

DISASTER RISK MANAGEMENT

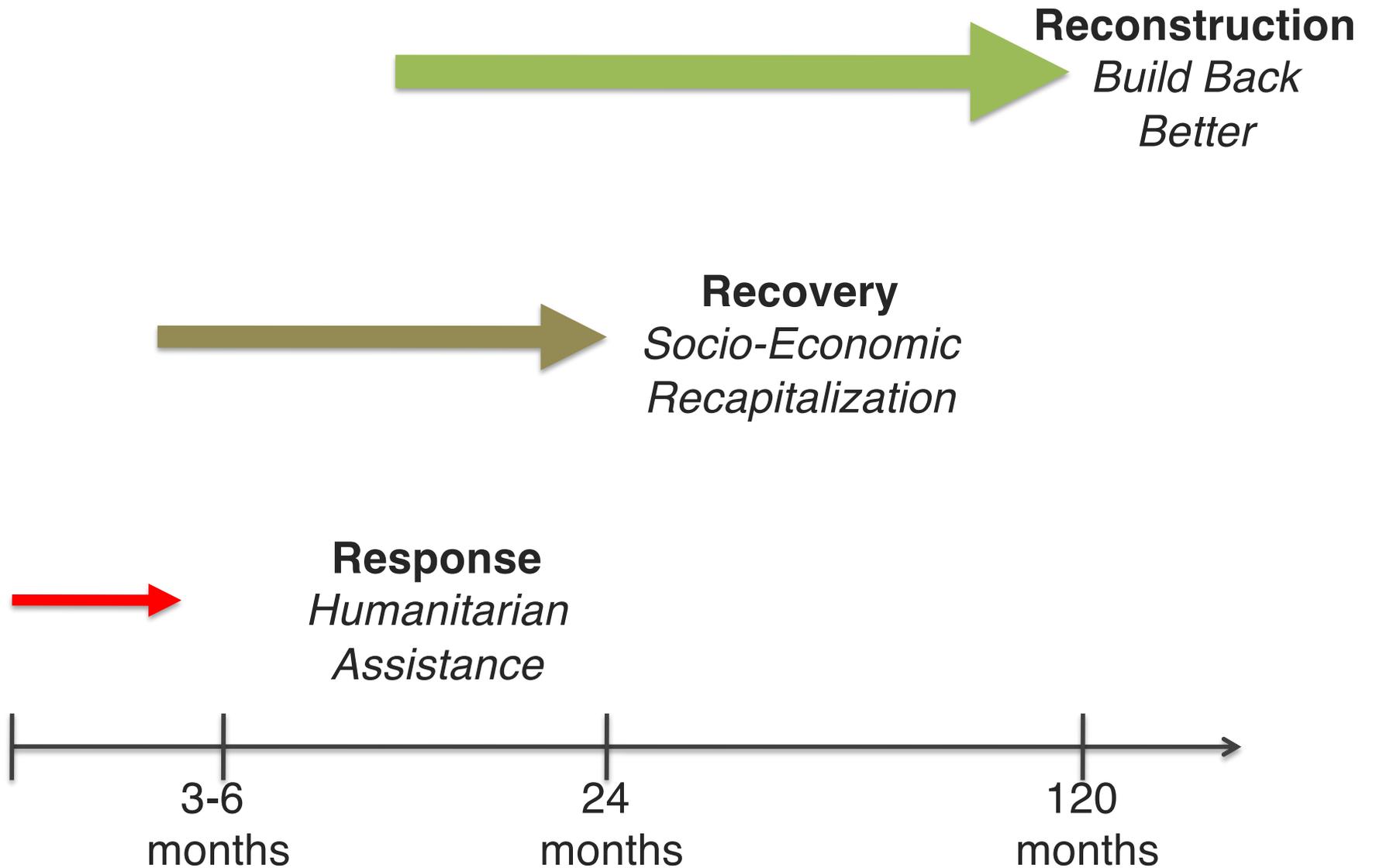
Universita di Roma Tor Vergata
B.A. Global Governance

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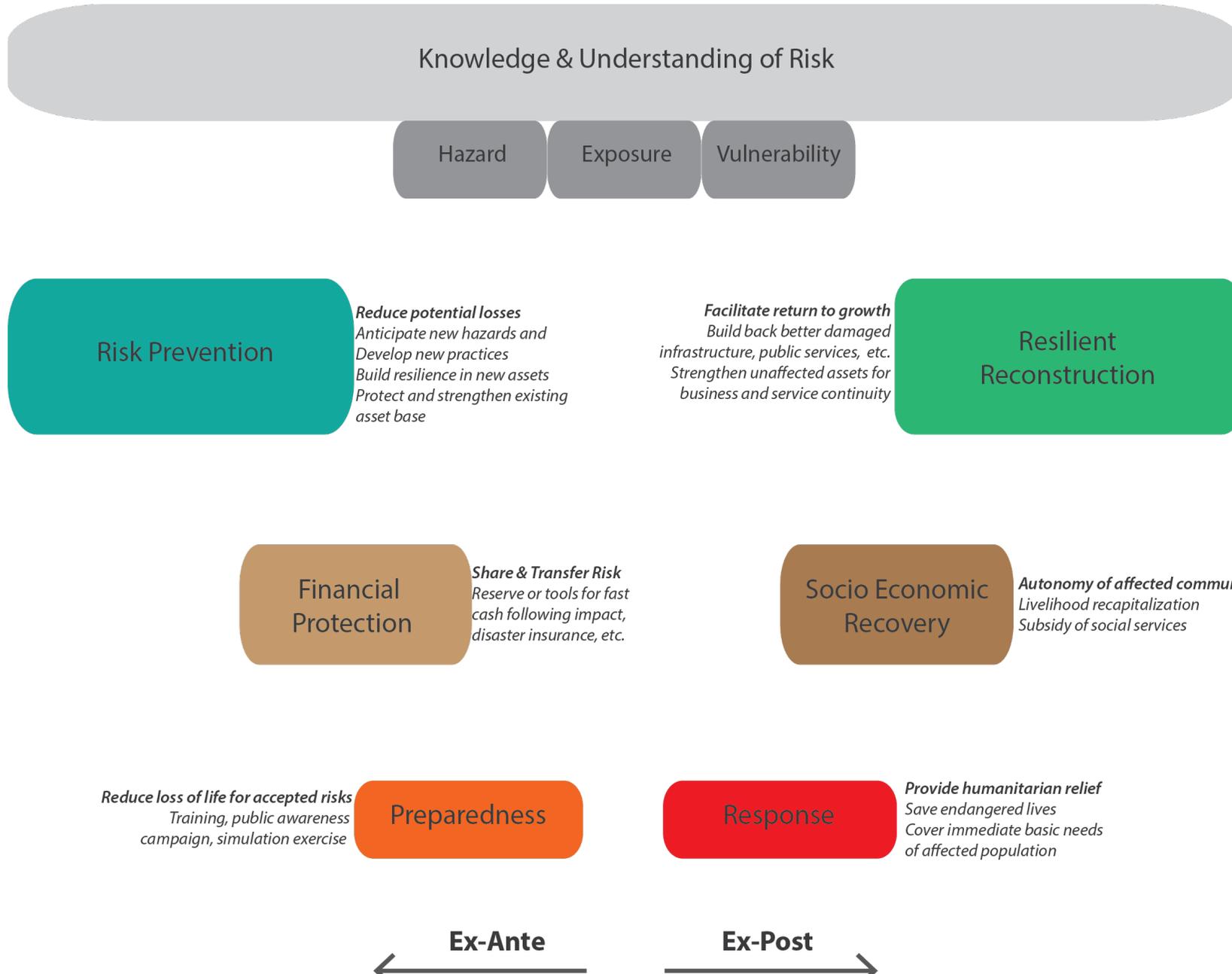
Session 8 – Wednesday May 11, 2022

Instructor: Erdem Ergin

Disaster Management



Disaster Risk Management



Session 8 – Risk Assessment

Definition – What is Risk Assessment?

Risk Identification – Identify what is to protect and understand the hazards

Risk Analysis – Assess probability of event and scale of impact

Risk Evaluation – Decide whether risk is acceptable or not

WHY? To know our risk priorities.

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.

Risk assessment attempts to answer the following fundamental questions:

What are we trying to protect? (A person, a job, a house, etc.)

What can happen and why? (Hazards)

What are the consequences? (Impact)

What is the probability of their future occurrence?

Is the level of risk tolerable or acceptable and does it require further treatment?

Risk Assessment

The structured process of risk assessment consists of 3 steps:

Risk Identification

Identify what is there to protect
Understand the hazard and its dynamics
Learn past history of events

Risk Analysis

What can go wrong?
What is the likelihood and the consequences of the risk scenarios?

Risk Evaluation

How high is the risk?
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

Source: ISO 31010

Risk Identification

Risk Identification

- Step 1 Identify what do you want to protect (Yourself, family, house, etc.)
- Step 2 Assess the hazard and the dynamics
- Step 3 Assess past history of disasters, how frequent, what intensity
AND potential future changes

Water intake



Step 1.1 System components

Ash Pond



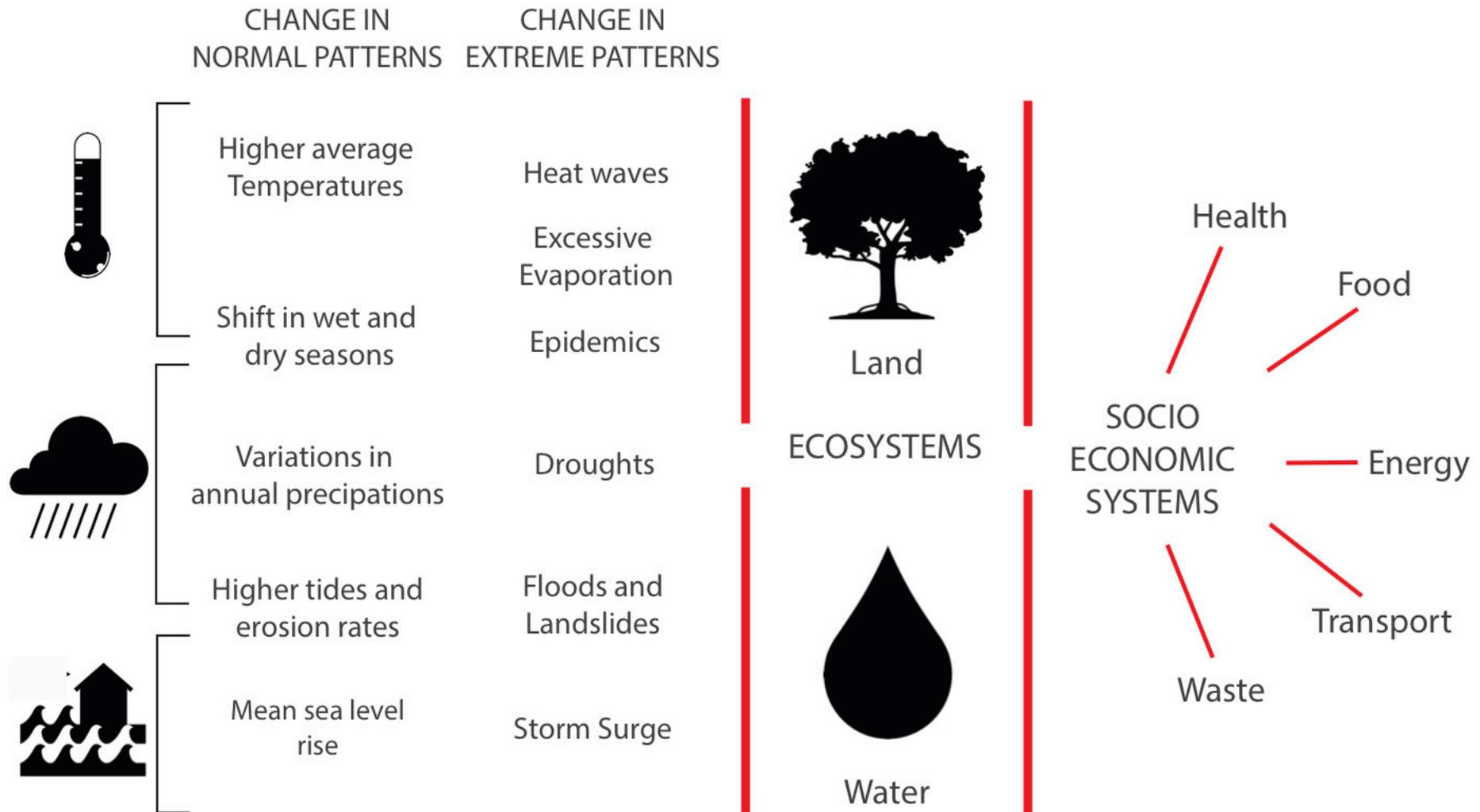
Coal Intake



Facility Surrounding



Step 1.2 – Identify the hazard



Step 1.3 – Assess past history

Soma Region (since 1951)

20 floods

16 high winds

9 drought

8 heat wave

SEAS plant

Floods in 1986 and 2005

Water intake flooded in 2003

Dam release in 1987, 1996 and 1998 due to high water level

No significant risk of landslide identified

Risk Analysis

Risk Analysis

Identify probability of event and determine its level

Step 1 Assess the likelihood of the hazard

Step 2 Understand the consequences (and potential cascading impact)

Step 3 Assign a level of impact for each event scenario in the risk matrix

Step 2.1 – Develop Scenarios

Annual Probability of occurring in any one year	Annual chance of occurring in any one year	Classification	
100%	1 in 1	Virtually Certain	Earthquake, Landslide, Volcano, Tsunami
10%	1 in 10	Probable	Flood, Hurricane, Storm Surge, Tornado, Winter storm, Hail, thunderstorm,
1%	1 in 100	Possible	
0.2%	1 in 500	Improbable	
0.1%	1 in 1,000	Highly Unlikely	Coastal Erosion, etc.

Practical advice – Start with 3 scenarios

Low frequency high intensity

Mid frequency mid intensity

High frequency and low intensity

Step 2.2 – Understand consequences

	Consequence scale				
Type of impact	Insignificant	Minor	Moderate	Major	Critical
Impact to cost	<\$150k	\$150k - \$500k	\$500k - \$1.5m	\$1.5m - \$5m	>\$5m
Impact to time	<10 days	10 - 20 days	20 - 40 days	40 - 60 days	>60 days
Impact to scope	Minor change in ancillary requirements	Change in ancillary requirements	Change in multiple requirements	Change in any of the critical requirements	Major change in any of the critical requirements
Impact to government reputation	Little to no impact; control of impact can be managed internally	Some impact to government reputation; control of impact can be managed internally	Moderate impact to government reputation; control of impact can be managed internally, but risk is high that other parties may need to get involved	Major impact to government reputation; control will require the involvement of a number of agencies	Significant impact to government reputation; media news coverage; Minister or Premier involved

Source: Queensland Government

Team Exercise

Consider GG Disaster Risk Management course :

Step 1.1 1 thing you want to protect (grade)

Step 1.2 Pick one hazard (Covid)
Pick one specific mechanism (motivation, focus, attendance)

Step 1.3 Discuss past history
Did you experience problem with other classes
What were the consequences on the grade (low grade, failure, ?)

Team Exercise

Step 2.1 Assess likelihood of hazard mechanism for this course

5 *Frequent (has already happened several times)*

4 *Probable (has happened once, will happen at some stage)*

3 *Occasional (has happened to a friend)*

2 *Remote (you heard about it)*

1 *Improbable (it is hard to believe)*

Step 2.2 Assess the intensity of impact – What would be your grade

5 *Catastrophic – No chance of recovery* 10

4 *Significant – Fail class at first, low grade at second* 18

3 *Moderate – Fail class at first, high grade at second* 22

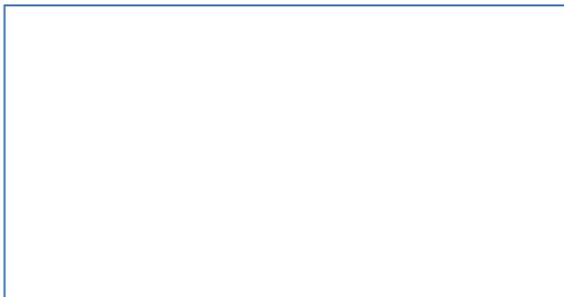
2 *Minor – Passing grade but retake exam* 24

1 *Negligible – Good grade no retake* 27

Step 2.3 – Fill the risk matrix

Combine probability and consequences to fill the risk matrix

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				



Risk Evaluation

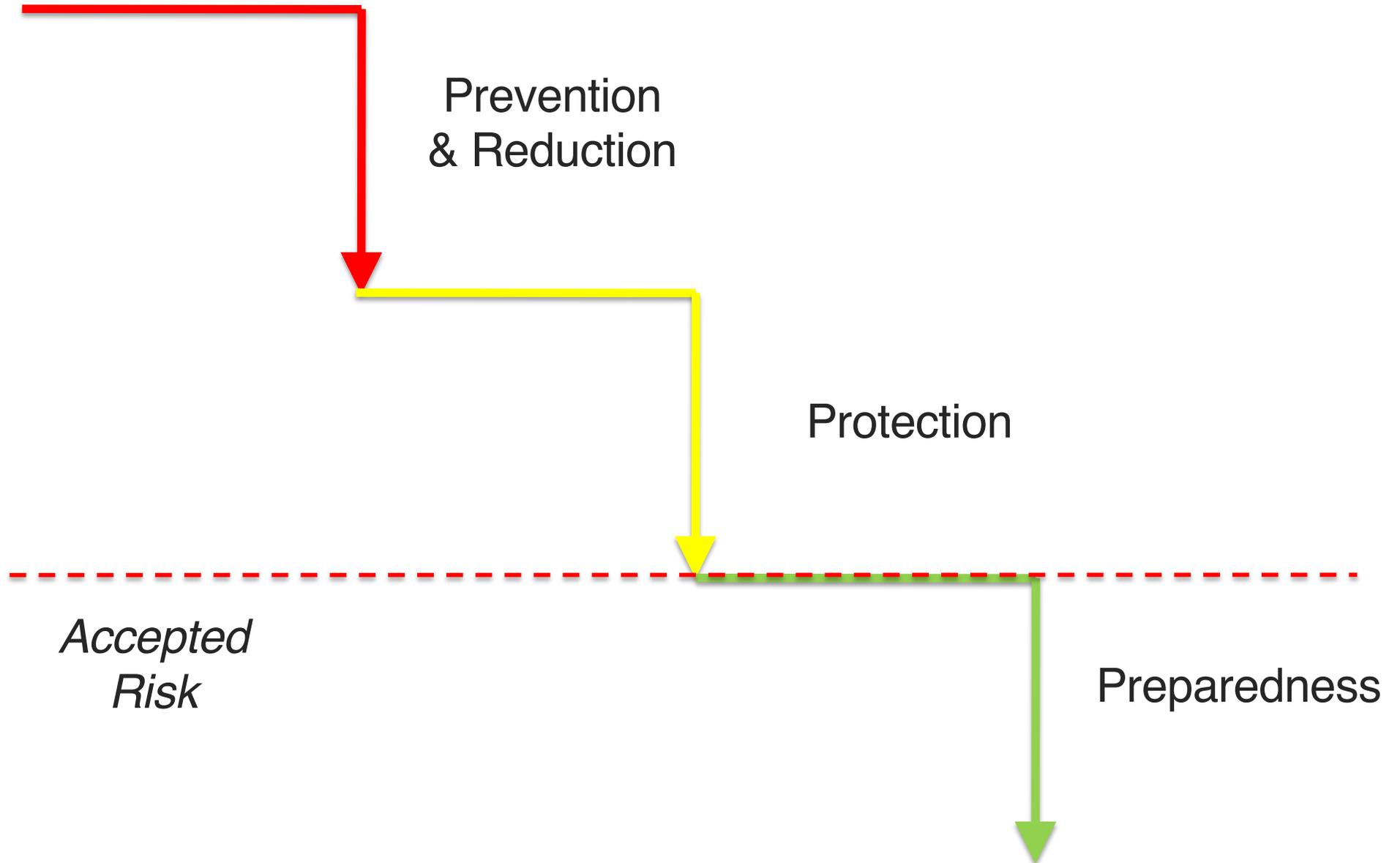
Team Exercise

Step 2.3 Fill in the risk matrix

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
			Improbable	Remote	Occasional	Probable	Frequent
			Likelihood				

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

Risk Management



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