

DISASTER RISK MANAGEMENT

Universita di Roma Tor Vergata
B.A. Global Governance

Spring 2022

Session 13 – May 24, 2022

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Learning Objectives

The course aims to make you better prepared for crises:

Conduct a risk assessment and decide how to manage your risk;

Define normal and crisis, evaluate the scope of a crisis;

Understand the process of response/recovery/reconstruction;

Improve your ability to manage a personal or professional crisis.

Effective learning involves a change of thought and/or behavior

Session 13 – Material Review

Main Concepts – Definitions

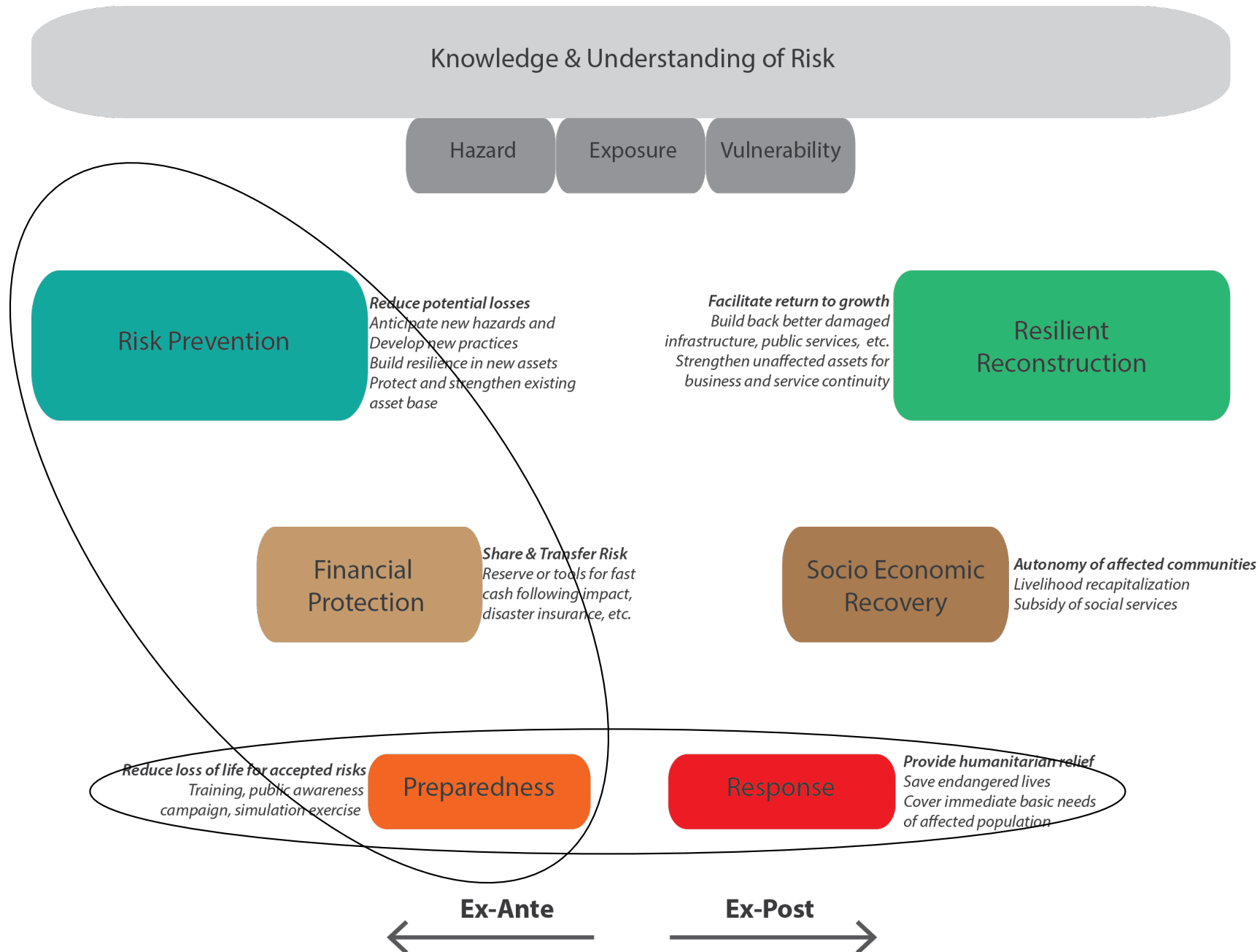
Risk Assessment – 3 steps, risk matrix

Disaster Management – Most common actions

Risk Management – Most common actions

MAIN CONCEPTS

Disaster Risk Management



Elements of Risk

Hazard

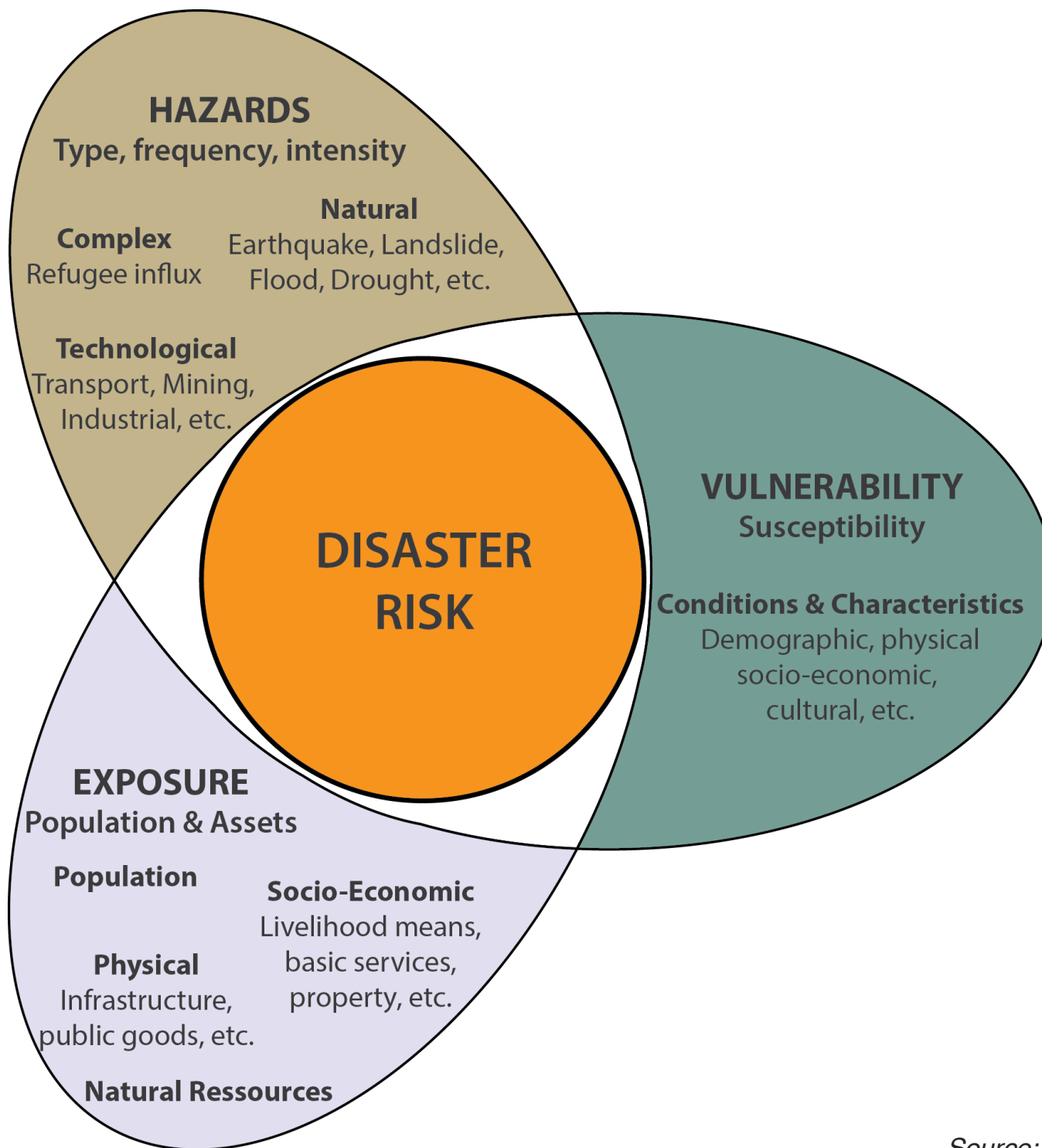
A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage

Exposure

People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses.

Vulnerability

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



Hazards

Geological – Earthquakes, Landslides, Volcanic Eruption, Tsunamis

Hydrological – Coastal Erosion, Land Subsidence, Snow Avalanches, Expansive soil

Meteorological – Extreme Heat, Wildfires

Hydro Meteorological – Floods, Drought, Hurricanes, Storm surges, Winter storms, Hail, Thunderstorm, Tornadoes

Pandemics – Flu (Spanish/Avian/Swine), Covid/SARS, Ebola, Plague, Malaria

Exercise

| | |
|---|---|
| Atlantic hurricane season | H |
| Housing near coastal areas | E |
| Degradation of ecosystem services | V |
| Decreasing mental capacity of the elderly population | V |
| The heavy snowfall of 2016 will increase risk of flooding | H |
| Using palm oil endangers the habitat of tropical species | H |
| Exams are stressful for our mental health | H |
| Not studying for an exam increase the probability of stress | V |
| Not buying insurance for your laptop increases.. | V |
| Informing your family of your whereabouts decreases.. | V |

Structural Changes*

Change is not new but the pace and the quality is. There are key trends to follow as they impact society as a whole, they are structural changes:

Urbanization and Infrastructure

Demographic changes

Industrial to Creative economy

Technology

Climate Change

Resilience

The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

Resilience

Type 1 = Go back to normal

Type 1 resilience models systems as close to a stable steady state.

Resilience is thus defined through the speed of return to the steady state after a perturbation. For the economy, this would mean a full recovery of activities and return to the pre-disturbance state. For a business, it means being back with same products and clients.

| | | |
|---------------|------------------------|---------------------|
| Type 1 | Efficiency of function | Single stable state |
|---------------|------------------------|---------------------|

Resilience

Type 2 = Adapt to new normal

Type 2 resilience focuses on conditions far away from steady states and look for how instability can alter the behavior regime of a system towards another stability domain.

Resilience is the magnitude of disturbance that the system can absorb while preserving the same controlling variables and process. For the economy, this would mean to explore alternative activities and modes of operations while achieving similar productivity, growth, employment, etc. goals.

| | | |
|---------------|-----------------------|-----------------------------|
| Type 2 | Existence of function | Range of states & emergence |
|---------------|-----------------------|-----------------------------|

RISK ASSESSMENT

Risk Assessment

The structured process of risk assessment consists of:

Risk Identification

Find, recognize and describe risks

Risk Analysis

Comprehend the nature of risk and determine its level

Risk Evaluation

Decide whether risk is acceptable or not

ISO 31010:2009 (Risk Management – Risk Assessment Techniques)

Contains 31 different techniques, from pure qualitative to pure quantitative

The technique you use depends on your needs and available resources

Is the accepted reference of best practice for the EU

Step 1 – Risk Identification

| Annual Probability of occurring in any one year | Annual chance of occurring in any one year | Classification |
|---|--|-------------------|
| 100% or greater | 1 in 1 or above | Virtually Certain |
| 10% (to 100%) | From 1 in 10 to 1 in 1 | Probable |
| 1% (to 10%) | From 1 in 100 to 1 in 10 | Possible |
| 0.1% (to 1%) | From 1 in 1,000 to 1 in 100 | Improbable |
| Less than 0.1% | Less than 1 in 1,000 | Highly Unlikely |

Magnitude 8 EQ
7 registered in the last millennium

Cat 5 Hurricane
30 registered since 1850

Intense drought
4 in the last decade

Overflow of river
150 in the last century

Step 2 – Risk Analysis

| <i>Impact</i> | <i>Classification</i> |
|---|-----------------------|
| Affect large areas, and/or many sectors. Loss of services 1,000,000 people or more | Catastrophic |
| Affect significant areas, and/or few sectors. Loss of services between 100,000 and 1,000,000 people | Extensive |
| Affect limited areas, and/or few sectors. Loss of services between 10,000 and 100,000 people | Moderate |
| Affect small areas, and/or one sector. Loss of services up to 10,000 people | Low |
| Affect small areas, loss of services up to 1,000 people | Trivial |

Sector or Topic Specific

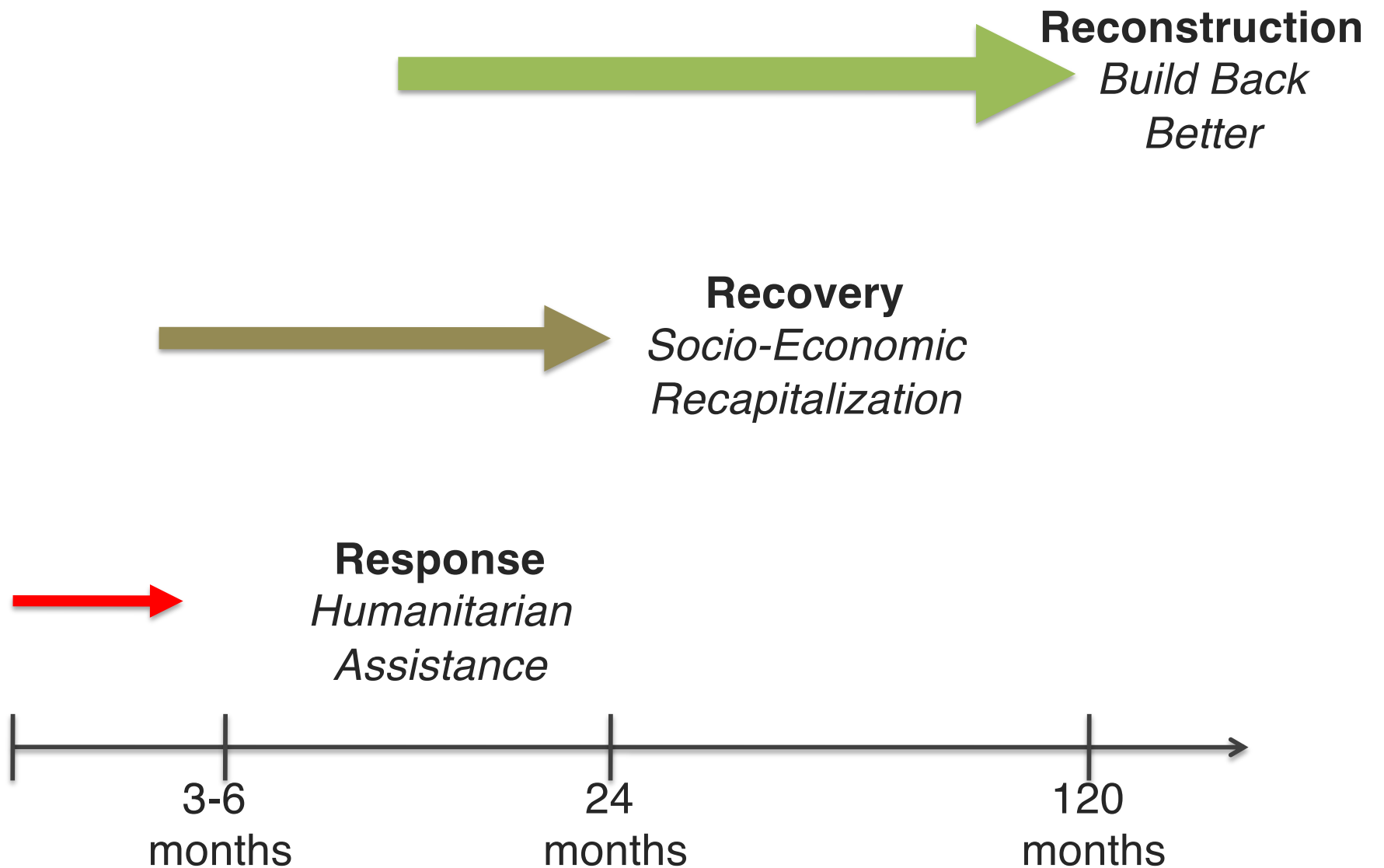
Step 3 – Risk Evaluation

| | | | | | | | |
|--|--------------|---|-------------------|--------|------------|----------|----------|
| S e v e r i t y | Catastrophic | 5 | 5 | 10 | 15 | 20 | 25 |
| | Significant | 4 | 4 | 8 | 12 | 16 | 20 |
| | Moderate | 3 | 3 | 6 | 9 | 12 | 15 |
| | Low | 2 | 2 | 4 | 6 | 8 | 10 |
| | Negligible | 1 | 1 | 2 | 3 | 4 | 5 |
| | | | 1 | 2 | 3 | 4 | 5 |
| | | | Improbable | Remote | Occasional | Probable | Frequent |
| | | | Likelihood | | | | |

Red = Prevention + Protection + Preparedness
 Yellow = Protection + Preparedness
 Green = Preparedness

DISASTER MANAGEMENT

Disaster Management



System approach

RESPONSE focus is on human impact.

Save lives and provide basic needs

Unit of analysis: individuals

Timeline: 0 to 3-6 months

RECOVERY focus is on socio-economic impact.

Restore autonomy and generate revenue

Unit of analysis: the household

Timeline: early to 24 months

RECONSTRUCTION focus on buildings and infrastructure.

Build back better and avoid creation of new risk

Unit of analysis: buildings, infrastructure

Timeline: up to 120 months

Disaster Management

Response

The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

Recovery

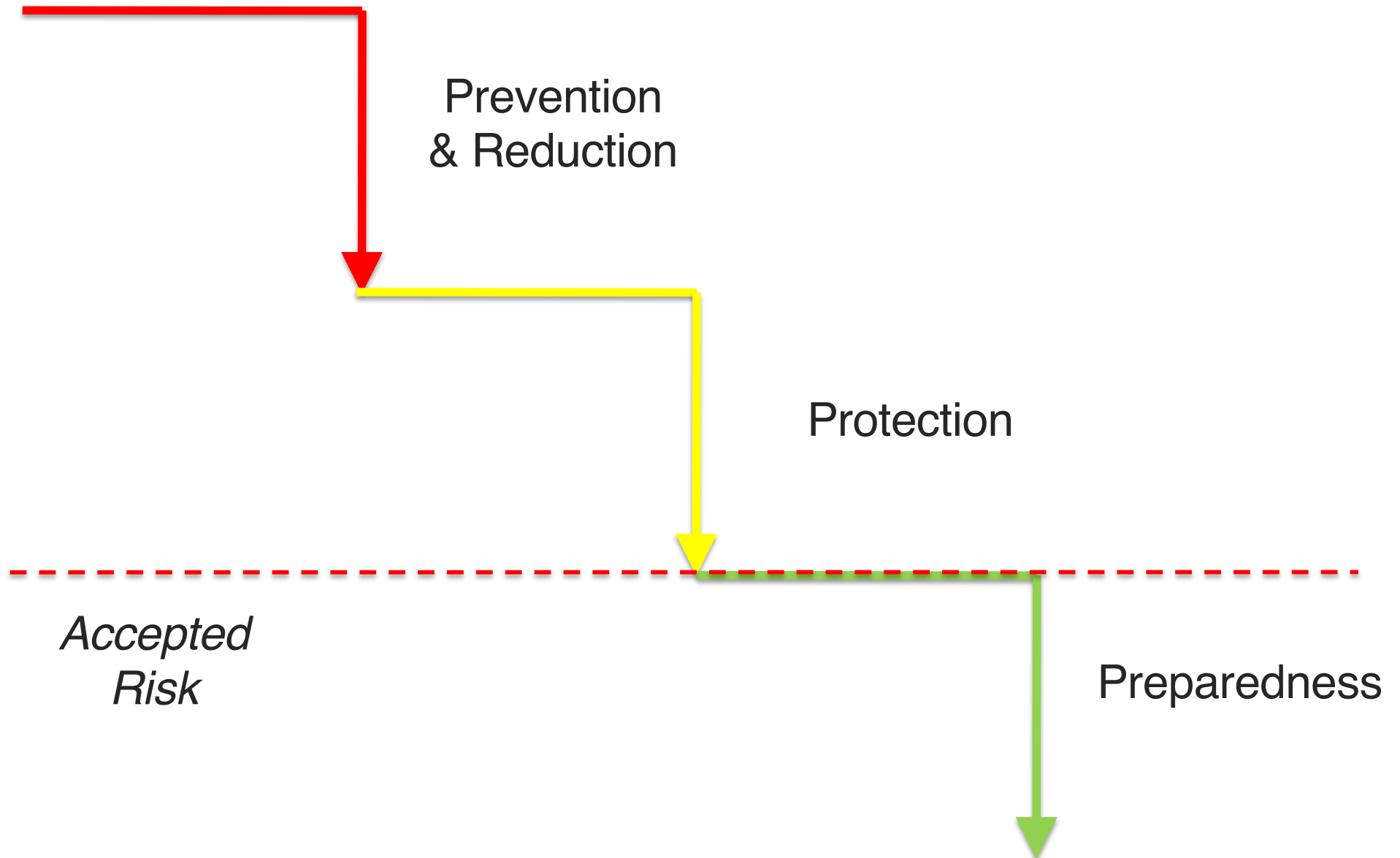
The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.

Reconstruction

The medium- and long-term rebuilding and sustainable restoration of resilient critical infrastructures, services, housing, facilities and livelihoods required for the full functioning of a community or a society affected by a disaster, aligning with the principles of sustainable development and “build back better”, to avoid or reduce future disaster risk.

RISK MANAGEMENT

Risk Management



System Approach

PREPAREDNESS is the first tier. Risk is accepted and we prepare to face it.

Save lives and meet most basic needs

Timeline: short term

PROTECTION is the second tier. Risk is shared and transferred.

Build safety nets and protect assets & activities

Timeline: Long/mid term

PREVENTION is the third tier. Risk is controlled and reduced.

Avoid new risk and decrease existing risks

Timeline: Long term

Risk Management

Preparedness

The ability to quickly and appropriately respond when required.

Protection

The process of formally or informally shifting the financial consequences of particular risks from one party to another whereby a household, community, enterprise or state authority will obtain resources from the other party after a disaster occurs, in exchange for ongoing or compensatory social or financial benefits provided to that other party. (Also known as **Risk Transfer**)

Prevention

The outright avoidance of adverse impacts of hazards and related disasters.

Reduction (Mitigation)

The lessening or limitation of the adverse impacts of hazards and related disasters.

Preparedness/Response Components

- 1- Scenario
- 2- Evacuation
- 3- First Aid
- 4- Basic Needs
- 5- Communication
- 6- Debrief
- 7- Crisis Management
- 8- Simulation

Recovery/Protection Components

| | |
|-------------------------|----------------------------|
| 1 – Household survey | Socio-economic Survey |
| 2 – Work | Community Organization |
| 3 – Vocational training | Job market analysis |
| 4 – Recapitalization | Insurance |
| 5 – Loans | Insurance |
| 6 – Subsidies | Alternative economies |
| 7 – Bail out | Sovereign National Finance |

Reconstruction / Prevention Components

1 – Development Agenda

Development Agenda

2 – Impact Assessment

Risk Assessment

3 – Risk Reduction

Structural control

4 – Sectoral strategies

Retrofitting/Maintenance

5 – Regulations & policies

Building codes/Land Use

6 – Financing

Financial incentives

7 – Implementation

Implementation

QUESTIONS

Sample questions

Write down the definition of resilience in your own terms and explain the 2 different forms of resilience.

Urbanization along the coastlines increases the quantity of infrastructure and housing _____ to flooding.

Keeping refugees without proper working options makes them more _____ to engage in criminal activities.

Driving faster increases the chance of having an accident, so we can say speed is a source of _____.

When we evacuate a community, we move people out of harm's way. We decrease their _____.

Exercise

Declaration of a state of emergency
Tax break on affected households

Response
Recovery

Mandatory or voluntary insurance
Cash for work or food for work

Protection
Recovery

Corruption concerns after subsidies
Creating work after a disaster

Recovery/Prot.
Recovery

Cost benefit analysis for resilience options
Having an exit strategy

Prev./Reconst.
All phases

Level of readiness of your community
Distorting the market with free goods

Preparedness
Response

Exercise

Mandatory flood insurance for business owners
Recapitalization of livestock

Protection
Recovery

Moratorium on education fees in affected areas
Providing free health care for a limited time

Recovery
Response

Search and Rescue operations
Building a levee

Response
Prev/Red/Rec

Updating building codes
Building an Early Warning System

Prev./ Reconst.
Preparedness

Exercise

| | |
|---|------------------|
| Build back better using a cash for work program | Recov+Reconst. |
| Subsidies for building material after disaster | Recov.+ Reconst. |
| Lockdown for Covid-19 | Prevention |
| Use of personal masks for Covid-19 | Reduction |
| Debrief each week during lockdown | Response |
| New hygiene standard in universities | Prev./Reduct. |
| Land use planning taking for climate change | Prev./Reconst. |
| Rebuild flooded houses with mandatory insurance | Protect+Reconst. |

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