



## **A multi-scale framework to link remotely sensed metrics with socioeconomic data**

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There is increasing interest in the use of remotely sensed satellite data for estimating human poverty as it can bridge data gaps that prevent fine scale monitoring of development goals across large areas. The ways in which metrics derived from satellite imagery are linked with socioeconomic data are crucial for accurate estimation of poverty. Yet, to date, approaches in the literature linking satellite metrics with socioeconomic data are poorly characterized. Typically, approaches use a GIS approach such as circular buffer zones around a village or household or an administrative boundary such as a district or census enumeration area. These polygons are then used to extract environmental data from satellite imagery and related to the socioeconomic data in statistical analyses. The use of a single polygon to link environment and socioeconomic data is inappropriate in coupled human-natural systems as processes operate over multiple scales. Human interactions with the environment occur at multiple levels from individual (household) access to agricultural plots adjacent to homes, to communal access to common pool resources (CPR) such as forests at the village level. Here, we present a multi-scale framework that explicitly considers how people use the landscape. The framework is presented along with a case study example in Kenya. The multi-scale approach could enhance the modelling of human-environment interactions which will have important consequences for monitoring the sustainable development goals for human livelihoods and biodiversity conservation.