

A young child with dark skin and short hair, wearing a red t-shirt with a grey rectangular patch on the chest, stands amidst a dense field of tall green crops. The child is looking directly at the camera with a neutral expression, their right hand near their mouth. The background is filled with lush green foliage, including tall stalks and broad leaves, creating a textured and vibrant setting.

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

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University of Edinburgh
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Africa's disproportionate poverty is well known.

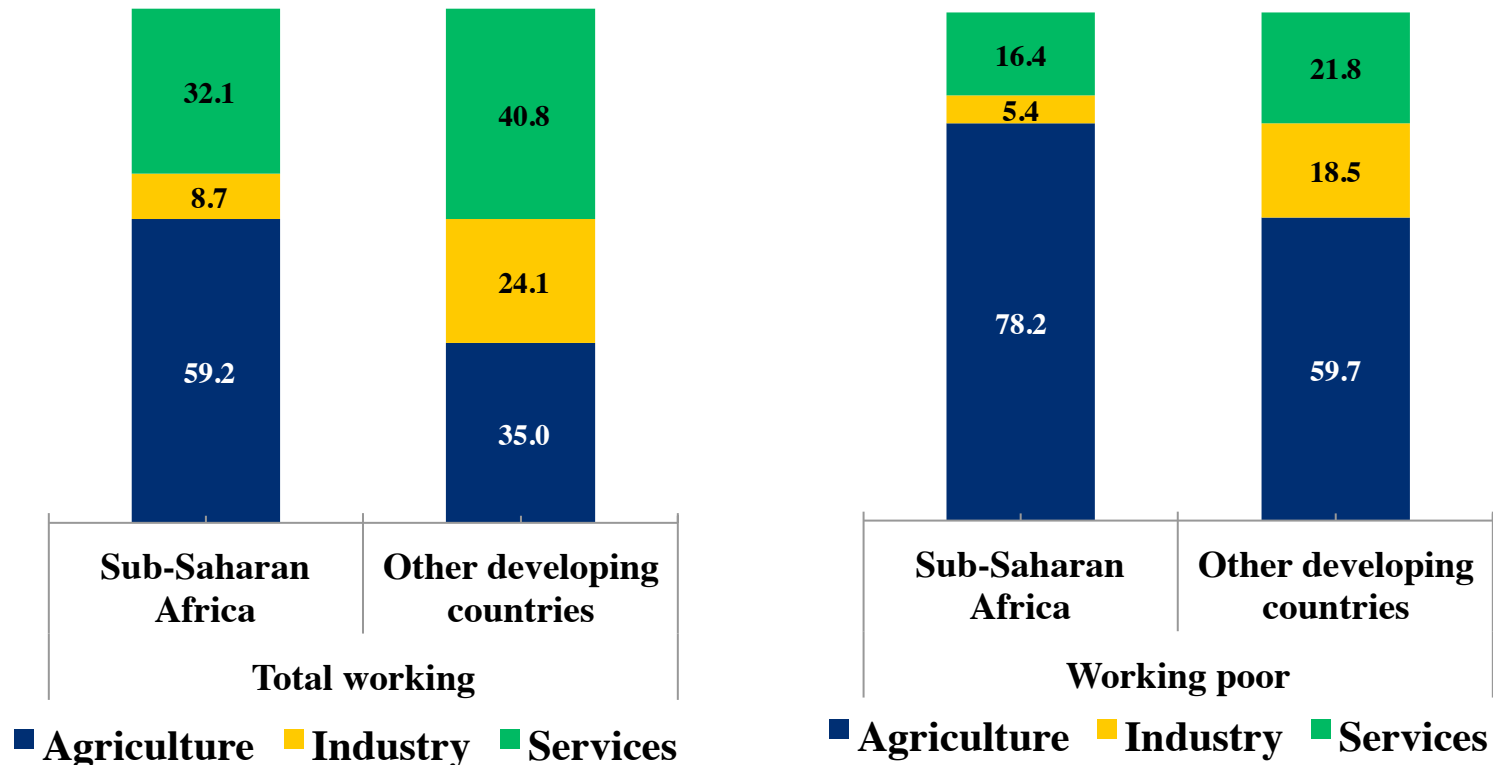
The number of extreme poor ($\leq \$1.90/\text{day pc}$ in 2011 int'l PPP) grew >100 mn, 1990-2013, from 276 to 389 mn, but headcount poverty rate declined from 54%-41%, still 2-5x Asian rate.

By 2030, 4/5 of world's extreme poor will live in SS Africa.





Almost 4 out of 5 of SSA's working poor employed in agriculture.
Poverty is overwhelmingly rural still.



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 ($\leq \$0.95/\text{day pc}$) population grew from 120 to 131 mn, 1990-2013, from 25% to 82% global share. Compelling evidence of poverty traps in some settings.



Conflict is the common factor in the places showing the least progress (most regress) in poverty.



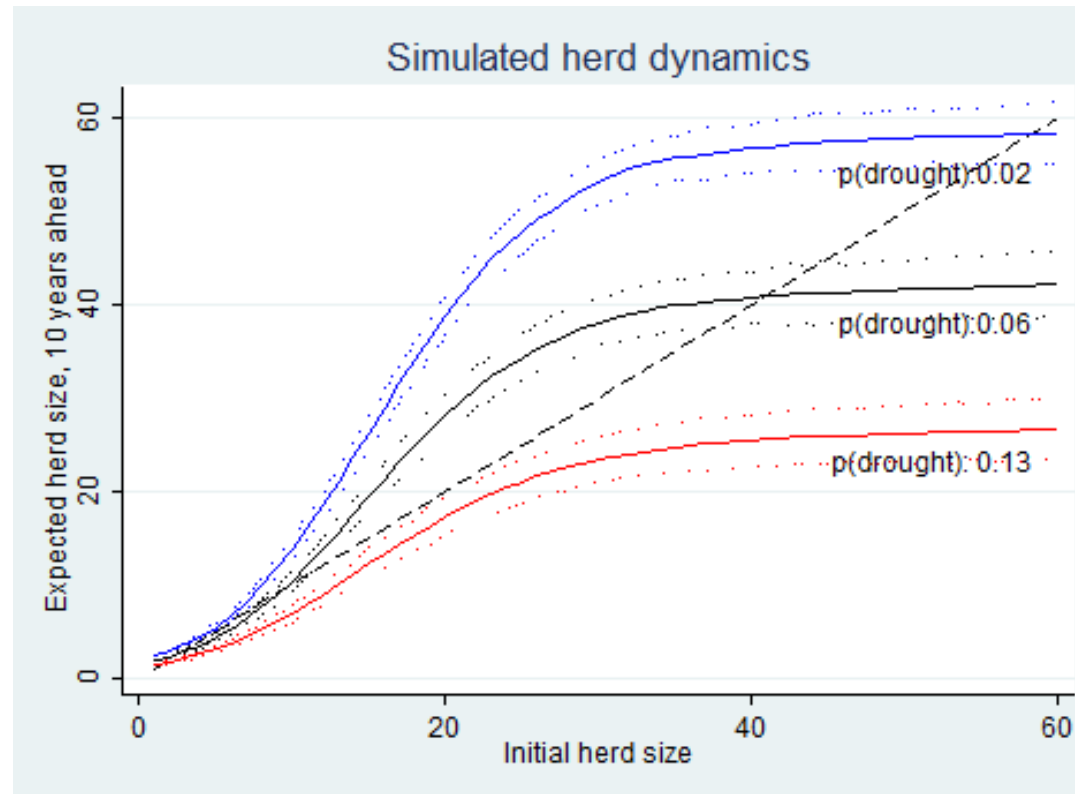
- High direct costs of conflict (on health, education, prices, productivity, etc. as well as direct loss of lives and property) but conflict risk exposure even bigger effects. (Rockmore *WBER* 2016)
- Risk preference and other behavioral effects persist for years (Rockmore, Barrett & Annan 2017)



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.





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



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

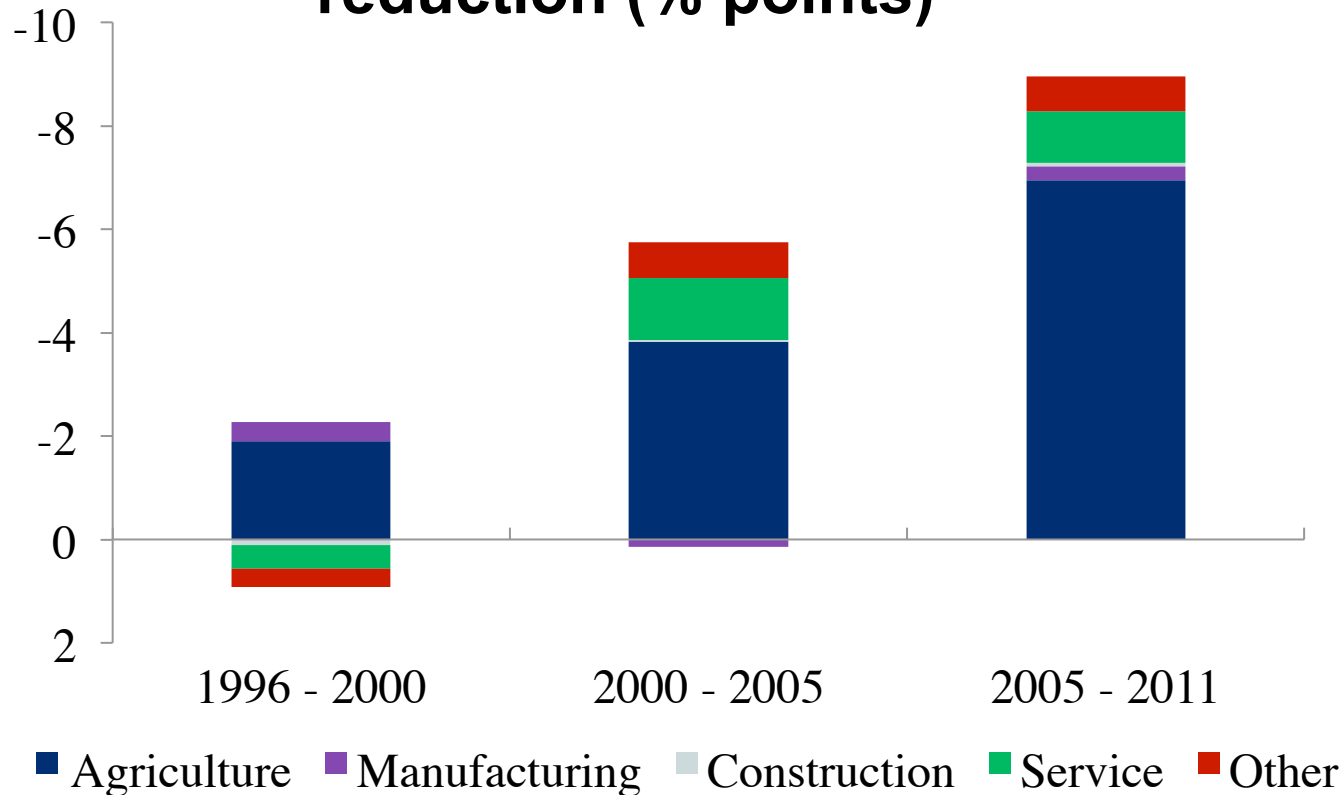
1	Ethiopia	10.5
2	China	8.3
3	Papua New Guinea	8.1
4	Lao PDR	8.0
5	Ghana	7.7
6	Myanmar	7.7
7	Dem. Rep. Congo	7.6
8	Panama	7.5
9	India	7.3
10	Zimbabwe	7.1
11	Rwanda	7.1
12	Mozambique	7.0
13	Cambodia	7.0
14	Tanzania	6.8

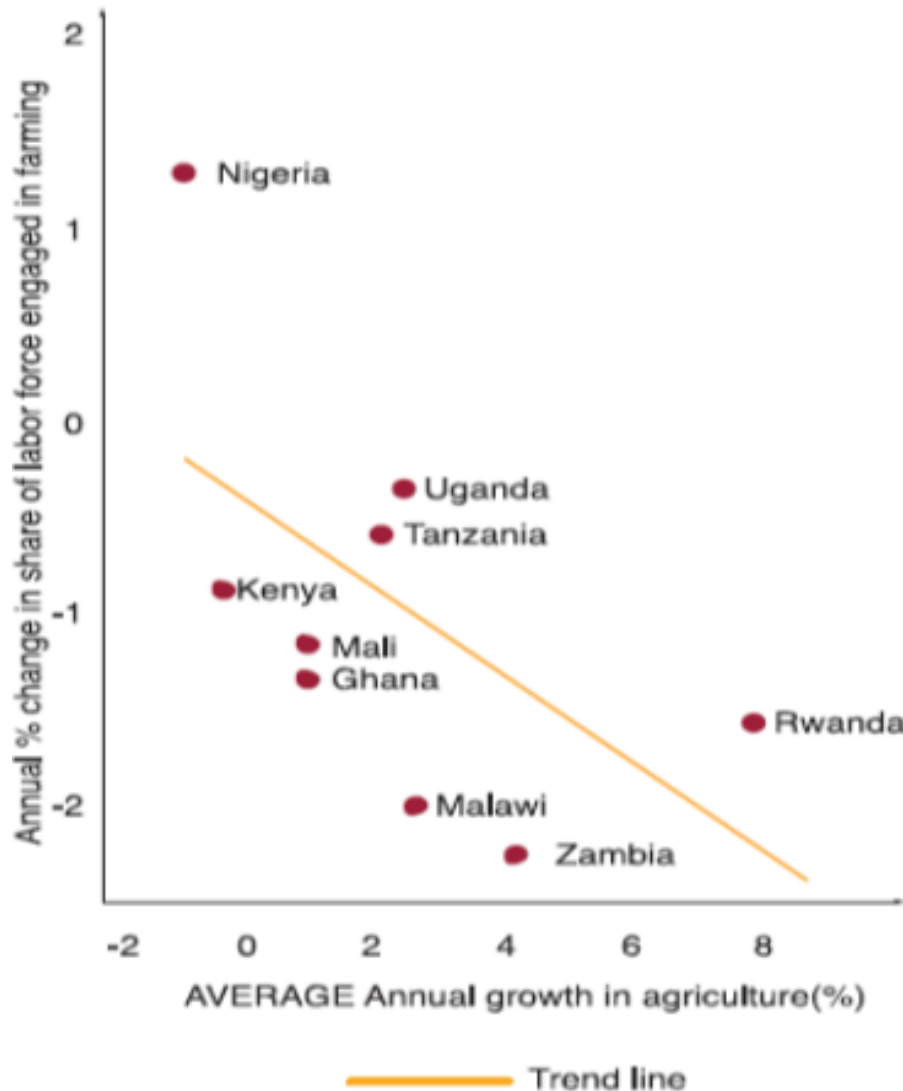
Annual average real
GDP growth, 2010-15.
Data source: World Bank



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

Sectoral contribution to poverty reduction (% points)





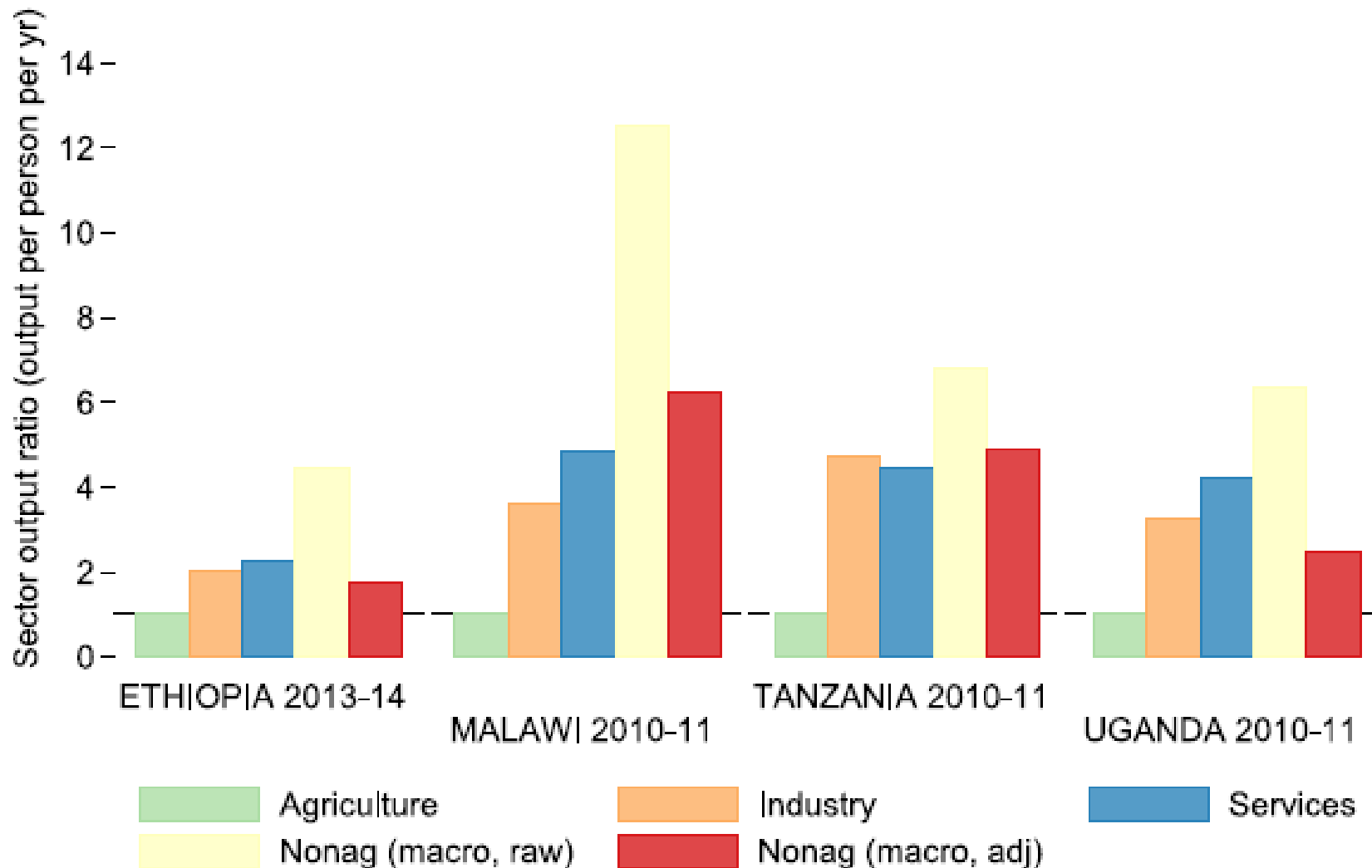
Source: Yeboah and Jayne (2016)

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



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



Source: McCullough, *Food Policy* 2017



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

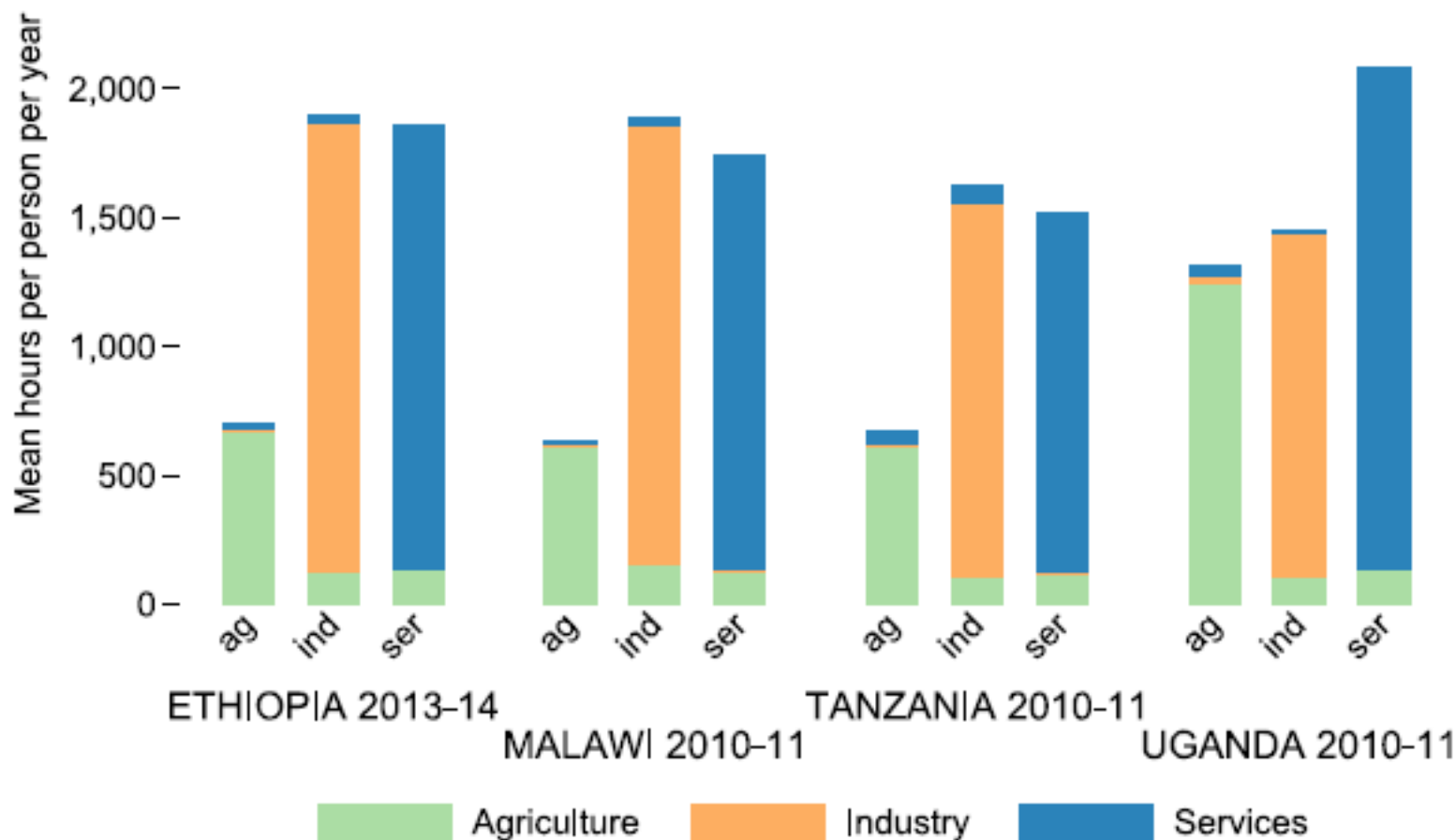


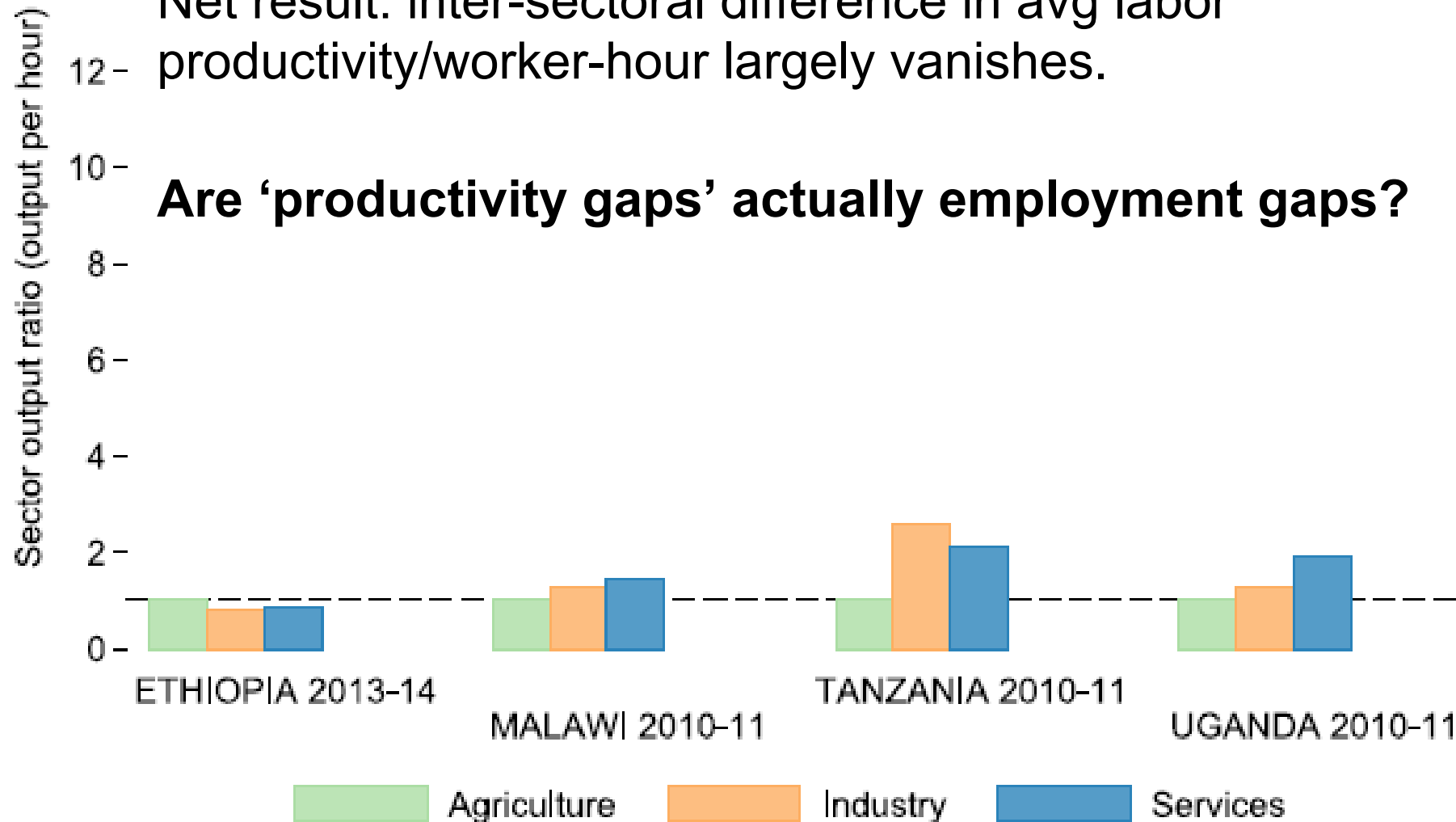
Fig. 3. Average hours supplied by individuals to all sectors, categorized by each individual's primary sector of participation.

Source: McCullough, *Food Policy* 2017



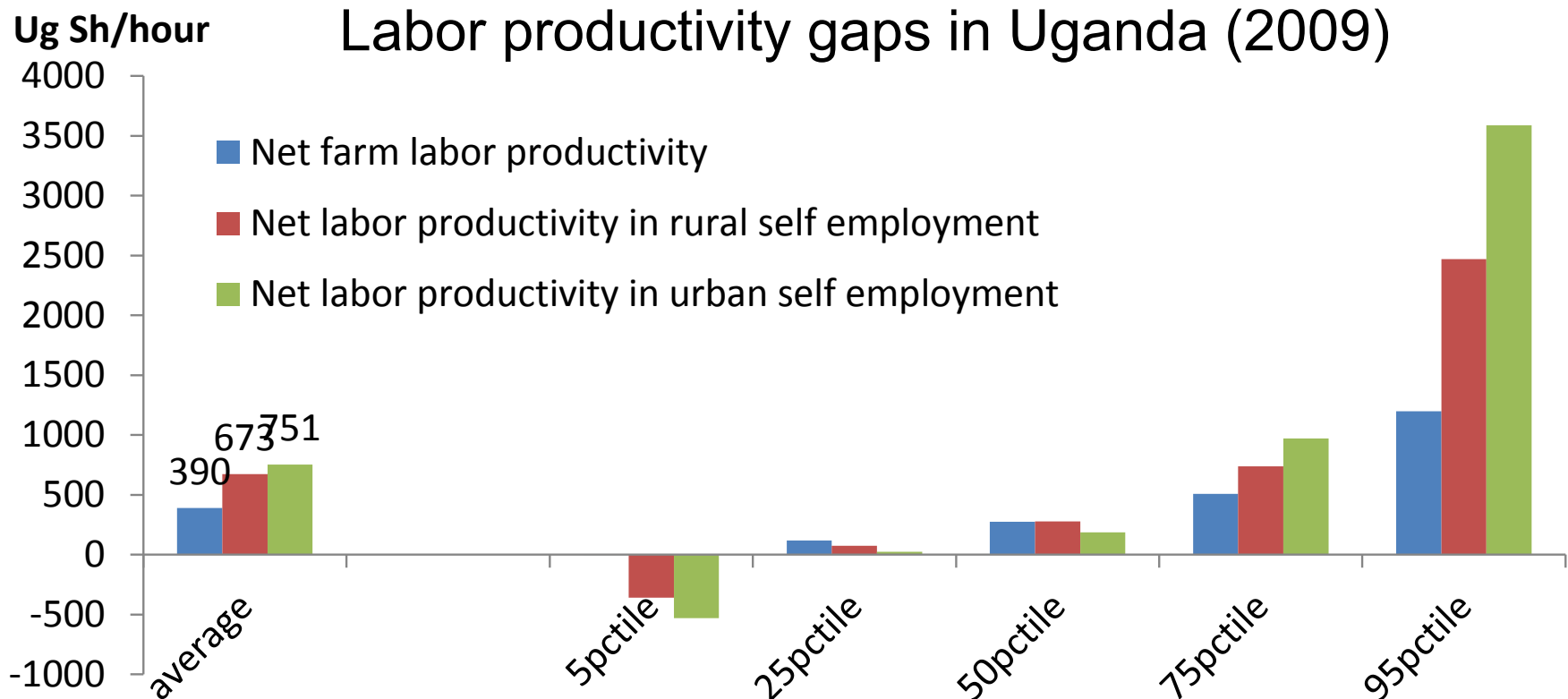
Net result: inter-sectoral difference in avg labor productivity/worker-hour largely vanishes.

Are 'productivity gaps' actually employment gaps?



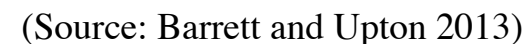


Indeed, the labor productivity gaps within sectors appear far larger than among them, suggesting that ag productivity growth remains crucial





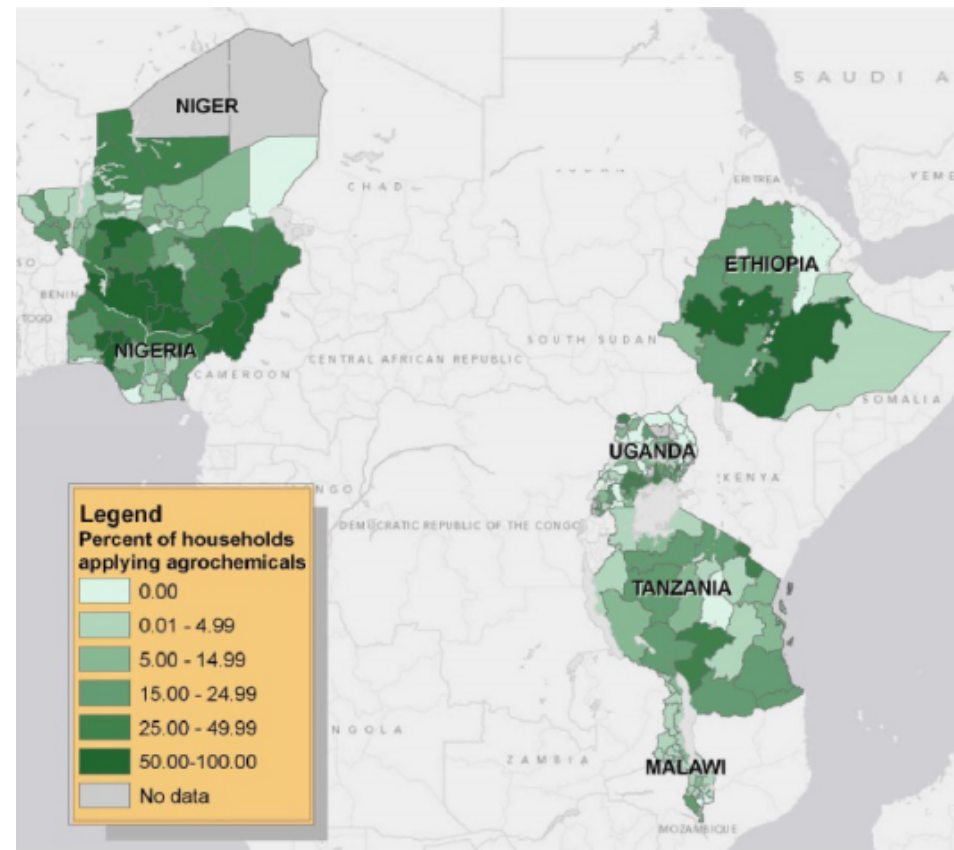
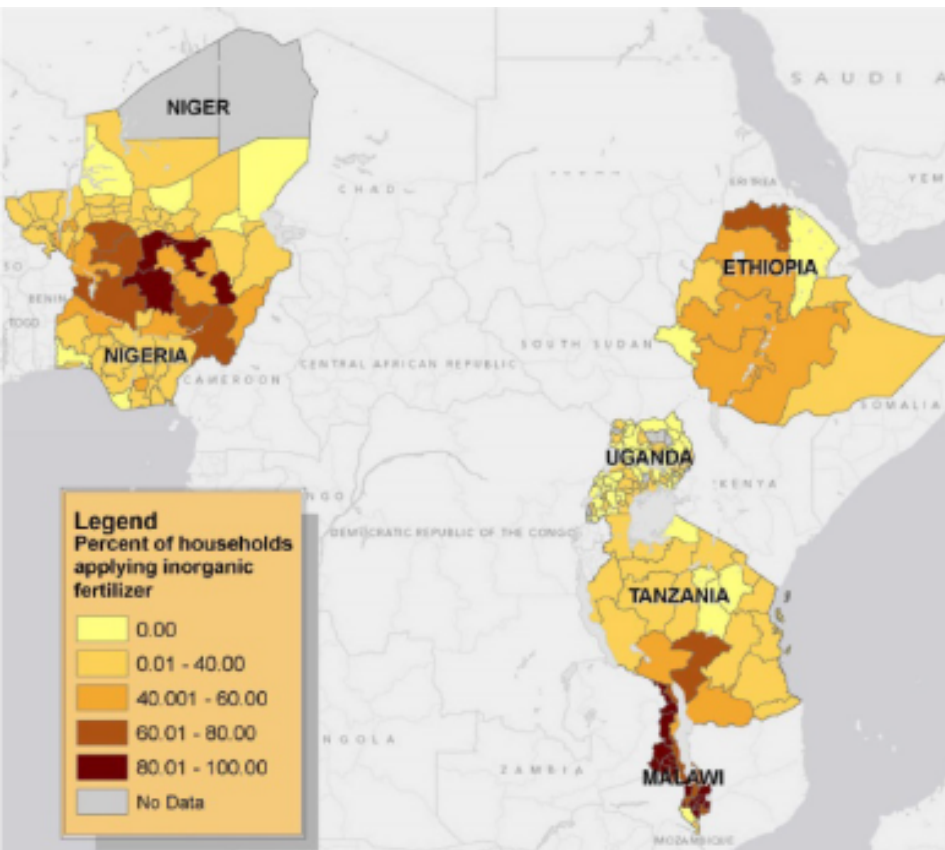
But ag growth has not been as poverty reducing as it might. Gains coming mainly in land rather than labor productivity.





Heterogeneous uptake of innovations

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



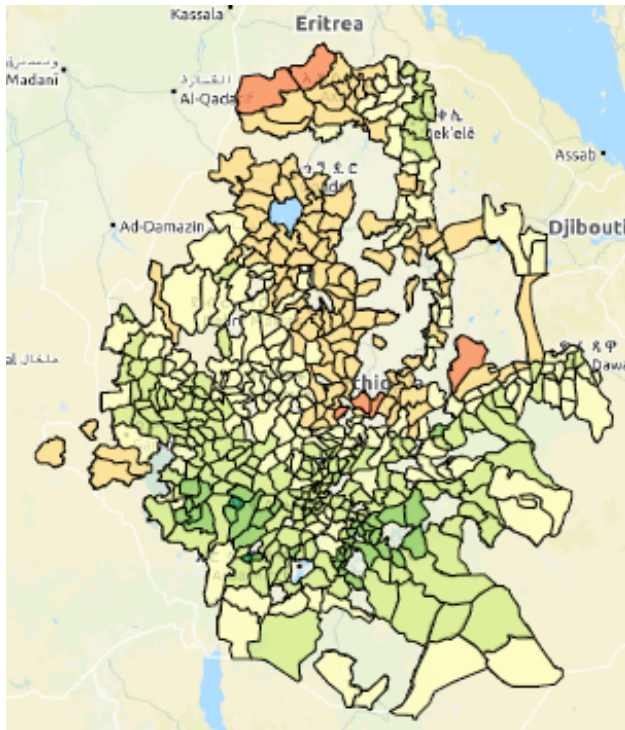


Cornell

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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)

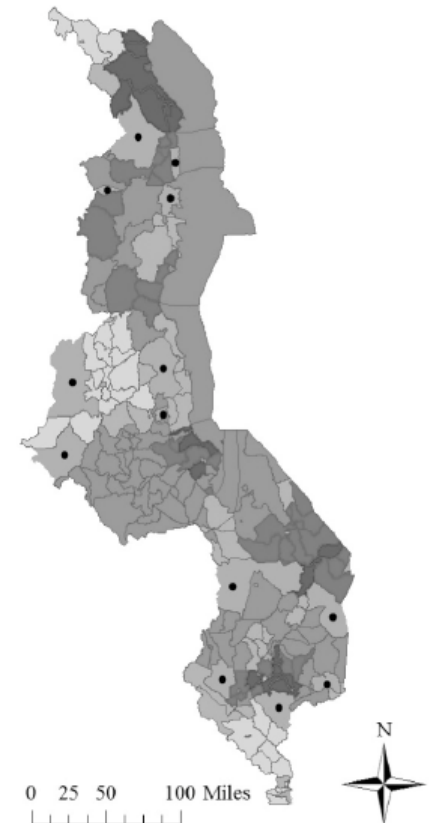
- Ethiopia fertilizer

Burke et al. (*AgEcon* 2016)

- Zambia fertilizer

Harou et al. (*JAfrEcon* 2017)

- Malawi fertilizer

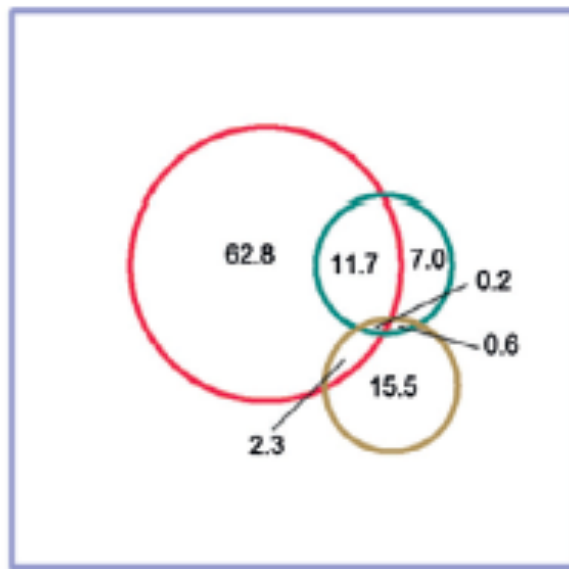




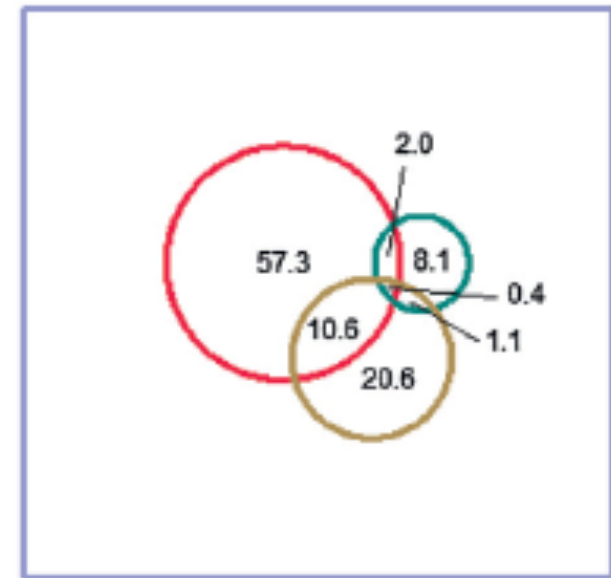
Uneven adoption even within households

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

Ethiopia – plot level



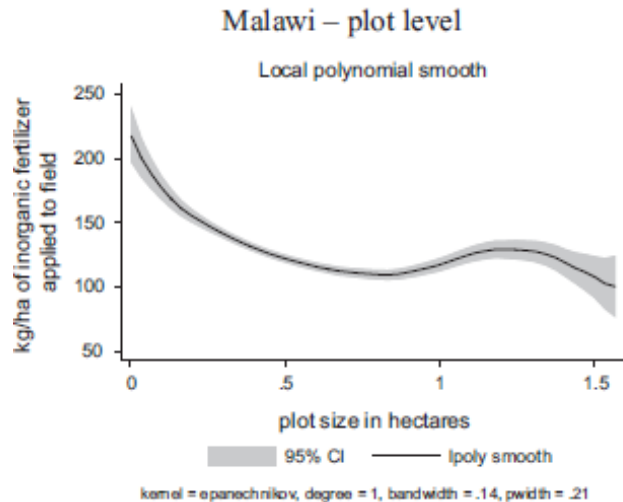
Niger – plot level



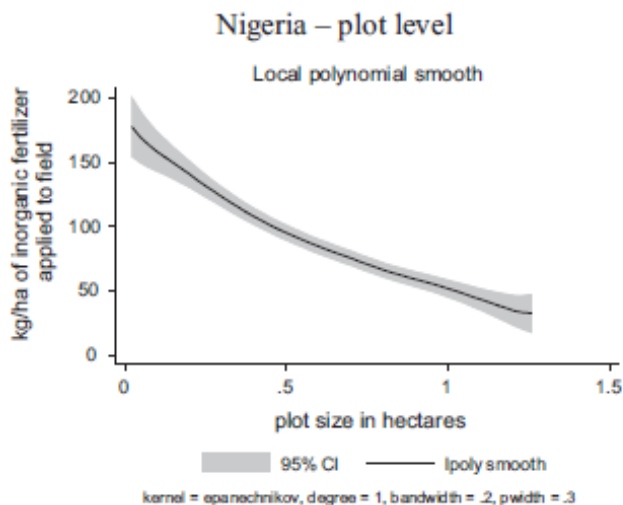
— use inorganic fertilizer — use irrigation — use inorganic fertilizer — use irrigation
— use improved seed variety — all cultivated plots — use improved seed variety — all cultivated plots



Plot-level inverse size-productivity relation



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)



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

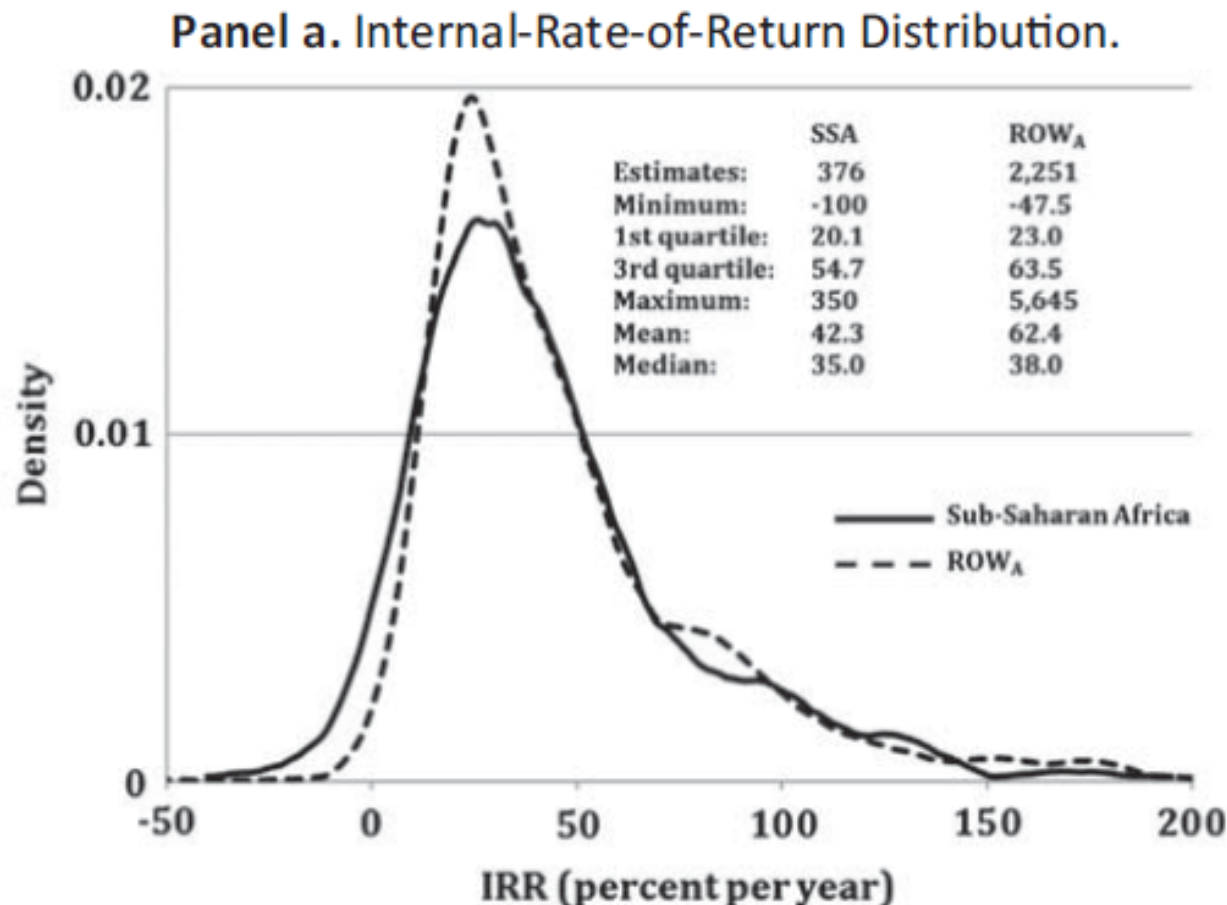
- Ultimately interested to learn where most of the variation in input use comes from: *biophysical, infrastructure, market, socio-economic, or policy-specific variables?*
- Binary use at household level (avoids bias from survey design)
- **45 percent** of variation in inorganic fertilizer use can be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

(Sheahan & Barrett, *Food Policy* 2017)

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)



Labor markets more active than often realized.

Percent of agricultural households hiring labor

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



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.



Market access and prices

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

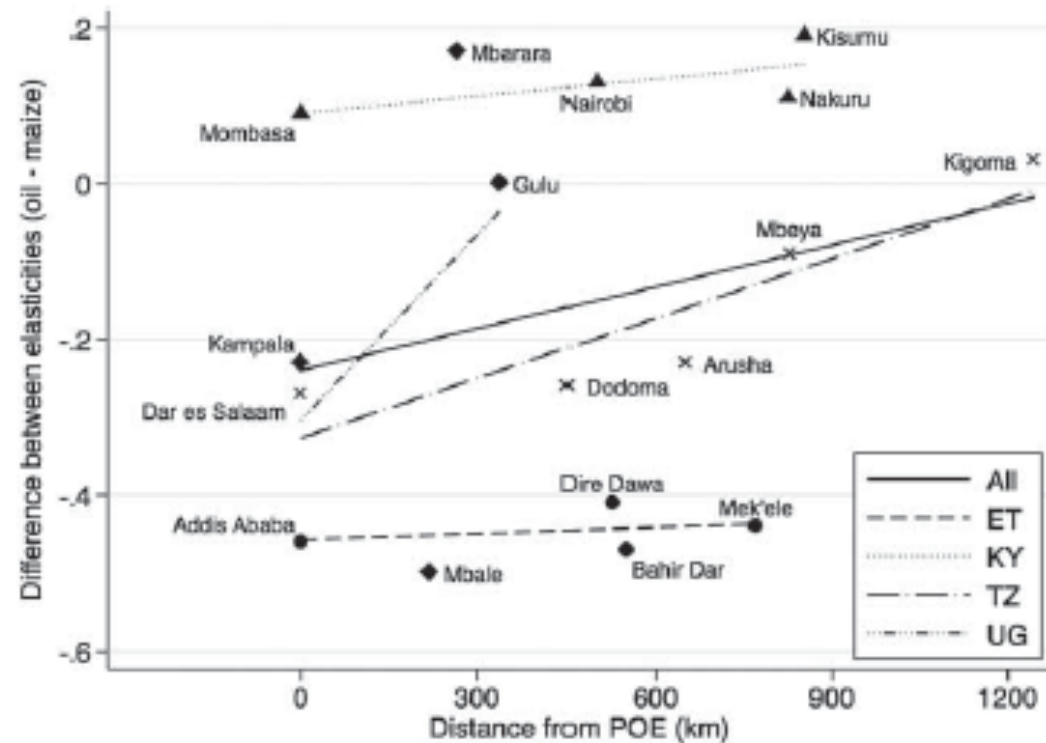
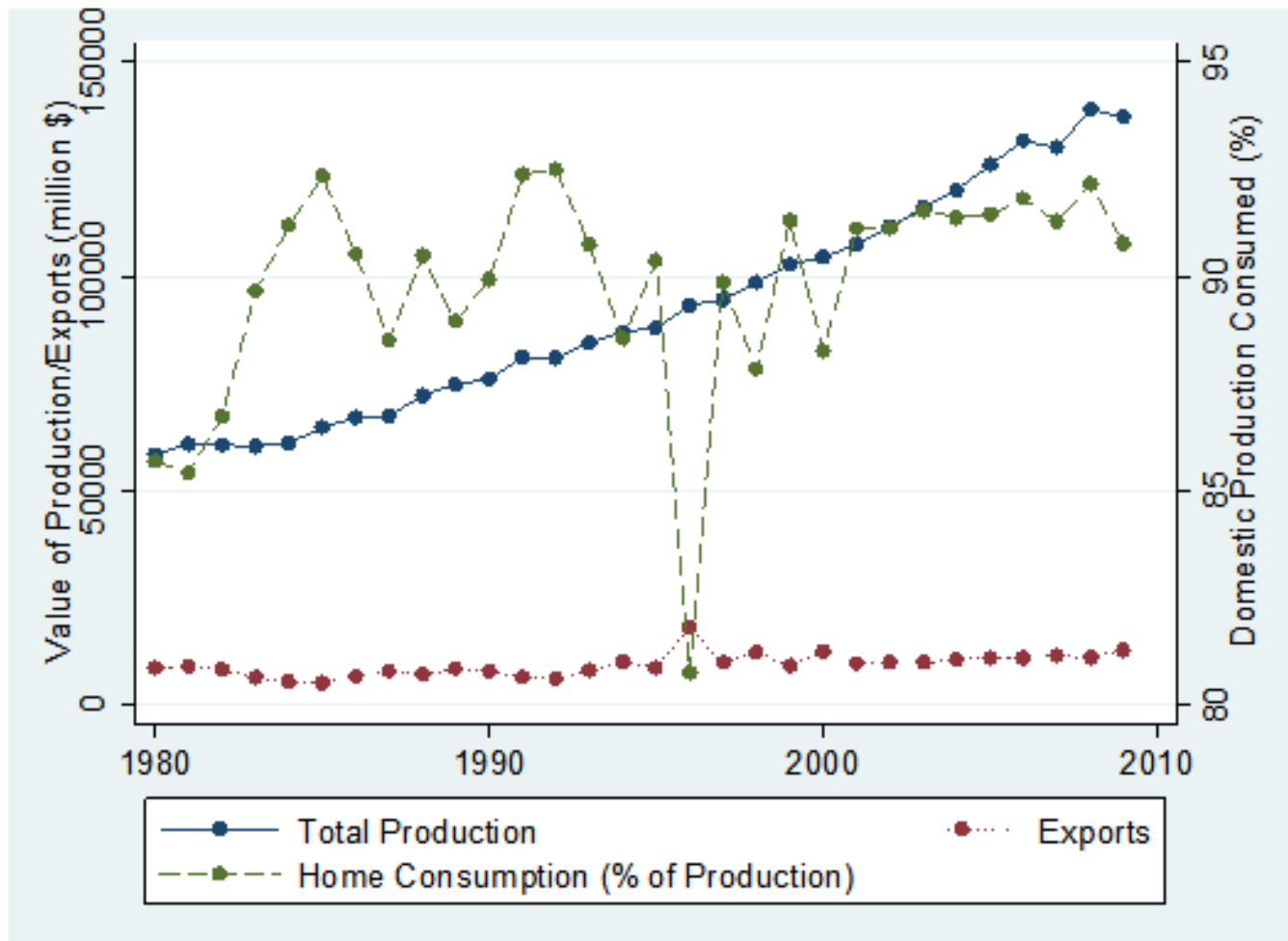


Figure 4. (Elasticity of local maize to global oil) – (Elasticity of local maize to global maize) plotted against distance from POE

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



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

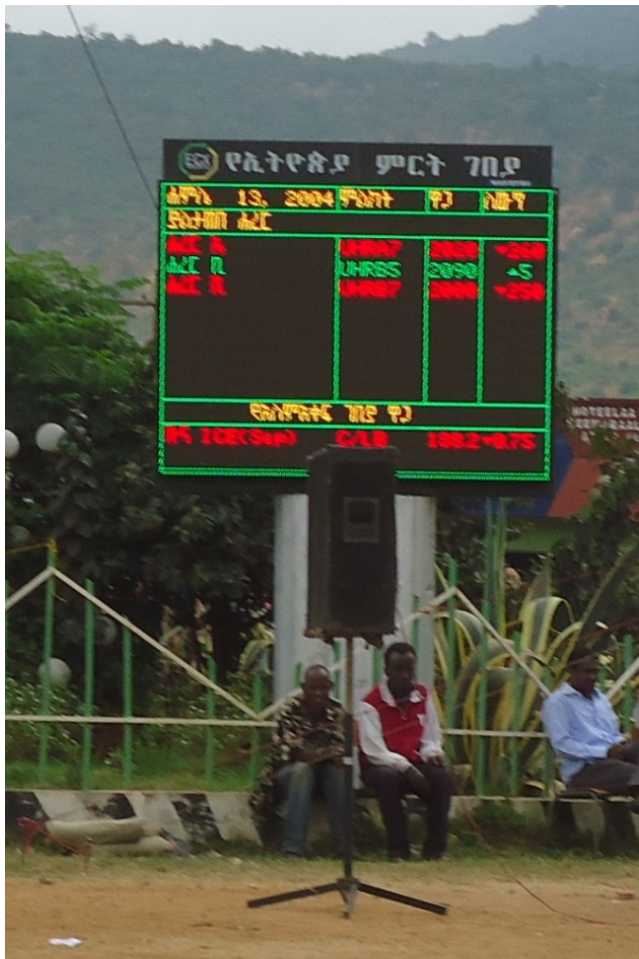


(Barrett and Upton 2013)



Changes are occurring quickly ... esp. through ICT and improved contracting institutions.

e.g., Ethiopian Commodities Exchange, outgrower schemes





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

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“[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)



% hhs w/diversified/specialized income portfolios





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*





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.

Thank you for your time and interest!

