

# BUILDING COLLABORATIVE RELATIONSHIPS FOR AFRICAN AGRICULTURE

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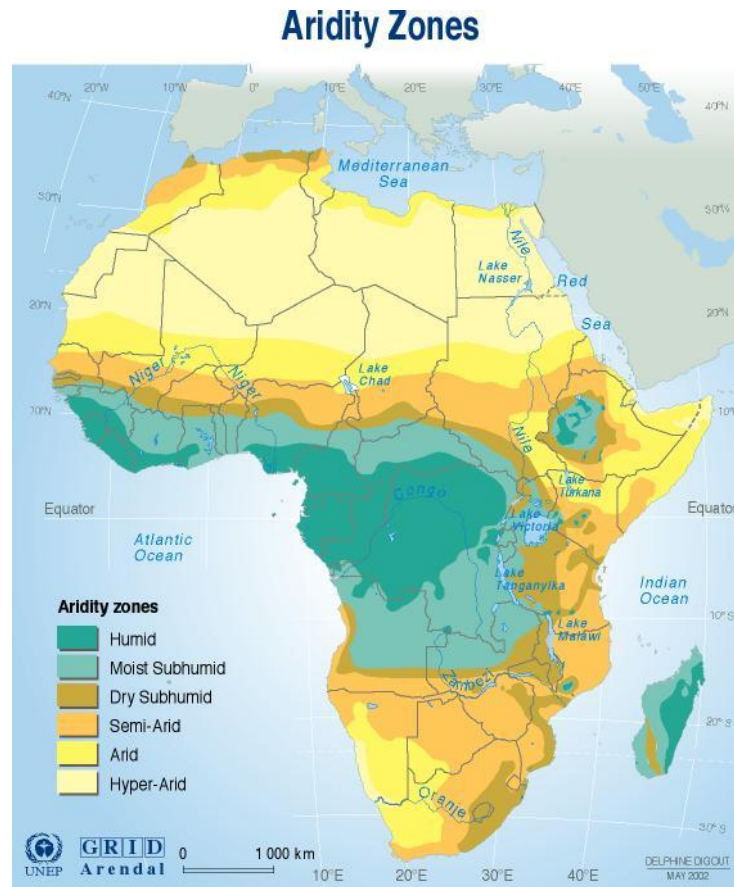
**Presentation made during the Africa2Ag week, 22-26 August 2011, Penn State College**

# Objective



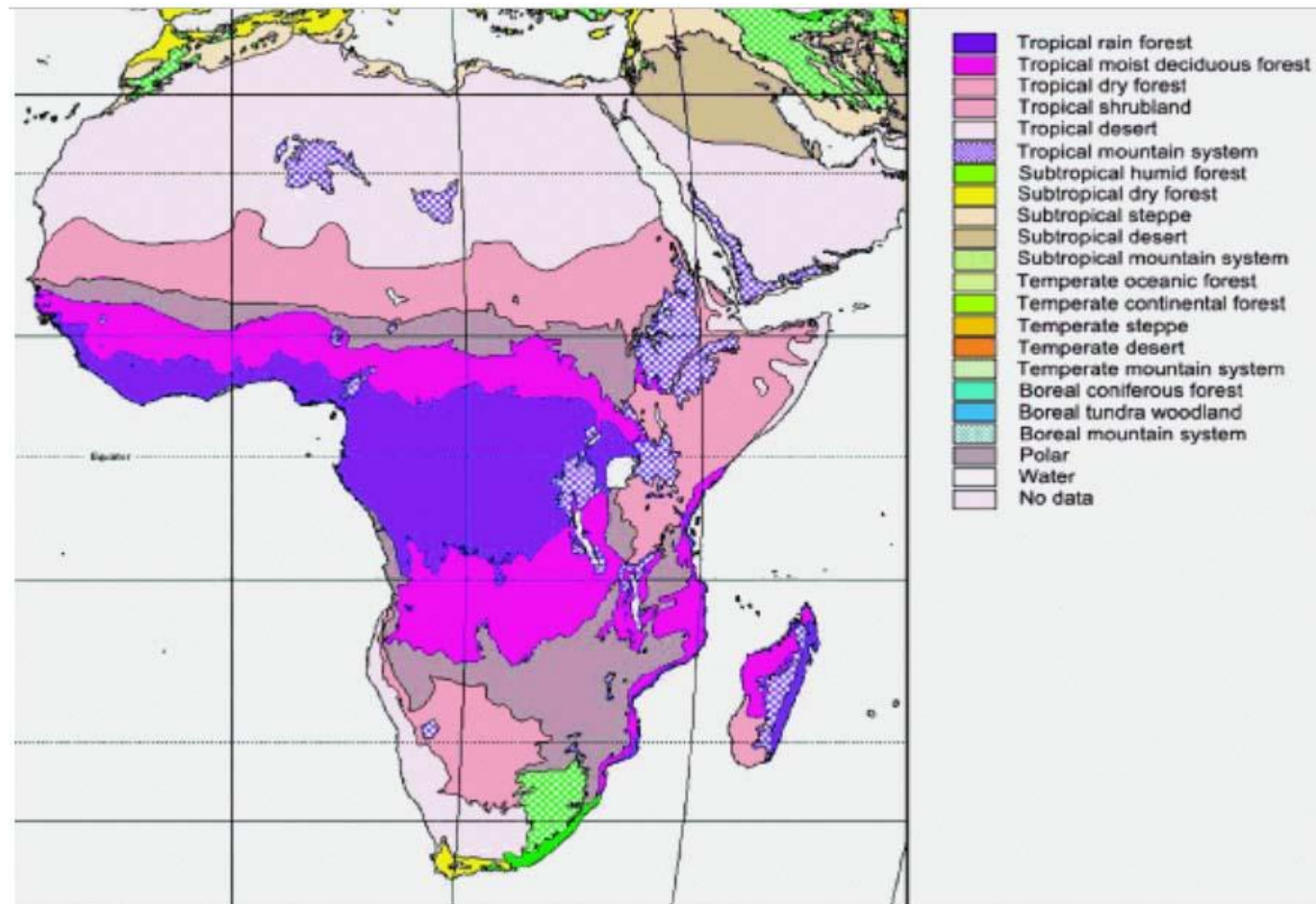
- Develop models to extend universities' and research institutes' expertise to the end users - farmers, community developers, policy makers
  1. Build strong collaborations with African partners
  2. Increase awareness of African agricultural development and Penn State's role in this arena
  3. Increase student, staff, faculty and extension awareness of global issues and involvement in international programs

# Climatic zones

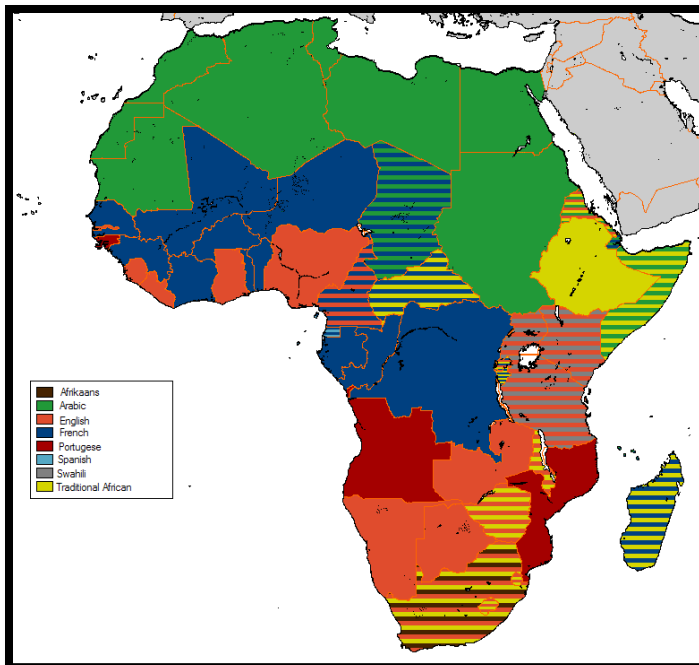


Source: World Meteorological Organization (WMO), United Nations Environment Programme (UNEP), *Climate Change 2001: Impacts, Adaptation, and Vulnerability*. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

# Ecological zones



# African Languages and UN Divisions

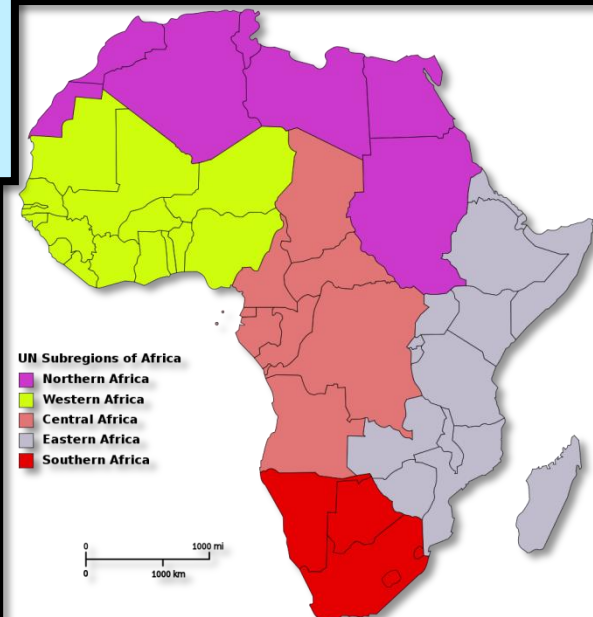


Official languages



Indigenous language family

## UN Divisions



# Agriculture in SSA



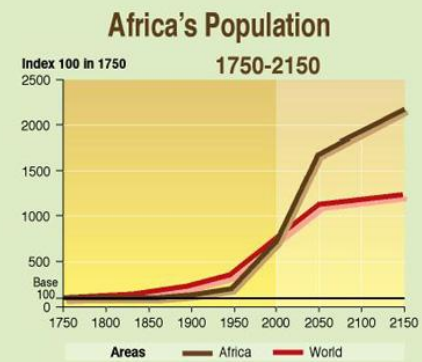
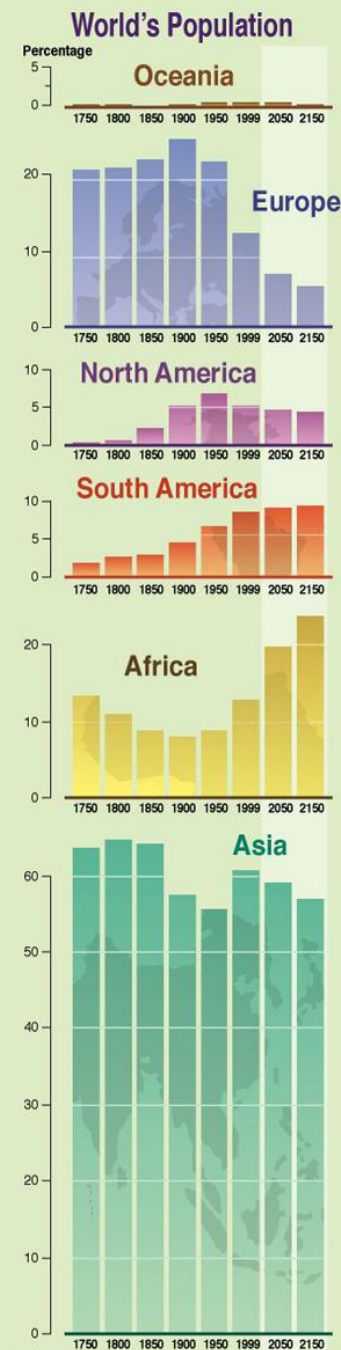
- Key role in providing food, employment and income
- Employs 70-80% of human population
- Generates 30% of the GDP
- Contributes 40% export goods
- 94% of cultivated land is rainfed, 6% is irrigated.
- Yields generally lower than in other parts of the world

# Challenges facing African agriculture

- Increasing population and food demand
- Declining growth in agriculture due to
  - ▣ soil degradation
  - ▣ Climate variability / change
  - ▣ Pests and diseases
  - ▣ Post harvest losses
- Declining agricultural land and labour
- Poor market infrastructure
- Low expenditure on inputs
  - 2002-2008 average fertilizer use less than 15 kg per hectare of arable land.

# Population

**Falling in Europe,  
North America and  
Asia, stabilizing in  
South America, rising  
in Africa**





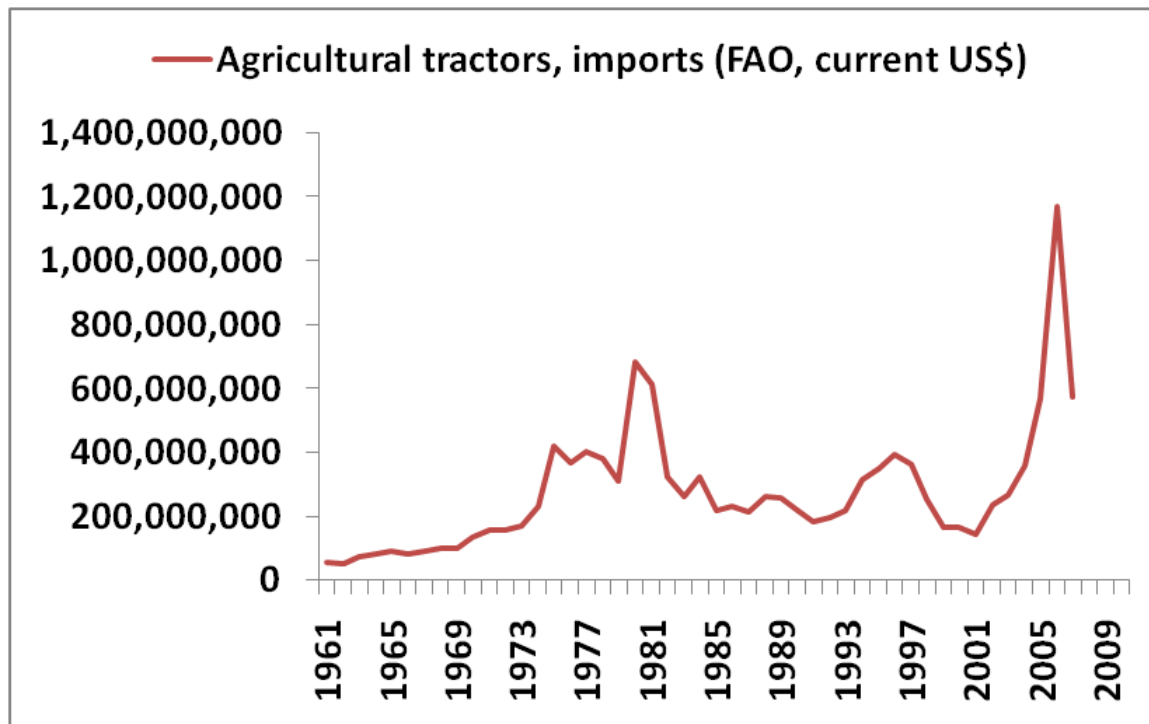
# Food production index

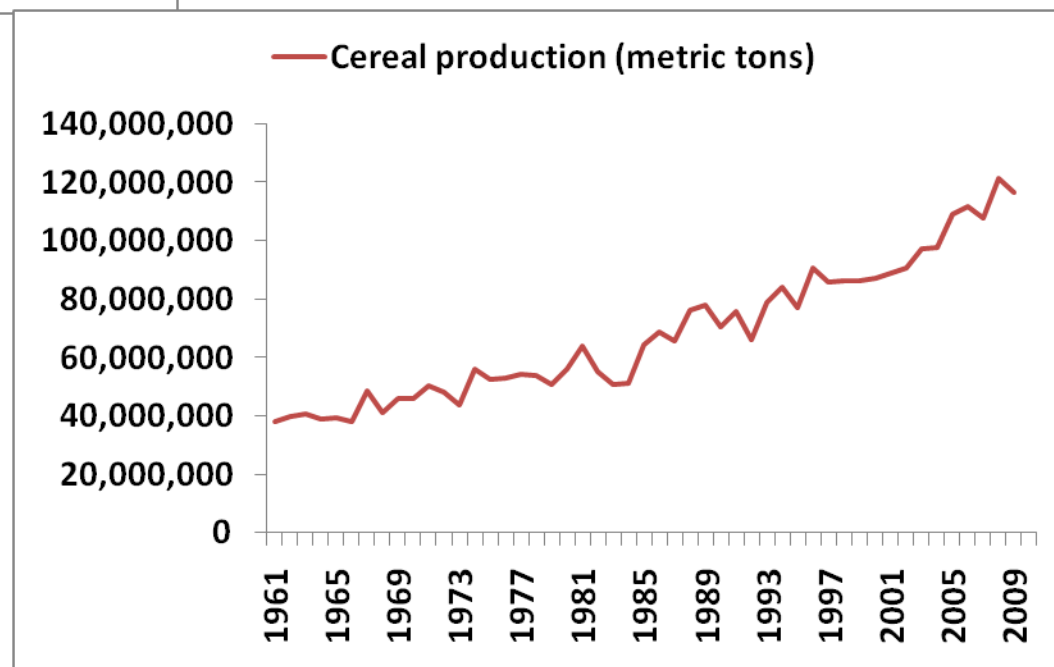
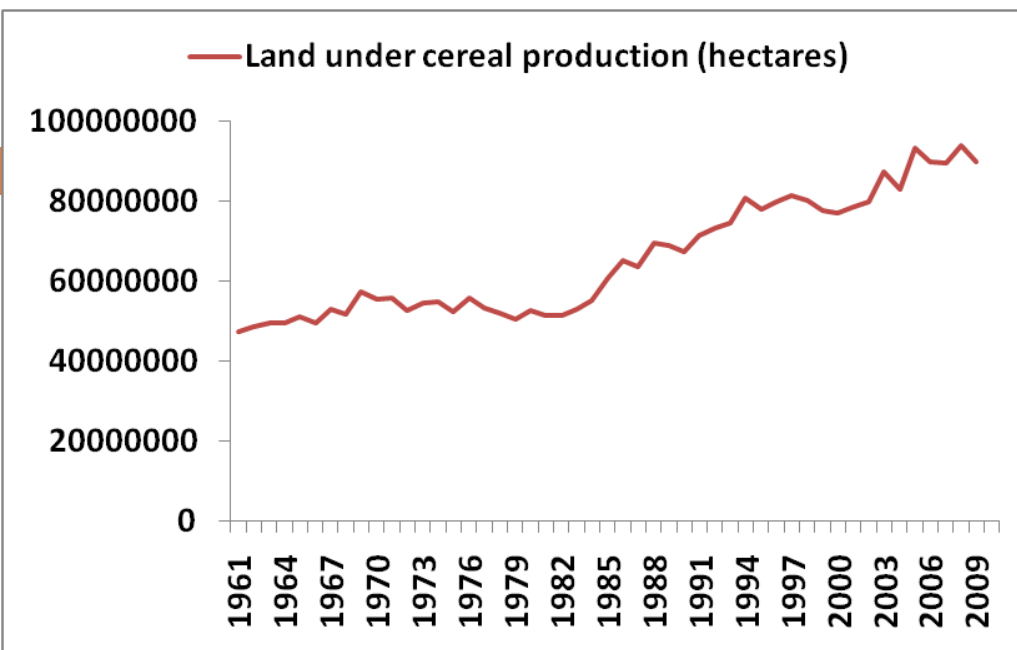


Source: Food and Agriculture Organization (FAO), Statistical databases (FAOSTats), 1995.

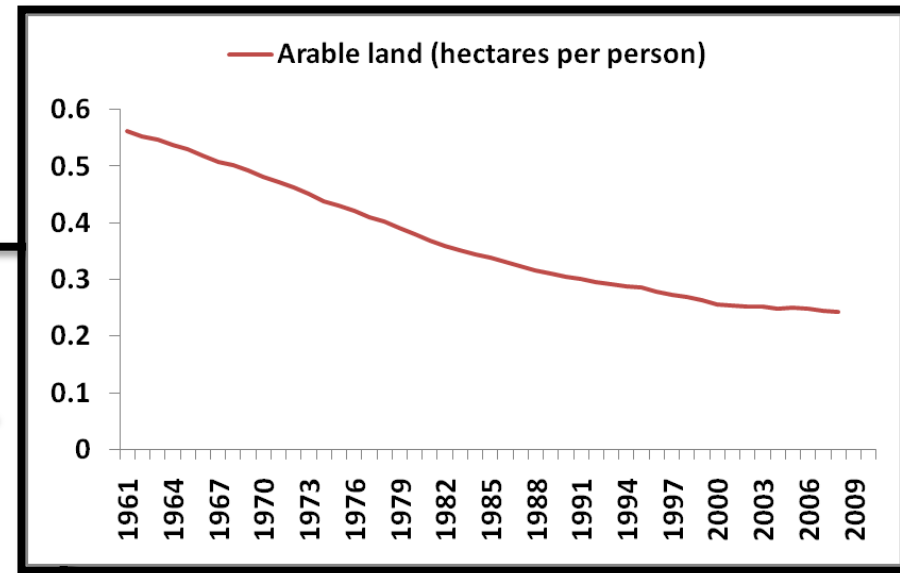
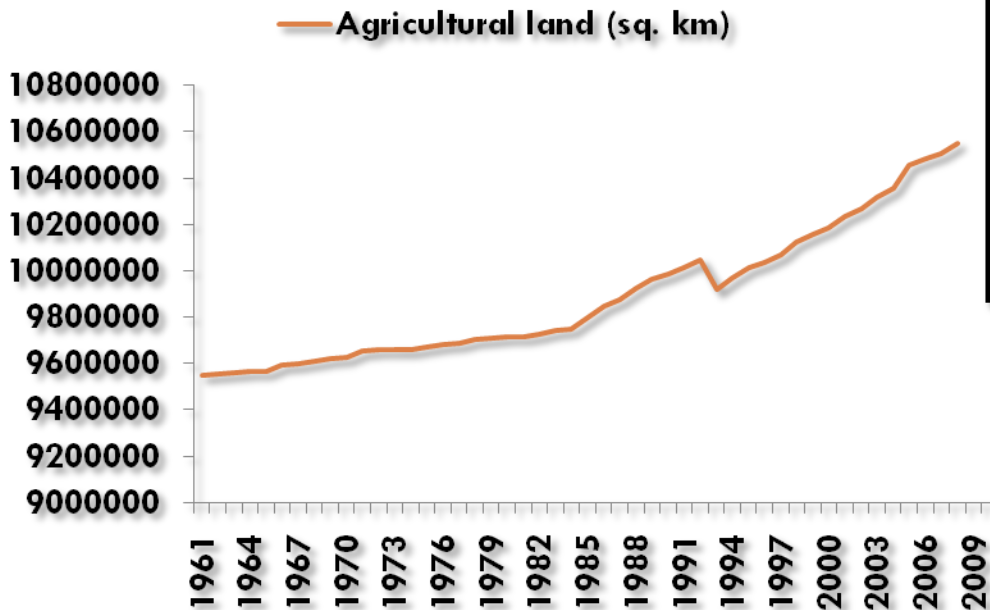
# Agricultural mechanization

- Gradual decline in tractor imports over the 80s



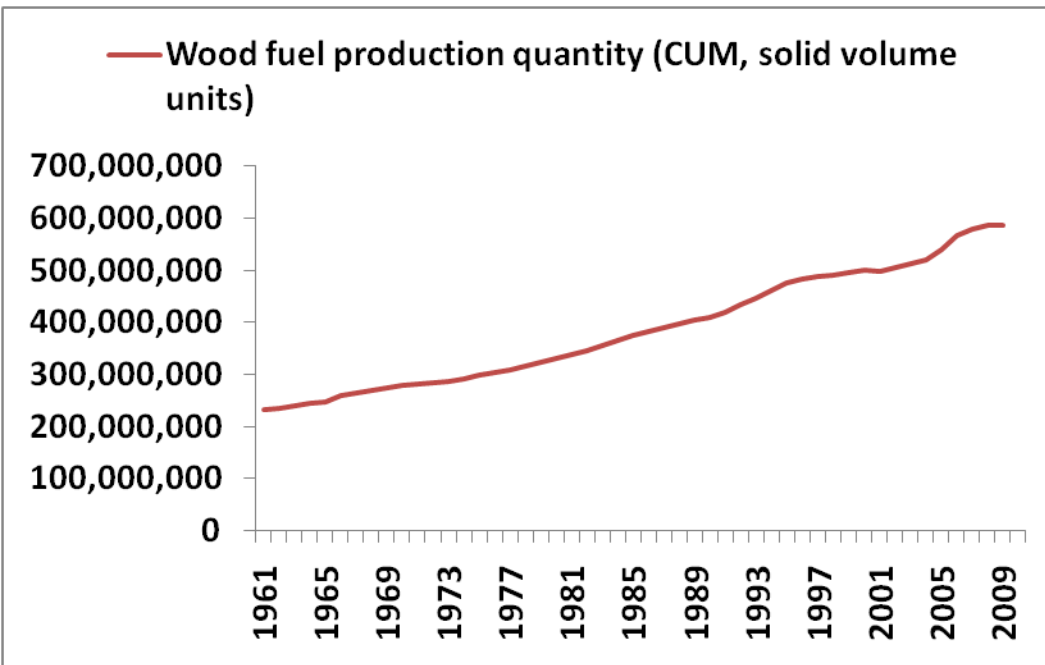


# Arable land and fertilizer use

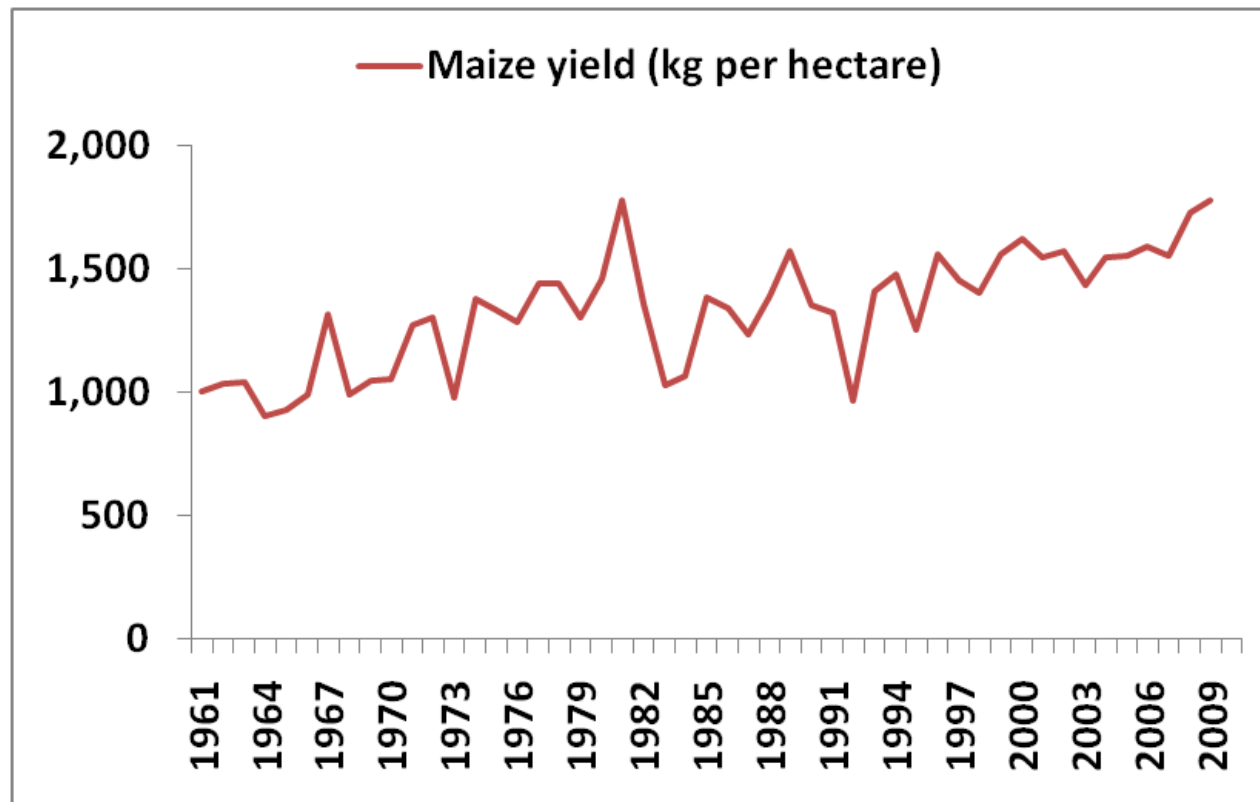


2002-2008 average fertilizer use less than 1 kg per hectare of arable land.

# Natural resource degradation



# Maize yields 1961-2009



# Poverty reduction constrained by low agricultural productivity

Table 1 Effect of 1 % increase in crop yields on poverty reduction

Development region	People living in poverty (%)	Reduction (%) in number of poor in relation to a 1% increase in crop yield
East Asia	15	0.48
South Asia	40	0.48
Africa	46	0.72
Latin America	16	0.10

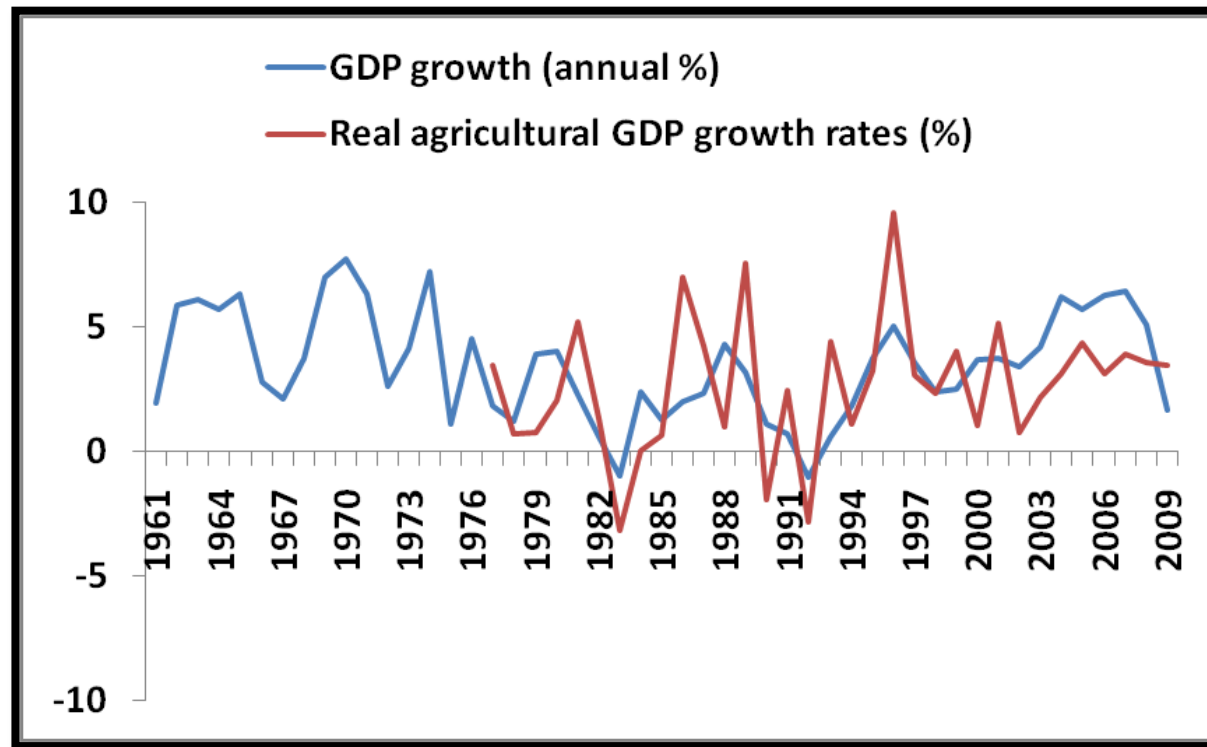
Source: (Thirtle *et al.* 2003)





# GDP growth

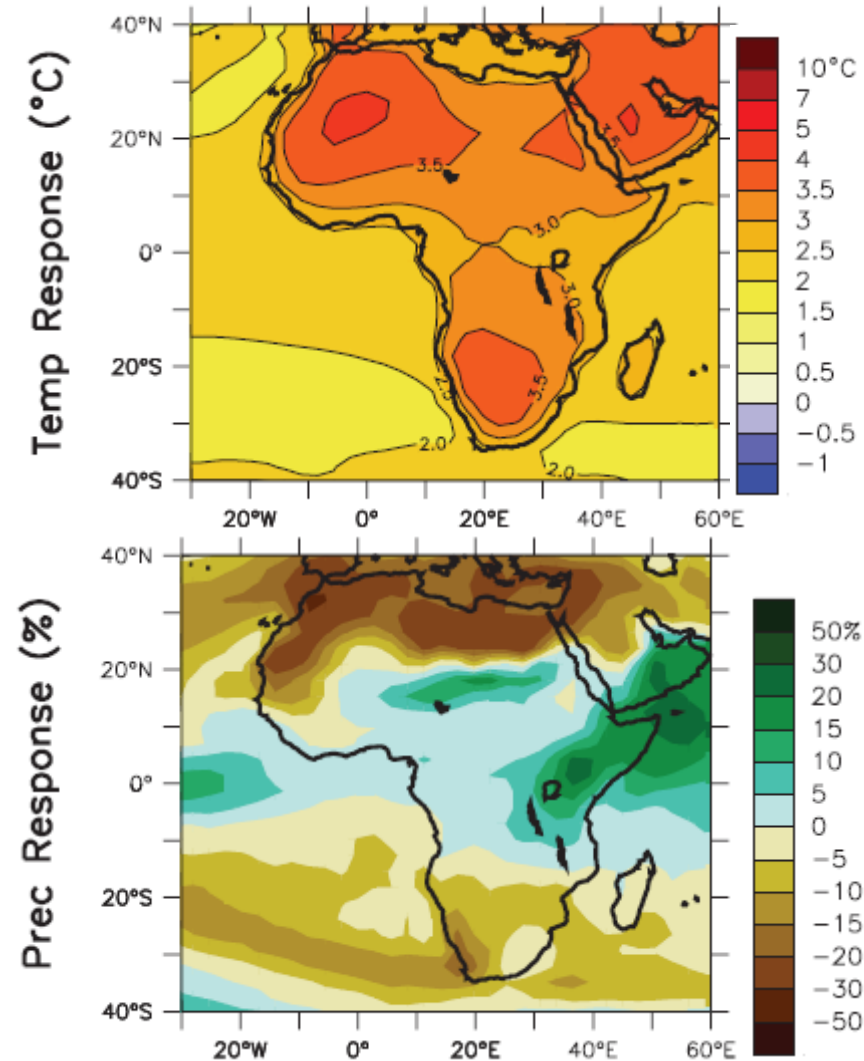
- Low, erratic and no upward trend, some years even negative
- Influenced by performance in agriculture





# Predicted climate change in Africa

- We expect changes in temperature, rainfall and extreme events
- Warming is very likely to be larger than the global annual mean
- Decrease in annual rainfall is likely in the north and south
- Increase in mean annual rainfall is likely in East Africa.
- Unclear how rainfall in the Sahel, the Guinean Coast and the southern Sahara will evolve.



# Future African climate

- *Changes in temp. and rainfall by 2100 from 21 GCM's – A1B scenario (IPCC 2007)*

Region	Season	Temp. Response ( C)					Rainfall Response (%)				
Africa		Min.	25	50	75	Max.	Min.	25	50	75	Max.
W. Africa	Annual	1.8	2.7	3.3	3.6	4.7	- 9	- 2	2	7	13
E. Africa	Annual	1.8	2.5	3.2	3.4	4.3	- 3	2	7	11	25
S. Africa	Annual	1.9	2.9	3.4	3.7	4.8	- 12	- 9	- 4	2	6

Projections very variable across GCM and GHG emission scenario.

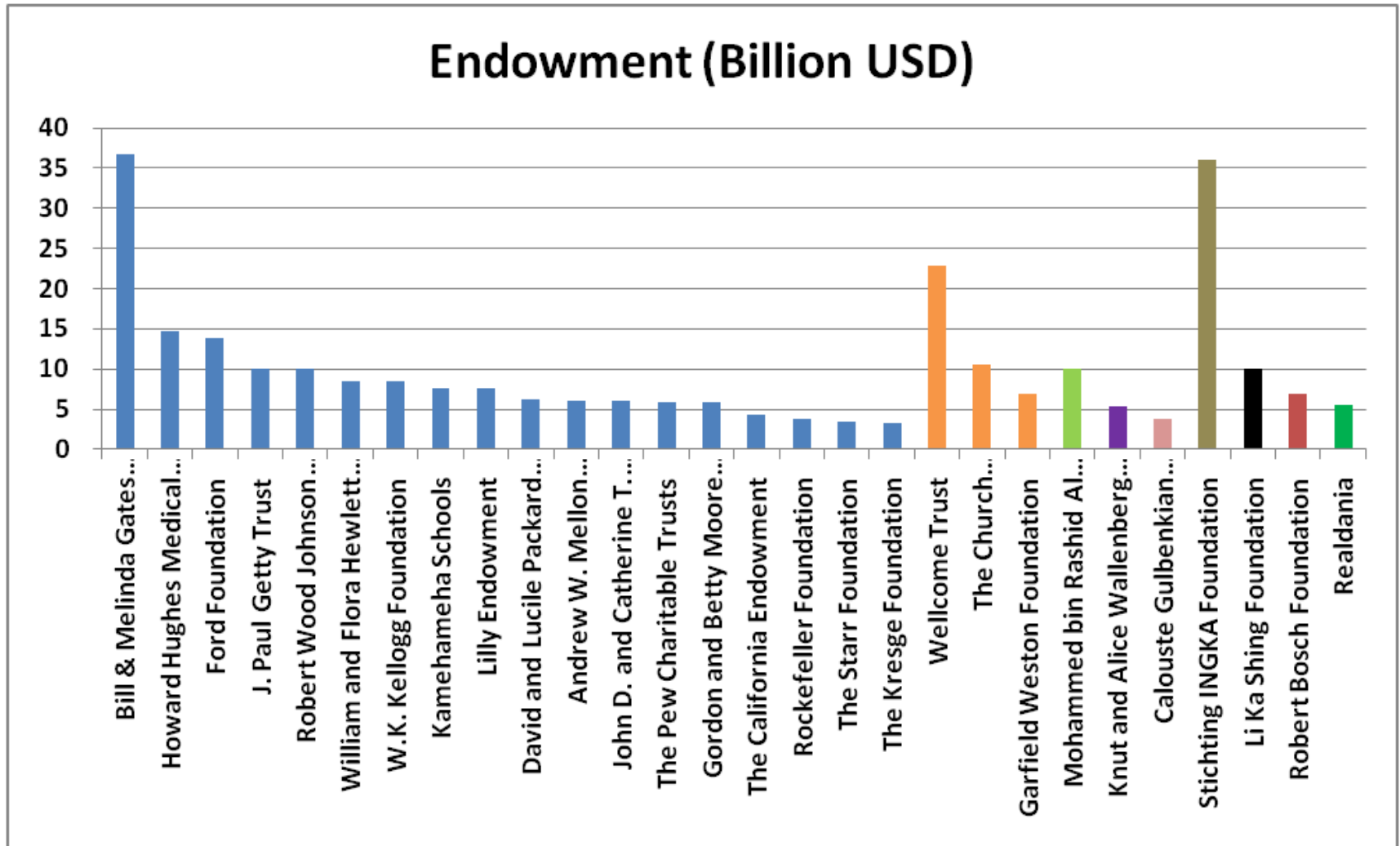
**All models agree it will get warmer, but impact of a warmer world on rainfall is far less certain.**

**CC will affect farmer decision making in agric (crops, livestock) => research**

# Opportunities

- Growth in education - 46.5 million more children started going to school between 1999 and 2008
  - ▣ African leadership on education,
  - ▣ increased aid and debt cancellation
- New initiatives from donor agencies especially philanthropic organizations: e.g. Gates Foundation, Rockefeller Foundation

# 27 wealthiest non-profit foundations

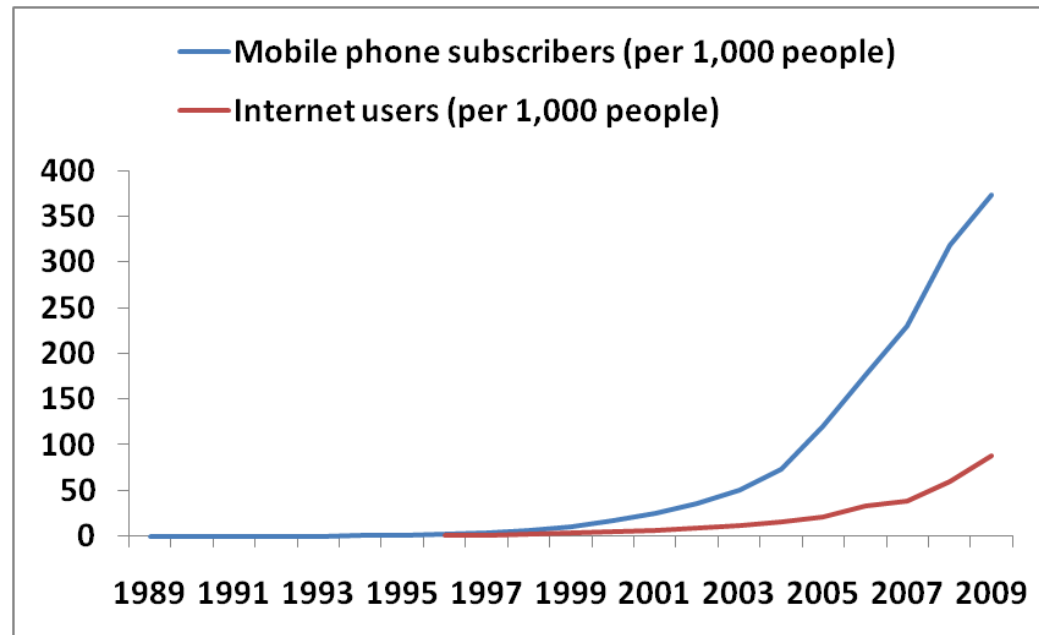


US foundations shown in blue (source: <http://en.wikipedia.org>)

# Opportunities

- Increased willingness of African governments and development partners to support agricultural development as a pillar of a broader economic development and poverty-alleviation strategy
  - ▣ Focus on smallholder agriculture,
  - ▣ greater involvement of private sector,
  - ▣ NEPAD target of 10% national budgets to support agriculture and rural development, Rapid growth in ICT
- Globalization
- Urbanization

# Rapid uptake of mobile phone and internet technology in SSA



**What opportunities arise from this?**

# Penn State's strengths



- Long experience in quality research and extension that meets the demand of agriculture
- Experience in working in Africa
- Teaching methods that encourage creativity and problem solving
- Close link between university and agric community

# Where should the focus be?

- Cutting edge research that
  - ▣ Emphasizes balanced collaboration
  - ▣ Is relevant to the needs of Africa
  - ▣ Is designed to bring lasting results
  - ▣ Is culturally sensitive
  - ▣ Is coordinated
  - ▣ Integrated in to existing continental, regional and national institutions e.g. NARIs
  - ▣ Integrates improved teaching methods
  - ▣ Is multi-disciplinary



# What should our focus be?



- Embedding scientific knowledge into national policy
- Communication research results to end users
  - ▣ Role of media, journalism etc.
- Strengthening science-policy dialogue

# What should we build on?

- Take advantage of
  - ▣ Existing international research institutions such as CGIAR centres
  - ▣ New opportunities for funding
  - ▣ New opportunities for staff / student mobility
- Challenges conventional wisdom
  - ▣ Climate change / land use / crop yields