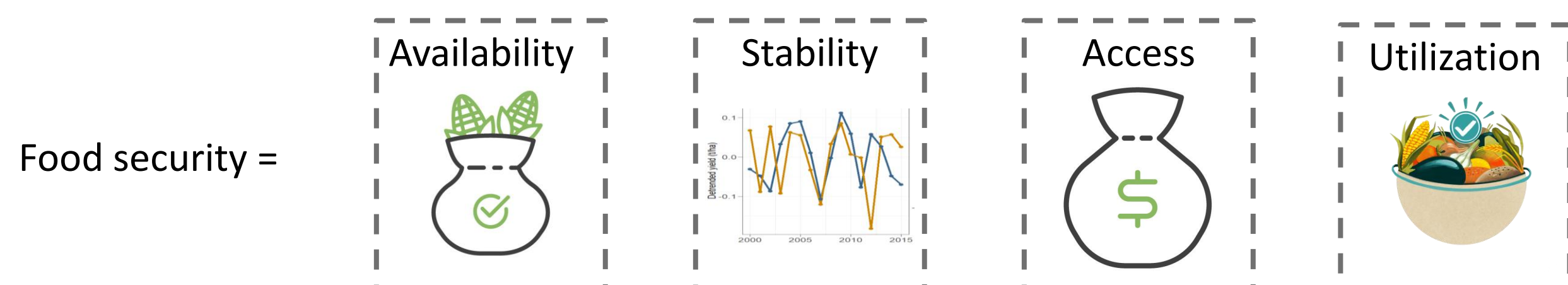


The role of anthropogenic climate change in shaping food security: An explicit assessment of 16 West African countries

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Background



- ❖ Climate change adds a burden on achieving food security across West Africa
- ❖ Most studies use food availability to represent food security
- ❖ Limited evidence of anthropogenic climate change on food security
- ❖ There is need to disentangle relative contributions of each pillar
- ❖ Understanding the major driver of food security facilitates designing appropriate adaptation measures

Methodology

Here we:

- ❑ Develop a process based crop modelling attribution oriented framework
- ❑ Calibrate APSIMx for 3 major calorie crops (maize, sorghum and peanut) across 16 West-African countries
- ❑ Simulate yields under historical scenario (world with anthropogenic cc) and hist-nat scenario (world without human induced climate change)
- ❑ Simulate the standalone CO₂ effect
- ❑ Assess access and utilization using wealth and macronutrient indicators
- ❑ Derive a food security index under factual and counterfactual climate scenarios

See Fig1

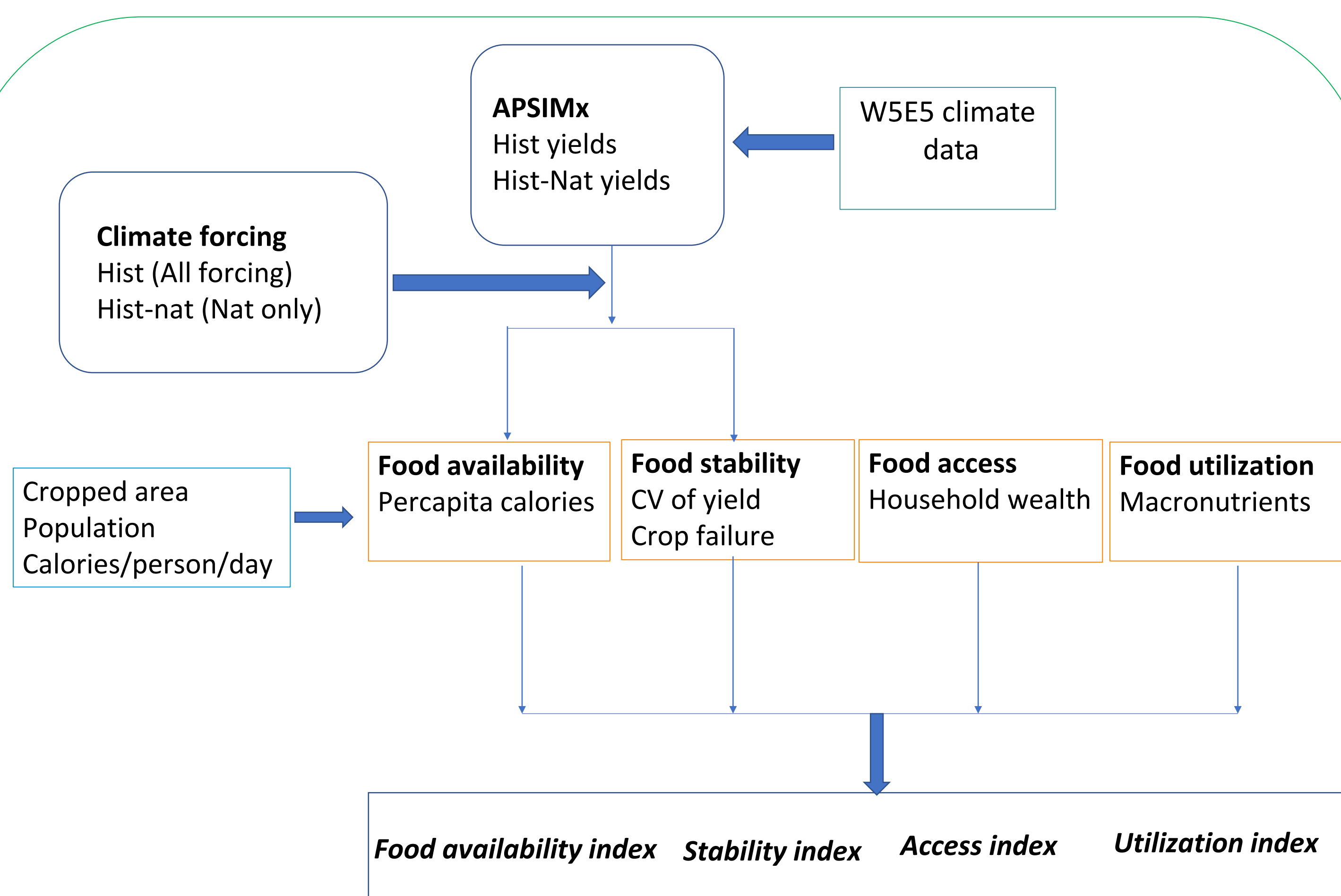
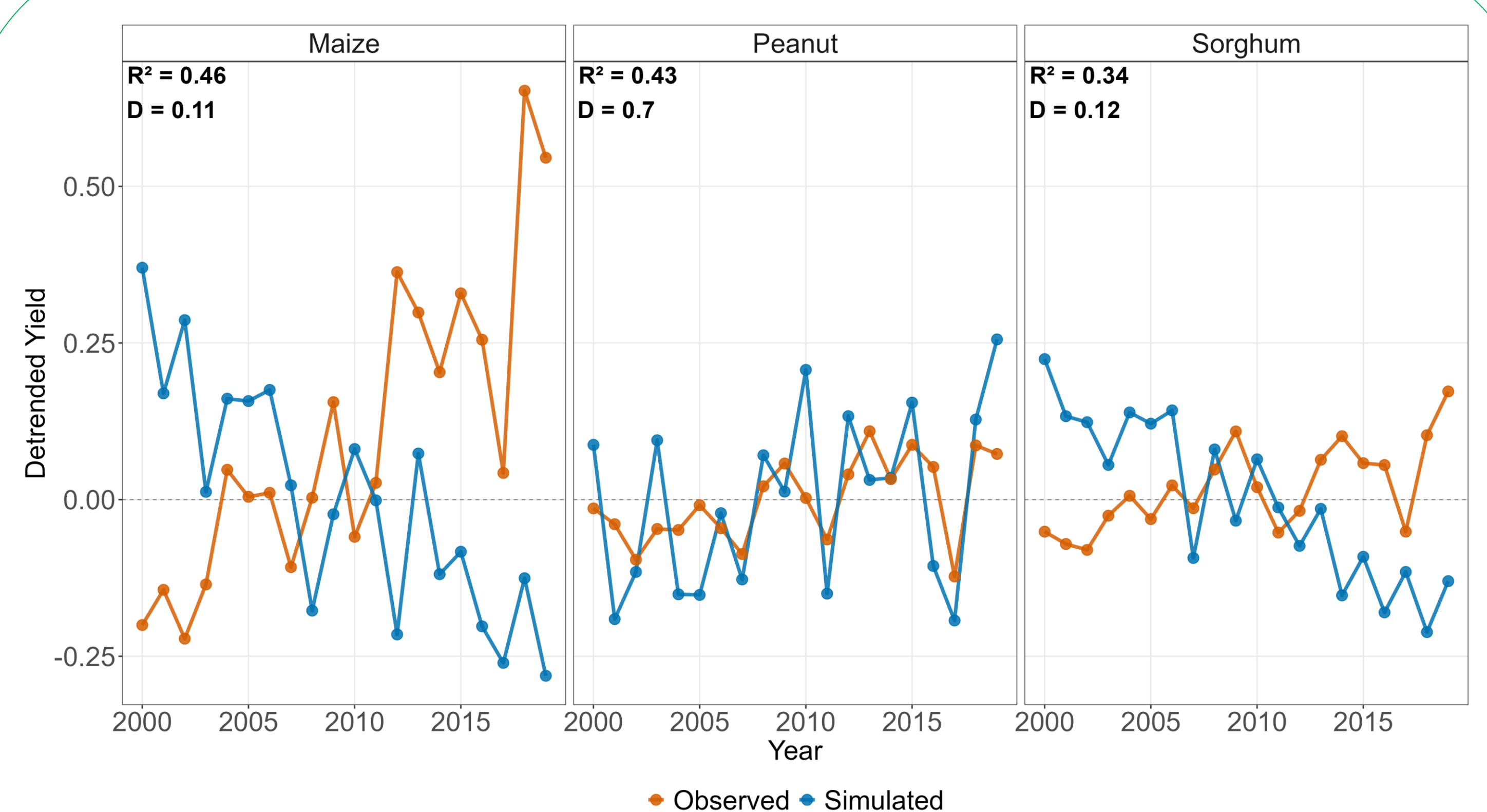


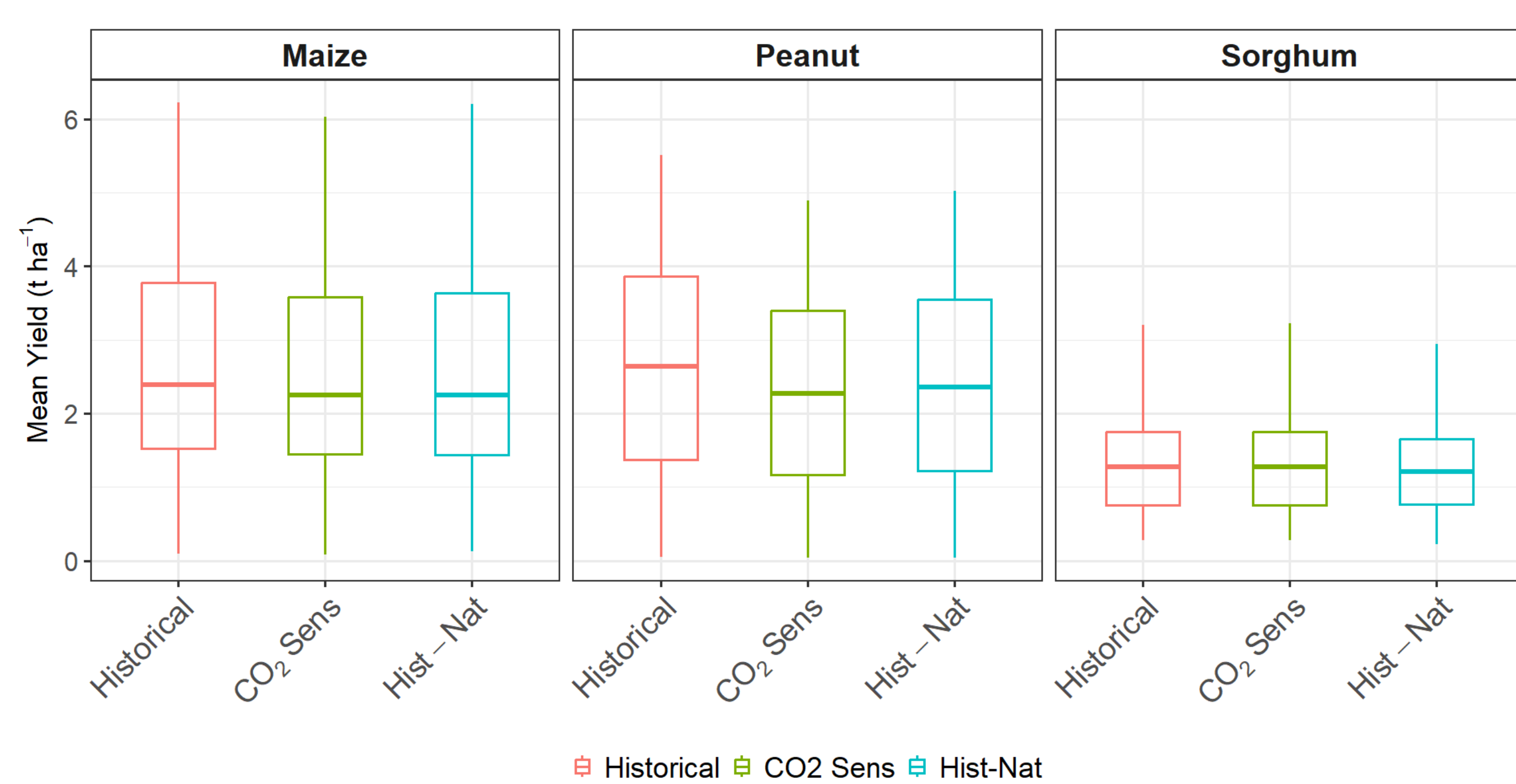
Fig 1) Flow diagram for food security assessment



- Model evaluated against FAO country level historical annual yields (aggregated to regional level) (Figure2).
- Spatial differences in model performance across countries.

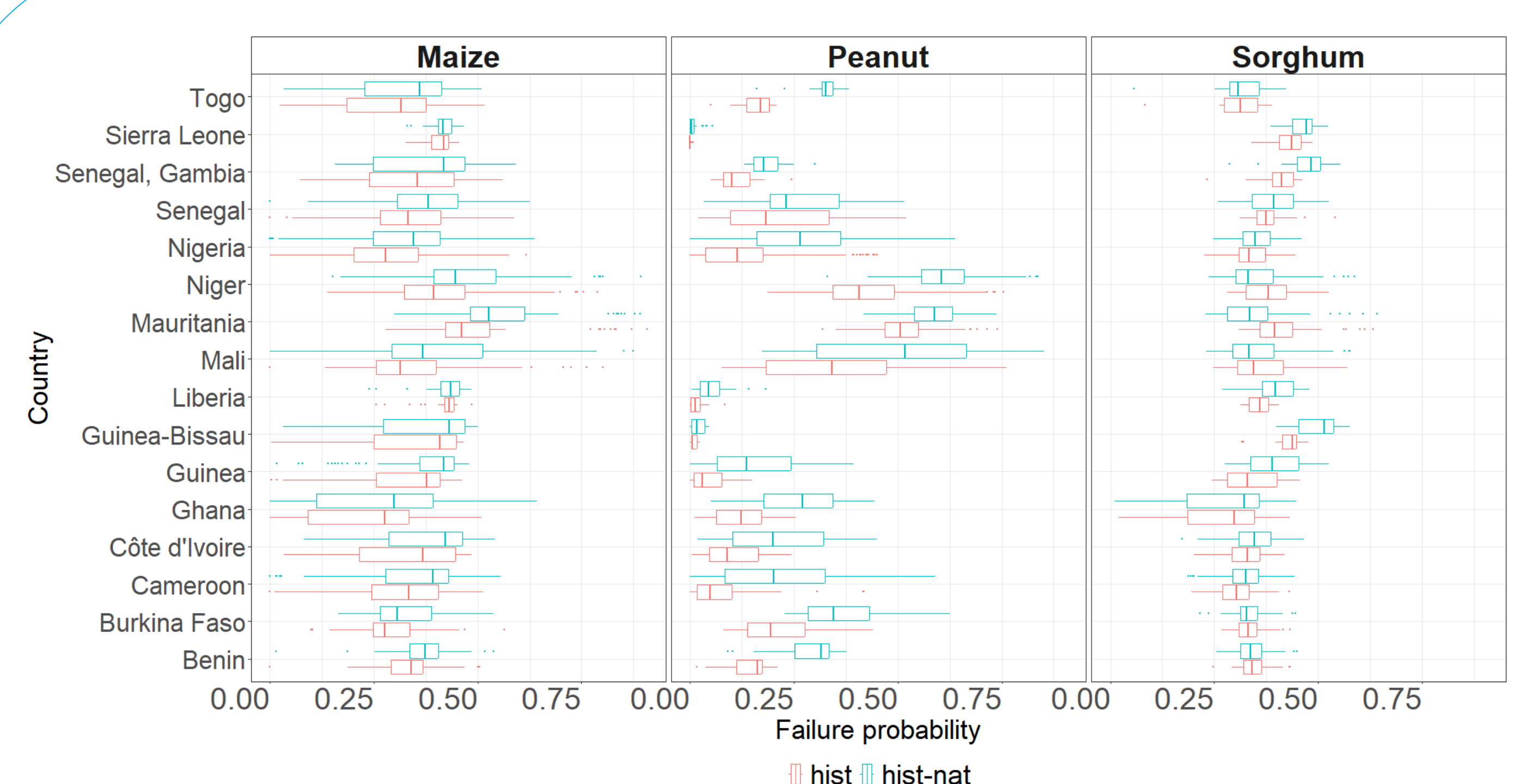
Fig 2) Model evaluation across West Africa

Preliminary results



- Generally higher yields under historical climate than counterfactual
- CO₂ has played a role in enhancing historical yields across the region especially for maize and peanut.
- Climate impacts differ by crops.

Fig 3) Historical anthropogenic climate change effect on maize, peanut and sorghum yields



- Higher probability of crop failure in hist-nat than historical
- Higher probability for crop failure in maize and peanut than sorghum

Fig 4) Yield stability across countries and scenarios

Conclusion and outlook

- Food security assessments should go beyond production – targeting other pillars such as access, utilization
- CO₂ fertilization has played a great role in enhancing crop production, but heat stress and interannual variability due to weather shocks affect food stability
- Policies that address structural limitations such as market access can enhance food security
- Include more crops to capture a wider calorie representation

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