Pesantren-based disaster mitigation strategy: case study pondok pesantren Darunnajah Cipining Bogor

Rihlah Nur Aulia¹, A I Setianingsih², Kurniawati³, S Narulita⁴.

¹ Lecturer and Researcher, Faculty of Social Science, Universitas Negeri Jakarta, Jakarta, Indonesia
² Lecturer and Researcher, Faculty of Social Science, Universitas Negeri Jakarta, Jakarta, Indonesia
³ Lecturer and Researcher, Faculty of Social Science, Universitas Negeri Jakarta, Jakarta, Indonesia
⁴ Lecturer and Researcher, Faculty of Social Science, Universitas Negeri Jakarta, Jakarta, Indonesia

Rihlah-nuraulia@unj.ac.id

Abstract This study aims to analyze the pesantren-based drought disaster mitigation strategy. This research method is a descriptive research method with a qualitative approach to describing drought disaster mitigation in pesantren. To get the right and appropriate informants, the sampling technique in this study used a purposive sample system. Data collection is done by using interview techniques, documentation, literature study, and observation. Mitigation in this research refers to mitigation theory which divides mitigation into 2 (two) forms of strategy, namely: first, structural mitigation, in the way of infrastructure development as a driver to minimize the impact of disasters through the use of technological approaches. The symptoms observed were a compilation of a database of potential landslide areas and the creation of an early warning system. Second, non-structural mitigation, in the form of management and spatial training to improve community capacity. This research concludes: Mitigation of drought in the Cipunn Darunnajah Islamic Boarding School in Bogor is carried out structurally and non-structurally. Structural mitigation is done by compiling a database of potential hazard areas and installing an Early Warning System (EWS). Non-structural mitigation is carried out by providing information, outreach, and training and disaster simulation. Efforts have been made to improve the effectiveness of disaster mitigation through the establishment of Disaster Response Students and Disaster Resilient Alumni.

Keywords: Strategy, Disaster Mitigation, Pesantren

1. Introduction
Indonesia is located between the Asian Continent and the Australian Continent and is at the confluence of three world plates, namely the Indo-Australian Plate, the Eurasian Plate, and the Pacific Plate. This position leaves most regions in Indonesia vulnerable to natural disasters. With this position, Indonesian archipelago is very susceptible to various natural disasters, mainly geological and hydrometeorological disasters such as earthquakes, volcanic eruptions, floods, and landslides. Natural disasters can be interpreted as an event that has a detrimental impact on humans and life resulting from an event or series of natural phenomena.

Disasters are events or a series of events that threaten and disrupt people's lives and livelihoods caused, either by natural or human factors, resulting in human casualties, environmental damage, property losses, and psychological impacts (Ramlı, 2011). Disasters cannot be separated from people's lives. Because of that, efforts are needed to overcome disasters. One of the countermeasures for disaster is to build Preparedness. According to the Law of the Republic of Indonesia Number 24 of 2007, concerning disaster management, preparedness is a series of activities carried out to anticipate...
disasters through organizing as well as through appropriate and efficient steps. One way to be prepared in facing disasters is through pesantren-based mitigation.

The definition of pesantren according to the government regulation of the Republic of Indonesia No 55 of 2007 concerning religious education and religious education, contained in article 1 paragraph 4, boarding schools or Islamic boarding schools are community-based Islamic religious education institutions that carry out diniyah (religion) education or integrated with other types of learning. Diniyah education is an Islamic religious education held in all lines and levels of education. Some pesantren have accommodated school or madrasa education in their pesantren, but there are still those who still maintain the typical pesantren education taught since ancient times. The location of the fundamental difference between public schools and pesantren is in pesantren where there are santri (student), kyai (leader), places of study, and residences of santri as a whole which have a process of Islamic religious education and other types of learning (Aulia, 2018).

Pondok Pesantren is the oldest educational institution in Indonesia, which existed before the birth of the modern education system. Several pesantren have been established and act as essential and flexible institutions in being actively involved as institutions that are very close to the community around the pesantren(Sauri, 2017).

Pesantren has a strategic position in educating the successor to the nation of Muslims who are friendly and care for the environment. In this case the pesantren is an independent, non-governmental Islamic educational institution which in its role can also make an essential contribution to environmental care, both now and in the future, because this institution is a place to galvanize santri cadres who are expected to be able to answer the challenges of the need for religious knowledge including knowledge of the environment. Besides, pesantren has become a concern of the world community because it can be considered as a node of cultural encounter and cultural broker (cultural broker) for the flow of ideas of modernization from the city(Aulia, Isnaini and Khumairoh, 2017).

Islamic boarding schools have a high vulnerability in disaster conditions because students who are still very young and do not have a stable physical and emotional like adults. Threats are also high if the infrastructure is inadequate. Surely this condition will pose a significant risk if preparedness has not been carried out in a planned, integrated, coordinated and comprehensive manner (Nursyamsiah, Sofyan and Nurbayan, 2018).

Therefore boarding schools are expected to have a system of preparedness in the face of disasters so that the function of the pesantren as one of the educational institutions continues and does not have a significant impact if disasters occur at any time. With the existence of a disaster preparedness system in pesantren, it is hoped that besides danger can be minimized the capacity of Islamic boarding schools can be increased.

Pesantren, a unique Indonesian educational institution, has a vital role in disaster mitigation in Indonesia. The number of Islamic boarding schools in Indonesia on the database http://pbsb.ditpdpontrn.kemenag.go.id is 25,938 with the number of students are 392,700. The existence of many pesantren is located in disaster-prone areas, that the reason why a pesantren-based disaster mitigation model is needed; to reduce disaster risks, both through physical development and awareness and capacity building to face the threat of disasters (Article 1 paragraph 6 of PP No. 21/2008 concerning Disaster Management).

Research Objectives The objectives of this research on pesantren-based disaster mitigation strategies are: first, Analyzing disaster mitigation carried out by the Darunnajah Cipining Islamic Boarding School in Bogor, as one of the boarding schools in the drought zone. Second. Formulate a mitigation strategy carried out by the Pesantren Darunnajah Cipining Bogor, West Java. This research takes the object of Islamic boarding school in the disaster zone in West Java. Bogor.

2. Research Detail
This research is a qualitative study, so the data collected comes from interview texts, personal documents, memorandum notes, field notes, and other official documents. This study aims to describe the empirical reality behind the phenomenon in-depth, in detail and thoroughly. Source of data comes from primary data and secondary data. Primary data uses data in the form of observations, interviews, and questionnaires to get direct information about the concept of environmental management based on
pesantren. Secondary data used to strengthen the findings and complete information that has been collected through interviews with Islamic boarding schools, consisting of 1 head of boarding school / Kyai, 5 (five) teachers, five students, and three managers of boarding schools, two people (local society). Besides that, the data also comes from reading sources and various other sources consisting of books, journals and official documents from multiple agencies. Also supported by attachments from official bodies such as data from ministries, study results, theses, dissertations, historical studies and so on.

Data collection techniques used in the form is observation, interviews, documentation and data analysis. This observation is used for research that has been planned systematically about the concept of environmental management based on pesantren. In-depth interviews were conducted with members of the pesantren, including Ustads, Santri, Kyai, and surrounding communities. The author's written notes are sourced from observations, photographs, and records of activities and supporting facilities and infrastructure in Islamic Boarding Schools. Data analysis was performed after using data collection techniques, namely processing and analyzing data using descriptive-qualitative analysis.

3. Result And Discussion
Law No. 24 of 2007 in Indonesia concerning Disaster Management explains that mitigation is defined as a series of efforts made to minimize the risks and impacts of disasters, both through infrastructure development and providing awareness and capability in dealing with emergencies. It was also explained that the disaster was an event or a series of events that threatened and disrupted people's lives and livelihoods caused by both natural and / or non-natural factors as well as human factors resulting in human casualties, environmental damage, property losses, and psychological impacts. The management cycle consists of 3 stages (Bevaola, 2014). These stages are 1. Pre-disaster or the stage of disaster in the condition before the event which includes: a. Prevention and Mitigation. Mitigation is defined as actions taken before an emergency occurs intending to reducing or eliminating the impact of the disaster on society and the environment. b. Preparedness or planning actions to respond in the event of a disaster. Preparedness relates to activities and steps taken before a disaster occurs to ensure an effective response to the impact of hazards, including the timely and effective issuance of early warning. 2. Stages of Disaster. The most crucial step in a disaster management system is when a disaster occurs or occurs. Activities undertaken are emergency response or response. 3 — post-disaster Stages. Stages carried out after the disaster occurred and after the emergency response process bypassed (Ramli, 2011) This stage consists of a. Rehabilitation, which is the improvement and recovery of all aspects of public or community services to an adequate level in post-disaster areas with the primary objective of normalizing all aspects of government and people's lives. b. Reconstruction, namely the rebuilding of all facilities and infrastructure, institutions in the post-disaster area, both at the government and community level with the primary objective of growing and developing economic, social and cultural activities, upholding law and order, as well as the rise of community participation in all aspects of life.

Mitigation is a step taken independently of an emergency. Coppola (Bevaola, 2014) explains that there are two types of mitigation. First, structural mitigation which defined as an effort to reduce risk through development or changes in the physical environment through the application of designed solutions. These efforts include construction resilience, regulatory steps, and building codes, relocation, structural modification, construction of community dwellings, development of barrier or detection systems, physical adjustments, recovery systems, and countermeasures for infrastructure for life safety. Second, non-structural mitigation, including reducing the likelihood or consequence of risk through modification of human or natural behavioral processes, without requiring the use of a designed structure. In this technique there are regulatory steps, educational programs, and public awareness, non-structural physical modification, behavior modification, and environmental control. Ecopesantren is part of the manifestation of mitigating the problem of global environmental warming. Integration of green boarding school planning for pesantren, ecological education, ecosystems and the daily culture of life in pesantrn can produce a green space model that synergizes with education in boarding schools. The concept of the Ecopesantren landscape is the integration of pesantren culture,
ecology and education (The integrated of education-eco-culture) which are directives for sustainable environmental management.

This research was conducted at Pondok Pesantren Darunnajah 2 Cipining, Bogor Regency. Geographically, Bogor Regency is located between 6º18'0" - 6º47'10" South Latitude and 106º23'45" - 107º13'30" East Longitude, with varying morphological types, from a relatively low plateau in the north to a plateau in the south, a lowland of about 29.28% at an altitude of 15-100 meters above sea level (asl), is a downstream ecological category. Ridged plains of approximately 43.62% are at an altitude of 100-500 meters above sea level, which is the middle environmental category. Around 19.53% of the mountainous area is at an altitude of 500 - 1,000 meters above sea level, which is an upstream ecological category. The high mountain area around 8.43% is at an altitude of 1,000 - 2,000 meters above sea level, is in the upstream environmental group and 0.22% is at an altitude of 2,000 - 2,500 meters above sea level, is the upstream category.

Bogor Regency itself has an area of ± 298,838.31 H and is part of the territory of West Java Province. In the north of Bogor Regency directly adjacent to Tangerang Regency, South Tangerang City, Depok City, Bekasi Regency / City, then in the west of Bogor Regency directly bordering Lebak Regency. In the east it borders Karawang Regency, Cianjur Regency and Purwakarta Regency, then in the south, borders Sukabumi Regency and Cianjur Regency, and in the central part of Bogor Regency directly borders Bogor City.

3.1. Structural Mitigation
The first research focus is Structural mitigation which is an effort to reduce disaster risk by carrying out disaster infrastructure development through building physical infrastructure with precise specifications and utilizing technology. The Darunnajah Cipining Bogor boarding school is carried out as follows; first, making earthquake-resistant structures. Dormitory building construction in boarding schools, designed for earthquake-resistant buildings. In this case, boarding schools adjust to the geographical conditions in the Bogor Regency Cipining area. Structural mitigation focuses on reducing vulnerability to disasters by engineering disaster-resistant buildings. That way, the building structure can survive in the face of disaster or just damage that does not endanger humans. Second, the construction of unique canals to prevent flooding. Darunnajah Cipining Islamic Boarding School in Bogor, making infiltration areas, by carrying out existing green open space is adequate, that of the total area of boarding schools covering an area of 84 ha only about 15% of the newly built boarding school buildings, the rest is still in the form of forests, lakes and vacant land. This forest is mostly planted by acacia and sengon trees. Third, structural mitigation is carried out by compiling a database of potential hazard areas and installing an Early Warning System (EWS)

Existing forests in boarding schools have played a role as controlling views, controlling climate and also controlling erosion. The location of the Islamic boarding school in the middle of the palm oil plantation and the mining of sand, stone, and land for the reclamation of the Jakarta bay has made the area around the boarding school arid and hot. However, the forest in this boarding school was able reduce the heat and aridity that is here. Also, this forest has become an erosion control for the surrounding area from the danger of landslides because many hills in this area have been deforested.

3.2. Non-Structural Mitigation
The second focus of this research is Non-Structural Mitigation. Non-structural mitigation is an effort to reduce the impact of disasters that might occur through specific policies or regulations. Some non-structural mitigation activities are carried out at the Darunnajah Cipining boarding school in Bogor. First, arranging urban spatial planning. In Darunnajah 2 Islamic boarding school, the existing green open space is adequate, in his statement Trimo said that out of the total boarding area of 84 ha, only about 15% had just been built. The remainder consists of forests, lakes and vacant land. This forest is mostly planted by acacia and sengon trees.

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reduce the heat and aridity that is here. Besides, this forest has become an erosion control for the surrounding area from the danger of landslides because many hills in this area have been deforested. Vacant land that has not been cultivated, and behind it is a stretch of forest managed by a boarding school. Forests that are inside are still very natural and inhabited by many animals such as weasels etc. Researchers have tried to surround the woods, but researchers were unsuccessful because it is a very forest extensive and also limited time.

Aside from being a climate controller, erosion and limiting views, green space in this boarding school has been managed for aesthetic purposes as well, and this can be seen by making an artificial lake of approximately 5000 m² which makes the boarding school more beautiful and exciting to look. The lake is also used as a reservoir of water reserves and fish farms. In the middle of the climate here, which tends to heat and low rainfall, the existence of this lake is beneficial for the provision of water reserves and make the area around the lake remain fertile. But behind the excellent management of green space, it turns out there are still efforts that are still lacking in this boarding school, namely efforts to contribute to reducing global warming by reducing the use of plastic bags. According to the results of the questionnaire researchers conducted for students, as many as 18 students from 20 students filled the column No. It shows that pesantren have not contributed to reducing global warming such as by reducing the use of plastic bags. The finding is strengthened by the results of field researchers who still see a lot of plastic bag waste and the use of plastic bags in the pesantren environment.

There is one aspect that researchers cannot get the data in this study, namely the policy of Islamic boarding schools in allocating funds and using funds for activities related to the environment. Data that researchers cannot constitute data on the allocation of funds from the cottage budget for actions related to the environment, as well as independent fundraising policies for environmental management. Second, Prohibition Dispose of trash in the river or river. Waste and waste management, in the Pondok Pesantren Darunnajah Cipining Bogor, is carried out through the establishment of the Pondok Pesantren garbage bank, besides that, the pondok pesantren, through reforestation and forest management, among the results of reforestation are the sale of crops and trees that have been processed into equipment such as tables chairs, etc. that are managed by the pesantren. The proceeds from the collection and sale are used to help the operational costs of the Islamic boarding school. Also, the funds are used to buy tree seedlings which will later be replanted in the forest of the Islamic boarding school, and some will be donated to the surrounding community. This is done because in the last few years the boarding school has not cooperated with third parties to plant trees. So the cottage is required to be more independent to develop the forest and the results for the needs of the boarding school itself.

Third, Non-structural mitigation is carried out by providing information, outreach and training and disaster simulations. Efforts that have been made to improve the effectiveness of disaster mitigation are through the establishment of Resilient Disaster Response Students and Disaster Resilient Alumni.

4. Summary

The research concludes: Mitigation of drought in the Darunnajah Cipining Islamic Boarding School in Bogor is carried out structurally and non-structurally. Structural mitigation is carried out by compiling a database of potential hazard areas and installing an Early Warning System (EWS). Non-structural mitigation is carried out by providing information, outreach and training and disaster simulations. Efforts that have been made to improve the effectiveness of disaster mitigation are through the establishment of Resilient Disaster Response Students and Disaster Resilient Alumni.

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References
[1] Aulia, R. N. (2018) ‘Pesantren-based environmental management in equatorial areas’, in AIP
Conference Proceedings. doi: https://doi.org/10.1063/1.5061868.

[2] Aulia, R. N., Isnaini, D. E. and Khumairoh, U. (2017) ‘Pengelolaan Lingkungan Berbasis Pesantren (Studi Kasus di Pondok Pesantren Nurul Hakim Lombok NTB)’, Hayula: Indonesian Journal of Multidisciplinary Islamic Studies, 1(2), pp. 229–244.

[3] Bevaola, K. (2014) Manajemen Bencana dan Kapabilitas Pemerintah Lokal. Yogyakarta: Gava Media.

[4] Nursyamsiah, N., Sofyan, S. and Nurbayan, Y. (2018) ‘A Critique of Local Wisdom Values in Indonesia’s Mar.’, Journal of Social Sciences & Humanities, pp. 37–50.

[5] Ramli, S. (2011) Manajemen Bencana (Disaster Management). Jakarta: PT Dian Rakyat.

[6] Sauri, S. (2017) Nilai Kearifan Pesantren Perpustakaan Nasional. Bandung: Rizky Perss.