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"Reconcile land system changes
with planetary health"

Future scenarios of okalma forest values and uses

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Abstract

Essential ecosystem services provided by forests in the Sahel region and around the globe are threatened by overexploitation and conflicting land use priorities. Variations in perceptions among local community members of current and future forest use may stem from past exposure to these threats, spatial positionality (living close or far from the forest), as well as gender differences.

In this study, we developed future scenarios for the Sudanese Okalma forest using combined participatory and non-participatory methods in two villages located at different distances from the forest. Communities shared narratives about forest ecosystem utilisation across past, present, and anticipated future timeframes during discussion sessions and interviews. Together with participants, we elaborated two distinct future scenarios: an undesirable scenario business as usual with no forest guard as in 2022, and a desirable scenario featuring a protected forest with good governance.

To compare community narratives with historical changes, we combined community narratives about past forest usage with remote-sensing data of forest land cover change from 1980 to 2024. We found that the forest land cover showed deterioration in both 1985 and 1995, which aligned with community perceptions. For 2009, the community narrative did not align with change detection data. While community members stated that the forest was in bad condition comparable to its past, quantitative land cover analysis revealed that the 2009 forest had almost similar land cover class distribution as observed in 1995. We also found differences between women's and men's visions of future, although the most mentioned envisioned development infrastructures are education, electricity, factory, health, housing, market, road, and water.

For the future, communities envisioned forest deterioration under the undesirable scenario and forest conservation under the favourable scenario. After data collection in 2022, Sudan experienced an outbreak of an armed conflict leading to an unexpected improvement of forest conditions.

Our research provides insights about the advantages and limitations of integrated valuation methods for forest ecosystem services.

Keywords: Development Sudan , forest , Future scenarios , Land cover ,Ecosysetem services, Participatory methods, Valuatiom

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