5. More Evidence of Governance and Institutional Change in Disaster Risk Reduction

The data for the analysis in Figure 38 is taken from "National Action Plan 2006-2009", which is formally endorsed by the Ministry of Development Planning (*Bappenas*) with the support of the UNDP. The network analysis is possible because there is a long shopping list in the plan with a simple format: "who is doing what with whom with the support of whom and where." There are more than 100 actors but only 81 organizations (therefore, 81 nodes/vertices, undirected) have been coded for the analysis. The reason for distinguishing other actors was a lack of clarity of information and a need to focus on mapping the main actors at the national level. The document is important because it was made during 2006-2007, exactly at the transitional period when the

[119] http://www.adrc.asia/aboutus/index.html

[120] See annual Indonesia reports since 1998: http://www.adrc.asia/disaster/index.html. Accessed on 13 Nov 2010.

[121] See the stories in Parlan, Suratman, and Astuti (2007).

culmination of disaster management policy change occurred. Therefore, it is arguably still valid to use as a proxy to map the "leaders" in a network (measured by *betweenness centrality* test) and the importance of a node in a network (measured by *closeness centrality*).

Only 25 out of 81 nodes (that represent national organizations) during 2006-2008 were ranked according to their relative leadership (*betweenness centrality*, BC) and importance (*closeness centrality*, CC) in a network. It was found that 11 government ministries could be considered as "leaders" together with four United Nations organizations, 4 INGOs, two international donors, four university/research institutes, and one media outlet. However, their levels of "leadership" and "importance" in the network vary considerably. The highest value for BC test is the transitional *Bakornas* (0.35) followed by the leading research institute on disaster mitigation, namely, Bandung Institute of Technology (node 1, BC value 0.26), UNESCO (node 17, BC value 0.21), Ministry of Public Works (node 13, BC value 0.17), and MPBI (the leading national NGO on DRR, node 7, BC value 0.15).

Figure 38 DRR Network in Indonesia 2006-2009 – Betweenness Centrality Test

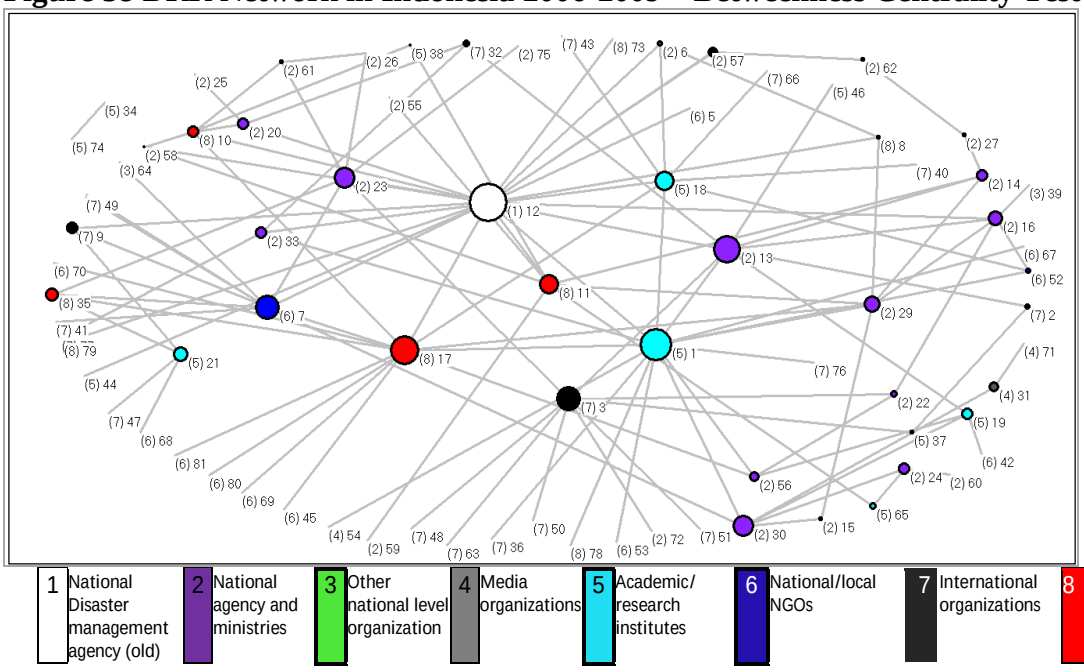
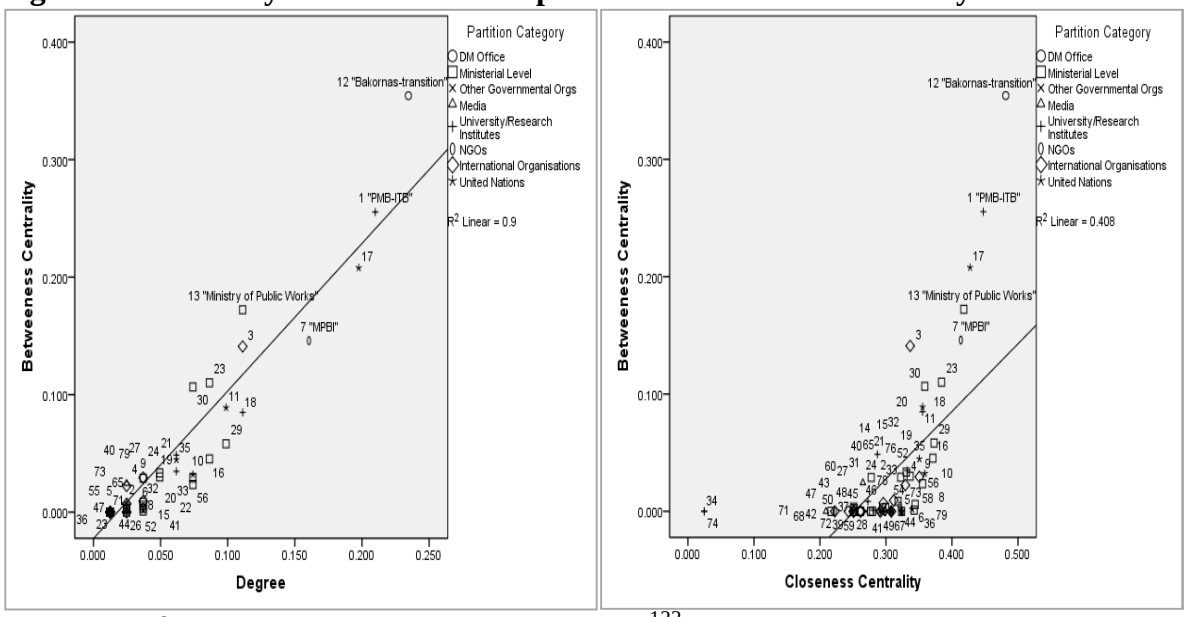


Figure 39 Centrality Test – Selected Top 25 for Betweenness Centrality



Coded data from National Action Plan 2006-2009.[122] (N=81)

It is obvious that, when the measure of *closeness centrality* (CC) is used to determine the level of importance of each node (organization), the reader can actually easily see that, for an important organization such as the Ministry of Education (CC value 0.36), its leadership is low in the network (indicated by a *betweenness centrality* (BC) value of 0.02). The same conclusion can also be drawn for the Ministry of Interior, which got the highest BC value in the previous exercise (Figure 38) but, in this network (Figure 39), has a low leadership indicator in contrast to its importance (CC value 0.34).

Figure 39 (left) presents the correlation between the *degree centrality* (i.e. the number of nodes adjacent to a given node or the number of ties connected to a given node) and the *betweenness centrality*. Apparently, the correlation is very high (as 0.949) with significance at 0.000 (two-tailed). The correlation between *betweenness centrality* and *closeness centrality* is also high at 0.639, with significance at 0.001 (two-tailed).

There are certain organizations that are more important than others; however, in the network they are distinguished by their "leadership" (*betweenness centrality* test). It is important to note that a network analysis like this neither represent the whole society nor the whole DRR networks.

[122] The analysis is possible because it uses a simple form asking who is doing what with whom with the support of whom. There are more than 120 actors but only 81 have been coded for the above analysis. The reason for this was a lack of clarity of the information.

Rather, it shows how each actor/organization/institution is linked in a certain network; in this case, the DRR network in the National Action Plan 2006-2009. It noticeably shows that, among all of the national NGOs in the network, MPBI (Indonesian Disaster Management Society) has been able to "lead" in view of its values of BC and CC - this means they have obtained their leadership status in the network during the period of 2006-2009.

Figure 40 Visualization of Closeness Centrality Test DRR Network 2006-2009

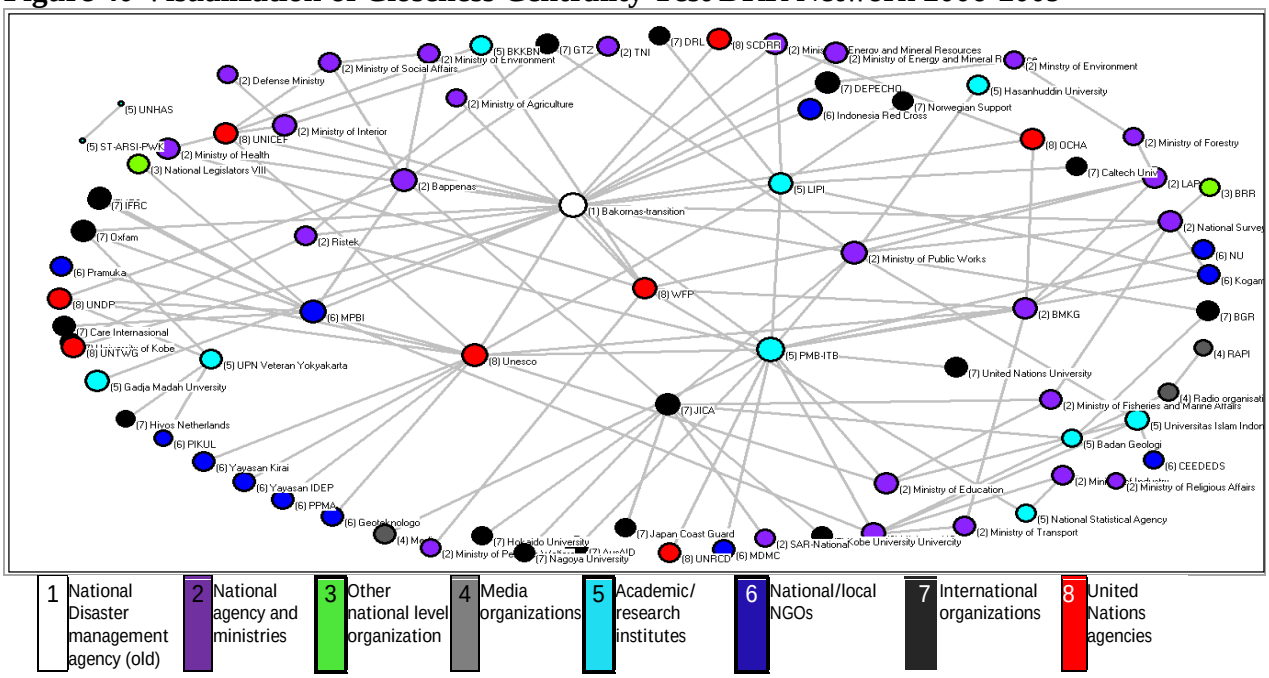


Figure 40 gives an idea of the importance of each node. Sometimes, key donors are not mapped out in the network but their actual importance should not be underestimated. This includes some local actors that are simply modest nodes in the network, but which have roles that are crucial to society because modest nodes can be a funder such as UNDP which have been one of the key actors in disaster risk reduction in Indonesia as it supports local governments to do DRR reform. The dominant leaders (Figure 38) in the network are the outliers in the scatter plot, such as transitional *Bakornas* (node 12, BC=0.35; CC=0.48) owing to its role as an important hub of the national structure, which is formally known as a "coordinating body" for disaster reduction. The Disaster Mitigation Center at the Bandung Institute of Technology (PMB-ITB – node 1 in Fig. 38) and UNESCO (node 17 in Fig. 38) as well as the Ministry of Public Works (node 13 in Fig. 38) are much more strongly tied in the network. What is interesting is that UNDP, one of the prime sponsors behind the reform, has a modest rank. Out of the top 20, nine are governmental

organizations, four are United Nations agencies, three are universities, and one is a national NGO (i.e. MPBI, node 7 with BC 0.0.15, CC 0.41 – one of the main initiators behind the reform).

6.6. Discussion and Conclusion

In regard to the theoretical notions on how institutions change in relation to disasters, from anthropological perspective, Hoffman (1999:304) argues that the variables for change are the size (magnitude of disaster, population mass, and amount of damage), time, and the thicknesses of structures of cultural institutions (such as norms, customs, traditions).

Large disasters such as the Flores tsunami in 1992 and the Indian Ocean tsunami in 2004 could be seen by ordinary people, including politicians and policymakers, as events beyond their comprehension, which could contradict the notion of Hoffman (1999) because in fact the dramatic effects of the events can convey the wrong messages to the people in power, namely, that such catastrophic events are simply beyond their imagination and control. The only factors that could help them cope with such a situation are the institutions closest to them, such as religion and culture. From this assertion, repeated large catastrophic events in fact reinforce the belief that disasters arise from God's punishment because "immorality causes disasters", as one of the Indonesian ministers recently explained to the people of Padang following the devastating earthquake there on 30 September, 2009.[123] The ministry held a position on the National Coordination Body for Disaster Management (Bakornas) in 2005 and 2007 (see Figure 34, especially the Minister of Information and Communication). In fact, faith-based civil society organizations in Indonesia, mentioned in Section 6.2, did not adequately play roles as agents of disaster management policy change, simply because religious discourse may discourage rational views and scientific explanations of human-nature relations.

The historical overview in Section 6.2.1 regarding the first genesis of anti-colonialism in Banten following the Krakatoa eruption and its associated tsunami (Winchester 2003:334) was fueled by the reasoning about divine punishment to the non-believing (colonial) government. Recent national disaster events such as Merapi Volcanic eruption (26 October – 19 November 2010)

[123] See the English version from the BBC: http://news.bbc.co.uk/2/hi/asia-pacific/8384827.stm [last accessed 16 June 2010].

caused more than 200 casualties and more than 350,000 displaced people.[124] There have been tens of opinions and articles at the national newspapers explaining why such a disaster happened and what can be done in the future.[125] Cultural explanations from Javanese cosmology have been a 'coping mechanism' for the local people in Yogyakarta. Dove (2010) presents the local communities' view on the cause of the Yogyakarta earthquake where 157,000 housing unit completely destroyed[126] by in May 2006 – such as that such the event was "seen as a divine judgment on those holding the reins of political power" (Dove 2010:122). Schlehe (2010) also noted that the earthquake in 2006 in Yogyakarta have put pressure on the Sultan of Yogyakarta and the President of the Republic, Susilo Bambang Yudhoyono, because "the leaders were seen as lacks blessing and legitimization from divine power" Schlehe (2010:116).

These explanation on the cause of the disasters reconfirm one of the hypothesis in this research that the bigger the scale of an event that went beyond people's understanding of the natural processes, the more difficult for disaster risk reduction reform, especially when the local institutions were weak(e.g. endemic corruption). This causes difficulties in encouraging a rational and science driven policy measures (Lavigne et. al. 2008) for volcano mitigation and post disaster management.

The legacy of the Dutch colonial government can be traced until the recent past which proved that institutions are hard to change. Even if they change, they may change on the surface and not in substance, as happened during the period of 1970s-1999. Another explanation could be that the DRR discourse during 1970s-1990 simply took place in the context where ICT infrastructures were not as advanced as they are today. Neither surface nor substance change occurs in isolation. Instead, it occurs as a result of national-international interactions facilitated by the context of when and where (the level) such interactions take place. Recent changes in Indonesia in 2007 disaster management policy were due to discursive changes at the global level coupled with large-scale disasters in Indonesia during the last ten years. Therefore, the disaster management

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[124] Source: First Briefing Notes Forum PRB, 18 Nopember 2010 Emergency needs for Emergency response: Merapi Volcano Eruption 2010 page 1-2.

[125] Such as Kompas, Tempo and Seputar Indonesia. See for example an opinion from Sindhnata, an expert on Javanese philosophy argued that one of the meaning from the Merapi eruption can be that Merapi has been able to show its power that should make rational human be humble. This kind of reasoning suggests that Merapi have actually punished the people and http://cetak.kompas.com/read/2010/11/19/05042143/gara-gara.mbah.merapi

[126] Not including the 202,000 units that suffered some damage – See http://www.adb.org/documents/reports/damage-loss/chap2.pdf (Accessed on 30 March 2010)

policy reform in Indonesia has been a result of dual process: the dynamic context where recurrent catastrophic events provide opportunities for the (domestic actors inside and outside of) government to review its existing policy combined by international processes and platforms such as the bilateral and multilateral aid institutions that encourage the government and the non-state actors in general to change.

Chapter 7 Institutional Vulnerability and Decentralization

7.1. Introduction

Disaster risk management policy reform in Indonesia takes place in the midst of three complex processes: First, the unfinished business of political reform at the national and local levels (see 5.4.8); second, complex decentralization processes at the local level; and third, there is demand for reform simultaneously from other sectors such as water sector reform, legal reform, environmental policy reform, ongoing economic reform after the financial crisis a decade ago, and governance reform, as well as that in many more sectors including disaster risk management itself.

7.2. Volatility in Indonesian Institutions and Governance

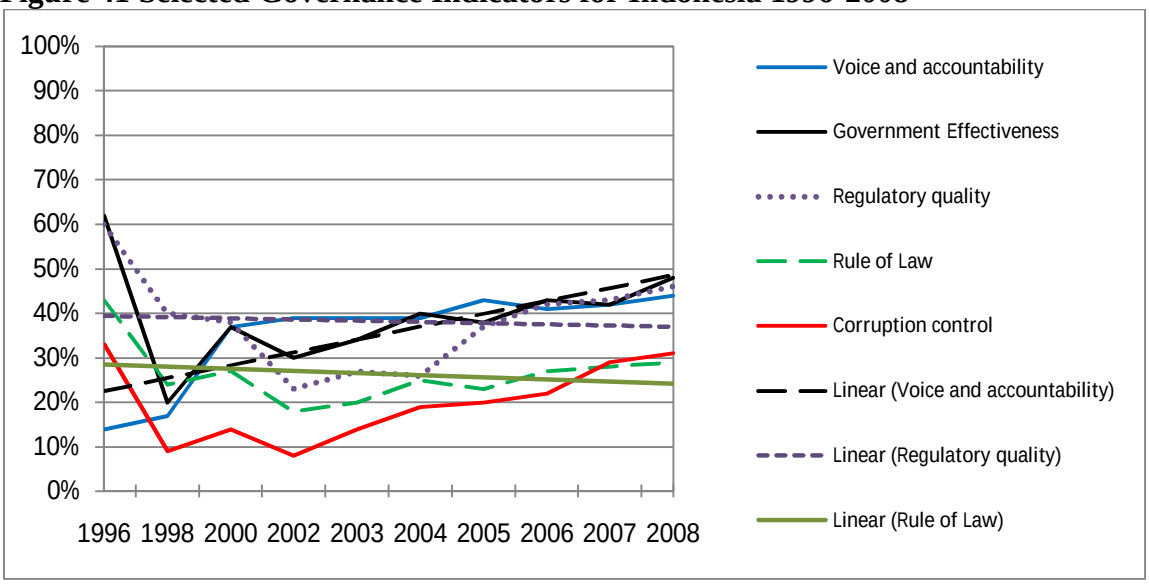
Indonesian political reform has often been praised by foreign media and experts as being successful because of the country having conducted three democratic elections since 1999 without significant complications. At the local level, district and provincial elections have also taken place successfully, which has been sustained up to the present. The problem is that, against such a successful picture, outcomes in human development are still relatively isolated from these achievements in politics.

Under the Suharto authoritarian regime of 1968-1998, public participation and media freedom were suppressed. During the last 10 to 12 years after political reform, Indonesia has enjoyed more freedom in terms of participation and media freedom. On a scale of 0 to 1, “voice and accountability” has crept up from 0.14 in 1996 to 0.40s in the last three years. Despite some progress, the government still needs to substantially improve policies and regulations that are conducive to sectoral development, including risk reduction.

On the basis of the *regulatory quality* index, Indonesia has been progressing since 2004; nevertheless, there is still a negative trend due to its high starting position in 1996 followed by a deep plunge in 2000. This is of course bad news for disaster management professionals who might have thought that they saw progress of disaster management policy by only looking at the enactment of new laws and ancillary regulations. In fact, certain disaster mitigation-related laws

such as Building Law 2002 have hardly had any effect on local realities.[127]

Figure 41 Selected Governance Indicators for Indonesia 1996-2008



Source: Adapted from Kaufmann, Kraay, and Mastruzzi 2009. 'Linear' means trend lines of selected variables.

Government effectiveness index[128] in Figure 41 illustrates the effectiveness of public services, bureaucracy, and the quality of the civil service. On a range of 0 to 1, the index fell threefold from 0.6 in 1996 to less than 0.2 in 1998. Indonesia has struggled to be effective in providing public services in both normal and pre- or post-disaster situations. Nothing indicates that emerging disaster management bureaucracy (at local and national levels) can be effective (and efficient/innovative) that is independent from the recent and the past templates of Indonesian bureaucracy.

The World Governance Survey (WGS)[129] noted that bureaucracy is a critical issue in regard to how a country sets and achieves its societal and economic goals. WGS's findings imply that bureaucracy is the hardest to change; Indonesia's public affairs still suffer from a low quality, as

[127] Ministry of Public Works admitted the enforcement was poor. See also table 19.

[128] It measures the quality of public services, bureaucracy, and the quality of the civil service, as well as the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies

[129] See Goran Hyden, Julius Court, and Kenneth Mease (2003) World Governance Survey Discussion Paper 7 http://www.odi.org.uk/resources/download/3141.pdf.

can be seen in Figure 41. However, the trend is good as it has now emerged from the so-called "era of confusion" (Hyden et. al. 2003) during 1998-2000, but has hardly reached a point of satisfaction today.

Rule of law index has fluctuated[130] and it is the most volatile index of all WGI. However, there is a negative trend. This value has hardly improved from the 2000 level (it is still less than 0.3 on a scale of 0 to 1). Furthermore, it suffers further from corruption, as indicated by Figure 41, which is still rampant. One can still argue about a gap between the public perception and the actual progress in the fight against corruption. However, longitudinal study on this issue by Kaufmann, Kraay, and Mastruzzi (2009, 2010) pointed out that progress occurs very slowly. There is a positive trend as the country is enjoying a positive trend in the level of press freedom.

Figure 41 is very interesting as it suggests widening divergence between press freedom and participation (measured by voice and accountability), which is in fact improving (see the trend line), whereas *rule of law* as well as *regulatory quality* of the country have been decreasing.

7.3. Decentralization and Its Missing Links and Implications for DRR

Indonesia rejects federalism because of its unitary state ideology rooted in the 1945 Constitution. Take the United States' decentralization system as an example for comparison: the US's decentralization is at the state-government level (equivalent to provinces in Indonesia). Indonesia took a different path by decentralizing central government power directly to cities/districts and not at the provincial level, except for the special case of Aceh province. There are some issues that cannot be decentralized, such as foreign affairs, defense and security, the judicial system, monetary and fiscal affairs, and religion.[131] Disaster risk is still seen as a national defense and security affair and this is part of the reason why the military and police still have a role as steering committee members in the current national disaster management office (BNPB). The BNPB is a national body without offices at the local level; it cannot command local governments to undertake DRR. The realities of governing DRR are made through local governments as required by Law 24/2007 and a series of government regulations regarding local government's specialized organizations. With this comes the hard fact regarding decentralization and DRR

[130] Rule of law measures the extent to which agents have confidence in and abide by the rules of society, in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence.

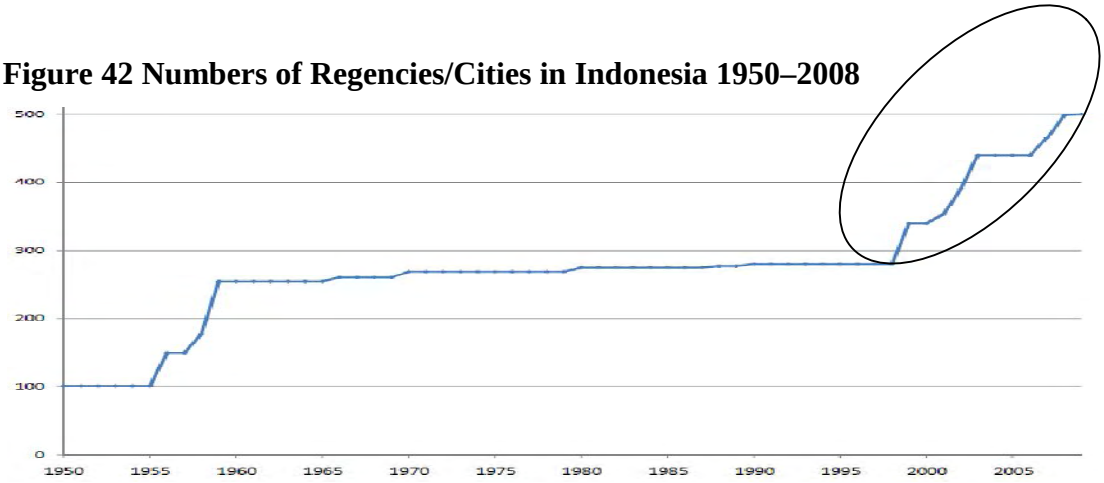
[131] The others are: "macro-level planning, fiscal equalization, public administration, economic institutions, natural resource utilization, strategic technologies, conservation, and national standardization." See Para 7.2 Law 22/1999.

policy implementation bottlenecks on the ground.

The "big bang" decentralization process in Indonesia has challenged national and local governance dramatically. More than 220 new cities/districts (municipalities/regencies) have been created since 1999. In 1998, the total number of cities/districts was 280, and now in 2010 it is 500 (June 2010, see Figure 42). This means that at least 220 new local governments have just started to exercise their power and command over local resources. A recent evaluation (report soon to be released) regarding the new city/district administrative affairs showed that they can take three years to ten years in transition, as many cities/districts have problems in public service deliveries after a transition of ten years.

The vast majority of new cities/districts still depend on central government funds/grants for their annual budget, and a few can fund less than 5% of their annual budget; fiscal autonomy, which is one criterion for decentralization, can hardly be found in practice.[132] This partly explains the puzzle shown in Figure 41 where there is emerging divergence in terms of a positive trend for media freedom (at least at the national level, even though it is still limited) and a negative trend in *rule of law* and *regulatory quality*, while *government effectiveness* is still poor and thus the majority of the people still suffer from poor public services.

Figure 42 Numbers of Regencies/Cities in Indonesia 1950–2008



Source: Fitriani et al. 2004, Seldado et al. 2009 and Setneg Online Database 2009.

In addition, because almost every sector (such as energy, water, land use, forestry, economy, and disaster management) needs reform, local governments (legislative and local executives) are

[132] A note from Endi Jaweng, a decentralization expert from KPPOD (Regional Autonomy Monitoring and Implementation Commission). Personal communication.

required to lead the local transformation process. In the case of disaster risk management, at least 200 new cities/districts hardly utilize the old structure that has gone under revision at least six times since 1979. Human capital for even reactive responses must be built from scratch. Local institutions are still vulnerable not only to problems coping with disaster risks but also still have problems in meeting the increasing demand from various sectoral reforms.

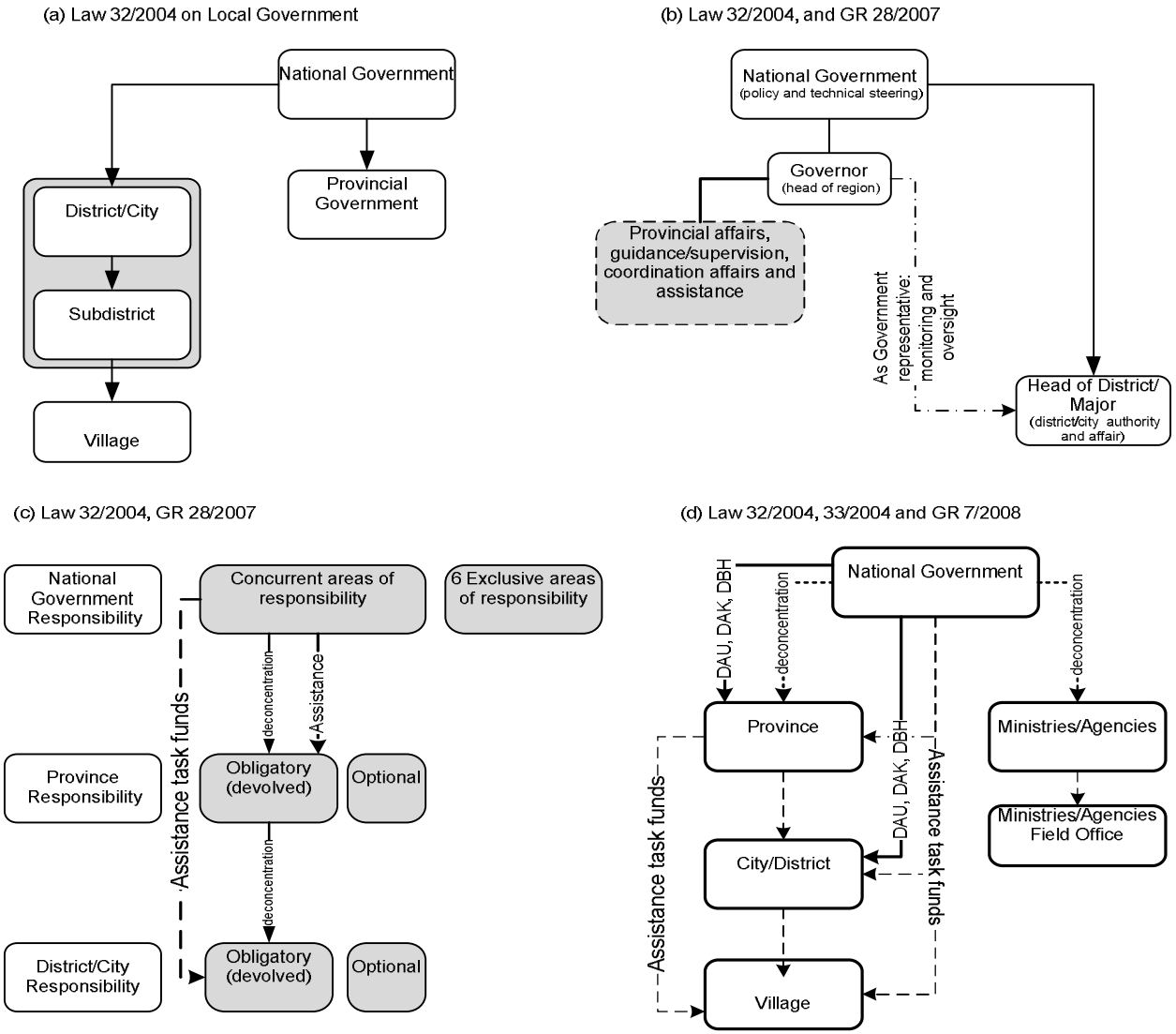
Indonesia's decentralization is characterized by multiple hierarchies of structure, function, funding, and areas of responsibility; there are inherent structural disadvantages to making DRR a local priority – as required by Law 24/2007 as well as HFA – because "missing links" in vertical governance may prevail, such as the lack of steering power of provincial governments to enforce mitigation measures at the city/district level. Sudarmo and Sudjana 2009 argued that de facto power and authority flow from central government to cities/districts, which means that provincial governments have no clear functions. Apart from their mandate for monitoring and coordination, provinces do not in fact have administrative power over the regencies/cities. This means that monitoring and coordination for disaster risk reduction and many more sectors will be difficult to implement and not easily enforced.

In the context of vertical governance, analysis of DRR institutions should involve a focus on the existence of multiple hierarchies, such as structural hierarchy, functional hierarchy, sharing and division of responsibility, and fiscal hierarchy (Sudarmo and Sudjana 2009:4, 11).

In terms of structural hierarchy, Figure 43(a) explains the structure according to Local Government Law 32/2004, where city/district governments are not linked by any means to provincial ones, as they are linked only to the central government; this is contrary to the general public understanding of the location of provinces in the hierarchy, they have in fact no or only symbolic power between the levels of district and central governments. On the other hand, some external interventions on DRR occur through the provinces with naïve (or false) expectations that the provinces can command the cities/districts to follow policy prescriptions. There is clearly a missing link, which has developed due to political decentralization (see Works 2002 – Section 2.3.2.) in Indonesia; city/district governments (both legislative and executive) are directly elected by the people and therefore held accountable to the people directly (although this not always the case) and cities/districts have no direct responsibility to provincial governments. This is the opposite of the situation before the reform. Therefore, any new policy innovation from the central government simply cannot be channeled through provincial governments because it has been

made irrelevant to the district governments as the real power have been granted directly to the district governments (Figure 43a).

Figure 43 Multiple Hierarchies of Structure, Function, and Fiscal Affairs



Source: Adapted from Sudarmo and Sudjana 2009.

The capacity such as human resources and information and knowledge capital is still (and often only) available in provinces rather than cities/districts. Having said this, this does not mean that provincial governments are already qualified to effectively steer the lower levels of government towards higher quality. The absence of steering capital from the provinces is obviously a lost

chain in vertical governance. In addition, press and civil society, which often have roles as third party monitors of the government, are generally based at the provincial level.

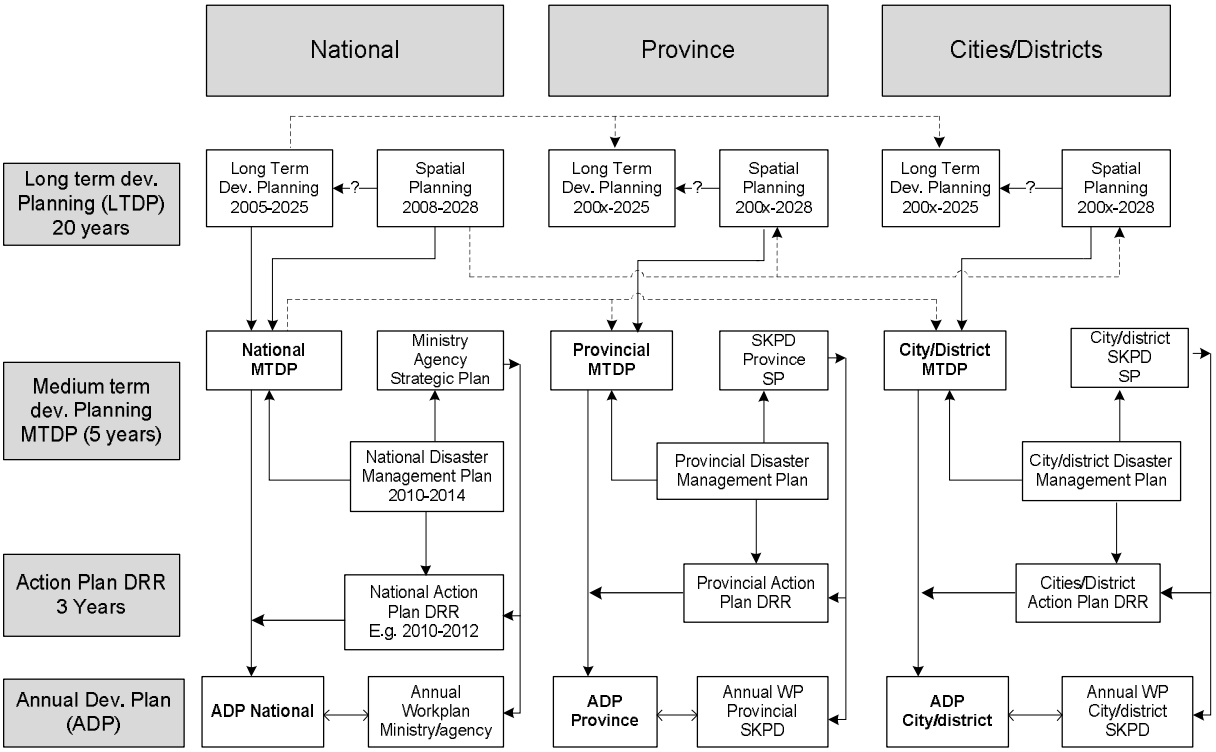
To solve the issue of a missing link in vertical governance, as there is clearly no link between district and province (Fig. 43a), the central government issued a new regulation in 2007 to authorize provincial governments to have clear steering roles by granting central government representative status, complemented by monitoring and oversight tasks. The model of governing shown in Fig. 43b and 43c still generates difficulties of legitimacy for provincial governments. Two other complementary models have been offered to solve these pitfalls. The first is to give provincial governments some seed capital to deliver to lower levels of government, which is generally earmarked as deconcentration funds[133]; in addition, the central government has also provided "assistance tasks funds", which are optional and complementary. Apparently, as shown in Fig. 43d, things turn out to be more complicated as central government also provides "assistance tasks funds" directly to village-level governments, which seems to strengthen national programs and the central government's interest, which is often deviated or shifted by local government interests when it flows through local governments. Fig. 43d provides a solution for the provincial governments to also channel resources directly to the village level in order to increase their legitimacy and to safeguard national programs. This is obviously necessary because of volatility in local governments in the budgeting of prioritized basic social services, apart from malpractice in local budgeting as local governments may cut short program budgets and spend more on overhead costs. Central government disburses the main support, namely, General Allocation Budget (DAU), complemented by Specific Allocation Budget (DAK), as well as grants to the local governments.

Decentralization also means delegating power to lower levels, that is, the transfer of authority and responsibility to cities/districts. Therefore, local governments have been given greater authority to regulate local affairs, so long as the regulations being produced do not conflict with national

[133] Deconcentration funds shall include any fund coming from APBN (national budget) implemented by a governor as the government representative, including all revenues and expenditures in order to implement deconcentration, excluding any fund allocated for central vertical agency in such a region. See details in www.djpk.depkeu.go.id/document.php/document/article/165/150/ [last accessed 9 July 2010].

interests. As of 2009, 1,843 local regulations have been canceled by the central government (which equates to about four local regulations produced in every district being cancelled).[134]

Figure 44 DRR Integration within Development-Related Planning



Note: Interpretation based on Law 24, 26/2007, DRM Plan 2010-2014, NAP DRR 2010-2012. 200x denotes different planned starting periods in every province and district in Indonesia.

7.4. Disaster Risk Reduction Planning After Reform

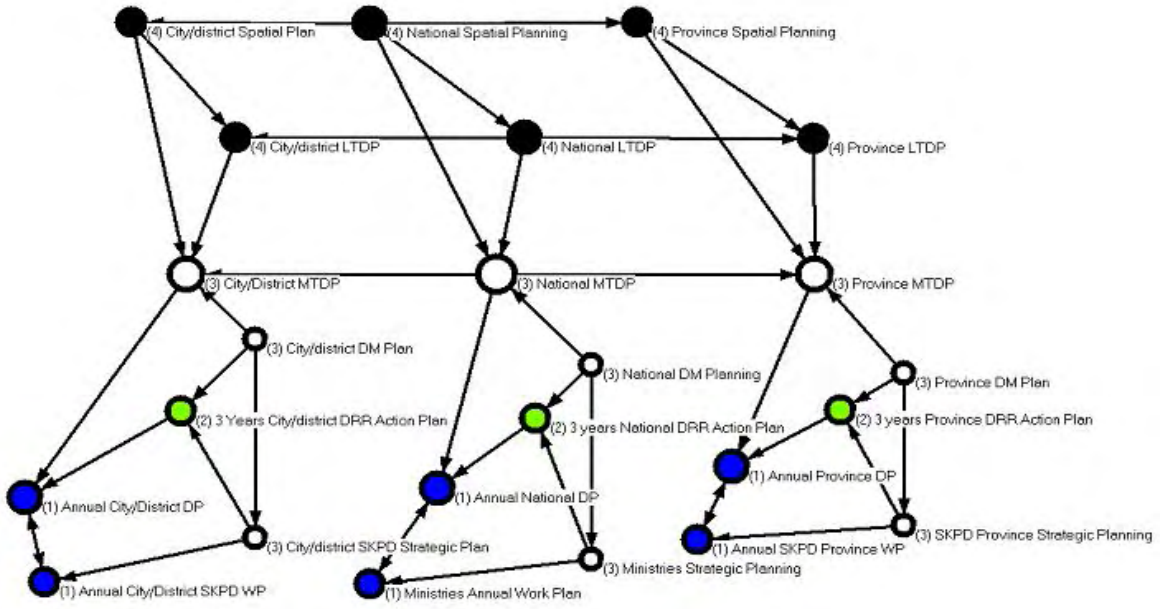
The "ideal type" of integration of disaster risk management into development is embedded into four types of development-related planning. The first is the long-term planning with a period of a 20-year cycle divided into two planning regimes, long-term development planning (LTDP) and spatial planning. Ideally, spatial planning is made in advance in order to contribute to the LTDP. In practice, the institutional setup often makes the uptake of spatial planning into LTDP difficult. For instance, recent national LTDP started earlier in 2005 while the spatial planning reform as

[134] See the data at http://www.kppod.org/ [last accessed 1 July 2010].

required by the Spatial Planning Law in 2007 was just recently drafted in 2008; this makes it impossible for spatial planning to be sufficiently considered in the ongoing LTDP.

Equally, at the provincial and local levels, similar events take places. Reconciliation of these two planning regimes is crucial. There is an impression that the uptake of spatial planning policy into LTDP can be made in flexible ways. However, this is easily stated, but almost impossible in practice. In addition, both have their own legal status; for instance, the LTDP is formally proposed by the executive government and agreed by the legislative body. The LTDP in 2005-2025, which was drafted soon after the 2004 tsunami, contains limited consideration of disaster risks.

Figure 45 Network Analysis of Indonesian DRR Planning System: Degree Centrality Test



Note: Interpretation based on Law 24, 26/2007, DRM Plan 2010-2014, NAP DRR 2010-2012

All medium-term development planning (MTDP) at each level must refer to the LTDP. The MTDP that produced later can comply with the spatial planning. Figure 45 below represents the concept of Figure 44 using a *directed graph* to demonstrate that, for all national, provincial, and city/district medium-term development planning must legally refer to the spatial planning and LTDP.

Figure 45 demonstrates the network analysis based on the DRR-development planning structure given in Figure 44. The size of the nodes reflects the *degree* (in social network terms) that indicates the number of links with the other nodes. It appears that medium-term development planning is the crucial facilitating node for all levels (the biggest in size) as it connects all the long-term national planning regimes with the short-term ones as well as with the lower hierarchy level. Since medium-term development planning (MTDP) contains the development vision from the elected executives (president at the national level and head of region at provincial and district levels), most often the MTDP does not comply with the long term planning regimes (such as LTDP and Spatial Planning) because the MTDP is the political product of the elected executives.

Disaster risk management integration into the processes of development is relatively new. The first exercise started in 2010 when the government published a Disaster Management Plan 2010-2014, which was later adopted into the 2010-2014 National MTDP. The National DRM Planning 2010-2014 document is claimed to have a dual function as a planning document and at the same time a guideline for the ministry/national agency to draft their DRR-sensitive five-year strategic plan document, DRR National Action Plan, and for regional disaster management agencies. The roles of the National DRM Plan document can be found in Box 3.

To date, there is very limited evidence of both the provinces and the cities/districts also drafting their own disaster risk management plans to be incorporated in regional MTDP. Therefore, Figures 44 and 45 are the "ideal types" or the traceable vision found in the formal documents. In addition, given the fact that the mandated agency for DRM Plan is the national disaster management office (BNPB), there is a planning legitimacy issue over whether BNPB has the power to plan for a nationwide DRM plan beyond its organizational territory and power. The basic problem is that BNPB was given the highest planning authority in DRM, far beyond its organizational boundaries and authority. However, the pathways for long-term development planning authority have been well placed in the Ministry of National Development Planning and Spatial Planning mandate has been placed in the Ministry of Public Works. This create complexity in the horizontal coordination between the governmental agencies at the national level.

Box 3 Principles for Implementation of National DRR Planning

- A reference to the ministries, central government agencies, local governments, private organizations/business and communities.
- The ministries, central government agencies, are obliged to develop strategic planning incorporating the DRR perspective according to their mandates and functions with reference to the relevant National Planning document.
- Local governments bear the responsibility to develop local disaster management plans that function as guidelines for SKPD (local government working units) strategic planning by referring to the national plan for DRR.
- Ministries, government agencies, must guarantee consistency between the long-term planning and their strategic planning related to disaster reduction.
- Respective local governments should guarantee consistency between the national DM plan and the local medium-term development planning
- In order to improve the effectiveness of implementation of the plan, BNPB and the Ministry of National Development Planning are responsible for monitoring of DM planning into ministries' strategic planning, National Action Plan 2010-2012, and Local Disaster Management Plan, as well as local medium-term development planning.

Source: Renas 2010-2014, page 5-6.

7.5. Recent Progress on DRM-Related Law Enforcement

Law 24/2007 for disaster management has been enforced by the other lower regulations in at least five different stages: regulation from the presidential level down to the level of ministries, such as the Ministry of the Interior, which is responsible for providing institutional guidance for any new law and regulation to become executable at the provincial and district levels. In the provinces, there is either legislative or executive governmental process of creating provincial regulation, without which, laws and national regulations remain powerless. Given the unique context of decentralization in Indonesia's structural hierarchy, city/district governments are not directly responsible to the provincial government; instead, they are directly responsible to the central government. Therefore, any created provincial regulation focusing on risk reduction may have no impact on the ground because the province may only have a limited steering role, which in many cases actually produces a steering deficit due to some failings in institutional capacity (e.g. human resources and information). Consequently, in theory, the 500 cities/districts must have their own processes of creating local regulation regarding disaster risk reduction.

DRM policy reform also finds its way through the Spatial Planning Law 26/2007 and, after the Indian Ocean tsunami of 2004, the government asserted the need for reform in the nationwide coastal management sectors, which was manifested in the Management of Coastal Zones and Small Islands Law 27/2007. Meanwhile, reform in mitigation, such as the enactment of the National Building Law of 2002, has occurred silently without clear progress in implementation.

In general, the prime movers behind each of these laws were different and, in effect, as will be shown later, the progress of the enforcement at national and local levels of each law resulted in very different paths and directions. Discussion on Law 26/2007 will be briefly presented below. While Law 27/2007 will not be discussed at all because data on its enforcement is difficult to obtain.[135]

The processes for the enactment of Disaster Management Law 24/2007 have been claimed as deliberative with strong involvement of stakeholders, including non-state actors, especially NGOs and UN organizations, political organizations, academia, executive government, and legislative agencies, among others (see BNPB-UNDP 2009). Civil society organizations (CSOs) have been heavily involved in the whole process of legal drafting, consultation, debates, hearings, and campaigning from day one to the production of the final DM Law 24/2007. In the words of some CSO activists, tireless efforts despite limited logistical resources have paid off by the enactment of the law. The implementation of the law, such as the establishment of the new National Disaster Management Agency, was seen as a great success. Some key CSO actors claimed the newly established National Disaster Management Agency (BNPB) as their "baby" that today may not work according to the logic of the "biological parents" (e.g. drafters/promoters/campaigners) [136] because it has been inappropriately nurtured by the bureaucratic mentality and logic.

At the national level, enforcement of the laws often occurs at the government level (under the president office) as well as at the ministerial level. One of the key transformation points is the overhaul of the Interior Ministry, which provides technical guidance on how enforcement at the

[135] Comprehensive information regarding the enforcement of the Law 27/2007 barely available online. The interviewed DRR actors often have no idea regarding this law.

[136] On many occasions, Ms. Hening Parlan, former General Secretary of Indonesian Disaster Management Society (MPBI), often called the office her "baby" because it was born in the very minds of key MPBI members. This was after several initial multistakeholder workshops in Jakarta in 2005, especially three months after the Indian Ocean tsunami in December, 2004.

local level should be carried out. The later stage of enforcement of the law is at the local level (provinces and cities/districts), which can be measured by the speed of ratification of the respective national laws at the local level.

Enforcement of the disaster management law, as indicated by provincial ratification, had reached 85% as of June, 2010 (90% by November 2010), and is likely to occur in all provinces within the near future. At the district level, progress has been more difficult as the speed of adoption is slower. By November, 2010, 250 out of 500 ((compare with June 2010: 103 out of 250) cities/districts had ratified the law. At this rate, it is very likely that, by 2020, almost all districts will have adopted it.

Table 19 DRR-Related Legal Reform and Status of Enforcement

Name of Law	Level of Vertical Enforcement		Horizontal Enforcement at National Level
	Province	City/District	
Spatial Planning Law 26/2007	6*	11*	Enforced e.g. by GR 26/2008 - 10 Mar 2008 on Implementation of Spatial Planning Law, followed by Ministry of Public Works Regulations in 2007
	18%	2%	
Disaster Management Law 24/2006	30**	250**	Enforced by GR 21-23/2008 - all signed on 28 Feb 2008, Presidential Decree 08/2008 on National Disaster Management Office
	90%	50%	
Building Law 28/2002	N.A.*	N.A*	Enforced by GR 36/2005

*. Data June 2010; ** Data November 2010 estimate

Enforcement of the Spatial Planning Law[137] and the Disaster Management Law as presented in Table 19 can be used as evidence that institutional change is often difficult to achieve in a short period of time. Since the enactment of Spatial Planning Law 26/2007, only 18% (6 out of 33) of provinces have enacted the local *Perda* (local regulation) of Spatial Planning. At the city/district level[138], as of June, 2010, only 2% of the cities/districts have enacted the local spatial planning regulation. The fact that the vertical enforcement of DM Law 24/2007 is far more faster than

[137] There are different stories regarding the legislation process for Spatial Planning Law 26/2007. Spatial Planning Law 26/2007 is a revision of the 1992 version. In the revised version for 2007, the Spatial Planning Law was radically changed and embodied a paradigm shift towards disaster-risk-sensitive spatial planning, which is clear throughout the pages of the document. The general impression is that the stakeholder involvement in the last law was actually less intense than that of the Disaster Management Law. It involved drafters (academics/professionals) and technical government agencies (such as Public Works Ministry, Development Planning Ministry), legislators, and limited civil society involvement. Further research on the differences between the two processes is needed.

[138] In this dissertation "cities/districts" are treated as synonyms of municipalities/regencies.

Spatial Planning Law (26/2007) begs further questions for future research. But one of the answer is probably that because the present scenario from the central government to provide incentives (contingency funds) for districts with conditions that districts and cities must have local level disaster management agencies. This justified the notion of new institutional economic theory works that actors follow the rules because they are motivated by the new incentives. But as far as the DRR regulatory quality is concern, 'rational' behavior towards incentives are not necessarily built on proper, and comprehensive rational vision of DRR.

In the case of Building Law 28/2002, it remains as a paper without clear reason for three years after its promulgation at the national level in 2005; at the ministerial level, it was enforced later in 2007, while at district level, the ratification of the Building Law has been extremely limited. There is no clear data on how many cities/districts have managed to adopt and ratify Law 28/2002. Figures are highly inaccurate because recent claims have been mixed up with the old local regulation on building permits, which often only regulates the administrative affairs of building permit taxes without technical provisions on the *nitty-gritty* of engineering aspects of the buildings. Further discussion will be provided in 7.4.1.

It is clear that inclusive processes in the legislation may provide much driving force for local enforcement because CSOs and motivated stakeholders often provide voluntary policy monitoring and advocacy.[139] Furthermore, there have clearly been international players, such as INGOs, United Nations, and donor agencies, directly supporting local governments to start their local legislation processes. This has been evidenced in many provinces and districts where ratification took place in 2008, such as West Sumatra, Aceh, and NTT.

This seems to fit the notion that when claims of ownership of the processes in drafting the law are

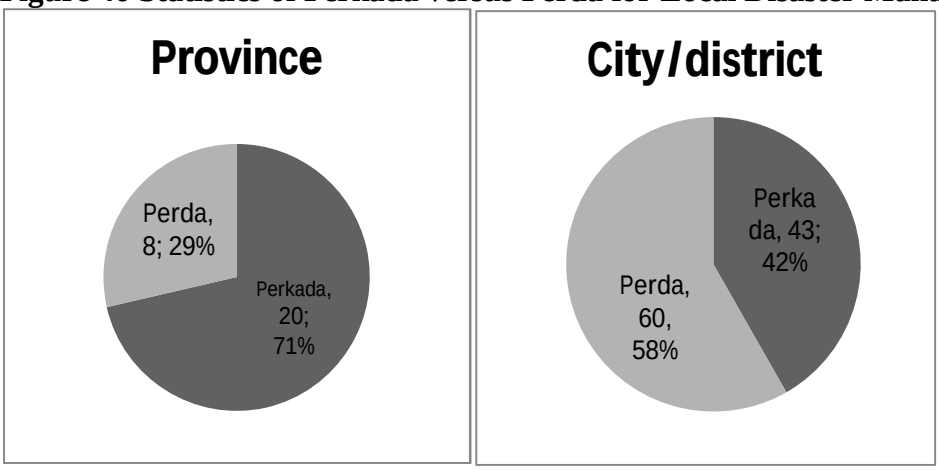
[139] One of the Oxfam's DRR project is called "Preparedness Response Influence of policy a Model for Emergencies" shorten as PRIME. The project has been designed for the Indonesian CSOs partners to focus on three aspects: the first is to influence of DRR policy that encourages local government's preparedness; The second is to build the capacity of local actors to response to the emergency; And the third, working with the vulnerable communities reduce their risks. Participant observation has been used as data collection method as the author had invited to participate in the two of the project meetings: The first was during the Mid Term Review of PRIME Projects 28-30 July 2008 in Yogyakarta, where the author were invited to present a paper entitled "The rise of risk – where is the resilience?". The second was during a civil society meeting (mostly Oxfam Great Britain's NGO partners from all parts of Indonesia) in Denpasar, Bali on 4-6 Feb 2009 where the author also presented a draft paper entitled "The DNA Code of Risk: Why Vulnerability Matters! A Civil Society Response to Draft Guidelines for Disaster Risk Assessment in Indonesia." This paper is an international peer reviewed advocacy paper, drafted for Oxfam & Indonesian CSOs and already translated in Bahasa. The Summary of the paper was published at the Jakarta Post Newspaper and also at the Indonesian Society for Disaster Management. Available at http://www.mpbi.org/content/jonatan-lassa-feeling-better-doing-worse (last accessed on 15 Nov 2010)

high from many stakeholders, as happened with the drafting of the Disaster Management Law during 2005-2007 (BNPB-UNDP (2009a, 2009b, 2009c), national and local level enforcement seems to be stronger at an earlier stage, but may not be sustained even though in the planning documents such as DRM Plan 2010-2014, significant resource have been allocated to local level DRR institution building (See 7.7.3) because based on the past experience, there have been huge gaps between planning and implementation (See Figure 54 National Action Plan 2006-2009: Actual vs Planning)

One of the secrets behind the achievement of local endorsement of the DM Law, in comparison with the Spatial Planning Law, was that the Spatial Planning Agency hosted by the Ministry of Public Works prefers certain forms of local regulation. Local level regulation can take at least two forms: the first is the *Peraturan Daerah*, namely, ***Perda*** (local regulation), which is jointly endorsed by both legislative (legislators) and executive branches (head of district). Therefore, legitimacy is higher and the likelihood of sustained legislative support is higher than those of the next form of local regulation, known as *Peraturan Kepala Daerah* or ***Perkada*** (Head of Region Regulation – such as Head of City regulation or Head of Province regulation).

Perda takes a longer time as it requires certain processes, such as the production of academic papers including those on its logistical processes, public consultation and debate, negotiation, and sometimes conflict. ***Perkada*** is the easiest to be issued because it is the concern of the head of the regional unit (province or city/district) alone and its drafting process does not have to be deliberative. Hence, there is a problem with political legitimacy because of the nature of volatility of local budgetary politics. There are limits to ***Perkada*** when local political conflict is high (as is often the case in many parts of Indonesia after the national reform and the big-boom decentralization in Indonesia started in 1999). ***Perda***'s drafting is more deliberative but does not always eliminate the political volatility, including that related to local budget politics to support certain sectors and programs/projects; however, given its shared-vision nature for both executive and legislative branches, ***Perda*** does, at least in theory, and in many actual cases, provide more sustainability, but of course this is not always the case.

Figure 46 Statistics of Perkada versus Perda for Local Disaster Management



[June 2010 – developed from BNPB database June 2010]

Figure 46 shows that certain provinces prefer *Perkada* over *Perda* (71% *Perkada*; 29% ***Perda***). At the district level, 60 out of 103 (June 2010) prefer to use ***Perda*** while the rest use ***Perkada***. In terms of legality, both are equally legal in a given jurisdictional unit. However, regarding evidence of local level enforcement towards sustainable investment and practice in disaster risk reduction only time can tell. The delays of spatial planning enforcement at the local level can be explained by the preference of actors to use ***Perda*** instead of ***Perkada*** because higher level regulations require this. While for DRR, local governments have been given options (by the DRM Law) to prefer either *Perda* or *Perkada* (See further explanation in the next Section 7.5.1)

Policymakers should decide based on their heuristic understanding (in other words, make an educated guess based on their experience) of the available options of *Perda* and *Perkada*. However, if the long-term approach and sustainable institutions are the main concerns, *Perda* is a better option even though it takes longer to be drafted.

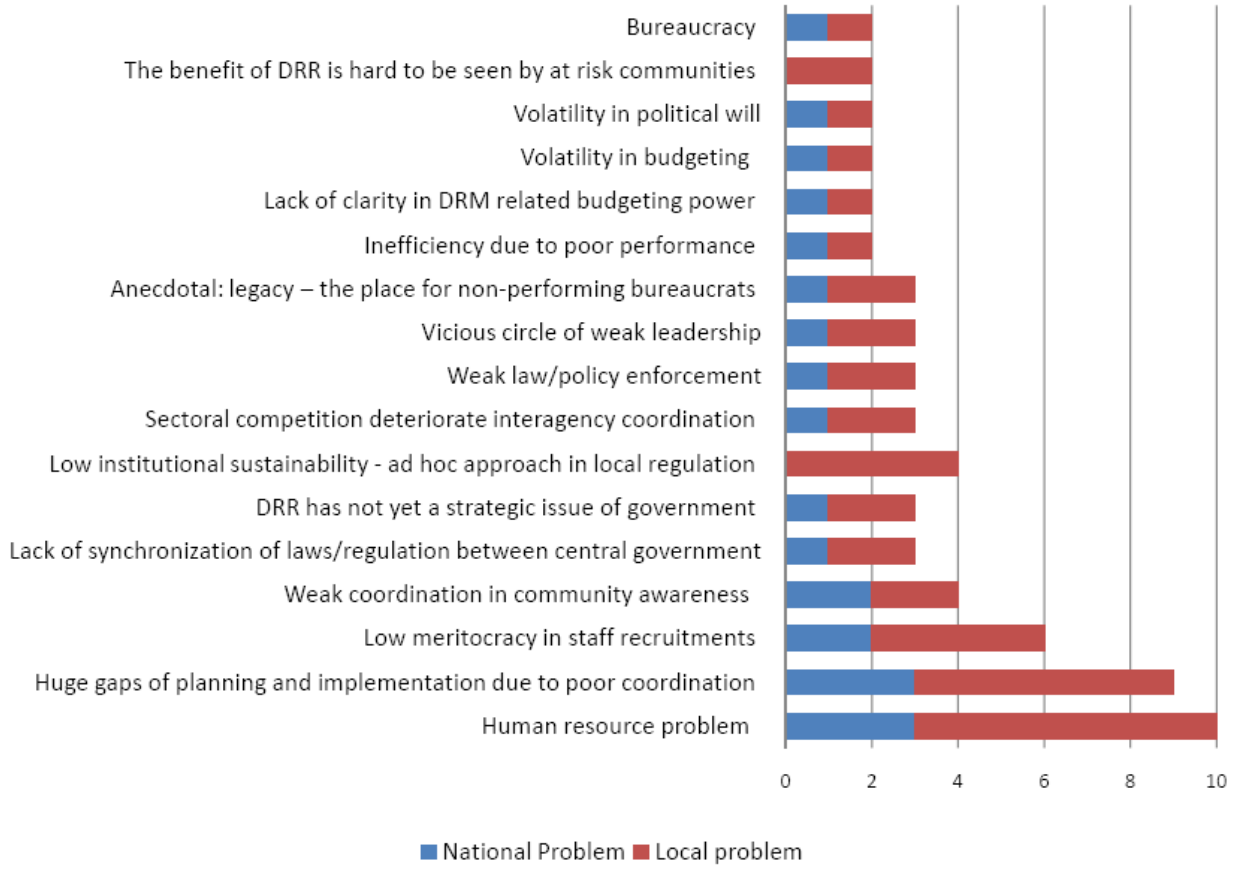
7.5.1. Institutional Constraints at National and Local Levels: Recent Findings

In a facilitated e-discussion by the author regarding local and national institutional problems in implementing DRR, 12 outstanding individuals involved in the local disaster risk management process voluntarily responded to one open-ended question: “What are the two main institutional

problems at local and national levels?" [140] Each participant responded by sharing their subjective views on the problem at local and national levels. Even though it was well understood that the new local disaster management office (or hereinafter BPBD) formation serves as an *enabling condition* for local level DRR implementation, they saw the formation of BPBD in cities/districts as a logical consequence of the law or that the formation of local disaster management office has 'naturally' occurred, provided that the law has been in existence rather than as a local response to disaster risks. There were barely any complaints regarding the speed of the local legislation process.

[140] The e-discussion started on Friday Apr 16 till 30 April 2010. The 12 DRR professional were from different local contexts dealing with local disaster management organization from Central Java, NTT, Aceh, Padang, and Papua.. All are DRR professionals with professional experience varying from 4 to 15 years. The answers were qualitatively recorded and later coded into Figure 47.

Figure 47 Perception on the Institutional/Organizational Obstacles



This was based on the answers from the e-discussion - the ranking was done by the author

There is a well-known legacy from the old disaster management structure (under *Bakornas* system, see Chapter 6), when in the past non-performing officers and troublemaking bureaucrats were often placed in the secretariat of local disaster management offices as one form of punishment because the offices were once the least well resourced. After the reform, the offices are likely to struggle and to suffer from this organizational legacy. At the local level, human resources seem to be more problematic than at the national level. However, most responders could not fully answer for the national scale because most of them were based at the local level.[141]

[141] At the national level, the Steering Committee members of BPNP from outside the government were chosen on the basis of merit in view of their knowledge and wisdom, but also it may also because of political proximity of the members. The process it self based on fit and proper test according to the politicians at the national House of

One DRR facilitator shared views on the constraints of working in partnership with the local governments during the last four years in West Sumatra. The main message is clear that bureaucracy is one of the serious problems. A recent case was outlined of a few staff from a provincial BPBD office (just established in April, 2010) asking for fees and transportation allowance when attending a workshop facilitated by a small NGO. "The NGO invited the provincial BPBD with a noble purpose to give the agency visibility in the local districts and increase their legitimacy. In fact they also come with official transport facility."[142] By all accounts, as presented in the beginning of this chapter, *government effectiveness* in the field of disaster management is not isolated from the macro context of bureaucracy in Indonesia.

Lastly, on the preference of using *Perkada* to form local disaster management offices, this is seen by the responders as an *ad hoc* approach. This is particularly interesting as this view is not shared by the bureaucrats themselves[143] because both are legally valid and the only difference is in the legitimacy issue. However, the truth is that for any local disaster management office (BPBD) to be considered as part of local government working units (a.k.a. SKPD)[144] and ready to access a regular annual budget, the BPBDs must be based on *Perda*, that is, local regulation co-produced by both legislative and executive branches. Therefore, the speed of BPBD formation as shown in Figure 46 indicates future sustainability problems for governability of disaster risk reduction.[145]

7.6. Understanding Law Enforcement Using Institutional Network Analysis

This section demonstrates network analysis of the recent local regulation (*Perda*) for disaster risk management. The purpose of this test still refers to the same research questions but in order to determine the quality of the *Perda* being produced. Since not all documents are available to the

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Representative. To the surprise of many DRR professionals in Indonesia, the politicians were not able to select Dr. Paripurno, the UNISDR Sasakawa Laureate 2009, who was nominated to be one of the Steering Committee members to represent NGOs. Dr. Paripurno has been training DRR facilitators in 22 provinces, reaching more than 1,500 local community-based DRR facilitators in Indonesia. Please consult http://www.unisdr.org/eng/sasakawa/sasakawa09-list.html. The nomination of Dr. Paripurno was managed and steered by the author together with the Indonesian Society for Disaster Management.

[142] Anon. Email communication on 7/05-2010

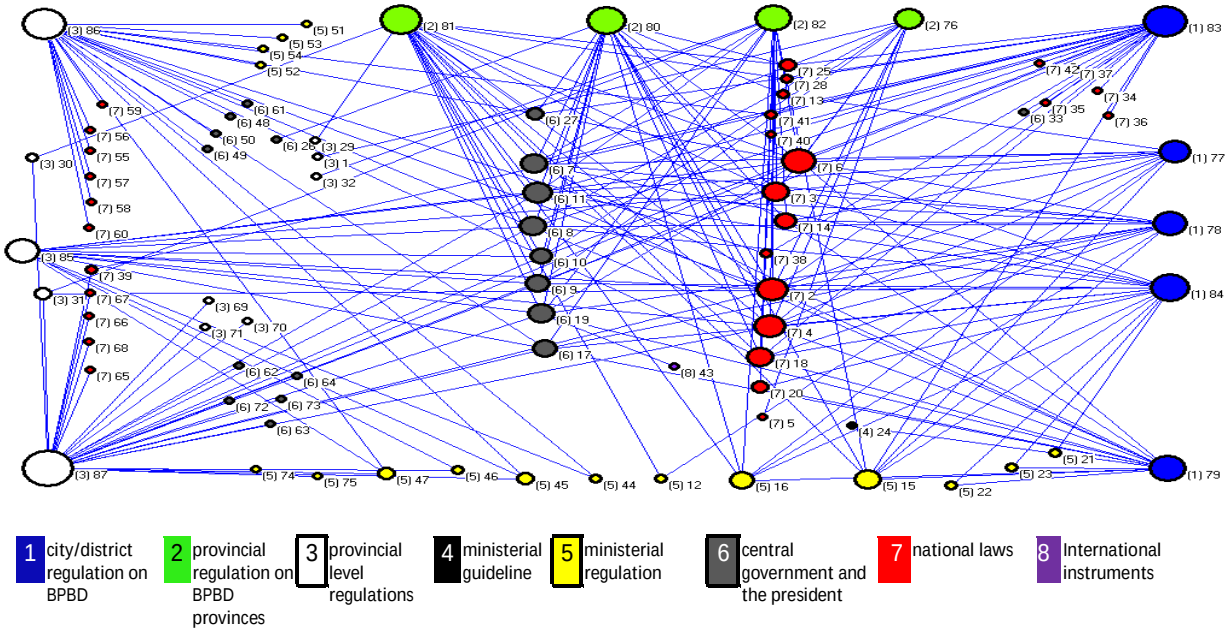
[143] Mr. Paulus Liu: a Local Development Planning Officer (Bappeda) and a PhD candidate at the Australian National University argues against the view of the responders. Personal communication, 10 May 2010.

[144] SKPD is a local government working unit under regional secretary leadership. It is comparable to sectoral departments of local government.

[145] On the basis of GR 41/2007, formation or establishment of organizational instrument at the local government must be based on *Perda*, which is further elaborated at lower level regulation. The same point was also mentioned in *Permendagri* 46/2008, Chapter 2, Article 2, point 2.

public and not all BPBDs are formed by specific local regulations, only 12 local regulations are analyzed, including those for BPBD Aceh, BPBD Agam, BPBD Bantul, Provincial DM Regulation NTT, BPBD NTT, BPBD Bojonegoro, BPBD Sikka, BPBD Gorontalo, and BPBD West Java. (See selected list of DRR and DRR related regulations in Annex 7)

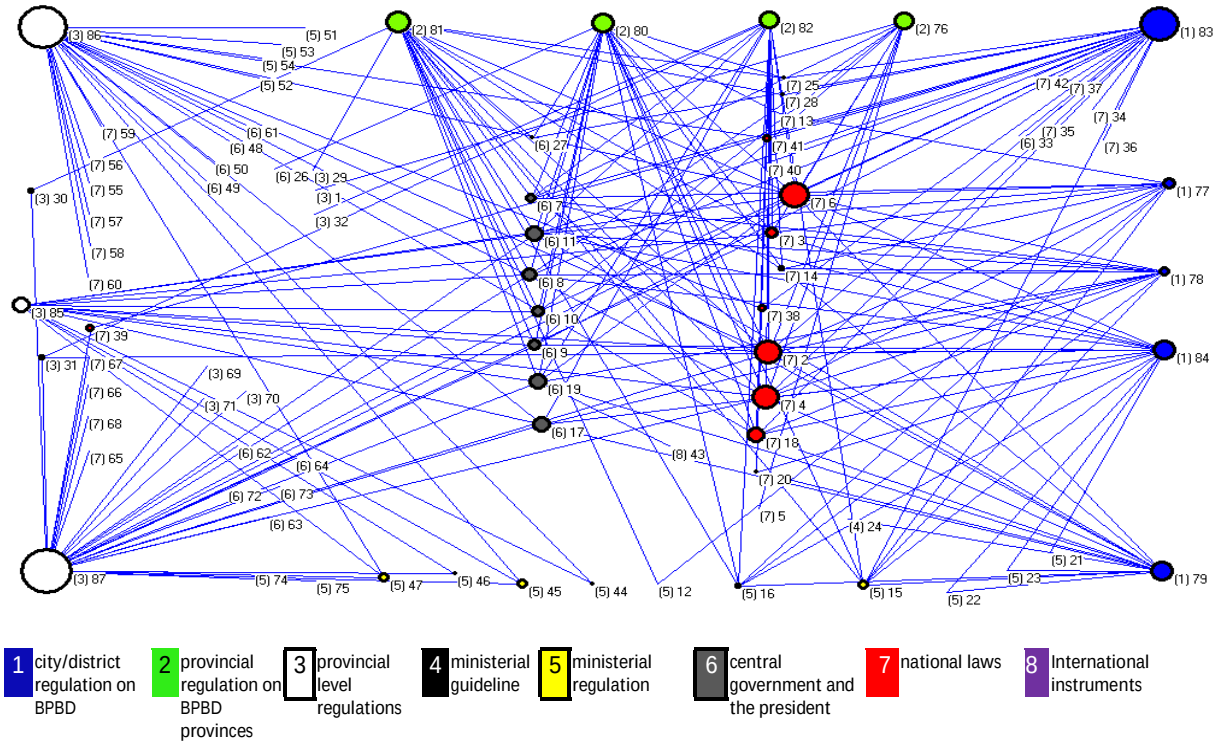
Figure 48 Degree Centrality Test of Local Disaster Regulations (N-87)



Both Figure 48 and Figure 49 present centrality analysis, for which the in-built assumptions are as follows: a good *Perda* must have strong ties with other relevant superior regulation at national and regional levels. In quantitative terms, the quality will be seen in the value of *degree centrality* test (i.e. how many ties a *Perda* has in relation to other related local and national laws and regulations), and in *betweenness centrality* (e.g. values that reflect the level of 'leadership' centrality relative to other regulations in a given network – see Figure 48): the bigger the nodes the better the leadership of the regulation.

Lastly is the *closeness centrality* test, which will receive less attention in this section. The numbers 1-87 reflect the number of 87 laws/regulations from local to national level. Eighty-seven is the total number of laws/regulations in the given network, drawn from 12 disaster management *Perda*.

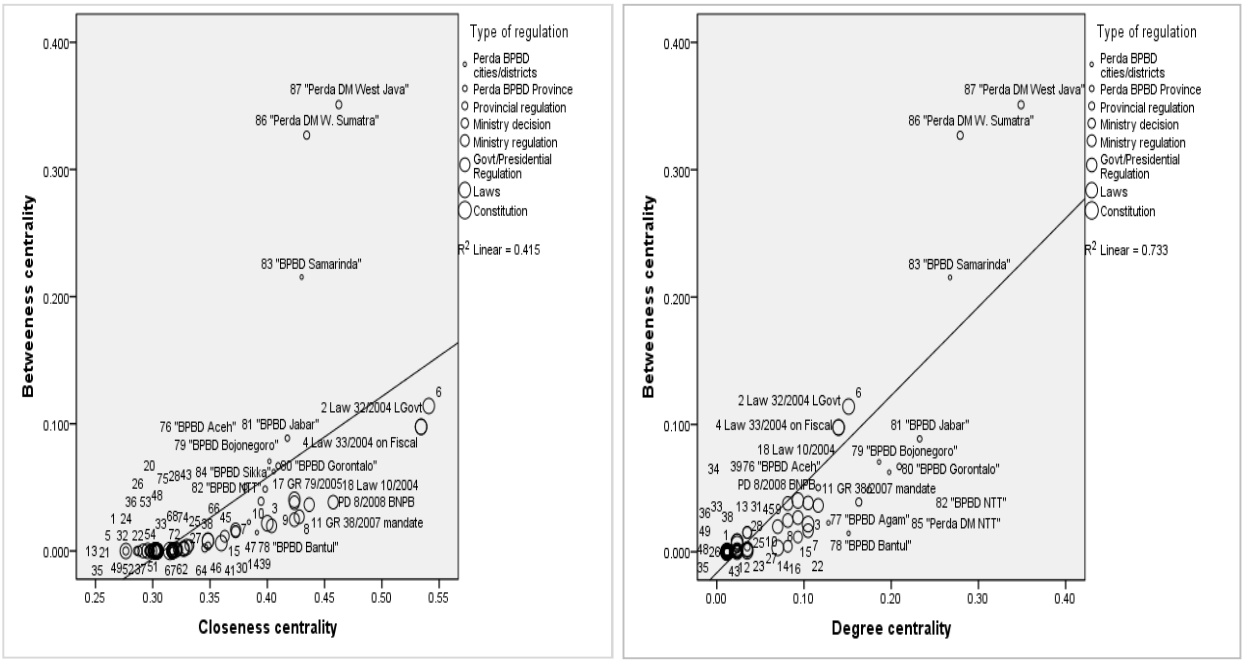
Figure 49 Betweenness Centrality Test of Local Disaster Regulations (N-87)



Apparently, the vertices (nodes) numbered (1), (2), and (3) are bigger than the rest of the nodes because this *centrality* analysis mainly focuses on the quality of the *Perda*. The bigger the size of a vertex (node), the more important it is in the network. The meaning of Figures 48 and 49 together can be visualized in the scatter plot in Figure 50. Apparently, node 87 (Local Disaster Management Regulation or *Perda* of West Java), node 86 (West Sumatra Disaster Management *Perda*), and node 83 (BPBD Samarinda City)[146] are the top outliers in the two selected regression analyses. The reason for this is obvious as they managed to comply with the superior regulations as much as both the local legislators and the legal drafters could. *Betweenness centrality* involves mapping the "leaders" in a network and *closeness centrality* measures the importance of a node in a network; they complement each other in explaining relationships.

[146] The capital city of East Kalimantan Province, Indonesia.

Figure 50 Selected Regression of Centrality Analysis

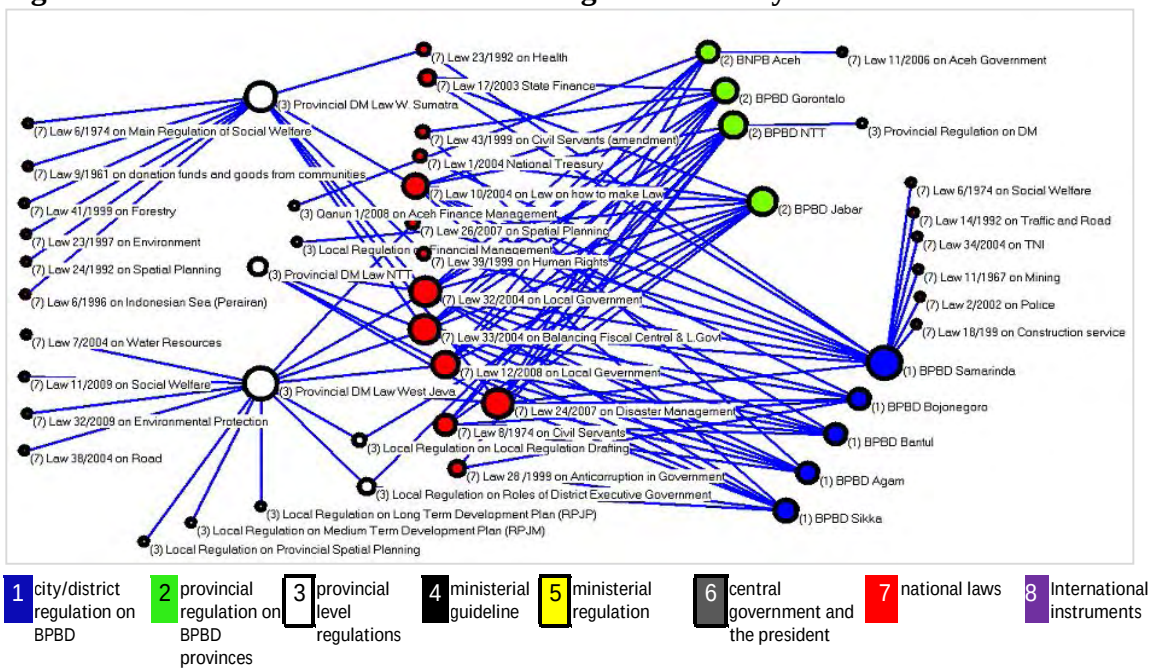


The most important national laws are node 2 (Law 32/2004, which regulates the local government including the main reference regarding how local institutions of DRR should be located in the province and districts – see Figure 50 left), node 4 (Law 33/2004 on fiscal balance between cities/districts and the provinces – a very important law because it regulates how resources in the development processes should be shared – indeed a DRR incentive structure), and node 6 (Law 24/2007 on disaster management). Obviously, it may be that an important law/regulation is not considered adequately by the local policymakers, which eventually means that a certain crucial law/regulation ends up at the bottom of the left axis for both tests (Figure 50 left and right). The worst scenario is that an important law/regulation is not considered at all and is totally neglected.

From Figure 50 (left), it appears that *Perda* disaster management in NTT (node 85), including *Perda* on local disaster management agency or BPBD NTT (node 82) together with BPBD Aceh, are closer to the regression line, together with BPBD Sikka. Meanwhile, BPBD Bantul is one of the bottom outliers. The further an item falls below the regression line, the less its level of leadership within the network. In Figure 50 (right), it appears that most *Perda* for BPBD fall well

below the regression line despite their strong ties to other nodes (measured by their *degree centrality*); node numbers 2, 4, and 6 remain influential leaders.

Figure 51 Extracted Network Based on Degree Centrality N=50



Note: the analysis uses all the accessible data from Perda DRM as of June 30th 2010.[147]

DM Law for West Sumatra signed on 27 June, 2007, is an example in terms of how it seeks to comply with other laws, including those that are no longer relevant or have expired. It is linked to Forestry Law, an expired Environmental Law, Donation Law from 1961, an expired Social Welfare Law from 1979, as well as an expired Spatial Planning Law from 1992. This is actually bizarre because the drafters including the legislators were not well informed of the enactment of Spatial Planning Law 2007. This could happen due to either lack of information regarding Spatial Planning Law 2007 (a proxy for lack of deliberation) or simply the local legal drafters and the policymakers did not know the vision of DRR. Most of the laws complied with by the West Sumatran policymakers were not referenced at all by the rest of the provinces, which was not because of different contexts but simply different logics of compliance with superior regulations.

Certain provinces and cities preferred to use the Anti-Corruption Law 1999 to safeguard their disaster management vision as the law is captured in the local regulation. For instance, three

[147] The data collected from various personal network of the author including the downloadable data from BNPB Websites: http://www.bnpb.go.id/. However, not all downloadable PDF files are useful because some of the Perda documents can not be analyzed because some of the districts and provinces set up their DRM regulation and BPBD offices based on a general Perda and not specific for either DRM or BPBD.

Perda (node 82 BPBD NTT, node 84 Sikka, and node 72 Bojonegoro) are connected to node 20 (Anti-Corruption Law 1999). Clearly, this suggests the main discourse behind the drafting of the regulation in the specific local context. One of the most surprising findings is that of all the 12 *Perda* analyzed (Figure 48-51), only two *Perda* consider that the recent Spatial Planning regulation is important for local disaster management. [148]

Take DM regulation of West Java as an example. Different logics were used as it refers to the Water Resource Management Law, which was probably due to high exposure to floods[149], as well as referring to Environmental Protection Law 2009, Social Welfare Law 2009, and Law of Road Infrastructure 2004. The Perda for BPBD Samarinda City is also an exception as it refers to the Social Welfare Law 1974, Law 14/1992 on Road and Traffic (but totally ignores Road Law 38/2004), Law 34/2004 on National Military, Law 11/1967 on Mining (already expired), Law 2/2002 on Police, and Law 18/1999 on construction services. Why certain important laws that are strongly related to mitigation, such as Building Law, were not complied with at all by the drafters and legislators is a particularly interesting topic for future investigation.

7.6.1. Correlation Test

Here, descriptive statistical analysis is presented together with correlation tests. For all correlation tests, the results are very significant at 0.01 (two-tailed). There is very high correlation between *betweenness centrality* and *degree centrality* (0.856) as well as between *closeness centrality* and *betweenness centrality* (0.78) with N = 87 (Table 20).

On the basis of the result shown in Table 20, it can be concluded that *betweenness centrality* suggests the level of leadership, in contrast to *closeness centrality*, which suggests the level of importance. The means of closeness centrality are always higher than those of *betweenness centrality* in Table 21.

It is suggested that a deeper analysis can be undertaken in the future when more data on local regulation are available. Methodologically, the network analysis above is unexpectedly useful in

[148] Based on Law 26/2007. Only in West Java Province and Samarinda City was the law considered.

[149] However, it is not considered in Samarinda's version.

bringing new insights to discourse analysis. This exercise suggests that discourse analysis can also be carried out with the aid of social network analysis.[150]

Table 20 Correlation Test Degree, Closeness, and Betweenness Centrality

Centrality analysis		Degree centrality	Closeness centrality	Betweenness centrality
Degree centrality	Pearson correlation test	1	.780**	.856**
	Significance (two-tailed)		.000	.000
	N	87	87	87
Closeness centrality	Pearson correlation test	.780**	1	.644**
	Significance (two-tailed)	.000		.000
	N	87	87	87
Betweenness centrality	Pearson correlation test	.856**	.644**	1
	Significance (two-tailed)	.000	.000	
	N	87	87	87

**. The correlation is significant at 0.01 (two-tailed).

Table 21 Descriptive Statistical Analysis

Centrality test	Mean	Standard Deviation	N
Degree centrality	.0569	.07262	87
Closeness centrality	.3454	.05973	87
Betweenness centrality	.0234	.05901	87

7.7. HFA Implementation in Indonesia

7.7.1. Overall Progress

Besides national reform processes, Indonesia has complied with the Hyogo Framework for Action (a.k.a. the international blueprint for disaster risk reduction for 2005–2015) through the development of two National Action Plans (NAPs) for 2006-2009 and recently for 2010-2012.

The Hyogo Framework for Action (HFA) has served as a soft institution as it originated at the World Conference on Disaster Reduction in Kobe, 2005, as an element of global discourse and

[150] There is also *network text analysis.* Please see also the http://www.textanalysis.info/ (accessed on 25 Oct 2010); Please also see an example from Diesner and Carley 2004 from http://en.scientificcommons.org/43236639.

later arrived as an element of national and local discourse in Indonesia, which has driven actors to comply with its indicators of progress. The evidence of its arrival and manifestation as a soft institution can be found in many spheres. Since the finalization of its indicators for progress (as presented in Chapters 3 and 4), local and international actors took only a few days to translate the indicators and spread them all over the DRR network in Indonesia (both professionals and academics).

Since Indonesia formally complies with the Hyogo Declaration and is fully committed to progress according to HFA, it sends self-evaluation on the progress of implementation. This was first carried out in May, 2009, to contribute to the Global Assessment Report on DRR 2009. Apart from the National Disaster Management Office sending the progress report[151] in 2009, in the country there were also other national actors that initiated measurement of the level of progress of HFA implementation, such as the National Platform for DRR 2009, which assessed Indonesia's achievement in reducing risks on the basis of HFA indicators of progress.

The Views from the Frontline – a global network of civil society organizations (CSOs) for disaster reduction - also voluntarily surveys alternative views on the progress of HFA implementation.[152] One of the findings from the Views from the Frontline is provocatively shortened as follows: "The people I work with every day see many clouds - international initiatives and plans, but very little rain - actual change at the frontline."[153] The methods for measurements have their own difficulties: the analysis involved average values (ranging from 1-5) for 22 indicators of progress surveyed for local government officials, local NGOs, and selected local communities in areas recently affected by disaster.

Since this is no absolute measurement of institutional progress and arguably objectivity is difficult to achieve, the raw data from the Views from the Frontline Indonesia 2009 will be used with reservations here.

In fact, all agree that, overall, on a scale of 1-5, Indonesia can only be awarded a maximum of 3. This varies from group to group (see Figure 52). In addition, as demonstrated in Figure 53, expert

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[151] http://www.preventionweb.net/files/7486_Indonesia%5B1%5D.pdf [last accessed 20 Dec 2009].

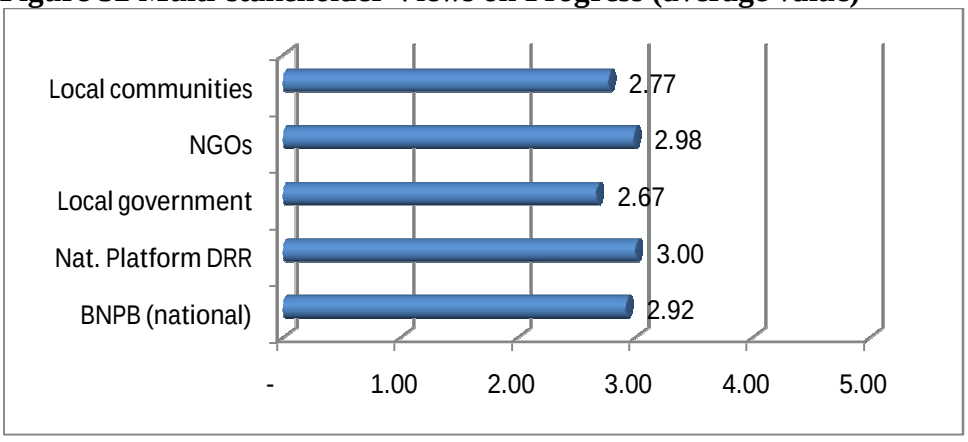
[152] http://www.globalnetwork-dr.org/ [last accessed 20 Nov 2009].

[153] In Indonesia, the facilitation of the survey was led by an NGO based in Yogyakarta, namely, Yakkum Emergency Unit http://www.yeu.or.id/ with voluntary support from some international partners such as Plan International and Humanitarian Forum Indonesia [last accessed 20 Nov 2009].

views (from National Platform for DRR) on progress do not fully reflect the reality of implementation. Expert views have been based on a consensus (see Planas 2009). Overall, the experts give a higher average value (3 out of 5). National Disaster Management Agency and NGOs give similar judgments despite some of the gaps seen in Figure 52. Interestingly, local government and local communities seem to question the progress by ranking the achievement significantly lower than the rest of the stakeholders, which is surprisingly closer to the reality, as the rest of this section will demonstrate. However, overall, Figure 52 presents general views regarding the progress of DRR implementation in Indonesia, as it ranges from a minimum value of 2.67 (local government group) to a maximum of 3.0 (national platform DRR).

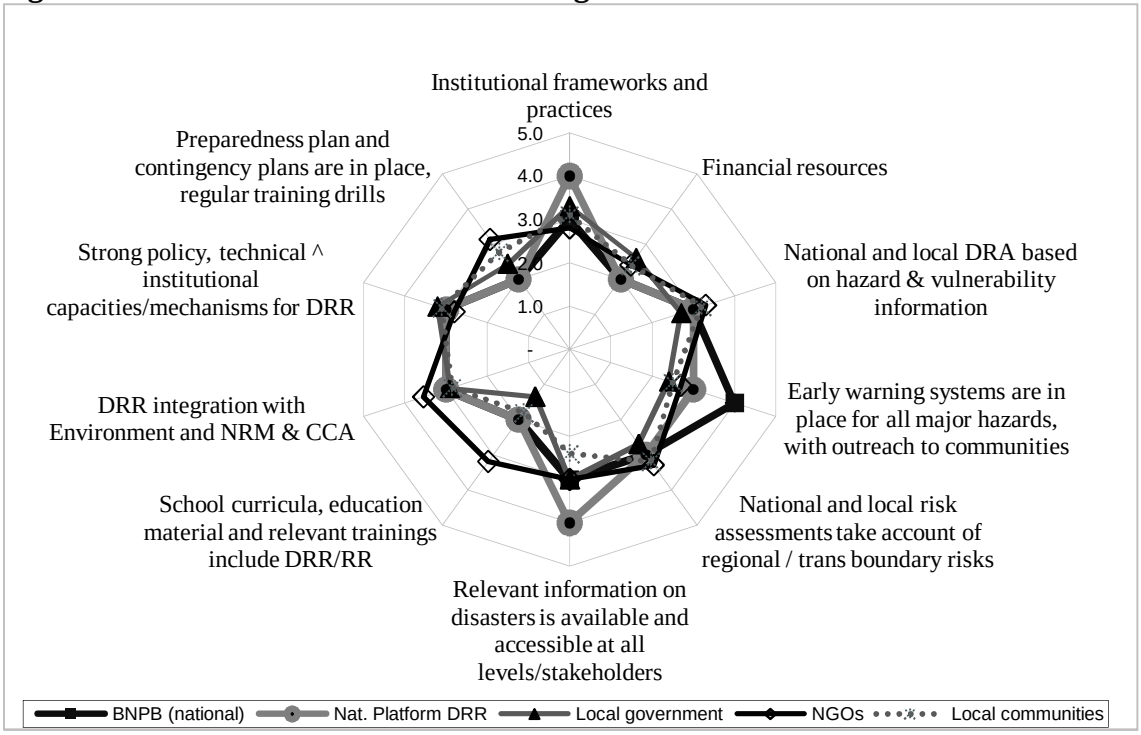
Symmetry in perception occurred when all the stakeholders agreed on at least four aspects: lack of institutional commitments on financial resources, the need to improve transboundary risk assessment at regional/national level, the need for stronger policy/technical and institutional capacity in DRR, and improvement in disaster risk assessment, which takes into account both hazard and vulnerability information. However, perception asymmetry on progress occurred for many aspects. It appears that experts (from the National Platform) marked 4 (on a scale of 1-5) on "whether information on disasters is available and accessible to all levels/stakeholders." In contrast, the local community marked this very low, between 1 and 2. Governments (local and national) as well as NGOs marked this moderately at 3.

Figure 52 Multi-stakeholder Views on Progress (average value)



Source: Developed from BNPB 2009, Planas 2009, Views from the Frontline 2009.

Figure 53 Multi-stakeholder Views on Progress



Data source: BNPB 2009, Planas 2009, Views from the Frontline 2009.

The gaps seen in Figure 53 are very interesting, for instance, for the indicator "early warning systems are already in place for major hazards, with outreach to communities." National actors (Disaster Management Agency and National Platform for DRR) claimed that "there is substantial achievement despite resources and operational capacity." However, local stakeholders (i.e. NGOs, local governments) stated that "the EWS is still relatively small and incomplete."

Gaps in the perception of progress of disaster risk reduction in Figure 53 could be explained as follows: national actors are more occupied with their ongoing project opportunities, which means that the national actors (both government and national platform) considered that both EWS and institutional progress have already made substantial achievements, but some deficiencies in commitment, financial resources, or operational capacities are recognized. On the other hand, local government officials and NGOs viewed EWS as follows: "achievements have been made but are relatively small or incomplete, and while improvements are planned, the commitment and capacities are limited."

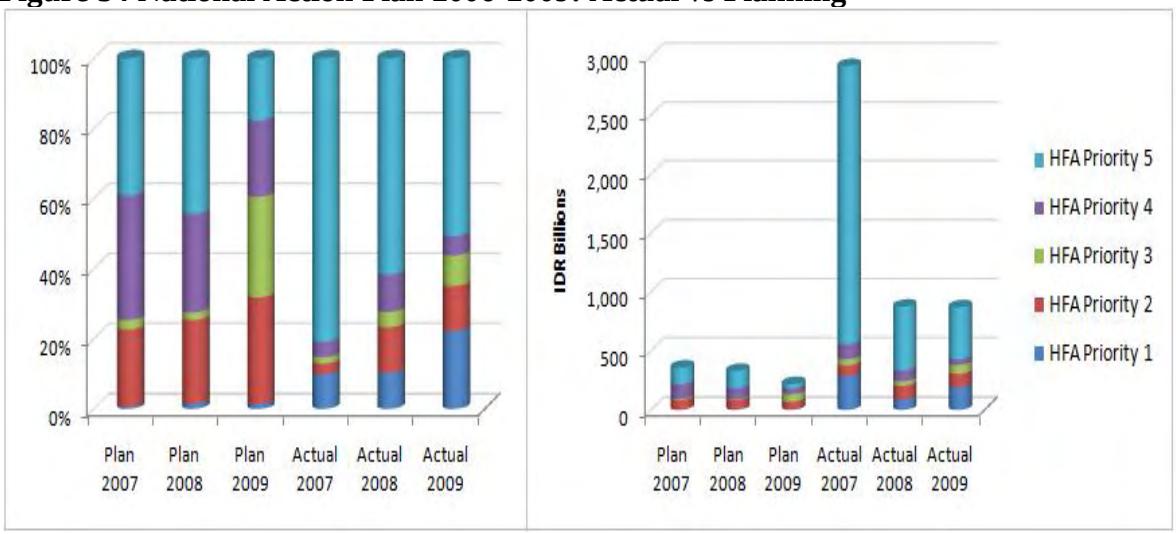
As of May, 2009, less than 10% of cities/districts in Indonesia had managed to enact local level disaster regulation and the establishment of a local disaster management office. Despite

substantial progress at the national level being made, the HFA 1.1 (i.e. indicator of the existence of a strong institutional framework and practices at national and local levels) has been judged by the experts to be at 4 out of 5, which means "substantial achievement." In contrast, the BNPB reported to the ISDR that "there is institutional commitment and capacities to achieving DRR but progress is not substantial." NGOs, local communities, and local government officials tended to agree with BNPB, while experts tended to be biased as their perception on progress was clearly different from the reality.

7.7.2. National Action Plan and Implementation 2007-2009

Responding to the HFA call, Indonesia developed its national action plan document for disaster risk reduction from 2007 (to cover the period of 2006-2009). Despite its shopping list style – "who does what where and where with whom" – it is a useful document. The action plan exercise started with poor planning as the difference between planning and actual investment is enormous (or more than 600% in 2007).

Figure 54 National Action Plan 2006-2009: Actual vs Planning



Source: Adapted from National Action Plan 2010-2012.

It appears that HFA Priority 5 (*Strengthen disaster preparedness for effective response at all levels*) dominated over the rest of the HFA priorities in 2007, which continues to be the case for 2008-2009 (see Figure 54). The total sum allocated for HFA Priority 5 was higher than the total sum for HFA Priorities 1-4 in 2007-2009. Therefore, in the first three years after the enactment of

the Disaster Management Law 2007, DRR investment was still being placed on emergency preparedness and post-disaster response. This phenomenon is the polar opposite of the vision of DM Law 2007. It is understandable that this has happened, as the period 2007-2009 was the time of responses to recent big and small disasters, such as post-tsunami activities in Aceh in 2004, Nias in 2005, and the devastating earthquake in Yogyakarta in 2006. Some post-disaster interventions, such as those in Aceh and Yogyakarta, have lasted several years. The dilemma is still the same as before, as the governments at the end of 2009 and 2010 have been busy with the reconstruction of more than 100,000 houses that either collapsed or were severely damaged in West Java Province and West Sumatra Province at the end of 2009.

The action plan itself cannot be called a plan that is intentionally drafted. It simply came to pass that there was more investment in HFA Priority 2 (risk assessment, risk information, and early warning system).[154] In fact, apart from HFA Priority 5, Indonesia apparently invested significantly in institution building, including regulations at national and local levels (see actual investment in Figure 54).

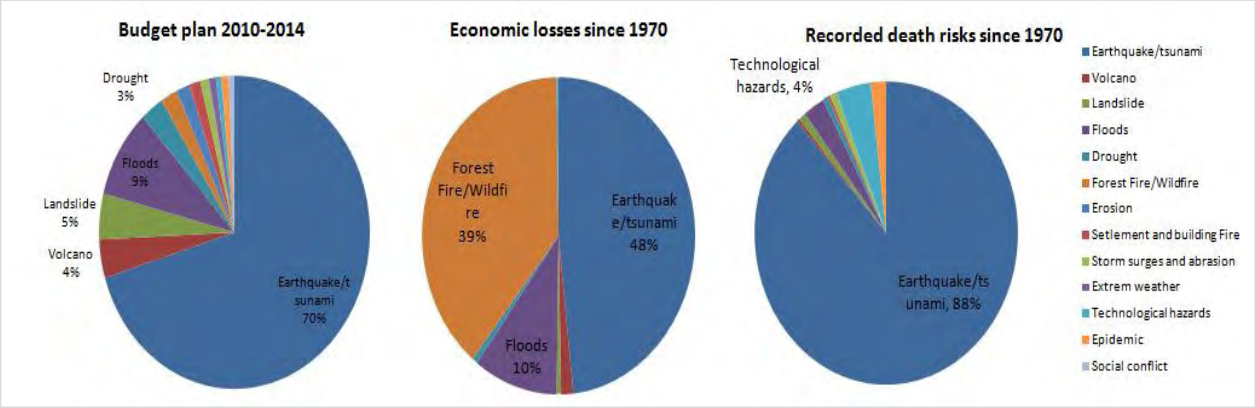
7.7.3. National DM Plan 2010-2014

The highest-order disaster risk reduction planning in Indonesia since the reform in 2007 is the national disaster risk management planning (DRM Plan – the formal documents still call it DM Plan), a five-year policy document. The present DRM Plan 2010-2014 provides guidance for ministerial/national agencies' five-year strategic planning, the Medium-Term Development Planning, as well as the National Action Plan 2010-2012. The document DM Plan 2010-2014 provides shopping lists of ministries/agencies with a clear budget line. This raises the question of how can the agency, namely, the BNPB, have the power to decide how much funds should be invested in the sectoral DRR. Therefore, the proper reading should be that the DM Plan 2010-2014 has been co-produced by the BNPB office with support from ministries/agencies. Therefore, the order should be revised as the practice is apparently different from the formal document.

[154] The influence from international agencies can be credited for the greater commitment of Indonesia in building its tsunami early warning system (a.k.a. INA TEWS) – please see www.jtic.org. Information on the multi-million euro projects can also be seen from the German-Indonesia Tsunami Early Warning System (www.gitews.org).

DM Plan 2010-2014, especially its budget planning, is particularly interesting. It suggests figures for government spending based on multi-hazard segregated data. From the total of IDR 64,475 billions (about US$6.5 billion), earthquake and tsunami risk received the highest attention (70%) followed by floods (9%) landslides (5%) volcanoes 4%, and drought 3%, with the other hazards receiving more or less 1% (Figure 54). This allocation have been based on the past disaster events as seen in Figure 55 (*Economic loses since 1979* and *Recorded death risks since 1970*) when seismic risks seem to be the highest for two category of risks (i.e. economic and death risks). This method can be criticized because the budget allocation should also consider potential disasters in the future. Of course there are limits to what policy makers predict the future risks but the recent volcanic eruption in October-November 2010 (that displaced at least 350,000, and totally ruined thousands of housing/settlements and livelihood assets surrounding Merapi Mount (within the distance of 15-20 km)[155]can be a lesson for future disaster planning to be able to anticipate future risks.

Figure 55 Planning Budget 2010-2014 Vs. Risks



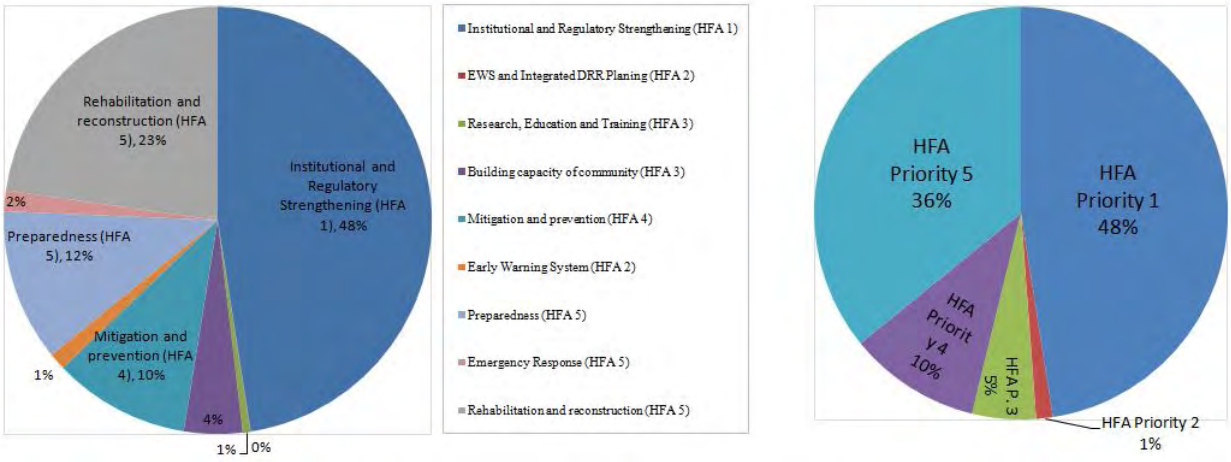
Source: Based on RENAS 2010-2014 and CRED-EMDAT 2010.

When one looks at the allocation pie chart (Figure 56) classified on the basis of HFA Priorities, 48% of the funds are allocated to HFA Priority 1 (earmarked in the document as institutional and regulatory strengthening), 36% for HFA Priority 5 (which has been predicted before on the basis of the results for the period 2006-2009), 10% for HFA Priority 4 (earmarked as mitigation/prevention), 5% for HFA Priority 3 (community capacity building and research, education/training), and the rest for HFA Priority 2 (earmarked as integrated DRR planning and

[155] First Briefing Notes Forum PRB, 18 Nopember 2010 page 1-2

early warning systems). Within the budget for HFA 5, there are the sub-categories of preparedness (12%) emergency response (2%), and rehabilitation and reconstruction (23%).

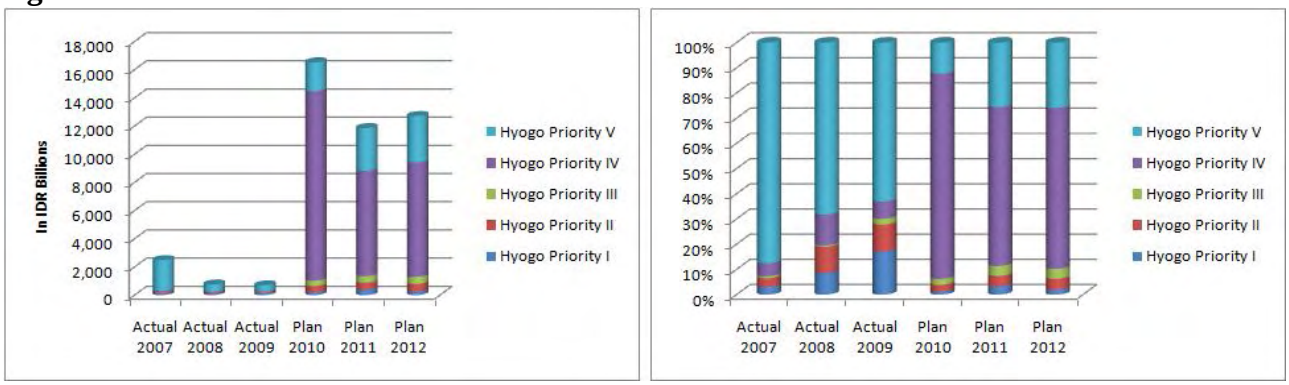
Figure 56 Planning Budget 2010-2014 Based on HFA Priority



Source: Adapted from RENAS 2010-2014 data.

The budgets (Figure 56) do not follow a clear logic or balanced priorities between sectors because 84% of spending is allocated to only two HFA Priorities, namely, 1 and 5. On the basis of experience during 2007-2009, there is a high likelihood that the actual spending will be shifted towards HFA Priority 5 because of recurrent surprise events that arise.

Figure 57 HFA Priorities 1-5 and NAP 2010-2012

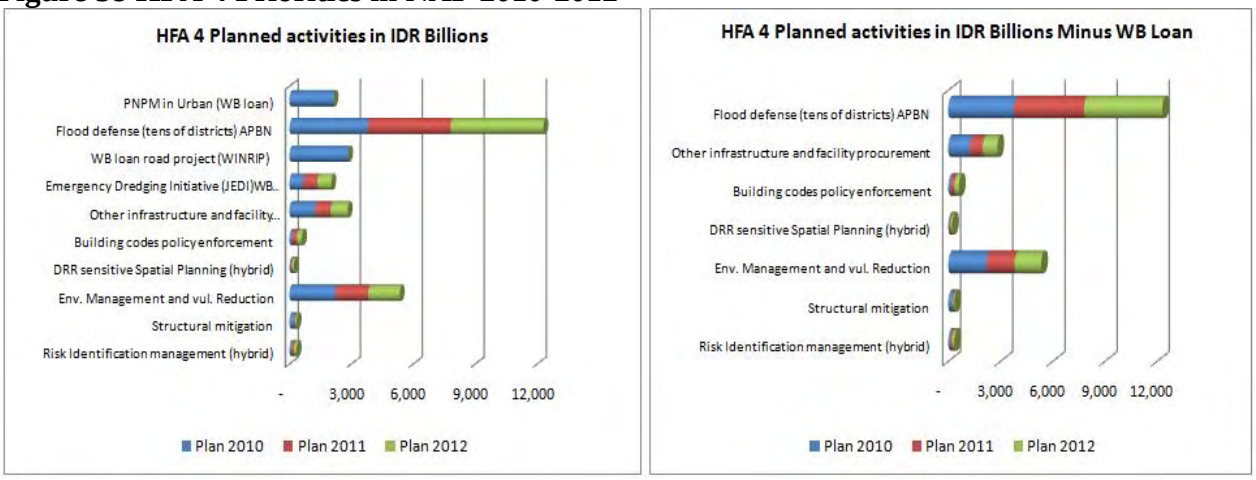


Source: Adapted from NAP 2010-2012.

7.7.4. National Action Plan 2010-2012

At the surface, one may be surprised that, overall, the national actors have now shifted their focus to deal with the root causes of disaster risks (i.e. HFA Priority 4), such as investing in better housing plans and mitigation, integration of DRR into land use, natural resource management, and better social development policy. There is clearly a willingness to do this even though there is a big imbalance in the DRR spending As Figure 57 above shows that there is a tendency for all actors, including the government, to shift from HFA Priority 5 (emergency preparedness and post-disaster response) towards HFA Priority 4.

Figure 58 HFA 4 Priorities in NAP 2010-2012



Source: Author's data from RAN PRB 2010-2012.

As shown in Figure 57 (right), the government has planned to allocate as much as 84% of resources to only two HFA Priorities, 4 and 5. One will be more puzzled by the fact that, on the basis of Figure 58 above, 91% of a total of US$4.1 billion will be spent on HFA Priorities 4 and 5 during 2010-2012.[156] However, the hugely disproportional allocation can be explained by the fact that, of US$4.1 billion, US$2.9 billion is allocated to HFA Priority 4. Within that sum, 24% is the World Bank's loan allocated for three projects: road construction, so called WINDRIP (West Indonesia National Road Improvement Projects), without a clear explanation of what kinds of roads should be constructed to contribute to risk reduction but be distinct from the previous road construction in the country – as often roads are built without proper drainage facility that

[156] Total allocation in RAN PRB 2010-2012 from all sources is IDR 41,096 billion or about US$4.1 billion.

later create flood problems)[157]; Jakarta Emergency Dredging Program for flood management; and community empowerment for poverty reduction in urban areas, namely, PNPM,[158] which is a typical poverty reduction program independent from the disaster management reform but probably earmarked by the government as part of "risk reduction."

Some of the facts are clearly discouraging: physical projects attract the government more than other aspects of HFA 4. If the support from the World Bank for projects such as road construction is excluded, in total, flood defense funded by the government in tens of districts will be about 56% of the total for HFA Priority 4. Adding the other infrastructure facility procurement (13%) and some physical project funding earmarked for environmental management and vulnerability reduction (24%) to the list, in total there will be more than 90% spending on physical aspects (such as physical environmental management; infrastructure and facility procurement; emergency dredging initiative, road project (WINRIP); flood defense districts – see Figure 58 left). While some of these features may be necessary, looking at the spending on DRR-sensitive spatial planning (1%), structural mitigation (2%), and building code enforcement (3%), there is clearly a big deviation from the overall aspect of HFA Priority 4. Furthermore, it does not show how the road construction projects that will be earmarked as HFA 4 activities are different from any other road construction projects undertaken elsewhere in Indonesia. This raises more questions than answers.

7.8. Decentralization and HFA Priority 4: A Case Study on Mitigation in Indonesia

For mitigation in particular, reform partly took place silently in 2002 when the National Building Law 28/2002, for which the idea and effort had been made since 1964.[159] As shown in Section 7.7 above, mitigation has been the smallest sector in terms of DRR investment for both overall DRR activities and overall HFA Priority 4 (in the case of Indonesia). Indonesia is not alone as the GAR 2009 noted that mitigation overall for HFA Priority 4 is the sector with the least progress.

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[157] This is an example of business as usual when development projects are simply coded to be DRR projects. In page 159-160 of Project and Technical Assistance Proposals 2006 – 2009. Volume I. Project Assistance Proposals. Ministry of National Development Planning/ National Development Planning Agency. The Project Code No: P-03-03300-0408-066201 gave no indication at all regarding mitigation or risk reduction. Please also consult http://www.evd.nl/zoeken/showbouwsteen.asp?bstnum=255730&location=&highlight= [last accessed on 15 June 2010].

[158] http://www.pnpm-mandiri.org/ [last accessed 20 Nov 2009].

[159] See Budiono, undated http://www.hyogo.uncrd.or.jp/hesi/pdf/expmeeting/budiono.pdf [last accessed 21 Nov 2009].

Before going to the field findings on mitigation policy in Ende and Sikka districts (see the Map in Annex 6), it is important to mention the vulnerability of local government buildings to fire. Data are difficult to obtain and even more difficult to update today because the former disaster management office[160] was totally burned down on 26 December, 2009, which caused all the historical disaster data, risk maps, and some early warning instruments lost.[161] In fact, the government building is located only 100 meters from the local Fire Brigade office. In a recent revisit to the district[162] two local analysts explained that there are at least possible reasons why this accident happened. The first is that it is a pure accident as it happened on holiday when the Fire Brigade staff could not help to stop the fire because all the staff joined a ceremony where high officials and the head of Sikka district also attended. This leads to the second possibility that it was probably not a pure accident as it was a deliberative event because the Fire Brigade should available 24/7. It was probably a deliberative one because due to unknown reason[163] and it could be legal issues such as corruption, the fire can be intendedly treated as a pure accident (a force major) where should there be any corruption cases, the legal evidence have been lost forever. The analyst also noted the third possibility – pointed to he fact that often the Fire Brigade's water tanks were left without water which is useless based on recent experiences that the analyst could not clearly remember. The interviewed analysts tend to believe in the second. While this needs further research, it is worth noted that the present BPBD in Sikka should start from zero[164] as pointed out by one BPBD official. Based on a recent interview with the BPBD[165] it was clear that 90% (or 18 out of 20) of the BPDB institution building activities have been provided by non-governmental institutions such as local and international NGOs as well as the United Nations

[160] Known as *Satlak* Office or Bansos (Social Aid) Office in 2008

[161] Information from the news followed by direct confirmation from one of Satlak staff on 29 December, 2009. See the video at http://www.metrotvnews.com/iwitness/play.php?vid=2756. In Ende, the author failed to obtain disaster mitigation-related data from the local office of public works because of a fire that burned all the required documents six years ago.

[162] This is based on a personal interview with two key informants in Sikka district. Their identity will be kept anonymously because of their personal safety. The author visited the district again on 29-31 October 2010 for a personal research on DRR policy and its linkages with climate adaptation.

[163] There is neither civil society organization nor local politician who are willing to push for an investigation at least to the best of author's knowledge.

[164] The author also shared most of the raw data collected during 2008 (such as Sikka Tsunami Risk Map, 1992 disaster loss data per village etc.) to the new local disaster management agency (BPBD) office where there barely any risk maps found in the office and almost no historical documents on DRR left.

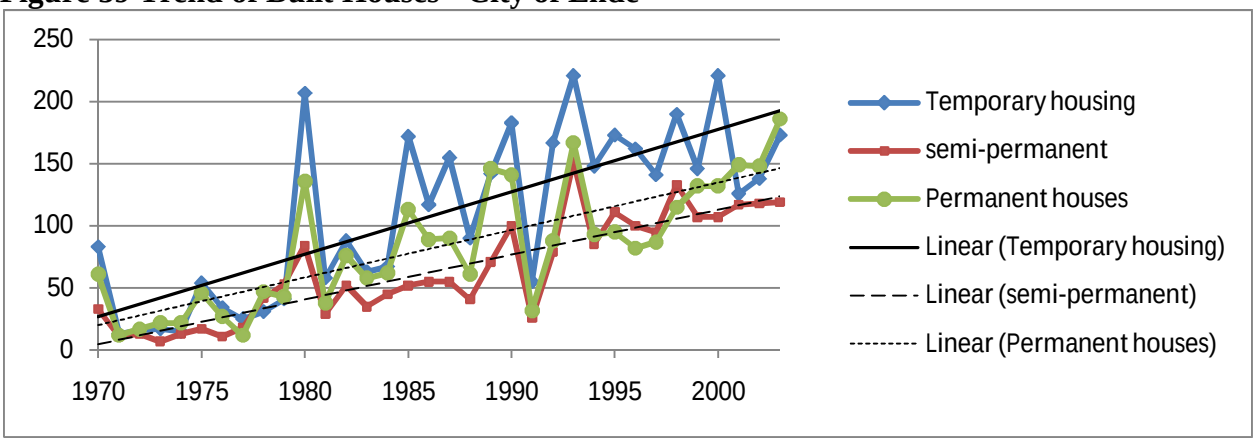
[165] Interview with the Head of Prevention Unit, BPBD Sikka on 30th October 2010

agencies such as UNESCO and UNDP because, the office has no budget on capacity building but a few physical construction project to repair a few bridges recently collapsed.[166]

7.8.1. Decentralization and Mitigation in Flores

Flores tsunami/earthquake in 1992 has been frequently mentioned with regard to the national response that it generated in Chapter 6. This section looks at the local response to the event, especially in terms of institutional commitment, and what has happened in the 18 years after the "National Disaster" status was assigned that helped to "market" the island in the international news.[167]

Figure 59 Trend of Built Houses - City of Ende



Source: Bappeda Office, Ende District (2004 housing census).

The 1992 earthquake/tsunami in Flores killed about 2,000 people (nearly half killed by the tsunami and the rest killed by houses/buildings that collapsed due to the earthquake). There are different data on the loss and damage in the housing sector in Sikka district, in which about 13,000-18,000 houses either collapsed or heavily damaged. The local government claims that 15,000 houses collapsed in Sikka district alone (30% of total hosing stocks in the district[168]based on the author's direct calculation by transferring the 1992 files to an Excel spreadsheet at the

[166] The money for this reconstruction has been provided by National Disaster Management Office.

[167] The initial design for this work was to study the institutional response in the regions that received "national disaster" status, such as Aceh and Flores after tsunami and earthquake. In Aceh, however, apart from the scale and logistical issues, it is only very recently that local institutions have started to think about mitigation and risk reduction in general. During 2005-2009, Aceh still heavily focused on rehabilitation and reconstruction.

[168] See for example Poling, P. (2005) "Sikka Dalam Kenangan 12 December 1992." In Sadikin Eds. "Penerapan Hasil Riset Untuk Penanggulangan Bencana Tsunami di Indonesia." Proceedings of Seminar Tsunami Dalam Kerangka Research on Tsunami Hazard and Its Effects on Indonesia Coastal Region 2002, 2003, 2004.

former disaster management office[169] in June 2008 it was about 13,500.)

In Ende district, fewer casualties occurred (probably about 100 or so)[170] and data are even harder to determine. The total from four sub-districts accounted for at least 3,900 permanent houses that collapsed[171] and almost 1,000 that were heavily damaged.[172] The data are actually no longer on display to the public but the author successfully negotiated with the local statistical office to open their old warehouse to look for the reports from sub-districts. One senior staff member in the office explained that one or two sub-districts did not send their reports because their offices collapsed during the earthquake.

Most people in Ende City preferred to build temporary houses for obvious reasons: the houses are cheap and local material and knowledge is abundantly available (see Figure 59). Starting in the late 1970s, when Indonesia's oil revenue trickled down to Flores Island, especially Ende, people started to built "non-engineering houses" (so-called "permanent houses" made from brick in the local language, built without formal engineering design or relying on mason's knowledge and experience alone). A similar trend also happened in Sikka; however, detailed data are not available.[173]

Since there is a lack of accessible detailed building data for Sikka, the epicenter of the earthquake in 1992, the data on damage in Ende can be used for the analysis as the two districts share similar building cultures. Figure 59 is an example of a growing trend of housing in the city of Ende.[174] The local people in the city prefer either permanent houses or traditional houses (often called "temporary" houses) instead of semi-permanent houses. A permanent house means a house made of brick or concrete. A "temporary" one refers to the use of local materials such as a combination

[169] After the enactment of district regulation (Perda) 3/2009, the DRM tasks have been shifted to the new Sikka Disaster Management Agency (BPBD).

[170] Direct aggregation from each sub-district's statistical data show less than 100.

[171] Ende 251 Magapanda 204 Ende slatan 3374 and Ndona 103.

[172] Only three sub-districts reported this house category: Aggregate of Ende, Magapanda, and Ndona is 786.

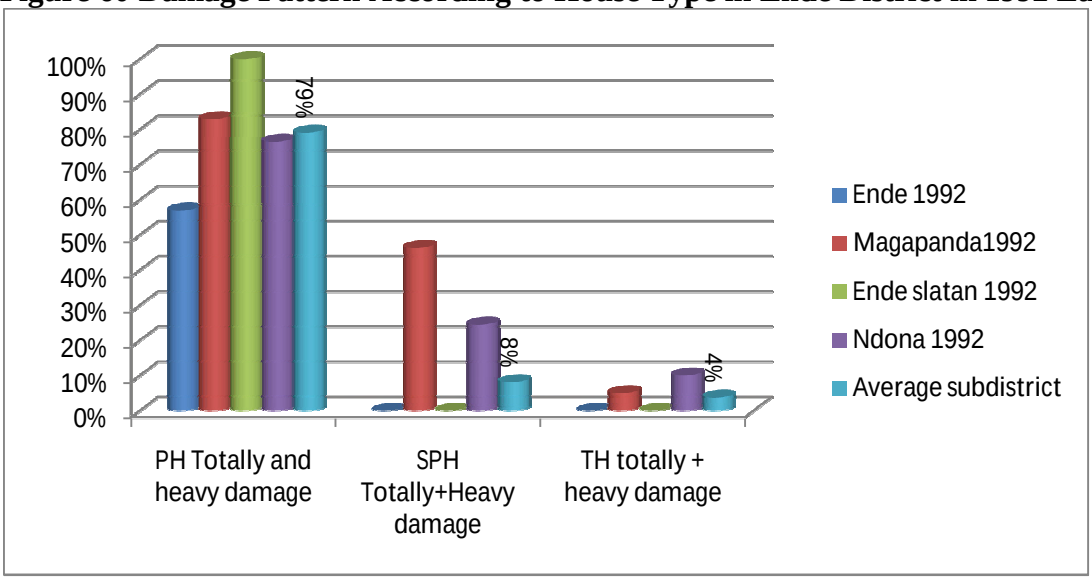
[173] Nong Susar (2008) also noted the happiness of a group of people who were members of a credit union and who started to build 50 new houses in Maumere City in 1971. It was seen as progress when people departed from the traditional houses.

[174] This calculation is only for Ndona and South Ende sub-district, calculated from the census of existing houses in 2004 broken down by the age of the houses.

of timber, palm leaves, and bamboo, sometimes with a tiny aluminum roof. A semi-permanent house refers to a combination of brick or concrete with temporary house materials.

The houses were too vulnerable, as evidenced by the fact that almost all permanent houses in Ende City collapsed with the earthquake, especially when comparing the data of *rusak total* (totally damaged). Overall, 79% of the permanent houses, 8% of the semi-permanent houses, and 2% of the temporary houses either collapsed or were heavily damaged. A similar pattern could be seen for Sikka. On average, a house was about 45-50 m^2 in size,[175] using the average housing data for Ende (existing houses built during 1919-2004). As of 1990, Ende district was occupied by about 37,750 families (218,000 people) (compared with Sikka, 245,000 people/42,500 families). Only a few spots in Ende were affected by the tsunami, including a small island called *Pulau Ende*. In Sikka, a rough estimate shows that about 20-30% of the houses collapsed due to the tsunami, while the rest of the houses for which damage was recorded were affected by the earthquake, and, in a few cases, by landslides triggered by the earthquake. Still, in total, collapsed and heavily damaged houses in Sikka numbered more or less double that in Ende.

Figure 60 Damage Pattern According to House Type in Ende District in 1992 Earthquake



Source: Ende Statistical Agency 1993 for Ende, Ndona, Magapanda, and Ende Selatan

In Ende, the formal institutions had barely considered earthquake and tsunami risks. This is not an exaggeration because no consideration at all of risks can be found in a *Perda* document of Spatial Planning for Ende 1998-2009 signed in December 2008 to supersede the old one made in

[175] Calculated from the housing database in Ende 2004.

1985.[176]

Decentralization requires the local government to increase its income and tax. Therefore, the next milestone of building regulation in Sikka was the endorsement of Tax for Building Permit in 1999.[177] On pages 15-17 of the Building Permit regulation of Sikka, there is an explanation regarding the cost associated with the permit, proportional to the economic status of the area. One unit house costs US$7,000 and the owners have three price options for building permit tax: should the house be situated in the city center and in a strategic location, then the price will be about US$225. The next two options are US$75 or US$25, depending on where it is situated and a few other details. In 2002, Ende government registered a new regulation on Tax for Building Permit (Perda 22/2002) as part of the decentralization policy.

In Sikka, the local government issued local regulation on building permits in 1989 to regulate the building administration.[178] There is no information on how it was enforced before the 1992 earthquake. A few arguments regarding disasters in relation to the need for building permits exist in the Building Permit *Perda* of 1989. The local government later decided, in 2007, to cancel the old building permit regulation with a new *Perda* no. 14/2007,[179] but strangely neither any argument in regard to earthquakes nor other disaster risks consideration are present in the 1989 draft.

If words are the starting point of a concept[180], the author cannot find a single example of the word "disaster" in the document; this is indeed a setback compared with the regulation in 1989. The absence of the word "disaster" and its associated hazards in recent documents triggers curiosity to look at other policy documents. Looking the "Master Plan Maumere City" of 1970, there was a flood map for Maumere City as reproduced in Metzner (1982).[181] Whereas, *Perda* Spatial

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[176] Perda No 8/1985 – Ende Master Plan.

[177] Perda No. 2 Tahun 1999 Kabupaten Sikka Tentang Retribusi Ijin Mendirikan Bangunan (Lembaran Daerah Kab. Sikka Tahun 1999 no. 11 Seri D no. 2).

[178] Perda 10/1989 Kabupaten Sikka.

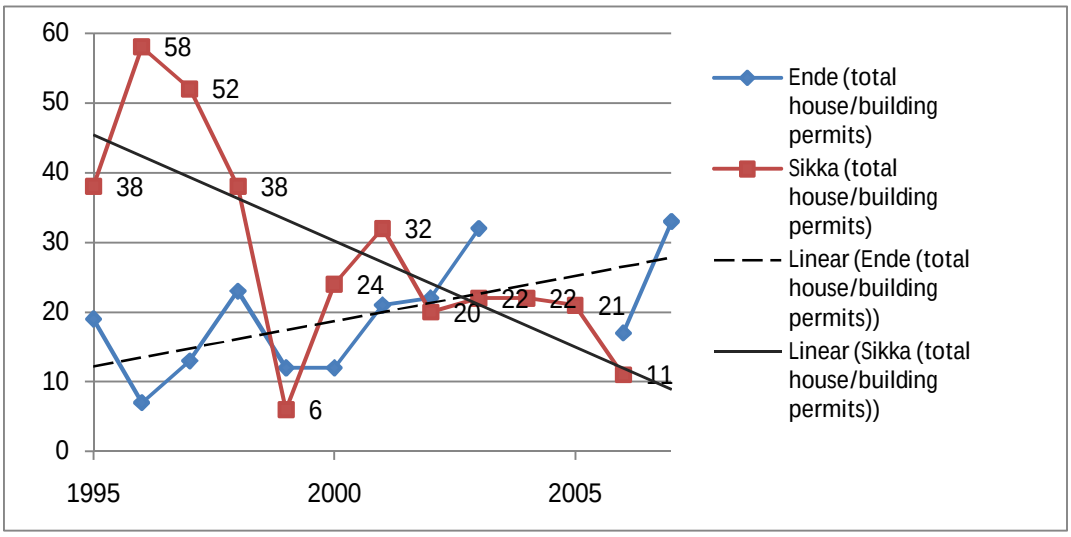
[179] Perda No. 14 Tahun 2007 Tentang Mendirikan Bangunan – Lembaran Daerah Kabupaten Sikka Tahun 2007. No. 14 Seri F No. 11.

[180] See Chopra in Robert Chambers (2004) Ideas for development: reflecting forwards IDS Working Paper 238.

[181] See the map in Metzner (1982:47-48) adopted from Maumere Master Plan 1970, a report produced in 1969 - http://oskicat.berkeley.edu/record=b12258470~S55/. Metzner, K. Joachim (1982) "Agriculture and Population Presssure in Sikka, Flores: A Contribution to the Study of the Stability of Agricultural Systems in the Wet and Dry Tropics" later published in 1982 by Development Studies Centre Monograph 82, The Australian National University.

Planning of Maumere City - Sikka's Capital in 2005, only one example of the word "disaster" appeared, which referred to the danger of coastal hazards (without an explicit name)[182] along Wuring coast.[183] This clearly shows that the adoption of disaster risk reduction into local policy is hard to implement, even though some capacity building for local government was made after the 1992 tsunami/earthquake. There have been discontinuities of efforts and ideas on disaster risks from one period to the other period.

Figure 61 Building Permits Issued in Sikka and Ende 1995-2007



Data source: Economic Development Unit in Sikka 2007; Public Works Agency, Ende District,

Interesting insights from the Figure 62 are as follows: as the local economy gets bigger, more people get access to buy land and are willing to pay for its legal status (land certificate), which in turn means that there is a likelihood that they want to build new houses. However, there is a negative trend in seeking building permits for the case of Ende, especially when looking at the long-term perspective for 1950-2004.

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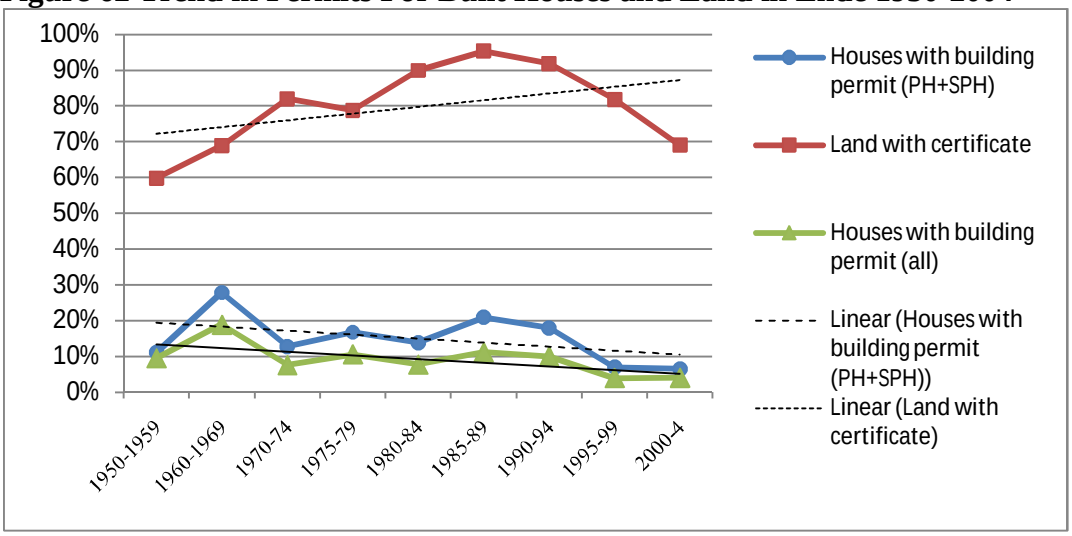
[182] See the final draft of Maumere City Spatial Planning by Terasis Erojaya Cabang Kupang Inc. page IV-9.

[183] The place is occupied by an Islamic minority group (in Flores, Islam is a minority religion), which was often under pressure from the local government to move from the area owing to its status as high risk designated by experts following the tsunami in 1992. In a personal visit to the area, the people clearly explained that they have been discriminated against in many ways. In 1992, they were forced to leave the area, but later, the people strove to return as they make a livelihood from the fishing sector. The people are descendants of nomadic sea travelers from *Bajo*, who originated in South Sulawesi. According to one aged government staff member, working with a local health unit, the displacement was forced by military personnel who burned down the ruined houses struck by the 1992 tsunami. However, from the community's perspective, it was an accidental fire, the result of uncontrolled burning of tsunami waste.

Figure 62 Trend in Permits For Built Houses and Land in Ende 1950-2004



Data source: Database on Houses in Ende 2004.

In Figure 61, in Sikka, the negative trend of people's willingness to seek a house permit plunged in 1999, which is the same year as local regulation on building permit tax was introduced and which is still applied today. In Ende, for the same time period, there is missing data because the public works office caught fire due to an electricity problem. However, when neglecting the missing data from Ende district, the period 1995-2007 shows a positive trend. This positive trend is really encouraging even though the long-term perspective is discouraging, as Figure 62 suggests.

In Sikka district, as of November 2010, there is still no local building regulation.[184] However, there is apparently voluntary enforcement of the seismic code. The practice of mitigation within the government projects has remained limited. At the community level, progress has come from the local masons, as indicated by at least four masons interviewed in Sikka district, all of whom were trained by a local Catholic mission, namely SVD, before and after the earthquake in 1992. During 1979-1980, the local SVD office decided to send one key person to Petra Christian University and Bandung Institute of Technology to attend courses on housing, where seismic aspects were included in the training materials, who later came back and trained local masons

[184] Interview with Head of Prevention Unit 30 Oct 2010. Based on explanation from Mr. Kelen, a contact person for a UNDP DRR project namely SC-DRR (Safer Community for Disaster Risk Reduction) in NTT Province, the local regulation on the Local Building Regulation that includes seismic risk has been drafted as supported by the project.

during 1980s and early 1990s. After 1992, SVD received more capacity building on the topic and the beneficiaries were often the local masons. Today, the capacity building effort is not being sustained[185] but fortunately, some local building technicians have brought the knowledge with them wherever they work in the districts. In Wolodhesa village in Sikka, a local mason shared a few behavioral change in their approach to their clients (house owners): the interviewed masons often ask whether the house owner needs to consider the seismic factors or not and most often the poorer families would not be able to buy additional materials to prevent the houses from seismic loads (strengthening of the brick walls against shear force caused by seismic loads or proper reinforced concrete for beam-column of the house structures).[186] Therefore, changes are taking place but the created pathways follow outside the formal system and are barely controlled.

7.9. Discussion and Conclusion

7.9.1. Discussion

Evidence on the urgent need for DRR especially mitigation is clear, for instance, in the physical vulnerability of the housing sector shown in recent disasters in Indonesia during 2004-2009. A recent earthquake in 2006 in Yogyakarta caused collapse of 156,662 houses and severe damage to 202,031 houses.[187] On 2 September, 2009, an earthquake struck West Java, Indonesia, causing a total of 65,000 houses to collapse or suffer heavy damage[188]. On 30 September, another earthquake hit West Sumatra and Jambi Province, producing a total of 114,797 collapsed and 67,198 severely damaged houses. In total, 32% of total housing stock was either collapsed or damaged.[189] Dozens of other events like these can be mentioned; the message needs to be strongly made that institutions seem to be getting very slow.

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[185] Dr. Budi Klenden, personal communication, 27 July 2009.

[186] Results from a focused groups discussion on 13-14 October 2008 in Wolodhesa village, Sikka district. In Blatatatin village, due to a generous hosting from a World Vision's staff whose family is in the village, the author was able to interview the father of the staff (kept anon.) The father has been trained by SVD 15 years ago and till today, the father (a building technician) will approach his clients the same ways as the masons in Wolodhesa village.

[187] See Damage and Loss Assessment Report for Yogyakarta and Central Java Earthquake 2006. Coproduced by the World Bank and Bappenas 2006.

[188] See Indonesia Earthquake SITREPs 6th 17 Sept 2009, OCHA Partnership for Humanity.

[189] Damage and Loss Assessment Report for West Java and Jambi province 2009. Coproduced by the World Bank and Bappenas 2009.

Analyzing DRR implementation, especially mitigation at the local level, is like opening a "black box". One "black box" was opened in 2010 when the mayor of Bandung City talked to the press about the fact that the city needs an earthquake risk and hazard map, given the rise of earthquake activity in the region. The mayor took advantage of the proximity of Bandung Institute of Technology (ITB), the oldest knowledge hub on mitigation and geo-risks in Indonesia. Responding to this mayor's comments, one disaster management professor from ITB explained that, during 1997-2000, ITB had been in partnership with Bandung City to map earthquake risk zones, including the production of standard operational procedures for a Bandung City emergency plan, with support from Indonesia Urban Disaster Mitigation Program (IUDMP) and RADIUS Project[190] under IDNDR initiatives with total funds of US$150,000[191]. The main messages from the professor can be summarized as follows: the change of local regimes every five years through direct elections eventually challenges the continuity of certain pressing issues, such as DRR, as key bureaucrats often change with newly elected head of cities/districts. As the newly elected head of a district or city assumes office, she or he often bring in new key officials and drops the old ones. This causes discontinuity of efforts/processes/investments, which can severely harm future DRR policy and planning. Continuity of DRR policy at the local level is clearly under pressure in the context of political decentralization today as actors tend to try to reinvent the wheel every five years.

The national disaster management office (BNPB) recently identified two main challenges regarding the progress of HFA 4.4. The first is weak enforcement of land use to suit the spatial plan. The second is a lack of accountability (in broader terms) in infrastructure construction projects that obey DRR norms. "Not all hospitals have an adequate waste disposal system. In addition, the procedure for evaluating disaster risk impacts in infrastructure building was still limited. These challenges were probably caused by constructors' lack of awareness and commitment in implementing the DRR."[192]

BNPB's report to the ISDR 2009 noted the gaps of interests between the central and local governments in prioritizing DRR. It suggests one issue that is almost impossible to implement

[190] Radius is Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disasters. See http://www.unisdr.org/eng/library/Literature/8697.pdf [last accessed 24 June 2010].

[191] Noted by Prof. K. S. Pribadi on Tue, Jun 29, 2010 in bencana@googlegroups.com.

[192] BNPB comments in the Progress of HFA Implementation 2009.

given the context: “to have better monitoring and law enforcement for the violations of city master plan, building codes, and other regulations related to DRR.” BNPB can clearly only make suggestions, but the messages will be reflected back to the messenger owing to the institutional context under the present decentralization process; while the Ministry of Public Works can only regulate technical standards and engineering codes, the national standardization agency can only provide the highest seismic codes and building standards. One of the keys for transformation is the Interior Ministry, but its role mainly involves steering. Local political processes are needed but the rate of progress is far from sufficient.

The BNPB’s business in the national planning level for DRR is just like building a new path. The National DRM Plan 2010-2014 is defined as “a formal document that contains data/information on disaster risks in Indonesia during 2010-2014 and a governmental plan to reduce the risks through program activities.”[193] On the other hand, it is also claimed as part of the “new government’s 100-day priority of the 2010-2014 period”, but in fact is not listed at all in the 45 lists of 100-day priorities of the present cabinet. The 100-day priorities only contain an initiative called “Rapid Emergency Response Task Force.”

DRR policy is still very new and its derivatives in the governmental planning and annual work plan (see Figures 44 and 45) only recently started at the national level. The local development planning offices in Indonesia[194] are responsible for spatial planning design but the actual spatial planning design is implemented by or contracted to private consultants, who in general have had little exposure to the knowledge of DRR-sensitive spatial planning. The present efforts for capacity building on DRR-sensitive planning have been limited to addressing the local planning officials. While this is necessary, there are missing links as the capacity building of the private firms and consultants in the business of spatial planning is more urgent as they are the cutting edge of DRR spatial planning designers.

7.9.2. Conclusion

Volatility in governance has been presented with longitudinal observation. This method is important to demonstrate the concern on the institutional vulnerability assessment. The findings

[193] National DM Planning Document or Renas (2010-2014, page 2)

[194] This has been admitted by officials in Aceh, West Sumatra, and East Nusa Tenggara Province.

regarding the DRR policy reform in Indonesia during the last five years have brought some improvement but largely artificial in real practice.

Given the polycentric nature of HFA (i.e. from legal reform to the risk assessment, knowledge, science and technology, the root causes such as poor mitigation policy/planning/implementation) there is risk of unbalanced DRR investment. As the institutions and organizations (e.g. formal ones such as government and local governments) tend to favor one aspect of HFA more than other pressing issues. But the patter of the DRR investment has been clearly shown in Section 7.7.4 where the HFA 1 and HFA 5. This means that the old practice is still coming back: it is easier to create new formal regulations than to implement it (as shown in the level of enforcement of DRR regulations) and consequently the energy including funds have been spent responding to emergency.

A deeper analysis of the HFA 4 shows that combining "disaster mitigation" and "spatial planning" budget, the total is only 3%. Physical/engineering solutions (93% of total spending plan for HFA 4) dominates the solution to "root causes" of disaster risk – therefore this seems to manipulate the concept of "underlying risk causes" as Blaikie et. al. (1994) once argued about the problem of political economy and power that shape disaster risks. Such a practice shows the domination of engineering/technical solutions has been challenged by Hilhorst (2004) to call for inclusive governance of DRR and the need to end the domination of dominant technocratic approach and top-down approach in DRR planning.[195] The national action plan (RAN) document 2010-2012 presents the fact that over 624 coded activities planned to be executed in Indonesia: 46% (or 264) from the governmental agencies, 25% (156) from International Institution such as World Bank etc., 17% (104) from NGOs/INGOs, 7% (45) and the rest 6% are hybrid (or mixed between either government-international institutions or government-INGOs).

Local realities from Sikka and Ende districts in Flores, Indonesia also demonstrate why reality on the ground do not change as expected even after 18 years of local catastrophe, amid several non-governmental interventions, including lessons from tens of disasters during the last six years in Indonesia. Therefore, it can be concluded that institutions have not changed as required and this

[195] Data on the organizational network for National Action Plan 2010-2012 is available but could not be presented in this dissertation due to time and space limitations. Furthermore, the quality of the data including the format of the report is different from the 2006-2009 National Action Plan. Howeer, it is important to analyze the present DRR network because the nature of present network may be different from the previous one.

can be predicted by the study because apart from the issue of complexity that arises from the decentralization, it is still difficult to get the message across because national and local institutions do not really change the discourse on how DRR should be done.

Chapter 8. Final Discussion, Conclusion, and Recommendations

8.1. Final Discussion

8.1.1. Institutional vulnerability disaster risk governance

Two main new disaster risk study concepts have been introduced in this dissertation. The first is institutional vulnerability and the second is disaster risk governance. Chapters 4 and 5 demonstrate the quantitative approach to measuring levels of institutional vulnerability and governance. It has been argued and shown that an institutional vulnerability analysis at the global scale is possible. Simple scatter plot analyses of the regulatory quality, rule of law, bureaucracy (based on government effectiveness), political stability, participation (voice and accountability), and corruption control have shown strong correlations with the existence of disaster risk reduction policy and disaster risk level. The correlations are significant; the scatter plots in Chapter 5 clearly show possibility in developing a prediction model for the prospect of disaster risk reduction policy implementation, as far as the selected simple regression exercises can demonstrate.

Chapter 4 shows that having good disaster risk regulation is beneficial as it may help a country to move forward and invest more in the diverse field of disaster risk reduction, along the lines as suggested by the Hyogo Framework for Action's list of priorities. However, some cases clearly do not support the idea that "where there is investment in disaster risk management laws and regulations, institutions should have better disaster risk management implementation." Chapter 7 provide the facts that even there is commitment in HFA (such as HFA priority 4), the details of the investment should be critically evaluated because it does not necessary address the call for "reducing underlying causes of disaster risks."

One considerable 'myth' in the study of disaster risk and vulnerability assessment is that when any country anywhere spends US$1 in risk reduction or mitigation, the country should always save US$4.[196] Some claim to have cost-benefit ratios, such as 1:2; 1:3, and even 1:7 for spending (cost) against avoided losses (benefit) [197]. These claims of benefits may originate from countries

[196] See for instance FEMA http://www.sciencedaily.com/releases/2006/01/060123074846.htm (last access on 10 May 2010)

[197] See Box 11 of DFID Scoping Study: http://www.dfid.gov.uk/Documents/publications/disaster-risk-reduction-scoping.pdf.

where institutional quality is stable and governance quality is at the level of many OECD countries, Otherwise, it is most likely that the cases may come from micro level project cost-benefit analysis. Future work should be carried out to prove these claims in countries where regulatory quality, overall governance, and institutional quality are low. The results from Chapter 5 show that, as every country has different institutional arrangements and its own specific governance quality, some countries may persist in losses regardless of how much has been spent or how good their disaster risk management regulations.

In terms of terminology, it can be asked why the term “institutional weakness” is not used instead of “institutional vulnerability”? It is equally valid to also challenge the established terminology of environmental-physical-social-economic vulnerability: why not use the noun “weakness” instead of vulnerability? The term institutional vulnerability is used to demonstrate the roles of institutions in disaster risk reduction, including the likelihood of institutional uptake of multi-dimensional vulnerability into disaster risk study and practice.

The usefulness of institutional plurality and polycentric governance of disaster risk reduction have been shown by the broad range of sectoral interventions as stated in the Hyogo Declaration. HFA requires diverse approaches and issues: law and regulation, participation, politics of budgeting (HFA 1); science, knowledge, and technology, participation and power, the requirement to carry out risk assessment, risk information, dissemination, and transboundary risk assessment; educational issues, school curriculum, etc. (HFA 3); legality context and practice of social-economic-physical-environmental vulnerability reduction (HFA 4); and the old but still relevant disaster management activities such as emergency management-related regulation, contingency planning, and budgeting (HFA 5). Therefore, at the policy and practical level it is clear disaster risk reduction requires coordination and cross-coordination at the local, national, and global scales.

Local and national coordination as shown in Chapter 7 is not an easy task, nor any easier than international coordination. Furthermore, disaster risk reduction and management policy is not a standalone policy independent from the overall context of general law enforcement and regulatory quality. DRR policy and regulation depends very much on the quality of other institutions and governance. In other words, governance and institutional quality clearly shape the performance of the DRR/DRM policy and regulation.

8.1.2. Institutional vulnerability disaster risk governance in Indonesia

Disaster risk reduction is not an end in itself as it is one way of achieving multiple goals, including sustainable development and human security. In the past, disaster risk reduction was seen by the vast majority of people as impossible because established institutions like religion have long maintained that disasters are interventions from an angry God (see Garcia-Acosta 2001, Chester 2005). A historical analysis from Indonesia since the case of the Krakatoa eruption in 1883 up until the present in terms of the institutional pattern in dealing with disaster risks is presented (Chapter 6).

The recent DRR policy change in Indonesia has been made possible by the fact that the old "reactive response" logic has been intensely challenged externally through many international institutions/actors and internally by civil society in Indonesia. However, it is not as Hoffman (1999) suggested that institutional change is only due to the magnitude of disasters, population mass and amount of damage, time, and the thicknesses of structures of cultural institutions (such as norms, customs, traditions, belief system). In Chapter 4, several developing countries are shown to have reported their policy changes due to international intervention where disaster risk science has been brought into the policymaking process by other countries, donors, or international non-state actors. Chapter 6 presents the case of Indonesia, where cooperation with the United States and ASEAN mechanisms led to some disaster policy changes in the late 1970s. This was affected by the United States' interest in controlling communist power in Southeast Asia. The recent changes in Philippines, through the Disaster Management Act in 2010, as also have been noted in the Philippines HFA Progress Report 2009,[198] showing that internal change in disaster management policy is not independent from the context of international cooperation. This kind of externally driven DRR policy change has been the case for Indonesia, the Philippines and other African and Asian countries. Interestingly disaster events do not always drive policy change but in some cases such as Sri Lanka, India and Indonesia (See Chapter 4), the Indian Ocean Tsunami in one way or another serve as legitimate demand for policy change.

[198] See Philippines HFA Progress Report 2009 at www.preventionweb.net/files/7495_Philippines%5B1%5D.pdf [last accessed 30 Aug 2010]

Furthermore, the influence of IDNDR to stimulate the establishment of national coordinating agencies for disaster management in more than 130 countries provides evidence on the role of global governance in disaster risk reduction (van Niekerk 2005). Under the HFA mechanism, more than 60 countries have been reported their progress of implementation of disaster reduction. Some have clearly credited HFA as one of the driving forces behind the change, as in the case of Indonesia (Chapter 7). Such an international approach can drive disaster policy change because new policy discourses have been brought together with the international DRR initiatives such as HFA.

In analyzing the pathways of disaster risk management policy in Indonesia, Chapter 7 presents two strong messages: firstly, what has been planned in formal disaster planning or the "National Action Plan" often shows huge gaps between planning and implementation after disaster policy reform in Indonesia. This seems to suggest that the gaps is not simply the problem of planning quality as suggested by rational choice theory (Section 2.2.2) but also that different institutional logics have been used in both planning and implementation.

Change of course takes time, but this needs more explanation. The theory of path dependency explains change better than rational choice theory because institutions (in the case of Indonesia) tend to continue to favor reactive emergency responses, as indicated by the huge proportion of disaster risk management budgets used in response rather than for the rest of the HFA priorities. In the first three years after the DRR reform, policymakers still largely invested in emergency preparedness and post-disaster response. The "historical path dependency" theory (Kaag et al. 2003) in this context explains that, owing to recurrent hazards on large and small scales, it is often difficult for local and national actors and institutions to plan on the basis of strategic decisions of disaster reduction in advance.

The defined strategies in the formal institutions at the local levels in Indonesia (unfold as they interact with not only dramatic natural events but also changes in the interaction with national-international regimes, such as the HFA, especially after disaster intervention, which may create a window of opportunity for more ex-ante DRR planning. The sudden increase in emphasis on HFA Priority 4 for 2010-2012 (in the case of Indonesia) is good on paper, but the reason why this has happened is interesting. Such a sudden change in planning is explained in Chapter 7. The HFA 4 accounts for 71% of the overall budget plan for 2010-2012, while mitigation only accounts for 1%. Hazard mitigation and land use planning are future-oriented issues as both focus

on “anticipating upcoming needs and impacts, rather than responding to yesterday’s events” (Berke and Gavin 2009). A deeper analysis of the budget structure shows that reform is barely taking place, as perceived by DRR advocates, despite the major change in formal regulation and initiatives embedded in the international and local response to recent disasters. One of the reasons is because the discursive change on the need for DRR reform have been superficial and do not really transform the way the actors (e.g. governments and non-governmental). In addition, the complex reform processes in Indonesia, the horizontal and vertical missing links in the Indonesia government have also played a role in neglecting disaster mitigation policy. This confirms North’s (1998) disbelief in sudden revolutionary change in institutions, as it takes time with no guarantee of better implementation.

The day-to-day business of mitigation will follow the status quo path created by the decentralization processes, where local governments view building permits as a means of taxation and not as means of mitigation. In addition, Indonesia still does not have clear political opposition in its multiparty system, at both local and national levels; therefore, a “big push” for change often relies on efforts from non-governmental organizations, which is not available in all cities/districts. The political ignorance of the issue will weaken DRR reform in Indonesia. Chapter 6 shows that many policy documents remain “tiger paper” without enforcement at either horizontal or vertical governance levels.

At the local level, the mitigation of seismic hazards in the building sector, the Local Disaster Management Offices (BPBD) should engage building administration, local engineers/drafters, house owners and all relevant governmental organizations (both executive and legislative agency. However, steering capacity of BPBD remains low (or undeveloped) and thus a future challenge for DRR implementation in housing sectors. Even though the vast majority of future buildings are screened through building permits, with the expectation that this will ensure construction safety, Salmon’s (1999) evaluation on the technical approval of house permits in Sikka district, Indonesia, during the late 1990s shows that more than 50% of the structures for which house permits are issued fall into the category of “no seismic mitigation feasibility.” Chapter 6 notes that large-scale disasters have not really transformed the institutional landscape of disaster risk reduction at the national level.

Chapter 7 presents the negative trend in the issuing of housing permits since 1999, which is coincidental with the issue of housing permit tax in 1999 in Sikka. In developing countries the

vast majority of houses were built by house owners directly with limited or absent building codes, decisions on building earthquake-resistant housing are in the hands of hundreds of millions of house owners. In Indonesia, 90% of the total housing stocks have been built directly by the house owners or dwellers (Silas 2005). Therefore, the decision making power in housing sectors are in the hands of house owners. In fact their compliance with the building regulation and ability to pay (especially from the poor house owners) is low. On the other hand, the local bureaucracy still have little commitment in risk reduction and disaster mitigation through building code enforcement as well as through land use policy enforcement. This shows that institutionalization of risk reduction into day-to-day building/housing sector still face real big challenges. For Indonesia, the question on why certain important laws that are strongly relate to mitigation, such as building law, were not complied with at all by the house owners, and other relevant stakeholders (such as drafters), is considered particularly legitimate for future investigation.

The very idea of the DRM reform in Indonesia was not originated from government offices but rather from non-governmental actors. The idea of the need for a national disaster management bill had been briefly discussed by disaster management professionals (mainly Indonesians who worked in NGOs/INGOs or are UN workers and representatives of non-governmental organizations) before the Indian Ocean Tsunami 2004. The IO Tsunami 2004 turned out to be the loudest signal, but there were not enough ears were there to hear the call for DRM policy reform. When the scale of disaster events such as catastrophic tsunami 2004 are too big to be comprehended by the public and politicians, including government officials, traditional institutions such as religions can reinforce their prevailing belief that disasters are from God. Some politicians and the public could not comprehend that such catastrophes can be ex-ante managed and their effects reduced, if not prevented. It took several disasters both big and small during 2005-2006 (such as a devastating earthquake in Nias 2005, a tsunami in Pangandaran in West Java 2006, a catastrophic earthquake in Yogyakarta in 2006) to push the government to finally make an official decision to invest in DRR with significant associated costs, which included demolishing old structures in hundreds of cities/districts in 33 provinces and creating new ones throughout the country.

8.2. Conclusion

8.2.1. Answering the research questions

How should institutional vulnerability that shapes disaster risks and disaster reduction policy be assessed? Chapters 4 and 5 have demonstrated that institutional vulnerability assessment can be carried out on a global scale. This automatically answers the sub-question, especially the limit of the global scale assessment. Since this is a pioneering work, the challenge remains in the quality of data and the new model required to be integrated into the global scale disaster risk assessment, including the justification on why the inclusion of institutional vulnerability into global disaster risk index country by country is important.

Chapter 5 demonstrates that the quality of institutions matter to the disaster risk reduction policy design and implementation. This has been clearly shown quantitatively in Chapter 5 that the implementation of disaster risk reduction policy has strong associations with the level of regulatory quality, government effectiveness, participation and political context. Meanwhile, Chapters 6 and 7 have shown the importance of the *nitty-gritty* of institutional quality and the fact that disaster reduction policy is not independent of the macro institutional and governance context.

Furthermore, in terms of theory building, there is enough evidence that policy change through global governance is more likely to succeed than simply waiting for disaster events to create momentum to drive internal policy change at both national and local level. Disaster policy change has barely been generated internally, despite recurrent disaster events. What is also seen is that disasters open new avenues for international cooperation. The later is a window of opportunity for new discourse making on the need for DRR reform in the national and local public policy making arena. There is also an increasing trend in the involvement of international non-governmental actors and international organizations (INGOs/IOs) in post disaster interventions with the statistics as follows: 200 INGOs/IOs in Indonesia (2004-2006), more than 500 INGOs/IOs in regards to Myanmar post Cyclone Nargis 2008 and more than 700 INGOs/IOs for post disaster earthquakes Haiti 2010.[199] This is a proxy to global governance practice in disaster management context, and thus an indication for potential channels for future DRR discourse and

[199] These statistics are based on the data from the International Federation of Red Cross and Red Crescent Societies, presented by David Fisher, in International Risk Forum in Davos, June 2010.

resources, however, this depends on institutional contexts (such as steering capacity, rule of law or legal context or often termed by IFRC as “legal preparedness” to disasters, etc.).

Evidence from Indonesia shows that even though decentralization and decentralized governance are needed, they do not necessarily bring positive outcomes (such as better basic public services etc.) because there are missing links in vertical and horizontal governance in the development context general. However, only a limited account on informal institutions and their interplay with formal institutions in reducing risks has been provided by the author owing to methodological constraints.

How can vulnerability be reduced when institutions and governance are vulnerable and barely change towards more pro-active DRR policy? The answers are clearly not black and white. For instance, Iran has shown the highest commitment to DRR policy and regulation among all the countries discussed in Chapter 4, despite its low quality of governance and low quality of institutional indicators as described in Chapter 5. This raises a new question instead of a concluding answer: Is it better to have a weak disaster management policy than nothing at all? This could be a future research topic for PhD and Master’s students.

Can disaster risk governance (DRG) framework offer a better explanation on how to address the underlying causes of disaster risks as stipulated by the Hyogo Framework for Action? DRG offers higher sensitivity of the institutional and governance issues including why institutions are hard to change and how to change.

This research (especially Chapters 6 and 7) found that formal disaster risk management institutions are indeed a set of networked laws and regulations formed to deal with disaster risks. Therefore, DRR institutions emerge more as governance networks. Any singly formal laws/regulation is not a standalone regulation but rather tied and connected to other formal laws/regulations as demonstrated in Chapter 6 and 7. This finding is accidental and it is partly supporting the notion of “intra-government networks” (See Goldsmith and Eggers 2004). Furthermore, it was also found that formal DRR institutions consist of a set of networks of DRR related institutions. In regards to vertical governance context in Indonesia, network analysis in Chapter 7 shows that there is no link between district and province in terms of DRR regulation. This strengthens the findings on the vertical missing link in the Indonesian development and governance.

The network analysis provides new understanding that the materialization of local DRM bills occurs through certain pattern. The cities/districts that experience recent disasters tend to have DRM regulations not because they are more aware of disaster risk reduction issues but because DRR networks are more likely to be formed and maintained there. Right from the beginning, the author intended to neither develop a new theoretical framework on "institutions as network of institutions" or nor use the network approach to understand institutions (see Ansell 2006) and governance. It is found that disaster risk governance emerge as form of networks that govern disaster risks. This supports the concept of "network governance" provided in Chapter 2. Therefore, it can be concluded that DRR outcomes do not simply arise from the "sum of efforts from agents, namely, individuals and organizations/institutions." (Jones et al. 1997, Stoker 2006, and Crawford 2006). In fact, DRR agents (organizations/individuals) and institutions exist and co-exist more in the form of networks. The overall demonstration of the social network analysis of DRR actors and institutions in Indonesia further strengthen the concept of "polycentric governance" of disaster risk reduction. Therefore, institutions are not the sum of laws. Network theory provides the notion (Chapter 6 and 7) that institutions are about connection of parts: linked (or unlinked) risk regulations/DRR laws/building codes etc. In the past, formal institutions are treated as sums of laws/regulations. But in fact how they are connected to (or unconnected to) enforce policy implementation is more important to study – as demonstrated by the network analysis from Indonesia in Chapter 6 and 7.

Lessons from Indonesia show that DRR institutional reform occurred because there is complex interaction between domestic events (hazard and disaster contexts provide certain rationale for the domestic actors such as civil society organization, media and the public at large) in one hand and the international challenges (e.g. from international institutions and organizations including the Hyogo Framework for Action) on the other hand. However, the national context has provided evidence that there is governance volatility. Furthermore, from the global scale analysis in Chapter 5 it was also clear that governance volatility often occurs; Furthermore, one interesting finding is that the more a country is institutionally vulnerable, the more volatile its governance which later affect the quality of disaster risk governance.

The IVA Framework (Chapters 4 and 5) suggests specific DRR institutions and governance have been exercised in the context of existing formal/informal institutions. The later are assumed to be deeper and the former are not independent from the context. The IVA Framework can surely be

questioned because some social scientists make a distinction between “the deep, normative structure of a system or society (treated in this research as the template or formal/informal institutional context) on the one hand and more specific regimes (such as DRR governance) and DRR organizations on the other (See Underdal 2006, Choncha, 2006). In this research, it is assumed that the later is shaped/influenced by the former. However, Choncha (2006) believes that specific regime (or institutions - in this case specific DRR institutions and governance) are seen as embedded in the “template” e.g. formal/informal institutions) and therefore it is seen that later as reflecting or reproducing the context (or the template) on which they are built (See a brief reflection in Underdal 2006)

8.2.2. Reflection on mixed methodology

The quantitative approach using simple scatter plot analysis in Chapters 4 and 5 has proven to be effective to demonstrate the differences between levels of commitment towards disaster reduction between countries and the differences in quality of institutions and governance. For generalization at the global scale, it is necessary to use the simple statistical methods (Chapters 4 and 5) and to demonstrate the gaps between relative progress and the desired or required conditions. In addition, there is a significant negative correlation between both progress in disaster reduction policy and quality of governance on one hand and disaster risk index on the other hand. The challenge will be to improve the quality of data given by countries for future analysis of institutional vulnerability index in order to be more precise in terms of predicting the implementation of DRR policy at global scale.

In the case of historical analysis of disaster management organizations in Indonesia since 1979, social network analysis, especially the tools such as centrality analysis (*degree centrality, betweenness centrality, and closeness centrality*), has proved its strength in mapping dominant governmental organizations. With regard to the quality of local regulation of disaster risk management that has recently been procured and is presently in use, the centrality analysis has been able to demonstrate the strengths and the weaknesses of DRR regulation. The same is also seen in the mapping of global-local DRR actors in Indonesia. In practical terms, the strength of centrality analysis can clearly identify the “main actors” and the actors in the periphery that must be included in practical DRR networks.

The method of social network analysis (SNA) is very promising but it has been barely used in disaster research. The method can be very effective and this in part can answer the challenge of advancing theory and research of disasters presented in Tierney's (2007) "From the Margins to the Mainstream? Disaster Research at the Crossroads." However, it has been argued that empirical research addressing social networks such as in natural resource governance have treated the method as being either present or absent (Bodin and Beatrice 2009: 367) and the same can be said for disaster studies.

It is a very reasonable research project to correct the present vulnerability analysis, by taking specific disaster risk reduction institutions and overall governance indicators into vulnerability analysis models. However, this requires new innovation in the research methodology and also consistency in the production of global dataset regarding DRR implementation such as bi-annual HFA progress reports that will be done at least until 2013.

The use of social network analysis has also been proven effective in demonstrating the linkages (e.g. the quality, the intensity of the linkages, the scale etc.) measured by simple SNA methods such as centrality analysis. For future analysis, longitudinal analysis using SNA can be used to identify changes in DRR governance networks, in the case of both actors and institutions. Chapters 6 and 7 demonstrate that agents and institutions of disaster reduction exist and co-exist more in the form of networks that emerge as one form of risk governance. Interestingly, what is called local DRR regulation turns out to be a network of institutions and regulations. This clearly supports the introductory note on networked governance in Section 2.3 which tries to demonstrate the fact that agents and institutions exist and co-exist more in the form of networks. (Jones et al. 1997, Stoker 2006, and Crawford 2006).

Mixed methodology in the case of disaster reduction may point to the benefits of interdisciplinarity as the increase of disaster incidents globally requires an interdisciplinary approach because the scale of the problems cannot be tackled through either a single disciplinary approach or simply an aggregate of disciplines (i.e. multidisciplinarity) (Mollinga 2008, Klein 1996). This dissertation can be categorized as applying an interdisciplinary approach. One of the reasons is because the author's upbringing from four disciplinary training e.g. civil engineering, development studies, environmental policy and international relations studies, therefore, some admixture of these disciplines may have happened. In addition, this dissertation mixes some selected concepts and methods such as the use of polycentric governance concepts (McGinnis

1999), interdisciplinary "political science" concept to study institutions (Schmidt 2008, 2009), the new institutional economics concept (such as North 1998 and Kaufmann, Kraay, and Mastruzzi 2009, 2010) and sociology (the case of SNA). Combining both the concepts and the mixed-methods above to analyze both institutional vulnerability and DRR governance concepts have therefore strengthen the belief that this is an interdisciplinary work. In addition, the interest in the SNA method after the field work have triggered the author to make use of national DRR network in Indonesia to promote the grass root actors' work on DRR and the outcome also receive an international level success i.e. the recognition of one of the DRR advocates from Indonesia to be the UNISDR Sasakawa Laureate 2009 in Geneva.[200]

8.3. Recommendations

8.3.1. Recommendations for Global Actors and Institutions

The Hyogo Framework for Action is comprehensive but demands high commitment from actors and institutions to voluntarily reduce their disaster risks according to the set indicators. Its implementation depends very much on institutions and actors/organizations. Since many initiatives of disaster risk reduction especially in developing countries often occurred through international cooperation and negotiation, it is suggested that international actors/institutions should conduct institutional vulnerability assessments. Without understanding institutional vulnerability and the institutional context, disaster reduction policy will face serious challenges as demonstrated in the case of Indonesia (Chapters 6 and 7).

Specific disaster risk reduction policy reform also depends on other governance variables such as rule of law, regulatory quality, participation, government effectiveness including bureaucracy, and control of corruption. Therefore, investment in HFA Priority 1 (i.e. specific DRR laws/regulation participation and budgeting) is vital, but awareness of the institutional vulnerability context and governance constraints is also crucial to find ways to reduce disaster risks within the institutional/governance constraints (e.g. formal/informal institutions and different types of governance).

How the bureaucracy enables or disables governmental disaster management organizations needs further research, but the point is that disaster management organizations are not immune to the

[200] This effort was supported by at least 140 NGOs and individuals from Indonesia. Please see the notification from UNISDR http://www.unisdr.org/eng/sasakawa/sasakawa09-about.html [last access on 12 October 2010]. All of the process of nomination has been administered from Bonn, Germany.

types of bureaucracy such as *Parkinsonization*, a phenomenon in Southeast Asia including Indonesia where state officials tend to increase the number of their subordinates irrespective of the tasks they have to perform (Evers 1987:667). Present formation of "disaster management bureaucracy" in Indonesia in more than a hundred of districts also need further investigation how the DRM bureaucracy can be effective in dealing with high disaster risks. Recent findings in a 2000 survey among 16 developing countries on merit-based systems for recruitment of civil servants ranked Indonesia at a low level as it suffered from "prevalent political patronage and the lack of transparency and accountability."

Promotion of institutional vulnerability framework for a comprehensive risks and vulnerability assessment is needed strongly because is relevant and pertinent to effectiveness and efficiency of the present worldwide investment in disaster reduction under the auspices of the Hyogo Framework for Action More effective in DRR implementation.

8.3.2. Recommendations for Indonesian DRR Actors and Institutions

DRR actors and institutions in Indonesia need to seriously think about how to improve efforts in local disaster legislation reform while striving equally to reform local and national disaster management bureaucracy. International donors need to have the courage to give long-term support locally for the sections of civil society working on disaster management and mitigation policy advocacy. Decentralization in Indonesia brings together problems that have affected disaster management policy and practice at the local level. Therefore, it is crucial that national and international actors be able to understand the disaster risk management challenges under the decentralization context.

At the national level, Indonesia needs a more balanced approach and balanced commitment to HFA priorities. The recent trends in disaster risk management budget structure and spending indicate the need to reform the structure of disaster reduction budget because the national government has been still spending more on *ex-post* disaster interventions than *ex-ante* disaster risk reduction. Only with a more balanced approach in the investment in the HFA priorities can better human resources in DRR be achieved (HFA 3, i.e. DRR education and curriculum), along with a significant increase in mitigation to reduce future loss of human life (HFA 4 priorities). At the local level, the province and city/district governments need to have a clear DRR budget structure which is absent from the present analysis. Given the missing link in vertical governance

involving the limitation of the power of provincial governments, civil society, national government, and donors/INGOs need to innovate the way that they promote DRR reform at the local level (such as clear understanding of local DRR networks)

8.3.3. Recommendations for Future Research

- Institutional vulnerability assessment in terms of both quantitative and qualitative approaches needs to be improved in the future in order to be more operational for comprehensive vulnerability assessment in general and to be better understood by policymakers.
- Improvement in the models is needed because, in this research, only simple statistical analyses including simple regression have been used. For future work, structural equation modeling can be used to demonstrate the "causality" especially on the role of institutions and governance on DRR policy and disaster risks level. This is because the correlation tests do not reflect causality but association of the selected variables (Utts 2005) and regression analysis can be only a proxy to predict the "implementability" of DRR policy based on the selected governance variables.
- The social network analysis (SNA) is effective in mapping actors and institutions, including their importance and leadership, when using methods/models such as centrality tests. For future work, other models and methods of SNA can also be used. The presently used methods can also be used to map institutions and governance in other countries or regions.
- Future research on disaster mitigation policy and institutional dimensions of mitigation in developing countries is needed given the disasters in the first decade of the 21st Century.

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Annexes

Annex 1. Simple Linear Regression

Descriptive Statistics

	Mean	Std. Deviation	N
Specific DRR Institutional Index	3.1912	.68475	63
Institutional Quality Index	4.6112	2.66651	63

Correlations

		Specific DRR Institutional Index	Institutional Quality Index
Pearson Correlation	Specific DRR Institutional Index	1.000	.596
	Institutional Quality Index	.596	1.000
Sig. (1-tailed)	Specific DRR Institutional Index	.	.000
	Institutional Quality Index	.000	.
N	Specific DRR Institutional Index	63	63
	Institutional Quality Index	63	63

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Institutional Quality Index[a]	.	Enter

a. All requested variables entered.
b. Dependent Variable: Specific DRR Institutional Index

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.596[a]	.355	.345	.55431

a. Predictors: (Constant), Institutional Quality Index
b. Dependent Variable: Specific DRR Institutional Index

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.328	1	10.328	33.615	.000[a]
	Residual	18.743	61	.307		
	Total	29.071	62			

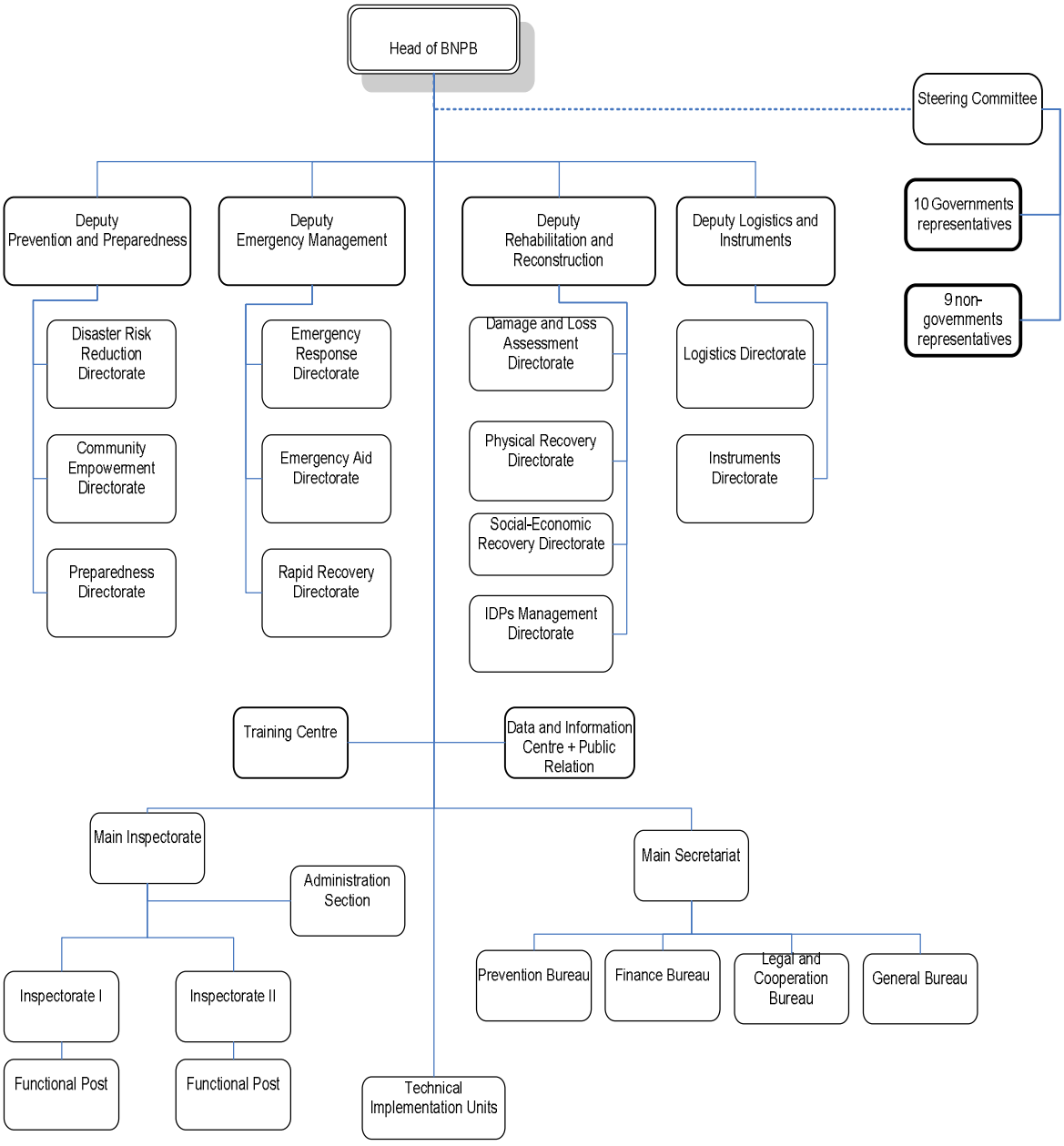
a. Predictors: (Constant), Institutional Quality Index
b. Dependent Variable: Specific DRR Institutional Index

Coefficients[a]

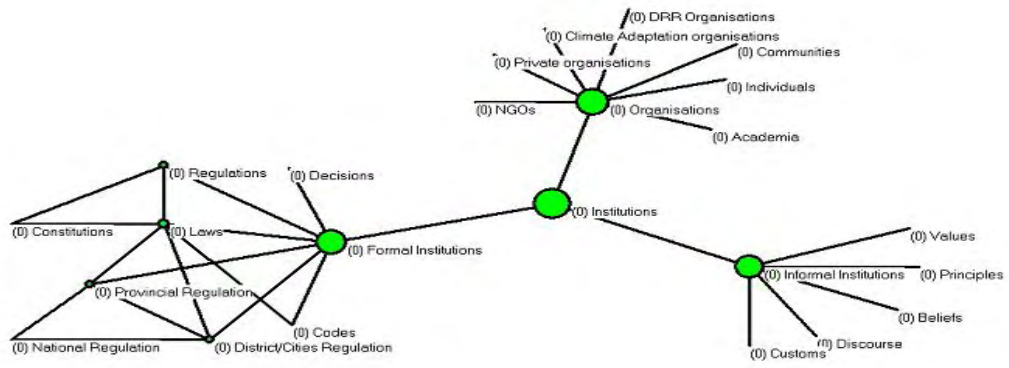
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.485	.140		17.709	.000
	Institutional Quality Index	.153	.026	.596	5.798	.000

a. Dependent Variable: Specific DRR Institutional Index

Annex 2. BNPB Structure



Annex 3. Example of Pajek Analysis on Closeness Centrality Output



All closeness centrality in N1 (24)

Dimension: 24
The lowest value: 0.2584270
The highest value: 0.5111111

Sum 7.9172593

Arithmetic mean: 0.3298858
Median: 0.3066667
Standard deviation: 0.0595749

Vector Values		Frequency	Freq%	CumFreq	CumFreq%
(.....	0.2584]	1	4.1667	1	4.1667
(0.2584 ...	0.3427]	18	75.0000	19	79.1667
(0.3427 ...	0.4269]	2	8.3333	21	87.5000
(0.4269 ...	0.5111]	3	12.5000	24	100.0000
Total		24	100.0000		

4. Betweenness centrality in N1 (24)

Dimension: 24
The lowest value: 0.0000000
The highest value: 0.6877470

Sum 2.3043478
Arithmetic mean: 0.0960145
Median: 0.0000000
Standard deviation: 0.1998915

Vector Values		Frequency	Freq%	CumFreq	CumFreq%
(...	0.0000]	16	66.6667	16	66.6667
(0.0000 ...	0.2293]	4	16.6667	20	83.3333
(0.2293 ...	0.4585]	1	4.1667	21	87.5000
(0.4585 ...	0.6877]	3	12.5000	24	100.0000
Total		24	100.0000		

Annex 4. Institutional Vulnerability Index

Countries	Institutional Quality Index	Specific DRR Institutional Index	Modeled Institutional Resilience Index	Disaster Risk Index
Switzerland	9,72	4,45	3,97	-0,08
NewZealand	9,6	3,91	3,95	0,28
Sweden	9,6	3,59	3,95	-0,64
Norway	9,51	3,64	3,94	-0,2
Australia	9,16	4,09	3,89	0,28
Germany	9,03	3,86	3,87	0,19
UnitedKingdom	8,88	4,27	3,84	0,13
Singapore	8,56	4,27	3,79	-
Japan	8,4	4,18	3,77	0,74
United States	8,32	3,68	3,76	0,71
France	8,32	4	3,76	0,13
CzechRepublic	7,65	3,77	3,66	-0,2
Korea	7,4	3,77	3,62	0,73
Mauritius	7,33	3,14	3,61	1,15
Costa Rica	7,09	3,82	3,57	0,59
Italy	7,11	3,86	3,57	0,24
Croatia	6,43	3,41	3,47	-
Bulgaria	6,13	3,55	3,42	0,19
Panama	5,82	2,77	3,38	0,34
Ghana	5,7	2,95	3,36	0,34
Jamaica	5,07	3,55	3,26	0,76
Turkey	5,09	3,41	3,26	0,77
El Salvador	4,89	2,41	3,23	0,69
Madagascar	4,9	3,59	3,23	0,97
India	4,74	3,55	3,21	0,9
Macedonia	4,74	3,41	3,21	-0,1
Argentina	4,43	3,09	3,16	0,51
DominicanRepublic	4,35	1,73	3,15	0,75
Senegal	4,28	2,23	3,14	0,51
Sri Lanka	4,25	2,59	3,13	0,72
Armenia	4,16	3,14	3,12	0,13
Tanzania	4,16	3,27	3,12	-
Colombia	4,11	3,36	3,11	0,52
Serbia	4,08	2,68	3,11	-
Peru	4	3,05	3,1	0,66

Mozambique	3,98	3,45	3,09	1,23
BurkinaFaso	3,85	3,23	3,07	0,64
Zambia	3,7	3,41	3,05	0,64
Philippines	3,47	2,45	3,02	1,11
Malawi	3,53	3,14	3,02	1,13
Egypt	3,33	2,73	3	0,48
Indonesia	3,14	3	2,97	1
Kazakhstan	2,92	3,05	2,93	-
Swaziland	2,91	1,73	2,93	-
Kenya	2,75	3,36	2,91	0,78
Bolivia	2,51	2,18	2,87	0,75
Algeria	2,54	3,05	2,87	0,69
Nepal	2,04	2,14	2,8	0,86
Cambodia	1,89	2,32	2,77	0,66
Sierra Leone	1,84	3,82	2,77	0,22
Ecuador	1,83	2,41	2,76	0,7
Lao PDR	1,81	1,95	2,76	0,78
Kyrgyz Rep.	1,81	2,86	2,76	-
Pakistan	1,7	3,14	2,75	0,86
Syrian	1,74	2,86	2,75	-0,77
Bangladesh	1,64	3,18	2,74	1,01
Yemen	1,64	2	2,74	0,78
Iran	1,63	4,59	2,73	0,83
Tajikistan	1,28	3,18	2,68	0,91
Venezuela	1,19	2,91	2,67	0,52
Angola	1,23	2,91	2,67	0,14
Uzbekistan	1,04	3,95	2,64	-
Cote d'Ivoire	0,57	2	2,57	0,38

Annex 5. Perception on the Cause of Disasters in Sikka: Selected Variables

Notes. This is a work in progress based on a baseline survey from Plan Sikka in 2008 with 521 respondents from Sikka district (from 10 sub-districts). 361 Males, 156 Females, 4. 87% of the respondents are Catholics and 8% Islam. Annex 5 presents only the selected questions.

Question No. 2 (close question) Disasters are *events and there is not much we can do about them*?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	45	8.6	8.8	8.8
	Disagree	108	20.7	21.2	30.0
	Dont know	55	10.6	10.8	40.8
	Agree	196	37.6	38.4	79.2
	Strongly agree	106	20.3	20.8	100.0
	Total	510	97.9	100.0	
Missing	System	11	2.1		
Total		521	100.0		

Question No. 40. What is the reason a disaster occurs? (close questions)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Natural	204	39.2	41.7	41.7
	Human made	49	9.4	10.0	51.7
	will of God	41	7.9	8.4	60.1
	Natural and human made	88	16.9	18.0	78.1
	Natural and will of god	21	4.0	4.3	82.4
	All natural human and will of god	86	16.5	17.6	100.0
	Total	489	93.9	100.0	
Missing	System	32	6.1		
Total		521	100.0		

Education of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no school	11	2.1	2.3	2.3
	elementary	279	53.6	57.6	59.9
	junior hs	71	13.6	14.7	74.6
	senior hs	89	17.1	18.4	93.0
	college/university	33	6.3	6.8	99.8
	postgrad	1	.2	.2	100.0
	Total	484	92.9	100.0	
Missing	System	37	7.1		
Total		521	100.0		

Annex 6. Visited Areas in Indonesia

Annex 7. Selected List of DRR Regulations Local and National

1 "Qanun (Perda) 1/2008 on Aceh Finance Management"
2 "Law 32/2004 on Local Government"
3 "Law 12/2008 on Local Gevernment"
4 "Law 33/2004 on Balancing Fiscal Central & L.Govt"
5 "Law 11/2006 on Aceh Government"
6 "Law 24/2007 on Disaster Management"
7 "GR 41/2007 on Local Organisational Instruments"
8 "GR 21/2008 on DRM Implementation"
9 "GR 22/2008 on Disaster Finance & Aid Management"
10 "GR 23/2008 on Participation of Int. institution and INGOs"
11 "GR 38/2007 on Mandate Sharing between District and Provincial Govt"
12 "Head of BNPB Regulation 3/2008 on Guides for BPBD"
13 "Law 43/1999 on Civil Servants (amendment)"
14 "Law 8/1974 on Civil Servants"
15 "Permendagri 46/2008 on Guides for (BPBD) and Rules"
16 "Permendagri 57/2007 on Technical Guide for L.Govt Orgs."
17 "GR 79/2005 on Guide for Strengthen and Monitor L.Govt"
18 "Law 10/2004 on Law on how to make Law"
19 "Presidential Decree 8/2008 on BNPB"
20 "Law 28 /1999 on Anticorruption in Government"
21 "Permendagri 15/2006 on Types and Form of Local Laws"
22 "Permendagri 16/2006 on Drafting Procedures of Local Laws"
23 "Permendagri 17/2006 on Local Notes and News"
24 "SMDNRI 061/707/SJ 2009"
25 "Law 17/2003 State Finance"
26 "GR 9/2003 on Authority to Recruit/Fire PNS"
27 "GR 58/2005 on Local Finance Management"
28 "Law 1/2004 National Treasury"
29 "Local Regulation on Financial Management"
30 "Local Regulation on Local Regulation Drafting"
31 "Local Regulation on Roles of District Executive Government"
32 "Provincial Regulation on DM"
33 "GR 55/2005 on Badan Perimbangan"
34 "Law 11/1967 on Mining"
35 "Law 14/1992 on Traffic and Road"
36 "Law 18/199 on Construction service"
37 "Law 2/2002 on Police"
38 "Law 23/1992 on Health"
39 "Law 26/2007 on Spatial Planning"
40 "Law 34/2004 on TNI"
41 "Law 39/1999 on Human Rights"
42 "Law 6/1974 on Social Welfare"
43 "Constitution 1945"
44 "Kepmendagri 131/2003 on Guide for DRM and IDPs"
45 "Permendagri 12/2006 on Community Preparedness"
46 "Permendagri 27/2007 on Guides on DP Facility and Infrastructure"
47 "Permendagri 33/2006 on Disaster Mitigation"
48 "GR 25/2000 on Power Division of Central and Provincial Government"
49 "GR 29/1980 on Collection of Donation"
50 "GR 6/1988 on Vertical Coordination at the Local Level"

51 "KepmenESDM 1054.k /12/MPE/2000 on Volcano Mitigation Guide"
52 "KepmenESDM 1452.K/10/MEM/2000 on TG.-Inv. ESDM,GeoMaGR,Landslide"
53 "Kepmensos 1/HUK/1995 on Donation Collection for Disaster Victims"
54 "Kepmensos 56/HUK/1996 on Implementation of Donation"
55 "Law 23/1997 on Environment"
56 "Law 24/1992 on Spatial Planning"
57 "Law 41/1999 on Forestry"
58 "Law 6/1974 on Main Regulation of Social Welfare"
59 "Law 6/1996 on Indonesian Sea (Perairan)"
60 "Law 9/1961 on donation funds and goods from communities"
61 "Presidential Decree 32/1990 on Protected Areas Management"
62 "GR 26/2008 on National Plan on Spatial Planning"
63 "GR 34/2006 on Road"
64 "GR 42/2008 on Water Resource Management"
65 "Law 11/2009 on Social Welfare"
66 "Law 32/2009 on Environmental Protection"
67 "Law 38/2004 on Road"
68 "Law 7/2004 on Water Resources"
69 "Local Regulation on Long Term Development Plan (RPJP)"
70 "Local Regulation on Medium Term Development Plan (RPJM)"
71 "Local Regulation on Provincial Spatial Planning"
72 "PD 67/2005 on Coop. govt and Infrastructure Business Org."
73 "PD 80/2003 on Guides for Goods/Services Provision"
74 "PermenPU 21/2007 on Guides for Spatial Planning for Volcanic Regions"
75 "PermenPU 22/2007 on Guides for Spatial Planning for Landslides Areas"
76 "BNPB Aceh"
77 "BPBD Agam"
78 "BPBD Bantul"
79 "BPBD Bojonegoro"
80 "BPBD Gorontalo"
81 "BPBD Jabar"
82 "BPBD NTT"
83 "BPBD Samarinda"
84 "BPBD Sikka"
85 "Provincial DM Law NTT"
86 "Provincial DM Law W. Sumatra"
87 "Provincial DM Law West Java"