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The risk to global coffee supply from synchronous climate hazards

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Global coffee production is at risk from synchronous crop failures, characterised by widespread reductions in yield occurring in multiple regions at the same time. For other crops, we know that these synchronous failures can be forced by spatially compounding climate anomalies, which in turn may be driven by large-scale climate modes like the El Niño Southern Oscillation (ENSO).

This talk will discuss the extent to which climate hazards occur and co-occur across the world's major coffee-growing regions. These climate hazards include temperature and rainfall anomalies and are selected to cover two coffee species and different periods of the crop growing cycle. The talk will show that regional and global risk posed from spatially compounding hazards has increased over recent decades. There is a clear shift in the profile of this risk. Temperature-based hazards are now much more likely to exceed thresholds for optimal growing conditions, rather than being overly cold as observed during the 1980s.

Through multiple lines of evidence we find relationships between spatially compounding hazards and six tropical climate modes such as ENSO and the Madden Julian Oscillation. Individual regions exhibit differing relationships with these modes. ENSO is found to have the strongest links with multiple regions during the same crop cycle, posing implications for ENSO-driven global impacts to supply.