

## Supplementary Information

**Table S1 – Summary of the papers selected for the in-depth analysis and their main topic of research**

Topic	Authors
Agricultural insurance	(BERTRAM-HUEMMER; KRAEHNERT, 2018; BOKUSHEVA, 2018a; BUCHELI; DALHAUS; FINGER, 2021; EZE et al., 2020; F; S; E, 2020; FU et al., 2018; FURUYA et al., 2021; HOHL et al., 2020; KATH et al., 2018, 2019a; MARTÍNEZ SALGUEIRO, 2019; MORTENSEN; BLOCK, 2018; RICOME et al., 2017; ROZNIK et al., 2019; SACCHELLI; CIPOLLARO; FABBRIZZI, 2018; TURVEY; SHEE; MARR, 2019; VROEGE et al., 2021; WARD; MAKHIJA, 2018)
Water supply, irrigation and energy insurance	(DENARO et al., 2020; GÓMEZ-LIMÓN, 2020a; GUERRERO-BAENA; GÓMEZ-LIMÓN, 2019; MOHOR; MENDIONDO, 2017)
Wind and solar power energy insurance	(BOYLE; HAAS; KERN, 2021a; RODRÍGUEZ; PÉREZ-URIBE; CONTRERAS, 2021; YAMADA; MATSUMOTO, 2021)
Multi-risk insurance	(AWONDO, 2019; GÜLPINAR; ÇANAKOĞLU, 2017; GUO et al., 2019a; KAPSAMBELIS; MONCOULON;

	CORDIER, 2019a; SHIRSATH et al., 2019a)
Derivatives	(ALEXANDRIDIS et al., 2021; BERHANE et al., 2021; MARTINEZ SALGUEIRO; TARRAZON-RODON, 2020)

**Table S2 – Summary of indices according to hazard**

Hazard	Index		Input variables	Authors
	Abbr	Full name		
Drought	CPI	Cumulative precipitation index	Precipitation	(AWONDO, 2019; BERTRAM-HUEMMER; KRAEHNERT, 2018; BOKUSHEVA, 2018a; BUCHELI; DALHAUS; FINGER, 2021; GÜLPINAR; ÇANAKOĞLU, 2017; KATH et al., 2019b; SHIRSATH et al., 2019a; TURVEY; SHEE; MARR, 2019; WARD; MAKHIJA, 2018)

	SPI	Standardised precipitation index	Precipitation	(BUCHELI; DALHAUS; FINGER, 2021; HOHL et al., 2021)
	SPEI	Standardised precipitation evapotranspiration index	Precipitation, potential evapotranspiration	(BUCHELI; DALHAUS; FINGER, 2021; KAPSAMBELIS; MONCOULON; CORDIER, 2019b)
	SMI	Soil Moisture Index	Soil moisture	(BUCHELI; DALHAUS; FINGER, 2021; VROEGE; VRIELING; FINGER, 2021)
	ESI	Evaporative Stress Index	Potential evapotranspiration	(BUCHELI; DALHAUS; FINGER, 2021)
	CDD	Consecutive Dry Days	Precipitation	(SHIRSATH et al., 2019a)
	PDI	Ped Drought Index	Precipitation, temperature	(BOKUSHEVA, 2018a)
	ENSO	El Niño South Oscillation	Surface Sea Temperature (SST)	(MORTENSEN; BLOCK, 2018)
	NDVI	Normalized Difference Vegetation Index	Red and Near infrared satellite data	(BUCHELI; DALHAUS; FINGER, 2021; EZE et al., 2020; F; S; E, 2020)

	WS	Water Storage	Streamflow	(DENARO et al., 2018; GÓMEZ-LIMÓN, 2020b; GUERRERO-BAENA; GÓMEZ-LIMÓN, 2019; MOHOR; MENDIONDO, 2017)
Temperature variation	LT	Low Temperature	Temperature	(GUO et al., 2019b)
	HT	High Temperature	Temperature	(GUO et al., 2019b)
	BBL	Berman and Levadoux	Precipitation, temperature	(MARTÍNEZ SALGUEIRO, 2019)
	RGP	Ribéreau-Gayon and peyraud hydrothermal scale	Precipitation, temperature	(MARTÍNEZ SALGUEIRO, 2019)
Excessive rainfall	RGP	Ribéreau-Gayon and peyraud hydrothermal scale	Precipitation, temperature	(MARTÍNEZ SALGUEIRO, 2019)
	CPI	Cumulative precipitation index	Precipitation	(KAPSAMBELIS; MONCOULON; CORDIER, 2019a; SHIRSATH et al., 2019a)
	SPEI	Standardised precipitation evapotranspiration index	Precipitation, potential evapotranspiration	(KAPSAMBELIS; MONCOULON; CORDIER, 2019a)

	R2mm	Sum of 2 consecutive days rainfall exceeds a <i>mm</i> threshold value	Precipitation	(SHIRSATH et al., 2019a)
Fire	VIIRS	<i>Visible Infrared Imaging Radiometer Suite</i>		(SACCHELLI; CIPOLLARO; FABBRIZZI, 2018)
Storm	WS	Wind Speed	Wind Speed	(SACCHELLI; CIPOLLARO; FABBRIZZI, 2018)
Wind variation	WS	Wind Speed	Wind Speed	(RODRÍGUEZ; PÉREZ-URIBE; CONTRERAS, 2021)
Cloud coverage	SR	Solar Radiation	Solar Radiation	(BOYLE; HAAS; KERN, 2021a)

**Table S3 – Summary of Expected Loss Amount (ELA) and Expected Annual Damage (EAD) models**

Type of impact	Type of model	Authors
Expected loss amount (ELA)	Cluster analysis	(EZE et al., 2020)
	Linear regression	(BOKUSHEVA, 2018b; BUCHELI; DALHAUS; FINGER, 2021; DENARO et al., 2018; F; S; E, 2020; FURUYA et al., 2021; GÓMEZ-LIMÓN, 2020a; GUERRERO-BAENA; GÓMEZ-LIMÓN, 2019; GUO et al., 2019a; HOHL et al., 2020; KATH et al., 2019a; MORTENSEN; BLOCK, 2018; WARD; MAKHIJA, 2018)
	Crop modeling	(RICOME et al., 2017)
	GALM	(AWONDO, 2019; KATH et al., 2018)
	Stepwise regression	(SHIRSATH et al., 2019b)
	Copula	(BOKUSHEVA, 2018b; KAPSAMBELIS;

		MONCOULON; CORDIER, 2019b; MARTÍNEZ SALGUEIRO, 2019)
Expected Annual of damage (EAD)	Empirical curve	(MOHOR; MENDIONDO, 2017; SACCHELLI; CIPOLLARO; FABBRIZZI, 2018)

**Table S4 – Description of risk pricing methods**

	Model	Authors
Expected Value	Burning rate	(GUERRERO-BAENA; GÓMEZ-LIMÓN, 2019; HOHL et al., 2020; MORTENSEN; BLOCK, 2018; SHIRSATH et al., 2019b)
	Probabilistic fit	(BOKUSHEVA, 2018b; BUCHELI; DALHAUS; FINGER, 2021; EZE et al., 2020; KATH et al., 2018, 2019a; MARTÍNEZ SALGUEIRO, 2019; RICOME et al., 2017; SACCHELLI; CIPOLLARO; FABBRIZZI, 2018; VROEGE; FINGER, 2020; WARD; MAKHIJA, 2018)
Stochastic	Index modeling	(ALEXANDRIDIS et al., 2021; BERHANE et al., 2021; GÓMEZ-LIMÓN, 2020a; GÜLPINAR; ÇANAKOĞLU, 2017; GUO et al., 2019a; KAPSAMBELIS; MONCOULON; CORDIER, 2019b; MARTÍNEZ SALGUEIRO, 2019; MOHOR; MENDIONDO, 2017; RODRÍGUEZ; PÉREZ-URIBE; CONTRERAS, 2021)
Market price	Wang Transform	(BOYLE; HAAS; KERN, 2021b; DENARO et al., 2018)

**Table S5 – Description of insurance policy evaluation methods**

Method	Authors
Utility function	(BUCHELI; DALHAUS; FINGER, 2021; EZE et al., 2020; FURUYA et al., 2021; RICOME et al., 2017; VROEGE et al., 2021; WARD; MAKHIJA, 2018)
Loss ratio	(MOHOR; MENDIONDO, 2017)
Coniditional VaR	(BOKUSHEVA, 2018b)
Lower partial moment	(BOKUSHEVA, 2018b)
Coefficient of variation for downside risk	(BOKUSHEVA, 2018b; MARTÍNEZ SALGUEIRO, 2019)
Minimum Support Price (MSP)	(WARD; MAKHIJA, 2018)
Mean Root Square Loss (MRSL)	(KATH et al., 2019a)
Certainty Equivalence of Revenue (CER)	(KATH et al., 2019a)
Conditional tail expectation (CTE)	(KATH et al., 2018)

Expected Shortfall	(BOKUSHEVA, 2018b; MARTÍNEZ SALGUEIRO, 2019)
Risk Mitigation Level (RML)	(DENARO et al., 2018)
Maximum cost savings	(BOYLE; HAAS; KERN, 2021b)

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