Nature-positive futures

Biodiversity research and education for landscapes and seascapes

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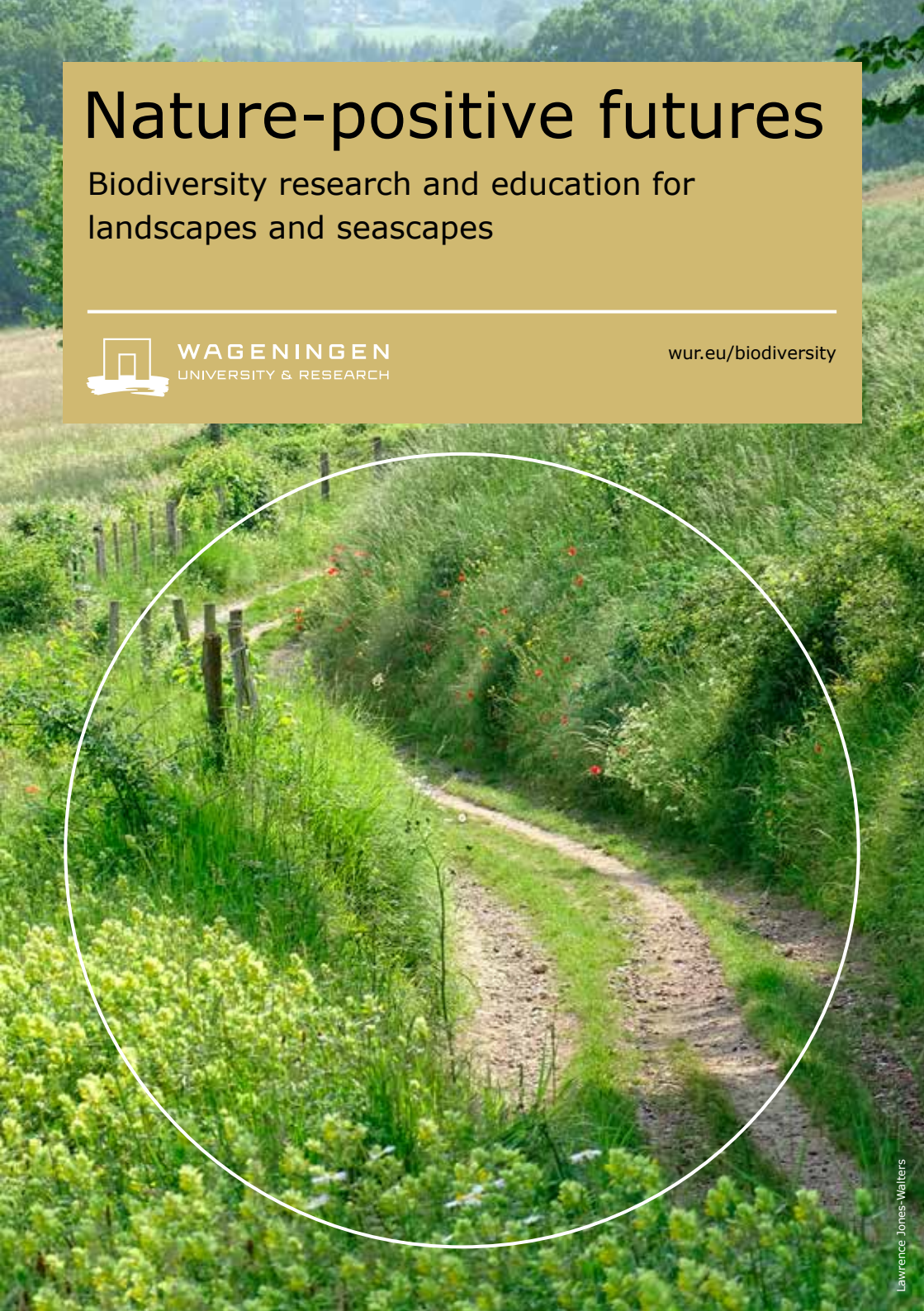

Lawrence Jones-Walters

Life on Earth is not possible without biodiversity and at least 40% of the world's economy depends on biological resources. The status of biodiversity on land, in freshwater and the sea is directly linked to the major challenges of food security, preventing climate change, combating diseases and improving human health. In all its forms, from flowers and bees to bacteria, grasslands, mangrove forests and seagrass, tropical rain forests and even city gardens, resilient biodiversity is essential for combating climate change, providing clean air and water and for food production and disease prevention. Not least, it is a significant contributor to our quality of life.

However, we know that biodiversity is under enormous pressure worldwide. This pressure is due to factors such as habitat fragmentation and decline, the loss of plant and animal species, climate change, desertification, industrialisation, urbanisation and the overuse of pesticides and fertilisers in our agro-ecosystems. In response to this, Wageningen University & Research (WUR) is working hard to create a world in which biodiversity flourishes. We do this through research and education, very often in cooperation with businesses, government and civil society.

It is our objective now and in the future to "bend the curve of biodiversity loss", to play a positive role in the move towards more sustainable production and consumption and to facilitate increased efforts for nature conservation. We identify five interlinked entry points through which biodiversity can be protected, restored and enhanced, where the climate regulation delivered by ecosystems can be safeguarded and which can lead to increasingly nature-positive sectors, in particular for agriculture and food systems:

- Diverse fields and farms
- Biodiverse landscapes and seascapes
- Connected communities
- Sustainable food and diet
- Inclusive finance and trade

It is clear that we can only solve the biodiversity, climate and related crises if we do it together. We from WUR will actively contribute to developing the science and practice that will support every step of this collaborative journey.

Diverse fields and farms

The farming system itself is where we can achieve significant gains by applying principles from agroecology, seeking innovation and the use of new technologies to deliver a nature-positive approach, whilst ensuring that we continue to produce sufficient and healthy food for all.

Nature based solutions in field crops

By making use of crop diversity, field crops can benefit from and contribute to the restoration of biodiversity in the Netherlands and beyond. We are working on quantifying the beneficial effects on biodiversity in order to create a functional trait database for biodiversity, with which effects can be scaled up.

Dirk van Apeldoorn, research lecturer Farming systems ecology

Evaluation of genetic diversity

We have demonstrated the relevance of enhanced use of genetic diversity between and within crop, livestock and aquatic species, in relation to four food system dimensions: safe and healthy diets, food security, inclusiveness and equal benefits, and sustainability and resilience.

Malou van der Sluis, researcher Animal Breeding & Genomics

Species-rich grassland – the green machine

If species-rich grassland can become the basis for sustainable dairy farming, it can have major benefits for biodiversity, landscape and climate when taking an interdisciplinary approach towards herbaceous grassland: from ecology, soil and water, to production, dairy farming and the supply chain.

Judith Westerink, senior scientist Landscape governance

Biodiverse landscapes and seascapes

Biodiverse landscapes and seascapes, made up of healthy ecosystems and habitats which are 'permeable' for wildlife and connected by ecological infrastructure, underpinned by a network of protected areas, are essential for providing the basis for sustainable wildlife conservation on land and at sea; they also provide nature's safety net for climate regulation, they are diverse, multifunctional and healthy.

The Circular Landscape

Through adopting an area based process, this project looks at how landscape- and nature-based solutions can be found and incorporated into a nature-positive vision of the future. It explores how they influence policy and planning processes and considers what contribution such a vision could make to transition in an area.

Sabine van Rooij, researcher Green infrastructure and transitions

Ecological restoration of freshwater ecosystems

In this project landscapes with high potential and priority for transformative restoration are identified, particularly focusing on essential ecosystem services, biodiversity targets, and climate change mitigation and adaption. WUR supports hydrological modelling, environmental costs and benefits analysis and the development of financing solutions for the upscaling of freshwater-related ecosystems restoration.

Lars Hein, professor Ecosystem services and environmental change

Restoration of resilience Dutch Caribbean

This project contributes to halting the decline of the coral reefs in the Caribbean Netherlands, improving the dependent ecosystem services and ensuring capacity building on the islands. By setting up an extensive scheme for monitoring the marine nature network together with island organizations and companies, nature policy is supported and negative effects are prevented, optimizing coral recovery and building capacity on site.

Erik Meesters, researcher Environmental ecology and statistics and Tropical marine ecology

What we teach

Wageningen University & Research offers a wide range of programmes and courses on the topic of biodiversity, climate and food systems. Biodiversity is a main topic in 6 Bachelor's and 13 Master's courses, and in 7 MOOC's (Massive Open Online Courses) and short (online) courses and summer schools for professionals. WUR organises Student Challenges for students worldwide and supports WUR teams that participate in student competitions.

MOOC: Climate action in biodiverse landscapes

This Massive Open Online Course takes the participants through examples from all over the world, how climate change negatively affects biodiversity, but also how biodiversity can play an important role in adaptation and mitigation efforts. This MOOC is part of the Online programme: Sustainable and Inclusive Landscapes. WageningenX MOOCs can be found on the EdX® platform.

Education for professionals: Inclusive and sustainable food systems for a food secure future

This education for professionals course shows participants how to design interventions, strategies and policies for resilient and sustainable food systems in their own local contexts. It spotlights the future global challenges of food production, the effects on different scales of farming and how to apply a systems dynamics approach for analysing food systems.

Student Challenge: Nature Based Solutions Challenge

Students are asked to work on a nature-based solution in a local context addressing climate change mitigation and adaptation, and biodiversity restoration to improve the quality of life.

Sustainable food and diet

Food is deeply cultural and social and we like to talk about food almost as much as we like to eat it; the sustainability of the pathway that brings food from the farm to the plate can become a core value and people are beginning to care about the environmental impacts of their food production, how it affects their own health and they increasingly want to make nature positive decisions about their diet.

Biodiversity and food systems

Improving use of the genetic diversity between and within plant and animal species is important for the transition to more resilient and sustainable food systems. Plant and animal breeders need access to broad genetic resources to be able to develop well-adapted varieties and breeds for a range of different systems.

Sipke-Joost Hiemstra, Centre for Genetic Resources

Circular Food Systems Network

The circular food systems approach is more than the sum of its parts. Interaction between the different parts of the food system results in additional resource efficiency. By being part of the Circular Food Systems network WUR shares knowledge and collaborates to increase the development and implementation of circularity within the agri-food system.

Karin Andeweg, team leader Water & Food

Nature-based Solutions for Climate Resilient and Circular Food Systems

This project is focused on improving our understanding about nature-based solutions in the context of food systems that are at risk due to climate change. Case studies are used to provide better understanding of different types of pathways and interventions that are inspired by or make use of natural processes. Underpinning mechanisms are included, as well as their potentials and limitations in achieving food security and maintaining or increasing biodiversity and circularity under climate change.

Marjolein Sterk, researcher Nature-based solutions and climate adaptation

Connected communities

Everyone has a stake in nature and citizens have an important contribution to make to the protection of biodiversity. Citizen science can bring people closer to an understanding of species and habitats. One of the best ways to connect communities to each other and to their natural environment is through providing them with a broad understanding about food and its relationship to biodiversity, climate change and social rights.

Citizens for biodiversity

Citizens make important contributions to the development, conservation and protection of nature and biodiversity, both as individual consumers and through social organizations and local initiatives. This project is developing effective strategies and tools that make optimal use of the change power of citizen involvement.

Arjen Buijs, researcher Human-nature interactions

A digital inspiration map for greening neighbourhoods of Amsterdam

Together with citizens, companies and organisations in Amsterdam, a search was made for suitable locations for greening the city with pocket parks or public gardens. These little green spaces offer many benefits which may far outweigh the costs involved, play an important role in reducing the impacts of extreme weather events and contribute to improving urban biodiversity. They also contribute to the health and wellbeing of citizens, whilst functioning as spaces for people to meet and can even play a role in food production.

Thomas Mattijssen, researcher Green economy and land use, and project leader WUR Science Shop

Successful implementation of green urban development

In order to improve the implementation of functional vegetation in projects for urban development and expansion, professionals working in relevant fields are given the knowledge and expertise they need to enhance the integration of vegetation in urban development processes. In this project WUR is working together with municipalities, NGOs, organisations and professionals in pilots to develop new concepts.

Robbert Snep, senior researcher Green Cities

Inclusive finance and trade

In order to achieve the change towards inclusive finance and trade, environmental impacts need to be reflected in the prices of products and negative impacts should not be shifted to other parts of the world or to future generations; stakeholders in the food chain need to take increased responsibility for engaging in nature-positive practices.

Nature Inclusive Sustainability and Environmental Law

This project looks at a future, more holistic sustainability law that redresses nature inclusive and biodiversity demands, while including trade-offs between legislation and the economy within alternative, novel legal systems.

Fred Kistenkas, associate professor and senior researcher Environmental law

Cost effective monitoring and pricing of biodiversity

This project delivers insights that are relevant for policy making by governments, actions by companies and consumers to reduce their negative effects on biodiversity in a cost-effective manner. Taking into account economic principles, all decisions must be based on social cost-benefit evaluations to reach optimal well-being.

Rolf Michels, researcher Green economy and landuse

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Biodiversity@WUR in numbers

Biodiversity publications (2016-2021)	Average Field-weighted citation impact	International collaborations
1,363	**3.03**	**1,123**

Note: detailed information and further explanations of the entry points featured in this leaflet and recommendations on how they can be implemented can be found in the WUR publication *Nature Positive Futures: Food systems as a catalyser for change* that can be downloaded at: www.wur.nl/en/show/mansholt-lecture-2022-nature-positive-futures.htm

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