



# Module 8

## Environment and Disasters



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UP Department of Broadcast Communication  
UP National Institute for Science and Mathematics Education Development



UP COLLEGE OF MASS COMMUNICATION  
DEPARTMENT OF BROADCAST COMMUNICATION



## **DZUP EskweKalikasan: Para sa kabataan, kapaligiran, at bayan**

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Published by:

Department of Broadcast Communication  
2F Plaridel Hall  
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University of the Philippines Diliman  
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The University of the Philippines  
National Institute for Science and Mathematics Education Development  
Quirino Avenue, University of the Philippines Diliman  
Diliman, Quezon City

For additional resources, go to:  
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**Module and Podcast Writer**  
Ma. Zarina Mae. J. Yamog

**Module Consultants and Evaluators**  
Eligio C. Obille Jr.  
Anthony Guillermo E. Urbano

**Module Supervisor (Teaching and Learning Process)**  
Sally B. Gutierrez, PhD

**Module Supervisor (Concept Development)**  
Daphne-Tatiana T. Canlas, PhD

**Managing Editor**  
Ma. Ivy A. Claudio

**NISMED Project Coordinators**  
Aida I. Yap, PhD  
Erlina R. Ronda, PhD  
Ma. Lourdes S. Agad

**Creative Consultant**  
Elizabeth L. Enriquez, PhD

**In charge of Module Development and Distribution**  
Ma. Ivy A. Claudio

**Project Staff**  
Ma. Zarina Mae J. Yamog  
Joseph Vince A. Claudio

**Artwork**  
Rosabelle Jem M. Torrecampo

**Layout**  
Carl Dave Anthony L. Sayat

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## Preface

Para sa bayan, kalikasan, at kabataan? Kayang-kaya!

The project, **DZUP EskweKalikasan: Para sa kabataan, kapaligiran, at bayan** is a publicly-funded initiative of the academe, with support from the government and advocates, that aims to contribute to the initiatives to integrate climate change knowledge and concepts about the Philippine environment in formal education.

According to the Climate Change Commission, “the Philippines is one of the countries at greatest risk from present and projected climate-related hazards such as tropical cyclones, floods, landslides, and droughts” (Climate Change Commission, n.d.). These teaching modules were designed to encourage students with a comprehensive examination of the issues confronting the environment. Recognizing the curriculum visions and the objectives of inquiry-based teaching and learning that are adopted and promoted by the Philippine Basic Science Education Curriculum, these modules go beyond increasing public awareness of the environment’s significance in sustaining life on Earth to examining the effects of human actions in the protection or degradation of the environment.

Results of the early studies of Belland, Glazewski, and Richardson (2012) claim that issue-based learning is closely linked with evidence-based learning. It is thus appropriate to use scientific argumentation to implement these modules. Embedded in the modules is the provision for students’ opportunities to deeply engage in evidence-based scientific argumentation while simultaneously developing their critical thinking and communication skills. Thus, the basic components of scientific argumentation such as **claim, evidence, and justification** were strategically presented in the teaching modules. The modules, identified in the Curriculum Entry Points section, can be used in the following Senior High School Core Curriculum Subjects: Earth and Life Science or Earth Science; Understanding Culture, Society, and Politics; and Disaster Readiness and Risk Reduction.

These modules use multimodal learning to create an engaging and exciting learning environment that recognizes diverse learning styles. The concepts and issues presented in each lesson are mirrored in the podcast “*Kayang-kaya!*” to supplement classroom discussion using aural storytelling. Case studies that highlight local experiences while recognizing the various contexts that surround environmental issues, particularly climate change, are made available so the students can better grasp the environmental challenges that we are facing and be acquainted with examples of adaptation and mitigation measures that are currently being practiced.

**DZUP EskweKalikasan** aims to contribute to the wider discussion of environmental issues and the impacts of climate change and disasters in our everyday life, and to enrich conversations about sustainable living, sustainable development, and mindful consumption. These modules aim to be of utmost help for teachers to supplement their resources in their implementation of the Senior Science Education Curriculum.



## The Project

**DZUP EskweKalikasan: Para sa kabataan, kapaligiran, at bayan** is an on-air and online modular educational project about the environment for the youth. The UP Department of Broadcast Communication (CHED Center of Excellence for Broadcasting) and DZUP 1602 (the official radio station of UP Diliman) spearheaded the project with funding support from the Philippine Government under the General Appropriations Act for Fiscal Year 2019 through the initiative of the Office of Senator Loren Legarda. The UP Diliman Office of the Chancellor also provided additional funding support.

Ten modules were conceptualized and developed in collaboration with the UP National Institute for Science and Mathematics Education Development (UP NISMED).

- Module 1.** The Environment and Me
- Module 2.** The Philippine Environment
- Module 3.** Biodiversity Conservation
- Module 4.** Sustainable Living
- Module 5.** Climate Change
- Module 6.** Waste Management
- Module 7.** Management of Environmental Resources
- Module 8.** Environment and Disasters
- Module 9.** Renewable Sources of Energy
- Module 10.** The Youth, the Nation, and the Environment

Each of the teaching modules comes with a **Kayang-kaya!** podcast and an episode of **Go Teacher Go sa DZUP EskweKalikasan (GTG sa DZUP Eskwe)**.

The **Kayang-kaya!** podcast, developed and produced by the UP Department of Broadcast Communication, chronicles the adventure of three Senior High School students residing in Brgy. Luntian, as they seek to understand and uncover the issues confronting the environment.

Meanwhile, DZUP EskweKalikasan and UP NISMED's radio program Go Teacher Go, collaborated to produce **GTG sa DZUP Eskwe**, video guides for teachers in implementing the modules in their classes. **GTG sa DZUP Eskwe** also discusses tips on how to adjust the modules into different modes of learning, i.e. blended, online, remote, etc. All the teaching modules and other learning resources are available for download at [www.dzup.org/eskwekalikasan](http://www.dzup.org/eskwekalikasan).



## How to use this module

The modules promote inquiry-based teaching and learning through scientific argumentation and were designed to encourage students to appreciate Mother Nature and examine the issues confronting our environment. Each module is composed of the following sections:

### Introduction Page / Table

This page contains the general information about the teaching module and its corresponding podcast. These include the following: **module number** and **title, podcast topic**, main question in the podcast, **synopsis** of the podcast, and the **teaching module objectives**.

### Curriculum Entry Points

The curriculum entry points serve as guides for the educators in the appropriate use of the teaching module. This will help the educators identify the student **grade level, subjects, and subtopics** that this material can be applied to, as well as the **content standard, performance standard, and learning competencies** from the Department of Education's curriculum guide. This part also contains the **prerequisite concepts** based on students' prior knowledge from previous grade levels.

### Teaching and Learning Process

The teaching and learning process guides the teacher in inquiry-based teaching using argumentation. This section identifies the **teaching approach**, and the **materials** that will be used to teach this module. The modules adopt the guided inquiry-based approach through argumentation as a teaching approach. It is composed of two major parts: the **lesson procedure** proper and the **assessment**. Embedded in the lesson procedure in each module is the eliciting of the three main components of argumentation: claim, evidence, and justification. They are placed differently depending on how the concepts are formed whether inductively or deductively. Assessment is used in the module in three ways: for learning (formative assessment), as learning (on-going), and of learning (summative assessment).

### Related Concepts

This part contains the science and other related concepts and their contextualized definitions depending on how they were used in the modules.

### References

This contains all the references used by the writers in writing the modules. The educators may revisit these references for additional information.

### Activity Sheets / Worksheets

Activity sheets may include **case studies** and **guide questions** to answer while listening to the podcast or for presentation purposes, and other types for individual and group activities.

### Answer Keys

The activity sheet/worksheet in each module comes with the corresponding answer key that can help the educators in assessing the student outputs.





## Teaching Module

<b>Module No. and Title</b>	Module 08. Environment and Disasters
<b>Podcast Topic</b>	Basic concepts in disaster risk reduction and preparedness
<b>Main Question</b>	Sabi sa Facebook post ni Mayor, may earthquake drill next week. Kasali ba ang barangay namin dito?
<b>Podcast Synopsis</b>	The Mayor announced on Facebook a town-wide earthquake drills next week. Kali wants to find-out if Barangay Luntian will be joining this. She also wants to know why the Philippines is prone to natural disasters and how to prepare for them. Together with her friend Naya, she consults a geographer and the NDRRMC Deputy Spokesperson, and visits the Barangay to learn about the Disaster Risk Reduction Management Plan. Let us also find out how Kali can personally prepare for any type of disasters. <i>Nagpost sa Facebook si Mayor tungkol sa earthquake drills ng kanilang bayan next week. Kasali kaya ang kanilang barangay dito? Aalamin din ni Kali kung bakit maraming natural disasters sa Pilipinas at kung papaano magiging handa sa mga ito. Kasama ang kaibigan si Naya, makikipag-usap sila sa isang geographer at sa NDRRMC Deputy Spokesperson, at dadalaw sa Barangay Hall para matuto tungkol sa Disaster Risk Reduction Management Plan. Abangan din natin kung paano personal na maghahanda sina Kali sa pagharap sa kahit anong sakuna.</i>
<b>Podcast Objectives</b>	After listening to the podcast, the learners should be able to: <ol style="list-style-type: none"><li>1. review the basic concepts, principles, and elements of disaster risk reduction (DRR);</li><li>2. identify hazards in their communities that can lead to disasters;</li><li>3. explain why the Philippines is prone to natural disasters and their impacts to the Filipino people; and</li><li>4. recognize the importance and the role of the community in DRR.</li></ol>
<b>Teaching Module Objectives</b>	(Adapted from the DepEd curriculum guides) <ol style="list-style-type: none"><li>1. Analyze the role of the community in various case studies about recent disasters; and</li><li>2. Discuss the key concepts, principles, and elements of DRR</li></ol>

## Curriculum Entry Points

Grade Level: Grade 11/12 (Earth and Life Sciences)

Content: Natural hazards, mitigation, and adaptation: Geological processes and hazards; hydrometeorological phenomena and hazards; and marine and coastal processes and their effects.

<b>Content Standard</b>	<b>Learning Competency</b>
<p><i>The learners demonstrate an understanding of:</i></p> <p>Different hazards caused by:</p> <ol style="list-style-type: none"><li>1. geological processes (earthquakes, volcanic eruptions, and landslides)</li><li>2. hydrometeorological phenomena (tropical cyclones, monsoons, floods, and tornadoes or ipo-ipo)</li><li>3. coastal processes (waves, tides, sea-level changes, crustal movement, and storm surges)</li></ol>	<p><i>The learners:</i></p> <p>Describe the various hazards that may happen in the event of earthquakes, volcanic eruptions, and landslides.</p> <p>Describe the various hazards that may happen in the wake of tropical cyclones, monsoons, floods, or ipo-ipo.</p> <p>Describe how coastal processes result in coastal erosion, submersion, and saltwater intrusion.</p>

Grade Level: Grade 11/12 (Disaster Readiness and Risk Reduction)

Content: Disaster and disaster risk, hazards, exposure and vulnerability, Disaster Risk Reduction and Disaster Risk Reduction Management (DRRM)

<b>Content Standard</b>	<b>Performance Standard</b>	<b>Learning Competency</b>
<p><i>The learners demonstrate an understanding of:</i></p> <p>Disaster risk reduction:</p> <ol style="list-style-type: none"><li>1. Concept of DRR</li><li>2. Importance of DRR</li><li>3. Key principles</li></ol>	<p><i>The learners shall be able to:</i></p> <p>Develop a community emergency preparedness plan and community disaster preparedness plan to minimize vulnerability and disaster risk in the community and avoid or limit adverse impacts of hazards.</p>	<p><i>The learners:</i></p> <p>Discuss the key concepts, principles, and elements of DRR.</p>

## Prerequisite Concepts

1. Geography and location of the Philippines and its influences on the environment (Grade 7)
2. Natural hazards and calamities in the Philippines (Grade 8 – Earthquakes and Typhoons, Grade 9 – Volcanoes)

## Teaching and Learning Process

<b>Teaching Approach</b>	Guided active listening and open inquiry-based approach through argumentation
<b>Materials</b>	<ol style="list-style-type: none"> <li>1. Podcast audio file</li> <li>2. PowerPoint presentation</li> <li>3. Case study sheets</li> <li>4. Guide questions for presentation <i>(Please visit <a href="http://www.dzup.org/eskwekalikasan">www.dzup.org/eskwekalikasan</a> to access the podcast, PowerPoint and/or student's worksheet.)</i></li> </ol>

**Assumption:** The students have already listened to the podcast episode at home as part of their homework.

### I. LESSON PROCEDURE

#### A. Introduction

1. Prepare the PowerPoint presentation. Show **SLIDES 1 and 2** (Project Introduction).

#### SLIDE 1



## SLIDE 2



### DZUP ESKWEKALIKASAN PROJECT

**DZUP Eskwekalikasan: Para sa kabataan, kapaligiran, at bayan** is a publicly-funded initiative of the academe, with support from advocates and the government. It aims to raise awareness on emerging and evolving discussions about climate change, disaster risks, sustainable living and development and mindful consumption. Especially designed for senior high school teachers and students, the project has produced several teaching and learning resources such as modules, video guides, podcasts, and radio episodes that are available for free online at [dzup.org/eskwekalikasan](http://dzup.org/eskwekalikasan).

The project (whose title is a portmanteau of the Filipino words for school and nature) is spearheaded by the Department of Broadcast Communication of the University of the Philippines (UP) College of Mass Communication and DZUP 1602, in partnership with the UP National Institute for Science and Mathematics Education Development (UP NISMED) and the UP Diliman of the Office of the Chancellor. It is principally funded by the Philippine Government under the General Appropriations Act for Fiscal Year 2019 through the initiative of the Office of Senator Loren Legarda.

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2. Introduce the podcast and read the synopsis of the episode. Show **SLIDE 3**

## SLIDE 3



### KAYANG-KAYA! PODCAST

**Káyang-Káya!** is a 10-episode podcast in Filipino that follows the adventures of three senior high school students, Kali, Naya, and Alab, as they seek to understand and uncover issues confronting the environment. As an educational tool, the podcast serves to supplement classroom discussion using aural storytelling.

In **Episode 8**, titled “**Paano maghahanda ang buong barangay laban sa disaster?**”, Kali wants to find-out if Barangay Luntian will be joining a town-wide earthquake drill next week which the Mayor announced in a Facebook post. She also wants to know why the Philippines is prone to disasters and how to prepare for them. Together with her friend Naya, they find out how their community can prepare for a disaster.

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3. Replay a part of the podcast: News montage of disaster news **[TIMESTAMP: 00:00-00:23]**.

#### SLIDE 4



4. Ask the students:

- **Question 1: How did the clip make you feel? Why?**

**Possible Answer/s:**

1. **Negative:** scared, worried, etc. – because it seems like the world is about to end, the Earth is collapsing; because of the adverse effects and impact (loss of life, property damage, livelihood, etc); because they are not prepared at all.
2. **Neutral:** no immediate feeling, neutral feeling, apathetic, it's fine – because these things are natural occurrences and they always happen in the Philippines; because Filipinos are resilient; Filipinos are used to disasters; these disasters have not affected their friends and families.
3. **Positive:** happy, confident, etc. – they were not affected; they feel like they are ready for any disaster

- **Question 2: If an emergency disaster is to happen right now, do you think you are ready? How so?**

**Possible Answer/s:**

1. **Yes**, because their family is prepared and has taken necessary actions like joining drills, having a family emergency communication plan.
2. **No**, because they did not make any preparations yet; have not even talked about these possibilities; do not know what to do; etc.
3. **No opinion**, because they are not concerned; they do not know what preparedness means; they will just wing it, like they always do; etc.

5. Discuss the concept of disaster preparedness. Show **SLIDE 5**.

**SLIDE 5**

**DISASTER PREPAREDNESS**

The **knowledge and capacities developed by governments, professional response and recovery organizations, communities, and individuals** to effectively anticipate, respond to, and recover from the impacts of likely, imminent, or current hazard events or conditions.

Source: Republic Act No. 101211. (n.d.). [PDF File].  
[http://www.ndrrmc.gov.ph/attachments/article/45/Republic\\_Act\\_10121.pdf](http://www.ndrrmc.gov.ph/attachments/article/45/Republic_Act_10121.pdf)

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6. Ask the students:

- **Question 3: Why is it important to be prepared for a disaster?**

**Possible Answer/s:**

Disasters can happen anytime and anywhere. Being prepared is knowing what to do and having the resources needed in times of disaster. Readiness is important because:

1. It raises the possibility of safety and limits the damage to life, property, livelihood, etc.;
2. It decreases the level of stress that may be felt;
3. It can help and contribute to faster recovery after a disaster;
4. It increases the capacity of the community in dealing with disasters; and
5. It helps the responders give priority in helping those who really need help (old, children, PWDs) instead of those who are perfectly capable of helping themselves like you.

7. Summarize the student's answers about the importance of disaster preparedness. Show **SLIDE 6**.

### SLIDE 6

#### Importance of disaster preparedness

Disasters can happen anytime and anywhere. So being prepared is knowing what to do and having the resources needed in times of disaster. Readiness is important because:

1. It raises the possibility of safety and limits the damage to life, property, livelihood, etc.;
2. It decreases the level of stress that may be felt;
3. It can help and contribute to faster recovery after a disaster;
4. It increases the capacity of the community in dealing with disasters; and
5. It helps the responders give priority in helping those who really need help (old, children, PWDs) instead of those who are perfectly capable of helping themselves.

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### B. Preparation for Activity

1. Show **SLIDE 7**. Group the class into four.

### SLIDE 7

#### Group Activity



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2. Have the groups pick from three common natural hazards in the country: typhoons, earthquakes, and volcanic eruptions, and one human-made disaster.

3. Based on what they have picked, assign the following Philippine disasters to the group:
  - a. **Typhoon:** Super Typhoon Yolanda in Eastern Visayas (November 2013)
  - b. **Earthquake:** Three succeeding earthquakes in Cotabato with magnitudes 6.3, 6.6, and 6.5 (October 2019)
  - c. **Volcanic Eruption:** Mayon Volcano eruption (1st quarter of the year 2018)
  - d. **Human-made:** Payatas Landfill Disaster (July 2000)
4. Hand out the corresponding case studies for each event and the guide questions for the presentation. Each case study contains a description of the events and the impacts of the events (loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage). The case studies can be found at the end of this teaching module.
5. Ask the groups to read the case studies and discuss among themselves the questions below. Give the groups ten minutes to discuss among themselves. Show **SLIDE 8**. For a more focused discussion, ask the students the following guide questions:

### SLIDE 8

#### Instructions and guide questions for discussions

**INSTRUCTIONS:** Read your assigned case studies and discuss among your group the questions below.

**Question 4.** Why did the event become disastrous?

- location of affected areas
- conditions that make a community prone to the damaging effects of a hazard, such as poor construction of buildings, lack of public awareness, and limited preparedness
- strengths and resources within a community that can reduce the effects of a disaster, such as infrastructure, institutions, human knowledge and skills, and leadership and management

**Question 5.** What could have been done in or by the community to avoid or limit the impacts of disasters?

### C. Concept Development/Eliciting Pieces of Evidence

## Eliciting claims from the argumentative statement

1. Before each group starts presentation, ask the class this question:

Do you think that the Philippines is prone to disasters? If yes, why? If no, why not?

Each group will choose a position—agree or disagree—and use the information in their case study to defend their position. The groups need not choose opposite sides; they may all select the same side. The objective is to be able to use evidence to support a claim.

## Gathering of evidence and concept formation

2. Have each group present their case studies for five minutes each. For each presentation, show the corresponding slides:

### SLIDE 9

**Sources:**  
Case Study — Typhoon Haiyan 2013 [Online image]. (n.d.). Geography.  
<https://garsidej.wordpress.com/igcse/hazardous-environment/typhoon-haiyan/yolandas-path-then-and-now/>  
Case Study — Typhoon Yolanda 2013 [Online image]. (2018, November 7). ABS-CBN News.  
<https://news.abs-cbn.com/focus/multimedia/slideshow/11/07/18/yolandas-path-then-and-now>

**Case Study**  
Super Typhoon Yolanda in Eastern Visayas (November 2013)

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## SLIDE 10

Sources:  
Earthquake stronger than 'The Big One' possible in N. Cotabato—PHIVOLCS [Online image]. (2019, October 31). Yahoo! News. <https://ph.news.yahoo.com/earthquake-stronger-big-one-possible-104124855.html>  
Cotabato quake death toll climbs to eight, 394 injured [Online image]. (2019, October 31). CNN Philippines. <https://www.cnnphilippines.com/news/2019/10/30/magsaysay-davao-del-sur-missing-quake.html>

### Case Study

Three (3) succeeding earthquakes in Cotabato with magnitudes 6.3, 6.6, and 6.5 (October 2019)

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## SLIDE 11

### Case Study

Mayon Volcano Eruption (1st quarter of year 2018)

Source: Warning in Philippines to 'evacuate or face death penalty' as Mayon volcano threatens deadly eruption [Online image]. (2018, January 23). Sky News. <https://news.sky.com/story/warning-in-philippines-to-evacuate-or-face-death-penalty-as-mayon-volcano-threatens-deadly-eruption-11219540>

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## SLIDE 12

Sources: Philippines: Landslide at Payatas Garbage Dump Latest [Online video]. (2015, July 21). AP Archive. [https://www.youtube.com/watch?v=n\\_NBmIChe0](https://www.youtube.com/watch?v=n_NBmIChe0)  
Koelsch, F. (n.d.). Stability problems of landfills—The Payatas landslide. [PDF File]. [http://www.dr-koelsch.de/Philippines\\_01\\_Payatas.pdf](http://www.dr-koelsch.de/Philippines_01_Payatas.pdf)

**Case Study**  
Payatas Landfill Disaster (July 2000)

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## Concluding Statements for Justification

3. Elicit ideas from the students that will establish the consensus that the Philippines is a disaster-prone country as described in the case studies provided. The concluding statements will consist of the reasons/factors that make the Philippines prone to disasters such as:
  - a. exposure to hazards which is mainly due to its location (e.g., living near a volcano or a dumpsite);
  - b. conditions of vulnerability which make a community susceptible to the damaging effects of hazards (e.g., poor design and construction of buildings, environmental factors, people not familiar with the term "storm surge"; and
  - c. capacity of the community (e.g., leadership and management by local authorities during evacuation).

Show the following slides:

**SLIDE 13**

### **Concluding statement for justification**

**The Philippines is a disaster-prone country because of the following factors:**

1. exposure to hazards which are mainly due to its location
2. conditions of vulnerability which make a community susceptible to the damaging effects of hazards; and
3. the capacity of community.

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**SLIDE 14**

### **Exposure to hazard**

**The degree to which the elements at risk are likely to experience hazardous events of different magnitudes** mainly due to its location

The Philippines is situated in the Typhoon Belt and Pacific Ring of Fire.

*Examples:* living near a volcano, a dumpsite, or steep-slope areas

Source: Republic Act No. 10121. (n.d.). [PDF File]. [http://www.ndrrmc.gov.ph/attachments/article/45/Republic\\_Act\\_10121.pdf](http://www.ndrrmc.gov.ph/attachments/article/45/Republic_Act_10121.pdf)

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## SLIDE 15

### Vulnerability

The **characteristics and conditions of a community, system, or asset that make it susceptible** to the damaging effects of a hazard.

It may arise from various physical, social, economic, and environmental factors such as poor design and construction of buildings, inadequate protection of assets, lack of public information and awareness, limited official recognition of risks and preparedness measures, and disregard for wise environmental management.

*Examples:* poor design and construction of buildings, environmental factors, and people not familiar with the term "storm surge"

Source: Republic Act No. 101211. (n.d.). [PDF File]. [http://www.ndrrmc.gov.ph/attachments/article/45/Republic\\_Act\\_10121.pdf](http://www.ndrrmc.gov.ph/attachments/article/45/Republic_Act_10121.pdf)

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## SLIDE 16

### Capacity

It is **the combination of all strengths and resources available** within a community, society, or organization that can reduce the level of risk or effects of a disaster.

It may include infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills, and collective attributes such as social relationships, leadership, and management.

*Examples:* leadership and management by local authorities during evacuation

Source: Republic Act No. 101211. (n.d.). [PDF File]. [http://www.ndrrmc.gov.ph/attachments/article/45/Republic\\_Act\\_10121.pdf](http://www.ndrrmc.gov.ph/attachments/article/45/Republic_Act_10121.pdf)

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4. Summarize and let the students reflect on their answers to "Question 5. What could have been done in or by the community to avoid or limit the impacts of disasters?" Ask the students:

- **Question 6: Why is the participation of the community important in disaster matters?**

**Possible Answer/s:**

Community-based risk reduction management is part of the NDRRMC framework, where the community is actively engaged in identifying, evaluating, and monitoring risks in their area, to enhance their capacity, and to mitigate the potential adverse effects of disasters. In CBDRRM, the people in the community are involved in the learning and studying of their local environment, decision-making, and implementing activities (Republic Act No. 10121, Section 3 (e), 2009).

Community participation in disaster matters is important because:

1. They are the ones directly affected by the disaster, and they also directly benefit from the good things it can bring.
  2. In times of disasters, the local community is the first responders because they are the closest. Disaster recovery will be faster.
  3. People in the community are better acquainted with their local environments—location of hazards, types of possible hazards, and their weaknesses and their strengths or capacity as a community. So, they know the steps that are best for them.
  4. Every community in the Philippines is different, mainly because of our geography. It is better to know which among the risk reduction practices work for your area.
5. Introduce the concept of community-based disaster risk reduction management or "CBDRRM." Show **SLIDE 17** and **SLIDE 18**.

**SLIDE 17**

**Community-based disaster risk reduction management or "CBDRRM"**

It is the **process of disaster risk reduction and management in which at-risk communities are actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks** to reduce their vulnerabilities and enhance their capacities, and where the people are at the heart of decision-making and implementation of disaster risk reduction and management activities (Republic Act No. 10121, Section 3 (e), 2009).

**SLIDE 18**

**Importance of community-based disaster risk reduction management**

1. It increases the capacity of the community against any disaster. That is, limiting the probability of life loss, injury, and destruction of property, livelihood, etc., decreases. So, the community becomes more resilient.
2. Local knowledge and traditions are used in more effective and more realistic disaster management planning.
3. It helps communities increase hope and courage, which is necessary in times of disaster.
4. It values the voice and participation of every person in the community and makes them more responsible citizens.

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**D. Wrap-up**

1. Replay a part of the podcast: Call to Action of Kali on how she can help increase the capacity of her community by being prepared **[TIMESTAMP: 19:23 -21:26]**.
  2. Ask the students:
    - **Question 7. What are the things that Kali did in preparation for a disaster?**
- Possible Answer/s:**
1. She coordinated with the barangay officials to determine the evacuation centers and safe areas in their barangay.
  2. She asked the barangay officials for the emergency hotline numbers for their area.
  3. She prepared a Go bag or survival kit.
  4. She joined emergency drills.
3. Show **SLIDE 19**.

**SLIDE 19**

## Kali's Call to Action

1. Makipag-coordinate sa inyong barangay para alamin ang evacuation centers, safe areas, and emergency hotlines sa inyong lugar.
2. Makipag-usap din sa inyong mga pamilya para maghanda ng Go Bags at makabuo ng emergency communication plan.
3. Sumali sa at seryosohin ang mga emergency drill.
4. #BidaAngHanda

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## II. ASSESSMENT

### A. Short Essay Writing

1. Show **SLIDE 20**. Ask the students to get a piece of paper and answer in not more than five sentences the following questions:

- **Question 8. What can the youth contribute to building the capacity of the community for disaster risk reduction?**

**Possible Answer/s:**

1. Recognize and acknowledge that you have a role in disaster risk reduction management.
2. Coordinate and participate in the activities organized by their community officials (own barangay, schools, etc.).
3. Educate yourself on the hazards in your community, what to do, community projects, signs of hazards, etc.
4. Inform and educate immediate social circles (friends and families) about DRRM. Make them understand the importance of preparedness.
5. Spread awareness.
6. Exercise preparedness (*activities listed above*).
7. Initiate a preparedness plan with your family unit (communication plan, evacuation plans, etc.).

- **Question 9. One of the challenges in the implementation of the DRRM policy is how they would invite and have the youth interested or participate in their initiatives. For you, what are the activities or initiatives that the local officials can do to awaken your interest, and have you participated in the activities related to disaster risk reduction and management?**

**Possible Answer/s:** *This can be anything because it is based on the preferences and interests of the students. There is no wrong or right answer. This part can be taken to the next level. The answers of the students can be collated and summarized and submitted to the officials of the school or the community, handling the disaster risk reduction management units.*

### SLIDE 20

**Assessment**

**INSTRUCTION:** Get one piece of paper, and answer in not more than five sentences the following questions:

1. What can the youth contribute to building the capacity of the community for disaster risk reduction?
2. One of the challenges in the implementation of the DRRM policy is how they would invite and have the youth interested or participate in their initiatives. For you, what are the activities or initiatives that local officials can do to pique your interest and have you participate in the activities related to disaster risk reduction and management?

## B. Conclusion

- After all the activity, highlight the main take away of the podcast and the lesson. Show **SLIDE 21**.

### SLIDE 21

**The youth has a role to building the capacity of the community in disaster preparedness.**

1. Recognize and acknowledge that you have a role in disaster risk reduction management.
2. Coordinate and participate in the activities organized by their community officials (own barangay, schools, etc.).
3. Educate yourself about the hazards in your community, what to do, community projects, signs of hazards, etc.
4. Spread awareness.
5. Inform and educate immediate social circles (friends and families) about DRRM. Make them understand the importance of preparedness.
6. Exercise preparedness (activities listed above).
7. Initiate a preparedness plan with your family unit (communication plan, evacuation plans, etc.).

21 Environment and Disasters

## Related Concepts

### 1. Disaster Risk Profile of the Philippines

- Located along the typhoon belt in the Pacific, the Philippines is visited by an average of 20 typhoons every year, five of which are destructive. Being situated in the "Pacific Ring of Fire" makes it vulnerable to frequent earthquakes and volcanic eruptions. Its geographical location and physical environment also contribute to its high susceptibility to the tsunami, sea-level rise, storm surges, landslides, flood/flash flooding, and drought (Asian Disaster Reduction Center, n.d.).
- Other hazards include floods, landslides, tsunamis, and wildfires, all of which are occurring in a frequency that has fundamentally changed the perception of hazards in the country (Disaster Risk Reduction in the Philippines, 2019).

### 2. Vulnerability

According to Republic Act No. 10121, Section 3 (nn), (2009):

- The characteristics and circumstances of a community, system, or asset that make it susceptible to the damaging effects of a hazard.
- It may arise from various physical, social, economic, and environmental factors such as poor design and construction of buildings, inadequate protection of assets, lack of public information and awareness, limited official recognition of risks and preparedness measures, and disregard for wise environmental management.

### 3. Capacity

According to Republic Act No. 10121, Section 3 (b), (2009):

- It is the combination of all strengths and resources available within a community, society, or organization that can reduce the level of risk or effects of a disaster.
- It may include infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills, and collective attributes, such as social relationships, leadership, and management.
- It may also be described as capability.

### 4. Exposure

- It is the degree to which the elements at risk are likely to experience hazard events of different magnitudes (Republic Act No. 10121, Section 3 (t), 2009).

### 5. Community-based disaster risk reduction management or “CBDRRM”

- It is a process of disaster risk reduction and management in which at-risk communities are actively engaged in the identification, analysis, treatment, monitoring, and evaluation of disaster risks to reduce their vulnerabilities and enhance their capacities, and where the people are at the heart of decision-making and implementation of disaster risk reduction and management activities (Republic Act No. 10121, Section 3 (e), 2009).

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## Activity Sheet: Guide Questions for the Presentation

**Members:** \_\_\_\_\_ **Score:** \_\_\_\_\_

**Group:** \_\_\_\_\_ **Grade and Section:** \_\_\_\_\_

### Instructions:

Study the case studies assigned to your group. Based on the material and your prior knowledge of the event, discuss among yourselves, and answer the questions below. You have five minutes per group to present your answers.

1. Why did the event become disastrous? Identify the factors cited below.

a. **location** of affected areas

b. **conditions that make a community prone to the damaging effects of a hazard** such as poor construction of buildings, lack of public awareness, and limited preparedness

c. **strengths and resources within a community that can reduce the effects of a disaster**, such as infrastructure, institutions, human knowledge and skills, and leadership and management

2. What could have been done in or by the community to avoid or limit the impacts of disasters?



## Case Study 1. Super Typhoon Yolanda



Residents walk on a road littered with debris after Super Typhoon Haiyan battered Tacloban city.

Source:<https://garsidej.wordpress.com/igcse/hazardous-environment/typhoon-haiyan/>



A ship washed ashore by storm surges during the height of Super Typhoon Haiyan (Yolanda) sits atop crushed houses in Tacloban, Leyte in November 25, 2013.

Source:<https://news.abs-cbn.com/focus/multimedia/slideshow/11/07/18/yolandas-path-then-and-now>

### Description of Disaster

On November 8, 2013, Super Typhoon Yolanda (international name: Haiyan) makes landfall in Eastern Samar and passed through the central Philippines, leaving a trail of destruction in its path. As a Category 5 storm with wind speeds sustained at approximately 306-314 kph, it made at least 6 landfalls in less than 20 hours. Yolanda brought with it a massive 5-meter-high storm surges in Tacloban City, Leyte, which caused 90 percent destruction of the island.

Tacloban City is a highly urbanized city in the northeastern part of Leyte island. Considered as the premier urban area in Eastern Visayas, it has been home to 221,174 persons and 45,478 households. It has been a center of commerce, education, and economic activities in Region VIII for decades. It suffered many casualties from storm surges with 2,646 dead and 701 missing. Based on the manual counting of structures, 7,677 structures were believed to be damaged by the storm surge.

From 1970-2013, a total of 720 tropical cyclones entered the Philippine Area of Responsibility (PAR). Based on NDRRMC records, Typhoon Yolanda is the worst typhoon to ever hit the Philippines ranking first in terms of damage to properties amounting to Php 93 Billion (infrastructure, productive, social, and cross-sectoral). A total of 6,300 individuals were reported dead, 28,688 injured and 1,062 are still missing, with more than 90 percent coming from Region 8.

Even though the hardest-hit areas received early warnings, the weather service and other officials later admitted that the victims were unfamiliar with the term "storm surge." Even though the hardest-hit areas received early warnings, the weather service and other officials later admitted that the victims were unfamiliar with the term "storm surge."

## Answer Key for Case Study 1: Super Typhoon Yolanda

### Instructions:

Study the case studies assigned to your group. Based on the material and your prior knowledge of the event, discuss among yourselves and answer the questions below. You have five minutes per group to present your answers.

1. Why did the event become disastrous? Identify the factors cited below.

a. **Location** of affected areas

Eastern Visayas, particularly Eastern Samar, is highly exposed to the natural hazard typhoon because it faces the Pacific Ocean, which produces numerous typhoons every year. The location is naturally part of the typhoon belt. The barangays, heavily affected by the storm surge, are in coastal areas which are prone to such hazards.

b. **Conditions that make a community prone to the damaging effects of a hazard**, such as poor construction of buildings, lack of public awareness, and limited preparedness.

Due to the high level of urbanization, the city has a large population. Some portions of Tacloban sit in low-lying wetlands, prone to flooding. Other upland barangays are landslide-prone. Many of the victims built their homes on the islands' narrow coastal plains and lived off subsistence fishing and farming. Many of the houses are made of cheap, flimsy materials that stood no chance against the typhoon.

Even though the hardest-hit areas received early warnings, the weather service and other officials later admitted that the victims were unfamiliar with the term "storm surge." Local governments failed to evacuate many of the vulnerable population away from the danger zones, partly because they did not fully appreciate the threat and partly because they had not built enough shelters.

c. Strengths and resources within a community that can reduce the effects of a disaster, such as infrastructure, institutions, human knowledge and skills, and leadership and management

- Monitoring systems
- Evacuation centers – but was not enough and some were vulnerable to the storm surge
- Emergency response team
- Local disaster risk reduction and management fund (LDRRMF)

2. What could have been done in or by the community to avoid or limit the impacts of disasters?

Serious threats brought by disasters may not have been taken seriously by the exposed community. The local government lacked in the implementation and execution of the new NDRRMC framework. The affected barangays and municipalities could utilize the local disaster risk reduction and management fund, educate the community, make the people understand the seriousness of the threats, and improve monitoring technologies and local information dissemination.



## Case Study 2. Cotabato Earthquakes



**Left:** Earthquake-damaged building in North Cotabato after a magnitude 6.5 tremor struck the province on October 31, 2019.

Source: Earthquake stronger than 'The Big One' possible in N. Cotabato [Online image]. (2019, October 2019). Yahoo! News. <https://ph.news.yahoo.com/earthquake-stronger-big-one-possible-104124855.html>

**Right:** Rescuers are still looking for three more people in Magsaysay, Davao del Sur after a magnitude 6.6 earthquake jolted the nearby town of Tulunan, South Cotabato on Tuesday morning, local authorities said.

Source: Cotabato quake death toll climbs to eight, 394 injured [Online image]. (2019, October 30). CNN Philippines. <https://www.cnnphilippines.com/news/2019/10/30/magsaysay-davao-del-sur-missing-quake.html>

### Description of Disaster

Three consecutive major earthquakes shook eastern and central Mindanao in the last quarter of 2019. These earthquakes are considered part of a sequence of events from interrelated faults in the region. The earthquake sequence triggered a large number of landslides and rockslides. Municipalities affected by landslides include Kidapawan City, Antipas, Arakan, Makilala, M'Lang, and Tulunan in Cotabato province; Magsaysay, Bansalan, Malalag, Matanao and Kiblawan in Davao Del Sur.

#### October 16 magnitude 6.4 – Tulunan, North Cotabato

On October 16, 2019, at 7:37 PM, a magnitude 6.3 earthquake struck the provinces of Cotabato, Davao del Sur, and vicinities. Tulunan felt the strongest ground-shaking. Aftershocks recorded afterward were small to moderate. Based on field investigations, geological impacts include liquefaction, tension cracks, and earthquake-induced landslides.

Reports included at least five people killed and thirty injured. The damaged buildings included forty houses, seventy schools, seven health facilities, ten commercial buildings, and two places of worship. Poor engineering has been a major contributing factor to these damages.

## Description of Disaster

### **October 29 magnitude 6.6 – Tulunan, North Cotabato**

On October 29, 2019, an earthquake occurred, with an epicenter located southeast of Tulunan, Cotabato. A major fire broke out in General Santos City. Many parts of Cotabato and locally in South Cotabato, Sultan Kudarat, and Sarangani experienced power outages. On a report, at least ten deaths and a minimum of another 400 injured. Arakan, Carmen, Tulunan, Makilala, Digos City, and Magsaysay reported deaths. Parts of North Cotabato, South Cotabato, and Sultan Kudarat suspended school classes. The October 29 shock triggered landslides that caused three fatalities, with six more people reported missing.

### **October 31 magnitude 6.5 – Central and eastern Mindanao**

Two days thereafter, another earthquake rocked central and eastern Mindanao. Some buildings in Davao and Soccsksargen were seriously damaged, and some collapsed. More than 300 aftershocks comprised the figure after the earthquake.

A hotel in Kidapawan City collapsed following the earthquake; fortunately, according to the National Disaster Risk Reduction and Management Council (NDRRMC), no one was inside the building when the earthquake struck. The Davao City government suspended classes on all levels. According to the NDRRMC, the earthquake impacted about 30,000 families or 150,000 individuals. The October 31 shock triggered landslides that caused two fatalities, with five more people reported missing.

For the last two earthquakes, A total of 71,247 families/349,266 persons were affected in 362 barangays in Region XI and XII. Of which, a total of 13,073 families/60,130 persons are taking temporary shelter in 107 evacuation centers, while 25, 812 families/125,609 persons are served outside ECs. Reports covered a total of 23 dead, 563 injured, and 11 missing persons. Displaced families took refuge in makeshift tents in the evacuation areas.

The DOST-PHIVOLCS Quick Response Team (QRT) was immediately deployed on 18 October 2019 and 30 October 2019 to 1) conduct earthquake information dissemination and education for local government units (LGUs) and locals in the affected areas; 2) conduct field surveys to determine the earthquakes' geologic impacts and effects to structures; 3) deploy temporary seismic stations for continuous aftershocks monitoring; and 4) assist the LGUs, together with the Mines and Geosciences Bureau, in assessing selected evacuation/relocation sites in terms of earthquake hazards. It also conducted information dissemination activities to explain the earthquake events.

Despite the reported total of seventy-three health facilities affected, they resumed operations and have set up temporary facilities for consultation areas, operating rooms, and delivery rooms to accommodate the surge of patients and casualties.

The Central Mindanao (SOCCSKSARGEN Region), which includes Cotabato, is one of the seismically active areas in the country because of the presence of the western extension of the Mindanao Fault (Cotabato-Sindangan Fault). This active fault traverses Sarangani province to northwest of the Zamboanga Peninsula. The Cotabato Trench is also a major source of earthquakes that can affect the region. In addition, there are other nearby local faults, some of which may be covered by recent deposits, and could be sources of small to strong magnitude earthquakes.

## Description of Disaster

One of the most destructive earthquakes in the Philippines was the Moro Gulf earthquake on August 17, 1976, with a magnitude 8.1 that eventually caused tsunamis. The fact that the tremor happened just after midnight when most people were sleeping and a great tsunami was spawned—which struck the coasts from different directions and caught the people unaware—attributed as the major causes of the great number of casualties during the event.

## Answer Key for Case Study 2: Cotabato Earthquakes

### Instructions:

Study the case studies assigned to your group. Based on the material and your prior knowledge of the event, discuss among yourselves and answer the questions below. You have five minutes per group to present your answers.

1. Why did the event become disastrous? Identify the factors cited below.

a. **Location** of affected areas

The Central Mindanao (SOCCSKSARGEN Region), which includes Cotabato, is one of the most seismically active regions in the country because of the presence of several active faults in the area. The Cotabato Trench is also a major source of earthquakes that can affect the region. In addition, there are other nearby local faults and could be sources of small to strong magnitude earthquakes. Since the 1900s, meanwhile, Mindanao has been hit by at least thirty-five earthquakes and at least three of these are destructive. One of which is the Moro Gulf earthquake in 1976, with a magnitude 8.1 that eventually caused tsunamis. That's why we can say that the area has high exposure to such hazards.

b. **Conditions that make a community prone to the damaging effects of a hazard**, such as poor construction of buildings, lack of public awareness, and limited preparedness.

Some areas are prone to landslides, and the design and construction of some structures or buildings are not strong, or not up to standard. The population in the severely affected area is 1.5M. Some areas are hard to reach due to undeveloped roads.

Based on the reports and the case studies, most of the people were not prepared and were shocked.

c. **Strengths and resources within a community that can reduce the effects of a disaster**, such as infrastructure, institutions, human knowledge and skills, and leadership and management

- PHIVOLCS, DOH, the LGUs, and other agencies were quick to respond to the event.
- Immediate public engagements that debriefed the affected residents and to prepare them for the possible occurrence of another earthquake.
- There were evacuation areas with makeshift tents for individuals and families who lost their homes due to the event.

2. What could have been done in or by the community to avoid or limit the impacts of disasters?

The poor engineering of structures, like houses, buildings, etc., was identified as the main vulnerability. Different impacts could have been avoided, such as mass panic and the volume of casualties, had only the local officials were strict in implementing standards, more focused, and able to prepare its governing community.

They could have developed and strengthened the implementation of policies for the people residing in areas prone to landslide and rockslide, so as to avoid roadblocks.



## Case Study 3. Mayon Volcano Eruption



Source: Warning in Philippines to 'evacuate or face death penalty' as Mayon volcano threatens deadly eruption [Online image]. (2018, January 23). Sky News. <https://news.sky.com/story/warning-in-philippines-to-evacuate-or-face-death-penalty-as-mayon-volcano-threatens-deadly-eruption-11219540>

### Description of Disaster

Early in 2018, Mayon Volcano, in the province of Albay, in the Bicol region, showed active volcanic activities. Aside from ashfalls, rockfalls, and lava flows, the ground around the summit has also been shaking. It caused the Philippine Institute of Volcanology and Seismology (PHIVOLCS) to raise Mayon Volcano's alert level. Below is a series of activities of Mayon Volcano.

**January 14:** PHIVOLCS raised Mayon Volcano's level from II to III, signifying that Mayon has an increased tendency toward hazardous eruption.

**January 15:** Two lava collapse events occurred, producing rockfall and small-volume pyroclastic density currents. Barangays in the southwest of the volcano reported ash clouds produced with ash falls. As of 15 January, a total of 5,318 families (21,823 people) have been displaced, with 4,134 families (16,877) staying in 18 evacuation centers.

## Description of Disaster

**January 16:** Lava flow, more rockfall events, and short pyroclastic flow continued. PHIVOLCS recommended a 6-km permanent danger zone, and a 7-km extended danger zone is enforced due to the dangers of rockfalls, landslides, and sudden explosions or dome collapse that may generate hazardous volcanic flows. The Province of Albay, Region V was declared under the State of Calamity through Resolution No. 00670-2018.

**January 22:** The alert level-4 (hazardous eruption imminent) was raised over Mayon Volcano, located in Albay province. The danger zone was extended to an 8-kilometer radius, up from a previous 7-kilometer where local authorities were advised to prevent any human activity, due to the danger of rockfalls, landslides, and sudden explosions or dome collapse that may generate hazardous volcanic flows. As of 22nd of January, 7,900 families (30,000 people) have been evacuated from seven (7) Albay municipalities neighboring Mount Mayon.

**January 24:** The danger zone has been further extended to a 9-kilometer radius. Around 60,500 people have been displaced, and are sheltered in 52 evacuation centers or being hosted by relatives and friends.

**February 26:** Six (6) separate lava eruptions, lasting up to 19 minutes, occurred. A volume of 90,000 people remain affected, and 62,000 people have been evacuated from their homes due to the volcano and are staying in 57 evacuation centers.

From Alert Level 4, Mayon volcano declined in unrest activities that made it downgraded to Level 3 on March 6. On 3 April, the government lowered its Alert Level to Level 2 and reported the return of all Internally Displaced Persons (IDPs) to their respective places of origin.

As of March 06, 2019, 6:00 PM, the province of Albay incurred a total of ₱166,288,833.36 worth of damages to agriculture. There is still a total of 10,443 farmers affected in the province. A total of 64 schools, 74,010 learners, and 2,732 DepEd personnel located within the 6-9 kilometer Permanent Danger Zone were affected, and there are still 1,698 livestock evacuated in the Polling Stations.

As of September 2018, a total of 91,055 people has been affected by the eruption of Mayon Volcano.

## Answer Key for Case Study 3: Mayon Volcano Eruption

### Instructions:

Study the case studies assigned to your group. Based on the material and your prior knowledge of the event, discuss among yourselves and answer the questions below. You have five minutes per group to present your answers.

1. Why did the event become disastrous? Identify the factors cited below.

- a. **Location** of affected areas

The people in Albay are exposed to the eruption of Mayon Volcano. The volcano is active and the people of Albay are aware of the destruction that this event can cause.

- b. **Conditions that make a community prone to the damaging effects of a hazard**, such as poor construction of buildings, lack of public awareness, and limited preparedness.

The agricultural livelihood of the community is highly vulnerable to the disaster because their farming lands are located around the volcano.

- c. **Strengths and resources within a community that can reduce the effects of a disaster**, such as infrastructure, institutions, human knowledge and skills, and leadership and management.

We can say that the community has a capacity in handling the eruption. They were quick to respond, considering that the Mayon didn't suddenly erupt, and just started showing signs of eruption. They followed evacuation protocols, which resulted in zero casualties.

2. What could have been done in or by the community to avoid or limit the impacts of disasters?

The main concern, in this case, is the vulnerability of the agricultural lands and livelihood of the community. With this, relocation is one of the suggestions. However, it's impossible because it will take so much time, effort, and money to do so. We cannot even do anything about the geography of the place. It is suggested to strengthen and improve the evacuation plans and evacuation centers since the event can likely happen again.



## Case Study 4. Payatas Landslide



Top: PHILIPPINES: LANDSLIDE AT PAYATAS GARBAGE DUMP LATEST.

Source: PHILIPPINES: LANDSLIDE AT PAYATAS GARBAGE DUMP LATEST [Online video]. (2015, July 21). YouTube. [https://www.youtube.com/watch?v=n\\_NBmIChce0](https://www.youtube.com/watch?v=n_NBmIChce0)

Bottom: Housing situation at Payatas Dumpsite before landslide.

Source: Stability problems of landfills — The Payatas landslide. (n.d.). [PDF File]. [http://www.dr-koelsch.de/Phillie\\_01\\_Payatas.pdf](http://www.dr-koelsch.de/Phillie_01_Payatas.pdf)

## Description of Disaster

In early July 2000, two tropical typhoons hit parts of the Philippines. After several days of heavy rain, the Payatas dumpsite tragedy happened on the early morning of July 10, 2000. A massive 50 feet wall of solid waste collapsed and burst in flames due to landfill gas, fallen power cables, or overturned stoves in the shacks. An avalanche of mud and rubbish buried more than 100 shacks and huts adjacent to the dump, which were home to around 800 families. It also buried an undetermined number of people. Bulldozers excavated the site while residents dug with their bare hands and whatever tools they could find to try to rescue victims.

More than 220 people were found dead in the plastered area. Four weeks after the landslide, rescue works were suspended. There was no longer hope to find survivors, and even the dead bodies were heavily degraded, which made the identification impossible. Therefore, an estimated 200 to 800 people are still missing.

The actual death toll will never be known, firstly because officials have no idea how many people were living alongside the dump, near Payatas. Local residents say that up to 500 are still buried under the rubbish, while local officials put the number at just 140.

The local city mayor, Mel Mathay, has tried to deflect criticisms of his administration by saying that he had ordered the residents out of the area the previous week for fear of landslides, but they had refused to go. Even after the disaster, many people are determined to stay simply because they have nowhere else to go.

During that time, about 1,540 metric tons (1,700 tons) per day of that MSW was placed at the Payatas landfill. Around the dumpsite, the city of Payatas houses 80,000 people, many of them working in a waste business, like in junk stores or as waste pickers (scavengers). The scavengers, who have the worst job in this micro-economy, often must live directly on the open waste surface of the dumpsite.

In 1998, the landfill was supposed to close, but the Quezon City government asked the Metro Manila Development Authority (MMDA) to postpone closure because of the higher cost of using the landfill in San Mateo, Rizal (~6.7 km away). According to the MMDA, the Quezon City government continued to postpone the closure of the Payatas landfill until one month before the July 2000 slope failure.

## Answer Key for Case Study 4: Payatas Landslide

### Instructions:

Study the case studies assigned to your group. Based on the material and your prior knowledge of the event, discuss among yourselves and answer the questions below. You have five minutes per group to present your answers.

1. Why did the event become disastrous? Identify the factors cited below.

a. **Location** of affected areas

The communities are highly exposed to the landslide hazard because they immediately beside the foot of mountains of waste. Their livelihoods also depend on these wastes. There were tons and tons of garbage that made the slope very steep. These dumpsites have immediate communities that are directly affected by the environmental hazards posed by the tons of garbage being dumped daily.

b. **Conditions that make a community prone to the damaging effects of a hazard**, such as poor construction of buildings, lack of public awareness, and limited preparedness.

The community is highly vulnerable to the hazard since their houses are made of flimsy materials. Due to extreme poverty, the population in the area is dense as well, and they are not accounted for by the local government since they are living illegally in the area. There is an influx of internal migrants from the twenty-two poorest provinces in the Philippines into already congested city centers, such as Metro Manila, but they could not afford proper housing due to the high living expenses.

Since the community is living in extreme poverty, they do not have the capacity to protect themselves with such hazard. Since they are unaccounted for, the local government also didn't capacitized the community. In fact, they were being asked to leave the area.

c. **Strengths and resources within a community that can reduce the effects of a disaster**, such as infrastructure, institutions, human knowledge and skills, and leadership and management

We can say that the community has no strength or resources at all that could have reduced the effects of the disaster. After the event, bulldozers excavated the site while residents dug with their bare hands and whatever tools they could find to try to rescue victims.

2. What could have been done in or by the community to avoid or limit the impacts of disasters?

This tragedy happened because of many factors that are far too complicated but cannot be ignored. First, there is the mismanagement and underdevelopment of the dumpsite system. Another factor is the huge amount of garbage that Metro Manila and nearby provinces are producing and having only one dumpsite for all these. But there shouldn't have been a community in the dumpsite area in the first place. If the community didn't have any other options for a more decent living situation, the local government could have done something to at least ensure the safety of these communities or exerted more effort in managing the community.