

## **When There's no November Rain: Developing a Parametric Insurance for Hydroelectric Energy Generators in Brazil**

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### **Resumo**

The nonlife insurance industry plays a relevant role protecting society from various risks, yet significant insurance protection gaps remain, particularly for fundamental risks. The increasing frequency and intensity of droughts in Brazil, worsened by climate change, have caused economical and energetic crises. This study addresses this pressing issue by introducing a parametric insurance solution tailored to Brazilian hydroelectric companies, to enhance resilience of energy generation during drought and mitigate hydrological risks. Our main objective was to design and assess the feasibility of this innovative insurance product, utilizing a combined index of precipitation and rivers' water flow or reservoir's volume. Employing spatial econometrics, we model energy generation from Brazilian hydroelectric powerplants, incorporating vine copula models to ensure robustness. Findings underscore the efficacy of spatial econometrics, particularly the fixed-effects SARAR model, in modeling energy generation for both hydroelectric powerplants' types. This model considers the influence of neighboring powerplants, which is vital for Brazil's interconnected electrical system. Moreover, the study highlights parametric insurance's potential in mitigating hydrological risks during droughts but stresses the necessity for tailored designs for run-of-river and water-storage plants due to their distinct characteristics. Initial design feasibility for insurers is challenged by high loss ratios, suggesting room for improvements.