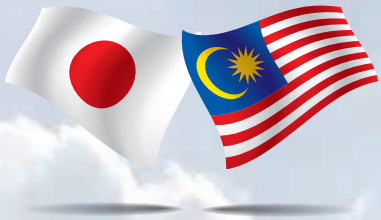
SeDAR Malaysia -Japan
UNDERSTANDING & MANAGING DISASTER RISK



Training of Trainers Guidebook

For Planning and Implementing
Community-Based Disaster Risk Reduction Programs

JICA Japan International Cooperation Agency
災害科学国際研究所 IRIDeS International Research Institute of Disaster Science
MAJLIS SELANGOR
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PREFACE

The past few years have seen the frequency and scale of hazards getting more pronounced and severe, with Asia bearing the brunt of the occurrences as the most disaster-prone region in the world. The impact of climate change is being felt everywhere, even in regions and countries where not many hazards normally occur. Just as recently as in 2021, severe floods have devastated the lives and properties of countless victims across the globe, cutting a swath of destruction stretching from Europe to Asia.

Compounding the disasters wrought by the forces of nature, the experience of COVID-19 has made us realize that hazards are not only natural, but they also include technological and biological types such as pandemics, and we need to strengthen our preparedness capacity for these complicated hazards. To tackle these compound hazards requires wider expertise, knowledge, and collaboration among different sectors and professionals. It has become imperative that all of us need to take action to reduce the impacts and damage as well as contribute to the process of mitigation and prevention.

No more is this becoming more evident than in Malaysia, where the December 2021 flood and landslide disasters showed us the just how devastating such events can be. Like many of its neighbors in the region, the number of floods and its intensity in Malaysia has demonstrated that large-scale disasters are no longer a possibility but a stark reality. Natural hazards cannot be prevented, but various disaster risk reduction (DRR) measures and efforts can reduce the damage caused by hazards. People's lives, knowledge, preparedness capacity, and resilience also can contribute to mitigating the impact. In contrast, vulnerability increases the damage. Whether a hazard develops into a disaster or remains as merely a hazard often depends on us. It means that we and our behaviors and actions can reduce the impacts and damage caused by natural hazards.

This guidebook aims to train trainers on DRR, with the ultimate goal of having communities and local actors work together to plan and implement their own DRR programs. In that process, the concept of "community-based" is extremely important, and it has to be shared with all the participating actors. This guidebook focuses on how to plan and implement programs based on this concept.

The JICA Partnership Program's "Strengthening the DRR Capacity to Improve the Safety and Security of Communities by Understanding Disaster Risk (SeDAR)" program targets the state of Selangor in Malaysia. However, we hope that this guidebook can be referred to by other states and a community-based DRR can be implemented throughout the country.

We would like to express our sincere appreciation to the team members who contributed tremendously to the development of this guidebook and for their hard work.

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ACRONYMS

AAR	*After action review*
APM	*Angkatan Pertahanan Awam Malaysia/ Malaysia Civil Defence Force*
BCP	*Business continuity plan*
CBDRR	*Community-based disaster risk reduction*
CERT	*Community Emergency Response Team*
CRED	*Centre for Research on the Epidemiology of Disasters*
CSO	*Civil society organization*
DEM	*Digital elevation model*
DID	*Department of Irrigation and Drainage*
DPPC	*Disaster Preparedness and Prevention Centre*
DRM	*Disaster risk management*
DRR	*Disaster risk reduction*
EM-DAT	*Emergency Events Database*
EWS	*Early warning system*
GIS	*Geographic information system*
GNSS	*Global navigation satellite system*
HEC-RAS	*Hydrologic Engineering Center's River Analysis System*
IoT	*Internet of things*
IRIDeS	*International Research Institute of Disaster Science*
JICA	*Japan International Cooperation Agency*
JKKK	*Jawatankuasa Keselamatan dan Kemajuan Kampung/ Village Safety and Development Committee*
JPP	*JICA Partnership Program*
KWABBN	*Kumpulan Wang Amanah Bantuan Bencana Negara/ National Disaster Relief Trust Fund*
LiDAR	*Light detection and ranging*
MJIIT	*Malaysia-Japan International Institute of Technology*
NADMA	*National Disaster Management Agency*
NAHRIM	*National Water Research Institute of Malaysia*
NGO	*Non-governmental organization*
NSC	*National Security Council*
PBRC	*Peta Bahaya dan Risiko Cerun/ Slope Hazard and Risk Map*
PDRM	*Polis Diraja Malaysia/ Malaysian Royal Police*
SDMU	*Selangor Disaster Management Unit*
SeDAR	*Strengthening the Disaster Risk Reduction Capacity to Improve the Safety and Security of Communities by Understanding Disaster Risk*
SFDRR	*Sendai Framework for Disaster Risk Reduction*
SMART	*Special Malaysia Disaster Assistance and Rescue Team*
SOP	*Standard operating procedure*
UTM	*Universiti Teknologi Malaysia*

INTRODUCTION

1. Introduction to the JPP SeDAR Program
2. Introduction to the Training of Trainers Guidebook

1. Introduction to the JPP SeDAR Program

The **Training of Trainers Guidebook for Planning and Implementing Community-Based Disaster Risk Reduction Programs** is a publication produced under the JICA Partnership Program's "Strengthening the Disaster Risk Reduction Capacity to Improve the Safety and Security of Communities by Understanding Disaster Risk" (SeDAR) program.

The SeDAR program aims to equip local governments as well as community leaders with the skills and know-how to build a disaster risk reduction (DRR) program at the grassroots level, from the bottom up.

This program take a unique approach to community engagement by:

- Instilling a science-based understanding of disaster risks among the community leaders, members and local authorities, and
- Having them work together to develop DRR activities and programs that are best suited to their understanding and needs

This community-oriented approach towards DRR is an important step towards building disaster-resilient communities.

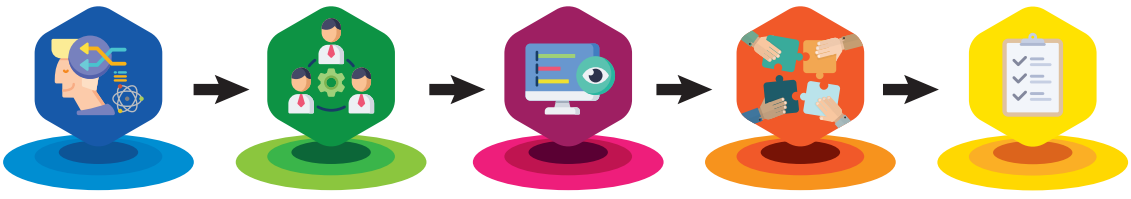
Key Concepts of the SeDAR Program

(i) Understanding of Disaster Risks by Local Governments and Communities
To create awareness and understanding of disaster risks among the local governments and communities

(ii) Leadership and Ownership by the Communities to Lead DRR Projects
To give ownership of the program to the communities, which will continue sharing the knowledge with others

(iii) Continuity and Sustainability of the Program by Local Governments and Communities
To ensure that the programs are continued and sustained by the local governments and communities

Phases of the SeDAR Program



Program Partners

SeDAR is a collaboration between the International Research Institute of Disaster Science (IRIDeS) of Tohoku University, Selangor Disaster Management Unit (SDMU), and the Disaster Preparedness and Prevention Centre (DPPC) of the Malaysia-Japan International Institute of Technology (MJIIT), Universiti Teknologi Malaysia (UTM) Kuala Lumpur.

- **IRIDeS – is the project proponent** that manages and provides direction in the implementation of the SeDAR project, as well as imparting skills and know-how that leverages on its vast experience in disaster management in Japan
- **DPPC – is the local researcher and developer** that transforms SeDAR objectives into local content for the communities, drawing on expertise from local domain experts
- **SDMU – is the local implementer** that serves as the link between the communities, government agencies and academia, thus ensuring smooth implementation

2. Introduction to the Training of Trainers Guidebook

The Training of Trainers Guidebook serves to create awareness of local disaster history, introduce DRR concepts, create understanding of local hazards and risks, and teach how to plan, implement and evaluate community-led programs.

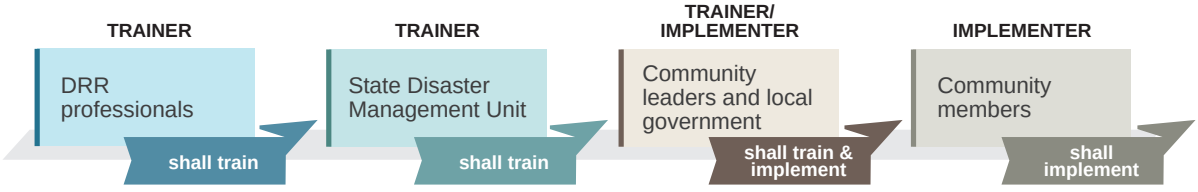
The ultimate goal of the Guidebook is to equip local governments and community leaders with the know-how and capability in spearheading DRR programs.

2.1 Who Are the Trainers and Target Audience?

There are successive levels of trainers. The first trainers are DRR professionals who train the state disaster management units or state-level agencies vested with the responsibility of disaster management. DRR professionals are academia, scientists, engineers, and town planners.

In turn, the state disaster management units train the community leaders and local/district government officers in target vulnerable areas. And finally, the community leaders train the community members.

Ultimately, the planning and implementation of the CBDRR programs are done by the community leaders and members, assisted by the local/district governments.



2.2 Content of the Guidebook

There are three modules and four annexes in this Guidebook.

- **Module 1: Understanding DRR Concepts** introduces basic concepts in DRR, which serves as the foundation knowledge for trainees to proceed to the rest of the Guidebook.
  Use this module to introduce key concepts of DRR.

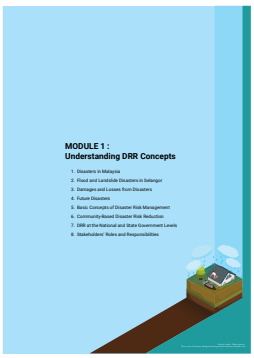
- **Module 2: Understanding Local Hazards and Risks** creates awareness and understanding of the hazards and risks surrounding the target local communities.
  Use this module to show how the science-based risk assessment tools and community-based maps help layman residents better understand the hazards and risk around them.

- **Module 3: Planning and Implementing CBDRR Programs** provides how-to's on planning, implementing, and evaluating the programs, which will be carried out by the community members.
  Use this module for providing an overview of the steps required to carry out the activities.

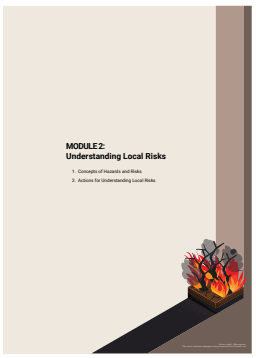
- Annexes provide detailed explanations and how-to's on carrying out risk communication as well as planning, implementing and evaluating CBDRR programs.
  Use annexes (where indicated) to explain and provide detailed information and instructions.

Instructional and Subject Matter Content

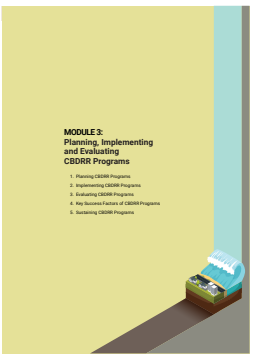
This Guidebook presents instructions to carry out each modules, as well as provide useful background information and subject matter material that trainers can use as content.



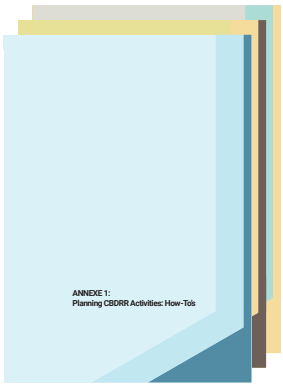
Module 1



Module 2



Module 3



Annexes

Training Aids

- Module 2 can be supported by the **JPP SeDAR Disaster Risk Report**, which has detailed content on hazard and risk in the target communities of the JPP SeDAR program.
- All modules are provided with ready-made presentation slides that trainers may use.

THE CBDRR TRAINING WORKFLOW

The CBDRR Training Workflow

In this Guidebook, community-based disaster risk reduction (CBDRR) is presented as a systematic approach that enables communities to create programs that they can carry out at regular intervals, such as on a yearly basis. This prevents CBDRR programs from becoming one-time or one-off events.

In its simplest form, it can be summarized as (1) understanding DRR concepts, (2) risk identification and understanding, (3) planning, (4) implementation, and (5) evaluation.

These steps are in line with the four prorities of the Sendai Framework.

Each step is broken down into several tasks and activities, which is explained further in this Guidebook.

	CBDRR ACTIVITY	Co-implemented by	
STEP 1	**Understanding DRR Concepts** Through Talks/Sessions/ Workshops by DRR Professionals The first step that participants must take before engaging in CBDRR programs is understanding basic concepts in DRR. This knowledge serves as the foundation for planning and implementing programs.	DRR professionals such as academia, scientists, planners, and engineers	MODULE 1
STEP 2A	**Understanding Local Risk** Using Science-Based Risk Assessment Tools The next step for participants involves understanding local hazard and disaster risks using existing science-based hazards and risk maps. This is done through risk communication by DRR professionals. It should be noted that this step is possible only if science-based maps are available. If none are available, then communities can proceed straight to Step 2b.	DRR professionals such as academia, scientists, planners, and engineers	MODULE 2
STEP 2B	**Understanding Local Risk** Using Community-Based Hazard Identification Tools Community members engage in hands-on hazard identification through town watching and community mapping.	Communities State and local government NGOs DRR professionals such as academia, scientists, planners, and engineers	
STEP 3	**Planning CBDRR Programs** This step consists of: - analyzing stakeholders - identifying problems - finding solutions/prioritizing DRR activities - planning CBDRR activities	Communities, with support from Local government and NGOs	MODULE 3
STEP 4	**Implementing CBDRR Programs** Under the direction of the community leader, community members carry out the activities identified in the CBDRR plan. Monitoring helps communities track the progress of their program and identify where problems occur during implementation.	Communities, with support from Local government and NGOs	
STEP 5	**Evaluating CBDRR Programs** This final step is for measuring the impact of CBDRR program on the community and determine whether it had met the program objectives. It is also for identifying challenges and obstacles for improvements in future programs.	State and local government NGOs DRR professionals such as academia, scientists, planners, and engineers Community leaders .	

MODULE 1 :
Understanding DRR Concepts

1. Disasters in Malaysia
2. Flood and Landslide Disasters in Selangor
3. Damages and Losses from Disasters
4. Future Disasters
5. Basic Concepts of Disaster Risk Management
6. Community-Based Disaster Risk Reduction
7. DRR at the National and State Government Levels
8. Stakeholders' Roles and Responsibilities

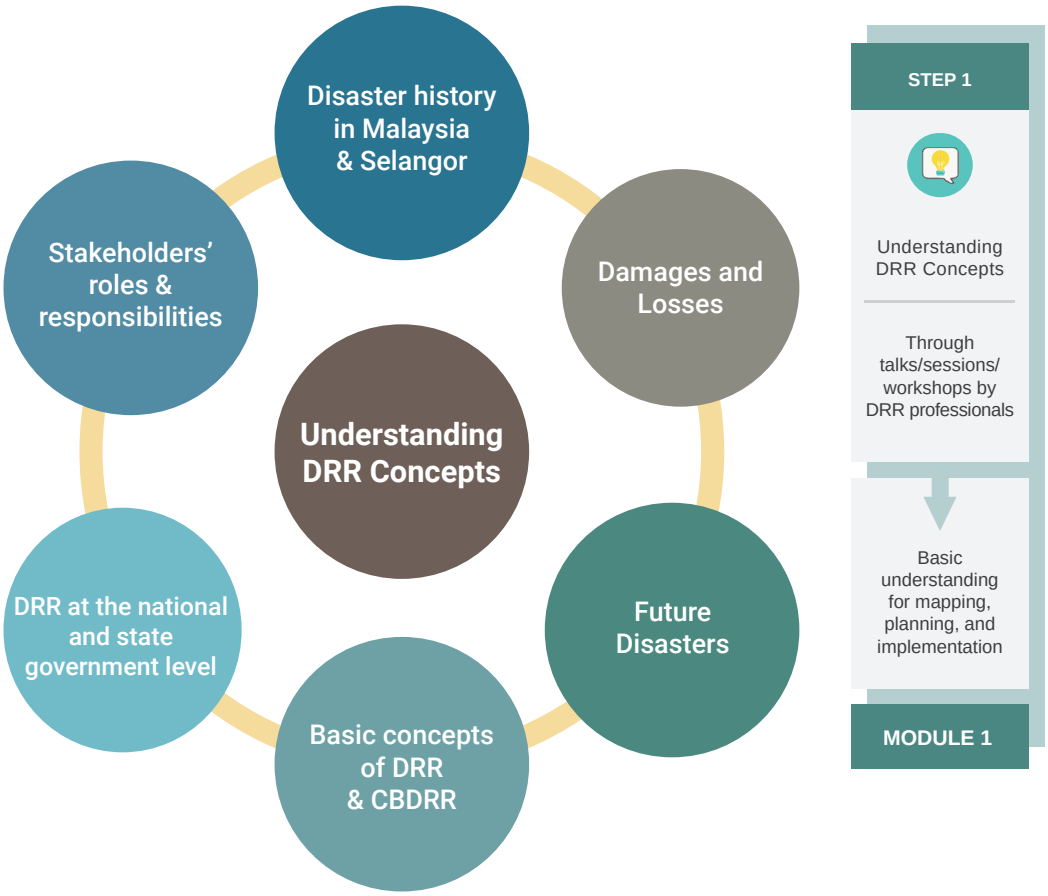
KEY MESSAGES

- To understand how disasters are occurring more frequently and appreciate the urgency of disaster risk reduction, **it is important to be familiarized with local disaster events**, past and future
- Disaster risk reduction covers the **prevention and preparedness phases of the disaster risk management cycle**
- The concept of community-based disaster risk reduction puts **communities as the main actor and initiator of planning and implementing DRR programs**

LEARNING OBJECTIVES

- Be aware of past disaster history in Malaysia and Selangor and what are the factors driving disasters in the future
- Learn the different phases of the disaster risk management cycle
- Learn what is disaster risk reduction
- Find out the difference between disaster risk reduction and community-based disaster risk reduction
- Find out who are the lead government agencies in DRR

Key Topics to be Covered



1. Disasters in Malaysia

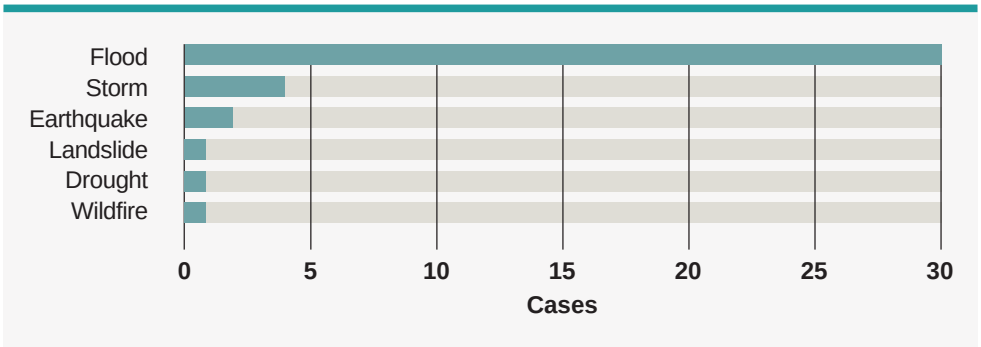
Malaysia lies in a geologically stable region that is free from earthquakes, volcanic activities, and strong winds such as tropical cyclones which periodically affect some of its neighbours. It lies just outside the “Pacific Ring of Fire”.

Disaster Management in Malaysia
Source : Linda Rahman, Slideshare

Hence, it is free from volcanic eruptions and earthquakes. It also lies too far south of the major typhoon paths, although tail-ends of tropical storms have occasionally hit it.

But that does not mean Malaysia is totally free from natural disasters. In fact, it is often hit by floods, droughts, landslides, haze, tsunamis, and human-made disasters (Parker, et al. 1997). Every year, disasters such as floods account for a significant number of casualties, disease epidemics, property, and crop damage as well as other intangible losses such as loss of productivity and emotional impact (Chan, et al. 2002).

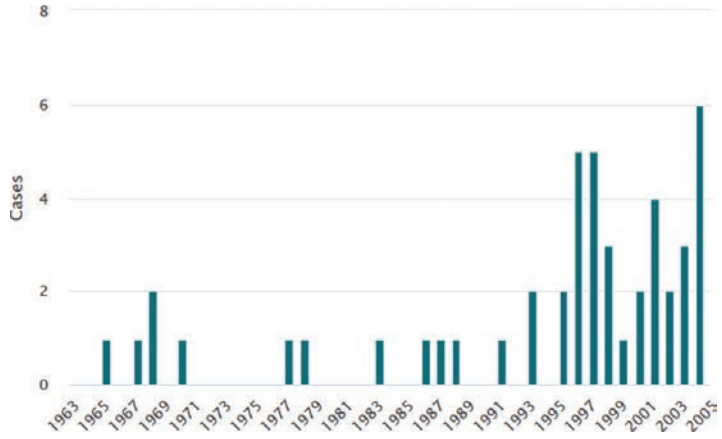
In the two decades between 1998 and mid-2018, Malaysia experienced 51 disaster events. In that period, over 3 million people have been affected and 281 people have died.



Disaster events, by type (1998-2018)
Source: CRED EM-DAT

The damages incurred have been severe: Emergency Events Database (EM-DAT) collected by Belgium-based Centre for Research on the Epidemiology of Disasters (CRED) showed that Malaysia has sustained a total damage of nearly US$2 billion (RM8 billion) in that period.

A striking trend could be seen by comparing the number of natural disaster occurrences in Malaysia since its formation. Before Malaysia's rapid industrialisation period in the 1990s, recorded natural disasters were pretty rare. But after the period of rapid urbanization and growth, disasters took place with increasingly regularity and magnitude.



Disasters by year (1998-2018)
Source: CRED EM-DAT

2. Flood and Landslide Disasters in Selangor

With geographical terrain that covers mountains to the east, a coastline to the west and densely populated river basins, the state of Selangor has a long history of disasters. The disasters include monsoon floods, flash floods, storms, landslides, peatland fires and fire incidents in forest reserves.

From 2015 until May 2019, there were 2,248 disaster incidents in Selangor. At the top of the list, flash floods prevailed, followed by storms, forest fires, and floods.

DISASTER TYPE	2015	2016	2017	2018	2019	TOTAL BY TYPE
Flood	44	95	114	54	0	**307**
Flash flood	0	160	159	266	49	**634**
Forest fires	82	132	126	135	45	**520**
Illegal dumpsite fires	0	0	16	41	18	**75**
Landslides	3	8	48	23	4	**86**
Storms	105	176	85	140	55	**561**
High Tide	0	14	48	0	3	**65**
Total (by year)	**234**	**585**	**596**	**659**	**174**	

Number of disasters in Selangor by type
Source: Selangor Disaster Management Unit, Selangor State, 2019

2.1 Landslides

A total of 20 critical hillslopes in Selangor (Kajang, Ampang Jaya, Selayang and part of Hulu Selangor), which have been identified to be at risk of a landslide if no action is taken to properly maintain the hilly slopes (2017).

Locations of the critical slope areas in Selangor

As of 2018, landslides account for 161 fatalities in Selangor, as shown below.

No.	Date Occurred	Location	Fatalities
1	23-Sep-69	Jalan University, Petaling Jaya	2
2	24-Mar-81	Kampung Kandan, Puchong	24
3	14-Nov-89	Bukit Permai, Ampang (fatalities not confirmed)	3
4	11-Dec-93	Highland Towers, Hulu Klang	48
5	31-Dec-93	KM 59.5, Timur - Barat Highway	1
6	2-May-94	Puchong Perdana, Puchong	3
7	30-Jun-95	KM 39, Genting Sempah, KL- Karak Highway	21
8	15-Jul-96	KM 1.5, Lebuhraya KL-Karak	15
9	25-Dec-97	Tanah runtuh di KM17 Lebuhraya Ampang - Hulu Klang	3
10	15-May-99	Jalan Wangsa 1, Bukit Antarabangsa	1
11	20-Nov-02	Taman Hillview, Hulu Klang	8
12	5-Nov-04	Taman Sri Harmonis, Gombak	1
13	1-Dec-04	Damansara Century Heights, Tol Sg Penchala	1
14	31-May-06	Kg. Pasir, Ulu Klang	4
15	11-Nov-06	Kg Bukit Sungai Seputeh, Lembah Jaya, Ampang	1
16	30-Nov-08	Ulu Yam Perdana, Kuala Selangor	2
17	6-Dec-08	Taman Bukit Mewah, Bukit Antarabangsa, Hulu Klang	5
18	21-May-11	Tanah runtuh Rumah Anak Yatim At Taqwa Hulu Langat	16
19	18-May-14	One sejati perabut, Kampung Melayu Subang, Subang	1
20	23-Feb-16	Ara Damansara	1
21	26-Nov-16	Serendah, Rawang	0
		TOTAL	**161**

Landslides with fatalities in Selangor
Source: Slope Engineering Branch, Public Works Department

Landslide at the orphanage in Batu 14 (2011)

2.2 Floods

Due to extensive flood mitigation projects carried out within the major river basins by the Department of Irrigation and Drainage, the state of Selangor no longer experiences floods from river overtopping. However, the state continues to be afflicted with flash floods, particularly in areas where there is construction or sand mining activities. With the current increase in urban development and construction, flash floods occur frequently.

Listed below are the number of flood events in Selangor by district from the period 2014-2019 (up until the month of May).

DISTRICT	2014	2015	2016	2017	2018	2019
Petaling	17	35	13	11	32	4
Klang	17	45	33	25	10	5
Sepang	7	17	5	12	10	4
Hulu Langat	6	16	21	29	20	6
Hulu Selangor	15	8	4	10	8	2
Kuala Langat	7	7	3	2	6	2
Kuala Selangor	6	11	7	9	16	3
Gombak	11	30	12	20	26	3
Sabak Bernam	6	2	2	23	23	2
Total	**92**	**171**	**100**	**151**	**151**	**31**

List of flood events in Selangor by district
Source: Disaster Management Unit, State Secretary's Office for State of Selangor, 2019

In addition to manmade activities, the State Government is also aware that increased flash floods and rising sea levels are effects brought about by climate change.

Scenes from coastal flooding at Kapar in the 2017 flood
Sources: New Straits Times

3. Damages and Losses from Disasters

There are different categories of losses from disasters such as floods or landslides. Normally, we think of losses in terms of direct, tangible losses (buildings and personal belongings), but there are also indirect and intangible losses, such as productivity losses and stress, anxiety and trauma.

We need to consider all the different types of losses.

	Direct losses	Indirect losses
Tangible losses	Building and contents, infrastructure, vehicles, crops, livestock, personal belongings and assets, etc.	Costs of rescue operation, aid, medical and lawsuit expenses, disruption to transport, business, commerce, employment, etc.
Intangible losses	Lives, injuries, damages to historical and ecological heritage, etc.	Stress, anxiety, trauma disruption to lives, loss of community, loss of societal resources, etc.

Categories of Flood Losses
Source: NAHRIM, Impact of Climate Change to Sea Level Rise in Malaysia, July 2019

4. Future Disasters

We must think of not only how to prepare and mitigate for disasters that are presently occurring, but also about driving factors that affect the frequency and impact of future disasters.

4.1 Climate Change

According to the Malaysian Meteorological Department (MetMalaysia), Malaysia is warming up. The rate of temperature warming over a 50-year period in Peninsular Malaysia is 1.1 degrees Celsius. In comparison, the rate of warming globally is 0.89 degrees.

While this sounds like a small increase in temperature, the effect is significant: 1-hour and 3-hour short-duration rainfall intensity in 2000-2007 increased 17 percent and 29 percent respectively compared to the same rainfall events in the 1970s. (Source: NAHRIM)

So, what does climate change mean for Malaysia?

It means warmer ocean and acidification, warmer temperatures, more intense rainfall, longer drier seasons, changes in the monsoon season, and sea level rise. This means that we will get more rainfall that can do more damage to people's properties and incur lives.

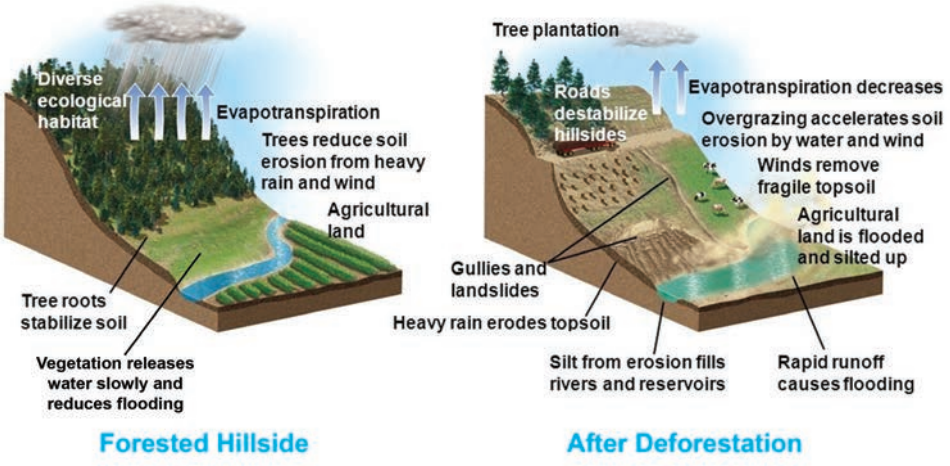
(Clockwise from top left) Flash floods, fires due to drier seasons, haze, coral bleaching due to warmer ocean temperature

October 2020 flash floods in Hulu Langat and Klang Valley

4.2 Urban Development

Urban development in high-growth areas changes land use and subsequently land cover. Changes in land use can affect the surroundings around our homes.

For example, place that was previously *permeable* to stormwater (meaning, ground cover such as vegetated earth that serves to absorb and retain rain water) can become impermeable (does not absorb rainwater) and can make large volumes of water flow more quickly. These large amounts of water can contribute to floods and landslides.



Flooding and landslides occurring after forest cutting
Source: Global Water Resources (SlidePlayer)

Such disasters can be mitigated with KNOWLEDGE and PREPAREDNESS, which comes with an understanding of disasater risk management and specifically, disaster risk reduction.

5. Basic Concepts of Disaster Risk Management

Although the main focus of this module is disaster risk reduction, it is helpful to become familiar with the disaster risk management (DRM) cycle. This is because disaster risk reduction covers several phases of the DRM cycle, which starts with the Response phase and includes the Preparedness and Mitigation phases.

5.1 Four Phases of Disaster Risk Management

Many of us are familiar with scenes of disasters that have afflicted the country. We have seen images of floods and landslides in various parts of the country, both of houses and victims as well as those of the emergency first responders such as BOMBA, Polis DiRaja Malaysia, and the Civil Defence Forces. You may even have been a victim yourself. If so, you have experienced the Response phase of the DRM cycle.

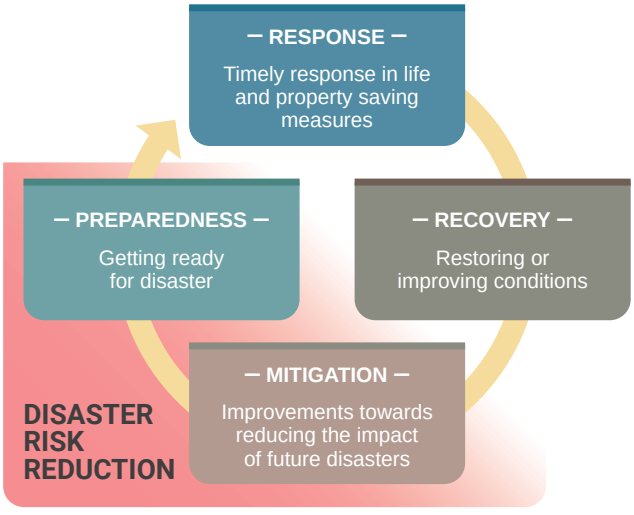
Disaster Response

Disaster Recovery

Disaster Preparedness

Disaster Mitigation

The DRM cycle is how disaster managers view the life cycle of a disaster, from response to recovery to mitigation to preparedness. Let's take a cursory look at the DRM cycle.



Disaster Risk Management Cycle

Disaster Risk Management Cycle

Each phase of the DRM cycle has specific activities pertaining to response, recovery, mitigation, and preparedness. DRR, which deals with pre-disaster activities, starts with the Response phase and includes Mitigation and Preparedness phases.

— RESPONSE —
Timely response in life and property saving measures

Disaster Response

Actions taken by those affected by disasters—during or immediately after a disaster event—or assistance/intervention by others to save lives and assets. It can be of an immediate, short-term or of an extended duration

Examples of actions taken as disaster response are:

- Evacuation
- Search and rescue
- Emergency medical service and triage
- Supply of medical aid and essential goods

— RECOVERY —
Restoring or improving conditions

Disaster Recovery

A series of actions taken after a disaster event with the goal of (1) restoring or further improving facilities and pre-disaster living conditions of the affected communities, while (2) encouraging and facilitating necessary measures to reduce disaster risks

Examples of actions taken as disaster recovery are:

- Resuming livelihood of affected community members
- Resuming businesses and commercial activities contributing to the local economy
- Rebuilding properties and infrastructure

— MITIGATION —
Improvements towards reducing the impact of future disasters

Disaster Mitigation

Structural and non-structural measures undertaken before disaster events to limit the adverse impact of hazards, environmental degradation, and technical hazards

Examples of actions taken as disaster mitigation are:

Physical measures such as:

- Constructing drainage systems
- Constructing retaining walls and flood walls
- Engaging in river works

Non-physical measures such as:

- Installing early warning systems
- Improving land use
- Public awareness and education

— PREPAREDNESS —
Getting ready for disaster

Disaster Preparedness

Activities and measures taken before disaster events to ensure effective response to the possible impacts of hazards, including delivery of timely and effective early warnings, evacuation of people and protection of properties

Examples of actions taken as disaster preparedness are:

- Preparing grab bags and stockpiling of emergency supplies
- Setting up a disaster gathering point
- Engaging in disaster drill simulations

From Disaster Response to Disaster Risk Reduction

Most of us are aware of actions carried out during the **Response** phase of the DRM cycle, but not so much about the other phases. As a result, much financial and human resources investment is made for the Response phase. However, disaster response is costly in terms of human lives, properties and infrastructure lost as well as response-related operations and logistics.

Thus, it is more important to focus more on disaster risk reduction, which is less costly as it focuses on mitigation measures that reduces the impact, damage and consequences that a disaster can bring. Investment in disaster risk reduction is therefore more effective.

5.2 What is Disaster Risk Reduction?

Disaster Risk Reduction (DRR) is the concept and practice of actively reducing the risks and impacts of disasters to people. This is done in a systematic way by analysing and managing the causal factors of disasters, such as reducing the exposure of people to disasters, reducing the vulnerability of people and property, and preparing for disasters.

This is a key point to remember as many belief systems support the notion that disasters are fated or destined to happen. However, DRR promotes the idea that there is also the element of human effort in preventing or reducing the impact of disasters.

In fact, there is no such thing as a 'natural disaster'. There could be a strong meteorological or geological phenomenon (e.g. storms, earthquakes, or landslides), but if we were all prepared and reacted effectively in a timely manner, we could reduce the effects of a major hazard and preventing the hazard from becoming a disaster and recover faster.

Here are some key points to consider:

- **Disaster hazards do not necessarily become a disaster unless it affects human lives and/or damage assets and properties.** However, they can be prevented from becoming disasters by changing human behaviour and practices.
- **DRR measures can significantly decrease disaster risk** especially if DRR actions are taken before disasters occur
- **DRR is a choice in which actions can make a significant difference in preventing or reducing the negative effects of disasters.** Reducing existing risks and/or preventing new risks can strengthen people's resilience to disasters and may help save lives and assets that society has built over the years.
- **In the DRM cycle, DRR starts at the Response phase and covers the Mitigation and Preparedness phases**

5.3 So How Do We Reduce Disaster Risk?

Although in many cases occurrences of disaster hazards cannot be prevented, the risks of disasters can be reduced by following a simple formula:

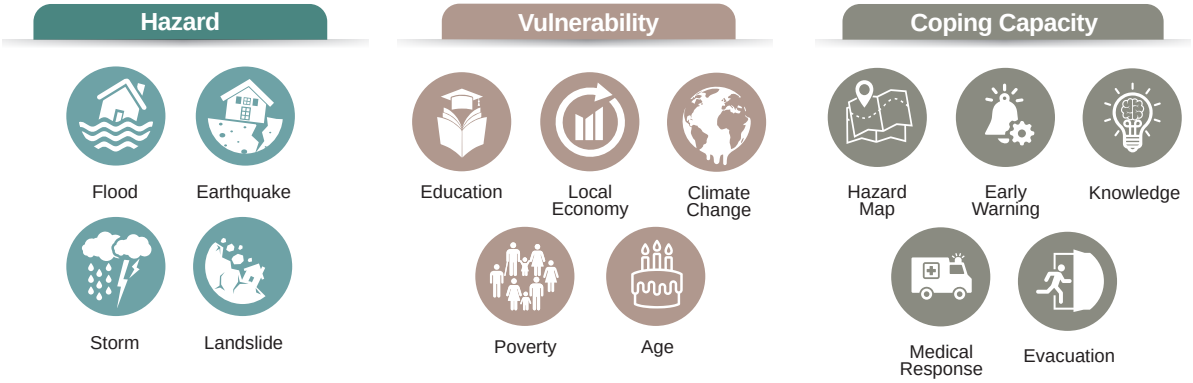
$$\text{Disaster Risks} = \frac{\text{Hazard} \times \text{Vulnerability}}{\text{Coping Capacity}}$$

Knowing what we know now about hazard, vulnerability and coping capacity, we look again at the formula with the aspects of what we CAN control.

$$\text{Disaster Risks} = \frac{\text{Hazard} \times \text{Vulnerability}}{\text{Coping Capacity}}$$

Communities have some measure of control over these

If DRR actions are taken before disasters occur, we can clearly see that our proactive actions can reduce our risk.



Examples of hazard, vulnerability and coping capacity

DEFINITIONS

Disasters
Losses in lives, health status, livelihoods, assets and services, which may occur to a community or society.

Disaster risk
Combination of factors that may create disasters that occur and affect a community or society.

Hazard
Phenomena that may cause and develop into disasters or environmental degradation (e.g. storm, heavy rain, earthquake, tsunami, sea surge).

Vulnerability
Characteristics or condition of a community or society that makes them more susceptible to the damaging effects of hazards.

Coping capacity
Ability or intent to endure or reduce disaster risk through structural and/or non-structural measures.

6. Community-Based Disaster Risk Reduction

Community-Based Disaster Risk Reduction (CBDRR) is based on the idea that the community is the main driver of DRR planning and implementation.

Communities are key in DRR because they:

a. **Are Their Own First Responders** – Communities are likely to become the first responders to disaster events and may need to take response measures by themselves until official help arrives.

b. **Require Localized Measures** – Because how disasters affect communities differs depending on the locality, DRR measures should be based on local context and needs.

c. **Are Familiar with Surroundings** – Communities know the locations of dangerous areas and where the vulnerable groups are residing in their neighbourhoods. Such information is critical during disaster response.

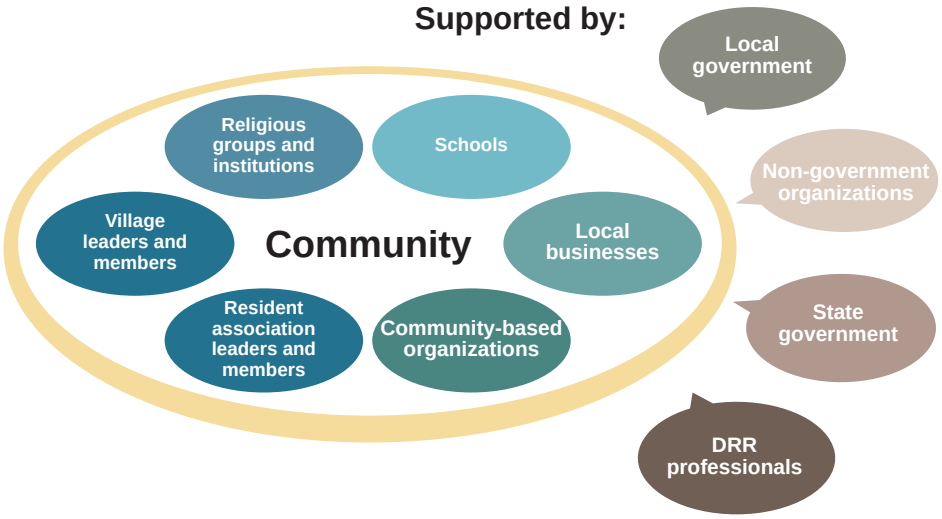
d. **Are All-Encompassing** – CBDRR is not only taking measures to a certain aspect of disaster management, but every aspect of community life.

However, communities need to be supported with:

e. **Technical and Budget Support** – Communities should be supported by local governments and technical experts to provide both technical and budgetary capacities in realizing DRR initiatives.

Government, DRR professionals, NGOs and community leaders should assist and empower the communities by providing knowledge, expertise and resources.

When we mention communities, it may include not only the community members, but also the local businesses, schools, religious institutions and houses of worship, and community-based organizations.



6.1 Establishing the DRR Mindset and Building Community Resilience Culture

There are different kinds of help or assistance to the community before or during disasters.

Different Categories of 'Help'

Self Help

Individuals equipped with DRR knowledge and skills being able to make their own decisions in saving their own lives during emergencies, including disaster events

Mutual Help

Community members and organizations helping each other in disaster response and preparedness. NGOs could play a key role to assist facilitation

Public Help

Official assistance provided by the government, such as police, fire department and military forces of all administrative levels

Help in DRR and DRM comes in various forms, namely Self Help, Mutual Help, and Public Help.

It is important to know about these three kinds of help, as all of them provide aid and support in varying capacities during emergencies. And collectively they all contribute towards the ability of the communities to bounce back.

Self Help – means that individuals with knowledge and skills in DRR can act to save their own lives during disasters.

Mutual Help – is when community members and local organizations help each other in disaster response as well as preparedness. Civil society organizations (CSOs) and NGOs play a key role during this time.

Public Help – refers to official assistance provided by the government such as the police, fire department, military forces, civil defence and other emergency first responders.

Setting Up Community for Mutual- and Self-Help

The three kinds of help are based on a concept introduced in the 2nd World Conference on Disaster Reduction in 1995 and is emphasized in the Hyogo Framework for Action. In Japan, this concept forms the principles for action by organizations called BOKOMI or Disaster-Safe Welfare Communities.

BOKOMI - Community DRRM Self-Help Group

- Established after the 1995 Kobe Earthquake (established in all 191 districts of Hyogo Prefecture
- Based on elementary school districts as each school had existing welfare organizations established already
- Consists of local residents associations, parent-teacher associations, firefighting volunteer corps, elderly clubs, women's club, local government, fire department, etc.

BOKOMI Activities:

During Disasters

- Rescue, emergency relief, transport
- Fire prevention, initial extinguishing
- Information gathering and reporting
- Assist in evacuation and evacuation centers
- Soup run, water supply
- Support for people with disabilities, elders

During Peacetime

- Promotion of DRRM knowledge
- Identifying high risk areas in the community
- Identifying people in need of special care and establishing support system
- Procurring basic DRRM equipment
- Conduct regular disaster simulation exercise

Source: UTM KL

Introducing CBDRR in Your Community

The BOKOMI concept shows how communities in Japan can establish a local organization for the purpose of public safety and welfare. For example, over 90% of public schools in Japan are designated as evacuation centres, so many of the DRR activities are done at schools where parent-teacher associations, community volunteers, and schools are actively engaged. Although carried out at schools, these activities are targeted for the whole community (adults and children alike).

DRR activities carried out at schools, where the people in uniform are not government officers, but community volunteers
Source: S. Matsuura, JICA and UTM KL

Similar organizations focusing on community well-being and safety may exist in your community, such as:

- Neighbourhood Watch (*Skim Rukun Tetanga*)
- Village Community Management Council (*Majlis Pengurusan Komuniti Kampung*)
- Local Council Committee (*Jawantankuasa Ahli Majlis*)
- Residents Associations (*Persatuan Penduduk*)
- Welfare and safety-related committees within religious organizations

Question to Participants:

What would a voluntary DRR organization look like in your community?

7. DRR at the National and State Government Levels

This section explains how the government is set up for DRR at the national and state levels.

7.1 International Framework for Implementing DRR Measures

DRR is implemented as a preparedness measure to (1) be able to take appropriate actions during and after disasters and (2) reduce disaster risks before disasters occur.

How the government and communities should approach and implement DRR are suggested in the global DRR agenda, **Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030**, that introduces various DRR concepts and measures through its 4 Priority Actions.

7.2 Key National & State DRR Organizations

National Disaster Management Agency (NADMA)

The central agency for disaster management in Malaysia is the National Disaster Management Agency. It was set up in 2015 and is under the Prime Minister's Department.

Its roles and responsibilities are to:

- Function as the lead disaster management agency in the country
- Formulate national disaster management policies
- Oversee implementation of disaster management

- Coordinate disaster management initiatives
- Coordinate training in disaster management
- Implement public awareness programs
- Implement After Action Review (AAR)
- Manage the National Disaster Relief Trust Fund (*Kumpulan Wang Amanah Bantuan Bencana Negara or KWABBN*)
- Serve as secretariat for the Central Disaster Management Committee (national level)
- Head humanitarian team missions
- Mobilize the Special Malaysia Disaster Assistance and Rescue Team (SMART Team)

Malaysian Civil Defence Force (APM)

In any emergency or disasters, the Malaysian Civil Defence Force (APM) is among the first to respond. APM plays its role as first responders within the local community. It strives to enhance its preparation level in facing any form of disaster or emergency.

APM's functions are to (1) implement disaster management and humanitarian services, (2) protect lives and property either before, during or after emergencies, disasters, security threats, pandemics, and wars, and (3) ensure disaster preparedness among the communities.

Selangor Disaster Management Unit

Established in July 2014, the Selangor Disaster Management Unit (SDMU) is an agency under the Selangor State Government that was especially set up to spearhead the Smart Disaster Management component of the flagship Smart Selangor Initiative.

Smart Disaster Management is an integrated crisis management system for better and more effective disaster management and coordination among the relevant state agencies. Its multi-hazard SMART Selangor Control Centre provides round-the-clock 24/7 monitoring early warning and fast responses to geo hazards.

As a dedicated agency for disaster management, SDMU is the first such state-level agency in the country, functioning as a coordinating body that responds to state and district level emergencies. It gathers disaster-related data for timely dissemination among local authorities and relevant agencies within Selangor to hasten disaster response, and is now leveraging on big data to play a bigger role in disaster risk reduction.

7.3 Implementation Policies and Mechanism

Malaysian National Platform and Action Plan for Disaster Risk Reduction

Malaysia's national platform for DRR was formalized in 2013, which involved various stakeholders from the government and the private sector.

The *Malaysian National Platform and Action Plan for Disaster Risk Reduction*, known as myDRR, is a nationally owned and multi-stakeholder led forum on DRR. The Plan shows the government's commitment to implement national and local disaster risk reduction activities while linking up with international efforts.

Scientific and Technical Panel on DRR

DRR requires effective use of science and technology for good decision-making. For this purpose, Malaysia has established the *Scientific and Technical Panel on DRR* to provide scientific guidance on disaster risk management for policy consideration and provide evidence-based inputs to support the operational activities of the National Platform for Disaster Risk Reduction.

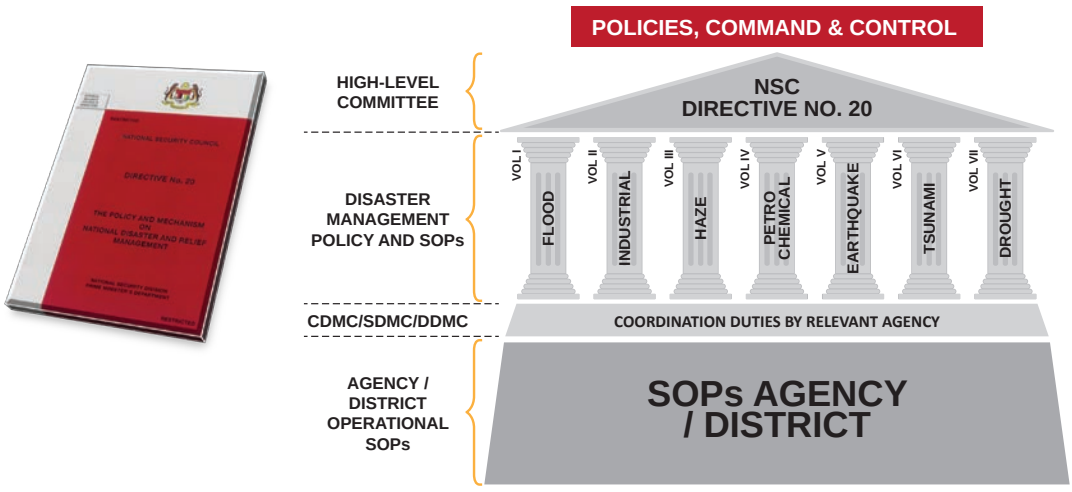
National Science, Technology and Innovation Plan for DRR

Malaysia has also developed the *National Science, Technology and Innovation Plan for DRR* to address knowledge gaps on current and emerging hazards in the country in a comprehensive and systematic way.

This includes taking an integrated approach to disaster risk reduction and climate change adaptation to ensure sustainable development. Implementation of the Plan, which is now awaiting endorsement by the Government, requires the commitment of multiple stakeholders.

NSC Directive No. 20

The policies and mechanisms for disaster management is outlined in the *National Security Council Directive No. 20 (NSC Directive No. 20) - Policy and Mechanism for National Disaster and Relief Management*, which was ratified in 1995. The Directive covers policies and standard operating procedures (SOPs) for activities before, during and after disasters. It also outlines the roles and responsibilities of relevant agencies for disaster management.



NSC Directive No. 20

How Is the NSC Directive No. 20 Relevant to Communities?

An important aspect of Directive 20 that is of interest to community leaders and members is the 'Command and Control' hierarchy of the agencies and organizations during a disaster.

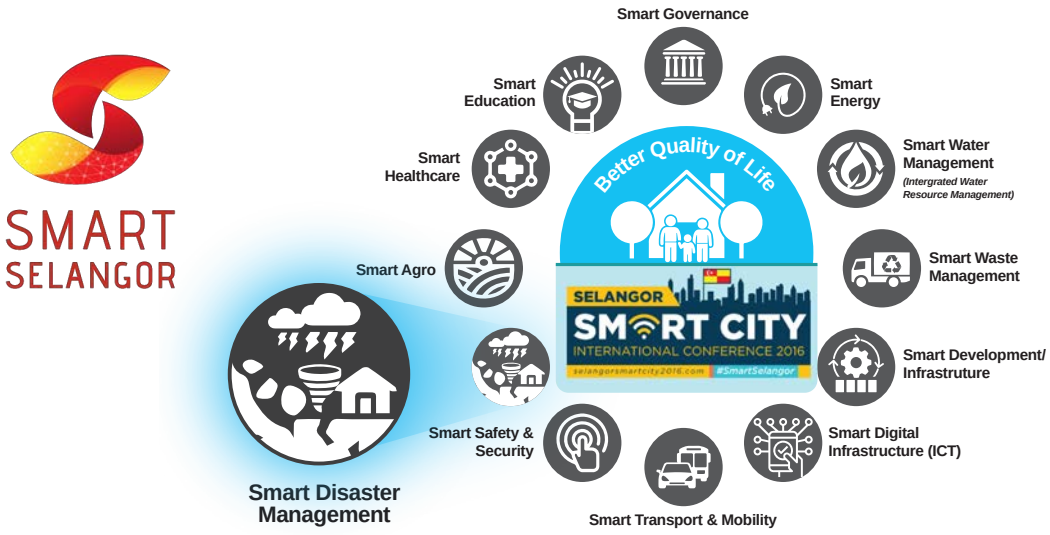
If a disaster covers two or more states, disaster response and management fall under the Central Disaster Management Committee. If the scope is smaller, and it covers one or two districts in a state, responsibilities fall under the State Disaster Management Committee. If the disaster Is limited within a single district boundary, the District Disaster Management Committee assumes control. As the Secretariat of Disaster Management at the state and district level, APM has provided guidance on governance under the State and District Disaster Management Committee.

Working under the above setup is a Community Emergency Response Team (CERT) that comprises the Village Safety and Development Committee (*Jawatankuasa Keselamatan dan Kemajuan Kampung* or *JKKK*). This is where the community is involved during a disaster.

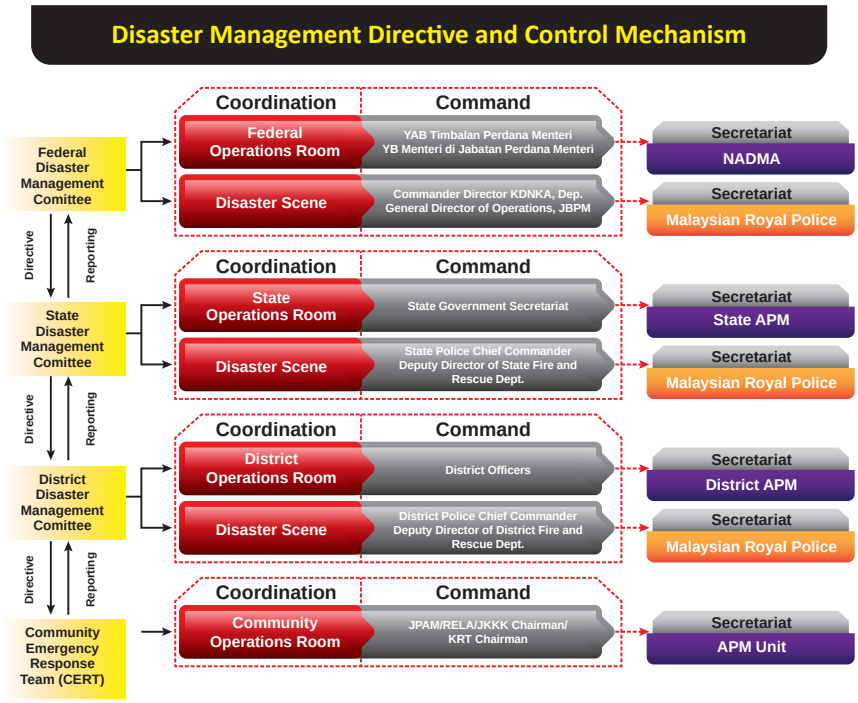
Smart Selangor Initiative

In 2016, the Selangor State Government introduced the *Smart Selangor Blueprint*, a strategic plan that leverages on smart infrastructure, services, systems and people for greater economic growth and resilience as well as better governance and efficient management of the state's key resources and economic sectors. In essence, it is the plan for making Selangor a hub of 'smart cities'.

There are 12 domains in the blueprint, ranging from education to healthcare and well-being to energy, with all leveraging on IoT (Internet of Things) solutions under the umbrella term 'smart' solutions. One of these domains is Smart Disaster Management, which is carried out by SDMU.



Twelve domains of the Smart Selangor Blueprint



Command and control structure under the Disaster Management Mechanism
Source: NADMA

8. Stakeholders' Roles and Responsibilities

Who are the DRR Stakeholders?

Stakeholders	Roles and responsibilities
Communities	**Owner and main driver** of the DRR programs **Key implementors**, with assistance and funding from the government
Federal disaster agencies	**Maintain legal and institutional framework** and take necessary actions such as budget allocation for implementing local DRR plans **Coordinates among related organizations** and establish an implementation structure to support the local government
Local authorities/district offices	**Studying, planning, designing, budget allocation, implementation, operation and maintenance, monitoring and evaluation** of measures **Provide instructions and directions to stakeholders.** Some examples are self-defence measures in the private sector, such as observance of building codes and business continuity plans, to identify what they can do on their own to reduce the risks
DRR professionals such as academic, scientists, engineers, planners	**Provide technical support and specialist knowledge** in guiding the communities in implementation
NGOs, CSOs	**Provide specialized and technical manpower** and know-how to help communities run their programs

QUIZ FOR MODULE 1

At the end of this module, Trainers can quiz participants on the following points:

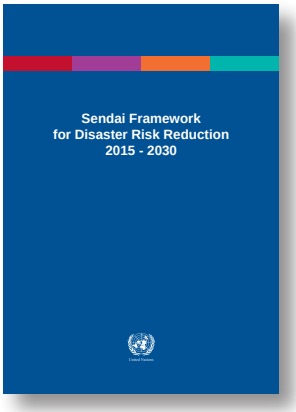
- ❒ What are the four phases of the Disaster Management Cycle?
- ❒ Which phases are categorized as disaster risk reduction?
- ❒ What is disaster risk reduction?
- ❒ What is the difference between DRR and CBDRR?
- ❒ What are the three different kinds of help during a disaster?
- ❒ What is the main role of the community in CBDRR?

Further Reading

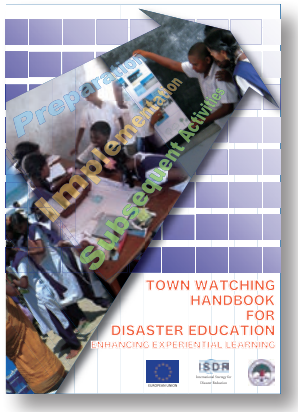
- Sendai Framework for Disaster Risk Reduction 2015-2030. Adopted by United Nations in March 2015 and endorsed by the General Assembly in June 2015. Published by UNISDR, the United Nations Office for Disaster Risk Reduction.
- Town Watching Handbook for Disaster Education: Enhancing Experiential Learning, Shaw, R., Takeuchi, Y. International Strategy for Disaster Risk Reduction, European Union, Kyoto University.

References

- Disaster Risk Report: Understanding Landslide and Flood Risks for Science-Based Disaster Risk Reduction in the State of Selangor. JICA, International Research Institute of Disaster Science (Tohoku University, Selangor Disaster Management Unit, Universiti Teknologi Malaysia Kuala Lumpur, 2019.



Sendai Framework for Disaster Risk Reduction 2015-2030



Town Watching Handbook for Disaster Education: Enhancing Experiential Learning

MODULE 2:
Understanding Local Risks

1. Concepts of Hazards and Risks
2. Actions for Understanding Local Risks

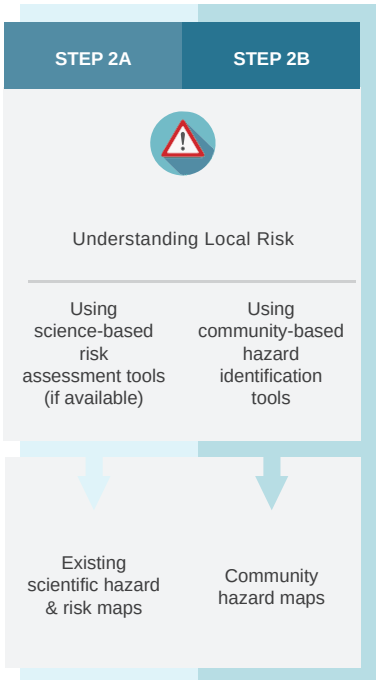
KEY MESSAGES

- An important step to CBDRR is **understanding disaster risk**
- An accurate and effective risk assessment tool to understanding disaster risk is **scientific hazard and disaster maps**
- **Scientific hazard and risk maps provide more details to community maps,** adding more information useful for community action planning
- **The merging of science and community action** combines evidence-based understanding of hazard and risk with hands-on action

LEARNING OBJECTIVES

- Learn the differences between hazards and risks
- Learn the difference between scientific hazard and risk maps and community maps
- Find out about local risks using science-based risk assessment tools through expert talks
- Find out about local risks through community-driven activities

Key Topics to be Covered



1. Concepts of Hazards and Risks

As mentioned in the previous module, local community leaders must understand what kind of hazards and risks their communities are facing to determine and plan how people can overcome them.

When we talk about hazards, we are referring to natural hazards. There are other kinds of hazards that are manmade, biological, or technological, which are not covered in this training guidebook.

1.1 Differences Between Hazard and Risk

What is a Hazard?

A hazard is a:

Natural process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage

Hazards are described or characterized by:

- magnitude or intensity (How strong will it be?)
- speed of onset (How fast will it occur?)
- duration (How long will it last?), and
- area of extent (How widespread is it?)

Source: European Food Safety Authority (EFSA)

What is a Risk?

A risk is described as:

The combination of the probability of an event and its negative consequences

Probability refers to 'chance' or 'possibility' while consequences refer to 'potential losses' to the community, either in terms of property or lives.

It may answer questions such as:

- How many buildings will be impacted?
- How many households will be affected?

Another way to look at hazard and risk in more simpler terms is as follows:

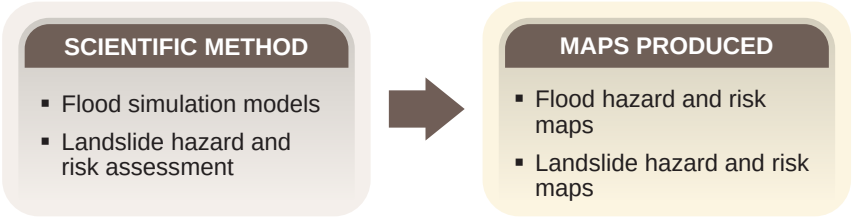
Hazard	Risk
▪ Hazards are part of the world around us and their occurrence is inevitable ▪ Floods, landslides, wildfires, windstorms and other hazardous events are natural phenomena over which humans have limited control ▪ Despite their destructiveness, these occurrences are not expected, and can even reflect healthy regeneration of natural systems.	▪ It is only when the human environment intersects with these natural phenomena that a risk is created, and a so-called “natural disaster” may result

These hazards and risk can be displayed as maps to make it easier to see for both the technical and layman audiences.

1.2 Hazard and Risk Maps as Tools to Understanding Risk

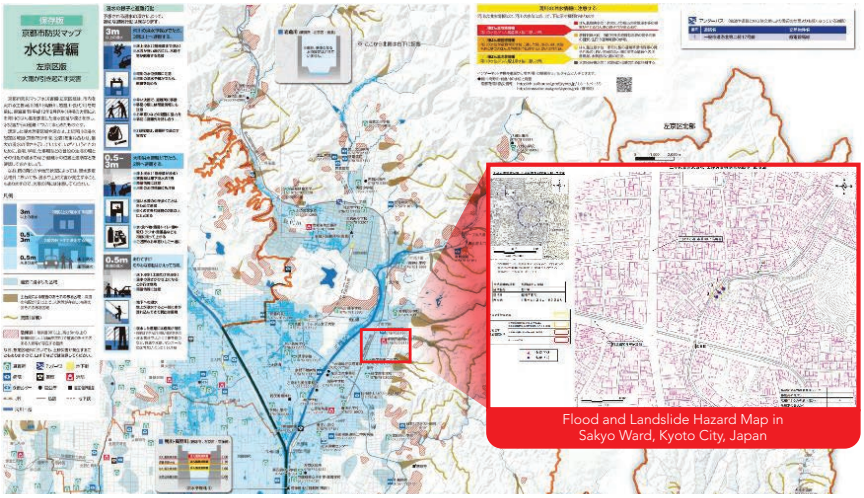
Scientists, engineers, GIS experts and other experts in the technical community apply scientific methods using computer models and other techniques to come up with hazard and risk maps.

These maps can then be used by the local government and community leaders to better understand the hazards and risks they are facing to determine and plan how to overcome them.



From Detailed Maps…

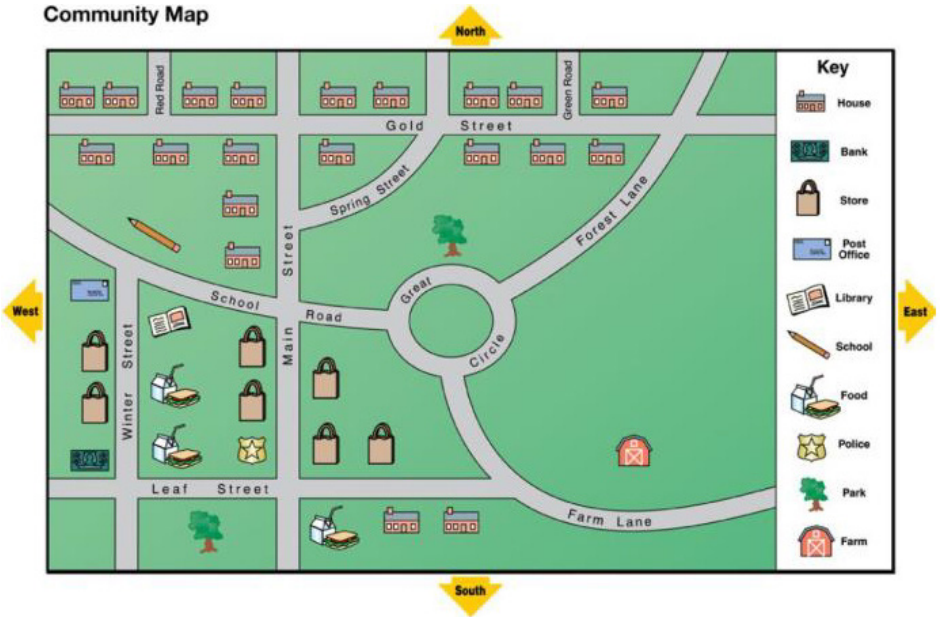
Hazard and risk maps range in level of detail and scale. The following map shows how far potential floods would extend and how deep. It shows where landslides may occur in the area. The map also indicates where are the safe areas as well as evacuation centres. The legend on the left side of the map explains what actions to take when the waters rise to 0.5 metres, to 0.5 to 3 metres, and at 3 metres.



Source: Kobayashi and Takara, DPRI and GCOE-ARS, Kyoto University

...to Simple Ones

Non-technical people, including community members, can also create risk maps. A community map is a big drawing or model of your community that you can draw or make with your fellow residents, showing all the important buildings such as schools and hospitals, farmland, roads, and any other things that could be affected in the event of a disaster.



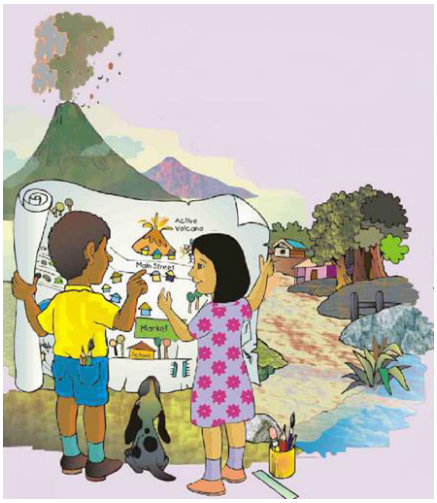
Community Map
Source National Geographic Learning/ Cengage Learning:

Maps help community members:

Identify hazards – It also shows potentially hazardous elements or places such as nearby slopes or areas that might get flooded. For example, they can show schools or other important buildings that are in high-risk area for landslides.

Identify resources – It also shows all the resources, such as people and things that can help your community to get ready and protect itself, like a nearby hospital, fire station or evacuation centre.

Plan and prepare for emergencies – Finally, risk maps help you be better prepared for a potential emergency. For example, they show you where the safest buildings are, or which are the best routes to follow if you are ordered to evacuate the area. This way, you and your community will know what to do in case of an emergency.



Source: www.unisdr.org/2004/campaignbooklet-eng/Pagina14ing.cdr

2. Actions for Understanding Local Risks

To carry out a CBDRR program, it is necessary to understand the local hazards and risks around the community. If existing scientific hazard and risk maps are available, it involves looking at the maps and receiving some risk communication by DRR professionals. **With their assistance, trainers can show and explain local risk by using either scientific hazard and risk maps or community mapping.**

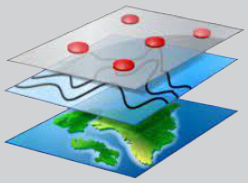
Risk communication sessions with local communities

Understanding Local Risks means:

- **knowing where the hazard and risk areas are** in the participants' communities
- **getting an understanding of hazard types** based on historical events that have occurred in their community and possible exposure to the hazards
- **understanding what are the causes of the risky/hazardous areas and impact**, e.g. illegal land clearing, poor drainage system

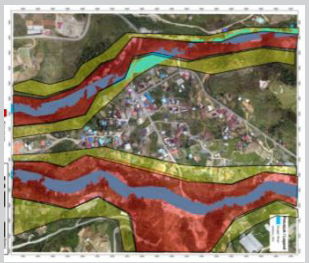
When explaining risk to communities, the presence of a scientific hazard and risk map has the added advantage of providing background info and grounding for understanding risk (Step 2A), but if there are no scientific hazard or risk maps available for your community, then you can proceed directly to conducting a town watching and community mapping exercise (Step 2B).

STEP 2A
If Scientific Hazard and Risk Maps are available for the community area:



Existing scientific hazard and risk maps

Community mapping



Community map validated with scientific maps

STEP 2B
If NO Scientific Hazard and Risk Maps are available:

Proceed straight to

Community mapping

Step 2A: Identifying Local Risks Using Science-Based Risk Assessment Tools

One of the science-based risk assessment tools are scientific hazard and risk maps.

For this, let us recall the definition of 'risk' that was presented in Module 2, 'Understanding Local Risk':

$$\text{Disaster Risks} = \frac{\text{Hazard} \times \text{Vulnerability}}{\text{Coping Capacity}}$$

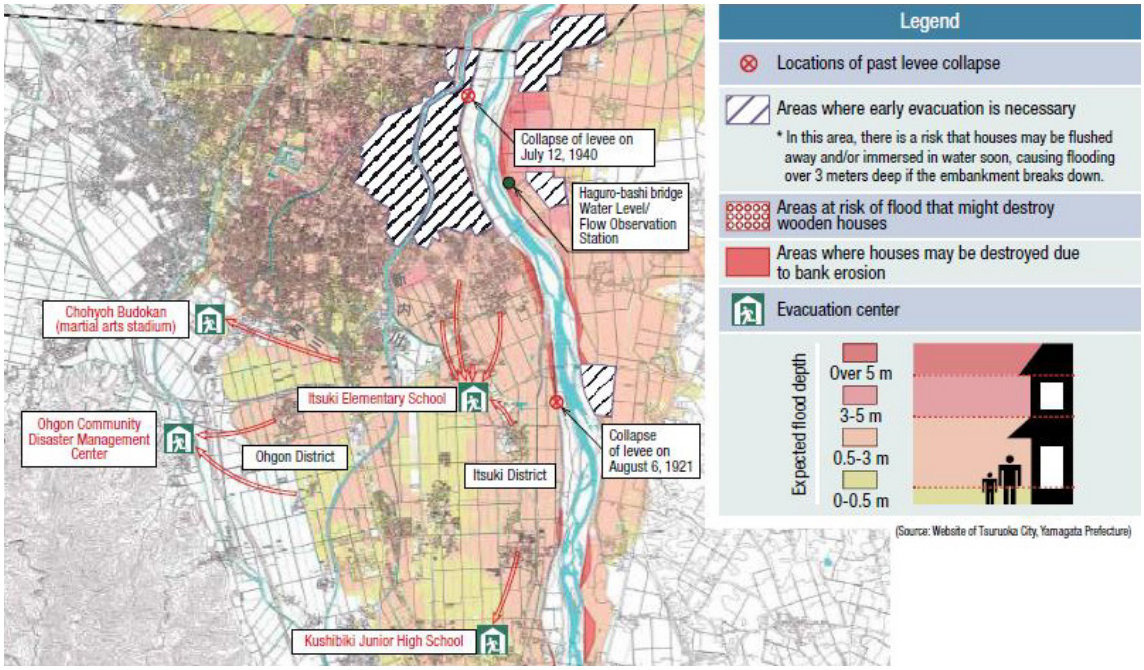
In the equation above, 'risk' is defined as a function of hazard, vulnerability, and coping capacity. From a scientific standpoint, engineers and disaster risk managers need to assess these factors for carrying out analysis and assessments, generating maps, and coming up with measures to mitigate the risks.

Thus, to create a risk map, vulnerability and coping capacity must also be included and calculated.

What Do Scientific Hazard and Risk Maps Tell Us About Local Risks?

Hazard and risk maps show us the level and extent of hazard and risks and the probability of hazards to occur.

- Hazard maps show the hazards or threats that may damage the community
- Risk maps identify locations and elements-at-risk within the community that may be affected by the hazards and its impacts



Flood Hazard Map
Source: Hazard Map Portal Site, Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Japan

How Communities Can Get Access to Information on Hazard and Risk Maps

- **Communities,** with the support of local authorities and state disaster management units, **can request** academia or technical government agencies such as the Department of Irrigation and Drainage, Department of Mineral and Geoscience, and Department of Public Works **for educating on local risks through risk communication sessions.**
- As community leaders may not necessarily know who to source for such sessions, **local authorities or state disaster management units should assist in liaising and organizing such session.** Scientific maps are kept by the local authorities and not by the communities.

Step 2B: Identifying Local Risks through Community Mapping

Unlike scientific hazard and risk maps, community maps are developed by local residents and community members through an activity called 'town watching'. **Town watching** is a hands-on, field work group activity comprising the recording of disaster information through site observation by community members. The outcome of town watching is the creation of a community map.

What is the Purpose of Town Watching?

Town watching has two purposes:

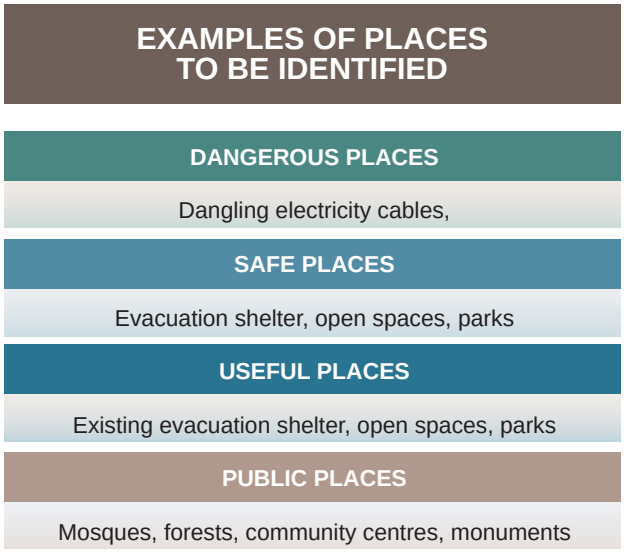
- **For creating awareness of the surroundings** – Town watching creates awareness of DRR and the surroundings of the community. This exercise fosters the sense of mutual-help, whereby community members work with each other in identifying potential hazards and risks as well as facilities and sites to use in times of disaster.
- **For identifying problem** - Town watching can also be used to conduct problem identification. With the guidance of DRR professionals, current and past observations by community leaders can be used to identify potential problem areas and engage in problem solving.

Town Watching Activities

Town watching consists of three main activities:

a. **Site observations and recording through group-driven walkabout**

   While walking, participants make notes and mark points on their maps. The main items they will record are places of danger, safety, utility, and special features.



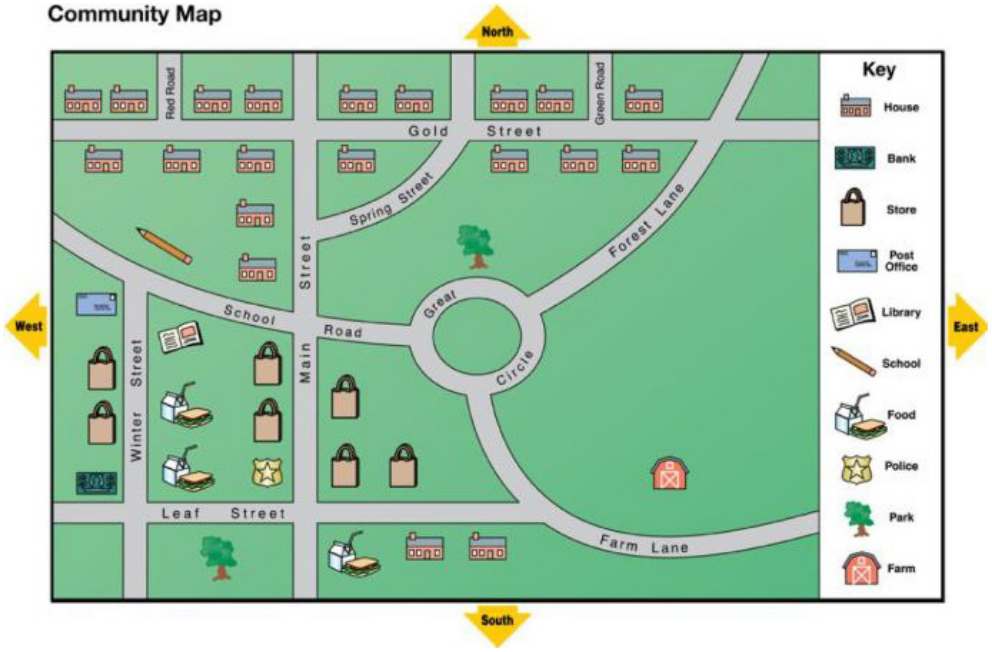
b. Developing a Community Map

Once the town watching is completed, the DRR professionals and community participants should review and validate the town watching findings for the preparation of developing the community map. This involves a group discussion, followed by the drafting of the community map. The respective group findings and maps are presented to other group members before consolidating into a single final map.

Community mapping has three key objectives:

- **Involvement of local residents in developing the hazard map** for their community
- **Reflecting the opinions of local residents in policies** made by their local government
- **Fostering of common understanding of risks** among local residents, government officials, and experts

There is no fixed representation of what constitutes a 'correct' community map. Instead, the maps should have information and data that best suits the community's particular needs and objectives and can be used for subsequent solution planning. Community maps can be fairly simple and easy to co-produce within a short period of time.



c. Identify Positive and Negative Points

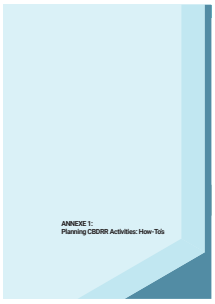
Referring to the items put into the community map by the group members, list each item in a table as either a 'positive' and 'negative' point. A positive point could be an evacuation assembly point or a place of value, such as a mosque. A negative point could be a stream that overflows during intense rain or a boulder perched on top of a rock slope.

After Town Watching

There are several points to keep in mind after town watching:

- **Compare the scientific hazard maps and map with local information collected through town watching.** This ensures accuracy and relevance.
- **Community maps should be updated regularly**, thus requiring town watching to be carried out at intervals. How often depends on how much the land use has changed or how much development has been taking place around the community.

FOR MORE DETAILS, PLEASE GO TO PAGE 60
ANNEXE 1, DAY 1: WORKSHOP FOR COMMUNITY MAPPING



How Do Scientific Maps Complement Community Maps?

In the past, the domains or worlds of **community action** and **scientific/technical study** have seldom intersected, and communities were not able to tap into the value of science-based tools and knowledge to make their CBDRR initiatives more impactful. One of the ways the two realms can intersect is through hazard mapping.

By combining technical/scientific data with layman community planning and action, a scientific view of the risks can be presented to the community members, at the same time enabling them to provide their local inputs into the maps.

Community maps are carried out by members of a community. Community mapping identifies and marks on a map what they perceive as potential dangers or hazards. While there may be engineers or domain experts within the community, chances are that many residents in a community are laymen observers.

The value of a community map is that it records and formalizes local observations and local knowledge. This is important in that this activity solicits awareness of hazards and provides input for community program planning among the community members.

A community block with hazards identified by residents

In a scientific hazard and risk map, the local knowledge and observations are placed on a bigger scale with more details to provide a 'big picture' view of the communities' input.

An example of a landslide hazard map is shown on an orthophoto map where the community's area of interest is placed on a regional scale and clearly shows the morphological and geological features of the area.

Combining the community and hazard and risk maps -- Let's see what happens when we combine the community map and the scientific map.

Here the terrain of the community's area is clearly visible, and the red and yellow zones (hazard and potentially hazardous) are demarcated. The source of the red and yellow zones boundaries come from the residents' input, which was obtained through surveys and community mapping.

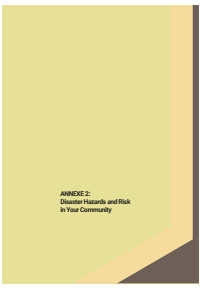
Data on social capital and other community characteristics were also collected. In this way, the communities can see how their observations and inputs have been converted into a scientific hazard map.

This merging of community and scientific hazard mapping adds value to the communities in that they can see how their contributions can be complemented with the results of scientific mapping.

Thus, the merging of community and scientific hazard mapping provides:

- Clearer overall, big-picture view
- More details and context (validation) of the community's findings
- Understanding that leads to action
- More accurate understanding of risk that leads to better preparation

REFER TO PAGE 74
ANNEXE 2, FINDING OUT ABOUT HAZARDS AND RISKS IN YOUR COMMUNITY



QUIZ FOR MODULE 2

At the end of this module, Trainers can quiz participants on the following points:

- ❒ What is the difference between hazard and risk?
- ❒ What is the difference between hazard/risk maps and community maps?
- ❒ What are the main steps of town watching?
- ❒ What are the places of interest to record while town watching?

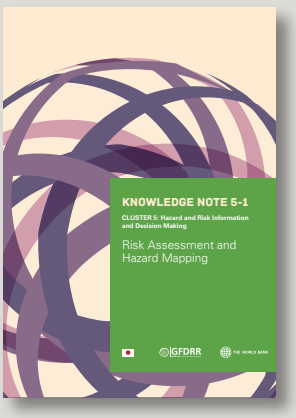
Further Reading

- 30 Innovations for DRR: Disaster Risk Reduction. International Institute of Disaster Science (IRIDeS) at Tohoku University, Keio University, the University of Tokyo, the United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS), and Church World Service (CWS) Japan in collaboration with the Association of Pacific Rim Universities (APRU) Multi-Hazards Program.
- Risk Assessment and Hazard Mapping (Knowledge Note 5-1), Global Facility for Disaster Reduction and Recovery, CTI Engineering, World Bank.

References

- ADPC Participant's Workbook: Community-Based Disaster Risk Management for Local Authorities. Asian Disaster Preparedness Center, January 2006

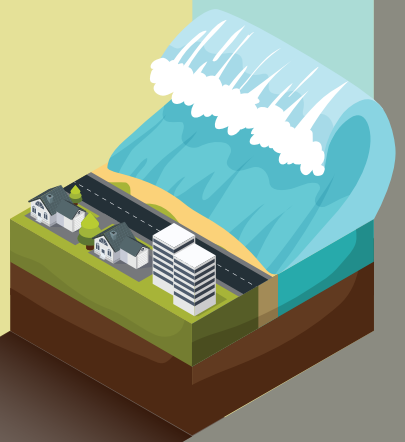
30 Innovations for DRR: Disaster Risk Reduction



Risk Assessment and Hazard Mapping (Knowledge Note 5-1)

MODULE 3:
Planning, Implementing and Evaluating CBDRR Programs

1. Planning CBDRR Programs
2. Implementing CBDRR Programs
3. Evaluating CBDRR Programs
4. Key Success Factors of CBDRR Programs
5. Sustaining CBDRR Programs



KEY MESSAGES

- **Key stakeholders for planning CBDRR activities are communities and local government**, assisted by DRR professionals
- **Planning that identifies the root causes of hazards and setting clear objectives** result in CBDRR programs that are sustainable
- **Implementation of CBDRR programs must include monitoring of schedules and milestones** to ensure that programs are carried on track
- **Mid-term evaluations** help in resolving issues during implementation, while **final evaluations** at the end of the project identify future improvements
- **CBDRR programs should be mainstreamed** into state-level annual agenda and planning

LEARNING OBJECTIVES

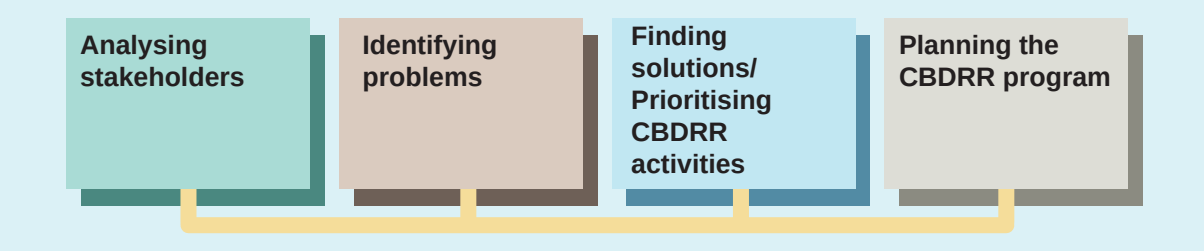
- Learn how to conduct planning (stakeholder analysis, problem analysis, and objective analysis) through one-day workshops
- Learn what to monitor while running a CBDRR program
- Understand what will be evaluated
- Know what are the key success factors of a CBDRR program
- Know how to keep a CBDRR program sustainable

Key Topics to be Covered

1. Planning CBDRR Programs

After identification and understanding of local risk, the second step is the planning of CBDRR activities. These activities should be carried out in a workshop format. A sample agenda and details of the workshop are shown in Annexe 1, Page 64.

Planning activities consist of:



Here is a brief description of each planning activity.

a. Analysing Stakeholders

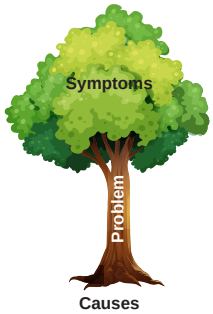
This step is also known as Stakeholder Analysis. It is to find out who are the key stakeholders before and during disasters. Examples are residents, emergency first responders, and supporting technical agencies. This exercise is to identify roles and responsibilities as primary or supporting role stakeholder.

b. Identifying Problems

Problem identification consists of two activities, **Problem Analysis** and **Objective Analysis**, that enables participants to do focused, goal-oriented planning that creates programs with impact.

This is similar to the group discussion carried out after town watching, but this is a more extensive and thorough exercise that will clearly identify what activities will form the CBDRR plan.

The objective of this activity is to prevent merely creating 'wish lists', which may end up not solving the community's problems.



Problem Analysis

- Takes the findings of town watching and develops programs based on the findings.
- It is a problem-solving approach for resolving DRR issues.
- It consists of identifying what is the current problem or scenario and breaking down the factors contributing to the problem until participants arrive at the root cause.
- Activities towards addressing the root cause becomes the basis for CBDRR program and activities.

Objective Analysis

- Is carried out right after problem analysis.
- It is a goal-setting approach for identifying desired outcomes.
- While the problem analysis focuses on identifying existing problems, objective analysis will help identify the desired (positive) situation for each of the problems.
- It then outlines the steps participants must take to achieve the desired objective.

c. Finding Solutions/Prioritizing CBDRR Activities

Once a problem has been identified, participants then prioritize options of CBDRR activities based on urgency, need and ease of implementation as well as available resources such as time and funding. It is vital that community leaders, local government officials, and technical experts participate in this session.

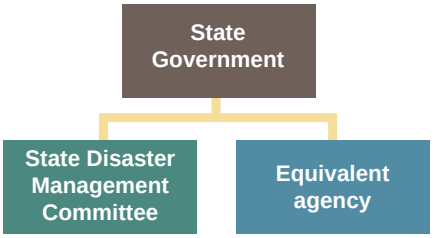
d. Planning the CBDRR Program

This is straightforward as it involves preparation and event management for carrying out the program.

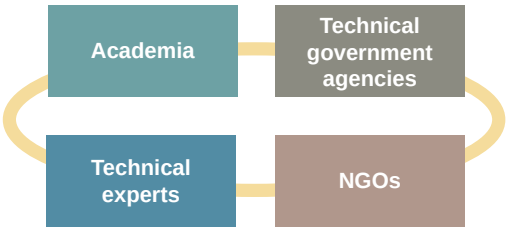
Major considerations as part of the planning process are:

- **Establishing a Steering Committee, Support Team, and Project Team:**

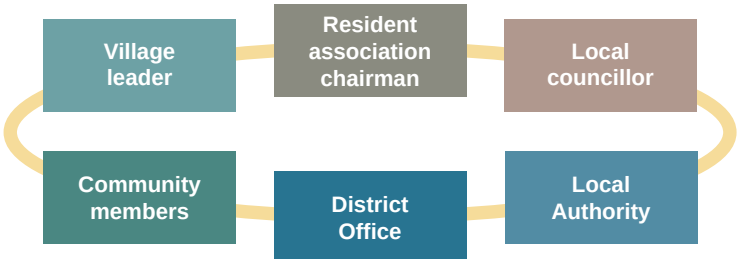
  i. **Steering Committee:** consists of disaster management units at the state and district level. This committee shall also be supported by project stakeholders such as DRR professionals and NGOs.



  ii. **Support Team:** consists of academia, technical agencies, experts, NGOs

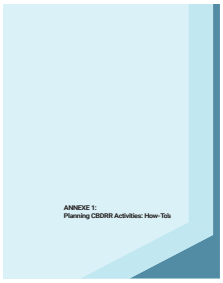


  iii. **Project Team:** consists of village leaders, resident association leaders, and community members, supported by local authorities and district offices



- **Program duration and scheduling:** How long is the project and milestones
- **Target Area:** Selection of the event venue, target areas
- **Project Activities:** Activities to be carried out within the project. This is based on the outcome of activities described in Annexe 1
- **Objectives and Targets:** Major objectives and goals to be achieved by this project
- **Logistics:** Preparations for the event and its activities
- **Costing:** Budget required to carry out the project activities
- **Monitoring:** Setting milestones and key targets to track progress of the program, sharing progress status and engaging in joint problem solving on issues that arise

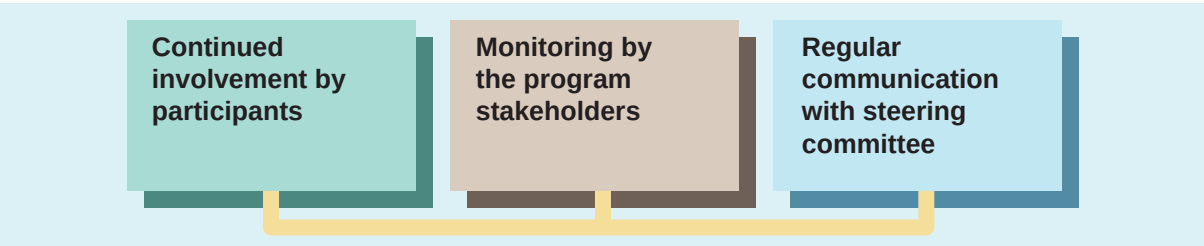
REFER TO PAGE 64
ANNEXE 1, DAY 2: WORKSHOP FOR CBDRR PLANNING



2. Implementing CBDRR Programs

This step involves implementing the actions and activities identified during the planning.

In addition to implementation, the program leader must also ensure three things:



a. Continued Involvement by Participants

Good implementation requires clear understanding and commitment towards the roles that the community members play in this program. A lack of clarity in roles, responsibilities, and direction of the program will result in diminished participation or attrition.

b. Monitoring by the Program Stakeholders

Monitoring is the review and overseeing by stakeholders as well as the management of the project implementation to ensure that input deliveries, work schedules, targets, and outputs are attained according to the plan. Through monitoring we get timely, accurate and complete information on project effectiveness. If implementation is not going as per plan, the local communities and community members should decide to take appropriate action to achieve the desired results.

Monitoring can be done through various means, such as:

- Regular staff meetings among the project staff members for exchanging information and discussing issues
- Visits to the project site by the local authorities and the community members
- Updates on the implementation of the activities to the project management such as the steering committee

c. Regular Communication with Steering Committee

Community members should have regular communication with the steering committee. This should also be a platform for joint problem-solving on issues identified during the monitoring carried out by the program leader.

3. Evaluating CBDRR Programs

Evaluations provide information that enables DRR managers to improve an ongoing project, judge the overall merits of a project, or generate knowledge about what works and what doesn't for future strategy and policy making. There are two kinds of evaluations: Mid-term and Final, which correspond to the timing of an evaluation at the mid-term and final point of a project.

	Mid-Term	Final
Objective	To address any potential problems and make adjustments This is a consultative meeting for problem-solving, exchange advice, and how to move forward	To assess the long-term impact and benefits of the community program
Activities	Progress reporting	Discuss and analyse any other issues faced during implementation Identify the reason, and list out the measures Activities to resolve the issues for improvements
Timing	Midpoint of the project	End of the project
Who Does	Project Team	Steering Committee
Mode	Half-day workshop	One-day workshop (Evaluation and Lessons Learned Workshop)
Criteria	Assessment based on: achievements, adherence to schedule, and financial/spending	▪ **Relevance** – Did the project address the needs of the community members? ▪ **Efficiency** – Did the project do so in a manner that was as low-cost as possible? ▪ **Effectiveness** – Did the project change existing practices in a beneficial manner? ▪ **Impact** – What was the effect of those changes? ▪ **Sustainability** – Are the changes sustainable?

Evaluation enables the review of the achievements, issues and other significant information based on the objectives and makes required revisions to future CBDRR plans, activities, and implementation design.

This is carried out by the steering committee and external party or agency that can provide an objective evaluation.

CRITERIA FOR LARGE-SCALE CBDRR PROJECTS

Depending on the magnitude and size of the project, assessment criteria may vary. For bigger projects, the evaluation criteria for the Lessons Learned Workshop could be more comprehensive, including the impact assessment on a larger scale (secondary assessment)

- **Technical:** Have the activities considered the technical factors (e.g. risk and vulnerability assessments) in the activities? Was the technical backstopping of DRR experts sufficient and understandable? Does the community better understand the disaster risks of its neighbourhood?
- **Financial:** Were the event/activities/measures sufficiently funded? Will it be feasible to fund such activities continuously in the future (e.g. incorporated in local government's annual budget plan)?
- **Economic:** Does the community feel that the result of the CBDRR activities will affect the community's economy (e.g. local business) positively? How do the community and local government see the benefits for investing in CBDRR?
- **Social and gender:** How did the activities/measures affect the different groups, at individual, household, and community levels? How was impact on women and children? Were they actively involved? Were the voices reflected in the planning and implementation of CBDRR activities?
- **Institutional:** Were the supporting institutions in place? Did they operate effectively within the existing legislative and policy environment? How can it be further improved to serve the community better?
- **Environmental:** Did the activities have any adverse effects on the environment? Any expected environmental changes in the target areas? (e.g. new infrastructure development)
- **Sustainability and risk:** Can the CBDRR activities and events be continued by the community as the initiator and main player? Can the partnership among the stakeholders be maintained? What are the risks of these activities to be discontinued?

4. Key Success Factors of CBDRR Programs

Knowing whether a community program is working or not can sometimes be difficult to measure. There are various metrics to measure awareness, knowledge, motivation, and other intangible contributing factors to determine whether a community program is successful.

However, there are several factors to consider to ensure that CBDRR takes root in your community.

The key success factors are:

- **Leveraging on the benefits of scientific hazard and risk maps** to understand local risk Incorporate science into community maps for increased accuracy, reliability, and ease of use
- **Planning CBDRR activities based on collaborative, inclusive discussions and dialogue** about problem identification and objective setting, finding solutions/prioritizing activities by communities
- **Ensuring participation of various community members and conducting regular monitoring and communication** with the steering committee and support team
- **Using consultative approach to resolving implementation issues and make adjustments** to ensure success of the program. Ensure that timing/scheduling and project budget is as per planned.

5. Sustaining CBDRR Programs

It is important that CBDRR programs are sustained over a long term. But this is not just the responsibility of the communities alone, they must be supported by local and state government and DRR experts in order to continue programs into the future. However, this effort/initiative must be led by the communities. In order to achieve continuity, stakeholders must carry out the following activities.

Sustaining CBDRR activities

- Create mechanism that converts the program into a system
- Institutionalize into the annual state government planning and budgeting
- Planning and management at the local authority/district office level
- Planning and implementation of program at the grassroots and community level
- Maintain the team framework for continued communication and ongoing dialogue
- Local leader to ensure the continuity of the program (ownership of the program)
- Local government to support in terms of budget and also for checking
- Replicating in other areas / sharing experiences

QUIZ FOR MODULE 3

At the end of this module, Trainers can quiz participants on the following points:

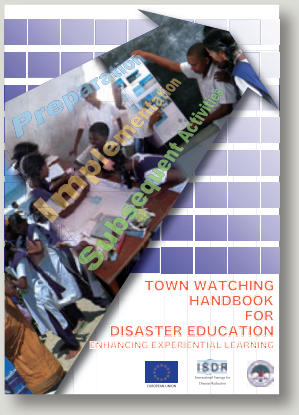
- ❒ What are the three activities of CBDRR planning?
- ❒ What is the key element in CBDRR implementation? And why?
- ❒ What are the two types of program evaluation?
- ❒ What are the key success factors of a CBDRR program?
- ❒ How do you keep CBDRR sustainable?

Further Reading

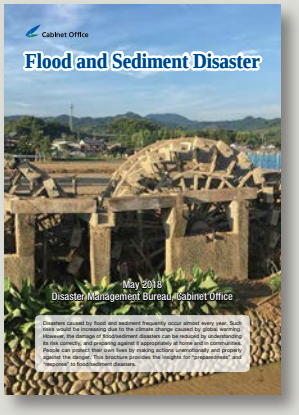
- Town Watching Handbook for Disaster Education: Enhancing Experiential Learning. Shaw, R., Takeuchi, Y. International Strategy for Disaster Risk Reduction, European Union, Kyoto University.
- Flood and Sediment Disaster (May 2018). Office in Charge of Disaster Preparedness, Public Relations and International Cooperation, Cabinet Office (Disaster Management Bureau), Government of Japan.

References

- ADPC Participant's Workbook: Community-Based Disaster Risk Management for Local Authorities. Asian Disaster Preparedness Center, January 2006



Town Watching Handbook for Disaster Education: Enhancing Experiential Learning



Flood and Sediment Disaster (May 2018)

ANNEXE 1:
Planning CBDRR Activities: How-To's

Planning CBDRR Activities: How-To's

Explanations of **Step 1, Understanding Local Risk**, and **Step 2, Planning CBDRR Programs,** were introduced earlier in this module. Here, we provide detailed procedures for carry out these steps.

These activities can be carried out in workshops over a span of two days, as shown below.

STEP 1. Understanding Local Risk	STEP 2. Planning CBDRR Programs
Workshop for Community Mapping (Day 1) Participants: Community at large **Activities:** ▪ Expert Talk/Briefing Session ▪ Town Watching ▪ Community Map Making	**Workshop for CBDRR Planning (Day 2)** Participants: Project Team, with supporting stakeholders **Activities:** ▪ Identifying the Stakeholders ▪ Identifying the Problems ▪ Finding Solutions/Prioritizing CBDRR Activities ▪ Planning the CBDRR Program

Day 1: Workshop for Community Mapping

Day 1 Workshop consists of an expert talk/briefing session, town watching, and community map making.

Target participants: Community at large, including local leaders, district officers, and local authorities. This is an open event, which includes members of the community.

Listed below is a sample agenda for Workshop 1.

TIME	ACTIVITY	DONE BY
09:00-09:15	Registration	
09:15-09:30 (15 min)	Opening and introduction	Coordinator (MC)
09:30-10:00 (30 min)	**(a) Expert Talk/Briefing Session** -Hazards and Vulnerability and Disaster Risk Report *DRR booths and activities in background	DRR professionals
10:00-10:10	Morning tea and break up into groups	
10:10-11:00 (50 min)	Explanation of Town Watching exercise	Facilitators
11:00-13:00 (120 min)	**(b) Town Watching**	Participants
13:00-14:00	Lunch break	
14:00-14:30 (30 min)	**(c) Community Map Making**	Participants
14:30-15:00 (30 min)	Discussion and listing out of DRR activities	Participants
15:00-15:45 (45 min)	Presentation by each group (10-15 min by each group) *Afternoon tea in background	Participants
15:45-16:00 (15 min)	Commentary by experts Award and certification ceremony	Experts and facilitators
16:00	Closing *Questionnaire (as needed)	Coordinator (MC)

The main activities for the Workshop for Community Mapping consists of (a) Expert Talk Session, (b) Town Watching, and (c) Community Map Making.

(a) Expert Talk Session (Slide #3 on next page)

Before starting the town watching, a DRR professional shall explain to the participants the basic concepts of DRR and provide an overview of the local risks in the participants' communities.

(b) Town Watching and (c) Community Map Making Purpose/Objective

Purpose

- Raising awareness
- Identifying actions to do next, based on the map produced by the communities

Concept

Participants walk around their community to investigate where (1) hazards are located (based on resident knowledge) and (2) where disaster prevention facilities and hazardous sites are located in their community.

Number of Participants

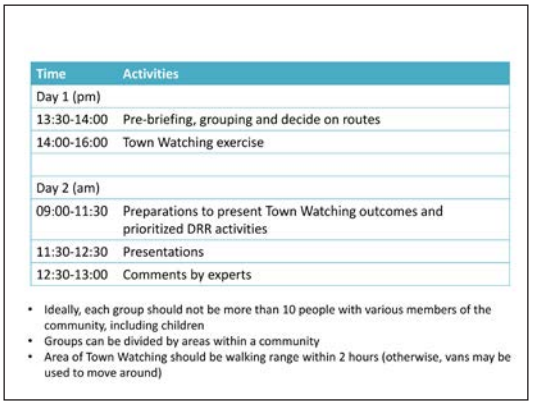
40 to 50, in groups of six to eight participants

Required Material

- Base map for each group
- Blank sheets of A1 paper
- Pens
- Camera

How To's

The following slides explain how to carry out town watching and conduct group discussions. The slides are sample materials that trainers may use and can be adjusted to fit the needs and requirements of the participant audience.

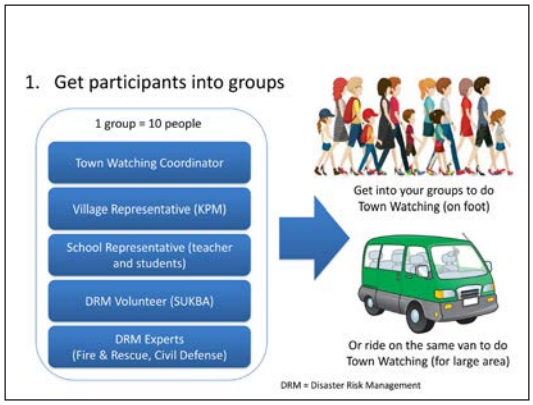


Time	Activities
Day 1 (pm)	
13:30-14:00	Pre-briefing, grouping and decide on routes
14:00-16:00	Town Watching exercise
Day 2 (am)	
09:00-11:30	Preparations to present Town Watching outcomes and prioritized DRR activities
11:30-12:30	Presentations
12:30-13:00	Comments by experts

- Ideally, each group should not be more than 10 people with various members of the community, including children
- Groups can be divided by areas within a community
- Area of Town Watching should be walking range within 2 hours (otherwise, vans may be used to move around)

Slide 1

Carry out event planning, such as setting the schedule and agenda.

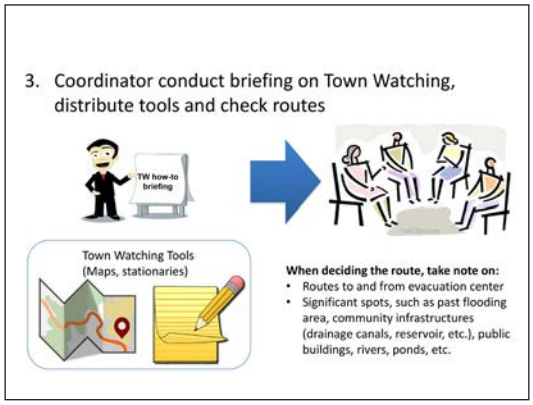


Slide 2

Event planning also includes organizing participants into groups, consisting of facilitators and community members. Decide whether the town watching will be conducted by foot or by car.

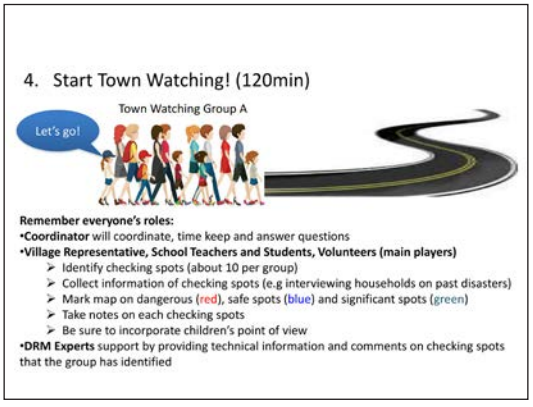
Slide 3

Before town watching, conduct a briefing to the participants on basic concepts of DRR so that they will understand how the results of the town watching will be used.



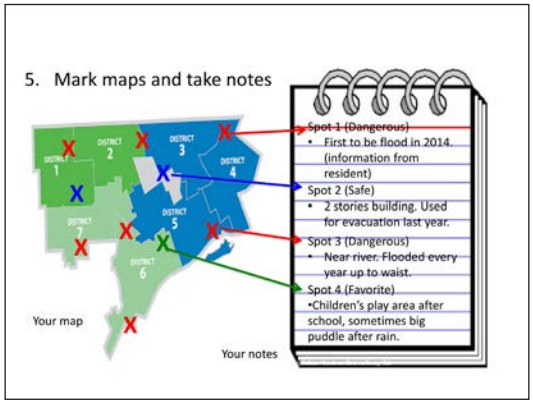
Slide 4

Coordinator conducts a briefing on how to carry out the town watching, such as what to watch out for and how to record observations.



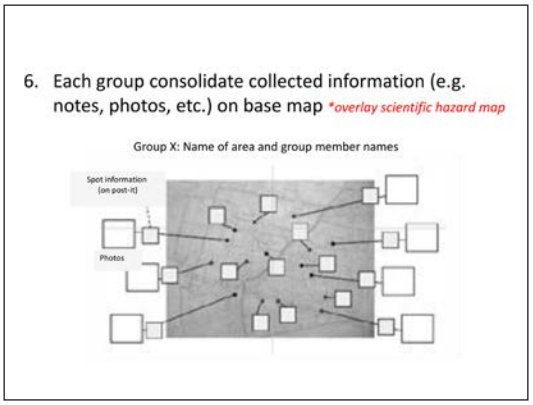
Slide 5

Start town watching, with participants following their given roles. Coordinators keep track of time and answer questions while the main group members observe and take notes. DRR professionals may provide technical advice.



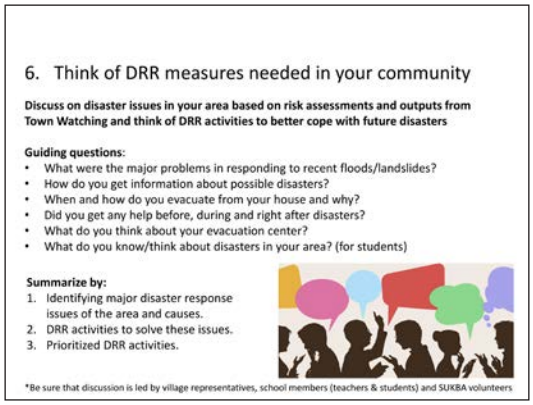
Slide 6

While town watching, participants take down notes. Mark the key locations on the map.



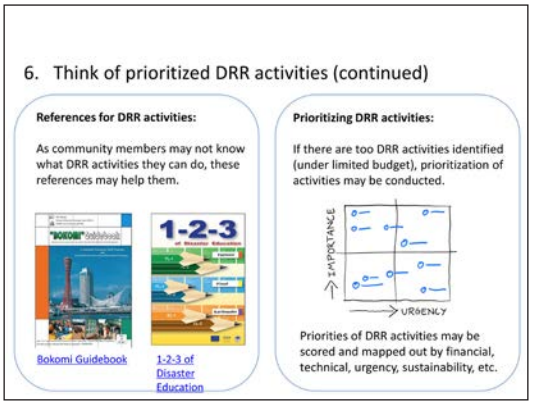
Slide 7

Mark the key locations on the base map (the result becomes a community map).



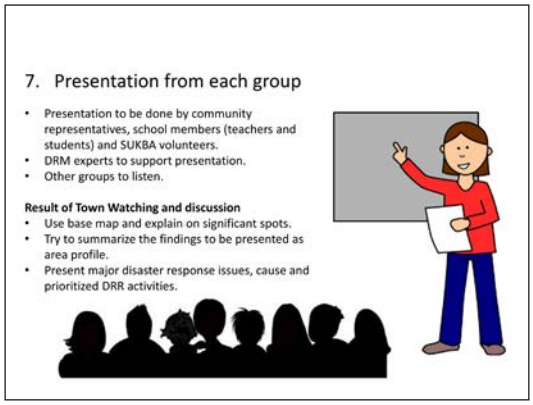
Slide 8

Based on the group's findings, think of CBDRR measures needed and jot them down.



Slide 9

Prioritize the CBDRR measures according to time, budget, and resources.



Slide 10

Present findings and recommended measures to other groups.

Slide 11

DRR professionals provide additional insights and comments.

Slide 12

Trainer to highlight on key success factors of town watching.

Day 2: Workshop for CBDRR Planning

Day 2 Workshop consists of identifying the stakeholders, identifying the problems, finding solutions/prioritizing CBDRR activities, and planning the program.

Target participants: Program team, including local leaders and local champions. The team shall be supported by local government, DRR professionals, and NGOs. This is a limited attendance event, reserved for program stakeholders only.

Listed below is a sample agenda for Workshop 2.

TIME	ACTIVITY	DONE BY
09:00-09:15	Registration	
09:15-09:30 (15 min)	Opening and introduction	Coordinator (MC)
09:30-10:00 (30 min)	Overview of Town Watching outcomes Integration with science-based hazard maps	Facilitators and experts
10:00-10:30 (30 min)	**(a) Identifying the Stakeholders**	Participants and facilitators
10:30-11:00	Morning tea	
11:00-13:00 (120 min)	**(b) Identifying Problems**	Participants and facilitators
13:00-14:00	Lunch break	
14:00-14:30 (30 min)	Presentation and discussion of analysis outputs	Participants and experts
14:30-14:45 (15 min)	Explanation of CBDRR planning	Coordinator (MC)
14:45-15:45 (60 min)	**(c) Finding Solutions/Prioritizing CBDRR Activities and (d) Planning the CBDRR Program**	Participants and facilitators
15:45-16:00	Afternoon tea	
16:00-16.30 (30 min)	Commentary and closing	Experts

The main activities for Workshop for Community Mapping consists of: (a) Identifying the Stakeholders, (b) Identifying Problems (Problem Analysis and Objective Analysis), (c) Finding Solutions/Prioritizing CBDRR Activities, and (d) Planning the CBDRR Program.

(a) Identifying the Stakeholders

Purpose

- To identify and prioritize stakeholders in the CBDRR program
- To clarify roles and responsibilities of each stakeholder in the program

Concept

Group discussion and tabletop activity that consists of creating a matrix of stakeholders, roles and responsibilities, and prioritization

Number of Participants

Up to 20, with approximately 5 or 6 in a group

Required Material

- Whiteboard
- Colored whiteboard pens
- Sticky notes
- Blank sheets of paper and pens

How To's

1. Each group lists out on sticky notes:
   - Each possible individuals, groups and organizations that are affected by disasters and in need for CBDRR measures ('Beneficiaries')
   - Individuals, groups and organizations that can help those likely to be affected by disasters and in need to implement CBDRR activities ('Supporters')
2. Separate the sticky notes into two main categories, Beneficiaries or Supporters.
3. Separate the Beneficiaries and Supporters categories further into groups such as:
   - internal/outside members
   - policy makers
   - technical experts
   - community based organizations
   - vulnerable group
   - financial providers
4. For each Beneficiary or Supporter, write down its roles, responsibilities, capacity to support and priority for each stakeholder in both disaster response and preparedness.
5. Prioritize each Beneficiary and Supporter, with 1 being the most important and 3 being the least important.
6. Put the groups into a table, as shown in the example below.

Stakeholders Before and During a Disaster Event		
Type of Stakeholder	**Description**	**Priority**
Beneficiaries		
Community members in urban areas	Main DRR stakeholder and beneficiary. Affected by flooding annually.	1
Community members in rural village areas	Main DRR stakeholder and beneficiary. Affected by flooding annually.	1
Vulnerable group	Priority group. Affected by flooding and vulnerable group due to low income.	1
Mosque	Community members who come may be affected because mosque is located near river	2
Supporters		
SDMU - coordination	Key supporter and coordinator for disaster response and preparedness	1
District Disaster Management Committee - APM	Coordinator of first response during emergencies	1
Academia - technical support - external supporter	Can provide technical support for CBDRR activities and measures	2
Civil society and NGOs	Can provide facilitation and coordination support	2
PDRM and BOMBA	Could provide support for training in evacuation	2

(b) Identifying Problems

Identifying problems consists of Problem Analysis (also called Problem Tree Analysis) and Objective Analysis. They are both conventional project management tools used to plan activities based on root causes of the issues that communities are trying to solve.

(b-1) Problem Analysis

Purpose

- Problem Analysis helps stakeholders identify the causes and effects of the DRR problems they face in their communities.

Concept

Group discussion and tabletop activity. One of the key activities involves drawing a problem tree, from which objectives (or measures) can be identified with logical thinking.

Number of Participants

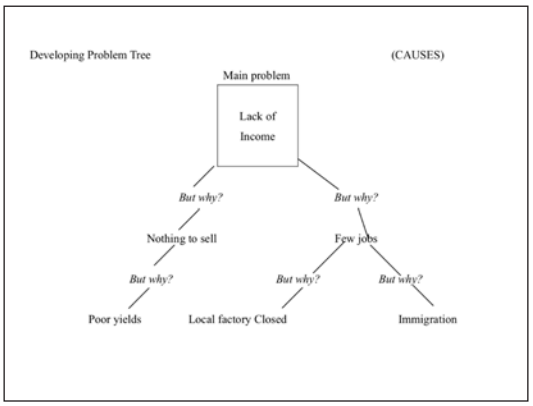
10 to 15, consisting of various community stakeholders including those who can advise on technical aspects of the discussion.

Trainers should ensure participation from various community stakeholders to get different views, experiences, and knowledge for developing a CBDRR plan with common goals that is owned by the community.

Required Material

- Stationaries for participants (e.g. memo pad, pens)
- White board, poster paper, sticky notes (different colors), masking tape, markers
- PCs, projectors, and screens

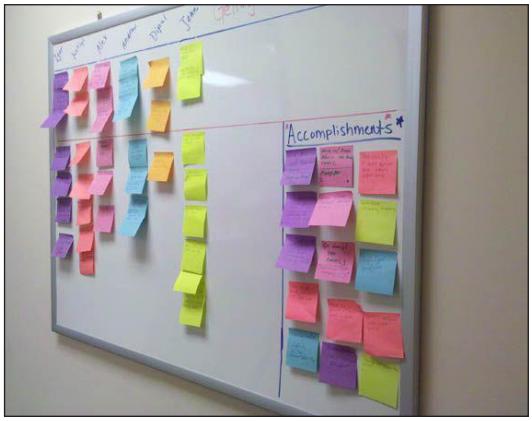
How To's



1. Ask the participants to think of one or several key DRR problems that prevent them from making their neighbourhood safer. The branches of the "tree" will expand with these key problems.

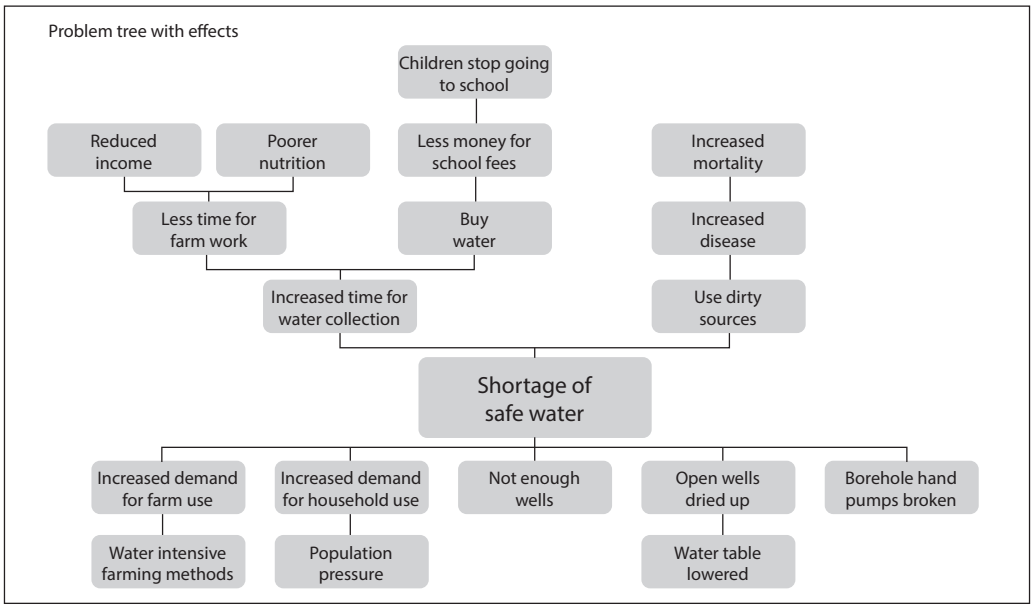
2. Write out the DRR issues on sticky notes and paste them on the poster paper. *Only one issue per sticky note.

3. After the first round of sticky notes are on the white board, the facilitator will reorganize them and group together sticky notes with similar topics.



4. Identify the cause of the issue(s) and write it on another sticky note. Draw a line downwards and connect the sticky notes to show the "issue - cause" relationship. One issue may have several causes. These causes can be further branched out downwards to identify their causes.

5. Identify the effects of the issue and write it on another sticky note. Draw a line upwards and connect the sticky notes to show the "issue - effect" relationship. One issue may have several effects. These effects can be further branched out upwards to identify their effects.



Outcome

By the end of this exercise, the causes and the effects of the key DRR issues identified by the participants will be laid out on the white board. Maintain poster paper with the sticky notes and take photo to keep record.

It is advisable that facilitators to have some knowledge about PCM in order to facilitate and get the expected outcomes from the exercise. Some online resources can be found with these searches: *JICA-Net Library - The ABCs of PCM (video), JSPR Model Project Cycle Management (PCM) Training Manual.*

(b-2) Objective Analysis

Objective analysis should follow immediately after the problem analysis so that the same participants who worked on the previous exercise can continue with this analysis.

Purpose

- Objective and goal setting. While the problem analysis identified the negative situations for CBDRR, objective analysis will reveal the desired situation for each of the problems.

Concept

Group discussion and tabletop activity

Number of Participants

10 to 15, consisting of various community stakeholders including those who can advise on technical aspects of the discussion.

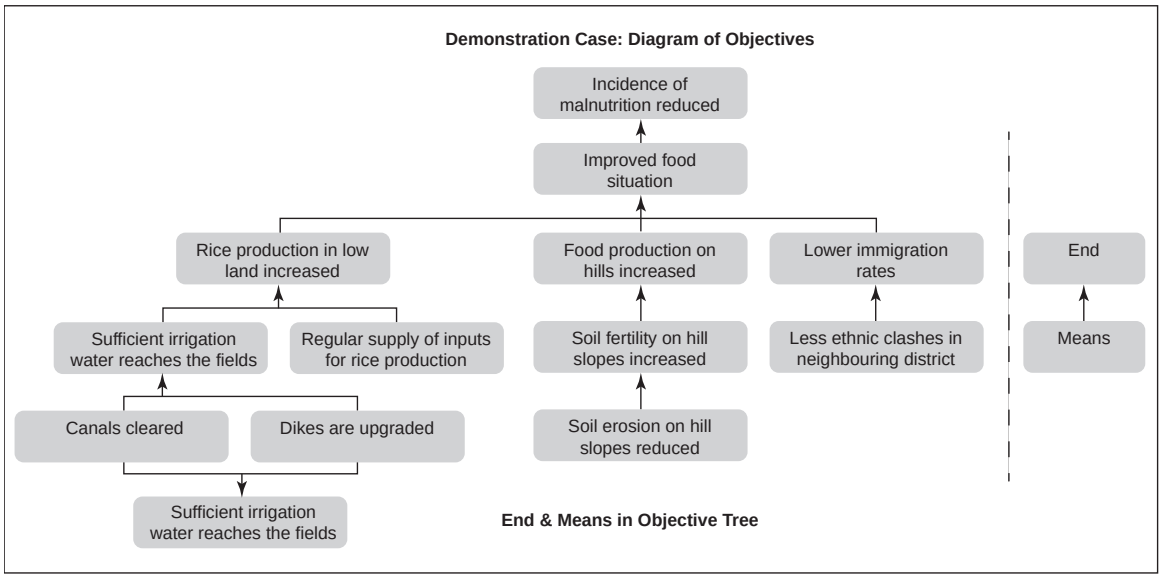
Trainers should ensure participation from various community stakeholders to get different views, experiences, and knowledge for developing a CBDRR plan with common goals that is owned by the community.

Required Material

- Stationeries for participants (e.g. memo pad, pens)
- White board, poster paper, sticky notes (different colors), masking tape, markers
- PCs, projectors, and screens

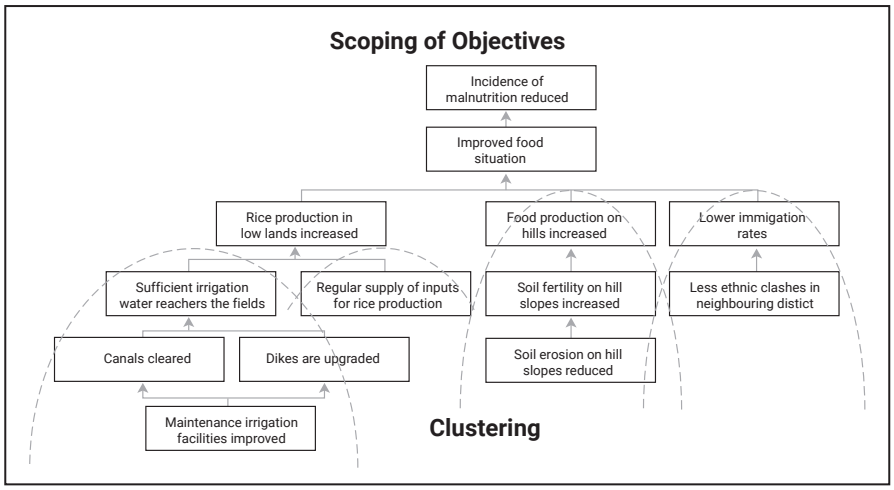
How To's

1. Replace (or cover) all sticky notes from the problem analysis with new sticky notes with desired situation of the problem. Be sure to include comments from all, as desired situation may differ among the participants in the group.
2. The "issue-cause" tree from the problem analysis should now be a "means-end" tree in the objective analysis.

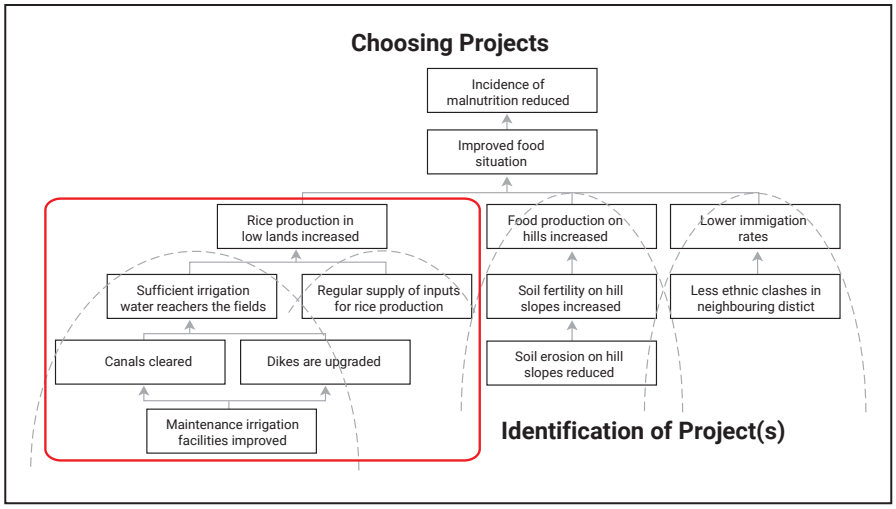


3. Because all desired situations cannot be realized in one program or event, scoping of the objective should be done by choosing and circling the sticky notes of feasible objective level and issues identified in this analysis.

4. Similar sticky notes may lead to overlapping actions, so the facilitator may suggest combining these sticky notes with agreement from the participants.



5. Each of the main objectives identified in Step 2 can become a CBDRR activity. For example, if "Improving evacuation" is one of the objectives, then a community DRR drill may be designed with all the branched-out objectives incorporated in the program.



Outcome

By the end of this exercise, the objectives and desired actions identified by the participants will be laid out on the white board. Maintain poster paper with the sticky notes and take photo to keep record.

If there are too many CBDRR activities identified, prioritization of activities may be done during the discussion (as described in Finding Solutions/Prioritizing CBDRR Activities)

(c) Finding Solutions/Prioritizing CBDRR Activities

Purpose

- Program selection. When there are many CBDRR activities and measures identified during this exercise, the most needed actions might need to be chosen, as time and resources are limited.

Concept

Prioritisation of CBDRR activities can be done in a group discussion by applying a score for each activity based on financial and technical feasibility, urgency and sustainability.

Number of Participants

10 to 15, consisting of various community stakeholders including those who can advise on technical aspects of the discussion.

Required Material

- Stationeries for participants (e.g. memo pad, pens)
- White board, poster paper, sticky notes (different colors), masking tape, markers
- PCs, projectors, and screens

How To's

1. List out all the possible desired objectives as identified during the Objective Analysis session on a whiteboard. Make a table by adding columns for resources and constraints in implementing these objectives. Usually they are financial, technical, urgency, sustainability, and availability of implementer. These shall be called 'implementation factors'.
2. For each objective, give a score for each factor, with 1 being least viable and 5 being the most viable.
3. The objective with the highest score is deemed the most implementable and feasible by the participants.

Outcome

The outcome is a matrix showing the implementation factors.

ACTIVITY	FINANCIAL	TECHNICAL	URGENCY	SUSTAINABILITY	IMPLEMENTER
Evacuation drills	4	4	5	4	SDMU School
DRR awareness workshop	5	3	4	4	SDMU District engineer
Community road upgrade	2	3	3	5	JKR

While both structural and non-structural measures and activities should be considered as DRR, not all can be implemented by the communities or need longer time and substantial budget to implement (e.g. upgrading community road). These measures may be recorded and requested to the local government for further actions.

(d) Planning the CBDRR Program

Purpose

CBDRR program planning aims to develop a CBDRR event or program for implementing a series of CBDRR activities that had been identified in the workshop.

Concept

Group discussion

Number of Participants

10 to 15, consisting of various community stakeholders including those who can advise on technical aspects of the discussion.

Required Material

- Stationaries for participants (e.g. memo pad, pens)
- White board, poster paper, sticky notes (different colors), masking tape, markers
- PCs, projectors, and screens

How To's

1. Break up into groups.
2. Each group may discuss and draft a framework of the event with the following information:
   - Objective, justification and expected outcomes of the program
   - Length of the CBDRR event (e.g. half day, 1-day, 1-week or series of events every month or during DRR awareness month in October)
   - Target areas and beneficiaries
   - Stakeholders involved, description of roles & responsibilities
   - Program agenda
   - Budget plan required for implementation
   - Post-mortem

Outcome

An outline of a CBDRR program, to be drafted as an implementation plan

ANNEXE 2:
Disaster Hazards and Risk in Your Community

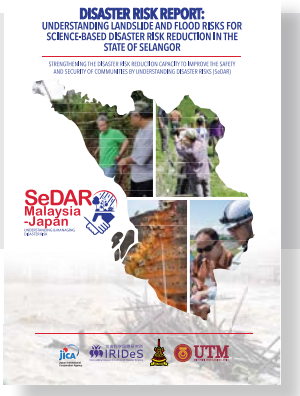
1. Finding Out About Hazards and Risks in Your Community

Now let's take a look at the hazards and risks that exist in the participants' communities. The selected communities are:

- Ulu Klang Sub-District, Gombak District
- Batu 14, Semungkis Sub-District, Hulu Langat District
- Kampung Sungai Serai, Hulu Langat Sub-District, Hulu Langat District
- Kampung Tok Muda, Kapar Sub-District, Klang District

This section should be presented by the trainers as a Risk Communication session. It covers the (1) hazards or threats being faced by the communities, (2) how science can help community members better understand these hazards, and (3) what are the findings based on science that can be shared to the communities.

It is helpful for trainers to refer to the **JPP SeDAR Disaster Risk Report** which has a more comprehensive explanation on the hazards and risks for each of the community areas when preparing materials for this section.



1.1 Ulu Klang

Located a few kilometres from the city centre of Kuala Lumpur, Ulu Klang is a suburban township consisting of many housing developments. The residential developments sit along the Titiwangsa Range, giving it the advantages of forest cover, beautiful scenery, and proximity to nature.

It is also widely known as a landslide-prone area. The area has seen frequent incidents of landslides since the 1990s. Most of these landslides occurred on man-made slopes, some with devastating effect such as the 1994 Highland Towers landslide, 2008 Bukit Antarabangsa landslide, and 2012 Taman Hillview landslide. While no fatal landslides have occurred since 2008, the area continues to experience smaller but chronic smaller failures and landslips.

From Left: Highland Towers landslide (1994), Bukit Antarabangsa landslide (2008), Taman Hillview landslide (2012)

Community members living there often observe:

- Landslips and erosion
- Rockfalls
- Surface and Groundwater flow

While visual observations and reports create awareness of the risks around them, science-based tools such as hazard and risks can help communities better understand and take measures against the risks.

How Scientific Hazard and Risk Maps Show Local Risk

The main tools to highlight risk in the Ulu Klang area are hazard maps, which have been developed by the Slope Hazard and Risk Mapping Project or the Projek Peta Bahaya dan Risiko Cerun (PBRC) by the Department of Mineral and Geoscience Malaysia.

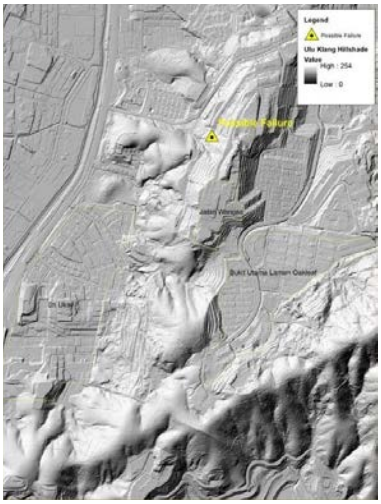
To develop hazard maps such as those used for Ulu Klang, there are many input data using methods such as airborne LiDAR data capture and mobile GNSS-GIS field mapping.

These maps show different views of a risk area. The following are some of the maps that were created for the Ulu Klang area.

Orthophoto Map

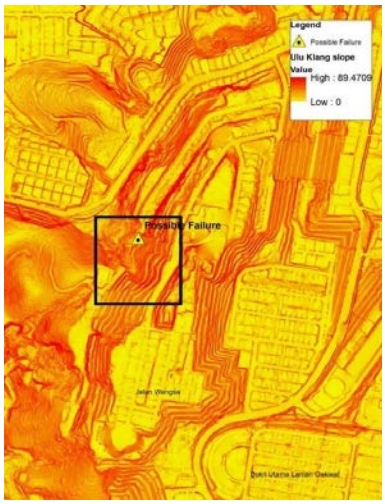
Orthophoto maps are different from ordinary aerial maps in that they are adjusted to provide a top-down view. In this map, we see built-up areas amidst a landscape of vegetation and trees.

Shaded Relief Map



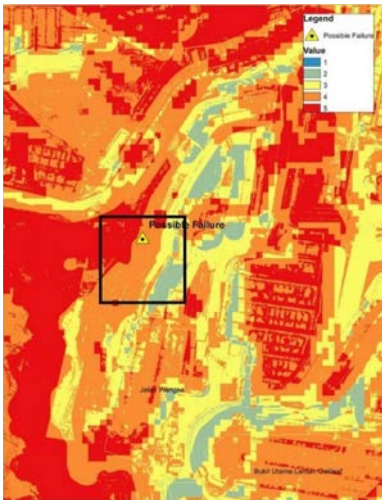
In this map, we now see the same area with the vegetation and built-up areas removed. This is a shaded relief map that was created using high-resolution Light Imaging and Detection Radar (LiDAR). With LiDAR, we can see the bare terrain beneath dense forest cover.

Slope Map



A slope map allows for slopes to be visualized as a 3-dimensional model. This slope map provides clues to risk managers about topography (hilly and flat terrain) and proximity of slopes to any elements-at-risk (houses, buildings, structures). The map also identifies the level of susceptibility (probability of failure) and hazard (extent of possible damage).

Landside Hazard Map



A landslide hazard map divides the terrain into zones of probability of landslides occurring according to intensity (high to low). Factors contributing to hazard are steepness of slope, weak geological material, experience a high degree of 'weathering', and are subject to intense or prolonged rainfall.

Findings

From these maps, communities found out that their area had:

- Naturally steep terrain
- Steep cut and fill slopes
- Abandoned lots with secondary vegetation overgrowth
- Temporary water accumulation zones
- Disturbed terrain from past human activities

In this section, we found out that hazard and risk maps are a powerful communication medium for identifying landslide hazards and risks.

By stripping away vegetative cover, shaded relief maps derived from LiDAR digital elevation maps expose the terrain beneath to show past or current human activities as well as natural geological or hydrological processes.

In this project area, the shaded relief map or hillshade view shows that what appears to be a 'natural slope' to the naked eye is in fact ridden with potential failure features.

Using maps derived from remote sensing, the 'signature marks' or signs of an impending slope failure can be detected.

1.2 Batu 14 Hulu Langat

Batu 14 is located in the suburban area in the district of Hulu Langat with large tracts of land and plantation and agriculture as well as small-scale farming and local tourism. However, in recent years, the semi-rural area is seeing rapid infrastructure and urban development growth.

Within this area, there are scattered development on private land such as those along Jalan Sungai Semungkis in Kampung Gahal, Batu 14. This area is prone to slope failures, with a number of them occurring in the past. The most notable incident is the 2011 landslide that claimed 16 lives at the Hidayah Madrasah Al-Taqwa Orphanage in Kampung Sosrowijayan, 15 of them children.

Hidayah Madrasah Al-Taqwa Orphanage

Community members living there have observed:

- Frequent landslips and erosion
- Rural area that is undergoing rural urban development
- Landslide incidents occurring on private land
- Absentee landowners starting development on their lots

While visual observations and reports create awareness of the risks around them, science-based tools such as hazard and risks can help communities better understand and take measures against the risks.

How Scientific Hazard and Risk Maps Show Local Risk

The main tools to highlight risk in the Ulu Klang area are hazard maps, which have been developed by the Slope Hazard and Risk Mapping Project or the *Projek Peta Bahaya dan Risiko Cerun (PBRC)* by the Department of Mineral and Geoscience Malaysia.

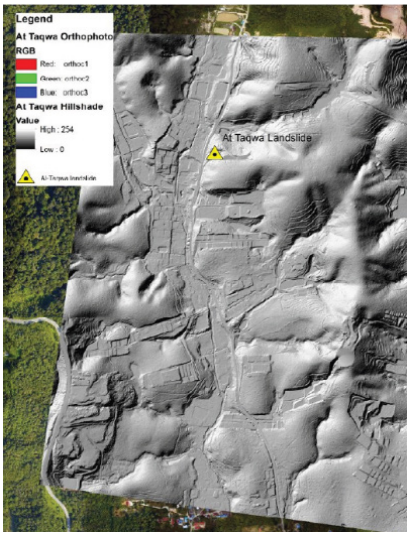
To develop hazard maps such as those used for Hulu Langat, there are many input data using methods such as airborne LiDAR data capture and mobile GNSS-GIS field mapping.

These maps show different views of a risk area. The following are some of the maps that were created for the Hulu Langat area.

Orthophoto Map

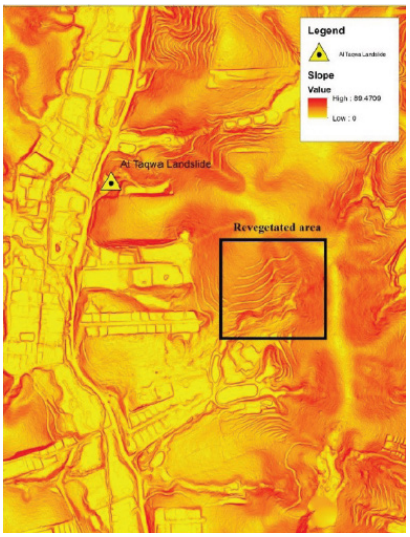
Orthophoto maps are different from ordinary aerial maps in that they are adjusted to provide a top-down view. In this map, we see built-up areas amidst a landscape of vegetation and trees.

Shaded Relief Map



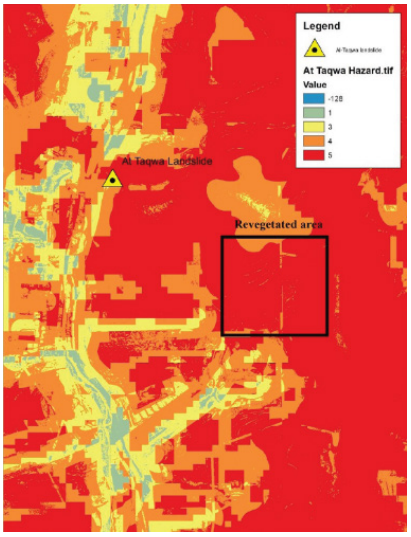
In this map, we now see the same area with the vegetation and built-up areas removed. This is a shaded relief map that was created using high-resolution Light Imaging and Detection Radar (LiDAR). With LiDAR, we can see the bare terrain beneath dense forest cover.

Slope Map



A slope map allows for slopes to be visualized as a 3-dimensional model. This slope map provides clues to risk managers about topography (hilly and flat terrain) and proximity of slopes to any elements-at-risk (houses, buildings, structures). The map also identifies the level of susceptibility (probability of failure) and hazard (extent of possible damage).

Landside Hazard Map

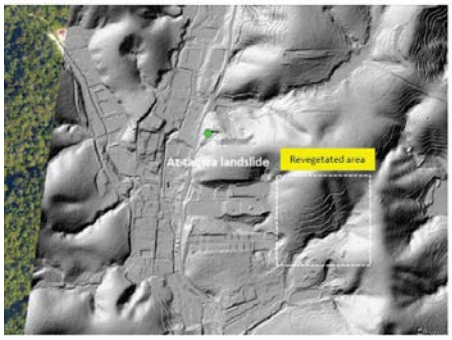


A landslide hazard map divides the terrain into zones of probability of landslides occurring according to intensity (high to low). Factors contributing to hazard are steepness of slope, weak geological material, experience a high degree of 'weathering', and are subject to intense or prolonged rainfall.

Findings

From these maps, communities found out the following:

- Original terrain in some areas have been excavated, most of the vegetation on the hills have been stripped, and building structures constructed very close to the foot of the slope to maximize the space within the designated lot.
- Some of these human activities appear to have taken place within the last few years, with the passage of time allowing secondary vegetation to grow and provide an appearance of undisturbed ground.
- Some of the slope cuttings created areas of temporary water accumulation zones, which allow water to pond during intense and prolonged rainfall.



- Hulu Langat is a popular recreational area that serves as a forest getaway close to the city. Nestled in greenery and shady hillside forests, Batu 14 and its neighbouring areas are popular destinations for resort owners, homestays, team building operators, fishing ponds operators, and other tourism-oriented businesses. As tourism is a key industry in this area, construction of slopes need to be properly carried out to reduce the risk of failure.

In this section, we found out that the use of orthophotos and landslide hazard maps make it possible to identify and analyze unseen topography beneath dense vegetation cover. In this project area, it appears that landslides are induced by small degrees of land disturbances, particularly at toe of the slopes, and the area is largely characterized by heavy rainfall.

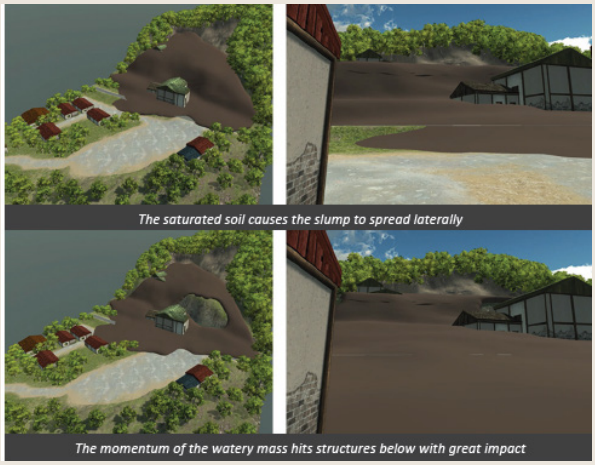
Simulation of the 2011 Hulu Langat Landslide

An online simulation of the Hulu Langat landslide demonstrates to participants how the incident occurred.

Simulation of disasters is a powerful communication tool in showing the consequences of a hazard. It is not used for risk identification, but for risk visualization during occurrence. This is helpful for stakeholders when communicating disaster risk.

The landslide simulation shows how the landslide moved in two movements within minutes of each other. Because the slope was waterlogged from previous rainfall events within the past nine days, the landslide moved rather quickly.

This demonstrates to community members that with retrogressive landslides, it may be possible to evacuate or move out of harm's way if the interval between movements is long enough. However, we can also see that with saturated slopes, once the slope is displaced, movement occurs rather quickly due to the saturated consistency of the soil.



Source: Dr S. Moriguchi, Computational Safety Engineering, IRIDeS

1.3 Kampung Sg. Serai, Hulu Langat

Kampung Sg. Serai is a combination of traditional villages and modern suburban residences located in Mukim Hulu Langat. The village is located about 2 km from the nearest town of Hulu Langat and 5 km from Kampung Batu 14.

Kampung Sungai Serai is considered the 'main village' (kampung induk) in the area, which is supported by 'linked villages' (kampung rangkaian) including Kampung Sungai Betong, Kampung Tengah, Kampung Hilir, Kampung Sungai Serai Tambahan, and Kampung Lombong.

Kampung Sungai Serai is also the site of frequent flooding incidents that occur on an almost annual basis. It faces:

Small-Scale Flooding – Small-scale flooding is concentrated in Kampung Sungai Serai and neighbouring tributaries, which occurs several times a year, usually around June and July. The affected areas are approximately 50 m from the riverbanks. The duration of flooding is short and affects about ten houses. Due to the frequency of the flood events, Sungai Serai is considered a hotspot for floods in Hulu Langat. Also commonly flooded are Sungai Betung and Sungai Putih.

Large-Scale Flooding – Once every five years, there is large-scale flooding that affects all villages that stretches for 12 km, from Batu 18 near the Semenyih Dam to Batu 10 in Cheras. Past flood occurrences have been in 2009, 2012 and 2017. In the 2017 flood incident, the entire Hulu Langat area was flooded, affecting 1,000 houses and 50 to 60 houses within 100 metres of the riverbanks were flooded. During flooding, a power substation was flooded, disrupting power supply.

Flooding in Kampung Sungai Serai, with the mosque on Jalan Hulu Langat (on right) being the first site to flood

Community members living there have observed:

- Frequent flash and monsoon flooding
- Area to get flooded most frequently is a mosque on the main road

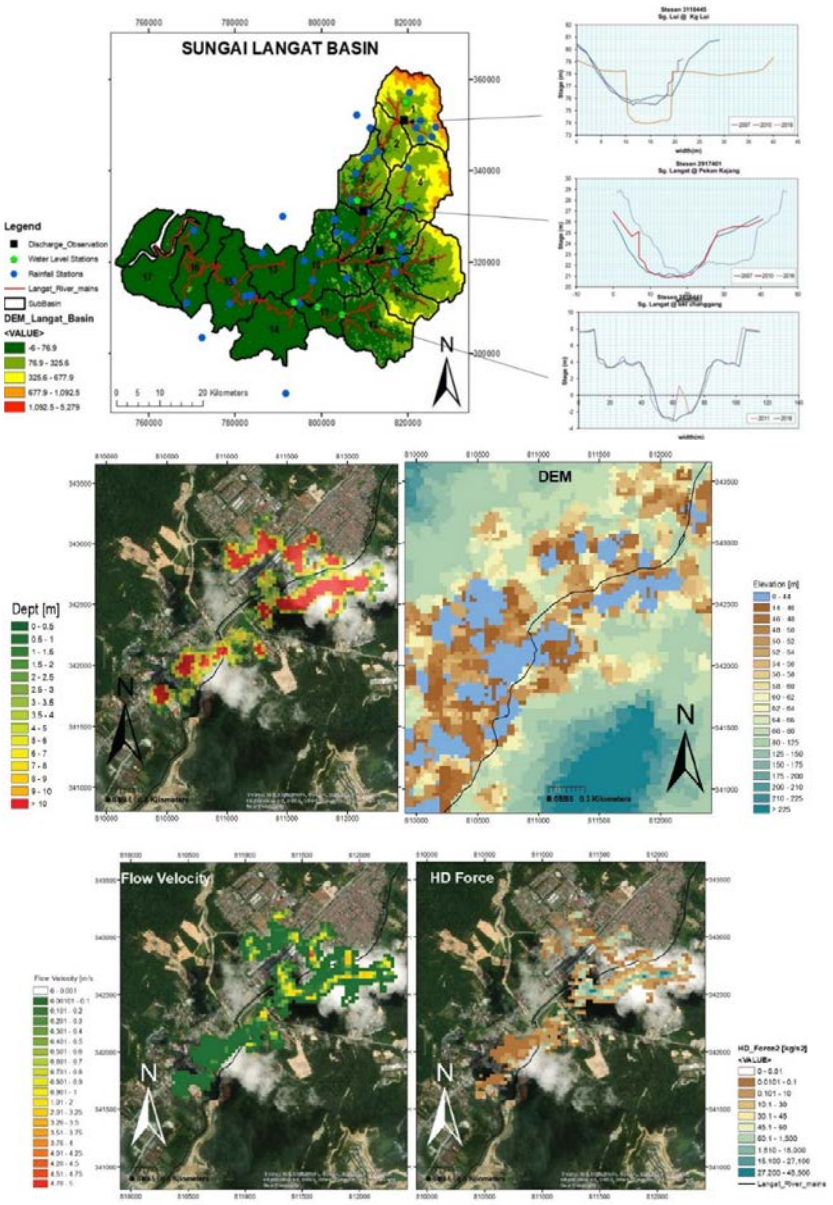
While visual observations and reports create awareness of the risks around them, science-based tools such as hazard and risks can help communities better understand and take measures against the risks.

How Scientific Hazard and Risk Maps Show Local Risk

The main tools to highlight risk in the Kampung Sungai Serai area was a flood modelling software called HEC-RAS. The process for setting up and running the flood model is complex, but for the sake of simplicity, the methodology for flood modelling is presented as five steps:

1. Establish the GIS base map
2. Generate the digital elevation model
3. Gather hydrological data
4. Run rainfall runoff and flood inundation model
5. Calibrate with past rainfall data

Once the model was generated, it was validated with observed data.



Hydrological data (river cross section, rainfall, water level and discharge stations) for modelling

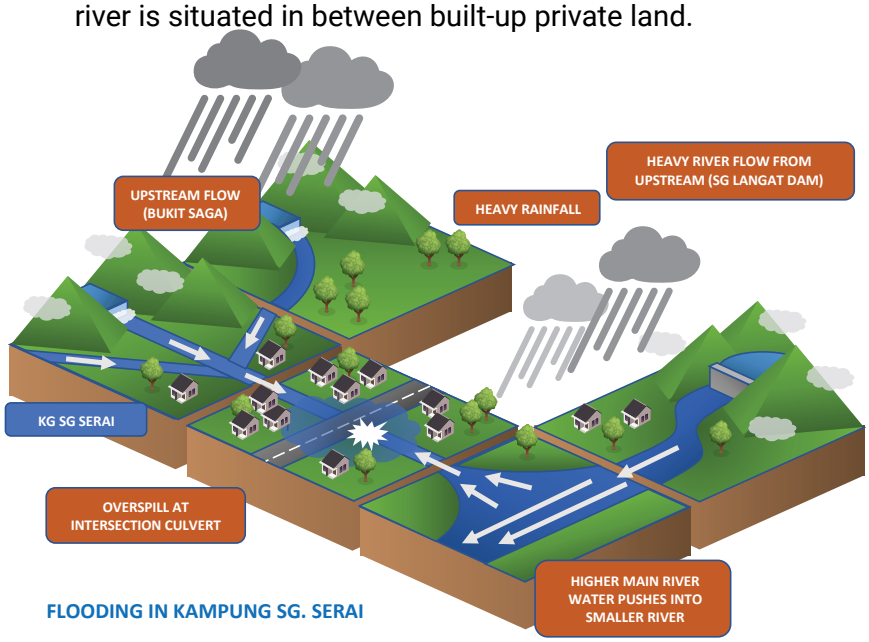
One of the results of the modeling is a flood inundation map, which shows that many houses around the project areas were inundated. It should be pointed out that flood inundation areas are associated with low elevation areas because water always flows from high elevation to low.

Another map generated from the modelling is a flood flow velocity and hydrodynamic force map. This shows how fast flood waters move at various locations within the catchment.

Findings

The flood modelling and resulting maps showed the following:

- The simulated flood inundation analysis showed us that many houses in Kampung Sg. Serai experience flooding with rainfall events.
- In addition, the flood velocity analysis showed that there is potential for the force of flood waters to be strong enough to make it difficult for residents to stay in their houses during floods, particularly for flood events that occur in the upstream sections of the main Sg. Langat river. As such, residents need to be aware of the potential forces of flood water during extreme rain events.
- There is also a narrow river flowing through a culvert. This culvert creates a bottleneck for the water flowing down from a vast hilly forested area upstream towards the main trunk of Sungai Langat downstream, a major river. During rainy seasons, heavy flow in Sungai Langat pushes backwater into Sungai Serai, accumulating water around the culver and flooding the town.
- It is notable that the culvert is close the mosque (that always flood first) and the narrow river is situated in between built-up private land.



FLOODING IN KAMPUNG SG. SERAI

Flooding condition 1: Bottleneck or overflow of water flow at tributary (narrow river)

Flooding condition 2: Backwater of water flow into main river (Sg. Serai)

Result: Overflow of river water at culvert (where the two rivers intersect)

In summary, flood inundation and velocity modelling are suitable methods for simulating flood events to show flood risk. However, accuracy of the model depends upon the availability of high-resolution DEM data. With high resolution data, modelers can develop hazard maps that are suitable for the local community to understand the risk and to evacuate before the disaster event.

1.4 Kampung Tok Muda, Sementa Sub-District, Kapar

Kampung Tok Muda is a village located beside Sungai Kapar Besar near the town of Kapar in the district of Klang along the coast of Selangor, about 12 km north of Port Klang. The area is on a coastal plain that lies between two major river basins in Selangor, the Sungai Buloh and Sungai Klang river basins.

Based on information and flood reports from DID Klang, Kampung Tok Muda and Kampung Sg. Serdang have been listed as flooding hotspots since 2010 and up until 2015, 2016 and 2017. Kampung Tok Muda is the closest to a river bund north of Sg. Kapar Besar and has been inundated during high tides due to river bund breaching. Kampung Sg. Serdang often gets flooded every time Kampung Tok Muda gets flooded.

A major flooding incident occurred in September 2016 when the bund was overtopped and breached during high tides. About 1,000 residents were affected in the flood due to its low-lying terrain.

Flooded areas in Kampung Tok Muda during the 2016 high tide phenomenon; flood hotspots in Semesta Sub-District

Community members living there have observed:

- Heavy flooding over consecutive years in the past
- Correlation between high tides and flooding
- Bund break

While visual observations and reports create awareness of the risks around them, science-based tools such as hazard and risks can help communities better understand and take measures against the risks.

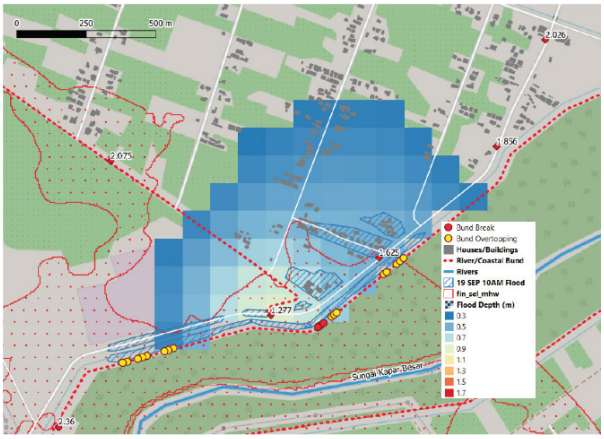
How Scientific Hazard and Risk Maps Show Local Risk

The main tools to highlight risk in the Kampung Tok Muda area was a flood hazard map that was created by the Project Team. It is a rough-hewn map for public demonstration purposes only, but it serves the purpose of risk communication to the communities.

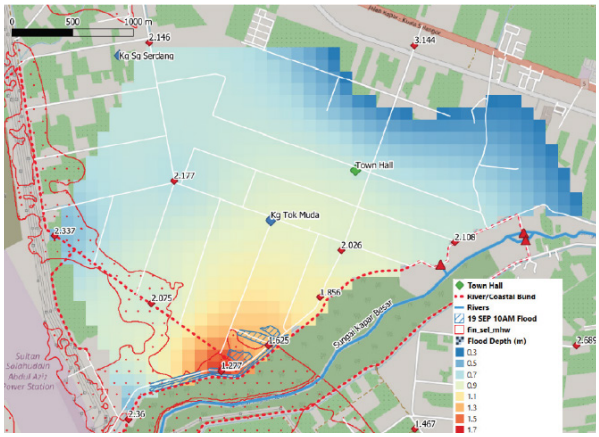
The hazard map shows where the low-lying areas are situated. This would indicate where the most flood-prone locations are. To do this, the following steps were taken:

1. Analyze long-term rainfall data
2. Geographical visual analysis
3. Identify flooding scenarios
4. Create a digital elevation map (DEM)

The resulting hazard map provided the following visualization, showing when and where flooding occurs.



Flooding during tidal phenomenon 'mean high water spring' (MHWS)' when bund breaches



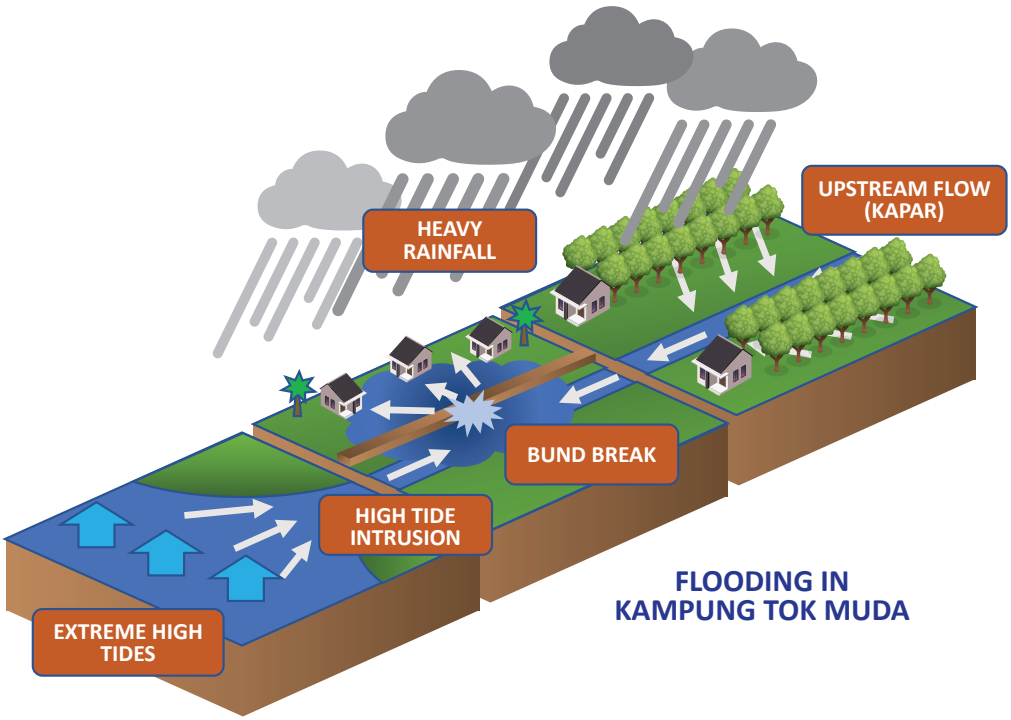
Flooding during tidal phenomenon 'extreme high water (EHW)' when bund breaches

Findings

The flood modelling and resulting maps showed that:

- The bunds are subject to erosion and need to be maintained consistently
- Natural sea life, most predominantly crabs that burrow nests into the bunds, contribute to weakening of the bunds
- Flooding in Kampung Tok Muda could be contributed by high water levels produced by the combination of heavy rainfall, high tides and strong waves. Just these factors alone may not create the flooding, but may put hydrodynamic pressure on bunds that are already weakened

Flooding occurs when there is the combination of intense/prolonged rainfall, extreme high tide, and bund failure.



The accuracy of the flood maps could be improved with higher resolution DEM maps, which is carried out by government agencies or organizations. However, when conveying the risks to the community, simplified three-dimensional maps provide good visualization to communicate the flood hazard in this area.

ANNEXE 3:
Sendai Framework for Disaster Risk Reduction 2015-2030

Sendai Framework for Disaster Risk Reduction

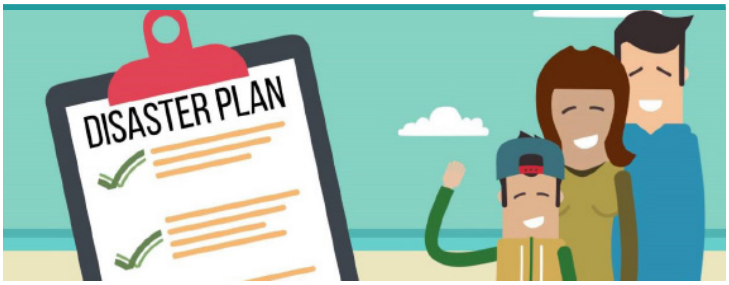
The emphasis on the role and active participation of the local communities is in line with the international strategy **Sendai Framework for Disaster Risk Reduction 2015-2030.** This framework focuses on communities understanding disaster risks and playing a lead role in local solutions and actions to reduce risk within their surroundings. There are four priority areas in this framework.

Priority 1: Understanding disaster risk

- You must understand what kind of disaster risks your community is facing in order to effectively plan and implement your DRR measures.
- This may require a series of technical and scientific assessments that can be supported by experts from the government or universities (e.g. SeDAR program).
- Local communities may also conduct their own risk assessment to better understand the disaster risks in their neighborhoods. (e.g. Town Watching for DRR – see Module 3).

Priority 2: Strengthening disaster risk governance to manage disaster risk

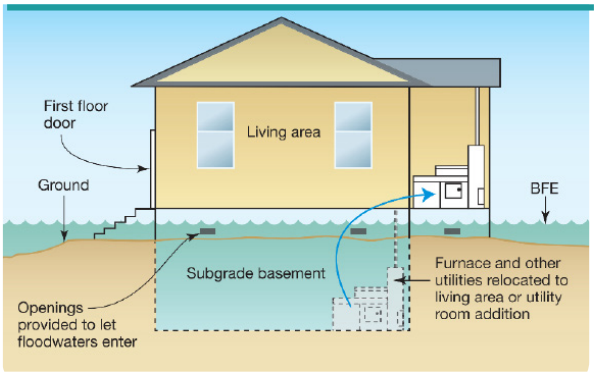
- DRR is everyone's business and requires everyone's involvement.
- DRR concepts should be also incorporated in all aspects for community life—from local development planning to individual household activities.
- Most importantly, all communities should have a DRR plan that includes clarification of roles and responsibilities, coordination mechanism, DRR activity plans, budget planning, etc.



Source: readysandiego.org/make-a-plan

Priority 3: Investing in disaster risk reduction for resilience

- Local governments and communities should find best ways to invest in DRR measures for safety and sustainable development of their neighborhood.
- However, it will not be easy to convince decision makers to pay for DRR. Therefore, DRR investment should be combined with other investments for community development (e.g. upgrading of public facilities, combined with disaster-proofing).
- Land use planning and building codes should be regularly reviewed. Enforcement can be monitored by the community themselves with support from experts, as needed.



Source: Floodproofing-Sustainable Buildings Initiative, challenge.abettercity.org

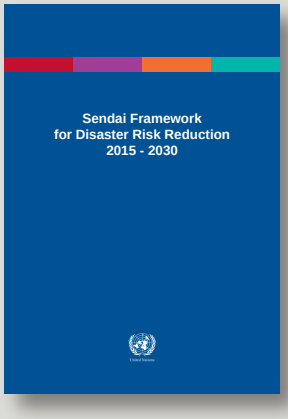
Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction

- Communities and local government should become aware of the following:
  - ❒ Availability of early warning systems and how you can receive the warnings.
  - ❒ Location of the closest evacuation centre that is stockpiled with sufficient relief items (food, daily goods, survival kits, etc.).
  - ❒ Whether local government and/or leaders plan and implement regular DRR drills.
  - ❒ Availability of business continuity plans (BCPs) for local small to medium-sized businesses.
- Communities should own a Community Recovery/Reconstruction Plan that incorporates lessons learned from past disasters to build back and restore to normalcy

Disaster Simulation Day 2018, Serendah, Selangor
Source: UTM KL

Further Reading

- Sendai Framework for Disaster Risk Reduction 2015-2030. Adopted by United Nations in March 2015 and endorsed by the General Assembly in June 2015. Published by UNISDR, the United Nations Office for Disaster Risk Reduction.



Sendai Framework for Disaster Risk Reduction 2015-2030.

ANNEXE 4:
Toolkit of CBDRR Exercises and Games

Toolkit of CBDRR Exercises and Games

In addition to the group activities presented in Annexe 1 to carry out CBDRR, there are other exercises and games that trainers can conduct with community leaders and members.

These exercises help further enhance the community's understanding and appreciation of the repetitive nature of disaster occurrence, emphasize the need for community-based disaster preparedness, and clarify the roles and responsibilities of each player at each stage of the disaster cycle.

There are four exercises presented in this section, which are Disaster Imagination Game, Venn Diagram, Disaster Timeline, and Emergency Drill Planning:

a. Disaster Imagination Game	b. Venn Diagram	c. Disaster Timeline	d. Emergency Drill Planning
is a disaster prevention drill which uses maps and transparent overlay	clarifies roles and responsibilities at each stage of the disaster cycle	encourages communities to sustain and continue DRR programs on a regular basis	helps communities carry out preparation of drills for disaster events

a. Disaster Imagination Games (DIG)

Purpose

- To raise awareness to the local community in the prevention and preparedness phase
- To enable communities to draft their own disaster action plans through maps

Concept

The *Disaster Imagination Game* is a scenario-based simulation and planning exercise based on a hypothetical disaster that strikes within a community (Komura and Hirano 1997). DIG is a form of disaster drill in which participants take on the role of the commanding post in an imaginary disaster and engage in planning for disaster response and recovery.

Using base maps and transparent overlays, participants can mark and tag key data, information and locations such as the (1) physical terrain and geographical features of the potential disaster area, (2) available resources, and (3) expected extent and impact of the disaster.

By viewing various details on maps, participants can easily grasp the situation of affected areas when disaster strikes, leading to a discussion on how participants could command response and relief activities at the community level. This discussion may include the participants' past disaster experience, local knowledge, and recovery expectations.

This virtual disaster exercise helps participants experience disasters not as victims, but as active players in local disaster response and relief activities.

Source: DIG Activities at CBDRM Tanjung Malim, Perak 2019 (Sardi, 2019)

Number of Participants

Up to 30, to form 5 groups of 6 participants

Required Material

- Base map of selected locality/community area (if available) – 5 sets
- Mahjong paper or tracing paper, if no base map is available (86 cm x 86 cm) – 10 sheets
- Transparent plastic sheet (86 cm x 86 cm) – 10 sheets
- Permanent marker pen (red, blue, black colors) – 5 sets
- Masking tape – 5
- Pencil (2B) – 5
- Pen (red, blue, black colors) – 5 sets
- A4 paper – 10 sheets
- Ruler (30 cm) – 5

How To's

1. This exercise starts with the base map of the locality/community area. If there is no base map available for the area, participants create their own base map by drawing the terrain landscape by hand on mahjong or tracing paper. This hand-drawn map becomes the base map.
2. Create overlay map showing geographical terrain (Overlay Map #1)
    - Place a transparent plastic sheet over the base map and label it as 'Overlay Map #1'. Trace the geographical terrain of the community area onto the overlay. Mark urbanized/built-up areas, slopes, open spaces, and water bodies such as rivers and streams using different colored pens for urbanized areas, water bodies and open spaces.

3. Create a map showing natural and manmade elements, positive and negative features, and make list of available resources (Overlay Map #2)

   - Place a second transparent plastic sheet over the base map and label it as 'Overlay Map #2'. Trace the community area's physical elements and features onto the overlay. Physical elements and features are either natural or manmade, and they may include transportation infrastructure such as railways, main trunk and ancillary roads, land use features such as open spaces, or natural features such as water catchments. Use different colored pens, e.g. black for roads, blue for river and water bodies, green for open spaces.
   - Make a list of vulnerable items (human and physical), such as facilities/sites at risk and groups with special needs and assistance. Then using a red colored pen, write each item on a sticky note and post them onto the overlay (e.g. house with one elderly resident).
   - Make a list of resources (human and physical), such as evacuation centres, public and private halls and wide space facilities, human resources and supply of goods. Using a blue colored pen, write each item on a sticky note and post them onto the overlay (e.g. local sundry goods store with food, bottled water, and hardware).

4. Make a list of expected damage of the area in the event of a disaster

   - Itemize and write onto sticky notes the expected damage within the community area in the event of a disaster, such as the expected type of damage, the expected damage effect, the expected victim involved, what might happen, and where it could happen. Write one point per sticky note.

5. Group discussion

   - Discuss the participants' findings on the overlay maps, taking into account what needs to be done to prepare for a disaster.

6. Presentation by group

   - Each group makes a presentation and explain the findings and recommendations towards the drafting of a community-based disaster action plan.

7. Consolidate and revise the findings and recommendation into a formal community-based disaster action plan

   - Participants evaluate, assess, harmonize, and refine the draft action plan to come up with a final plan.
   - Establish, formalize, and adopt the community-based disaster action plan.
   - For public communication, print map (if posible in 3D format) and display in prominent and strategic locations within the community for public viewing and understanding of disaster management mitigation and planning.

Outcome

This exercise results in the creation of a multi-layered map showing (1) natural and manmade elements, (2) attributes and features that will be a resource or a vulnerability in the event of a disaster, and (3) the impact of a disaster on these elements and features within their communities. Having a map with these kinds of details enables participants to prepare and plan for actions to take in a disaster event.

Source: DIG Activities at CBDRM Kundasang, Sabah 2020 (Sardi, 2020)

b. Venn Diagram

Purpose

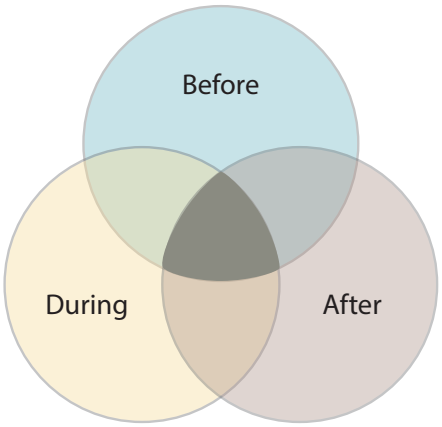
- To raise awareness and understanding on the roles and responsibilities of government agencies, community leaders and members, NGOs and other players in disaster risk management

Concept

Venn diagrams help communities identify agencies that provide assistance and resources to the communities before, during and after disasters. This is to get community members aware of and understand the different roles and responsibilities of emergency first responders, technical experts, academia, and other players in the disaster risk management spectrum.

This exercise helps answer questions such as "Who provides assistance during a disaster? Who does what exactly? And what are the roles of the various government agencies, NGOs, families, and individuals during a disaster?" Knowing the legislated powers and scope of responsibilities of the agencies would lead to effective and smooth coordination between stakeholders during disaster.

This exercise supplements the section on the 3-Help Concept introduced in Module 1 of this Guidebook.



Example of a Venn diagram

Number of Participants

Up to 50, to form 5 groups of 10 participants

Required Material

- Mahjong paper or tracing paper (86 cm x 86 cm) – 10 sheets
- Permanent marker pen (red, blue, black colors) – 5 sets
- Masking tape – 5 sheets
- Pencil (2B) – 5
- Pen (red, blue, black colors) – 5 sets
- A4 paper – 10 sheets
- Ruler (30 cm) - 5

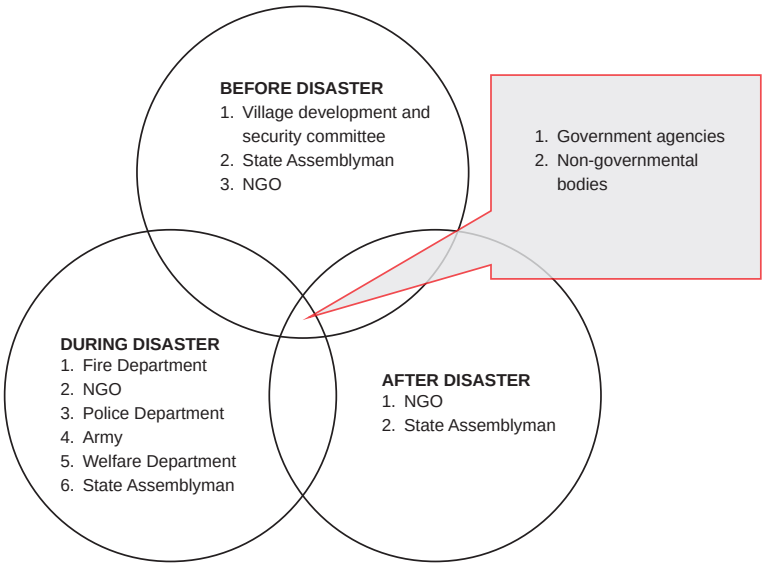
How To's

1. Participants sketch a Venn Diagram (as shown above). A Venn Diagram is an analysis tool consisting of two or more intersecting circles, with a shared core. Label each circle as 'Before', 'During' and 'After'.
2. Based on the most recent catastrophic events in their area, participants fill in each circle with:
   - Actions taken by the community before, during and after the disaster
   - Roles of the community before, during and after the disaster
3. Next, for each circle list external bodies and entities (government, private, NGOs or individuals) that provided assistance (rescue, medical, safety, supply, counselling, financial, technical, training, welfare, etc.) before, during and after the disaster.
4. Discuss and identify individuals or agencies that need to be contacted first in the event of a disaster (based on past disaster experience of the community).
5. Discuss the need for other kinds of assistance required the community to deal with future disasters.
6. Each group makes a presentation and explain their findings.

Outcome

The end result of this exercise is the identification of critical organizations or entities for communities to contact in a disaster. These are usually entities that appear in the 'core' of the intersecting circles. From this, community members know that they must have contact numbers of these entities available on short notice. This exercise teaches the residents to be reliant on resources within their own community, before public/government help arrives.

Venn Diagram Output from CBDRM Tanjung Malim Participants
Source: CBDRM Tanjung Malim, Perak 2019 (Sardi, 2019)



Venn Diagram Output of Kampung Sungai Serai from CBDRM Kundang Participants
Source: CBDRM Kundang, Selangor 2019 (Sardi, 2019)
In this example, the core shows that the critical bodies to contact before, during and after a disaster are the government agencies and NGOs

c. Disaster Timeline

Purpose

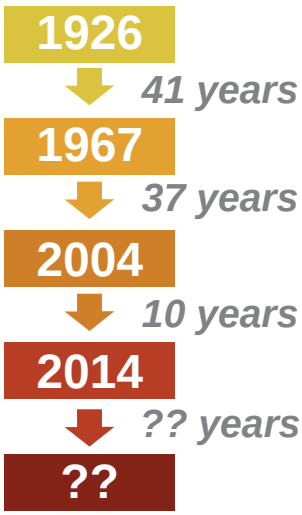
- To create awareness of the repetitive nature of disasters
- To motivate community leaders on the need and responsibility to continue DRR on regular basis

Concept

Disaster timelines can help community in recording, identifying, analyzing and understanding disasters. It can also assist in the development of a disaster action plan for the local community.

Based on the records of past disasters, participants are asked to conduct a simple analysis of the frequency/recurrence of the disaster. This is to enable them to predict the repeatability of the same event in the future, based on the characteristics of the event, local elements, weather forecast and early signs of a catastrophic event.

While science can provide a more accurate and comprehensive prediction of future disasters, this exercise serves to enable communities to recognize the broad pattern of disaster occurrences using local knowledge. Through storytelling and sharing of local experiences through past events, this exercise gives communities a voice by merging local knowledge into science and enables them to provide input in disaster risk reduction.



Example of a disaster timeline: pattern of events for the state of Kelantan
Source: Sardi, 2015

Number of Participants

Up to 50, to form 5 groups of 10 participants

Required Material

- Mahjong paper or tracing paper (86 cm x 86 cm) – 10 sheets
- Permanent marker pen (red, blue, black colors) – 5 sets
- Masking tape – 5
- Pencil (2B) – 5
- Pen (red, blue, black colors) – 5 sets
- A4 paper – 10 sheets
- Ruler (30 cm) - 5

How-to's

1. Participants draw a timeline of disasters they had experienced in their area on the mahjong or tracing paper (as shown in the disaster timeline example).
2. Participants record the dates (days, months, and years) as well as the type of disaster.
3. Participants state the main causes and factors of the occurrence of such incidents from their perspective.

YEAR	DISASTER TYPE	ACTION
2018	**Floods** Low-lying area by the river The river depth cannot accommodate increased water capacity during heavy rain	Deepening and widening of the river by DID Support from Gamuda Garden and Fire Department to communities
2017	**Big flood** Development of Gamuda Gardens Persistent problem with drainage system Evacuation of 12 families due to flooding Retention pond not constructed well **Flash flood** Low-lying area (by the river)	
1990	**Big flood** Replanting of rubber trees Water flow from PLUS Highway Evacuation of 12 families due to flooding Retention pond not constructed well	Deepening and widening of the river by DID Support from Gamuda Garden and Fire Department to communities

Disaster Timeline of Kampung Sungai Kundang from CBDRM Kundang Participants
Source: Sardi, 2019

4. Based on the results of the disaster timeline created, participants take note of the time interval between disaster events, frequency of disasters, and factors of disaster occurrence (taking into account seasonal meteorological and monsoon patterns).
5. Participants make a projection of future disasters based on the time intervals.
6. Participants make a list of preparation/mitigation actions to by undertaken by the community to address future risk.

7. Each group makes a presentation to present their findings.

Group Presentation of Disaster Timeline of Kampung Ketoyong at CBDRM Tanjung Malim Participants
Source: CBDRM Tanjung Malim, Perak 2019 (Sardi, 2019)

Outcome

At the end of this exercise, communities learn to make a projection of future disasters based on their past experience.

Through the resulting action list, communities take the initiative to push or engage in these actions, putting into action community participation in disaster risk reduction.

d. Emergency Drill Planning

Purpose

- Preparation for disasters at the community level (promoting self- and mutual help)
- Identifying and liaising with key stakeholders for public help

Concept

There are different kinds of drills, such as drills for evacuation, communication among communities in a disaster, and community response during flood and landslide disasters. Irrespective of the type of drill, they all require planning at the community level for actions to take before disaster strikes.

This exercise aims to get community leaders and members to create a disaster drill plan for actions that they can take before public help arrives. With a disaster drill plan, communities can prepare for disasters by conducting disaster drills on a regular basis.

An emergency drill should focus on the following two points:

1. Good planning in disaster preparedness
2. Hands-on implementation practice prior to an actual disaster

In line with Point 1, it is important to create a Community Disaster Drill Plan and liaise with related government organizations in order to conduct a comprehensive and effective drill.

The process of Conducting a Drill
Source: "BOKOMI" Handbook, JICA Kansai, Disaster Reduction Learning Center (DRLC), KOBE City Fire Bureau

Number of Participants

Up to 100 participants (based on locality)

How-To's

The following are key points when planning a disaster drill:

1. **What is the scenario?**

   Decide whether whether the drill will be for flooding or landslide or other disaster types, based on local hazards.

2. **What kind of drill is it?**

   Once the scenario for the disaster is decided upon, determine the content of the drill such as a drill for evacuation, rescue, or a first aid training.

3. **Decision on a Date**

   Selection of a date for maximum participation is important. One way to obtain many participants is to conduct a drill using the opportunity of community cleaning activities (*gotong royong*) or a community sports events.

   Limit the hours of the drill so that it is not long for the participants, although the time required depends on the number of participants and the content of the drill.

4. **Number of Participants**

   Decide on the number of participants by considering the target groups of community, drill hours, the venue, the content of the drill, among other considerations.

5. Alternative Plan

In case of rains or bad weather, decide in advance on an alternative venue and mode of drill.

6. Decision on a Venue

Choose a venue that is appropriate for the content of the drill and the number of participants. A park or the playground of a school is suitable for outdoor drills. Check how to use the facilities in advance as permission or notification from an administrator may be needed to use the facilities.

7. Coordination with Government Organizations

Ask for support from related government organizations such as the civil defence office, police station or fire station, before conducting a drill. Consult with government agencies for technical guidance from DRR professionals about a drill or the use of specialized equipment and materials. Include input from the consultation content in the community drill plan.

8. Cooperation with Various Groups

In addition to government organizations such as district government offices, there are also other organizations that can cooperate with the activities, such as NGOs and local community organizations.

9. Public Safety Considerations

Take all possible care concerning the participants' safety to prevent accidents during a drill. In particular, ask government agencies such as the Fire Department or the Police Department for guidance during these exercises. If an accident happens, prioritize dealing with the accident (such as first aid operation) and take appropriate measures.

Outcome

The result of this exercise is the preparation and drafting of a Community Disaster Drill Plan that enable community leaders and members to conduct disaster response simulation and practice on a regular basis and be fully prepared when disaster strikes.

Further Reading

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