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Regione Lombardia Conference
Global Climate Leadership: sub-national governments commitment to climate change towards COP21

Adaptation to climate change: designing, implementing and harmonizing policies from European to regional and local level

Antonio Ballarin Denti

Lombardy Foundation for the Environment

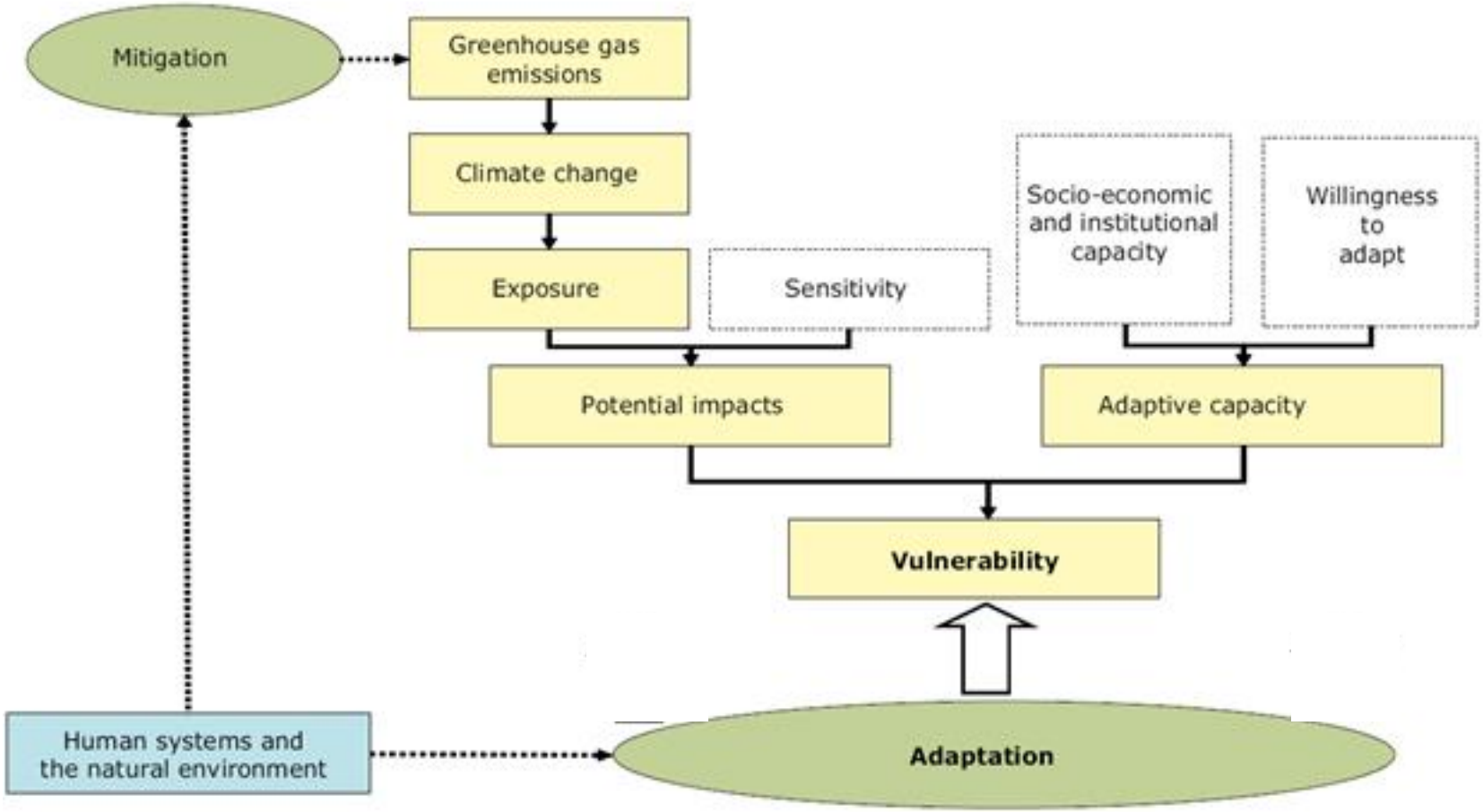
EXPO, Italian Pavilion, 26 October 2015

What is adaptation?

"The adjustment of natural or human systems to actual or expected climate change or its effects in order to moderate harm or exploit beneficial opportunities."

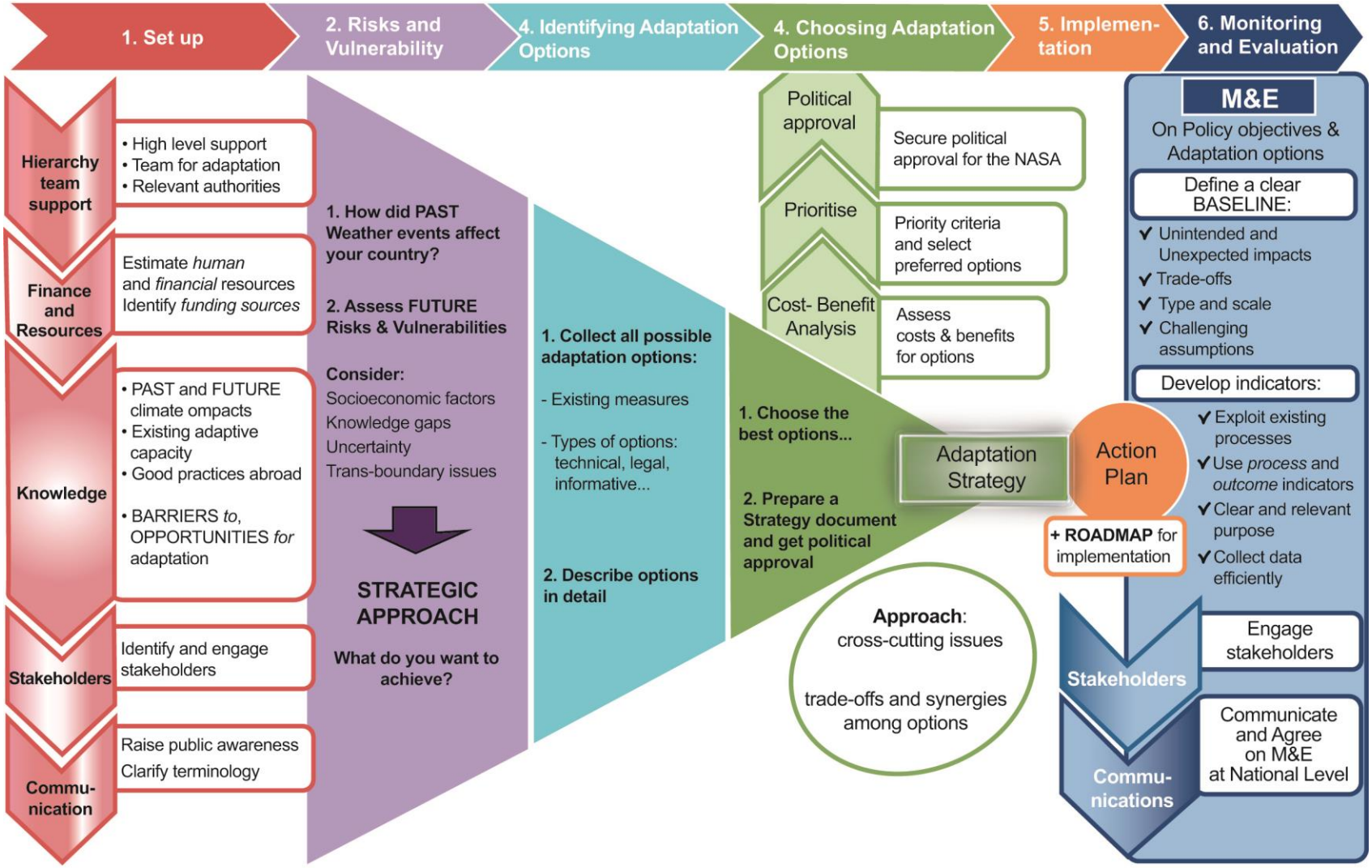
(IPCC, 2007)

Mitigation vs adaptation



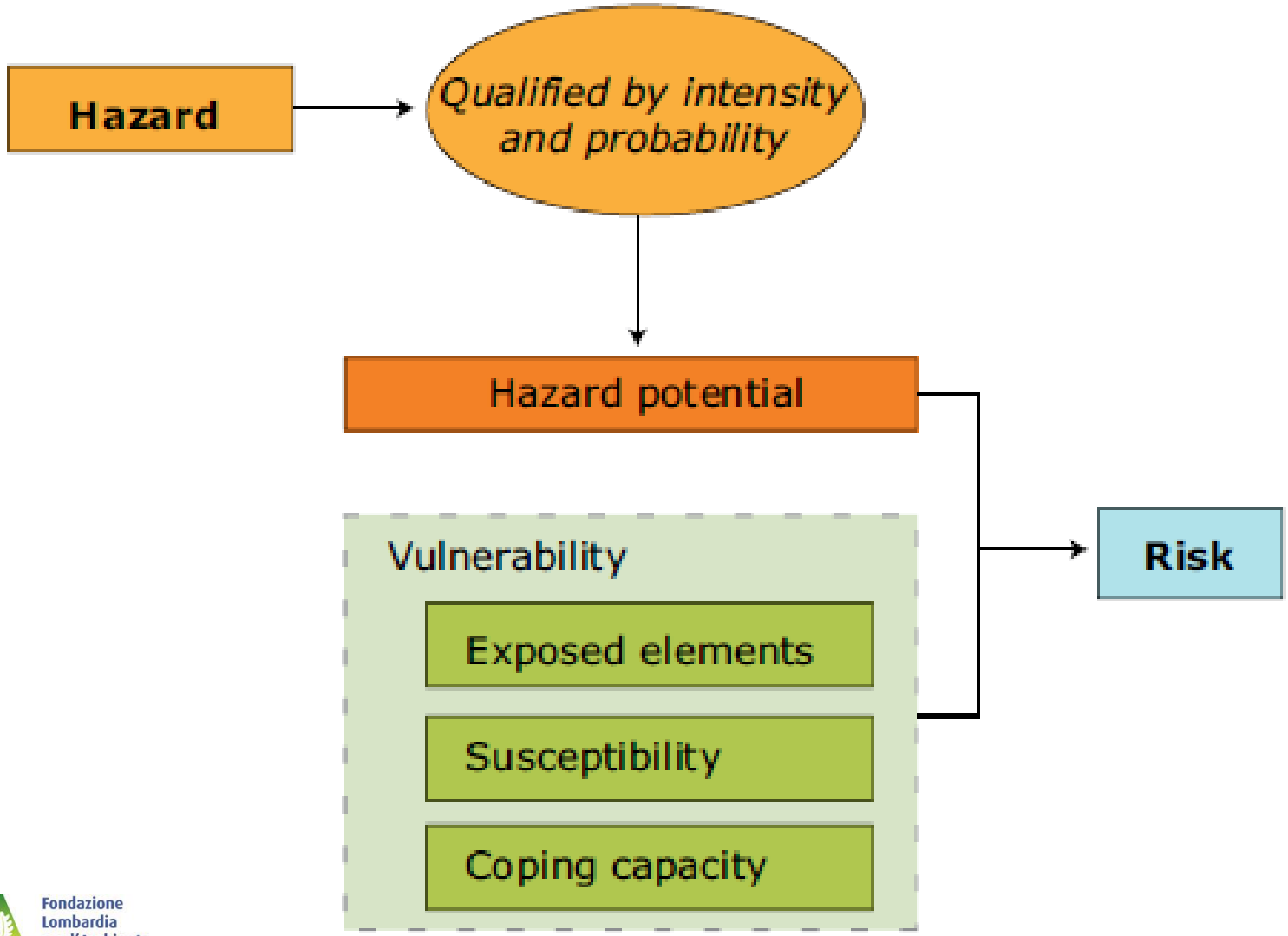
Source: EEA, 2008; Isoard, Grothmann and Zebisch, 2008.

The adaptation process: an overview



Source: EC, 2013

The approach:
CC impacts and risk assessment



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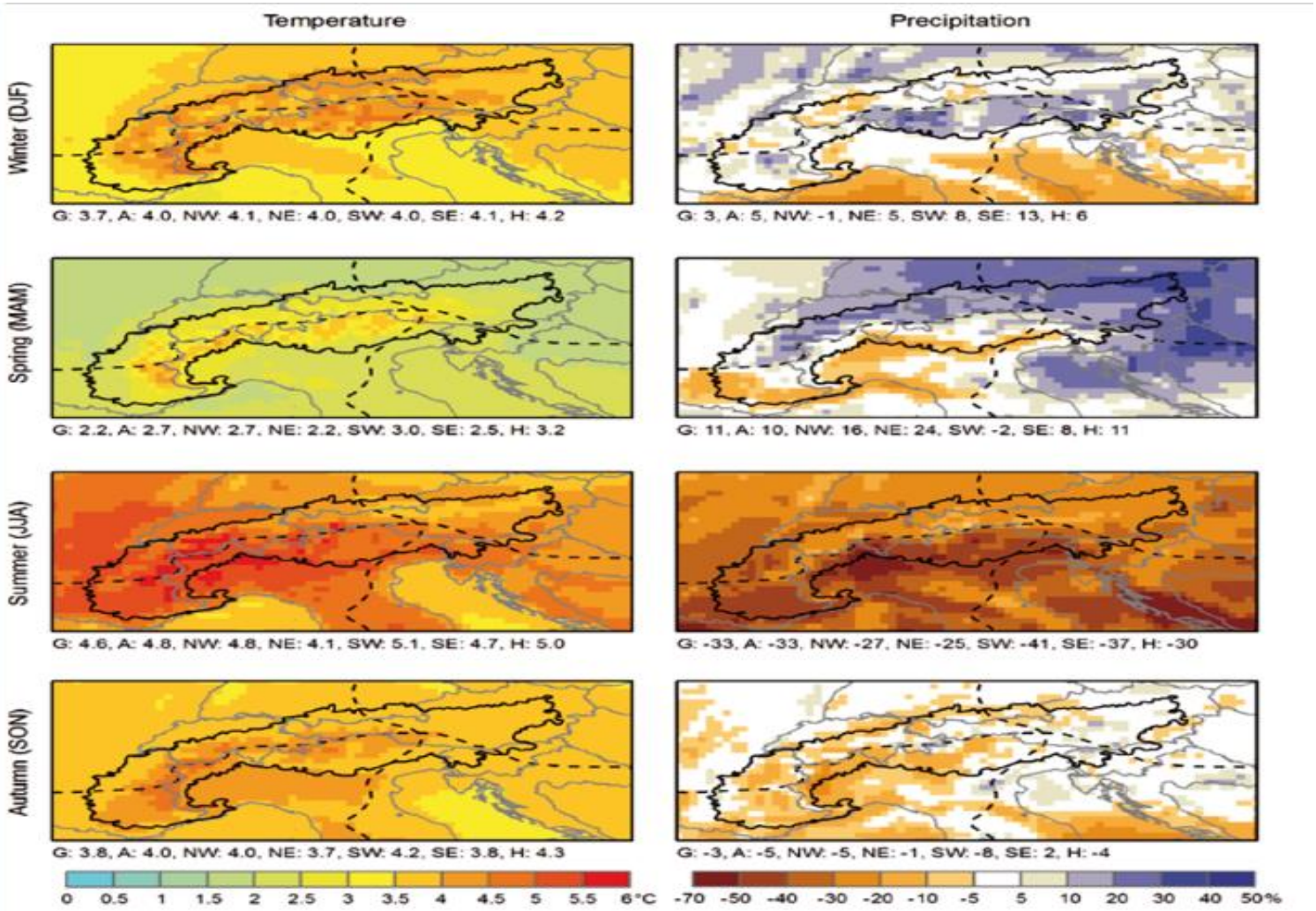
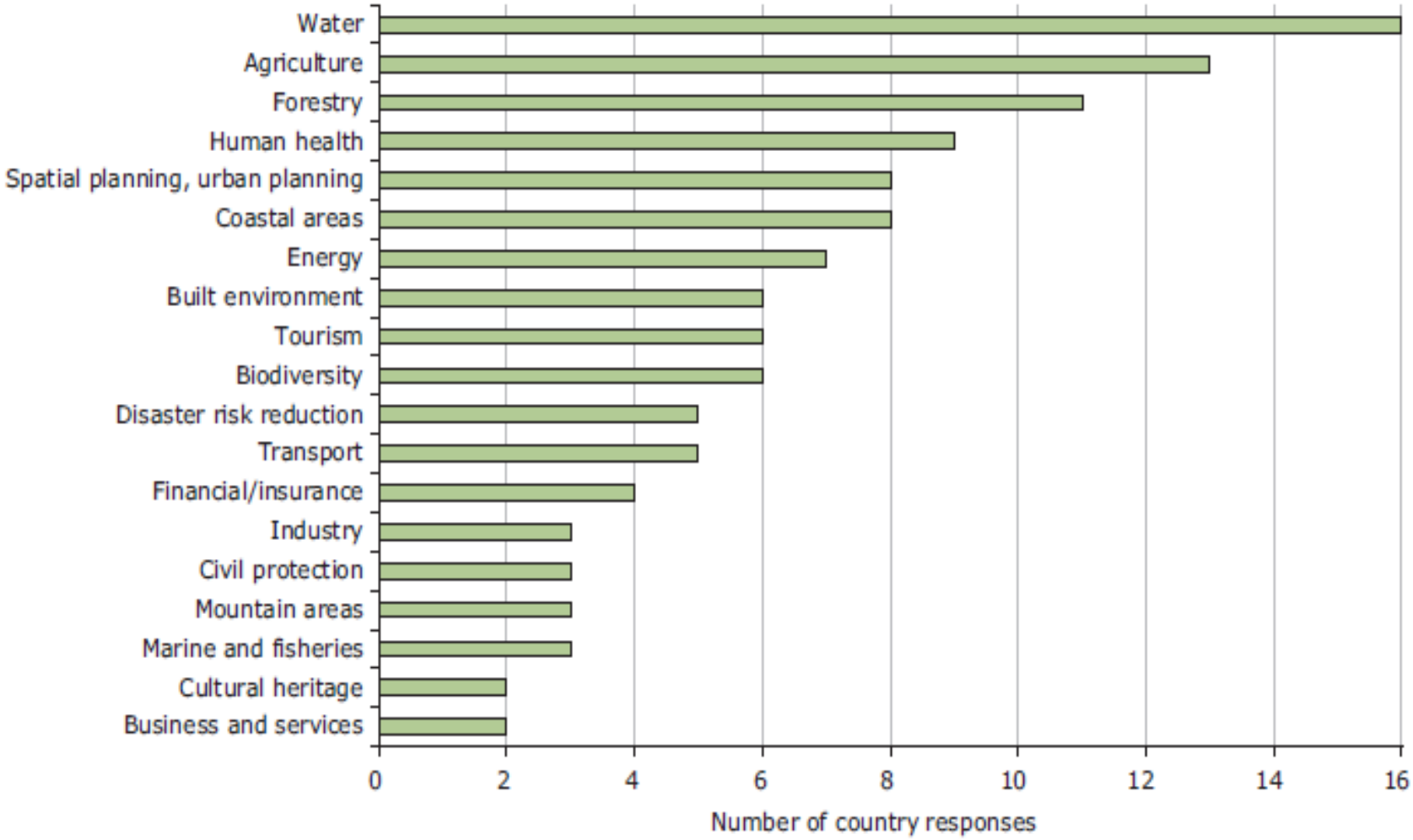
Assessing impacts: the climatic drivers



Note: Left: absolute difference in temperature. Right: relative difference in precipitation. Regional statistics: G = Greater Alpine Region, A = Alps, NW = north-western Alps, NE = north-eastern Alps, SW = south-western Alps, SE = south-eastern Alps, H = higher than 1 500 m. Seasons are: Winter (December, January, February) Spring (March, April, May), Summer (June, July, August), Autumn (September, October, November).

Source: EURAC, 2008, based on data from CLM climate scenarios (Lautenschalger *et al.*, 2008).

Selection of targets



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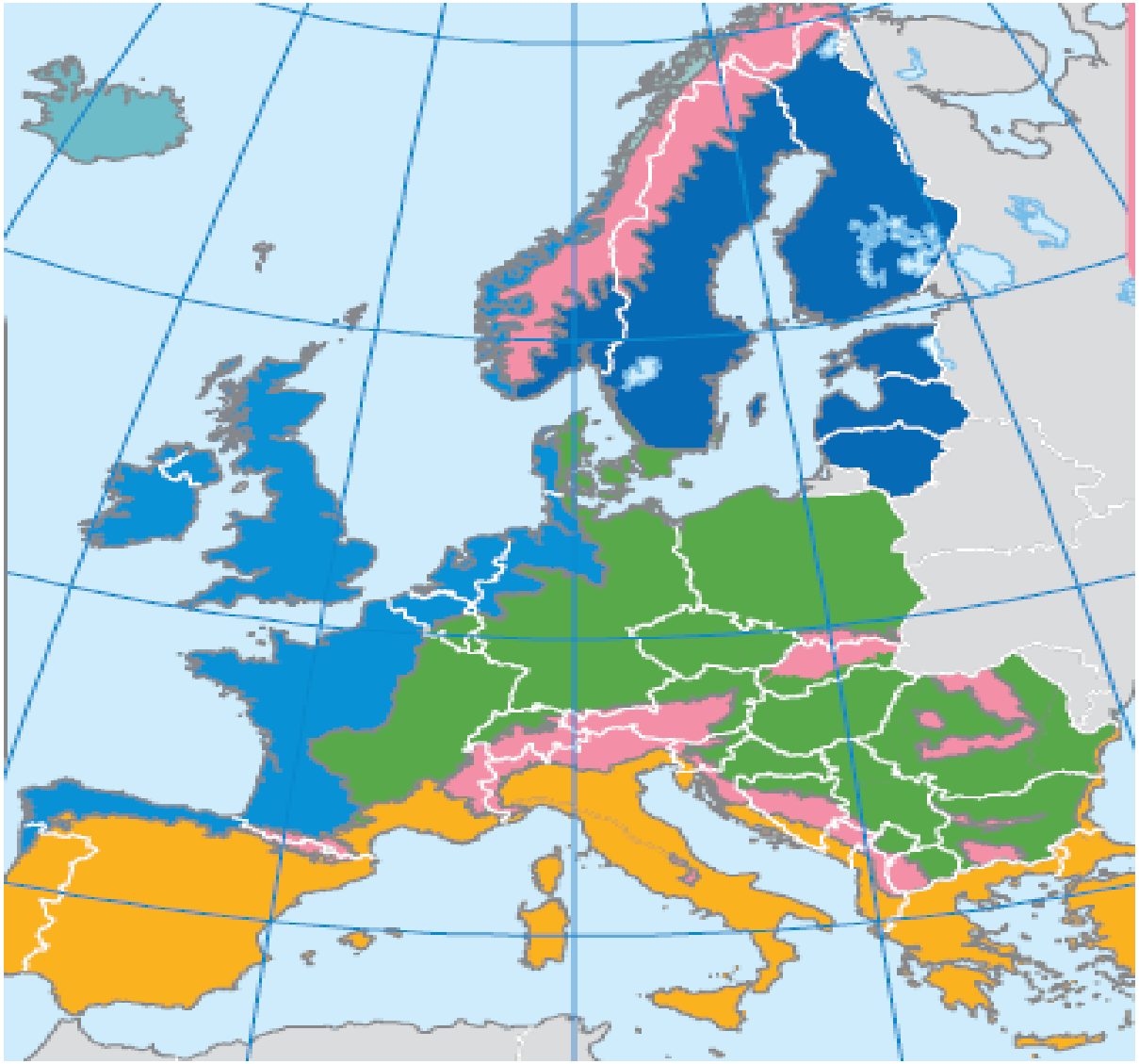
Source: EEA, 2014

Priority targets depend on climate pressures …



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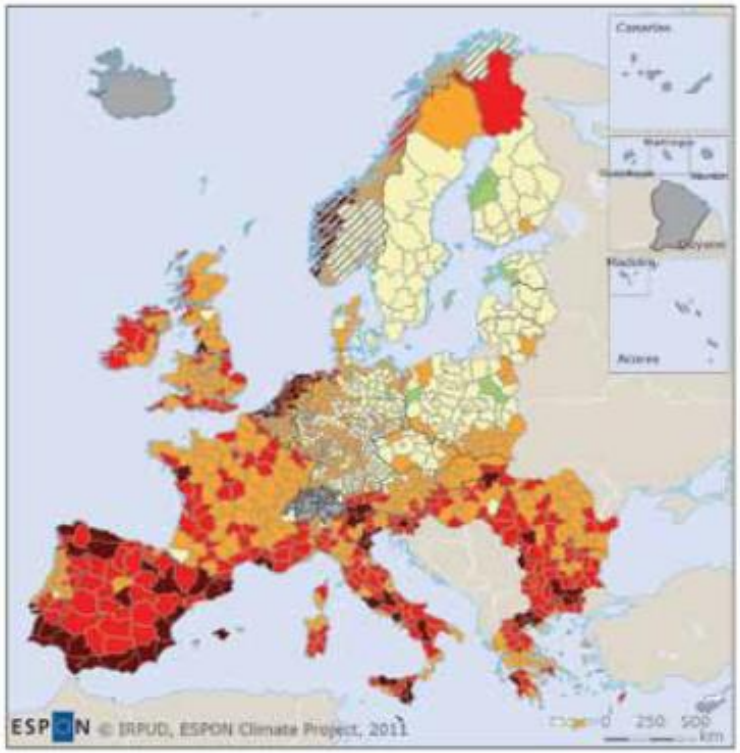
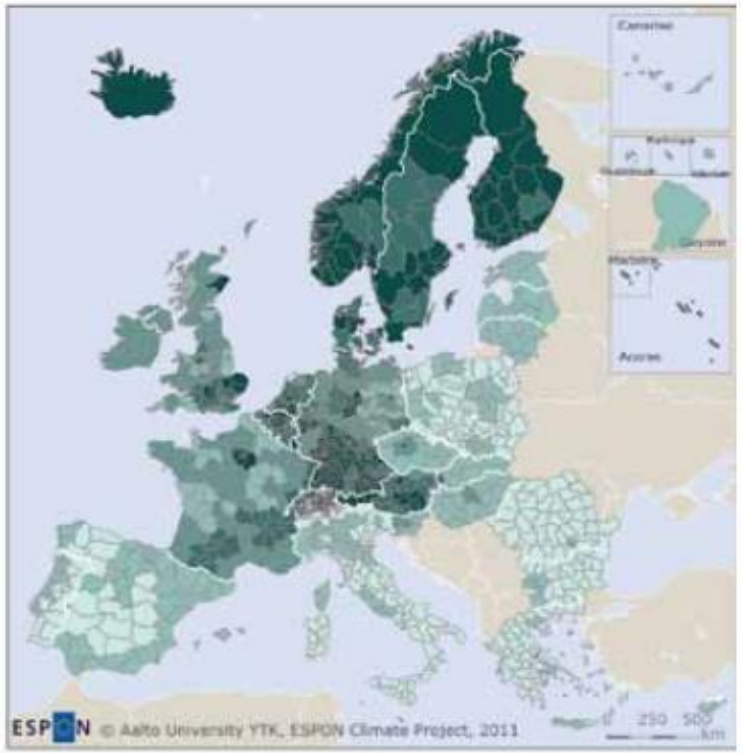
… and local vulnerability & resilience factors



Aggregate potential impact of climate change

- Highest negative impact
- Medium negative impact
- Low negative impact
- No/marginal impact
- Low positive impact
- No data
- Reduced data



Overall capacity to adapt to climate change

- Highest capacity
- High capacity
- Medium capacity
- Low capacity
- Lowest capacity
- No data

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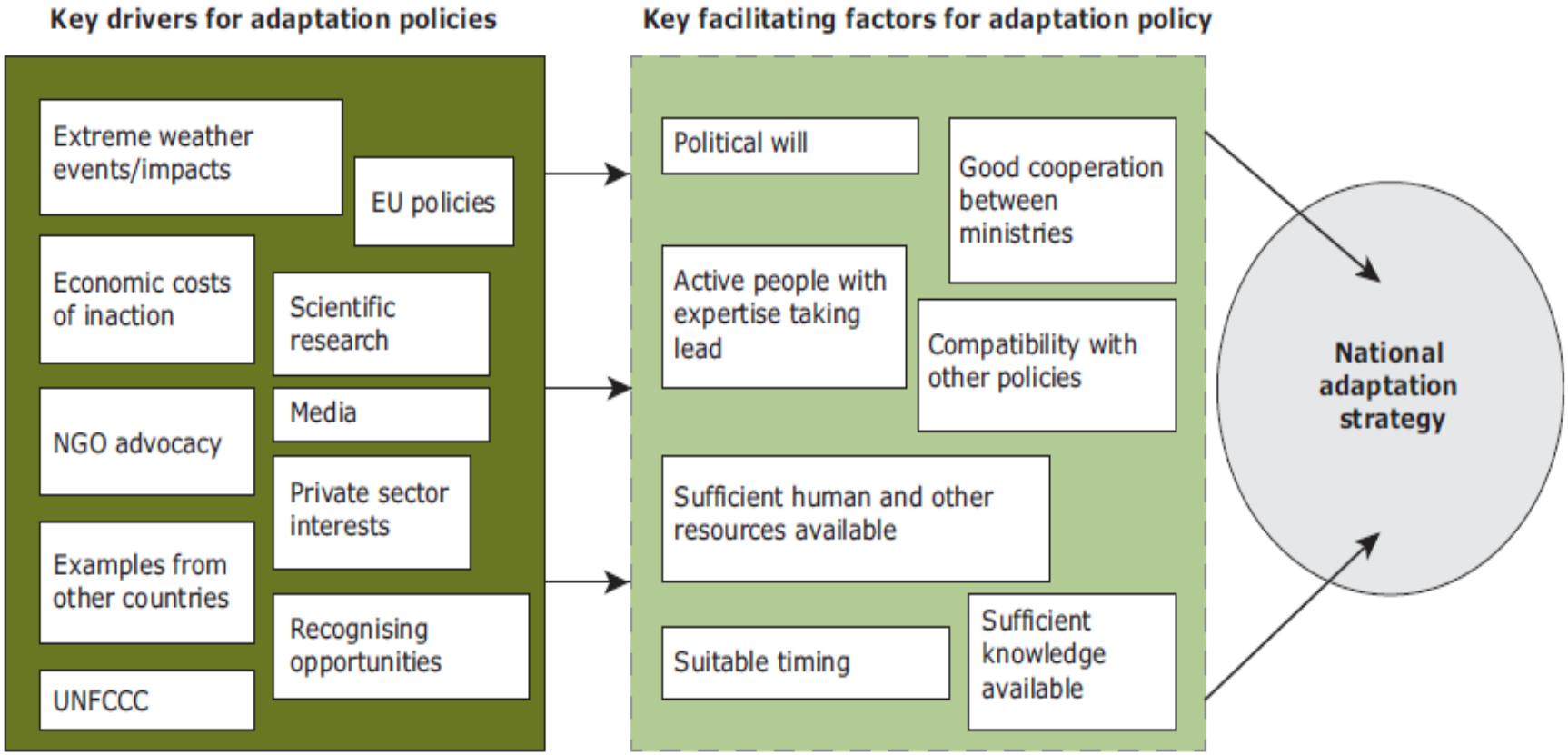
The adaptation process: the design of strategy



Source: Swart et al., 2009.

Adaptation options

- "Soft" measures: managerial, legal and policy approaches that aim at altering human behavior or styles of governance
- "Grey" measures: hard options aimed at reducing vulnerability to CC and/or enhance resilience
- "Green" measures: based on use of natural systems or ecosystem services
- **"Combined"** measures: they make use of all these three types

From strategy to action plan: estimate costs and benefits

- *Use the most suitable approach (costs&benefits, cost effectiveness, multi-criteria analyses*
- *Consider all costs and benefits: economic, social, environmental*

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Ensure a multilevel governance

- *Policy coherence*
- *Policy integration in territorial governance and spatial planning*
- *Building capacity across all levels of governance*
- *Securing access to funding for adaptation measures*
- *Developing the multi-level knowledge base*

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Involve stakeholders

- *Institutional (sub-regional level)*
- *Administrative (official of the sectors involved)*
- *Economic (industry, agriculture, services)*
- *Social (education, communication, participation)*

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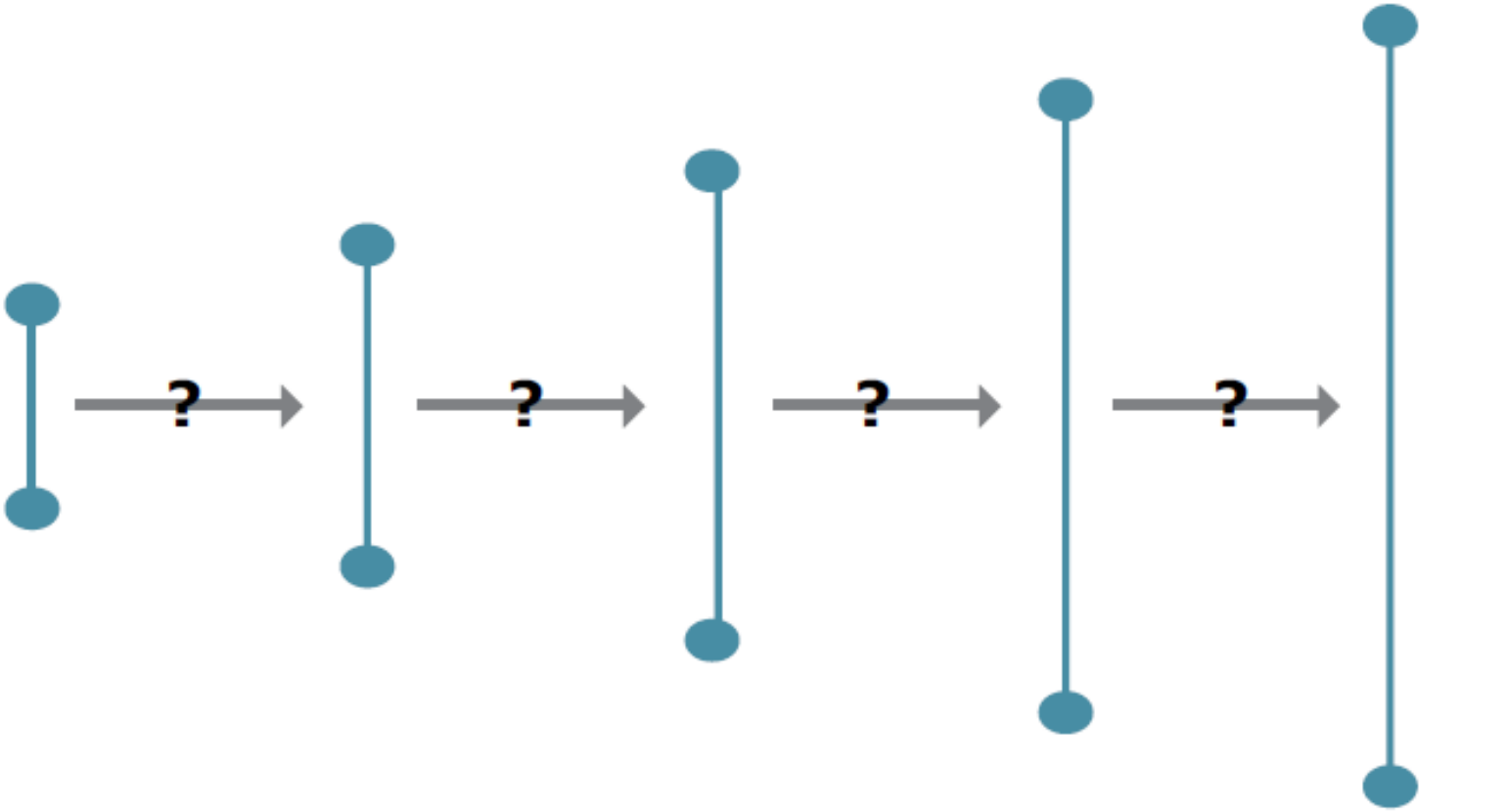
Monitor, Report, Evaluate

- *Select proper indicators of process and outcome (suitable for an effective data collection)*
- *Use current indicators as proxys (but be wary of other influencing factors)*
- *Adjust existing M&E systems*
- *Envisage new resilience indicators*

Avoid maladaptation

- *Increase emissions of greenhouse gases*
- *Disproportionately burden the most vulnerable people*
- *Have higher opportunity costs*
- *Reduce incentives to adapt*
- *Set paths that limit the choices available to future generations*
- *Transfer vulnerability to a neighboring area or country*

Be aware of the uncertainties



Note: The length of the bars represents the magnitude of the uncertainty.

Source: Ahmad et al., 2007, figure 2–2.

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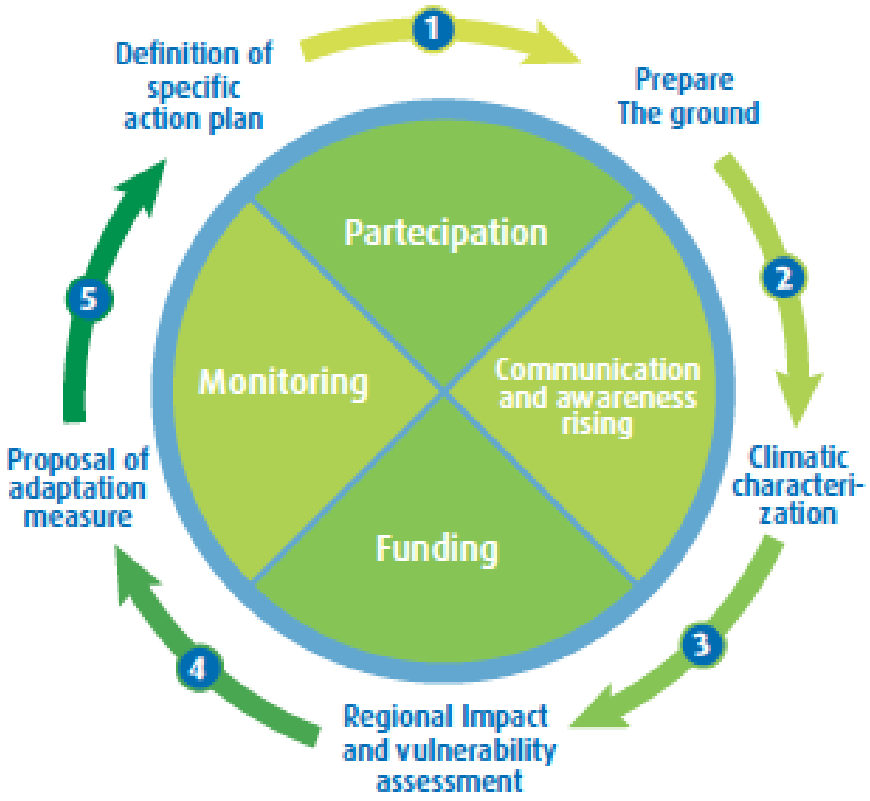
Regional adaptation strategy: key steps

Key steps in the Lombardy *RAS*



adapted from Ribeiro et al. 2009

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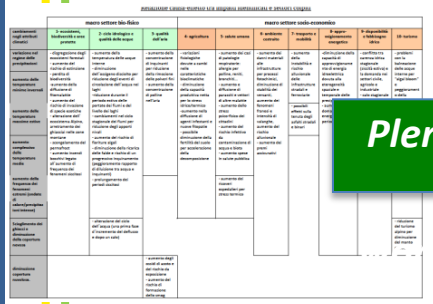
RAS: key sectors and working program

causal matrix: climatic stressor *versus* climatic impacts by sector



Plenary

Main sectors

1. Ecosystems, forests, biodiversity and protected areas;
2. Air quality;
3. Water resources;
4. Energy supply;
5. Human health;
6. Built environment
7. Hydro-geological risk
8. Transport and mobility;
9. Agriculture;
10. Tourism.

Working program

Phase 0

collection of basic documentation and organization of the RAS

Phase I.

Construction of the climatIc bases of the RAS

Phase II

Sectoral impact and vulnerability assessment

Phase III

Definition of the lines of action for the adaptation process

Phase IV

Definition of the specific actions and measures for adaptation

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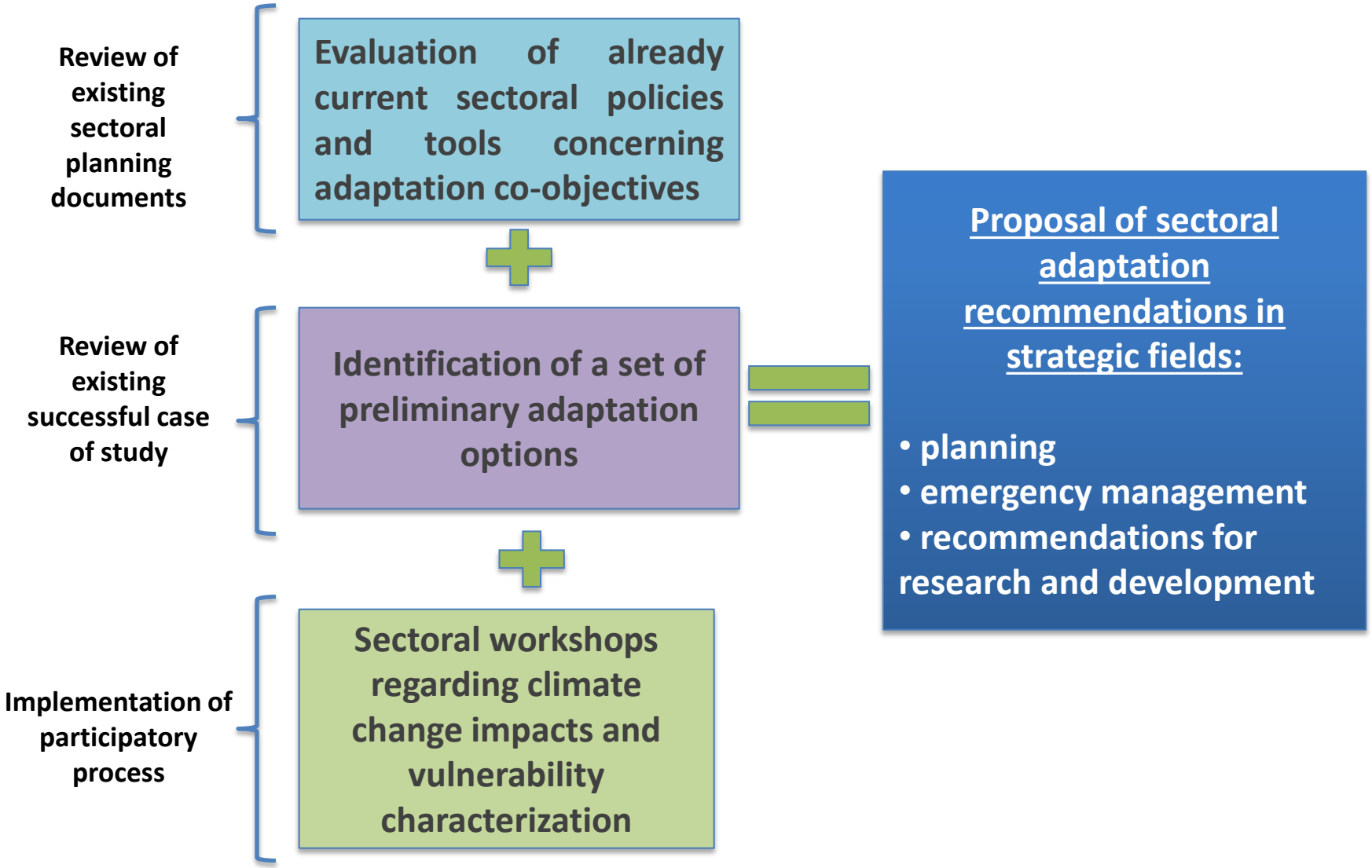
Policy review and sectoral recommendations



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Adaptation priorities and specific adaptation options

Relevant impacts per sector

Adaptation objectives

Proposed adaptation measures

Nome/cognome:
Email:

Risorse idriche: Obiettivi settoriali per l'adattamento e proposta di misure di adattamento

Ciclo idrologico e qualità delle acque		*Obiettivi strategici per l'adattamento*		*Proposta di misure di adattamento*[1]
Impatti	***Importanza relativa dell'impatto*** ***Importanza (1-5)***	***Obiettivi***	***Necessità d'intervento*** ***Necessità (1-5)***	***Proposta***
1-Alterazione delle caratteristiche fisico-chimiche e biologiche delle acque superficiali e sotterranee (Qualità)		**1.1** Ampliare e rinforzare le reti di misurazione, monitoraggio e sorveglianza delle risorse idriche superficiali e sotterranee **1.2** Incrementare la resilienza dei corpi idrici alle implicazioni del mutamento del clima per assicura… servizi e… forniti **1.3** Gar… stato ec… delle ris… regiona… conside… mutam… **1.4.** App… conosce… implicaz… cambiar… nella qu…		**Soft o non strutturali:** 1. Potenziare ed estendere gli attuali strumenti e reti di monitoraggio e il controllo della qualità delle risorse idriche lombarde (identificare i gap esistenti nell'attuale rete di monitoraggio costituita da 260 punti di prelievo e misura, relativi a 175 corpi idrici superficiali) (1.1; 2.1; 2.2; 3.3) 2. Intensificare il controllo dell'evoluzione del grado di diluizione degli inquinanti nelle acque sotterranee durante i periodi a maggiore rischio (es: periodi siccitosi prolungati) (1.1; 1.2; 1.3; 2.3; 3.1) 3. Rinforzare la prevenzione dei casi di penuria, fioriture algali e peggioramento eccessivo della qualità dei corpi idrici in considerazione all'incremento di eventi climatici estremi (es: intensificare il monitoraggio dell'influenza degli scarichi termici nelle acque superficiali) (1.1; 1.3) 4. Minimizzare i disturbi associati alla captazione e al rilascio di acque dalle centrali idroelettriche e termoelettriche (1.3; 2.1; 2.2; 2.3) 5. Ampliare la caratterizzazione dettagliata delle acque del territorio regionale e concretamente completare la cartografia dettagliata (e informatizzata) del reticolo irriguo minore (1.1; 2.1; 2.2; 3.3; 4.4) …ima e dei feedback del suolo (1.1; 2.1; 2.3; 4.4) …tura nei sistema di monitoraggio attuali: Introdurre i …ndice Sintetico di Invaso per i corsi d'acqua Montani …e la portata e lo sfruttamento da parte dell'uomo (1.1; …tà delle acque rispetto alle attività antropiche in …limatici connessi (es: misura 121 del Programma di … di coperture delle vasche di stoccaggio degli effluenti …tati) (1.3; 3.1) …co-fisiche delle acque superficiali e sotterranee (1.2, …ntegrità ecologica delle aree riparie e delle zone di …a modulazione e regolazione dei processi e delle

Weighting process (2 parameters)

i. **Relevance of each impact from a sectoral point of view**

ii. **Need for actions to fulfill each adaptation objective**

[1] I superindici localizzati alla fine di ogni proposta di misura di adattamento fanno riferimento agli **obiettivi strategici** per i quali la misura in questione si prevede abbia delle **sinergie positive per il raggiungimento di tali obiettivi.**

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Voltaire, 1694-1778

« *Les hommes discutent, la nature agit* »

"Men argue, nature acts"

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Thank you for your attention!

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