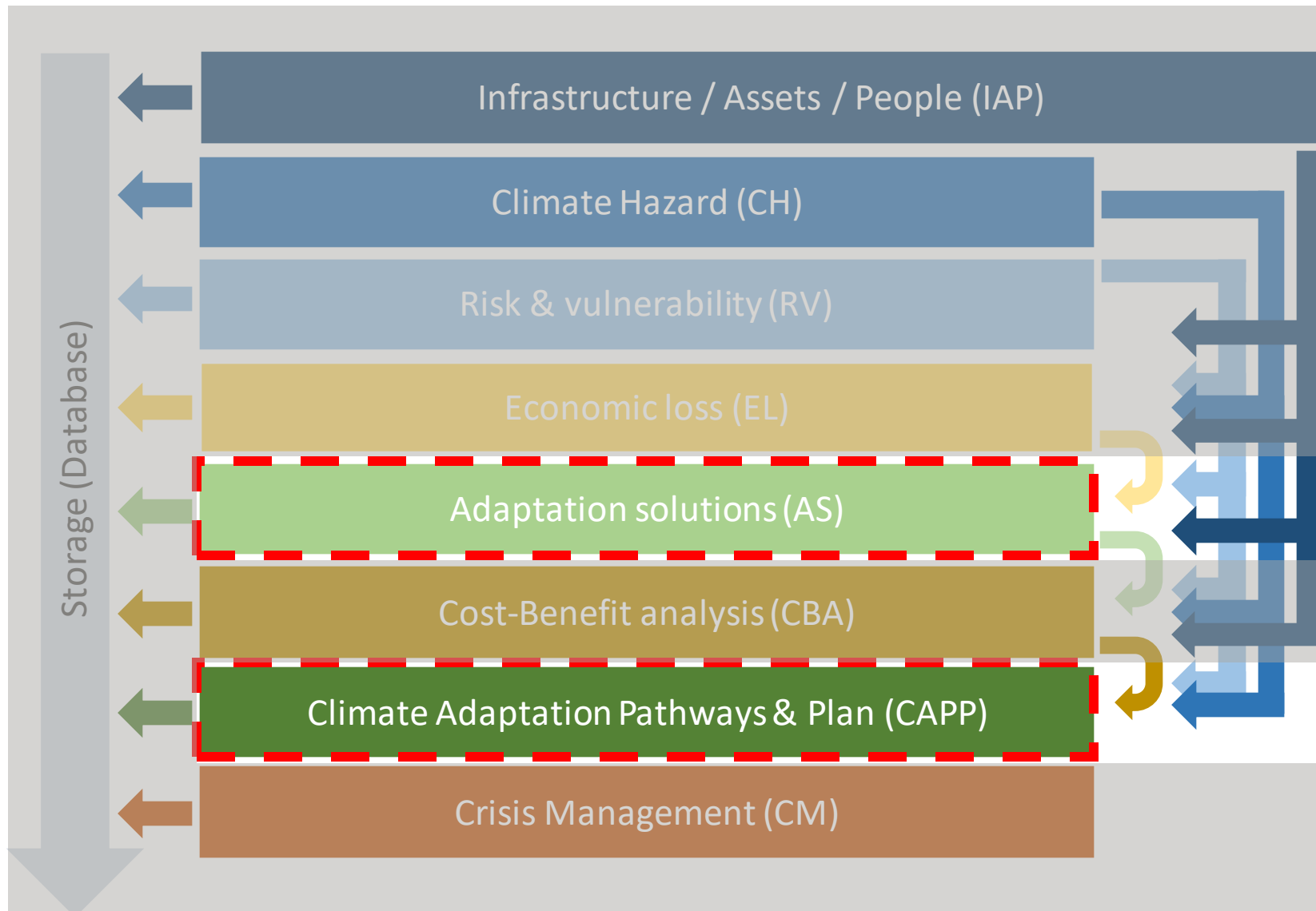


# MODULE 4, 5

Cyprien BUTIN



## Adaptation pathways (AP)

### In a nutshell

*“Sequences of actions, which can be implemented progressively depending on how the future unfolds and the development of knowledge.”*

Address the major issues faced by decision-makers → climate change **uncertainty. Shift in the understanding of climate change adaptation from predicting impacts to understanding dynamic decision processes.**

There is no common approach to the development of climate adaptation pathways. **It is a context and stakeholder-driven process.**

## Climate Adaptation Pathways & Plan (CAPP)

### Climate Adaptation Plan (5)

*“This module will produce an adaptation action plan sequenced over time. It will be derived from the adaptation pathway analysis (module 4) as well as the estimated avoided economic loss of adaptation measures (module 6, “Cost Benefit Analysis”).”*

### Adaptation pathways (4)

*“Using the data developed through module 2 (Risk and Vulnerability, the Adaptation Pathways module will enable dynamic and flexible adaptation planning accounting for the uncertainty of climate change scenarios.”*

# METHODOLOGY



➤ The methodology of the module comprises **6 distinct steps** which aim at **identifying and prioritizing the adaptation measures** by distinguishing **the ones to be taken now** and **the ones which should be implemented once certain conditions occur**.

➤ *Step 0:* Mobilize stakeholders and advance a roadmap

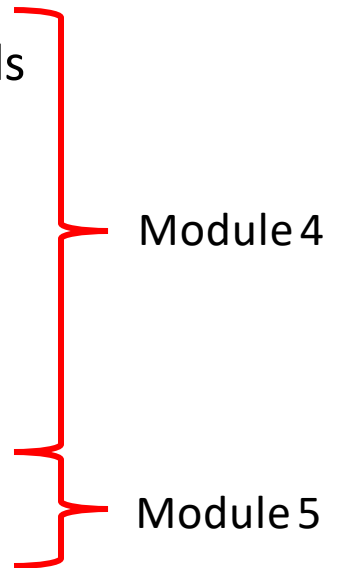
➤ *Step 1:* Identify the main climate-related risks, the risk levels, and associated thresholds

➤ *Step 2:* Set the adaptation objectives/desired vision

➤ *Step 3:* List and assess adaptation measures (including through a cost-benefit analysis)

➤ *Step 4:* Co-construct the adaptation pathway map

➤ *Step 5:* Climate adaptation plan and next steps for implementation.



# Step 1: Identify & Assess the Risks



An example of climate-related risk (based on preliminary discussions)

## Climate hazards

More frequent and intense heatwaves

## Vulnerability

### Exposure

Patients & health workforce  
Hospital buildings (including ICUs)  
Assets including medical equipment (such as MRI scanner, radiographic examination table)

### Intermediate impact

Breakdown of the cooling system

### Risk

Disruption of the medical equipment operation

### Sensitivity

Intense heat produced by the operation of the equipment  
A/C system cannot operate > T°C threshold  
Equipment cannot operate if T° in the room is >T°C threshold  
Bad insulation of the buildings

### Lack of/Weak Adaptive Capacity

Do it yourself cooling solutions (portable air conditioners, hoze, etc.)  
medical equipment is renewed every 7 years  
Lack of awareness of climate impacts

## Socio-Economic/ Environmental effects

Patients are impacted:

- Some may have to perform their examination in hospitals (it adds pressure to the whole health system)
- Or may rely on other techniques that are less efficient (radiology, etc.)

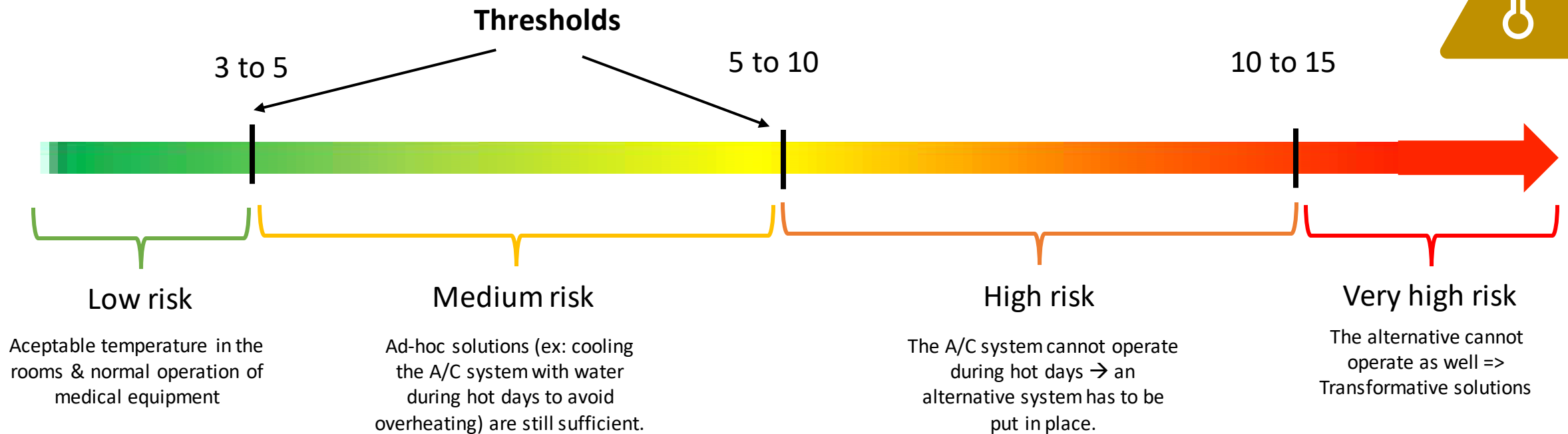
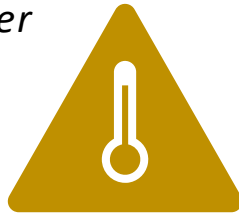
## Step 2: Set the objectives



### Risk of disruption of medical equipment operation

**Indicator:**

*Number of days in a year with a temperature over 35°C (days/year)*



**Objective :** Prevent A/C system disruption and maintain acceptable temperature in the rooms where medical equipment is located

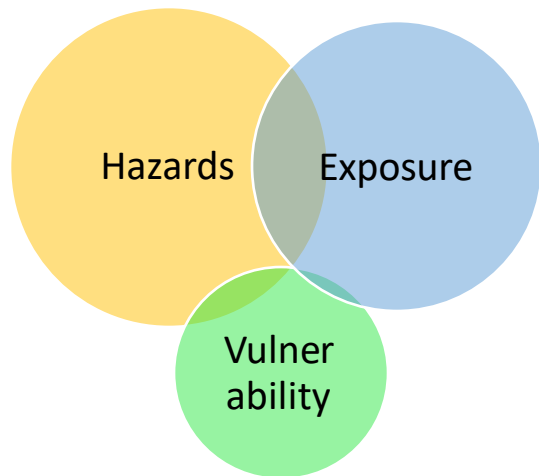
**Objective :** Relocation of medical equipment to another less vulnerable hospital

# Step 3: List Adaptation Solutions



Adaptation measures can be identified through a climate risk assessment. They are the ones that:

- Reduce exposure
- Reduce sensitivity and increase adaptive capacity



## Array of adaptation measures :

- Install a tool for real time temperature monitoring
- Install a back-up A/C equipment
- Install chillers & A/C systems that are fit for tropical standards (hotter & more humid environment)
- Use new technology: MRI without chilled water (aerothermal)
- Retrofit the buildings to increase heat insulation
- Develop new buildings using state-of-the-art technologies (air blowers, canadian well)
- Etc.

**no or low regrets interventions** that can be implemented from now on

**Highly costly** interventions, that need to be sequenced over time



More work (desk review, benchmark, discussions with hospitals) needed to identify relevant adaptation actions and assess their implementing condition.



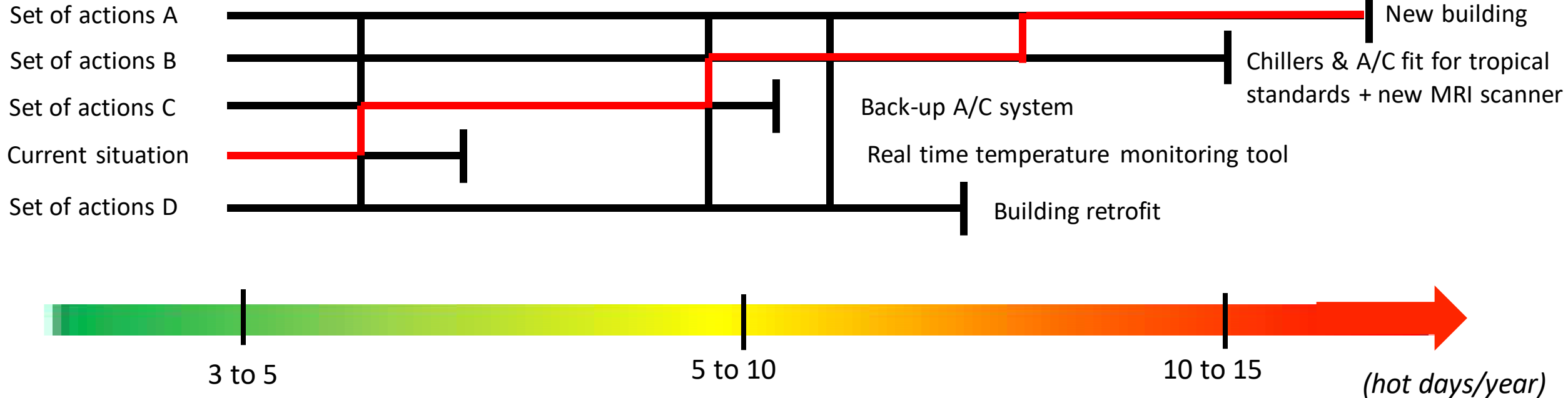
# Step 3: Assess Adaptation Solutions

## Multi-criteria analysis

- Help the CoP work group to assess if a measure is adequate (= in relation to the objectives set, the hospital's context and the availability of financial and technical resources)
- 8 assessment criteria proposed (efficiency, feasibility, flexibility, synergy, environmental co-benefit, social acceptability, cost-benefit analysis, contribution to mitigation)
- CoP knowledge → give a score for each criterium from 1 star (unsatisfactory) to 4 stars (very satisfactory)
- Results of a quantitative assessment (ex: cost-benefit analysis)

Assessment criteria	Guiding questions	Scoring grid	
<b>Efficiency</b>	What kind and level of climate-related risks does the healthcare facility has to deal with?	★☆☆☆	This action is not relevant to deal with the risk.
		★★☆☆	This action is only marginally to deal with the risk.
		★★★☆☆	This action is quite relevant.
		★★★★	This action is very relevant.
<b>Feasibility</b>	To what extent can its implementation be hampered by technical, regulatory or institutional barriers?	★☆☆☆	This action faces major implementation constraints.
		★★☆☆	Implementation constraints exist but can be overcome.
		★★★☆☆	<u>There</u> a limited implementation constraints
		★★★★	This is an easy to implement action, with very limited implementation constraints

# Step 4: Co-construct Adaptation Pathways



**Set of actions A & B:** Robust actions but require large capital or would have ramifications on social/economic systems.

**Set of actions C:** short term action – easily implemented / allow to buy us time but do not have a long shelf life

**Action D:** medium term action

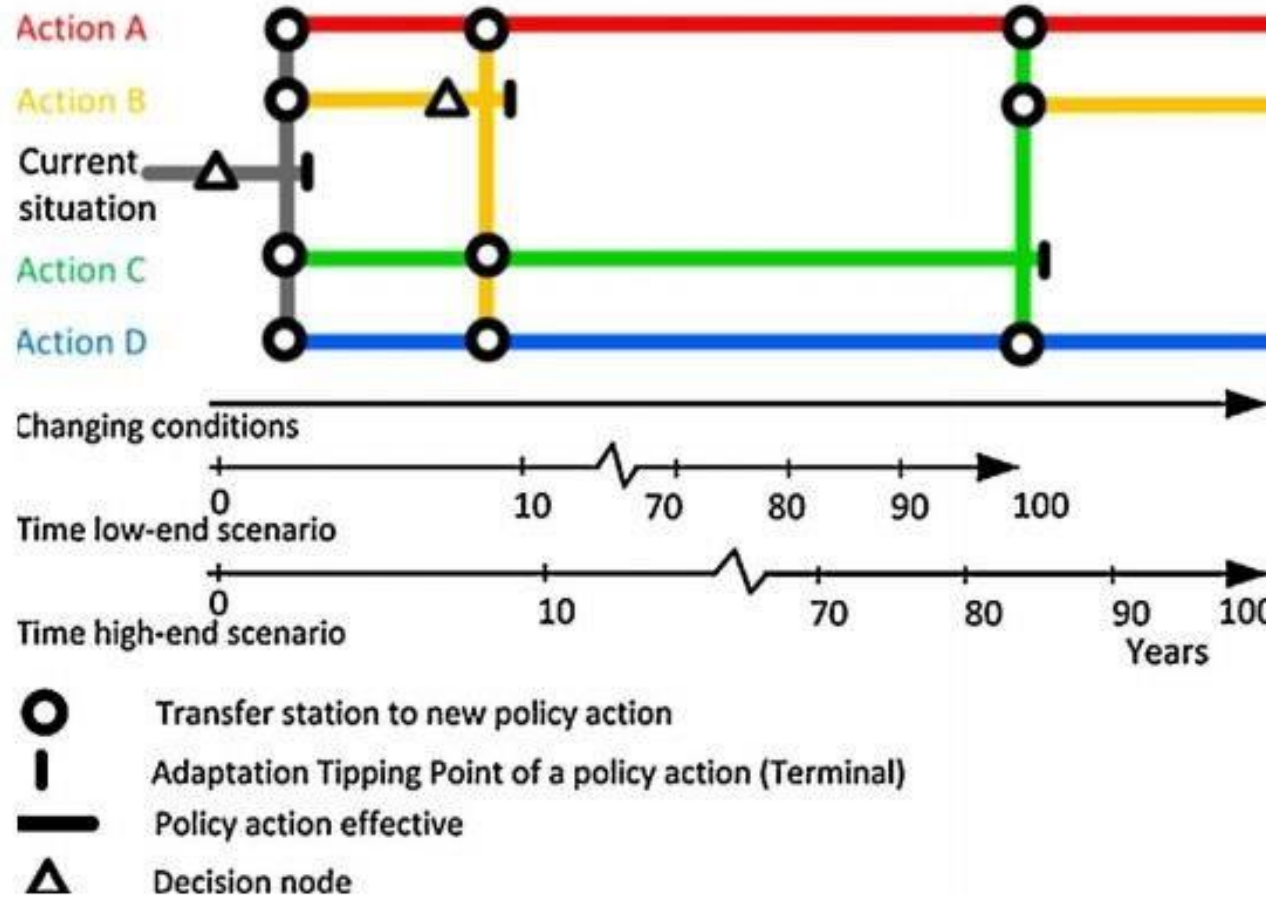
┌ Indicates that action has reached its “tipping point”

— Preferred path

# Step 4: Co-construct Adaptation Pathways



Adaptation Pathways Map



Typical adaptation pathway map

# Connections with other modules

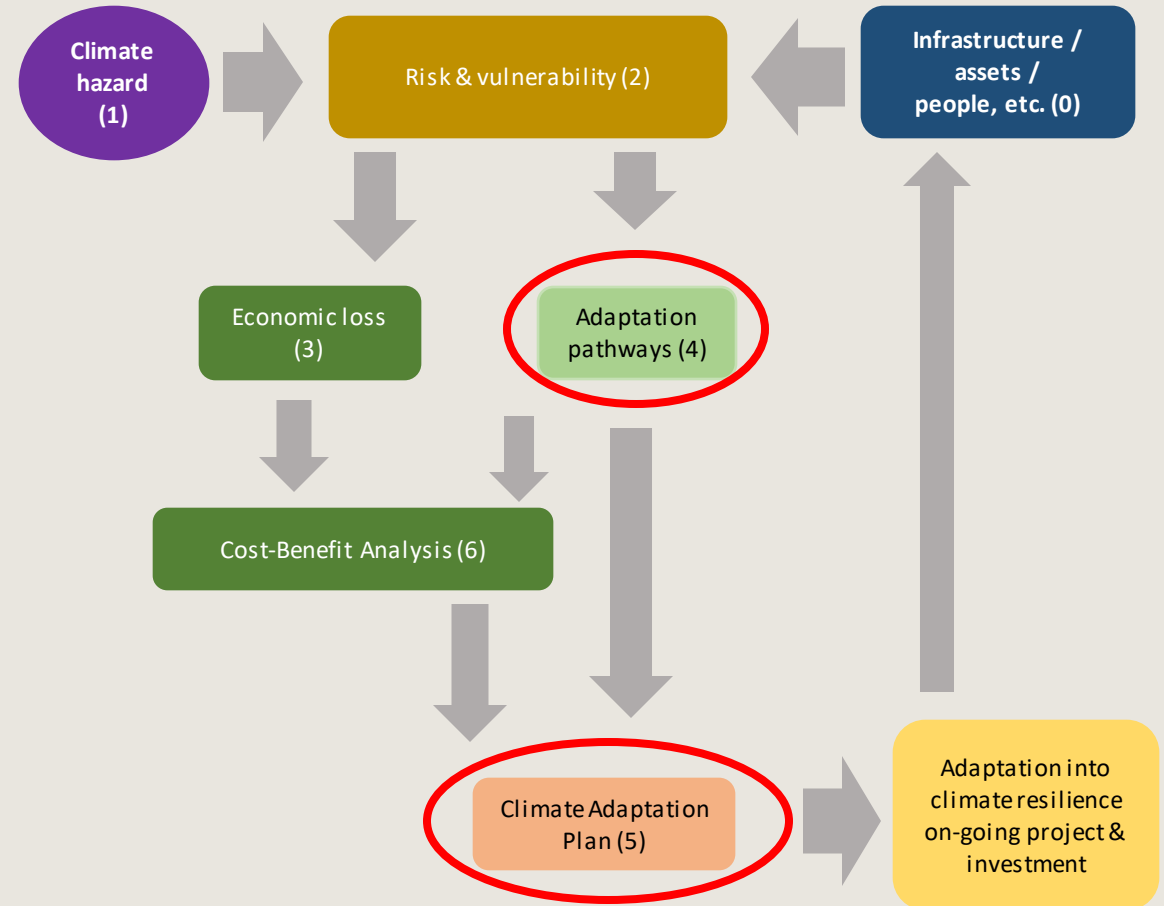
**Modules 4 & 5** are built upon the identification of climate-related risks, that are inferred from **modules 0, 1 & 2 (NCSR)**.



The **module 2** of the healthcare facilities is determined by i) the analysis of the exposure & vulnerability factors (**module 0**) & ii) that of the climate hazard (**module 1**).

**Step 3** (=assesses the relevance of each adaptation measure and prioritizes them) is interconnected with the **module 6 (RINA-C)** focusing on the analysis of different actions' cost benefit.

The outputs of the **Adaptation Pathways (Module 4)** and estimated avoided economic loss of adaptation measures (**module 6**) should determine the **Climate Action Plan (Module 5)**.



# Climate Adaptation Pathways & Plan (CAPP)



## INPUTS

The **identification of climate-related risks**



The required inputs are:

- a list of up to five **identified risks**
- their **magnitude** which refers to the risks' likelihood and intensity
- the **indicators** (climatic or non climatic ones) that monitor the transition between levels of risk
- the **critical thresholds** that indicate the transition between levels of risk

## OUTPUTS

- List of measures with a preliminary costing to be assessed through Module 6 (Cost-Benefit Analysis)
- The **Adaptation Plan (Module 5)** that is inferred from the modules Cost-Benefit Analysis (6) and Adaptation Pathways (4).