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Climate Analogues for Climate Change Impact Projection and Adaptation Planning

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Abstract

Climate change will affect land use systems around the world, yet reliable projection of the impacts of particular climate scenarios is currently only possible for selected systems, for which robust models exist. Many smallholder farming systems throughout the developing world are characterised by mixed cropping, integration of trees with annual crops and suboptimal crop management. Such situations cannot currently be modeled at the scale and accuracy required for adaptation planning. Climate analogue analysis promises potential for overcoming this constraint. The premise of this approach is that for most places of interest and for most climate scenarios, it is possible to find a currently existing location that presently has a similar climate to the projected climate at the target location. Comparison of environmental and socioeconomic conditions at target and analogue locations can deliver information that is informative for climate change impact projection. Land use strategies at the analogue locations may be useful for adapting the target location to climate change. Visits by land managers from the target location at analogue locations may serve to increase awareness of the need to adapt and to gain useful insights into what kinds of management practices are possible under climate regimes expected in the future.

The usefulness of the climate analogue approach is currently constrained by a number of factors: (1) site-specific climate data is not normally available, especially for the future, so that climate matching is limited to monthly means of temperature extremes and rainfall; (2) differences in soil types and other crucial environmental and socioeconomic factors cannot currently be captured, casting doubts on the transferability of land use strategies between analogue and target locations; (3) the approach has yet to prove its applicability in the field. Strategies to overcome some of these constraints are proposed.

Keywords: Adaptation, climate analogues, climate change impacts, climate data