DISASTER RISK REDUCTION: CONCEPTUAL SHIFTS

Pande LAZAREVSKI
Ph.D., Institute for Sociological, Political and Juridical Research, "Ss. Cyril and Methodius University" - Skopje
e-mail: pande.lazarevski2@gmail.com / pande.lazarevski@isppi.ukim.edu.mk

Nikola GJORGON
Ph.D., Public Administration
e-mail: nikola.gjorgon@gmail.com

Abstract
Over the decades, Disaster Risk Reduction (DRR) has moved from a narrowly perceived technical discipline, to a broad-based global movement focused on sustainable development. The 2004 Indian Ocean tsunami that killed 230.000 people, served as a catalyst that convinced many skeptics of the importance of DRR. In 2015, policy-makers and practitioners from 168 countries came together in Hyogo, Japan and adopted the *Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience for Nations and Communities to Disasters*. However, HFA had many gaps. Compared to the HFA, the Sendai Framework for DRR (2015-2030) is more far-reaching, holistic and inclusive, and emphasizes the need to address disaster risk management, to reduce existing vulnerability and to prevent the creation of new risks. However, it too has its setbacks. The aim of this paper is to examine the four conceptual or paradigm shifts that occurred in the field of disaster resilience and risk reduction: first, the nature of disasters; second, the shift from disaster management to disaster risk management; third, the shift from monistic to holistic approach that combines DRR, Climate Change Adaptation (CCA) and Sustainable Development (SD); fourth, from voluntary to obligatory risk reduction. Following the fourth paradigm shift, an upgraded Disaster Resilience Index (DRI) is proposed by Macedonia as an analytical tool that can help policymakers in disaster risk assessment and preparedness.

Keywords: *Disaster Risk Reduction (DRR); Climate Change Adaptation (CCA); Disaster Risk Management; Sustainable Development (SD); Disaster Resilience Index (DRI); HFA; SFDRR; Macedonia;*

1. Background: DRR Milestones and Institutional Framework

Disaster Risk Reduction (DRR) did not come about over night. Over the decades, DRR has moved from a narrowly perceived technical discipline, to a broad-based global movement focused on sustainable development. In 1989, the UN General Assembly proclaimed the 1990s as the International Decade for Natural Disaster Reduction – IDNDR (Mysiak, Surminski, Thieken, Mechler, and Aerts, 2015). The IDNDR was reviewed in 1994 at the First World Conference on Natural Disaster Reduction, which produced The Yokohama Strategy for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation and its Plan of Action (IDNDR, 1994). In 1999, the UN General Assembly established the UN International Strategy for Disaster Reduction – UNISDR, "to serve as the focal point in the United Nations system for the coordination of disaster reduction and to ensure synergies among the disaster reduction activities of the United Nations system and regional organizations and activities in socio-economic and humanitarian fields" (UN General Assembly Resolution 56/195).

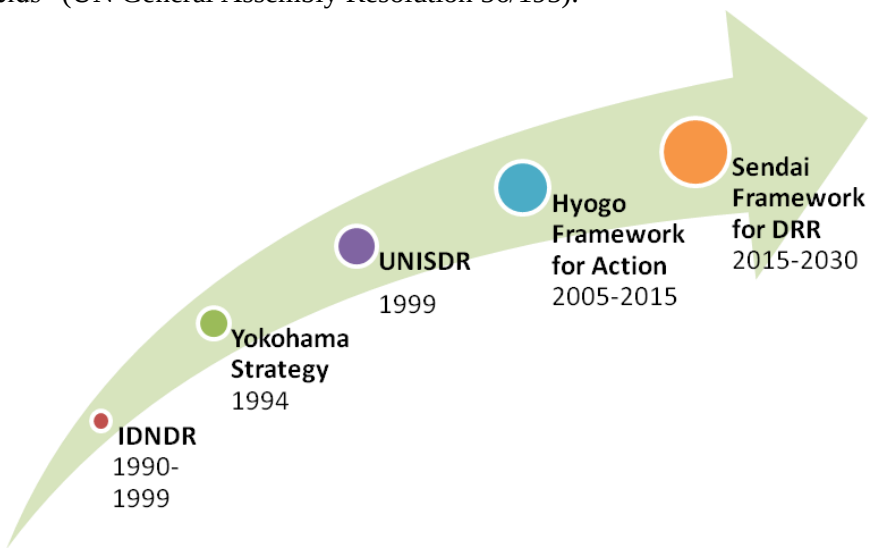

Figure 1: 25 years of international commitment to DRR

1.1. HFA 2005 - 2015

In 2005, only weeks after the 2004 Indian Ocean tsunami that killed 230.000 people, policy-makers and practitioners from 168 countries came together in Hyogo, Japan and adopted the *Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience for Nations and Communities to Disasters*. Unfortunately, the Tsunami served a catalyst that convinced many

skeptics of the importance of DRR. With its five priorities for action[1], it was expected that HFA would provide a "substantial reduction of disaster losses, in lives and in the social, economic and environmental assets of communities and countries" (HFA, 2005).

For 10 years, HFA provided guidance for reducing the loss of life and assets in the event of disaster, and for making the world safer from natural hazards. It was the most comprehensive and ambitious attempt to put DRR at the top of the international political agenda. However, HFA had many gaps and faced many challenges (Oxley, 2015). According to Munich Re, over the same 10-year time-frame disasters continued to exact a heavy toll: 700.000 people lost their lives and 1.4 million people were injured. Approximately 23 million have been made homeless as a result of disasters. 1.5 billion people, mostly women, children and people with vulnerabilities, have been affected by disasters. Referring to the same source, the total economic loss worldwide is estimated at $1.3 trillion. Between 2008 and 2012, 144 million people were displaced as a result of disasters. In 2014 alone, Europe saw almost 160 disaster events with over 300 fatalities and damages amounting to US$ 17.6 billion (Munich Re, 2015). People in vulnerable situations, especially in developing countries, are disproportionately affected. A high percentage of losses are due to recurring small-scale disasters. Why is this happening?

The mid-term review of HFA has revealed some major flaws in the Framework (Oxley, 2015): It was found that the DRR, Sustainable Development and Climate Change frameworks were not synchronized. There was a growing implementation gap between national policy and local action. There was limited political space and participation for local people and authorities in the formulation of policy, strategic planning and decision-making processes. Due to its voluntary nature, HFA resulted in weak accountability and commitment for implementation and weak political ownership of the DRR agenda. It failed to provide for systematic learning from disasters. There were also weak collaboration and knowledge sharing mechanisms. In the context of complexity, uncertainty, informality, fragility, insecurity (including conflict), HFA failed to put DRR high on the agenda. Lastly, it did not adequately address the unequal power relationships that influence implementation.

[1]It's Priorities for Action included: (1) Ensure that DRR is a national and a local priority with a strong institutional basis for implementation; (2) Identify, assess and monitor disaster risks and enhance early warning; (3) Use knowledge, innovation and education to build a culture of safety and resilience at all levels; (4) Reduce the underlying risk factors; (5) Strengthen disaster preparedness for effective response at all levels.

This has created a condition in which exposure of persons and assets in all countries has increased faster than vulnerability has decreased.[2] In other words, "the creation of disaster risk is increasing faster than the ability to enhance disaster risk management capacities. The result is a continued rise in disaster losses which undermine efforts to achieve sustainable development" (Oxley, 2015). The year 2015 was a chance for a fresh start with a new framework.

1.2. SFDRR 2015 - 2030

The Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030 was adopted at the Third UN World Conference for DRR in Sendai, Japan on March 18, 2015. It was the first international agreement to be adopted within the context of the post-2015 development agenda.[3] Its scope and purpose includes "the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters, caused by natural or manmade hazards as well as related environmental, technological and biological hazards and risks. It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors" (SFDRR, 2015). Its goal is: to "prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience" (SFDRR, 2015). SFDRR has seven targets[4], four priorities for action[5] and 13 guiding principles.

[2]"This means generating new risks and a steady rise in disaster-related losses, with a significant economic, social, health, cultural and environmental impact in the short, medium and long term, especially at the local and community levels." UN: Sendai Framework for Disaster Risk Reduction 2015–2030, A/CONF.224/CRP.1, 18 March 2015, 2015b.

[3]It was followed by the adoption of the Sustainable Development Goals in September, and the Paris Climate Agreement in December 2015.

[4](1) Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 compared to 2005-2015; (2) Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared to 2005-2015; (3)Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030; (4) Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030;

Compared to the HFA, the Sendai Framework is more far-reaching, holistic and inclusive, and emphasizes the need to address disaster risk management, to reduce existing vulnerability and to prevent the creation of new risks. Since disasters affect local communities within national boundaries, states have the primary responsibility for reducing disaster risk. Its aim is to achieve risk avoidance by sustainable development that "minimizes risk accumulation, reduces existing risks, and promotes resilience – creating nations and communities that can absorb losses, minimize impacts and bounce forward." (Wahlström, 2014).

Many observers expected that the SFDRR would bring a new level of international commitment to DRR, including concrete goals and actions. The world conference in Sendai, however, had mixed results. Although it highlights the importance of preparedness and prevention for reducing vulnerability to disasters and for building resilience and provides global targets to guide DRR for the next 15 years, some experts say that SFDRR "lacks ambitious and concrete indicators that could track the new framework's progress toward its goals." (Glantz, 2015). Furthermore, institutional mechanisms to monitor the implementation of the agreement were not included. The SFDRR is an aspirational framework that needs effective implementation, meaningful investment, and political will" (Glantz, 2015). The concrete numerical targets from pre-conference drafts of the agreement, which would have simplified future objective assessment of the SFDRR were removed. Moreover, it failed to fill the gap of stronger institutional basis for the implementation and monitoring process.

There are at least two setbacks:

1. The Sendai Framework for DRR is a guide to voluntary action by governments and practitioners in their disaster-related activities. It is a non-abiding document that countries are encouraged, but not obliged, to follow.

(5) Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020; (6) Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030; (7) Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030.

[5]Priority 1: Understanding disaster risk; Priority 2: Strengthening disaster risk governance to manage disaster risk; Priority 3: Investing in disaster risk reduction for resilience; Priority 4: Enhancing disaster preparedness for effective response, and to «Build Back Better» in recovery, rehabilitation and reconstruction.

2. If we carefully read the Sendai Framework, we will notice a phrase that appears throughout the document. "As appropriate" appears a total of 43 times in the Sendai Framework. What does this mean? This phrase allows actors to continue along the "business as usual" pathway (Glantz, 2015).

2. From "Natural Disasters" to Nature of Disasters: Understanding disaster risk

We often hear people speak of earthquakes, floods, tsunamis, hurricanes, landslides, forest fires as natural disasters. They make headlines in the news, because, as we know, bad news always sell better than good news. But, what is a disaster? Disaster is defined as "a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources." (UNISDR Terminology on Disaster Risk Reduction, 2009). Exposure to hazards, existing conditions of vulnerability and insufficient capacity or measures to reduce or cope with the potential negative consequences together consists the basis of a disaster. Disasters are often described as a result of the intersection of 4 components (Milutinovic and Garevski, 2009):

1. Hazard is the first component of a disaster. Now, we know that a hazard is a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.
2. The second component to a disaster is exposure to a hazard. Exposure is the number of people, property, systems present in hazard zones that can be affected by a particular event.
3. Vulnerability of exposure is the third component to a disaster. It is the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard. Vulnerability indicates a damage potential. So, in order to determine vulnerability, we should be asking what would happen if a certain event impacted particular community?
4. Here we come to the final component of disasters. In real life, the harm done does not only depend on hazard, exposure and vulnerability, but also on the coping capacity and resilience of the community. Coping capacity is the ability of people, organizations

and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters. While resilience is the ability to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

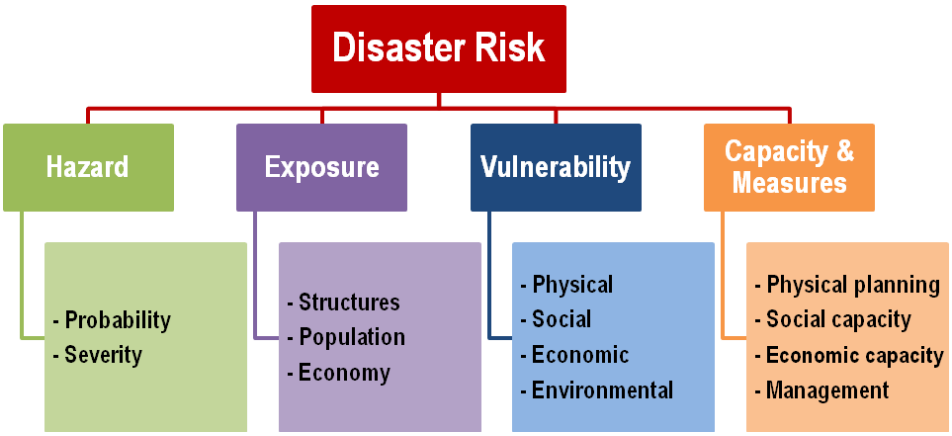

Figure 2: Conceptual Framework for Disaster Risk Assessment

Having the above in mind, Milutinovic and Garevski provide the following equation for the measurement of disaster risks: Disaster Risk = f (hazard, vulnerability, exposure, resilience).

Figure 3: Risk Seen as a Function of Hazard, Vulnerability, Exposure and Resilience

Source: Milutinovic, Z., Garevski, M., Guidelines for Development of Methodologies for Assessment of Risks and Hazards and their Implications, ECILS-Skopje, Skopje, November, 2009

If we take a look at the nature of disasters, we will see that there is no such thing as a natural disaster. Instead of natural disasters, there are natural hazards (which are natural process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage).

The first paradigm-shift consists of the following: natural hazards in themselves do not inevitably lead to disasters. For instance, an avalanche that slides down the mountain where there are no people or property is not a disaster. However, disasters result from the impact of natural hazards on exposed and vulnerable individuals and communities who have insufficient capacity to reduce or to cope with the negative consequences. And, this hazard results in a devastation that leaves communities or even entire nations unable to recover without external aid (Lazarevski and Gjorgon, 2012). The crucial point here is that disasters are neither inevitable nor "natural." They are, instead, a result of human attitude, behavior and misconduct related to adverse natural phenomena or to man-made accidents.

This resulted in a second paradigm shift from the traditional approach focused on disaster response and disaster management towards a new, systematical and holistic disaster risk reduction (Lazarevski, Gjorgon, Talevski, 2010). Here we come to the key concept of Disaster Risk Reduction.

3. From Disaster Management to Disaster Risk Management

UNISDR defines Disaster Risk Reduction as the concept and practice of reducing disaster risks through:

- Understanding the very nature of disasters and their causal factors;
- Reducing exposure to hazards;
- Lessening vulnerability;
- Wise management of land and the environment;
- Improving preparedness for adverse events.

In other words, Disaster Risk Reduction is not only about survival in the face of disasters. It is about building resilience to those very same disaster risks. This means developing the capacities of communities and nations to manage the risks in their environment in a way that keeps them safe from harm and improves their quality of life. DRR includes disaster management, disaster risk management, disaster mitigation and disaster preparedness; DRR involves every part of society, every part of government, and every part of the professional and private sector.

However, there is a conceptual shift from *disaster management* to disaster risk management. According to UNISDR, disaster management is "the organization, planning and application of measures preparing for, responding to and, initial recovery from disasters." In other words, its focus is on organization and management of resources and responsibilities for addressing all aspects of emergencies and initial recovery steps. Since its focus is on preparedness for decrease of the impact of disasters, disaster management is mostly *reactive*.

On the other hand, *disaster risk management* is defined as "the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses." The revised definition states: "disaster risk management is the application of disaster risk reduction policies, processes and actions to prevent new risk, reduce existing disaster risk and manage residual risk contributing to the strengthening of resilience." According to some authors, disaster risk management completes DRR by adding a management perspective that combines prevention, mitigation and preparedness with response. (Baas, Ramasamy, de Pryck and Battista, 2008, p. 6). It can be prospective[6], corrective[7] and compensatory[8]. It focuses on the organization and management of resources and responsibilities for emergency prevention and risk control. Compared to disaster management, which is reactive, disaster risk management is *proactive*.

Following the Hyogo Framework for Action 2005-2015 and the Sendai Framework for Disaster Risk Reduction 20215-2030, the second conceptual shift is from reactive disaster management to proactive disaster risk management.

[6]"Prospective disaster risk management activities address and seek to avoid the development of new or increased disaster risks. They focus on addressing disaster risks that may develop in future if disaster risk reduction policies are not put in place. Examples are better land-use planning or disaster-resistant water supply systems." (UNISDR).

[7]"Corrective disaster risk management activities address and seek to remove or reduce disaster risks which are already present and which need to be managed and reduced now. Examples are the retrofitting of critical infrastructure or the relocation of exposed populations or assets." (UNISDR).

[8]"Compensatory disaster risk management activities strengthen the social and economic resilience of individuals and societies in the face of residual risk that cannot be effectively reduced. They include preparedness, response and recovery activities, but also a mix of different financing instruments, such as national contingency funds, contingent credit, insurance and reinsurance and social safety nets." (UNISDR).

4. From Monistic Perspective to Holistic Approach

The nature of disasters shows a strong link between disasters, on one hand and climate and weather, on the other hand:

- 91% of recorded major disasters caused by natural hazards 1994 - 2013 were linked to climate and weather.
- 80% of current disaster losses are caused by weather-related hazards, which are set to increase in frequency, intensity, spatial extent and duration as a result of changing climate, according to the IPCC's Fourth Assessment Report.

According to IPCC, Climate Change is the "change in the climate that persists for decades or longer, arising from either natural causes or human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (Dickson, Baker, Hoornweg, and Tiwari, 2012). Climate change is a disaster risk amplifier (Lazarevski and Gjorgon, 2012) because it combines three aspects:

1. Vulnerability of communities caused by ecosystem degradation and reduced water and food availability;
2. Communities' exposure to ever more frequent, extreme and rapid weather events like floods and droughts;
3. Result: climate change increases Disaster Risks and decreases Sustainable Development.[9]

Why is this important? For years, countries have adopted and tried to implement strategies, policies and plans concerning Disaster Risks, Climate Change and Sustainable Development, without recognizing that Sustainable Development efforts are undermined by both disaster risks and climate change. Just as the answer to Disaster Risks is Disaster Risk Reduction, so the answer to Climate Change is Climate Change Adaptation, understood as "…the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities…" (IPCC, 2012).

On one hand, we have DRR monistic perspective understood as DRR reduction to the activities for preparedness, reaction, mitigation and recovery of competent authorities directly related to adverse natural or man-made event. On the other hand there is the DRR holistic approach: DRR conceptually, legally and practically perceived as a complex approach and

[9] Sustainable development is understood as the "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*" (UN World Commission on Environment and Development, 1987)

multilevel and multidimensional network for disaster risk prevention in a broader context of achieving sustainable development, including climate change adaptation. So, here we come to the third paradigm shift. Just as Disaster Risk and Climate Change lead to unsustainable development, so, Disaster Risk Reduction and Climate Change Adaptation are necessary for Sustainable Development (UNISDR, Briefing Note 02, 2009).

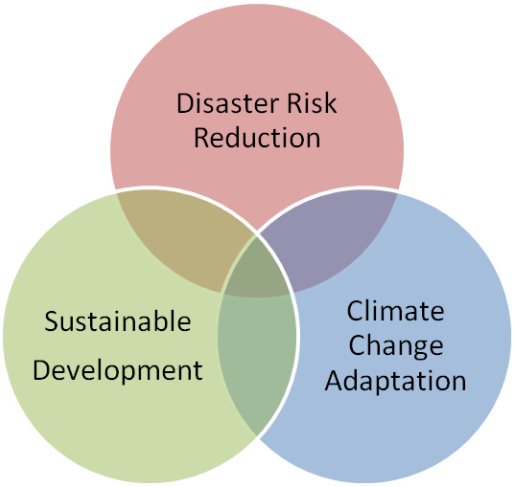

Figure 4: The links between Disaster Risk Reduction, Climate Change Adaptation and Sustainable Development

An example of this is the ongoing effort to synchronize the global frameworks within a same post-2015 agenda.

4. Voluntarily vs. Obligatory DRR implementation: Disaster Resilience Index

Here we come to the fourth paradigm-shift. As mentioned before, the voluntary nature of the agreements is the Achilles' heel of both the Hyogo and Sendai Frameworks for Disaster Risk Reduction. Therefore, the dilemma is:

- DRR as a FREE CHOICE. DRR reduced to declarative commitment without legal and real instruments for execution and without legally binding criteria and indicators for establishing personal, group or institutional responsibility, or
- DRR as an OBLIGATION. Established and implemented by competent authorities legally binding set of criteria and measurable indicators for assessing impact of individuals` and institutions`

attitude, behavior and misconduct in a case of adverse natural phenomena or man-made accidents.

The proposed answer by the authors of this paper to this dilemma (DRR as a free choice or DRR as an obligation) is the establishment of Disaster Resilience Index that will be explained in the next section.

What is Disaster Resilience Index? According to the UNDP's Global Report: Reducing Disaster Risk – A Challenge for Development (2004), DRI is a tool that enables:

1. Calculation of the average risk of death per country in large-and medium-scale disasters;
2. Identification of a number of socio-economic and environmental variables that are correlated with risk to death and which may point to causal processes of disaster risk.

4.1. The Conceptual Model

Disaster risk is not caused by hazardous events per se, but rather is historically constructed by human activities and processes. Key Steps Involved in Producing DRI include the calculation of:

- Physical exposure
- Relative vulnerability
- Vulnerability indicators

Building on the UNDP DRI Report, a Climate and Disaster Resilience Initiative was launched as an umbrella initiative of Kyoto University, funded by the Global Center of Excellence's "Human Security Engineering for Asian Megacities" Program and aimed at establishing a Climate Disaster Resilience Index (CDRI) to build resilient communities (Shaw, 2009).

The objective of this study is to measure the existing level of climate disaster resilience of the targeted areas using a Climate Disaster Resilience Index (hereafter CDRI) which is developed considering five resilience-based dimensions:

Dimensions	Variable considered
1. Physical	Electricity, Water supply, Sanitation, Solid waste disposal, Internal road network, Housing and land use, Community assets, Warning system and evacuation
2. Social	Health status, Education and awareness, Social capital
3. Economic	Income, Employment, Households' assets, Access to financial service, Savings and insurance, Budget and subsidy
4. Institutional	Internal institutions and development plan, Effectiveness of

	internal institutions, External institutions and networks, Institutional collaboration and coordination
5. Natural	Hazard intensity, Hazard frequency

Table 1: List of variables considered in CDRI five dimensions

Source: Shaw, R. and IEDM Team. (2009). Climate Disaster Resilience: Focus On Coastal Urban Cities In Asia.

4.2. Macedonian Contributions

The official statement of the Government of the Republic of Macedonia, delivered at the Third Session of the Global Platform for Disaster Risk Reduction (GPDRR) and the World Conference on Reconstruction (Genève, 2011) acknowledges the following: "recognizing the direct linkage between climate change and natural disasters, the Republic of Macedonia is strongly committed to promoting the merging of risk reduction and adaptation efforts on a national, regional and global level, that implies the following:

1. Development of integrated risk assessment methodologies and procedures;
2. Establishing mutually interdependent:
   - Disaster prevention standards,
   - Inspection procedures,
   - Insurance mechanisms;
3. Introducing "National Disaster Resilience Index" as international financial support eligibility criteria."

In his statement during the Macedonian Chairmanship with the European Forum for DRR, the President of the Republic of Macedonia Dr. Gjorge Ivanov said: "...governments need additional encouragement […] to […] develop standards and indicators for measuring the effectiveness of disaster risk reduction at both national and regional levels to guide public and private sector investments and improve quality and consistency in implementation." What is this, if not a recommendation for a Disaster Resilience Index that would encourage governments to be more responsible towards their own citizens as well as towards the global DRR efforts?" stated the President.

Based on pledges given at the 3rd Global Platform, Macedonia proposes further improvement of the Disaster Resilience Index at the International Workshop "Governance of climate-related risks in Europe: the need for policy oriented research" organized in Brussels from 8-9 September 2011 (Lazarevski, Garevski, Gjorgon, Ristovski, 2011).

The "building block" of DRI (suggested at the abovementioned International Workshop in Brussels) is the Risk Exposure Probability Index (REPI), which depends on the crosscutting values of the following indexes:
Natural Threats Index (NTI) based on the assessment of:

Severity	(...HOW MUCH?)
Frequency	(...HOW MANY?)
Extension	(...WHERE?)
Unpredictability of a natural threats	(...WHAT IF?)

Institutional Response Capacity Index (IRCI) based on the assessment of:

- Organizational capacity (competences, responsibility loop, material, equipment, funds, insurance);
- Expert capacity to predict, monitor, analyze and evaluate risk;
- Administrative capacity to plan;
- Operational capacity to act.

Community Vulnerability Index (CVI) based on the assessment of:

- Public perception of risk;
- Public perception of institutional and personal responsibility;
- Public perception of mutuality and inter-connectivity & inter-operability;
- Public attitude to be proactive.

DISASTER RESILIENCE INDEX is a mirror image of the RISK EXPOSURE PROBABILITY INDEX, measuring both human and institutional capacities:

- To act proactively, minimizing risks from becoming disasters, or (if a catastrophic chain of events starts);
- To react in a sound and systematic manner to put the situation under control.

Factors turning Risk Exposure Probability Index into Disaster Resilience Index:

- Methodologically consistent analysis and expert-based evaluation of "Risk into Disaster" transformation factors and circumstances;
- Public understanding of the possibility of a risk from becoming a disaster, followed by strong attitude and sound political will for prevention;
- Systematic and profound implementation planning and execution, both for prevention and reaction.

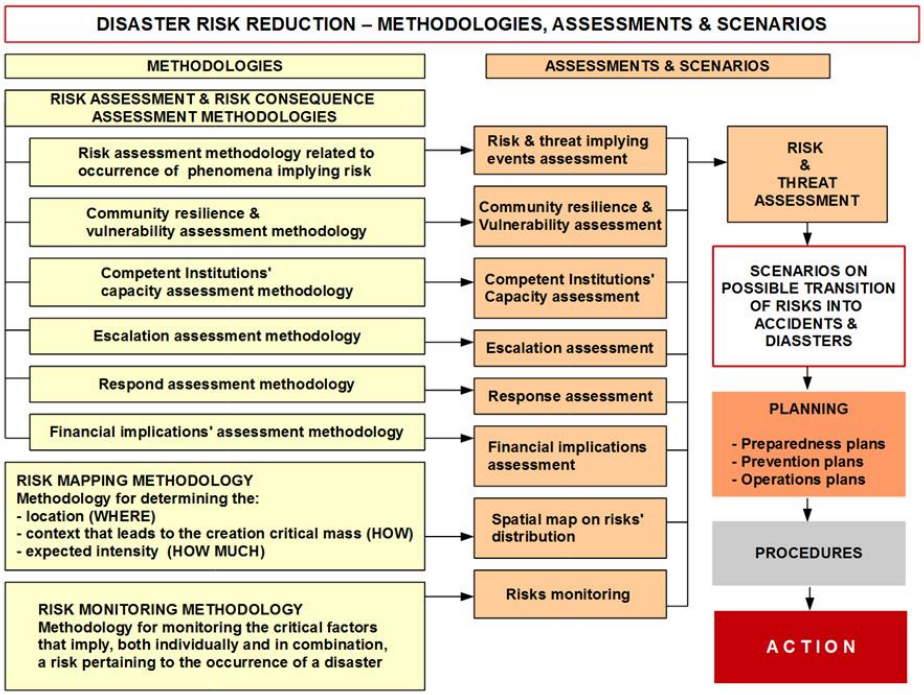

Figure 5: DRR – Methodologies, Assessments and Scenarios

Source: Lazarevski, P., Gjorgon, N., Taleski, M. (2010). National Platform of the Republic of Macedonia for Disaster Risk Reduction. Crisis Management Center. Skopje.

5. Conclusion

This paper examined the four conceptual or paradigm shifts that have occurred in the field of disaster resilience and risk reduction: first, the nature of disasters; second, the shift from disaster management to disaster risk management; third, the shift from monistic to holistic approach that combines DRR, CCA and SD; fourth, from voluntary to obligatory risk reduction (from DRR as a choice to DRR as a obligation), as suggested at the UNISDR International Workshop "Governance of climate-related risks in Europe: the need for policy oriented research" organized in Brussels from 8-9 September 2011.

By examining the first paradigm shift, it can be concluded that there is no such thing as a natural disaster. Instead of natural disasters, there are natural hazards. In real life, the harm done does not only depend on hazard, exposure and vulnerability, but also on the coping capacity and resilience of

the community. Therefore, the first paradigm-shift consists of the following: natural hazards in themselves do not inevitably lead to disasters. Disasters result from the impact of natural hazards on exposed and vulnerable individuals and communities who have insufficient capacity to reduce or to cope with the negative consequences.

The second paradigm shift, from Disaster Management to Disaster Risk Management, shows that Disaster Risk Reduction is about building resilience to disaster risks. This means developing the capacities of communities and nations to manage the risks in a way that keeps them safe from harm and improves their quality of life. Conceptual shift from *disaster management* (mostly *reactive*) to disaster risk management (mostly *proactive*) means shifting the focus from organization and management of resources and responsibilities for addressing emergencies and initial recovery steps, to preparedness for decrease of the impact of disasters focusing the organization and management of resources and responsibilities for emergency prevention and risk control.

The third shift is from a mostly monistic perspective which reduces DRR to the activities for preparedness, reaction, mitigation and recovery of competent authorities directly related to adverse natural or man-made event, to a holistic approach. This holistic approach helps us perceive conceptually, legally and practically DRR as a complex approach and multilevel and multidimensional network for disaster risk prevention in a broader context of achieving sustainable development, including climate change adaptation.

Finally, the fourth paradigm shift is from voluntary to obligatory risk reduction. DRR as a free choice, reduced to declarative commitment without legal and real instruments for execution and without legally binding criteria and indicators for establishing personal, group or institutional responsibility is the "Achilles' heel" of both the Hyogo and Sendai DRR Frameworks. Instead, DRR should be treated as an obligation, establishing and implementing legally binding set of criteria and measurable indicators for assessing impact of individuals` and institutions` attitude, behavior and misconduct in a case of adverse natural phenomena or man-made accidents. DRR paradigm-shift imposes need for establishment of Disaster Resilience Index (as a tool that enables calculation of the average risk in large-and medium-scale disasters and identification of a number of risk correlated socio-economic and environmental variables), having as a "mirror image" Risk Exposure Probability Index. which depends on the crosscutting relative values of Natural Threats Index, Institutional Response Capacity Index, Community Vulnerability Index, measuring both human and institutional capacities to act proactively, minimizing risks from becoming disasters, or, if a catastrophic chain of events starts, to react in a sound and systematic manner to put the situation under control. Following the fourth paradigm shift, this upgraded

Disaster Resilience Index (DRI) is proposed by Macedonia as an analytical tool that can help policymakers in disaster risk assessment and disaster preparedness.

6. Bibliography

Dickson, E., Baker, J. L., Hoornweg, D. and Tiwari, A. (2012). Urban Risk Assessments: Understanding Disaster and Climate Risk in Cities. Urban development series. Washington, DC: World Bank.

Glantz, M. H. (June 2015). The Letter and the Spirit of the Sendai Framework for Disaster Risk Reduction (a.k.a. HFA2). International Journal of Disaster Risk Science. Vol. 6. Issue 2. 205–206.

Lazarevski, P., Gjorgon, N., Taleski, M. (2010). National Platform of the Republic of Macedonia for Disaster Risk Reduction. Crisis Management Center. Skopje.

Lazarevski, P., Gjorgon, N. (2012). A Holistic Approach to Disaster Risk Reduction, Climate Change Adaptation & Sustainable Development Political Thought. No. 39. Kondrad Adenauer Stiftung. Skopje.

Lazarevski, P., Garevski, M., Gjorgon, N., Ristovski, L. (2011). Disaster Resilience Index: turning a concept into a tool. Presentation at the International Workshop Governance of climate-related risks in Europe: the need for policy oriented research. 8-9 September 2011. Brussels. Belgium.

Milutinovic, Z., Garevski, M. (2009). Guidelines for Development of Methodologies for Assessment of Risks and Hazards and their Implications. ECILS-Skopje. Skopje.

Mysiak, J., Surminski, S., Thieken, A., Mechler, R. and Aerts, J. (2015). Brief Communication: Sendai Framework for Disaster Risk Reduction – success or warning sign for Paris? Natural Hazards and Earth System Sciences Discussions. 3 (6). 3955-3966.

Oxley, M. (July 2015). Review of the Sendai Framework for Disaster Risk Reduction 2015-2030. GNDR Discussion Paper.

Prior, T. and Roth, F. (May 2015). Global Disaster Politics Post Sendai. CSS Analyses in Security Policy. No.173. Editor: Matthias Bieri.

Shaw, R. and IEDM Team. (2009). Climate Disaster Resilience: Focus On Coastal Urban Cities In Asia. [online] Available at: http://www.unisdr.org/files/12505_CLIMATEDISASTERRESILIENCEEN.pdf [Accessed 2 April 2017].

Official Statement of the Government of the Republic of Macedonia, delivered at the Third Session of the Global Platform for Disaster Risk

Reduction (GPDRR) and the World Conference on Reconstruction. Genève. 2011.

Statement by the President of the Republic of Macedonia, Dr. Gjorge Ivanov, on the occasion of the opening ceremony of the Second Session of the European Forum for Disaster Risk Reduction under the Macedonian Chairmanship. Skopje. 10 October 2011.

Opening Statement by SRSG Margareta Wahlström at the 5th meeting of the European Forum for Disaster Risk Reduction, Madrid, 06 October 2014. [online] Available at: https://www.unisdr.org/archive/39689 [Accessed 2 April 2017].

IDNDR. Report of the World Conference on Natural Disaster Reduction. (Yokohama, 23-27 May 1994). PreventionWeb.net. 24 January 2010

European Forum for Disaster Risk Reduction1 (EFDRR). Concept Paper.

European Forum for Disaster Risk Reduction: Roadmap for the Implementation of the Sendai Framework.

MunichRE. (2015). Loss events worldwide 2014. NatCatSERVICE. [online] Available at:https://www.munichre.com/site/touch-naturalhazards/get/documents_E-1125431578/mr/assetpool.shared/Documents/5_Touch/_NatCatService/Focus_analyses/Loss_events_worldwide_1980-2015.pdf [Accessed 2 April 2017].

UN General Assembly Resolution 56/195

UN. (2005). Hyogo Framework for Action 2005-2015: Building the Resilience for Nations and Communities to Disasters.

UN: Sendai Framework for Disaster Risk Reduction 2015–2030, A/CONF.224/CRP.1, 18

March 2015, 2015b.

UNDP. (2004). Global Report: Reducing Disaster Risk – A Challenge for Development.

UNISDR. (2009). UNISDR Terminology on Disaster Risk Reduction. Geneva

UNISDR. Background Paper. Proposed Updated Terminology on Disaster Risk Reduction: A Technical Review. Facilitated by The United Nations Office for Disaster Risk Reduction. August 2015. [online] Available at: http://www.preventionweb.net/files/45462_backgoundpaperonterminologyaugust20.pdf [Accessed 2 April 2017].

UNISDR. (2009). Briefing Note 02. Adaptation to Climate Change by Reducing Disaster Risks: Country Practices and Lessons.