Expert Briefing
"Climate Risk Assessment for Loss and Damage'"

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Loss & Damage Network

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IIASA | WU Wirtschaftsuniversität Wien Vienna University of Economics and Business | Centre for Climate Change Economics and Policy | Grantham Research Institute on Climate Change and the Environment | LSE The London School of Economics and Political Science

Overview

1. Scope: what we want to achieve with this talk
2. Official terminologies around ‘climate risk assessment’ – why the confusion?
3. Reflection on existing approaches to climate risk assessment
4. Climate Risk Assessment and the L&D space – unique requirements?
5. Challenges and next steps

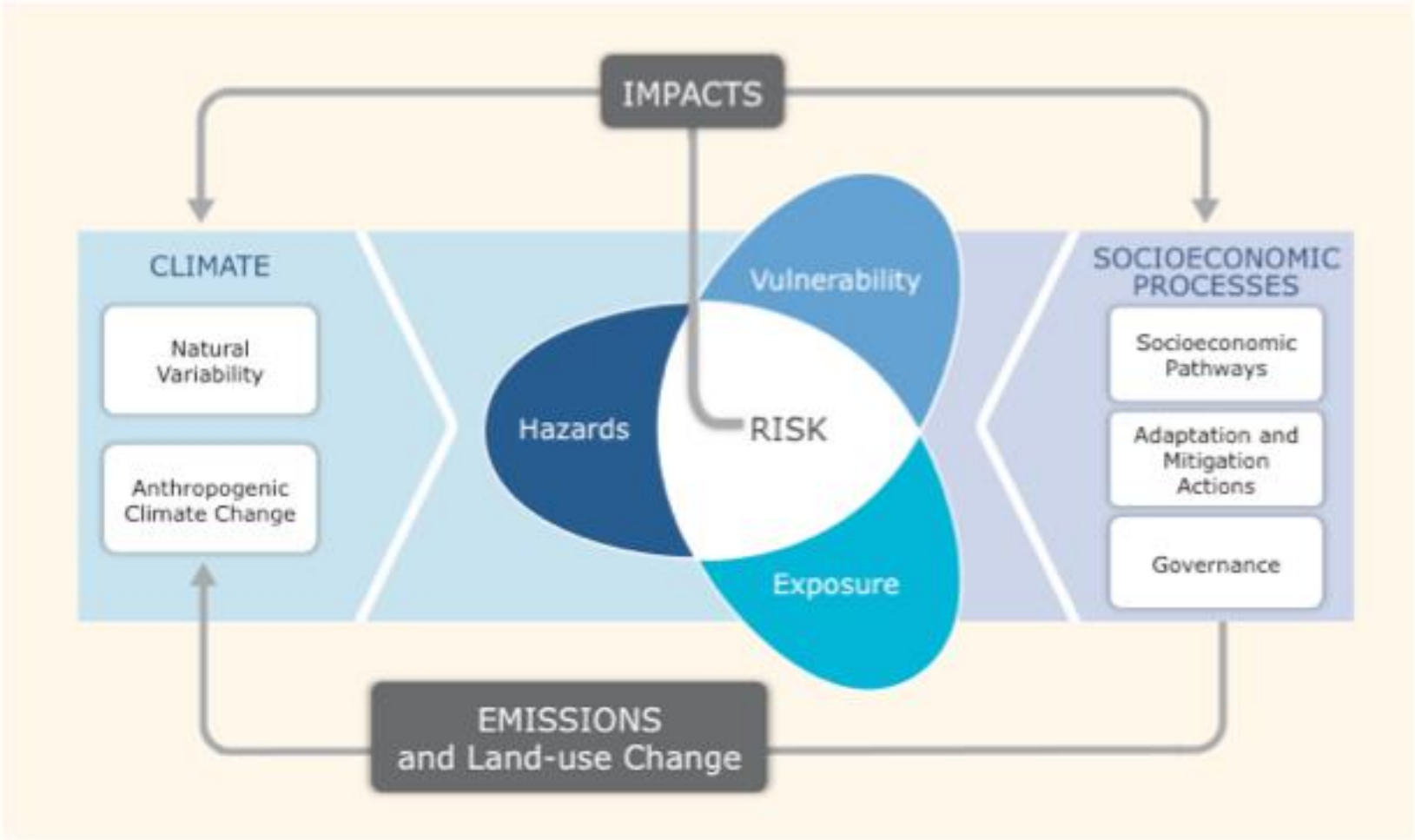
1. Scope

Scope of the talk

- Starting point: Concern from L&D policy makers that the wide range of different concepts, approaches and methods creates confusion.
- Why CRA?
  - Risk assessment a process for identifying, analysing, and evaluating risks, with the aim to inform those with the ability to reduce or manage the risk.
  - It should allow decision-advisors to weigh choices for action under uncertainty and to provide a process to evaluate threats, probabilities, outcomes, and courses of action with incomplete information.
- How to move forward with CRA for the L&D Workplan development?

2. Terminologies and concepts: What is climate risk assessment?

Climate Risks
IPCC Working group I&II perspective



IPCC, 2014

IPCC definition of climate-related risk

- The potential for consequences where something of value is at stake and where the outcome is uncertain, recognizing the diversity of values.
- Risk is often represented as probability of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur.
- Risk results from the interaction of vulnerability, exposure, and hazard.

IPCC, 2014 (WG II)

IPCC 2014 identifies 3 constructions of climate-related risk

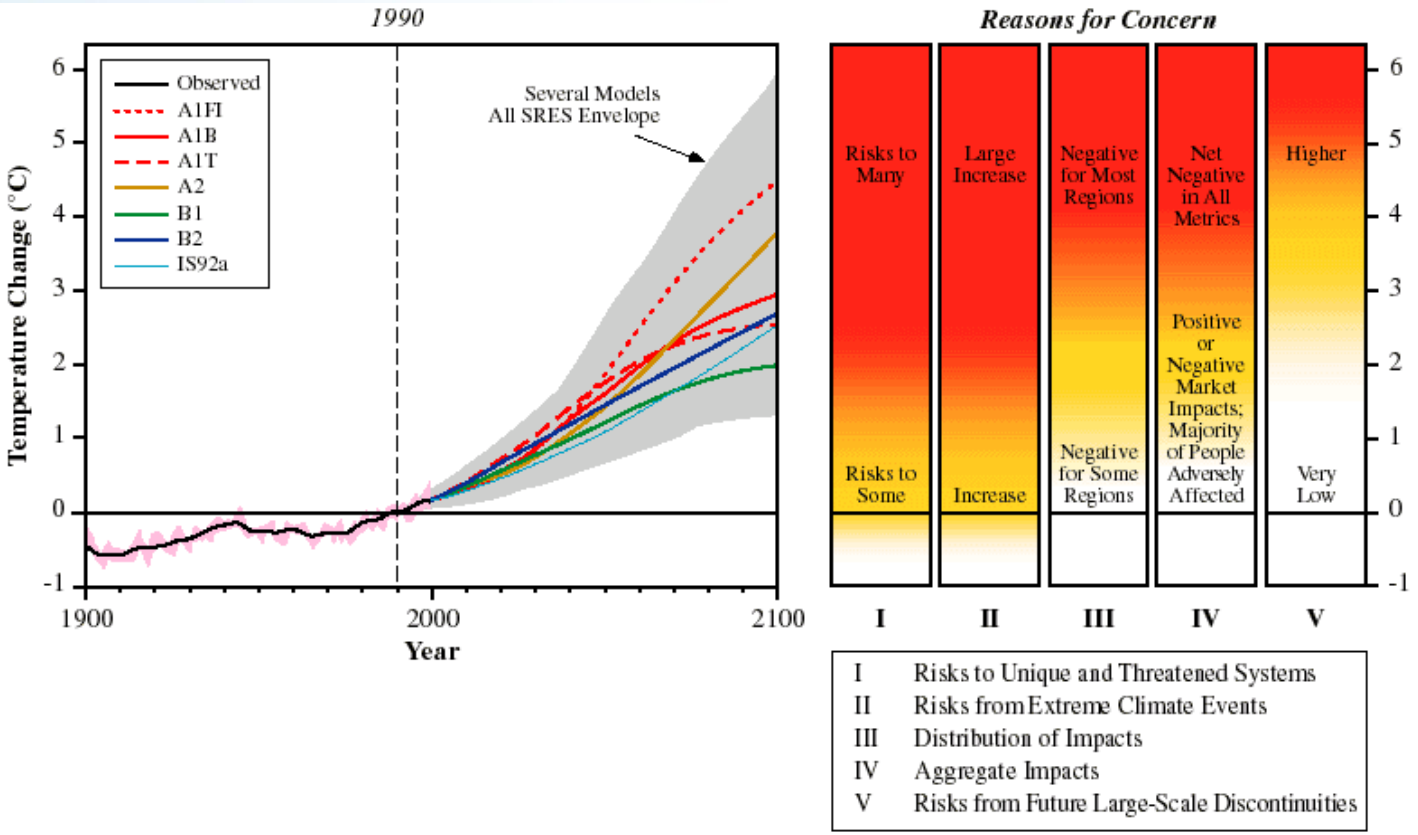
1. *Risk of dangerous interference*: the conceptual framing of the problem at hand - dangerous anthropogenic interference with the climate system as dominant framing
   → informing mitigation

2. *Calculated risk*: the product of a model based on a mixture of historical (observed) and theoretical information
   → informing adaptation

3. *Risk perception and tolerance*: the judgment agents make about risk
   → informing adaptation

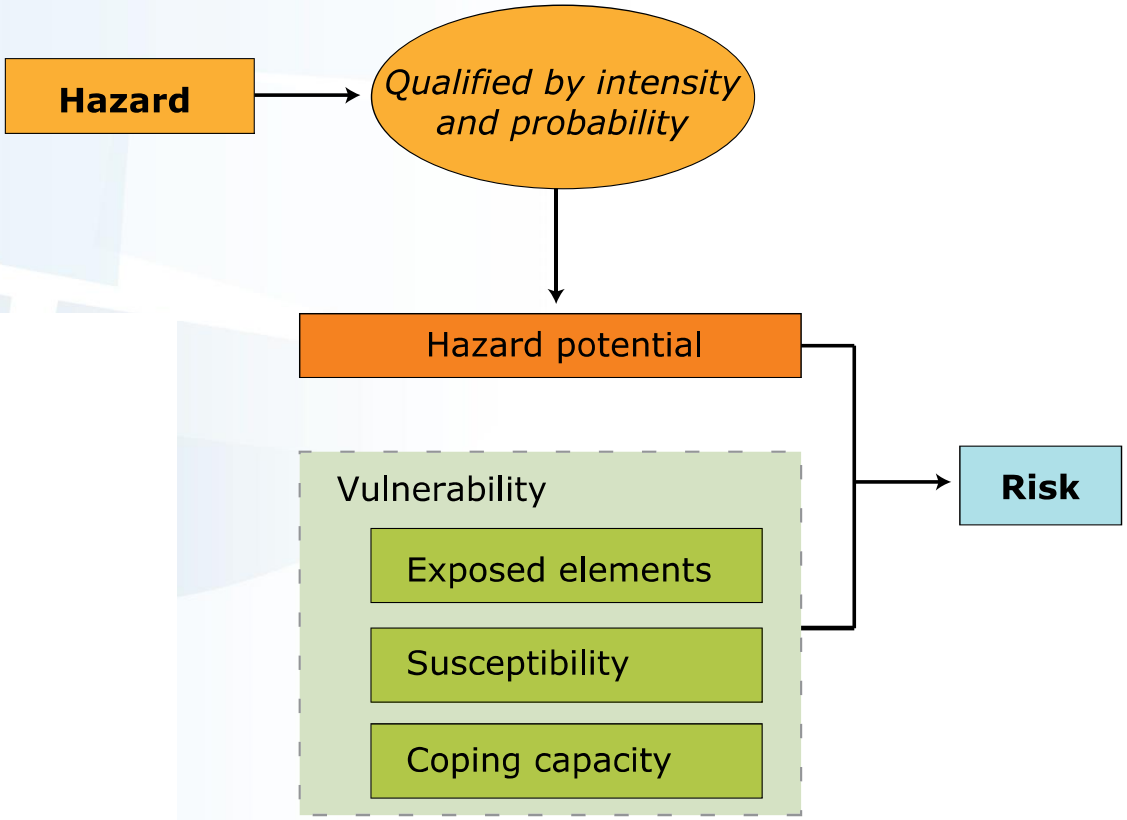
1. Dangerous Climate Change

The *Reasons for Concern*

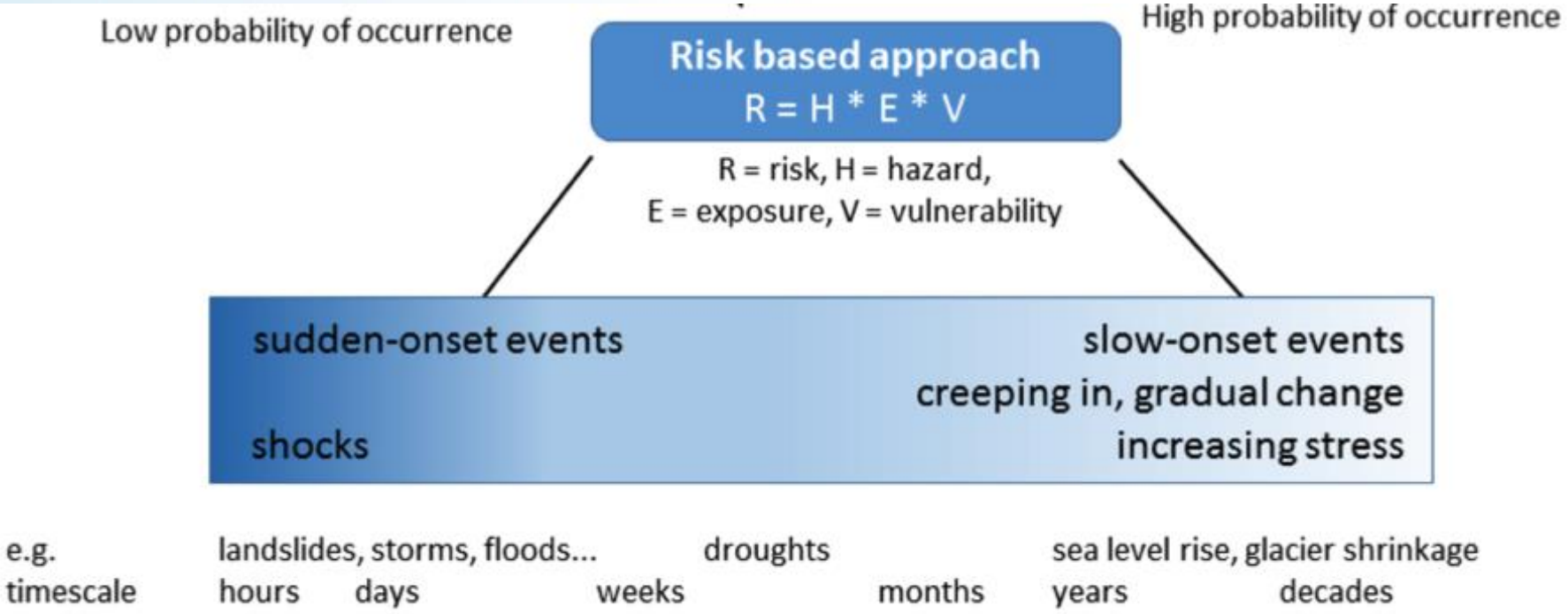


IPCC, 2001

2. Calculated risk



Considering a continuum of slow to sudden onset events



Huggel et al., 2016

Challenges and opportunities: Understanding the risk space

- Downscaled climate projections with climate variability
- Hazard analysis and probability of recurrence

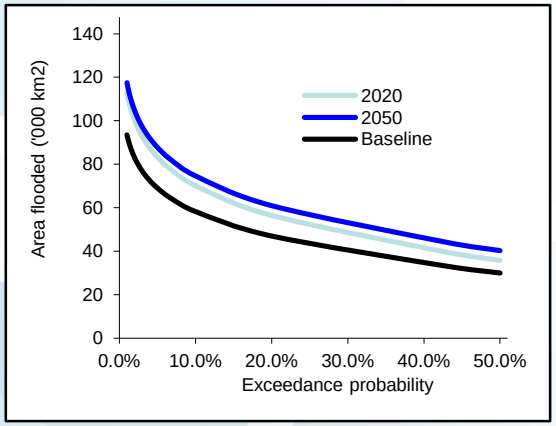
Socio-economic Vulnerability

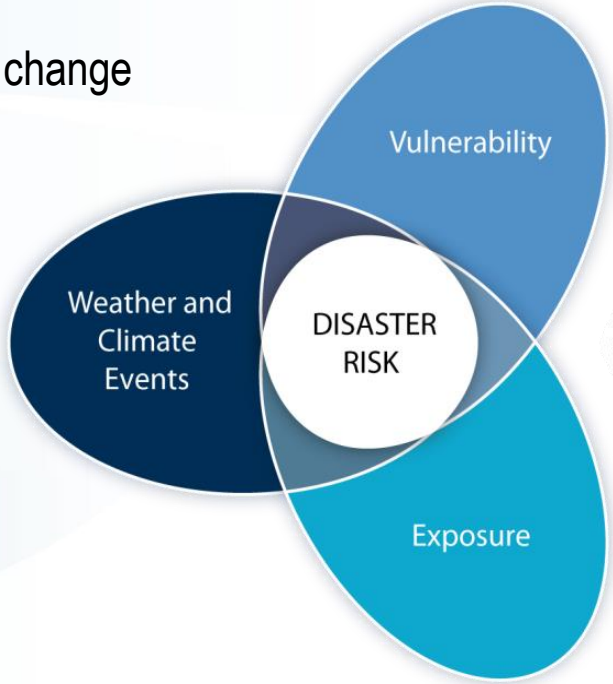
Exposure and dynamics

IPCC, 2012

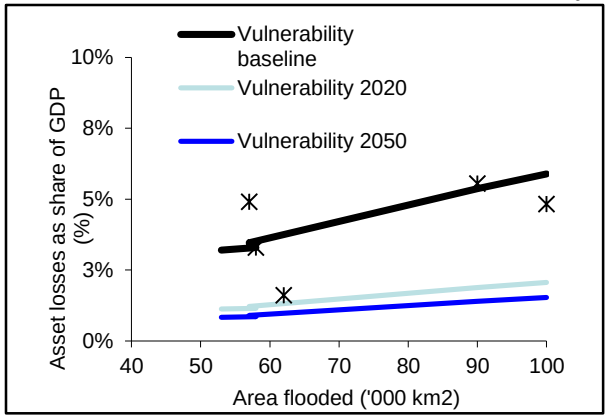
Calculated risk and trends
Example Bangladesh

Hazard occurrence with climate change

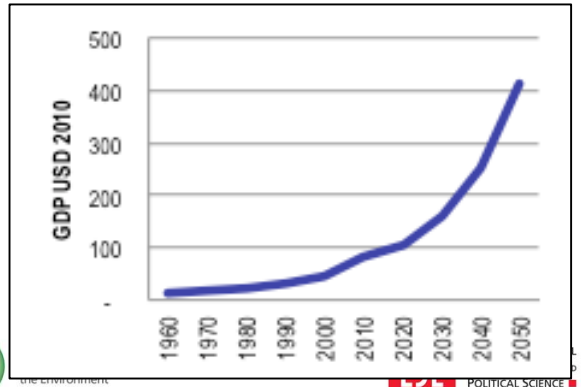




Losses for hazard intensity



Exposure assets exposed to hazards



Source: Mechler and Bouwer, 2015

Climate risk assessment – status quo

Hazard

Intensities, duration and frequencies of some hazards changing (IPCC 2012&14)

Extreme event attribution in early stages (James et al., 2014; Trenberth et al., 2015)

Exposure

Dominating Factor - <u>currently</u> (IPCC, 2012&14)

Vulnerability

Key driver, knowledge gaps, significant adaptation deficit (IPCC, 2012)

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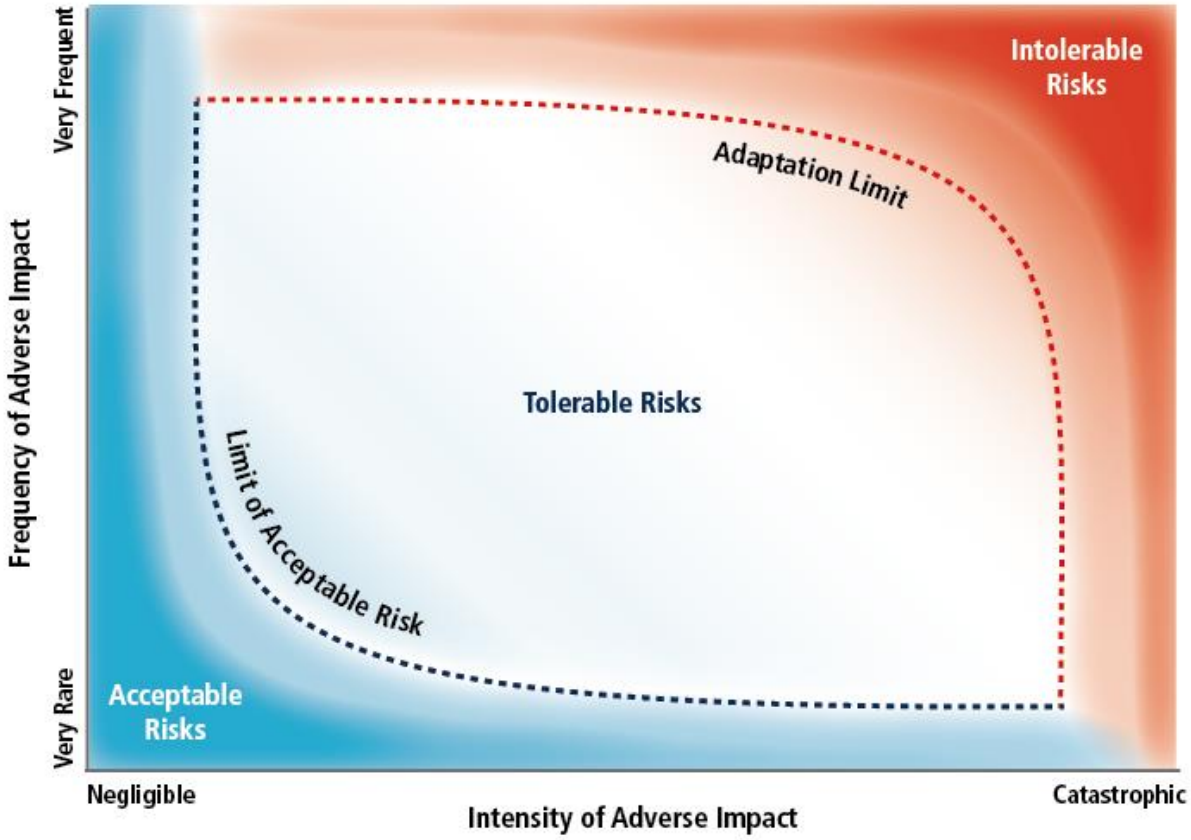
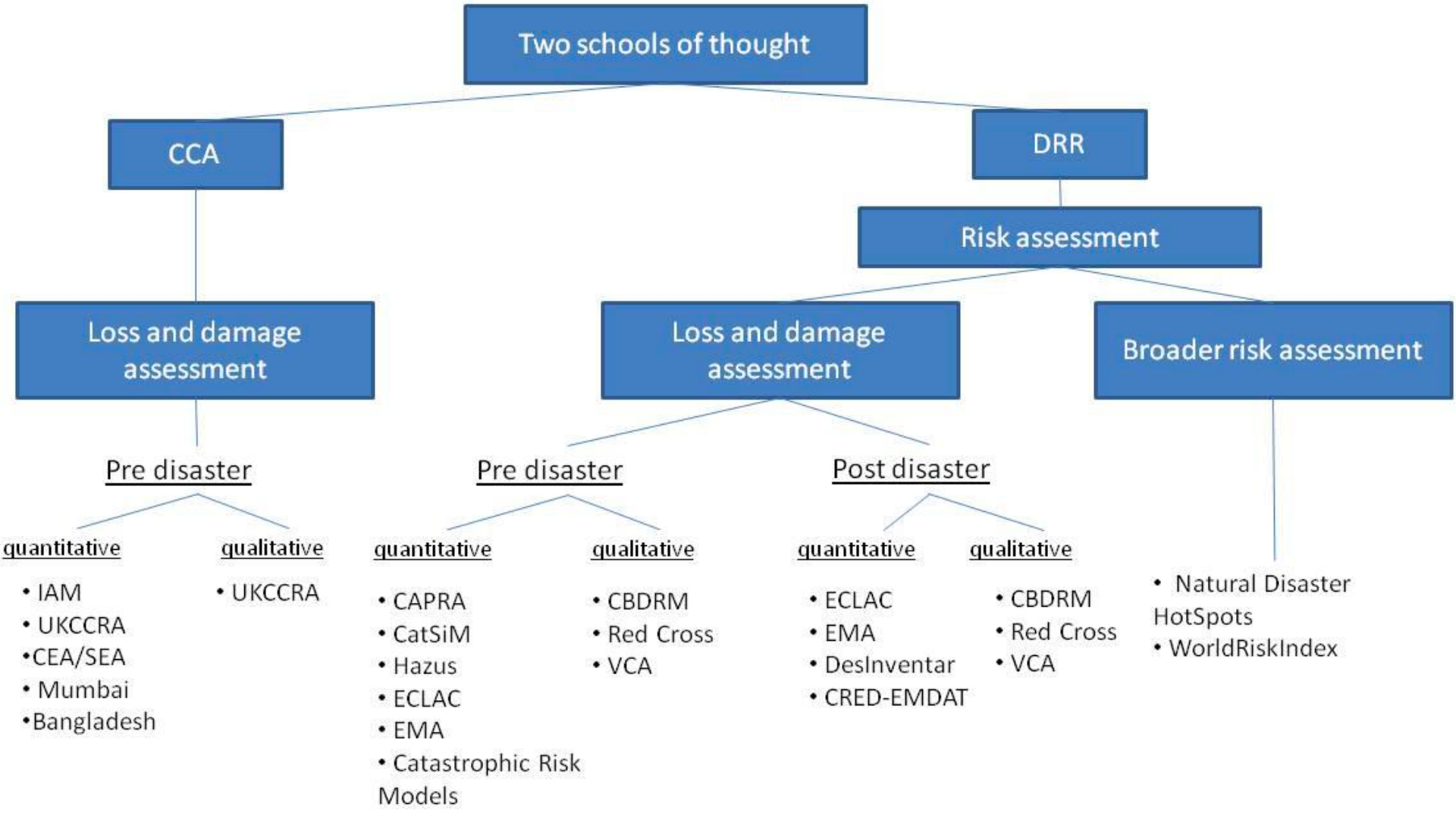
3. Risk perception and tolerance



Dow et al., 2013

3. Existing approaches for climate risk assessment



Source:Surminski et.al. 2012

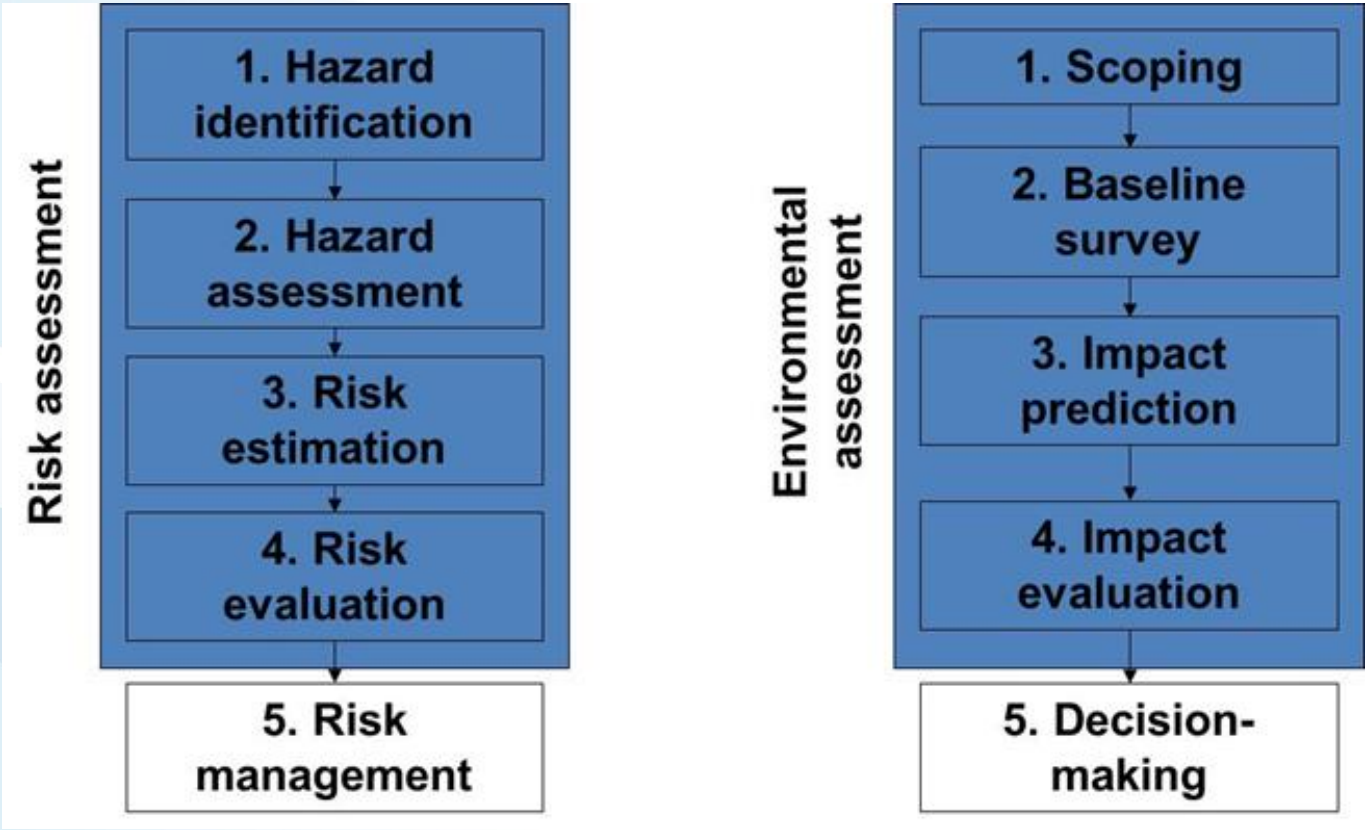
Climate Change and Disaster Risk Assessment - Comparing Terminology

Climate change and disaster risk assessments use sometimes overlapping terminology in defining what contributes to risk. The following table summarizes these differences and similarities. (See below for sources of quotations)

Term	As Applies to Climate Change Assessment	As Applies to Disaster Risk Assessment
Exposure	"…background climate conditions against which a system operates, and any changes in those conditions…"	Whether someone or something is in a location which can be affected by a hazard.
Sensitivity	"…the responsiveness of a system to climatic influences, and the degree to which changes in climate might affect it *in its current form...*"	Incorporated as part of vulnerability.
Potential Outcome	Exposure and sensitivity	Incorporated as part of vulnerability.
Adaptive Capacity	"Adaptation reflects the ability of a system to change in a way that makes it better equipped to deal with external influences."	Incorporated as part of vulnerability, but only to potential damage and not to risk reduction.
Vulnerability	Exposure, sensitivity, potential outcome and adaptive capacity, as defined in climate change assessment.	The damage which can be done by a hazard event of a specific magnitude, frequency and timing.
Hazard	The change between the current and future climate (e.g., increase in average temperature).	An event which can lead to negative consequences on humans.
Hazard Event	Incorporated in *Exposure* – "...any changes in those conditions"	A occurrence of a hazard of a specific magnitude, timing and frequency
Frequency	Incorporated in *Exposure* – "...any changes in those conditions"	How often a hazard of a specific magnitude will occur.
Magnitude	Incorporated in *exposure* – "...any changes in those conditions"	The physical scale of a hazard event, measured in a standard metric (e.g., mm of precipitation)
Resilience	Similar *to Adaptive Capacity* but only in relation of a hazard event, not reducing the likelihood of future hazard events.	The means which reduce the initial outcome of a hazard event on six capitals; the means to reduce vulnerability.

Source: UNDP 2013

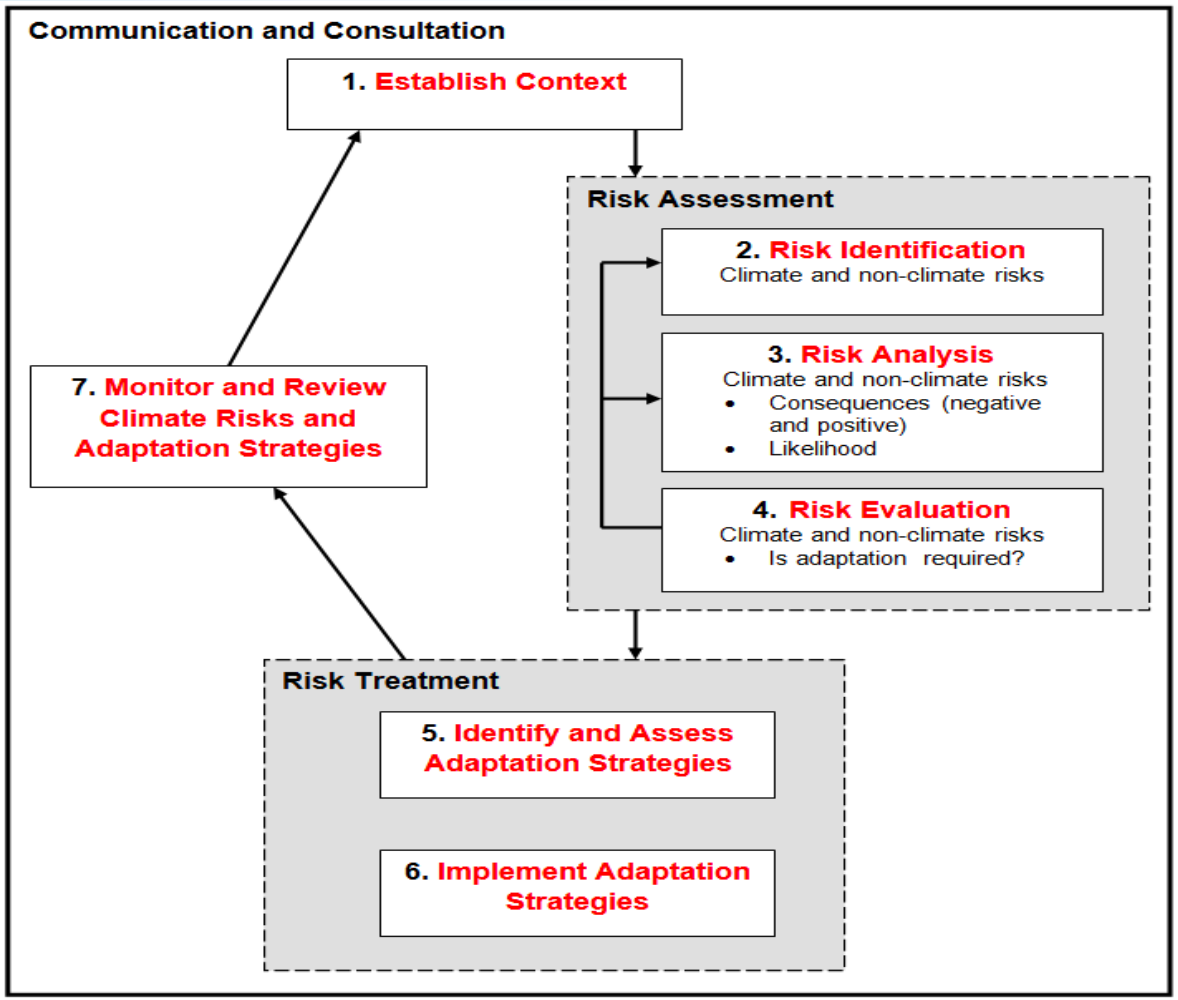
Figure 1. **Stages of risk assessment compared with EIA/SEA ('environmental assessment')**



Source: Authors' own diagram, adapted from (Eduljee, 1999)

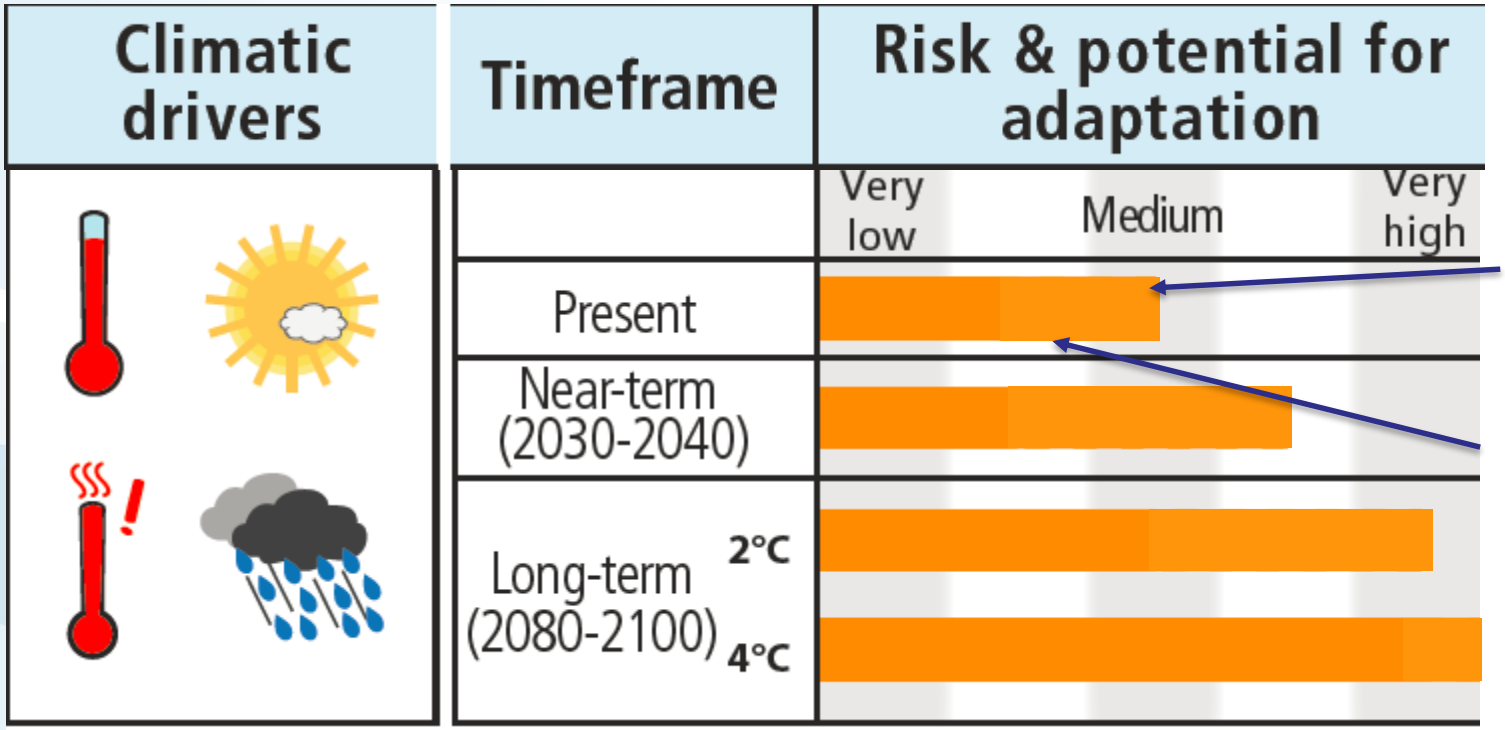
Source: Fankhauser et.al. 2013

Risk Assessment, Management and Adaptation



Bowyer et al., 2014

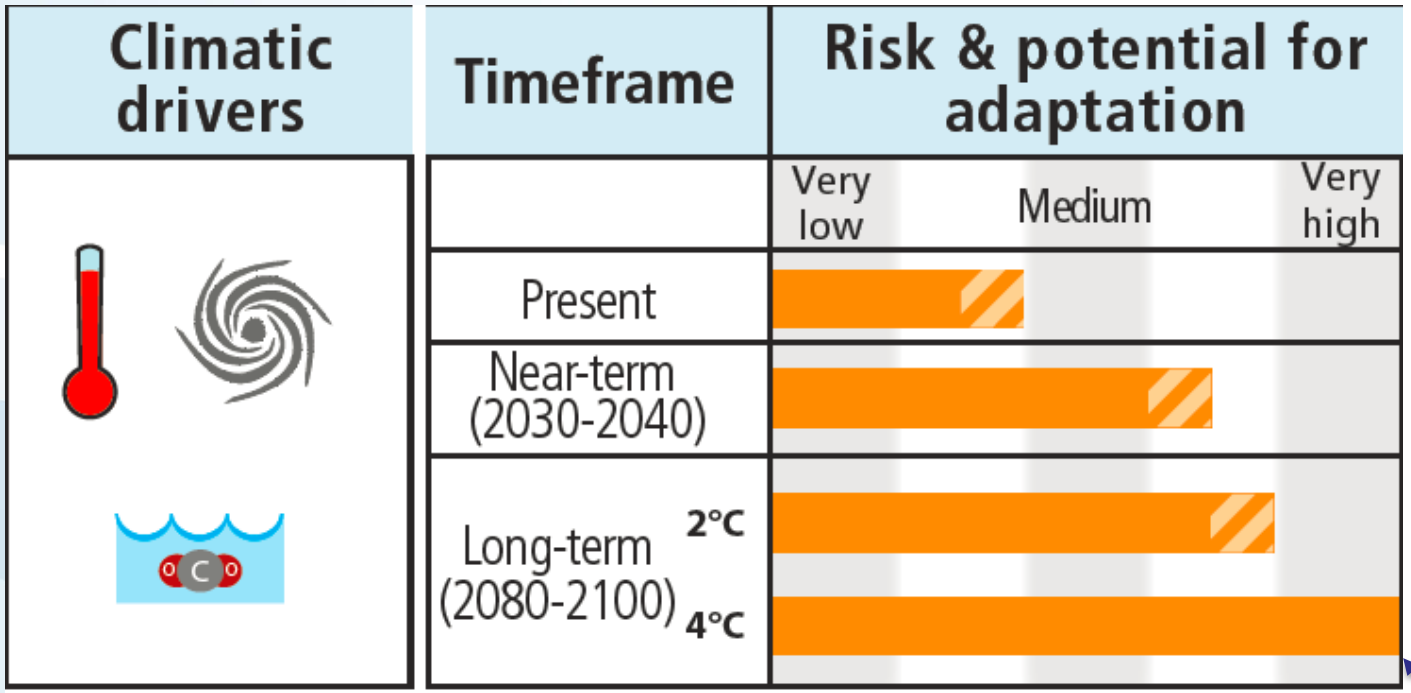
IPCC expert-based climate risk assessment
Linking climate risk, adaptation deficit and projections



- Africa and Agriculture

IPCC, 2014

IPCC expert-based climate risk assessment
Linking climate risk, adaptation deficit and projections



Biodiversity and loss of coral reefs

IPCC, 2014

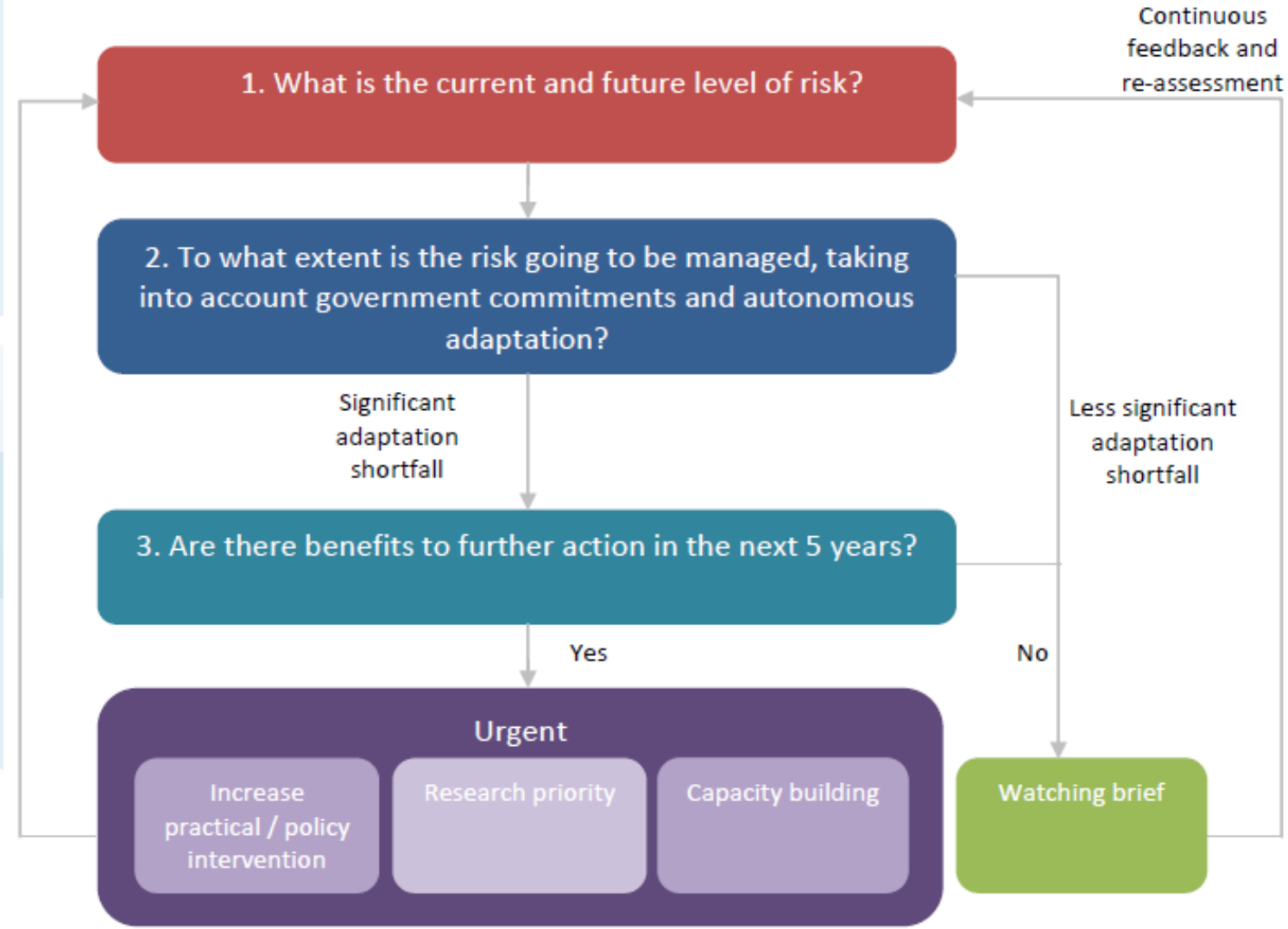
3.1 Disaster risk reduction	3.2 Climate change adaptation and vulnerability assessment
3.1.1 Comprehensive impact and risk assessment • Natural disaster HotSpot • World Risk Index • Global Climate Risk Index	**3.2.1 Vulnerability assessment** • Climate Vulnerability Monitor • Participatory Vulnerability and capacity assessment (part of Participatory Assessment of Disaster Risk (PADR) • The vulnerability sourcebook
3.1.2 Pre-disaster risk assessment • Comprehensive Approach for Probabilistic Risk Assessment (CAPRA) • Catastrophe Simulation model (CATSIM) • Handbook for Estimating the Socioeconomic and Environmental Effects of Disasters (also for post-disaster) • Community based disaster risk management (also for post-disaster)	**3.2.2 Climate change adaptation assessment** • Climate Change Risk Assessment • Climate change and Environmental Degradation Risk and Adaptation Assessment (CEDRA) • Climate Risk Assessment Guide
3.1.3 Post-disaster risk assessment • Disaster Loss Assessment Guidelines • DesInventar • Climate Vulnerability and Capacity Analysis (CVCA) • Assessing Damage after Disasters: A participatory Framework and Toolkit	

Source: Schaefer et.al. UNU-EHS 2015

Differences in approach between the UK CCRA 2012 and 2017 Evidence Reports		
Coverage of risks and opportunities	100+ threats and opportunities, prioritised from a list of 700.	Around 60 threats and opportunities, chosen by Government and the report authors.
Metric for summarising the results	Focused on magnitude and confidence	Focused on urgency
Time periods covered	2020s, 2050s and 2080s	Current, 2020s 2050s and 2080s, post-2100 for sea-level rise
Type of analysis	Mix of existing data and new analysis to create 'response functions' for risks and opportunities	Mostly synthesis of existing analysis with some new data from four new research projects
Use of climate science	Used the UK Climate Projections, UKCP09, to explore different climate scenarios	Literature used to inform the Evidence Report is based on a mixture of studies that use UKCP09, CMIP5, single models and other scenario approaches
Consideration of drivers of risk	Did not include effects of planned adaptation or socio-economic change (beyond population growth)	Includes evidence and analysis of the effects of adaptation and socio-economic change on risk
Cost	£3 million over three years	£650K over three years (not including existing ASC salaries)

Source: UK-ASC, 2015

Summarising risks based around concept of urgency



4. Climate Risk Assessment and the L&D space

- How is Loss and Damage different from CCA and DRR
- What is the space for Loss and Damage?

What is 'Loss & Damage' risk?

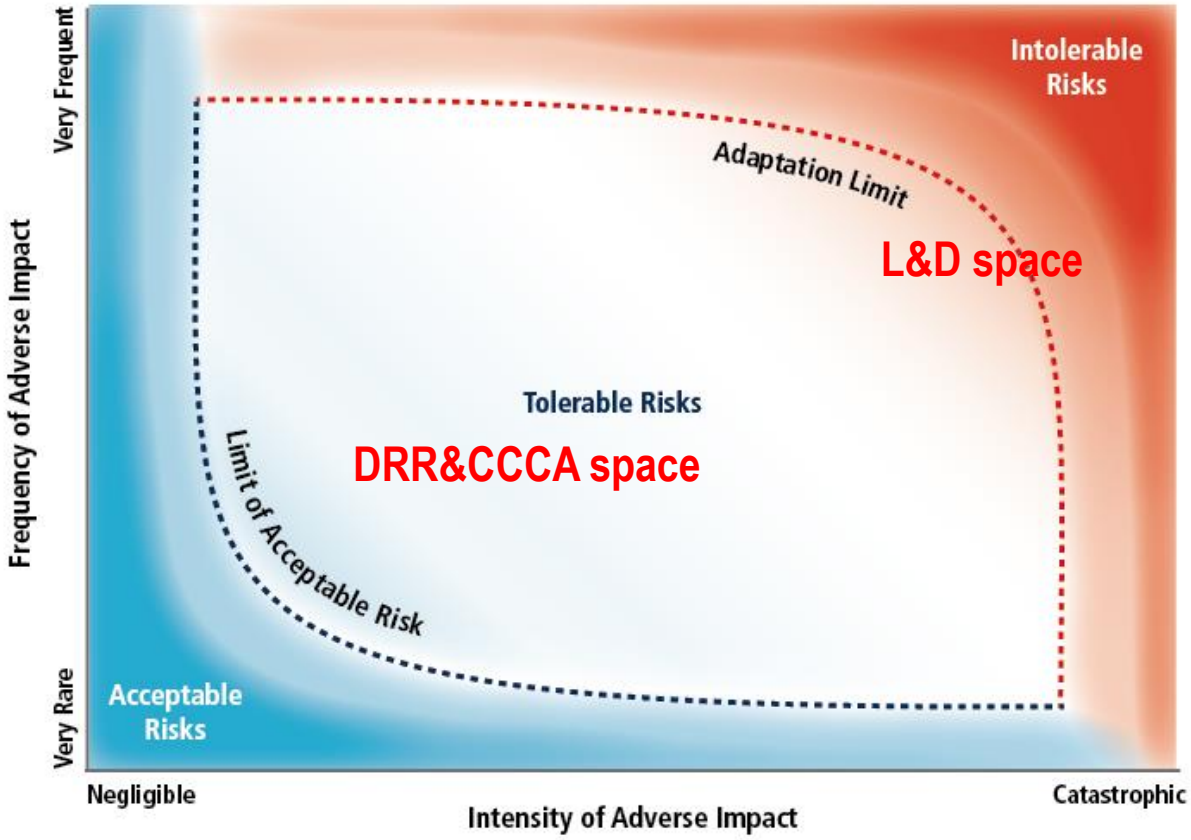
Non-residual

Residual: L&D

AVOIDED	UNAVOIDED	UNAVOIDABLE
AVOIDABLE DAMAGE AVOIDED → Damage prevented through mitigation and/or adaptation measures.	AVOIDABLE DAMAGE AND LOSS NOT AVOIDED → Where the avoidance of further damage was possible through adequate mitigation and/or adaptation, but where adaptation measures were not implemented due to financial or technical constraints.	UNAVOIDABLE DAMAGE AND LOSS →(Irreversible) Damage that could not be avoided through mitigation and/or adaptation measures; - slow onset changes such as sea level rise, glacial melting - damage due to extreme events where no adaptation efforts would have helped prevent the physical damage.

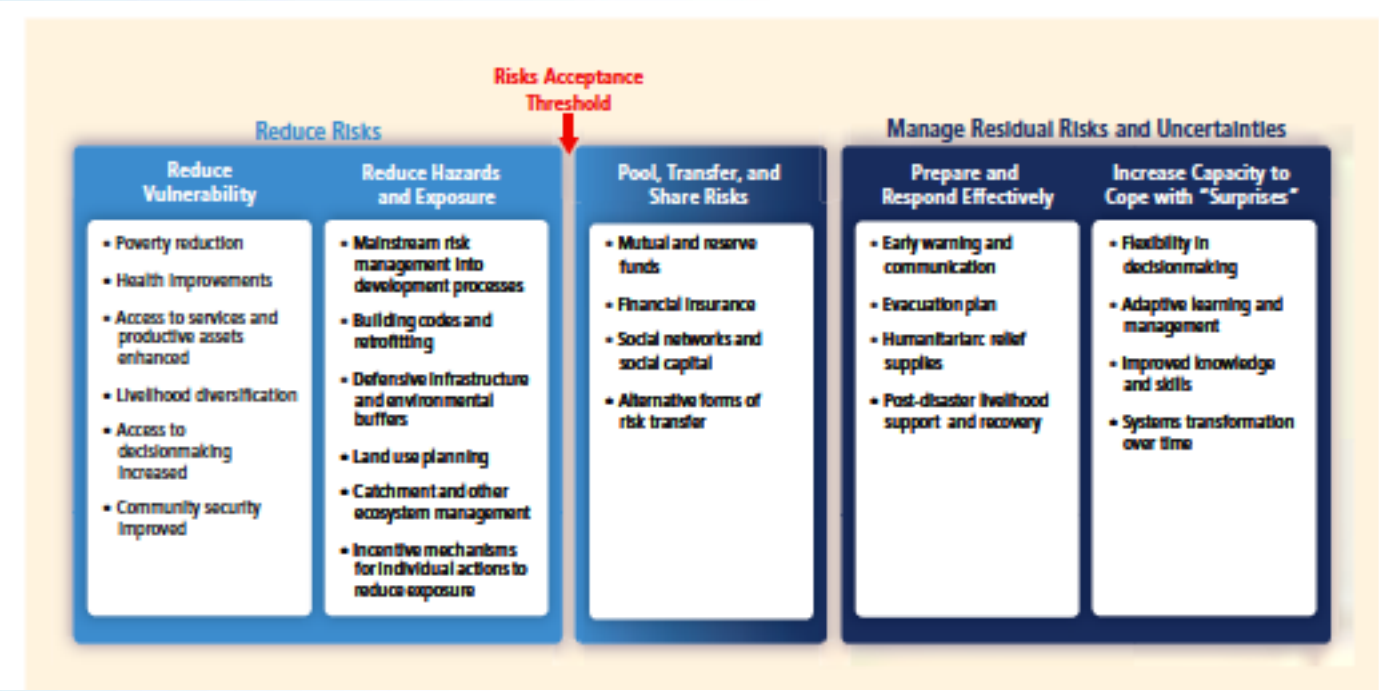
Verheyen, 2012

Risk perception and tolerance



Dow et al., 2013

Managing DRR and CCA



IPCC, 2012

5. Challenges and next steps

Challenges and next steps

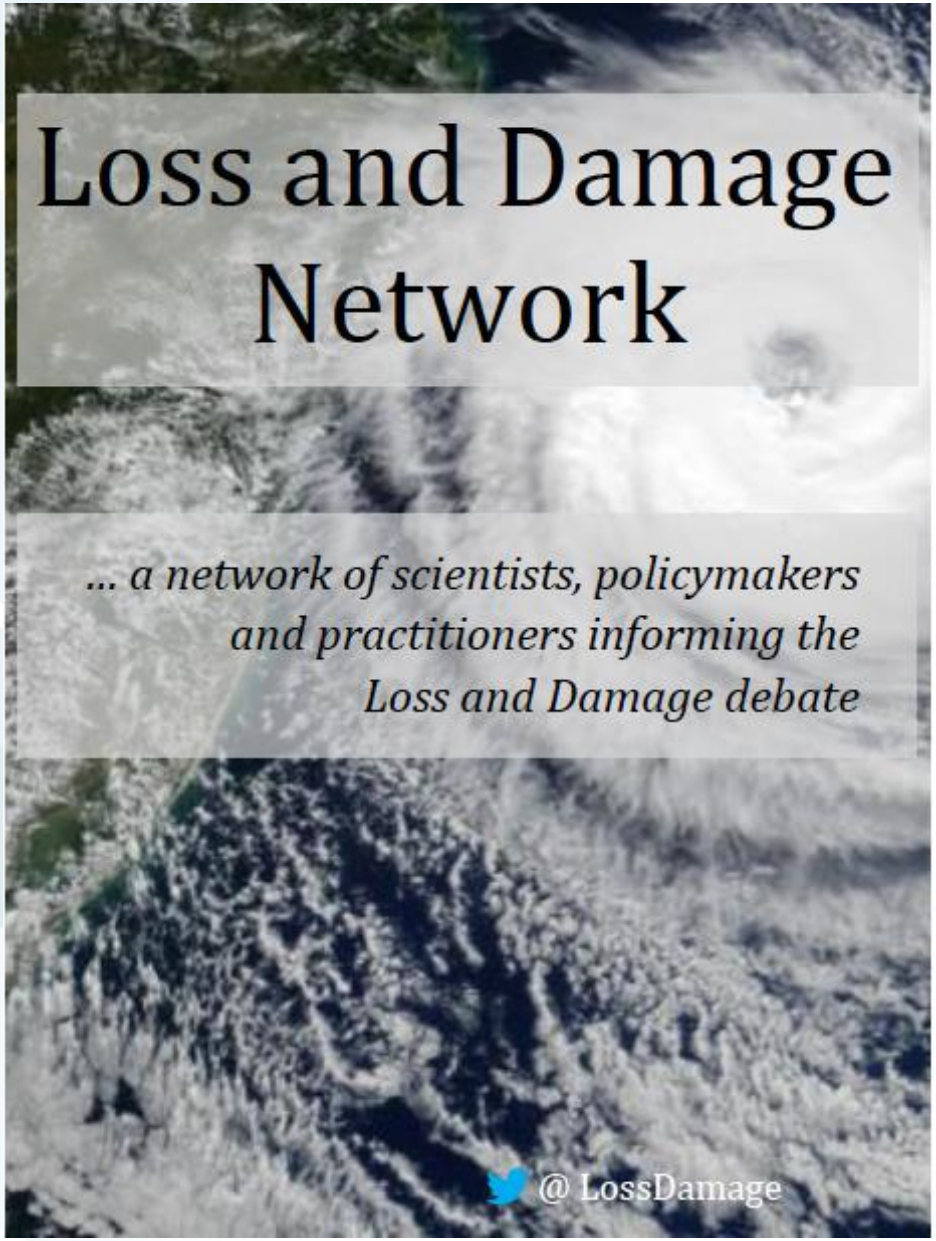
- Direct and indirect losses & growing interconnectedness of impacts (such as cascading effects) are recognized, but no clear methodology exists
- Non-economic losses: Quantification poses challenges, but can be addressed pragmatically (See: Vivid Economic 2013)
- Slow onset changes require a different perspective
- Linking qualitative and quantitative assessment approaches can be challenging

Challenges and next steps

- From global to local: different scales of data and assessment are needed – ‘If we have no idea how much of something has been lost, the loss assessment will be challenging’ (UNU-EHS 2015)
- We need to understand vulnerability & adaptation, the effectiveness and limitations – example: UK CCRA 2016
- Climate signal often weak or unclear - further understanding necessary
- Calculated risk: projecting probabilistic risk with challenges (return periods etc.)
- Limits to adaptation: Knowledge only emergent, part. for human systems

Next steps

- Find agreement for risk assessment “beyond adaptation”
- Further understanding for risks beyond adaptation needed (conduct mapping exercise based on IPCC, 2014 and other sources?)
- Identify instruments for the L&D space


Loss and Damage Network
... a network of scientists, policymakers and practitioners informing the Loss and Damage debate
@ LossDamage

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