



Forecasting Climate Extremes Impacting Sorghum Production in Senegal: Evidence from APSIM Model Simulations

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Background and Objectives

- ✓ Climate change threatens food security in Senegal.
- ✓ Sorghum=staple crop, climate-resilient but sensitive to rainfall, temperature variability.
- ✓ Assess climate extremes (CDD,Rx1day, TXx)
- ✓ Analyse growing season characteristics (Onset, cessation, growing length, rainfall)
- ✓ Simulate sorghum yield under 5 CMIP6 (Historical, SSP2-4.5, SSP5-8.5)

Data and Method

- ✓ Study site: Bambey, Nioro, Velingara
- ✓ Data: 5GCMs (ACCESS, CNRM-ESM2-1, HadGEM3-GC31-LL, MPI-ESM1-2-HR, UKESM1-0-LL)
- ✓ Indices: Climate extreme indices
- ✓ Modelling: APSIM-Sorghum under low-input
- ✓ Crop: Four contrasted sorghum cultivar (Faourou, Nganda, Nguinthe, Payenne)
- ✓ Analysis :Multi-scenario comparison, visualisation

Key messages

- ✓ Climate extremes are increasing, shortening Sorghum growing seasons and reducing yields.
- ✓ Smallholder farmers are vulnerable to climate variability and change.
- ✓ Targeted adaption (tolerant cultivars) is critical to sustain food security

Key result

- ✓ Climate extremes intensify with increasing, extreme rainfall (Rx1day) rises by +3-15% and heat extreme(TXx) increases by 2-2.5°C under SSP2-4.5 and SSP5-8.5 (Fig.2).
- ✓ Sorghum yield decline drops by 10-16% across sites mostly affected under SSP5-8.5 as a result of an increase in CDD(Bambey, Nioro), with Payenne cultivar showing to be more stable (Fig.3).

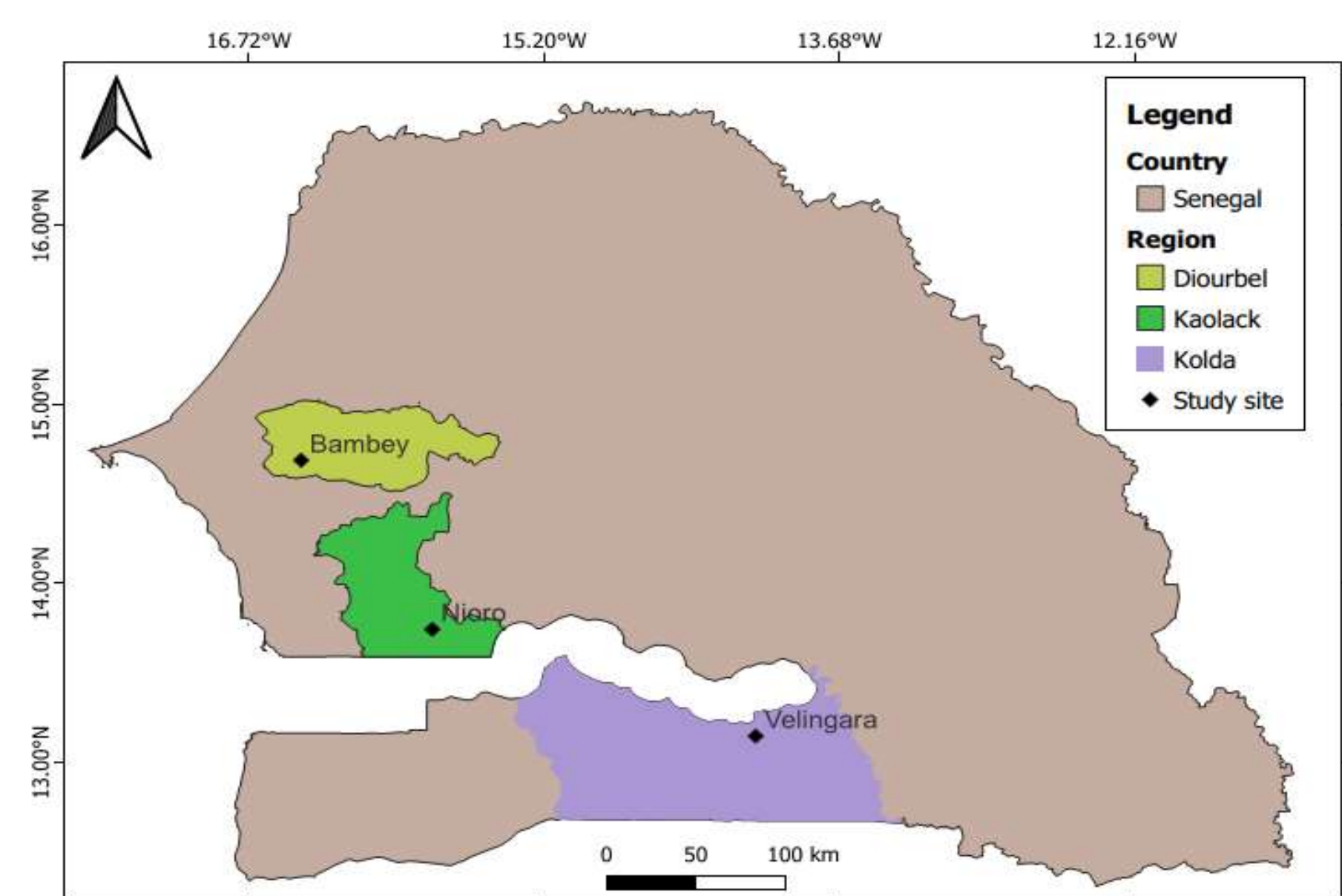


Fig. 1: A study map showing the study site in Senegal

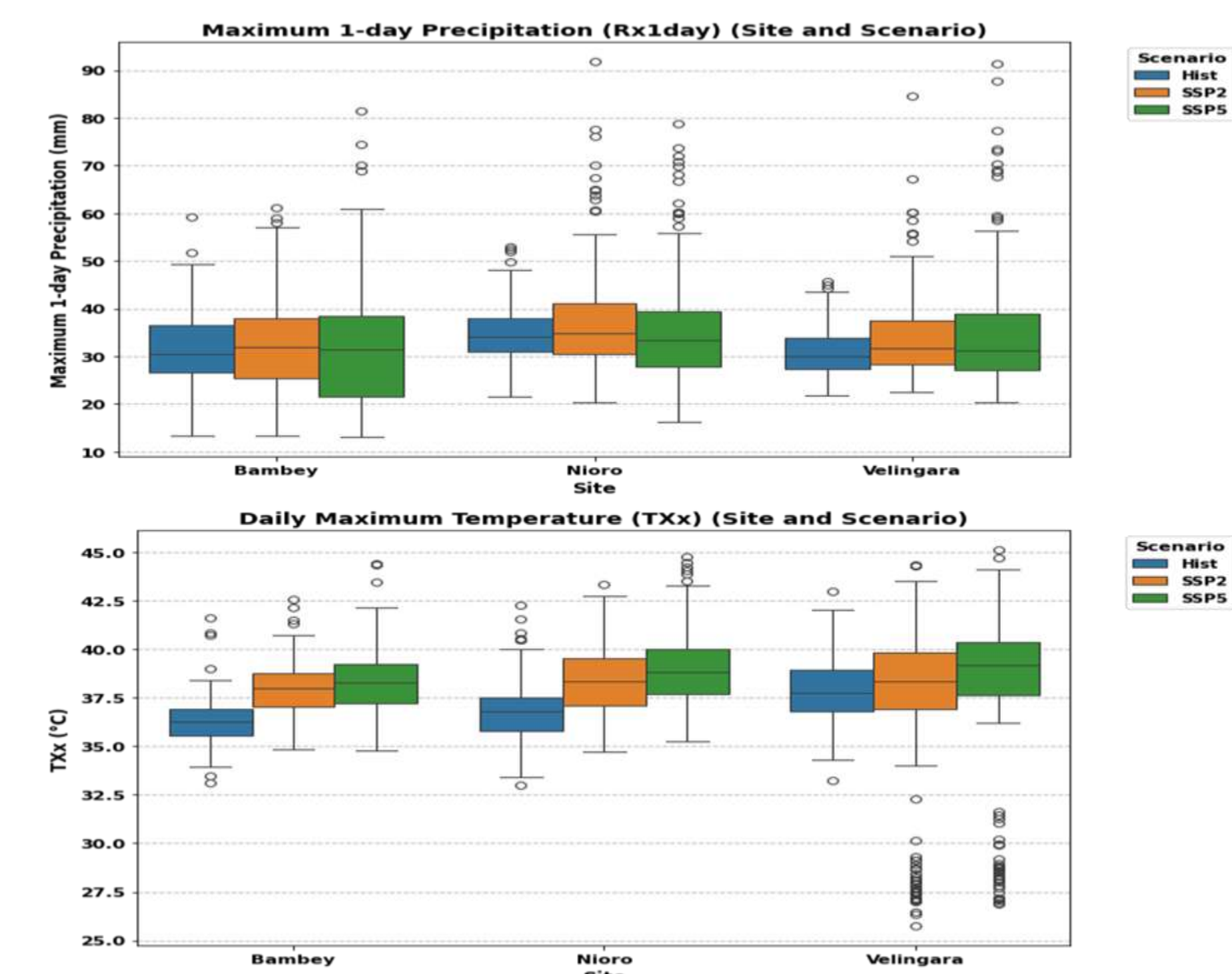


Fig. 2: Climate extreme indices across the simulated site in Senegal

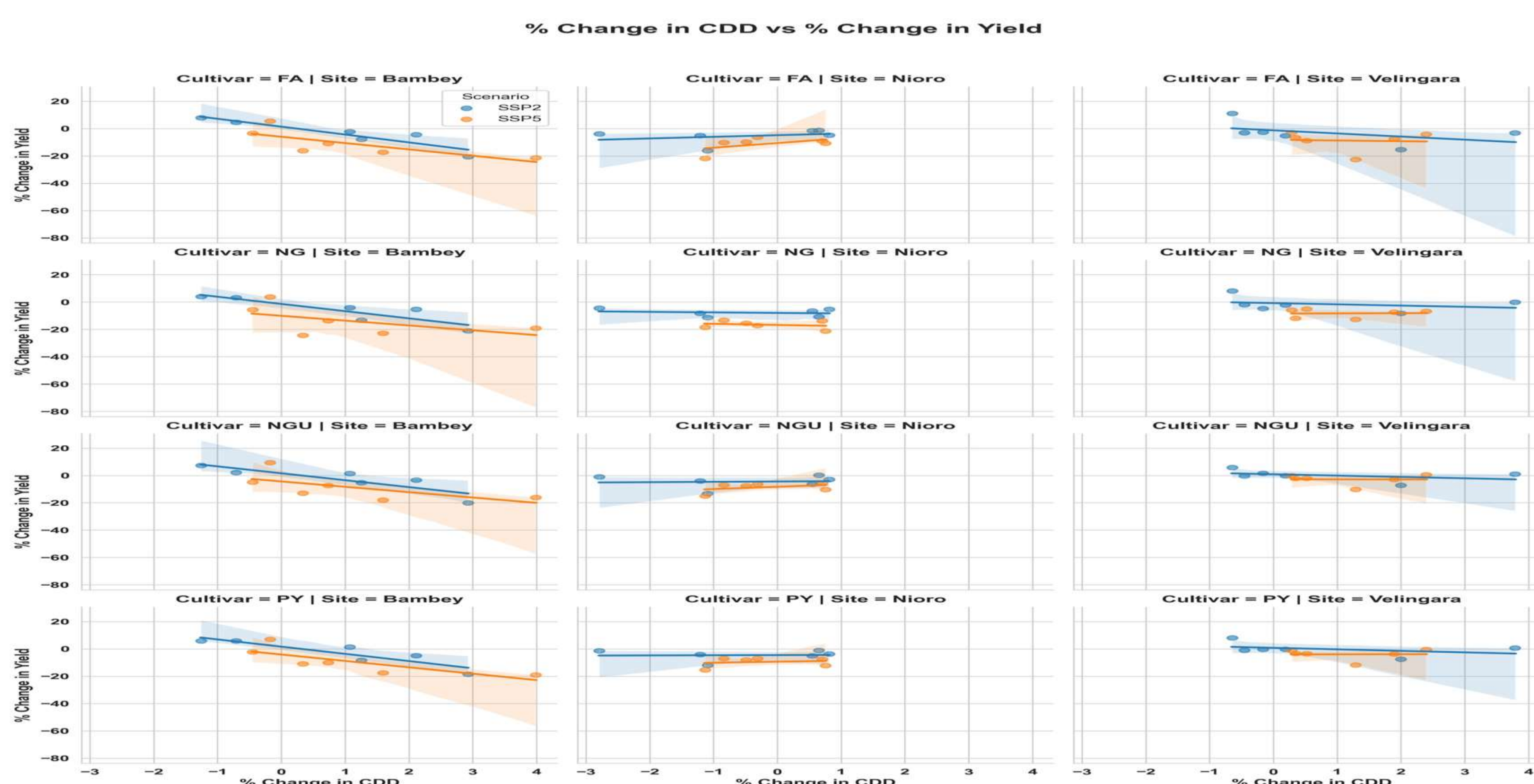


Fig. 3: Effect of Climate extremes (CDD) on Sorghum yield productivity in Senegal (FA- Faourou, NG- Nganda, NGU- Nguinthe, PY- Payenne).

Conclusion

- ✓ Climate change is intensifying extreme events (longer dry spells, hotter days) across Senegal's sorghum zones.
- ✓ Shorter growing seasons result in yield reduction, especially under high emissions
- ✓ Adaptation through climate-smart planting date, cultivar choice, and soil fertility management is essential to sustain sorghum production and farmer resilience

Partners

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