

# CO-CREATING MULTIPLE BENEFITS BY UNLOCKING POTENTIALS OF SUB-SAHARAN AGRICULTURAL UNIVERSITIES

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# COLLABORATIVE VENTURES BETWEEN EUROPEAN AND AFRICAN AGRICULTURE AND LIFE SCIENCE UNIVERSITIES WITH MULTIPLE BENEFITS

## Benefits for all collaborating parties & society

Oldest SSA University = Timbuktu, Mali, 12<sup>th</sup> century

Oldest European University = Bologna, Italy, 1088

What is the academic and societal need for collaboration?

How to initiate and sustain collaboration?

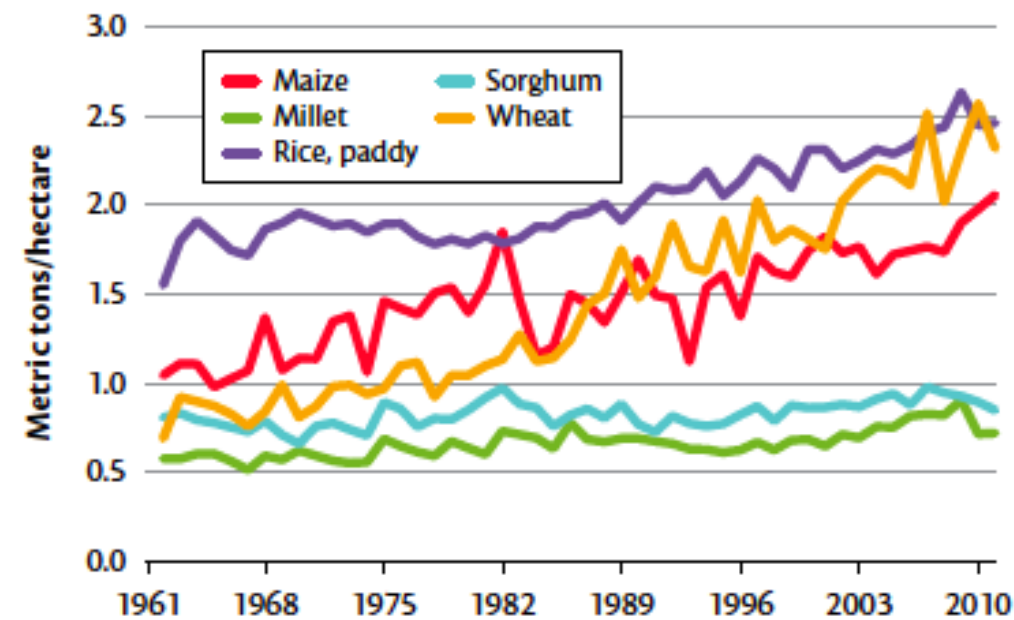
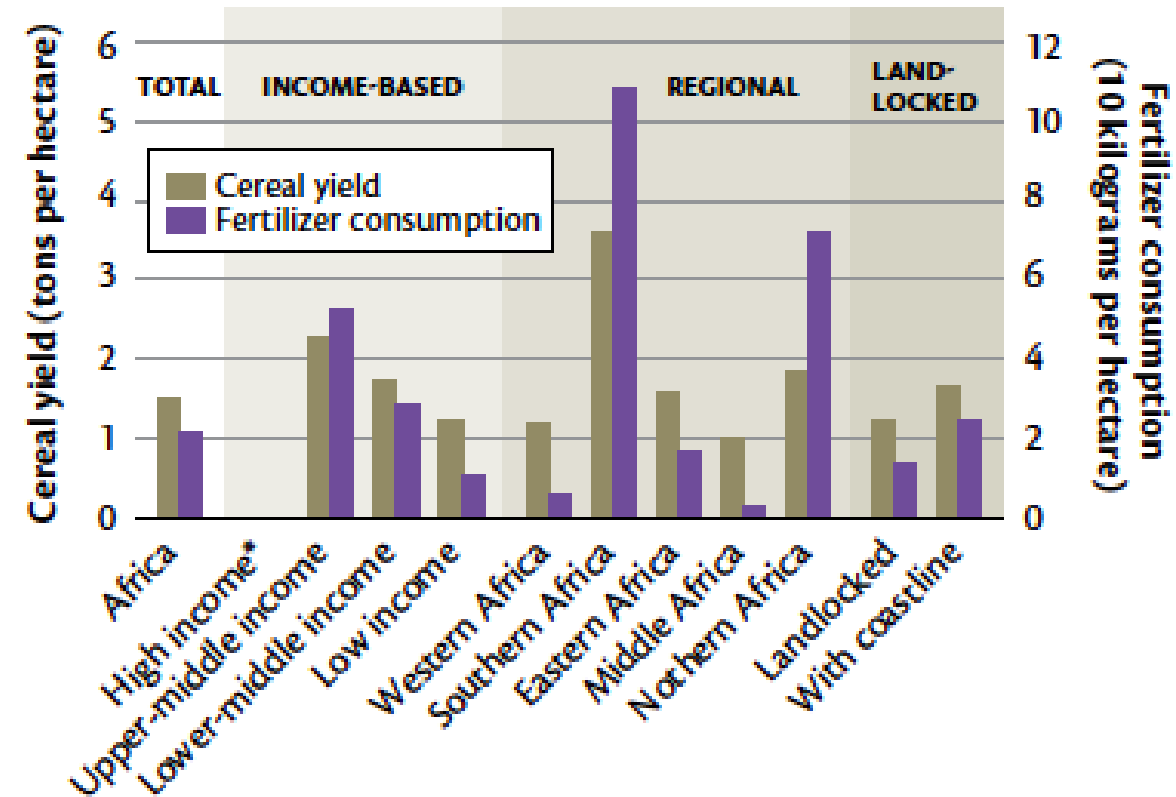
What are the potentials of SSA universities and research institutes?





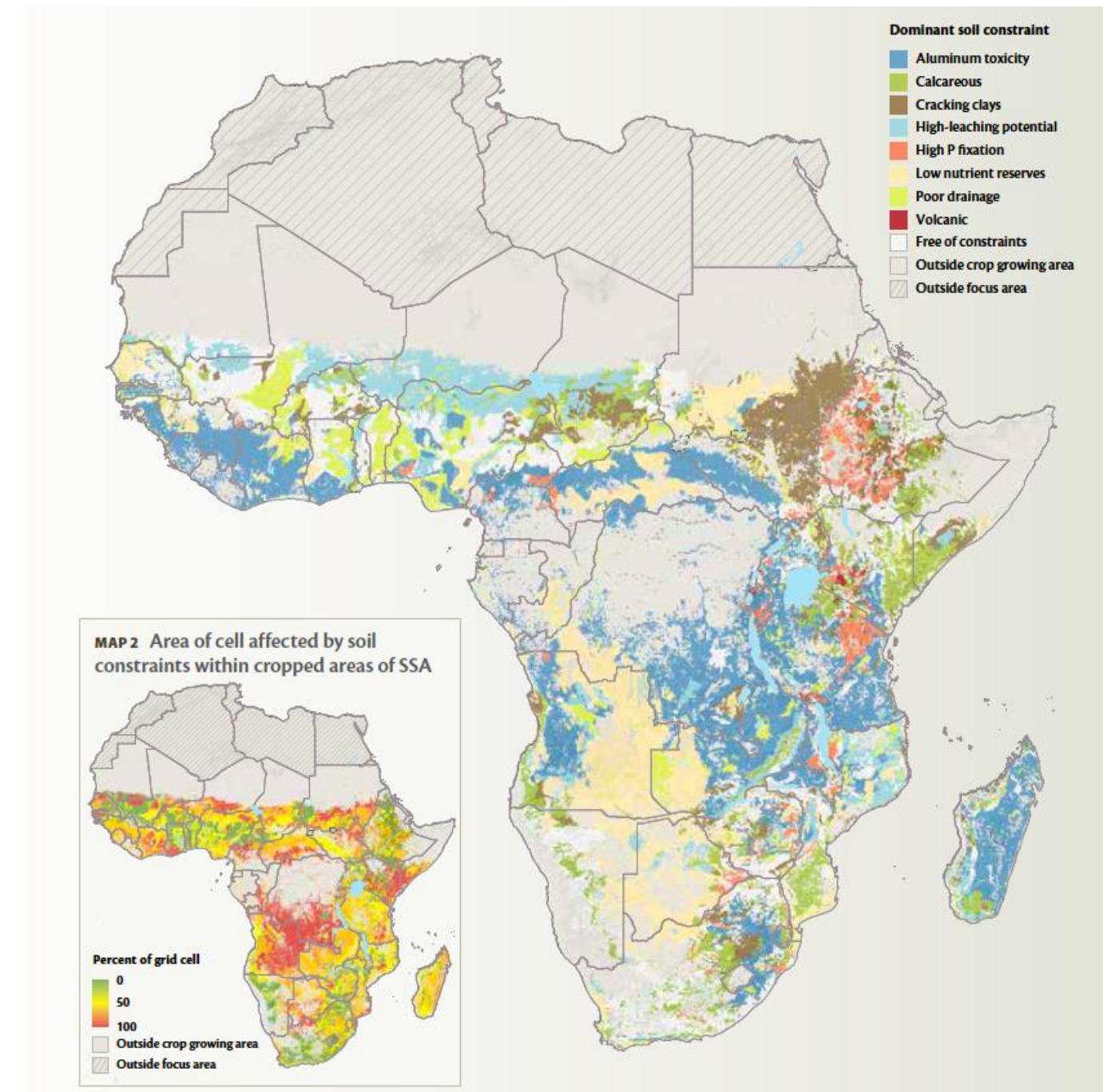
# CEREAL YIELD: 1.5 t ha<sup>-1</sup>

## FERTILIZER CONSUMPTION: 20 kg ha<sup>-1</sup>

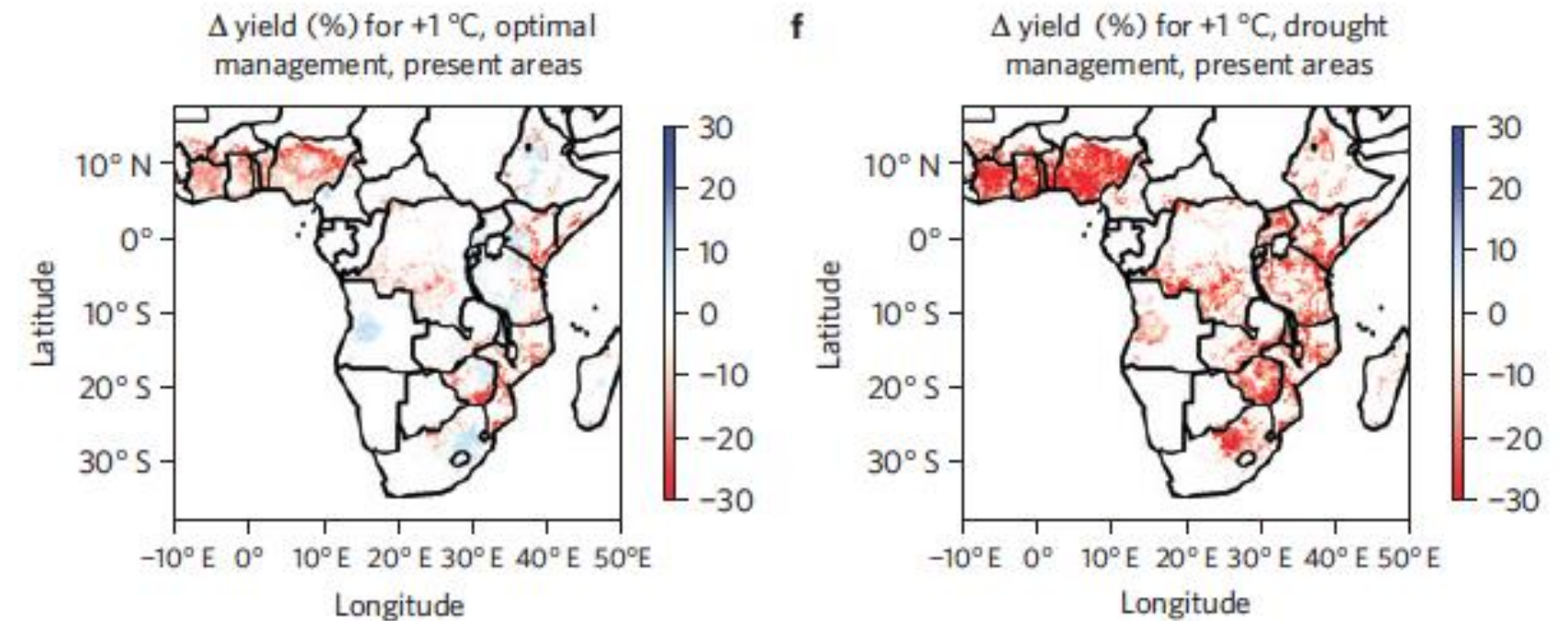




# SOIL AND CLIMATIC CONSTRAINTS



Atlas of African Agriculture Research and Development,  
IFPRI, 2014



Warming and drought effects on maize yield

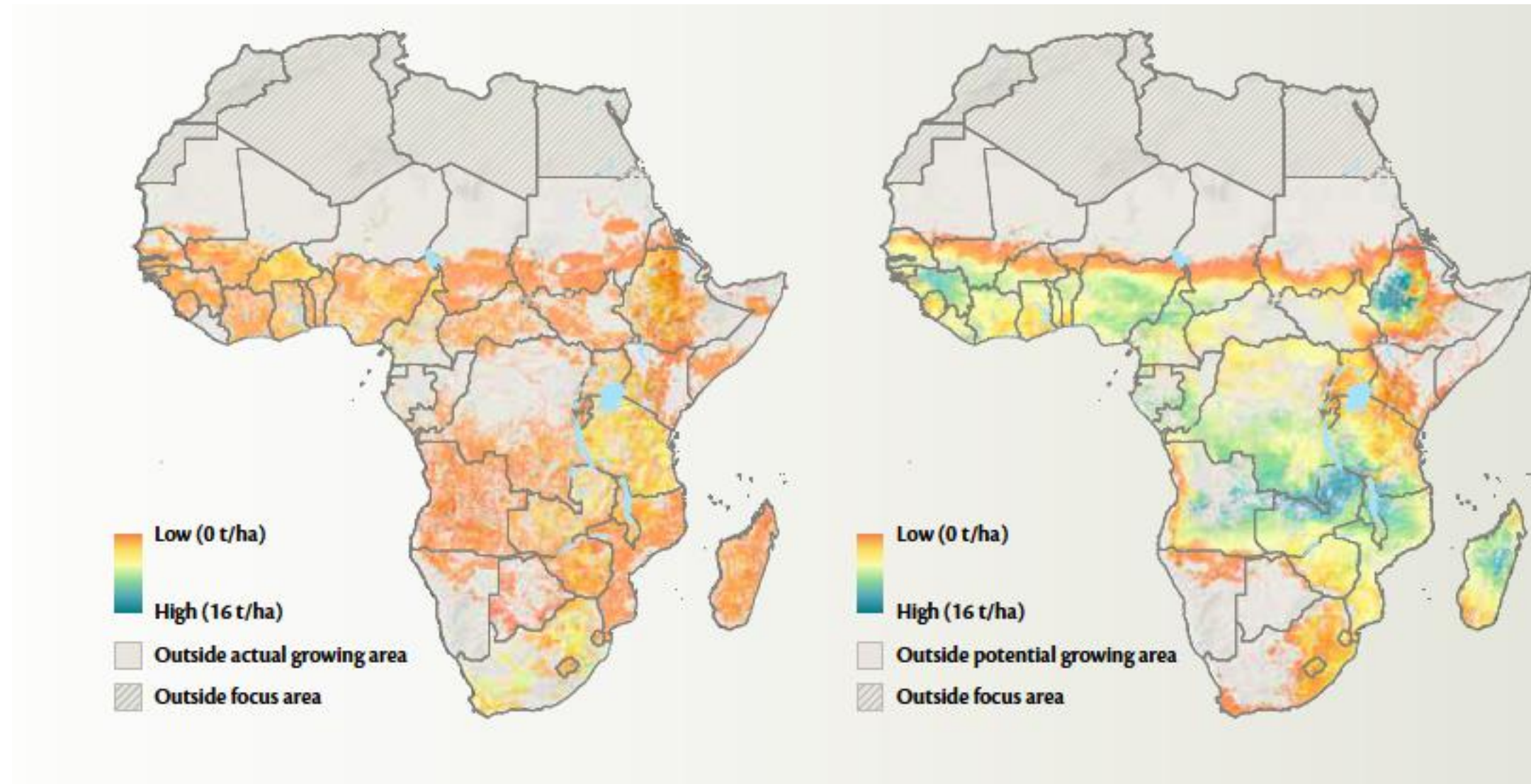
Lobell et al. 2011

## In addition

- Poor mechanization
- Poor infrastructure
- Inadequate policy environment



# YIELD GAP (e.g. maize)



## Gap 1 = Defining factors

Climate: soil moisture & temperature

## Gap 2 = Limiting factors

Nutrient deficiencies

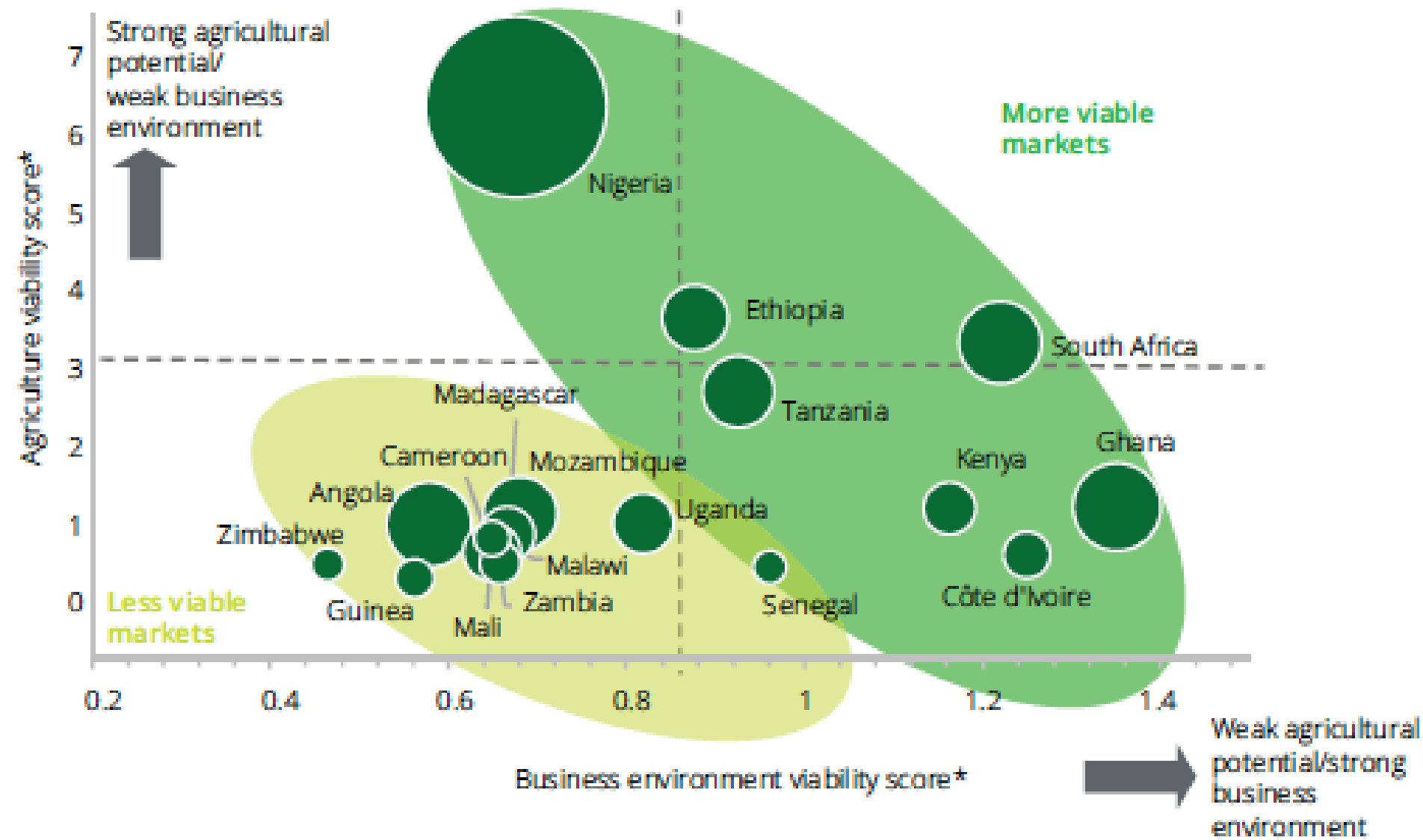
## Gap 3 = Reducing factors

Pest & diseases  
Improved varieties



# PRIORITY MARKETS

## Potential crop farming markets in Africa

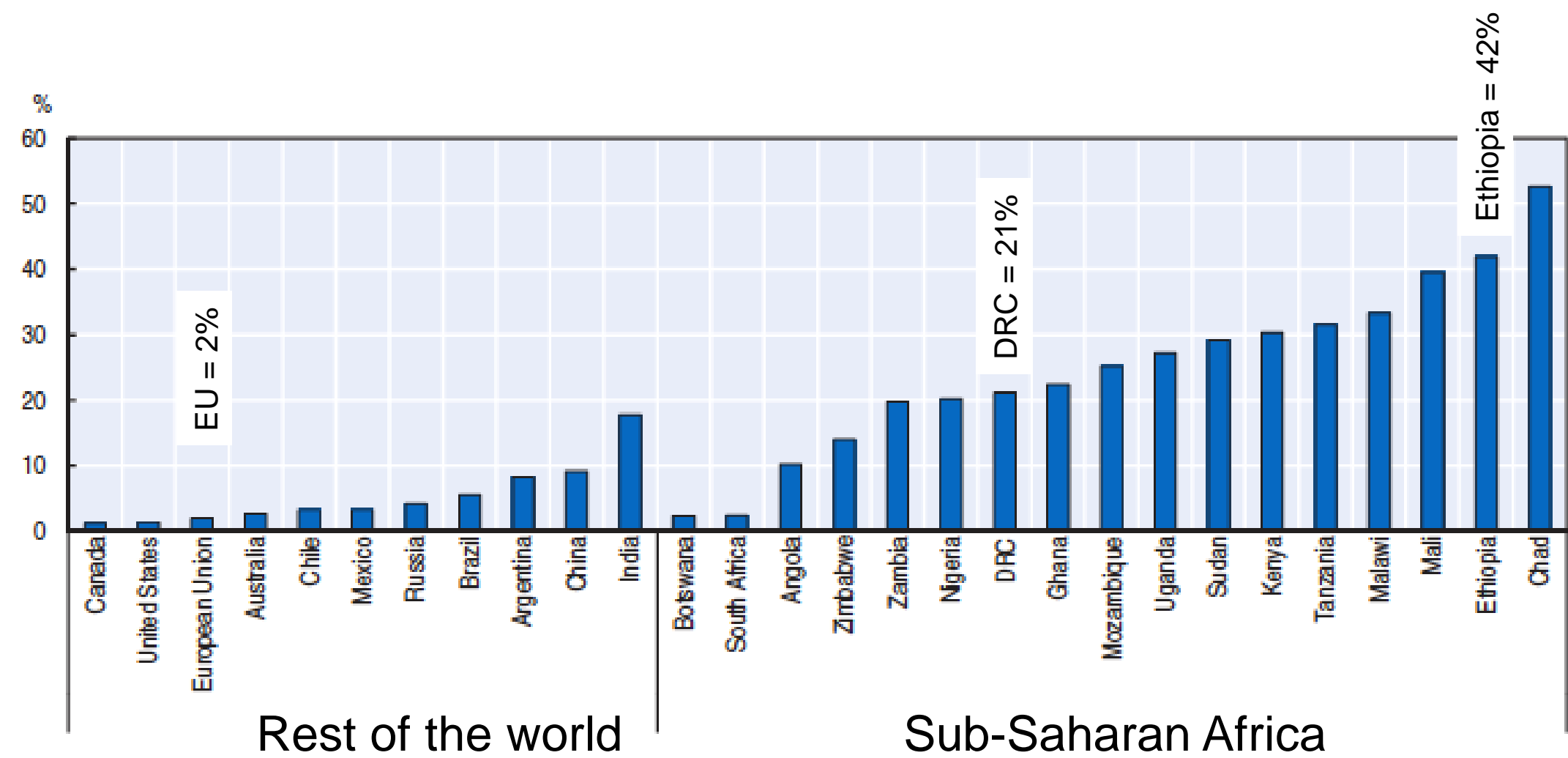


Size of bubble indicates relative total consumption of priority crops\*

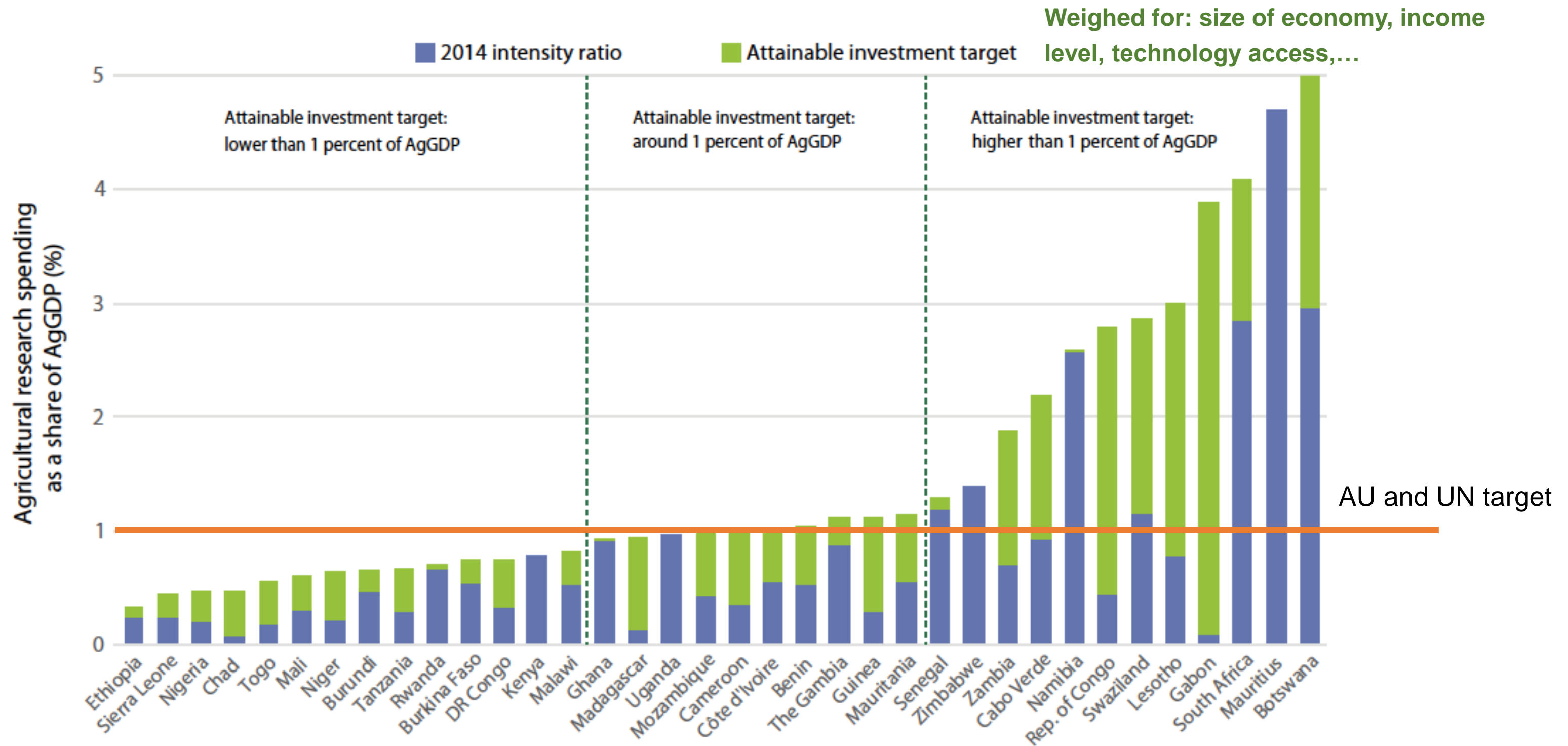
\* Priority crops include cassava, maize, wheat, rice, ground nuts and soya beans. The business viability matrix includes the WEF Competitiveness and Ease of Doing business Rankings. The agricultural viability matrix includes FAO crop consumption and production and agricultural resource endowment indicators.



# AGRICULTURE AS SHARE OF TOTAL GDP (2014)



# AGRICULTURAL RESEARCH INTENSITY (ARI)





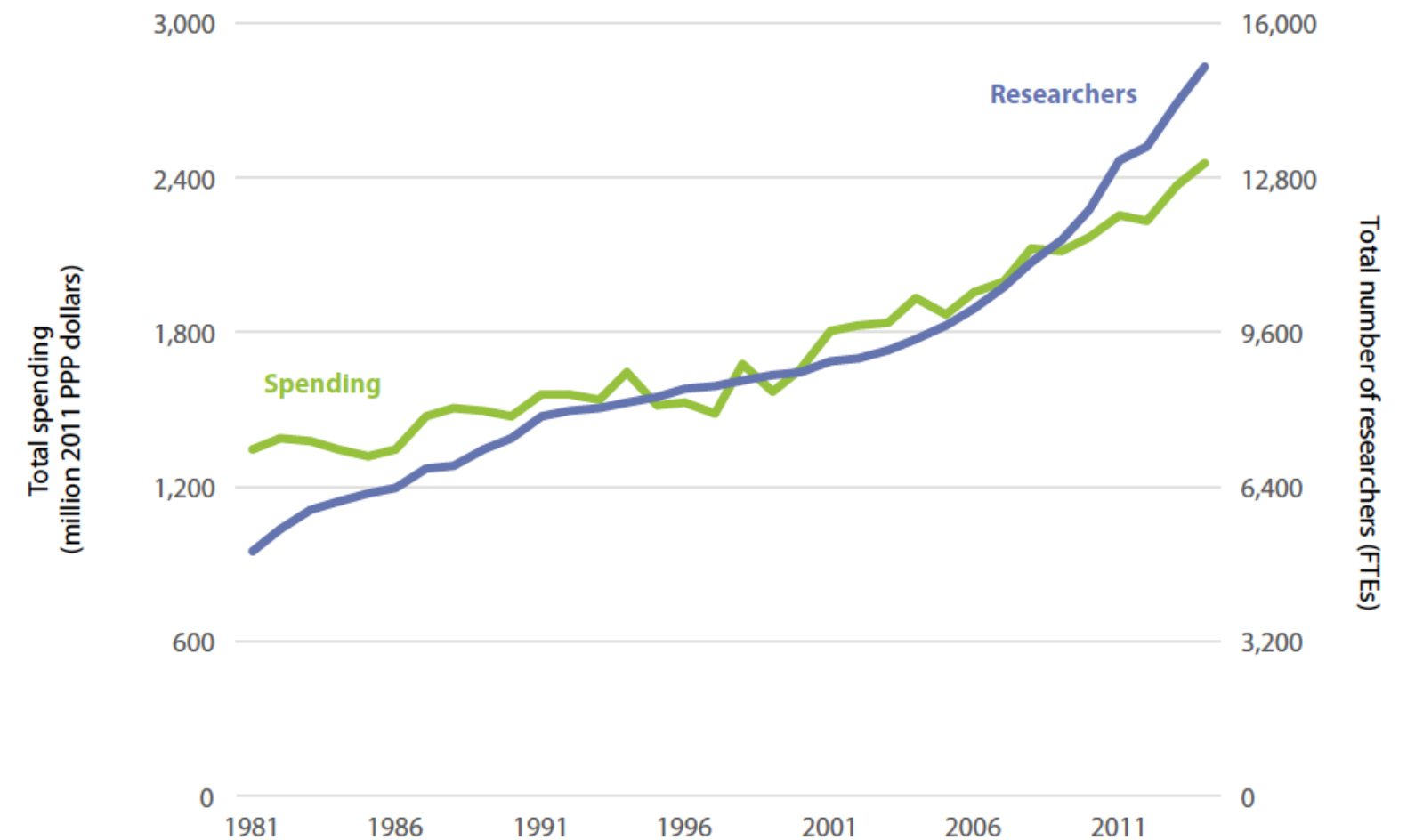
# AGRICULTURAL RESEARCH SPENDING AND CAPACITY

## Spending

- €2.5 billion (€1.4 billion excl. Nigeria and SA)
- Donor share: Ca. 30% (7 - 70%) - volatility
- Growth 2000-2014: 0.8 billion € - mainly salaries, (Ethiopia, Nigeria, SA, Ghana, Uganda = 75%)

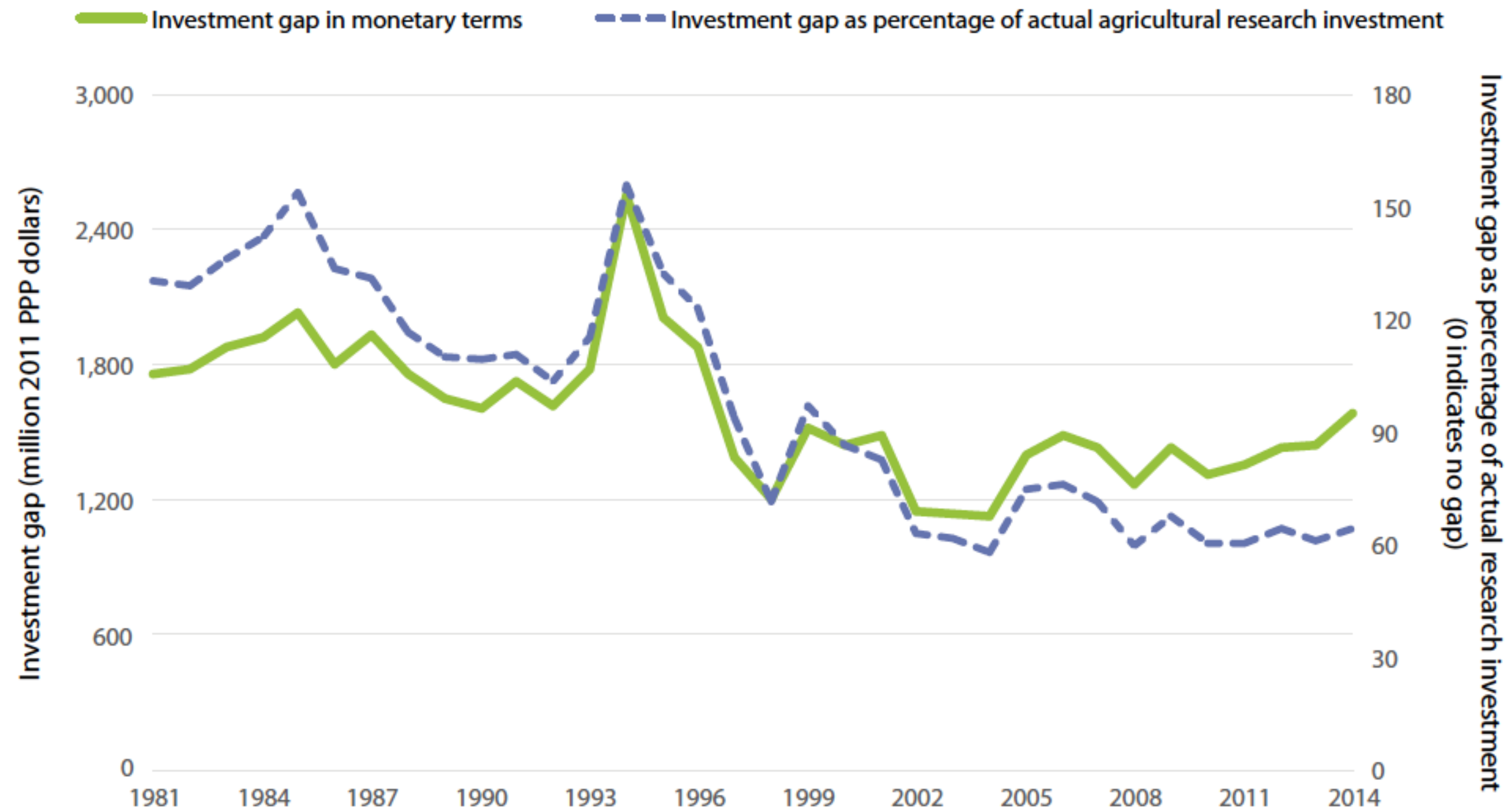
## Capacity

- Low share of PhD-qualified researchers: e.g. Ghana 40%, Ethiopia 10%,
- Aging critical mass (% PhD's above 50): e.g. Ghana 60%, Ethiopia 40%



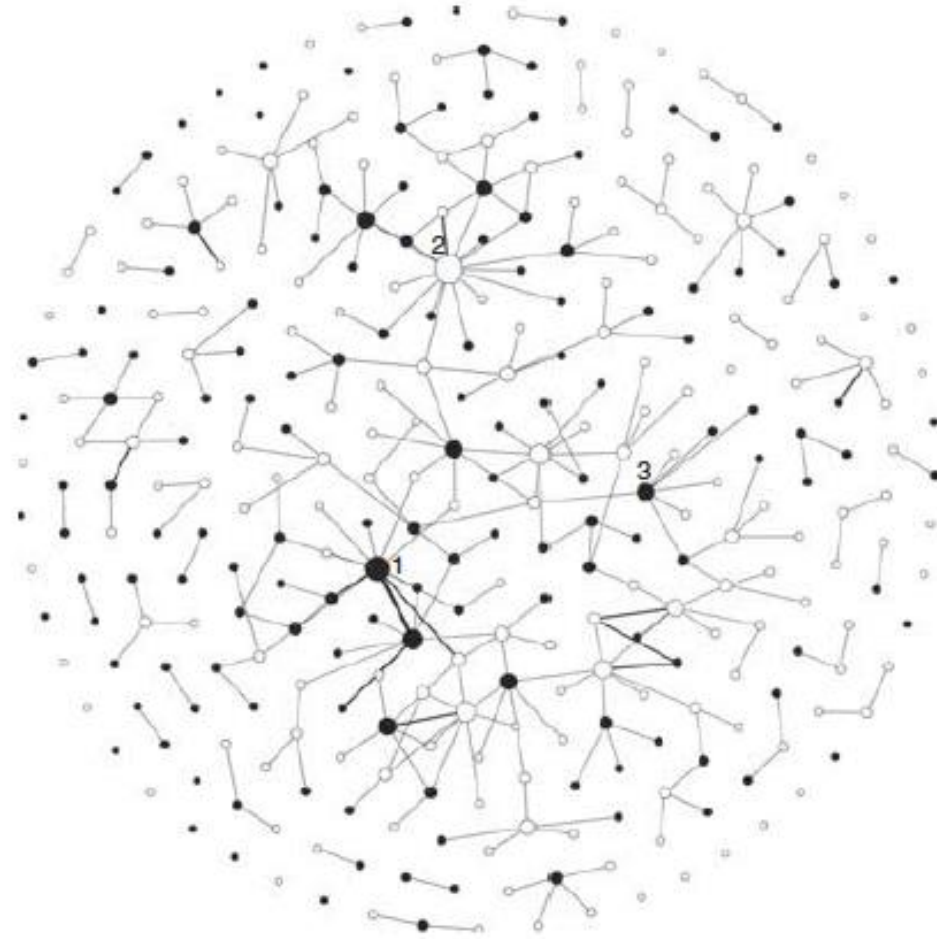
Beintema and Stads, 2017, ASTI, IFPRI

# INVESTMENT GAP (relative to weighed ARI)



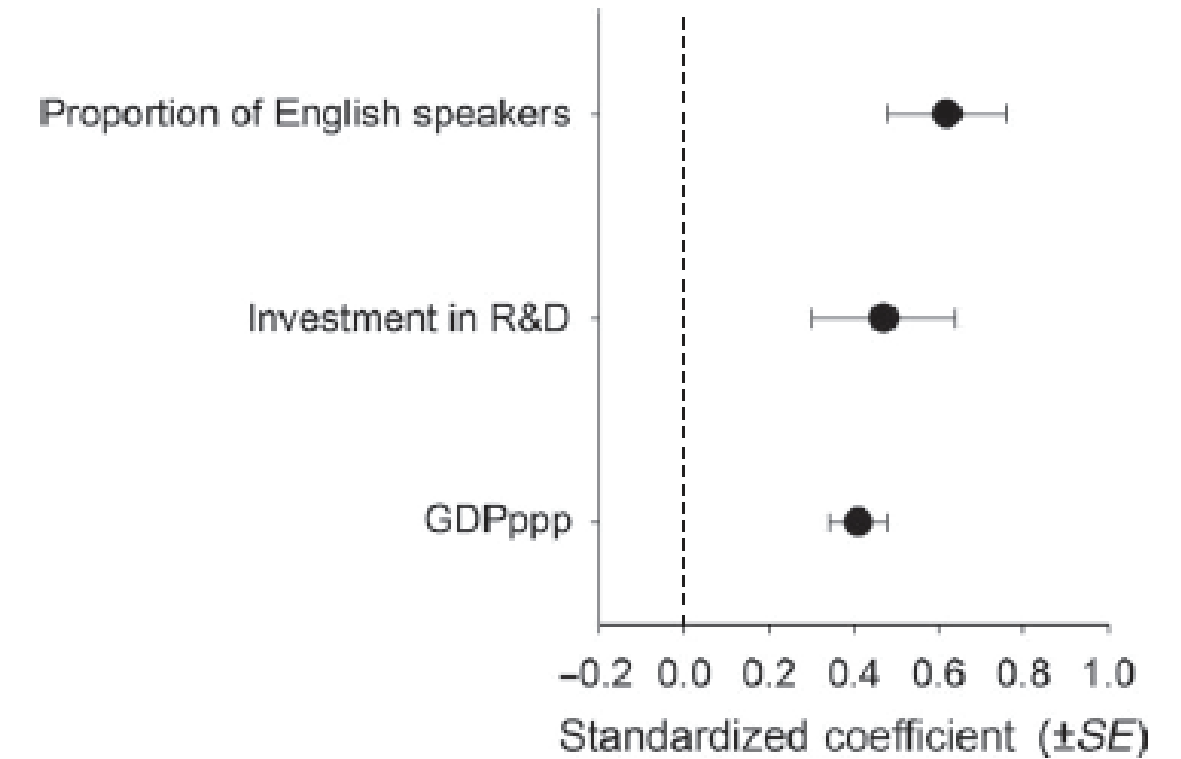
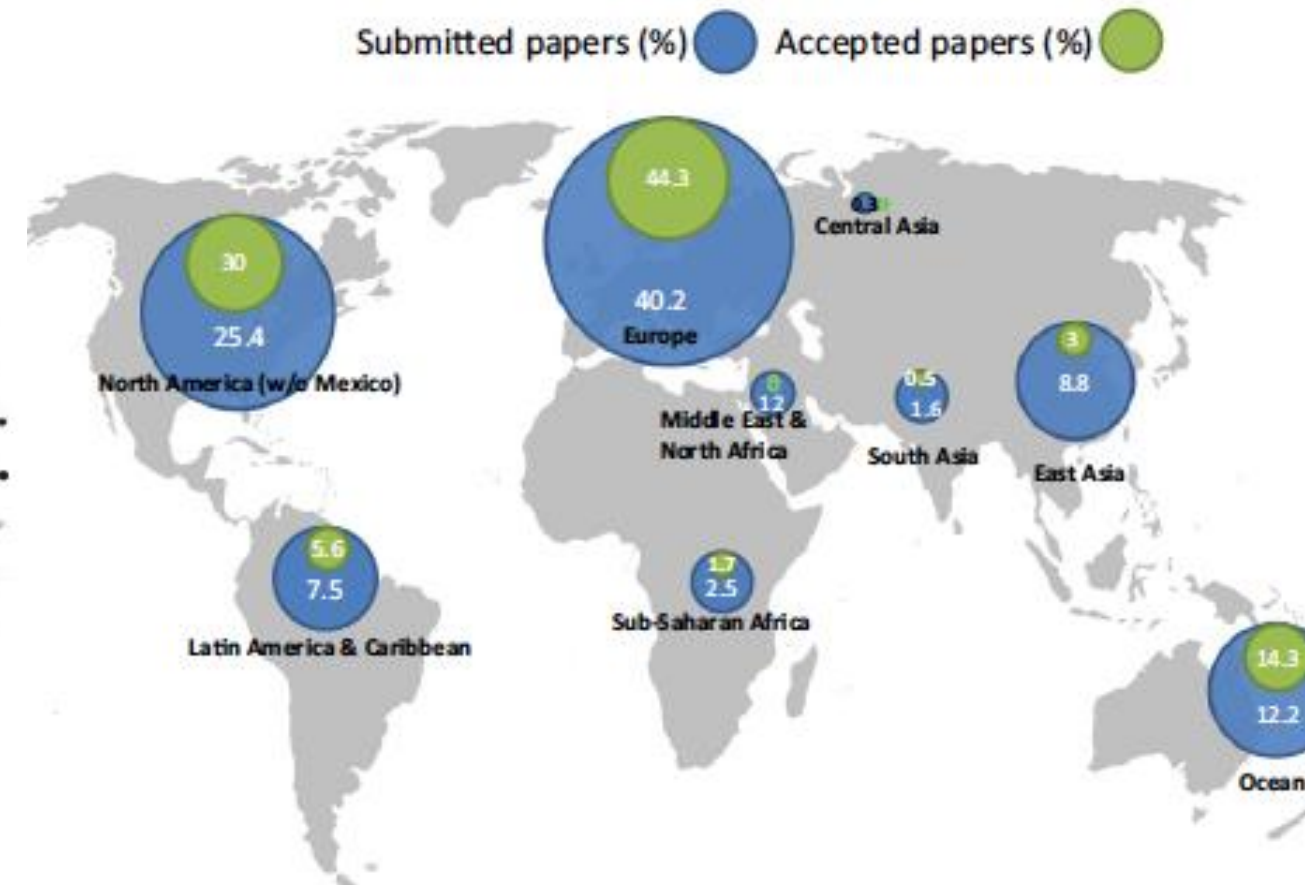


# ACADEMIC NETWORK AND PUBLICATION GAP



Network view on nutrition status research  
In Africa (n = 294)

Lachat et al., 2014, Public Health Nutrition



*“Lack of locally applied (ecological) research may inhibit novel solutions to socio-(ecological) problems such as sustainable food production”*

Nunez et al., 2019, J. Appl. Ecol.

# STRENGTHENING AGRICULTURAL R&D INVESTMENT

- **Maputo declaration**
  - 10% of the total government expenditure to agriculture (now 4%)
- **(Agricultural) development paradox**
  - Poor national capacity results in limited ability to establish R&D priorities and to absorb (donor) funds, resulting in inefficient use of funds
  - Inability of donors to understand and address the local context (i.e. heterogeneity in agro-ecological and socio-economical conditions)
- **PPP-investment**
  - Economic, social and environmental sustainable **commercial crops** (e.g. cocoa, coffee,...), but also **staple crops** (wheat, cassava and maize,...)
- **Rural innovation capacity**
  - Link the inherent capacity of (resource poor) farmers to innovate with an institutional environment that facilitates innovation (e.g. drought resilience)



# STRENGTHENING (ACADEMIC) RESEARCH CAPACITY

## Objective

Enhance research leadership to develop locally-driven interdisciplinary research agenda's

## Problem

Limited available critical academic mass, i.e. PhD-qualified scientists

### (Levels of) solutions: organizational, institutional and individual

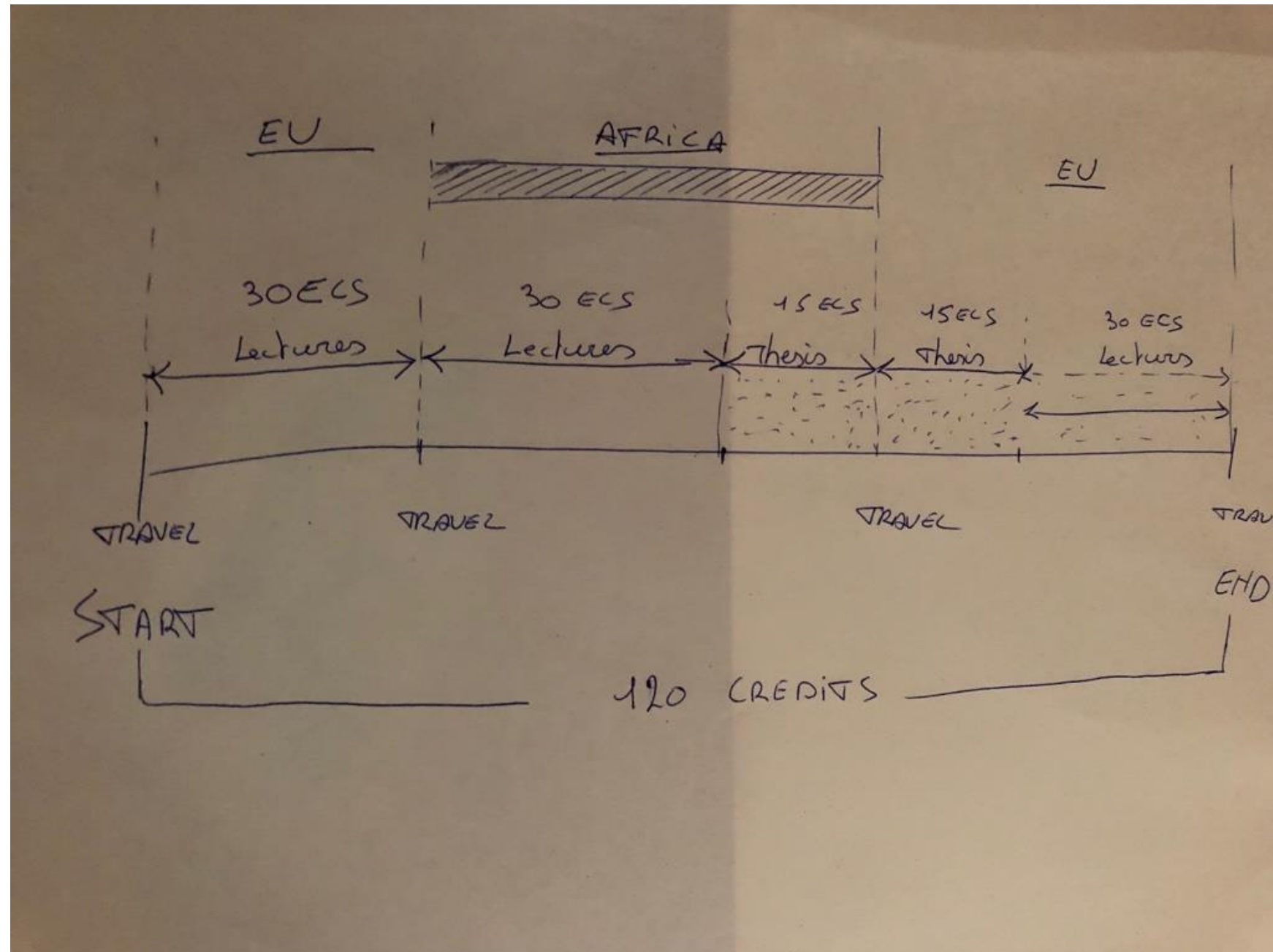
- Increase research awareness/environment: learn to identify problems, set priorities, conduct sound research, propose solutions to problems
- Rehabilitate and maintain research infrastructure
- Initiate and maintain regional and international networks and collaboration
- **Revitalize (postgraduate) education and research**
  - *Joint EU – Africa MSc's* with high quality African specialist hubs
  - *Twinning sandwich PhD's*
  - Scientific writing, statistics,...



Adapted from Ngongalah et al., 2019

# JOINT EU - AFRICA MASTER HUBS

- Select thematic **African hub** universities
- **Regional** student recruitment
- **Distribute** lectures and MSc thesis between EU and African institutes





# TWINNING SANDWICH PhD

- **Low investment (150.000 Euro) – high gain**
  - 24 months in EU (EU-based grant)
  - 24 Months in Africa (local grant)
  - 4 international travels
  - Operational budget
  - Tuition fee
- **Win-win of twinning PhD's**
  - One African PhD teams with an EU PhD





# CASE DEMOCRATIC REPUBLIC OF THE CONGO

L'agriculture, une priorité pour Tshisekedi? « On verra la part du budget qui lui sera réservée »



- INERA = first tropical agricultural research center (1964) with spillover to Ivory Coast (Cocoa), Malaysia (oil palm) and coffee (Vietnam)
- Agriculture from 0.5 to 2% of government investment in the next 5 years
- Engage 200.000 agronomists
  - Fraction researchers?
  - “S’il pense à des agronomes-Hilton à Kinshasa, non!” (B. Michel, ERAIFT)
- **PICAGL: INERA-IITA-UGENT** (World Bank)





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