Global Covenant of Mayors for Energy and Climate

Insights on RVA, tips, best practices, and recommendations based on experience with Covenant cities and their SECAPs

18 February 2025

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Joint Research Centre, European Commission

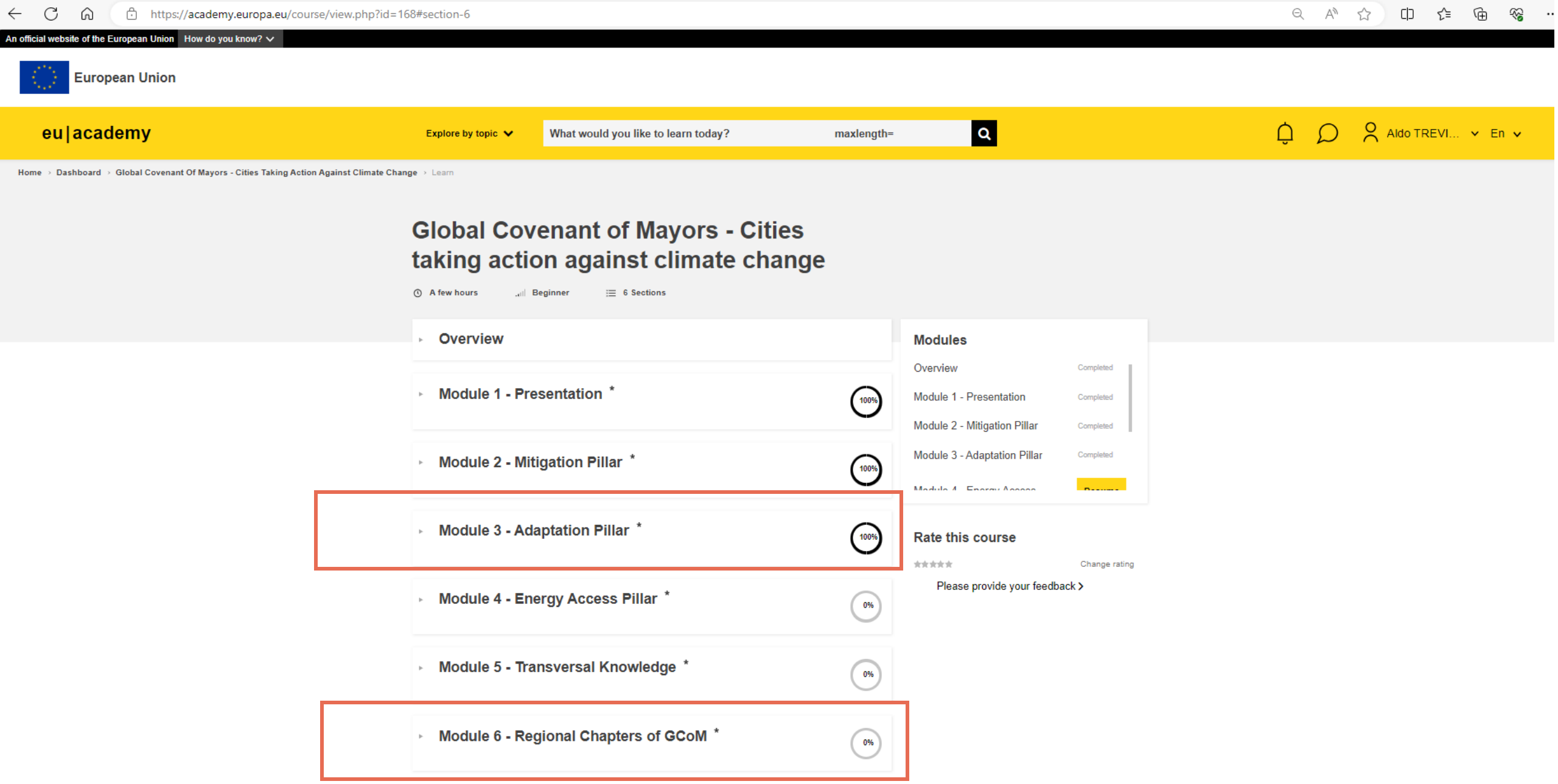
European Commission

e-learning course on

Cities taking action against climate change

Global Covenant of Mayors for Climate and Energy

eu|academy



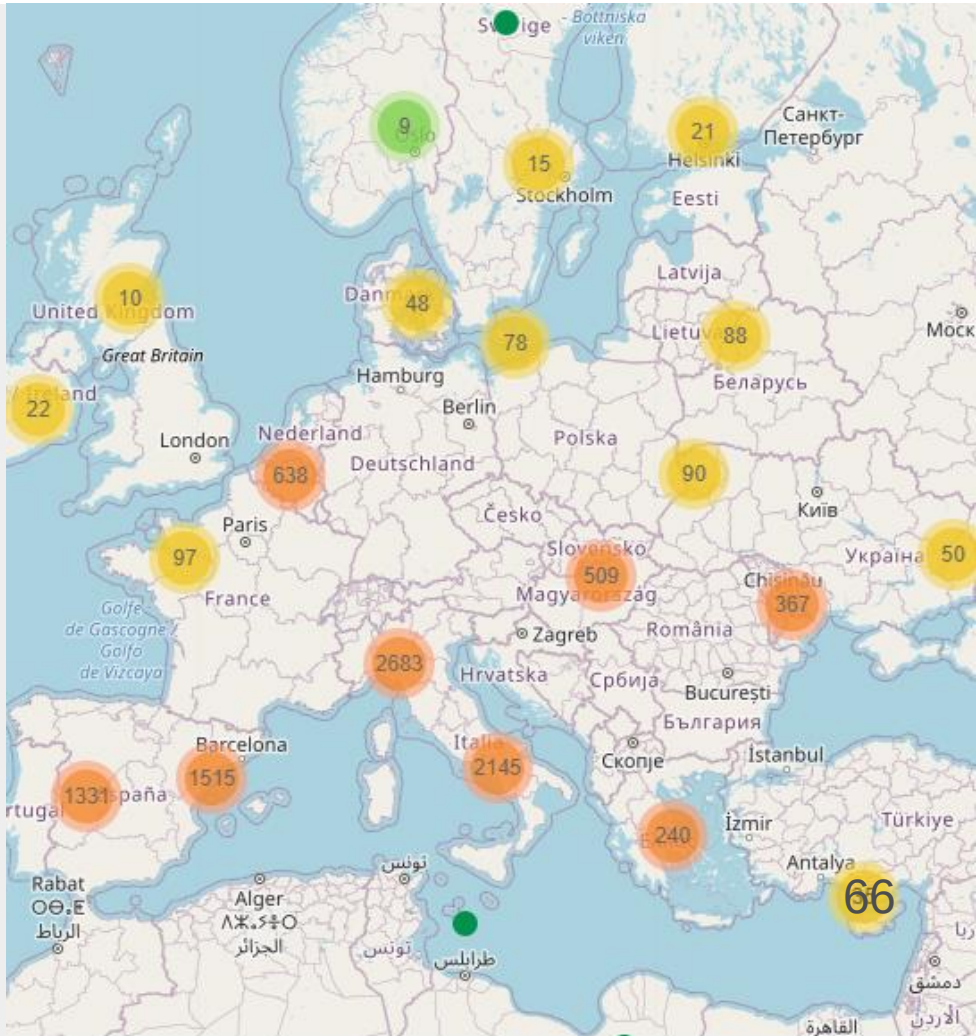
https://academy.europa.eu/courses/global-covenant-of-mayors-cities-taking-action-against-climate-change

Global Covenant of Mayors for Climate & Energy - Turkey

Turkish Signatories already reporting in MyCovenant platform:

- Amasya
- Ankara
- Antalya Metropolitan Municipality
- Ardahan
- Avcilar
- **Bağcılar**
- Balıkesir
- Bandırma
- Bayındır Belediyesi
- Bayraklı
- Beylikdüzü Belediyesi
- Bodrum
- Bolu
- Bornova
- Bozcaada
- Buca
- **Bursa Metropolitan Municipality**
- Büyukçekmece
- Çankaya Municipality
- Çiğli
- Çorlu
- Denizli Metropolitan Municipality
- Diyarbakir
- Dörtdivan
- Edirne
- Efeler
- Erzurum Metropolitan Municipality
- Eskişehir
- **Eskişehir Tepebaşi**
- Findikli
- **Gaziantep**
- Gaziemir
- İnegol Belediyesi
- **İzmir Metropolitan Municipality**
- İzmit
- **Kadikoy**
- Karaburun
- **Karşıyaka - İzmir**
- Karşıyaka (Erdek-balikesir)
- Kırklareli
- Konak
- Konya
- Küçükçekmece Belediyesi
- Kuşadai
- Maltepe
- Melikgazi
- Mezitli
- Muğla Metropolitan Municipality
- Muratpaşa
- **Nilüfer Municipality**
- Pendik
- **Sakarya Metropolitan Municipality**
- Samsun
- Seferihisar
- Serdivan
- Silivri
- **Şişli**
- Sındırgı
- Sultanbeyli
- Suluova
- Tekirdağ
- Üsküdar
- Uzunkopru
- Yalova
- Yenimahalle
- Yenisehir

In Red Signatories With Reported Plan Also Reporting RVA



Three Pillars

Mitigation

Mitigation:

Reducing Greenhouse Gas (GHG) emissions and accelerating the decarbonisation of the territories.

Adaptation

Adaptation:

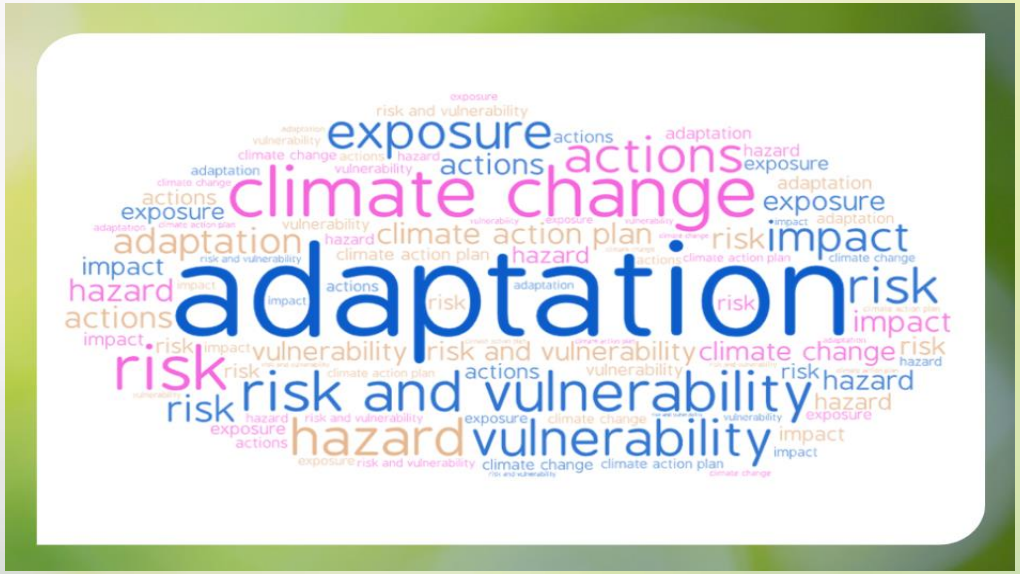
Increasing resilience and strengthening the capacity to adapt to unavoidable climate change impacts.

Access to Energy

Access to Energy:

Allowing the citizens to access secure, sustainable and affordable energy.

Adaptation to climate change



Climate change impacts transcend borders and vary considerably across regions.

Introduction – Climate Action Plans (CAPs)

Adaptation to Climate Change

Climate Change Risk and Vulnerability Assessment (CRVA)
determines the nature and extent of risks by analysing potential hazards and assessing the vulnerability of people, property, livelihoods and the environment.

Climate hazards:
Extreme heat/cold
Extreme precipitation
Flooding...

Vulnerabilities:
Building sector
Transport sector
…
Vulnerable population groups

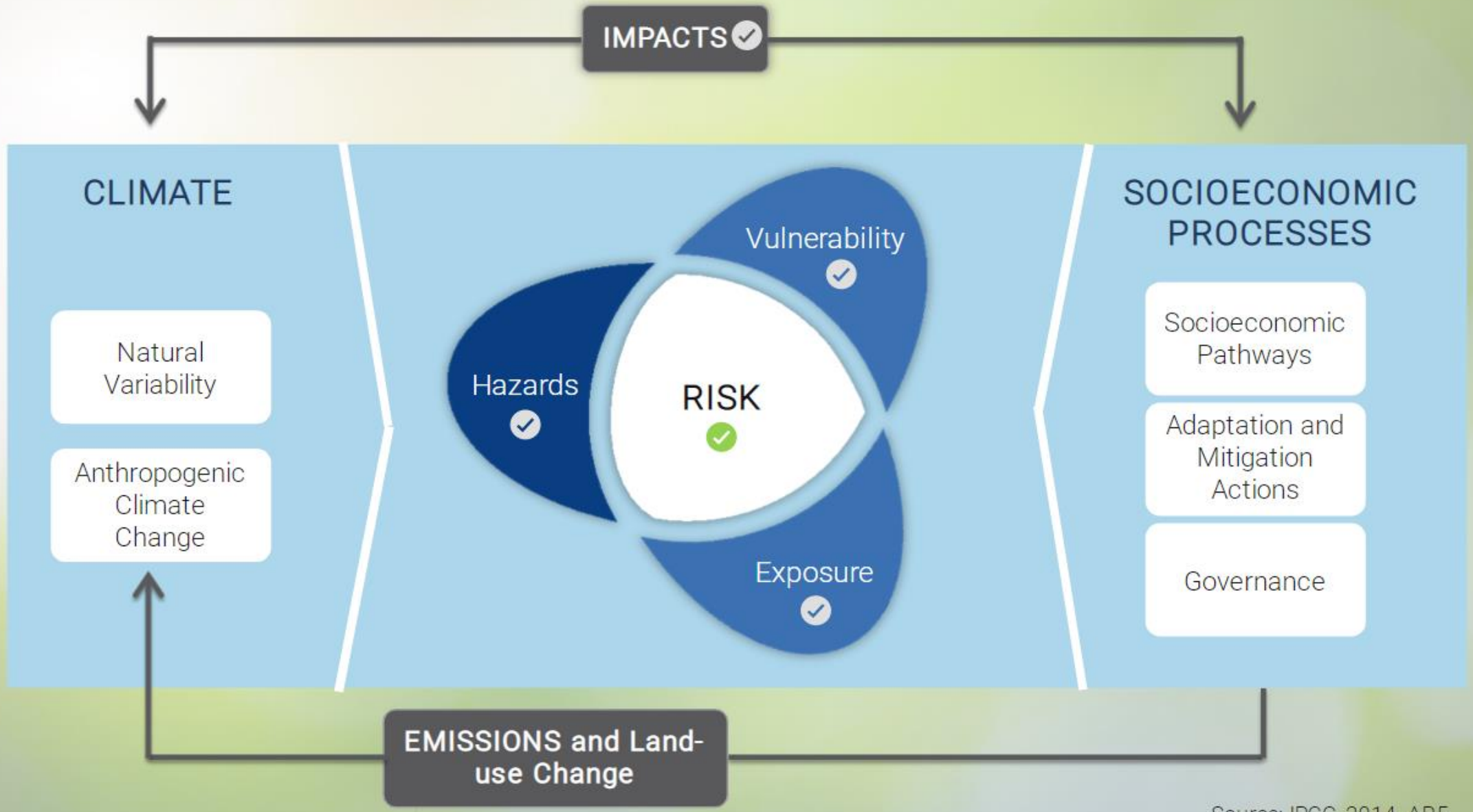
Definition of the vision

ADAPTATION GOALS

Elaboration of the

ACTION plan

IPCC Framework for Adaptation



Source: IPCC, 2014. AR5

IPCC Framework for Adaptation

X

The potential occurrence of a natural or human-induced physical event that may cause loss of life, injury, or other health impact, as well as damage and loss to resources, infrastructure, livelihoods, ecosystems and environmental resources.

IMPACTS

Hazards

Vulnerability

RISK

Exposure

SOCIOECONOMIC PROCESSES

Socioeconomic Pathways

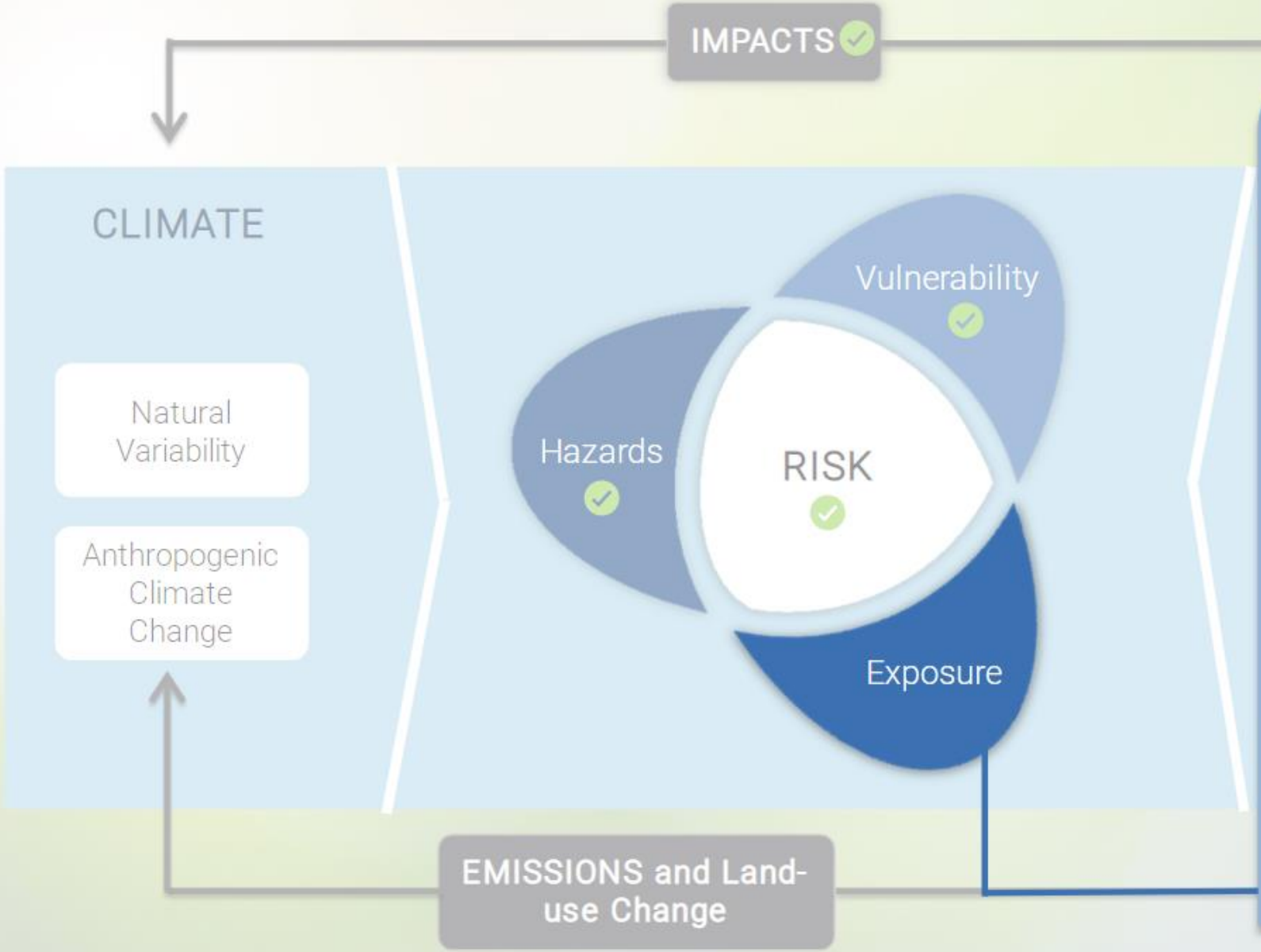
Adaptation and Mitigation Actions

Governance

EMISSIONS and Land-use Change

Source: IPCC, 2014. AR5

IPCC Framework for Adaptation



X

The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings **that could be adversely affected.**

Source: IPCC, 2014. AR5

IPCC Framework for Adaptation

IMPACTS

CLIMATE

Natural Variability

Anthropogenic Climate Change

Vulnerability

Hazards

RISK

Exposure

EMISSIONS and Land-use Change

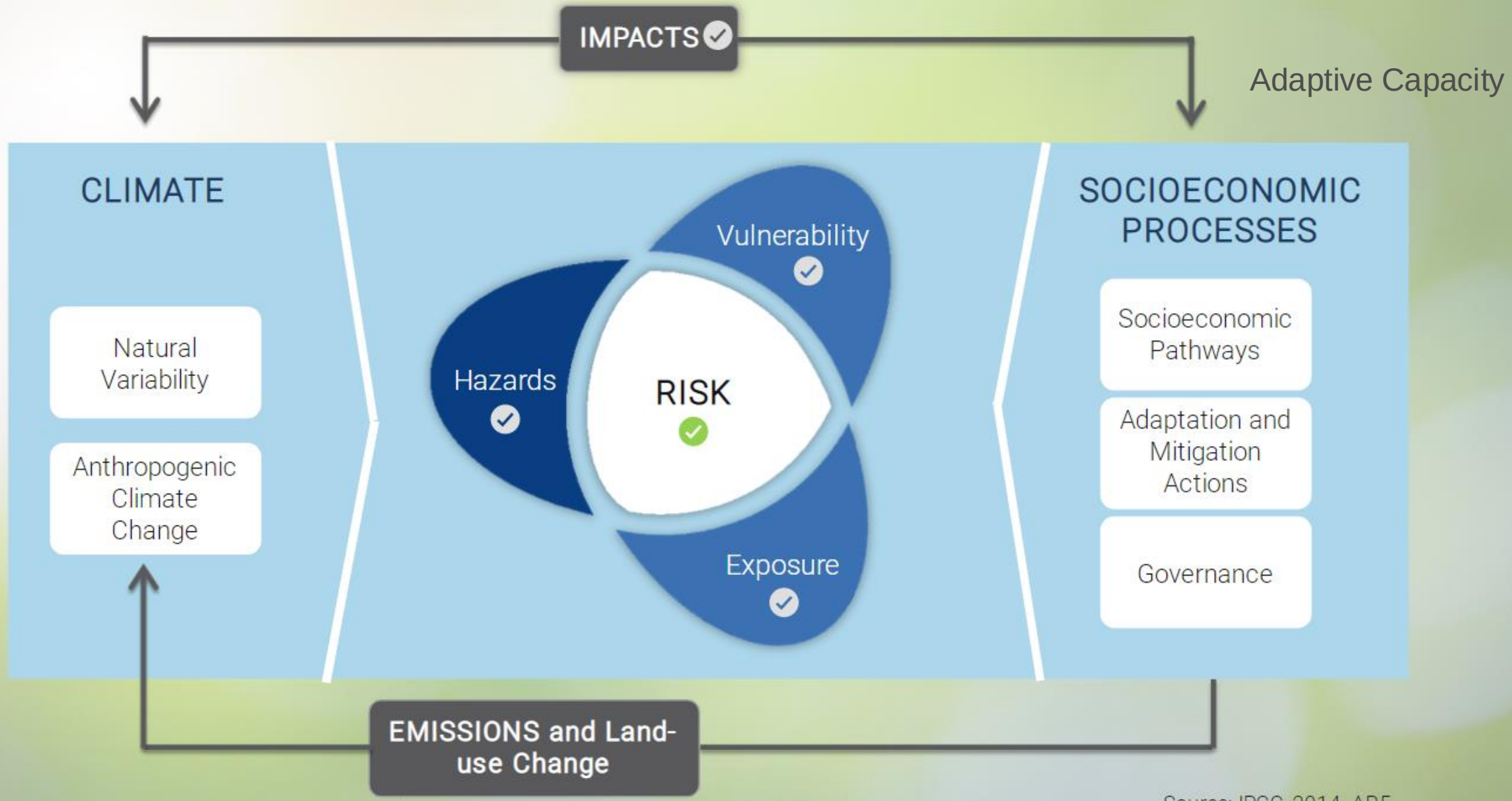
The propensity or predisposition to be adversely affected.

Vulnerability can be seen as situation-specific, interacting with a hazard event to generate risk.

For example, population might be vulnerable to hurricanes, but not to landslides or floods.

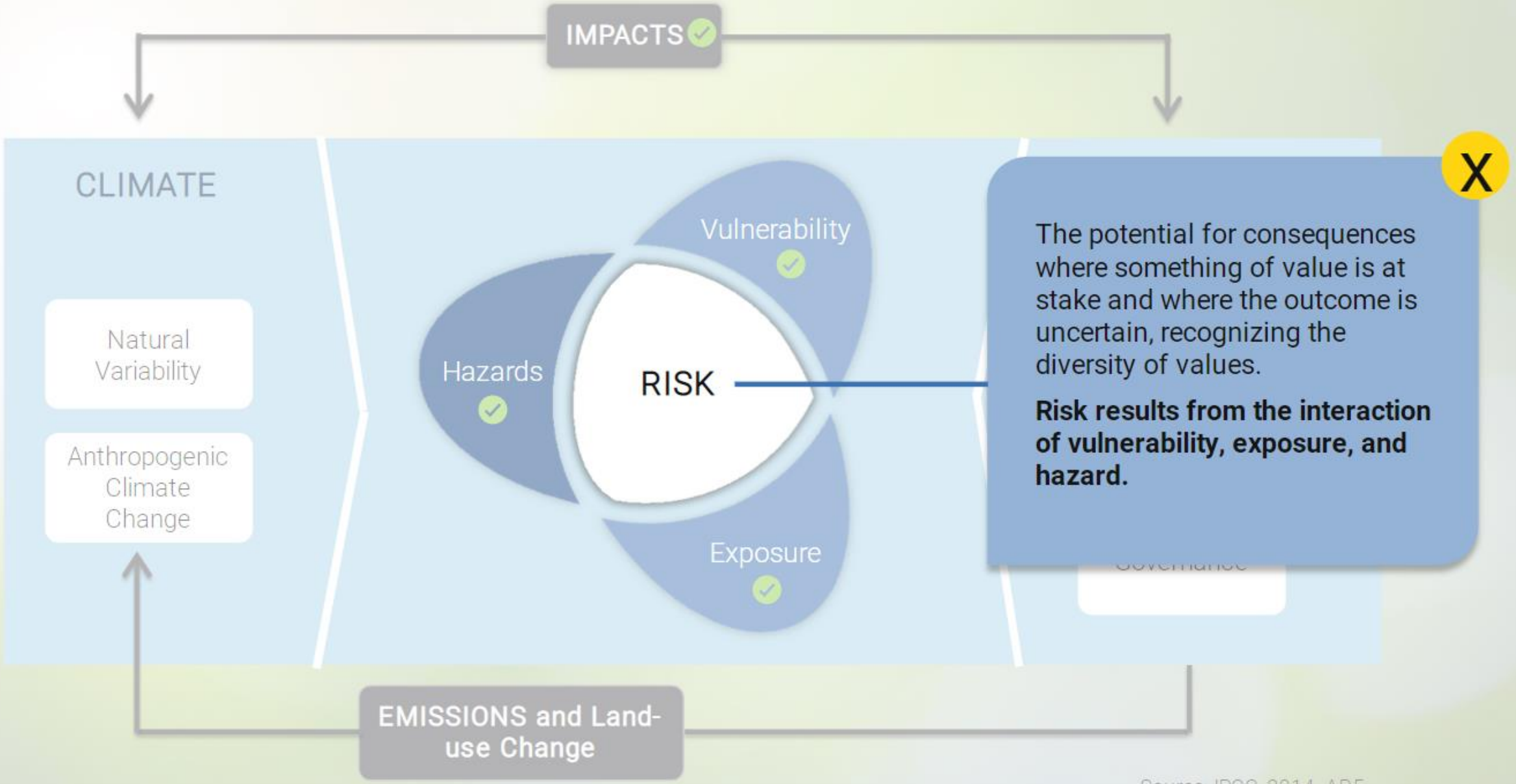
Source: IPCC, 2014. AR5

IPCC Framework for Adaptation



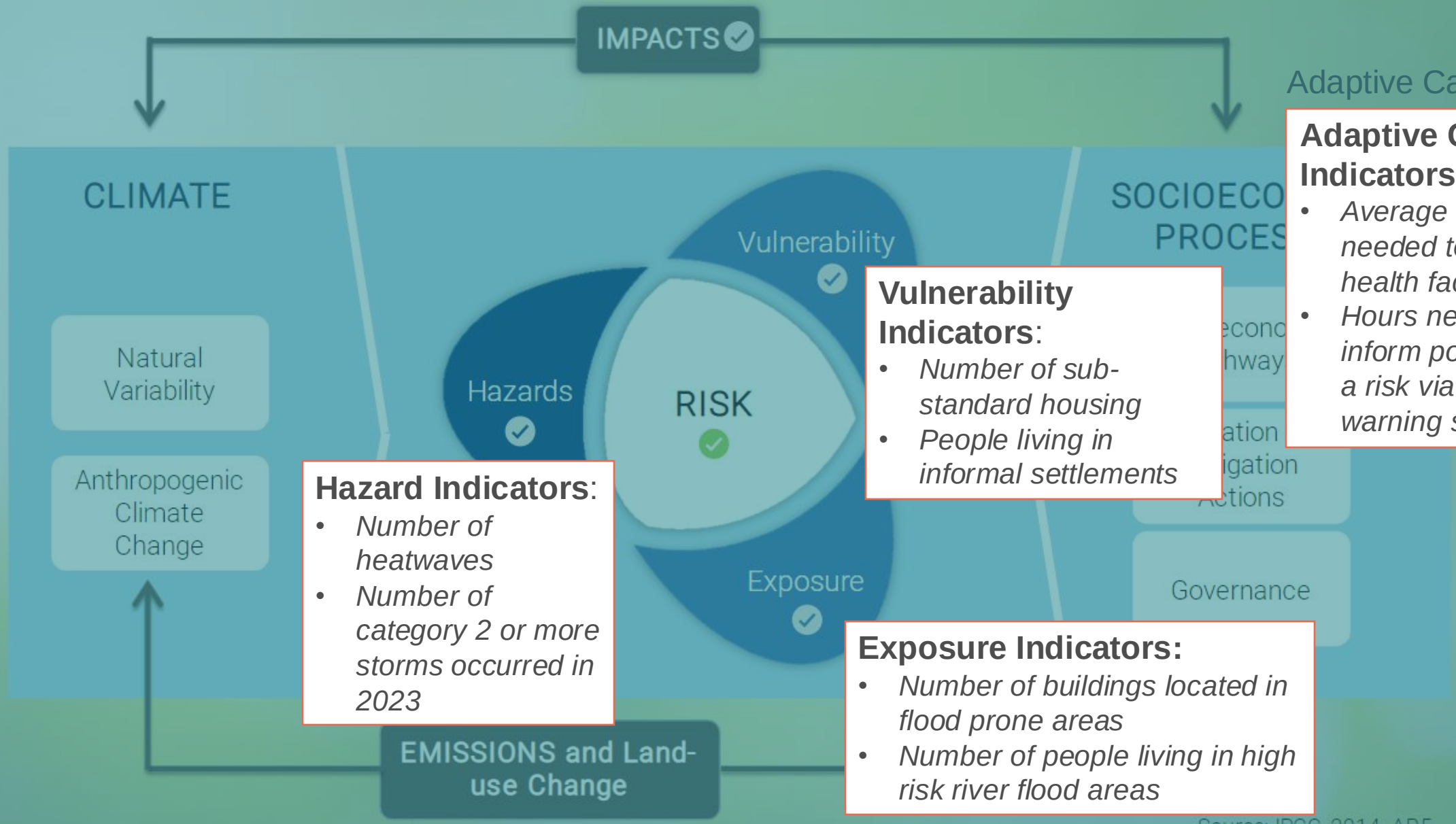
Source: IPCC, 2014. AR5

IPCC Framework for Adaptation



Source: IPCC, 2014. AR5

IPCC Framework for Adaptation



Adaptive Capacity

Adaptive Capacity Indicators:

- *Average time needed to reach a health facility,*
- *Hours needed to inform population of a risk via an early warning system*

Vulnerability Indicators:

- *Number of sub-standard housing*
- *People living in informal settlements*

Hazard Indicators:

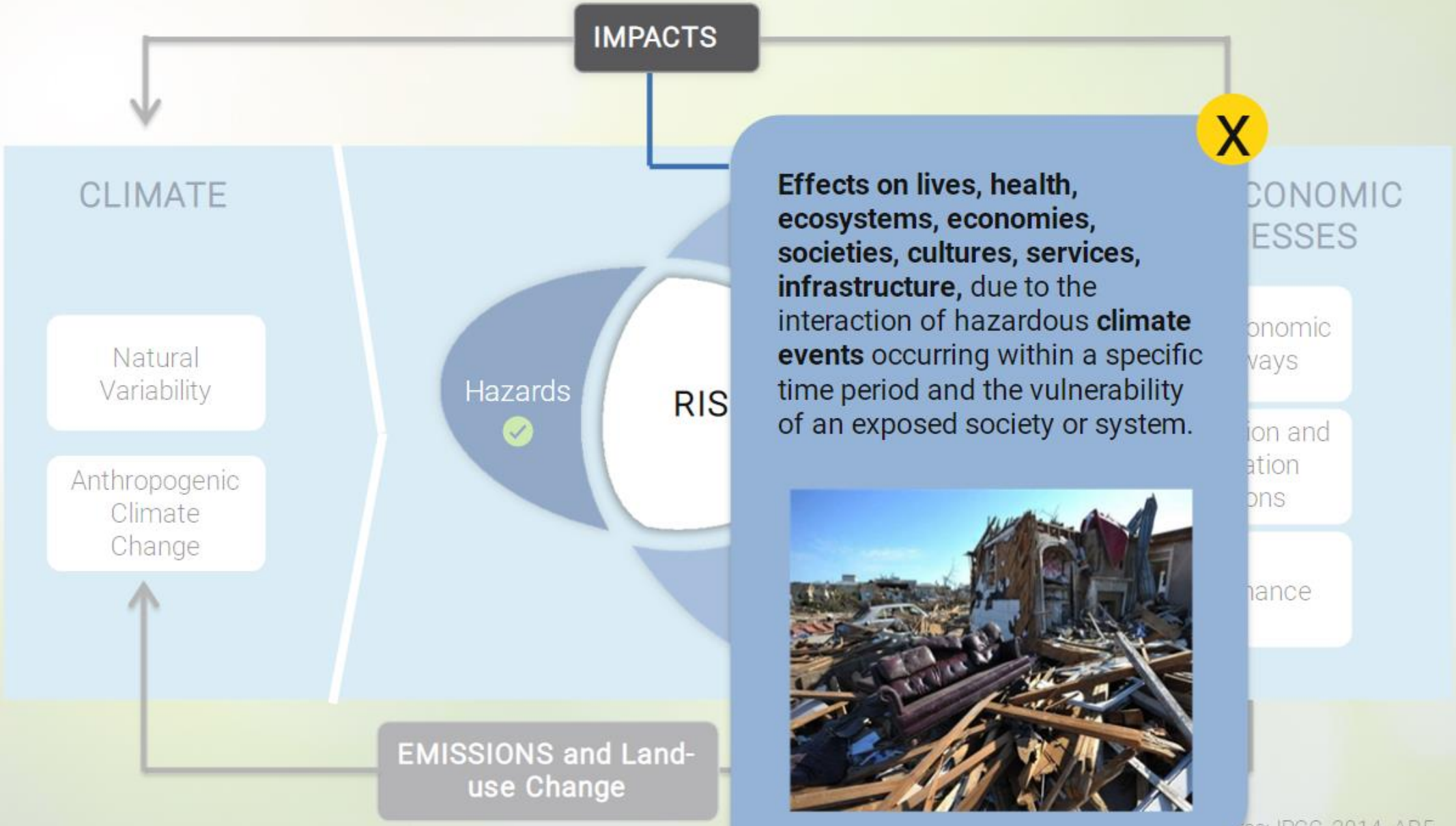
- *Number of heatwaves*
- *Number of category 2 or more storms occurred in 2023*

Exposure Indicators:

- *Number of buildings located in flood prone areas*
- *Number of people living in high risk river flood areas*

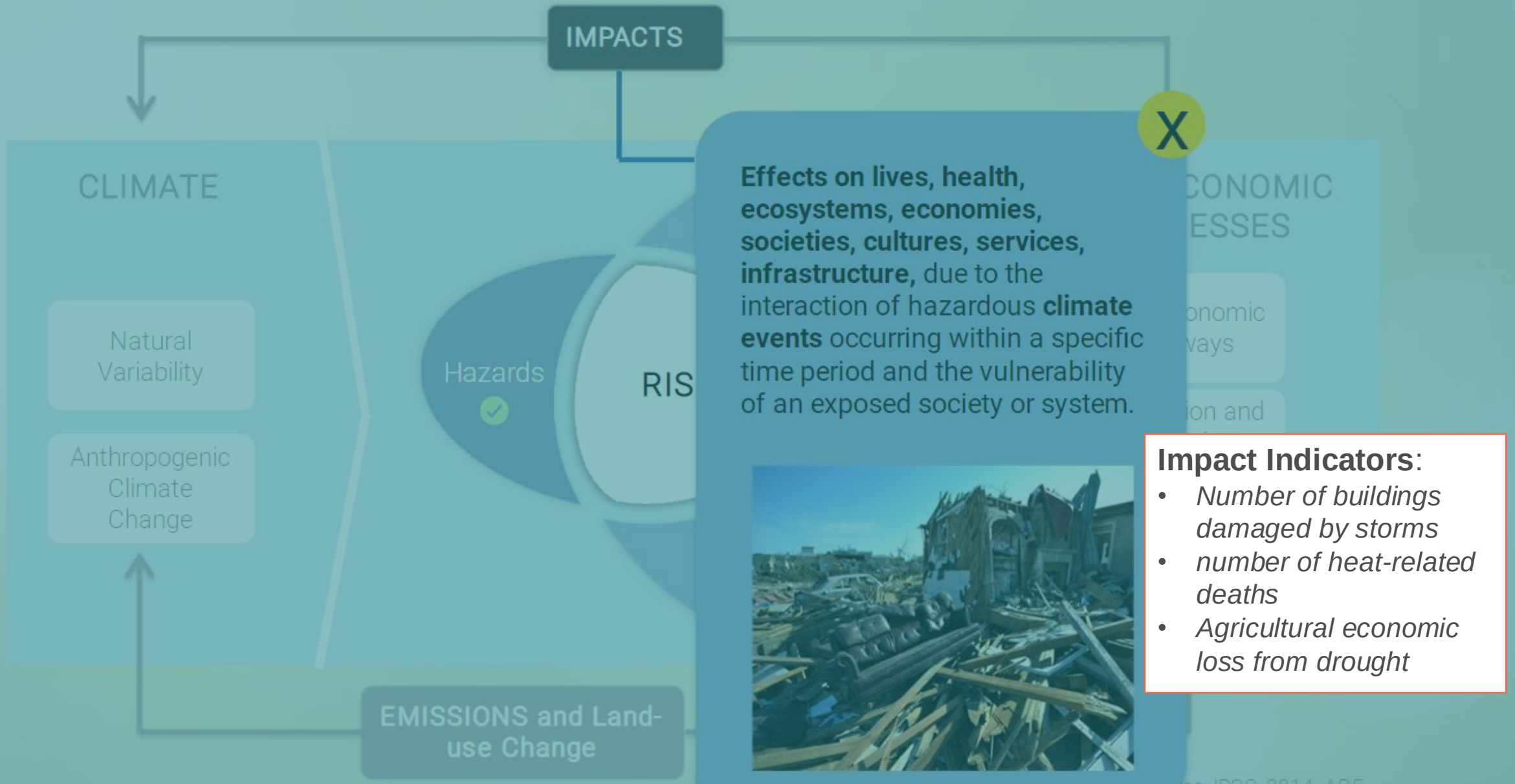
Source: IPCC, 2014. AR5

IPCC Framework for Adaptation



rce: IPCC, 2014. AR5

IPCC Framework for Adaptation



Impact Indicators:

- *Number of buildings damaged by storms*
- *number of heat-related deaths*
- *Agricultural economic loss from drought*

rce: IPCC, 2014. AR5

Adaptation: From assessment to action

Risk and Vulnerability Assessment (RVA)

The RVA is the most common tool used to identify, quantify and classify the main risks of a system challenged by climate change.

RVA determines the nature and extent of a risk by analysing potential hazards and assessing the vulnerability that a potential threat could pose to people, property, livelihoods and the environment on which they depend.

Know more

Example of risk assessment matrix

Key steps for the Risk and Vulnerability Assessment (RVA)

Step 1 : Identification of climate hazards and impacts

Local authorities shall identify the most significant climate hazards and their impacts (at different timescales):

- Identifying past climate hazards and their impacts
- Identifying current and future climate hazards and their impacts

Potential climate hazards affecting local authorities

Key steps for the Risk and Vulnerability Assessment (RVA)

Potential key climate hazards affecting local authorities

Extreme heat

Alberto Pizzoli / AFP

Key steps for the Risk and Vulnerability Assessment (RVA)

Potential key climate hazards affecting local authorities

Floods & sea level rise

- Flash / surface flood
- River flood
- Coastal flood

Key steps for the Risk and Vulnerability Assessment (RVA)

Potential key climate hazards affecting local authorities

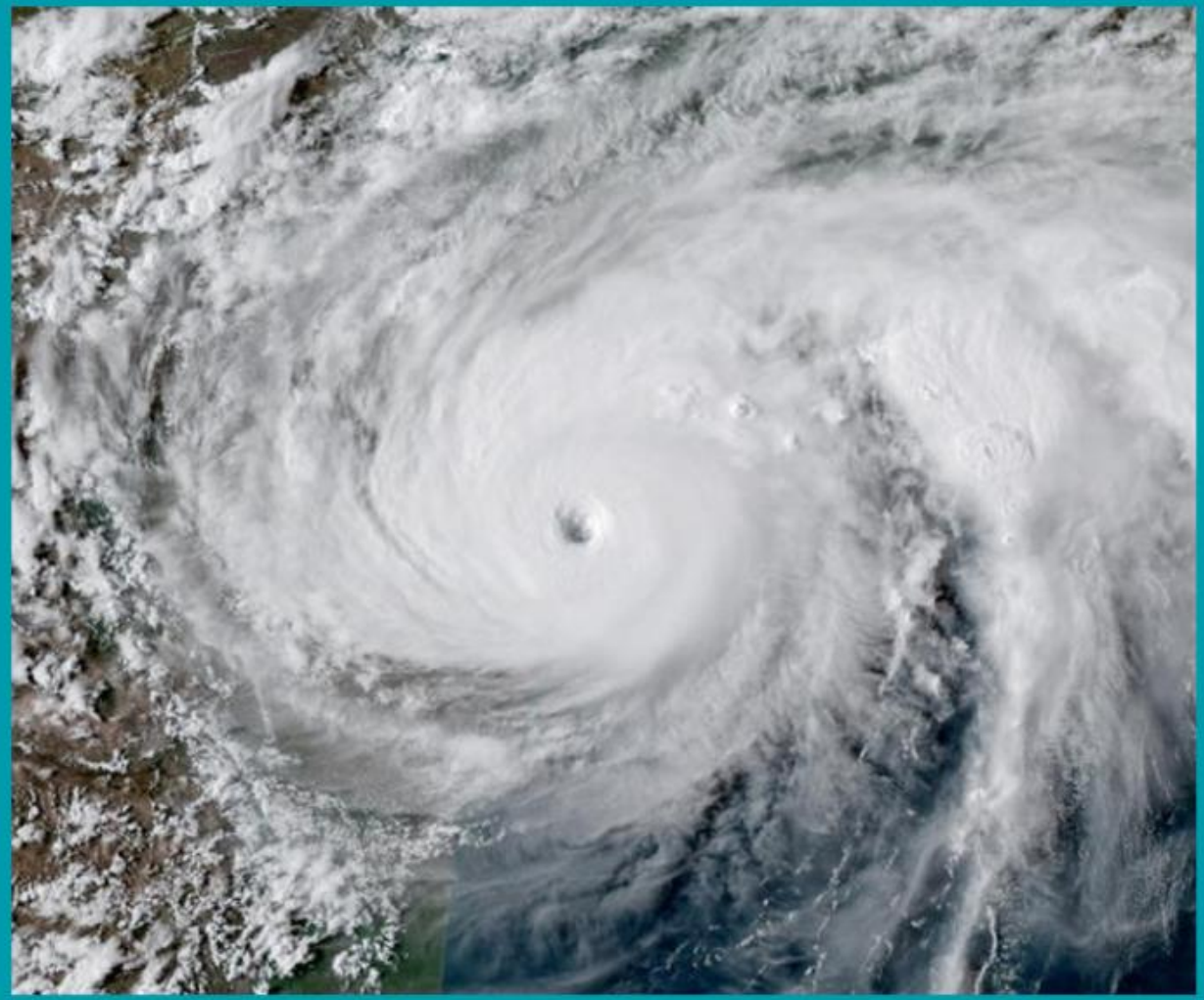
Droughts & water scarcity

Key steps for the Risk and Vulnerability Assessment (RVA)

Potential key climate hazards affecting local authorities

Storms

- Severe wind
- Cyclone (hurricane / typhoon)
- Tropical storm
- Storm surge
- Lightning / thunderstorm



credit to NOA

Key steps for the Risk and Vulnerability Assessment (RVA)

Potential key climate hazards affecting local authorities

Mass movement

- Landslide
- Subsidence
- Avalanche
- Rockfall

Key steps for the Risk and Vulnerability Assessment (RVA)

Potential key climate hazards affecting local authorities

Wildfires

- Forest fire
- Land fire

Key steps for the Risk and Vulnerability Assessment (RVA)

Potential key climate hazards affecting local authorities

BIOLOGICAL HAZARDS

- Waterborne Diseases
- Vector-borne diseases
- Airborne diseases
- Insect infestation

Key steps for the Risk and Vulnerability Assessment (RVA)

Step 2 : Vulnerability and adaptive capacity

The local authorities should provide information on:

- Vulnerable population groups according to the local context for each hazard
- Vulnerable sectors
- Categories and factors that can affect the local government's adaptive capacity and enhance climate resilience

Vulnerable sectors

Key steps for the Risk and Vulnerability Assessment (RVA)

Buildings

Refers to any (municipal/residential/tertiary, public/private) structure or groups of structures, surrounding spaces, permanently constructed or erected on its site.

Transport

Includes road, rail, air and water transport networks and related infrastructure. It comprises an extensive range of both public and private assets and services and excludes all related vessels, vehicles (and related parts and processes).

Key steps for the Risk and Vulnerability Assessment (RVA)

Energy

Refers to the energy supply service and related infrastructure. It includes coal, crude oil, natural gas liquids, refinery feedstocks, additives, petroleum products, gases, combustible renewables and waste, electricity and heat.

Water

Refers to the water supply service and related infrastructure. It also covers water use (e.g. by households, industry, energy production, agriculture, etc.) and (waste-, rain-) water management system, that includes sewers, drainage and treatment systems.

Key steps for the Risk and Vulnerability Assessment (RVA)

Waste

Includes activities related to the management (including collection, treatment and disposal) of various forms of waste, such as solid or non-solid industrial or household waste, as well as contaminated sites.

Land Use Planning

Process undertaken by public authorities to identify, evaluate and decide on different options for the use of land, and the subsequent formulation and promulgation of plans or regulations that describe the permitted or acceptable uses.

Key steps for the Risk and Vulnerability Assessment (RVA)

Agriculture & Forestry

Includes land classified/designated for agriculture & forestry use, as well as organisations and industries linked to creation and production within and surrounding the boundaries of the municipality.

Environment & Biodiversity

Environment refers to green and blue landscapes, air quality, including urban hinterland.

Biodiversity refers to the variety of life in a specific region, measurable as the variety within and between species, and the variety of ecosystems.

Key steps for the Risk and Vulnerability Assessment (RVA)

Health

Refers to the geographical distribution of dominance of pathologies, information indicating effect on well-being of humans linked directly/indirectly to the quality of the environment. It also includes the health care service and related infrastructure.

Civil Protection & Emergency

Refers to the operation of the civil protection and emergency services by or on behalf of public authorities and includes local disaster risk reduction and management (i.e. capacity building, coordination, equipment, emergency planning, etc.).

Key steps for the Risk and Vulnerability Assessment (RVA)

Tourism

Refers to the activities of persons travelling to and staying in places outside their usual environment for not more than 1 year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited.

ICT (Information & Communications Technology)

Refers to the technologies related to integrated telecommunications systems, computers, audio-video technologies and related software, which allow users to create, store and exchange information.

Key steps for the Risk and Vulnerability Assessment (RVA)

Education

Refers to the process of learning through an organised and sustained communication.

Society, Community & Culture

Refers to the society as a group of individuals variously aggregated and organised who interact in order to pursue one or more common objectives . Culture refers to traditions, public goods and historic and cultural values.

Key steps for the Risk and Vulnerability Assessment (RVA)

Step 3: Adaptive capacity factors

- ❑ Access to services
- ❑ Socio-economic
- ❑ Governmental & institutional
- ❑ Physical & environmental
- ❑ Knowledge & innovation

Key steps for the Risk and Vulnerability Assessment (RVA)

Vulnerable groups (step 4)

- Women and girls
- Children
- Youths
- Elderly people
- Marginalised groups
- Persons with disabilities
- Persons with chronic diseases
- Low-income households
- Unemployed persons
- Persons living in sub-standard housing
- Persons living in sub-standard conditions
- Other

Importance of RVA in developing effective SECAPs

European Commission

Adaptation goals

Adaptation goal(s)

The goals are strictly linked to the local situation and are coherent with the identified vulnerabilities, risks and hazards. The adaptation goal(s) can be described in qualitative/descriptive terms and/or in quantitative terms. For each adaptation goal it is advised to define a unit for goal measurement and baseline and target completion year.

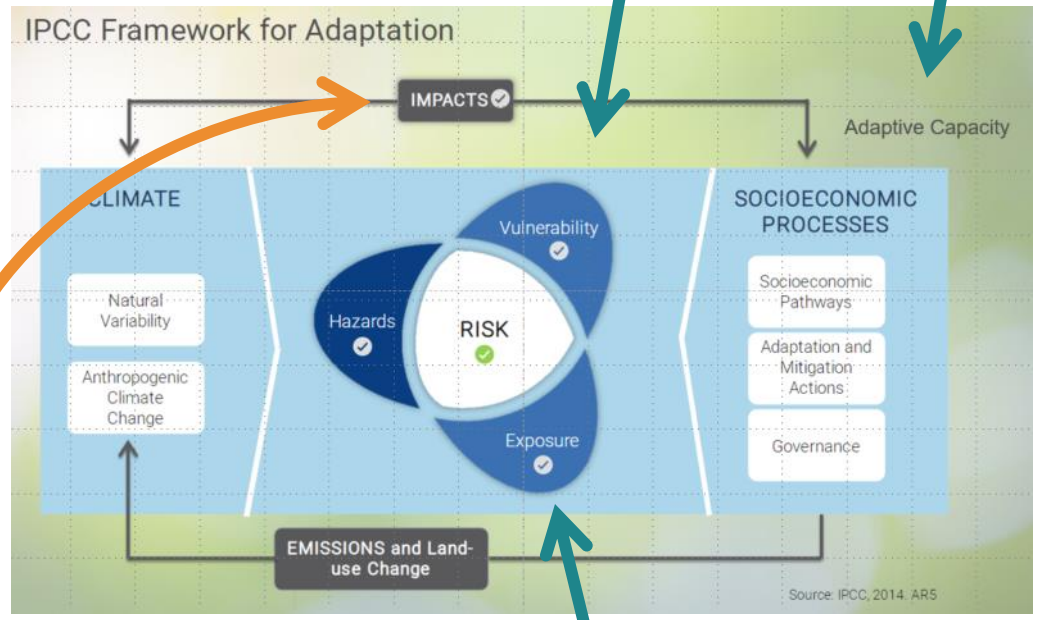
Examples of Adaptation goals are:

- Reduce the number of casualties due to hurricanes
- Decrease the amount of leakage from water supply network
- Increase the area of greening on and around public buildings by 10%

Adaptation goals

Should identify the most relevant hazard(s) to tackle and formulate the intention to reduce its potential impact by:

- decreasing the overall risk level,
- decreasing **sectors**' **vulnerability** (and/or **exposure**),
- decreasing **population groups' vulnerability** (and/or **exposure**),
- increasing sectors' **adaptive capacity** (factors);
- **DECREASING IMPACTS**



Adaptation goals as S.M.A.R.T. goals

- **Specific**: Climate adaptation goals should be clearly defined. Instead of setting a vague goal like "reduce the impacts of climate change," a specific goal would be "reduce the annual loss resulting from river floods." This specificity enables stakeholders to focus their efforts on precise challenges and devise targeted strategies.

- **Measurable**: To track progress and assess the effectiveness of adaptation strategies, goals must be quantifiable. For instance, "decrease the number of forest fires/hectares of land burned to max 5% of land" provides a clear metric that can be measured and evaluated.

- **Achievable**: While ambition is important, climate adaptation goals must be realistic given the available resources, technology, and time. Setting an achievable goal might mean starting with gradual targets to be reached in the next few years or limit the climate impact to low levels instead of zero or going beyond current capabilities.

- **Relevant**: Adaptation goals must align with the broader objectives of the communities and ecosystems they aim to protect. A relevant goal takes into account the local context, such as “reduce the economic loss of drought-prone agricultural areas to ensure food security.“

- **Time-bound**: Setting deadlines is crucial to maintaining momentum and urgency in climate adaptation efforts. A time-bound goal could be "reduce damages on the building stock as a result of storms to zero by 2030." This creates a clear timeline for planning, execution, and review.

Examples of quantifiable (S.M.A.R.T) goal with measurable targets

- By 2030, reduce the **annual loss** resulting from river **floods** by X% compared to the base year value of *[insert base year value].*
- By 2030, decrease the number of forest fires/hectares of **land burned** to X fires/year or ha/year, compared to the base year value of *[insert base year value].*
- By 2030, reduce losses and **damages on the building stock/infrastructure** as a result of **storms** by X% compared to the base year value of *[insert base year value].*

Adaptation goals are not “adaptation actions”

The goal is not “***going to gym 3 times a day***” (=action)

but “***to lose XX kg by XX***” (=goal with a measurable target)

- **RVA** High-risk Hazard: *Floods*
- **RVA** High-vulnerable Sector: *Buildings*
- **Goal**: “*By 2030, reduce the impact of flood events on buildings (-50% number of buildings affected in 2020)”*
- **Action1**: *Climate-proofing exposed buildings (valves, pumps, ..) in area X*
- **Action2**: *Developing nature-based solutions on public space in area X*
- **Action2**: *Developing campaigns on climate awareness and preparedness*

Definitions & Indicators

- **Annex I:** Lists (Hazards, sectors, vulnerable groups)
- **Annex II:** Definitions
- **Annex III: Indicators** (indicative list)

Annex III: Indicators (indicative list)

Below is a sample list of indicators that may be used for the risks and vulnerability assessment. They will be useful to set adaptation goals/targets and track progress over time.

Sector	Indicator	unit
Buildings	Number or % of (public/residential/tertiary) buildings damaged by extreme weather conditions/events	(per year / over a certain period)
Transport, Energy, Water, Waste, ICT	Number or % of transport/energy/water/waste/ICT infrastructure damaged by extreme weather conditions/events	(per year / over a certain period)
Transport, Energy, Water, Waste, Civil Protection & Emergency	Number of days with public service interruptions (e.g. energy/water supply, health/civil protection/emergency services, waste)	No.
Transport, Energy, Water, Waste, Civil Protection & Emergency	Average length (in hours) of the public service interruptions (e.g. energy/water supply, public transport traffic, health/civil protection/emergency services)	hours
Health	Number of people injured/evacuated/relocated due to extreme weather event(s) (e.g. heat or cold waves)	(per year / over a certain period)
Health	Number of deaths/hospitalizations related to extreme weather event(s) (e.g. heat or cold waves)	(per year / over a certain period)
Health	Number of water quality warnings issued	%
Health	Number of air quality warnings issued	No.
Environment & Biodiversity	% of habitat losses from extreme weather event(s)	%
Environment & Biodiversity	% of native (animal/plant) species affected by diseases related to extreme weather conditions/events	%
Agriculture & Forestry	% of agriculture losses from extreme weather conditions/events (e.g. drought/water scarcity, soil erosion)	%
Agriculture & Forestry	% of livestock losses from extreme weather conditions % of timber losses from pests/pathogens	%
Agriculture & Forestry	% change in crop yield / evolution of the annual grassland productivity	%
Agriculture & Forestry	% change in water abstraction	%
Tourism	% change in tourist flows / tourism activities	%
Other	€ annual direct economic losses (e.g. in commercial/agricultural/industrial/touristic sectors) due to extreme weather event(s)	€/year
Other	€ annual amount of compensation received (e.g. insurance)	€/year

RVA table

Climate hazards (see Annnex)	Current levels of hazards		Future hazards			Vulnerable Sector(s) [See Annex]	INDICATOR [See Annex III]	Vulnerable Population group(s) [See Annex]	Optional: Adaptive Capacity Factors *(Access to services, Socio-economic, Governmental & institutional, Physical & environmental, Knowledge & innovation)*
	Probability *(high, moderate, low, not known)*	**Impact** *(high, moderate, low, not known)*	**Expected change in hazard intensity** *(increase, no change, decrease, not known)*	**Expected change in hazard frequency** *(increase, no change, decrease, not known)*	**Time frame** *(short-term, mid-term, long-term, not known)*				
Example: Extreme Heat	High	Moderate	Increase	Increase	Short term, mid-term, long-term	Health	Number of hospitalizations related to heat waves	Elderly	-

Adaptation goals

PART 2 – Define Adaptation Goals

Please, fill the table below based on the information provided in part I.

Adaptation goals should address the most relevant hazards and vulnerabilities coming from the RVA.
Goals could be aimed at decreasing the overall risk level, decreasing a specific sectors vulnerability (and exposure), decreasing specific population groups' vulnerability (and exposure), or increasing adaptive capacity.

Using an indicator, future monitoring reports will measure the progress towards the defined target.

Adaptation Goal	Climate hazard	Sector	Vulnerable population group	Base value	Base year	Target value	Target Year
Example: "Reduce the annual heat-related hospitalizations by 50% by 2030"	Extreme heat	Health	Elderly	150	2022	75	2030

(at least 1 row)

Tips for CoM cities and their SECAPs

European Commission

Establishing the RVA Team

- **Human Resources:**
  - Evaluate skills and identify gaps for targeted training.
- **Technical Resources:**
  - Assess and update technology and tools.
- **Financial Resources:**
  - Explore diverse funding options (EU, national, private).
  - Integrate adaptation into policies for cost efficiency.

Formation of RVA Team

- **Core Composition:** Multidisciplinary team from key sectors (health, transport, energy, etc.).
- **Leadership:** Appoint an 'adaptation officer' for coordination and goal alignment.
- **Objectives & Tasks:** Define goals, tasks, and engage external entities.
- **Collaboration:** Regular meetings, shared workspaces, and workshops for stakeholder input.
- **Transparency:** Maintain clear documentation of processes and decisions.

Stakeholder Engagement and Communication

- **Identifying and Mapping Stakeholders**
  - Identify and categorize organizations or individuals impacting or impacted by climate adaptation plans.
- **Engagement Strategies and Tools**
- **Workshops & Focus Groups:**
  - Validate climate vulnerabilities and risks.
  - Conduct both thematic/sectoral and cross-thematic/cross-sectoral workshops.
- **Deliberative Processes:**
  - Engage vulnerable groups to better identify specific risks and vulnerabilities.
- **Communication Activities:**
  - Implement targeted campaigns to enhance citizen awareness and understanding of climate issues.

Clarify concepts, common language

- **(Climate) Hazard vs Risk?**
- **(Climate) Hazard vs Threat?**
- **(Climate) Adaptation vs Mitigation?**
- **(Climate) Adaptation vs Hazard Mitigation?**
- **(Climate) Adaptation vs Resilience?**
- **(Climate) Resilience vs Resiliency?**
- **(Climate) Adaptive Capacity vs Adaptation Action?**
- **(Climate) Adaptation vs Disaster Risk Management?**
- **(Climate) Action/ Response/ Measure/ Instrument/ Strategy/ Policy?**
- **(Climate) Hazards vs Disaster event?**
- **Heat Stress vs Heatwave vs Overheating vs Urban Heat Island (UHI)?**
- **Heavy Precipitation vs Floods?**
- **Drought vs Heat?**
- **Drought vs Water Scarcity?**
- **Biological Hazard as a Climate hazard?**
- **Multi-Hazards vs Cascading Effect?**
- **Coastal Erosion vs Sea Level Rise?**

European Commission

Thank you. *Questions?*

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Joint Research Centre, European Commission

European Commission

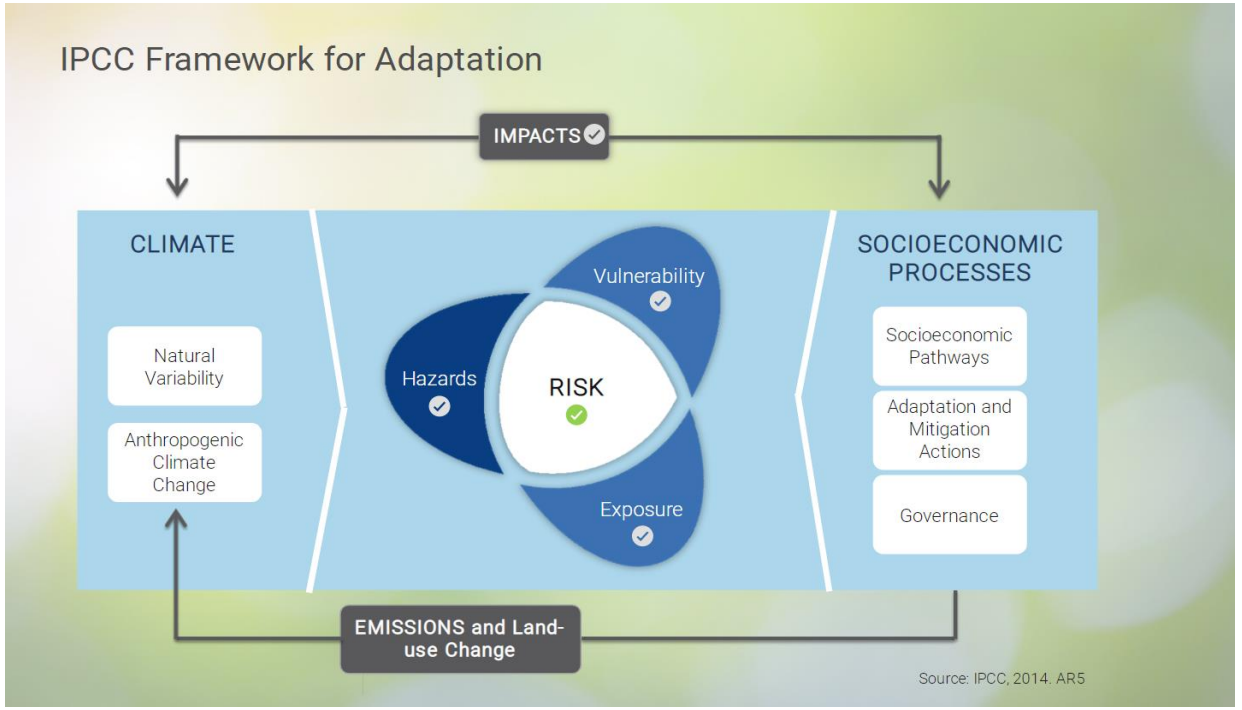
Example – Identify risks (Flood Risk)

Example – Identify risks (Flood Risk)

- **FLOOD RISK** =The *overflowing* of the normal confines of a stream or other body of water, or the *accumulation of water* over areas not normally submerged.
  - **Flash/surface flood**: Heavy or excessive rainfall in a short period of time that produce immediate runoff, creating flooding conditions within minutes or a few hours during or after the rainfall.
  - **River flood**: River floods (also referred to as ‘riverine’ or ‘fluvial’ flood) occur over a wide range of river and catchment systems. Floods in river valleys occur mostly on flood plains or wash lands because of flow exceeding the capacity of the stream channels and spilling over the natural banks or artificial embankments.
  - **Coastal flood**: Higher-than-normal water levels along the coast caused by tidal changes or thunderstorms that result inflooding, which can last from days to weeks.
  - **Groundwater flood**: The emergence of groundwater at the ground surface away from perennial river channels or the rising of groundwater into man-made ground, under conditions where the 'normal' ranges of groundwater level and groundwater flow are exceeded.
  - **Permanent inundation**: Landmass completely covered with water

Activity 1 – Identify risks

- Looking at the following pictures, please identify:
  - **Hazard**
  - **Exposure**
  - **Vulnerability**
  - **Adaptive Capacity**
  - **Impact**
  - **Adaptation Action**
- Discuss together results



Flood risk

Hazard? Exposure? Vulnerability? Adaptive capacity? Impact? Action?


NO ENTRY
KHÔNG VÀO LỐI NÀY
COLD®
FLOOD PREVENTION

Flood risk

Hazard

2

3

4

5

6

7

Flood risk

Hazard

Exposure

3

4

5

6

7

Flood risk

Hazard

5

Exposure

6

3

Vulnerable sector (building)

7

Flood risk

Hazard

5

Exposure

6

Vulnerable population group (children)

Vulnerable sector (building)

7

Flood risk

Hazard

5

Exposure

Impact

Vulnerable population group (children)

Vulnerable sector (building)

7

Flood risk

Hazard

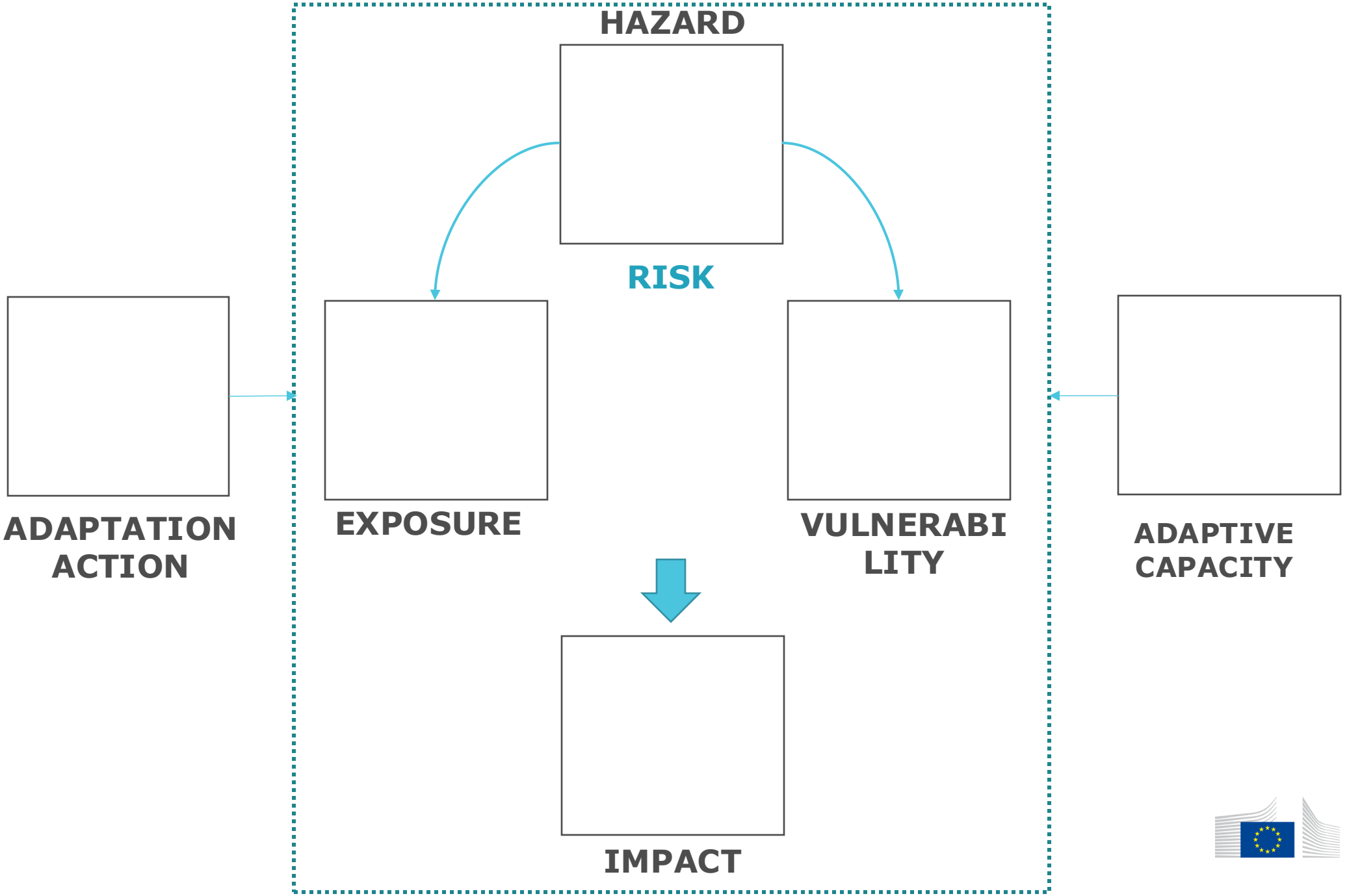
Exposure

Vulnerable population group (children)

Vulnerable sector (building)

Adaptive capacity

Impact



European Commission

HAZARD

RISK

ADAPTATION ACTION

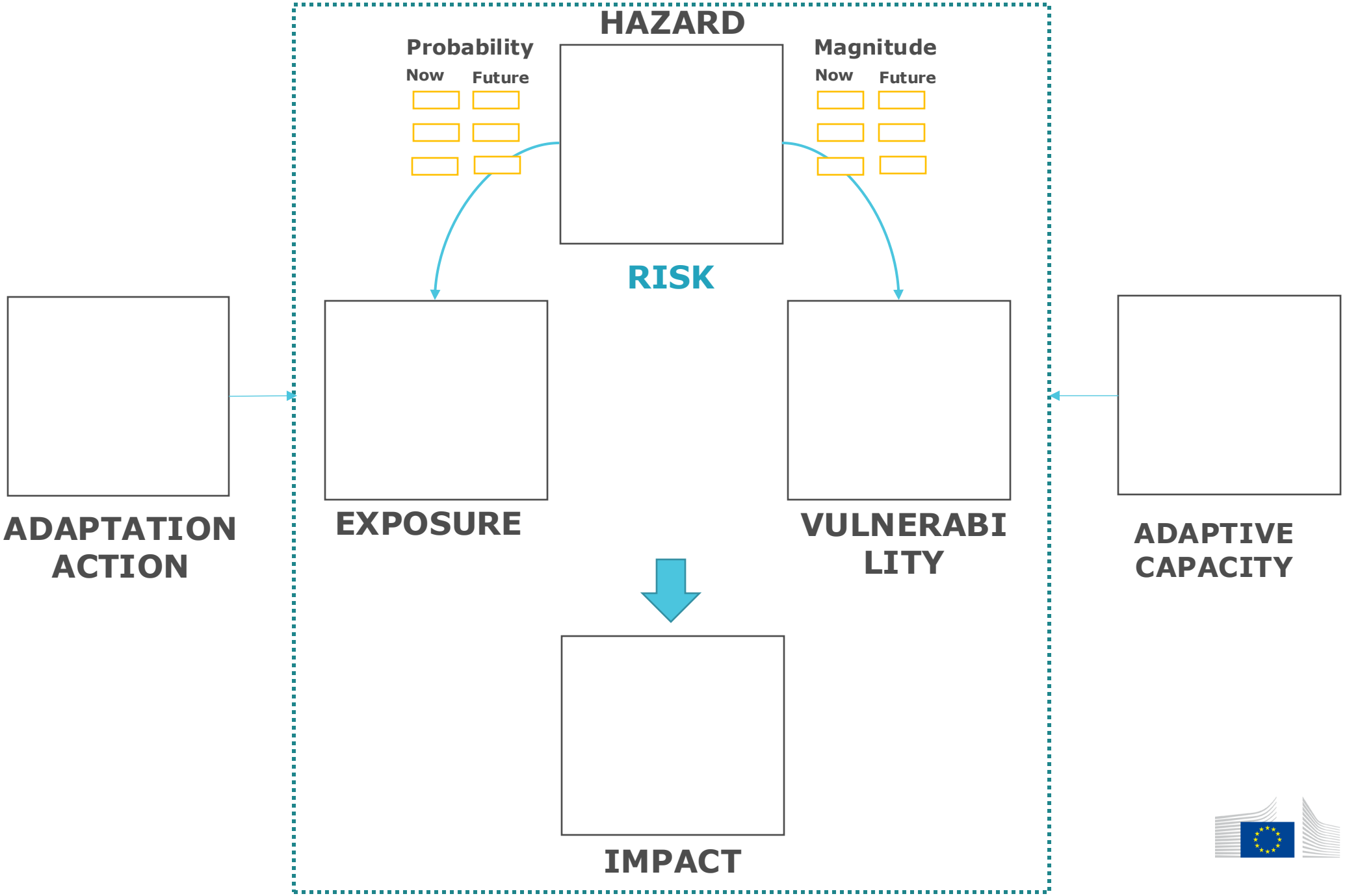
EXPOSURE

VULNERABILITY

ADAPTIVE CAPACITY

IMPACT

European Commission



European Commission

HAZARD

Probability

Now Future

Magnitude

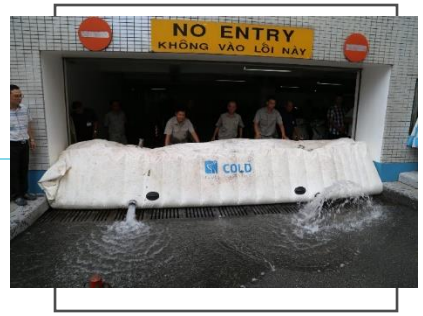
Now Future

RISK

ADAPTATION ACTION

EXPOSURE

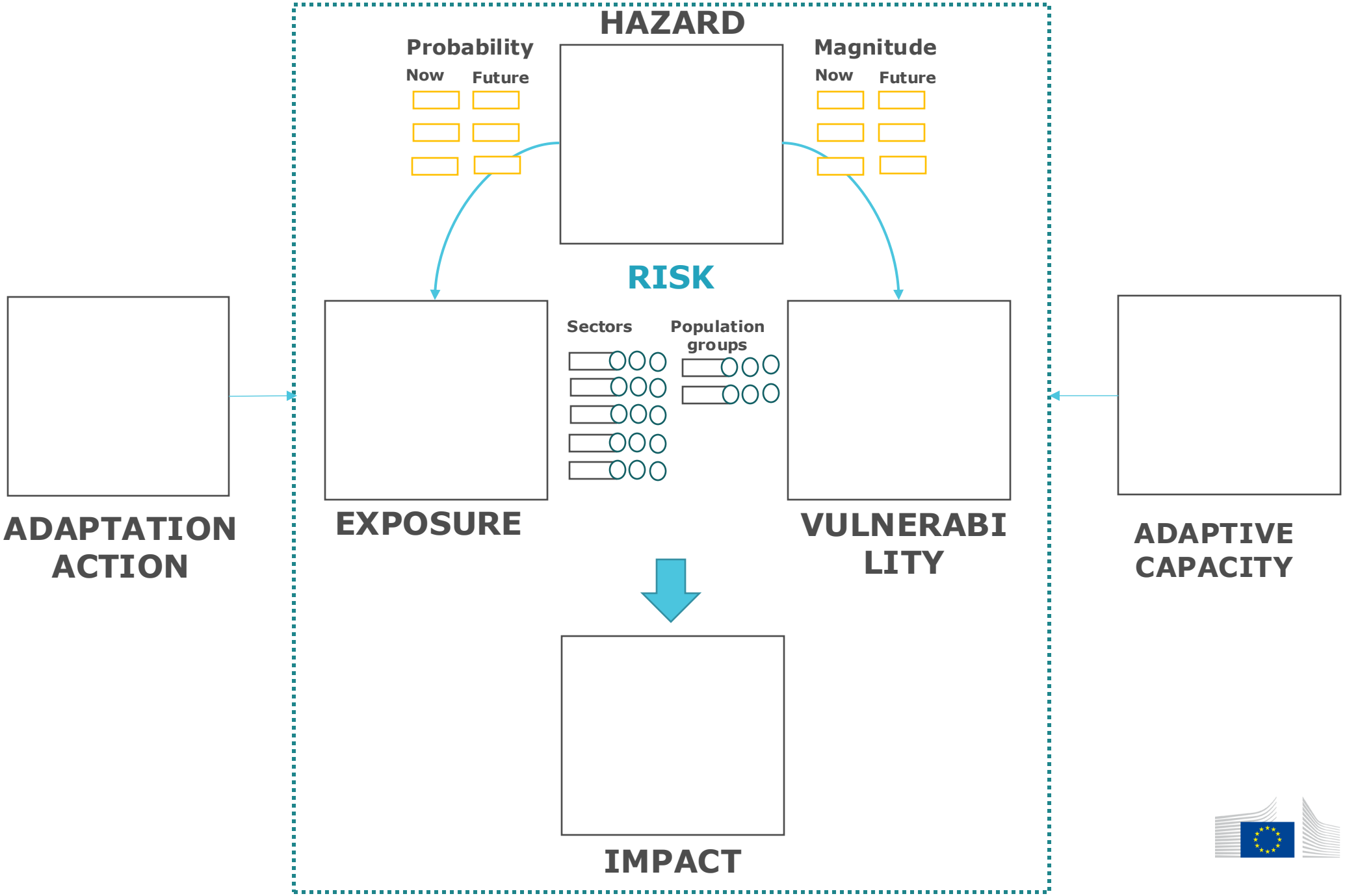
VULNERABILITY



ADAPTIVE CAPACITY

IMPACT

European Commission



European Commission

Flood risk INDICATORS

Hazard: days with water level above 10 cm (data from hydrometric station)

Adaptive capacity: Hours needed to activate emergency response systems

Exposure: population living in flood prone areas (500-year flood risk)

Impact: number of buildings damaged, economic damages to infrastructure

Vulnerable population group: number of children/people with disabilities

Vulnerability: n. of sub-standard buildings

Adaptation Action: n. of houses made resilient to floods

HAZARD

Probability

Now Future

Magnitude

Now Future

RISK

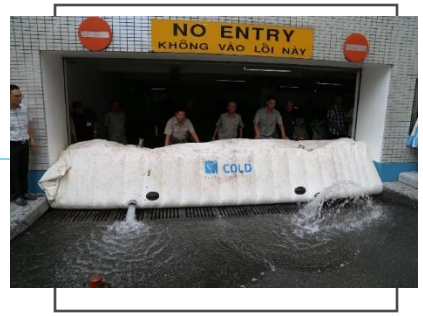
ADAPTATION ACTION

Sectors

Population groups

EXPOSURE

VULNERABILITY



ADAPTIVE CAPACITY

IMPACT

European Commission