



AI based forecasting for Early Warning Systems over the Greater Horn of Africa

Earth Information Day | 10th Nov. 2025





World Food Programme

Google.org



Early Warning Systems for Anticipatory Action



Typically, regional models are computationally expensive meaning:

- Low ability to generate ensembles
- Limited skill out to longer lead times





Hybrid forecasts



Forecast output:

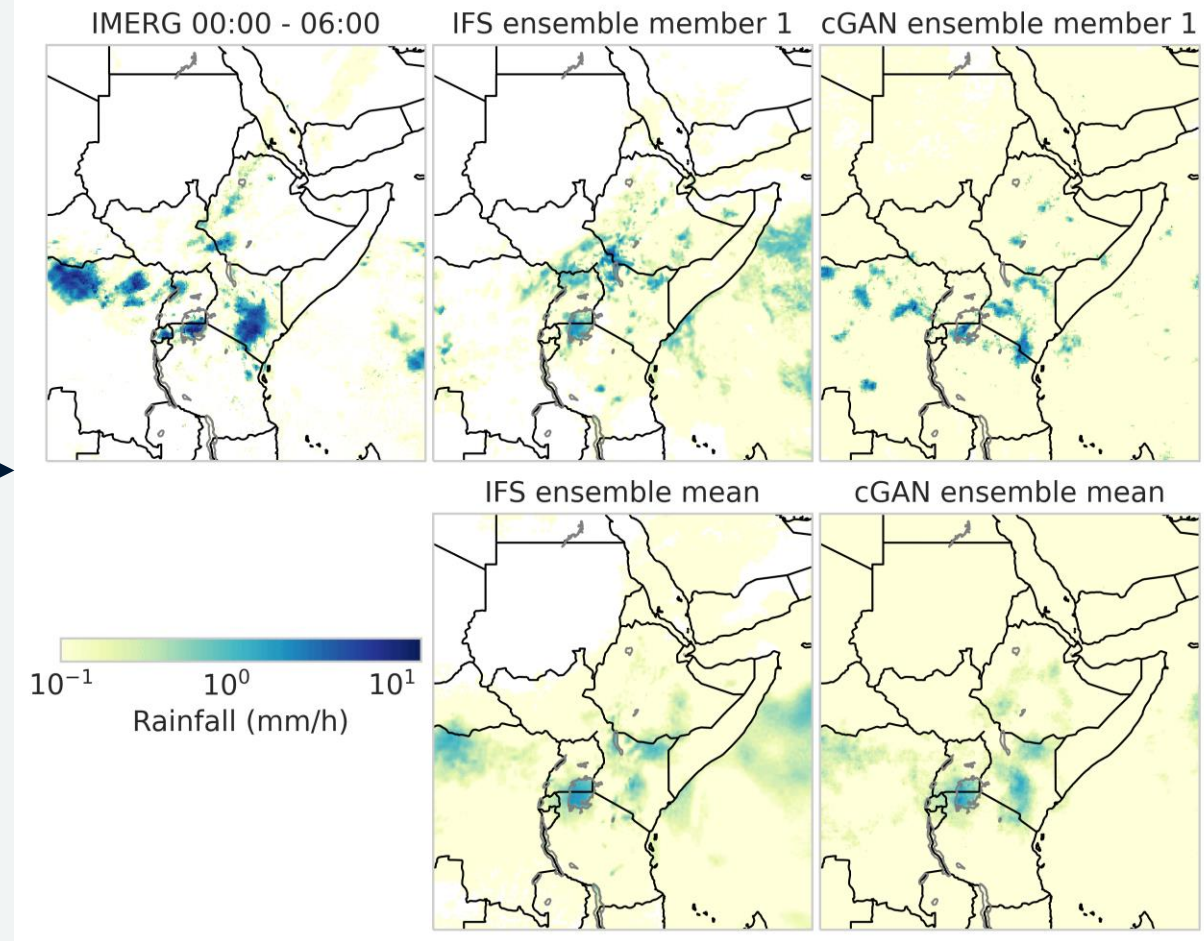
CAPE

⋮

V component of
wind

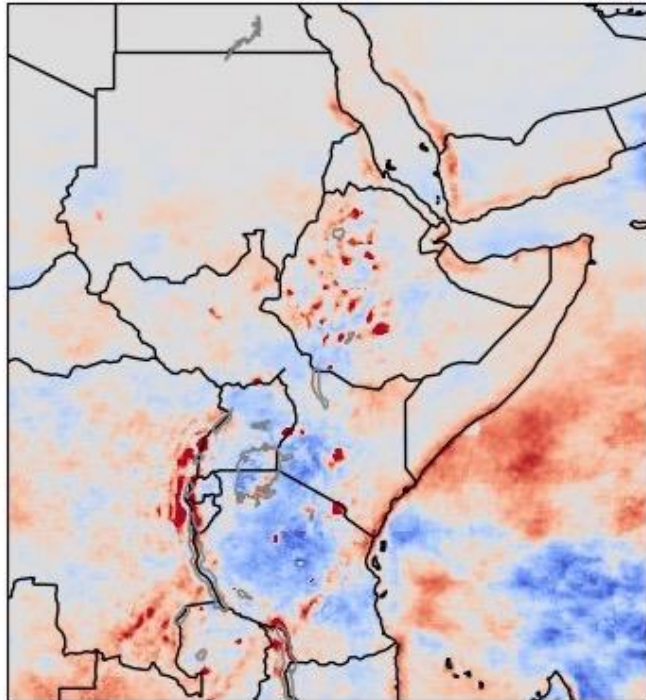
cGAN

Conditional Wasserstein
Generalised Adversarial Network

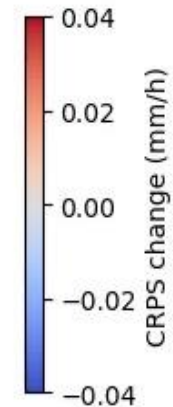
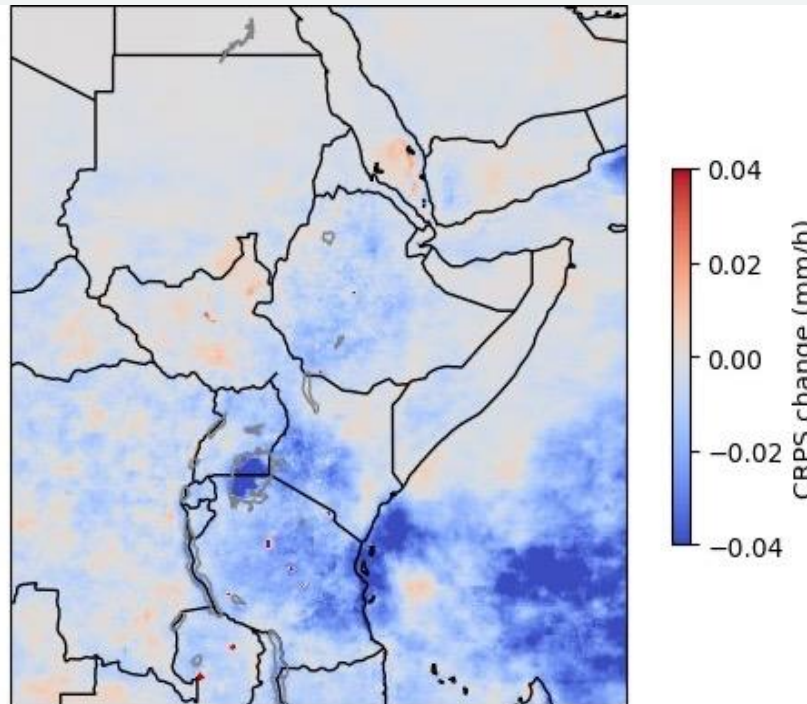


Value added on top of climatology (1-day lead time)

IFS



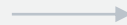
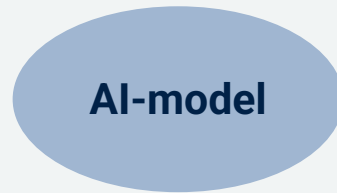
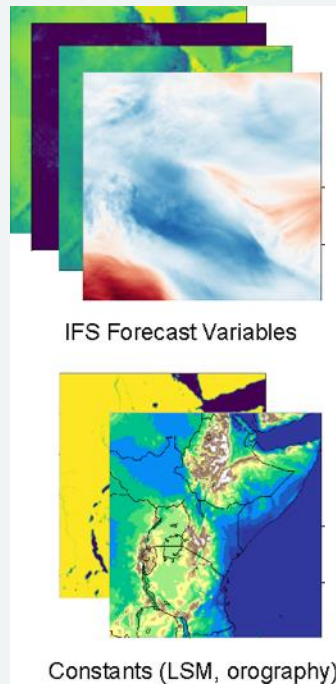
cGAN



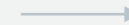
Blue= Better
than
climatology

Red= Worse
than
climatology

End-to-end early warning generation



Warning Production



Triggering

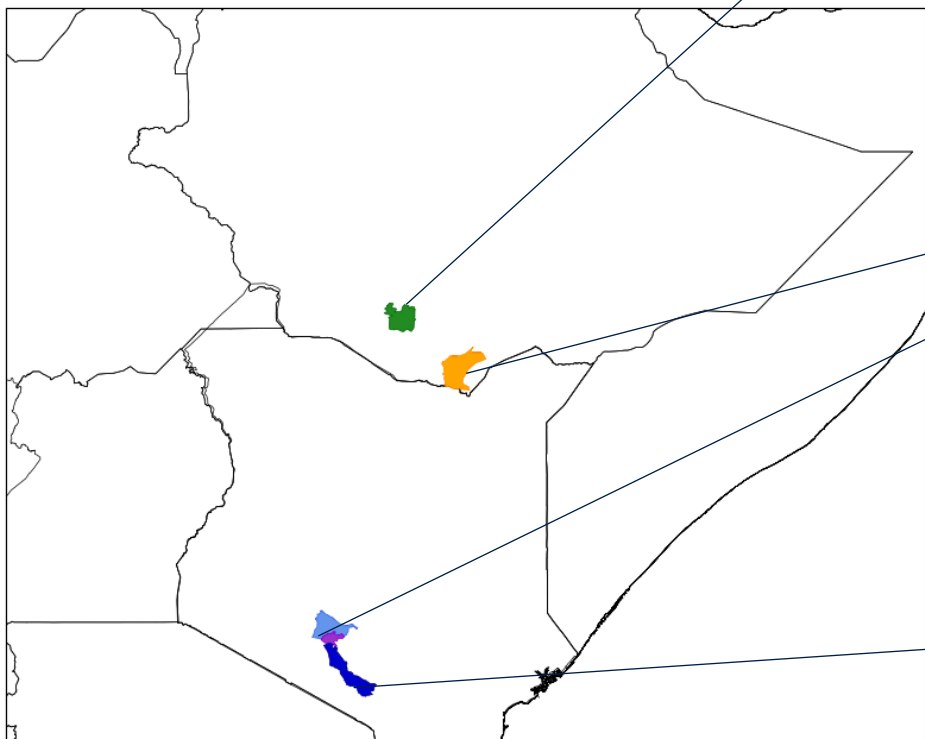


We still need to communicate
probability as a **yes/no**
for user-defined **rainfall levels**

Weigh **cost of action vs
inaction**

How do general, global scores translate to ability to make better decisions for extremes?

Case studies



Flash floods, OCHA, 16.11.2023
<https://reliefweb.int/report/ethiopia/ethiopia-floods-flash-update-2-15-november-2023>



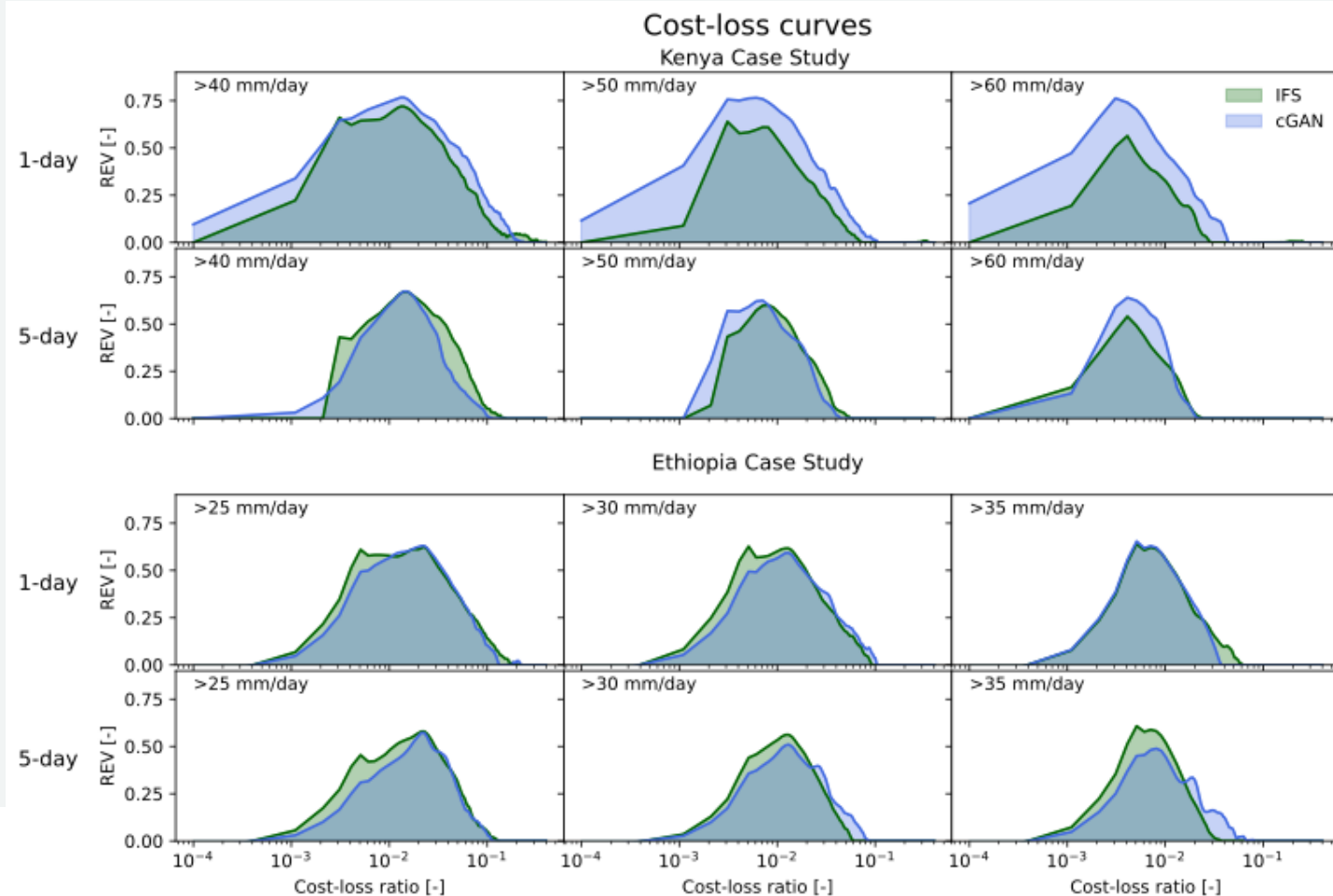
Urban flooding, personal camera, 22.04.2024

Forecast Added Value

perfect=1



default
(always or never
act)=0



Example work stations in Rwanda and Kenya

