Extreme heat index for Parametric Risk Transfer in Northern India

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Characteristics of Parametric Risk Transfer

Extreme heat events are an underrecognized natural hazard impacting many parts of society, and especially the vulnerable poor. Sometimes the effects of a heat event, or a heat wave, are measurable, such as in the relationship between heat and reproductive outcomes in agriculture, or directly as damaged infrastructure or higher cost of industrial cooling. More often, the true impacts and social costs are more difficult to quantify such as in the case of reduced labor productivity, spikes in moribundity and mortality and a variety of other business interruptions.

We present a parametric risk transfer product targeting extreme heat effects. The initial application of the product is for heat emergencies in working poor urban settings of Northern India, but the objective is to generalize the product globally.

Heat Index Selection

Central to a parametric risk transfer product is an index that is closely related to the damaging effects. This index should be based on an undisputed data source, that neither the insured or the insurance provider can influence. In parametric risk transfer, payouts are based on the index value, rather than an ex-post loss assessment. The main strengths of parametric products is that payments for an event can be made nearly immediately following a triggering event, providing financial resources to quickly address and mitigate losses.

We tested and present a large sample of the many extreme heat indexes which exist in the literature pertaining to human physiology for their historical impacts on mortality and on business interruption from historical data in Europe and India.

We characterize the risk in terms of maximum severity as well as the bivariate relationship of severity and duration and derive exceedance probabilities. Based on this assessment, we adopt a generalized form of the Wet Bulb Globe Temperature as extreme heat index, based on the ERA5 atmospheric reanalysis.

Implementation in Gujarat, India

The index will be implemented as part of a resilience building program with women's network Mahila Housing Trust, across three cities in the Gujurat state of India. The index will form the basis of a risk transfer product with local credit cooperatives in these regions - ultimate beneficiaries will be individual cooperative members, women employed in the informal sector. A climate risk education program will also be offered concurrently to inform mitigation and adaptation measures for the cooperative members.

Global applicability

The use of parametric risk transfer schemes to mitigate the effects of extreme heat is possible beyond the implementation in India. Based ont he lessons learnt in this pilot project, parametric products can be used in extreme heat risk adaptation if:

1. the index and data sources are defined and accepted by all local parties.

2. a strong local distribution channel is present

3. strong capacity is built to deal with basis risk