



Asean Regional Disaster Response Simulation Exercise (ARDEX) 2023

(Case Study: Bantul Earthquake, DIY)

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Abstract. Partnership, Coordination, and Integration are the principles of disaster management in Indonesia based on Law no. 24 of 2007 on Disaster Management. One of the implementations of these principles is the involvement of cross-sectors in disaster management at the pre-disaster phase, during disaster relief efforts phase, and at post-disaster phase. Implementing disaster relief efforts by prioritizing humanity and solidarity among people are also felt among neighboring countries with the desire to provide various assistance in accordance with the capacity of their country. ARDEX is a form of collaboration to increase preparedness capacity through disaster management simulation training between countries in the ASEAN Region. In 2023, ARDEX activities with the theme of earthquake disaster was held in the Province of Daerah Istimewa Yogyakarta (DIY), Indonesia. The series of ARDEX activities are including Tabletop Exercises (TTX), Command Post Exercises (CPX) and Field Training Exercises (FTX). The purpose of this research is to analyze capacity building efforts in the ASEAN region through joint exercises and sharing good practices in disaster management. The method used in the research is descriptive qualitative with case studies.

Keywords: Preparedness, Earthquake, ARDEX, TTX, CPX, FTX.

1 Introduction

In accordance with Law of the Republic of Indonesia Number 24 of 2007 concerning Disaster Management, the Government and local governments are responsible for the implementation of disaster management in a planned, integrated, coordinated, and comprehensive manner, in order to provide protection for the community from the threat of disasters and create peace in the life of society, nation and state.

There are various potential disasters in Indonesia, including volcanic [1] [2], flood disaster [3] [4] [5], flash floods [6], landslides [7] [8] earthquakes [9] [10], tsunami [11] [12], extreme weather, abrasion [13] [14], epidemics of disease outbreaks in the

form of malaria [15] and forest and land fires [16] [17] [18]. Out of the various potential disasters, earthquake disasters are one type of disaster that has a considerable impact both physically, socially, economically, and environmentally. there is further deadly and destructive disaster potential caused by earthquake which is tsunami [19].

Some of the destructive earthquakes that occurred in Indonesia in the last two decades are the earthquake occurred in Yogyakarta in 2006 [20], West Sumatra in 2009 [21], Aceh in 2013 [22], Pidie Jaya in 2016 [23], Lombok in 2018 [24], Mamuju-Majene in 2021 [25] and Cianjur Year 2022 [26]. The massive impact of disaster events encourages the government and local governments to be able to carry out more optimal disaster management. Not focusing on the time of the incident, but the implementation of disaster management during the pre-disaster period is one of the new paradigms that is now encouraged

Based on Law No. 24 of 2007 on disaster management, participation in the implementation of disaster management, in addition to being carried out by disaster management institutions, must also be carried out by the community. This is because the community is one of the most affected elements. For this reason, capacity building for disasters as a whole and gradually is important to be implemented, by taking the local wisdom of the local community into account. Disaster management efforts by prioritizing humanity and solidarity between others, are also felt between neighboring countries, with the desire to provide various assistances in accordance with the capacity of their countries.

Indonesia is one of the countries that are members of disaster management organizations in the Southeast Asia region through the ASEAN Coordinating Centre for Humanitarian Assistance (AHA Centre). Therefore, the opportunity of other countries and international institutions to participate in the efforts of disaster management implementation in Indonesia is very wide open. Indonesia's involvement in disaster management between countries is a collaboration and commitment in creating world peace. In its implementation, various forms of exercises were carried out to test, evaluate, and harmonize the Disaster Emergency Management Command System (SKPDB) with the ASEAN Standby Arrangement and Standard Operating Procedures (SASOP). This study will explain simulations and exercises at the ASEAN Regional Disaster Response Simulation Exercise (ARDEX) 2023.

2 Method

The method used in the research is descriptive qualitative with case studies. Data collection technique used was through literature study and direct observation Literature studies include a summary of recommendations and implementation guidebooks on TTX, CPX and FTX at ARDEX 2023. On the other hand, direct observation was conducted at the time of the event. Some of the indicators observed are the training mechanism at each session, the issues, the ability of participants to take steps and policies, information on disaster management policies from participants, disaster management good practices, as well as the process of formulating recommendations training results.

3 Results and Discussion

3.1 ARDEX 2023

ASEAN Regional Disaster Response Simulation Exercise (ARDEX) is an advanced work program aimed to improve preparedness and response to major disasters in ASEAN member countries [27]. In addition, it is also used as a means of integrating learning between countries in order to realize One ASEAN One Response (OAOR). Indonesia has the opportunity to be the organizer of ARDEX in 2023 which is in accordance with the 41st ASEAN Committee for Disaster Management (ACDM) activity points. Previously, in 2018, Indonesia also hosted the ARDEX event which was held in Cilegon, Banten.



Fig. 1. Location of Ardex venues

The series of ARDEX activities held from 1 – 4 August 2023 in Daerah Istimewa Yogyakarta (DIY), including Tabletop Exercises (TTX), Command Post Exercises (CPX) and Field Training Exercises (FTX), and attended by all state delegations and international disaster management agencies in the ASEAN region. Training location can be seen in Fig 1. The theme at the 2023 ARDEX conference is Strengthening ASEAN's Collective Response Capacity through National Leadership, Regional Enhancement and International Support with the scenario of an earthquake disaster.

Indonesian region is located on the world's active plates, and has very active seismicity conditions [28]. The impact of the disaster has the potential for massive damage so that disaster assistance allocation is needed for the victims. The disaster relief, in addition to being sourced from the government, can also be sourced from international institution.

3.2 Training scenarios

The scenarios used in the exercise are broadly divided into two, namely strategic scenarios and tactical scenarios. Strategic scenarios are intended to provide a general picture of disasters that occur to the impact caused. As well as triggering participants to provide an initial response related to disaster management that will be carried out.

Table 1. Earthquake Map Scenario and Incident Scenario [29]

Map

-- Earthquake Planning Scenario --
ShakeMap for Sesar Opak Scenario
L 21, 2023 00:00:00 WIB, M 6.6, 7.88LS 110.41BT, Kedlmn:10km

The map displays the seismic hazard distribution for a magnitude 6.6 earthquake on the Opak Fault. The epicenter is located 2 km from Bantul District and 11 km south of Yogyakarta. The map shows the city of Yogyakarta and the surrounding area, with the Opak Fault running through it. The hazard levels are indicated by colors: green for low hazard, yellow for moderate, and orange/red for high hazard. The epicenter is marked with a star and labeled 'SCENARIO'. The map includes a scale bar (0 to 10 km) and coordinates (110°E, 7.5°S to 110.5°E, 8°S).

PLANNING SCENARIO ONLY -- Map Version 1

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
SEISMIC HAZARD INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

ShakeMap based upon: Witten et al., 2011

Description

On the xx of the xx of the year 20xx, at 02:00 Western Indonesian Time, an earthquake of M6.6 magnitude occurred, with an epicenter of 2 km away from Bantul District, 11 km to the south of the City of Yogyakarta located on the Opak Fault, at 7.88 South Latitude-110.41 East Longitude. 10 km depth and VI-VIII MMI shock scale. The duration of the main earthquake seismic wave is 20 seconds. Aftershocks occurred again at 03:00 WIB with a magnitude of M5 with an epicenter of 10 Km south of Yogyakarta City at 8.22 South Latitude-110.33 East Longitude at the depth of 10 Km.

Moreover, for tactical scenarios, it is intended to provide more detailed pictures of what is done in a disaster situation. Tactical scenarios describe the specific and detailed actions taken by each participant. The discussion and implementation of tactical scenarios will be more complex CPX and FTX simulations.

3.3 Tabletop Exercise

Tabletop Exercise is a specific learning method through a simulation designed to test the competency and the ability of a group to respond to disasters [30]. Tabletop exercises provide the opportunity to exchange information and learn from mistakes in advance [31]. They help to identify the interaction of involved agents, correct flow of messaging, decision quality, and recovery from an incident based on the cybersecurity national laws and other legislative regulations [32].

TTX ARDEX 2023 held on August 1, 2023 at 07.30 to 17.30 WIB at Royal Amba-rukmo Hotel Yogyakarta, Jl. Laksda Adisucipto No.81, Ambarukmo, Caturtunggal District, Depok District, Sleman Regency, Special Region of Yogyakarta 55281

Broadly speaking, it was divided into three parts including academic sessions, implementation, and after-action review (AAR). The more detailed agenda can be observed in in table 2.

Table 2. Session and TTX

Session	Description
Academic Session	Earthquakes and Liquefaction Potential, due to the Opak Fault
	Earthquake Disaster Emergency Management Command System
	Mechanism for Receiving International Assistance in BNPB
	Procedures for Receiving International Assistance from the Ministry of Foreign Affairs
	AADMER
	SASOP and AJDRP
	Interoperability ASEAN-UN
TTX Session	TTX Move I: Disaster Emergency Response Operations and Preparation to Welcome International Assistance
	TTX Move II: Deployment
	TTX Move III: Demobilization

Source: ARDEX Guidebook for TTX Participants, 2023

During the TTX implementation session, it was divided into three moves, namely (1) Emergency Response Operations and Preparation to Welcome International Assistance, (2) Deployment, and (3) Demobilization. In all three moves, participants from various delegations and international institutions were directed to provide responses and answers and provide updated information in accordance with the expected answers, which are in the exercise operation plan. The training atmosphere can be seen in Fig. 2.



Fig. 2. TTX ARDEX 2023

Based on the results of the exercise evaluation, in general, there is an increase in interoperability between national and regional disaster management policies in ASEAN, as well as an increase in disaster management mechanisms in ASEAN through their implementation in the region and nationally [33].

3.4 Command Post Exercises (CPX) and Field Training Exercises (FTX)

Command Post Exercises based on a training scenario that simulates emergency response operations that actually or like describing events as realistically as possible, and is interactive without the deployment of equipment [34]. CPX at ARDEX 2023 runs simultaneously with the implementation of Field Training Exercises (FTX).

The target of field training is to complement and test the operational and functional knowledge and skills of individuals and organizations in situations that describe the real condition of disaster impact emergencies in real training areas [34].



Fig. 3. CPX and FTX Map [35]

CPX and FTX will be held at the same location, Sultan Agung Bantul Stadium, on August 2, 2023, detailed locations can be seen in Fig. 3. Many organizations involved in the practice include BPBD Bantul District, BPBD DIY Province, Basarnas, Asean Member State (AMS), Crisis Center of the Ministry of Health, TNI Air Force and other organizations. Some of the activities trained include Self-Evacuation, Rapid investigation from Quick response team, Search and Rescue, Handling of refugees and health services. The whole series of events went well and orderly.

Some of the recommendations submitted by the evaluation team on the implementation of the activity are to explore ways to improve monitoring and evaluation of response actions using available technology, and ensure sustainable practices of the demobilization process, giving importance to the value of documentation and the safe

return of resources [33]. The training atmosphere of FTX and CPX can be seen in Fig. 4.



Fig. 4. CPX and FTX

4 Conclusion

The principles of disaster management need to be carried out responsibly by disaster management organizers. The impact of catastrophic events that are so significant that they cause death and extreme poverty needs to be highlighted. Disaster management consist of several phases that acknowledge the importance of not only emergency response but also the critical role of pre-disaster efforts and how it being assessed, to ensure sustainable resilience is achieved. This can be done with collaboration from various sectors including international disaster management organizations.

Capacity building of various elements of disaster management, through simulations and exercises needs to be implemented and improved. Therefore, disaster management organizers can always be connected in a complete disaster management system. Technological advances for disaster management can be utilized more widely as one of the potential resources. ARDEX as one of the routine agendas for increasing disaster management capacity in the ASEAN region, can continue to be carried out optimally in member countries, in order to ensure the protection of the community from disaster threats and create peace in the life of society, nation and state while still paying attention to the existing noble cultural heritage.

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