Towards a nature inclusive society

Biodiversity research by the Wageningen institutes

WAGENINGEN
UNIVERSITY & RESEARCH

"Our research focusses on finding a more sustainable future through exploring solutions to the critical problems for halting and reversing biodiversity loss and making the transition towards a more nature inclusive society."

dr. Lawrence Jones-Walters
Programme Director Nature Inclusive Transitions

Human nutrition, world food production, sustainable productivity of soils, the genetic resources for all crops, livestock, and marine species harvested for food, as well as livelihoods of people, society and even our future, are all dependent upon biodiversity. The loss of biodiversity is linked to the cumulative effects of a range of human induced factors (such as habitat loss and fragmentation, diffuse pollution, over-exploitation of resources, and the growing impacts of invasive alien species and climate change). These forcible effects of these recent developments and an increasing social debate has brought the biodiversity research to the forefront.

This publication highlights the research programme Biodiversity in a Nature Inclusive Society and some of its exemplary projects, in which the transition to a more nature inclusive society is explored. By sharing our knowledge, we hope it provides you with and stimulating future collaboration and cocreation.

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Nature inclusive and
circular agriculture

Circular agro-economy, also known as circular agriculture, can be a force for increasing biodiversity in sustainable agricultural landscapes. In the research projects leading edge technology is applied such as monitoring using environmental (e)DNA, remote sensing, precision agriculture and artificial intelligence to test the potential of new, or even tried and tested ancient forms of agriculture with a modern twist. Elsewhere the factors that trigger farmers and land management to change their practice and make the transition to nature inclusive are looked at.

The project results and developed knowledge are geared towards increasing the nature-inclusive management of agriculture and extending this work into policy and practice.

Crop diversity in the field

Photo: © Klaas Eissens | ERF B.V.

By planting different crop species in adjacent strips, this project makes use of the resulting crop diversity to explore how field crops can benefit from and contribute to the restoration of biodiversity in agricultural systems in the Netherlands. But to what extent? To answer that question the effects on biodiversity are quantified through monitoring and measuring the changes in wild plant and animal composition in and around the fields, and the data is used as input for the development a functional trait database for biodiversity that allows us to scale up the effects at a wider landscape level.

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Species-rich
grassland

Herbaceous grassland will have major benefits for biodiversity, landscape and climate if it can be the basis for sustainable dairy farming. This is an interdisciplinary approach with researchers involved from ecology, soil and water, production, dairy farming and the food chain. The project is working on the development of a typology of species-rich grassland in dairy farming, it is examining the species composition of herbaceous grasslands, and assessing the feed quantity and quality of the different grassland types. The social aspects of how to integrate the findings into the farming system, and the development of possible business models provides a further avenue for study and exploration.

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Nature Based Solutions for climate change

Photo: Shutterstock.com

The development of viable, sustainable and long term solutions for climate change issues that are inspired and supported by nature, is at the heart of these projects. The selection of methods to be employed for achieving these solutions depends upon the specific areas and landscapes under consideration. A number of projects therefore consider solutions for metropolitan areas and others review landscape based approaches.


Climate and biodiversity:
an inspiring vision

The Netherlands has been moving with the climate for centuries. The current climate scenarios show that a new and more robust design is necessary for the Netherlands. The aim of this project is to develop an inspiring vision for a future-proofed design of the Netherlands in the light of major social transitions, such as energy, climate adaptation, circular economy, urbanization, at the heart of which is the creation of opportunities for nature and biodiversity and the utilization of natural processes.

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Nature-inclusive climate adaptation of cities

Photo: www.hollandfoto.net / Shutterstock.com

The weather in cities is changing under the influence of climate change. More peak showers and more warm, long dry periods are expected. The social task of keeping the city livable therefore means that cities need to adapt to a changing climate. One of the ways to do that is by choosing solutions based on green and water in the city. This project focusses on the broad questions of how to fund greening the city and which methods can best be applied.

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Circular landscapes

Photo: Shutterstock.com

For the adaptation of an (urban) area it is important to look for solutions at a higher scale level, the landscape level, because a city is not an isolated system. The aim of this project is to use nature-based solutions for climate adaptation and mitigation in the city and countryside to increase biodiversity and to create conditions for climate-robust biodiversity. In two case studies on high sandy soils in the Netherlands, the relationship between upstream areas and cities (often located downstream) is of great importance in search for solutions. The results from both cases can be related to each other, and the cases can inform and inspire each other.

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Energy transitions and biodiversity

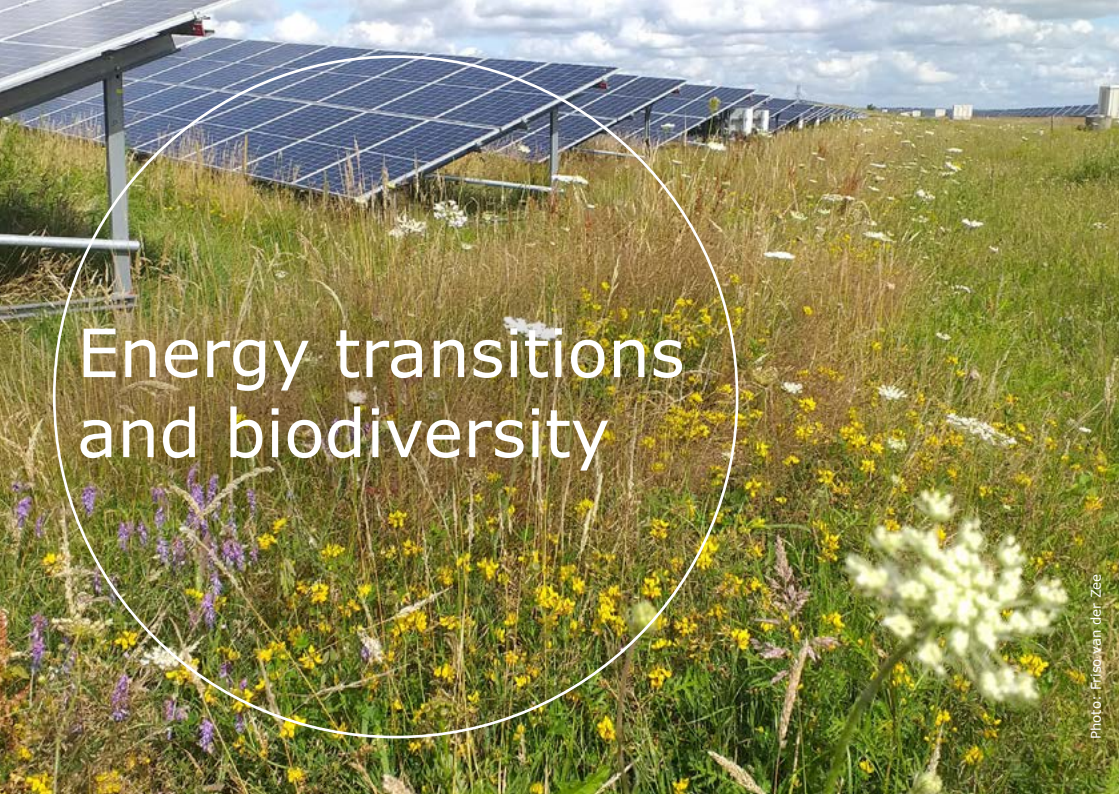

Photo: Friso van der Zee

The energy transition will not only revolutionize the organisation of our energy supply, but the decentralization of facilities also offers great chances for the improvement of biodiversity and the achievement of nature goals. Focusing on new energy sources, such as wind and solar, a good knowledge of the effects and impacts of new installations on biodiversity is essential.

Nature-inclusive design of wind and solar systems

Photo: Shutterstock.com

Integration of biodiversity in solar fields and windfarms in terrestrial and marine ecosystems can offer large benefits. This project is looking at the main knowledge gaps and how existing and new knowledge can contribute to the nature-inclusive design of wind and solar systems, that promote biodiversity as much as possible.

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North Sea Solutions

Multiple use, exploitation and competing claims, such as increased food production and new forms of energy generation, on the North Sea are having a dangerous effects that include damaging the fragile natural ecosystems of this vital, shallow but highly productive sea. These projects contribute to the question to finding solutions to the pressures from the development of the North Sea potential.

Ecosystem services for biodiversity conservation in the North Sea

Photo: Oscar Bos/WUR

Human exploitation of the marine environment is increasing, resulting in the degradation of habitats and loss of biodiversity. At the same time, society is becoming more dependent on the sustainable supply of marine ecosystem services, such as supplying food from the sea, as well as climate regulation, nutrient cycling and waste removal. This project is working on an investigation of how the concepts and valuation of ecosystem services can help in decision-making towards a sustainable exploitation of the marine environment and t conservation of marine biodiversity.

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Marker Wadden

The Marker Wadden is an artificial archipelago under development in the Markermeer, a lake in the Netherlands. It has developed as a bird paradise but an important precondition for this is the availability of sufficient food within the range of the target bird species that form part of the designation of the site as a European Natura 2000 protected area. The islands of the archipelago increase the habitat and breeding ground for birds. By and through clever management and manipulation of the shores of the lake, it is expected that the local food availability for fish, benthos and herbivorous birds can be increased. This research is looking at the importance of different habitats around the islands for food supply.

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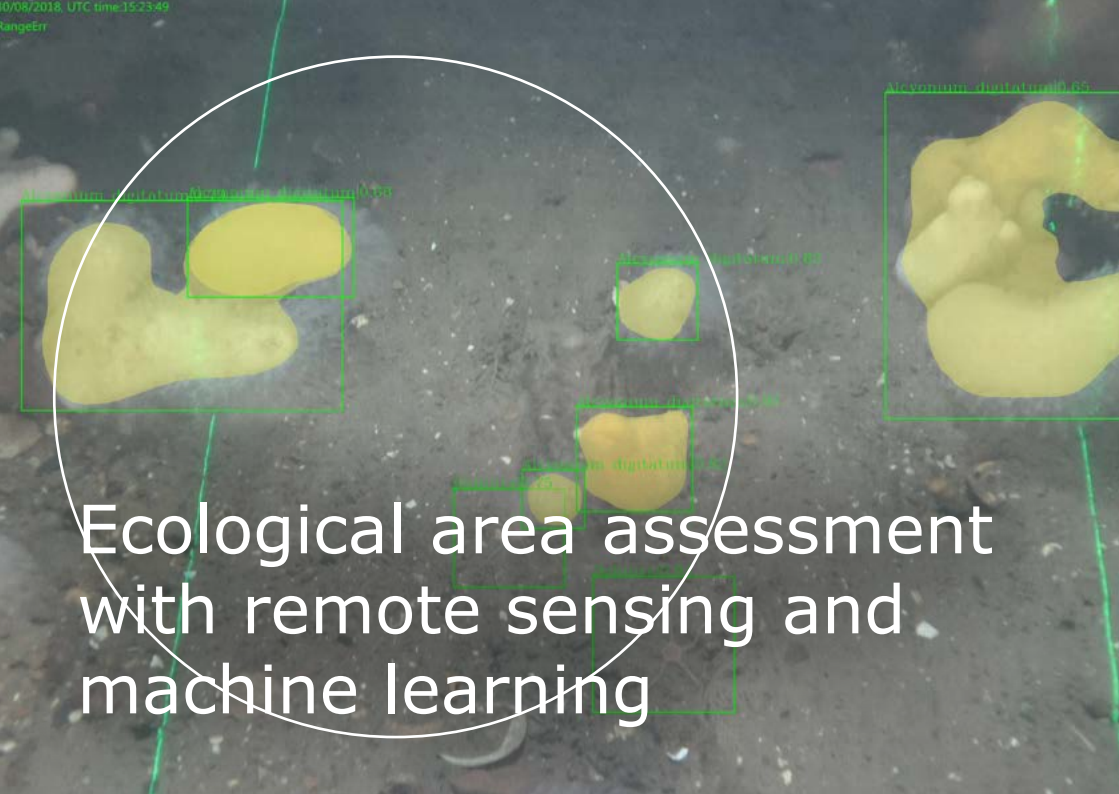
New technologies and tools for biodiversity monitoring and research

Research into the implementation of new and emerging tools and practices for measuring and monitoring biodiversity is a necessity in this era of rapid technological and societal developments.

The developing new and cost-effective monitoring techniques, including environmental DNA, drones carrying different types of sensors, satellite and other remote sensing methodologies are at the heart of these projects.


Ecological area assessment
with remote sensing and
machine learning

When research is being carried out to establish the effectiveness of interventions for the conservation and management of biodiversity, comparative before and after measurements need to be taken. This project is looking at the potential for the latest developments in image processing to perform accurate, objective and complete species counts and distribution measurements. Using artificial intelligence and machine learning models a method for automatic species counting is being developed and validated based on the epifauna community of the Dutch North Sea seabed and the bird population on the IJsselmeer.

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Innovative
eDNA techniques in
environmental monitoring

To measure changes in the North Sea ecosystem, such as species composition and biodiversity, innovative techniques such as environmental (e)DNA offer great potential. To be able to apply this technique for a variety of purposes the project is developing elaborated protocols and working on a decision tree for the selection of the optimal eDNA method for the most important forms of application.

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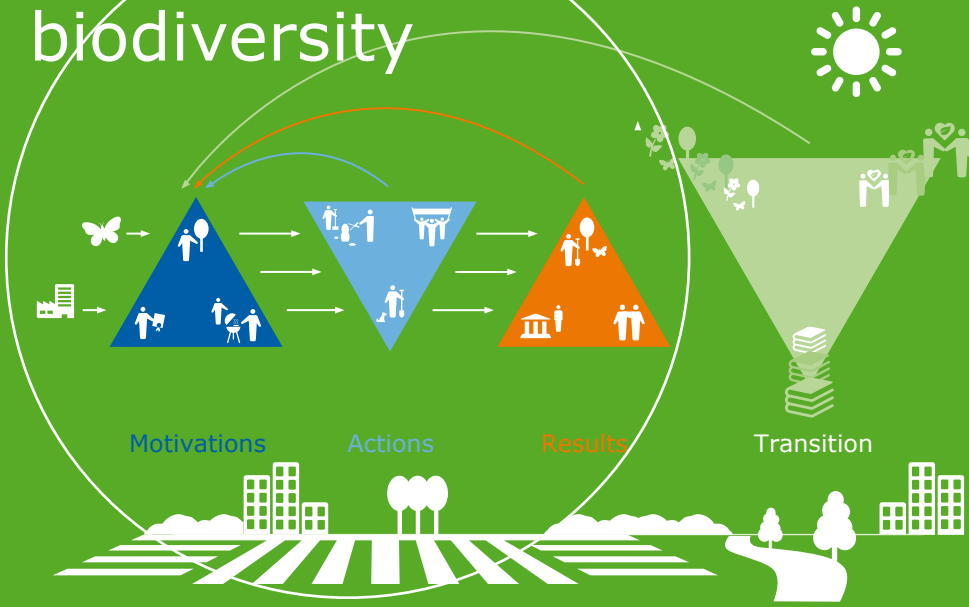
Nature inclusive society

Photo: littlenySTOCK / Shutterstock.com

Achieving the transition towards a nature-inclusive society has been and remains a widely debated and researched area in modern times. Key stakeholders such as governmental organisations, businesses, agriculture, fisheries, civil society organisations and financial institutions are engaged in establishing the effectiveness and desirability of a nature-based approach. The projects have significant impact in relation to the question of how to change society for the better in relation to being more nature inclusive, sustainable and socially just.

Citizens for biodiversity



In current times of decentralization and bottom-up approaches, government authorities aim to strengthen their relationship with citizens and consumers. Based on the Theory of Change approach, this project is working from an overarching perspective on the socio-ecological interactions made by citizens and how these contribute to the transition to a nature-inclusive society. The ultimate aim of the project is to develop action-oriented suggestions for governments, NGOs and businesses and to develop marketable products for national and international interdisciplinary projects.

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Nature-inclusive real estate in urban areas

Photo: Shutterstock.com

Green spaces in urban areas are important for human health and well-being, biodiversity and the environment. Yet in practice, green spaces often succumb to competing claims for space. This can have a significant impact on the living environment of people who live and work in those urban areas. This project looks at the influence of the real estate industry on urban green spaces, and how it can play a key role in the further transition to a nature-inclusive living environment that offers social, economic and ecological resilience.

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The ‘KB’ Knowledge Base - Kennisbasis -funding programme is provided to the Wageningen Research Institutes by the Dutch Ministry of Agriculture, Nature and Food Quality to carry out independent research into pressing and topical issues with high societal impact. The KB36 programme ‘Biodiversity in a Nature Inclusive Society’ contains more than 60 active projects.

To explore more of the programme or projects go to

www.wur.eu/nature-inclusive-transitions

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