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Case Study: TAMSAT-ALERT

Managing The Risk Of Agricultural Drought In Africa

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TAMSAT

National Centre for Earth Observation
NATURAL ENVIRONMENT RESEARCH COUNCIL

National Centre for Atmospheric Science
NATURAL ENVIRONMENT RESEARCH COUNCIL

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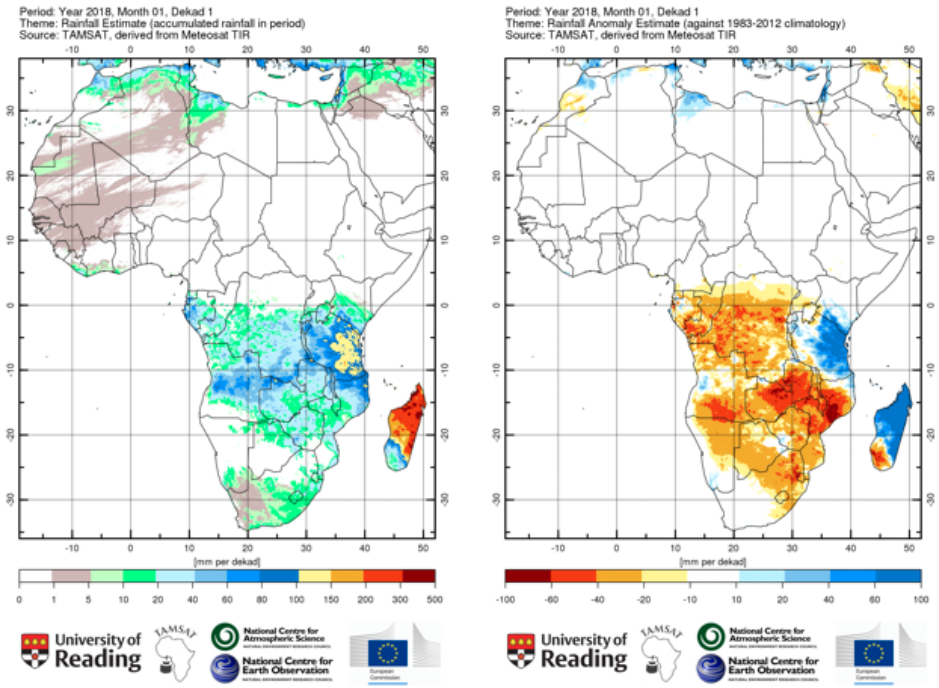
Context

TAMSAT* has a long history (since 1980s) of working with African stakeholders (**climate**, **agricultural** and **finance** sectors), founded on it's operational, Africa-wide satellite-based rainfall product.



Understanding and assessing **the risk meteorological hazards pose to agriculture** is a common theme across all stakeholders we work with.

How can we use TAMSAT and other data streams in an open framework to support the sectors we routinely work with to address this challenge?

*Tropical Applications of Meteorology using SATellite and ground-based observations

TAMSAT-ALERT *(The TAMSAT-AgricuLtural Early waRning sysTem)*

Quantitative risk assessments of agricultural and meteorological drought

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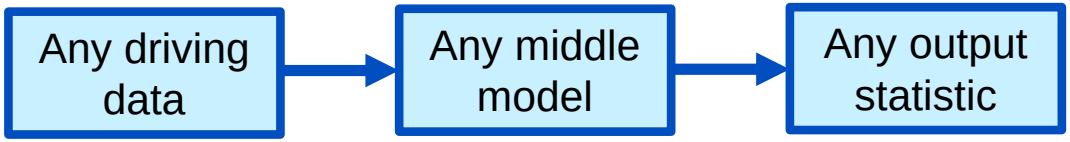
TAMSAT-ALERT framework is highly flexible



What is it?

- A monitoring and decision support tool that combines information on current and historical weather and land surface properties.

What it does?

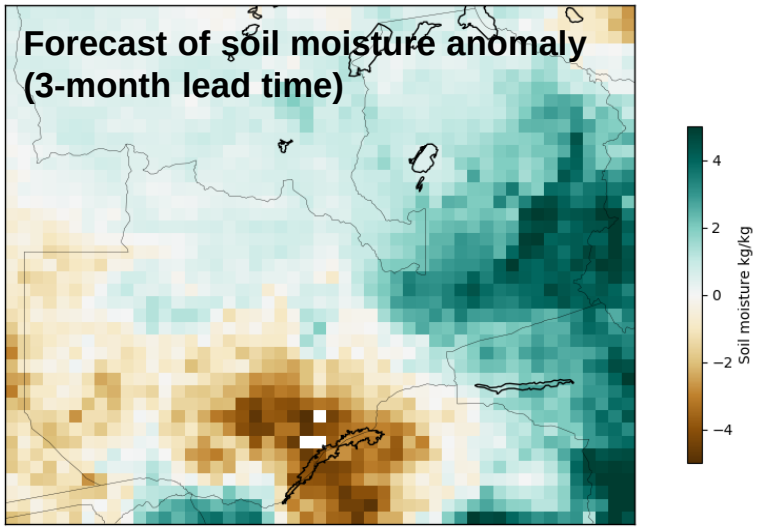
- Makes forecasts to support management of agricultural/meteorological drought.

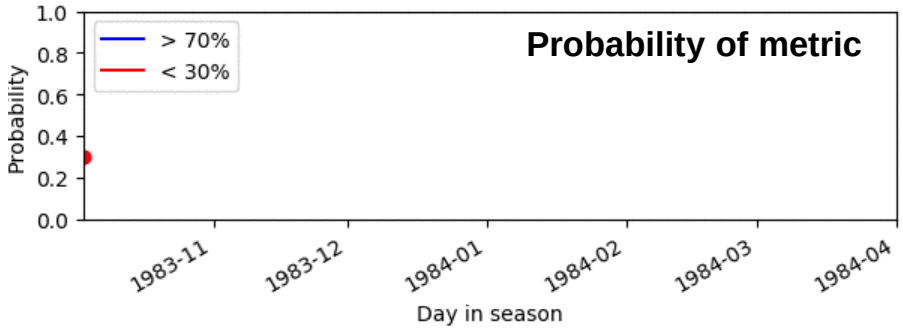
Why have we developed it?

- To provide early warning of weather-related hazard to a range of decision makers to mitigate their exposure to risk.

How have we developed it?

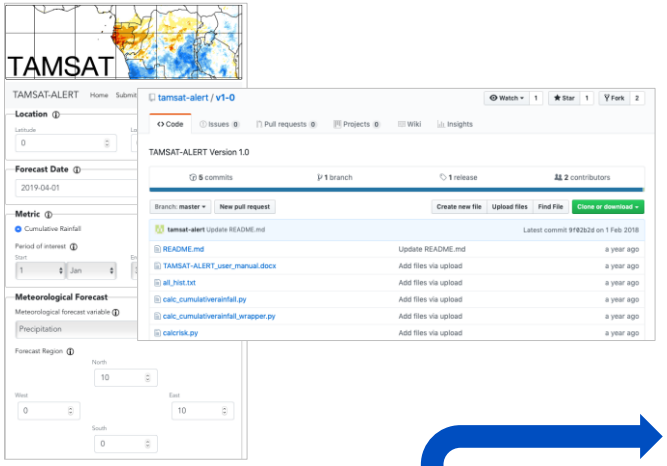
- Through intensive research in close collaboration with African stakeholders.





Open Practices

Adopting different open practices was essential for uptake



Frequent stakeholder engagement

Complete transparency

Simplicity (no "black box")

UPTAKE
Stakeholders choose TAMSAT-ALERT over less suitable products

TRUST
TAMSAT-ALERT needs to be a system that users trust enough to pay out money and make decisions

EASE
Products need to be (1) easily reproducible and (2) issued by mandated agencies, to comply with regulations

RATIONALE

PRACTICE

Open source code and driving data

Open access publications

No fees or licenses required

Web platform (no login required)

Where are we now?

Open science has helped facilitate uptake across Africa

- Capacity building in NHMSs
- Planting date decision support
- Decision support for forecast-based finance
- Weather index insurance

Benefits realised (so far)

- Improved evidence based decision support for 500,000+ farmers in Mozambique and Malawi, because we were able to share all of our code.
- Insurance and forecasts for 2.6 Million farmers across Zambia over 2 years directly as a result of having a transparent process from satellite data to rainfall/soil moisture estimates, which was able to be replicated by the re-insurers and regulators.

RISKSHIELD PULA ONE ACRE FUND

Barriers and lessons learnt

Overcoming obstacles was challenging, but following open research practices has led to maximal impact

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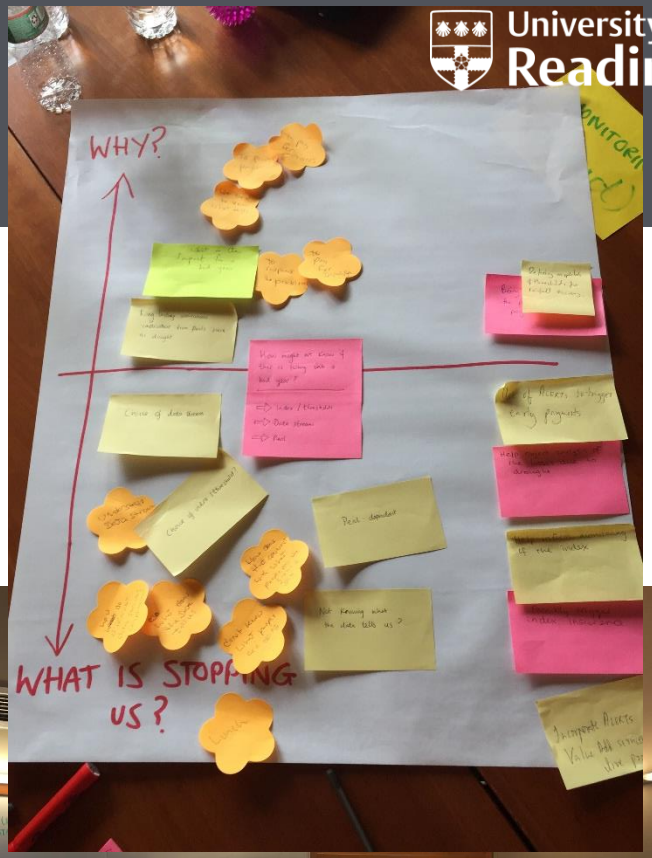
Barriers and challenges

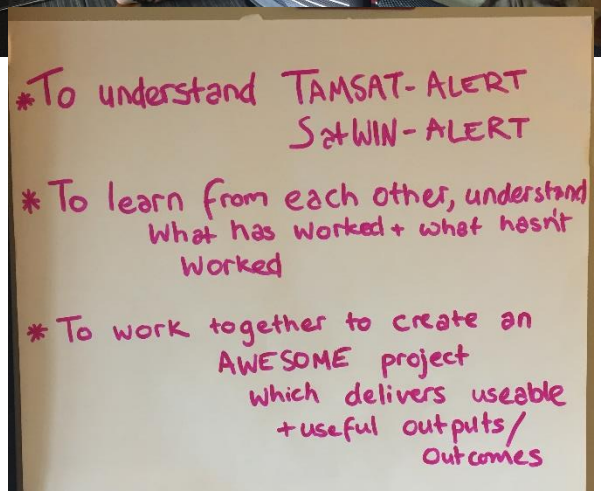
- Existing land surface models are proprietary, so had to re-write a drought model.
- High resolution driving data were licensed so had to develop downscaling technologies.
- Data has to be mandated by national agencies, so developed open source code that could be run in-house in Africa.

Lessons learnt

- Licensing models and holding back code limits the applicability of methods and hence take up - even if it is theoretically possible to obtain licenses free of charge. This is because of legal complications of third parties developing value added products that may contravene the original license.
- Transparency during the development process is critical for trust, even if this means exposing mistakes and coding errors.

Open discussion amongst different stakeholders





Example of TAMSAT-ALERT

Managing the risk of agricultural drought in Africa

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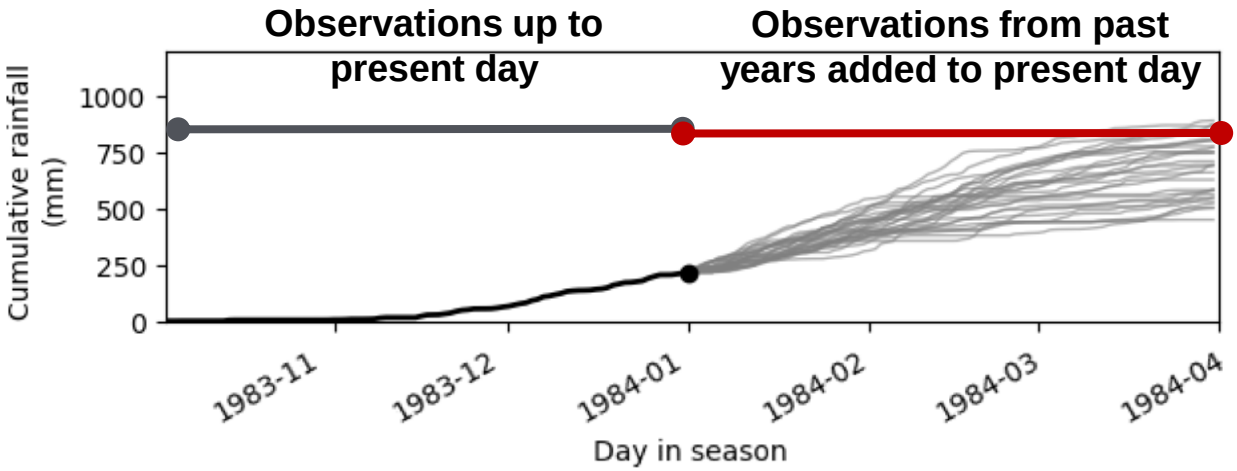
Risk:
The likelihood of the seasonal rainfall falling below the 30th percentile by the end of the season.

1) Use observations up to present day. [black line]

2) Project/forecast possible futures from present day using data from historical years [grey lines]

3) Compare new projected distribution with climatological distribution



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4) Derive probability using a threshold [red and blue lines]