



Impact of climate change on food systems: case studies from Africa

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Climate change, food systems and health

- The triple burden of malnutrition (underweight, hidden hunger and overweight) is globally responsible for one out of five preventable deaths.
- Food systems are very susceptible to climate change due to the reliance on climatic variables.
- Crop production in Africa occurs mainly on rain-fed land and is reliant on seasonal water availability.
- Agriculture provides employment and direct livelihood to over half of the continent's population, and contributes on average 15% of national GDP.

1. Spread of pests and diseases: 2020 desert locust outbreak in East Africa

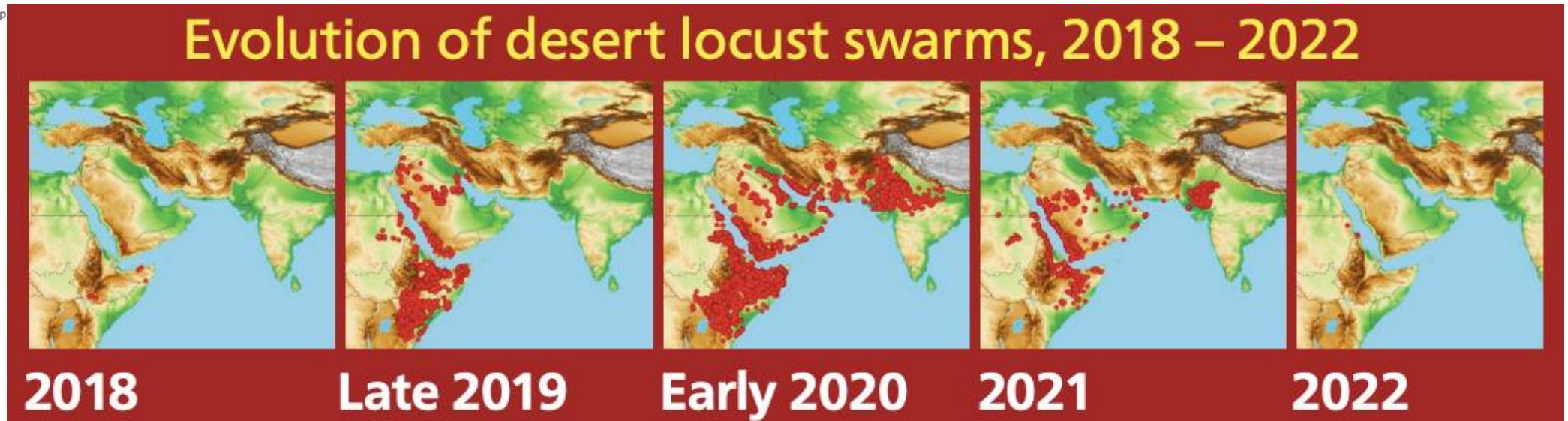
- Linked to changing climatic conditions: prolonged exceptionally wet weather
- Locusts reproduce exponentially, migrate long distances and destroy crops along the way (1 km² swarm = food for 35,000 people).



Photo: Christiaan Kooyman



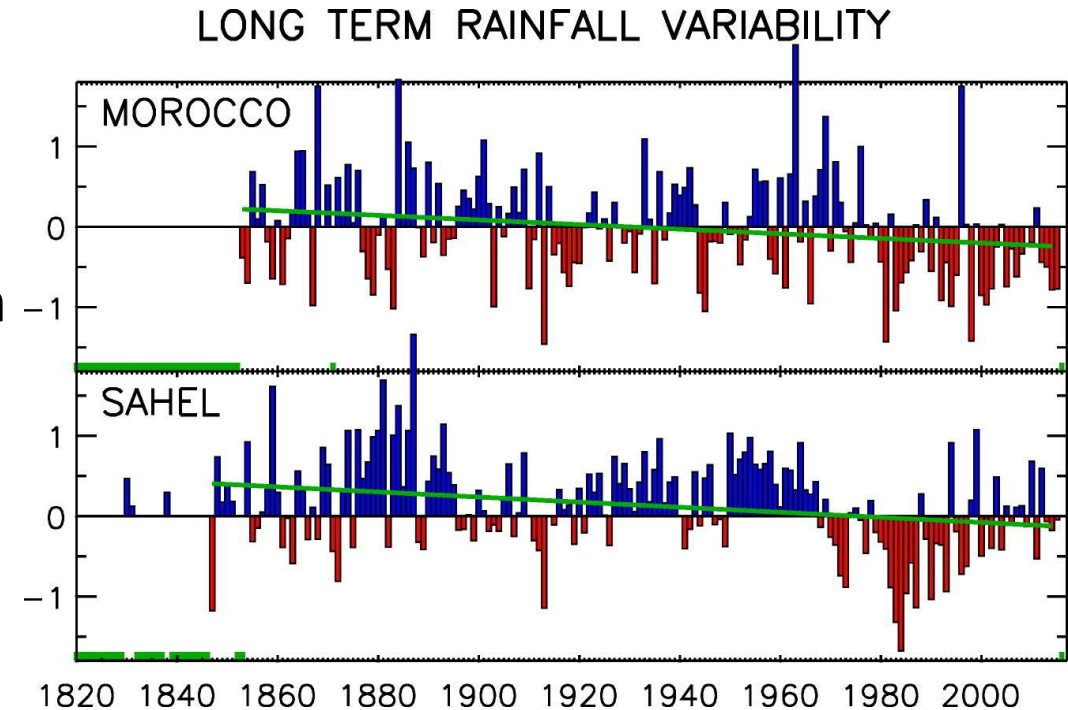
Photo: FAO



- International co-operation and mobilisation of resources critical (243M \$ raised by Jan 2022).
- Outbreak controlled end 2022- West Africa spared
- 2020: COVID-19 and extensive floods in the region.

2. Climate services for agriculture

- Adapting to climate change requires better projections of the specific climate hazards that will be faced at the local, regional and national levels
- Climate services: information to improve decision making/ minimise risks
- Climate variability- esp. precipitation
- Farmers' perceptions are not always aligned with historical records: many stresses experienced simultaneously, attribution of effect of a single stress difficult.



Nicholson et al. 2018. Global and planetary change 165: 114-127.

- Lack of high-resolution data: strengthening the database of observed weather is a crucial research priority.
- Co-creation of climate information with farmers critical: indication of the vulnerabilities experienced and of the key barriers to adaptation
- Heat stress requires more attention: effect on crop productivity and on the ability of farmers to work outdoors during the hottest part of day.



Photo: C. Schubert (CCAFS)

Participatory Climate Services for
Agriculture (PICSA)
<https://research.reading.ac.uk/picsa/>

The Kirkhouse Trust (KT)

- UK-based charity founded in 2000 by Ed Southern. Operates as trust in perpetuity.
- Long-term funding provided to African scientists in Africa for research on legumes.



www.kirkhoustrust.org



Common bean



Cowpea



Stress tolerant orphan legumes



Capacity building

3. Crop breeding for disease and pest resistance- cowpea and common bean

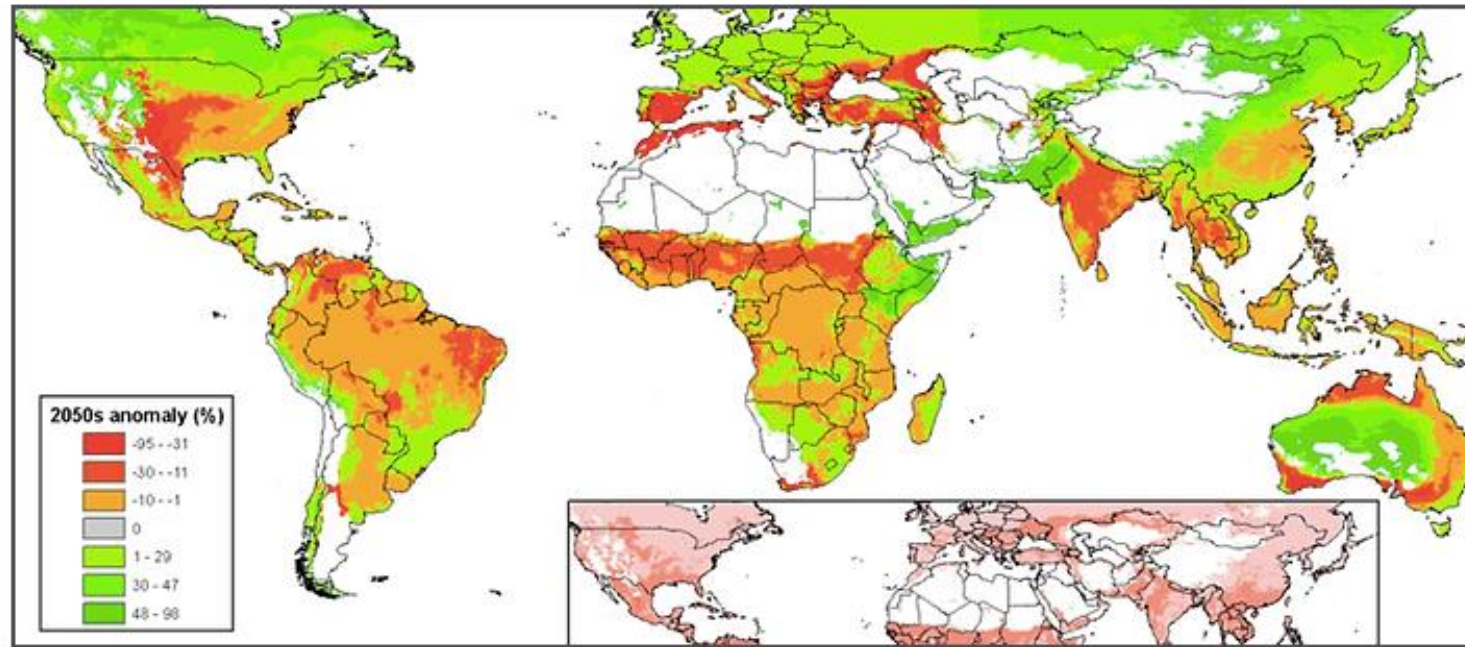


Cowpea: Striga, Alectra, insect and disease resistance, earliness, large seed size. Over 20 improved varieties released in West Africa.



Common bean: anthracnose, angular leaf spot, common bacterial blight, *Pythium* root rot, bean common mosaic virus, bean common necrotic mosaic virus, bean scab.

4. Genetic diversity for climate change adaptation



Map showing the world regions expected to be most impacted by the effects of climate change in 2050 (shown in red). Source: the CGIAR Research Program on [Climate Change, Agriculture and Food Security \(CCAFS\)](#).

- Climate change will disproportionately affect parts of Africa (West Africa and the Sahel).
- The cultivation of conventional crops will increasingly fail due to higher average ambient temperatures and increased drought.

Stress tolerant orphan legumes (STOL)

STOL crops: bambara groundnut (*Vigna subterranean*), moth bean (*Vigna aconitifolia*), mung bean (*Vigna radiata*), horsegram (*Macrotyloma uniflorum*), dolichos (*Lablab purpureus*), marama bean (*Tylosema esculentum*), tepary bean (*Phaseolus acutifolius*)



STOL Consortium objectives

1. Identify promising varieties of each STOL species.
2. Multiply and exchange seed to partners for evaluation (MTAs between India and eight African countries).
3. Carry out farmer field trials of the best performing crops and varieties.
4. Promote diversity of farming systems
5. Increase the capacity of scientists, extension workers and farmers for promoting and growing STOL crops.



Thank you