

BIOSPHERE

Activating local resources
for cultivating regional
cooperation for
sustainable land-use

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United Nations
Educational, Scientific and
Cultural Organization



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• Sustainable Heritage and
• Environmental Management-Nature
• and Culture, University of Bergen

RQ1

How can multifunctional landscapes provide multiple functions and services and safeguard biodiversity?
(WP1, WP2, WP3, WP5)



RQ2

Which potential Nature-based Solutions are possible in Nordhordland UNESCO Biosphere, and which are scalable beyond this region and how?
(all WPs)



RQ3

What can we learn from past and present landuse systems to strengthen social-ecological resilience?
(WP1, WP2, WP5)

WP1 – Knowledge from the past – enabling solutions for a sustainable future

Aim: To analyse the rate and direction of land-use change, nature's benefits to people, and landscape multifunctionality by re-sampling the Lindås-project (1971-76).

In the 1970's the Research Council of Norway and UiB funded a large multidisciplinary research project, the Lindås-project, at the very same time as the building of the Mongstad oil refinery was taking place. The main aim then was to map natural resources and land-use systems to show how these had been used for centuries in a circular economy type model. It comprised 20 researchers and students over 5 years, producing 35 reports and numerous papers. However, agriculture and land-based food production was deprioritized in competition with highly paid jobs in the petroleum industry. This led to major land-use changes that lack in depth investigation to date. Today, most of this material is not available in a digital format and will be lost for the future if no action is taken.

- a) Digitalize all of the existing material, including aerial photographs, from the Lindås-project (1971-76) and design a searchable data base with open access to this unique material for the future.
- b) Re-sample the core sites of the Lindås-project (vegetation and soil) and add additional fauna groups (arthropods and birds) to the re-sampling protocol.
- c) Analyse the land-use change and associated soil chemistry change, in particular for soil carbon, in the region over the past 50 years.
- d) Document oral histories of land-use and outline a national archive of oral history: "Memory for all", based on a model developed by our Portuguese partners.
- e) Develop future scenarios by modelling, to explore potential threats/solutions, connecting WPs 1 and 5.

WP leaders: Måren, Eycott, PhD-candidate.

WP2 – The state of the biosphere – mapping social-ecological interdependencies

Aim: To develop solution-oriented methods for documenting and mapping the greatest land-use pressures, challenges and conflicts in Nordhordland today.

A SES approach challenges the assumption that one can study the separate ecological, social, and economic systems to understand their properties and trends, and from this reconstruct a holistic picture of outcomes. Instead, SES research offers an integrated perspective of humans in nature and has been demonstrated to offer new data, methods, and avenues, from which to engage with sustainable development in a more holistic manner (Leslie et al. 2015, Berkes 2017, Selomane et al. 2019). As societies urbanize and 'decouple' from local ecosystems and their feedback effects, cascading social–ecological feedbacks are increasingly important to capture. Consequently, we need to develop new approaches for studying emergent phenomena, nonlinear dynamics and the feedback processes that give rise to these changes.

Multifunctionality, a concept developed within the field of land management research, refers to how landscapes are managed to deliver multiple societal benefits and ecosystem services. The idea of fostering landscape multifunctionality has gained traction as pressures on land to provide multiple functions and services increase. However, although the concept of multifunctionality is the basis of much of the EUs agricultural land-use policy, the theoretical framework for measuring and evaluating multifunctionality is still being developed.

BIOSPHERE will use participatory mapping approaches which integrate multiple stakeholder perspectives into landscape planning (Brown & Fagerholm 2015). Public Participation Geographical Information Systems (PPGIS) can help us understand how a landscape meets different needs and multiple functions, and highlight ecosystem benefits to people and how these are heterogeneously distributed, both in a landscape and across a human community.

a) We currently use PPGIS in the TradMod-project (NRC) and will extend its application by using our current ES PPGIS mapping as a pilot dataset for understanding current pressures, conflicts and challenges relating to land-use and ES trade-offs.

b) We will use the PPGIS to identify land-use/habitat classes, and associated ES bundles, most affected by environmental quality and land-use change. In these hotspots of good/bad environmental quality we will analyse the drivers that people identify behind these changes.

c) Facilitated by the above-mentioned mapping, we will pair down to identify land-use pressures. By doing so we will pinpoint main conflicts, e.g. road developments, windmills, urbanization, land abandonment, and afforestation. We will utilize the same case studies to map emerging sustainable alternatives and solutions to identified pressures (WP3).

d) We will record perceptions of ES and land-use changes in the recent past and present by conducting semi-structured interviews and using photo elicitation, particularly involving the older generations, to explore if local traditional knowledge can be related to different indicators of social-ecological change.

e) We will undertake a comparative study of current ES provision and demand between Nordhordland BR and Portuguese BRs, as we are part of an EU project under the 'Environment, Climate Change and Low Carbon Economy Programme', targeting the 12 Portuguese BRs.

WP leader: Postdoc, Nåmdal, Måren.

WP3 – Seeds of good Anthropocenes – how to get there from here

Aim: Build a solid idea bank for locally grounded sustainable land-use initiatives through participatory methods and a bottom-up approach

The methodology coined Seeds of good Anthropocenes aims to help us develop inspirational visions and stories, with the potential to be key components of transformations to sustainability, helping to shape the very reality that they forecast (Bennett et al. 2016, Hebinck et al. 2018, Pereira et al. 2018, Raudsepp-Hearne et al. 2019). Extending on this methodology, we will use citizen science to encourage citizens to be directly involved in the knowledge creation and defining future research needs.

a) Use Seeds of Good Anthropocenes to map local initiatives and innovations for a more sustainable land-use, and pathways for scaling-up existing seeds, what needs to decrease, and paths between the steppingstones to get to where we want to be. Links to WP 5.

b) Design citizen science projects on valued initiatives and innovations, and their potential future effects on the social-ecological system, involving the local communities, particularly the younger generations and farmers/part-time farmers, linking to WPs 4 and 5.

c) Identify demand-driven information gaps to guide further research, as fit-for-purpose knowledge is critical to develop adaptive and resilient ecosystems and communities where rapid change events may become more frequent.

d) Identify types of transformative work (structural, systemic, and enabling) people are doing and what parts of the ecological landscape it is likely to impact, connecting to WP 2. Document if those associated with the transformative “seed” are aware of the trade-off (flip sides) of the work, and the potential for emergence of those unwanted consequences in other parts of the social-ecological system.

WP leaders: Postdoc, Måren.

WP4 – Strengthening impact through active communication

Aim: Secure knowledge-sharing, involvement and transparent communication between partners and stakeholders, and to provide efficient dissemination to ensure impact of project results.

Strategy: Communications will have both a supporting function and be a core project activity, integrated with all other WPs. From the onset, we will structure communications within and from the project to lay the foundation for continuous use of new insights and knowledge both during the project and beyond. Participation and personal involvement, innovative use of existing communications resources and development of new tools are key elements. Target audiences: People directly involved in the project, partners and collaborators, the scientific community, students, and stakeholders with interests in land-use issues. Ultimately the project aims to influence attitudes and behaviour of all inhabitants in the region; landowners, farmers, community planners, the business community – as well as future generations.

Objectives/activities

1. **Raising awareness:** The challenges BIOSPHERE raise, are very real for the municipalities and communities in the BR and we will work actively to generate interest and raising awareness about sustainable land-use in the region.
2. **Influencing attitude:** Our approach will be “bottom-up” built on early inclusion, creating learning communities and building trust and understanding. We will influence attitudes by demonstrating the potential in trying new ways of addressing an uncertain future.
3. **Increasing knowledge:** Understanding the challenges and potential solutions to future land-use change has been identified as a key challenge. We want to ensure that the knowledge accumulated through BIOSPHERE is actively used.
4. **Changing behaviour:** BIOSPHERE is concrete and practical. We will encourage our local partners to try out new approaches and adapt to the challenges they face. By being open and inclusive, by strengthening links among stakeholders and by sharing ideas and results in an informal setting, we believe that new knowledge will be put into practice.

WP leader: Natland

WP5 – Applied resilience thinking – resilient futures by design (and not disaster)

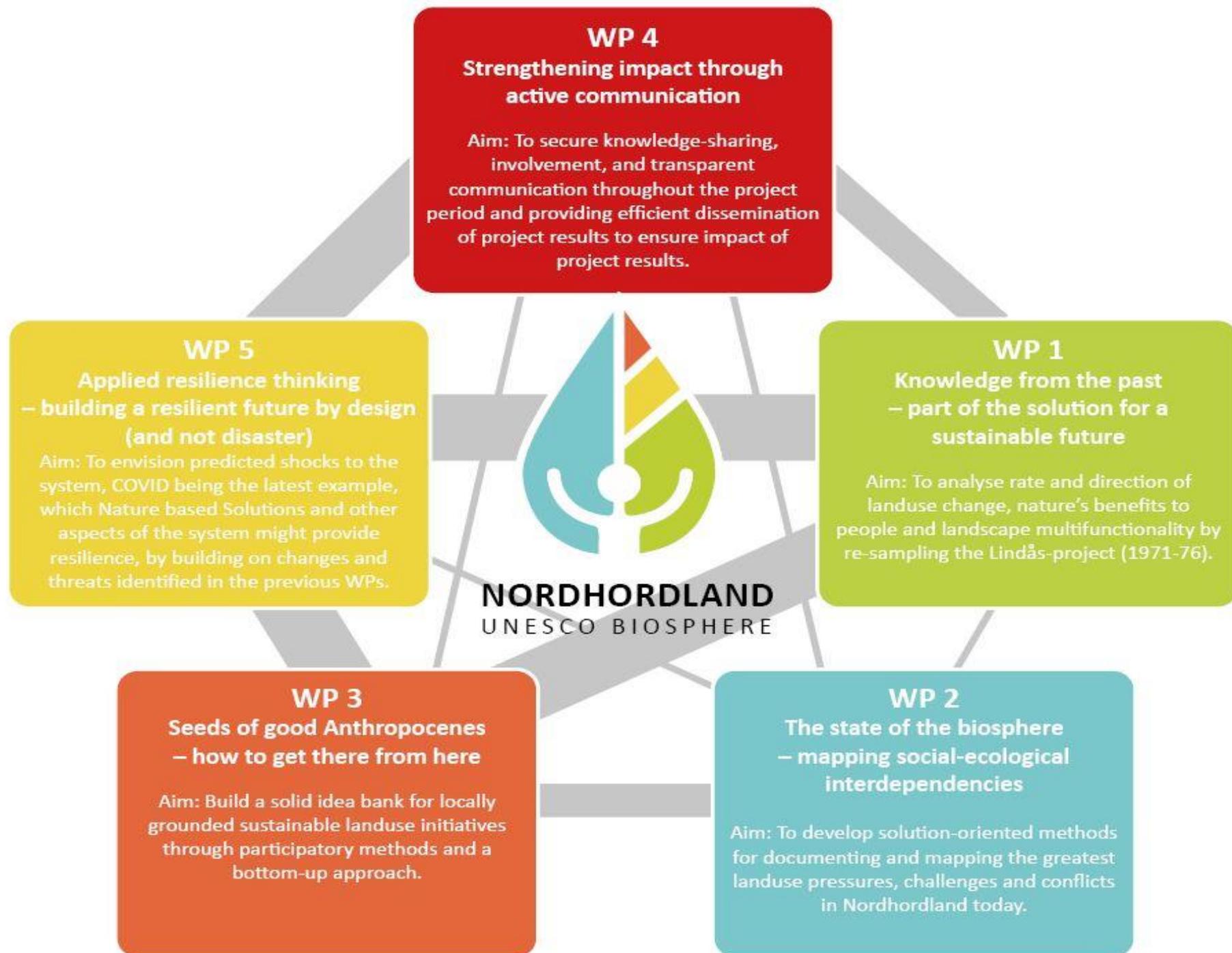
Aim: To envision predicted shocks to the system, which Nature based Solutions and other aspects of the social-ecological system might provide resilience.

NbS have the power to deliver multiple resilience benefits and are often more adaptive to shocks and stresses than 'grey infrastructure'. They may buffer the worst effects of shocks and provide longer term benefits. A shift towards resilience-based approaches that promote diversity in all its forms, seek non-linear transformational change, enable local actors to transform their own futures, and tackle distant drivers alongside local, context-specific ones is urgently needed. BIOSPHERE is in the unique position to offer longitudinal data which allows us to understand long-term system transformation. This WP will:

a) Integrate results from all previous WPs and conduct a resilience assessment of Nordhordland BR over the past 50 years, including identifying slow and fast changing variables, system memory, emergence of innovations, and causes of system stagnation, in the economic, social and ecological system. This assessment will also build on our social-ecological network analysis from an on-going project to analyse connectivity and redundancy in the system, both socially and ecologically.

b) Identify the role of NBR specifically, in conferring system resilience in past, present and future, in the context of land-use change.

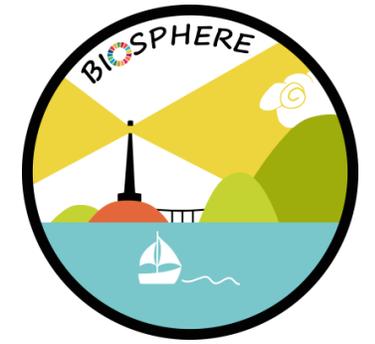
WP leaders: Postdoc, Måren





Project-team

- Project leader: **Inger Elisabeth Måren**
- **Kristin Nåmdal**, Head of special planning in newly formed Alver municipality, will together with colleagues in the agricultural sector help shape the research agenda of BIOSPHERE to be action-driven and locally adapted to important ongoing processes like the new Municipality Plan, the most important plan at municipality level.
- **Kari Evensen Natland**, Region Nordhordland, specializes in tourism and local stakeholder engagement. Natland is project leader of the Nordhordland UNESCO Biosphere on behalf of the Region Council. She will drive and manage the contact between stakeholders, and facilitate information and dissemination work amongst all involved parties, by leading WP4 and involving in WPs 2 and 3.
- **Associate professor Amy Eycott** is a landscape ecologist specialising in land-use change the Universitetet Nord. Her extensive experience comes from both academic and applied, stakeholder-oriented research environments, which is of benefit to the integrative aspect of this project. She will co-lead WP1 and co-supervise the PhD and one Master student.
- **Professor Helena Freitas** is centre leader for the Centre for Functional Ecology - Science for People & the Planet, the Department of Life Sciences of the University of Coimbra, Portugal and UNESCO Chair on Biodiversity Safeguard for Sustainable Development. Freitas has worked extensively with UNESCO's MAB-programme and will bring valuable international comparative aspects to mapping and incentivizing sustainable land-use.



Scientific advisory board

- Dr. Robin Marsh (agroeconomist, University of California Berkeley, USA),
- Dr. Lisen Schultz (sustainability scientist and Deputy director of Transdisciplinarity at Stockholm Resilience Centre, University of Stockholm, Sweden),
- Dr. Alicia Barraclough (current Postdoc under the UNESCO Chair, UiB),
- Dr. Rosalind Bryce (senior researcher on Sustainable Land Use and Renewable Energy, University of Islands and Highlands, UK),
- Johanna MacTaggart (leader of UNESCO's MAB Programme in Sweden),
- Prof. Siri Granum Carson (philosopher and Director of Ocean Sustainability at NTNU)



The local BIOSPHERE steering group

- Key regional stakeholders closely related to sustainable land-use processes in the region (Vestland):
- Kai Grieg, the UN Association of Norway
- Jarle Skeidsvoll
- Ida Kleppe - Bybonden i Bergen
- Anna Milford - NIBIO Bergen, agro-economist
- Ruth Rørvik - leader of Bergen UNESCO Creative City of Gastronomy
- Laila Bjørge - agricultural adviser, Alver municipality
- Torhild Kvingedal - head of the Heathland Centre
- Peter Emil Kaland - Professor emeritus UiB, in charge of the Lindås-project.

Progress to date

- Recruitment of PhD-candidate for WP1 completed
- Recruitment of postdoc for WPs 2, 3 & 5 completed
- Co-creation processes started with the key stakeholders in Nordhordland UNESCO Biosphere