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The tsunami disaster in Aceh, December 26, 2004, has made the world realize the importance of tsunami early warning system in Indian Ocean. Since that time, the Government of Indonesia has mobilized resources and capability to develop an Indonesian Tsunami Early Warning System (Ina-TEWS). Ina-TEWS was then developed by synergy among 16 institutions in Indonesia, and was supported by 6 friendly countries, and will be inaugurated on November 11, 2008. This system will become an important part of the Indian Ocean Tsunami Early Warning system and has the following features:

- Provides warning to communities on the potentials of tsunami maximum 5 minutes after an tsunamigenic earthquake occurs
- Covers both Indian Ocean and Pacific Ocean
- Develop according to the International Standard.

Ina-TEWS consists of two main parts, namely: structural and cultural Component. Structural component, which is the task of the central government, covers the installation of the disaster detection equipment; data processing to compose the warning; and dissemination of this warning to interface institutions. (local, governments, relevant institutions and the media). The cultural component, which is the task of local government, includes dissemination of disaster warnings to communities; ensure that the community acts accordingly, and the increase of community preparedness.

In the structural component, Ina-TEWS consists of 160 seismometers, tsunami data base, 22 buoys, and 80 tide gauges, as well as 500 accelerometer and 40 GPS. For cultural component, the local governments are expected to implement the following:

1. Secure the disaster detection equipments in their own region
2. Prepare risk (inundation) map as well as standard operation procedure (SOP)
3. Develop evacuation places with their respective evacuation routes
4. Install signboards for evacuation
5. Build crisis/command centers
6. Implement routine and regular tsunami drill
7. Develop sirens network
8. Construct or determine escape building/tsunami shelters
9. Incorporate disasters considerations in spatial planning
10. Adopt disaster management in local school curriculum

This book is expected to give guideline for tsunami drill for cities and regencies.

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Germany Japan United States France China Malaysia

Guideline Tsunami Drill Implementation for City and Regency

# GUIDELINE
# Tsunami Drill Implementation for City and Regency

BOOK 6

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**Front Cover**
**Upper Left Hand Picture** : President Susilo Bambang Yudhoyono during tsunami drill in Cilegon 2007 (Source: Syahril B. Kusuma)
**Lower Left Hand Picture** : State Minister for Research and Technology, Minister of Tourism and Culture, and Mayor of Denpasar during tsunami drill 2006 (Source: State Ministry of Research and Technology)
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# Foreword
# Minister of Research and Technology

Greetings and May God's Blessing be upon you

The tsunami disaster in Aceh on December 26, 2004 and the Pangandaran tsunami on July 17, 2005, as well as the enormous potential of tsunami in Indonesia, have caused the central government to start the development of an Indonesian Tsunami Early Warning System in Indonesia (Ina-TEWS) since 2005, together with other related government institutions, namely KESRA, RISTEK, DEPDAGRI, DEPLU, BAPPENAS, BAKORNAS PB (BNPB), KOMINFO, DKP, KLH, DEPBUDPAR, ESDM, BMG, BPPT, LIPI, BAKORSURTANAL, LAPAN, ITB.

The development of Ina-TEWS, which consists of structural and cultural components, is an integrated effort among central government, local governments, communities and the related stakeholders. The structural component, which is the responsibility of the central government, consists of the building and development of infrastructure to detect earthquakes and potential tsunami disasters, as well as to disseminate a warning of a potential tsunami to local governments and related stakeholders. Whereas cultural component, which is the responsibility of local governments, consists of forwarding the said warnings to communities predicted to be impacted by the disaster, ensuring that the communities take expected actions, as well as increasing the community preparedness. The effort to enhance the capacity of local governments to give early warning evacuation to communities includes preparing or building infrastructure supporting warning and evacuation order, evacuation procedures and enhancing the preparedness of local government official and communities for the tsunami disaster evacuation process.

In facing the tsunami hazards in the future, an effective and integrated early warning strategy that involves the said two components is necessary. Therefore, local governments must have an effective strategy in response and in handling of tsunami disaster risks, starting from prevention to emergency response measures, including the preparedness of local governments and communities in facing the disaster.

To ensure that local governments, communities and related stakeholders are ready and prepared in facing a tsunami disaster, a routine exercise in handling tsunami disaster is needed through the implementation of Tsunami Drills, namely, full scale tsunami evacuation exercises that involve three main elements simultaneously: local governments, communities and Tsunami Early Warning System (TEWS). In addition to enhancing the preparedness of the three elements the Tsunami Drill is aimed to test the effectiveness of the developed detection devices and TEWS to increase the capacity and preparedness of local governments and their communities in handling tsunami early warning.

For the effective and efficient implementation of local Tsunami Drills, *the Guideline of Tsunami Drill Implementation For City and Regency* is formulated. The guideline contains all phases that need to be prepared, planned and implemented by local governments. The Tsunami Drill guideline concludes the experience of previous Tsunami Drills carried out annually on December 26 (Padang, Sumatra, 2005, Denpasar, Bali, 2006, Cilegon, Java, 2007).

We hope that this guideline supports cities and regencies in Indonesia prone to tsunami to hold tsunami drills showing the concern of the local governments as well as an effort to increase the knowledge, alertness and preparedness of communities, government officials, and related stakeholders in facing tsunami disasters. It is expected also to enhance local government capacities in handling and managing tsunami disasters. With tsunami drills held regularly and routinely, community preparedness will be more effective in saving lives when disasters strike.

May the Peace of God Almighty be upon you.

Jakarta, April 2008

The State Ministry of Research and Technology
Kusmayanto Kadiman

# PREFACE

Major earthquakes and tsunami disasters continue to hit Indonesia in the last years. The recovery, reconstruction and rehabilitation caused after the mega earthquake and tsunami disaster that took place in Aceh on December 26, 2004, which caused not less than 150.000 casualties and Rp. 43,2 trillion in property loss had not been finished, when we were stunned by the consecutive earthquake in Nias, Alor, Simeuleu, Yogyakarta and tsunami in Pangandaran. The results of development were destroyed in minutes due to those disasters, crippling and even destroying the livelihood of the area. This is not to mention the psychological trauma suffered by the communities due to the loss of parents, children and loved ones.

Several basic factors on the cause of the enormous loss of life and properties among others are the lack of understanding of the disaster and the capability and preparedness of the government and community in anticipating the disaster. Efforts to increase the awareness, concern, capability and preparedness in conducting security efforts as well as disaster handling are felt to be highly important, especially those involving active roles of the communities and governments.

Learning from the various earthquakes and tsunami disasters and looking at the potential tsunami hazards in Indonesia, the existence of a tsunami early warning system becomes the main priority in the development of Indonesia. In 2005, to anticipate tsunami disaster in the future, the Indonesian government has started to establish the Indonesian Tsunami Early Warning System (Ina-TEWS) which is expected to be completed in 2008.

Ina-TEWS is an integrated effort of the central government, local governments, communities and related stakeholders in the building and development of structural components and the increase of cultural components explained in the Indonesian tsunami early warning system Grand Scenario. Structural component consists of the development and implementation of high technology infrastructure to detect earthquake disasters, tsunami potentials, and to disseminate tsunami warnings to local governments and related stakeholders. The structure component is the responsibility of central government and includes following institutions: KESRA, RISTEK, BMG, BAKORNAS PB (BNPB) DEPDAGRI, DEPHUB, DEPBUDPAR, DEPLU, ESDM, KOMINFO, BAPPENAS, BPPT, BAKORSURTANAL, LAPAN, LIPI, DKP, KLH and ITB, as well as other related national and international stakeholders. The cultural component consists of capacity building to local governments in handling disaster warnings to the communities, evacuation, and building infrastructure

supporting emergency operation procedures and enhancing the preparedness of local government official and communities in an integrated manner.

To get communities, local government official and related stakeholders ready and prepared to face tsunami disasters, routine drills and simulations have to be carried out through an End to End Tsunami Drill. To conduct a full scale tsunami evacuation drill, three main elements are involved simultaneously: the tsunami early warning system (TEWS), the local government and affected communities. The End to End Tsunami Drill further tests the effectiveness of the detection and dissemination of early warnings in the Indonesian Tsunami Early Warning System (Ina-TEWS) program, as well the capacity and preparedness built in local government official and in the communities handling tsunami early warnings issued by the National Meteorology and Geophysics Agency (BMG).

End to End Tsunami Drills have been conducted previously in Padang, Sumatra in 2005, in Denpasar, Bali in 2006, in Cilegon, Banten in 2007. Learning from tsunami disaster drills, a comprehensive guideline was needed to formulate complete and systematic steps for preparation, planning and implementation of a full scale tsunami disaster drill. The general objective of this guideline is to provide guidance for cities and regencies in Indonesia prone to tsunamis in order to empower and implement tsunami drills in their region.

In the formulation of this guideline, many parties have taken role and provided contributions in the form of inputs for the perfection of the contents and finalization. Therefore, the greatest appreciation should be given to:

1. The State Ministry of Research and Technology (RISTEK)
2. Meteorology and Geophysics Agency (BMG)
3. Ministry of Home Affairs (DEPDAGRI)
4. Ministry of Foreign Affairs (DEPLU)

5. Ministry of Energy and Mineral Resources (ESDM)
6. Ministry of Transportation (DEPHUB)
7. Ministry of Communication and Informatics (KOMINFO)
8. Ministry of Culture and Tourism (DEPBUDPAR)
9. National Development Planning Agency (BAPPENAS)
10. National Disaster Management Agency (BNPB)/ National Coordinating Agency for Disaster Management (BAKORNAS PB)
11. Agency for the Assessment and Application Technology (BPPT)
12. National Coordinating Agency for Survey and Mapping (BAKORSURTANAL)
13. National Space and Aeronautics Institute (LAPAN)
14. Indonesian Institute of Science (LIPI)
15. Ministry of Maritime and Fishery (DKP)
16. State Ministry for Environment (KLH)
17. Center for Disaster Mitigation – Bandung Institute of Technology (PMB-ITB)
18. Government of Padang City
19. Government of Denpasar City
20. Others

Finally, we hope that this guideline can benefit to the capacity building and preparedness of local governments and communities in handling disasters, especially tsunami.

Thank you

August 2007

Author and Team

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## GLOSSARY OF TERMS

| | | |
|---|---|---|
| **1. Hazard** | : | A natural or man-made phenomenon which potentially causes physical damage, economic losses, or threaten human life and well-being if it occurs in an area of human settlement, agricultural, or industrial activity. |
| **a. Primary Hazard** | : | The main hazard, mostly a natural phenomena that are potentially causing economic and physical loss or threat to human lives and welfare |
| **b. Collateral Hazard** | : | The secondary hazard which occurred due to the occurrence of primary hazard. For example: tsunami, liquefaction, landslide and fire may occur due to the occurrence of earthquakes. |
| **c. Natural Hazard** | : | A threat which is caused by a natural process, this include large scale hazards such as earthquake to smaller scale hazards such as loose rocks on a hillside. This threat potentially causes economic and physical loss or human lives and welfare if it is occurred in a vulnerable area. |
| **d. Technological / Industrial Hazard** | : | A man-made threat that caused by technological failure or the destruction of a particular industrial area due to natural hazards, such as earthquake, flood, tsunami, etc |
| **2. Disaster** | : | The expected losses (life loss, casualties, damage to property, and disruption of livelihood, social and economic activity caused by a particular hazard. |
| **3. BNPB** | : | Badan Nasional Penanggulangan Bencana (*National Disaster Management Agency*) is state agency responsible for disaster management at national level. |
| **4. BPBD** | : | Badan Penanggulangan Bencana Daerah / *Local Disaster Management Agency* is an agency at local level (City and Regency) that is designated for disaster management. |
| **a. Satkorlak PB** | : | Satuan Koordinasi Pelaksana Penanggulangan Bencana – *Disaster Management Coordinating Unit at Regional Level* – A |

unit organization at provincial level that is designated for disaster management with its main task on coordinating displaced peoples and disaster management initiatives in its respective area according to the policy set by Bakornas PB (now BNPB), consisting of prevention, preparedness, rescue, rehabilitation, and reconstruction initiatives.

**b. Satlak PB** : Satuan Pelaksana Penanggulangan Bencana *Disaster Management Coordinating Unit at Local Level* – A unit organization at local level (City and Regency) that is designated for disaster management with its main task on coordinating displaced peoples and disaster management initiatives in its respective area according to the policy set by Bakornas PB (now BNPB), consisting of prevention, preparedness, rescue, rehabilitation, and reconstruction initiatives.

5. **Capacity Building** : A long-term and sustained process to build the capacity and participation of all stakeholders, such as regional government, community, media, etc particularly for those related to disaster areas.

6. **Community Based Action Plan** : An action plan that is participatory developed by the community in order to cope with disasters. This participatory process aims to build the community by having active involvement of the community through dialogues regarding the actions needed to be done in overcoming the problems, particularly disaster problems, starting from planning to conduct.

7. **Community Development** : A long term process to build the community by having active involvement of the community in conducting the actions defined in their action plan.

8. **Dissemination** : To share and distribute the information regarding tsunami drill activities through many kind of media dissemination, such as newspaper, radio, TV talk show, fliers, banner, posters at strategic places.

9. **Duck, Cover, Hold** : Self protection measures in coping with the earthquake shaking

by means of ducking, covering head, and holding on to the table whilst being under the table.

**10. End to End Tsunami Drill** : Testing the readiness of 3 main components of tsunami early warning system, i.e. the reliability of tsunami early warning infrastructure, the readiness of local government (City and Regency), and community preparedness through a simultaneous process.

**11. Entry Point** : The starting point of conducting a tsunami drill.

**12. Evacuation** : The orderly process of moving the people at risk from a unsafe place to a designated site considered safer. Plans and procedures for possible evacuation should be developed beforehand, taking into account people needs and understood by the community.

**13. Expert Judgment** : A judgment given by expert on a certain criteria.

**14. Five in One Mode** : A set of alternative communication media designed for Indonesian tsunami early warning system, i.e. from BMG to intermediate institutions (Interface Agency) and regional/local government, in the form of telephone, fax, internet, radio, ranet. Now it is called as multi-mode, where the numbers of alternatives are not limited to five.

**15. Focus Group Discussion (FGD)** : A group discussion to deliberate on a particular issue. This group discussion could consist of community members or regional government officials.

**16. Rehearsal** : The pre-simulation conducted minimum once prior the actual drill to test in order to ensure that the actual drill or simulation can be conducted accordingly.

**17. Golden Time** : Critical moments which are very valuable and important in determining the continuance of human lives during the disaster emergency response time.

**18. Ina TEWS** : Grand scheme of Indonesian early warning system containing the structural and cultural components. The structural components consist of the process of detection and monitoring earthquake and

tsunami, analysis of tsunami potential, and warning dissemination. And The cultural part which consists of the response of local government toward the BMG early warning for tsunami received directly from BMG or via interface agencies to order evacuation for community at risk.

**a. Structure** : The first component of Ina TEWS that integrate the mechanism of detecting and monitoring the occurrence of earthquake using seismometer and accelerometer, tsunami analysis, detecting and monitoring the occurrence of tsunami using tsunameter (i.e. dart buoy) in the off shore and using tide gauge in near coastal area, until disseminating the warning using multi mode devices to local government, regional government as well as the interface institution.

**b. Culture** : The second component of Ina TEWS that integrate the process of issuing the order to evacuate from local government to the community. This includes development of the warning mechanism for evacuation, capacity building of local government, and community preparedness and resiliency.

**19. Interface Agency** : Intermediate institutions functioning as back system to transmit the warning mechanism from BMG to the local government. The interface agencies include TNI (Indonesian National Army), POLRI (Indonesian Republic Police Corps), etc

**20. Inundation Map** : The coastal area which is flooded during the tsunami occurrence.

**21. Damage Assessment** : A post disaster investigation conducted to estimate damages in the stricken area.

**22. Capacity** : The resources, means and strength that exist in individual or group that enable them to cope with, withstand, prepare for any disaster and restore the condition back to its original state.

**23. Vulnerability** : A set of prevailing or consequential conditions, which adversely affect an individual, a household or community's ability to prevent, mitigate, prepare for or respond to a threat, hazard or process. These

long-term factors, weaknesses or constraints affect a household's, communities or society's ability (or inability) to absorb losses after a disaster and to recover from the damages. The vulnerability consists of physical/material vulnerability, social / organizational vulnerability and attitudinal / motivational vulnerability.

**24. Preparedness** : Measures to ensure the readiness and ability of a society to anticipate and take precautionary measures in advance of an imminent threat, and to respond to and cope with the effects of a disaster by organizing and facilitating timely and effective rescue, relief and appropriate post-disaster assistance.

**25. Liquefaction** : The natural process of watery soil occurrence due to strong ground shaking.

**26. Media Campaign** : A particular media used to promote drill or simulation activities. It could be in the form of brochures, posters, pamphlets, TV commercial ads, radio ads, etc.

**27. Media Center** : Information center designed for providing information related with the disaster event, damage assessment, casualties, etc. This media center should be established during disaster emergency response in the evacuation shelters.

**28. Mitigation** : Disaster risk reduction measures conducted prior or subsequent to a disaster event, which can be taken to minimize the destructive and disruptive impacts of hazards in order to reduce the magnitude of a disaster. Mitigation consists of structural mitigation and non-structural mitigation.

**a. Structural Mitigation** : Mitigation initiative related with physical development, such as building, infrastructure, etc.

**b. Non-structural Mitigation** : Mitigation initiatives related with non-physical efforts, such as spatia management, SOP, etc.

**29. Monev** : Monitoring and evaluation is a process conducted in order to ensure the preparation activities for conducting tsunami drill goes complying with the plan and reaching the objectives. Since the

process of tsunami drill preparation is dynamic, the monitoring and evaluation process should be conducted in every activity or stages prior the tsunami drill.

**30. Observer** : A group of resources person, experts and representatives of government officials from other cities invited to watch and the whole process of the drill, including the readiness of local government, response of community and the infrastructure deployed for tsunami early warning.

**31. Development** : Sustainable activities aimed to improve or ensure the economic and social welfare from a society.

**32. Disaster Management** : A collective term encompassing all aspects of planning and responding to disaster, including both pre- and post disaster activities. It may refer to the management of risk and consequences of disasters.

**33. Public Education** : Increasing or improving the knowledge of society or general public toward disaster reduction counter measures through disseminating the education materials. The materials include books, pamphlets, brochures, posters, etc.

**34. Pusdalops** : Pusat Pengendalian Operasional – Emergency Operation Center (EOC) is a part of Disaster Management Coordinating Units at Local and/or Regional Level designated for receiving warning, reporting to the Mayor, Bupati or Governor as well as monitoring the coordination process in disaster management.

**35. Risk Assessment** : A process of systematically collecting information related to hazard potential, vulnerability and capacity factors, which are analyzed to make a determination of specific condition or situation of disaster.

**a. Rapid Risk Assessment** : A process of systematically collecting preliminary information related to hazard potential, vulnerability and capacity factors, in order to determine a disaster risk.

**b. In-depth Risk Assessment** : A process of systematically collecting exhaustive information related to hazard potential, vulnerability and capacity factors, which are analyzed to make a determination of specific condition or situation of disaster.

**36. Reconstruction** : Initiatives conducted at post disaster events to improve or replace permanently damaged housing and infrastructure and restore the economic growth to its original state. Reconstruction must be fully integrated into long-term development plans, taking into account future disaster risks and possibilities to reduce such risks by incorporating appropriate measures.

**37. Rehabilitation** : Initiatives taken in the aftermath of disaster to enable basic services to resume functioning, to assist affected people, self-help effort to repair physical damages and community facilities, to revive economic activities and provide support for the psychological and social well-being of the displaced people.

**38. Disaster Risk** : The amount of expected losses, including the loss of lives, injuries, property damages and disruptions towards economic activities or livelihood caused by a certain phenomenon.

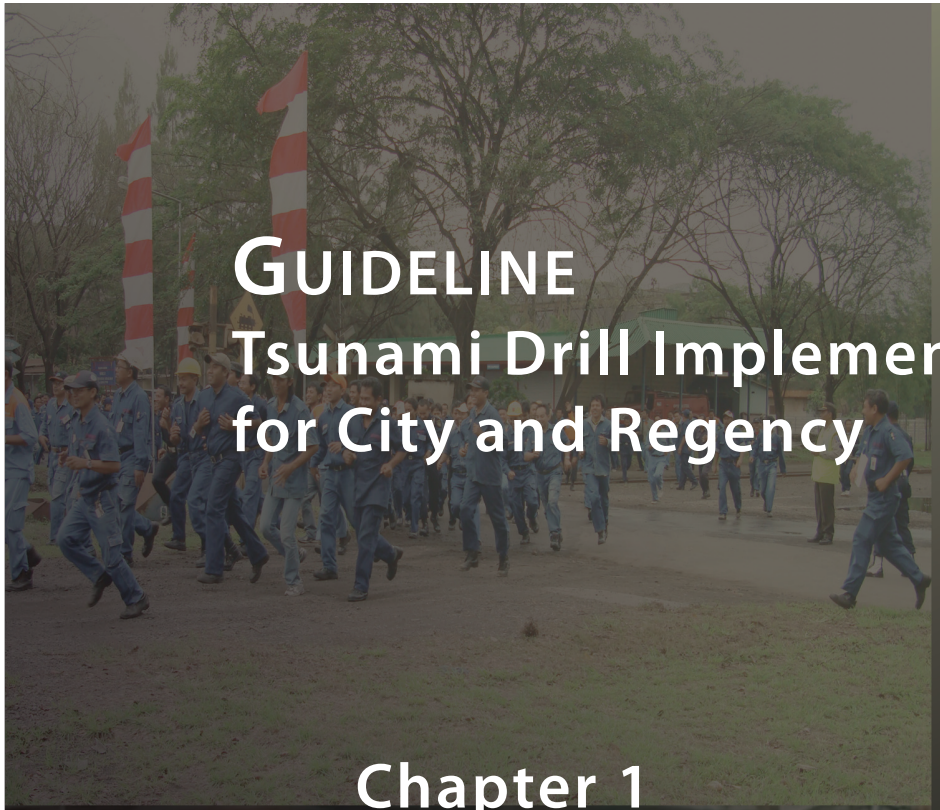
**39. Run-down** : Detailed of sequential actions to be taken by taking into consideration the time of disaster occurrence, the golden time, as well as the milestone of receiving the tsunami warning, which is to be simulated during tsunami drill.

**40. Scenario Analysis** : Analysis made to determine the disaster risk scenario to be used during drill or simulation.

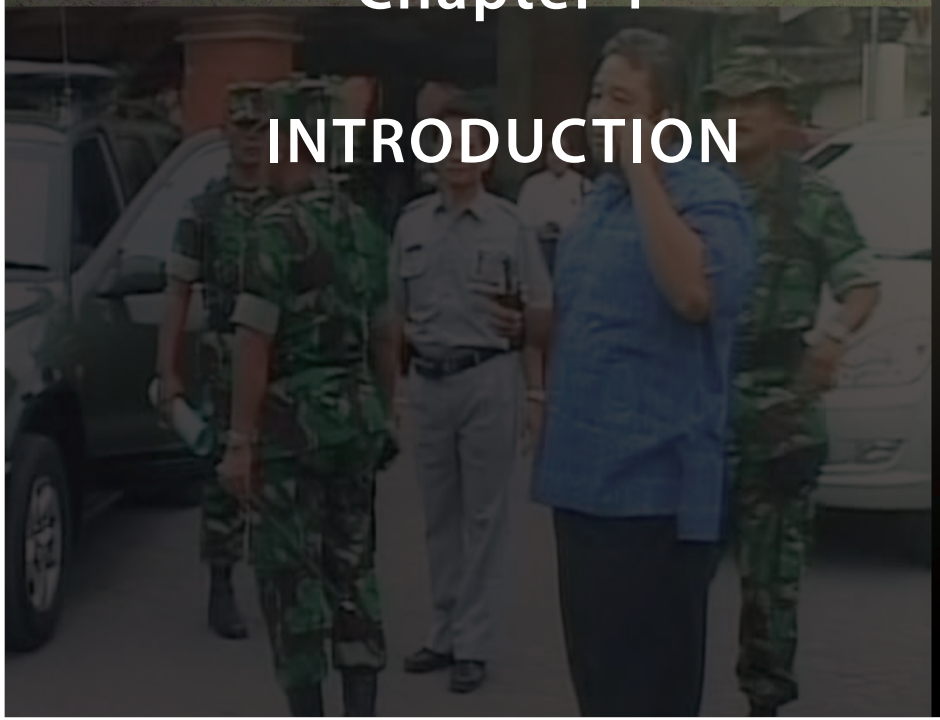
**41. Setting Performance Indicator** : Identifying the success indicator for every activities for the whole process of tsunami drill implementation.

**42. Early Warning System** : A system developed to create the readiness of detection and monitoring infrastructure, readiness of disseminating of alert mechanism, readiness of local government, and the preparedness of community to anticipate such disaster. A specific chain link (critical relationship) between.

| | | |
|---|---|---|
| **43. Snow Balling Effect** | : | A continuing effect, starting from a small group of community and enlarging to a large group of community. |
| **44. Standard Operational Procedure (SOP)** | : | An exhaustive procedure for conducting of disaster emergency response, often called as Prosedur Tetap – (Protap). |
| **45. Table Top Simulation** | : | A form of exercise used for increasing the readiness and capacity in emergency response of the local and regional government officials. |
| **46. Emergency Response** | : | Critical actions needed to be performed immediately after disaster occurred to cope toward disaster. The actions include the search and rescue, health and fulfilling the basic needs of the displaced people. |
| **47. SAR Team** | : | Critical actions needed to be performed immediately after disaster occurred to search and rescue any victim. |
| **48. TOT** | : | Training for Trainers - training given to a selected group of people that are expected to be able to convey the knowledge and skill obtained from the training to other group of people. |
| **49. Tsunami drill or tsunami conducted** | : | The basic premise of tsunami drill is an evacuation simulation conducted by local government and community on every level to prepare in coping with the tsunami. However the tsunami drill can be conducted to test the readiness of the three factors of tsunami early warning system, i.e. availability of early warning infrastructures, readiness of local government officials, and preparedness of community in anticipating tsunami. |
| **50. Tsunami Shelter (Escape Building)** | : | A designated place, building or structure which can be used by evacuee to stay safe if a tsunami occurred. |
| **51. Tsunami Warning Dissemination** | : | The continuous dissemination mechanism for tsunami warning from BMG up to local government using multi mode media of communication, i.e. telephone, fax, email, sms, ranet etc. |



# GUIDELINE
## Tsunami Drill Implementation for City and Regency



## Chapter 1

## INTRODUCTION

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## 1.1 Background

### 1.1.1 Earthquake and Tsunami Potentials in Indonesia

Indonesia is a country prone to earthquake and tsunami. This is because Indonesia lies on the most active earthquake part in the world, which is the meeting point of three tectonic plates, the Indo-Australia ocean plate, Eurasia continent plate and Pacific ocean plate.

Based on the earthquake map of Indonesia, approximately 290 cities (60% of the cities in Indonesia) lies in earthquake prone area, and approximately 11.000 km of beaches in Indonesia are prone to tsunami. The frequency of tsunami in Indonesia is quite high, it can be said that in average, almost every year there is a tsunami occurence. The seismicity map as well as the history of tsunami can be seen on figure 1.1., figure 1.2. and figure 1.3.

Shallow earthquake measured above 6 SR (Skala Richter) taking place on seabed has the potential to generate tsunami. Potential tsunami in Indonesia is a local tsunami with fast travel time, because the sources of earthquake lie close to most part of beaches in Indonesia.

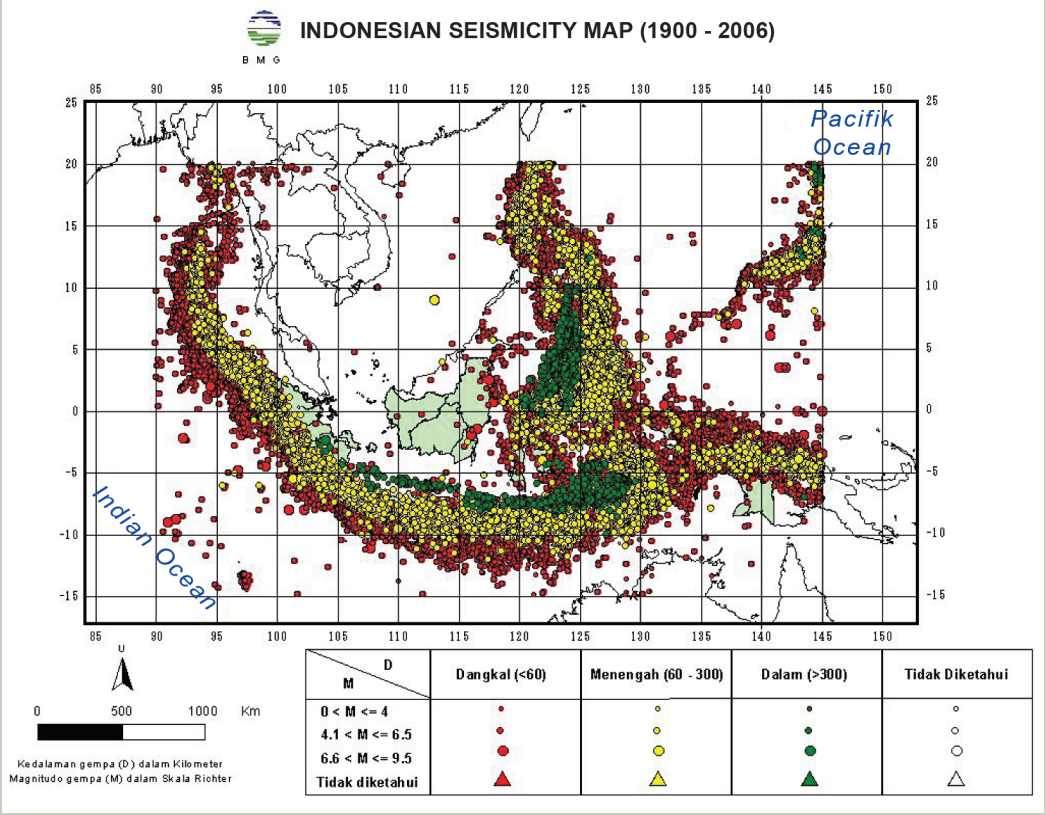



Figure 1.1. Seismicity Map for Indonesia (source: BMG)

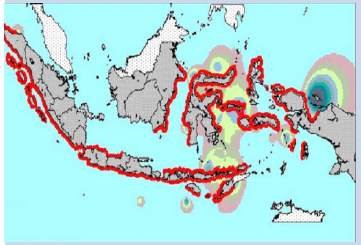


Figure 1.2. Tsunami Prone Map
(Sources : Hamzah Latief)

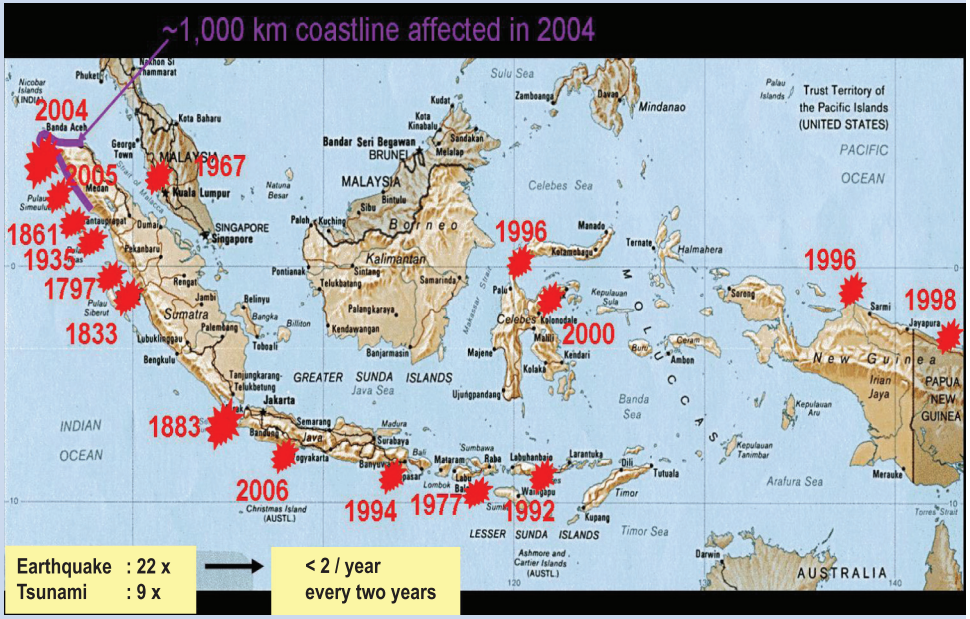



Figure 1.3. Tsunami Occurence for 1991-2000 (Sources : Hamzah Latief)

Earthquake and tsunami occurences in Indonesia have caused many life and huge amount of material loss. The largest tsunami disaster in the world within the past 100 years other than the one in Chile in 1960, with earthquake magnitude of 9.5 Mw was Aceh December 26, 2004, with earthquake magnitude of 9 Mw and caused hundreds of thousands of people in 7 countries in the region of Indian oceans died and lost, as well as the enormous amount of material lost. Developments were wiped out in a blink of an eye. The most death (150 thousand people) took place in the Aceh Province and around.

Learning from the history of tsunami, the great number of casualties in a tsunami occurences is generally caused by several factors. In addition to the factor of the tsunami itself (among others the epicenter of earthquake, height of waves, speed of travel time and height of inundation), it is also influence by the factor of abandonment/forgetting of local knowledge and wisdom on the signs of tsunami and the slow response towards tsunami due to the low awareness and readiness of people on the danger of tsunami as well as the low capacity and readiness of local government official in responding to tsunami signs.

### 1.1.2. Indonesian Tsunami Early Warning System (Ina-TEWS)

Learning from the December 26, 2004 Aceh tsunami, and looking at the history and potential tsunami danger in Indonesia (see figure 1.2. and 1.3.), the existence of a national tsunami early warning system becomes the main priority in the development of Indonesia. To anticipate tsunami in the future, from early 2005, Indonesian government has developed and built an Indonesian Tsunami Early Warning System (Ina – TEWS) consisting of structural and cultural components, expected to be fully finalized in 2008.

In principle, the Ina-TEWS is an integral measure between the central government, local governments, communities and stakeholders related in the development of structural component, as well as enhancement of culture from the grand scenario of Indonesian early warning system (see figure 1.4.).

The structural component covers the building and development of high technology infrastructure to detect earthquake incidents, potential tsunami up to disseminating potential tsunami warning to related stakeholder, including among others local government, in addition to capacity building of related institution. Building

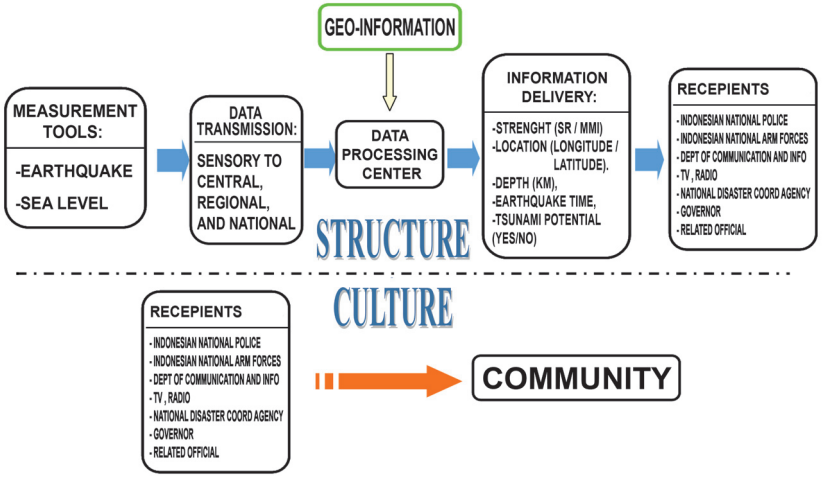



Figure 1.4. Grand Scenario of Ina-TEWS

and development of this component is the responsibility of central government, collected in the Ina-TEWS among others Coordinating Ministry of People Welfare (KESRA), RISTEK, DEPDAGRI, DEPHUB, BMG, DEPLU, ESDM, KOMINFO, DEPBUDAR, BAPENAS, BNPB, BPPT, BAKOSURTANAL, LAPAN, LIPI, DKP, KLH and ITB.

The cultural component consists of enhancing the capacity and readiness of local governments in giving early evacuation warning to the community, including preparing or building infrastructure to support warning/evacuation order, evacuation procedure and developing/enhancing integrally the readiness of local government and community itself.

Since the development and enhancement of cultural component is more in line with the fulfillment of local needs and development, this component is the responsibility of local government.

### 1.1.3. Effective Early Warning Systems

Considering the tsunami travel time in Indonesia is generally short (local tsunami), ranging between 20 – 45 minutes after the earthquake, in facing tsunami disaster in the future, an effective and integrated early warning system strategy which involved the two elements of structure and culture is necessary. To reduce the number of casualties, the role of accuracy and speed of tsunami early warning system built in the structural component, and readiness of cultural component is really great. The full picture of information flow of tsunami early warning system issued by BMG can be seen in figure 1.5, 1.6, 1.7, and 1.8. figure 1.5. is the description of emergency response need to be conducted by the local Government when receiving warning I to IV from BMG as seen in figure 1.6. figure 1.7. and 1.8. is the description of information flow of early warning system.

Figure 1.5. Emergency Response for Earthquake and Local Tsunami (Source : Harkunti P. Rahayu)

| | |
|---|---|
| **8:05** | Warning I : ”TESTING WARNING I: POTENTIAL BIG TSUNAMI IN THE WEST COAST OF BANTEN; CIWANDAN, KKTAU STEEL, ANYER, DUE TO EARTHQUAKE MAG 8.0 AT 8:00 WIB 180KM SW OF CILEGON : BMG” issued based on seismometer and accelerometer data if shallow earthquake at the beach above 6.5 SR |
| **8:07** | Warning II : “TESTING II POTENTIAL BIG TSUNAMI IN THE WEST COAST OF BANTEN AT 08:38 ANYER 5M CIWANDAN 5M KKTAU STEEL 4M, EARTHQUAKE MAG 8.0 AT 8:00 WIT 180KM SW OF CILEGON:BMG -” issued based on tsunami modelling simulation and tsunami occurrence from tsunameter (Buoy) and GPS monitoring |
| **8:48** | Warning III : “TESTING WARNING III: BIG TSUNAMI IN ANYER AT 08:35 5M CIWANDAN 08:40 5M KKTAU STEEL 08:40 4M DUE TO EARTHQUAKE MAG 8.0 JAM 8:00 WIB 180KM SW OF CILEGON : BMG” issued based on tsunameter/buoy monitoring and water level information at the beach result from field monitoring (tide gauge information) |
| **10:00** | Warning IV : “TESTING WARNING IV: TSUNAMI HITTING BANTEN COAST HAS FINISHED : BMG” issued based on field monitoring (tide gauge and tsunameter) compare to tsunami modelling result. |

Figure 1.6. Example of Tsunami Warning (First, Second, Third And Fourth Warning)
(Source: Suhardjono)

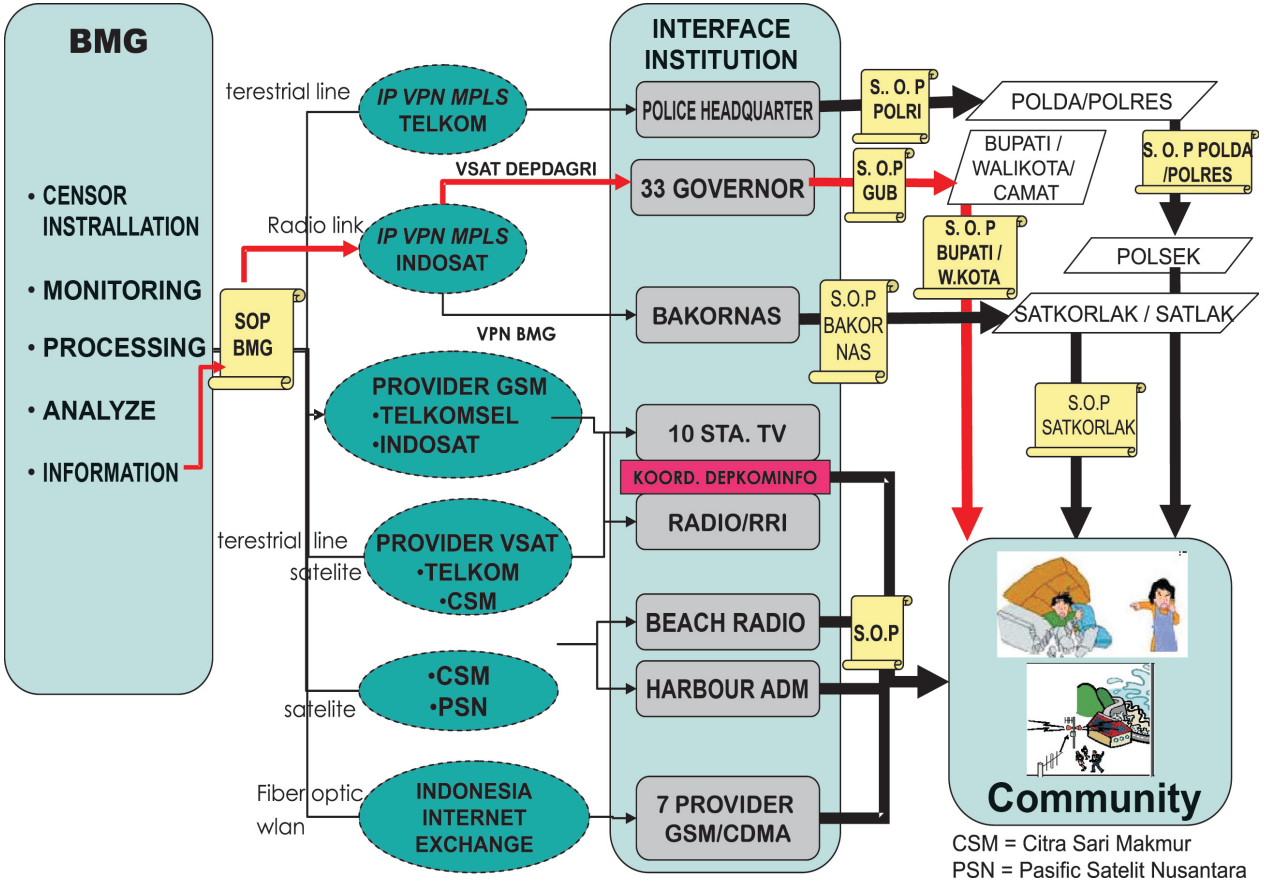



Figure 1.7. Indonesian Tsunami Early Warning System (Ina-TEWS) Scheme
(Source : BMG)

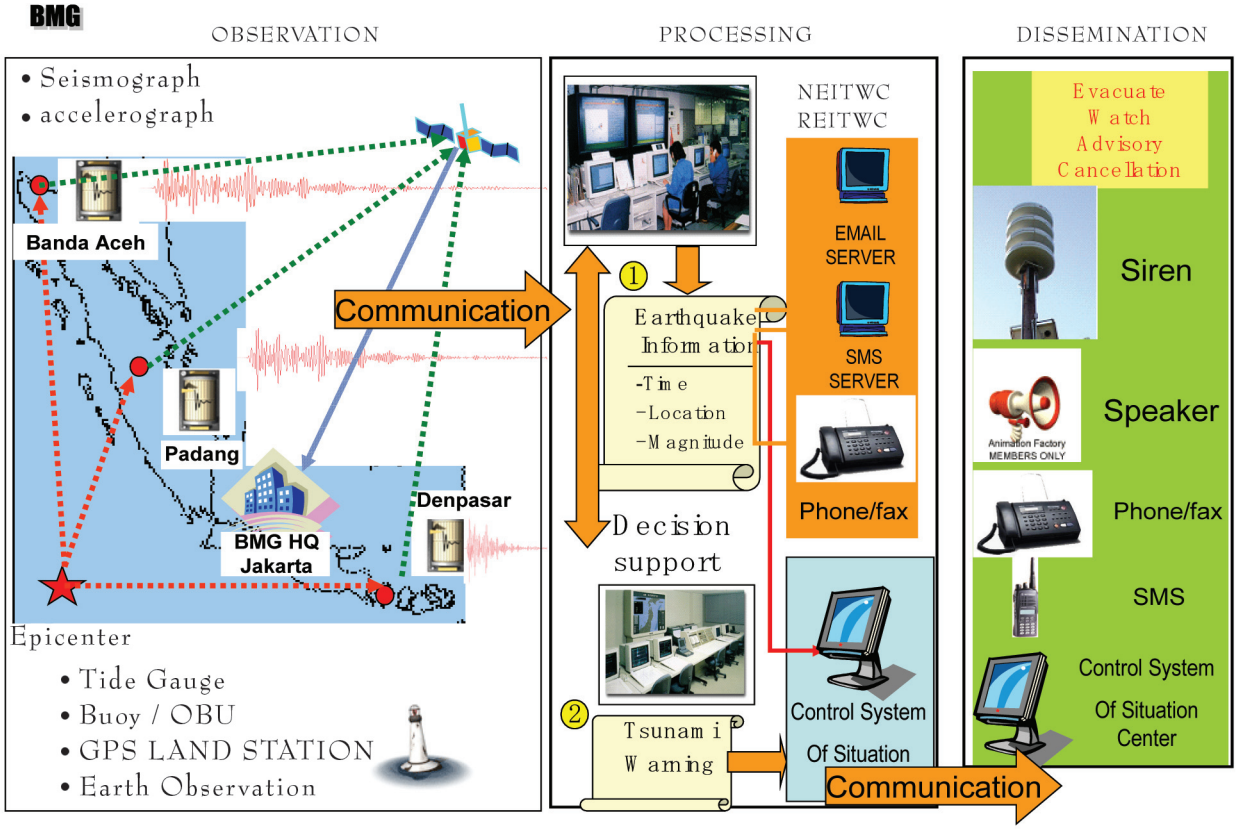



Figure 1.8.Mechanism of Issuance for Tsunami Early Warning (Source : BMG)

From the above picture, the participation of local government, in this case, the regency and city government is great. Based on the declaration of agreement of city/regency government during the anniversary of Earth Day, it was decided that the participation of local government in the Indonesian Tsunami Early Warning System (Ina-TEWS) was formulated into the following 10 points :

1. Secure the disaster detection equipments in their own region
2. Prepare risk (inundation) map as well as standard operation procedure (SOP)
3. Develop evacuation places with their respective evacuation routes
4. Install signboards for evacuation
5. Build crisis/command centers
6. Implement routine and regular tsunami drill
7. Develop sirens network
8. Construct or determine escape building/tsunami shelters
9. Incorporate disasters considerations in spatial planning
10. Adopt disaster management in local school curriculum

In implementing point 6 (Implement routine and regular tsunami drill), the readiness of cultural components is needed among others:

1. Readiness of infrastructure supporting evacuation early warning that is able to respond effectively on tsunami early warning into evacuation early warning in the region.
2. Readiness of local government official in quickly and accurately responding to the early warning of potential tsunami from central BMG, regional BMG as well as interface institution such as *TNI*, *POLRI* and *Satkorlak* by giving evacuation warning to the community as well as evacuation process coordination.
3. Responsive preparedness from communities and related stakeholders, such as journalist, members of parliament, NGO, business people, and others.

### 1.1.4. The Need of Testing the Tsunami Early Warning System Through Tsunami Drills

Paradigm on disaster management has shifted from community relying on outside help into community ready to face the disaster. In addition, regional autonomy has made local community and government into having an effective strategy in handling and managing tsunami disaster risks, starting from prevention measures up to emergency response, such as readiness of quick and accurately Tsunami Early Warning System.

To have the community, local government official and related stakeholder ready and responsive in facing tsunami disaster threat, a routine exercise or simulation in facing tsunami disaster is needed through the implementation of End to End Tsunami Drill which is a big scale tsunami drill conducted by involving the three main elements simultaneously. The three elements are the community, local government and the Indonesian Tsunami Early Warning System.

In addition to building the readiness of the three elements above, this activity is also aimed to test the effectiveness of detection system and Indonesian tsunami early warning system equipment built, as well as to test the capacity and readiness of local government official and its community in responding to the tsunami early warning issued by BMG.

To have the tsunami drill in regions effective and efficient, local government not only need to build and develop the evacuation warning system infrastructure, but also need to build and increase the awareness and preparedness of the community, local government official and stakeholders through various communication efforts on the risk of tsunami disaster holistically such as educational campaign, traning for trainers, community training, workshops, focus group discussion and table top simulation. All these efforts need to be planned and conducted systematically.

To have the implementation of End to End Tsunami simulation more efficient and effective, this guideline

outlines all steps that need to be prepared, planned and implemented completely and systematically based on the experience on implementing the Second National Tsunami Drill in Bali, December 26, 2006, and the Third National Tsunami Drill in Banten, December 26, 2007, as well as many literature studies including the experience of the First National Tsunami Drill in Padang, December 26, 2005.

## 1.2 Objectives

The general objective is to give guidelines for cities and regencies all over Indonesia that are prone to tsunami in the implementation of tsunami drill, so the regions can implement this activities to:

1. Increase the knowledge, awareness and preparedness of community, government official and stakeholders related to tsunami disaster response.
2. Increase the capacity of local government in the handling and responding to tsunami disaster.
3. Train the preparedness of community, local government official and personnel of related stakeholder in facing earthquake and tsunami disaster.
4. Test the effectiveness of tsunami early warning system and its socialization.

## 1.3. Output

At the end of tsunami drill implementation, the following outputs are expected:

1. The community is prepared towards disaster.
2. Local government official are responsive on disaster threats.
3. A tested and reliably Tsunami Early Warning System (TEWS) and
4. Available and tested SOP for Disaster Coordinating Unit

## 1.4 Scope

This Tsunami Drill guideline is made to accommodate the various condition of local government capability to implement Tsunami Drill by using resources existing in regions. Thus, there are three types of implementation packages, which are: Type I, II, and III depends on the ability of local finance. In overall, the guideline consists of six phases as described in the Tsunami Drill flowchart (see figure 1.8), which are:

1. Preliminary phase
2. Disaster scenario development phase
3. Planning phase
4. Preparation phase
5. Tsunami drill implementation phase
6. Output

**I. Tsunami Drill Type I**

The implementation is more emphasized on the community evacuation and capability/preparedness of regional government for mass evacuation process. This package can be seen in figure I,9 in which the implementation consists of:

1. Preliminary phase, consisting of:
   a. Formulation of organizing committee for Tsunami Drill Implementation
   b. Budgeting (*RAB*)
   c. Schedule for preparation and implementation of evacuation process (D-Day)
2. Planning phase, consisting of :
   a. Selection of target community
   b. Selection of location
   c. Selection of run down scenario
3. Preparation phase *(communication and coordination simulation)*

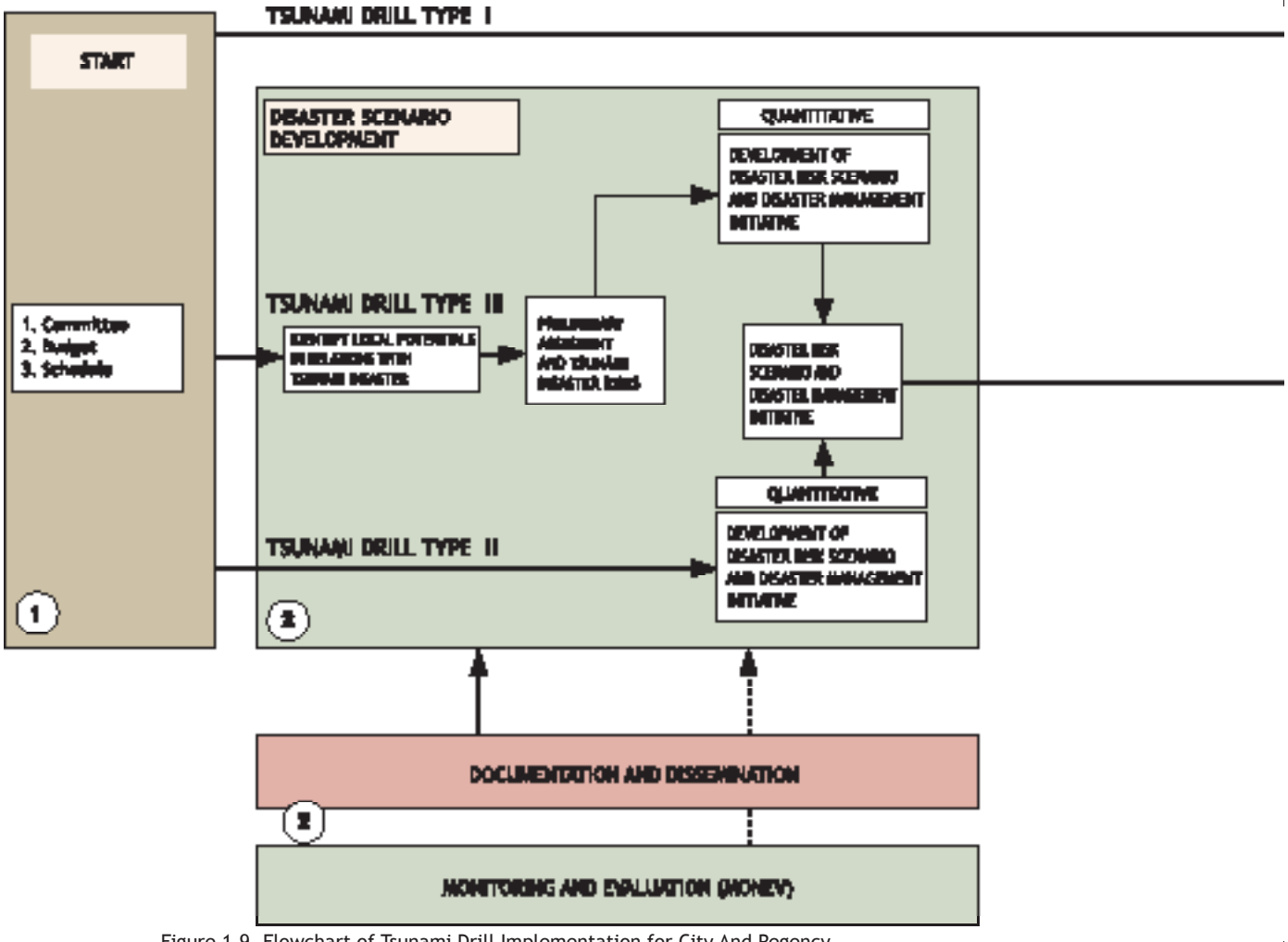
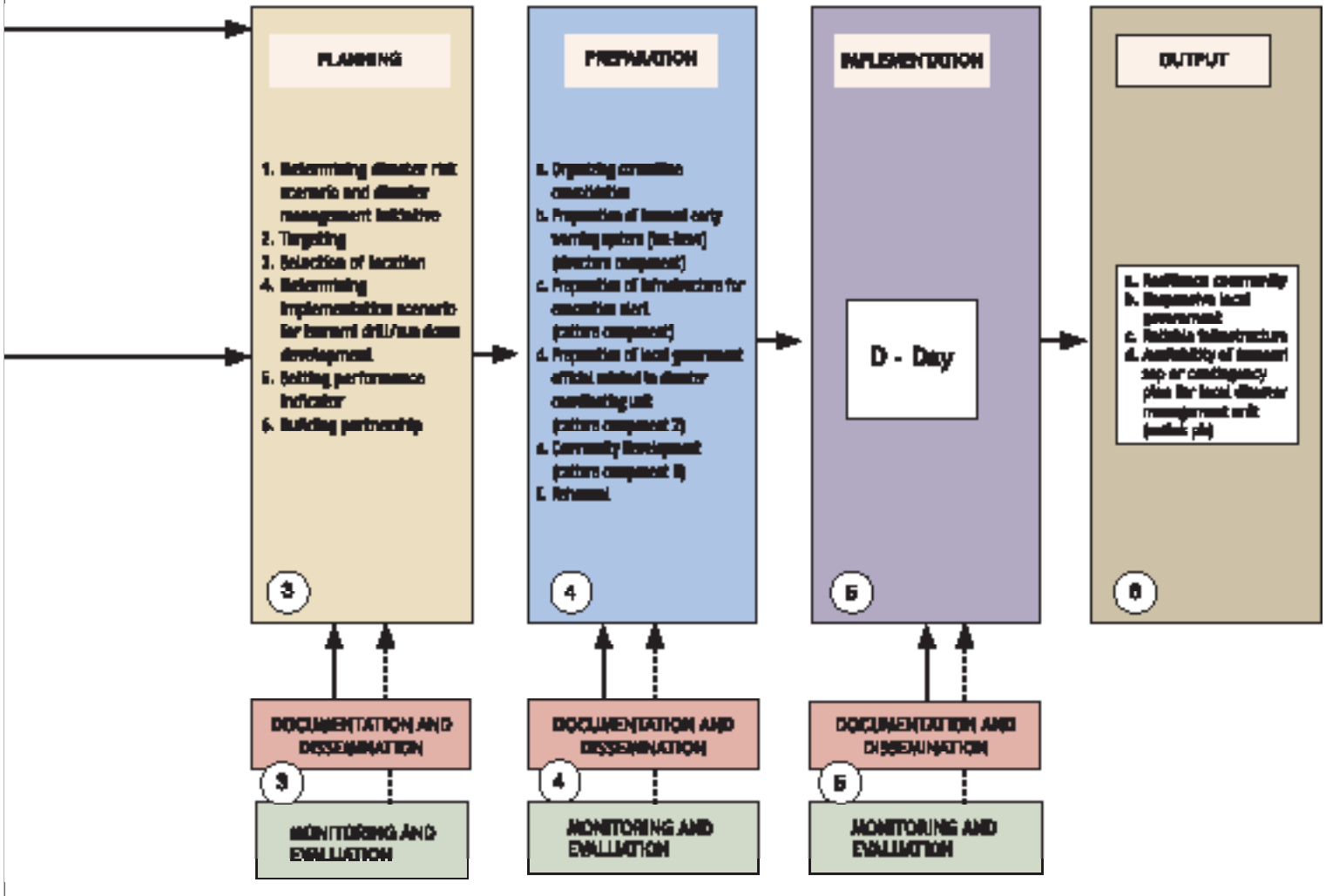



Figure 1.9. Flowchart of Tsunami Drill Implementation for City And Regency


PLANNING
1. Determining disaster risk scenario and disaster management initiative
2. Targeting
3. Selection of location
4. Determining implementation scenario for tsunami drill/sub-dome development
5. Setting performance indicator
6. Building partnership
3
PREPARATION
a. Organizing committee constitution
b. Preparation of tsunami early warning system (tsu-tews) (structure component)
c. Preparation of infrastructure for evacuation start (culture component)
d. Preparation of local government official related to disaster coordinating unit (culture component 2)
e. Community Development (culture component 3)
f. Rehearsal
4
IMPLEMENTATION
D - Day
5
OUTPUT
a. Resilience community
b. Responsive local government
c. Reliable infrastructure
d. Availability of tsunami map or contingency plan for local disaster management unit (public job)
6
DOCUMENTATION AND DISSEMINATION
3
MONITORING AND EVALUATION
DOCUMENTATION AND DISSEMINATION
4
MONITORING AND EVALUATION
DOCUMENTATION AND DISSEMINATION
5
MONITORING AND EVALUATION

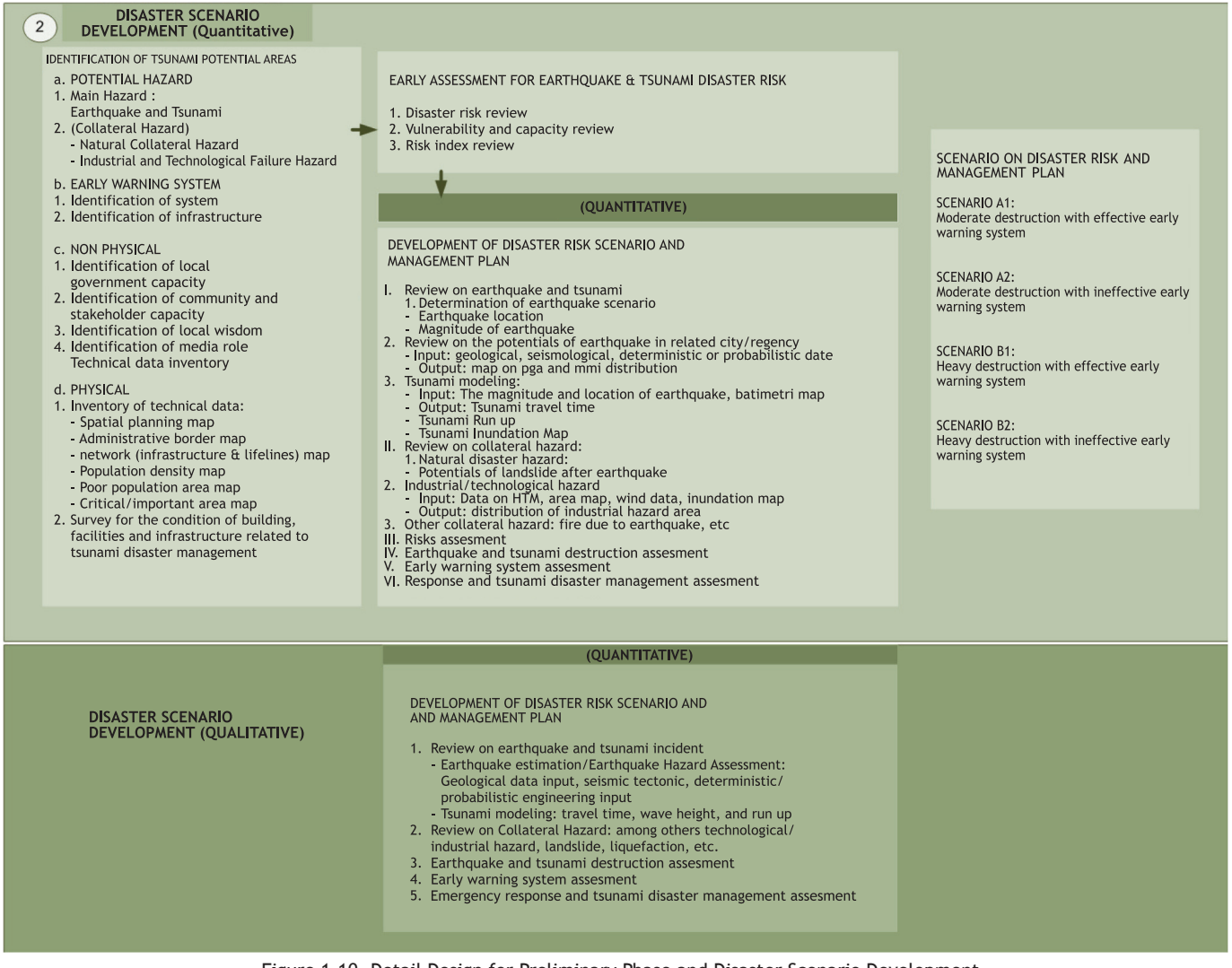



Figure 1.10. Detail Design for Preliminary Phase and Disaster Scenario Development

4. Implementation phase (D-Day)
5. Output expected is trained community and local government

**II. Tsunami Drill Type II**

Implementation that follows the whole process of end to end Tsunami Drill but in a more simple form and adequate target community. This package can be seen in figure 1.9 in which the implementation consists of:

1. Preliminary phase, consisting of:
   a. Formulation of organizing committee for tsunami drill implementation
   b. Budgeting (RAB)
   c. Schedule starting from scenario development up to the evacuation process implementation (D-Day)
2. Disaster scenario development phase, conducted qualitatively
3. Planning phase, consisting of :
   a. Selection of target community
   b. Selection of location
   c. Selection of run down scenario
   d. Development of performance indicators
4. Implementation phase, consisting of:
   a. Organizing committee consolidation
   b. Preparation of tsunami early warning system (Ina-TEWS)
   c. Preparation of infrastructure for evacuation alert
   d. Preparation of local government official related to disaster coordinating unit, consisting of:
      - Workshop
      - socialization
      - Training for Trainers (TOT)

- SOP development for tsunami disaster management
- Table Top Simulation
- Communication and coordination simulation (gladi posko)

e. Community development

f. Rehearsal phase

5. Implementation Phase (D-Day)
6. Expected outputs are :
   a. Resilience community
   b. Responsive local government
   c. Reliable infrastructure
   d. Availability of tsunami SOP or contingency plan for local disaster management unit (*satlak PB*)

**III. Tsunami Drill Type III**

Complete implementation of end to end tsunami drill for all preliminary phase, development of disaster scenario quantitatively, planning, preparation and implementation.

As a whole, the "Type III" consists of :

1. Preliminary phase
   a. Establishment of organizing committe
   b. Budgeting (RAB) and schedule for disaster scenario development and planning
   c. Schedule
2. Disaster scenario development, consisting of :
   a. Identification of potential hazard of tsunami potential areas :
      a. Hazard potentials
         1. Main disaster hazard: Earthquake, tsunami
         2. Secondary/collateral disaster hazards:

- Natural collateral hazards
- Industrial and technological failure hazard

b. Tsunami of Early Warning System:
   1. Identification of system
   2. Identification of infrastructure

c. Non-physical
   1. Identification of local government capacity
   2. Identification of community and related stakeholder capacity
   3. Identification of local wisdom
   4. Identification of media role

d. Physical :
   1. Inventory of technical data:
      - Spatial planning map
      - Administrative boarder map
      - Network map (infrastructure + lifelines)
      - Population density map
      - Poor area distribution map
      - Critical/important area map
   2. Survey on the conditions of buildings, means and infrastructure related to the tsunami disaster management

b. Earthquake and tsunami assesment
   1. Determination of earthquake scenario
      - Earthquake location
      - Earthquake Magnitude
   2. Potential earthquake assesment

      Input : geological, seismographic, deterministic or probabilistic data

      Output: *pga* and *mmi* distribution map

3. Tsunami model :
    - Input : The magnituge and location of earthquake, bathymetric map
    - Output : Tsunami travel time
    - Tsunami run – up
    - Tsunami inundation map

c. Collateral hazard assesment:
    1. Natural hazard threats :
        - Potential risks of landslide due to earthquake
    2. Industrial/technological hazard threats :
        - Input : toxic and dangerous material data, regional map, wind data, inundation map
        - output : distribution of industrial hazard area
    3. Other collateral hazard, fire due to earthquake, etc

d. Risks assesment

e. Earthquake and tsunami destruction assesment

f. Early warning system assesment

g. Emergency response and tsunami disaster management assesment

Output of disaster scenario development in the form of disaster scenario and necessary intervention efforts consist of :

1. Scenario A : moderate destruction in which some of the means and infrastructure are destroyed and some are functional
2. Scenario B : heavy destruction in which many of the means and infrastructure are destroyed

Both scenarios are further developed for scenario of preparedness on Tsunami Early Warning System and evacuation early warning system to be as follows:

1. Early warning system is operating effectively
2. Early warning system is not operating effectively

In scenario A, Tsunami Early Warning System (Warning I to IV) functions from BMG to Pusdalops Satlak PB or Pusdalops and Evacuation Warning system (sirens, watchman's rattle, etc) can function effectively and reaching the target community. In scenario B, the warning system functions but cannot reach the greater target community and there is no mechanism that supports the system to reach the said community.

Thus, there are four alternative disaster scenarios which are the outputs of disaster scenario development phase :

- Scenario A1 : moderate destruction with early warning system operating effectively
- Scenario A2 : moderate destruction with early warning system not operating effectively
- Scenario B1 : heavy destruction with early warning system operating effectively
- Scenario B2 : heavy destruction with early warning system not operating effectively

3. Planning phase, consisting of :
    1. Determining disaster risk scenario and disaster management initiative
    2. Targeting
    3. Selection of location
    4. Determining implementation scenario for tsunami drill/run down development
    5. Setting performance indicator
    6. Building partnership

4. Preparation phase, consisting of :
    a. Organizing committee consolidation
    b. Preparation of tsunami early warning system (ina-tews)
    c. Preparation of infrastructure for evacuation alert
    d. Preparation of local government official related to disaster coordinating unit

1. Enhancement of the preparedness of local government official and capacity (workshop, TOT, Table Top Simulation for developing SOP of tsunami disaster management)

f. Community development consisting of :
   1. Enhancement of community awareness (media campaign, public education campaign)
   2. Enhancement of community preparedness (training for community through TOT, community empowerment)
   3. Enhancement capability of media

g. Rehearsal

5. Tsunami Drill Implementation

**Notes :**

1. To do tsunami drill type I, the local government can do by themselves by following this guideline.
2. To do tsunami drill type II, the local government can cooperate with the said experienced universities or institutions to develop disaster scenario qualitatively The rest can be done by themselves by following this guideline.
3. Tsunami drill type III (End To End Tsunami Drill) can be beneficial not only for tsunami drill that is a preparation effort, but also can be used to develop preventive and mitigation efforts, both structural and non-structural mitigation. However, it should be noted that in this type III, review on disaster risk conducted quantitatively can be in the nature of rapid risk assessment as well as in depth risk assessment. This in-depth assessment can result in a comprehensive and in-depth disaster risk assessment that can be used for the purpose of development/building of cities/regencies based on disaster mitigation.
   In the implementation of complete package, cooperation between local government and central government in regards to funding, and with institutions or universities experience in the risk assessment field, for technical assistance.

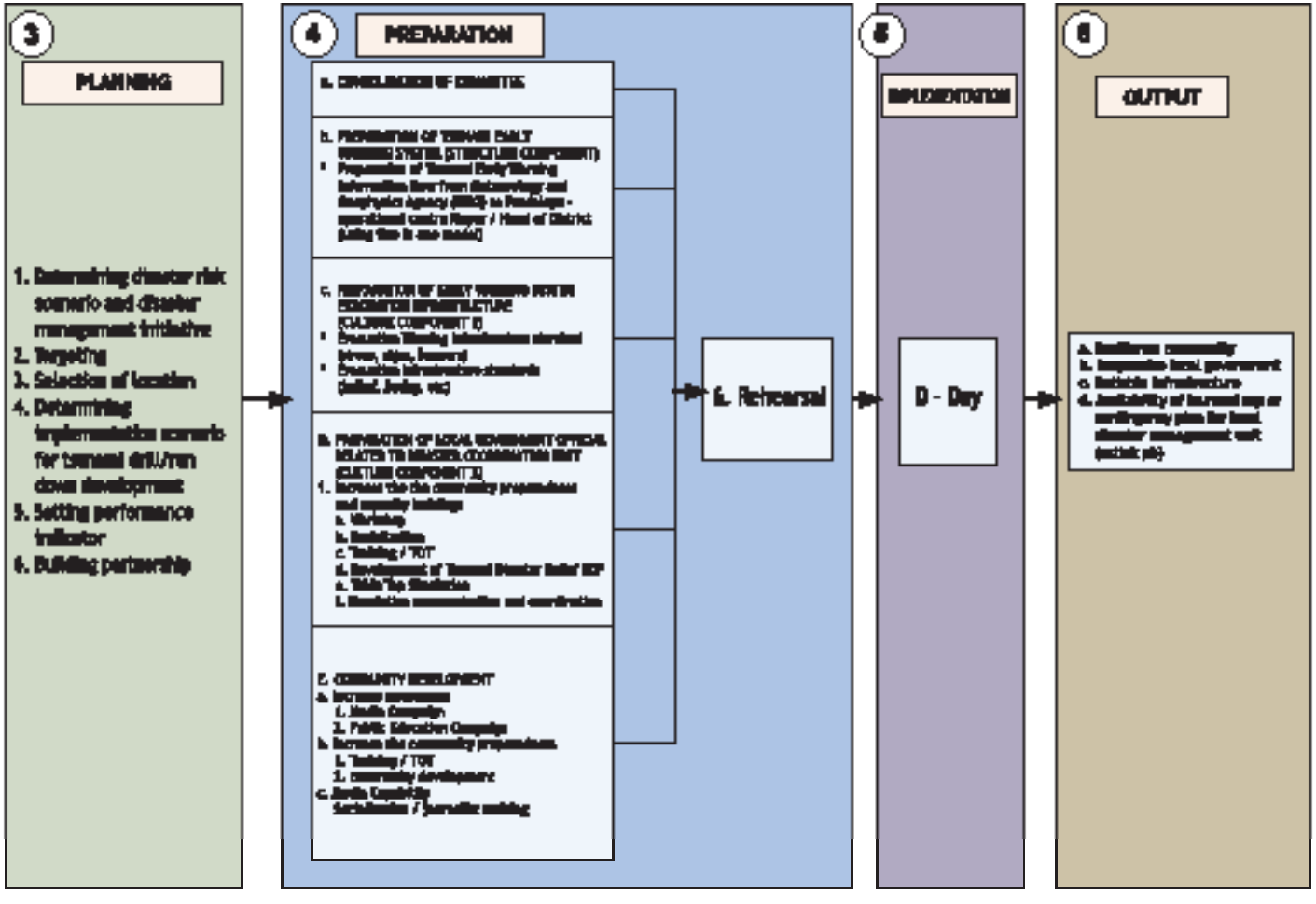



Figure 1.11. Detail Design for Planning, Preparation and Implementation Phase

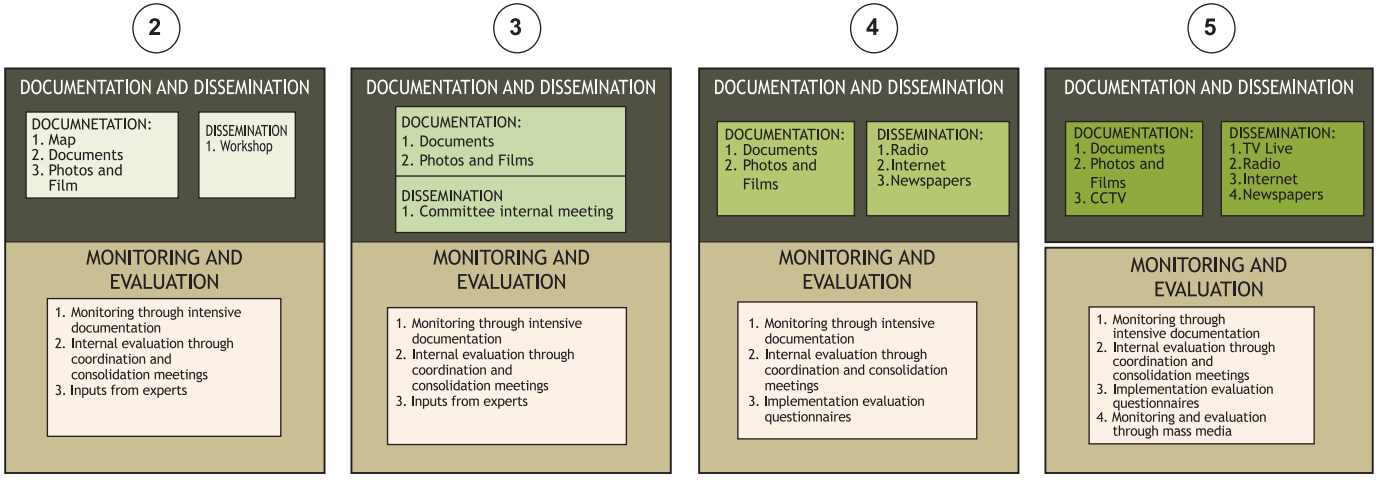
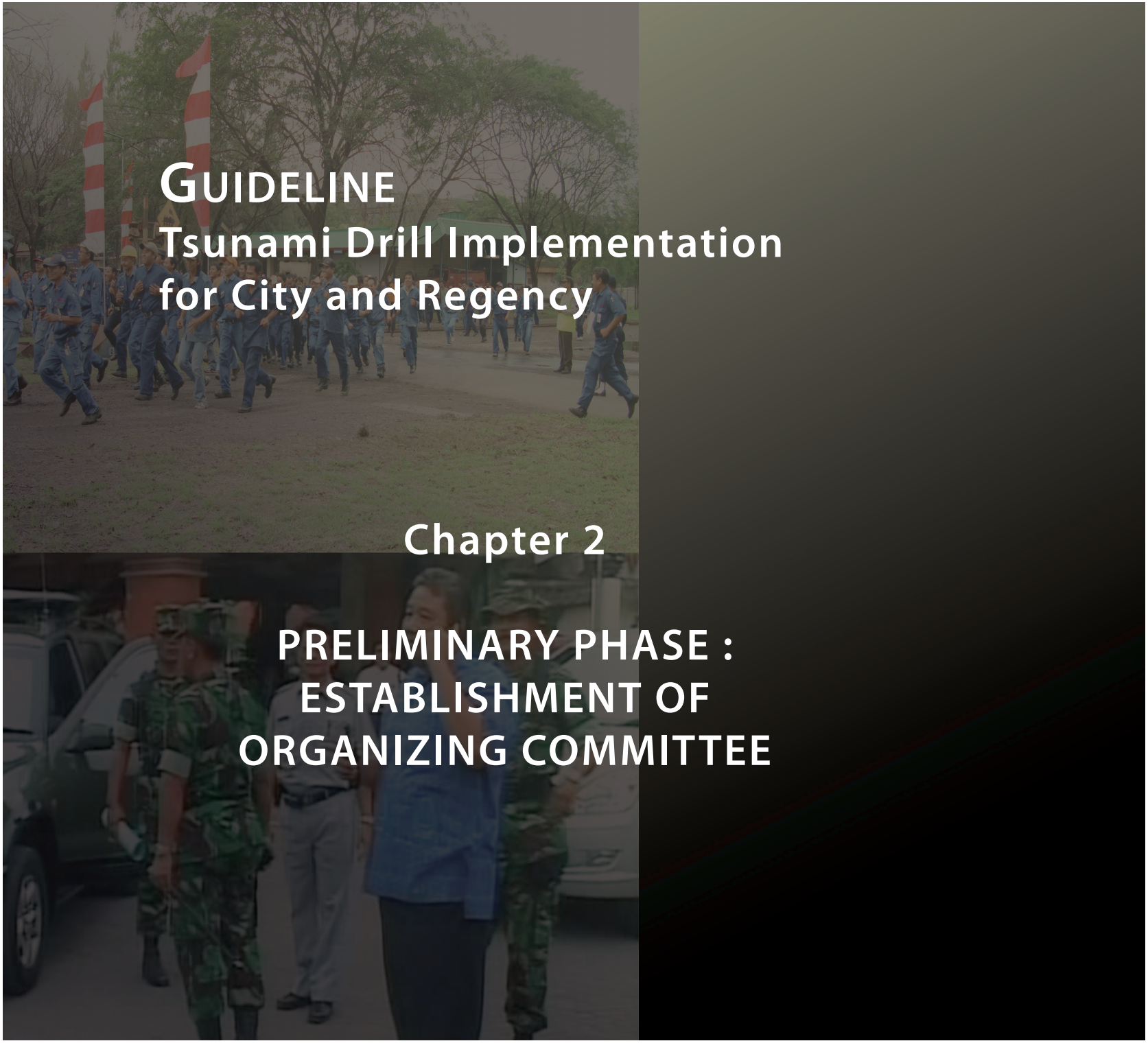



Figure 1.12. Detail Design for Documentation and Dissemination



# GUIDELINE
## Tsunami Drill Implementation for City and Regency

## Chapter 2

# PRELIMINARY PHASE : ESTABLISHMENT OF ORGANIZING COMMITTEE

# Chapter 2
# PRELIMINARY PHASE : ESTABLISHMENT OF ORGANIZING COMMITTEE

## 2.1 Establishment of Organizing Committe

The first step of Tsunami Drill implementation is the establishment of organizing committee consisting of :

1. Steering and Advisory Team
2. Chairman (assisted by general secretary and general treasurer)
3. Coordinator for preparation
4. Coordinator for planning
5. Coordinator for implementation
6. Coordinator for documentation and dissemination
7. Coordinator for monitoring and evaluation

Based on complexity of activity scope in a complete package (End to End Tsunami Drill), the coordinators are assisted by secretaries, treasures and sections under them. Whereas for tsunami drill type I and II, the organization can be simplyfied with seven committees member assisted by technical and/or implementing team.

## 2.2 Steering and Advisory Team

This team has the following duties :

a. Provide directions on various matters for the success of Tsunami Drill implementation
b. Formulate concepts on Tsunami Drill implementation.
c. Monitor and evaluate implementation of each Tsunami Drill activity.

## 2.3 Chairman

is assisted by a general secretary and general treasurer, with the following duties:

a. Conduct the whole event of Tsunami Drill activity, starting from preparation, planning, implementation, documentation, dissemination up to monitoring and evaluation.
b. Conduct coordination with all coordinators for the success and achievements of Tsunami Drill implementation.
c. Conduct supervision and control on all activities related to the implementation of Tsunami Drill.
d. Conduct coordination with all parties relevant to the implementation of Tsunami Drill.
e. Identify and conduct coordination on the involvement of institutions for the implementation of Tsunami Drill both from government as well as from private institutions and community organizations.
f. Document all activities and conduct dissemination activities related to Tsunami Drill to increase awareness and preparedness of communities on disasters.
g. Conduct continuous monitoring and evaluation on all phases of Tsunami Drill from preparation, planning up to implementation.

## 2.4 Coordinator for Preparation

Coordinator for preparation is assisted by a secretary, treasures and sections comprising :

a. Tsunami disaster regional potential identification section: conduct survey to identify the regional potentials related to tsunami disaster, both physically and non-physically.
b. Earthquake and tsunami disaster risk review section: conduct review on hazard, vulnerability and disaster risks as the basis of subsequent activities, namely disaster scenario development.
c. Disaster Scenario Development and Response and Management Measures section: develop disaster scenario by conducting the following assesment :
   - Earthquake and tsunami occurence assesment
   - Subsequent danger hazard assesment
   - Risk assesment

- Earthquake and tsunami destruction assesment
- Early warning system condition assesment
- Emergency response and tsunami disaster response and management assesment

## 2.5 Coordinator for Planning

Coordinator for planning phase is assisted by a secretary and treasurer with the duties to design and plan activities on the following issues :

a. Determination of disaster risks and response and management measures
b. Targeting
c. Selection of location
d. Determining implementation scenario for tsunami drill/run down development
e. Setting performance indicator
f. Building partnership

## 2.6 Coordinator for Implementation

Coordinator for implementation phase is assisted by a secretary, treasurer and sections consisting of :

a. Tsunami Early Warning System Preparation section: this section is assigned for implementing activities related to:
   - Preparation of tsunami warning flow from BMG to Pusdalops Satlak PB/mayors or regents by using multi mode mechanism, either directly or through interface institution (Police, Governor, etc).
   - Development of warning system infrastructure, preparation of rupusdalops, data collection on multi mode

b. Preparation of local government official related to Disaster Response: this section is assigned to implement activities related to :

- Increase preparedness and capacity building of disaster coordinating unit through activities such as TOT, workshop, SOP development as well as contingency plan, Table Top Simulation and communication and coordination simulation.

c. Community Development section: this section is assigned to implement activities related to :

- Increase of awareness and preparedness of communities through workshop, media campaign and public education campaign
- Increase of community preparedness through TOT and community development
- Increase of media capacity through workshops.

## 2.7 Section for Rehearsal and D-Day

Coordinator to implement simulation and D-day is responsible for the smoothness and success of implementation by conducting simulation for Tsunami Drill D-Day preparation. This section is divided into several sub-sections, among others:

a. Monitoring through intensive documentation
b. Internal evaluation through coordination and consolidation meeting
c. Questionnaires of evaluation on tsunami drill implementation
d. Monitoring and evaluation through mass media
e. Evaluation from experts.

The committee can have members from local governments, universities, mass media and local non-governmental organizations. For some sections, specific scientific background is needed since this will be necessary to implement their duties. The sections that needs specific knowledge among other things are the sections under the coordinator for preparation and implementation.

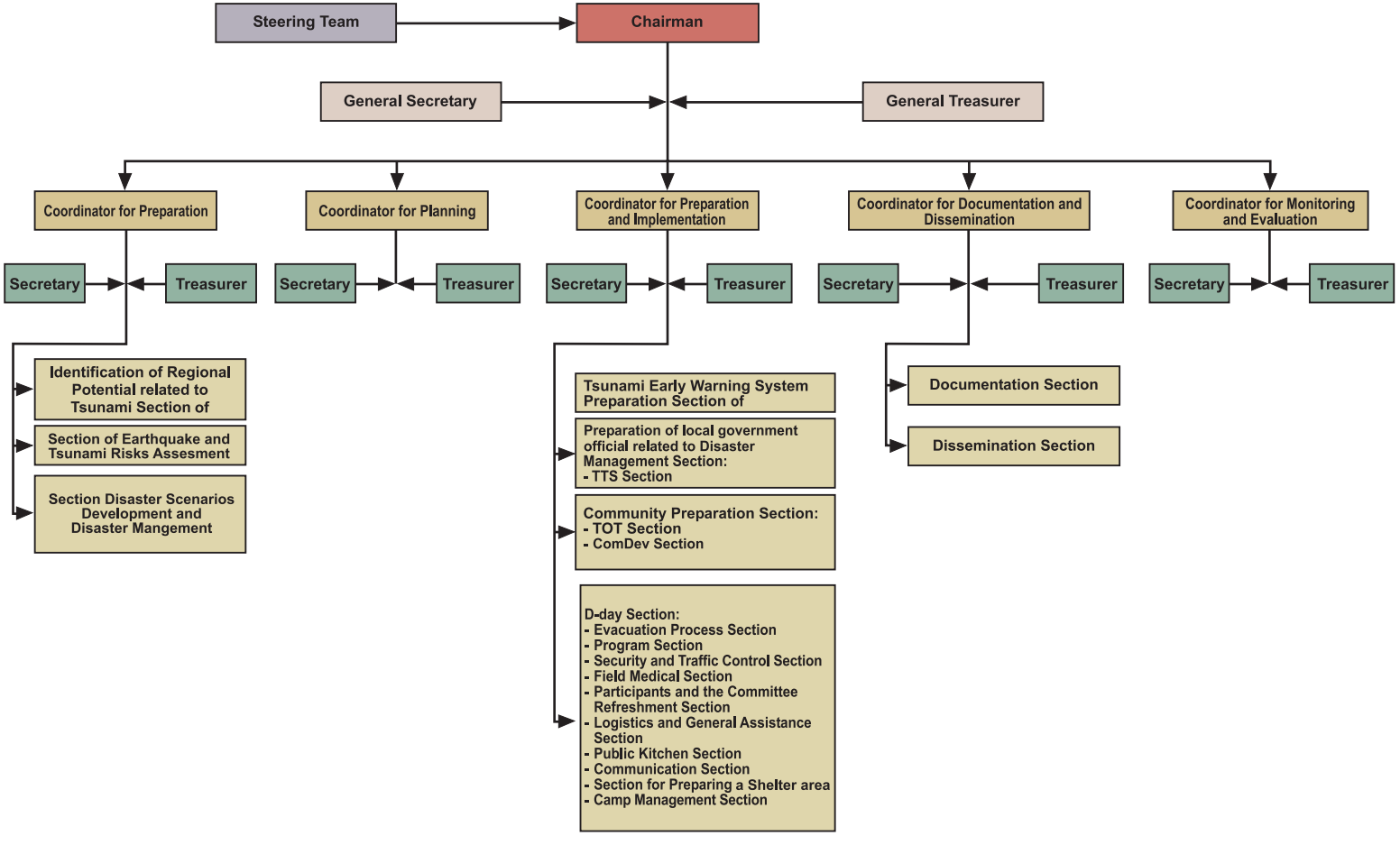



Figure 2.1. Organizing Committee

## 2.8 Coordinator for Documentation and Dissemination

Coordinator for documentation and dissemination is assisted by a secretary, treasurer and sections comprising of :

a. Documentation section: documenting all activities, starting from preparation, planning and implementation in the form of :
   a. Maps
   b. Documents
   c. CCTV (Circular Circuit Televisi)
   d. Photographs
   e. Films

b Dissemination section: disseminating various information related to the implementation of Tsunami Drill through the following medias :
   a. Internal meetings
   b. Workshops
   c. Radio
   d. Internet
   e. Newspapers
   f. TV Live

## 2.9 Coordinator for Monitoring and Evaluation

Coordinator for monitoring and evaluation, assisted by a secretary and a treasurer, is assigned to conduct evaluation and monitoring in the form of :

a. Monitoring through intensive documents
b. Internal evaluation through coordination and consolidation meetings
c. Questionnaires of evaluation on tsunami drill implementation
d. Monitoring and evaluation through mass media
e. Evaluation from experts

The committee can have members from local governments, universities, mass media and local non-governmental organizations. For some sections, specific scientific background is needed since this will be necessary to implement their duties. The sections that needs specific knowledge among other things are the sections under the coordinator for preparation and implementation.
Before conducting those activities, it is important to draw up a budget and activity schedule. The explanation regarding the budget and schedule for the preparation phase will be given in end of this chapter.

## 2.10 Budget for Preparation and Planning

The budget for preparation and planning includes the following cost components:

a. Honoraria
b. Survey tools and equipment
c. Transportation and Accommodation
d. Materials used up
e. Documentation
f. Communication
g. Cost for Data Collection
h. Cost for organizing meetings

Meanwhile, cost components for planning phase are simpler, because activities conducted in this phase are more like a desk study. Cost components included in the planning phase are:

a. Honoraria
b. Cost for organizing meetings
c. Accommodation
d. Communication
e. Materials used up
f. Documentation

## 2.11 Timetable

The preparation phase in the tsunami drill implementation will determine the next phases, which are planning and implementation. Therefore, this phase must be conducted in the beginning of the activity in the tsunami drill timetable. The preparation phase timetable must be made according to the following activities sequence:

1. Identification of local potential related to tsunami disaster
2. A preliminary assesment of earthquake and tsunami risks
3. Development of disaster scenarios and disaster management initiative.

A time period provided for this phase is two months.
Meanwhile, activities in the planning phase can be conducted in parallel because they are just a desk study that can be conducted in committee meetings. The maximum time period provided for this planning phase is one month.

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| **A** | **STEERING TEAM** | | |
| 1 | Mayor / Regent | Head of Steering Team | • Providing inputs in the form of policies for the implementation of Tsunami Drill at city / regency Level<br>• Giving technical and operational direction for Tsunami Drill at the city / regency Level<br>• Organizing technical and operational coordination with the central government for the implementation of Tsunami Drill at the city level |
| 2 | Muspida[1] : TNI Elements (Kodim), POLRI (Polres), District Attorney office | Members | • Assisting the steering team by providing inputs either in the form of policies, technical or operational for the implementation of Tsunami Drill at the city / regency Level |
| **B** | **HEAD OF THE COMMITTEE** | | |
| 1 | Provincial Secretary (Sekda) | Executive Chairperson | • Designing the end-to-end tsunami drill comprehensively<br>• Coordinating and implementing the technical and operational of Tsunami Drill by referring to the Run-Down developed by the rehearsal team and during the D-Day of the Tsunami Drill<br>• Identifying the involvement of government institution and other community institutions/organizations (NGO, The Red Cross, industry, etc) at the central or local level.<br>• Establishing partnership with the institution and other community institution/ organization (NGO, The Red Cross, industry, etc) for the financing of Tsunami Drill<br>• Conducting monitoring, coordination with the whole section coordinators<br>• Preparing questionnaire for the observers by coordinating with the central government's team |
| 2 | | Secretary | • Conducting administrative coordination between the local and central government for the smooth implementation of tsunami drill.<br>• Implementing administrative assignments for tsunami drill.<br>• Composing the minutes of each coordinating meeting |
| 3 | | General Treasurer | • Budgeting<br>• Expanse and monitor the use of fund in each section on the tsunami drill<br>• Prepare financial report |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| **C** | **SECTION OF TRANING OF TRAINER (TOT)** | | |
| 1 | | Coordinator | • Composing the Plan of TOT activity, which among others is to :<br>  • Seek information about curriculum and manual that are related to TOT Material<br>  • Seek information about the institutions that have involved in the development of TOT Material (for example at the PMB of ITB)<br>  • Determine the form/design of TOT event along with the material to be delivered on the TOT (including designing the means of delivering the material)<br>  • Determine the time and venue of TOT implementation<br>  • Identifying the participants of TOT (including the number of participants)<br>• Preparing for TOT activities by :<br>  • Determine the instructors/speakers as well as the resource persons at the TOT<br>  • Determining the facilitators that will help the TOT program<br>  • Conducting survey on the venue of the event<br>  • Coordinating with other related parties including internal coordination<br>• Implementing and monitoring the implementation of TOT that must be in line with the plan and preparation<br>• Reporting the implementation of tsunami drill TOT to the Executive Chairperson<br>• Being involved in the implementation of field rehearsal and implementation of the D-day of Tsunami Drill, which refer to the run down developed by the Field Rehearsal Team and the D-day Team |
| 2 | | Members | • Assisting in terms of coordinating on planning, preparation and implementation of TOT |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| **D** | **SECTION OF COMMUNITY DEVELOPMENT** | | |
| | | Coordinator | • Prepare the plan of community development, among others by:<br>  • identifying the training village as well as the community target that will become the assisted community<br>  • Determining the form/design of the community development program<br>  • Identifying personnel that will be involved in the Community Development program (com-dev specialist and trainer)<br>  • Determining coordination mechanism between Com Dev specialist, trainer and the assisted community<br>  • Determining the mechanism of evaluation and monitoring of activities for the existing personnel<br>  • Composing activity schedule of community development starting from planning, preparation to implementation<br>• Preparing community development activities that cover:<br>  • Coordination with other parties in the community development<br>  • Survey toward the assisted village and target community<br>  • Internally coordinate with the trainer<br>• Implementing and monitoring the implementation of community development activities<br>• Continuous implementation of community development in order to improve the implementation mechanism thus increasing community's awareness and capacity, which are expected to be the motor and guide to the public at large during the tsunami drill<br>• Reporting the activity to the Executive Chairperson<br>• Being involved in the implementation of field rehearsal and implementation of the D-day of Tsunami Drill, which refer to the run down developed by the Field Rehearsal Team and the D-day Team |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | | Secretary | • Assisting the coordination in determining targets of trained village in the implementation of community development<br>• Assisting the coordination in the composition of community development schedule<br>• Assisting the coordination in monitoring and evaluating the implementation of community development<br>• Preparing minutes of each internal or external coordination meeting<br>• Coordinating the alumni of TOT that are assigned in the community development program<br>• Assisting the coordination during the implementation and reporting of community development |
| | Stakeholders, Public Figures, Religious Leaders and Youth Figures | Members | • Assisting the coordinator and secretary in the planning and implementation process of community development program,<br>• Assisting as trainer<br>• Assisting in monitoring and evaluating the implementation of Com-dev program<br>• Assisting to prepare the report of the Com-Dev to the Executive Chairperson<br>• Being involved in the implementation of field rehearsal and implementation of the D-day of Tsunami Drill, which refer to the run down developed by the Field Rehearsal Team and the D-day Team |
| **E** | **SECTION OF TABLE TOP SIMULATION** | | |
| 1 | | Coordinator | • Preparing the plan of Table Top Simulation which covers :<br>  • Determining the form/design of the table top simulation as well as the material that will be delivered (including the design/mechanism of activity)<br>  • Determining the time and venue for Table Top Simulation<br>  • Identify Table Top Simulation participants (including the number of participants)<br>• Preparing table top simulation activities that cover :<br>  • Determining the resource persons of the activity<br>  • Conducting the survey on venue of the activity<br>  • Coordinating with other related parties including the internal coordination<br>• Implementing and monitoring of the Table Top Simulation as written on the plan and preparation<br>• Reporting the implementation of Table Top Simulation to the Executive Chairperson<br>• Being involved in the field rehearsal and implementation of table top simulation as developed by the D-Day Team |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | | Members | • Assisting in the coordination of planning, preparation and implementation of Table Top Simulation<br>• Assisting to prepare reports on the implementation of Table Top Simulation to the Executive Chairperson<br>• Being involved in the implementation of field rehearsal and implementation of the D-day of Tsunami Drill, which refer to the run down developed by the Field Rehearsal Team and the D-day Team |
| **F** | **FIELD REHEARSAL AND THE IMPLEMENTATION TEAM OF TSUNAMI DRILL** | | |
| 1 | | Coordinator | • Preparing the activity plan, which among others include:<br>  • Working together with the team from Central Government in developing the run down for field rehearsal and the Tsunami Drill D-Day.<br>  • Determining the time and venue for the field rehearsal and the Tsunami Drill D-Day.<br>  • Identifying the number of participants who will be involved in the activity<br>• Conduct the preparation of the activity, which among others include:<br>  • Coordination and cooperation with other related parties for the smoothness of field rehearsal and tsunami drill.<br>  • Determining the resource persons for the activity<br>  • Conducting survey on the critical paths of the rehearsal and tsunami drill day (Starting point, evacuation process, finishing point)<br>  • Conducting internal coordination<br>  • Coordination with all sections in the committee of Tsunami Drill<br>  • Mastering the Run Down<br>• Implementing and overseeing the implementation of Table Top Simulation that should be in accordance with the planning and preparation<br>• Reporting the implementation of Table Top Simulation to the Executive Chairperson<br>• Being involved in the field rehearsal and the Tsunami Drill Day<br>• Monitoring and evaluating intensively the preparation and implementation of the field rehearsal and drill day<br>• Anticipating the change in the Run Down and coordinate the change with the Central Government |
| 2 | | Secretary | • Assisting the Coordinator in administration and management of preparation and implementation of field rehearsal and Drill day<br>• Preparing the schedule of events in big poster<br>• Preparing the minutes of each coordination meeting |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 3 | | Treasurer | • Preparing the budget<br>• Spend and monitor the use of fund of each section of tsunami drill reheasal d-day implementation<br>• Preparing financial report |
| 4 | | Members | • Assisting out in all process from preparation to the implementation |
| **G** | **SECTION OF EVACUATION PROCESS** | | |
| 1 | | Coordinator | • Coordination and collaboration with the local government for the mobilization of the community during rehearsal and d-day<br>• Identifying the community target for mobilization.<br>• Monitoring the response of the community regarding the convened event from the current available infrastructure such as *babinsa*, religious figures, etc.<br>• Anticipating for the worst-case scenario with all supporting infrastructure<br>• Mobilizing the community for the d-day and rehearsal<br>• Designing the evacuation process referring to the run-down developed by the field rehearsal team, including the evacuation of the community, VVIP, VIP and the Observers<br>• Anticipating the worst-case scenario that is having only few people during the D-day by mobilizing more people.<br>• Coordination with the guides<br>• Designing the evacuation process as what the reality would be, such as the presence of pregnant women, school children, etc.<br>• Designing the number of casualities during the simulation.<br>• Predicting the number of participating people<br>• Coordinating the evacuation process on :<br>  • Security aspect of the participants with the health division<br>  • Security aspect of the participants with the security section<br>• Monitoring the evacuation process |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 2 | Stakeholders, Village Head and Youth Figures | Members | • Assisting the Coordinator in various issues that are related with the evacuation process of the community during rehearsal/D-day, such as :<br>• Coordinating the guides in evacuation process<br>• Simulation of disaster casualities<br>• Conducting quick count of the participating people<br>• Security and safety of the participants<br>• Assisting the coordinator in monitoring the implementation as designed in the run-down |
| **H** | **EVENT SECTION** | | |
| 1 | | Coordinator | • Planning an interesting program during the mass convention at the starting point and on displaced person's camp<br>• Designing the stage's needs<br>• Coordinating with sub-section of logistic<br>• Preparation of event at the starting and finishing points<br>• Coordinating the people who will be performing during the events<br>• Reporting to the executive Chairperson |
| 2 | | Members | • Assisting the coordinator in the planning of the events, stage's needs, and sound system equipments, preparation at the starting and finishing points as well as coordinating with the performers<br>• Assisting the Coordinator in the whole series of events during rehearsal and d-day<br>• Assisting the coordinator in making report to the executive chairperson. |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| **I** | **SECTION OF SECURITY AND TRAFFIC MANAGEMENT** | | |
| 1 | | Coordinator | • Conducting the planning of Security and Traffic Management section, which covers:<br>  • Design of security and traffic management mechanism for the rehearsal and D-day<br>  • Identification on the number of personnel involved in the events<br>  • Designing the needs of parking lot<br>  • Designing the security needs on the field (convention of mass on the starting point), along evacuation route and in the displaced person camp<br>• Preparation of activity :<br>  • Coordination with the security section and the community<br>  • Preparation of security effort<br>• Securing the parking lot, mass-convention spot, along evacuation route and in the displaced person spot according to the run-down<br>• Coordinating the traffic management during rehearsal and D-day<br>• Reporting to the Executive Chairperson |
| 2 | Military, Police, Transportation office and Youth | Members | • Assisting the coordinator in the planning, preparation and implementation of security section<br>• Assisting the coordinator in reporting the result to the Executive Chairperson |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| **J** | **SECTION OF FIELD HEALTH** | | |
| 1 | | Coordinator | • Conducting planning by determining the mechanism of health division exercise on the field<br>• Preparing the health division exercise on the field (provision of tools and other supporting devices)<br>• Coordinating the health division during the field rehearsal and the D-day of tsunami drill<br>• Reporting to the Executive Chairperson |
| 2 | Task Force of Health; Office of Health; Local Hospital, and other Private Hospitals, Public Health Units, Indonesian Red Cross, *Tagana* and the Scouts | Members | • Assisting the coordinator in the implementation of the Health Division during the rehearsal and d-day<br>• Assisting the Coordinator in the whole series of events during rehearsal and d-day<br>• Assisting the coordinator in preparing report to the executive chairperson. |
| **K** | **SECTION OF LOGISTICS (MEALS AND BEVERAGES)** | | |
| 1 | | Coordinator | • Plan and prepare the logistic of meals and beverages, which covers among others:<br>  • Identifying the amount of meals and beverages to be prepared<br>  • Arranging the menu that is safe and edible for such mass-scale participants (scale of thousands of people)<br>  • Identifying the people who will work on the section (women's group) and coordinate with them<br>  • Coordinate with other section in terms of number of meals and beverages to be provided<br>• Coordinating the arrangement of food and beverages for large scale crowd, local goverment officials, participants and the committe of reheasal and D-day of tsunami drill implementation<br>• Reporting to the Executive Chairperson |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 2 | Task Force of Social; General Division of the Provincial Secretary of the Social Office, the Indonesian Red Cross, community or the women's activities groups. | Members | • Assisting the coordinator in managing the logistic of food and beverage for the large crowd and the committee<br>• Assisting the coordinator in making report to the executive chairperson |
| **L** | **DOCUMENTATION/ PROTOCOL/ PUBLICATION SECTION** | | |
| 1 | | Coordinator | • Coordinating the invitations and VVIP Protocol system with the Secret Service<br>• Coordinating the initiation and VIP Protocol System with the city / regency goverment<br>• Coordinating the invitations and international observers and referees protocol system with the central government<br>• Documenting the activity through photographs and video that are in line with the run down<br>• Publication of the event through film and website<br>• Reporting to the Executive Chairperson.<br>• Designing the spot, and camera places to take the picture of before, during and after the evacuation process<br>• Coordination with professional video/photographers and the internal staff<br>• Monitoring the documentation process |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 2 | Public Relations Element: | Members | • Assist coordinator in the matter of protocol for guests, VIP and VVIP (national and international)<br>• Assist coordinator in conducting Tsunami Drill documentation both in the form of written documentation (printed media), film, website, etc by referring to the run down developed by Field Rehearsal Team and Tsunami D-Day Implementation Team<br>• Assist the reporting of documentation/publication/protocol team in the implementation of tsunami drill rehearsal and D-Day to Implementing Chairman<br>• Assist coordinator in identifying spots for picture taking before, at the time and after evacuation process by referring to the run down developed by Field Rehearsal Team and Tsunami D-Day Implementation Team<br>• Assist coordinator in monitoring the documentation process both by internal committee as well as professional documentation by referring to the run down developed by Field Rehearsal Team and Tsunami D-Day Implementation Team |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

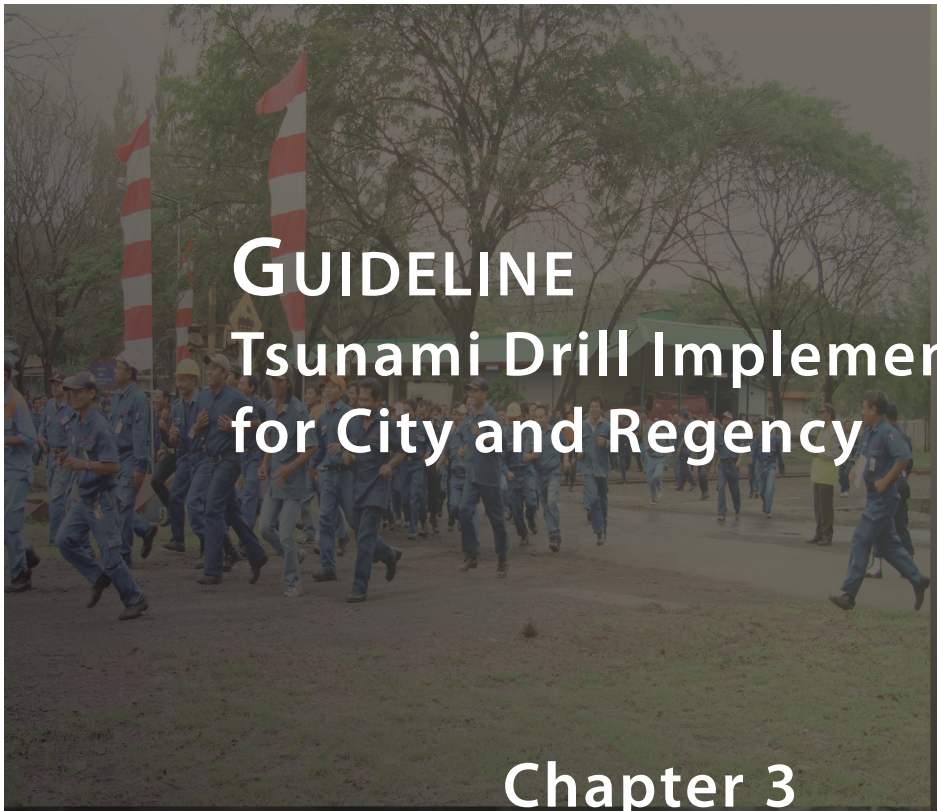
| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| **M** | **LOGISTIC/GENERAL AFFAIRS SECTION** | | |
| 1 | | Coordinator | • Coordinate with other section in designing logistic needs in the field by referring to the run down developed by Field Rehearsal Team and Tsunami D-Day Implementation Team<br>• Provide equipment for rehearsal and D-Day tsunami drill<br>• Assist other sub-section in logistic procurement<br>• Recording logistic needs<br>• Maintain rental equipments<br>• Report the activity of logistic/general affairs activities to organizing chair |
| 2 | Logistic Element, General Affairs, Public Works Office | Members | • Assist coordinator in collecting data, preparing (including renting) logistical equipment for the rehearsal and D-Day of tsunami drill by referring to the run down developed by Field Rehearsal Team and Tsunami D-Day Implementation Team<br>• Assist in protecting rental equipment<br>• Assist in the reporting of logistic/general affair section to organizing chair |
| **N** | **PUBLIC KITCHEN SECTION** | | |
| 1 | | Coordinator | • Conduct planning through coordination with other section to identity the needs for planning and preparation of public kitchen section<br>• Design the public kitchen activity implementation plan for rehearsal and D-Day Tsunami Drill by referring to the run down developed by Field Rehearsal Team and Tsunami D-Day Implementation Team<br>• Conduct coordination with related parties for the provision and preparation of public kitchen equipments<br>• Organize demonstration of public kitchen by referring to the run down developed by Field Rehearsal Team and Tsunami D-Day Implementation Team<br>• Report public kitchen activities to organizing chair |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 2 | Social Task Force Element: Social Office/ Social Welfare Office, Red Cross, Scouts, First Aids, *Tagana* | Members | • Assist Coordinator in the planning, provision/preparation of public kitchen equipments<br>• Organize public kitchen demonstration by referring to the run down developed by Field Rehearsal Team and Tsunami D-Day Implementation Team |
| **O** | **SEKSI KOMUNIKASI** | | |
| 1 | *RAPI / ORARI* Element | Coordinator | • Conduct planning and preparation of activities, among others :<br>  • Designing communication equipment needs by referring to the run down developed by Field Rehearsal Team and Tsunami D-Day Implementation Team, for example, HT equipment including transmitter and repeater antennae for coordinators, Sub-section heads and other important personnel in simulation implementation<br>  • Procurement of necessary communication equipments<br>• Guard rental equipments<br>• Report communication section activities to Organizing Chair<br>• Note: can be coordinated by *RAPI or ORARI* |
| **P** | **PREPARATION OF DISPLACED PERSON CAMP** | | |
| 1 | | Coordinator | • Conduct planning by referring to the run down developed by Field Rehearsal Team and Tsunami D-Day Implementation Team, among others making designs for displaced person camp according to SPHERE (Humanitarian Charter and Minimum Standards in Disaster Response)<br>• Conduct the following preparations :<br>  • Provide displaced person camp infrastructures, such as: water sanitation (Watsan), trash bin, access to camp<br>  • Provide huge tents for: fields medical units, media centers, tactical command posts, trauma relief, children play area, assembly/dining area<br>  • Provide family tents<br>  • Conduct coordination with related parties for the provision of tents<br>• Report displaced person camp preparation section activities to Organizing Chair |

Table 2.1 : Task and Responsibility of Tsunami Drill Organizing Committee (Continued)

| No | PERSONNEL | POSITION | TASKS AND RESPONSIBILITIES |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 2 | Public Works Office, Transportation Office, *Tagana*, Red Cross, Scouts, Military Command (Kodim) Elements | Members | • Assist coordinator in the planning, preparation and implementation by referring to the run down developed by Field Rehearsal Team and Tsunami D-Day Implementation Team, among others including designing and providing infrastructure for displaced person camps, such as :<br>• Watsan, trash bin, access to camp<br>• Huge tents for: fields medical units, media centers, tactical command posts, trauma relief, children play area, assembly/dining area<br>• Provide family tents<br>• Assist the reporting of displaced person camp area activities to the Organizing Chair |
| **Q** | **DISPLACED PERSON CAMP MANAGEMENT** | | |
| 1 | | Coordinator | • Conduct activity planning, among other includes :<br>• Identify the number of displaced person<br>• Design displaced person organization mechanism<br>• Design displaced person security mechanism<br>• Conduct activity preparation by coordinating with related sections for the interest of displaced person and prepare tactical command post tents<br>• Conduct refugee camp management duties by regulating and directing refugees to related tents during the Rehearsal and D-Day of Tsunami Drill by referring to the run down developed by Field Rehearsal Team and Tsunami D-Day Implementation Team<br>• Report displaced person camp management section activities to Organizing Chair |
| 2 | Offices, Red Cross, *RAPI/ ORARI* elements, etc | Members | • Assist coordinator in planning, preparation and implementation by :<br>• Identifying, regulating and direction incoming refugees<br>• Conducting protection of displaced person camps and preparing tactical command post<br>• Assist in the reporting of displaced person camp management activity to Organizing Chair |



# GUIDELINE
## Tsunami Drill Implementation for City and Regency

## Chapter 3

# DEVELOPMENT PHASE DISASTER SCENARIO :

# Chapter 3
# DEVELOPMENT PHASE DISASTER SCENARIO :

The preparation phase encompasses several activities which consist of:

1. Identification of local potential
2. Preliminary assesment earthquake and tsunami risks
3. Development of disaster scenario and disaster management initiative
4. Output in the form of a disaster scenario

## 3.1. Identification of Tsunami Potential Areas

The activity of identifying potential areas related to tsunami disaster is conducted to identify the potential for earthquake and tsunami hazards in local areas and vulnerability or local capability, physical as well as non-physical to the risk of earthquake and tsunami.

### 3.1.1. Identification of Potential Hazard

Potential hazards that can be seen are as follows:

1. Primary Hazard, i.e. earthquake and tsunami
2. Collateral Hazard in the form of natural hazard such as liquefaction, landslide or other hazards like technological and industrial hazards

Identification of hazard could be identified from natural physical condition such as topographical and morphological conditions of an area, geological conditions, hydro-meteorological conditions and so forth.

### 3.1.2. Identification of Tsunami Early Warning System Existence

The identification of Tsunami Early Warning existence built by the central government can be seen from two sides, they are a system such as information channel from BMG to *Pusdalop Satlak PB*, and evacuation warning system support infrastructure such as sirens and evacuation signs.

### 3.1.3. Identification of NonPhysical Potentials Condition

The identification of non-physical potential is an effort to find out the potential of vulnerability and local capability seen from capacity and role of local governments, community and the media in generally handling and overcoming a disaster, especially earthquake and tsunami.

**a. Identification of Local Government Capacity**

The local government's capacity may be seen especially from the presence of disaster organizations at the level of city/regency, which has trained human resources as well as means and facilities which support, disaster management especially those related to efforts of tsunami emergency response. Apart from that, the local government's capacity may also be seen from whether there is a local regulation that has incorporated elements of disaster management, and whether there are means and facilities that support the culture part of early warning system. Those means and facilities among other things are the center of disaster management operation control (*Pusdalops*) and supportive infrastructure, such as fax, telephone, internet, etc.

**b. Identification of Community and Stakeholder Capacity**

The community and stakeholder's capacities may be seen from the level of awareness to earthquake and tsunami disasters and also from the level of preparedness in facing a disaster.

**c. Identification of Local Wisdom**

The local wisdom and knowledge in facing a disaster, are indicators of the community capacity, for example whether the community has a local knowledge of signs that a tsunami will happen or not, and also people's customs used to face earthquake and tsunami.

**d. Identification of Media's Role**

The media's role is very important as information and knowledge dissemination means and as a promotion of a series of Tsunami Drill activities. The existence of local as well as national media, either printed or electronic may also be used as documentary tools, which eventually can be used as a way to make evaluations and monitoring of all series of activities.

**e. Technical Data Inventory**

The inventory of technical data related to the identification of non-physical potential is in the form of a map of demography or population related to information such as population rate, birth rate, death rate, population ratio, population distribution, means of livelihood, the amount of income and so on.

### 3.1.4. Identification of Physical Condition

a. Technical Data Inventory

The identification of physical potential related to tsunami disaster management includes the inventory of technical data obtained through maps:

1. Topographical and bathymetry maps with a scale of 1:25.000;
2. A land use map/spatial map,
3. An imagery map,
4. An administrative boundary map,
5. A population density map,
6. An infrastructure/lifelines map with a minimum scale of 1:25.000;
7. A geological map with a scale of 1:50.000.

b. Survey

The identification of physical potential also includes a survey of physical condition of buildings, infrastructure and means in the assessed areas, lifelines or networks in the assessed areas which support efforts of earthquake and tsunami emergency response.

## 3.2. Preliminary Assessment of Earthquake and Tsunami Risk

### 3.2.1. Introduction to Disaster Risk Assessment

#### 1. Seismic and tsunami hazard assessment

Hazard assessment is based on assessment of the following aspects:

- The chronology of earthquakes and tsunamis
- Topographical and morphological conditions of cities/regencies
- Natural physical condition
- geological condition

Using this hazard assessment will give the picture of how massive a natural hazard can happen in a city/area and collateral hazards that may happen as a result of the natural hazard whether it is a natural collateral hazard (landslide, liquefaction, etc.) or technological/industrial hazard (the spread of a hazardous toxin).

#### 2. Seismic and tsunami vulnerability assessment

Vulnerability assessment is performed qualitatively which can provide important indications of disaster potential in the future. Components qualitatively assessed are:

- Population (socioeconomic condition)
- Buildings
- Public facilities and infrastructure

To be able to perform vulnerability assessment, data needed among other things is:

- General data on population density
- Data on buildings
- Data on available facilities and utility system (clean water pipelines, gas pipelines, electricity system, telephone system and roads including railroads and bridges.
- Data on socioeconomic activities

Figure 3.1 Survey for Site Selection

Figure 3.2 Cilegon Industrial Estate

The aspect related to vulnerability is capacity, which is strengths or resources available in individuals, households, and communities that can help them in facing disasters, performing mitigating efforts or recovering from disaster condition.

Capacity can be categorized into:

- Physic or material, which means that people with adequate economic and material resources can better survive.
- Social or organization which helps them to be able to face, survive and handle threats that might exist.
- Behavior or motivation, which is community members who concern about the capability they have and the degree of confidence to face disaster challenges.

Results of vulnerability assessment (including capacity) will give the picture about the degree of risk of components reviewed, which is in the form of general picture of the degree of damage in buildings, infrastructure, public and social facilities, production facilities and people's housings..

### 3. Disaster risk assessment

The risk of a disaster is the loss (of lives and properties) that may be incurred resulted from a disaster. Using the disaster risk assessment, a picture about natural hazard potential that can happen in a city/ area will be obtained so that priorities of disaster hazard and vulnerability can be identified generally, and the magnitude of the risk can be identified fast. This disaster hazard can be in the form of casualties, the possibility of building, vital facility and infrastructure damages that can cause losses and a stagnant economy.

Preliminary assessment of risk produces illustration of disaster risk obtained from the merger of hazard assessment and vulnerability assessment, in

**Risk (R ) = Hazard (H) x Vulnerability (V)**

Furthermore, this formula can be developed to calculate the Total Risk (R(t)):

$$R(t) = E \times R_S = (E) \times (H) \times (V)$$

Where:
Element Risk (E) shows elements at risk of a disaster whose degree of loss/damage needs to be reviewed. These elements can be in the form of a non-physical element of an area such as population, and a physical element of an area such as buildings, infrastructure and so forth.

Total Risk (Rt) shows the number of the death toll, the number of the injured, building damages, infrastructure damages or the loss in economic value resulted from a disturbance in post earthquake economic activities.

The result of disaster risk preliminary assessment by using the above formula will be used in the development of disaster scenarios, disaster map and evacuation route map. These maps are made in the scale of 1:25.000 for the level of city / regency and in the scale of 1:10.000 for the level of sub-district.

### 3.2.2. Criteria of Disaster Risk Assessment

For rapid risk assessment, the calculation of disaster assessment, vulnerability assessment, early warning system assessment, and capacity assessment needs to be done. For those phases, a justification from experts is needed in giving evaluative weight ranging from 1 to 5. For hazard potential, score 1 means that the hazard potential in an area is very low, whereas score 5 means that the hazard potential in an area is very high. Score 2 to 4 stands in between.

Likewise, for tsunami early warning system and vulnerability, score 1 is for very low degree of early warning system and vulnerability, and score 5 for very high one. Vulnerability includes the vulnerability of buildings, infrastructure (roads, bridges, utility system), population, and economy.
Meanwhile, for the capacity, score given is 1 for low capacity and 5 for the highest capacity.

The following tables show an assessment format that can be used by experts in giving assessment based on certain criteria and indicators. The example of criteria and indicators is given at the end of chapter 3 (source: Disaster Mitigation Center of ITB, 2006), and can be further developed according to the need.

**Table 3.1. Hazard Potential Assessment Form**

## A. HAZARD POTENTIAL

| No | Type of Hazard Potential | Score of Hazard Potential |
|---|---|---|
| *A* | Geological Hazard + Collateral Hazard | |
| 1 | Earthquake | |
| 2 | Tsunami | |
| 3 | Landslide | |
| *B* | Technological/Industrial Hazard | |

**Table 3.2. Early Warning System Assessment Form**

## B. Early Warning System

| No | Type | Score |
|---|---|---|
| 1 | Dissemination System | |
| 2 | Infrastructure | |

**Table 3.3. Vulnerability Assessment Form**

## C. VULNERABILITY

| No | Type of Vulnerability | Score of Vulnerability to Hazard Potential | | | | |
|---|---|---|---|---|---|---|
| | | Geological Hazard | | | Technological/ Industrial Hazard | Other Hazards |
| | | Gempa | Tsunami | Landslide | | |
| 1 | Vital Buildings | | | | | |
| 2 | Infrastructure System: | | | | | |
| | 2.a. Roads & Bridges | | | | | |

| No | Type of Vulnerability | Score of Vulnerability to Hazard Potential | | | | |
|---|---|---|---|---|---|---|
| | | Geological Hazard | | | Technological/ Industrial Hazard | Other Hazards |
| | | Gempa | Tsunami | Landslide | | |
| | 2.b. Municipal Waterworks | | | | | |
| | 2.c. Electricity (State-owned Electricity Company) | | | | | |
| | 2.d. Telecommunication | | | | | |
| 3 | Population Density | | | | | |
| 4 | Socioeconomic | | | | | |

**Table 3.4. Local Capacity Assessment Form**

**D. REGIONAL CAPACITY**

| No | Type of Capacity | Score |
|---|---|---|
| 1 | Identification of Local Government's Capacity | |
| 2 | Identification of Community Capacity | |
| 3 | Identification of Related Stakeholder's Capacity | |
| 4 | Identification of Local Wisdom | |
| 5 | Identification of the Media's Role | |

## 3.3. Development of Disaster Scenarios and of Disaster Management Initiative

After identification of potential of areas related to tsunami and also risk preliminary assessment, the next phase is developing earthquake and tsunami scenarios and also efforts of disaster handling and management. The development of disaster scenarios includes:

(1) Earthquake and Tsunami Incidents

The scenario of earthquake and tsunami occurences is done by using tsunami modeling and simulation comprising information concerning the earthquake magnitude, epicenter, time of occurence, tsunami run up (the height of a tsunami at the coast), tsunami travel time, tsunami duration and the height of inundation. With a scenario of earthquake and tsunami occurences, a damage scenario, a tsunami early warning system scenario and efforts of the management starting from the earthquake, tsunami rising, tsunami approaching the coast, tsunami reaching the land and repeatedly hitting the land to the end of tsunami attack will be able to be made.

(2) Damages Caused by Earthquake and Tsunami

Assessment of damages caused by an earthquake and tsunami is made based on the scenario of earthquake and tsunami occurences. The scenario of damages incurred may include:

1. Physical damages (means and facilities) incurred either in coastal areas or in maritime areas.
2. Non-physical damages (humans and others) incurred either in coastal areas or in maritime areas.

(3) Tsunami Early Warning System and Emergency Response Condition

The moments when an earthquake and tsunami attack are situations where the condition is in the state of emergency which needs to be handled immediately and responsively especially when there are casualties (die and injured) and the damage of various physical means and facilities. Therefore, scenario development of tsunami early warning system and emergency response condition is needed that can be developed based on the following scenarios:

1. The tsunami early warning system functions effectively
2. The tsunami early warning system does not function effectively

(4) Efforts of Tsunami Handling and Management

The efforts of tsunami handling and management ideally start long before the occurence. These efforts known as mitigating efforts, that is, all actions to mitigate the effect of a disaster that can be done before the disaster happens including preparedness and long-term, middle-term and short-term risk mitigating actions. Disaster mitigation is part of disaster management cycle (see figure 3.3) which can also be done to anticipate an emergency response situation after a tsunami.

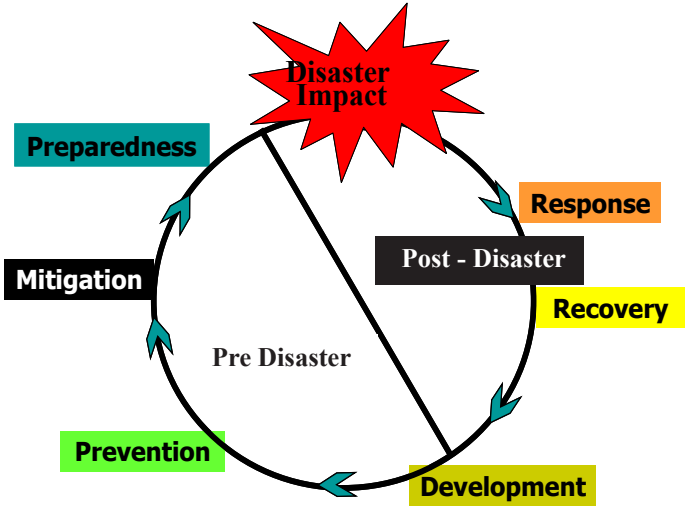



Figure 3.3. Disaster Management Cycle

Mitigation can be categorized into structural mitigation and non-structural mitigation. Structural mitigation relates to buildings engineering efforts to withstand the strength of an earthquake, reinforce existing buildings which are known to be vulnerable to earthquake and tsunami hazards, and stifle a tsunami with vegetation planting on the coast. While the efforts of non-structural mitigation is non-physical such as land use planning adjusted to the area vulnerability, the regulations, the implementation and law enforcement of construction

regulations such as employing effective building standards and regulations, improving community awareness and preparedness (public education campaign, TOT, community development, etc.).

Comprehensively, the illustration of disaster scenarios A1, A2, B1, and B2 can be seen as follows:

**Table 3.5. Disaster Scenario**

| MEDIUM DAMAGE (PARTLY DESTROYED) SCENARIO – SCENARIO A | | |
|---|---|---|
| | **Scenario A1 = Effective TEWS** | **Scenario A2 = Ineffective TEWS** |
| *A STRONG EARTHQUAKE HAPPENS FOLLOWED BY LIQUEFACTIONI AND LANDSLIDE:* | | |
| Physical condition : | • Houses and buildings are partly destroyed<br>• Shelters are not destroyed<br>• Roads and bridges are not destroyed, only damaged<br>• Electricity, waterworks and communication means are not destroyed<br>• Tsunami Early Warning System Infrastructure functions effectively | • Houses and buildings are partly destroyed<br>• Shelters are not destroyed<br>• Roads and bridges are not destroyed , only damaged<br>• Electricity, waterworks and communication means are not destroyed<br>• Tsunami Early Warning System Infrastructure functions but not effectively |
| Human condition : | • People cannot get out of some damaged buildings<br>• People are not isolated because the transportation access are not destroyed<br>• People have had knowledge of what they must do during an earthquake | • People cannot get out of some damaged buildings<br>• Because the transportation access are not destroyed, people are not isolated<br>• Only some people who have had knowledge of what they must do during an earthquake |
| A. Non-structural Mitigation Preparedness training for people: | • Self-protection during an earthquake: duck, cover, hold movements<br>• As the earthquake wanes, “Earthquake Evacuation” to open areas avoiding dangerous buildings<br>• Anticipate an aftershock by avoiding dangerous buildings or infrastructure<br>• Seek information about the potential of tsunami if the earthquake is strong enough to related institutions (Pusdalops BPBD) | • Self-protection during an earthquake: duck, cover, hold movements<br>• As the earthquake wanes, “Earthquake Evacuation” to open areas avoiding dangerous buildings<br>• Anticipate an aftershock by avoiding dangerous buildings or infrastructure<br>• Seek information about the potential of tsunami if the earthquake is strong enough to related institutions (Pusdalops BPBD) |
| Capacity Building of the Local Government: | | • Seek information about the potential of tsunami to related institutions (BMG), with the early warning system functioning but not effectively<br>• Trainings about how to distribute a tsunami early warning to the community<br>• Quick Response Team (TRC) needs to be trained<br>• The establishment of taskforces related to disaster management |

## Development Phase Disaster Scenario :

| MEDIUM DAMAGE (PARTLY DESTROYED) SCENARIO – SCENARIO A | | |
|---|---|---|
| | **Scenario A1 = Effective TEWS** | **Scenario A2 = Ineffective TEWS** |
| *DURING A PHENOMENON MARKING THE PRESENCE Of TSUNAMI:*<br>*Sudden ebb tide, thundering sound, strong wind* | | |
| Physical condition : | • The sea wall and tidal gate are destroyed<br>• Buildings are under water and destroyed<br>• Oil refineries at coastal areas are destroyed<br>• Cars and other heavy objects are taken along by the tsunami<br>• Foundations are eroded<br>• Spreading through the river<br>• Under ground facilities are under water<br>• Oil and gas are spilled<br>• Fire, causing damages<br>• Boats and ships are damaged<br>• Damages at fish cultivation places and trees<br>• Damages of harbor facilities<br>• Damages of buildings that break the wave<br>• Trash and floated objects affect coastal walls and buildings<br>• The place where oil and gas come out<br>• Sea transportation is stopped<br>• Boats and ships crash | • The sea wall and tidal gate are destroyed<br>• Buildings are under water and destroyed<br>• Oil refineries at coastal areas are destroyed<br>• Cars and other heavy objects are taken along by the tsunami<br>• Foundations are eroded<br>• Spreading through the river<br>• Under ground facilities are under water<br>• Oil and gas are spilled<br>• Fire, causing dam<br>• Boats and ships are damaged<br>• Damages at fish cultivation places and trees<br>• Damages of harbor facilities<br>• Damages of buildings that break the wave<br>• Trash and floated objects affect coastal walls and buildings<br>• The place where oil and gas come out<br>• Sea transportation is stopped<br>• Boats and ships crash<br>• A leakage of oil and gas |
| Human condition : | • Several damages happen on the coast and a small number of people who are late in making evacuation are taken along by the tsunami<br>• The second tsunami causes damages<br>• Some are taken along to the ocean by the tsunami<br>• Human evacuation route is not blocked, so that many people successfully make an evacuation<br>• Some are on ruined ships and boats<br>• Many visitors, divers, swimmers are safe | • Several damages happen on the coast and a small number of people who are late in making evacuation are taken along by the tsunami<br>• The second tsunami causes damages<br>• Some are taken along to the ocean by the tsunami<br>• Human evacuation route is not blocked, so that many people successfully make an evacuation<br>• Some are on ruined ships and boats<br>• Many visitors, divers, swimmers are safe |
| Structural Mitigation: | • Provision of emergency tents<br>• Provision of the emergency necessities | • Provision of emergency tents<br>• Provision of the emergency necessities |
| ***WHEN TSUNAMI ENDS*** | | |
| Physical condition : | • Spreading of fire<br>• Destruction on agricultural areas<br>• Water contamination | • Spreading of fire<br>• Destruction on agricultural areas<br>• Water contamination |
| Non-Structural Mitigation:<br>A. Community Preparedness | • **Training for the preparation of disasters thus the recovery phase will be implemented faster** | • **Training for the preparation of disasters thus the recovery phase will be implemented faster** |
| B. Capacity Building of the Local Government: | • Table top simulation for the warning when tsunami ends<br>• Training for rescuing missing and displaced persons<br>• Preparing a list of occurring destructions | • Table top simulation for the warning when tsunami ends<br>• Training for rescuing missing and displaced persons<br>• Preparing a list of occurring destructions |

| HEAVILY DAMAGED SCENARIO (TOTAL DESTRUCTIONS) – SCENARIO B | | |
|---|---|---|
| | Scenario B1 = Effective TEWS | Scenario B2 = Ineffective TEWS |
| *A STRONG EARTHQUAKE HAPPENS FOLLOWED BY LIQUEFACTIONI AND LANDSLIDE:* | | |
| **Physical Condition :** | • Houses and buildings are destroyed, thus the road is filled with material debris.<br>• The shelter is destroyed<br>• Road and bridge are destroyed<br>• Electricity, drinking water and communication facility are destroyed<br>• Tsunami Early Warning System Infrastructure functions effectively | • Houses and buildings are destroyed, thus the road is filled with material debris.<br>• The shelter is destroyed<br>• Road and bridge are destroyed<br>• Electricity, drinking water and communication facility are destroyed<br>• Tsunami Early Warning System Infrastructure functions effectively |
| **Human Condition:** | • Only a few people trapped in destroyed buildings<br>• Only a few people are panicking because the roads are closed down due to collapsed buildings<br>• The community is isolated because the access of road and brigde is disrupted. | • Most people are trapped in destroyed buildings<br>• Most people are panicking because the roads are closed down due to collapsed buildings<br>• The community is isolated because the access of road and brigde is disrupted. |
| A. Non-Structural Mitigation Community Preparedness Training: | • **Self-protection during an earthquake: duck, cover, hold movements**<br>• **As the earthquake wanes, "Earthquake Evacuation" to open areas avoiding dangerous buildings**<br>• **Anticipate an aftershock by avoiding dangerous buildings or infrastructure**<br>• **Seek information about the potential of tsunami if the earthquake is strong enough to related institutions (Pusdalops BPBD)** | • **Self-protection during an earthquake: duck, cover, hold movements**<br>• **As the earthquake wanes, "Earthquake Evacuation" to open areas avoiding dangerous buildings**<br>• **Anticipate an aftershock by avoiding dangerous buildings or infrastructure**<br>• **Seek information about the potential of tsunami if the earthquake is strong enough to related institutions (Pusdalops BPBD)** |
| Capacity Building of the Local Government: | | • **Seek information about the potential of tsunami to related institutions (BMG), with the early warning system functioning but not effectively**<br>• **Trainings about how to distribute a tsunami early warning to the community**<br>• **Quick Response Team (TRC) needs to be trained**<br>• **The establishment of taskforces related to disaster management** |
| *DURING A PHENOMENON MARKING THE PRESENCE OF TSUNAMI:*<br>*Sudden ebb tide, thundering sound, strong wind* | | |
| Physical Condition | • There are two possibilities of condition, the first one is the tsunami early warning system infrastructur's destroyed but the siren rung. The second condition is that by having the early warning system destroyed, the siren is also destroyed and did not ring. | • There are two possibilities of condition, the first one is the tsunami early warning system infrastructur's destroyed but the siren rung. The second condition is that by having the early warning system destroyed, the siren is also destroyed and did not ring. |

| HEAVILY DAMAGED SCENARIO (TOTAL DESTRUCTIONS) – SCENARIO B | | |
|---|---|---|
| | Scenario B1 = Effective TEWS | Scenario B2 = Ineffective TEWS |
| *A STRONG EARTHQUAKE HAPPENS FOLLOWED BY LIQUEFACTIONI AND LANDSLIDE:* | | |
| Human and the Environmental Conditions: | • The debris and remains of the buildings are covering the tsunami evacuation road<br>• Livelihood stops<br>• Fire starts to occur | • The debris and remains of the buildings are covering the tsunami evacuation road<br>• Livelihood stops<br>• Fire starts to occur |
| 1. Non-Structural Mitigation<br>A. Training for the Community's Preparedness : | • There is an effective mitigating effort for example training for the community thus they will have knowledge on the presence of sirens which signaling danger, so they will have the awareness of preparing themselves to move to higher altitude and also communicate the message to other members of the community by using traditional media such as Kentongan (long bamboo percussion instrument used as notification media), Bedug (large drum usually located in a mosque), Kulkul, etc. | • There is an effective mitigating effort for example training for the community thus they will have knowledge on the presence of sirens which signaling danger, so they will have the awareness of preparing themselves to move to higher altitude and also communicate the message to other members of the community by using traditional media such as Kentongan (long bamboo percussion instrument used as notification media), Bedug (large drum usually located in a mosque), Kulkul, etc. |
| **B. Capacity Building of the Local Government :** | • **Table top simulation, that is, information dissemination after receiving the early warning sign from BMG**<br>• **Providing quick response to the victims because the road to evacuation spot is not blocked by the debris**<br>• **Public and private service provisions are controlled by the tsunami warning**<br>• **The personnel of local government will be given training and knowledge on the closest alternative evacuation routes to be alet whenever the closest evacuation routes are blocked by the debris.**<br>• **Table top simulation is used when sirens do not ring by using the interface agency such as Indonesian Military, Indonesian Police etc, to have it delivered to the Mayor/ Head of District. Then the Mayor will deliver the message to people.** | • **Table top simulation, that is, information dissemination after receiving the early warning sign from BMG**<br>• **Providing quick response to the victims because the road to evacuation spot is not blocked by the debris**<br>• **Public and private service provisions are controlled by the tsunami warning**<br>• **The personnel of local government will be given training and knowledge on the closest alternative evacuation routes to be alet whenever the closest evacuation routes are blocked by the debris.**<br>• **Table top simulation is used when sirens do not ring by using the interface agency such as Indonesian Military, Indonesian Police etc, to have it delivered to the Mayor/ Head of District. Then the Mayor will deliver the message to people.** |
| Structural Mitigation: | • Develop infrastructure of tsunami early warning system that is earthquake-resistance thus the possibility of being destroyed during earthquake is small and the siren will function.<br>• Preparing the tools for early warning actions to the community like siren tower, kentongan/kul kul at the community level, loud speaker in the mosque, etc.<br>• Preparing all tools to deliver information from BMG to local government through five-in-one-mode such as telephone, fax, internet, e-mail, etc. | • Develop infrastructure of tsunami early warning system that is earthquake-resistance thus the possibility of being destroyed during earthquake is small and the siren will function.<br>• Preparing the tools for early warning actions to the community like siren tower, kentongan/kul kul at the community level, loud speaker in the mosque, etc.<br>• Preparing all tools to deliver information from BMG to local government through five-in-one-mode such as telephone, fax, internet, e-mail, etc. |

| HEAVILY DAMAGED SCENARIO (TOTAL DESTRUCTIONS) – SCENARIO B | | |
|---|---|---|
| | Scenario B1 = Effective TEWS | Scenario B2 = Ineffective TEWS |
| *A STRONG EARTHQUAKE HAPPENS FOLLOWED BY LIQUEFACTIONI AND LANDSLIDE:* | | |
| *SAAT TERJADI SECARA BERULANG DAN MENGGENANGI KAWASAN PANTAI DAN AKHIRNYA SURUT* | | |
| Physical condition: | • The sea wall and tidal gate are destroyed<br>• Buildings are under water and destroyed<br>• Oil refineries at coastal areas are destroyed<br>• Cars and other heavy objects are taken along by the tsunami<br>• Foundations are eroded<br>• Spreading through the river<br>• Under ground facilities are under water<br>• Oil and gas are spilled<br>• Fire, causing damages<br>• Boats and ships are damaged<br>• Damages at fish cultivation places and trees<br>• Damages of harbor facilities<br>• Damages of buildings that break the wave<br>• Trash and floated objects affect coastal walls and buildings<br>• The place where oil and gas come out<br>• Sea transportation is stopped<br>• Boats and ships crash<br>• A leakage of oil and gas<br>• Floated debris and material stop the harbor from functioning | • The sea wall and tidal gate are destroyed<br>• Buildings are under water and destroyed<br>• Oil refineries at coastal areas are destroyed<br>• Cars and other heavy objects are taken along by the tsunami<br>• Foundations are eroded<br>• Spreading through the river<br>• Under ground facilities are under water<br>• Oil and gas are spilled<br>• Fire, causing damages<br>• Boats and ships are damaged<br>• Damages at fish cultivation places and trees<br>• Damages of harbor facilities<br>• Damages of buildings that break the wave<br>• Trash and floated objects affect coastal walls and buildings<br>• The place where oil and gas come out<br>• Sea transportation is stopped<br>• Boats and ships crash<br>• A leakage of oil and gas<br>• Floated debris and material stop the harbor from functioning |
| Human condition: | • Several damages happen on the coast and a small number of people who are late in making evacuation are taken along by the tsunami<br>• The second tsunami causes damages<br>• Some are taken along to the ocean by the tsunami<br>• Human evacuation route is not blocked, so that many people successfully make an evacuation<br>• Some are on ruined ships and boats<br>• Many visitors, divers, swimmers are safe | • Several damages happen on the coast and a small number of people who are late in making evacuation are taken along by the tsunami<br>• The second tsunami causes damages<br>• Some are taken along to the ocean by the tsunami<br>• Human evacuation route is not blocked, so that many people successfully make an evacuation<br>• Some are on ruined ships and boats<br>• Many visitors, divers, swimmers are safe |
| Non-structural Mitigation:<br>A. Capacity Building of the Local government | • **There is delegation of roles of six taskforces. They are divided into two parts, i.e. helping casualties and assessing and predicting damages**<br>• **Trainings about pitching an emergency tent and provisioning an effective public kitchen, so that in the evacuation place, the public kitchen can immediately function**<br>• **Trainings for the health taskforce about emergency aid, so that the casualties can be helped at golden time** | • **There is delegation of roles of six taskforces. They are divided into two parts, i.e. helping casualties and assessing and predicting damages**<br>• **Trainings about pitching an emergency tent and provisioning an effective public kitchen, so that in the evacuation place, the public kitchen can immediately function**<br>• **Trainings for the health taskforce about emergency aid, so that the casualties can be helped at golden time** |
| Structural Mitigation: | • Provision of emergency tents<br>• Provision of the emergency necessities | • Provision of emergency tents<br>• Provision of the emergency necessities |

| HEAVILY DAMAGED SCENARIO (TOTAL DESTRUCTIONS) – SCENARIO B | | |
|---|---|---|
| | Scenario B1 = Effective TEWS | Scenario B2 = Ineffective TEWS |
| *A STRONG EARTHQUAKE HAPPENS FOLLOWED BY LIQUEFACTIONI AND LANDSLIDE:* | | |
| *WHEN TSUNAMIS HAPPEN OVER AND OVER AGAIN AND FLOOD A COASTAL AREA AND FINALLY EBB* | | |
| Physical Condition: | • Spreading of fire<br>• Destruction on agricultural areas<br>• Water contamination | • Spreading of fire<br>• Destruction on agricultural areas<br>• Water contamination |
| Non-Structural Mitigation:<br>A. Community Preparedness | • Training for the preparation of disasters thus the recovery phase will be implemented faster | • Training for the preparation of disasters thus the recovery phase will be implemented faster |
| B. Capacity Building of the Personnel at the Local Administrative | • Table top simulation for the warning when tsunami ends<br>• Training for rescuing missing and displaced persons<br>• Preparing a list of occurring destructions | • Table top simulation for the warning when tsunami ends<br>• Training for rescuing missing and displaced persons<br>• Preparing a list of occurring destructions |

## 3.4. Output of Earthquake and Tsunami Disaster Scenarios

SCENARIO A1 The earthquake does not cause serious damages, thus the networks of communication, electricity, water, transportation facility and infrastructure and other infrastructures are still functioning. In this scenario A1 the tsunami early warning system functions effectively.

SCENARIO A2 The earthquake does not cause serious damages, thus the networks of communication, electricity, water, transportation facility and infrastructure and other infrastructures are still functioning. In this scenario A2 the tsunami early warning system functions though ineffectively.

SCENARIO B1 Tsunami happened due to high-scale destructing earthquake. As the result, all infrastructure and networks such as the communication, water, electricity and transportation facility and infrastructure, etc are badly destroyed. In this scenario B1, the tsunami early warning system functions effectively.

SCENARIO B2 Tsunami happened due to high-scale destructing earthquake. As the result, all infrastructure and networks such as the communication, water, electricity and transportation facility and infrastructure, etc

are badly destroyed. In this scenario B2, the tsunami early warning system functions but ineffectively. The matrix of these four scenarios could be seen in Table 3.5

Table 3.6 Criteria for Rapid Risk Assesment (source: I wayan Sengara):

**A. CRITERIA OF ASSESSMENT/EVALUATION OF HAZARD POTENTIAL**

| Assessment of Earthquake Hazard Potential | |
|---|---|
| **Grade** | **Criteria** |
| 5 | To be located in Zone 5 and 6 at the Indonesian Earthquake Map SNI-2002 |
| 4 | To be located in Zone 4 at the Indonesian Earthquake Map SNI-2002 |
| 3 | To be located in Zone 3 at the Indonesian Earthquake Map SNI-2002 |
| 2 | To be located in Zone 2 at the Indonesian Earthquake Map SNI-2002 |
| 1 | To be located in Zone 1 at the Indonesian Earthquake Map SNI-2002 |

| Assessment of Tsunami Hazard Potential | |
|---|---|
| **Grade** | **Criteria** |
| 5 | To be located in close proximity with subduction earthquake zones in the sea that have the potential of tsunami with extremely flat sea bathimetric and topography. The distance between the city and the beach is less than 5 km, with less than 10% flatness. |
| 4 | To be located in close proximity with subduction earthquake zone that have the potential of tsunami with relative flat dept sea , 5-10 km, 20% |
| 3 | To be located in close proximity with subdiction earthquake zones that have the potential of tsunami, the potential of mediocre tsunami, 10-15 km, 30% |
| 2 | To be located in close proximity with subdiction earthquake zones that have potential of tsunami, the potential of low tsunami, 15-25 km, 40% |
| 1 | To be located in close proximity with subdiction earthquake zones with the potential of tsunami, the potential of tsunami is quite low, > 25 km, > 40% |

## A. CRITERIA OF ASSESSMENT/EVALUATION OF HAZARD POTENTIAL (Continued)

| Landslide Potential Hazard Assesment | |
|---|---|
| **Grade** | **Criteria** |
| 5 | Landslide often occurs, area topography varied, most of the area are cliffs with soft soil and ineffective rainwater drainage and land use condition |
| 4 | Landslide often occurs, area topography varied and many steep cliffs with soft soil |
| 3 | Landslide often occurs in certain climate condition, area topography is varied |
| 2 | Landslide seldom occurs |
| 1 | Landslide potentials are very low |

| Hazard Technological Potential Assesment | |
|---|---|
| **Grade** | **Criteria** |
| 5 | Industry that contains high hazardous chemical substances, both airborne and flammable, the location is in extremely close proximity with residential area |
| 4 | Industry that contains medium hazardous chemical substances, both airborne and flammable, the location is in close proximity with esidential area |
| 3 | Industry that contains low hazardous chemical substances, both airborne and flammable, the location is in enough close with residential area |
| 2 | Industry that contains less hazardous chemical substances, both airborne and flammable, the location is in far from residential area |
| 1 | Industry that contains least hazardous chemical substances, both airborne and flammable, the location is in extremely far from residential area |

## B. ASSESSMENT/VALUATION OF EARLY WARNING SYSTEM CRITERIA

| Early Warning System Infrastructure Assessment | |
|---|---|
| **Grade** | **Criteria** |
| 5 | If there is a TEWS system that functions effectively in an area |
| 4 | If there is a TEWS system that functions quite effectively quite in an area |
| 3 | If there is a TEWS system that functions does not effectively in an area |
| 2 | If there is a TEWS system that functions in an area but it does function |
| 1 | If there is a TEWS in an area |

## C. ASSESSMENT/VALUATION OF VULNERABILITY CRITERIA

| Building Vulnerability Assessment | |
|---|---|
| **Grade** | **Criteria** |
| 5 | **Earthquake**: More than 80% buildings are designed and built without reinforcement |
| | **Tsunami**: More than 80% buildings are designed and built without reinforcement (earthquake proof) |
| | **Landslide**: More than 80% buildings are located near high and steep slopes |
| 4 | **Earthquake**: 60-80% buildings are designed and built without reinforcement |
| | **Tsunami**: 60-80% buildings are designed and built without reinforcement (earthquake proof) |
| | **Landslide**: 60-80% buildings are located near high and steep slopes |
| 3 | **Earthquake**: 40-60% buildings are designed and built without reinforcement (earthquake proof) |
| | **Tsunami**: 40-60% buildings are designed and built without reinforcement (earthquake proof) |
| | **Landslide**: 40-60% buildings are located near high and steep slopes |

## C. ASSESSMENT/VALUATION OF VULNERABILITY CRITERIA (Continued)

| | |
|---|---|
| 2 | **Earthquake**: 60-80% buildings are designed and built with reinforcement (earthquake proof) |
| | **Tsunami**: 60-80% buildings are located far from coastal area with sloping topography |
| | **Landslide**: 60-80% buildings are located far from high and steep slopes |
| 1 | **Earthquake**: 80-100% buildings are designed and built with reinforcement (earthquake proof) |
| | **Tsunami**: 80-100% buildings are located far from coastal area with sloping topography |
| | **Landslide**: 80-100% buildings are located far from high and steep slopes |

| Infrastructure Vulnerability Assessment | |
|---|---|
| **Grade** | **Criteria** |
| 5 | Roads/bridges infrastructure, PDAM water pipeline, PLN electricity grid and Telkom telecommunications grid are **VERY VULNERABLE** against each danger hazards: (a) Earthquake, ((b) Tsunami), (c) Landslide. |
| 4 | Roads/bridges infrastructure, PDAM water pipeline, PLN electricity grid and Telkom telecommunications grid are **VULNERABLE** against each danger hazards: (a) Earthquake, ((b) Tsunami), (c) Landslide. |
| 3 | Roads/bridges infrastructure, PDAM water pipeline, PLN electricity grid and Telkom telecommunications grid are **QUITE VULNERABLE** against each danger hazards: (a) Earthquake, ((b) Tsunami), (c) Landslide. |
| 2 | IRoads/bridges infrastructure, PDAM water pipeline, PLN electricity grid and Telkom telecommunications grid are **SECURE** against each danger hazards: (a) Earthquake, ((b) Tsunami), (c) Landslide. |
| 1 | IRoads/bridges infrastructure, PDAM water pipeline, PLN electricity grid and Telkom telecommunications grid are **VERY SECURE** against each danger hazards: (a) Earthquake, ((b) Tsunami), (c) Landslide. |

| Population Density Vulnerability Assessment | |
|---|---|
| **Grade** | **Criteria** |
| 5 | Residential population is **highly dense** (>750 person/km$^2$) and highly vulnerable against each danger hazards: (a) Earthquake, (b) Tsunami, (c) technology/industry |
| 4 | Residential population is **dense** (501-750 person/km$^2$) and highly vulnerable against each danger hazards: (a) Earthquake, (b) Tsunami, (c) technology/industry |
| 3 | Residential population is **quite dense** (251-500 person/km$^2$) and highly vulnerable against each danger hazards: (a) Earthquake, (b) Tsunami, (c) technology/industry |

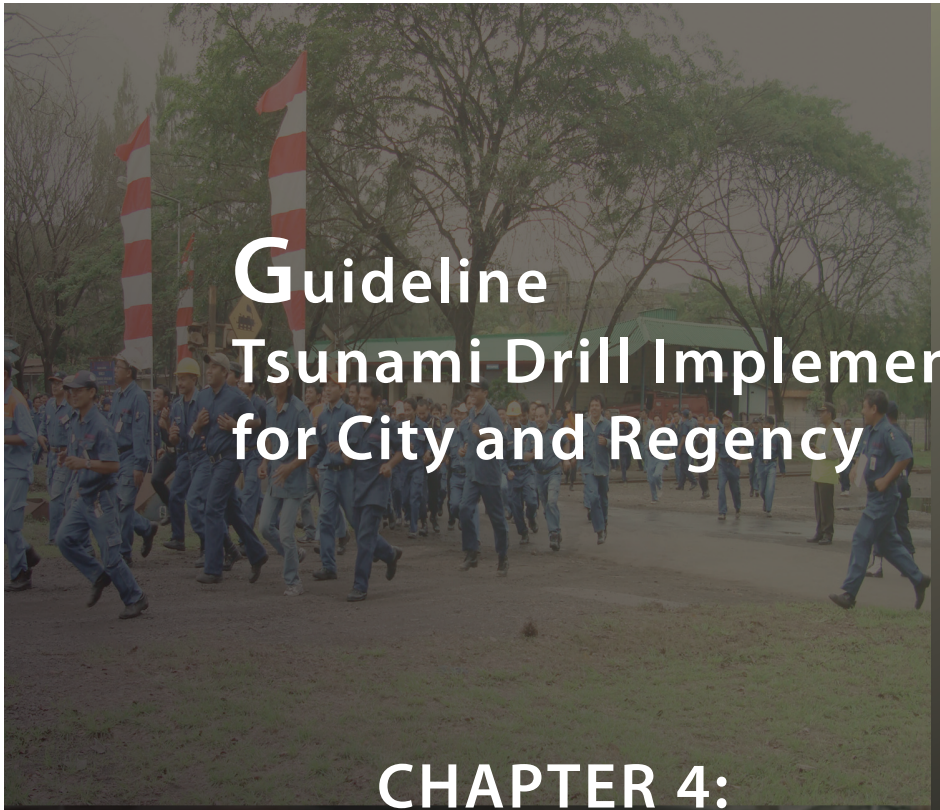
## C. ASSESSMENT/VALUATION OF VULNERABILITY CRITERIA (Continued)

| | |
|---|---|
| 2 | Residential population is **sparse** (100-500 person/km$^2$) and highly vulnerable against each danger hazards: (a) Earthquake, (b) Tsunami, (c) technology/industry |
| 1 | Residential population is **highly sparse** (<100 person/km$^2$) and highly vulnerable against each danger hazards: (a) Earthquake, (b) Tsunami, (c) technology/industry |

| Economy Vulnerability Assessment | |
|---|---|
| **Grade** | **Criteria** |
| 5 | Economy (identified from average livelihood of population) is **highly disturbed** by the impact from each potential hazard: (a) Earthquake, (b) Tsunami, (c) technology/industry |
| 4 | Economy (identified from average livelihood of population) is **disturbed** by the impact from each potential hazard: (a) Earthquake, (b) Tsunami, (c) technology/industry |
| 3 | Economy (identified from average livelihood of population) is **quite disturbed** by the impact from each potential hazard: (a) Earthquake, (b) Tsunami, (c) technology/industry |
| 2 | Economy (identified from average livelihood of population) is **slightly disturbed** by the impact from each potential hazard: (a) Earthquake, (b) Tsunami, (c) technology/industry |
| 1 | Economy (identified from average livelihood of population) is **not disturbed** by the impact from each potential hazard: (a) Earthquake, (b) Tsunami, (c) technology/industry |

## D. LOCAL CAPACITY

| Regional / Local Capacity Assessment | |
|---|---|
| **Grade** | **Criteria** |
| 1 | If the local government, communities, relevant stakeholders and media are **highly unprepared** in facing disaster, especially earthquake and tsunami; local wisdom has not adopted disaster mitigation |
| 2 | If the local government, communities, relevant stakeholders and media are **are unprepared** in facing disaster, especially earthquake and tsunami; local wisdom has not adopted disaster mitigation |
| 3 | If the local government, communities, relevant stakeholders and media are **are prepared** in facing disaster, especially earthquake and tsunami; local wisdom has not adopted disaster mitigation |
| 4 | If the local government, communities, relevant stakeholders and media are **are prepared** in facing disaster, especially earthquake and tsunami; local wisdom has not adopted disaster mitigation |
| 5 | If the local government, communities, relevant stakeholders and media are **are very prepared** in facing disaster, especially earthquake and tsunami; local wisdom has not adopted disaster mitigation |



# Guideline
# Tsunami Drill Implementation for City and Regency

## CHAPTER 4: PLANNING

# Chapter 4
# PLANNING

## 4.1. General

The planning phase is roughly consisting of:

1. Determining disaster risk scenario and disaster management initiative
2. Targeting
3. Selection of location
4. Determining implementation scenario for tsunami drill/run down development
5. Setting performance indicator
6. Building partnership

### 4.1.1. Determining Disaster Risk Scenario and Disaster Management Initiative

Before the tsunami drill conduct, each city / regency must determine which disaster scenario to use in the tsunami drill. There are six scenarios developed in this guidebook which can be seen in matrix 3.1, and they consist of:

- Scenario A1 : medium damage condition with an effective early warning system
- Scenario A2 : medium damage condition with ineffective early warning system
- Scenario B1 : severe damage condition with effective early warning system
- Scenario B2 : severe damage condition with ineffective early warning system

The considerations valuable in determining which scenarios to use are among others:

1. According to the location of city/regency by referring to figure 4.1. Earthquake zone / area map in Indonesia whether the particular area is enlisted as an area prone to earthquakes and tsunamis. If the city/regency is enlisted as a prone area with high risk for earthquakes and tsunamis then the medium or severe scenarios can be implemented in the tsunami drill conduct. Whereas it the city/regency is enlisted as an area with relatively medium risk for earthquakes and tsunamis then only the medium damage condition scenario is to be applied.
2. According to the infrastructure condition of the city. If the existing infrastructure has a high risk then the scenario available for use is the worst scenario in which all of the existing infrastructure can collapse due to the earthquake.

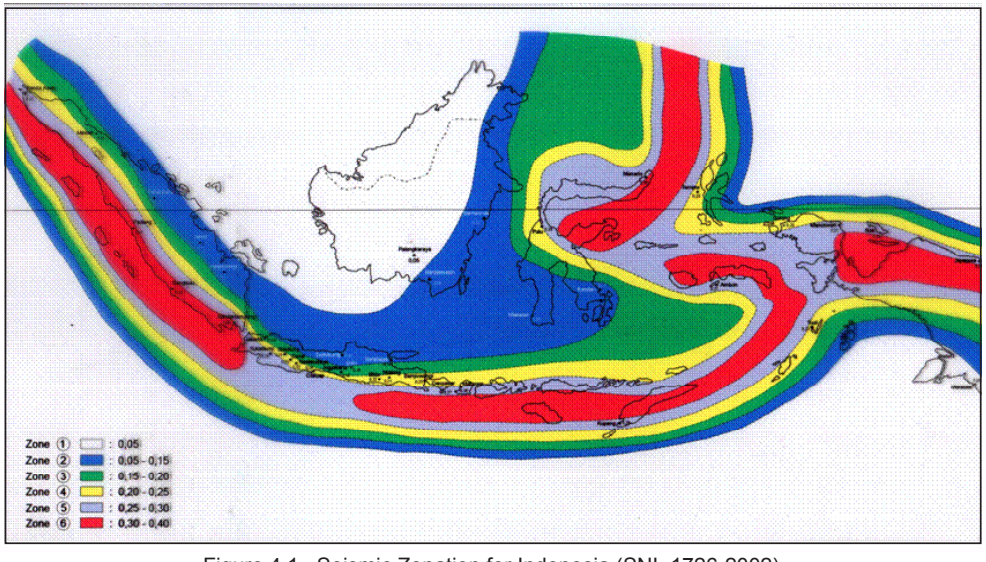



Figure 4.1. Seismic Zonation for Indonesia (SNI, 1726-2002)

### 4.1.2. Targeting

Determining the community target will determine the role of each party in an actual-based tsunami drill. This community target is involved in the overall tsunami drill activity so that their roles do not become passive players only but as active players or stakeholders which determine the overall activity, starting from planning, conduct until the next tsunami drill activities in the future.

The minimum community target to be involved in a tsunami drill in city / regency level should consist of these parties, among others:

1. Local government
2. Members of the Regional House of Representatives (DPRD)
3. Public community
4. School community
5. Non-government organization (NGO)
6. Mass media
7. Corporate community

Each party has its own functions and responsibilities in the tsunami drill.

(1) Local government: As the policy maker in city / regency level, the local government can act as a facilitator in the conduct of various disaster risk reduction efforts, among others is in the tsunami drill. In the tsunami drill, local government elements can conduct their various functions and responsibilities as officials responsible in disaster management particularly tsunami. Aside from that, the local government functions as an activity executor starting from the preparation process until tsunami drill implementation.

(2) Members of the Regional House of Representatives: As a legislative institution, the DPRD generally has a role to encourage the government to include disaster risk reduction aspects in various development programs which are to be conducted on city / regency level. Aside from that, as the makers of various

regional regulations, the members of DPRD can include disaster mitigation elements among others tsunami drill, as a part of the regional regulations including to obtain supporting funds. In tsunami drill, the members of DPRD can join as participants or observers which can assess the importance of tsunami training to increase the city's/regency's resilience in overcoming disasters.

(3) Public community: as a member of community in a city / regency, the public community is the main target in tsunami drill implementation. Tradition leaders, religious leaders and community leaders among the public community can be involved in the tsunami drill implementation as mediator leaders to invite the participation of common people in the tsunami drill. By involving the public community in tsunami drill, they can have increased ability in overcoming disasters, in the end they can reduce the loss and casualitis in disastrous events, particularly tsunami.

(4) School community: consists of students, teachers/lecturers, school committee and other parties, which should be involved in the tsunami drill. The school community, particularly students, is one of the community elements most prone to be casualties in various disastrous events. Aside from public community, the school community is also the community party with the largest number of members in city/regency level. Therefore, it becomes a necessity that the school community is made a target in the tsunami drill.

(5) Non-Government Organization: is an important target in tsunami drill. The NGOs can become the extension arm of government to implement various risk reduction efforts in smaller level such as in municipality or village level. The capability of NGO to work on grass root level becomes one of the strength that can be utilized in empowering the community to be involved in tsunami drill.

(6) Mass media: Both printed and electronic, have a strong role in influencing the knowledge and behavior of community. By involving the mass media, the impact of various disaster management efforts becomes broader and can reach smaller depths of the area. The employment of mass media as an information

dissemination tool is very effective in terms of time and the amount of community target. Disaster risk reduction information which is disseminated through various mass media channels in the correct and concise manner would be one of the ways to increase community awareness and preparedness in overcoming disasters, particularly tsunami.

(7) Corporate community: is an important target in tsunami drill particularly due to its capability in financial sector. By involving the business community, various barriers in financial issues of tsunami drill is expected to be minimized. There is also high level of importance to increase the level of disaster management capability from this community since they may have a close connection with the issues which can trigger disaster events, such as industries using various chemical substances.

Aside from determining the community target, it is important to determine also in tsunami drill the amount of involved participants. This decision depends from the officials' capability in conducting tsunami drill which is highly related with funds availability for it. The more citizens involved in the activity, the better the community capacity in overcoming disasters, particularly tsunami, will be.

In determining this amount, the aspects which should be taken into consideration are:

1. The participants have represented all of the resolved target of community aspects
2. Local government element particularly targeted to the Disaster Coordinating Unit
3. The public community and school community have a balanced amount viz. 50% public community and 50% school community.

### 4.1.3. Selection of Location

In determining the location for rehearsal dan D-day, the criteria to be considered are as follow:

(1) Technical aspect:
   a. The location chosen is one of the inundated location in the inundation map
   b. Is an area prone to the perils of earthquakes
   c . Is an area prone to tsunami occurrence

(2) Giving broad impact (economic, social, environment and tourism),

(3) Considering the security issue.

### 4.1.4. Determining Implementation Scenario for Tsunami drill/run down Development

The conduct of tsunami drill is to be determined based on the three following scenarios:

1. Preparation of tsunami early warning system, by preparing information channel from BMG to *Pusdalops* mayor of regent through five in one mode.
2. Preparation of evacuation early warning system infrastructure which consists of evacuation warning infrastructure and evacuation infrastructure.
3. Enhance the capacity of regional goverment apparatus related with disaster management and capacity through of workshop, TOT, contingency plan and SOP development (TTS) Communication and coordination simulation (*Gladi Posko*), among others.
4. Enhance the community preparedness and awareness through media campaign, public education campaign, TOT, community development and development of media capacity.

The development of Run Down Tsunami Drill is determined according to golden time, namely the crucial moment of tsunami warning issue starting from the occurrence of earthquake until when the tsunami is about to occur. This golden time needs 30-35 minutes from the start of earthquake until tsunami in which during those times the BMG will issue warnings which will determine the appropriate response towards the earthquake and tsunami.

Aside from golden time, in the run down development, a consideration should be taken in resolving which disaster scenario to be chosen, whether it is Scenario A (A1, A2) or Scenario B (B1, B2).

Based on golden time and the fixed disaster scenario, then the run down on the actual day of tsunami drill can be developed. The run down design which will be the overall activity in tsunami drill can be adjusted based on the actual inputs and needs according to the related city/regency. The rationale that earthquake and tsunami can happen anywhere anytime is used as future reference for activity design, particularly for the pre-tsunami event. The D-day of tsunami drill is designed according to several event phases, viz.:

1. Pre-tsunami
2. During the earthquake and tsunami
3. Post-tsunami

(1) Pre-Tsunami

Pre-tsunami activity can be conducted in several points in which the community deployment is conducted. Several important things to be considered in pre-tsunami event are as follow:

a. Determining the location for mass assembly activity center: the criteria to determine the location for mass assembly activity center are, among others (1) can hold a massive amount of people/community, (2) within a location that is easy to reach and widely-known by local community, (3) is the area / spot that is prone for tsunami. Mass assembly can be conducted in several spots to show various community activities in daily lives.

b. Types of event for mass assembly: determining the types of pre-tsunami event will determine the success rate in mass assembly/deploying to follow the tsunami drill activity. The types of event which

can be to gather the masses are among others: (1) has the nature of entertaining the community, (2) giving incentives (among others in the form of door prize) to the community for their willingness to come and participate in tsunami drill activity, (3) although only as an exercise, the design of event during the pre-tsunami should be done as natural as possible and as similar to the daily lives of local community as possible.

(2) During the earthquake and tsunami

During the event of an earthquake, it is very important to inform the community about the things that they need to do. Information regarding duck, cover, and hold need to be disseminated both on pre-tsunami event and through information medias utilized in previous socialization and campaign for the community.

Earthquake simulation with the usage of sound effects can help making as if an actual earthquake is really happening

Tsunami Warnings (I until IV): tsunami warning issued by BMG since the start of earthquake until the tsunami occurs is comprised of four warnings. These warnings are given to community through various medias both modern (TV, radio, *RAPI* communication channel) and traditional (such as *kul kul* in Bali, *kentongan* in Java, *bedug*, etc). The issue of warning message from BMG will determine the response to be taken both by regional government and the community in facing the earthquake and tsunami disaster. Therefore, data accuracy and usage of proper Bahasa Indonesia are crucial aspects in the issue of warning messages from BMG. The standard of issuing warning by BMG consists of four warnings.

After the first warning from BMG occurred about the location of the upcoming tsunami, an evacuation process should be conducted. The evacuation process is done from the mass assembly points to the previously determined assembly point. It is expected that during evacuation process, the community would perform it seriously and run to the assembly point to calculate evacuation time needed if a tsunami should occur.

When a tsunami comes to a particular city / regency, the communities in locations potential for tsunami are expected to have finished conducting the evacuation process to a safer place. The communities

conduct activities in assembly point (displaced person camp) in the form of emergency response in various available tents such as *Poskotis* tent, media center tents, public kitchen, health tent (Indonesian Red Cross Empowerment), emergency tent and family tent, field sanitation and trauma relief. Through these activities, it is hoped that the duty groups *(Pokgas)* in BPBD can understand and exercise their roles and responsibilities when a disaster should occur whereas the public community can get a more thorough awareness and comprehension regarding various activities related to disaster management.

(3) Post-tsunami

Post-tsunami activities in tsunami drill are focused to the search and rescue of casualties in the disaster area, performed by search and rescue duty groups *(Pokgas)*. Other activities could also be performed by the health duty groups, such as triase demo and displaced person evacuation to the nearest / referred hospital. The Run Down of implementation Tsunami drill D-Day Banten 2007 shown on table 4.1.

### 4.1.5. Setting Performance Indicator

To determine the success rate of a particular tsunami drill activity, performance indicators for activity success rate should be created. The success rate of tsunami drill activity will be made as an evaluation for the organizer to be able to improve similar activities in the future.

Several aspects which can be utilized as indicators in tsunami drill success rate are:

a. Warning and decision making aspect
b. Evacuation and emergency response aid aspect
c. Search and rescue aspect

Table 4.1. Example of Run Down in Cilegon City – Banten Tsunami Drill in 2007

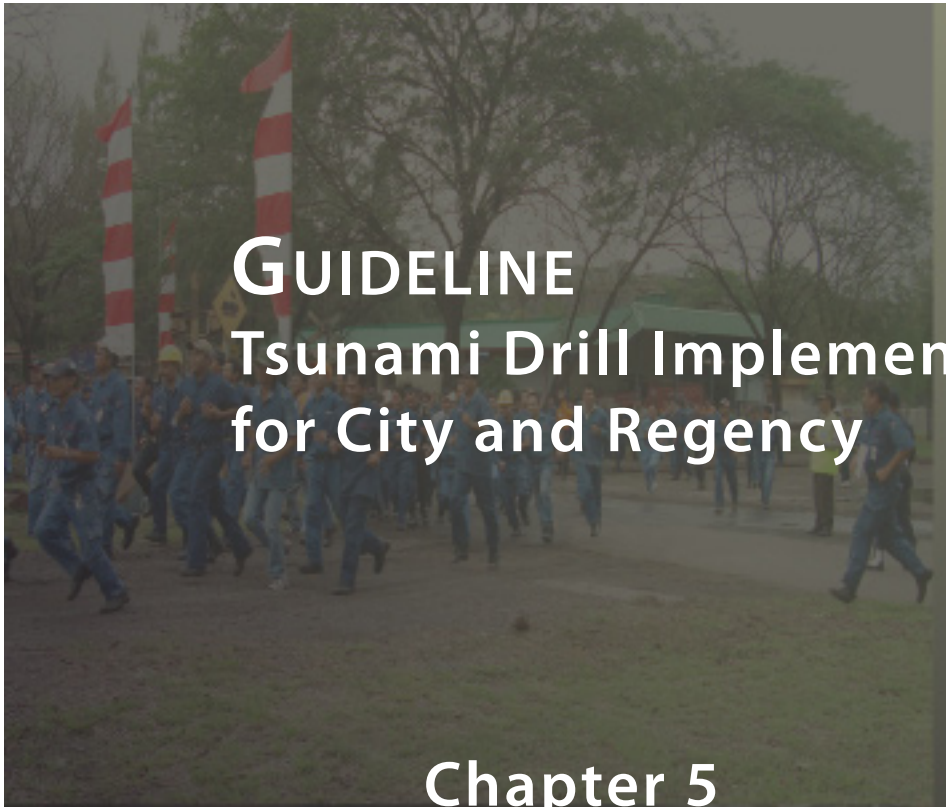
| NO | TIME | ACTIVITY |
|---|---|---|
| 1 | 06:00:00 - 07:00 | **ACTIVITY PREPARATION IN FOUR STARTING POINT LOCATION (PT SELAGO BEACH FIELD, CIWANDAN INDUSTRIAL AREA, PUBLIC JUNIOR HIGH SCHOOL 9 IN CILEGON, AND HOUSING COMPLEX IN SUGIH MOUNTAIN MUNICIPALITY)** |
| 2 | 07:00 - 08:00 | **IN PT SELAGO BEACH FIELD:**<br>• Memorial Service to Commemorate the 2004 Aceh Tsunami and Earthquake Disaster start (take a moment of silence)<br>• Tsunami Buoy Technology Demo |
| 3 | 08:00:00 | **AN EARTHQUAKE OCCURS:**<br>In location: 6.5 LS and 105.4 BT (near Panaitan Island) with the magnitude of 8.0 Mw (Richter Scale) & 20 km depth under the sea. |
| 4 | 08:00:15 - 08:00:45 | **QUAKE AT VI - VII MMI SCALE IS FELT BY THE CIWANDAN COMMUNITY FOR 30 SECONDS WITH 2 QUAKES IN TOTAL** |
| 5 | 08:01:45 | **SIMULATION OF INDUSTRIAL LEAK AND FIRE AND ALSO RESPONSE TO INTERNAL EMERGENCY LEVEL II INDUSTRIAL (WITHOUT SIRENS)** |
| 6 | 08:05:00 | **BMG ISSUES WARNING I TO BE DISPATCHED TO INTERFACE INSTITUTION**<br>***"WARNING I PRACTICE TEST: A POTENTIAL OF MASSIVE TSUNAMI IN BANTEN WEST COAST; CIWANDAN, KKTAU STEEL, ANYER, AS A RESULT OF EARTHQUAKE MAG 8.0 AT 8:00 AM 180KM NORTHWEST CILEGON : BMG"*** |
| 7 | 08:07:00 | **THE RESPONSE OF HEAD OF SATLAK FOR THE OPERATION OF 24/7 RUPUSDALOP SATLAK CILEGON CITY**<br>1. Response from Satlak PB Cilegon City: Ruspusdalop 24/7 → Head of Satlak Cilegon (Mayor) → Order to Activate Sirens + Crisis Center → Coordinators for Zone 1, 2 and 3 + Incident Commander → Response of Pokgas Satlak in accordance with SOP RENKON |
| 8 | 08:07:00 | **BMG ISSUES WARNING II TO BE DISPATCHED TO INTERFACE INSTITUTION**<br>***"WARNING II PRACTICE TEST:A POTENTIAL OF MASSIVE TSUNAMI IN BANTEN WEST COAST AT 08:38 AM ANYER 5M CIWANDAN 5M KKTAU STEEL 4M, EARTHQUAKE MAG 8.0 AT 8:00 AM 180KM NORTHWEST CILEGON:BMG"*** |
| 9 | 08:09 | THE EVACUATION SIREN RINGS<br>• VVIP, guests and communities from PT Selago, Ciwandan Industrial Area, Sugih Mountain Village and Public Junior High School 9 perform an evacuation to the assembly point - Panca Puri Field, facilitated by Satgas officers related in conducting SOP. |
| 10 | 08:09 - 09:38 | RESPONSE OF SATLAK PB CILEGON:<br>**1. Coordination between Pokgas coordinator and his members in performing the RENKON emergency response SOP**<br>**2. Coordination of incident commander with Pokgas coordinator, camp manager, crisis center and mayor.**<br>**3. Resolving INNER CORDON AREA** |

Table 4.1. Example of Run Down in Cilegon City – Banten Tsunami Drill in 2007

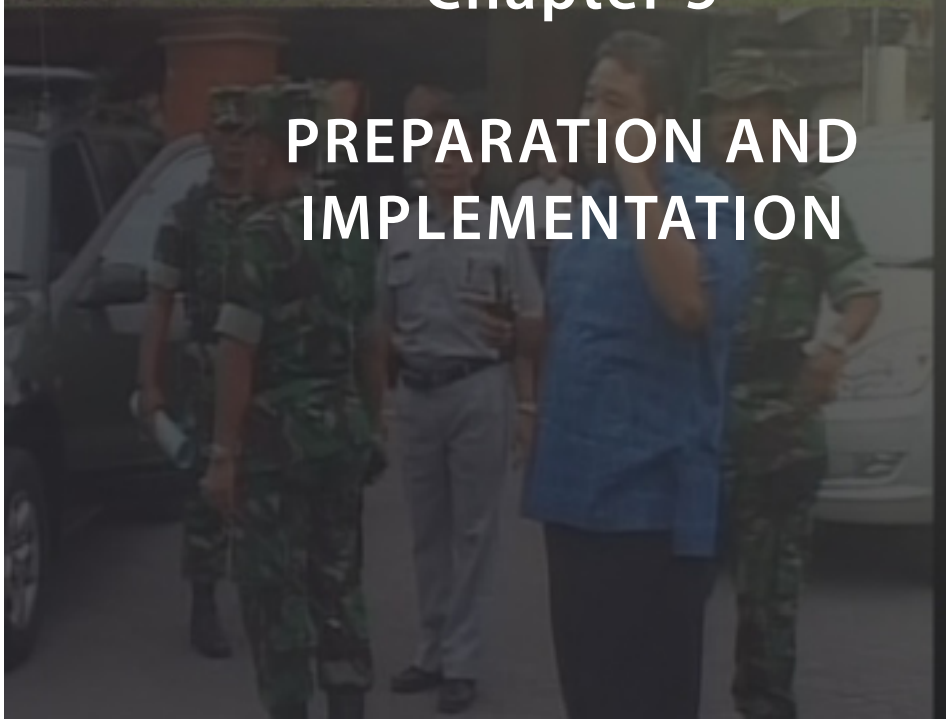
| NO | TIME | ACTIVITY |
|---|---|---|
| 11 | 08:38:00 | **TSUNAMI OCCURS:**<br>**THE FIRST WAVE OF TSUNAMI STARTS TO ENTER THE CIWANDAN BEACH AREA** |
| 12 | 08:48:00 | **BMG ISSUES WARNING III TO BE DISPATCHED TO INTERFACE INSTITUTION**<br>***"WARNING III PRACTICE TEST: MASSIVE TSUNAMI IN ANYER 08:35 5M CIWANDAN 08:40 5M KKTAU STEEL 08:40 4M DUE TO EARTHQUAKE MAG 8.0 AT 8:00 AM 180KM NORTHWEST CILEGON : BMG"*** |
| 13. | 08:38:00 – 10:00:00 | **OPERATIONAL RESPONSE 24/7 CRISIS CENTER SATLAK CILEGON CITY AFTER THE TSUNAMI OCCURED**<br>• **COD in Crisis center**<br>• **INCIDENT COMMANDER DISPATCHED THE DANDIM 0623/CILEGON AND ZONE II COORDINATOR TO ERECT A TACTICAL POST** *(POSKOTIS (POSKO TAKTIS))*<br>• **ACTIVITY IN ASSEMBLY POINT (PANCA PURI SOCCER FIELD)**<br>1. The construction of evacuation point according to damage and need assessment<br>2. The construction of displaced person camp:<br>o The regulation and data collecting for displaced person, emergency tent erection, field hospital construction, etc<br>o Emergency response simulation from disaster *satgas* (Planning, Health, Social, Rehabilitation and SAR) |
| 14 | 10:00:00 | **BMG ISSUES WARNING IV**<br>***"IV PRACTICE TEST: THE TSUNAMI OCCURRED IN BANTEN BEACH AREA HAS ENDED : BMG"*** |
| 15 | 10:10:00 - Selesai | **CASUALTIES SEARCH AND RESCUS PROCESS**<br>1. **TAGGING AND DECONTAMINATION PROCESS BY *NUBIKA AD***<br>2. **LAND CLEARING BY RECONSTRUCTION REHABILITATION DUTY GROUP *(POKGAS)*: PU (PUBLIC WORK OFFICE - HEAVY EQUIPMENT)**<br>3. **CASUALTIES SEARCH AND RESCUE PROCESS BY SAR SATGAS**<br>4. **TRIAGE PROCESS BY HEALTH DUTY GROUP (POKGAS) → REFERRAL TO HOSPITAL**<br><br>**ACTIVITY IN DISPLACED PERSON CAMP: BY CAMP MANAGEMENT**<br>**1. DATA COLLECTING, *POSKOTIS*, TRAUMA RELIEF, DISPLACED PERSON CAMP**<br>**2. PUBLIC KITCHEN, LOGISTIC, WATSAN PROCUREMENT, CLEAN WATER** |
| 16 | 12:00:00 | **ACTIVITY IN DISPLACED PERSON CAMP: BY CAMP MANAGEMENT**<br>• Closing speech from the organizer<br>• VVIP speech<br>• Traditional art show<br>• Door Prize<br>• Closing<br>•<br>**VVIP PRESS RELEASE IN: MEDIA CENTER IN PANCA PURI** |

### 4.1.6. Building partnership

The tsunami drill activity is a very complex activity, starting from its preparation, planning, up to its actual conduct. Therefore, partnership becomes an important step which needs to be done. Developing partnership is performed with various stakeholders related with the conduct, starting from the city / regency government interns consisting of *dinas-dinas (offices)*, DPRD, NGO, public community to the corporate community.



# GUIDELINE
## Tsunami Drill Implementation for City and Regency



## Chapter 5

# PREPARATION AND IMPLEMENTATION

# Chapter 5
# PREPARATION AND IMPLEMENTATION

In the implementation phase, all aspects made and developed in the planning phase is conducted. The implementation phase consists of:

1. Pre-rehearsal
2. Rehearsal - test
3. D-day

## 5.1. Pre-rehearsal Activity

Before the Rehearsal is conducted, there are five activities to be done:

1. Organizing committee consolidation
2. Preparation of tsunami early warning system (Ina-Tews)
3. Preparation of infrastructure for evacuation alert
4. Preparation of local government official related to disaster coordinating unit
5. Community development

### 5.1.1. Organizing Committee Consolidation

In this phase, the committe, particularly the implementation team must already have started coordination and consolidation for the tsunami drill implementation purpose. Various coordination meetings and activity check list needs to be done for each phase of activity implementation in detail.

### 5.1.2. Preparation of Tsunami Early Warning System (Ina-TEWS)

Preparation of tsunami early warning system is part of the structure part of the Ina-TEWS grand design. Several basic infrastructures needed in the tsunami early warning system tsunami and needed by the

Disaster Coordinating Unit among others are the preparation of tsunami warning information channel from BMG to *Rupusdalops Satlak PB* or *BPBD* in city and regency. The multi-mode information channel will determine the decision-making process by the mayor or regent and determine the success rate of warning dissemination to the community.

### 5.1.3. Preparation of Evacuation Alert Infrastructure

The development of evacuation early warning system infrastructure consists of:

- Evacuation warning infrastructure standard:
  1. *Rupusdalops/*Crisis Center
  2. Sirens
  3. 5 in 1 mode communication equipment: (from BMG to Head of Pusdalops BPBD namely computer/ internet e-mail, fax, telephone, SMS – Text message, alarm)
  4. Sign board and banner
  5. Evacuation route and map
  6. Evacuation area/shelter

Figure 5.1. Local Sirens at Denpasar Developed in 2006 and at Cilegon in 2007

- Evacuation infrastructure support such as *kulkul, bedug* etc.

In preparing sign boards, the activity phase is as follow:

- Making the sign boards: They are to be made according to the planned design, namely by using standards consisting of size, color, symbols, amount and message in the sign board. For the banner design, need to remember that the size must be large, and the information should be easy to understand.

Figure 5.2. State Minister of Research and Technology During Tsunami Drill Preparation

- Survey of location to put the sign boards according to the evacuation channel map: through the survey one can determine the sign board erection spots for the Tsunami Drill implementation purpose. The sign board placement should follow the requirements among others to be in inundated area, along the beach and along the evacuation route. Sign board placement along the evacuation route among others in intersections, easy to be seen, in high density areas. Whereas the banner should be placed in strategic places easy to be seen by the community.
- The resolve and erection of sign board and banner: after the survey has been conducted, the resolve and erection of sign board and banner can be performed.

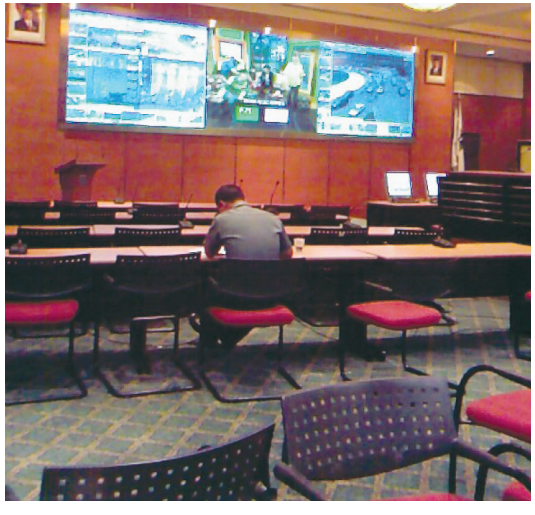


Figure 5.3. Example of Emergency Operation Center (pusdalops) and Crisis Center for Cilegon City and Jakarta Province

Before the rehearsal and D-day, all physical infrastructures should be re-checked and tested to see if they are in proper order.

The tsunami early warning system test should be performed simultaneously with the readiness of regional government official and community.

Aside from that, need to perform maintenance from various structural components which have been prepared for the tsunami drill activity.

### 5.1.4. Preparation of Local Government Official Related to Disaster Coordinating Unit

#### 5.1.4.1. Workshop

Workshop on the regional government level is conducted as an initial step for the preparation of socialization and conduct of various activities related with Tsunami Drill. This workshop is important due to the double role the regional government has in the Tsunami Drill activities:

1. As an actor of Tsunami Drill: targeted particularly to the duty group *(Pokgas)* in BPBD holding important roles in the disaster emergency response condition or situation
2. As an organizing committee: responsible in the overall activity, phase by phase of Tsunami Drill so that it can go on smoothly and successfully.

#### 5.1.4.2. Training for Trainers (TOT)

TOT (Training for Trainer) for regional government apparatus is conducted together with other community aspects.

TOT is an opportunity for government apparatus to increase capability, knowledge and prepared in responding tsunami warning issued by BMG until mass mobilizing for evacuation and and emergency

response purpose during and post-tsunami. In TOT various knowledge are given regarding disaster and tsunami and earthquake disaster management.

In general, several things needed to be taken into consideration in TOT conduct is as follow:

1. Involving the participants, consisting of various community elements namely general community, school community, members of the Regional House of Representatives, NGO and other institutions related with disaster management.
2. Involving experts in their field in giving the materials in TOT
3. The training materials are designed to cover awareness and understanding of natural events which can create tsunami and earthquake, awareness of outside environment towards the potential of tsunami and earthquake, understanding of disaster concept and management, understanding of community and government role in managing disaster and increasing community and government capacity in elevating the vigilance to anticipate tsunami and earthquake in the future.
4. Information dissemination method in TOT does not only consist of lectures but also group discussion, role play and direct practices through various trials related with tsunami and earthquake disaster and also its management including composing a disaster map, evacuation point and road, and tsunami and earthquake evacuation simulation training.

Figure 5.4. Training for Trainers (TOT) for Community Preparedness

### 5.1.4.3. Table Top Simulation Through SOP Development for Tsunami Disaster Management

This activity involves local government official enlisted in *Pokgas Satlak* PB or Regional Disaster Management Agency (BPBD) accompanied by the community stakeholder. Several things to be considered in Table Top Simulation are:

1. Done in informal situation and designed through a constructive discussion among participants.
2. Participants decide and try to resolve the existing issue related with the disaster in which the resolution is based on existing plan and procedure.
3. Every participant is expected to thoroughly express and discuss the issues and their answer.
4. Table Top Simulation needs to have a certain purpose and goal and use the disaster scenario in determining and resolving the existing issue.

Figure 5.5. Table Top Simulation Activity

The purpose of Table Top Simulation is as follow:

1. To identify the existing capacity from the local government institution related with the disaster management (BPBD) particularly towards the earthquake and tsunami.

2. To identify the preparedness of local government official in *BPBD* and the community preparedness in anticipating earthquake and tsunami.
3. To increase the capacity of local government institution in each *Pokgas BPBD* with a clear distribution of role and duties (who is doing what) in tsunami and earthquake disaster management particularly from emergency response side.
4. To increase the personnel capacity from institutions within each *Pokgas BPBD* with a clear distribution of role and duties in tsunami and earthquake disaster management particularly from emergency response side.
5. To achieve a synergy between government official and community in the efforts of managing tsunami and earthquake disaster particularly from emergency response side.
6. To achieve a synergy between government official and community in the conduct of Tsunami Drill through the conduct of field practice simulation for tsunami and earthquake disaster management particularly from emergency response side.

One of the important thing from the process resulted from table top simulation is the development of SOP or emergency response fixed procedure (*PROTAP - Prosedur Tetap*) or contingency plan from *Satlak PB* or BPBD for disaster emergency response. Fixed procedure is guidance for formal implementation according to the respective roles coordinately defined in PROTAP so that the actions performed can achieve the maximum and optimum target

The initial phase of SOP/Protap development is through SWOT analysis (Strength, Weakness, Opportunity and Threat) to form a base for responsibility matrix system.

With audio visual aid and other aids, the development of SOP is to be conducted using the following procedure:

1. SWOT analysis
2. Development of responsibility matrix
3. Table Top Simulation

(1) SWOT Analysis

Has the purpose of identifying stakeholders and their respective roles. The materials discussed in this phase are, among others:

a. Conceptualizing organization structure which can accommodate tsunami warning
b. Conceptualizing the duty, role, and function from each *Pokgas* member enlisted in Regional Disaster Management Agency - BPBD
c. Simulation for Command Post Rehearsal for members of Regional Disaster Management Agency
d. Members coordination in the preparation of rehearsal

The stakeholders involved in the development of SOP/PROTAP are institutions enlisted in *Satlak* PB or local Disaster Management Agency based on Presidential Decree / PERPRES No. 8 Year 2008 from regional government on city / regency level. According to PERPRES 83 Year 2005 on Bakornas PB, the aspects of *Satlak* PB usually consist of several duty groups (Pokgas) among others are:

a. Duty groups for Search, Help and Rescue; the main responsibility of this duty group is to be responsible in searching, helping and rescuing disaster casualties in disaster locations. The members of this duty group consist of *Kodim*, Regional Secretary Government Assistant, (*Public Order Officer*), *City Poltabes* c/q *Kasubag*. *Binmas*, *Kesbang and Linmas Kota*, *Trantib* (Public order officer) and *Satpol PP* for the city, SAR office in the city, the city fire department, the city KPDE office, Community Relationship Department from the City Setda *(Bag. Humas Setda Kota)*, Transportation Department, *Satgas* civil defense unit for village / municipality, local state community, ORARI, Indonesian Red Cross, BMG office for city area, and Drinking Water Regional Company.
b. Duty groups for Health (*Pokgas Kesehatan*): This duty group has the responsibility to handle casualties and evacuation of disaster casualties. This duty group consists of Health Department, the city Secretary Administration Assistant, Indonesian Red Cross, local public hospital, community health centre and trained laymen group.

c. Duty groups for Rehabilitation, Reconciliation and Relocation; during a disaster, this duty group is responsible in erecting the tents, transporting / evacuating victims to evacuation area and perform data collection and inventory which includes means and facilities damage after the disaster occurs. This duty group also offers the heavy equipment availability data which can support the disaster management and the ownership of such equipments can be easily utilized when needed. Whereas the inventory damage data includes facilities such as roads and bridges, offices, market / trade facility, education facility, religious venues, housing complex, utility network, farming and marine means and facilities and also the physical rehabilitation needed for each means and facilities. The members of this duty group consist of general affair Department, Development Administration Assistant, City Poltabes Secretary c/q Kabag Bina Mitra, Kodim, Transportation Department, Setda Facilities Department, Setda Financial Department, BAPPEDA, Education Department, Village Community Empowerment Agency, Park and Sanitation Department, all Head of Sub-District in the city, Head of Village / Municipality on the disaster location, each civil defense unit for village / municipality in the city.
d. Duty groups for Social; with members consisting of Social Welfare Department, Bag. Kesra Setda Kota, the city's Indonesian Red Cross, Women Organization, Population Office, Religious Office, Boy scout, Youth Organization, forum for inter-faith harmony ( FKUB ), *Bag. Umum Setda Kota, Kadin Kot*a.

(2) Developing Responsibility Matrix

To be able to describe the role, authority and responsibility from each duty groups in Satlak PB, there should be an identification and simulation regarding their role, authority and responsibility in tsunami and earthquake disaster management for the Tsunami Drill purpose as a foundation for the SOP development of tsunami emergency response or tsunami contingency plan.

To be able to obtain the role, authority and responsibility from each duty group, a phase simulation is divided into several critical time phase according to the Run Down from the result implementation of Tsunami

Drill which has been developed on previous phase. The result is obtained through discussions conducted among the existing personnel in each duty groups. A Run Down is the timeline for events conducted in Tsunami Drill activity.

In this process, the existing duty groups can be widened according to the needs in each city / regency. For example, during the Tsunami Drill on December 26, 2006 in Bali, four duty groups were widened into 6 Duty Groups with the addition of Vigilance Duty Group and Community Duty Group.

Figure 5.6. Evaluation for Table Top simulation Situation

(3) Table Top Simulation

This activity is the test for the development of responsibility matrix or SOP draft in which this phase is required before actual practice in the field. The materials discussed in Table Top Simulation are as follow:

a. The perfection of organization form which can accommodate tsunami warning
b. The perfection of role, duties, and function from each duty group member enlisted in *Satlak* PB in the city
c. The perfection of for communication and coordination simulation (*Gladi Posko*) from members of the Satlak PB in the city
d. Members coordination in the preparation of rehearsal and D-day

   Table Top Simulation involves all members of duty groups from Satlak PB to anticipate tsunami and earthquake disaster. The discussion performed during the second Table Top Simulation was more focused on the explanation of fixed procedures in managing the existing disasters in each duty group for SOP draft or Contingency Plan.

Table Top Simulation can be performed several times until the SOP developed is felt mature enough and actionable. If necessary, it can be added with communication and coordination simulation activity to strengthen the duty groups institutional development

### 5.1.5. Community Development

#### 5.1.5.1. Increasing Community Awareness

Activities to increase the community awareness and vigilance are socialization and campaigns, which are in the form of:

1. Media Campaign
2. Public Education Campaign

(1) Media Campaign

Information dissemination regarding aspects related with Tsunami Drill should also be conducted through various media such as leaflet, flyer, poster, sign board, evacuation map banner, advertisement and *PSA*. The media campaign dissemination and construction should be done in various public places where the people may come and read the messages (information) given in such various media campaign.

Media campaign in the forms of leaflet and flyer can be disseminated in places such as traffic light intersections, campus, traditional markets, supermarkets, malls and so forth. Posters, sign boards, advertisement and *PSA* can be put in strategic places which enable the people to read the information given. Evacuation map banner can be put along the evacuation lines in Tsunami Drill.

(2) Public Education campaign

For the sake of increasing community information, as part of the Tsunami Drill, there should also be information dissemination and development for public education campaign. This activity can be conducted through various media such as:

Figure 5.7. Public Education Activity

a. Book, booklet, and guidebook: to be disseminated for limited scope through TOT (training of trainer), community development, workshop and socialization to various institutions and so forth. The materials in the book, booklet, and guidebook should be more thorough and informative, and aided with pictures and colors which can help the community in understanding the information/message.

Figure 5.8. TV Talk Show

b. Talk show : TV and / or Radio

The mass media with relatively large community coverage are television and radio. Therefore, through these mass media, the Tsunami Drill can be disseminated in the form of talk show in the efforts to disseminate information of activity to the greater public / community. With the coverage possessed by TV and radio, it is expected that the community can be informed and involved in the Tsunami Drill activity. Aside from that, through the explanation of information related with disaster through talk show, it is expected that the community awareness and knowledge regarding preparedness for disaster can be raised and the community can understand the benefits of participating in Tsunami Drill.

c. Exhibition

In the efforts of raising community capacity and awareness in preparing for tsunami and earthquake, exhibitions on disaster can also be conducted as one of the Tsunami Drill activity series. Several things to be considered in conducting the exhibition are as follow:

- Theme: Deciding a theme should still be in the effort of raising community awareness and capacity
- Time: the exhibition should be conducted before the final practice until the day of conduct so that during practice the community can fully understand the benefits of Tsunami Drill, and not participating in it for the sake of conformity
- Material: the exhibition should be focused on pictures and films regarding tsunami in Indonesia or other countries
- Venue: the ideal exhibition venue is in Tsunami Drill location, as it can mobilize a greater amount of community

### 5.1.5.2. Increasing Community Preparedness

Training for the community can be conducted in the form of TOT and community development.

(1) TOT for the Stakeholder and community

TOT is an initial step from the preparation program for stakeholder and community. Considering that disaster information and tsunami and earthquake management generally are still seen as new information for the community, the ideally community development should also include all stakeholders from the ‘community’, starting from regional government, members of the Regional House of Representatives, private company, mass media, NGO up to the school and public community. This is done to accommodate the paradigm change in disaster management in which disaster management is not solely the responsibility of local government but is a collective responsibility among government, community and related stakeholders.

Through TOT, it is expected that the community can:

a. Expand knowledge on natural indicators which often cause disasters, particularly earthquake and tsunami.
b. Expand knowledge on methods to reduce the aftermath of disaster and prepare self.
c. Expand knowledge on the process of community-based action planning to prepare for tsunami.
d. Discover local wisdom in preparing to face disaster.
e. Become trainers who are prepared to train in community development activities.
f. Synergize with the regional government officials representing BPBD in the understanding on community-based disaster management.

Several issues to be considered in TOT can be seen in section 5.1.2.2.

(2) Community Development

Community Development is a direct training effort to the community regarding the anticipation which can be done by the community in facing tsunami. Several issues to be considered in this activity are:

a. Availability of facilitators in the community who become the trainers and are alumnis of previous TOTs.
b. The facilitator/trainer should be tradional, religious, or local community leaders who are respected by the community, as this would ease the direct training for community.
c. Facilitators/trainers should be accompanied by community development specialists so the material teaching during direct training can be controlled.
d. Aside from the public community, one of the target of community development is the school community, comprised of students, teachers, school committee, etc.

At the end of community development, it is expected to result in the following:

a. Increased vigilance in public community to face tsunami and earthquake through community learning process in which the community learns to prepare a community action plan as an initial step in preparing for disasters

b. Increased school community preparedness particularly students from Primary School, Junior High School up to High School in preparing for tsunami and earthquake danger through direct learning and learning by doing in their school before the actual practice and conduct.
c. A snow balling effect can occur in the community related with tsunami and earthquake by involving TOT alumnis who have become trainers in the community. This is expected to result in the increase amount of people with knowledge on the preparation to face tsunami and earthquake.
d. Socialization to the greater community regarding the Tsunami Drill program and activity so that Tsunami Drill can run smoothly and successfully without any unnecessary panic.

The amount of trained community which is expected to be able to participate in Tsunami Drill activity is 10% from the amount of participants targeted by the organizer

Figure 5.9. Community Development Activity at a Junior High School

Figure 5.10. Community Development at Village Level

Figure 5.11. Preliminary Socialization of Community Development Activity

Figure 5.12. Coaching for Community Development

**Determining the Community Development location**

As an integral part of Tsunami Drill, the community development is an effort to mobilize the community in the activity. Since this activity will determine the amount of involved participants, then criteria to choose the location of the community development activity should be made, consisting of:

1. Representing the location potential to be attacked by tsunami
2. Representing the community density and strata.
3. Has a distribution aspect for several locations.

### 5.1.5.3. Increasing Media Capacity

Media capacity is increased through the training or enlightening the reporters to be able to write a good story without inducing any fear or misperception in the community.

This training for reporters can be filled with various materials, among others materials based on the general disaster management and the roles of media before, during and after the disaster occur. Aside from that,

materials regarding important materials which should be remembered in writing a story about disaster and also tips on how to cover and publish a disaster news and how to interview during disaster conditions. These materials are expected to be able to enlighten the reporters, particularly on the aspect of increased knowledge on disaster management.

## 5.2. Rehearsal *(Gladi)*

Rehearsal is a try-out session from various preparation stages previously conducted. In this rehearsal, the smoothness of various aspects planned and prepared can be seen and then evaluated for the purpose of D-day. The field rehearsal is a minute-by-minute run-down implementation starting from pre tsunami, during tsunami and post tsunami activities.

According to the result of the practice, evaluation can be conducted starting from evacuation, how the community responses and up until the performing of roles and duties from various BPBD work groups. From this evaluation result, revisions could be taken so that the actual day conduct can run on smoothly and as planned.

Fiqure 5.13. Rehearsal Situation in Bali Tsunami Drill 2006

Figure 5.14. Community Gathering at Bali Tsunami Drill Rehearsal in 2006

Figure 5.15. Readliness of Health Team During Bali Tsunami Drill Rehearsal in 2006

Figure 5.16. Fire Brigade Participation During Banten Tsunami Drill Rehearsal in 2007

Figure 5.17. Casualties Evacuation During Banten Tsunami Drill Rehearsal in 2007

Figure 5.18. Participation of School Children in Banten Tsunami Drill Rehearsal in 2007

The work performance, role and duties of BPBD work groups are carried out can be seen during the rehearsal. How far the workgroups can carry on their roles are to be evaluated as inputs in revising the SOP (Fixed Procedure - *Protap*) for Tsunami Drill. This revision is done in the second table top simulation in which the participants can actively evaluate various duties accomplishment in the rehearsal and then conceptualize the revision of SOP (Fixed Procedure - *Protap*) for Tsunami Drill D-day.

This revision is also to be conducted towards the Run-Down of Tsunami Drill. In the rehearsal, various activities starting from pre-tsunami during and post tsunami activities can be seen and observed to then be perfected and revised on the necessary areas and areas which could not be conducted as written in run down.

The field rehearsal can be conducted more than once (rehearsal,and general rehearsal) but if it is not possible, the rehearsal can be conducted once with a shorter time compared to D-day .

## 5.3. End To end Tsunami Drill (D-Day)

The actual conduct D-day of Tsunami Drill is the representation for all stages in the run-down. On the Tsunami Drill D-day, the aspects to be observed are:

1. The handling method for VIP or VVIP guests to observe the Tsunami Drill D- day. These guests can be involved as active participants (not as audience) in the Tsunami Drill together with other communities.
2. The handling method of mass media: covering the activities are expected to support the success in hopes of socializing the Tsunami Drill activity and sending the message to the general population on the importance of being prepared for tsunami through Tsunami Drill activity.
3. Starting point: will determine the success of subsequent activity series in the Tsunami Drill
4. Documentation: is also very important as evaluation materials for the next Tsunami Drill

Tsunami Drill D-day in the implementation of revised run-down after the field rehearsal. As with the rehearsal, Tsunami Drill D-day is a sequence of practice starting from pre-tsunami, during tsunami up to post tsunami. The minute-by-minute revised run-down then would be performed on the Tsunami Drill D-day.

Although the D-day is the peak of all Tsunami Drill activities, but a continuous evaluation is still needed. Evaluation for D-day can be performed internally or through external observation through the distribution of evaluation questionnaire made on previous stage. Both internal and external evaluation will be very beneficial to improve the next Tsunami Drill or as a model for the conduct of Tsunami Drill in other cities/ sub-districts.

Figure 5.19.President of Republic Indonesia during Banten tsunami drill in 2007

Figure 5.20. Community Gathering During Bali Tsunami Drill D-Day

Figure 5.21. Community Participatory in Tsunami Evacuation in Banten Tsunami Drill in 2007

Figure 5.22. Community Assembly

Figure 5.23.Tsunami Casualties

Figure 5.24. Triage Activity Performed by Health Team and Nubika (Nuclear, Biology And Chemical)

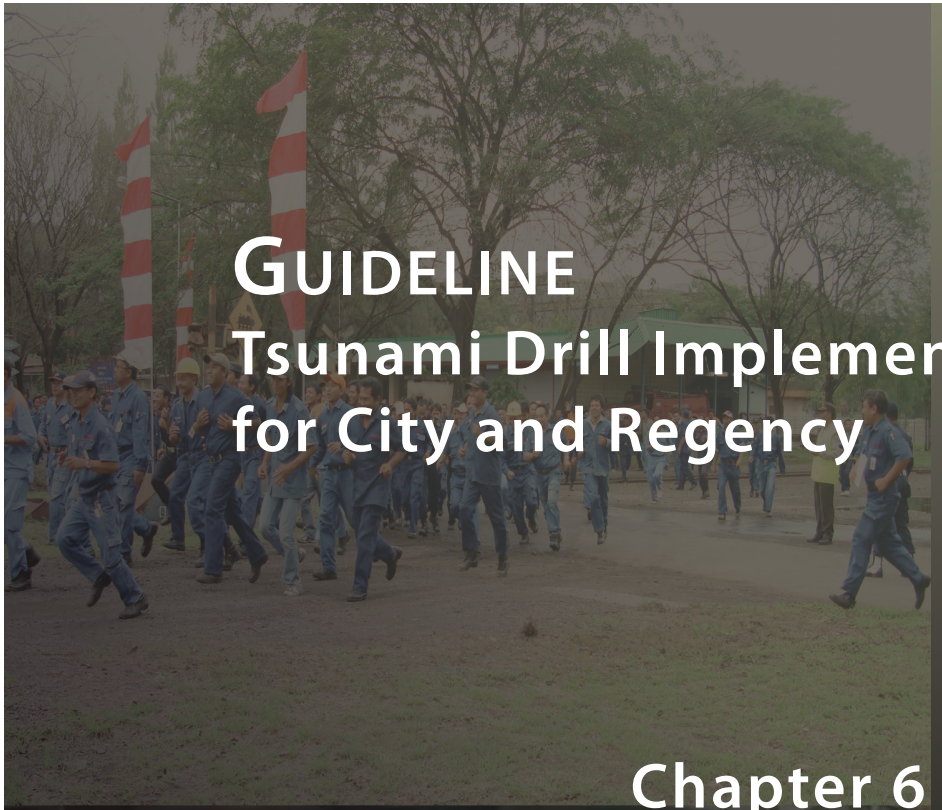
Figure 5.25.Demonstration for Fire Handling and Gas Leaking

**Figure 5.26.** Ambulance in Disaster Area

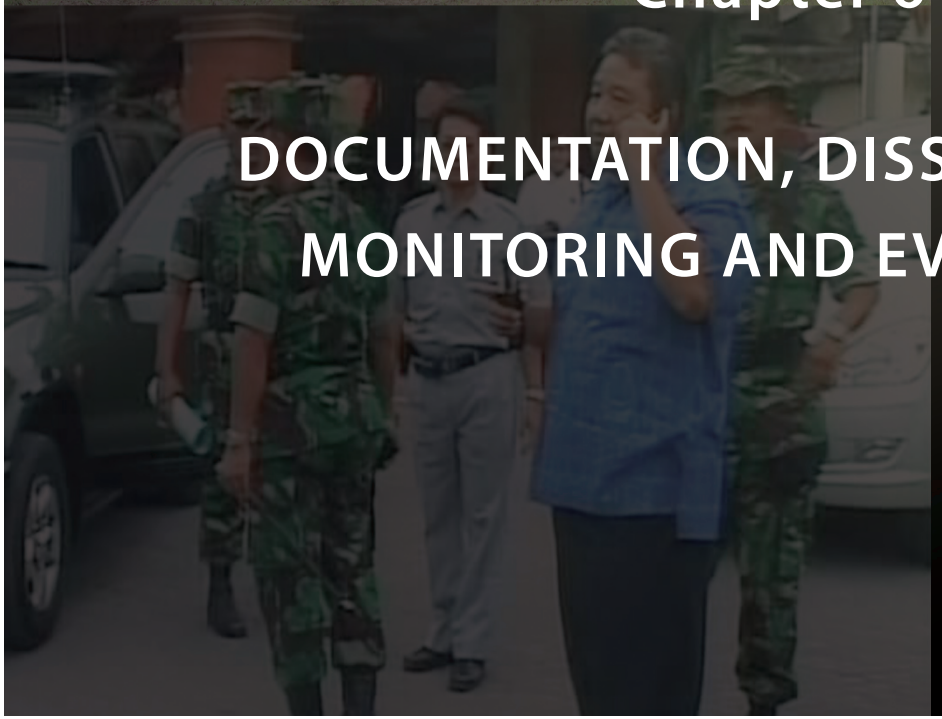
**Figure 5.27.** Decontamination by Nubika

**Figure 5.28.** Shelter Camp

Figure 5.29. Tsunami Evacuation Map for Banten



# GUIDELINE
## Tsunami Drill Implementation for City and Regency



## Chapter 6

# DOCUMENTATION, DISSEMINATION, MONITORING AND EVALUATION

# Chapter 6
# DOCUMENTATION, DISSEMINATION, MONITORING AND EVALUATION (MONEV)

Another important part in a Tsunami Drill is documentation and dissemination that need to be done in every phase either preparation, planning or implementation. Meanwhile, monitoring and evaluation (monev) are conducted through the following mechanisms:

1. Monitoring through intensive documentation
2. Internal evaluation through coordination and consolidation meetings
3. Inputs/evaluation from experts
4. Evaluative questionnaires
5. Monev through mass media (media coverage)

## 6.1. Documentation

### 6.1.1. Preparation Phase

in the preparation phase, documentation is conducted in forms of:

1). Maps

Documentation in the form of maps is important to be collected for the preliminary study of earthquake and tsunami risks. Types of map that can be made as documentation are topography and bathymetry maps with the scale of 1:25.000; land use maps, image maps, administrative border maps, demography maps, and network maps (infrastructure/lifelines map) with the minimum scale of 1:25.000; and geology maps with the scale of 1:50.000.

2). Documents

Documentation in the form of documents in the preparation phase especially those related to data and information of:

a. Condition of buildings, facilities, infrastructure related to tsunami response and management
b. Condition of institutions related to tsunami response and management

3). Photographs and Films

Photo and film shooting in the preparation phase is one of the intensive documentation internal ways film can be used as evaluation materials in the future.

Figure 6.1. Tsunami Signboard used During Tsunami Drilll

### 6.1.2. Planning Phase

(1) Documents

Any documents such as meeting notes related to the planning process (making disaster risk scenarios and efforts to respond to and manage them, making a Tsunami Drill scenario, deciding the target and so forth) need to be collected for documentation that can be used as evaluation materials for the next Tsunami Drill.

(2) Photographs and films

Photo and film shooting in the planning phase especially during internal meetings to plan many things film to a Tsunami Drill.

Figure 6.2. Role of Media and Journalist during National Tsunami Drill Coverage (Banten 2007)

### 6.1.3. Implementation Phase

In the implementation phase, activities documentation is conducted in forms of:

(1). Documents

Many documents such as books, leaflets, posters and so forth which are related to information about tsunami and how to manage it need to be collected for documentation as one of references in conducting the next Tsunami Drill. In addition, documents in forms of newspaper articles, the internet or radio and tv shows recording about the Tsunami Drill can also be documentation for the organizer that can be useful for the next Tsunami Drill.

(2). Photographs and films

Photographs and films: documentation of a Tsunami Drill conducted by photo and films shooting by professionals can be intensive internal documentation and made as a visual model of a Tsunami Drill conducted in each city/regency. Through this documentation, it can be seen also how well the run-down implementation and SOP (Standard Operating Procedure) evaluation are, whether they have run well or not.

(3). CCTV

A tool which is actually used to control city security can be made as one of good documentation media because through a CCTV it can be seen how the community's participation is, considering from either the number or the response. This documentation through CCTV can also be made as a medium for monitoring the community members' evacuation during the Tsunami Drill and evaluation materials of a Tsunami Drill.

Figure 6.3. Banten Tsunami Drill Documentation

## 6.2. Dissemination

### 6.2.1. Preparation Phase

Workshops

Information dissemination in the preparation phase can be done through workshops whereby the participants are limited to local government official related to the preliminary study of earthquake and tsunami risks and development of disaster risk scenarios and disaster management initiative.

Figure 6.4. Tsunami Drill Socialization Workshops

### 6.2.2. Planning Phase

Committee Internal Meetings

Various information in the planning phase are limited to local government official. The dissemination of information concerning planning activity done through committe internal meeting that each member know various planning activity and do the work properly

Figure 6.5. Final Coordinating between Organizing Committee and the Mayor (Bali tsunami drill 2006)

### 6.2.3. Implementation Phase

In the implementation phase, information dissemination either disaster or the tsunami drill may be done through:

(1) TV Live

In disseminating information about the D-day of the Tsunami Drill to the community at large either at local or national level, TV live may be used. Things need to be paid attention to in this TV live are:

- The number and location of points shot,

- The airtime, and
- The activity recording replay

(2) Radio

Besides television, another mass media commonly used by the community is the radio. Hence, a radio can be used in disseminating information regarding the activities and invitation for the community to be involved in a Tsunami Drill.

(3) The Internet

Nowadays, the Internet is a medium that many of the community members start to use although the target is still specific and limited to the educated community members. The internet wide-range coverage can reach the public/the society at large. Besides domestic community members, the internet can be accessed by the community members abroad. News/Information disseminated through the internet can be made as a lesson for other countries about how a Tsunami Drill is carried out in a developing country such as Indonesia. News/information on the internet can also be made as activities documentation.

(4) Newspapers

A newspaper is one of the most important dissemination and documentation media and can be used for a Tsunami Drill. Various articles concerning a Tsunami Drill and other things related to disaster written in newspapers by journalists can be made as lessons learned to organize a Tsunami Drill in city/regency that have not carried out a Tsunami Drill. The comments conveyed in a newspaper can be made as evaluation and inputs for the perfection of the Tsunami Drill.

HIBURAN. Peserta simulasi penanggulangan tsunami mendapat hiburan dari penyanyi Agung Wirasutha.

AGUNG HIBUR 'KORBAN TSUNAMI'

Agung dan Jero Wacik.

Ditengah teriknya matahari, ribuan orang yang dilukiskan menjadi korban tsunami Pantai Sanur dan melarikan diri, mendapat hiburan gratis dari penyanyi Agung Wirasutha di Lapangan Kapten Pica.

Agung Wirasutha, Selasa (26/12) pagi, ternyata mampu membuat para 'korban tsunami' Pantai Sanur bergoyang di Lapangan Kapten Pica, Denpasar.

Ya, Agung Wirasutha memang diundang pihak panitia untuk menghibur peserta acara simulasi penanggulangan bencana alam tsunami, dengan tujuan agar para peserta yang kebanyakan murid SMP dan SMU itu menjadi betah mengikuti kegiatan yang dihadiri tiga Menteri Kabinet Indonesia Bersatu, masing-masing : Menteri Negara Riset dan Teknologi Dr Kusmayanto Kadiman, Menteri Kebudayaan dan Pariwisata Jero Wacik, serta Menteri Negara Lingkungan Hidup Rachmat Witoelar.

Bukan Agung Wirasutha namanya kalau tak bisa bikin orang betah hingga acaa usai. Gaya kocaknya tak hanya membuat peserta menjadi terhibur ditengah

dicomot dari album terbarunya itu digeber Agung, termasuk juga beberapa lagu-lagu dangdut.

Agung mengaku, sebagai penyanyi Bali tampil dihadapan menteri merupakan suatu kebanggaan, meski rasa gugup juga dirasakannya. "Bangga sekaligus gelisah. Jangan-jangan ada aksi saya yang tidak berkenan di hati mereka (menteri). Tapi saya sudah berusaha *kok* menghibur sesuai dengan batasan-batasan kewajaran," kata bapak satu putri ini, sambil tersenyum.

Ditanya tentang kegiatan simulasi tsunami ini, pemilik infotainment 'Kene-Keto Artis Bali' ini menyambut dengan baik, sehingga dirinya juga bersemangat begitu ditawari menghibur di acara ini. "Kalau saya tidak nyanyi, pasti saya ikut jadi peserta. Kegiatan ini sangat bermanfaat bagi kita semua, untuk mengantisipasi bencana yang

Figure 6.6. Public Education Campaign for Tsunami Drill

## 6.3. Monitoring and Evaluation

(1) Monitoring through intensive documentation

Through intensive documentation strengths and weaknesses in a Tsunami Drill can be discovered. Documentation starts to be conducted from the preliminary phase of a Tsunami Drill, that is, establishment of the committee up to the Tsunami Drill implementation phase. Here, many things can be recorded and observed, for example, the estimation of participant number involved in a Tsunami Drill, the evacuation

process carried out by the participants during practice, whether there is any casualty or not during practice, and so on.

(2) Internal evaluation through coordination and consolidation meetings
Internal evaluation through coordination and consolidation meetings can be done periodically in every phase of a Tsunami Drill starting from preparation to implementation. This evaluation gives useful inputs for the activity process to improve weaknesses and anticipate things that might happen on the D-day. Wisdom to admit weaknesses and strengths in a Tsunami Drill will improve the next Tsunami Drill especially in other city/regency of Indonesia.

(3) Inputs/Evaluation from Experts
In evaluating the activities implementation, inputs from experts are needed to improve weaknesses and remove constraints faced in the activities.

(4) Evaluative Questionnaires
Evaluation of the Tsunami Drill implementation on the D-day can be done through dissemination of a questionnaire emphasizing on 3 aspects of questions, i.e.:

a. Warning and decision-making aspect
b. Evacuation and emergency response assistance aspect
c. Search and rescue aspect

Each of these three aspects has elements that can be observed to be evaluated whether it succeeds or not. There are three things evaluated in each aspect, i.e. the aspect itself (the warning and decision-making aspect, the evacuation and emergency response assistance aspect or the search and rescue aspect), general aspects and objective accomplishment.

The evaluation uses numbers ranging from 1 to 5 showing 1 for the lowest score and 5 for the highest score. The highest score obtained the more successful the Tsunami Drill is.

The questionnaire is disseminated to internal and external observers coming from national, local as well as international institutions. The questionnaire dissemination and collection mechanism used is direct mechanism to chosen observers. The questionnaire is disseminated not long before the Tsunami Drill D-day and collected by the committee after the Tsunami Drill. By disseminating a questionnaire, inputs concerning the Tsunami Drill from many aspects can be obtained.

Sample Questioner of evaluation which is distributed to internal or external observer can be seen on the attachment of Tsunami Drill implementation Bali 2006.

(5) Monev through mass media

Monitoring and evaluation through the mass media can observe how far the media report information related to a Tsunami Drill. It is one of the many ways to evaluate the activities. Whether the news covered by the media is positive or negative may illustrate whether the Tsunami Drill succeeds or not.

The following is the monitoring and evaluation mechanism needed for every phase of a Tsunami Drill:

Preparation Phase

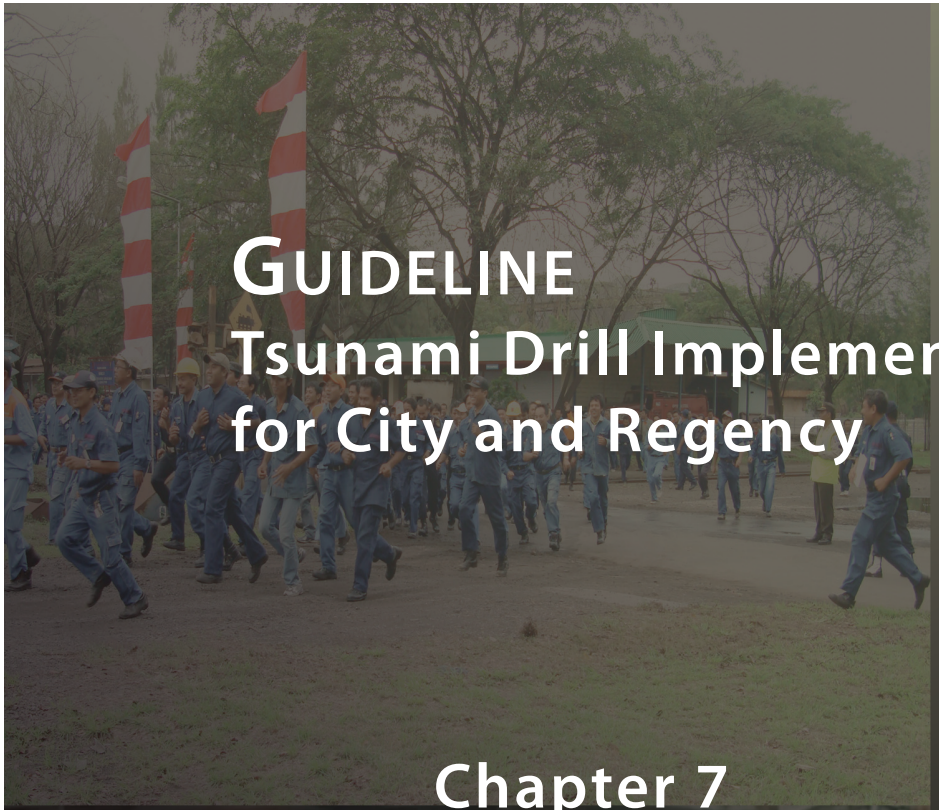
- Monitoring through intensive documentation
- Internal evaluation through coordination and consolidation meetings
- Inputs from experts

Planning Phase

- Monitoring through intensive documentation
- Internal evaluation through coordination and consolidation meetings
- Inputs from experts

Implementation Phase

- Monitoring through intensive documentation
- Internal evaluation through coordination and consolidation meetings
- Evaluative questionnaires
- Monev through the media



# GUIDELINE
## Tsunami Drill Implementation for City and Regency

## Chapter 7
## OUTPUT

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Output from the Tsunami Drill activity is to have:

## 7.1 Resilience Community

With the Tsunami Drill, the community becomes trained in dealing with earthquake and tsunami disasters in anticipating disasters which can occur anytime. A resilience community has the characteristics of:

1. Knowing what to do during the event of disaster,
2. Having a low risk rate for occurrence of loss,
3. Having a swift post-disaster recovery level,
4. Having a network which can be employed for recovery purposes.

## 7.2 Responsive Local Government

Tsunami Drill is a means for the local Government on city/regency level to practice into becoming a local government that is responsive in anticipating various disastrous events particularly earthquakes and tsunamis. Having a swift response when a disaster occurs, knowing the steps to be done as accordance with the existing SOP/PROTAP, having the skills to operate the equipments.

## 7.3 Reliable Infrastructure

Various physical infrastructures and facilities obtained for the Tsunami Drill purpose, such as sirens, five in one mode and so forth can be tested and proven reliable should an actual disaster really occurs.

## 7.4 Availability of tsunami SOP or Contingency Plan for Local Disaster Management Unit (*Satlak PB*)

Through the Tsunami Drill activity, Satlak PB or BPBD has a certain Standard Operation Procedure (PROTAP/ Fixed Procedure) or Contingency Plan developed by various stakeholders in a table top simulation activity and tested in the implementation of Tsunami Drill.