

ความเข้าใจในขบวนการสร้างความเสี่ยงต่อภาวะภัยพิบัติ และการจัดการความเสี่ยงต่อภัยพิบัติ

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บทคัดย่อ

การจัดการความเสี่ยงที่เกี่ยวข้องกับภัยพิบัติในปัจจุบันได้ให้ความสำคัญกับการป้องกัน ลดผลกระทบ และการเตรียมพร้อมรับมือภัยพิบัติ ดังนั้นความเข้าใจถึงกระบวนการเกิดความเสี่ยงที่เกี่ยวข้องกับภัยพิบัติจึงมีความจำเป็น ปัจจัยหลักที่สนับสนุนการเกิดความเสี่ยง ได้แก่ ภัย (hazard), ความเปราะบาง (vulnerability) และการเผชิญภัย (exposure) ในขณะเดียวกันนั้น ศักยภาพขององค์กร (capacity) ก็เป็นปัจจัยที่ช่วยลดความเสี่ยงดังกล่าว จากความเข้าใจข้างต้นได้ส่งผลต่อการจัดการภาวะภัยพิบัติในทศวรรษนี้ ให้มุ่งเน้นการจัดการความเสี่ยงก่อนเกิดภาวะภัยพิบัติเป็นอันดับต้น และเตรียมพร้อมเพื่อการตอบโต้หากเกิดภัยพิบัติไปพร้อมๆ กัน งานวิจัยต่างๆ สนับสนุนการมีส่วนร่วมของชุมชนที่อาจได้รับผลกระทบจากภัยพิบัติเนื่องจากชุมชนเหล่านั้นสามารถค้นหาความเข้มแข็งและศักยภาพภายในชุมชนและนำมาขยายผลเพื่อจัดการกับความเปราะบางและความเสี่ยงในชุมชนด้วยกระบวนการที่เหมาะสมกับสภาพปัญหาและทรัพยากรในชุมชน งานวิจัยยังสนับสนุนการจัดการเชิงนโยบายที่จะสนับสนุนชุมชนเข้มแข็ง (resilient community) ตัวอย่างจากการจัดการสภาพอากาศเปลี่ยนแปลงได้แสดงให้เห็นว่า ต้องใช้กระบวนการจัดการในหลายมิติในการจัดการความเสี่ยง อาทิเช่น การติดตั้งสัญญาณเตือนภัยจากสภาพอากาศเพื่อลดการสูญเสีย และการบาดเจ็บยามเมื่อเกิดภัย ซึ่งเป็นไปในทางเดียวกันกับรายงานจากผู้เชี่ยวชาญว่า การจัดการเพื่อลดผลกระทบและป้องกันนั้นเป็นการลงทุนที่มีประสิทธิภาพมากกว่าค่าใช้จ่ายในการตอบโต้ภัยพิบัติ

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คำสำคัญ

การจัดการความเสี่ยง ภัยพิบัติ ภัย ความเปราะบาง การเผชิญภัย และ ความเข้มแข็งและศักยภาพของชุมชน

The understanding of disaster risk and disaster risk management.

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Abstract

Disaster risk management currently focuses on mitigation and preparedness. In term of mitigation, the understanding of disaster risk production is required. Hazard, vulnerability and exposure are the main factors that create disaster risk, while capacity is the tool to reduce disaster risk. These concepts have changed the trend of disaster management to pay attention more to mitigation and preparedness in the last decade. However, quick response and recovery are still necessary. Literature shows that the participation of the local community is a vital factor to enhance their capacity which will make them cope with and resilient to disaster and also diminish their vulnerability. Many studies also encourage the concept of resilient community which is required the promotion of the national policy. In the climate-change-related disaster, the multi-aspect solution is required to overcome vulnerabilities and reduce some human activity related to global warming. The early warning system is an example of mitigation that can reduce death and injury. Therefore, the disaster manager should focus more on disaster risk management in mitigation-preparedness phase.

Keyword

disaster risk management, hazard, vulnerability, exposure and capacity

Introduction

In the last decade, disaster has happened more frequently and increased in complexity and severity¹⁻⁴. Disaster refers to “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 resources⁵. The human community is affected by the disastrous consequences in many aspects⁶. For example, there were 1.8 million deaths in the previous century from an earthquake, and more than 100,000 buildings, including hospitals and schools, were destroyed in the Kobe earthquake 1995. Consequently, these effects result in some social activities to be paralyzed⁷. Climate change is also a disaster risk that causes more hazards and makes more vulnerability. As an illustration, the hazard, droughts, and flooding cause a human vulnerability resulting from global warming⁸. The article will explain disaster risk production and the logical disaster risk management.

The rising earth surface temperature up to 1.06 degree Celsius in 2012 reveals that global warming is coming⁹.

The rising sea level is also caused by the melting Arctic ice sheet at a higher global temperature. In addition, a significant heat weather event is induced⁹. For example, in 2010, there were 10,000 deaths from a heatwave attack in Russia, and from 1999-2009 there had been around 11,000 hospitalizations over that period¹⁰. People life, economy and social mobility are affected by climate change. For example, the heat effect impacts human health, while food insecurity, which resulted from severe weather change, also affects both economy and social mobility⁹. Notably, these climate change would result from human activities, including greenhouse gas production¹¹. The Intergovernmental Panel on Climate Change; IPCC (2014) stated that “climate change would amplify existing risks and create new risks for natural and human systems. Risks are unevenly distributed and are generally greater for disadvantaged people and communities in countries at all levels of development”⁹. Leaning and Guha-Sapir (2013) claimed that an increase in urban expansion, deforestation, and environmental damage increase the level of disasters because of the severe level of climate variables such as high-



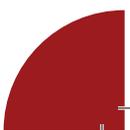
er temperatures; as a consequent, the extreme violent wind and water storm have been induced in the last decade¹². These changes also affected Thailand, which caused a megaflood in Bangkok, 2011¹³. It is reasonable to focus on disaster risk from the severe weather change. In term of reducing risk, an in-depth understanding of the underpinned vulnerability and the ability of risk perception in local people is necessary as well as the logical system should be developed according to the root cause of that risk.

Disaster risk

Notably, the disaster root cause can be eradicated by the understanding of what influence disaster risk. At present, many experts report that the external factor like hazard exposes to the internal factor like human vulnerability is a major cause of the disaster, called ‘convolution’¹⁴. Hazard is defined as “the probability of occurrence of an event of certain intensity in a specific site and during a determined period of exposure”¹⁴. The natural event, such as storm, earthquake and tsunami, was identified as a disaster. Conversely, scholars have recently defined a hazard as a part of the normal environmental

process¹⁵. Even though some hazards result from the natural process, some experts believe actually that human activities are the significant factor to induce the disaster. For example, Wisner, Gaillard, and Kelman (2012) stated that some communities prefer to stay in unsafe livelihoods and location in which prone to be affected by hazard because of the benefits of the economy, like living near a river where they can catch fish for a living¹⁶. It is clear that the only natural hazard would not make the disaster, but also people activities play some parts in disaster production.

The social determinant group suffer disproportionately from the disaster effects due to the present economic and social situation⁴. They are likely to affect by the disaster because some social process out them close to the hazard. The multi-factors, such as gender, social class and ethnicity, makes some people vulnerable¹⁷. Vulnerability refers to “the susceptibility to suffer damage in a potentially dangerous event, either natural, economic or political”¹⁸. In other words, vulnerability can be defined as the susceptibility to resist the impact of an emergency or disaster event¹⁴. The inequity-socio-economic process and/or



a lack of development are believed to be a major cause of vulnerability^{14,17}. The vulnerable people suffer from political, social, and economic issue by ignoring their voice; excluding them because of nationality, gender and religion; unequal work opportunity, respectively¹⁶. For instance, poor people may have to live in cheap-low-lying land which prone to hazards. Moreover, their economic status makes them lack basic needs. Some poor minor ethnicity people may be rejected from social activity and ignored their voice in political issue^{18,19}.

Exposure is another vital factor that leads to disaster risk production. Exposure is defined as “People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses”⁵. some people are likely to stay near a riverside due to the chance of fishing, where they may confront annual flooding²⁰. They bring themselves to expose to the

hazard for a better life, such as the large migration from the rural to an urban area that makes a crowded city. Thus, when some hazard attack, there will be a great number of deaths².

It would seem that hazard, vulnerability, and exposure have some relations. The convolution of hazard and vulnerability creates disaster risk, and the exposure also makes it happen easier^{14,16}. The scholar demonstrates the relation of hazard, vulnerability and exposure in the mathematic equation as figure 1¹⁹. The equation reveals that disaster risk could not be created by the only hazard, but it is also induced by vulnerability and exposure make by people^{2,15}.

Disaster risk management

Disaster management is mentioned in many pieces of literature. Blanchard et al. (2007) defined disaster management as “the managerial function charged with



Figure 1 Disaster risk equation (adapted from Cardona, 2004)

creating the framework within which communities reduce vulnerability to hazards and cope with disasters”¹. Comprehensive management is a critical concept of disaster management. The address of potential hazard and impact in every phase of the disaster cycle is vital, and the collaboration among disaster-related agencies is also important¹. The disaster cycle can be explained in Figure 2²¹

Traditionally, command and control system, which is dominated in disaster management because it could direct the several rescue organization to work

with the same objective and standard operation¹. Conversely, the direction of disaster management has turned to prevention and preparedness in the last decade^{1,22,23}. Disaster preparedness is claimed by several experts that could decrease vulnerability and foster the coping capacity; as a consequent, the negative impact from disaster is reduced⁷. Healy and Malhotra (2009) revealed that evidence shows that prevention process would be cost-effective more than disaster relief operation²⁴. Disaster risk management consists of risk and hazard identification, risk analysis and risk reduction. Besides,

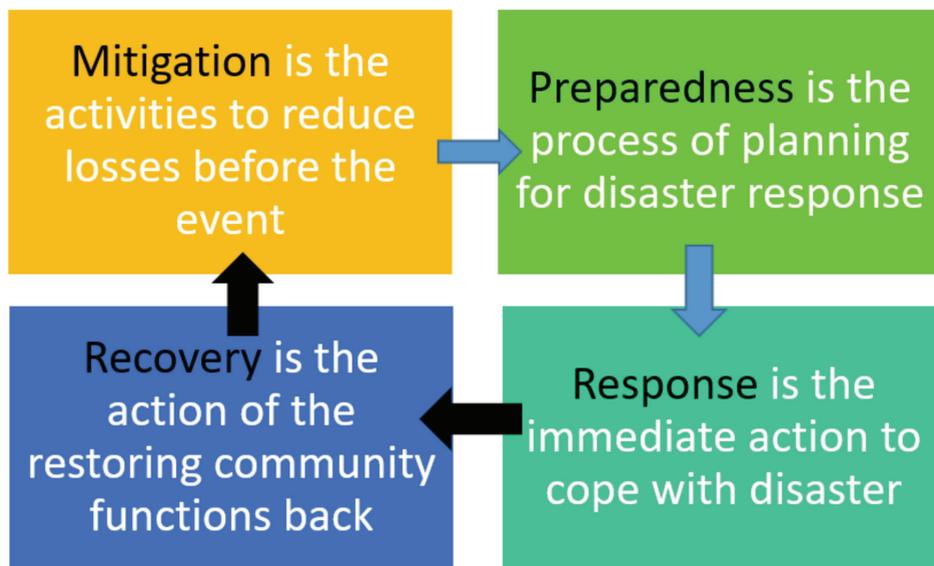
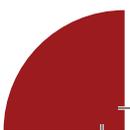


Figure 2 Disaster cycle (adapted from Waugh and Streib, 2006)



disaster risk management would be successful if it works under the cooperation among all-level stakeholders, including the local community, the private sectors, local government, NGO, government agencies and international agencies¹. Swords et al. (2010) also stated that the integration among all stakeholders and the recognition that all relevant agencies are all first responders in emergency management²³. For example, disaster mitigation had become the priority over disaster response in the Federal Emergency Management Agency (FEMA) by the mid-1990s²¹. Later in the UK, in which the fire and rescue service changed their attention from firefighting to fire protection²³. In term of disaster prevention and mitigation, it requires a community-based approach or people-centred approach or the bottom-up approach to encourage the local community and disaster-related agencies to work together^{18,22,23}. The top-down approach may not proper because the different community would need a different solution to tackle various disaster risk depending on the local context^{1,22}. For instance, in Hurricane Katrina, the top-down command system illustrates

the failure in the poorly prepared community²¹. Scolobig et al. (2015) also explained that there are many advantages of a people-centred approach, such as the proper action according to their capacity and the establishment of the participation, responsibility and ownership of disaster management among local citizens²². In other words, the community-based disaster management strategy would promote the participation of affected communities in the evaluation and reduction of risk. This risk matrix reveals that if local people can identify their risk and mark the level themselves, they will know the priority of management²⁵ as figure 3. As a result, hazards, vulnerabilities, capacities of affected communities are explored, and the resilient community is developed¹⁸.

Due to the complexity and severity of the disaster, it would be not easy to tackle by one organization. As a result, all level of stakeholders should be involved, especially the local people who always be the first-line person to cope with the disaster¹⁸. Significantly, the enhancement of local capacities to tackle complexity and a variety of hazard is essential²³. Capacity is defined as the resources and

		Consequence				
		Very low	Low	moderate	Major	Critical
Probability	Very likely					
	Most likely					
	Likely					
	Not likely					
	Rare					

color					
Risk	Very high	high	medium	low	Very low

Figure 3 Risk matrix (Adapted from Vatanpour, 2015)

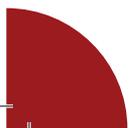
assets people possess to resist, cope with and recover from disaster²⁶. Gaillard (2010) reported that the community’s capacities can always be found because of their endogenous resource and local knowledge that create their capacity¹⁸. Furthermore, Wisner et al. (2012) noted that to enhance the community’s capacity might be easier than to diminish the community’s vulnerability¹⁶. Importantly, the local community would always be the first-line responder to tackle hazard prior to the external assistance might arrive in hours, or days later. Therefore, to foster their capacity is necessary even though there are the prompt national rescue teams from central government¹⁸.

For instance, Phibbs, Kenney, and Solomon (2015) stated that indigenous people in the Canterbury earthquake, New Zealand in 2010, developed a network for assisting indigenous people who are waiting for the assistance from outside resource and also conveying the disaster information including warning message and instruction²⁷. However, this indigenous-people network is not identified by a disaster manager but is recognized by the United Nations which claims that this network is an exciting model of community-based disaster risk management. This example reveals that there are some hidden capacities in the community which only the community recognizes itself.



Recently, disaster risk reduction (DRR) in the prevention phase and building up the capacities of the community in the preparedness phase have become interesting topic among DRR agencies²⁸. To design the risk reduction procedure and the coping strategy by the affected community, which is suitable in the community's context and their capacity that is called 'resilient community'^{18,28}. Manyena et al. (2011) defined resilient community as "the intrinsic capacity of a system, community or society predisposed to a shock or stress to "bounce forward" and adapt to survive by changing its non-essential attributes and rebuilding itself"²⁹. The local capacity can be used to identify the hazard, risk analysis and impact analysis, and then they can eradicate the risk; prepare for a disaster and cope with disaster in the possible solution that fits to their context^{1,18,29}. Notably, Twigg (2009) reported that the five influent factors, including governance; risk assessment; education and knowledge; risk management and vulnerability reduction; and disaster preparation and response, should be considered to the development of resilience³⁰. Additionally, the key factor that activates the starting of other factors is the governance

factor, such as a policy that supports other factors to operate. On the contrary, the legislation only might not overcome the obstacle if there is a lack of collaboration and coordination with all stakeholders¹. Besides, the community's business resilient should be included in the disaster plan because the survival of local business will affect the community economy, which would affect the coping capacity, recovery and resilience¹. In term of culture, Cannon (2014) stated that politicians, solid community organization, a hierarchy system, and the advantages that had already existed with target activity regarding resilient community building should be concerned and refrained to disturbed these existing benefits³¹. Also, the implemented program is likely to go on even DRR agencies leave that community if local authority and local organization are involved. Gaillard (2010) also indicated the relevant procedure called Community-Based Disaster Risk Reduction (CBDRR), which encourage local people to make a resilient community by their intrinsic capacities¹⁸. For instance, in the Philippines, CBDRR is claimed to be a key success to build a resilient community and recognized





by a non-government organization NGO and government agencies³².

In term of Climate-change-related disaster, the concept of vulnerability and resilience can be a logical solution under the integrative process⁸. The root causes of vulnerability, such as social inequity, should be resolved in all aspects. The solution for one aspect may fail. For instance, the coastal people who affect annually by climate-changed related storm surge. If the coastal people are moved to higher land to prevent them from the annual storm surge, it is necessary to provide them with the chance of a new area of work for a living. Otherwise, they would come back to their place for an economic reason²⁰. This example demonstrated the complexity of vulnerability, which poverty, economy and society, can alter the solving process and cannot be solved by the top-down command^{8,22}. Therefore, the encouragement of building community resilience as CBDRR would be the logical method and result in sustainable development as a demonstration in the Sustainable Development Goals by the United Nations^{8,18}. In risk reduction, there are several aspects to operate.

It requires a national policy and budget. The politician can help to force the policymaker to make a support policy for building a community resilient in global warmings, such as legislation⁹. Significantly, the prevention and preparedness have to be focused as well as a readiness response¹. An early warning system is vital to decrease the result of severe weather hazard. For instance, there are many preventable heat-related deaths because of the inadequate heat-warning system in California¹⁰. Conversely, the timely warning message and evacuation can prevent death from tsunami around 96 per cent from an early warning system in the Great East Japan earthquake in 2011³³. Even the mitigation and preparedness are significantly effective to decrease climate-change-related risk; unpredictable environmental hazard could occur as a normal environment cycle. Therefore, external assistance would be ready to support the affected community. It can be seen that both top-down and bottom-up approach should be applied simultaneously in a balanced and proper decision.



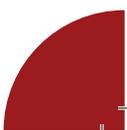
Conclusion

Mitigation and preparedness management would be cost-effective more than response and recovery management. The vulnerability and resilience concept are claimed to be the logical method to foster the local community, local government, private sectors, NGO and all relevant government agencies to build up their adaptive capacities to tackle the complexity of disaster and unpredictable risk with minimal external assistance. The policy regarding eliminating risk and enhancing the community's capacity should be focused on integrative management, including the collaboration and coordination with all stakeholders. The resilient community is able to identify a local hazard, analyse risk and possible impact in order to discover their risks and establish a sustainable solution with their resources and local knowledge

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