



Futures of agriculture and food systems: impacts on rural job dynamics in SSA

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17th Annual Conference on Global

Economic Analysis

Dakar, Senegal

18-20 June 2014



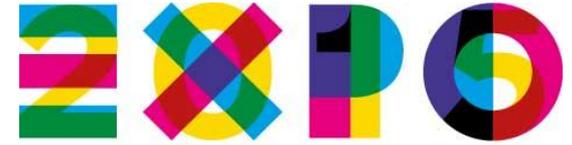


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FOODSECURE
FOR POLICIES THAT MATTER

Motivation



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FEEDING THE PLANET
ENERGY FOR LIFE

Many uncertainties on the futures of agriculture and food systems globally.

JOIN THE EXPERTS. GET INVOLVED. MOVE THE PLANET FORWARD.

FEEDING THE PLANET SUMMIT

SUSTAINABLE INNOVATIONS IN FOOD SECURITY

WEDNESDAY, OCTOBER 30, 2013
8:30AM - 4:00PM
AGRI LIFE CENTER

Event will be live streamed
Participants may come and go
Refreshments will be served

Join the discussion on Twitter:
@Planet_Forward with #FoodFWD

SUMMIT HIGHLIGHTS

- GMO Debate
- Keynote by Rajiv Shah, USAID
- Innovations Showcase with Chief Spike Mendelsohn
- Discover Internship Opportunities in Sustainability

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Food System Thinking



FEED THE FUTURE
The U.S. Government's Global Hunger and Food Security Initiative



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YOUTH AG-SUMMIT
August 19-24, 2013 • Olds, Alberta, Canada

FUTURE OF
Food

*The Oxford Martin Program:
on the Future of Food*

The Economist

FEEDING THE WORLD 2013

ACCELERATING GLOBAL COLLABORATION ON FOOD SECURITY

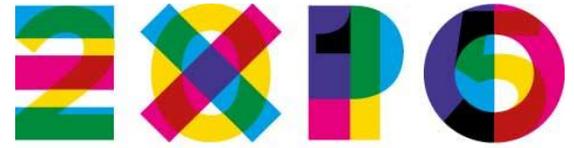
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THE SUSTAINABILITY PROJECT 

Motivation



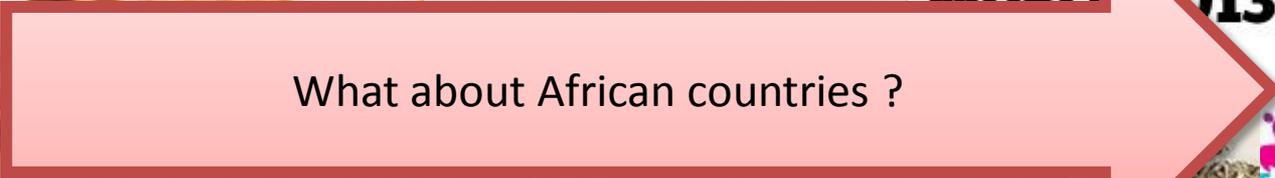
Klaus Hahlbrock
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Environmental Protection
through Sustainable Agriculture



Ma

the futures of agriculture
ly.

Food System



What about African countries ?

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Highly recommended for National Geographic, World Economic Forum, and USDA

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FUTURE OF
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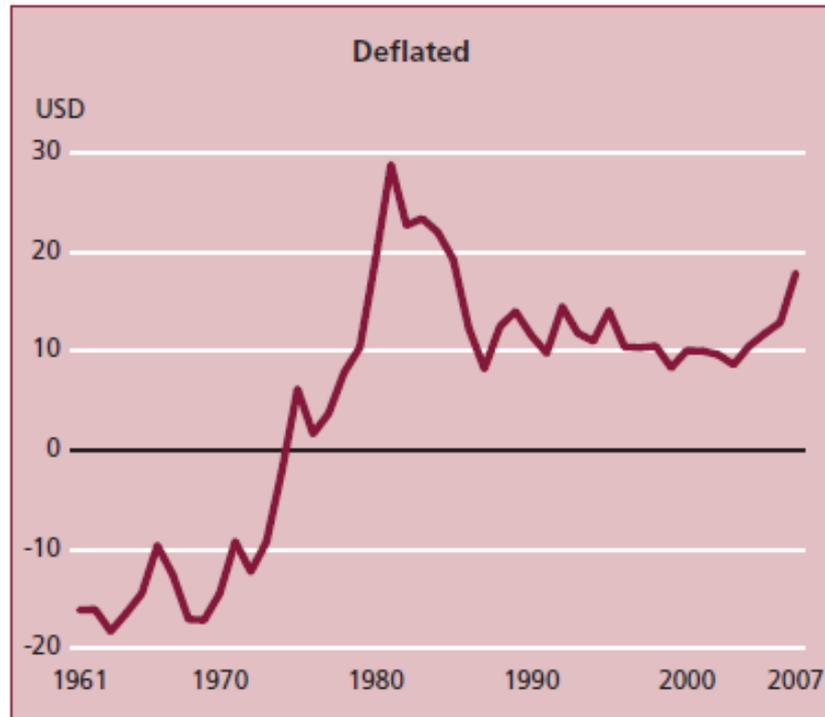
FUTURE
Food Security Initiative



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Africa is more and more dependant on imports for food

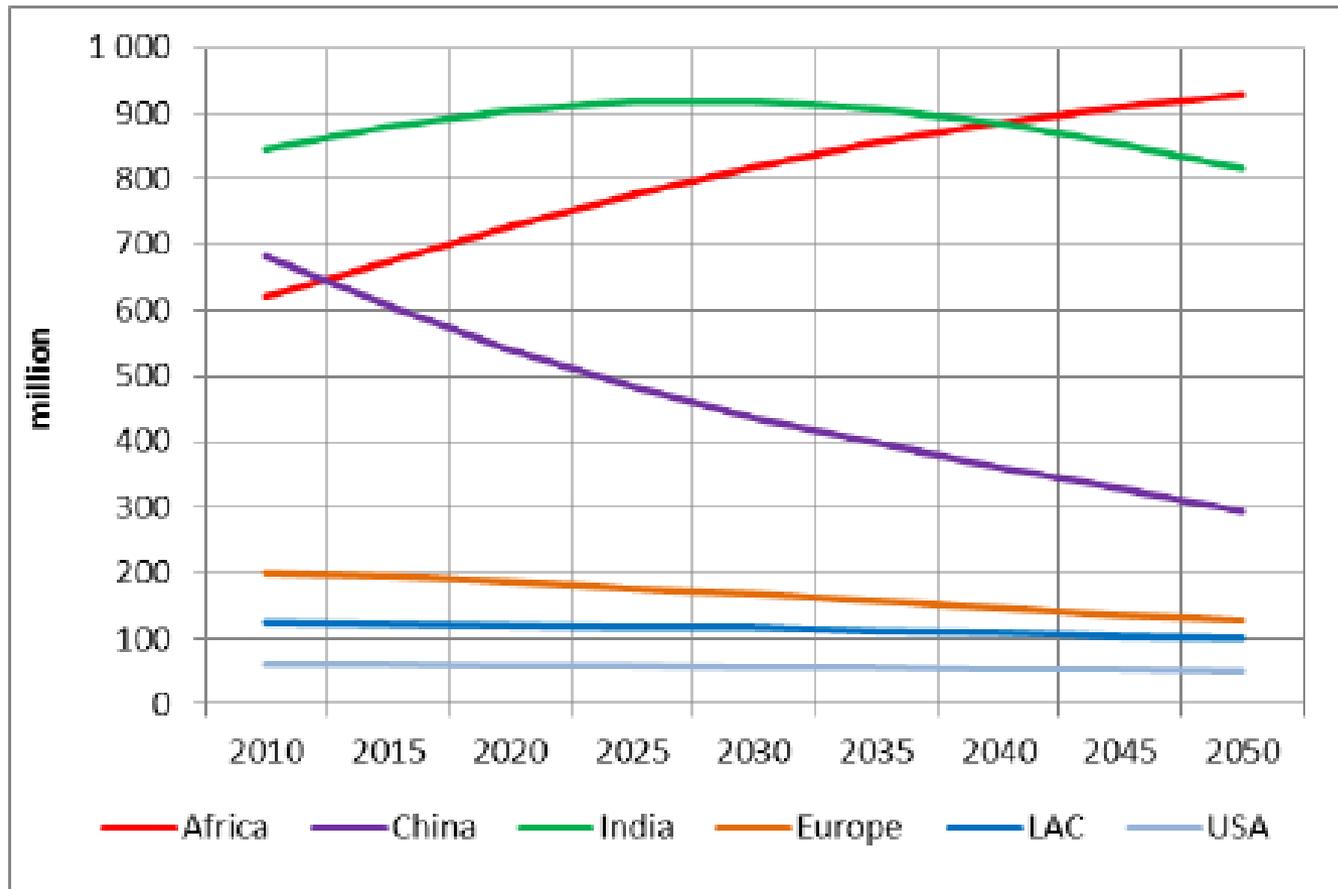
African per capita net food import



Source: FAOSTAT, 2010, IFS, 2010, Authors' own calculations
Note: CPI (Base Year 2000)

Africa rural population growth: a global exception

Rural Population Growth (2010-2050)



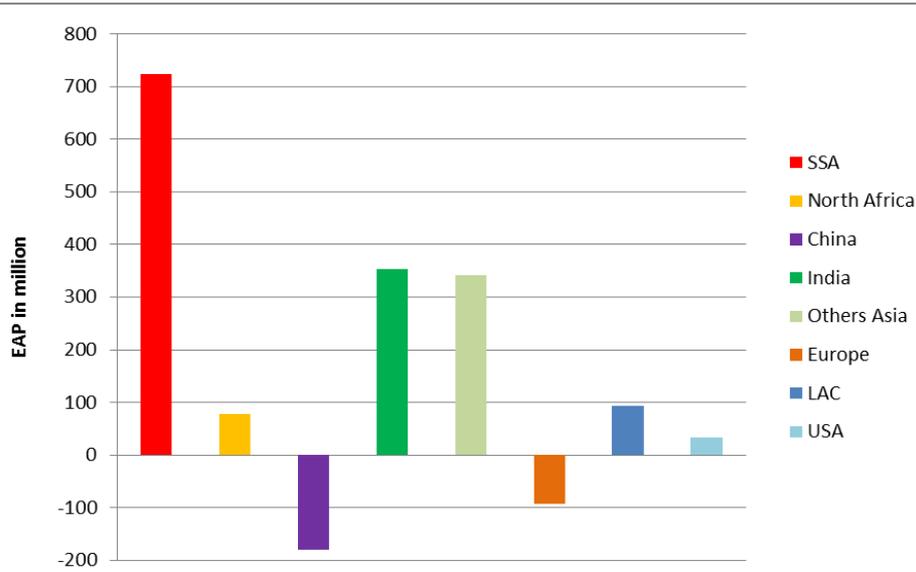
Source: Losch (2014)



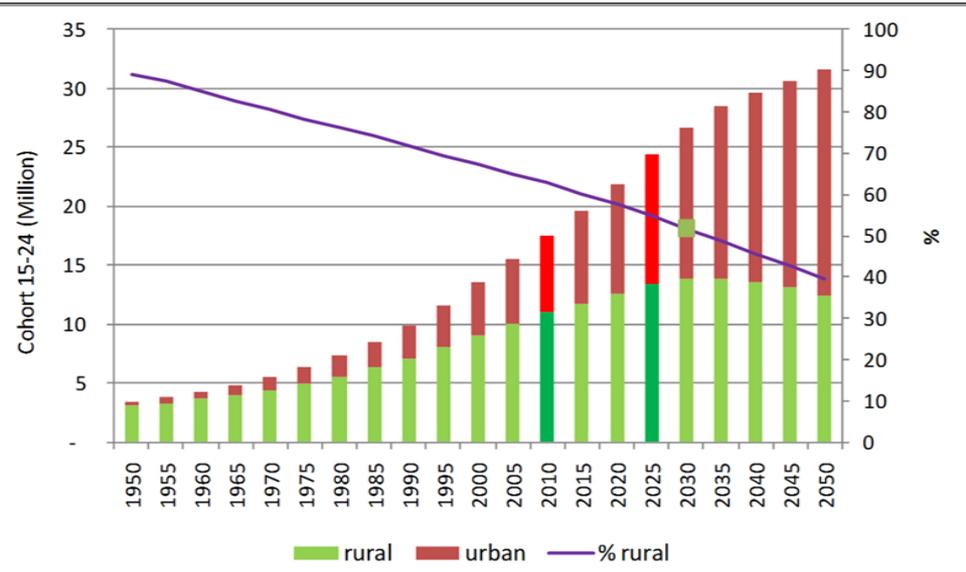
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The employment challenge of the youth

Growth of the labor force (2010-2050)



Yearly cohort of new workers in SSA



Source: Losch (2014)

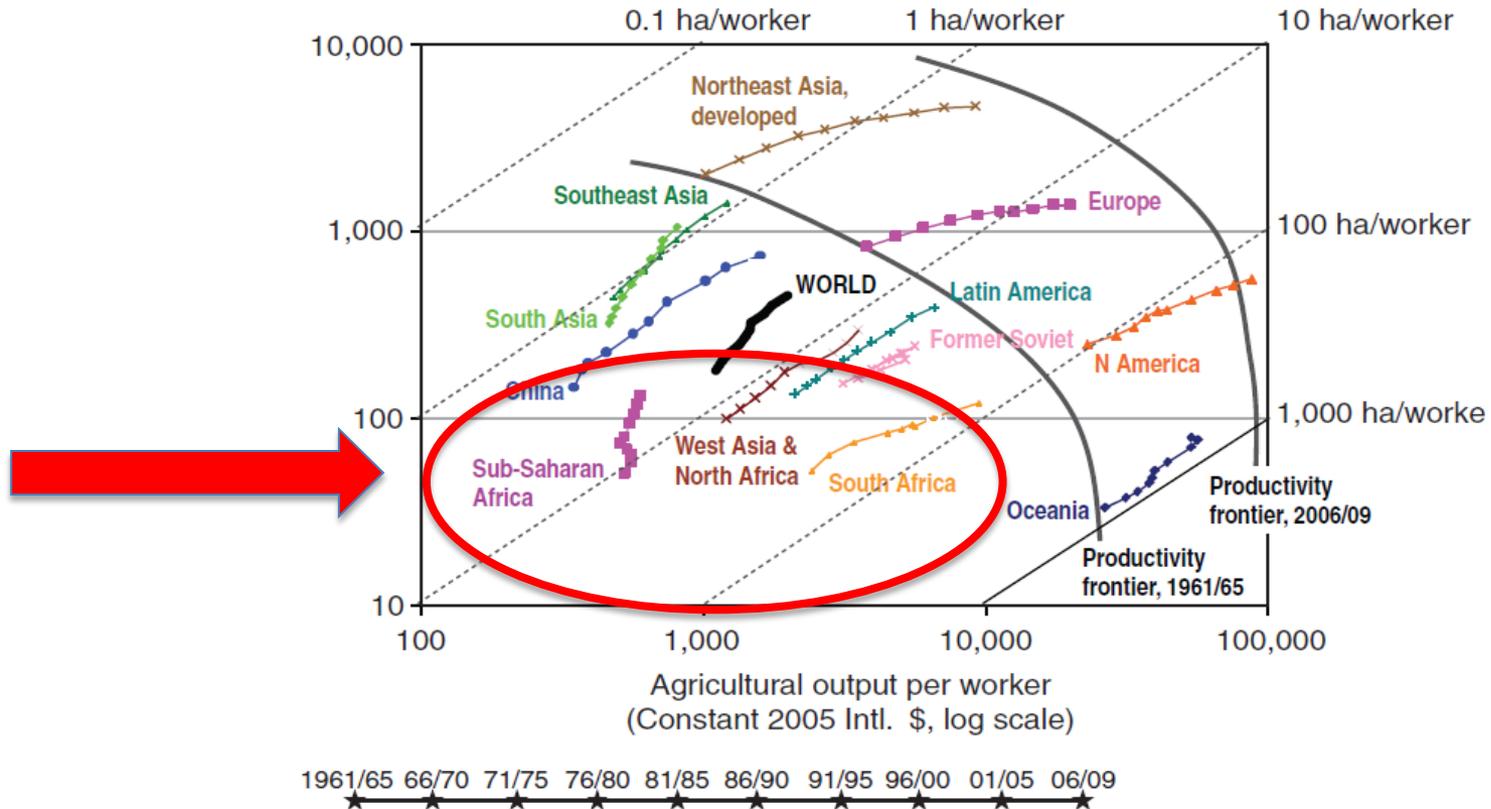
Between now and 2025, SSA's economies will have to incorporate **330m youth**, 195m in rural areas and 135m in cities. Which employment alternatives?



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African agricultural productivity is the lowest in the world

Agricultural output per hectare (ha) of land
(Constant 2005 Intl. \$, log scale)

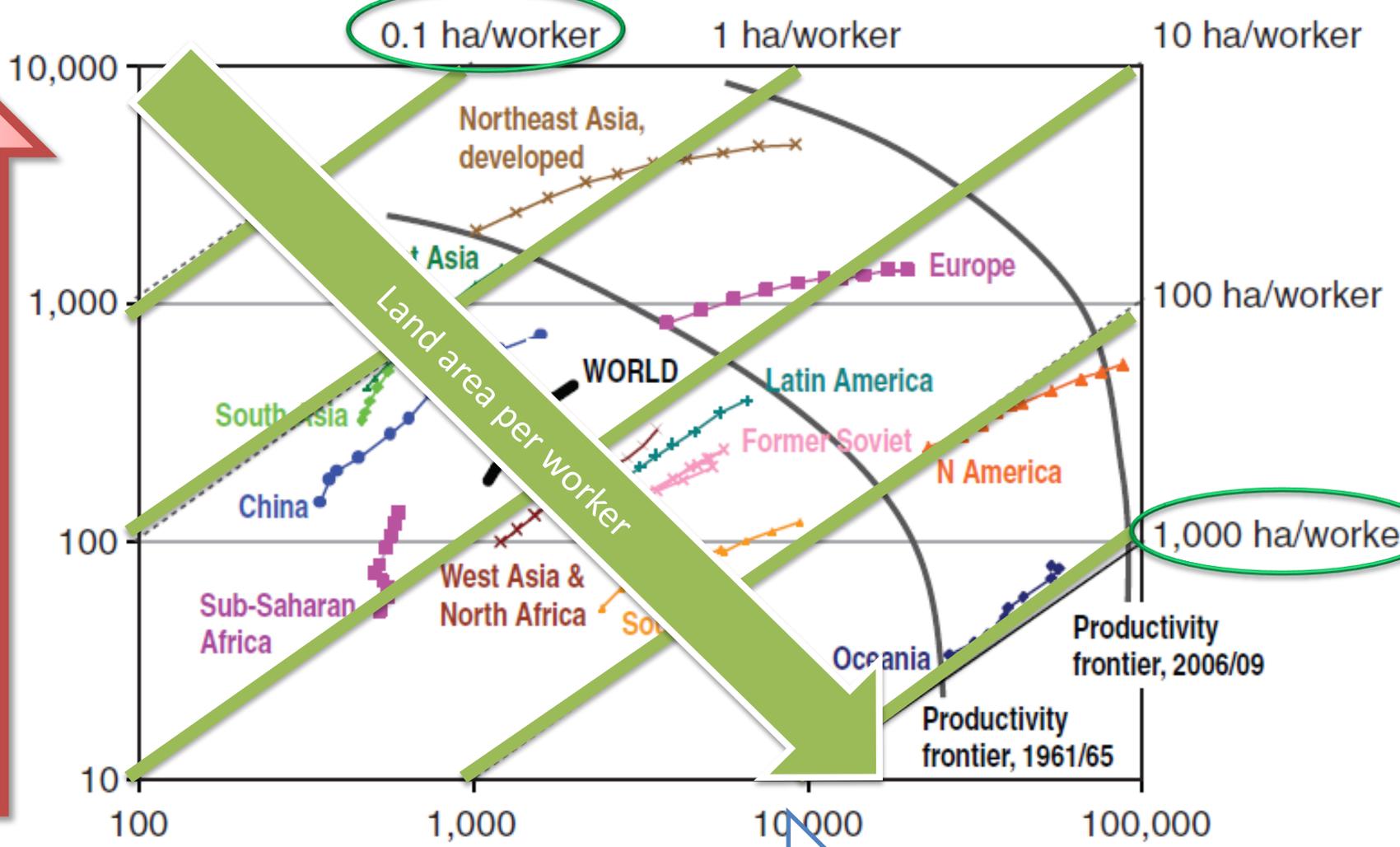


Source: Fuglie, Wang et Ball (2012)

Agricultural output per hectare (ha) of land
(Constant 2005 Intl. \$, log scale)



Land productivity

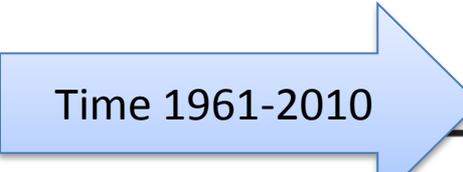
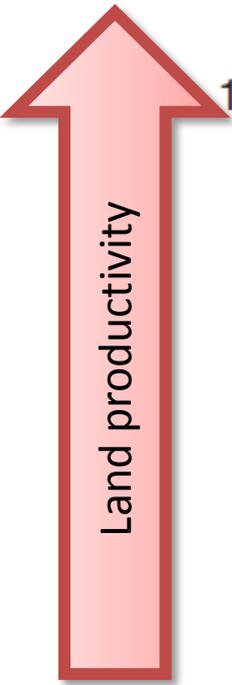
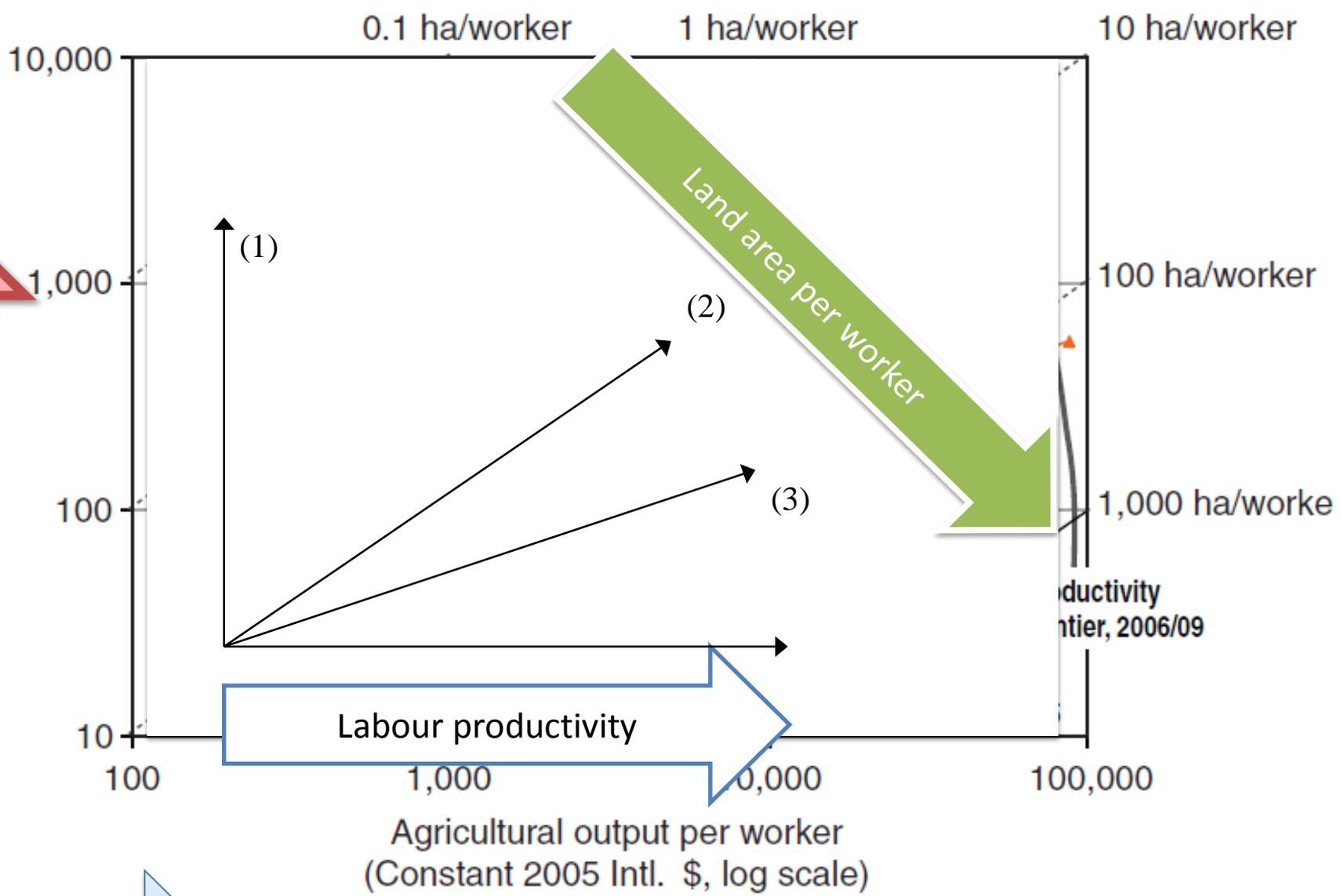


Labour productivity (Constant 2005 Intl. \$, log scale)

Time 1961-2010

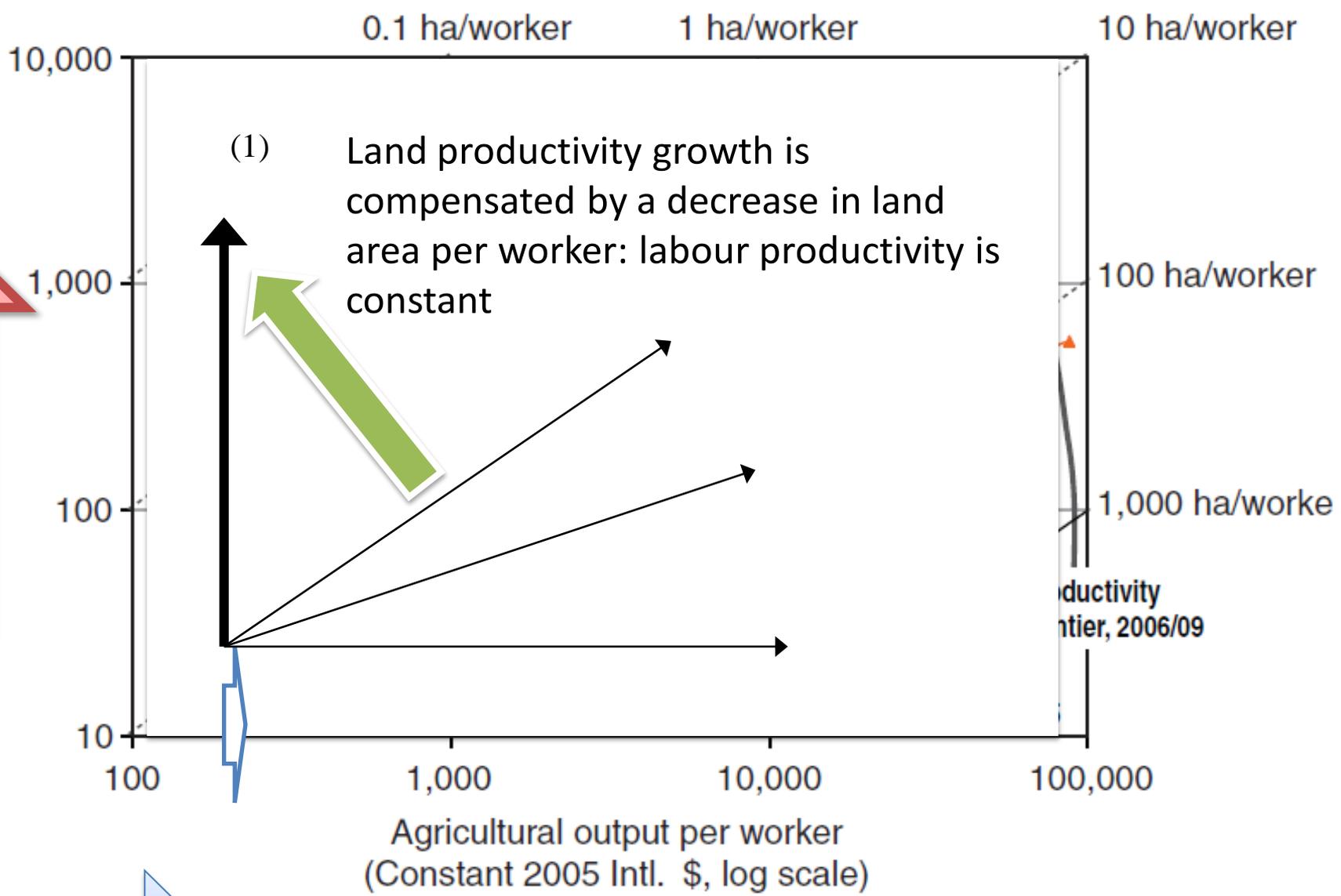
11/75 76/80 81/85 86/90 91/95 96/00 01/05 06/09

Agricultural output per hectare (ha) of land
(Constant 2005 Intl. \$, log scale)



11/75 76/80 81/85 86/90 91/95 96/00 01/05 06/09

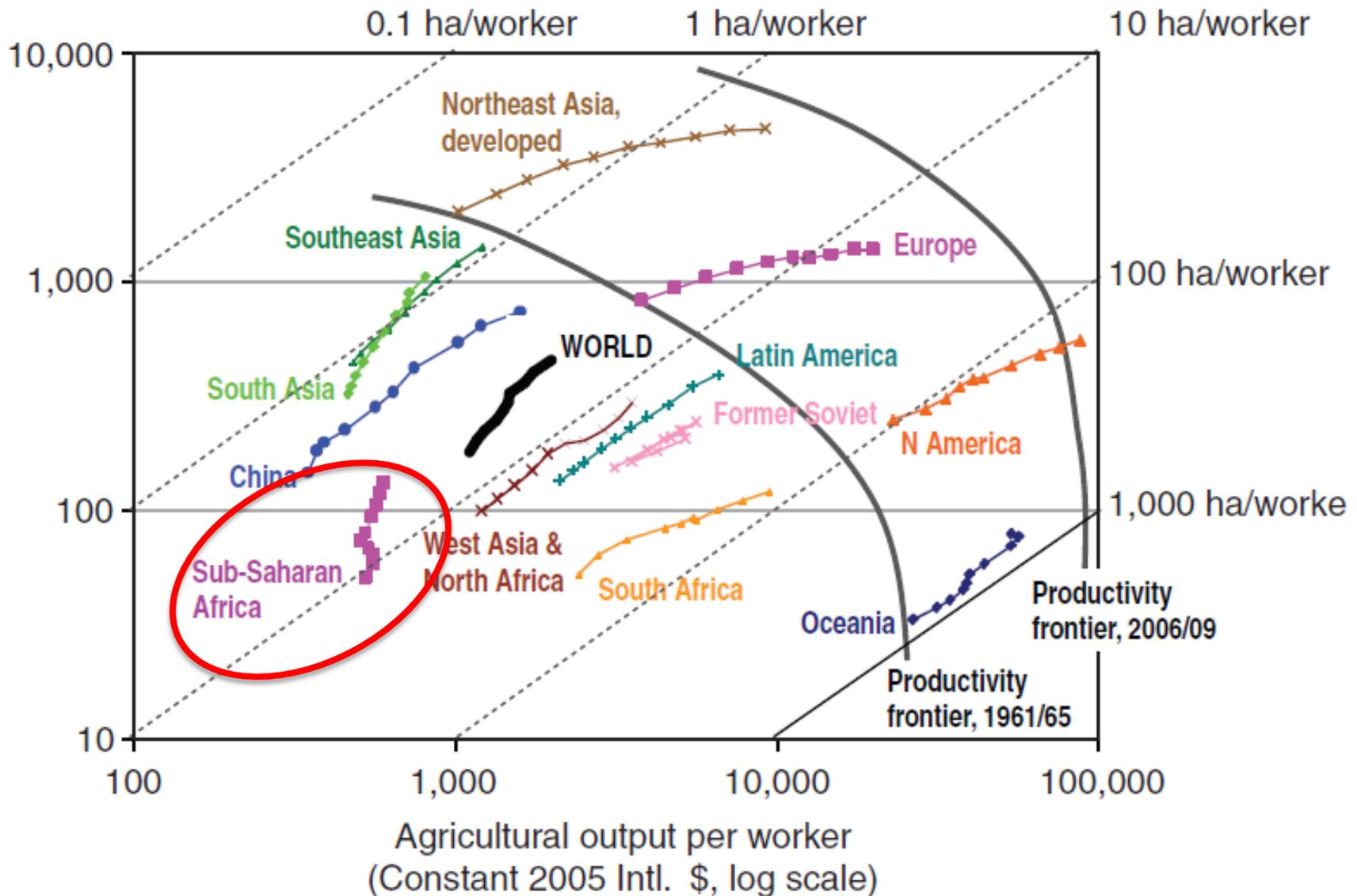
Agricultural output per hectare (ha) of land
(Constant 2005 Intl. \$, log scale)



Time 1961-2010

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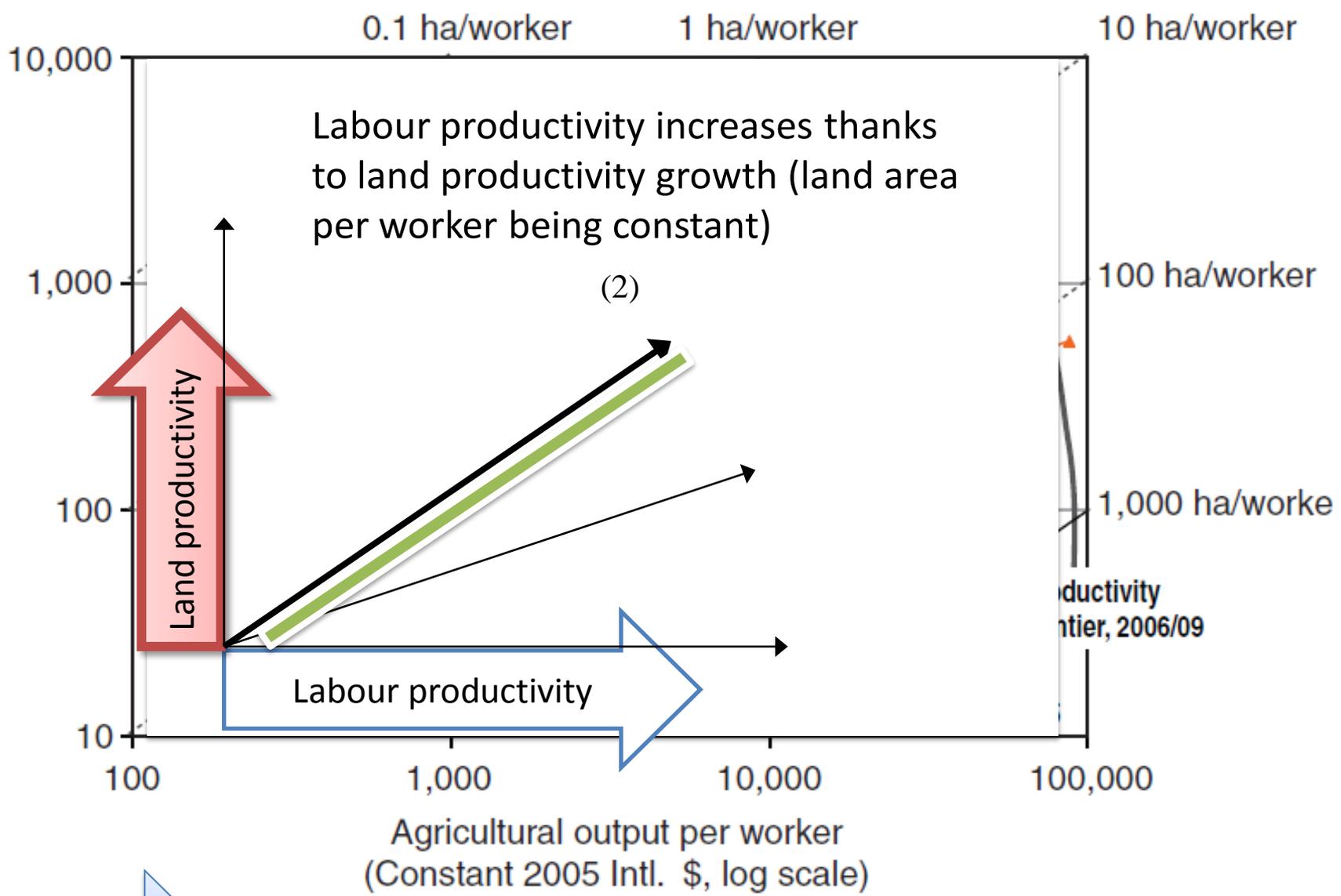
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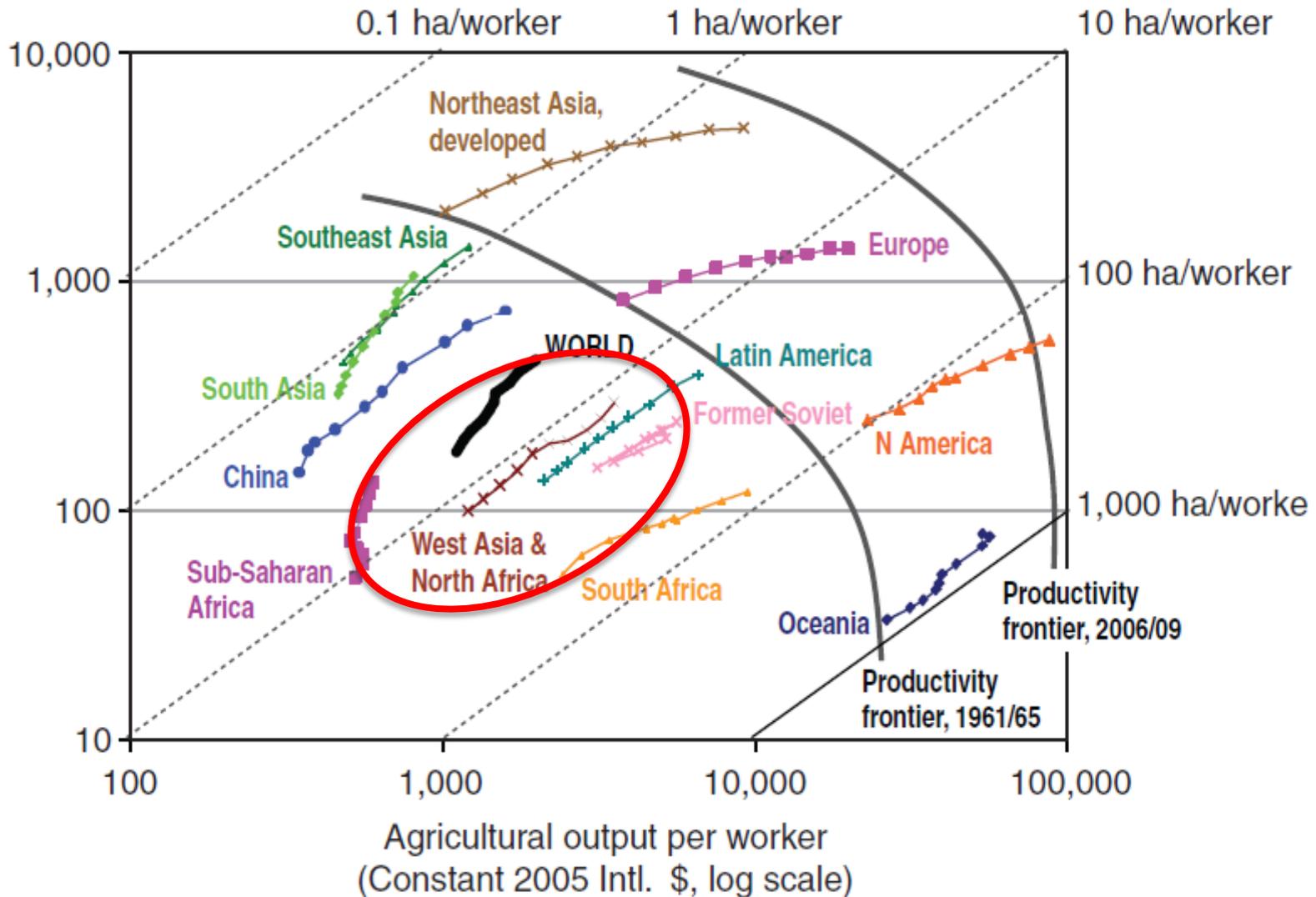
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Time 1961-2010

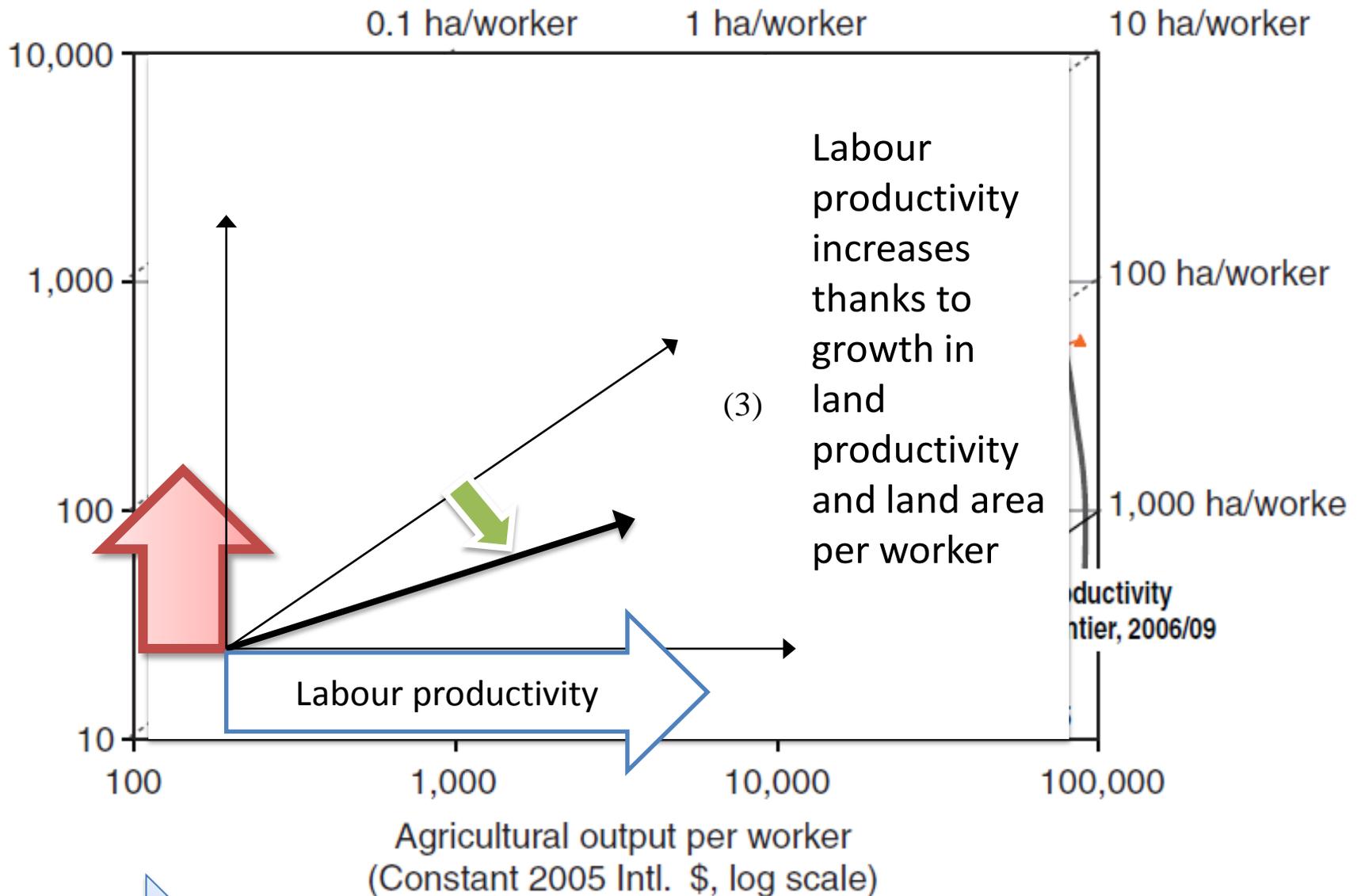
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Agricultural output per hectare (ha) of land
 (Constant 2005 Intl. \$, log scale)



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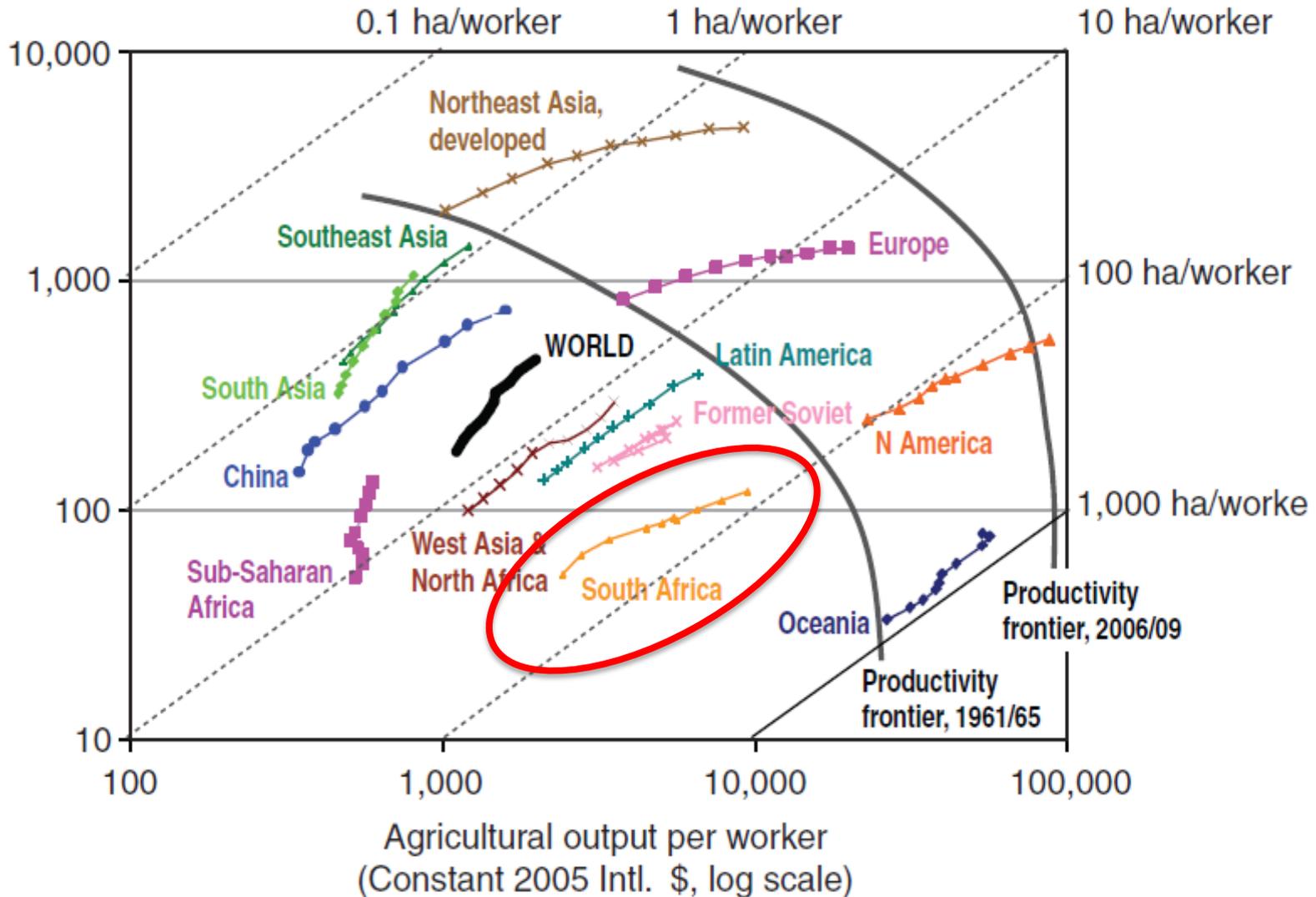
Agricultural output per hectare (ha) of land (Constant 2005 Intl. \$, log scale)



Time 1961-2010

1/75 76/80 81/85 86/90 91/95 96/00 01/05 06/09

Agricultural output per hectare (ha) of land
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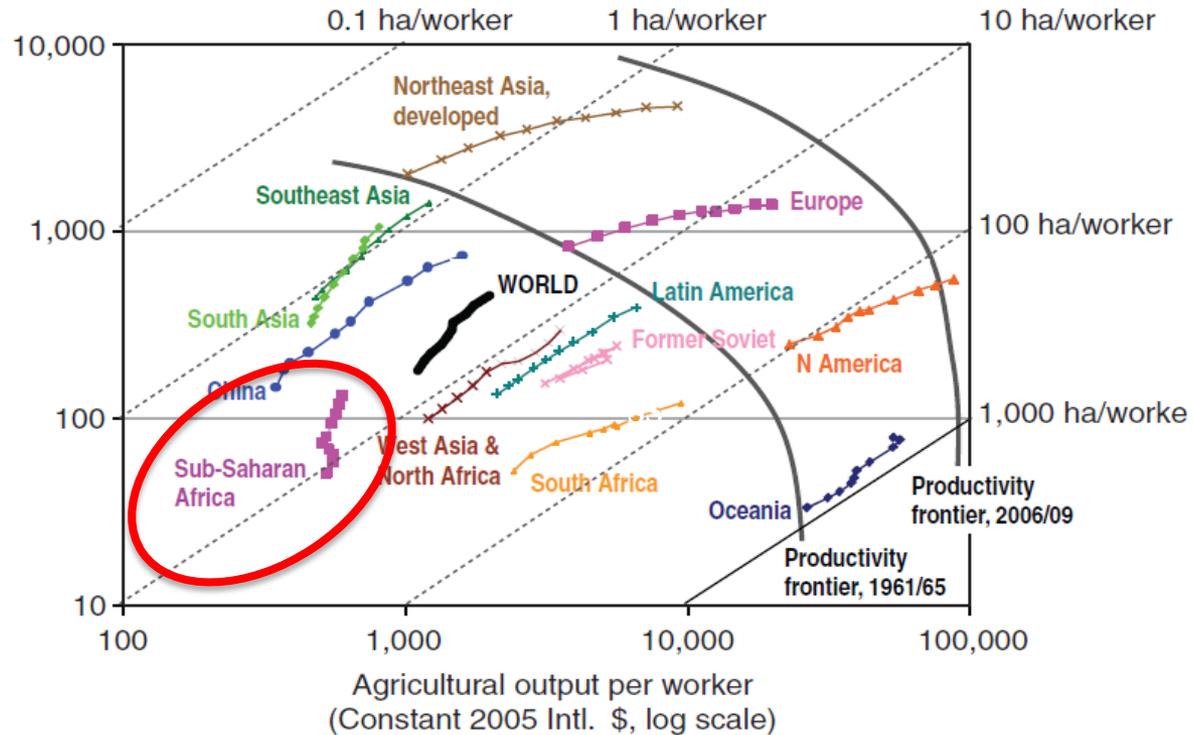
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Labour productivity strongly determines income

Agricultural output per hectare (ha) of land
(Constant 2005 Intl. \$, log scale)



Source: Fuglie, Wang et Ball (2012)

Research question

- What are the likely futures of agricultural and food systems in Africa ?

What about their impacts on:

- the capacity of production to meet food demand ?
- food prices ?
- incomes ?
- rural job creation ?



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METHODOLOGY AND DATA



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CGE model

- MIRAGE model: multi-sector, multi-region, recursive dynamic CGE model of the world economy (Bchir et al, 2002; Decreux and Valin, 2007)
 - Perfect competition in all sectors
 - 5 factors of production: skilled labor, unskilled labor, land, capital, natural resources
 - Rural/ urban segmentation of unskilled labor market: imperfect mobility

MIRAGE model: modifications (1)

1) Unemployment in labor markets (Blanchflower and Oswald 1995)

- Wage curve for all types of workers
- We activate the option only for African countries
- Calibrate with unemployment data from ILOSTAT
- Using standard estimates of elasticity of wages to unemployment: -0.10 (Kingdon, G. and J. Knight, 1999)

| | WAF | CAF | EAF | SAF |
|--------------------------------|------------|------------|------------|------------|
| Skilled workers | 1,4 | 4,7 | 2,0 | 18,4 |
| Unskilled rural workers | 0,7 | 3,2 | 0,5 | 9,6 |
| Unskilled urban workers | 1,0 | 4,1 | 1,6 | 21,7 |

MIRAGE model: modifications (2)

2) Land market

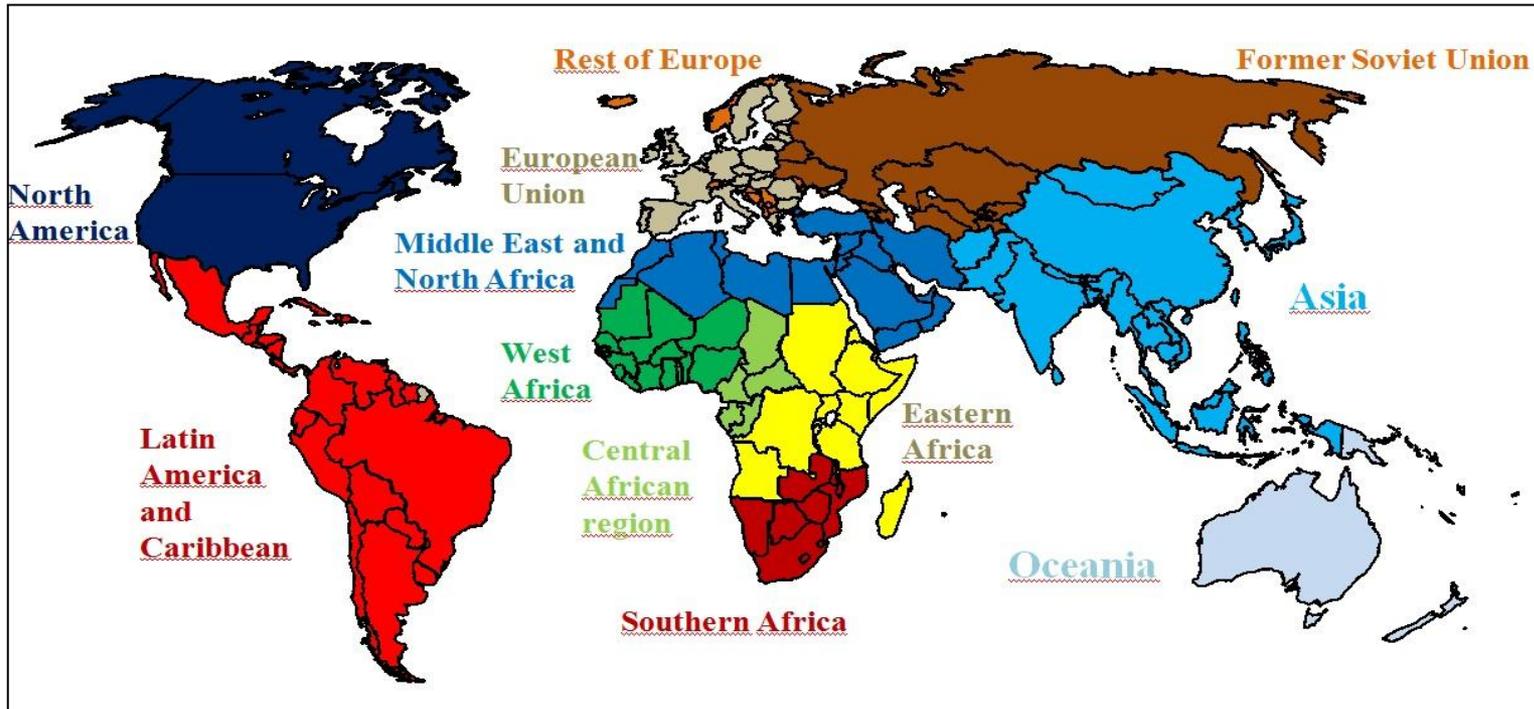
- Standard MIRAGE: endogenous supply of land
- We introduce an exogenous component so that we can simulate land use change by crops

3) Dynamic considerations (Laborde et al 2011)

- Allow for supply response of natural resources, to avoid high increase in prices
- Current account imbalances converge to zero by the end of the period

Data

- GTAP 7.1 (Year 2004)
- 12 regions and 24 sectors (20 agriculture and agro industrial products)



Baselines and scenarios

- Main baseline: FAO perspective 2030/2050 (Alexandratos and Bruinsma 2012)
 - Population increase (Cepii data)
 - GDP increase (Cepii data)
 - Yield
 - Land use
 - With and without unemployment in labor markets
- Alternative baselines:
 - Higher population growth rates (high fertility rate assumption from UN, 2012)
 - Labor market restrictions among unskilled workers employed in the urban and rural sectors (lower substitutability).
- Scenario: 50% productivity(TFP) increase in agriculture in African regions



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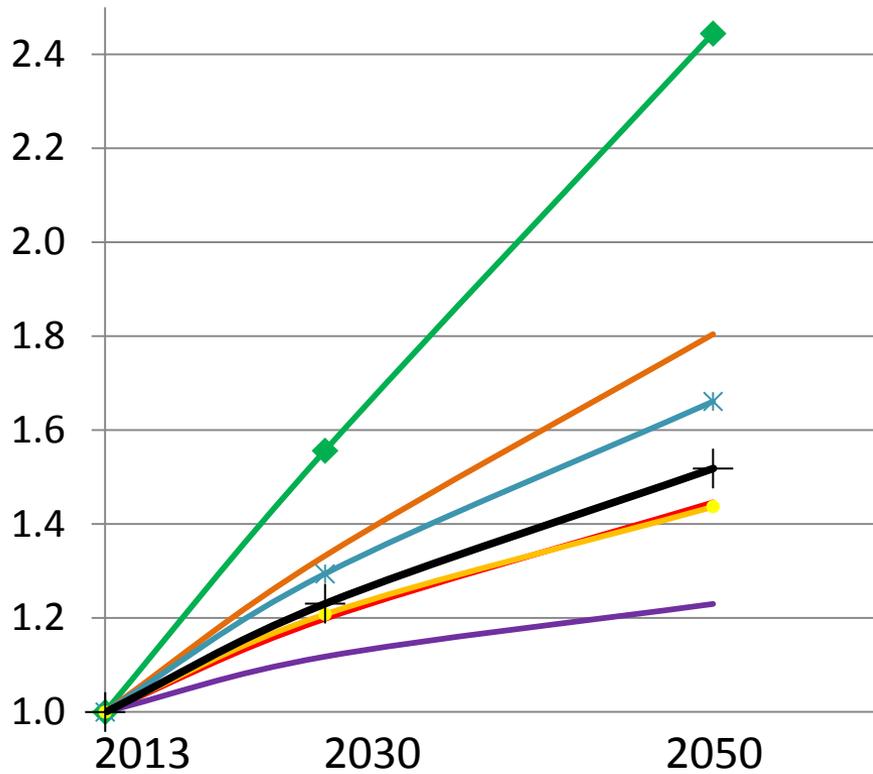
SOME PRELIMINARY RESULTS



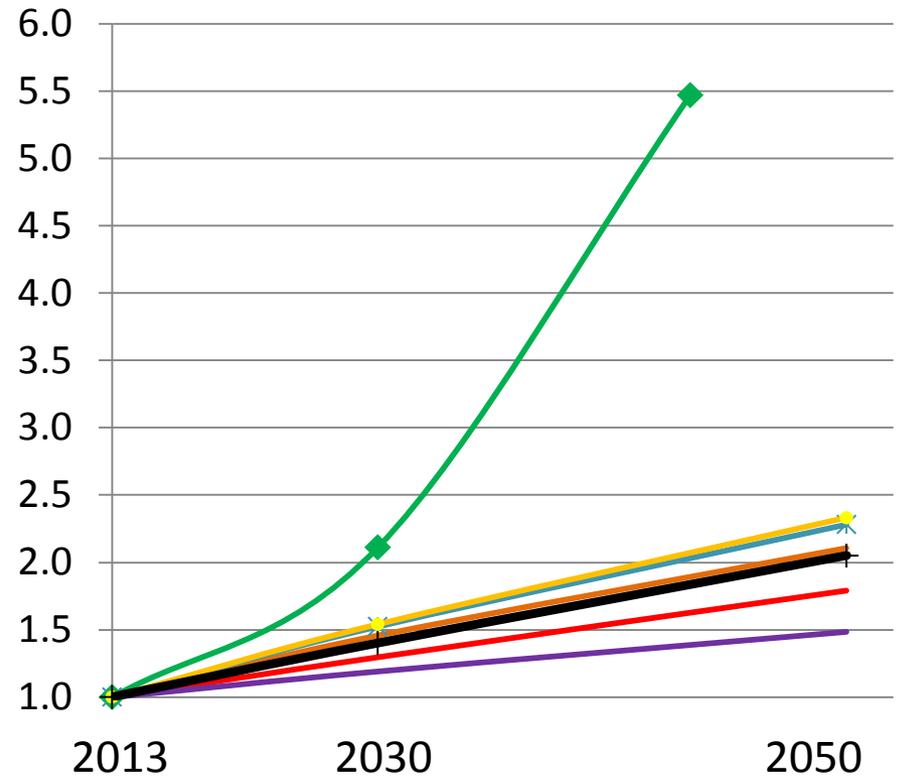
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FAO baseline: Production growth

Agricultural production growth index

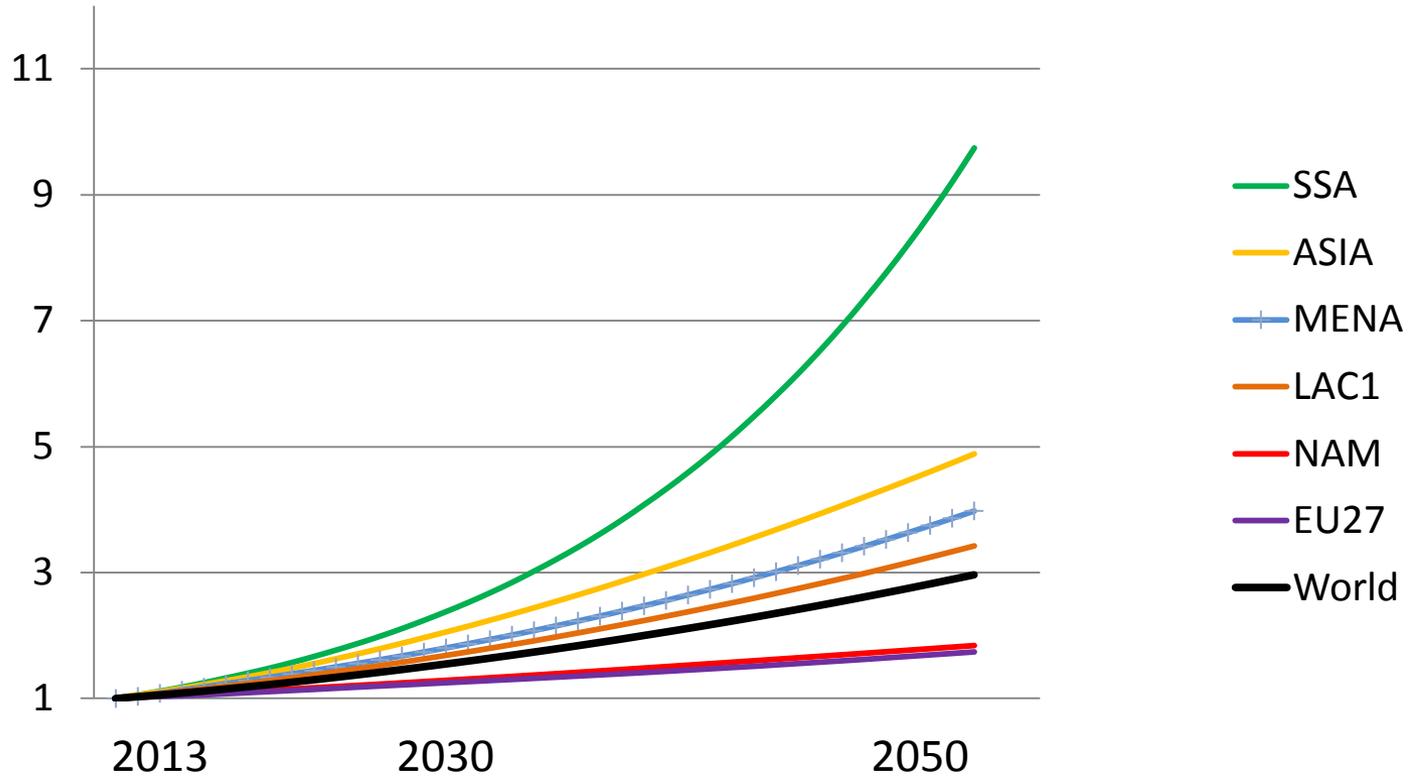


Agrofood industries growth index



◆ SSA — LAC * MENA — NAM ◆ ASIA — EU27 + World

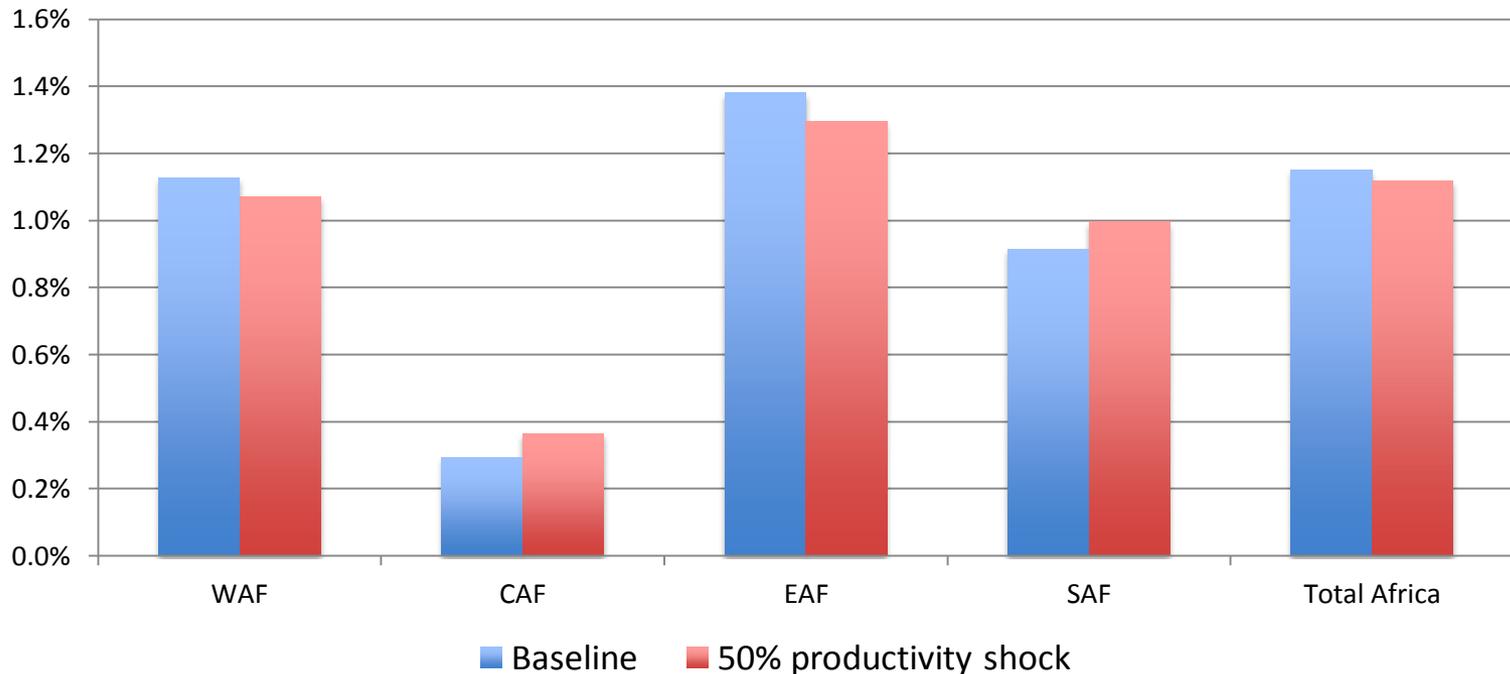
FAO baseline: GDP growth



Differences with usual GDP projections used in Global CGE foresight ? (CEPII)

Introducing unemployment: FAO baseline

Difference in the real GDP in 2050 without unemployment with respect to results with unemployment (%)



Introducing restrictions in rural/urban migration?

- Making urban/rural migration more restrictive benefits rural workers in African regions, as agriculture production increases at a higher rate.
- This is consistent with lower initial unemployment rates among rural workers.
- But there is “hidden” unemployment in rural areas, in the form of informal or subsistence low-paid employment



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CONCLUDING REMARKS



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Further improvements

- Deepen the analysis of the results:
 - At mid-term 2020
 - In terms of
 - Food self-sufficiency
 - Growth part: Labor/land productivity changes, land use vs. Labor force
 - Employment creation
 - Income growth (urban/rural income gap)
- Add additional scenarios
 - What productivity increase is needed to reach CAADP target (6%) ?
- Improve the modelling
 - Additional data (available land)
 - Specifications
 - Linkages with other models



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Concluding remarks

- Agriculture is a major provider of employment in Africa and is bound to continue being so.
- But for agriculture to attract young people, it will need to be:
Profitable Competitive Dynamic
- In the short term, agri food industries seem to better meet the aspirations of many (Leavy 2013) and have a high growth potential.



There is a need to raise awareness on the fact that the agendas of agricultural growth and youth employment complement one another.