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Water Multi-Risk insurance strategies to cope with the global change

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On one hand, climate change and population growth uncontrolled make society more vulnerable to the water insecurity, especially in low-income countries (MCII, 2016). On the other hand, the risk management complexity show the need to integrate mechanisms for the analysis of impacts that extreme hydrological events imply. According to the report by the World Meteorological Organization (2014), between 1970 and 2010, close to 55% of natural disasters reported correspond to floods, severe droughts and extreme temperatures. In turn, these events left a balance of 58% of deaths and economic losses by approximately US$ 1075.8 billion (WMO, 2014). Considering the increasing extreme events catastrophic consequences, risk transfer tools, such as insurance, have emerged as an effective strategy not only for to ensure economic resilience, and also in an element that encourages the global change study and their impacts in hydrological processes (Surminski et al., 2016). For example, Brazil, a country with about 8.5 million square kilometers and 200 million inhabitants[1], annually suffers the impacts of floods and severe droughts in its territory. In this sense, hydrological insurance schemes could be satisfactorily implemented given the risk diversification and the population affected (IPCC, 2014; Kunreuther et al., 2013). For this, we propose a methodology for Multi-year insurance (MYI) scheme design, associated to hydrological risks (floods and droughts), considering the coupling of climate-hydrology-economic processes of iterative scenarios under the "what if" approach. As an academic application results, we show two real cases with changing conditions of drought and flooding in Southeast Brazilian vulnerable watersheds, based on the Eta-HadCM3 regional climate model (RCM) future outputs , forced by A1B radiative scenario and equiprobable scenarios intensive analysis, to deal with the risk based insurance premiums ambiguity (Guzman et al., 2017).

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