

Thinking Global, Acting Local

Vulnerability to climate change and adaptation strategies in South Tyrol, Italy

Stefan Schneiderbauer

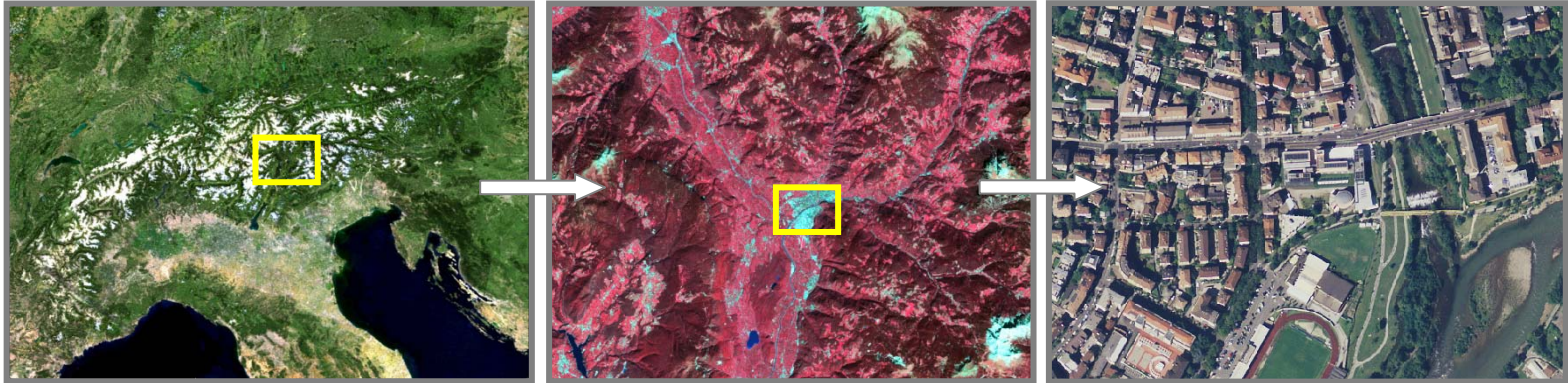
Marc Zebisch

EURAC - Institute for Applied Remote Sensing

- Background
- Climate change in The Alps - past & future
- Climate change impacts
- Vulnerability to climate change
- Adaptation strategies

Who and where are we?

European Academy - Bolzano / South Tyrol / Northern Italy

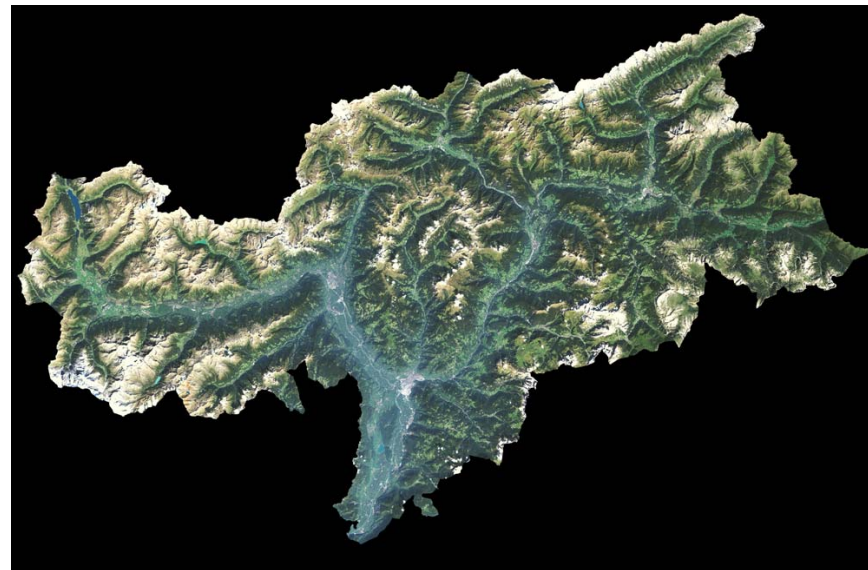


- independent non-profit research organisation
- 190 people in 5 research departments, 11 institutes
- interdisciplinary: from minority rights via public management and institute for the Iceman to sustainable development institutes
- including the institute for applied remote sensing



Objective:

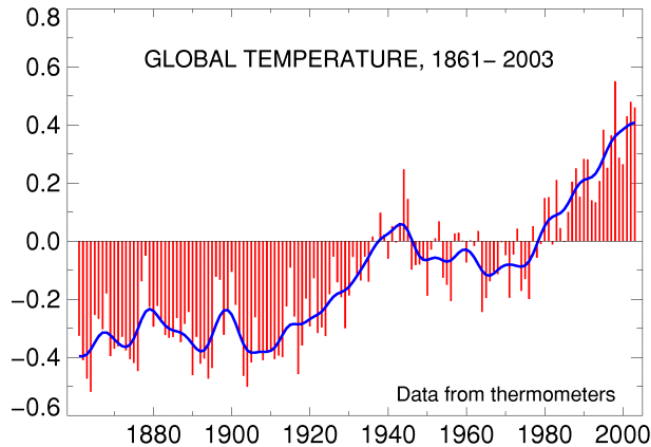
to develop remote sensing applications for the Alps and other mountainous areas, addressing current environmental problems:



1 focus topic (amongst others):
vulnerability and risk to
natural hazards and
climate change impacts

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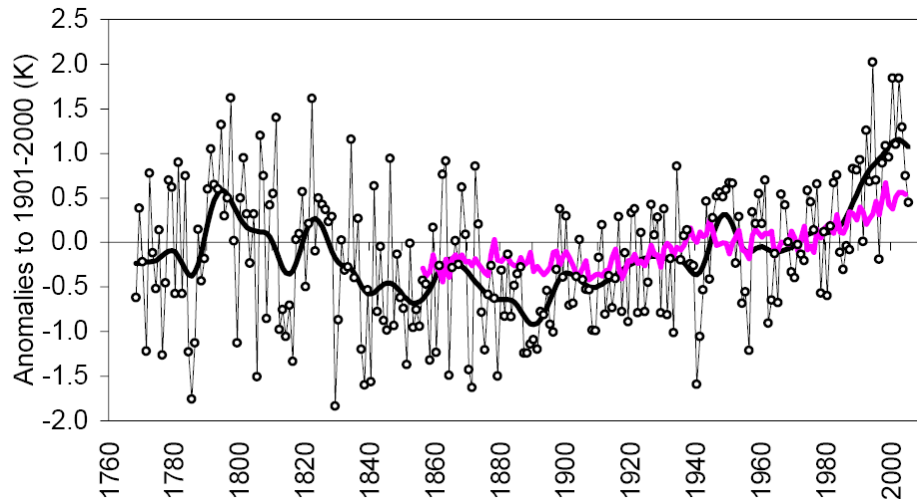
Experienced change in Temp - global / alps



Global warming in atmospheric layer at ground level:
 average temperature increase since 1850: approx.
 $0.76^{\circ}\text{C} (\pm 0.19^{\circ}\text{C})$ 0.65°C of which in the last 50 yrs.
(IPCC 2007)

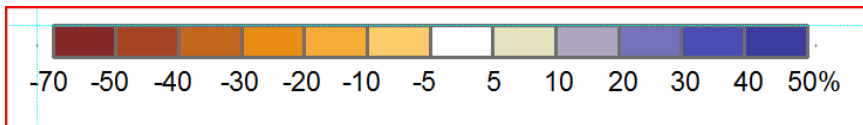
Mountains:

early indicators of climate change worldwide,
 particularly the Alps, where recent warming
 was approx 3 times global average

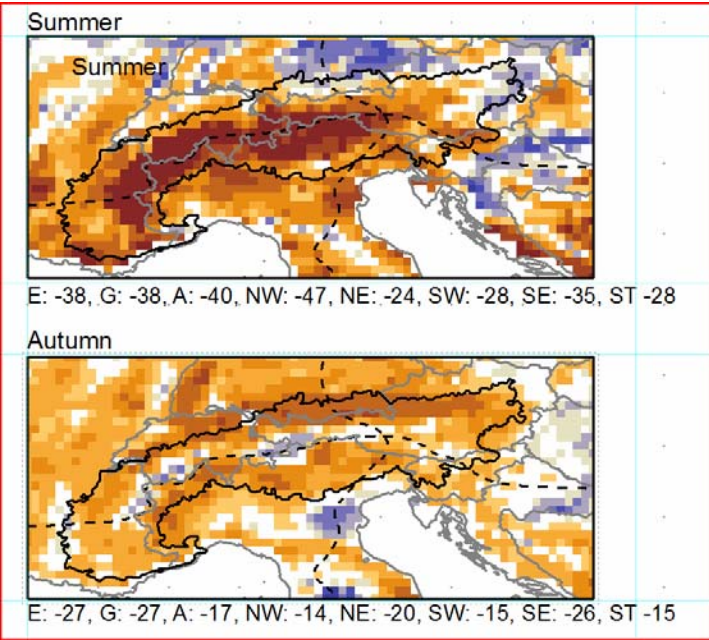
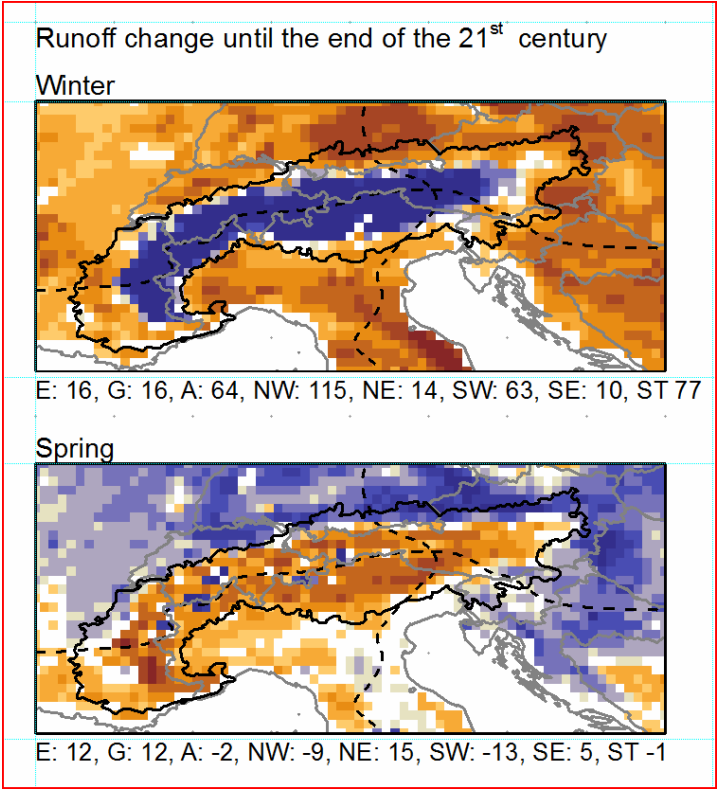
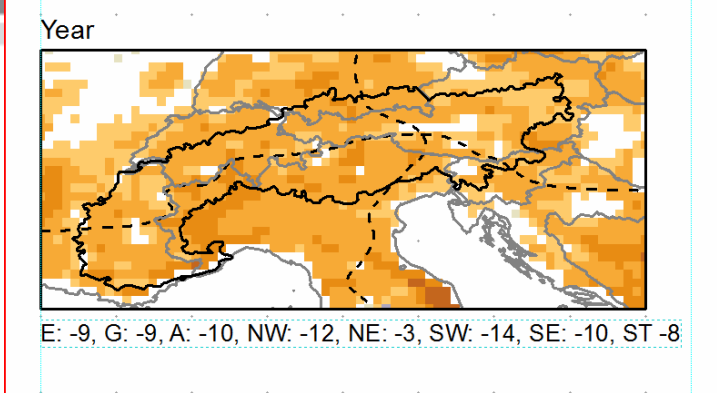


Compared to the global trend from 1890 to
 2005 of $+0.74\text{K}$ (global land at 0.5 deg grid -
 CRU TS), the GAR has warmed
 nearly twice as much.

*(Final report for RTD-project ALP-IMP (EVK-CT-2002-
 00148))*



2100 scenario in relation to average of last 100 yrs
(CLM data, ~20 km)



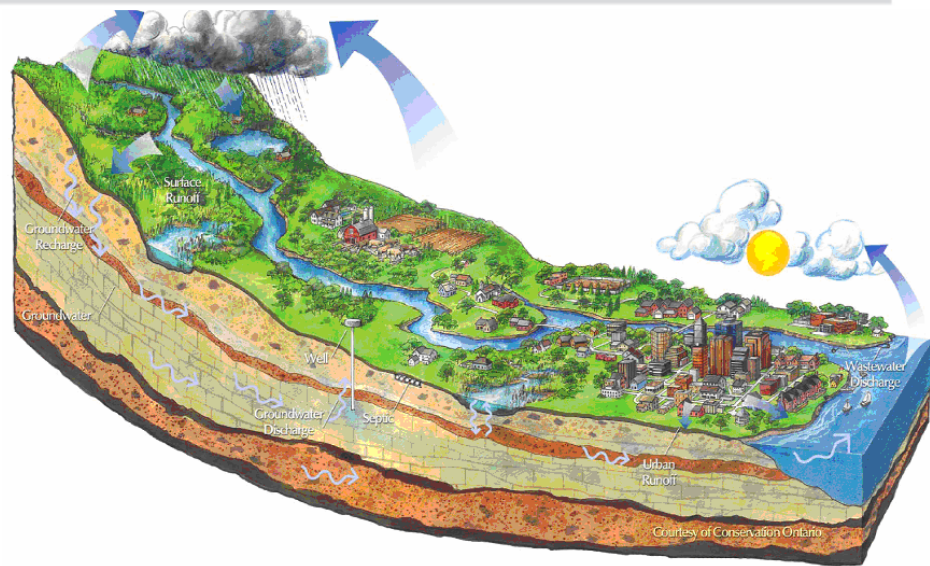
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Mountains (general):

- ❑ Changes in temp and moisture regimes, negative implications: disruptions of ecosystems and dependent socio-economic activities (e.g. agriculture)

- Most crucial/evident ecosystem services:
 - Water tower (reduced glacier extents and snow cover) - large area service
 - Reduction of natural hazard impacts (Biodiversity loss, runoff extremes, etc)

- ❑ Increase of extreme events: frequency and severity of natural hazards
- ↑ (permafrost, precipitation patterns, extreme temp and rainfall etc...)



Brienz, 24. August 2005



The Alps, characterised by: High population density, high value economic activities, dense network of infrastructure

impacts:

- lack of snow cover for winter tourism
- water scarcity (at least in parts):
strong competition between
 - tourism (artificial snow),
 - irrigation for agriculture
 - drinking water
 - hydropower
 - nature protection
- Loss of attraction
(biodiversity, glaciers etc..)

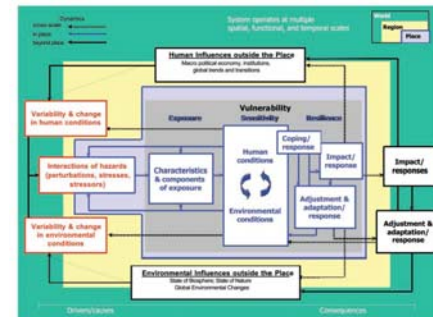
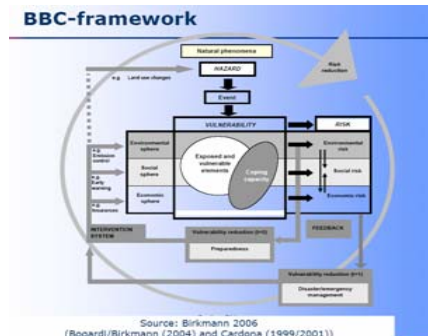
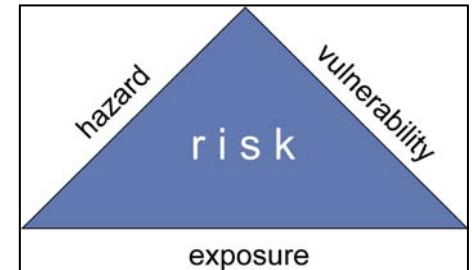
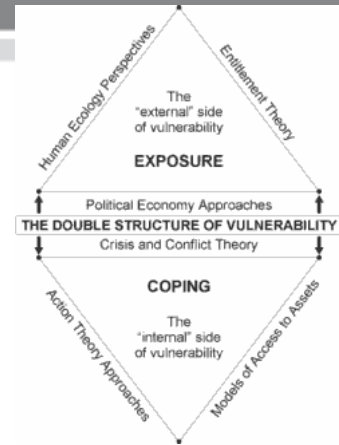


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Vulnerability concepts

Various schools / research communities

- ➔ various objectives / scales (time and space)
 - ➔ various concepts
 - ➔ various ways of understanding, defining and assessing vulnerabilities
- Food security / livelihood / development community (e.g. Bohle 2001)
 - Risk / disaster assessments (Crichton 1999)
 - Climate change (e.g. Turner et al 2003)
 - Integrative approaches (e.g. BBC 1999/2001/2004)
 - Economic, policy analysis, security etc....



Climate Change concept



Exposure



Sensitivity

Impact



Holland



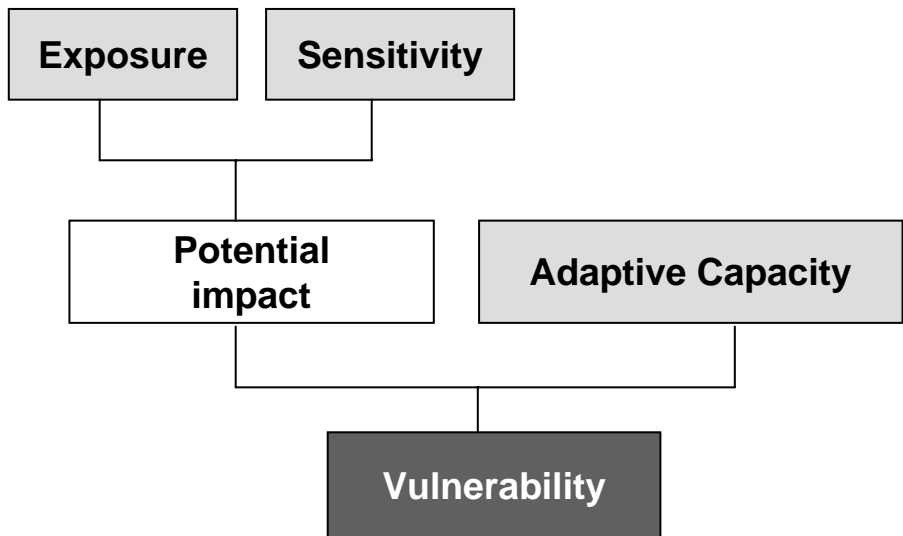
Bangladesch

Adaptive
Capacity

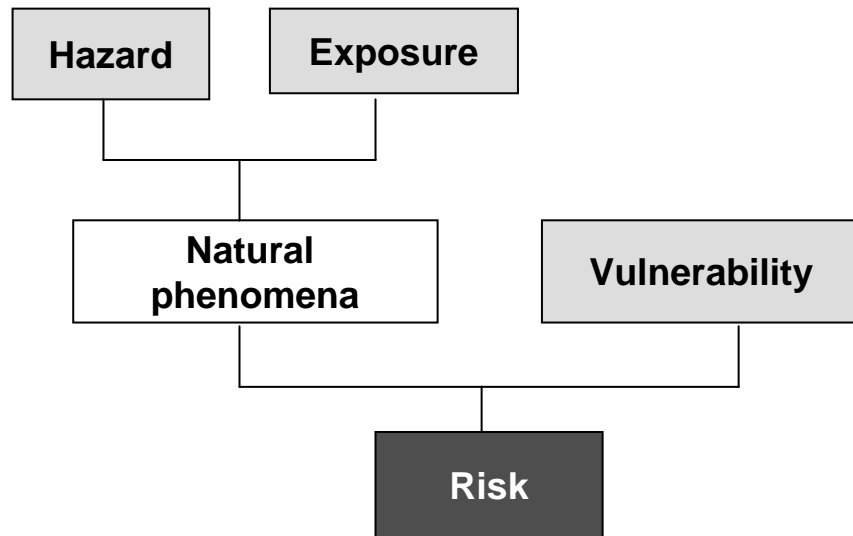
Vulnerability



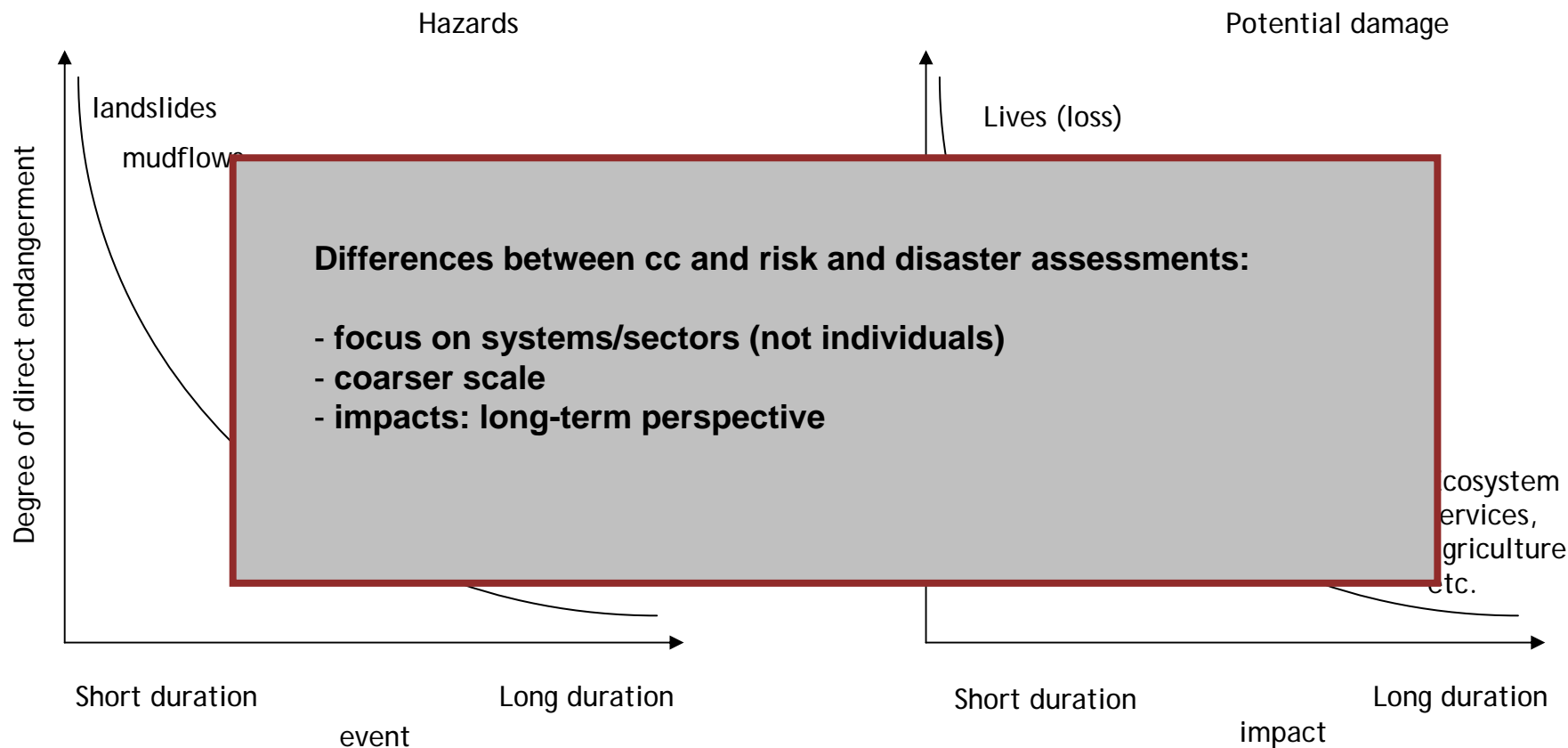
Climate change



Risk / disaster assessment



Common understanding is needed for integrated approaches!!

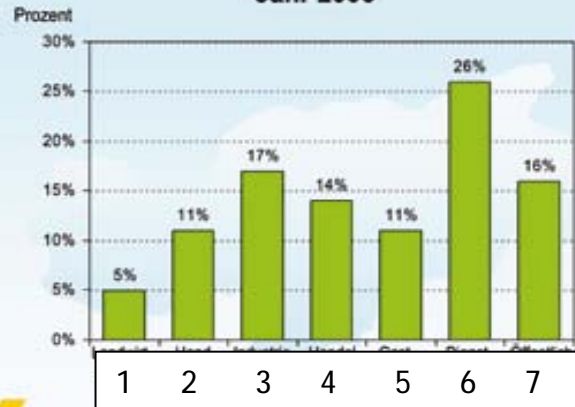


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South Tyrol - some basics:

- Autonomous province in Northern Italy
- Population: 400k
- 7400 sqkm - 14 % below 1000m
- GDP: ~ 13 billion €
- Almost full employment
- Diversified economy
- Small and very small companies

Sectors - economic value added [percentage]



- 1 - agriculture (fruit, livestock, vine)
- 2 - craft
- 3 - industry
- 4 - trade
- 5 - hotel & restaurant industry
- 6 - services
- 7 - public sector



WIFO - Wirtschaftsforschungsinstitut der Handelskammer Bozen
Ausarbeitung: WIFO
 Quelle der Daten: ASTAT, ISTAT



Pressure on valley bottoms and arable land, industrialised agriculture, traffic...



We do not start at zero:
in South Tyrol (as in many other regions) strategies to deal with weather extremes have been used in agriculture for centuries and in modern economic sectors for decades.

Examples:

- Waale for irrigation in drier areas
- dealing with all kinds of natural hazards (particularly: flash floods, landslides and mudflows, avalanches)
- high altitude water basins as drinking water reservoir, for hydropower or in more recent years as source for snow canons.

Most recently:

- artificial snown
- 'Klimahaus'



Adaptation strategies should (and often are in South Tyrol):

- be based on best data available with respect to current situation and future scenarios - including as accuracy assessment particularly for the latter one
- be developed in close cooperation between scientists, planners, decision makers and all relevant stakeholders (starting with the vulnerability assessments)

But...

- Climate change increases the risk level you have to be prepared for as we can already see with storms (wind speeds) and floods (HQ values)
 - → new legislations
- Most strategies follow a sector approach, that is, they are focusing on one activity or sector (agriculture, environment, craft, culture, tourism), and on one dimension (economy, landscapes, natural parks) - example water

The sustainable solution is an integrated approach:
Cross-sectorial and partnership

Where to set priorities?

- Protecting the climate
 - saving energy
 - using renewable energies
 - implement soil protecting handling (in agriculture)



- Adaptation

- integrative approaches
- communication and risk awareness
- prevention
- monitoring
- new technologies
- cooperation (transnational, sectoral, ...)



What we should not do....

