

# **DISASTER RISK MANAGEMENT**

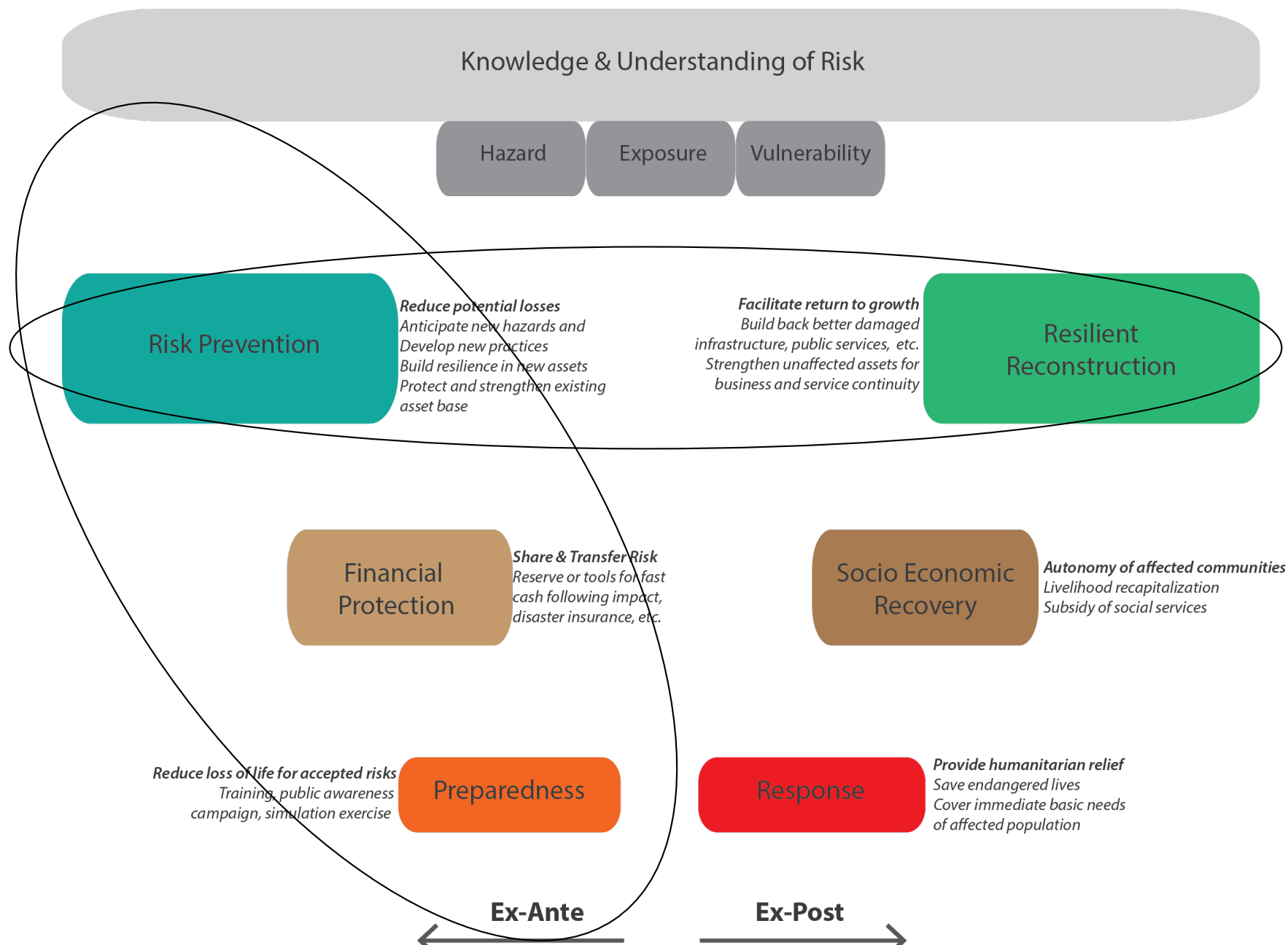
Universita di Roma Tor Vergata  
B.A. Global Governance

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Session 10 – Friday May 13, 2022

Instructor: Erdem Ergin

# Disaster 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 Matrix

Combine Hazard Probability and Impact Severity

<b>S e v e r i t y</b>	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
			<b>Likelihood</b>				

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

# Prevention

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

*Prevention expresses the concept and intention to completely avoid potential adverse impacts through action taken in advance. Very often the complete avoidance of losses is not feasible and the task transforms to that of mitigation.*

## **Reduction (Mitigation)**

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

# **Elements of Risk**

## **Hazard (Danger/Threat)**

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/Asset)**

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

## **Vulnerability (Condition)**

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

# 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

\*\* equivalent to risk reduction & sectoral strategies & regulations

# 1 – Development Agenda



Align the reconstruction efforts with the national development and growth agenda





## 2 – Risk assessment

Risk assessment is the structured process that identifies how objectives may be affected and analyses the risk in term of consequences and their probabilities before deciding on whether further treatment is required.

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### 3 – Land Use Planning

The process undertaken by public authorities to identify, evaluate and decide on different options for the use of land, including consideration of long term economic, social and environmental objectives and the implications for different communities and interest groups, and the subsequent formulation and promulgation of plans that describe the permitted or acceptable uses.

#### *UNISDR Comment:*

*Land-use planning is an important contributor to sustainable development. It involves studies and mapping; analysis of economic, environmental and hazard data; formulation of alternative land-use decisions; and design of long-range plans for different geographical and administrative scales. Land-use planning can help to mitigate disasters and reduce risks by discouraging settlements and construction of key installations in hazard-prone areas, including consideration of service routes for transport, power, water, sewage and other critical facilities.*

### 3 – Land Use Planning

Annual Probability of occurring in any one year	Annual chance of occurring in any one year	Classification
100%	1 in 1	Virtually Certain
10%	1 in 10	Probable
1%	1 in 100	Possible
0.2%	1 in 500	Improbable
0.1%	1 in 1,000	Highly Unlikely

Earthquake, Landslide, Volcano, Tsunami, Flood, Hurricane, Storm Surge, Tornado, Winter storm, Hail, thunderstorm, Coastal Erosion, Land Subsidence, Snow Avalanches, Expansive soil, Extreme Heat, Wildfires, Drought

### 3 – Land Use Planning

Annual Probability of occurring in any one year	Annual chance of occurring in any one year	Classification	Zoning	Land Use Type
100%	1 in 1	Virtually Certain	3b	Outdoor facility, park,
10%	1 in 10	Probable	3a	Water compatible infra (water, sewage system, etc.), marina, ship repair
1%	1 in 100	Possible	2	Residential buildings
0.2%	1 in 500	Improbable	2	Non-critical infrastructures (local energy, school, etc.)
0.1%	1 in 1,000	Highly Unlikely	1	Emergency services, Hospitals, Large raised reservoirs (1/10,000)

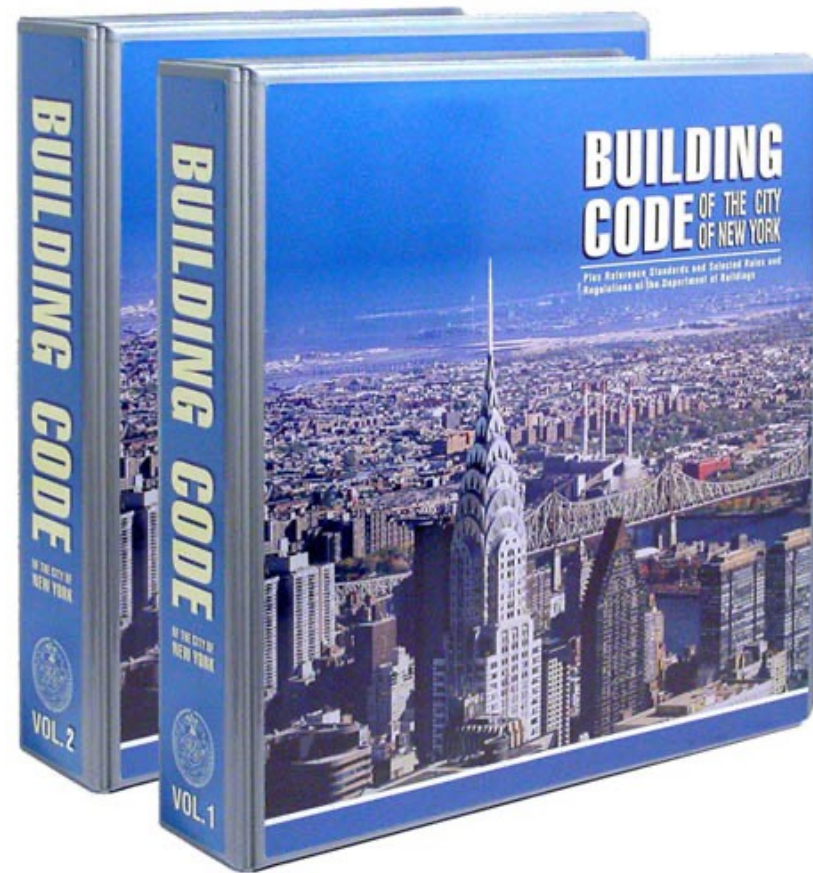
### 3 – Land Use Planning (UK)

Typical Developments	1	2	3a	3b
ESSENTIAL INFRASTRUCTURE Critical infrastructure (Strategic utility, essential transport infrastructure)	✓	✓	T	T
HIGHLY VULNERABLE Emergency service stations, basement dwellings, caravans, mobile home, permanent residences, hazardous substance installations	✓	T	✗	✗
MORE VULNERABLE Hospitals, residential institutions, dwellings, hotels, halls of residences, nightclubs, pubs, nonresidential healthcare, nurseries and education facilities	✓	✓	T	✗
LESS VULNERABLE Shops, offices, cafes and restaurants, general industry, storage and distribution, building and land for agriculture/forestry, waste treatment, water and sewage plant	✓	✓	✓	✗
WATER COMPATIBLE Flood control, water supply, sewage system, sand/gravel work, docks, navigation facilities, nature conservation, outdoor sports, lifeguard and coastguard stations	✓	✓	✓	✓

### 3 – Building Code & Design Parameters

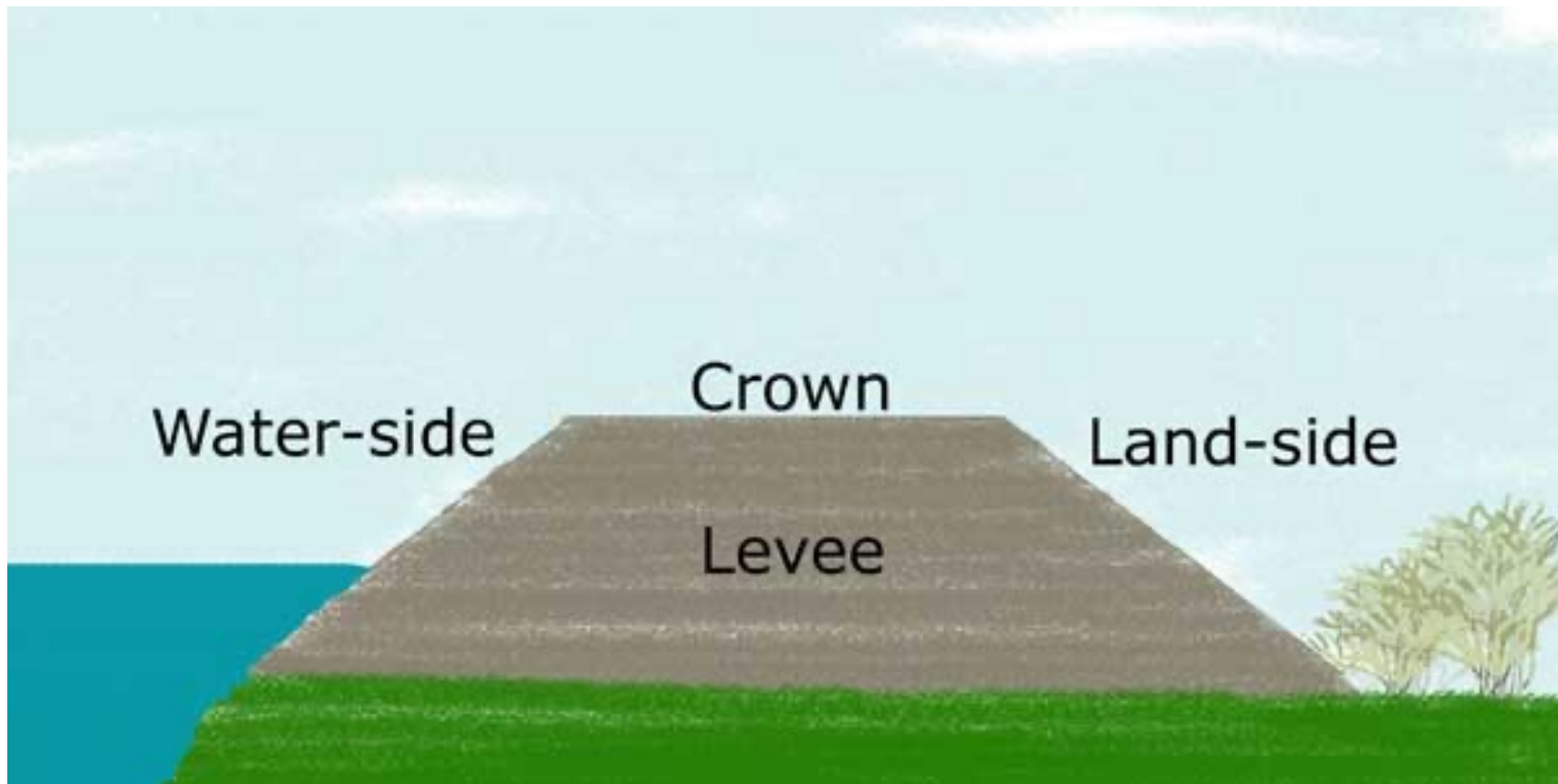
A set of ordinances or regulations and associated standards intended to control aspects of the design, construction, materials, alteration and occupancy of structures that are necessary to ensure human safety and welfare, including resistance to collapse and damage.

***One of the most cost-effective means of addressing risk.***



## 4 – Structural Control

Structural approach to CONTROL the hazard, not reduce it. It is most commonly used to protect existing assets. It is highly controversial because of 2 reasons: It does NOT reduce risk and gives a false sense of safety; there is high chance to RELOCATE risk. The most common structural control practice is the building of levees.







GETTY IMAGES





## 5 – Maintenance & Repair

**Maintenance, repair and operations (MRO)** is defined as, "All actions which have the objective of retaining or restoring an asset in or to a state in which it can perform its required function. The actions include the combination of all technical and corresponding administrative, managerial, and supervision actions."



## **5 – Retrofitting (Strengthening)**

Reinforcement or upgrading of existing structures to become more resistant and resilient to the damaging effects of hazards.

We are strengthening our future



# Istanbul Seismic Risk Mitigation and Emergency Preparedness Project





## 6 – Financial Incentives

One of the emerging practice to promote prevention, this includes special tax assessments, passage of tax increases or bonds to pay for prevention, relocation assistance, and development or renewal of grant funds.

### The Hazard Mitigation Grant Program

Acquisition of Property on a voluntary basis and commitment to open use of property

Retrofitting of structures and lifelines

Elevation of structures

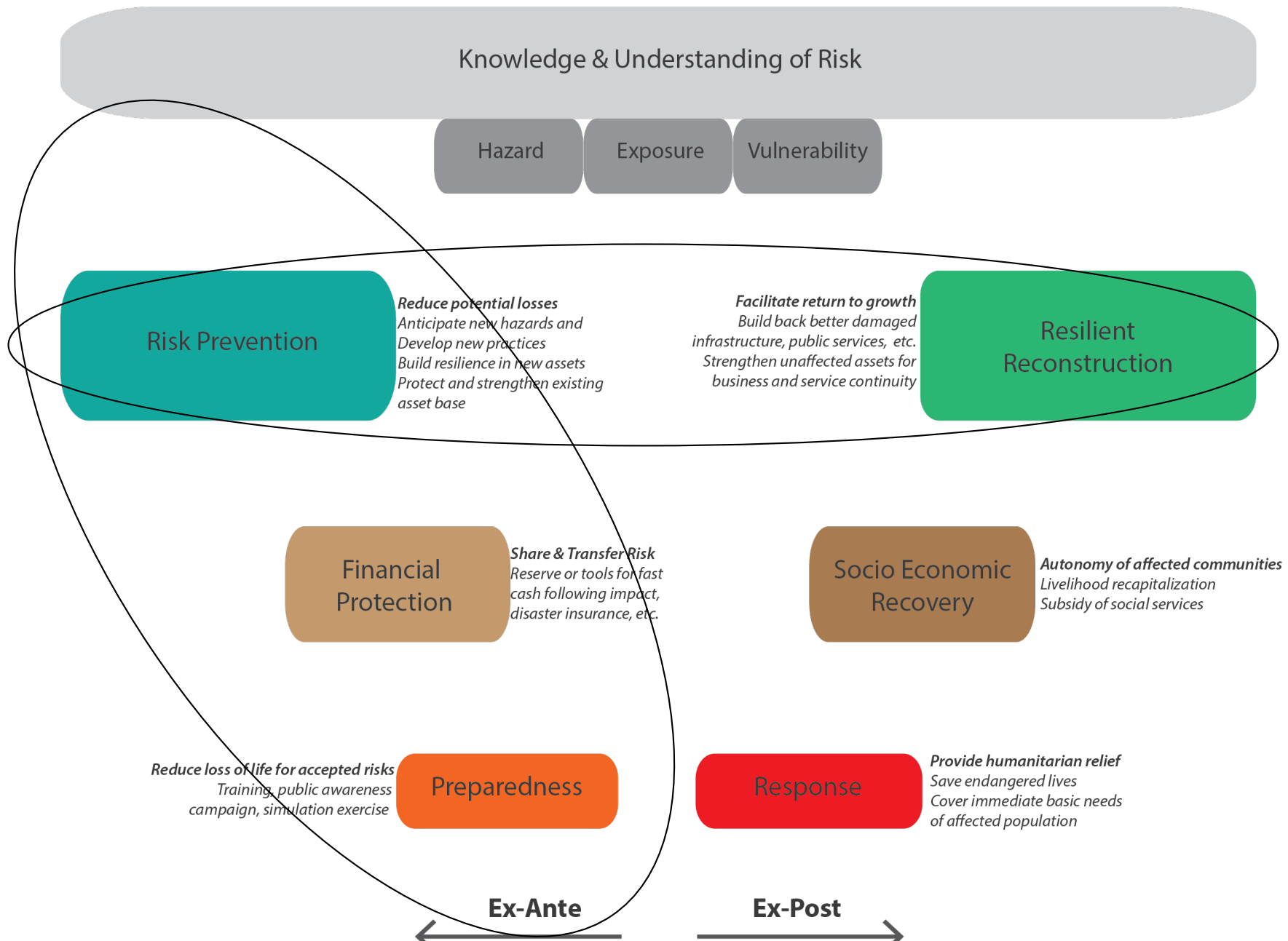
Vegetation management programs

Building code enforcement

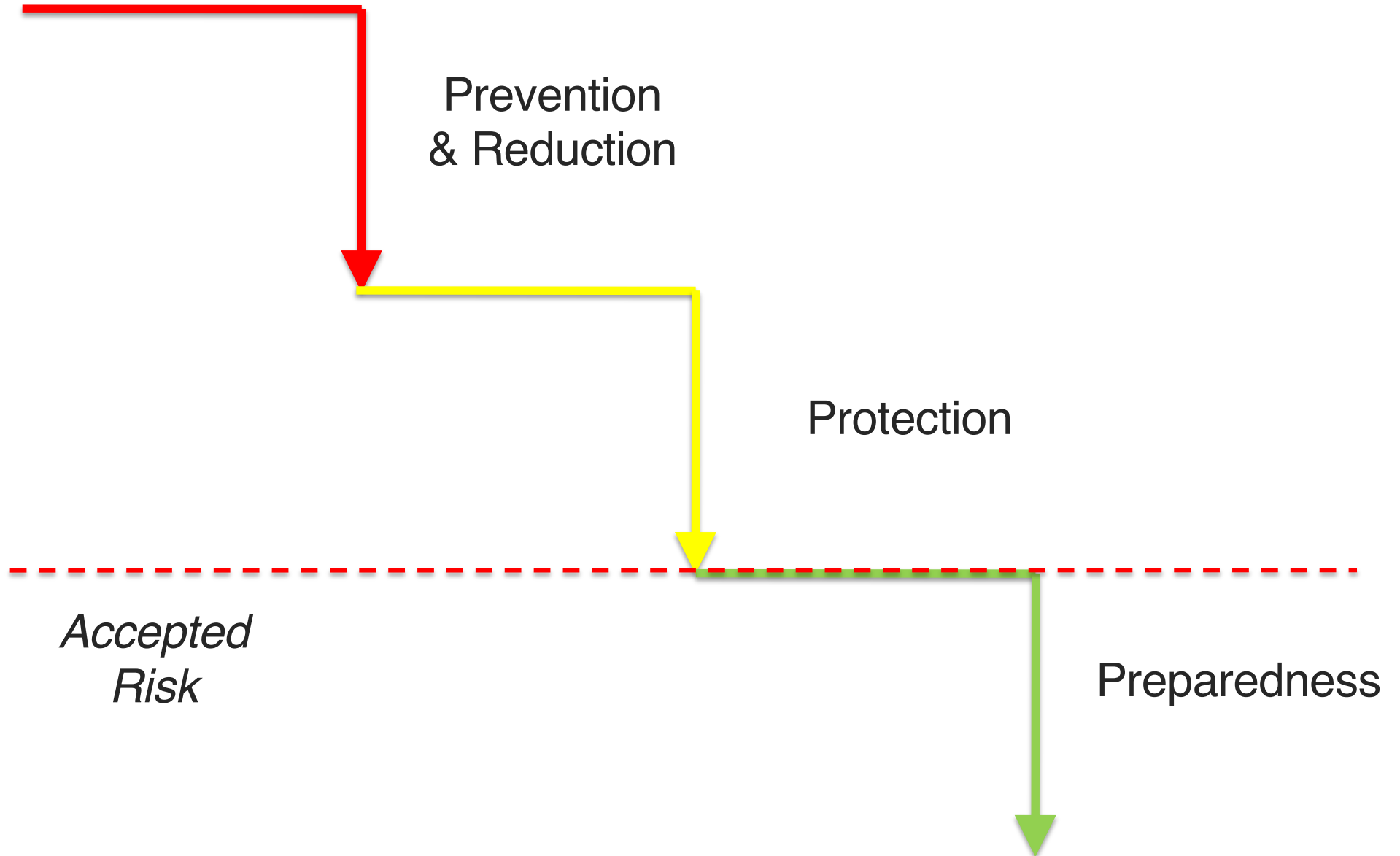
Localized Flood Control projects

Public Education and Awareness

# Disaster Risk Management



# Risk Management



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