AFRICA KNOWLEDGE PLATFORM

Engaging communities in land planning

and co-designing solutions to benefit biodiversity, climate and people

European Commission

"We have reached an unprecedented moment whereby humans change the Earth and its processes more than all other natural forces combined." Edward Burtynsky - The Anthropocene Project, MAST Foundation

To build an equitable and sustainable future for people and nature, communities should be able to anticipate future challenges and co-design the way forward.

When tackling societal and environmental challenges, top-down, expert driven approaches delivering national plans and policies are often disconnected from local implications. Solutions need to be understood. Appropriated. Owned.

Earth Observation data can bring tremendous insight to solution design. And engaging communities in decision-making and in using supporting tools helps stakeholders take ownership of the decisions. It brings them one step closer to tangible and successful outcomes.

This story illustrates the added value of geospatial information within participatory approaches to address climate change land development challenges. It tells of a project carried in Tanzania by researchers of the University of York, in collaboration with WWF Tanzania and Sokoine University of Agriculture, and engaging Tanzanian stakeholders. They looked at how climate change mitigation strategies and land management decisions can shape the future of Tanzanian people. And, conversely, how Tanzanian people can influence land management decisions.


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YEMEN
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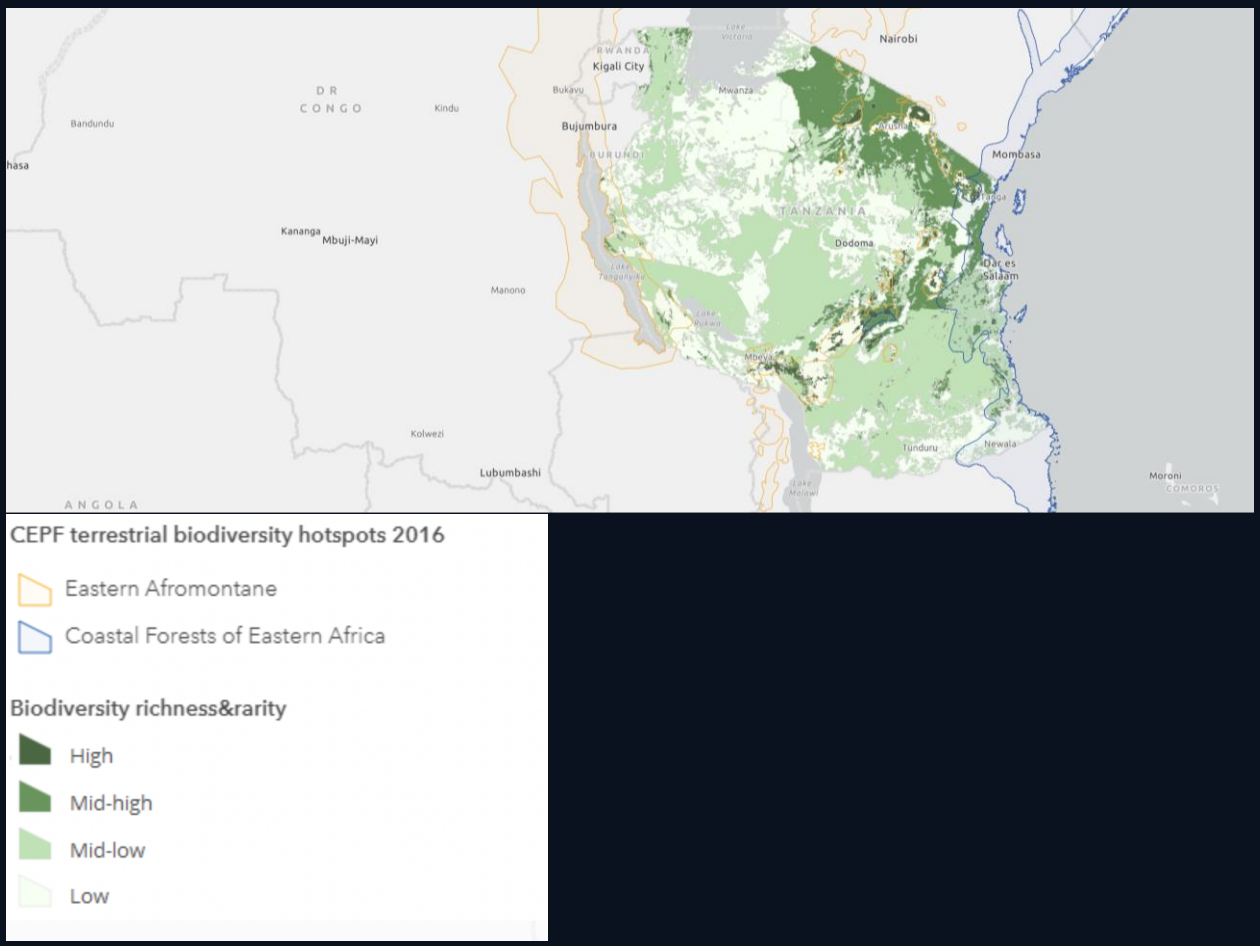
People and Nature of Tanzania



Tanzania is the largest country in East Africa.

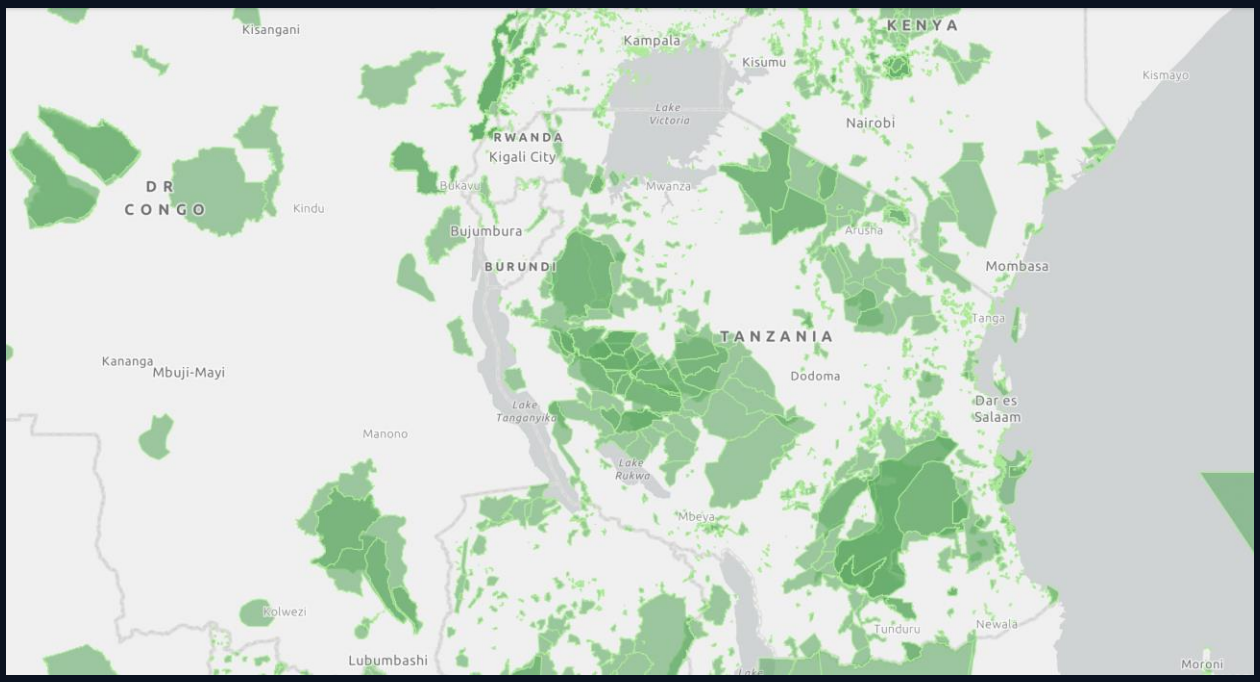
Despite its fast-growing economy, a large share of its 58 million inhabitants (2018) live in rural areas and rely on subsistence farming for a living.

Tanzanian landscapes are astonishingly beautiful and diverse, spanning from the Indian Ocean to the peaks of the Kilimanjaro. They host among the richest and rarest species and ecosystems on Earth.

The map above shows the boundaries of the two Biodiversity Hotspots spanning the country: the Eastern Afromontane (yellow) and the Coastal Forests (blue); and an index of biodiversity richness (how many species live in the same site) and rarity (how widespread are the species) of terrestrial vertebrates (shades of green).

Udzungwa forest in the Eastern Arc Mountains is part of the Afromontane Biodiversity Hotspot

These great ecological and cultural values have led to the establishment of more than 800 Protected Areas: about 40% of the Tanzanian territory is protected, according to the World Database of Protected Areas (UNEP).



Challenges behind development

Healthy ecosystems rich in biodiversity are key for water and climate regulation. They provide numerous services from provision to tourism. People in rural Tanzania rely on their forests and woodlands for fuelwood and construction materials, medicinal plants, wild fruits, honey, and water.

Wild coffee naturally grows under the forest canopy

But large portions of natural habitats are being converted into other land uses. More and more land is needed to grow crops, for local consumption (maize) or for trade (coffee, tea, fruits), and to produce charcoal.

Mobility is also a challenge. Tanzanian development corridors create opportunities for the society as they improve access to services, facilities, and urban areas. But at the same time, new roads increase habitat fragmentation and land conversion dynamics.

How can development challenges be overcome for the coexistence of people and nature in Tanzania? How to build shared visions? Are there win-win solutions?

The first step to enhance decision-making is to understand and anticipate future impacts of present decisions.

A framework for participatory scenario modelling

In Tanzania, we aimed at building awareness of the long-term effects of deforestation through the elaboration of scenarios for Land Use and Land Cover Change.

We applied the KESHO framework: a guide for understanding and anticipating environmental and socio-economic changes leading to land change, developed at the University of York.

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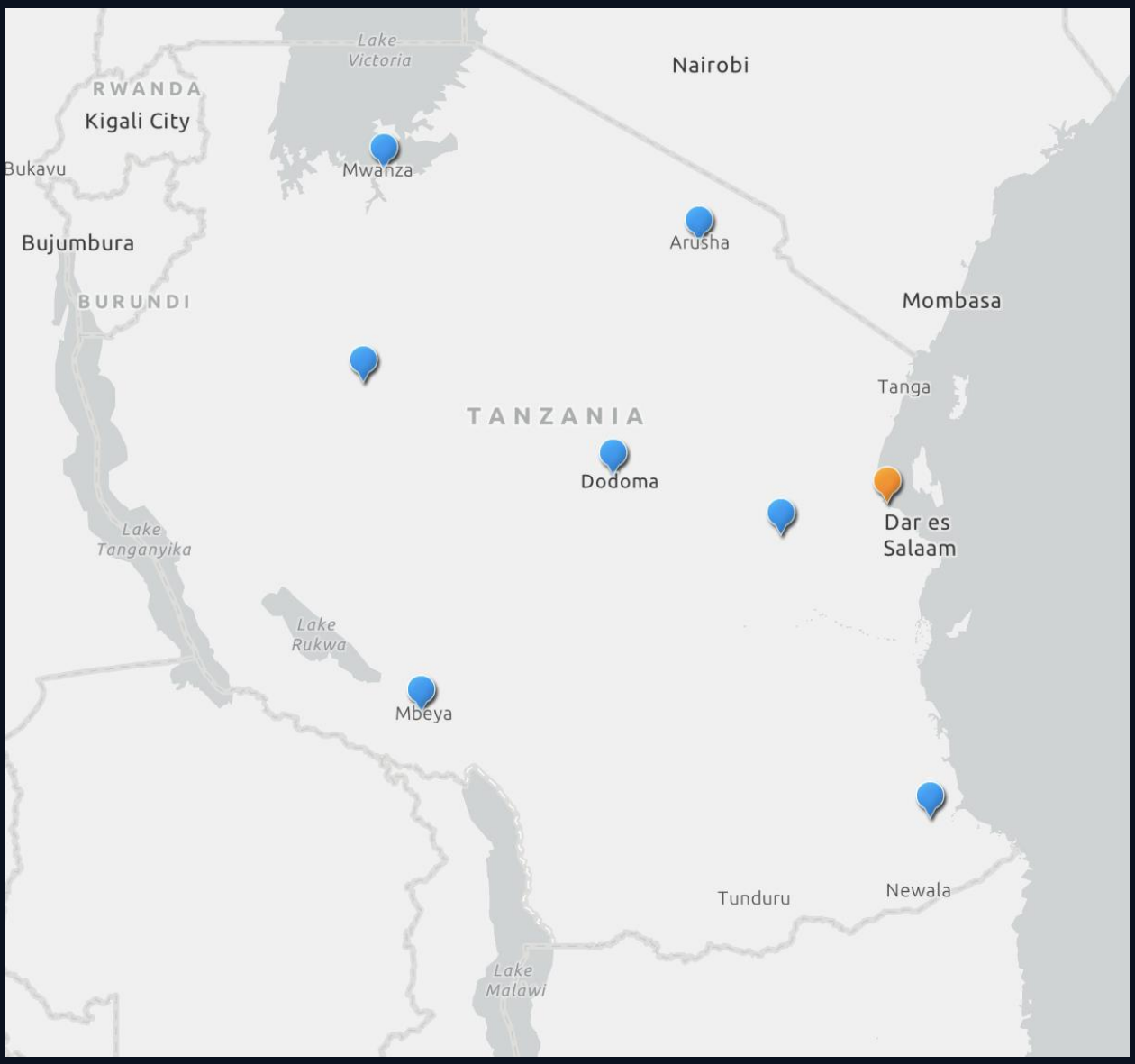
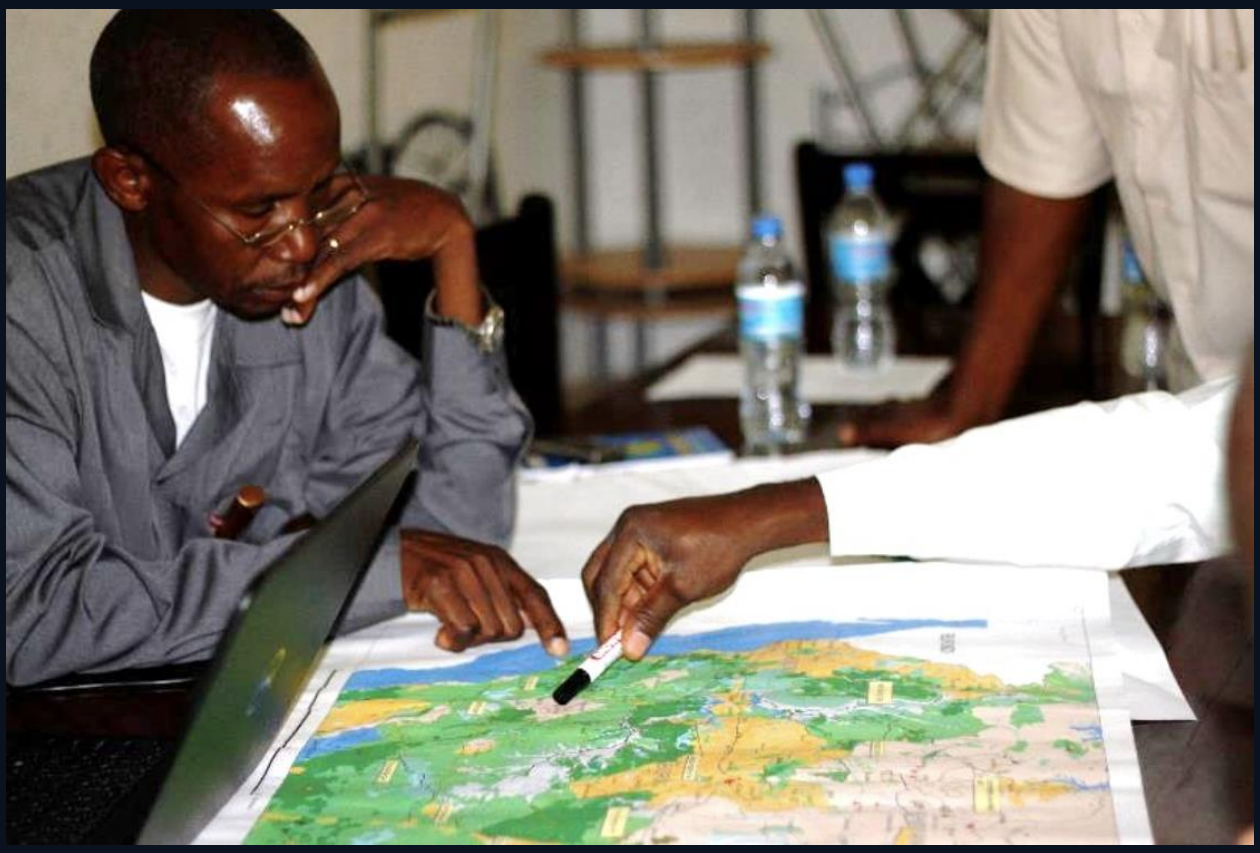
Communities were actively involved in the process. Together with researchers, stakeholders identified two alternative development scenarios merging scientific and local knowledge, and applied them to specific local contexts.

We used spatial data on human pressures and uses (e.g. population density, land cover and use, infrastructural presence, mineral exploitation) and information on land protection refined by local information and interpreted according to participants knowledge of the impacts. Local expectations for the future were integrated with a standard framework to co-produce maps of future land use and land cover change scenarios.



We engaged a total of 240 regional and national stakeholders in seven focal (regional) workshops and one synthesis-feedback (national) workshop. Governmental institutions, regional government and district officers, NGO, and private businesses were represented.

The map above shows the location of the regional and national workshops.



How to reach a sustainable use of forest resources? Where to best expand cropland to meet the needs of Tanzanian people? Stakeholders developed two alternative scenarios for their future land development.

The Business-As-Usual scenario looks at what would happen in the near future if land policies and management did not change.

The Green Economy scenario considers the role of implementing REDD+ policies for greenhouse gas emissions reduction.

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Land use and land cover change impacts concentrate along the main commercial routes, in the most densely populated or weakly governed areas, and extend inside protected areas.

In the Green Economy scenario, protected areas regulation is fully enforced. Land use change is limited and partially displaced compared to the BAU scenario, occurring in different habitats like bushland and grassland.

Two scenarios for climate change mitigation and land development

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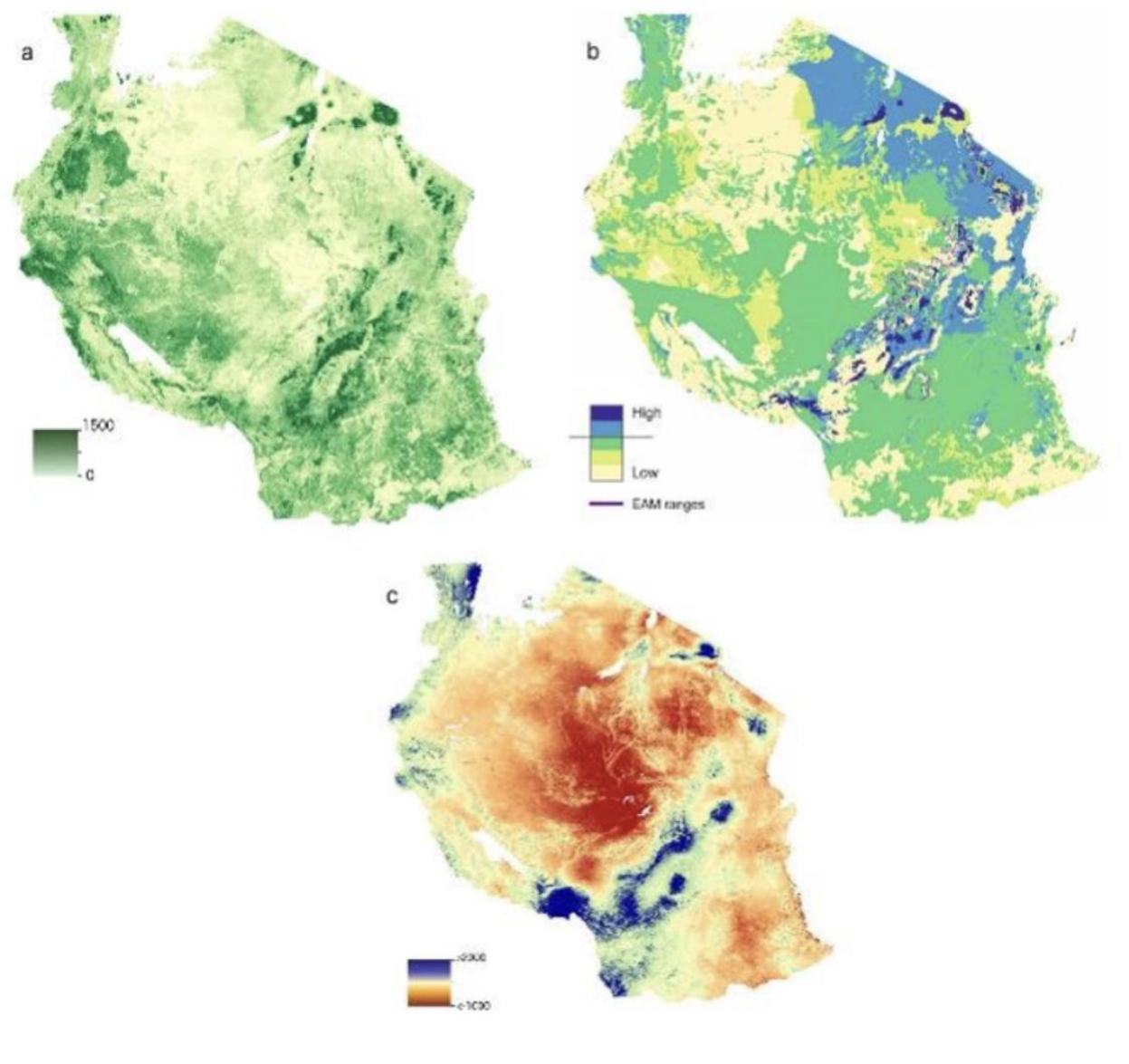
Next, we want to assess potential impacts of land use and cover change on biodiversity and ecosystem services (e.g. carbon storage or water regulation) in a

manner that still reflects stakeholders' perspectives and knowledge. These variables (total carbon stock, biodiversity richness and rarity, and water availability) are associated with land cover. So their change -as consequence of land cover change- can be estimated. We use these data to quantify the qualitative scenarios according to local stakeholders' rules.



Distribution of total carbon (a), biodiversity richness and rarity (b) and water availability (c)

It is then possible to assess trade-offs between different objectives, as well as synergies or divergences in the impacts on different dimensions (water, carbon, biodiversity) depending on what kind of interventions are planned and their alternatives.

Stakeholders can use the thematic maps to reflect on what they want to achieve, negotiate accordingly, set priorities, monitor the change and adapt over time.

Results of the Business-As-Usual scenario (BAU) show that loss-loss conditions (high impact on multiple dimensions) would especially hit montane and coastal forests, richer in biodiversity, carbon stock and water.

In the Green Economy scenario (GE), protected areas account for 23% of avoided carbon emissions. Protected forests store carbon, preserve biodiversity and maintain the water catchment, albeit over relatively small areas. Improved agricultural practices would help mitigate climate change and, simultaneously, protect local biodiversity and ecosystem services.

This approach applied in Tanzania reconciles local stakeholder perspectives and national spatial data while building the stakeholders' capacity to apply data evidence in actual decision-making. The resulting spatial outputs propose scenarios relevant to national policy implementation associated with sustainable development. Especially, they guide land planning priorities that benefit nature as well as people and the economy.

This StoryMap was compiled for the Africa Knowledge Platform, a project of the European Commission's Joint Research Centre.

A more thorough version of the storymap compiled for the BIOPAMA programme is available at https://rris.biopama.org/biopama_stories/tanzania

This storymap could not be realised without the former collaboration and engagement of 240 Tanzanian stakeholders participating in the project "Enhancing Tanzanian Capacity to Deliver Short and Long Term on Forest Carbon Stocks Across the Country".

We are grateful to the University of York which provided intellectual guidance and financial and logistic support throughout the project in partnership with WWF Tanzania, Sokoine University of Agriculture, UNEP-WCMC, IUCN.

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https://africa-knowledge-platform.ec.europa.eu/

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Maps: Biodiversity richness and rarity, Simultaneous changes of carbon stock, biodiversity and water yield

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