Participatory Approach to Long-Term Socioeconomic Scenarios as Building Block of a Local Vulnerability and Risk Assessment Tool – The Case Study Lienz (East-Tyrol)

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The overall aim of the project

Adaptation and Decision Support via Risk Management Through Local Burning Embers

Developing a decision support system for climate-sensitive iterative risk management as a key adaptation approach

- Identifying and bridging the gaps between global CCA and DRR frameworks, research and policy and national, subnational as well as local risk management, adaptation needs and requirements

- Downscaling IPCC’s “Burning Embers - Reasons for Concern” to the local level (LBE) with respect to hazard types and sectors including a consideration of key risk drivers

- Supporting the building of resilience and adaptation capacities at the local level via an LBE-integrated, iterative risk management approach
IPCC: Risk management is central to limit impacts of climate change on society, economy and ecosystems.

Representation of the 5 risk categories (Reasons for Concern) as "Burning Embers" using a color scale that shows the increasing risk along with rising global mean temperature.

Mahony, Hulme (2012): “The Colour of Risk” “…a new visual convention in the representation of the risks associated with climate change.”

Source: IPCC AR5, ch. 19, p. 1073
Downscaling “Global Reasons for Concern” to the local level

Background: From Global to Local
First application of global Burning Embers concept at the local government level

Study site: City of Lienz, East Tyrol, Austria (considered as peripheral, mountainous region)
Considering the wider Lienz region is relevant for mountainous tourism, agriculture and forestry
Inhabitants:
Lienz city: 11,903
Surrounding regions: 15,945
Schematic Positioning of Socioeconomic Scenario Building in ARISE local risk assessment

**Methodology**

- **Influencing Factors**
- **Socio-economic Development**
- **Climate Change Response**

**Risk** = Vulnerability \( \times \) Exposure \( \times \) Hazard

**Scenario Approach**

- Regional Climate Change Scenarios
- Literature Review on Impacts + Vulnerabilities of Sectors + IPCC Shared Socioeconomic Pathways (SSPs)

**Participatory Approach**

- Qualitative Interviews and Workshops
- Literature Review on Mountain Hazards

**Desk Review**

S: WIFO compilation
Methodological Approach

- **Hybrid approach** of top-down and bottom-up as well as model-driven and participatory methodologies
- **Co-creation of knowledge** and co-design of tools and measures
- Participatory and transdisciplinary research approach
- Integration of local knowledge and expert knowledge
- Science-stakeholder dialogues as contribution to social learning
- Collaborative design of Local Reasons for Concern
- Collaborative Assessment of local adaptation measures
### Temperature

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Changes until mid-century (reference period 1981-2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean temperature</td>
<td>+ 1.6 – 2.8°C</td>
</tr>
<tr>
<td>Summer days (tmax &gt; 25 °C)</td>
<td>0 – +10 days</td>
</tr>
<tr>
<td>Hot days (tmax &gt; 30 °C)</td>
<td>0 – +1.3 days</td>
</tr>
<tr>
<td>Frost days (tmin &lt; 0 °C)</td>
<td>- 45 – - 22 days</td>
</tr>
</tbody>
</table>

### Precipitation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual precipitation</td>
<td>-200mm – + 100mm</td>
</tr>
<tr>
<td>Heavy precipitation days</td>
<td>- 2.5 – + 2.7 days</td>
</tr>
</tbody>
</table>

Q: ZAMG

0-19 years

20-64 years

65+ years

Austria
Tyrol
East-Tyrol

S: ÖROK, 2010, WIFO compilation
Input Data to Scenario Workshop (3):
Employment by sector in
Lienz and the surrounding region

- Agriculture, Forestry and Fishing
- Mining and Quarrying
- Manufacturing
- Energy and Water Supply; Sewerage, Waste Management
- Construction
- Wholesale and Retail Trade; Repair of Motor Vehicles and...
- Transportation and Storage
- Accommodation and Food Service Activities
- Public Administration and Defence; Compulsory Social...
- Education
- Human Health and Social Work Activities
- Other Economic Activities (Services)

Municipality of Lienz
Surrounding areas of Lienz

0 500 1 000 1 500 2 000
Heuristics: “Matching” of stakeholder scenario narratives with the Shared Socio-Economic Pathway’s narratives

Participative Szenario’s Lienz

"Boom"

"Stagnation"

Shared Socio-Economic Pathways (SSP’s, IPCC) – Narrative

SSP1 – Sustainability Taking the Green Road

SSP3 – Regional Rivalry A Rocky Road

Sustainability

Rocky Road

S: WIFO compilation
Stakeholders were asked to envision and characterize two distinct futures for Lienz: A "Boom" and a "Stagnation" scenario

**Boom**
- **Tourism**: Create innovative offers for summer tourism, cater for “tourism refugees” from Mediterranean and the urban agglomerations, focus on backcountry skiing and elevations above 1500m, water world, make use of water
- **Agriculture/Forestry**: new markets through diversification of woods and plants (wine, fruit), self sufficiency of region, increased demand for timber as energy source
- **Industry & manufacturing**: important for peripheral region, strengthening regional value-added chains, endogenous innovation, niche production for global market, energy prices central for competition, migration, high-skilled labour, soft-factors: awareness for regional products
- **Education, health & services** ...
- **Policy & administration** ...

**Stagnation**
- **Tourism**: today’s winter tourism stagnates, costs increases with cablecars and artificial snow
- **Agriculture/Forestry**: Outward migration – missing cultivators for steep terrain, pests, aridity, erosion and storm losses, high irrigation costs, difficult cultivation of alpine pasture
- **Industry & manufacturing**: Competitive disadvantage due to bureaucratic overload, increasing out-migration of skilled persons, shortage of education options in region, “self-marginalisation” of region
- **Education, health & services**: Ageing negatively affects health und education facilities
- **Policy & administration**: Territorial thinking as barrier for economic growth, policies inhibit innovations, reactive policies
The different SSP narratives represent specific combinations of socioeconomic challenges to mitigation and socioeconomic challenges to adaptation without explicitly considering climate change itself (O’Neill et al., 2015).

2 Scenarios for Lienz: „Sustainability“ and „Rocky Road“

„Rocky Road“ as underlying narrative for local risk assessment and analysis of adaptation options

**Fig. 1.** Five shared socioeconomic pathways (SSPs) representing different combinations of challenges to mitigation and to adaptation. Based on Fig. 1 from O’Neill et al. (2014), but with the addition of specific SSPs.
Local Reasons for Concern for Lienz

*LRC 3 mainly due to demographic change, in particular aging*
For further information on the project:

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