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Mitigating Hazards at the Different Levels (local, regional, globally)

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Mitigating hazards

Local mitigation

- Examples

Regional mitigation

- Examples

Global mitigation

- Examples

Mitigating hazards at the different levels: local, regional, global

- Hazard: a threatening phenomenon that may cause social, economic or environmental destruction within a given period and area (EEA, 2017)
- Location, intensity, frequency and probability (ISDR, 2009)
- Climate change increases the severity, frequency and duration of climate-related disasters
- Sea level rise 0-18-0.59 meters by 2100 and even up to 2 meters (Bosello and De Cian, 2014)

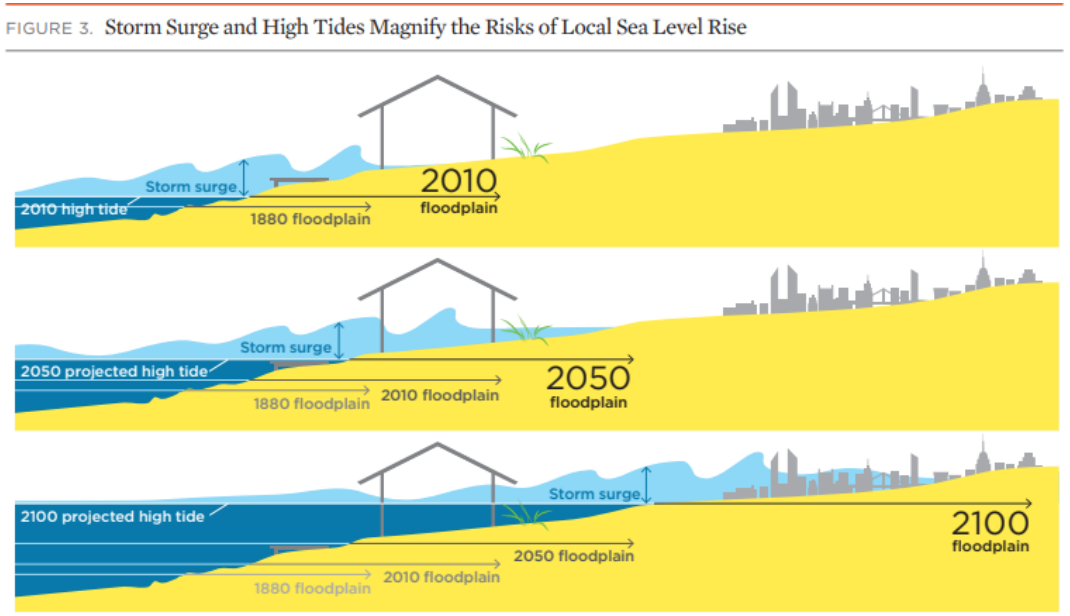


Image source: © APRIL 2013 union of concerned scientists www.ucsusa.org/sealevelrisescience

- Mitigation refers to measures that are aimed at reducing the potential damaging effects of natural hazards (ISDR, 2009) to human communities and ecosystems.
- Climate change (CC), mitigation refers to limiting greenhouse gas (GHG) emissions

- Adaptation is the adjustment of society or ecosystems in response to hazards to lessen their effects.

Disaster risk management

Mitigation of hazards is part of a larger framework called disaster risk management

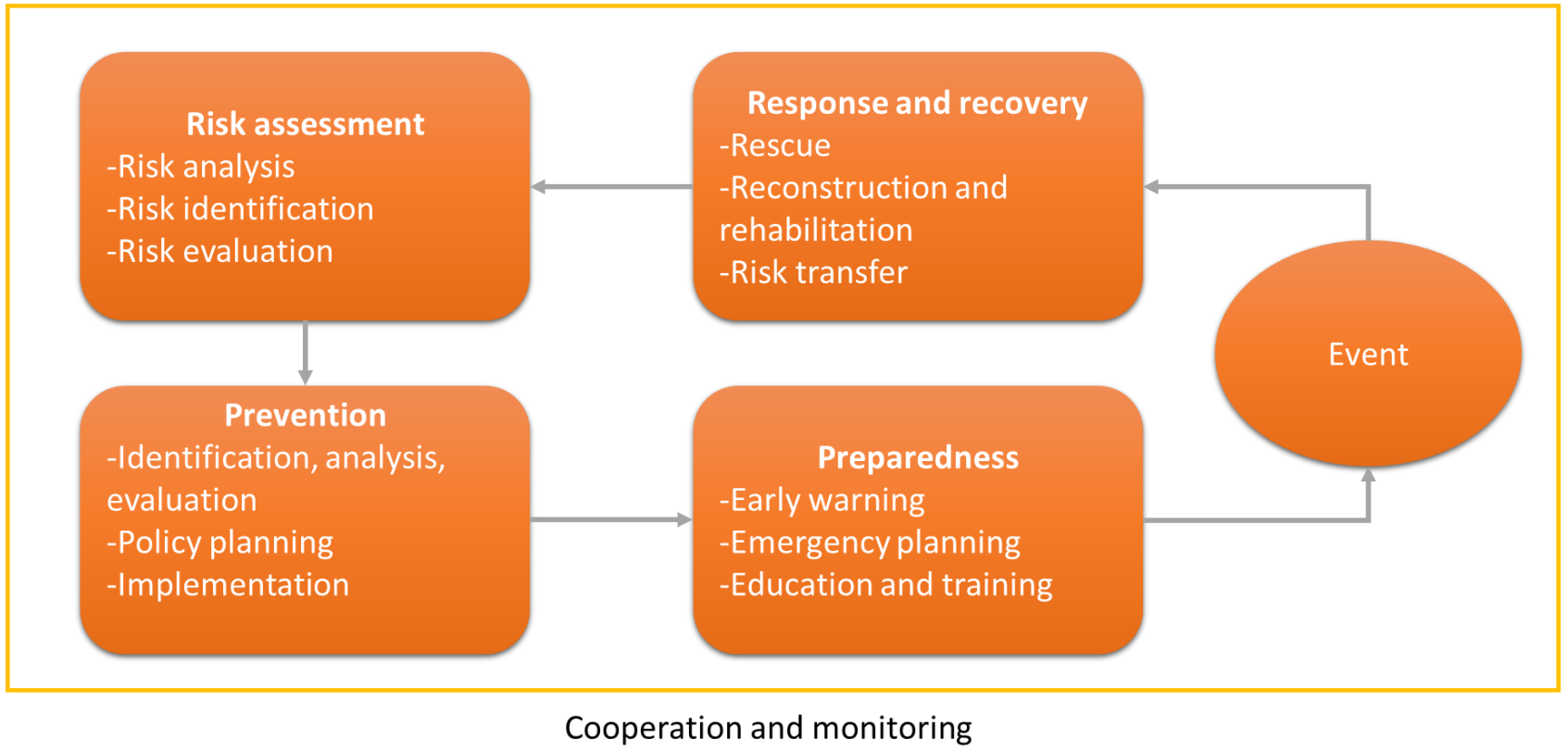


Image: Disaster risk management cycle, adapted from (European Environment Agency, 2017)

Components of risk mitigation

- Mitigation measures often involve structural or non-structural measures
- Long term and short term
- Implementation tools that refer to transfers from policies to practical interventions and actions

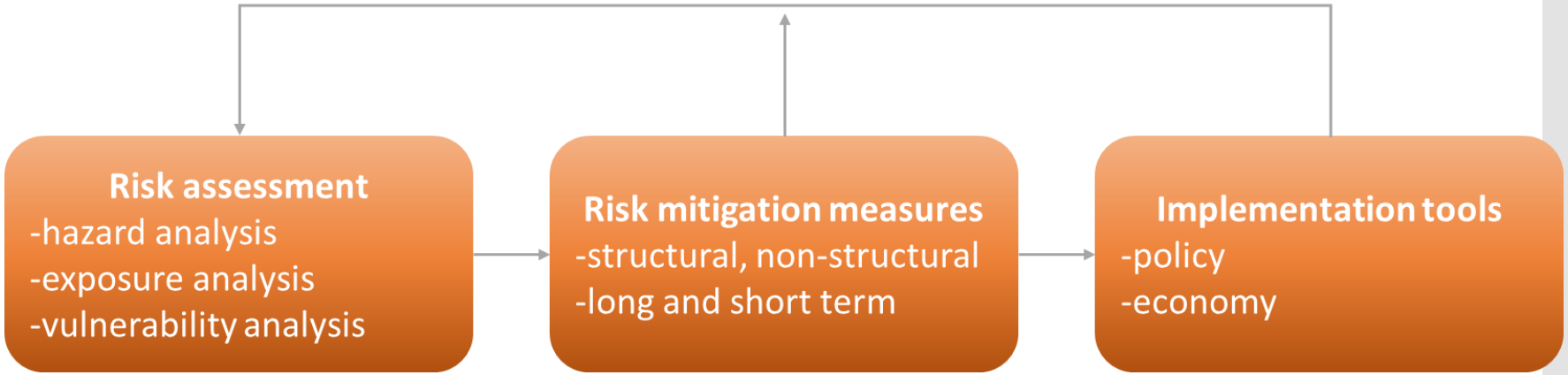
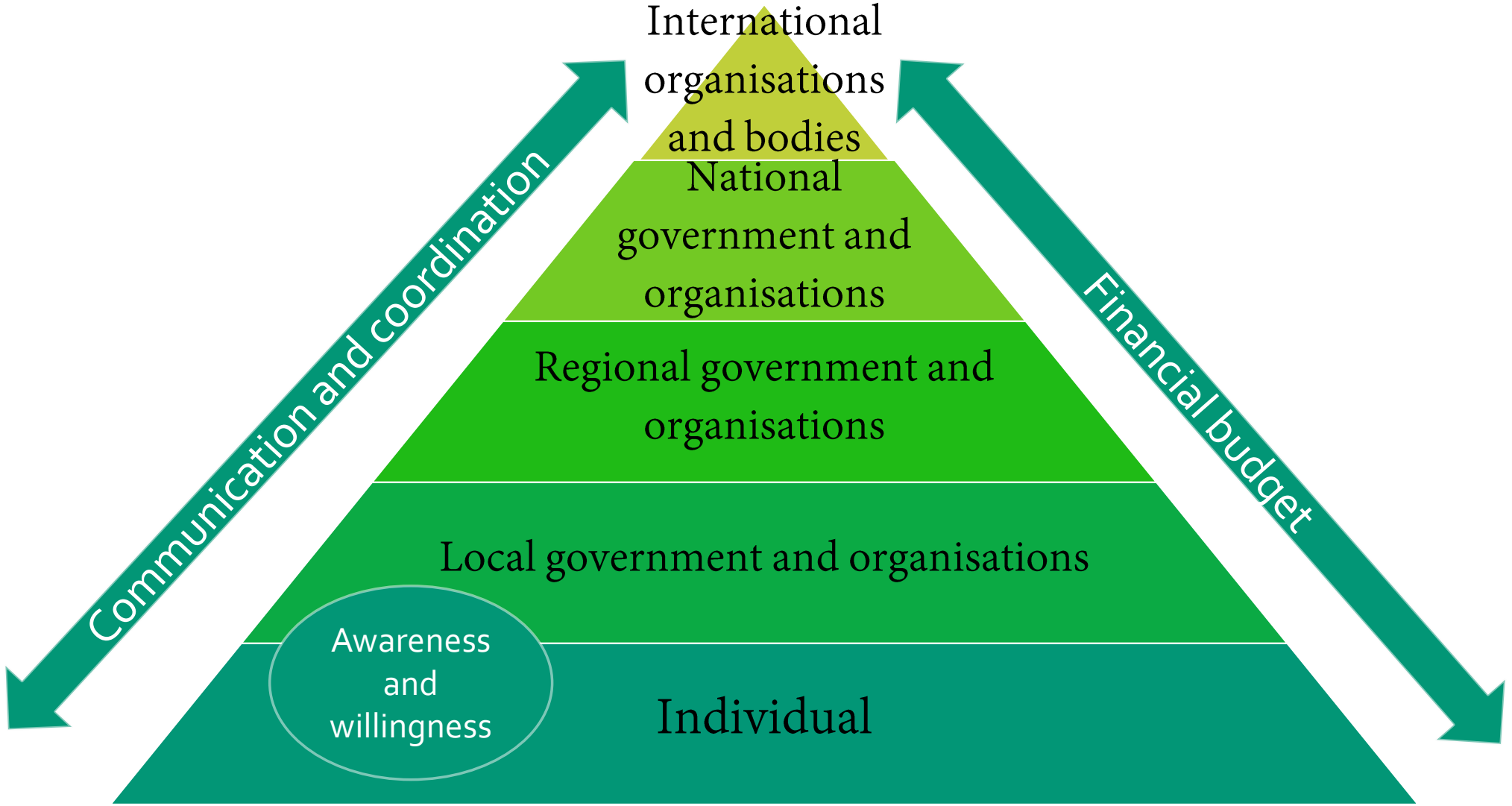


Image: The different components in risk mitigation, adapted after (Esteban et al., 2011)

Mitigation: a complex feat



Communication

- Communities that are less prepared for or aware of hazards will respond to an event in an ill-equipped manner, risking to sustain more sever and/or long lasting effects (Esteban et al., 2011).
- Education and raising awareness
- Warning systems, individuals will know what to do during an event

Image source: Creative Commons Attribution-Share Alike 3.0 Unported license. By Roland Zumbühl (Picswiss), Arlesheim (Commons:Picswiss project)

Coordination

Survey in New Zealand whether decision-making is affected locally by the decisions taken by near-by communities.

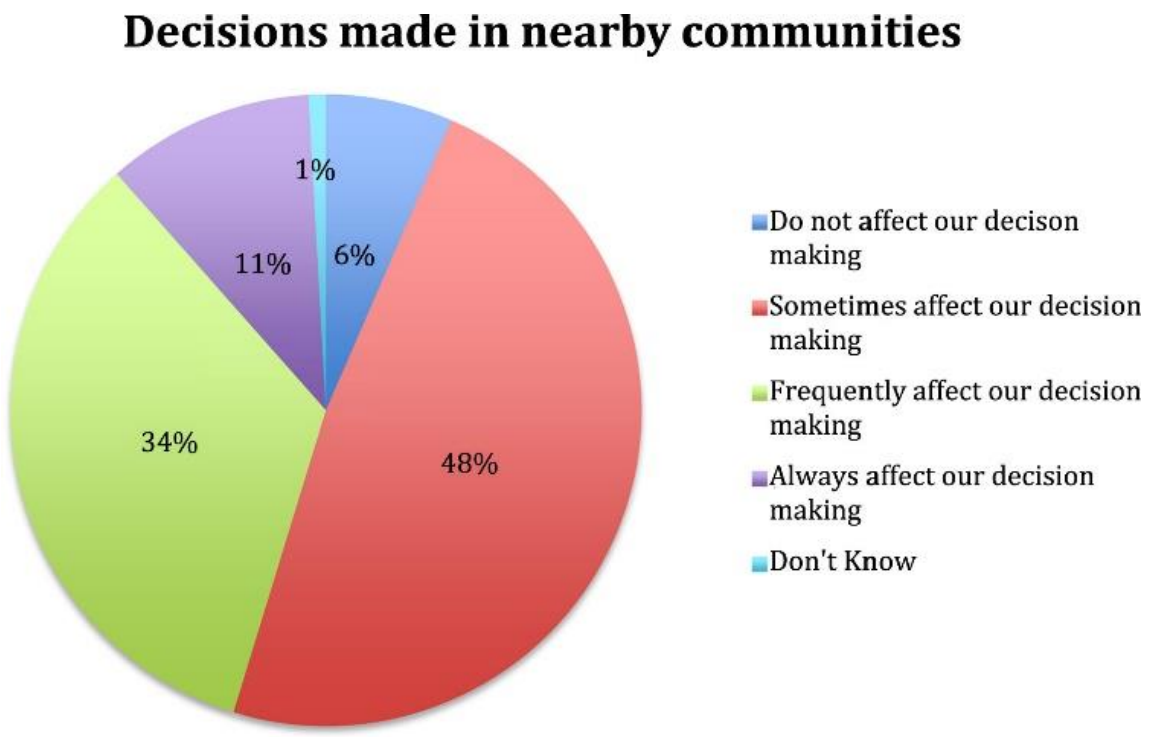


Image: Fig. 3. from Archie et al 2018
Respondent reports of the extent to which decisions in nearby communities affect their own decision-making (N = 249).

Local level mitigation

Small Island Developing States are a group of 58 states located in all oceans of the world

High vulnerability to climate change and in particular to the SLR hazard

Image By Osiris - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=23505603

Hazards

- Economic impacts: land loss, increased coastal flooding, storms, coastal erosion, salinization of coastal aquifers, loss of homes, loss of livelihoods etc. (Martyr-Koller et al., 2021).

- Non-economic hazards: disruption of cultural and social life, forced relocation, internal and international displacement, financial and political barriers. (Martyr-Koller et al., 2021)

Local mitigation measures

- Generally, all measures trigger trade-offs and co-benefits
- Structural measures include engineering solutions like breakwaters, seawalls, elevated buildings or beach nourishment
- Ecosystem-based solutions (EBS) are also taken into considerations such as coral reef or mangrove restauration

Regional mitigation

The case of the EU

- Responding to extreme events is the responsibility primarily of local governments (EEA, 2017)
- But higher level governments have a role to support municipalities in the various stages of DRR (EEA, 2017)
- Effective coordination and collaboration between the national and sub-national administrations (EEA, 2017)

EU civil protection mechanism

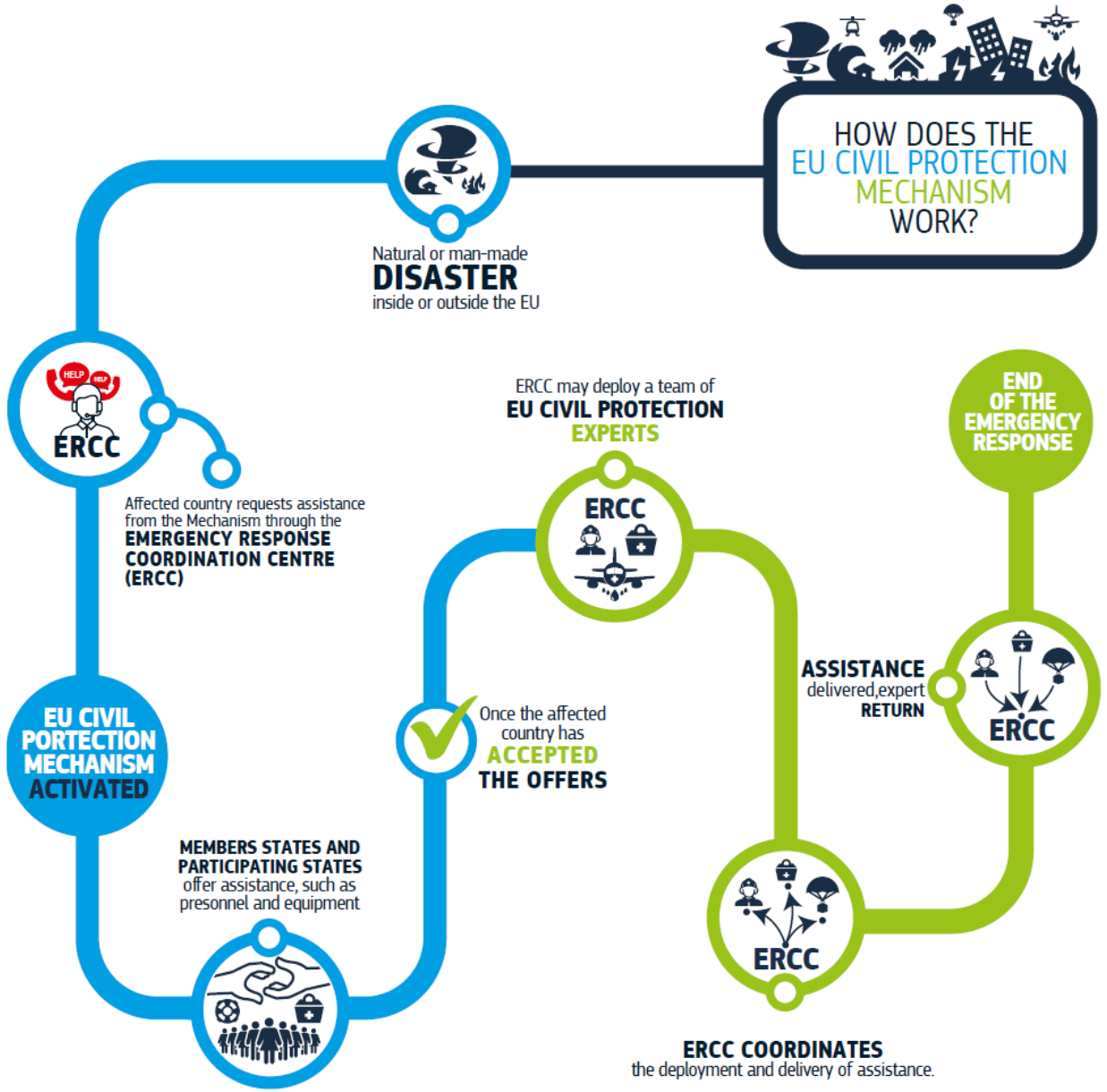


Image source: European Commission, 2020

Regional mitigation

The case of the EU

- In 2009, the Council invited the Member States to develop national risk analyses, it recommended taking into account the future impact of climate change (European Commission, 2020)

- The European Green Deal adopted by the Commission in December 2019
  - a set of policy and legislative initiatives
  - making Europe the first climate-neutral, climate-resilient and environmentally sustainable continent over the next decades (European Commission, 2020)

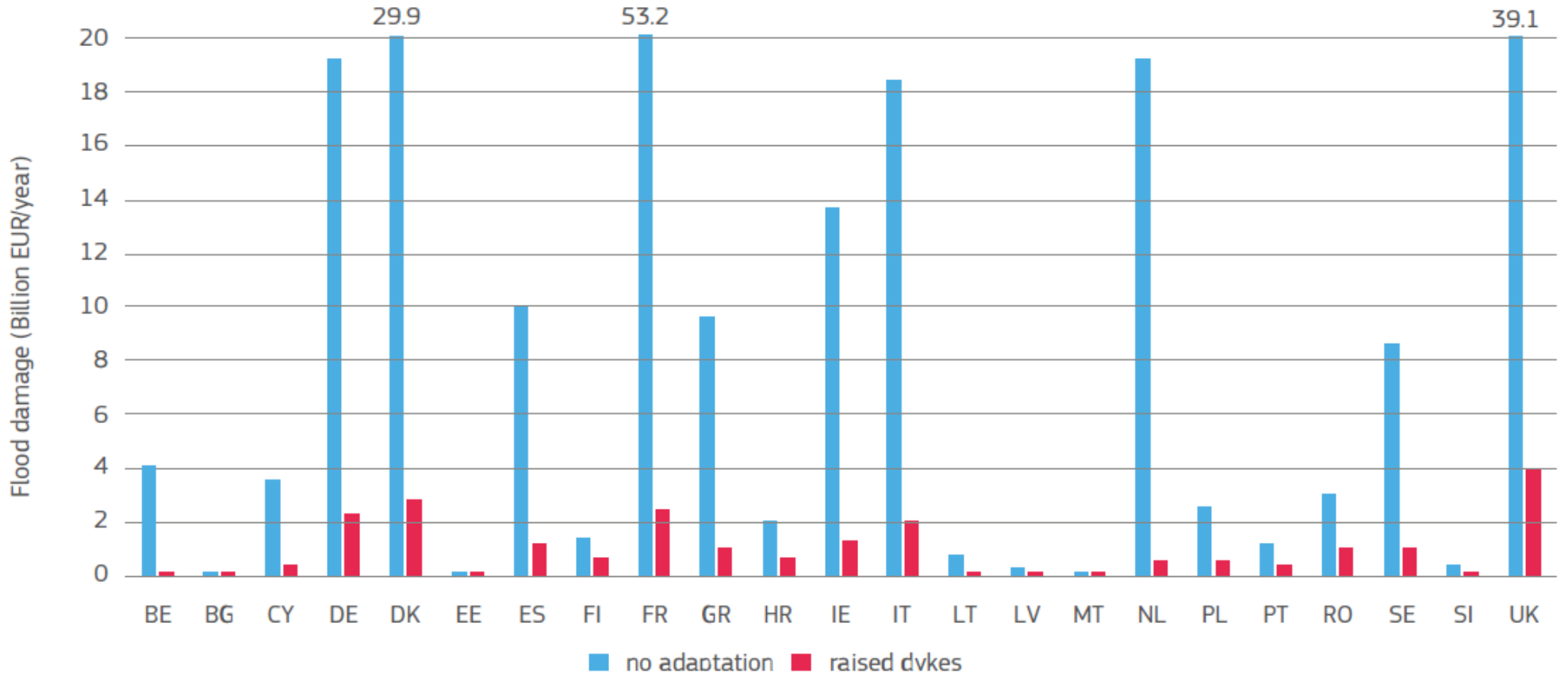


Figure 32. *Coastal* flooding: national annual damage without and with adaptation by 2100 (high emissions scenario).
Source: PESETA IV[291]

Image source: European Commission, 2020

Shifting from regional to global

- Disaster risk management in the EU is closely linked to global initiatives, in particular, the Sendai Framework for Disaster Risk Reduction

- Reduce: global disaster mortality
  - Number of affected people
  - Economic loss in relation to GDP
  - Damage to critical infrastructure and service disruption
- Increase: Number of countries with national and local DRR strategies by 2020
  - International cooperation to developing countries
  - Availability and access to early warning systems and DRR information

Source: https://www.preventionweb.net/sendai-framework/sendai-framework-at-a-glance

Shifting from local to global

"SIDS at the forefront of global discussions on strong climate mitigation ambition, minimizing the risks from climate change, and on mechanisms to address loss and damage" (Martyr-Koller et al, 2021).

- Warsaw International Mechanism for Loss and Damage
  - assist developing countries that are particularly vulnerable to the adverse effects of climate change

1. Enhancing knowledge and understanding of comprehensive risk management approaches to address loss and damage
2. Strengthening dialogue, coordination, coherence and synergies among relevant stakeholders
3. Enhancing action and support, including finance, technology and capacity-building

Source: https://unfccc.int/topics/adaptation-and-resilience/workstreams/approaches-to-address-loss-and-damage-associated-with-climate-change-impacts-in-developing-countries#Action-and-support

Local, regional to global

The Paris Agreement

- A legally binding international treaty
- It entered into force on 4 November 2016
- Today, 194 Parties (193 States plus the European Union)

1. Limit temperature rise to 1.5 °C
2. Reviews countries' commitments to cutting emissions every 5 years
3. Provide climate finance to developing countries

Source: https://www.un.org/en/climatechange/paris-agreement

Summary

1. Mitigation refers to measures that are aimed at reducing the potential damaging effects of natural hazards (ISDR, 2009) to human communities and ecosystems.
   - There are structural and non-structural measures
2. Hazards affect communities differently based on their vulnerability and resilience
3. Climate change increases the severity, frequency and duration of climate-related disasters, including sea level rise
4. Local-regional-global cooperation and coordination is crucial
5. Policy and economic instruments must be put into place

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