AI in supporting natural disaster prediction/early warning in humanitarian settings

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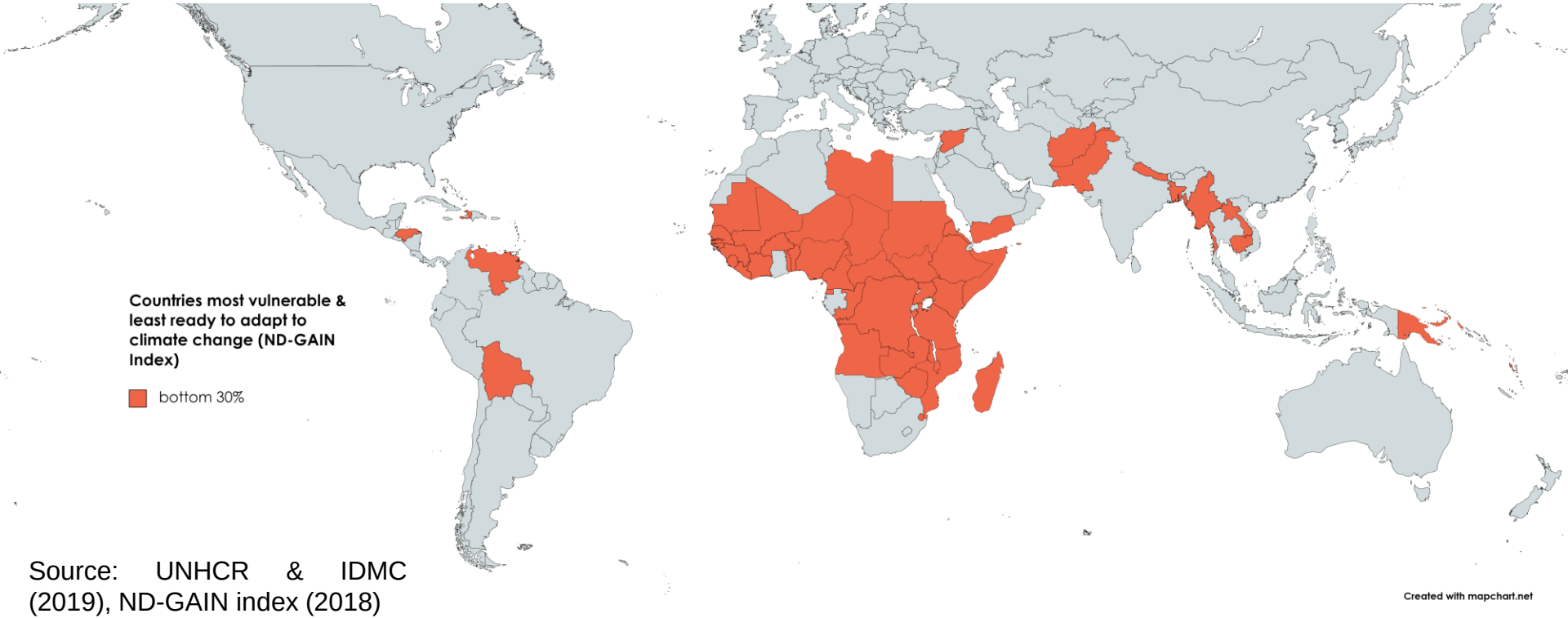
The most climate vulnerable countries in the world:

- Countries of origin/return for 90% refugees (70% global conflict IDPs)
- Host countries for 40% refugees



Source: UNHCR & IDMC (2019), ND-GAIN index (2018)

What AI can be used for?

- Artificial intelligence
  - Mimic cognitive human processes

- Speed up data processing and analysis → key for big data sources
  - E.g. satellite imagery, social media data, recordings, text
  - Large volume of weather/climate/environment related datasets

- Ethically speaking, ideally AI would provide results that need to be verified/confirmed

1. Kenya: Drought Watch insurance to farmers

Project Goal: data, the goal is for the machine learning algorithm to recognize the forage quality in each image and then accurately predict forage quality

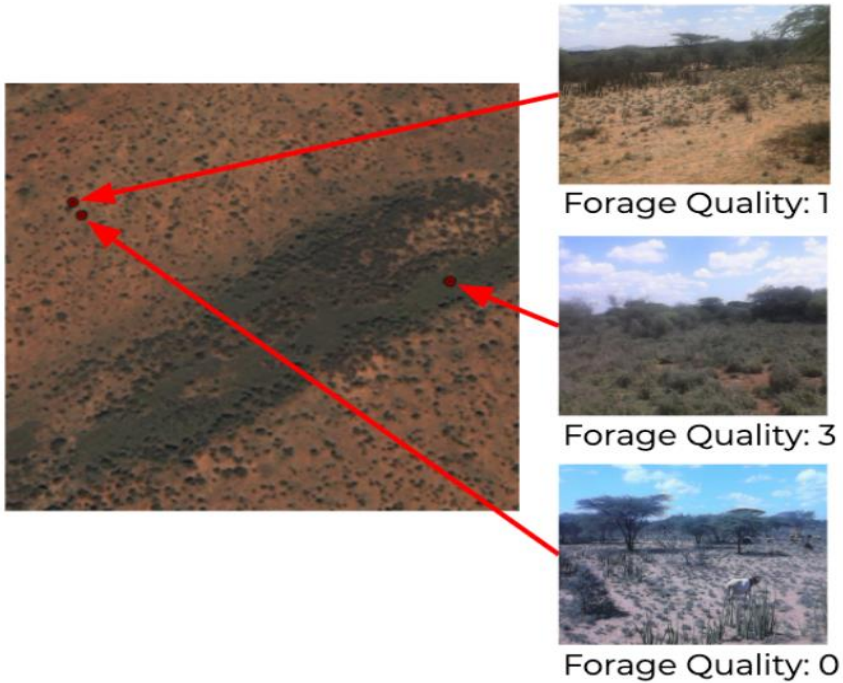
Context: ILRI developed and implemented the index-based livestock insurance in northern Kenya that was adopted by the government for the national Kenya Livestock Insurance Program (KLIP) in 2015. This program is supported by WB

AI use:

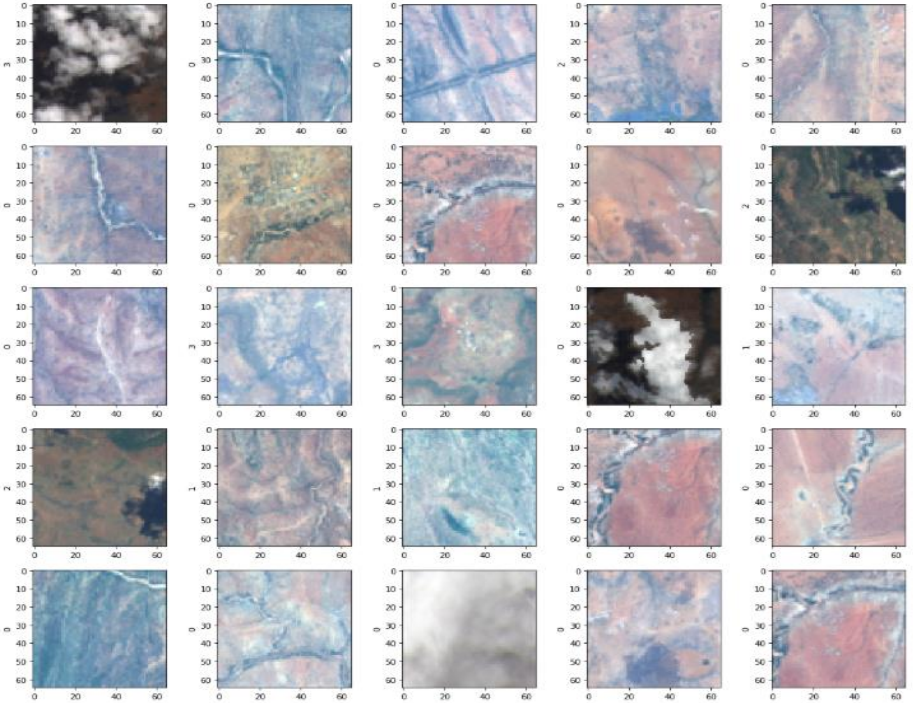
- Recognize forage quality from 100,000 satellite photographs of Northern Kenya collected by the International Livestock Research Institute (ILRI).
- Match using AI these images to data collected by ILRI from local experts who rated forage quality on the ground where the photographs were taken

Preliminary results:

- Improve index insurance, that sometimes can be inaccurate, failing to pay a farmer who has losses or paying one who has not



Estimates of forage quality from ground level



Example satellite images in RGB, 65x65 pixels

FEED THE FUTURE INNOVATION LAB FOR ASSETS & MARKET ACCESS
BASIS basis.ucdavis.edu

Weights & Biases

Source: ReliefWeb

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2. Somalia: Drought patterns nexus with conflict

Project goal:

- finding nexus between forced displacement, drought and conflict

AI use:

- using **satellite imagery** from NDVI images and find nexus with conflict-prone areas during a certain time period (2015-2019)

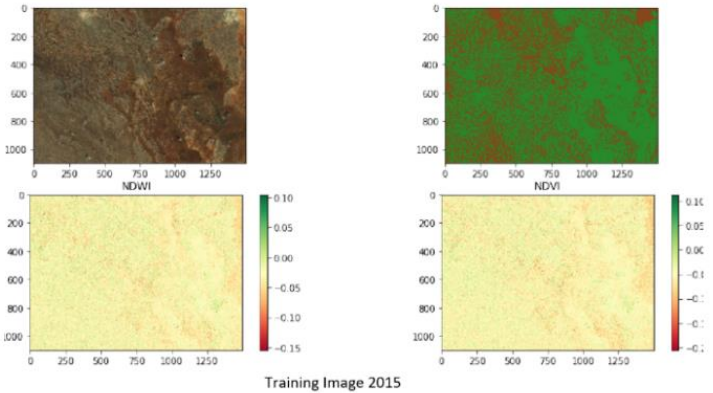
Preliminary results:

- Increased demand for water resources, as a result of the IDPs arrivals or rivers drying up
- During conflict, the pressure to utilize the land for housing increased (urban displacement)
- Able to calculate nexus between climate-related anomalies (drought) and conflict to admin-level 1 (region)

Omdena Foundation

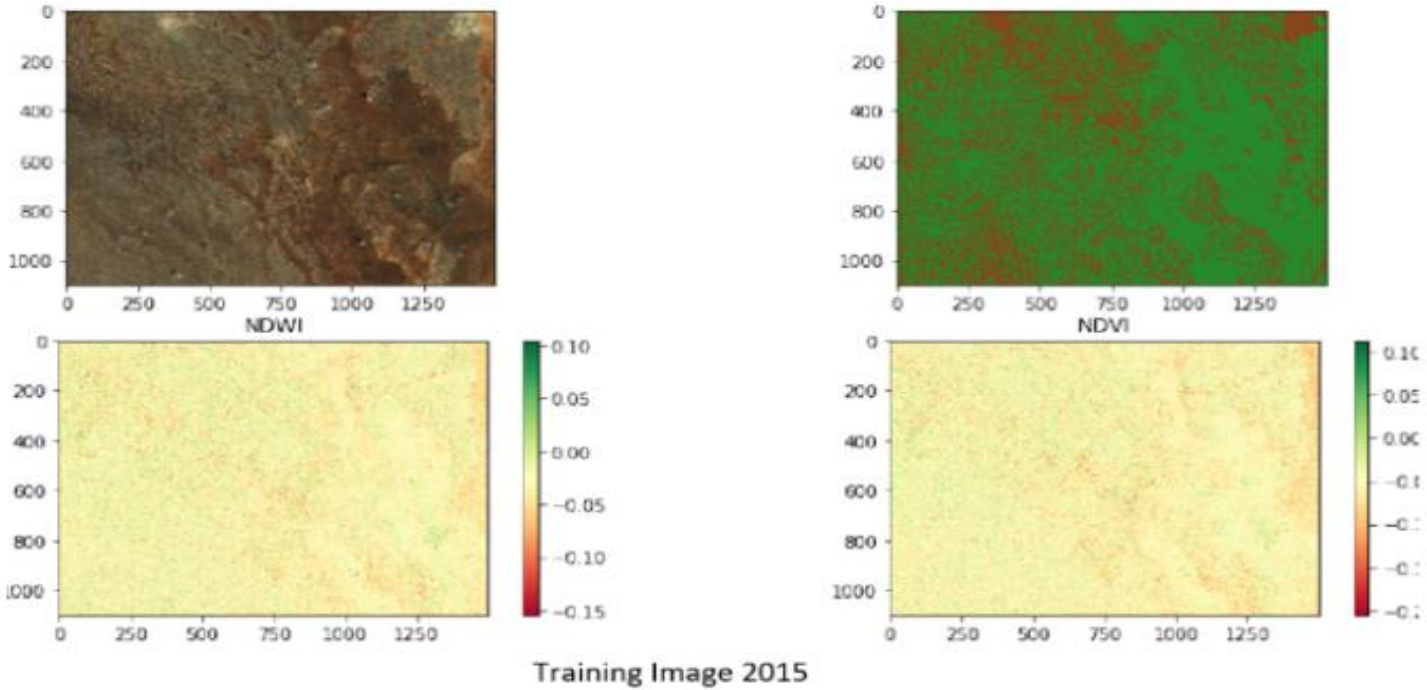
UNHCR Innovation

University of Essex



NDWI and NDVI: training image and result

Source: Omdena UNHCR Challenge



NDWI and NDVI: training image and result

Source: Omdena UNHCR Challenge

3. Malawi: Measuring Resilience disaster prone areas

Goal:

- The USAID-funded MIRA project was developed and implemented in the context of the United in Building and Advancing Life Expectations (UBALE) program, a program that serves three of the poorest and most disaster-prone districts in Malawi—Chikwawa, Nsanje, and Rural Blantyre.

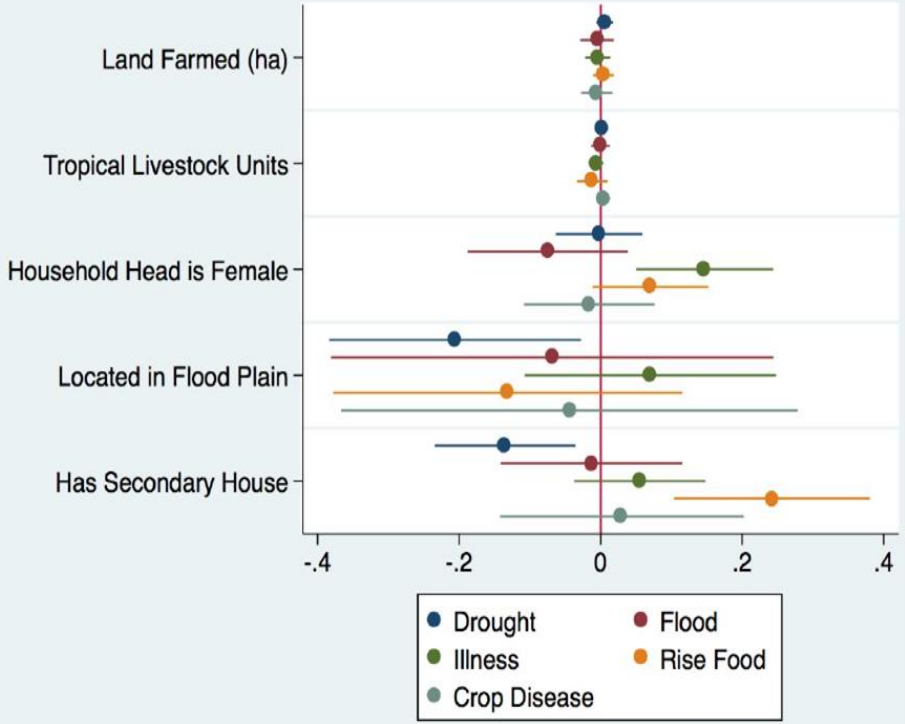
AI use:

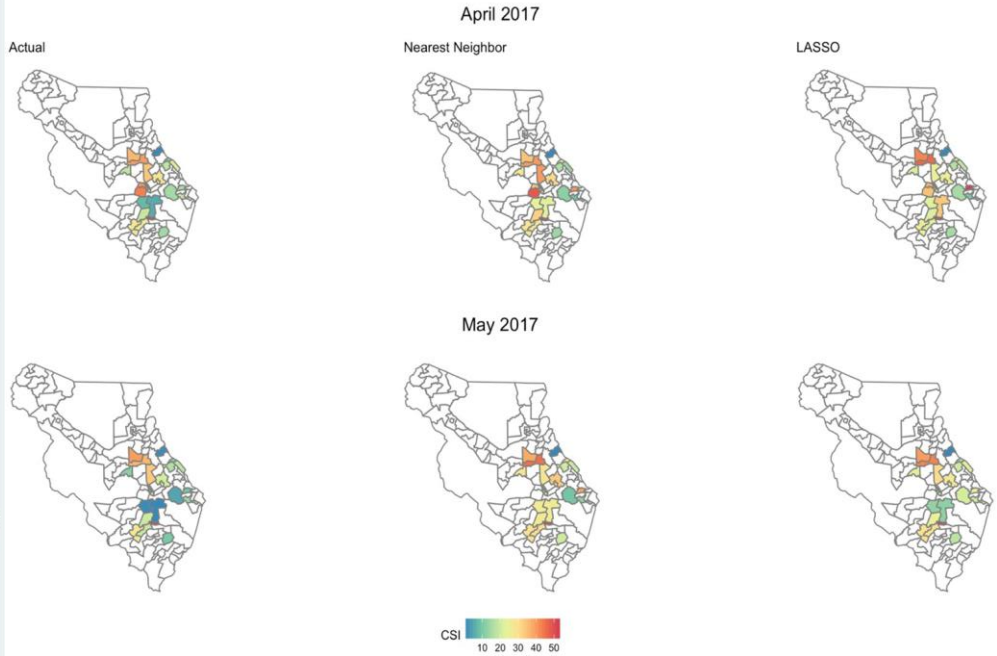
- predict the future level of food stress through rich, timely data that offered a snapshot of the shocks and stresses experienced by UBALE beneficiaries and non-beneficiaries in these districts.

Preliminary results

- Based on the observable indicators from the baseline, as well as the previous round of high frequency observation, we sought to predict the next months' incidence of food stress

Figure 7. Change in shock probability correlated with resilience capacity





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Anticipatory planning

- Proactive rather than reactive!
- How can AI and ML enhance future UN operations?
- Inter-connectedness of risks in Sahel?
- How will climate change/mega-trends impact the triple nexus?

Data sharing

- Align with the SG's Data Strategy
- Facilitate, access, integrate & share data
- Regional Data/knowledge Hub
- Non-traditional data: social media /crowdsourcing
- Unified insights on SDG progress

What did we achieve so far?

Consultation

- Digital surveys and 50+ in-depth interviews
- 22 UN entities consulted (HQs, regional, field)
- Academia (PIK, CUNY, Uppsala)

Formulation of issues & desired solutions

- Align with UNISS – Special Coordinator for Dev.
- Be clear on questions & why they are necessary
- Mapping data collection performed in the region
- Support attainment of SDGs

Thank you

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