The Uneven Transformation Of Rural Africa: Myths, Facts and Pressing Needs

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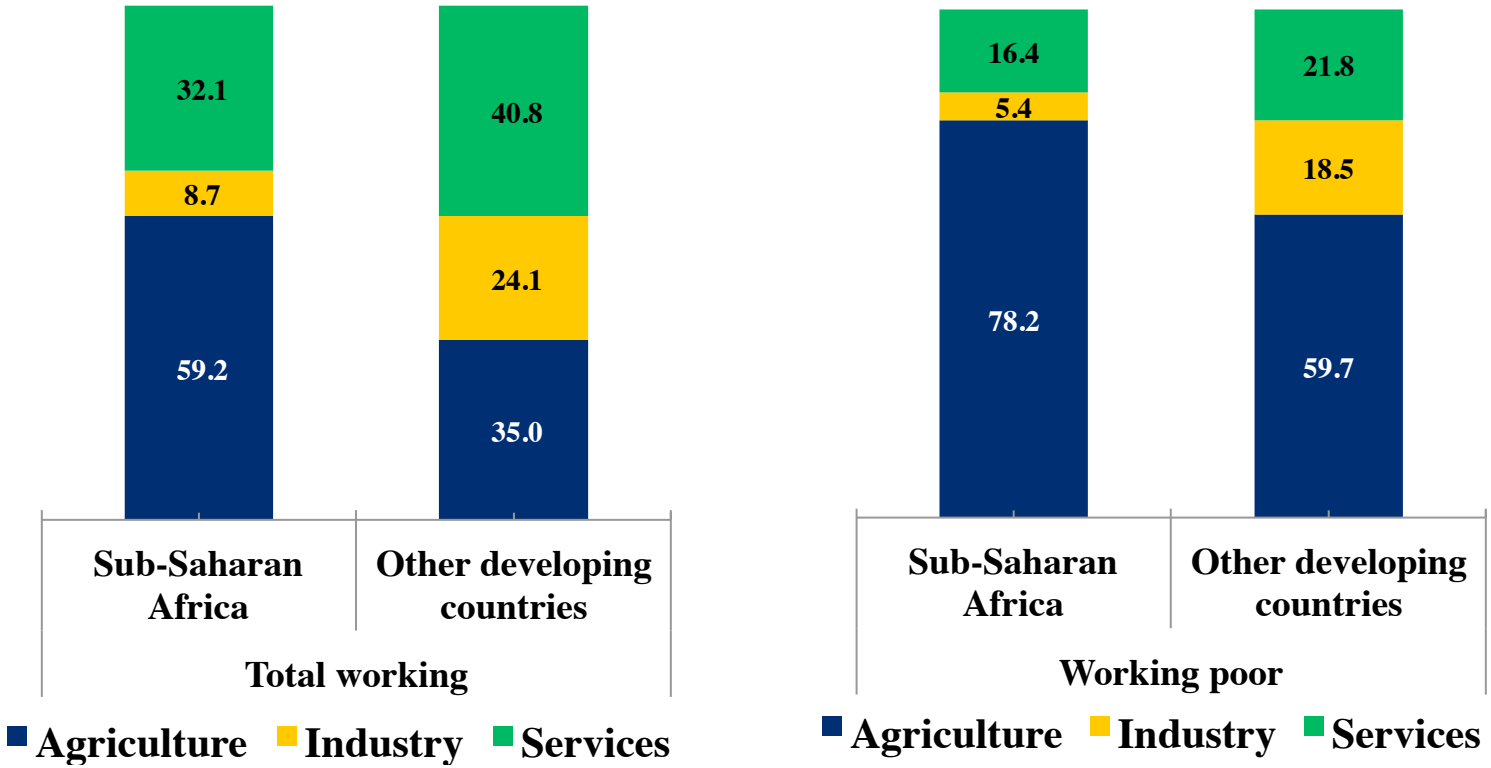
Africa's disproportionate poverty is well known.

The number of extreme poor (≤ $1.90/day pc in 2011 int'l PPP) grew >100 mn, 1990-2013, from 276 to 389 mn, but headcount poverty rate declined from 54%-41%, still 2-5x Asian rate.

By 2030, 4/5 extreme poor will live in Sub-Saharan Africa.

African poverty mainly rural

Almost 4 out of 5 of SSA's working poor employed in agriculture



Source: World Bank, Africa's Pulse vol. 10. International Income Distribution Database.
Notes: The numbers correspond to working age (15-65) population weighted averages of the most recent survey between 2002 and 2012. Average of 33 (20) SSA countries and 66 (41) other developing countries for total working (working poor).

More troubling, much is deep and persistent poverty that is increasingly concentrated in rural SSA.

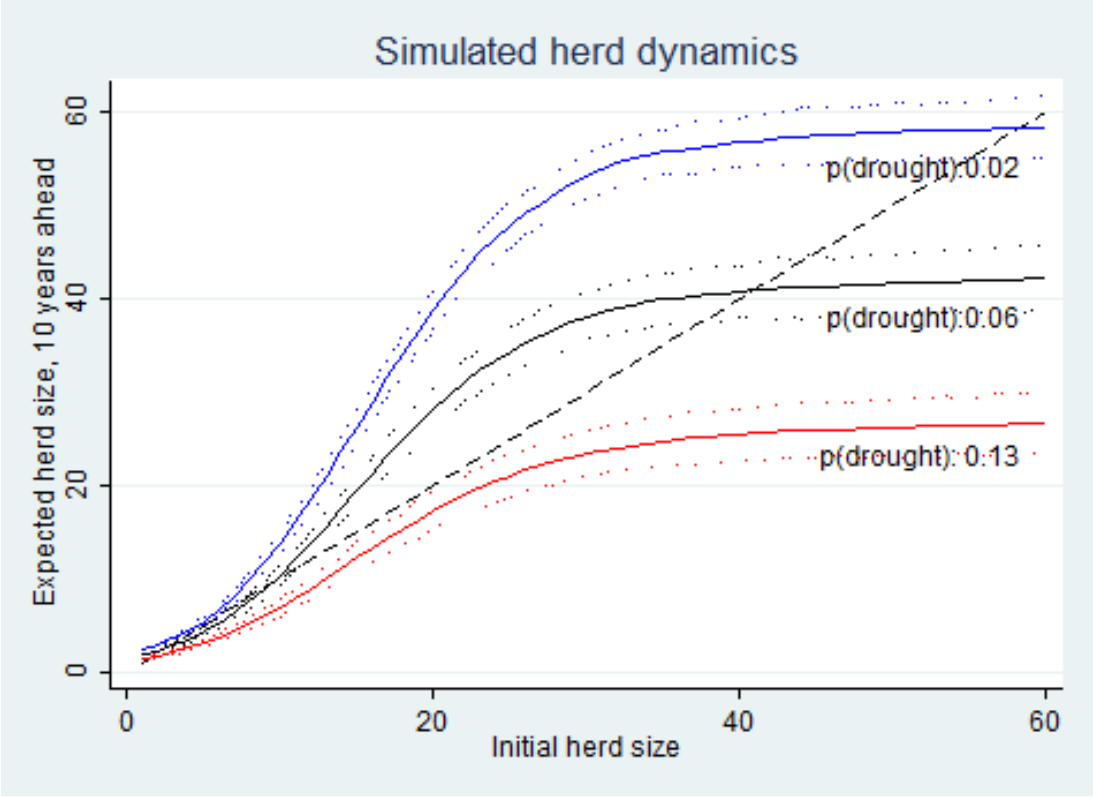
SSA's ultra-poor (≤$0.95/day pc) population grew from 120 to 131 mn, 1990-2013, from 25% to 82% global share.

And serious threats loom!

Ex: East African pastoralist systems exhibit poverty traps arising from drought shocks. What happens if climate shifts?

Herd dynamics differ b/n good and poor rainfall states, so change w/ drought (<250 mm/yr) risk.

In so. Ethiopia, doubling drought risk would lead to expected system collapse if no disruption to current herd dynamics.



Source: Barrett and Santos (*Ecol Econ* 2014)

Innovative response: IBLI

For more information visit www.ilri.org/ibli/

Index-based livestock insurance to protect vs. drought

- Based on remotely sensed NDVI
- Individuals buy policies to protect their herds
- Private underwriters, global reinsurers
- Commercial pilot in 2010; worked in 2011, 2017 droughts
- Scaled out to Ethiopia and nationally in Kenya; Takaful
- Major, positive effects in both countries: 12-20x the marginal benefit/cost of cash transfer programs

African growth

At the same time, Africa is on the move.

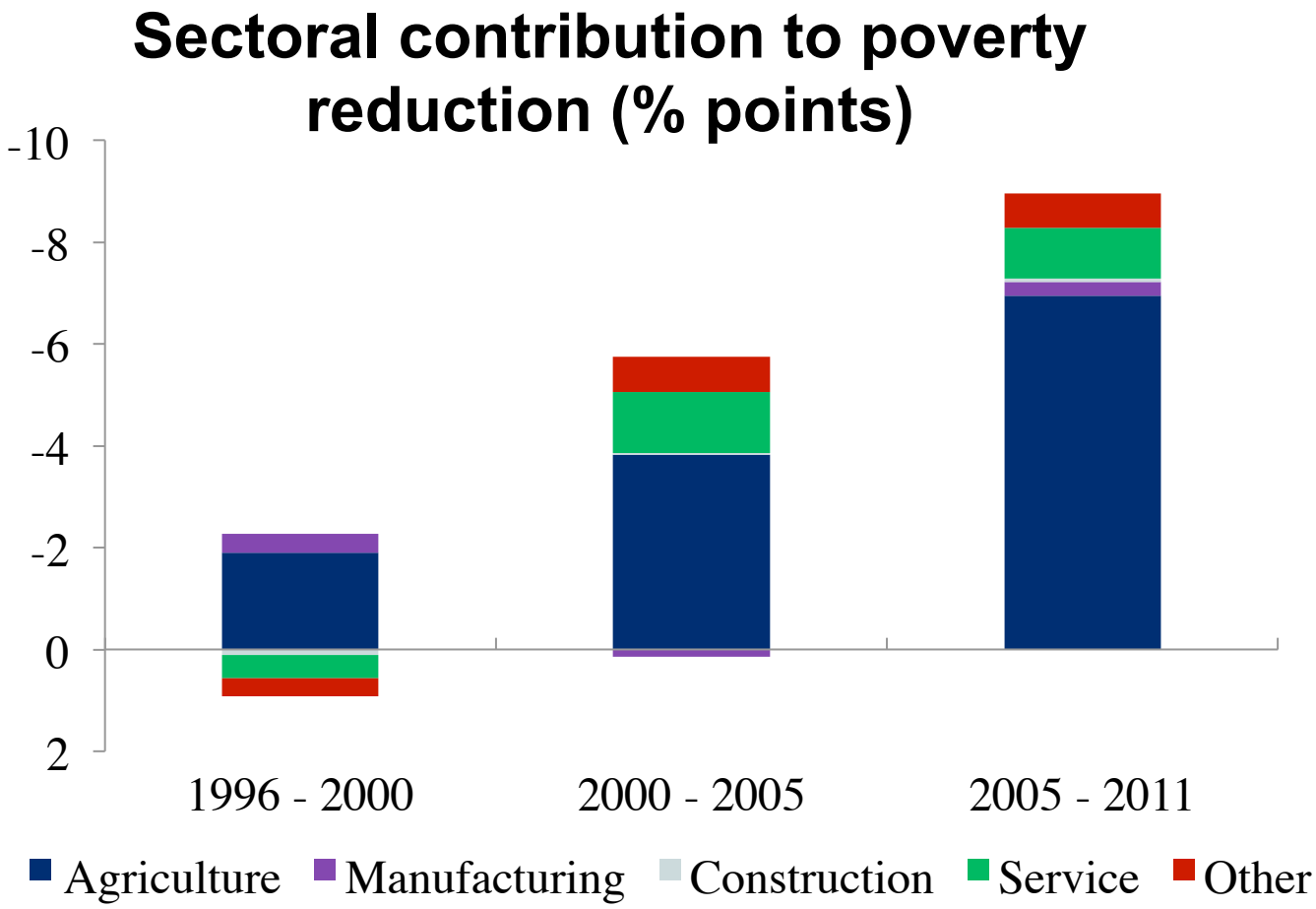
7/14 world's fastest growing economies are in Africa. Agriculture is at the heart of much of that growth.

Fastest real GDP growth, 2010-15		
1	**Ethiopia**	**10.5**
2	China	8.3
3	Papua New Guinea	8.1
4	Lao PDR	8.0
5	**Ghana**	**7.7**
6	Myanmar	7.7
7	**Dem. Rep. Congo**	**7.6**
8	Panama	7.5
9	India	7.3
10	**Zimbabwe**	**7.1**
11	**Rwanda**	**7.1**
12	**Mozambique**	**7.0**
13	Cambodia	7.0
14	**Tanzania**	**6.8**

Annual average real GDP growth, 2010-15.
Data source: World Bank

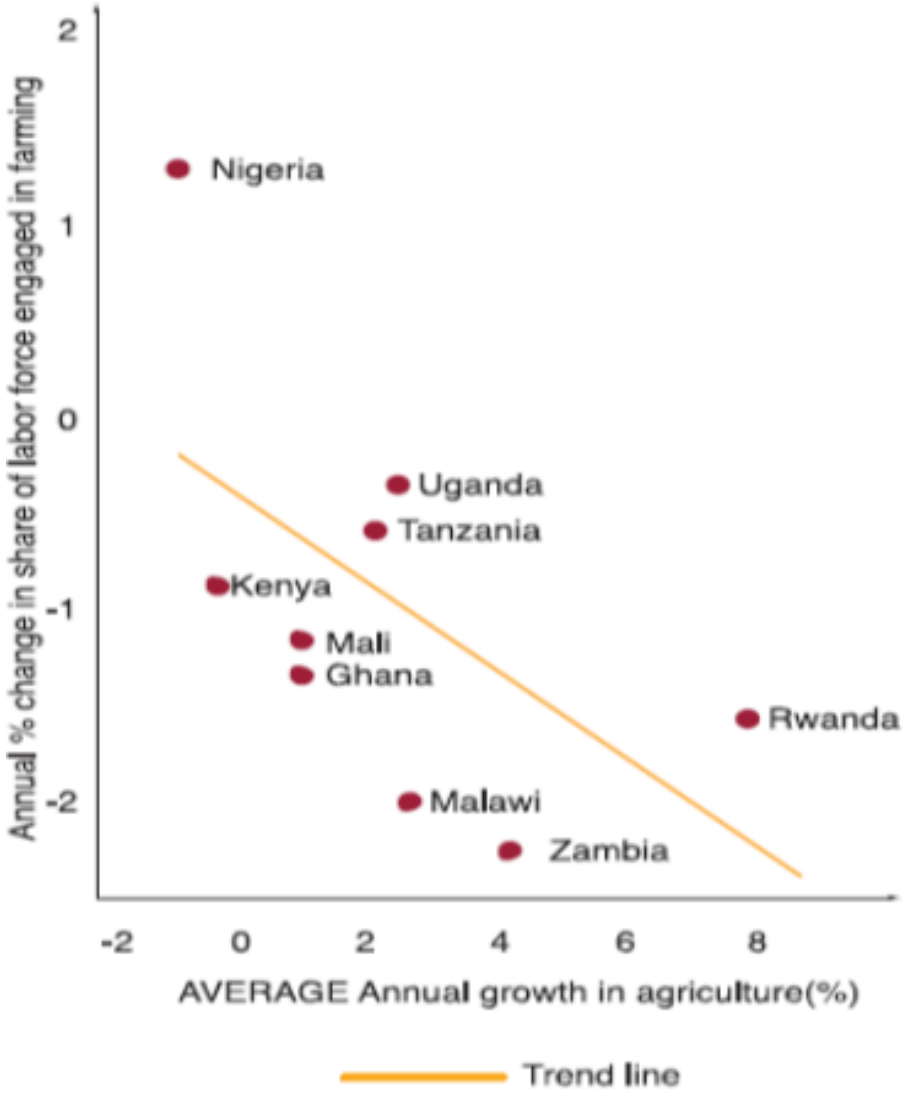
Ag-led poverty reduction

Ethiopia since 1996: growth in agriculture has contributed most to poverty reduction



Source: Hill & Tsehaye, 2014, *Growth, Safety Nets and Poverty-Assessing Progress in Ethiopia from 1996 to 2011*

Structural transformation



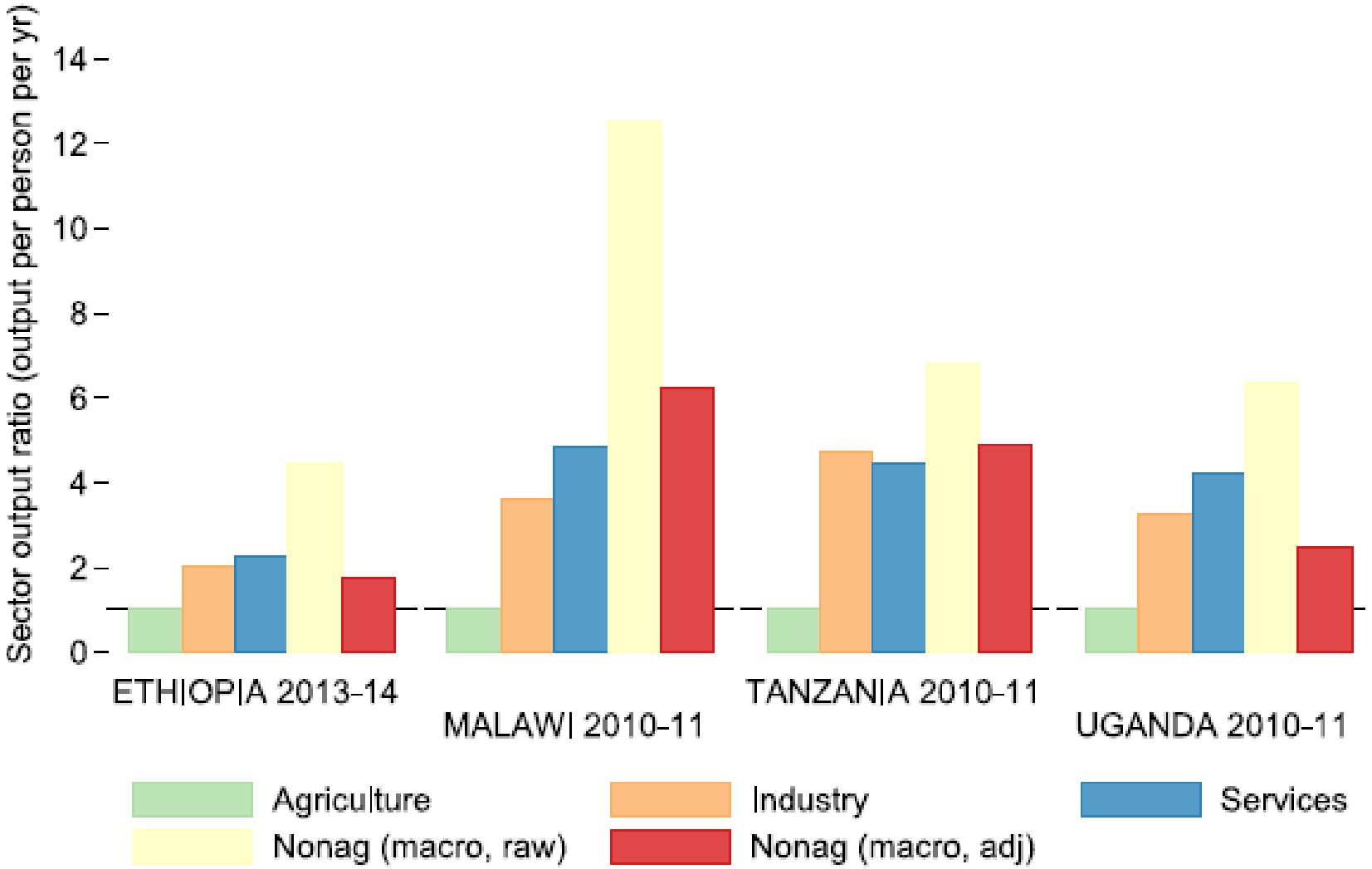
Source: *Yeboah and Jayne (2016)*

As ag growth picks up, exits from ag accelerate.

Ag share of employment in SSA falling ~1%/yr … 2+%/yr in fastest growing ag sectors

Structural transformation

Big inter-sectoral differences in avg labor productivity/worker-yr



Source: McCullough, *Food Policy* 2017

Structural transformation

But those primarily employed in agriculture work far fewer hours per year than those primarily employed outside ag.

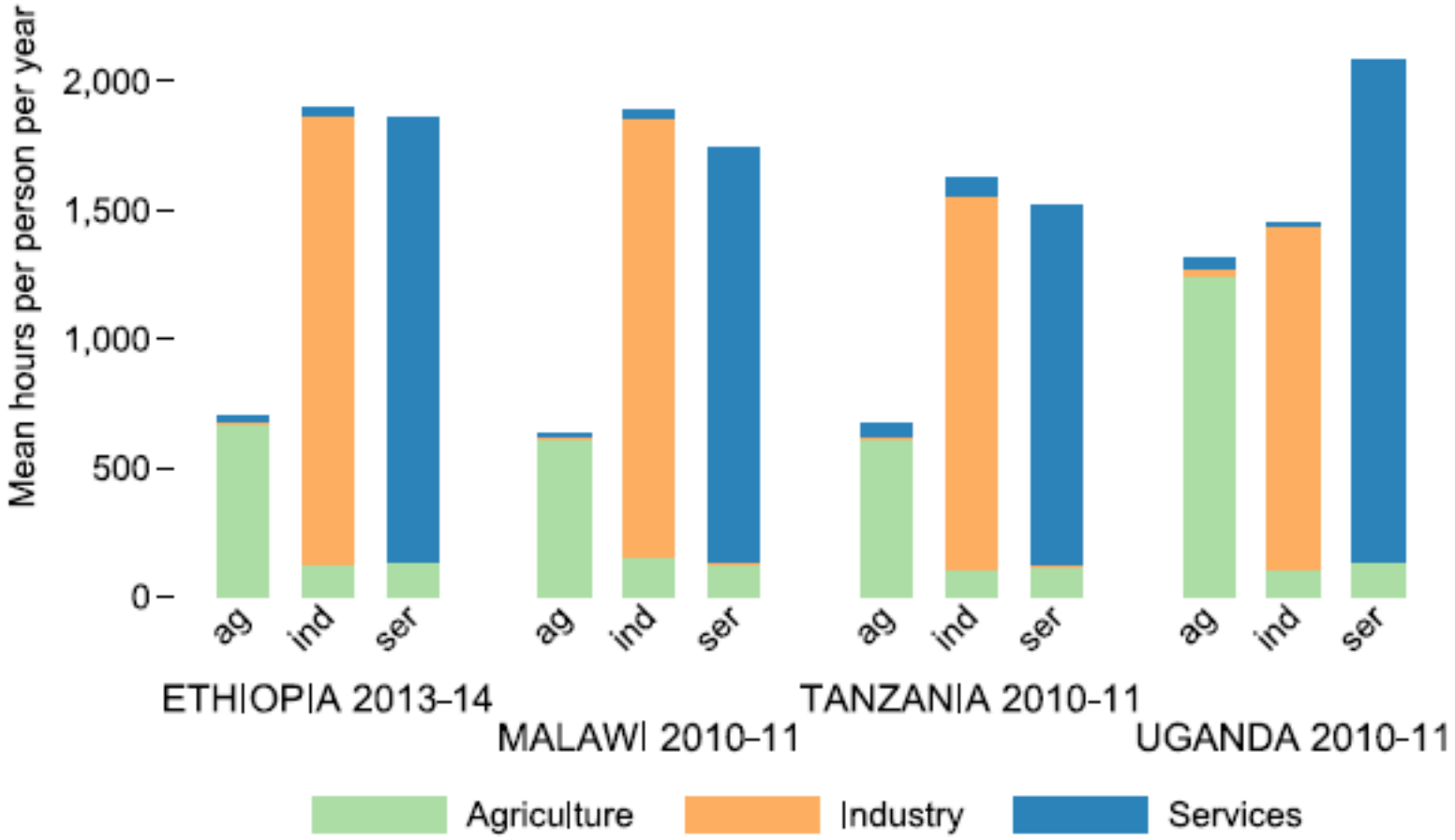


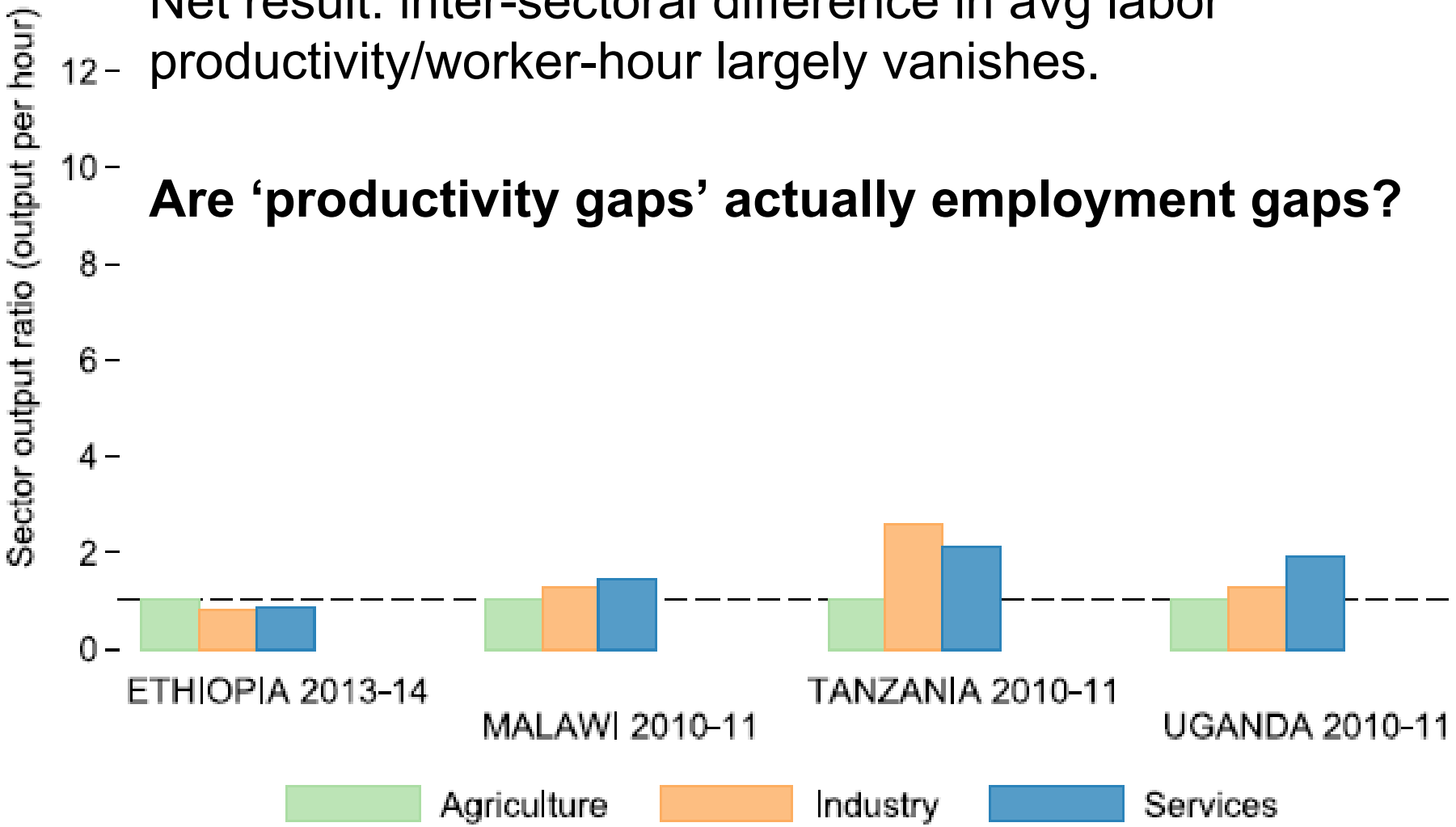
Fig. 3. Average hours supplied by individuals to all sectors, categorized by each individual's primary sector of participation.

Source: McCullough, *Food Policy* 2017

Structural transformation

Net result: inter-sectoral difference in avg labor productivity/worker-hour largely vanishes.

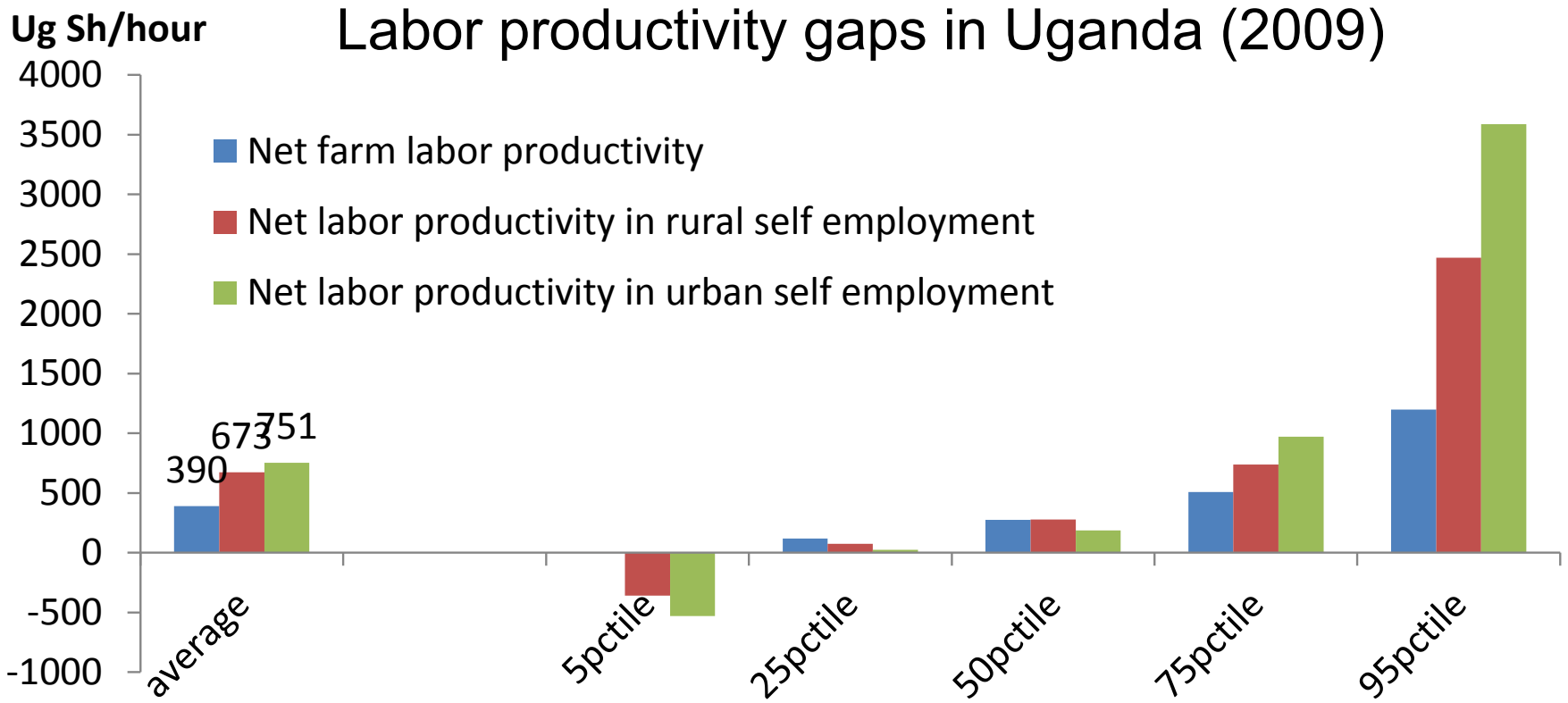
Are 'productivity gaps' actually employment gaps?



Source: McCullough, *Food Policy* 2017

Structural transformation

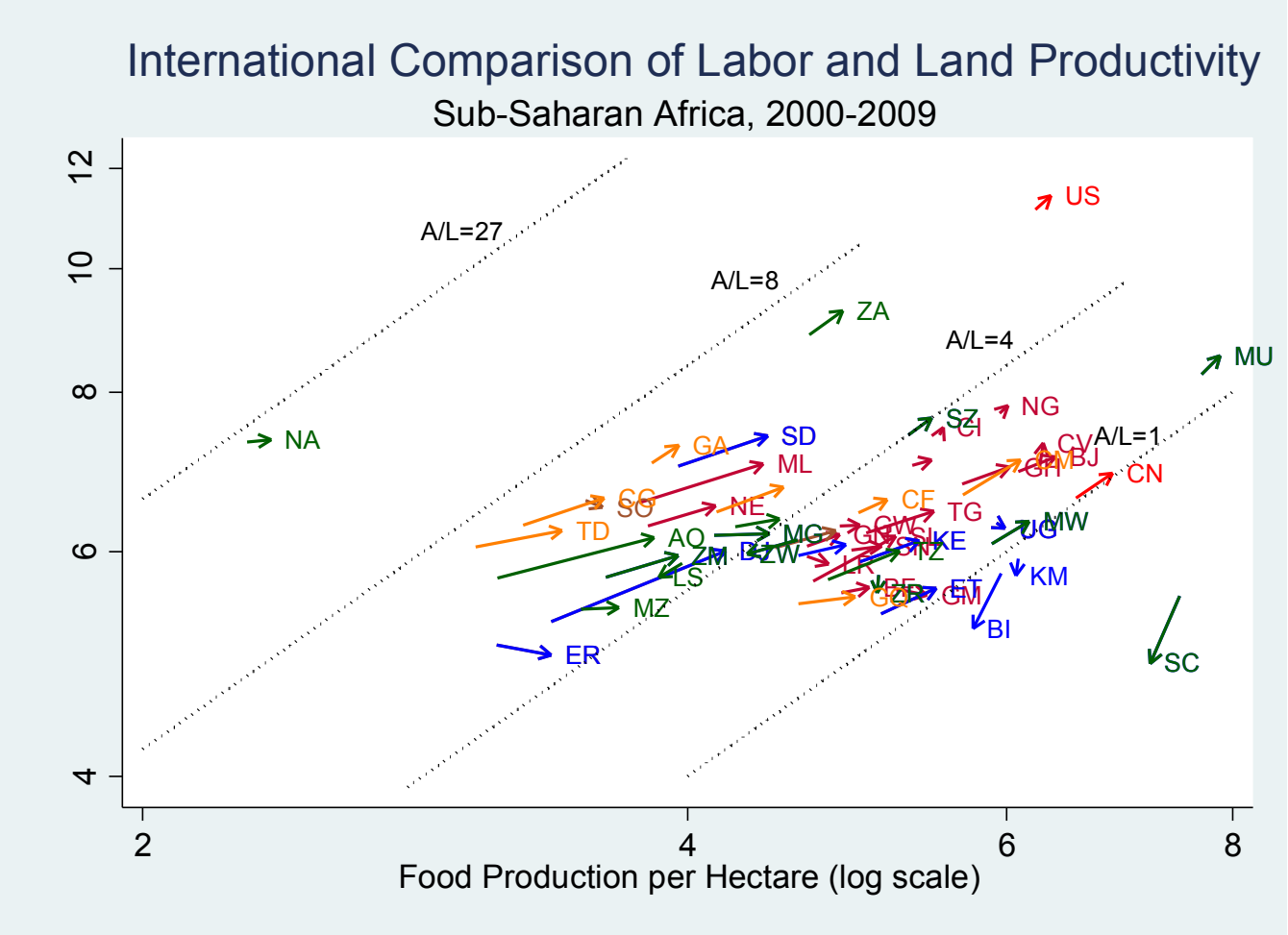
Indeed, the labor productivity gaps within sectors appear far larger than among them, suggesting that ag productivity growth remains crucial



Source: Christiaensen and Kaminski, 2014

African ag tech change

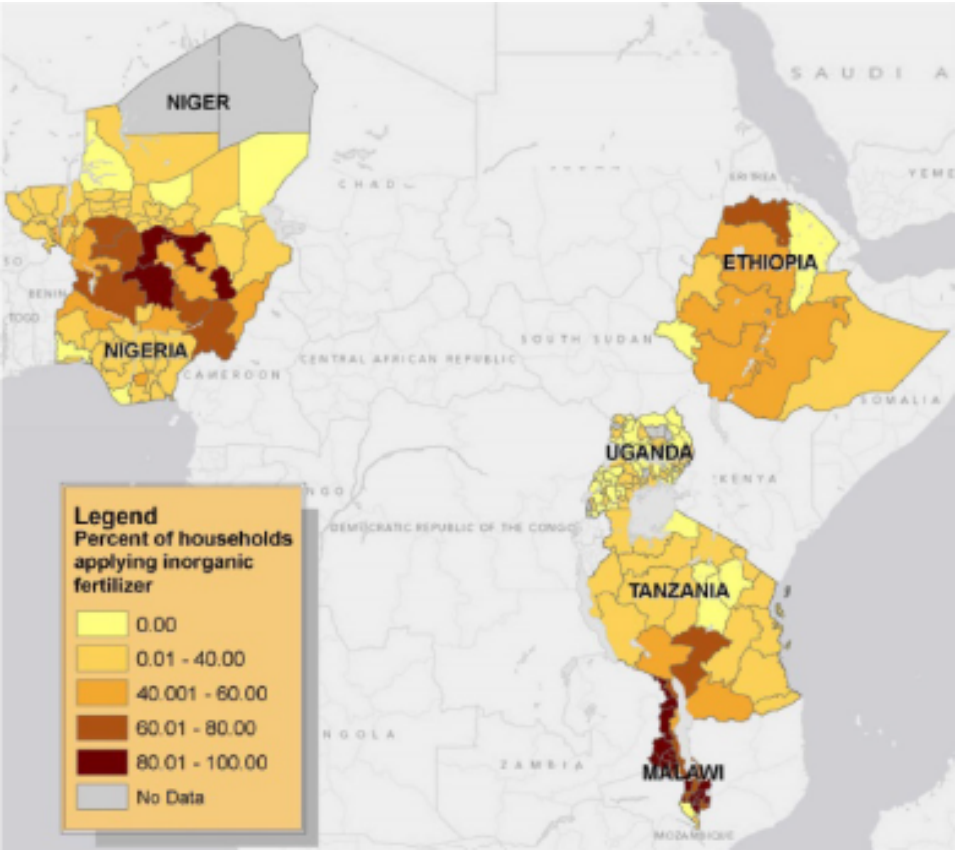
But ag growth has not been as poverty reducing as it might. Gains coming mainly in land rather than labor productivity.

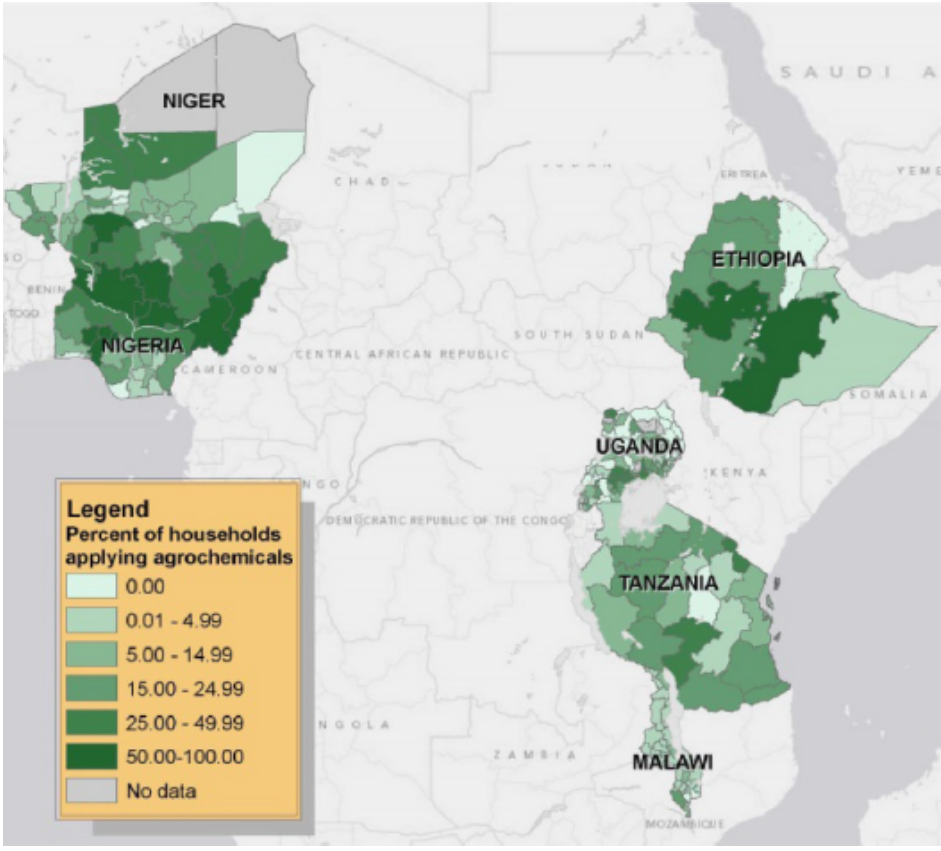


(Source: Barrett and Upton 2013)

Heterogeneous uptake of innovations

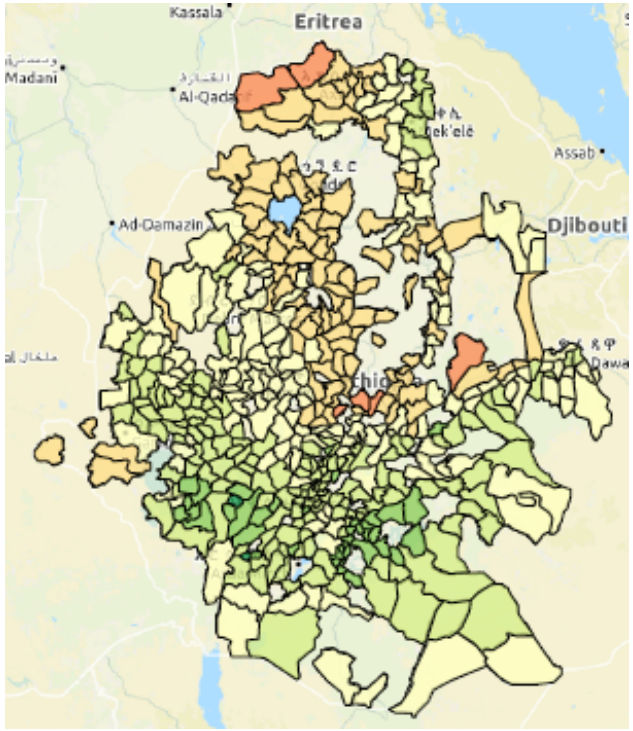
LSMS-ISA data show that uptake of modern fertilizer/agro-chemical uptake varies both within and among countries.





Sheahan and Barrett, *Food Policy 2017*

African ag tech change Likely reflects heterogeneous returns due to soils, weather, market access, etc.



Probably relatedly, a number of recent studies find spatially heterogeneous returns to inputs:

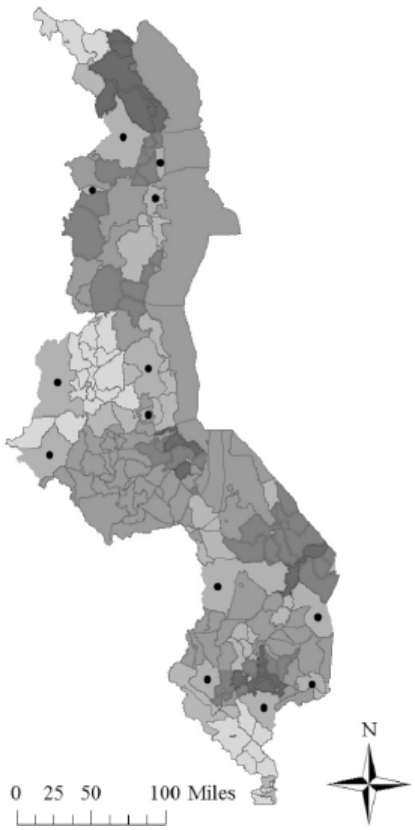
Suri (*EMTRA* 2011) – Kenya hybrid maize seed

McCullough et al. (WP 2016) - Ethiopia fertilizer

Burke et al. (*AgEcon* 2016) -

- Zambia fertilizer

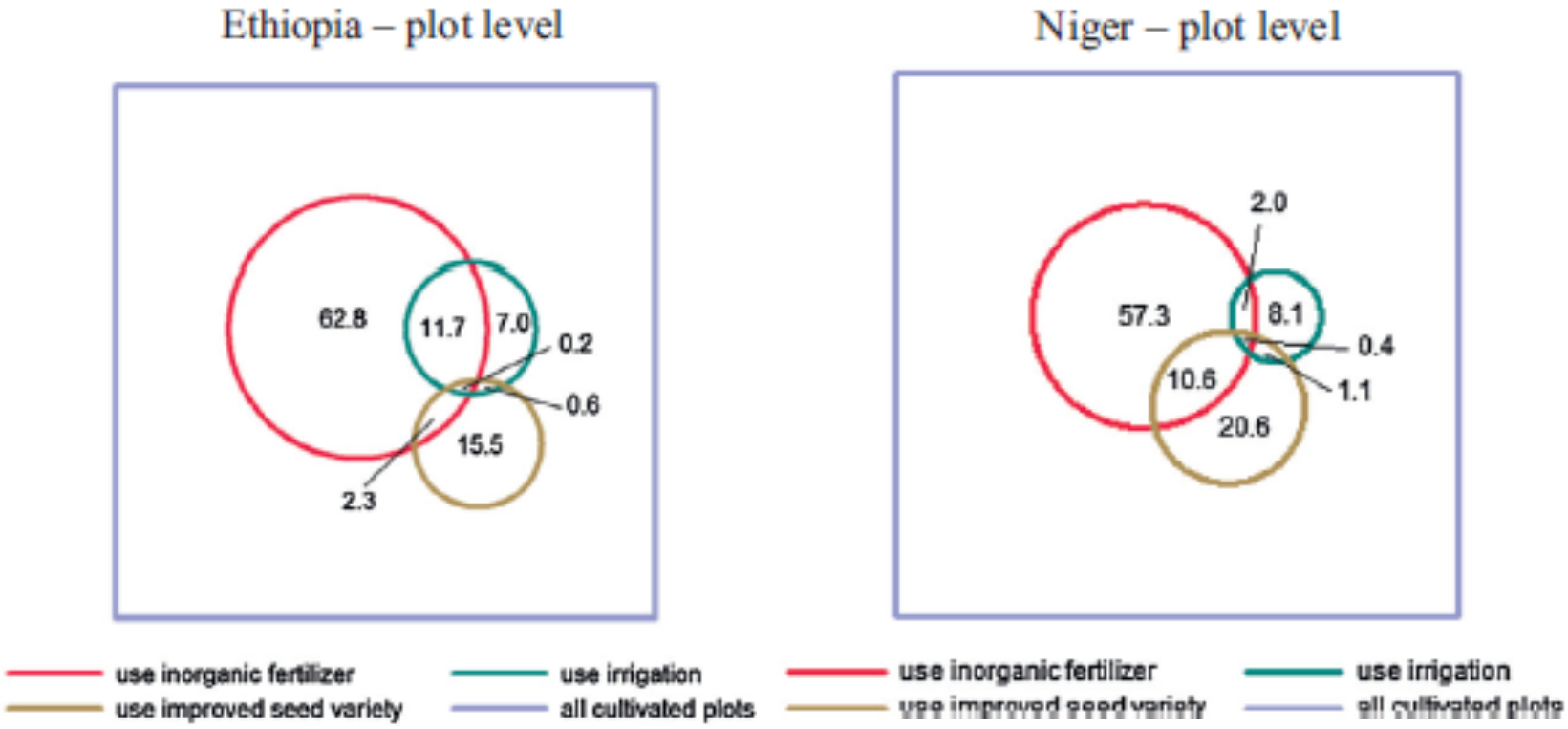
Harou et al. (*JAfrEcon* 2017) - Malawi fertilizer



https://www.ag-analytics.org/AgRiskManagement/EthiopiaGeoApp

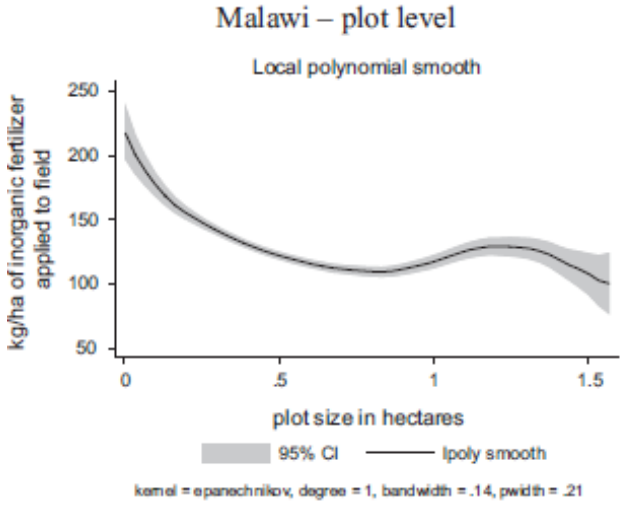
Uneven adoption even within households

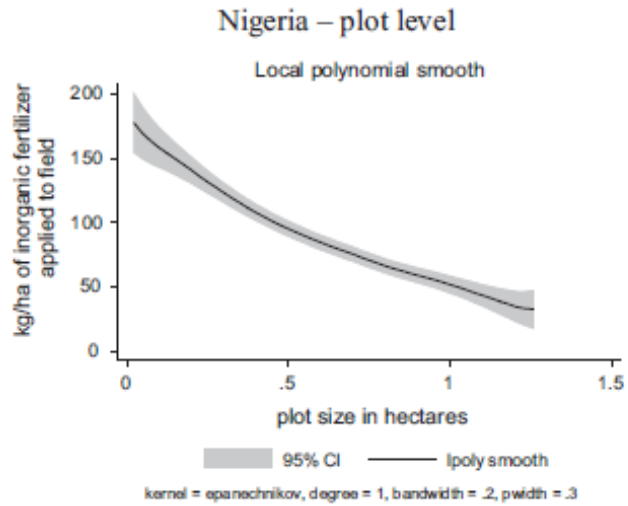
LSMS-ISA data show little joint uptake of modern ag inputs despite agronomic synergies and contrary to ISFM principles.



(Sheahan & Barrett, *Food Policy* 2017)

Plot-level inverse size-productivity relation





(Sheahan & Barrett, *Food Policy* 2017)

Plot-level input application and productivity varies inversely w/plot size. True *within-hh* and w/controls for soil quality and actual size, so *not* due to ORV, measurement error, or heterogeneous shadow prices.

Adoption varies even across plots w/n hh … why? Edge effects hypothesis?

(Barrett, Bellemare & Hou *WD* 2010; Carletto, Savastano & Zezza *JDE* 2013; Bevis & Barrett, 2017 WP)

African ag tech change

National-level factors explain nearly half of the farm-level variation in inorganic fertilizer and agro-chemical use.

Variation in household-level inorganic fertilizer use

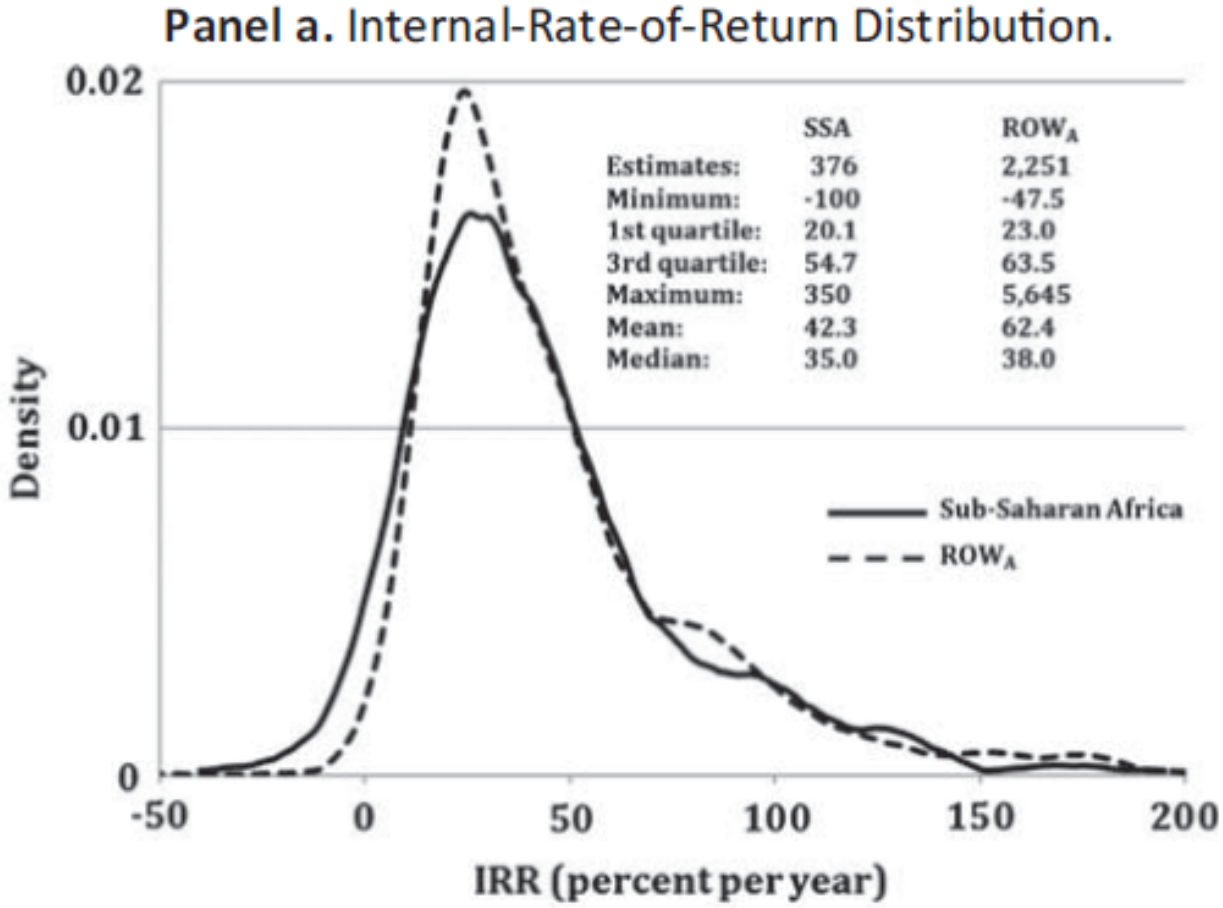
Categories of variables	Shapley value
Bio-physical variables: rain, soil, elevation, maximum greenness, agro-ecological zones	24
Socio-economic variables: consumption level, sex of household head, household size and dependency ratio	4
Farm characteristic variables: farm size, number of crops, type of crops	16
Market and accessibility variables: distance to market and road, prices of fertilizer and main grain	11
Country dummy variables	**45**

(Sheahan & Barrett, *Food Policy* 2017)

- Ultimately interested to learn where most of the variation in input use comes from: *biophysical, infrastructure, market, socio-economic, or policy-specific variables?*
- Binary use at household level (avoids bias from survey design)
- ***45 percent*** of variation in inorganic fertilizer use can be explained by country level (similar for agro-chem)

Suggests the policy and operating environments facilitated by governments and regional processes (e.g., CAADP) are critically important to ag productivity growth in SSA.

Undersupply of ag R&D in SSA evident in very high rates of return on investment



(Pardey et al., *Food Policy* 2016)

Ag factor markets

Labor markets more active than often realized.

Percent of agricultural households hiring labor

Country	Activity	Number of households	Percent hiring workers
Ethiopia	*Cultivation*	3091	18.5%
	Harvest	2666	20.9%
	Overall	2666	30.2%
Malawi	*Non-harvest*	2605	32.6%
	Harvest	2605	16.0%
	Overall	2605	42.0%
Niger	*Preparation*	2339	19.5%
	Cultivation	2339	37.4%
	Harvest	2339	18.6%
	Overall	2339	47.8%
Tanzania	*Planting*	2630	18.5%
	Weeding	2630	18.9%
	Fertilizing	2630	2.6%
	Harvest	2630	16.0%
	Overall	2630	30.8%
Uganda	*Overall*	2109	46.8%

Dillon & Barrett (*Food Policy* 2017)

Ag factor markets

The same holds for land markets, too.

Participation in land rental markets

	Ethiopia	Malawi	Niger	Tanzania	Uganda
N	3094	2666	2339	2630	2135
Household rents land out	6.10%	0.90%	1.20%	3.40%	0.40%
Household rents land in	19.50%	13.10%	7.30%	6.20%	18.10%
Household rents or borrows land in	30.30%	28.40%	27.70%	23.20%	36.60%

Clearly factor markets have sufficient transactors to be competitive. Yet market failures pervasive and structural.

Dillon & Barrett (*Food Policy 2017*)

Ag output markets

Market access and prices

Transport costs have big impact on food prices (Dillon & Barrett *AJAE* 2016)

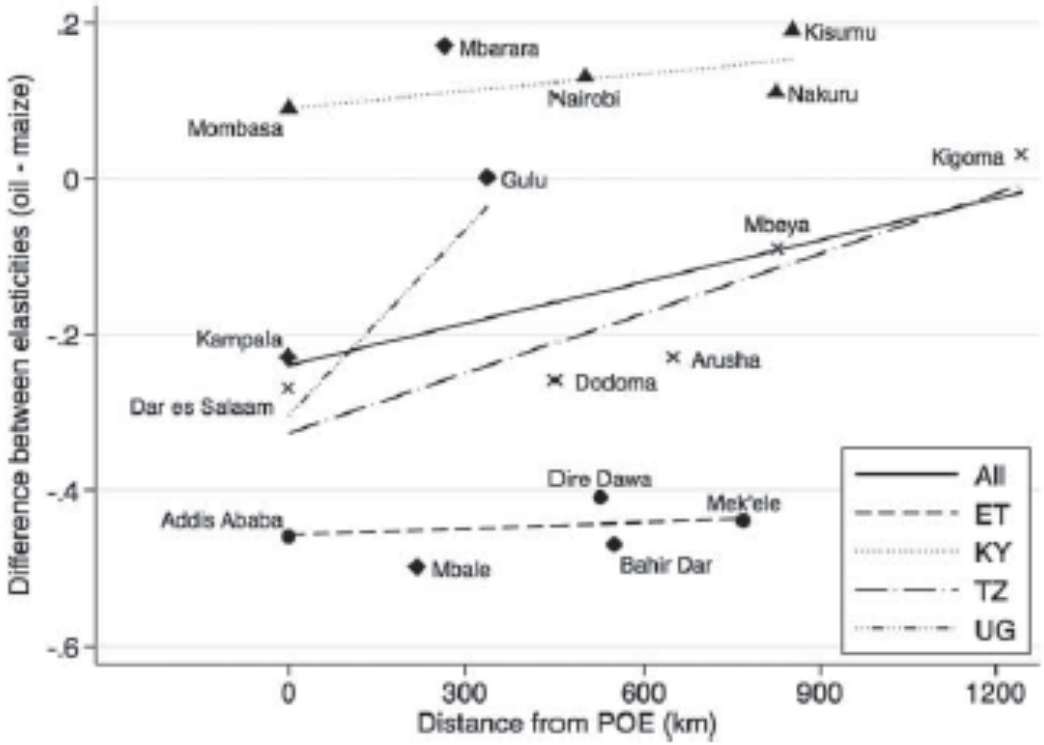
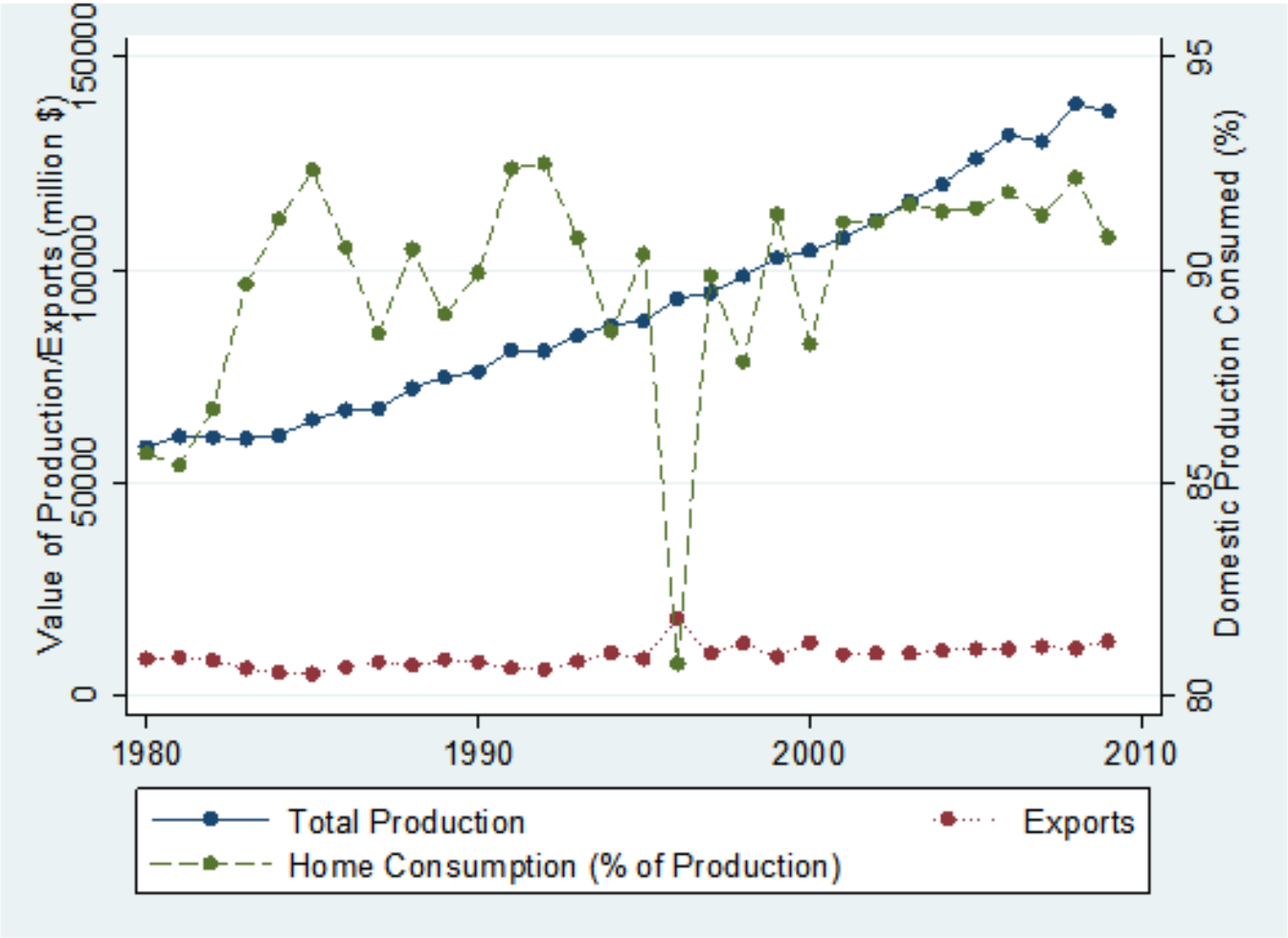


Figure 4. (Elasticity of local maize to global oil) – (Elasticity of local maize to global maize) plotted against distance from POE

Burkina Faso school feeding program and cowpeas (Harou et al. *WD* 2013) – trader seasonality, market access and bulking

Ag output markets

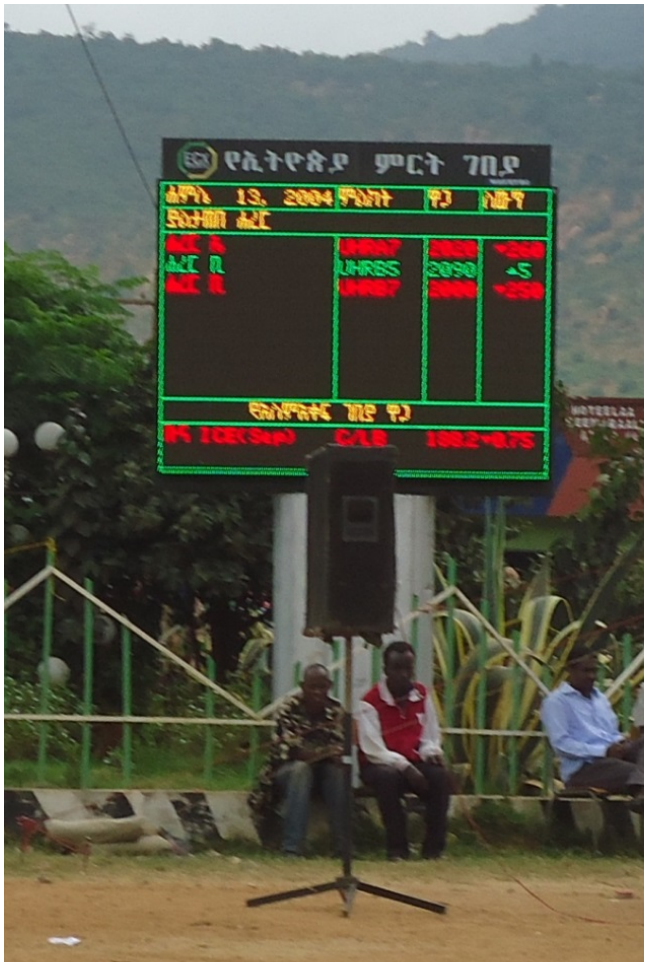
Domestic, not export, markets are the big drivers of value chain development. 80-95% of food consumed/grown in same country.



(Barrett and Upton 2013)

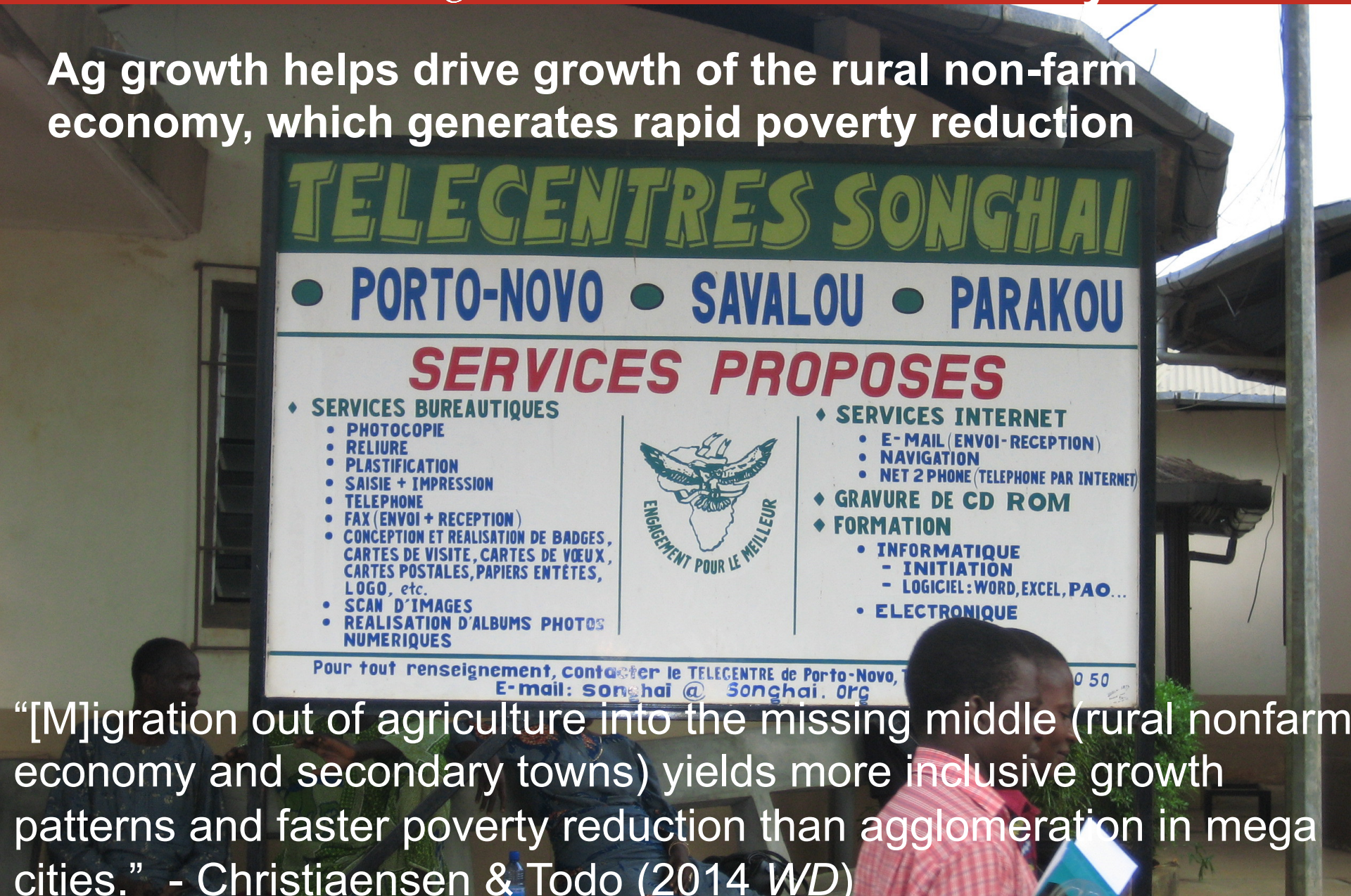
Ag output markets

Changes are occurring quickly … esp. through ICT and improved contracting institutions.
e.g., Ethiopian Commodities Exchange, outgrower schemes



Rural non-farm economy

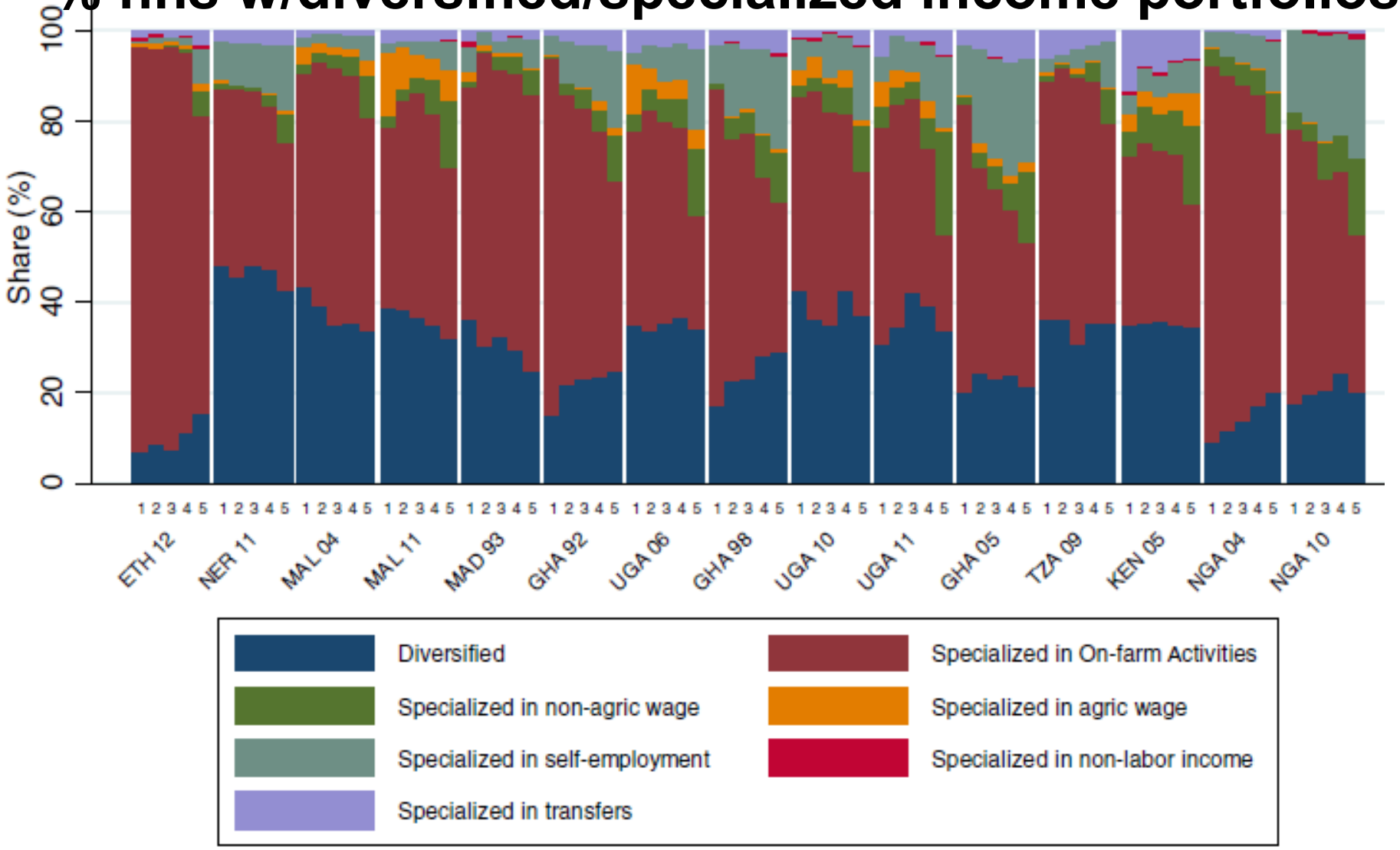
Ag growth helps drive growth of the rural non-farm economy, which generates rapid poverty reduction



"[M]igration out of agriculture into the missing middle (rural nonfarm economy and secondary towns) yields more inclusive growth patterns and faster poverty reduction than agglomeration in mega cities." - Christiaensen & Todo (2014 *WD*)

Rural non-farm economy

% hhs w/diversified/specialized income portfolios



(Davis et al. *Food Policy 2017*)

Rural non-farm economy

Technologies to reduce transactions costs and enhance financial access accelerate transformation.

"the spread of mobile money helped raise at least 194,000 households out of extreme poverty, and induced 185,000 women to switch into business or retail as their main occupation."
– Suri & Jack 2016 *Science*

Policy priorities for SSA

Six broad policy interventions key to accelerating inclusive and sustainable rural transformation in SSA.

1. Invest in physical and institutional infrastructure to remedy deficiencies that impede markets and differentially penalize agriculture.
2. Address the water and soil constraints that hold back agricultural productivity.
3. Invest in the development and diffusion of new agricultural technologies appropriate to SSA.
4. Focus as much on the post-harvest value chain and the rural non-farm economy as on farm-level production.
5. Encourage the emergence of rural financial institutions and products.
6. Build rural human capital through improved preventive and curative health care and primary and secondary education systems.

(Barrett et al. *J. African Economies 2017*)


Thank you for your time and interest!