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Socio-ecological Context Typology to Support Targeting and Upscaling of Sustainable Land Management Practices in Diverse Global Dryland

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Abstract: It is widely recognized that sustainable land management practices (SLM) are much needed for improving land-based livelihoods of 2.5 billion people living in the dry areas across the globe. Adoption and effectiveness of SLM depend on specific contexts. The high contextual diversity over global drylands makes (1) uniform blanket policies promoting SLM less effective and (2) the synthesis and upscaling of site-based successful lessons difficult. We propose the functional context type (FCT) approach to overcome these challenges by grouping common biophysical, economic and social drivers of land use adoption and change into distinct context types that shape SLM adoption and resulting primary productivity and efficiencies. The drivers selected for analysis were based on a literature review. We identified and mapped context types using spatial cluster analysis with global data. The functionality of the derived context types were evaluated by unbalanced ANOVA that measured and tested the differences in primary productivity and rain use efficiency among the context types. The testing of the types' function regarding SLM adoption will be the subject of follow-up studies at regional or national scale, where adoption data are available. Our initial result demonstrates the potential of the FCT approach to further our understanding of the role of socio-ecological contexts in SLM, and management of the contextual diversity. The results can be used by SLM-oriented projects/programs and citizen scientists to improve their targeting. For example given limited resource and aims, we can know approximately *where* efforts should be focused by managing, or coping with *what* drivers. The result can also be used as an extrapolation domain: given SLM outcomes in a number of project sites, we can identify where similar intervention options have a potential of success based on contextual similarity.

Keywords: context, driver, dryland, socio-ecological, SLM, functional context type.