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Multi-discipline Approach to Improve the Role of Higher Education in Disaster Risk Reduction: Case Study in Unesa

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Abstract. Although the government has established the National Disaster Management Agency (BNPB) and the Regional Disaster Management Agency (BPBD), the involvement of Higher Education and other agencies is crucial, given the vast territory of Indonesia, which consists of 17,000 islands with diverse geographical characteristics and resource capabilities. As a scientific community and a forum for experts on disaster, tsunami, earthquake, earth science, geographers, sociologists, scientists, artists, athletes, geopolitics, doctors, medical personnel, psychologists, and economists. The role of Higher Education is very important to support the government in disaster management in Indonesia. This study aims to increase the role of Higher Education disaster mitigation through disaster management synergies both pre-disaster, during, and post-disaster. The data in this study uses observation and documentation method of Unesa's role in Disaster Risk Reduction (DRR) by sorting out three pillars of DRR, namely: 1. DRR management. 2. DRR Education, 2. DRR Learning Facilities. Regarding the management of DRR, Unesa has established a Crisis Mitigation Center Unit (SMCC). The SMCC is tasked with synergizing resources at Unesa for disaster mitigation purposes in Indonesia and this is a pre-disaster mitigation program. Regarding DRR Education, SMCC has implemented various program activities involving Lecturers, Students and Alumni. These programs are Community Service Program (KKN), education and community empowerment towards disaster independent communities. Programs during disaster and post-disaster that can be carried out include forming volunteer teams, evacuation teams, disaster care posts, public kitchens, shelters, fundraising, rehabilitation and reconstruction. Unesa has also reduced the cost of education and immediate assistance for affected students and organized a "Sit-in Student" program and credit transfers for students in disaster areas to send assistant lecturers.

Keywords: Disaster · Risk · Reduction

1 Introduction

Since time immemorial, humankind has faced disasters in various forms and humans have tried to reduce the risk of these disasters. Indonesia has a reasonably significant potential for disaster because of its geographical and geological location in the “ring of fire”, which has around 130 active volcanoes, such as Mount Merapi, the most active volcano in the world. In addition, Indonesia is located at the confluence of 3 tectonic plates of the Pacific, Eurasian and Indo-Australian which can trigger earthquakes and faults at any time. Likewise, Indonesia’s position is right on the equator, bordered by two continents of Asia and Australia and two large oceans, Indian and Pacific, resulting in high rainfall which causes floods and landslides. Meanwhile, the long dry season causes drought, plus weather fluctuations cause strong winds, hurricanes and high sea waves which are very dangerous for sea and air transportation. Tidal floods also often occur at full moons and submerge areas with low ground levels. In addition to natural factors, accompanying disasters such as drought and drought, rising air temperatures can cause forest, land and residential fires. High rainfall, denuded forests, and poor environmental management can cause flash floods and landslides [1]. Non-natural disasters such as forest fires, flash floods, technological failures, modernization, epidemics and disease outbreaks such as COVID-19 always stake out in Indonesia. Likewise, with social disasters, the plurality of the Indonesian nation consisting of various tribes, cultures, religions, social status, economy, ideology and politics also can cause social conflict if not managed properly.

The year 2018 was a “disaster year” for Indonesia. Although the number of disaster events was less than in 2019 and 2020, but in that year claimed the most extensive physical, economic, social and life casualties over the past decade. BNBP noted that as of December 30, 2018, 3,521 disasters caused 5,010 people to die, 725 people were declared missing, 21,717 people were injured, and 9,524,726 people suffered 852,369 people were displaced and 369,665 housing units and public facilities were damaged with economic losses of over 100 trillion. The most frequent natural disasters were floods, landslides and hurricanes, while geological disasters such as earthquakes and tsunamis recorded only 83 events but had the most significant impact compared to other disasters in 2018 [1].

This condition certainly requires the role of various parties to find a solution. One of them is the role of Higher Education which are places for academics. Through annual research, scientists play an essential role in disaster risk reduction and management [2]. The most important role of scientists is to focus more on scenario preparation and disaster risk factors [3] including disasters that have emerged in the medium and long term, through increased research. However, not all universities have this mandate and contribute to it. The Higher Education must play a role through various aspects of activities relevant to the activities of Higher Education Tridharma and supports. Both academic and non-academic. The problem is how to maximize the role of PT in reducing disaster risk in Indonesia?

1.1 The Higher Education and Society

The Higher Education is a unit that provides higher education as an advanced level of secondary education in the formal education path. This follows the definition of higher

education according to Law of the Republic of Indonesia Number 20 of 2003 article 19 paragraph 1 [3], which states that higher education is a level of education after secondary education, including diploma, bachelor, master, specialist, and doctoral programs organized by Higher Education. The Higher Education in Indonesia can be in the form of Polytechnics, Colleges, Academics, Universities, and Institutes. Each type of the Higher Education usually has several majors or study programs. Every prospective student who will enter a university will be faced with choosing a study program or significant to enter. The selection of study programs for students is a moment that determines the future in every phase of life.

Higher education is an educational institution that prepares students to become members of the community with both academic and skill abilities as a place of education for the nation's generation. The Higher Education have a crucial role in character building and are expected to be able to produce quality graduates so that they can bring the Indonesian nation in a more advanced direction. Implementing higher education refers to the Tri Dharma of Higher Education, including education, research, and community service [4, 5].

The first is the task of education. The Higher Education must be able to educate people to be more intelligent, more innovative and more thoughtful. Thus, when people have become smart, intelligent and clever, they will produce superior human qualities. People will be more creative and independent in solving various life problems such as economic, socio-cultural, political and so on. With the independence of the community, at least it will reduce outside influences which in fact have not helped the community. Nevertheless, on the contrary, it is not very pleasant.

The second is the research tasks. With this mission, the role of the Higher Education is not only to transfer knowledge to the community by causing excesses from the condition of the community from not knowing to know. The Higher Education must be able to research social and natural phenomena to produce discoveries. Thus, the existing science is not only static knowledge but dynamic, actual science and knowledge that can answer or solve various existing problems. Thus, there is a harmonization between the theories studied in the Higher Education with the realities of people's lives.

The third is the duty of service. With this mission, the Higher Education are required to be part of the community. Of course, higher education must be close to the community and understand society's psychological, sociological-anthropological, political and economic realities. The Higher Education must be able to change society from powerless to an empowered, independent and cultured society.

Boulton and Lucas [6] stated that the Higher Education s are responsible for sustaining and researching the uncertainty of knowledge and theories that are difficult to solve. The Higher Education must seek practical applications through research by testing, reviving and transmitting knowledge inherited from previous generations. The Higher Education are expected to be the inheritors of previous scientific knowledge to sustain people's lives. Saleem Badat [7]. Explains that there are at least five roles of the Higher Education in people's lives, including (1) Formation of a highly educated society; (2) Fostering democracy and democratic attitudes; (3) Responding to development needs and challenges; (4) Involvement in the intellectual and cultural life of the community; and conduct research and scholarships to the community.

1.2 Factors of Disaster

The World Health Organization (WHO) defines a disaster as “any event that causes damage, ecological disturbance, loss of human life, deterioration of health and health services, on a scale sufficient to warrant an extraordinary response from outside the affected community or area”. According to Law of the Republic of Indonesia Number 24 of 2007 [8] a disaster is an event or series of events that threaten and disrupt people’s lives and livelihoods caused, either by natural factors or non-natural factors as well as human factors, resulting in human casualties, environmental damage, property loss and psychological impact.

The definition states that disasters are caused by natural, non-natural, and human factors. Therefore, Law of the Republic of Indonesia Number 24 of 2007 also defines natural disasters, non-natural disasters, and social disasters. Natural disasters are caused by natural events, including earthquakes, tsunamis, volcanic eruptions, floods, droughts, hurricanes, and landslides [1]. On the other hand, non-natural disasters are disasters caused by non-natural events, including technological failures, failed modernization, epidemics, and disease outbreaks. Furthermore, social disasters are disasters caused by events or a series of events caused by humans which include social conflicts between groups or between communities and terror [1].

There are three factors that cause disasters, namely: (1) Natural factors (natural disasters) due to natural phenomena and without any human intervention. (2) Non-natural factors (non-natural disasters), which are not due to natural phenomena and are not the result of human actions, and (3) Social/human factors (man-made disasters) that are purely human actions, such as horizontal conflicts, vertical conflicts, and terrorism [8]. Generally, the factors that cause disasters are due to the interaction between the threat (hazard) and vulnerability (vulnerability). According to Law of the Republic of Indonesia Number 24 of 2007, the threat of disaster is an event or event that can cause a disaster. Vulnerability to impact or disaster risk is a condition or biological, geographical, social, economic, political, cultural and technological characteristic or condition of a community in an area for a certain period that reduces the community’s ability to prevent, mitigate, achieve preparedness, and respond to the impact of specific hazards.

2 Research Method

In this study, the method used for data collection is the method of observation and documentation of the role of Unesa and other universities in reducing disaster risk. By sorting and selecting three components of DRR, namely 1. DRR management. 2. DRR Education, 2. DRR Learning Facilities. Regarding the management of DRR, Unesa has established the Unesa Crisis Mitigation Center (SMCC).

3 Result and Discussion

Unesa has implemented three components of DRR, namely 1. DRR management. 2. DRR Education, 3. DRR Learning Facilities. Regarding DRR management, Unesa has

established the Unesa Crisis Mitigation Center (SMCC). To expedite the management of DRR, UNESA has established a Crisis Center Mitigation Unit (SMCC), which has four divisions, namely the Health and Covid-19 division and the Occupational Health and Safety (K3), the Disaster Mitigation division, and the Mental Health and Anti-Drugs division. The emergence of the 3 Health Divisions is to anticipate non-natural disasters that are urgent and require preparation and high-intensity activities, especially those related to COVID-19. If the Covid-19 subsides later, the SMCC division needs to be restructured into only three divisions to be more productive, effective and efficient. This SMCC is tasked with synergizing resources at Unesa for disaster mitigation purposes in Indonesia. Regarding DRR Education, SMCC has implemented various program activities involving Lecturers, Students and Alumni. Community Service Program, education and community empowerment towards disaster independent communities, including disaster study materials in the curriculum, conducting research and scientific studies, holding seminars, workshops, training, and developing products/media related to disaster management and establishing a disaster preparedness campus. Programs during disaster and post-disaster that can be carried out include forming volunteer teams, evacuation teams, establishing disaster care posts, public kitchens and shelters, fundraising, rehabilitation and reconstruction. Unesa has also reduced or waived the cost of education and special assistance for affected students organized a “sit in student” program and credit transfers for students in disaster areas to sending lecturers.

As a scientific community and a gathering place for disaster experts, education, geophysics, sociologists, geopolitical experts, doctors and medical personnel, psychology, economics and reconstruction and rehabilitation experts, the role of The Higher Education is crucial to support the government in disaster management in Indonesia. Although the Government of BNPB and BPBD, considering the vast territory of Indonesia and the diversity of existing resources, the government needs support from all elements of society, including The Higher Education [3].

Disaster education needs to be developed by The Higher Education, especially those located in disaster-prone locations. Disaster education aims to reduce risk due to disasters, including the potential for disasters and the history of disasters that have occurred in the area, forms of anticipation, increasing knowledge and awareness of the signs of disasters, the impact of disasters on individuals, families and communities, ways of handling in conditions of disaster, how to survive in a disaster situation [8]. Through disaster mitigation experts from various fields (Education, Psychology, Seismology, Geophysics, Sports Science, Geology, Geography, Climatology, Demography, Social and Economics), The Higher Education academics can develop their Disaster Education on campus and off campus according to the vulnerability existing disaster. Several Campuses have declared themselves Disaster Prepared Campuses that provide disaster training and education for their academic community. Likewise, more than 30 The Higher Education public and private in Indonesia have developed Study Centers and Centers for Disaster Studies. All of this shows the enthusiasm of The Higher Education to support the Government in Disaster Management [3].

The role of The Higher Education in Disaster Management can be integrated into the activities of the Tridharma of Higher Education, either through Education, Research and Community Service Programs.

3.1 Educational and Teaching Activities

Unesa and universities in Indonesia can develop a Disaster Preparedness Campus as a model for disaster education for preparedness for all employees and students. The campus is equipped with disaster instruments or props and periodically conducts disaster simulations for campus residents. Disaster Education from an early age must be instilled in students during the Orientation Period for new students following instructions from the Minister of Research Technology and Higher Education. In addition, Disaster Education is also required to be included in the study material for courses in the Higher Education Curriculum (KPT). Thus, students are expected to understand disasters for themselves and transmit their knowledge to their families and community members. Universities can also package community service programs with disasters subject both in disaster areas and post-disaster areas so that students can practice their knowledge and skills directly in the community and think critically to solve problems. Unesa has integrated disaster mitigation lessons into university courses (MKU) and selected themes and relevant courses for undergraduate students. The implementation of this model integration needs to be evaluated periodically to improve the implementation.

3.2 Research Activities and Scientific Publications

Several Unesa lecturers have conducted research and publications in disaster mitigation from 2019 to 2021 Unesa's disaster mitigation research has been entered and funded by the Higher Education Excellence Research Consortium. Disaster management can also be integrated into Scientific Research and Publication activities by conducting various research on mitigation and disaster management pre-disaster, during, and post-disaster. Research activities can be multidisciplinary and interprofessional by involving other institutions at home and abroad. Lecturers are encouraged to actively write articles about disasters in the mass media or publications in disaster-related scientific journals. In addition, universities can also produce scientific books, learning modules, guide books or pocketbooks on disasters that can be used as a reference for Disaster Education on and outside the campus community. It is also possible to make attractive leaflets and models or teaching aids for disaster education to educate the public. Campus personnel can also develop Intellectual Property Rights (IPR) products on various systems, tools, and supporting tools for disaster management. In addition, the campus is the main forum for holding seminars, scientific discussions, training and workshops on disasters on a local, national and international scale.

3.3 Community Service Activities

In addition to scientific activities, the role of Unesa and other universities in disaster management can be through various Community Service Activities with the theme of disaster. This program is packaged in activities to provide disaster education to the community, especially in disaster-prone areas, to form a disaster-independent community. Assistance and empowerment of disaster-affected communities in refugee camps, temporary shelters (Huntara) and relocation areas so that they immediately get up and return to their activities enthusiastically. The Higher Education can also raise funds and

assistance for disaster victims on campus and offer various assistance programs to the private sector for donations. In addition, The Higher Education with study programs related to disasters can establish disaster posts, soup kitchens and volunteer teams to help victims physically, medically and psychologically. Universities with disaster mitigation and engineering study programs can deploy their experts to play an active role in the post-disaster mitigation, recovery and reconstruction team.

3.4 Policies of Unesa Officials and Several Other Higher Education

In order for the contribution of Unesa and other universities to run optimally, the leadership of the university must have a high commitment to playing an active role in disaster management, so it is necessary to include it in the Strategic Plan and Budget for Routine Higher Education Activities for the allocation of funds that are always available. In addition to establishing a Study Center or Research Center and developing a Disaster Preparedness Campus, the campus' humanitarian mission can be realized through; 1) Providing full or partial scholarships or delaying the payment schedule for tuition fees for students whose families are affected by the disaster; 2) Provision of financial assistance for living expenses for students who have lost their homes or relatives in disaster areas; 3) Providing special assistance and protection as well as trauma healing for students who are victims of disasters; 4) Helping other university students affected by the disaster so they cannot carry out the learning process on their campus through the temporary "Sit in Student" program; 5) Helping affected campus students with credit transfer programs in the next semester until the affected campus recovers; 6) Sending Auxiliary Lecturers or staff to assist campus recovery so that Tridharma activities on affected campuses can return to normal.

4 Conclusion

Disaster risk reduction is a complex problem, so a multi-disciplinary approach is needed. Increasing the role of Higher education in Disaster Risk Reduction (DRR) requires attention to three pillars: DRR management, DRR education, and providing facilities for DRR learning. Higher education is crucial in supporting the Government in disaster management, both during pre-disaster, during disaster and post-disaster. Disaster Education in Higher Education is essential to be developed both integrated into the curriculum and extracurricular activities as well as the development of Study Centers and Disaster Prepared Universities.

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