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Designing a multi-objective framework for forecast-based action of extreme rains in Peru

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The last few years have seen a major innovation within disaster management and financing through the emergence of standardized forecast-based action protocols. Given sufficient forecasting skill and lead time, financial resources can be shifted from disaster response to disaster preparedness, potentially saving both lives and property. Short-term (hours to days) early warning systems are common worldwide; however, longer-term (months to seasons) early actions are still relatively under-studied. Seeking to address both, the Peruvian Red Cross has developed an Early Action Protocol (EAP) for El Niño-related extreme precipitation and floods. The EAP has well-defined risk metrics, forecast triggers, and early actions ranging from 5 days to 3 months before a forecasted disaster. Changes in climate regimes, forecast technology, or institutional and financial constraints, however, may significantly alter expected impacts of these early actions. A robust sensitivity analysis of situational and technological constraints is thus conducted to identify benefits and tradeoffs of various actions given various future scenarios, ensuring an adaptive and effective protocol that can be used for a wide range of changing circumstances.