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**LAND USE CONFLICTS  
AND NATURE**

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## RELEVANCE AND FRAMEWORK

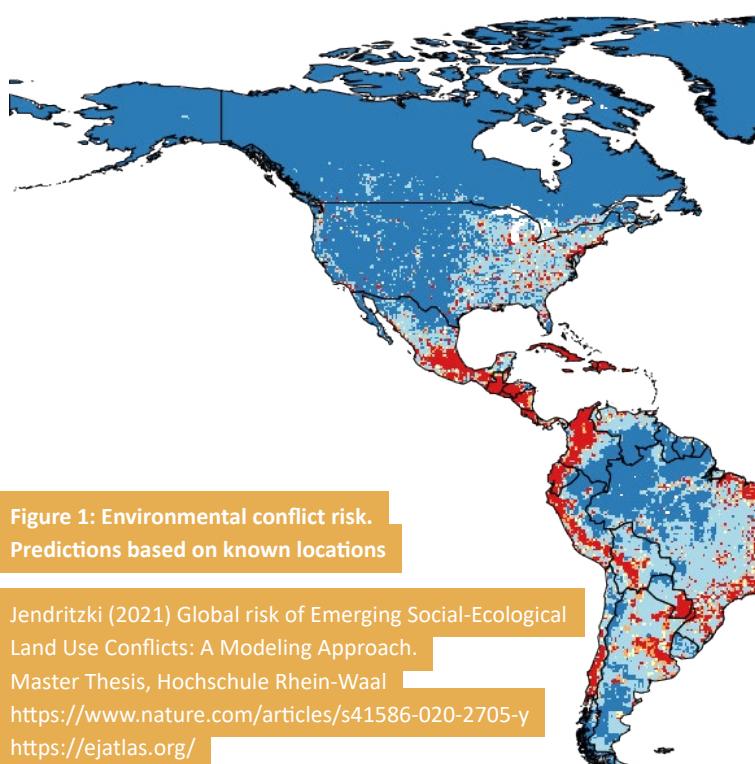
Biodiversity contributes to human well-being by providing food and materials, water and climate regulation as well as the cultural, educational and spiritual benefits that humans derive from nature. Yet we are currently witnessing the so-called sixth global mass extinction, and the first ever caused by a single species. At least one million species are now threatened with extinction. This has serious implications for human well-being, especially in countries with limited resources to invest in adaptation. So far, world leaders and decision-makers have failed to address the multiple drivers of biodiversity loss, including overexploitation of natural resources, pollution, invasive species, climate change and land-use change. Bending the curve of biodiversity loss will require not only more conservation and restoration efforts, but also more sustainable production and consumption patterns. All in all, we are talking about nothing less than a global socio-ecological transformation.

Land is at the heart of the biodiversity conservation challenge. It is a limited resource that humanity needs to produce food, materials and energy. Competing land uses, such as agriculture, forestry, urban development and nature conservation, can lead to conflicts that exacerbate biodiversity loss.

In recent decades, we have seen an increase in the number of environmental conflicts worldwide. But the Global South seems particularly prone to land use conflicts. What are the factors driving such conflicts? Abundant biodiversity and natural resources often interact with high demand for land due to international trade, population growth and governance and equity challenges. Although land use conflicts are highly context-specific, they are more likely to occur under certain local conditions. Based on data on known locations of existing environmental conflicts from the Environmental Justice Atlas, we modelled high-risk and low-risk areas for land use conflicts using indicators of socio-economic conditions such as population density, income and corruption, and land cover characteristics such as distance to a protected or key biodiversity areas, agricultural area and tree cover.



Overall, we see that areas with a high risk of becoming involved in environmental conflicts are mainly located in the global South. In total, about a third of the land in Latin America and Africa is predicted to be at high risk of conflict. Some of the drivers of increased risk of environmental conflict are: growing demand for land use in agricultural and forestry (e.g. to support the substitution of biomass-based materials for fossil fuels and energy) or for biodiversity conservation (e.g. for additional protected areas or restoration sites). This often happens on land where property rights are poorly defined or enforced. Research and policy on sustainable land use should therefore adopt a systemic approach, taking into account the different perspectives, values and interests of stakeholders in how and whether land and nature should be used and conserved.





## ZEF'S CONTRIBUTION

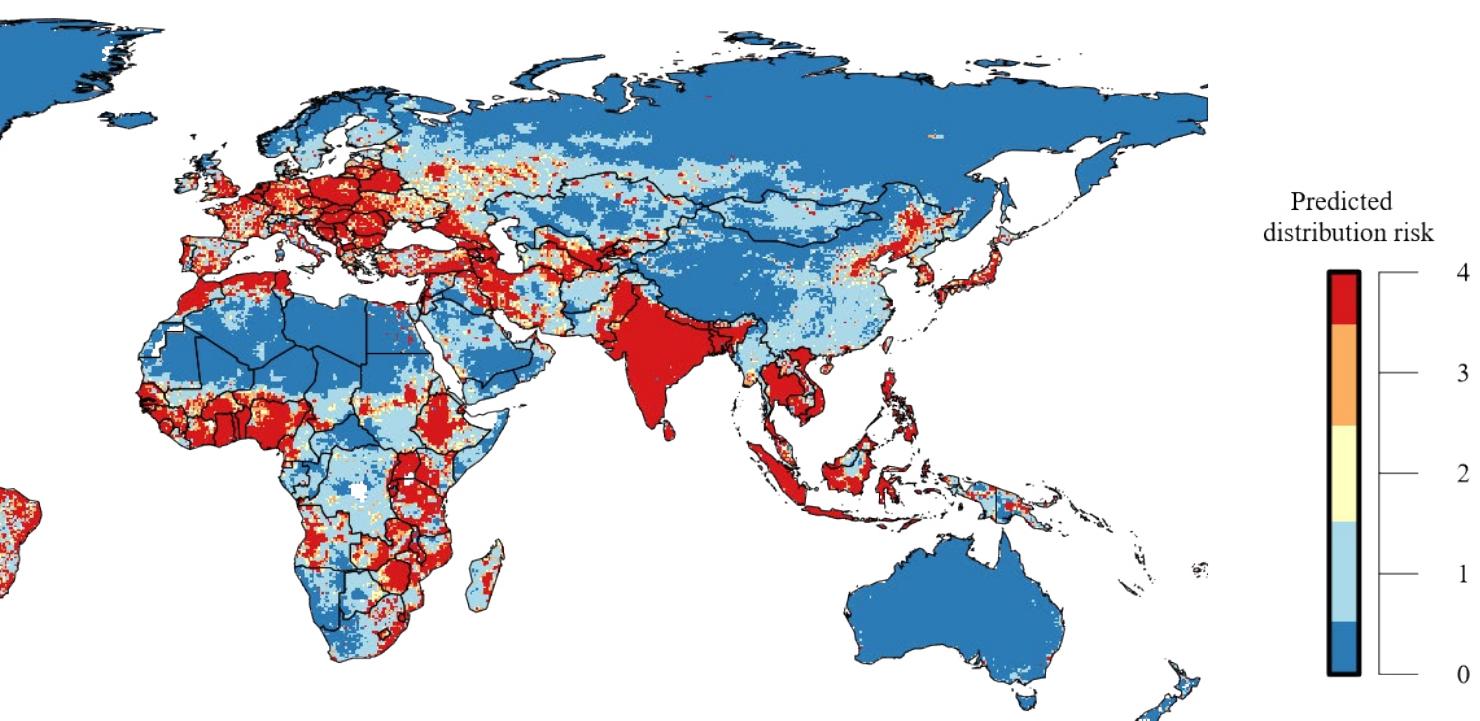
ZEF is engaged in several lines of research on solutions for sustainable socio-environmental transformation. Our research projects develop, assess and often critically evaluate technological and governance innovations aimed at mitigating trade-offs between competing land uses and related conflicts. This includes, for example, research on agricultural technologies, bio-economic innovations, private and public environmental policies and governance arrangements. In addition, our research explores nature-based solutions and the role of equity and diversity in societal transitions.

Land use management involves trade-offs across multiple dimensions of sustainability, as well as complex feedbacks between ecological and social subsystems.

Understanding these trade-offs and systemic relationships requires an inter- and transdisciplinary research approach and international collaboration. Our current science and innovation systems and funding landscape do not always coherently encourage and reward such solution-oriented research approaches. At ZEF, we seek to address this challenge by building strong networks with international partners and investing in inter- and transdisciplinary training of early-career researchers.

## ONGOING INITIATIVES AND ACHIEVEMENTS

In the LANUSYNCON project (At the Science Policy Interface: LAND Use SYNergies and CONflicts within the framework of the 2030 Agenda), we are assessing how available land resources in Kenya and Tanzania can be used most efficiently for human development, while reducing negative impacts on the environment. To do this, we are integrating the knowledge and perspectives of different stakeholders to understand how interventions aimed at achieving one sustainable development goal might affect other goals in the context of land use. In the BIOCLIMSOCIAL project, we are investigating the impact of nature-based solutions on local societies and how to maximize positive out-



comes by involving stakeholders in the research and implementation process. In RAINFOREST, we are working with international partners in Europe and South America to identify solutions and leverage points for biodiversity conservation in the global food system - using a co-designed research approach.

We find that even the most promising technological and governance solutions to land use trade-offs require careful and coherent adaptation to context- and actor-specific characteristics and needs. Importantly, business people and policy makers are rarely sufficiently informed about alternative science-based solutions. As a result, we are increasingly involving stakeholders and practitioners in refining our research questions and approaches, and participating in initiatives at the science-policy-practice interface, such as IPBES, IPCC and Eklipse. These interfaces are crucial for providing policy-relevant knowledge to decision-makers. To support their work, we contribute to assessments produced under the mandates of these organizations and support the active engagement of experts from sub-Saharan by facilitating training and networking activities, through projects such as INTERFACES, AFAS and CABES.

- Climate change and biodiversity loss and their negative impacts on human societies are expected to accelerate in the future. Under these conditions, we need to develop compelling positive narratives and visions of sustainable futures that leave no one behind. The development of such visions must be informed by inclusive research, based on epistemological pluralism and taking into account culturally diverse stakeholder perspectives.
- Science policies need to create a more encouraging and supportive environment for interdisciplinary and transdisciplinary research in international networks. Greater involvement of local communities, indigenous peoples, the private sector and civil society in policy-making processes can increase policy acceptance and impact.
- However, greater participation in policy design must go hand in hand with the cultivation of a learning environment that encourages systematic stocktaking of both failures and successes in managing conflicts over land resources. Such learning cultures have already been successfully established in health and development policy. They are urgently needed in land and environmental policy as well.

## OUTLOOK AND RECOMMENDATIONS

- Bending the curve of global biodiversity loss will require greater efforts than have been made to date: we need a positive socio-ecological transformation in the way we use natural resources.

## IMPRINT

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Over the past 25 years, ZEF researchers have aimed to find science-based solutions to promote sustainable development and planetary health. ZEF's research divisions and groups have conducted inter- and transdisciplinary research in, for, and with emerging economies and on global issues with its collaborating research partners around the world. In this special "ZEF 25 Years" Policy Brief series we focus on some of our core research themes.

