In African drylands, rangeland enclosures are a common restoration and intensification tool. It is well-known that rangeland condition typically increases with enclosure age, and that this has positive effects on adopters' livelihoods. However, little is known how rangeland condition is modulated by individual enclosure management, and how enclosure adopters' socio-economic embedding modulates forage sufficiency. We took a social-ecological system perspective to understand how these ecological and socio-economic outcomes of enclosure adoption are interrelated. In an enclosure-dominated SES located in Kenya's West Pokot drylands, we assessed aboveground phytomass in 54 enclosures representing three age classes (≤ 10 years, 11-20 years, > 20 years) and three management types (grazing-dominated, contractual grazing dominated, and cultivation dominated). Sampling was repeated in a dry and in a wet season, and was extended to adjacent communal rangeland. We also assessed enclosure adopters' perception of forage sufficiency, their strategies to manage forage surpluses and deficits, and their socio-economic embedding.

We found that peak aboveground phytomass varied with management type; it was highest in grazing-dominated and lowest in contractual grazing dominated enclosures. Only 54% of farmers were self-sufficient in forage resources. Their higher livelihood security was related to land-use intensification, income diversification and a strong dependence on local resources. Hence, enclosure adoption triggered complex social-ecological transformations and created novel feedbacks between nature and society. As a consequence, new social-ecological arrangements emerged to manage forage surpluses and deficits. Our findings might help in understanding the implications of local pathways to sustainability via rangeland enclosures in African drylands.