

GreenMAR

GREEN GROWTH BASED ON MARINE RESOURCES:
ECOLOGICAL AND SOCIO-ECONOMIC CONSTRAINTS

Linking some of the very best Nordic and international scientists within their fields, spanning from climatology, ecology and evolutionary biology to economics and sociology.

GreenMAR is a project about the **fundamental challenge** of **Green Growth** and how to use our renewable natural resources more **efficiently** while ensuring that the **ecosystems** retain their **functionality**.

funded by:



norden

NordForsk

Green Growth Nordic Network:

CEES

UiO : Centre for Ecological and Evolutionary Synthesis

UiO : **Department of Geosciences**
University of Oslo

UiO : **Faculty of Mathematics and Natural Sciences**
University of Oslo



UNIVERSITY OF ICELAND

Stockholm Resilience Centre
Sustainability Science for Biosphere Stewardship

International Partners:



Stakeholders:



Cluster 1: Ecological processes and adaptation



Cluster 2: Fisheries dynamics and adaptation



The fundamental challenge of Green Growth

- To use our renewable natural resources more efficiently
- While ensuring that the ecosystems retain their functionality

Marine ecosystems provide unique opportunities to meet a growing global demand for healthy and nutritious food, if harvested more **efficiently** and **sustainably**. Yet, overexploitation, climate change and other anthropogenic stressors challenge such a development.

We form an **interdisciplinary** Nordic research team, linking up with researchers in the USA, Russia, and the Netherlands. By including a leading Nordic fishing company, the relevance and utility of the research is enhanced. We propose to **integrate** different **essential** disciplines that need to be integrated to achieve green growth climatology, ecology, sociology and economy. We investigate how the **ecological** and **social** components of **complex marine systems** can adapt to the growing stress factors, and provide management recommendations for **improved harvesting** strategies. Climatologists and oceanographers provide state-of-the-art model results on how climate affects sea surface temperature, ocean circulation and freshwater run-off. Modeled and observed environmental data are combined with biological time-series to unravel effects on fish populations, with particular focus on possible critical thresholds in the effects of climate and fishing. Sociologists perform in-depth studies on how fishermen adapt to changes in their environment. These insights will be integrated in social-ecological models to quantify how systemic properties, such as **resilience**, **sustainability**, and **viability**, will be affected

Cluster 3: Future socio-ecological interactions



Cluster 4: Societal adaptations



by climate change. In parallel, bio-economic models will be developed to predict the economic effects of climate change and to investigate how industry and regulation can adapt in a cost effective way. Together, such a multidisciplinary approach provides **knowledge** to ensure the sustainable management of our oceans, as a necessity and a catalyst for green growth. Moreover, through strong focuses on **training** and **communication** (by organizing a series of policy forums, outreach events, workshops and courses), we aim to contribute to the formation of a new generation of multi-disciplinarily skilled scientists, administrators and industrialists.

Our research is organized into **6 Thematic Clusters** (seen above):

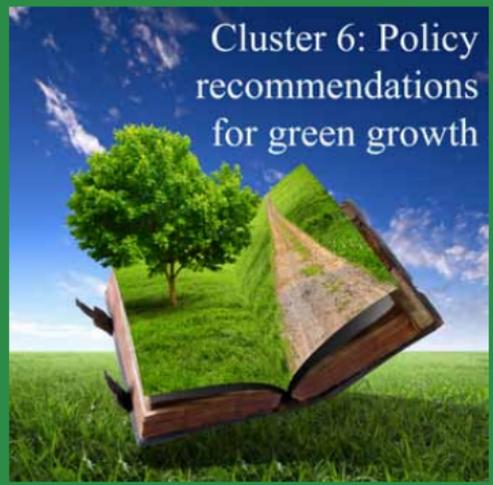
- 1. Ecological processes and adaptation**
- 2. Fisheries dynamics and adaptation**
- 3. Future socio-ecological interactions**
- 4. Societal adaptations**
- 5. Resource sharing**
- 6. Policy recommendations for Green Growth**

This organization helps us to address these challenges of Green Growth in a systematic way. We will use **Education**, **Innovation** and **Communication** (all means of improving knowledge) together with **Interdisciplinary Research** in **Academia** as well as **Industry** and **Stakeholders** to promote **Green Growth**.

Cluster 5: Resource sharing

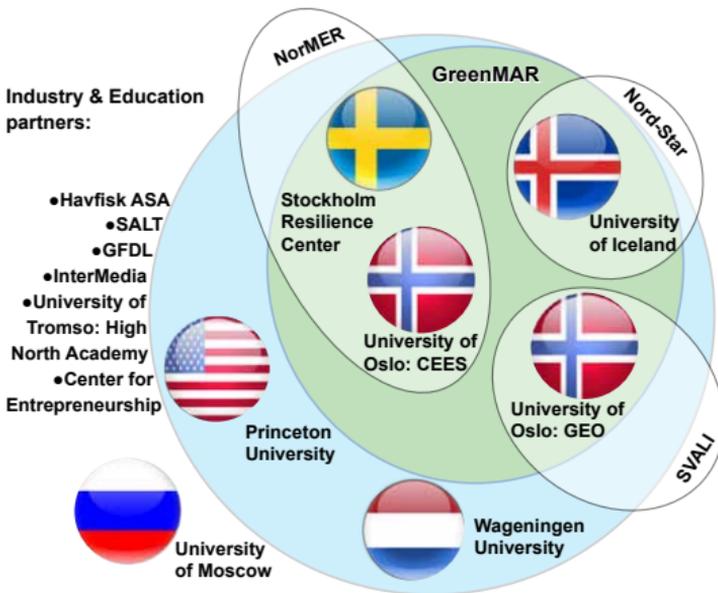


Cluster 6: Policy recommendations for green growth



Green Growth Research Network:

- 24 Researchers & students
- 23 Collaborators
- 16 Nationalities



GreenMAR links research centers involved in the Nordic Centres of Excellence (*NorMER*, *Nord-Star* and *SVALI*) with academic partners in Europe and US, as well as Industry and Educational partners. Through this network each Nordic country will be able to benefit from the expertise housed by all these institutions.

GreenMAR Participants:

University of Oslo (CEES, cees.uio.no):

Anne Maria Eikeset, PI/Cluster Leader
Nils Christian Stenseth, Co-PI/Node leader
Joël Durant, Researcher
Leif Christian Stige, Cluster Leader
Marcos Llope, Researcher
Florian Diekert, Collaborator
Anna-Marie Winter, PhD Student

University of Oslo (Geo, mn.uio.no/geo):

Jon Ove Hagen, Node leader
Thorben Dunse, Post-Doc

Stockholm Resilience Center (stockholmresilience.org):

Carl Folke, Node Leader
Thorsten Blenckner, Cluster Leader
Susanna Niiranen, Post-Doc
Emma Björvik, PhD student
Wijnand Boonstra, Cluster Leader
James Watson, Collaborator
Matilda Valman, Post-Doc
Maja Schlüter, Collaborator
Saskia Otto, Collaborator

University of Iceland (english.hi.is/):

Brynhildur Davídsdóttir, Cluster Leader & Node Leader
Ragnar Arnason, Advisor/Mentor

Fredrik Salenius, PhD Student
Sigurður Eyberg Jóhannesson, PhD Student
Conor Byrne, PhD Student

Princeton University (princeton.edu):

Simon Levin, Node leader
Malin Pinsky, Collaborator
Dane Klinger, Researcher

Other Partners:

Juan A. Bonachela, Researcher, University of Strathclyde
Andries Richter, Researcher, Wageningen University
Ludmila Artemieva,
Researcher, Moscow State University
Elena Rovenskaya, Collaborator, Moscow State University & IIASA
Vera Timofeeva, Collaborator, Moscow State University
Webjørn Barstad, Collaborator, Havfisk AS

Scientific Advisory Board:

Dr. Cecilie Mauritzen (chair), CICERO, Oslo
Prof. Marc Mangel, University of California, Santa Cruz
Prof. Fiorenza Micheli, Stanford University
Prof. Sir Partha Dasgupta, University of Cambridge
Prof. James Wilen, University of California, Davis
Nina Jensen, Gen. Sec. WWF

For more information please see our web page at greenmar.uio.no or by scanning the QR code below:

