The HuT · FOREST FIRES · DROUGHTS · HEATWAVES

The Human-Tech Nexus: Building a safe haven to cope with climate extremes

DEM 10 "Bern Canton" (Switzerland)

https://thehut-nexus.eu/territory/berne-canton/

The HuT

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Demonstrator arena activities

Early warning systems

1) 2022 - 2023: Local risk management practices: strengths and weaknesses (focus groups and interviews)

2) 2022 - ongoing: Meteostation set up, data collection and analysis

3) 2023/24: Warning communication: gaps and ways forward (interviews)

4) 2024/25: Overcoming multi-hazard barriers (forum)

Nature-based Solutions

5) 2024/25: Nature-based solutions (NbS) for multi-hazards: enablers and barriers (interviews)

6) 2025/26: Mainstreaming NbS (workshop, policy brief)

7) 2025/26: Climate change impacts on NbS protection forests (focus groups)

Focus on upscaling Nature-based Solutions: the case of Protection Forests (PF)

Background and research questions

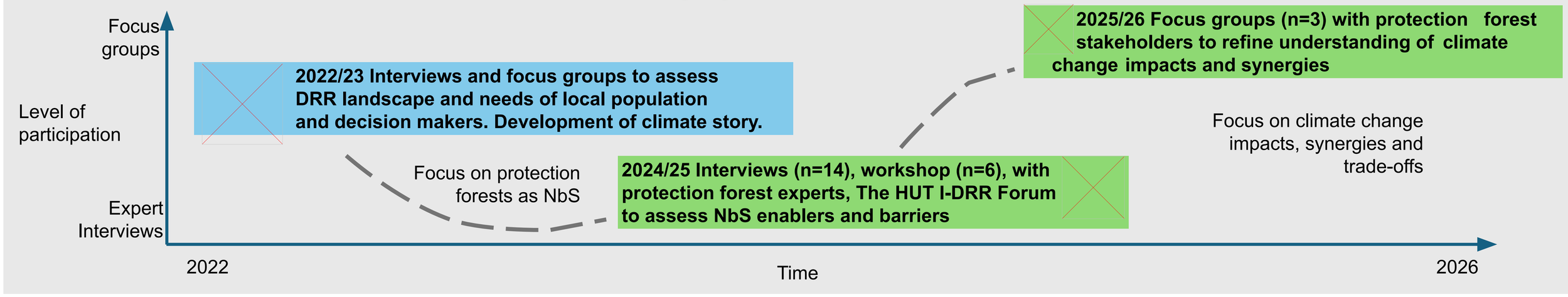
- PF protect against rockfalls, landslides, debris flows, snow avalanches and floods.
- Traditionally used in Switzerland and formally managed for over 100 years
- 50% (95,700 ha) of all forests in Bern have a protective function for 60,000 inhabitants
 - **What are the enablers and barriers of protection forests?**
 - **How are protection forests affected by climate change and what can we learn from them for other NbS?**

Methods and data analysis

Literature review on protection forest and NbS policy analysis in Bern and Switzerland

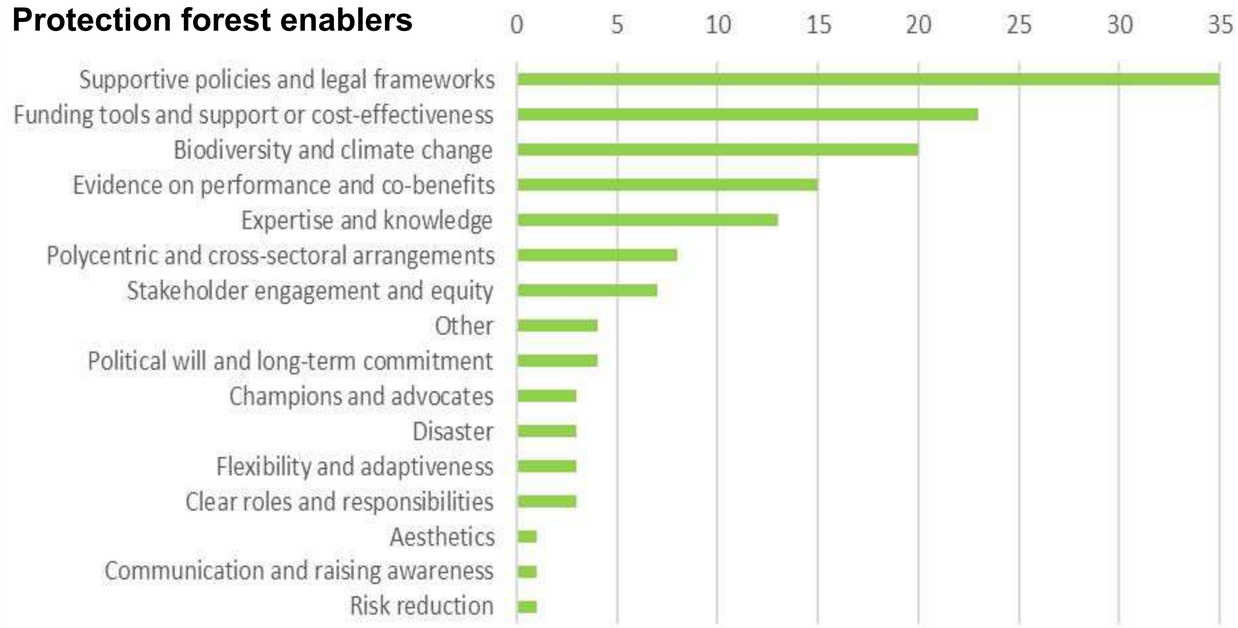
Quantitative data and content analysis of interviews, focus groups and workshops using Nvivo

Stakeholder engagement processes / DRRnF

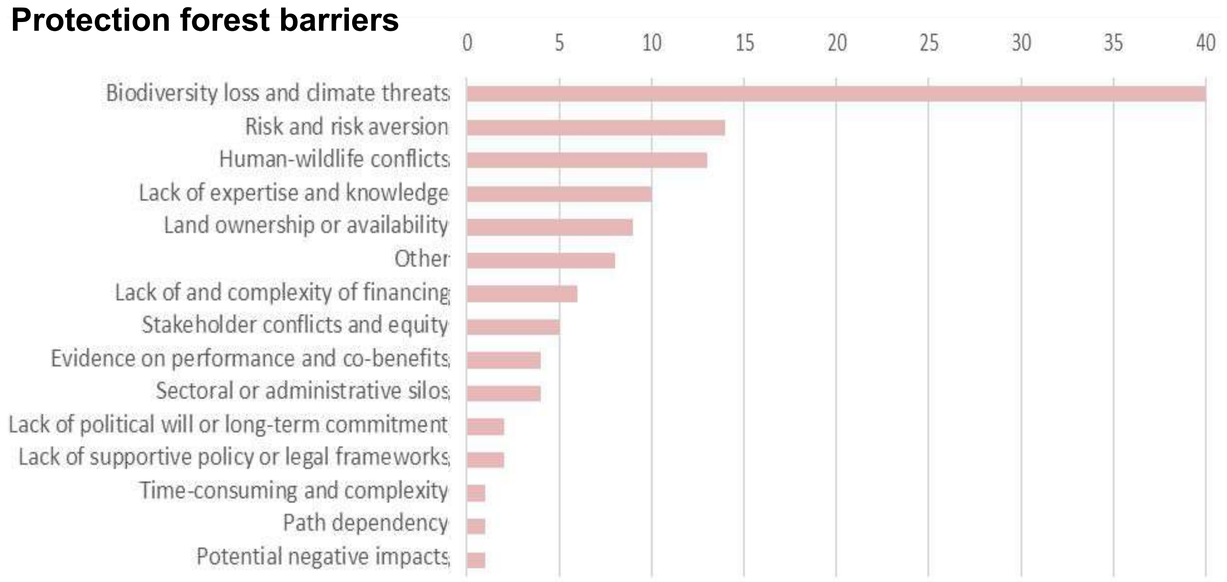


Enablers and barriers

Protection forest enablers



Protection forest barriers



Climate change adaptation

Climate Change → Changing hazards Changing forests → Uncertainty about future protection function → Need for adaptation and governance responses

The focus groups revealed three central governance challenges:

1. Natural adaptation or proactive human intervention?

Natural adaptation
Close-to-nature forestry
Natural regeneration
Local biocoenosis & epigenetics

Proactive intervention
Assisted migration
Planting climate-fit species
Larger gap sizes

- Stakeholders support resilient and diverse protection forests, yet they disagree on management intensity.

2. Protection forests: ecosystem or infrastructure?

Ecosystem
Self-adapting
Slow processes
Natural dynamics

Infrastructure
Reliable protection
Standards
Measurability

- Climate change intensifies tensions between ecological flexibility and reliable hazard protection.

3. Governing multifunctionality across sectors

Protection ↔ Timber ↔ Biodiversity ↔ Water provision ↔ Recreation

- Multifunctionality is widely recognized in strategic visions, but implementation remains organized within sectors. Climate challenges affect multiple functions.

Conclusions & policy recommendations for NbS upscaling

Strengthen the biodiversity and climate nexus	Incentivize biodiversity-climate interactions in policy frameworks: E.g. combined adaptive silviculture and biodiversity-enhancing practices Establish a joint risk task force to develop planning responses that consider biodiversity-climate linkages, synergies and feedbacks.
Mitigate ungulate browsing pressure	Mandate regional game management plans that include ecological targets and adapted hunting quotas. Introduce forest regeneration monitoring to track recovery success and target problem areas.
Address workforce gaps in PF and multi-risk management	Add interdisciplinary modules to forestry and natural hazard curricula and training programs. Mandate interdisciplinary consultations in PROTECTpraxis application, e.g. by requiring involvement of experts outside the applicant's core
Enhance multi-risk and cascading risk integration:	Create multi-risk focal points to coordinate between different units, pilot multi-hazard risk planning, e.g. on test sites for multi-risks Harmonize training and terminology of multi-risk. E.g. joint work on hazard-interaction or NbS, grey, and organizational measures.

Publications developed within DEM10
- Abderhalden J., et al. (2025) "Barriers and enablers to stakeholder engagement in the co-creation of disaster risk reduction solutions", *International Journal of Disaster Risk Reduction,* https://doi.org/10.1016/j.ijdrr.2025.105381
- Aguilera Rodriguez J.J., et al. (2025) "Implementing nature-based solutions: insights from private contractors and consultants" *Nature-Based Solutions Nature based solutions* https://doi.org/10.1016/j.nbsj.2025.100278 (WP3)
- Martin J.G.C., et al. (2025) "The nature-based solution implementation gap: a review of nature-based solution governance barriers and enablers", *Journal of Environmental Management, https://doi.org/10.1016/j.jenvman.2025.126007*
- Bhandari C., et al. (2025) "Risk communication policies and strategies in Nepal and Switzerland: a comparative study", *International Journal of Disaster Risk Reduction*, https://doi.org/10.1016/j.ijdrr.2025.105773

Submitted
- Huland, E., et al. (under review). "Tackling barriers to multi-hazard DRR: Lessons from NbS and early warning systems", *Nature-based Solutions*.
- Meisburger, E., et al. (under review). "Cost-Benefit Analysis of Nature-Based Solutions: A Review of Mountain Protection Forests", *Forest Policy and Economics.*

In preparation (titles are preliminary)
- Huland et al. "Adapting Protection Forests to climate change: Perceptions, governance and interventions in Switzerland"
- Rohrer M. et al. "High-intensity precipitation events and their spatial and temporal interpolation in the catchment scale by remote-sensing and model-based tools like INCA and 'Combiprecip' "