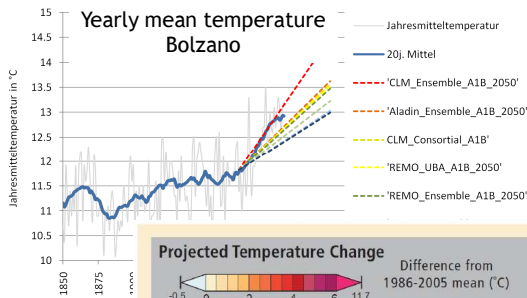


Climate Change Vulnerability Analysis: Concepts, Approaches, Practices

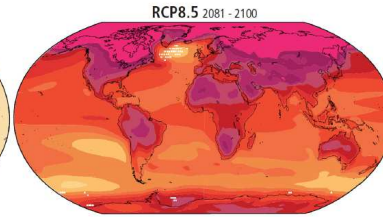
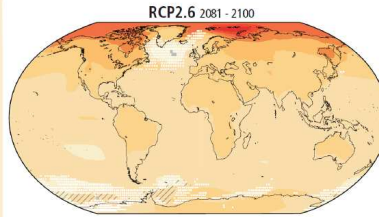


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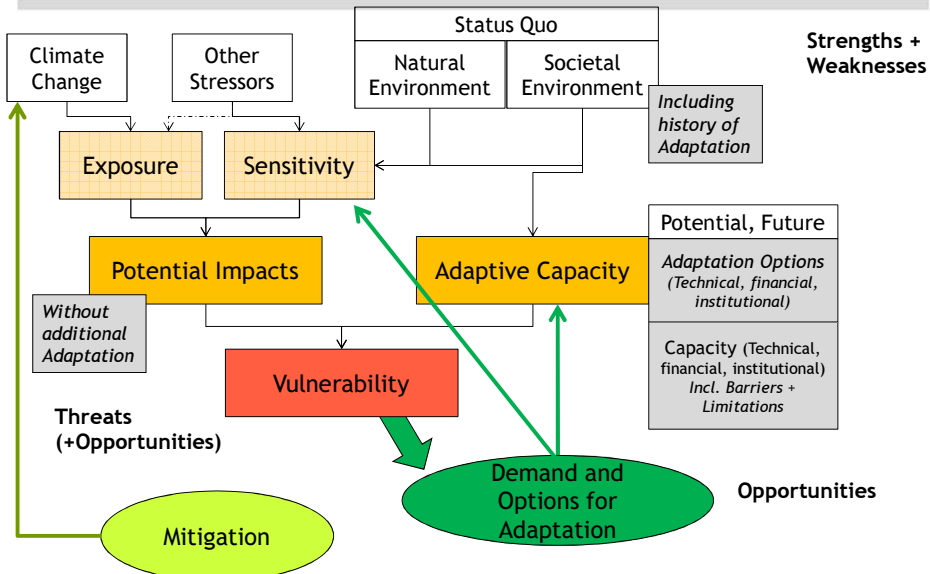
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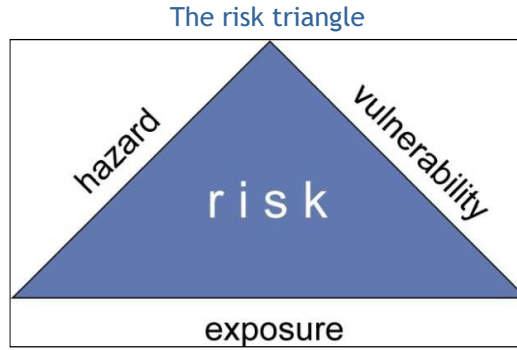


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“Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.” (Parry 2007, p. 883)

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Crichton, D. (1999)

Risk is the probability of a loss, and this depends on three elements: hazard, vulnerability, and exposure. If any of these three elements in risk increases or decreases, then the risk increases or decreases respectively. (Crichton, 1999)

Risk is thus defined as a function of hazard, exposure and vulnerability as shown below:

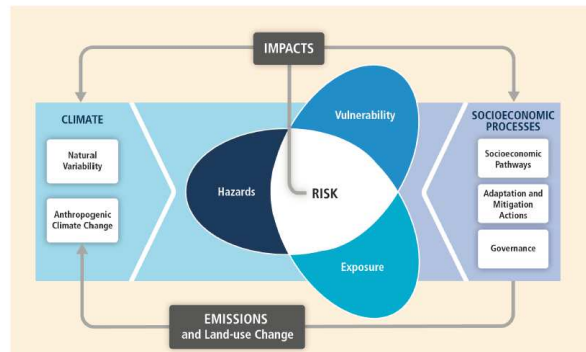
$$\text{Risk} = \text{function} (\text{Hazard} \times \text{Exposure} \times \text{Vulnerability})$$

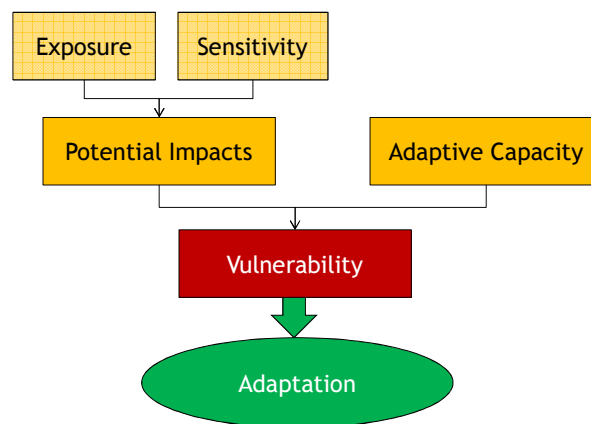
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Vulnerability: The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

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IPCC WGII AR5 Summary for Policymakers





- Complexity - representation of the whole system
- False pretences of being straight forward / measurable
- Vulnerability IPCC <> Vulnerability DRR
 - Synchronisation in AR5?

purposes

→ **Identifying current and potential hotspots:**

Vulnerability assessments can compare susceptibility to climate change in multiple systems. They also allow better understanding of the factors driving the vulnerability of particular climate change hotspot (e.g. a specific geographical area or industry, which is more severely affected by climate change than others).

→ **Identifying entry points for intervention:**

Information on the factors underlying a system's vulnerability can serve as a starting point for identifying suitable adaptation interventions. Adaptation can reduce vulnerability by *increasing* a system's adaptive capacities and by *decreasing* its sensitivity to climate change.

→ **Tracking changes in vulnerability and monitoring & evaluation (M&E) of adaptation:**

A relatively new approach is to use vulnerability assessments to track changes in climate change vulnerability over time. This complements existing methods for M&E of adaptation measures and generates additional knowledge on the effectiveness of adaptation. The Conceptual Framework provides a brief introduction to this topic. Chapter 3 deals with the application of vulnerability assessments for M&E of adaptation in more detail.

Impact Chain

Cause



effect



Metrics /
Indicators



Evaluation

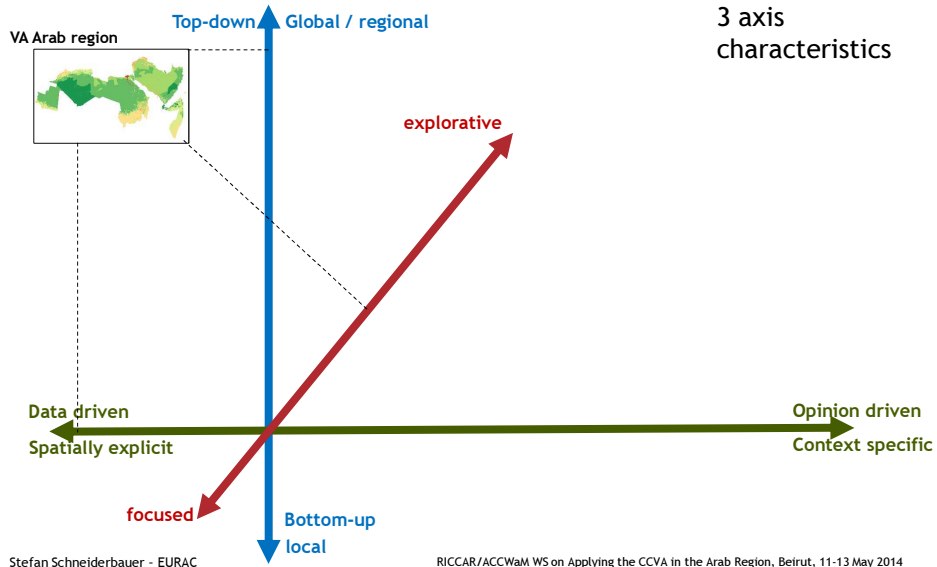
Normative / subjective choices



Who and what is vulnerable
To which exposure / impact?

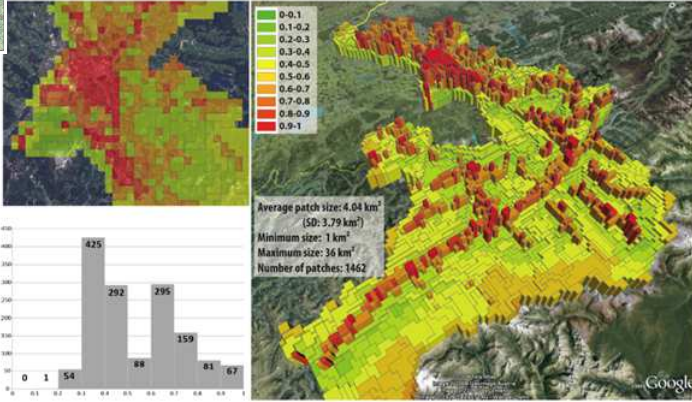
Method to quantify the
factors of the impact
chains and their relations /
correlations

Method to assess the
results of this
quantification



Selection of methodology

- quantitative vs. qualitative
- modeling vs. indicator assessment vs. expert knowledge
- aggregation vs. individual results

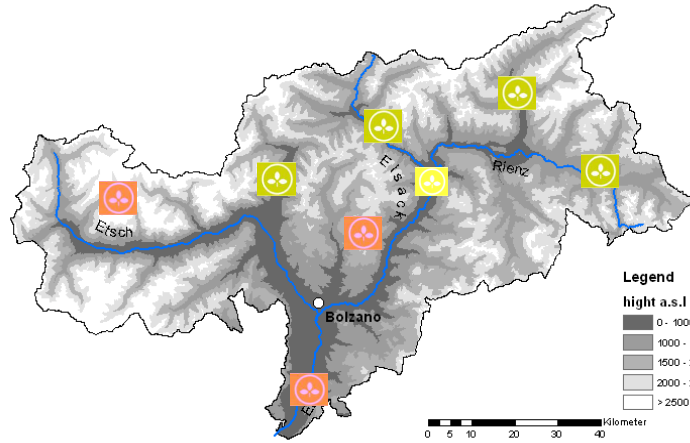


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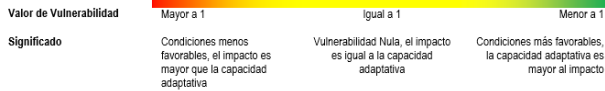
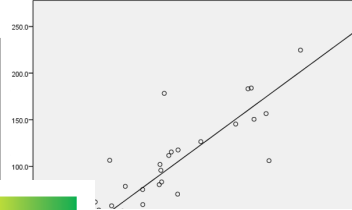
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AÑO	ENE	FEB
1961	867	861
1962	918	891
1963	941	931
1964	763	911
1965	1363	481
1966	442	881
1967	378	1101
1968	1034	1061
1969	711	1021
1970	914	781
1971	1029	871
1972	883	881
1973	717	1001
1974	2045	871
1975	1335	981

Tabla 13: Ponderación de los factores de capacidad adaptativa

Factor	Ponderación	Subfactor	Ponderación
Gobernanza	35	Organización de regantes	100
		Disponibilidad de tierra	40
Recursos	25	Apoyo institucional (Asistencia técnica)	10
		Acceso a la información	25
		Proximidad a canales de comercialización	25
		Conocimientos en la introducción de nuevos cultivos	30
Conocimientos (know how)	15		



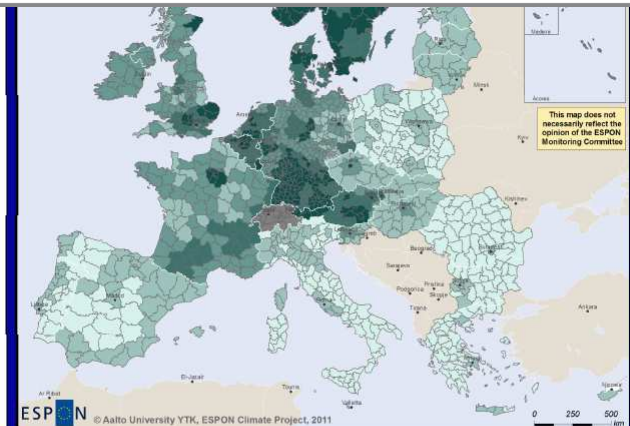
daptativa (criterio de experto)

Ítem de 1 a 3)	Capacidad adaptativa	
	Después de la implementación	Antes de la implementación
3	11.7	35.0
1	3.3	3.3
1	0.8	0.8
1	2.1	2.1
3	6.3	6.3
2	1.5	3.0
2	1.5	3.0
2	2.0	4.0
1	1	2.5
1	1	2.9
1	1	2.9
Total Capacidad Adaptativa (Escala de 1 a 100)	37.5	65.8

La siguiente tabla muestra los resultados de la aplicación de la anterior fórmula para el caso de Chullcu Mayu.

Situación	Periodo	Área bajo riego óptimo	Impacto del Cambio Climático	Capacidad Adaptativa	Vulnerabilidad
Sin Proyecto	1960-2007	4.8	92.1	37.5	2.46
Con Proyecto	2008-2011	50.44	17.3	65.8	0.26

M. Zebisch / S. Schneiderbauer
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Capacity to adapt to climate change

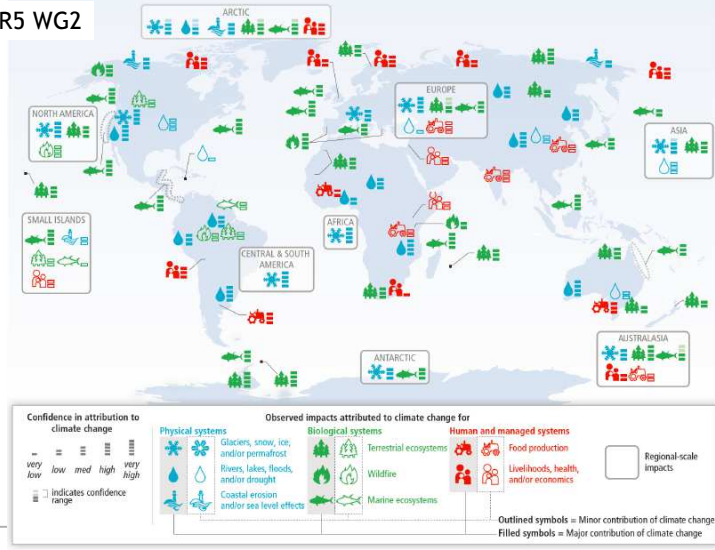


Combined adaptive capacity expressed in quintiles.
Adaptive capacity calculated as weighted combination of economic capacity (weight 0.21), infrastructure capacity (0.16), technological capacity (0.23), knowledge and awareness (0.23) and institutional capacity (0.17).

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23
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- All VAs:
 - normative decisions are necessary, For example: focus sectors or impacts, selection of indicators, rules for aggregation etc.
 - realism - study design and expectations to results must be appropriate to time and resources available
 - balance: deep versus broad
- When aggregation:
 - transparency - show intermediate results
- Spatially explicit, multi-sector VAs:
 - highly complex → modular structure
 - literature and experience is rare

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Thank you for your attention!