

## A critical investigation on environmental security: towards examination of rural water resource use in Western Kenya

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The theme of environmental security has brought about an ongoing debate on natural resource scarcity as a trigger of conflict in developing countries. One reason is that many studies insist micro-level causation relying on macro-level country data, causing the problem of cross-level inference. In recent years, therefore, a series of studies have tried to explain the relationship between environmental variables with relatively high spatial resolution on the one hand, and conflict count data that are down-scaled by identifying the location of conflict on the other. For pastoral societies in Eastern Africa, for instance, a generalised linear model with rainfall (one of natural resources) data as explanatory variables shows that various hypotheses may be correct including resource scarcity, cost-benefit calculation, and resource abundance (Raleigh and Kniveton 2012), thus urging reconsideration. However, its explanatory power is not great, and it leaves room for methodological scrutiny. The present study therefore re-examines the relationship between conflict and rainfall by applying hierarchical Bayesian models to the data, and by using explanatory variables with higher spatial resolution. It also examines issues related to the application of the same type of models to agrarian societies. Taking semi-arid areas in Western Kenya as an example, where most rivers are seasonal, this study begins preliminary investigations into the geographical distribution, use, management, conflict and cooperation concerning boreholes that are significant sources of water both for human being and domestic animals.

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