Integrating disaster risk reduction with sustainable development goals: Mechanism analysis and readiness of stakeholders

E Sunarti¹, H Sumarno¹, I Islamia¹,², and A F Fithriyah¹

¹Center of Disaster Studies, Bogor Agricultural University, Bogor, Indonesia. 
²Center of Disaster Studies, Bogor Agricultural University, Bogor, Indonesia; Department of Islamic Psychology, Raden Intan State Islamic University, Lampung, Indonesia.

Email: euisunarti@apps.ipb.ac.id

Abstract. Hyogo Framework for Action (HFA) on disaster risk reduction (DRR) has not been fully implemented, but now there is a rise of awareness and need to integrate a new DRR Framework with the Sustainable Development Goals (SDGs). Facing this perspective, Indonesian stakeholders also aware about the importance of integrating DRR with SDGs, but they need to consider related aspects such as mechanism analysis and readiness of stakeholders. This analytical descriptive study aimed to analyse the causative factors of disasters and any response needed, as well as portrays the readiness of regional disaster managers in fulfilling the global DRR agenda. The study was conducted in some particular provinces and districts with the incidence of volcano eruption (North Sumatera Province), mining-related disaster (Bombana District, South-East Sulawesi Province), and floods (Bandung District, West Java). Primary data were collected through interviews and focus group discussions. Results of the study found several important findings, which were disaster management had not become one of the priorities of district’s development program, DRR has not been integrated both in development and in implementation of regular development program. After the focus group discussion, stakeholders has become more convinced that disaster disturbs the development program, therefore several disaster managers began to consider the importance of DRR, evaluate the impact of disaster on development, and integrate DRR with SDGs. There had been no comprehensive calculation of the impact of disaster on SDGs achievement because of several constraint, which must be faced in the implementation of the integration of DRR with SDGs. The findings highlight the importance of advocacy efforts for disaster management and capacity building for stakeholders in the future.

Keywords: disaster, integration, risk reduction, SDGs, HFA

1. Introduction

The Hyogo Framework for Action (HFA) as a disaster risk reduction (DRR) framework has ended in 2015 [1], [2]. Based on the evaluation results, HFA implementation has not been completed in which some targets have not been fully achieved. However, those results lead to rise of awareness, assessment, and finally brought up a new need to integrate DRR with development goals. Due to an end of Millennium Development Goals (MDGs) [3] achievement targets and HFA implementation, the integration of DRR, which embedded to SDGs, is very strategic action as part of the planned and integrated development effort and also the embodiment of the mandate of Law No. 24 of 2007.
According to the law, disaster management consists not only 3 phases program, which are pre-disaster, emergency responses, and post-disaster, but also includes policies and programs that may prevent or decrease the risk of disaster.

This discussion leads to the question of whether DRR stakeholders (especially government) could follow and meet these needs. Awareness and needs, which are important as integration of DRR in development, influence the Sendai Framework for Disaster Reduction (SFDRR) 2015. This descriptive-analytic research aimed to analyse the causative factors of disasters and any response needed, as well as portrays the readiness of regional disaster managers in fulfilling the global DRR agenda.

2. Method
This study was conducted in some provinces and regions, with volcanic eruption disaster (Karo District, North Sumatera Province), mining-related disasters (Bombana District, South-East Sulawesi Province), and floods (Bandung District, West Java). Research data included primary and secondary data (documents, reports, and related articles). Primary data, which were consisted of perception and preparedness of stakeholders to integrate DRR with poverty alleviation and land management, were obtained through in-depth interview using researcher-developed questionnaire and Focus Group Discussion (FGD) with related stakeholders. Around 15-30 participants per location were chosen by purposive sampling depends on the type of disasters. Secondary data, which were related to natural disasters, poverty, and the efforts undertaken to mitigate disaster risks, was collected through relevant agencies. Therefore, data were processed in descriptive and qualitative analysis.

3. Results and discussion
3.1. Complexity of factors behind the disaster
In order to understand the environment ecological conditions of disasters in terms of driving forces, pressures, conditions in the fields, impacts on humans (physical, social, and economically), as well as the need for response to mitigate the impact of disasters, DPSIR or Driving force, Pressure, States, Impact, and Response [4] analysis were used to analyse each type and disaster occurrence in three research sites. Figure 1 shows the results from Centre for Disaster Studies IPB [5] about eruption disaster, accommodating the impact of flood and mining-related disaster. Mt. Sinabung eruption is one type of disaster that had complex causes and handling process. Eruption began in 2010 and still continues in this day. It can be seen from Figure 1, driving force of the eruption was natural conditions, population growth in the area around disaster location, lack of policies of land and forest management. Then, it affects the disruption of livelihood patterns, health, welfare, financial losses, conflicts, social pressures, destruction of local wisdom, and changing patterns in community interaction. Similar phenomena also happen for environmental condition of other disasters (floods and mining-related).
Figure 1. Overview of DPSIR analysis of disasters including eruption, floods, and mining-related Disaster.

3.2. Integration of DRR and SDGs

3.2.1. Disasters and achievement of SDGs. The research findings show the impact of disasters on the achievement of SDGs among others on the economic and socio-cultural aspects of society [6], [7]. From the economic point of view, disasters caused the disruption or even stalled economic activities that lead to people’s unproductivity. Consequently, people’s welfare, especially in economic terms, had declined. Disasters have been proven to cause and/or exacerbate the poverty [2]. Long evacuation periods led to the development of social problems, in which awareness of health and living standards were declining, and people become dependent on other’s help. In the future, those occurrences are most likely will have any impact on the community resilience -especially when facing any disaster- that required harder efforts of realization. Therefore, adequate short-term and long-term responses to disaster risk reduction and mitigation [8] are needed. One of them is the existence of sustainable development mechanism in accordance with the target of SDGs based on DRR [9], [10].
3.2.2. Mechanism analysis and readiness of stakeholders. Integration of sustainable development in accordance with the target of SDGs based on DRR ensures the realization of a resilience and adaptable community life system in facing disasters, thus minimizing the negative impact of disasters on SDGs achievement. Figure 2 describes the indicator of SDGs particularly those related to DRR if every development implementation is carried out by taking DRR aspects into account.

![Figure 2. Sustainable development schemes integrated with DRR.](image)

The results of this study helped strengthen previous findings regarding some critical points of integrating DRR and SDGs implementation [5]. First, this study confirmed the finding that disaster management stakeholders have not fully understood and mastered the importance of DRR [11]. A holistic disaster risk management model is required; development of more specific and applicable risk assessment methods; capacity building of all stakeholders: risk literacy, disaster risk awareness, and investment to dedicated stakeholders [12]. Secondly, budgeting generally have not been optimally arranged based on a comprehensive and in-depth needs analysis [5]. Third is the coordination, which has not been well established among related stakeholders [9]. Problems were raised in regards to the number of stakeholders involved, the dynamics of power / authority among stakeholders, also efforts to achieve an understanding of each task or job focus [13]. Poor coordination among stakeholders at the national level will directly affect the local or regional level [14]. The next factor is not all districts/municipalities have BPBD (Regional Disaster Management Agency). Participation of stakeholders is a key in the ongoing process of disaster risk management [15]. However, the absence of BPBD, which actually should act as the coordinating motor at local level, in some districts will lead to stronger difficulty of coordination. In fact, the research results conducted by [16] on the approach of knowledge coproduction—where collaboration among stakeholders in the development of knowledge and improvement of ecosystem services such as investments in ecosystem restoration efforts, institutional changes in the private and public sectors, innovative cooperation in the fields of science, practice and policy—have proven to have a major impact on DRR efforts.
In addition, facts about a great disaster potential, vulnerability factors, and disaster experiences require more attention to mitigation and post-disaster mitigation efforts [17]. At this time, DRR efforts require data adequacy, which leads to an understanding of the physical and social impacts of disasters, inter-hazard interactions, technology utilization as one way to spread the information of disaster risks, and monitoring changes in the natural state from time to time to build an early warning system [12]. Furthermore, there is a need to conduct a comprehensive risk analysis, which includes a comprehensive assessment to identify disaster risk in each region [14], [9].

Community participation is also mentioned as an important component, which may accelerate the realization of disaster-caring community [18]. In the DRR framework, there is a need for an understanding of the local perspectives of the community, the involvement of local community leaders, and the process of enhancing community roles by participatory bottom-up methods initiated by communities [14], [19]. These findings are supported by [20] in their research on the integration of DRR and Climate Change Adaptation CAA; they found that DRR should be strengthened at the local level in order to reduce the causes of vulnerability at the community level and needs of non-governmental organizations (NGOs) role through community-based initiatives. In addition to common disasters, several factors need to be addressed in specific disaster cases, for example, the Mt. Sinabung eruption case which requires considerable consideration in relocation efforts, because an overlap between emergency response and reconstruction rehabilitation, etc [10].

Another result according to FGD in research area, the readiness of stakeholders to integrate DRR and SDGs were categorized based on the indicator of behavioural stages and expert judgement. There are five stages of the readiness of stakeholders:

1) Knowledge, stakeholders were in the stage of knowing the importance of integrating DRR and SDGs for their regional development.
2) Understanding, stakeholders had begun to understand the importance of integrating DRR and SDGs;
3) Mastery, stakeholders had mastered up to local needs for the process of integration;
4) Advocacy, stakeholders had attempted to advocate the integration of DRR and SDGs to other related agencies or region;
5) Implementation, stakeholders had started to integrate DRR and SDGs in their working area.

4. Conclusion and recommendation
There were several important findings from this research, which included: disaster management that had not become one of the priorities of regional development program, and DRR that had not been integrated both in planning and in the implementation of regular development. Stakeholders had not fully mastered the significance and purpose of disaster risk analysis, nor did they have comprehensive information to run the appropriate calculation of disaster impact on the development, particularly on poverty and environmental degradation. FGD with local disaster managers led to new belief in the importance of disaster risk control, integration with SDGs, and need for capacity building of stakeholders. The findings highlight the importance of advocacy efforts for disaster management and capacity building for disaster related stakeholders in the future. One possible way to do is through the inclusion of advocacy and capacity building program in the working agenda of related stakeholders.

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