Validation of TAMSAT-derived soil moisture using NDVI

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Importance of water

LandSat 8 imagery – NASA’s Earth Observer
Use of precipitation

IPC v3.0 Acute Food Insecurity Phase

1: Minimal  2: Stressed  3: Crisis  4: Emergency  5: Famine

Would likely be at least one phase worse without current or programmed humanitarian assistance

FEWS NET classification is IPC-compatible. IPC-compatible analysis follows key IPC protocols but does not necessarily reflect the consensus of national food security partners.
It’s complicated...
Soil moisture

https://www.farmmanagement.pro/5-methods-of-manipulating-soil-moisture-levels/
Incorporating JULES

Figure taken from Brown et al. 2017. Weather, 72(7) - Contains public sector information licensed under the Open Government Licence v.1.0
Validation

1) Is soil moisture a good predictor of vegetation growth?

2) Does soil moisture have added value over rainfall?
Rainfall
- TAMSAT
- Cold cloud duration

VCI
- NASA GIMMS project
- AVHRR

100 x (NDVI – min) / (max – min)

Soil moisture
- TAMSAT
- Incorporating JULES

Yield
- End of season questionnaires
- Additional sources
Predicting VCI

- SPI (standardised rainfall) vs. VCI
- October to December
- $R = 0.86$
Predicting VCI

- Soil moisture vs. VCI
- October to December
- $R = 0.88$
Predicting crop yield

- SPI (standardised rainfall) vs. FAO maize yield
- March to October
- $R = 0.45$
Predicting crop yield

- Soil moisture vs. FAO maize yield
- March to October
- $R = 0.54$
Next steps

- Crop parameters to improve yield predictions
- County-level assessment
- Forecasting ability
- OND 2019 pilot
TAMSAT soil moisture provides a more direct means of monitoring agricultural drought