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The Economic and Ecological (Side-)Effects of Index Insurance for East African Pastoralists

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Abstract

Currently, microinsurance is considered a promising tool to combat hunger and extreme poverty in the developing world. During their 2015 summit, G7 declared their intention to increase the number of people with access to microinsurance from 100 to 500 million people by 2020. Weather-index insurance constitutes one important form of microinsurance, especially for people living in arid and semi-arid lands (ASALs). In these regions, mobile pastoralism is very common and frequently seen as the way best adapted to use the sparse and heterogeneous lands. Yet the ASALs are very vulnerable to drought. And pastoralists for whom animal husbandry is the most important income source run the risk of becoming destitute when hit by extreme droughts. While there is evidence for the immediate positive economic effects of insurance, its (long-term) ecological effects are not yet well understood. We argue that insurance can have a negative impact on the rangelands since it reduces the natural resting period that would normally occur after a drought.

To test this hypothesis, we developed a social-ecological agent-based model (ABM) that is adapted from the Borana pastoral land use system in Kenya/Ethiopia. Our model depicts the feedbacks between herders' mobility decisions and rangeland dynamics. It is spatially implicit, includes stochastic rainfall and is based on quarterly time steps that account for dry and rainy seasons.

Our results corroborate the hypothesis that insurance cushions the immediate economic impact of a drought. Yet they also show that it can degrade the ecosystem in the long run. With insurance, animal numbers decrease less after a drought and pastures get less resting time. For ecosystems of low resilience (i.e. where grazing has a strong impact on the pasture), this effect can trigger a phase transition towards a long-term degradation. We conclude that pasture characteristics have to be considered when designing the insurance contract. Additionally, changes in land use (e.g. the expansion of agriculture) can further aggravate the situation.

Keywords: Agent-based modelling, drought, livestock, pastoralism, social-ecological systems, weather-index insurance

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