

Africa

The Next Breadbasket

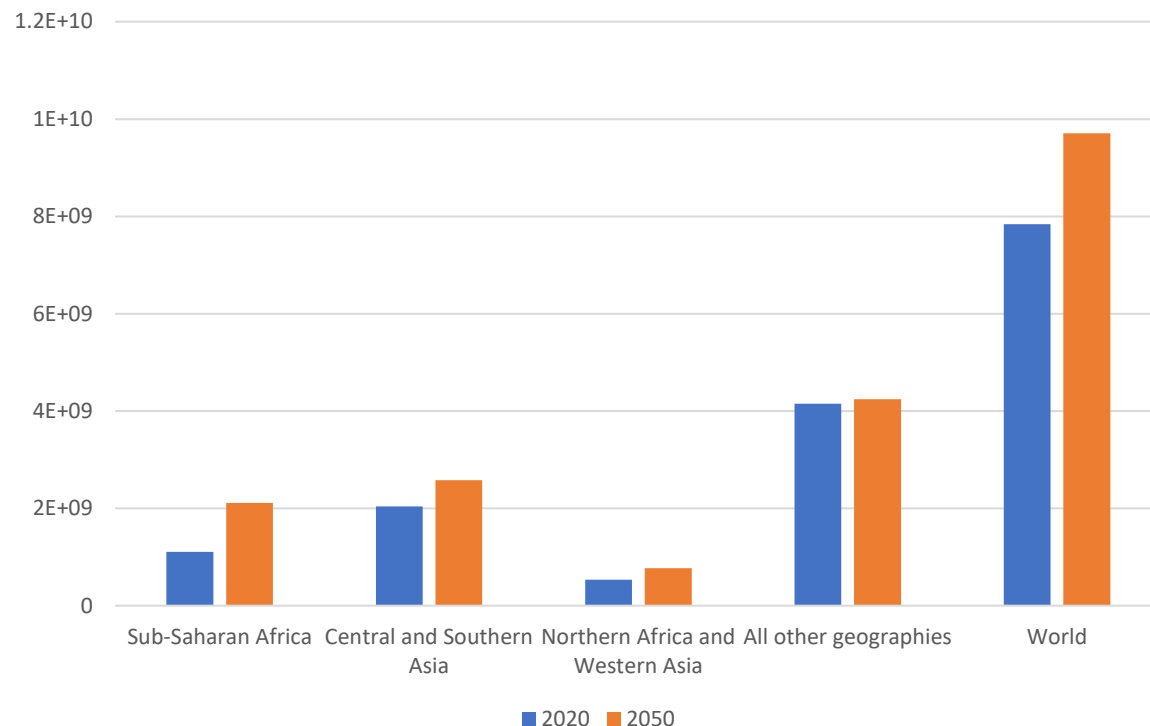
Channing Arndt, Senior Director
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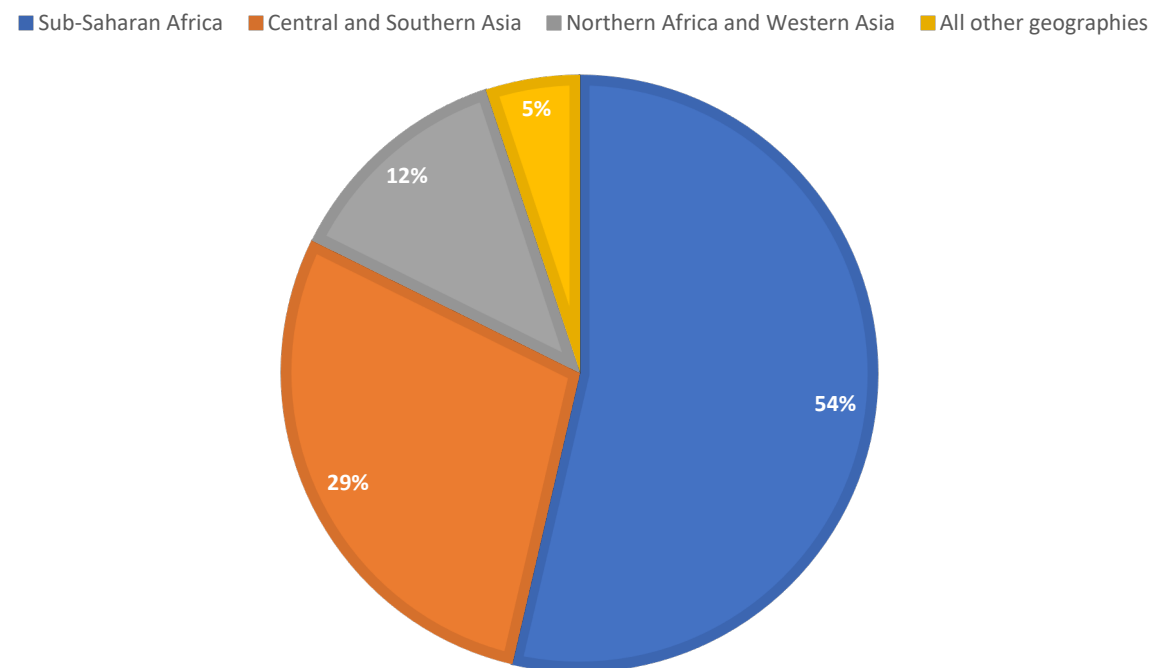
July 13, 2023

Global Population Growth

POPULATION BY GEOGRAPHY
2020 and 2050



SHARES OF INCREMENTAL POPULATION CHANGE
2020 TO 2050



If incomes in SSA grow rapidly as desired, most global incremental food demand will be in SSA.

Why do we want growth of food supply in SSA to keep pace with or exceed growth in demand?

- **Welfare.** Rapid growth in food and agriculture is highly likely to be a powerful driver of poverty reduction and overall improvement in living standards from a low base.
- **Environmental.**
 - SSA has scope to grow food production with relatively little environmental damage.
 - Success in SSA drastically reduces pressure to increase production elsewhere allowing focus to shift from producing more with less to producing about the same with less environmental damage.
- **Security.** Malthus vindicated in an important region of the world would have potentially profound implications for global stability.

Assets and Challenges

Growth in African cereal production has been relatively rapid but was helped by high area growth

Region	Average for 2012-2015			Annualized growth rates 2002-2005 to 2012-2015		
	Tons	Hectares	Yield (kg / hect)	Produc- tion	Har- vested area	Yield
World	2,737,337,452	716,115,547	3,822	2.32	0.58	1.74
Africa	180,059,533	112,607,418	1,599	3.12	1.35	1.77
Americas	698,420,833	128,128,299	5,451	2.35	0.48	1.86
Asia	1,334,600,630	337,212,821	3,958	2.61	0.67	1.95
Europe	484,461,045	119,481,865	4,055	1.33	-0.12	1.45
Oceania	39,795,411	18,685,144	2,130	1.53	-0.12	1.66

- African yield growth was only slightly lower than that of Asia or the Americas

Source: FAOSTAT (FAO 2018).

With Northern Africa excluded, SSA cereal yields rose at 2.1%, higher than any other continent

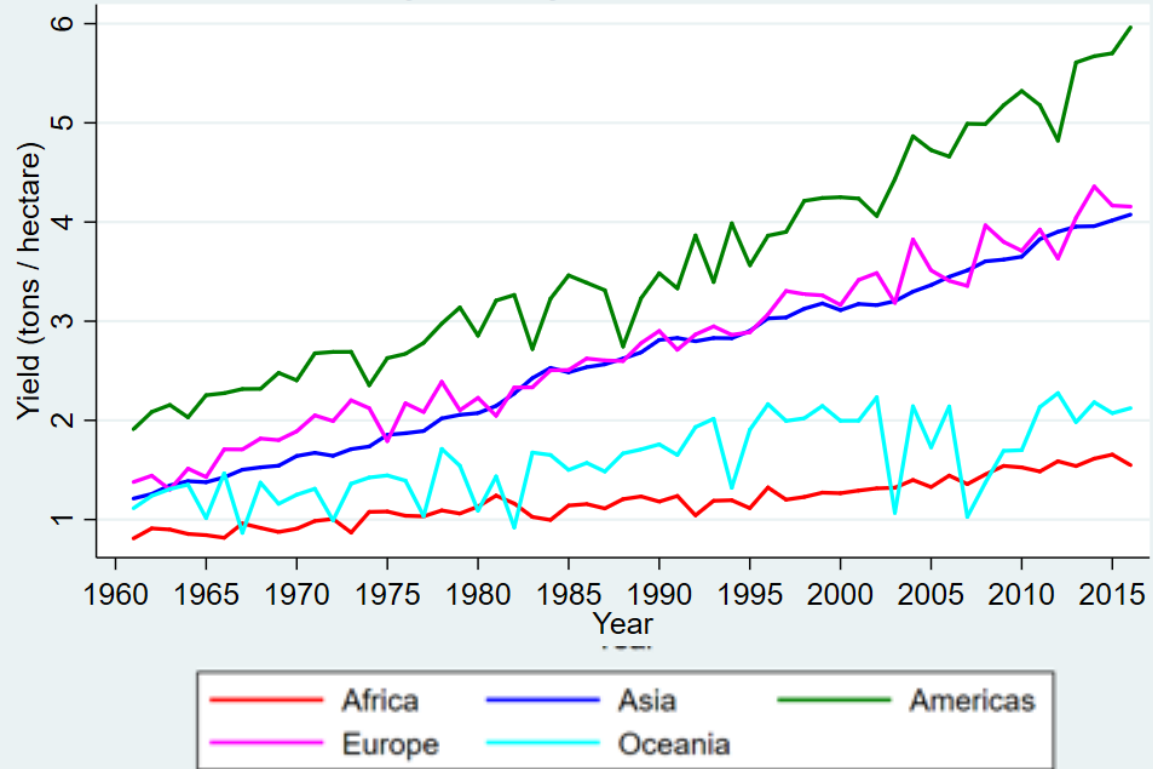
Region or country	Average for 2012-2015			Annualized growth rates 2002-2005 to 2012-2015		
	Tons	Hectares	Yield (kg / hect)	Produc- tion	Har- vested area	Yield
Africa	180,059,540	112,607,422	1,599	3.12	1.35	1.77
Sub-Saharan Africa	141,451,409	99,644,682	1,420	3.59	1.47	2.12
Northern Africa	38,608,131	12,962,740	2,978	1.56	0.47	1.09
Eastern Africa	47,959,387	31,766,940	1,510	5.43	1.74	3.68
Middle Africa	9,417,656	9,270,609	1,016	5.03	3.41	1.62
Southern Africa	28,926,097	12,339,261	2,344	2.62	-0.60	3.22
Western Africa	55,148,269	46,267,872	1,192	2.49	1.55	0.94

- Production in Eastern Africa grew by 5.4% annually, with 60% of that due to yield growth.
- Even Middle Africa production grew by 5% annually, but 70% of that was due to area growth.
- Southern Africa yields grew 3.2% annually, but the area decreased.
- SSA experienced twice the rate of yield growth compared to Northern Africa.

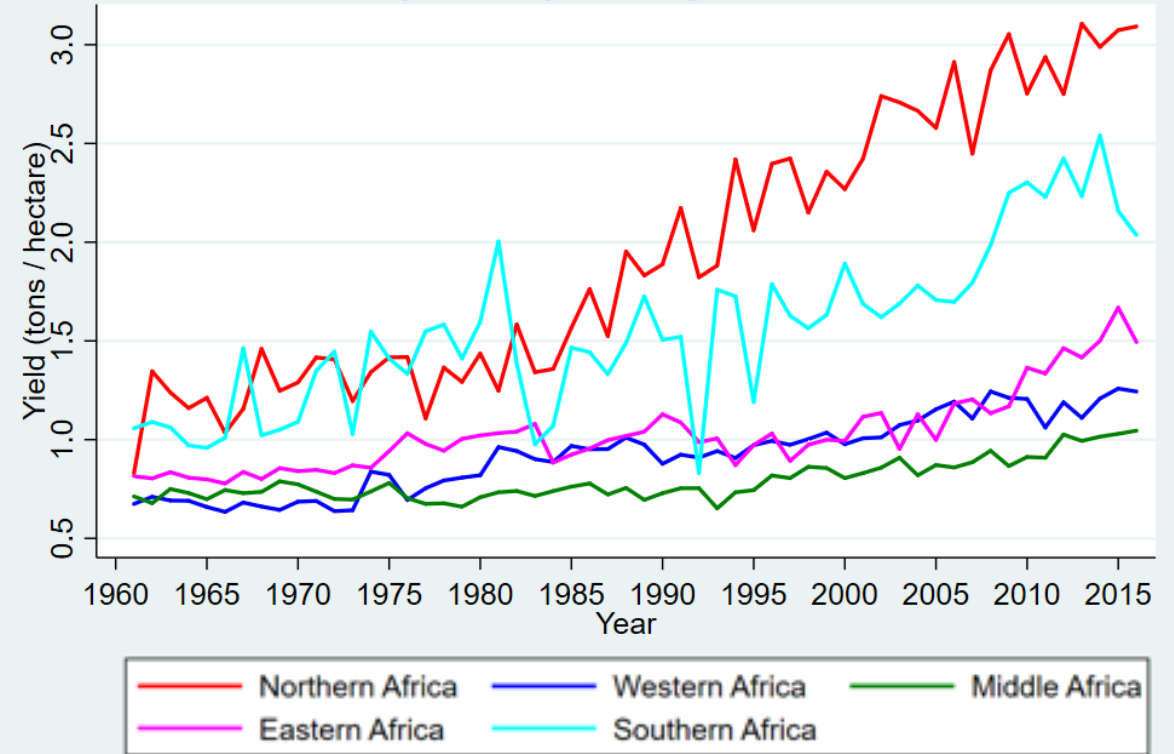
Source: FAOSTAT (FAO 2018).

Despite recent growth, yields remain low and yield gaps are large

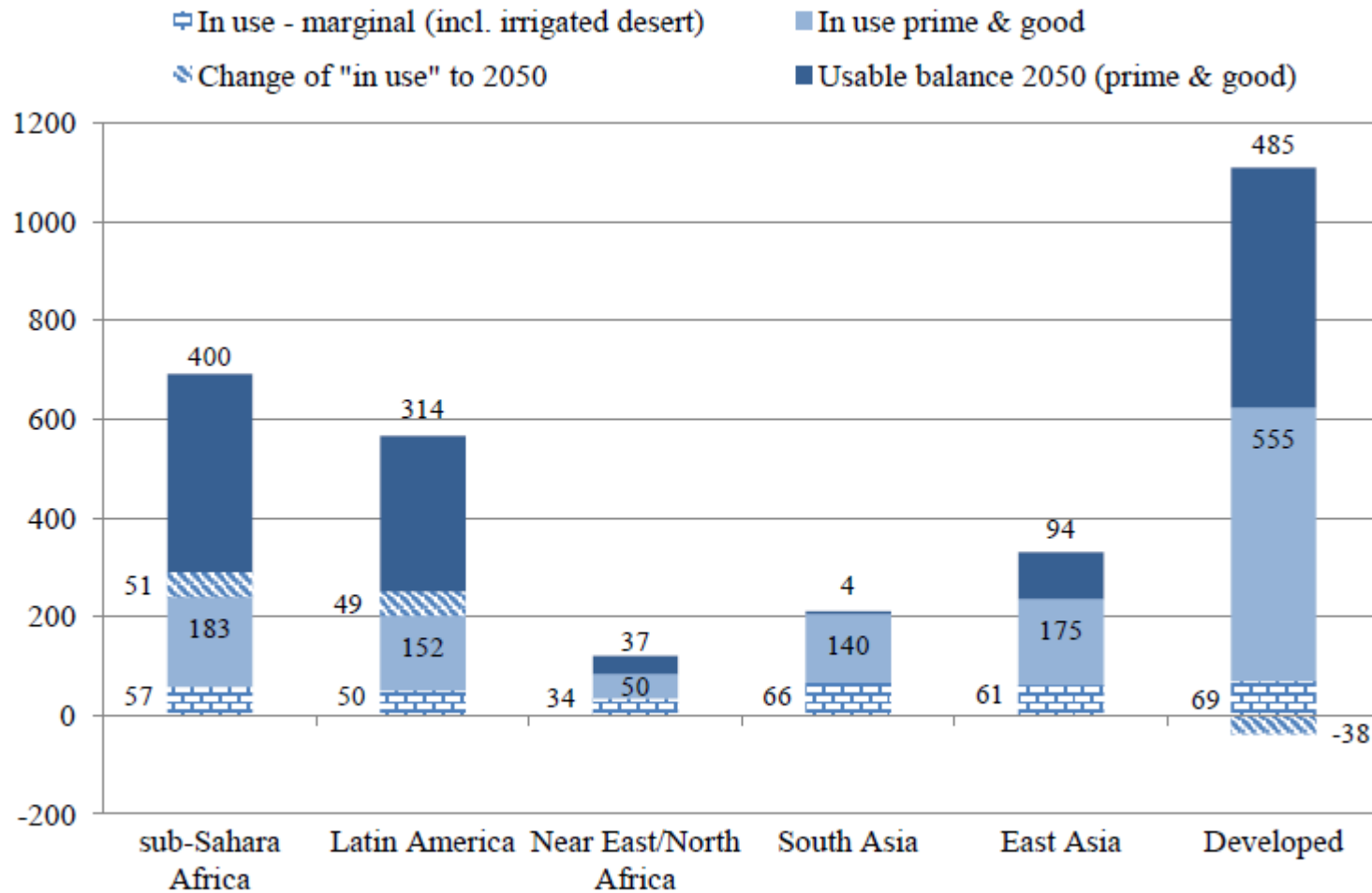
Cereal yields by continent, 1961-2015



Cereal yields by subregion, 1961-2015



FAO argues that SSA will not cultivate even half of its productive land by 2050

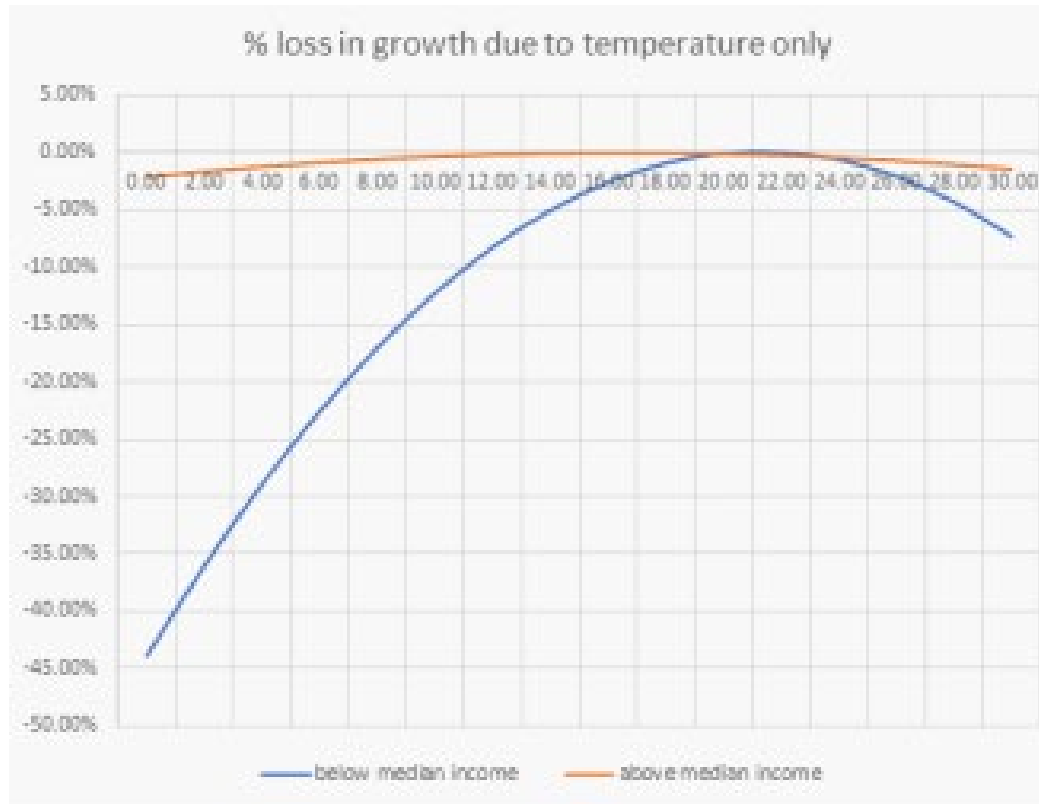


Source: Alexandratos and Bruinsma (2012).

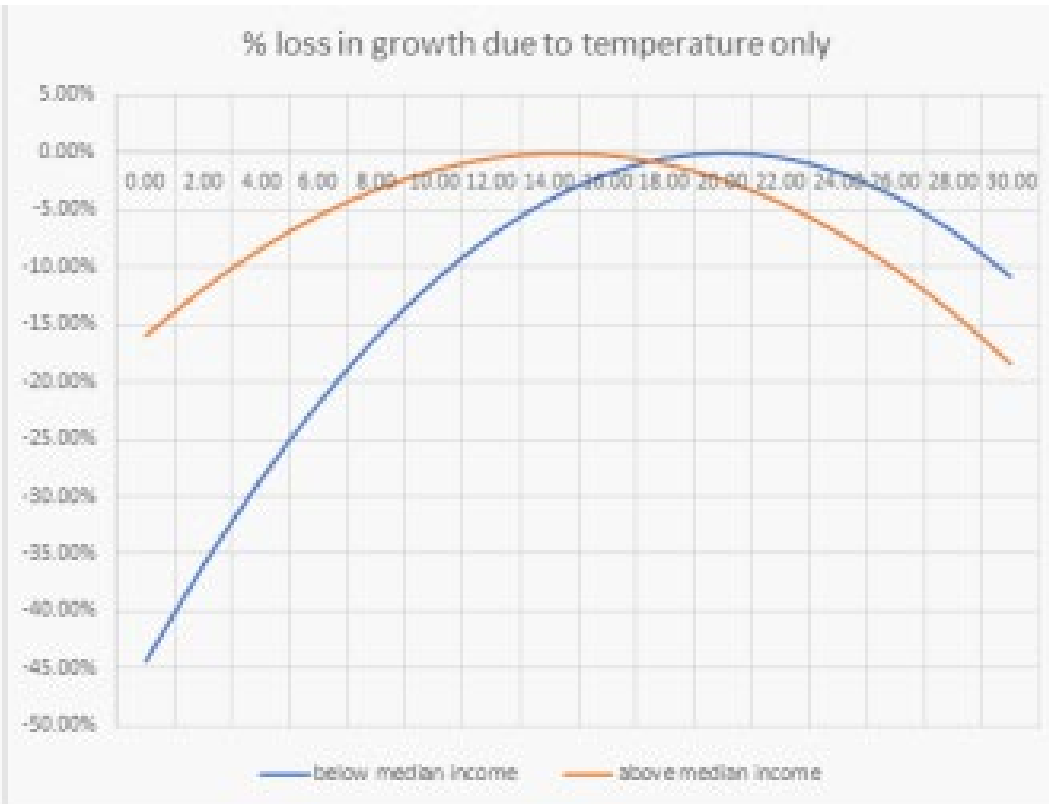
Note: The quantity is believed to be millions of hectares, but it is not specified in the original figure.

Work in progress: Good news and bad news

Temperature and GDP Growth: 1960-2015



Temperature and Ag GDP Growth: 1960-2015



Preliminary results not for citation.

Probability

- CC Crop Failure
- ▨ NoCC Crop Failure
- NoCC
- CC

Shift in mean temperature increases risk of crop loss

Large increase in the probability of crop failure.

20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

Temperature, °C



Foresight and Metrics to
Accelerate Food, Land
and Water Systems
Transformation

Probability

- CC Crop Failure
- ▨ NoCC Crop Failure
- NoCC
- CC

**Increased
uncertainty
raises risk of
crop loss**

Leads to increased
probability of crop
failure.

20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

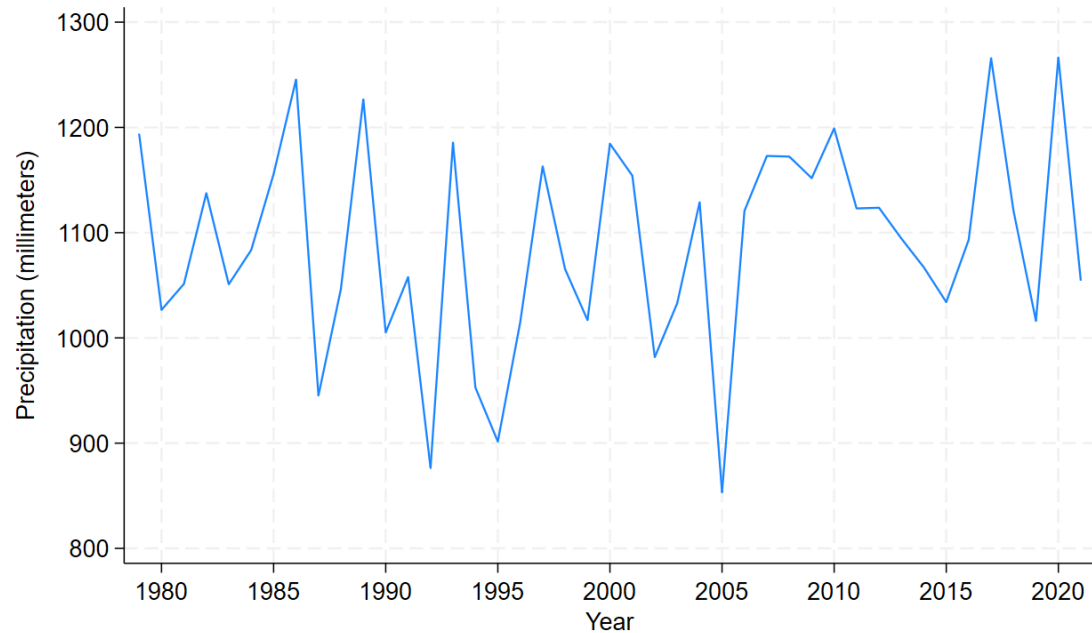
Temperature, °C



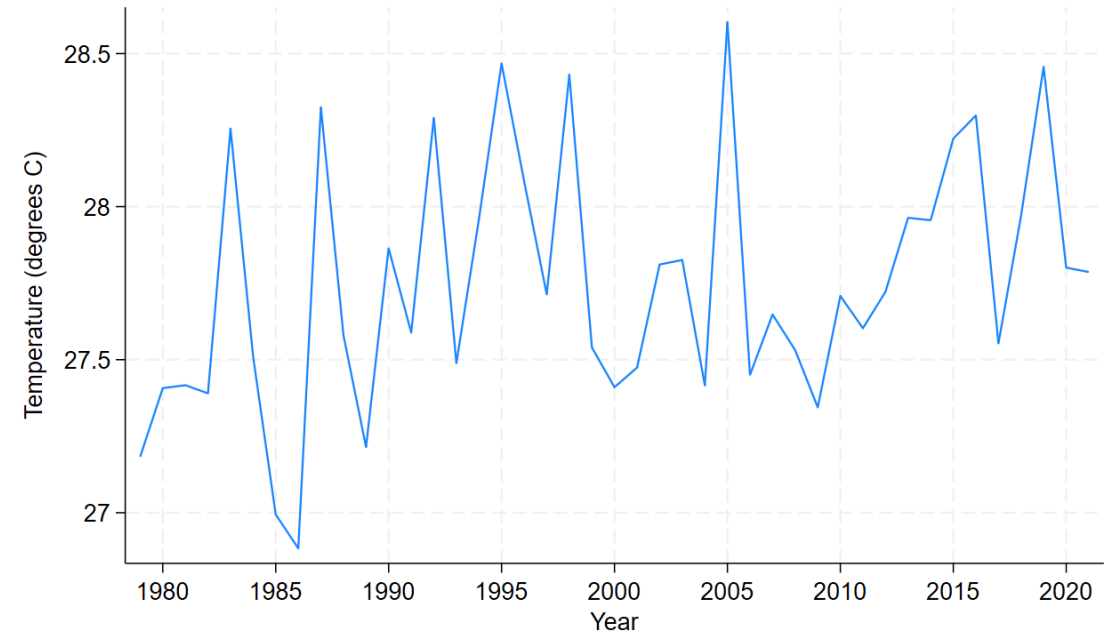
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Zambian weather, 1979-2021 (AgERA5)

Annual Precipitation

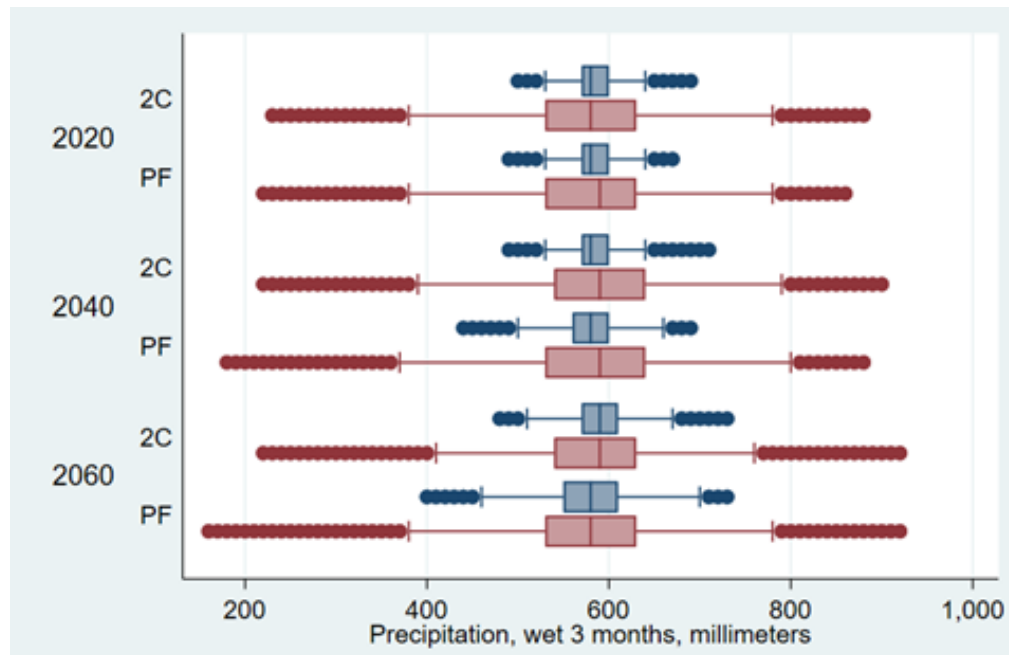


Mean daily maximum temperature

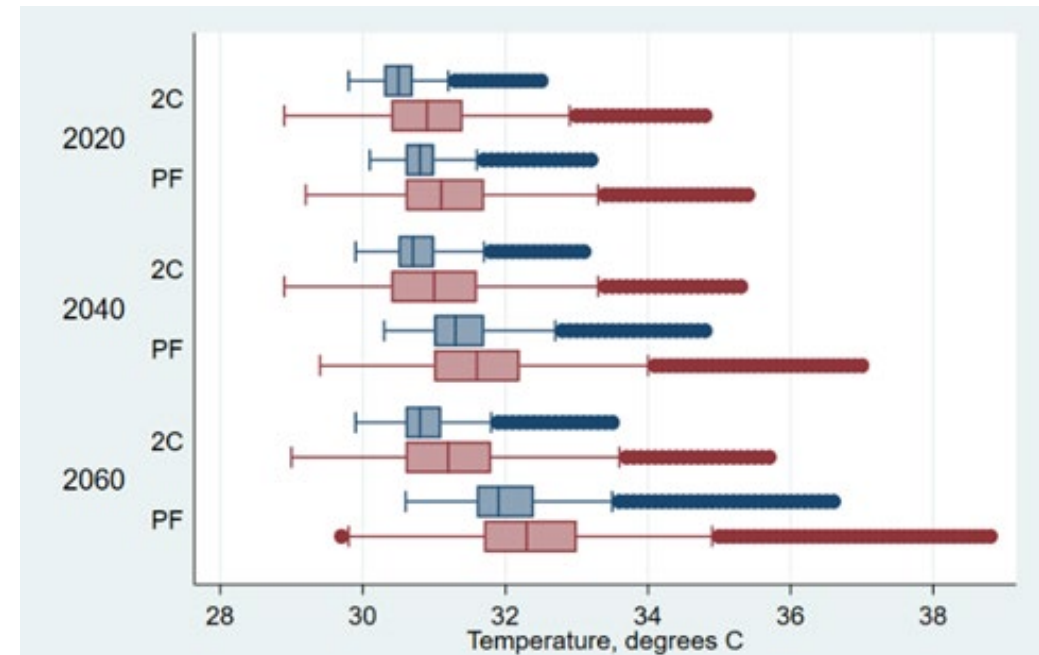


Mean climate uncertainty, and inter-annual variability in Zambia

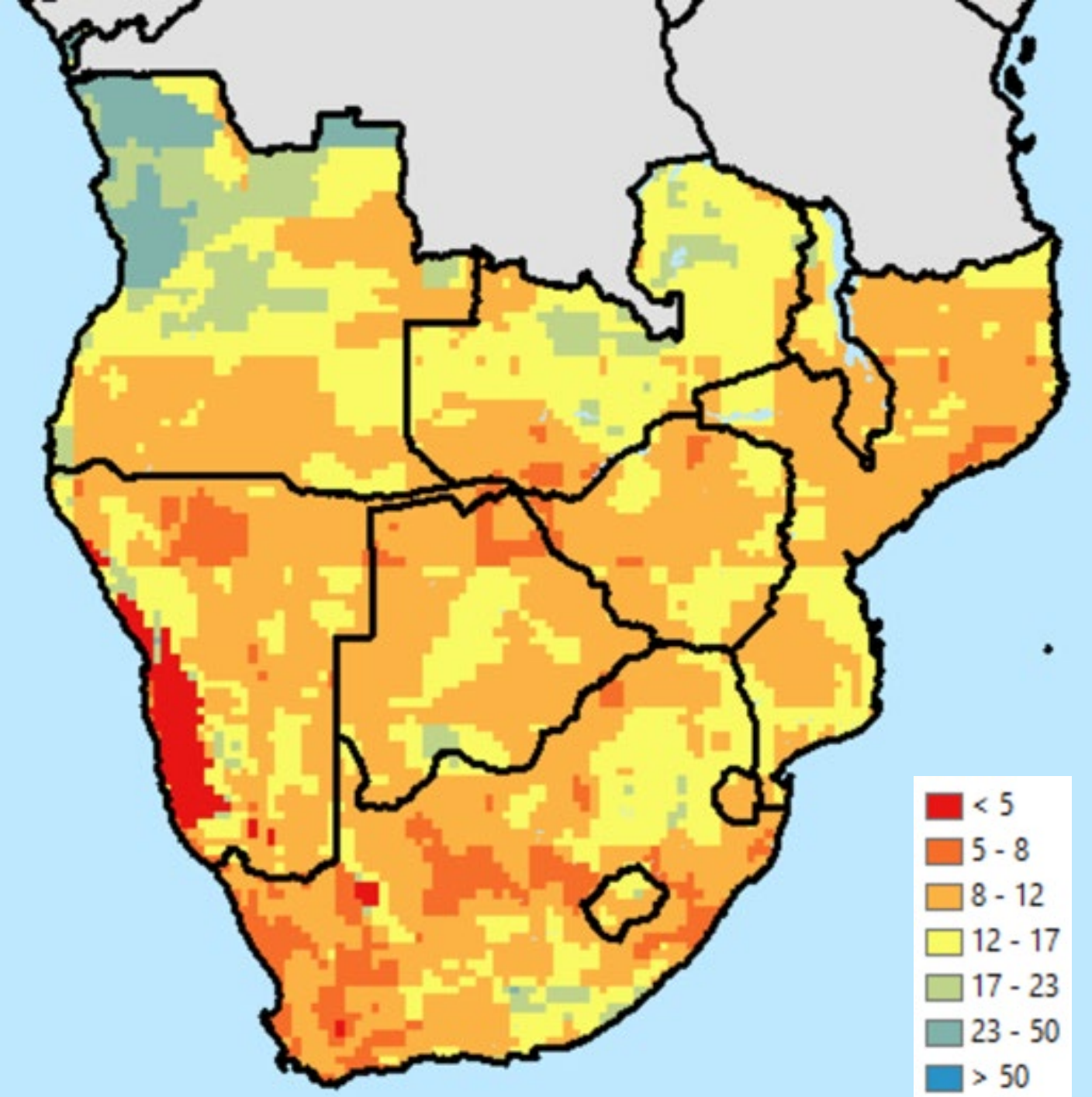
Annual Precipitation



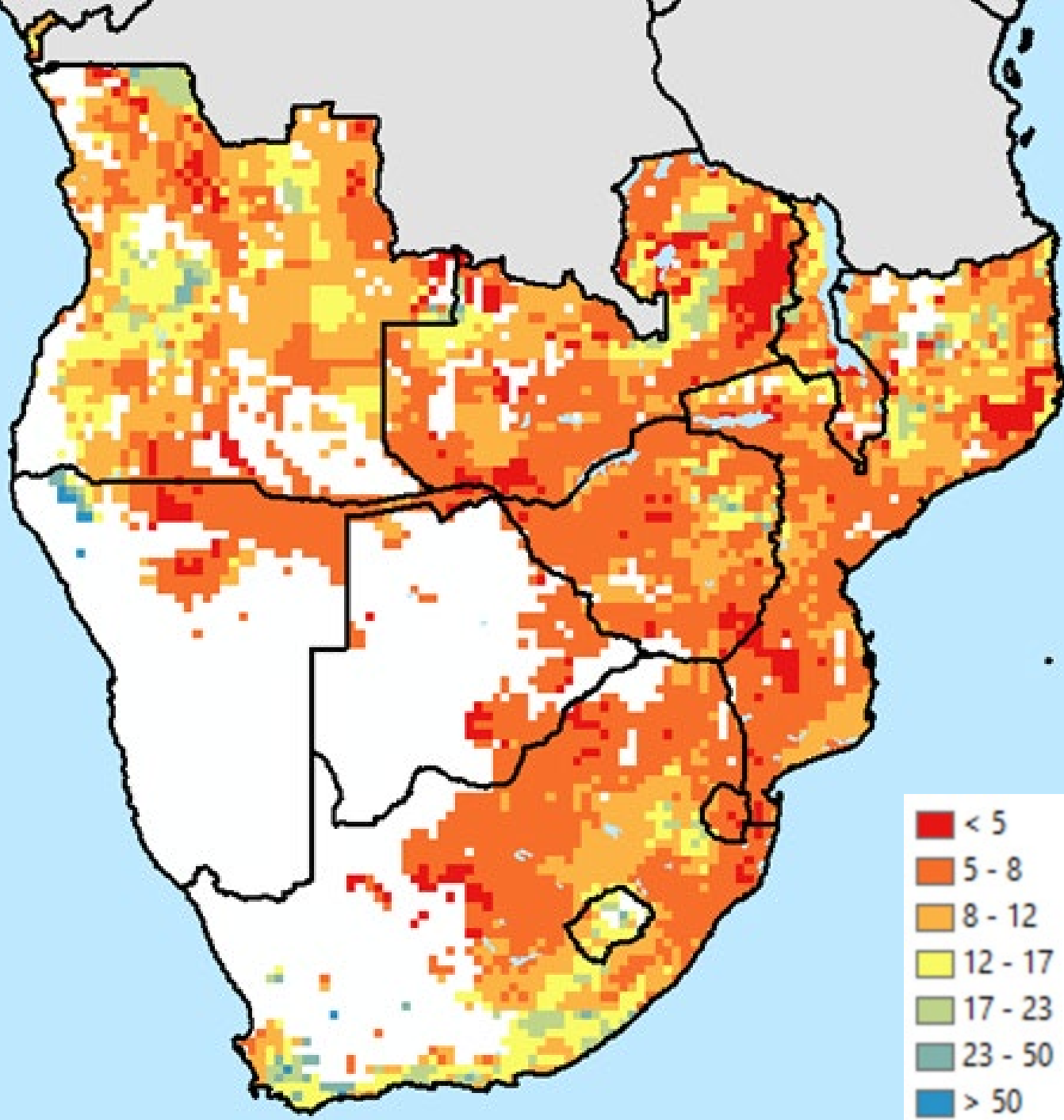
Mean daily maximum temperature



climate only climate plus weather



Frequency of 1-
in-20-year low
rainfall events
(2060s REF)



Frequency of 1-
in-20-year low
maize yield
events (2060s
REF)

Africa as a Breadbasket - Summary

- Most global incremental food demand to 2050 is very likely to come from SSA
- Very compelling reasons for most incremental food production to also occur in SSA
 - [NOT a call for autarky]
- SSA has grown and can continue to grow food production rapidly
- Many challenges (here are two)
 - Increased volatility where volatility is already a big problem
 - Increasing temperatures exerting a drag on agricultural productivity in countries that have high average temperatures already
- Building block solutions
 - Policies/investments/governance [supported by financial flows]
 - Institutions
 - Technology