

EMERGING LAND ISSUES IN AFRICAN AGRICULTURE: **Toward the Identification of Effective Rural Development Strategies**

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October 25, 2012*



Background

- Malthusian “perfect storm”?
- biofuels
- rising incomes in BRIC countries
- extreme weather events
- export bans



- Increased global demand for farmland

Ironically, Africa has the greatest and cheapest supply of unutilized arable land in the world

Land grab or development opportunity?
Agricultural investment and international land deals in Africa

guardian.co.uk
Qatar looks to grow food in Kenya
The Gulf state has joined a growing list of rich countries that want to grow food in poor countries

1

2

NEWS
Proposed Kenya-Qatar Land Deal Stirs Controversy
March 18, 2009

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DAILY NATION
Kenya Edition
OPINION
Why Qatar-Tana River land deal requires further discussion
By CAROL PINO
Posted Friday, January 2, 2009

4

THE STANDARD
For Fairness and Justice.
\$10.00
66 year old killed over land wrangles
Updated 13 hr(s) 47 min(s) ago
By George Olwenya
A 66-year-old man was on Monday killed by his wife and son after they discovered his land in Siaya County.

5

THE STANDARD
For Fairness and Justice.
Land crisis in the Tana River Delta
Updated 20 hr(s) 7 min(s) ago
By LILLIAN ALUANGA
When residents of Mpeketoni village in Ozi location, Tana Delta District, first heard the land they were living on was being auctioned, they laughed it off as a sick joke.
Related Stories
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NEWS
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Main questions motivating our enquiry

1. Are rural populations experiencing land shortages?
2. What are the impacts of growing rural population density on farmer behavior and welfare?
3. Explanatory power of the Boserup model?
4. Are there viable alternatives to a smallholder-led agricultural development strategy?

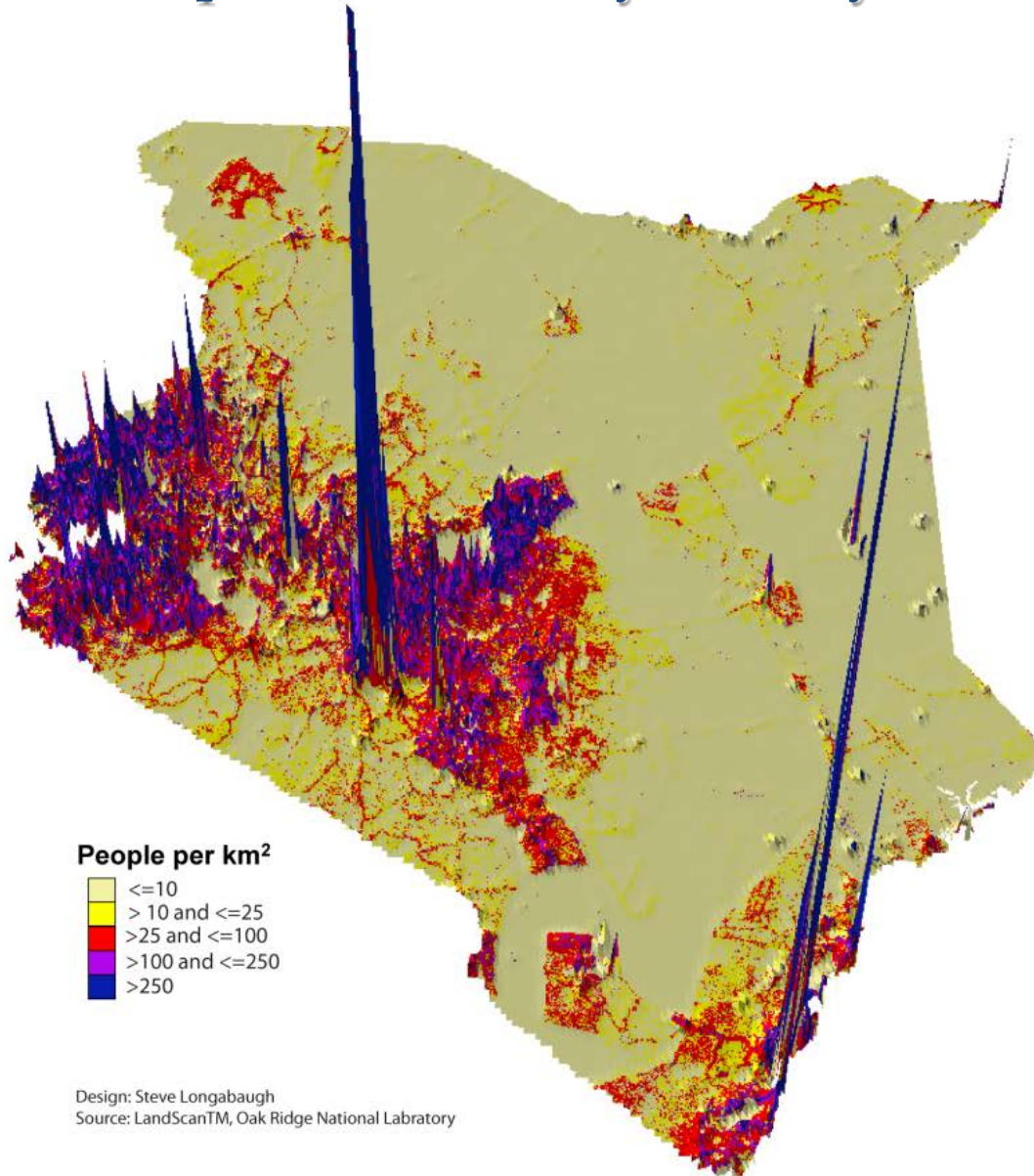
Major conclusions

1. Rising concentration of land leading to de-coupling of the link between agricultural growth and rural poverty reduction
 - Public expenditures on input subsidies and price supports are mainly benefiting the larger farms
2. Promoting foreign investment to farm Africa's unutilized land diverts attention and public resources away from the more central problem: how to reduce hunger and poverty through inclusive agricultural growth
3. Agricultural development and poverty reduction strategies need to be differentiated for sparsely and densely populated areas – the challenges are different
 - Evidence of declining land intensification beyond a population density threshold

Data sources

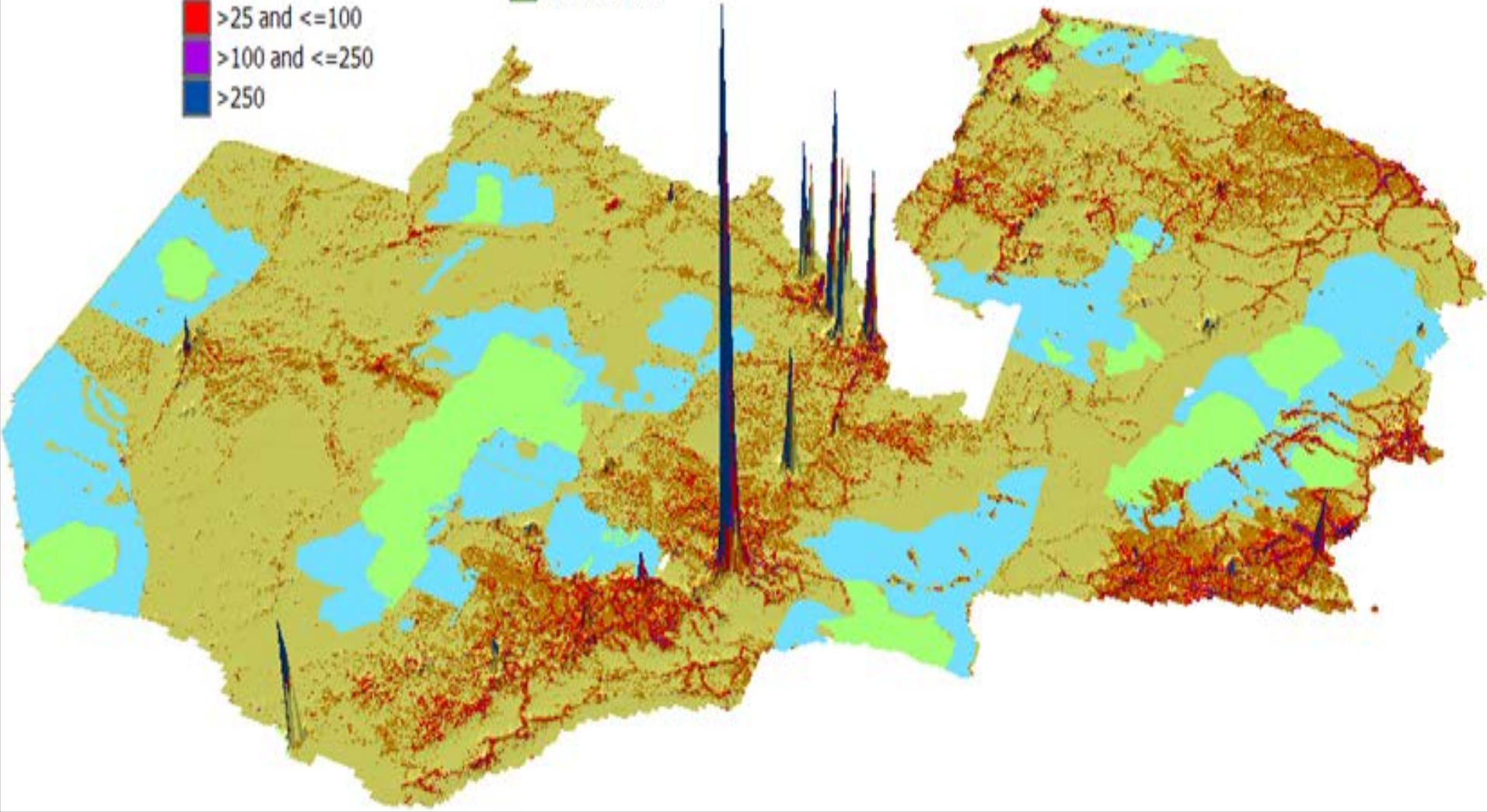
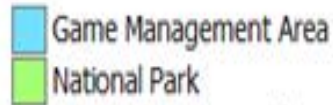
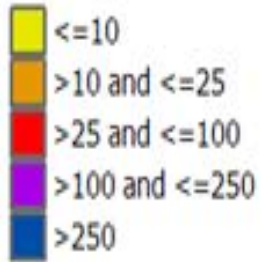
1. Nationally representative farm household surveys with GPS coordinates
2. Spatial data sets based on most recent national population census
 - Global Rural-Urban Mapping Project
 - AfriPop Mapping Project

Population density in Kenya



Population density, Zambia

People per km²



Organization

1. Evidence of land constraints in African agriculture
2. Impacts of rising population density on African agriculture
3. Why there are few viable alternatives to a smallholder-led rural development strategy?
4. Conclusions and policy implications

I.
Evidence of land pressures in
African agriculture



Land-to-person in agriculture ratio, selected countries

	1960-69	1970-79	1980-89	1990-99	2000-09	2000-09 land-person ratio as % of 1960-69
Ethiopia	0.501	0.444	0.333	0.224	0.218	43.5%
Zambia	0.643	0.607	0.398	0.342	0.297	46.2%
Kenya	0.462	0.364	0.305	0.264	0.219	47.4%
Uganda	0.655	0.569	0.509	0.416	0.349	53.3%
Malawi	0.480	0.466	0.357	0.304	0.307	64.0%
Zimbabwe						
Rwanda						
Mozambique						
Ghana						
Nigeria						

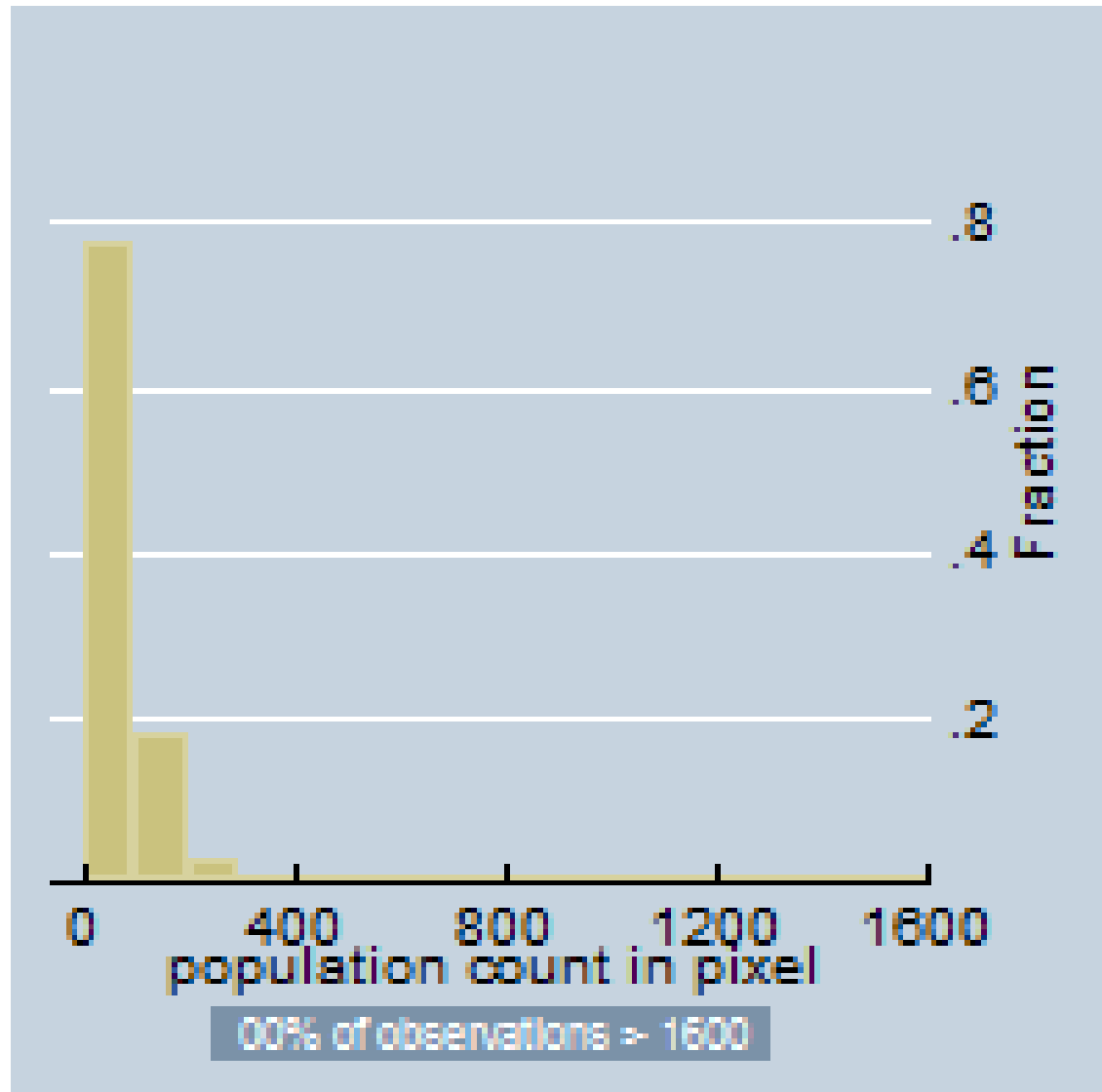
Source: FAO STAT (2010)

Land-to-person in agriculture ratio, selected countries

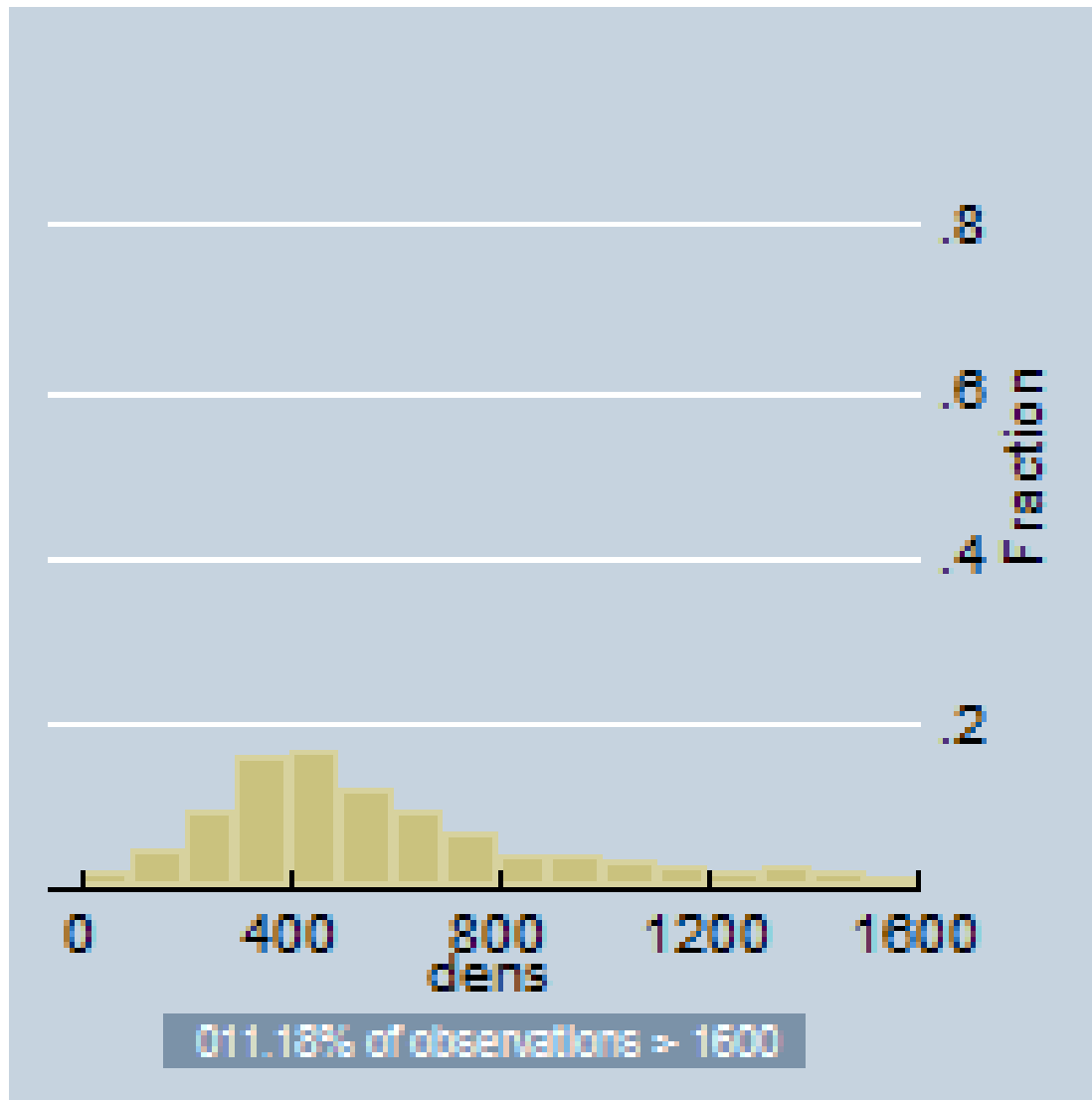
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Kenya	0.462	0.364	0.305	0.264	0.219	47.4%
Uganda	0.655	0.569	0.509	0.416	0.349	53.3%
Malawi	0.480	0.466	0.357	0.304	0.307	64.0%
Zimbabwe	0.613	0.550	0.452	0.420	0.469	76.5%
Rwanda	0.212	0.213	0.195	0.186	0.174	82.1%
Mozambique	0.356	0.337	0.320	0.314	0.294	82.6%
Ghana	0.646	0.559	0.508	0.492	0.565	87.5%
Nigeria	0.982	0.860	0.756	0.769	0.898	91.4%

Source: FAO STAT (2010)

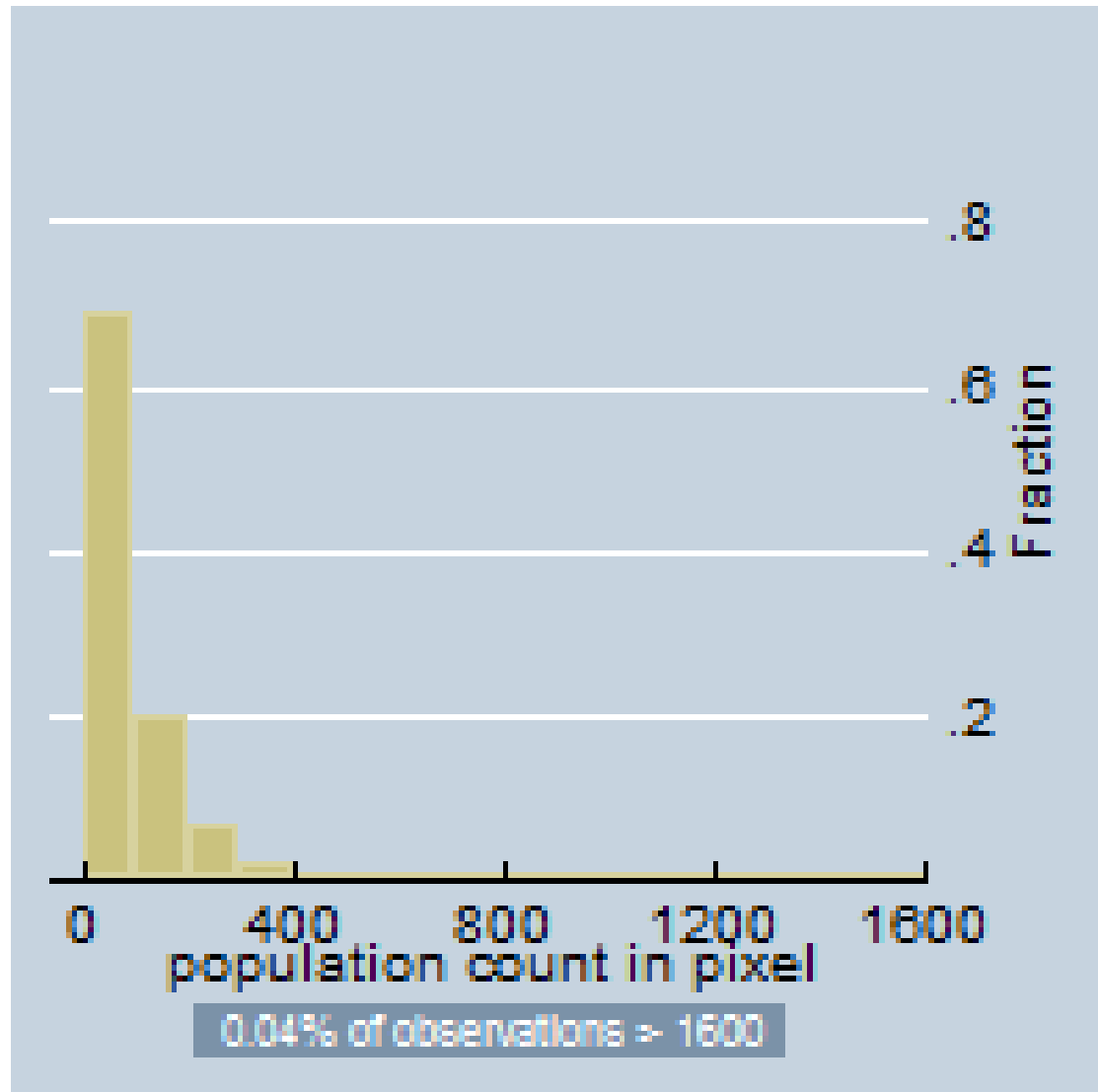
Population density histogram, Ethiopia (counting all rural 1km² grid-cells)



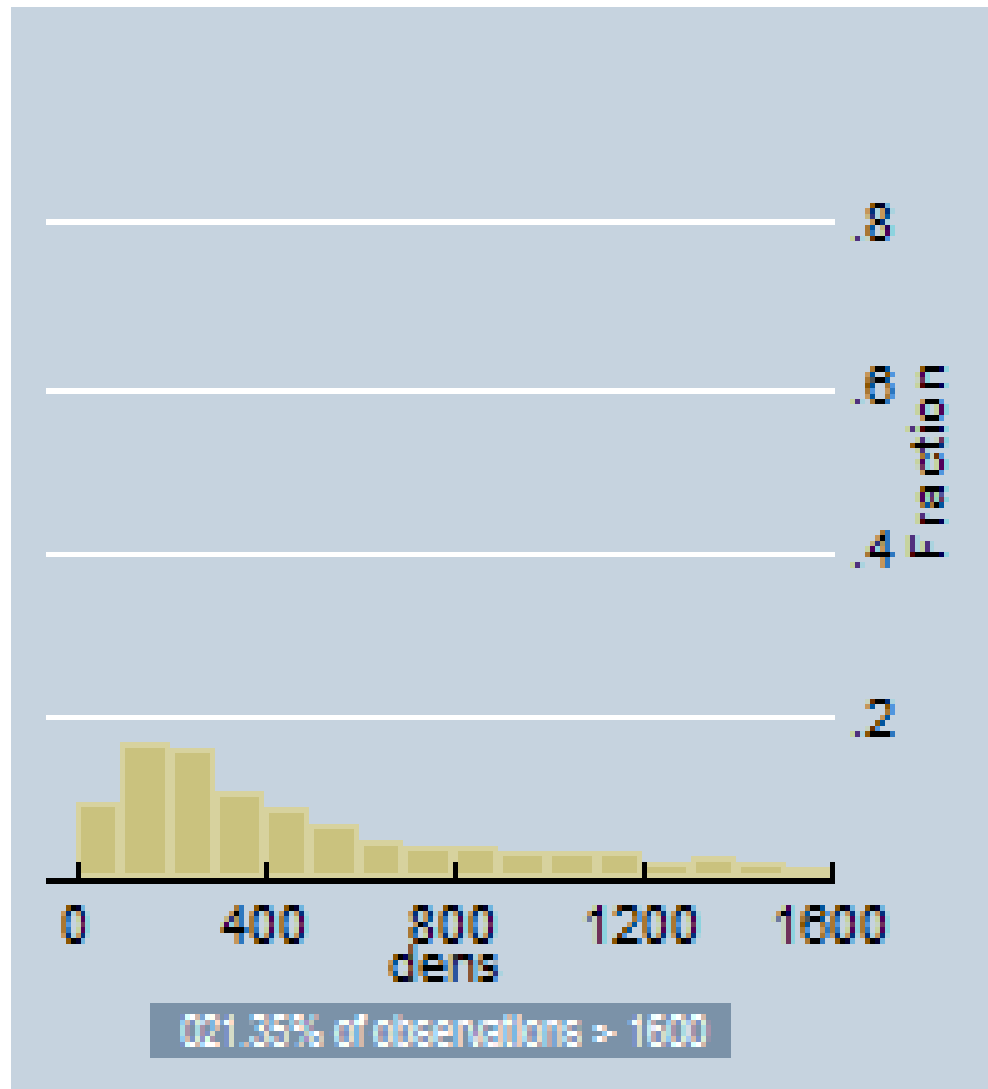
Population density histogram, Ethiopia (counting all 1km² grid-cells designated as arable)



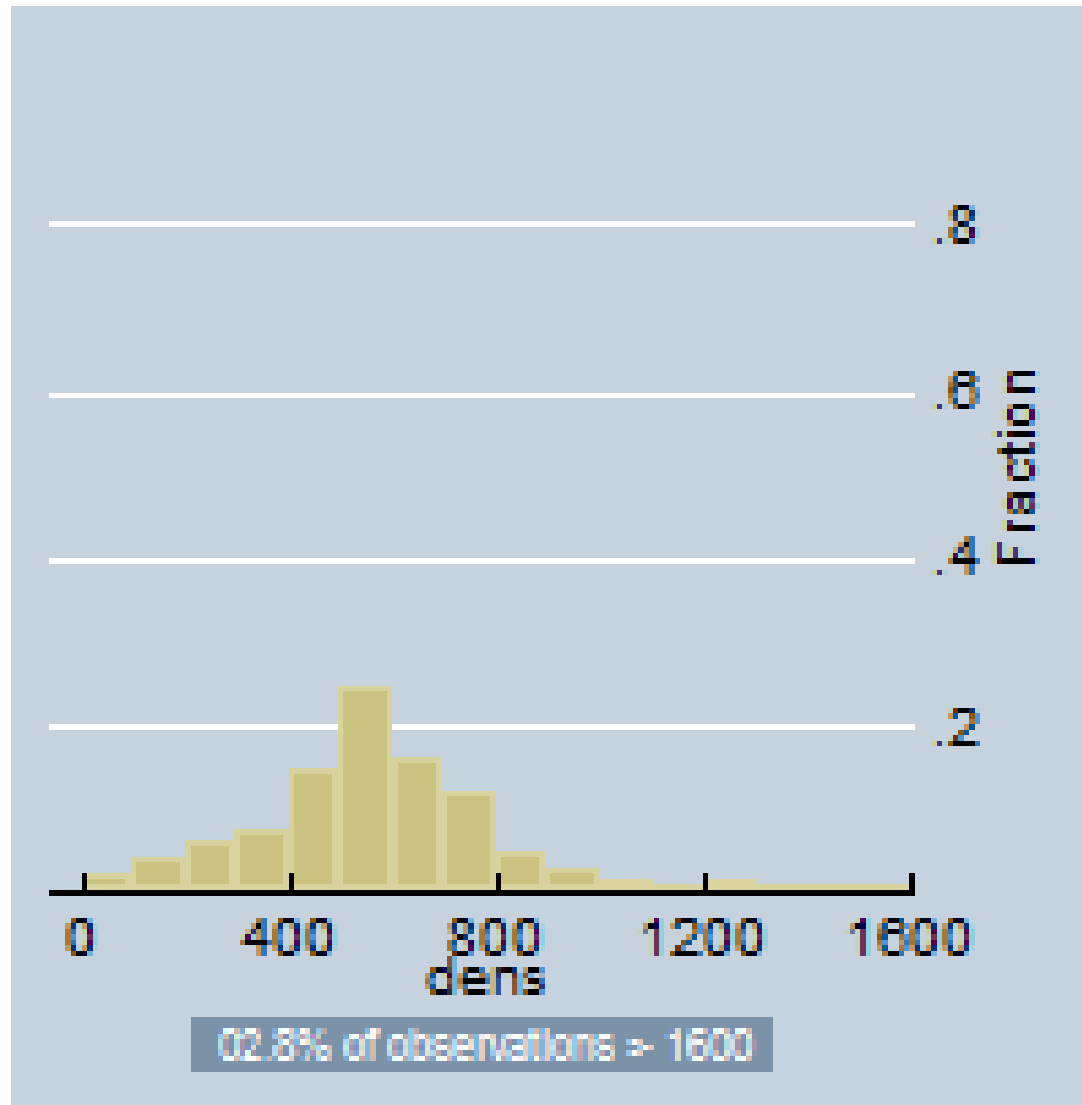
Population density histogram, Nigeria (counting all rural 1km² grid-cells)



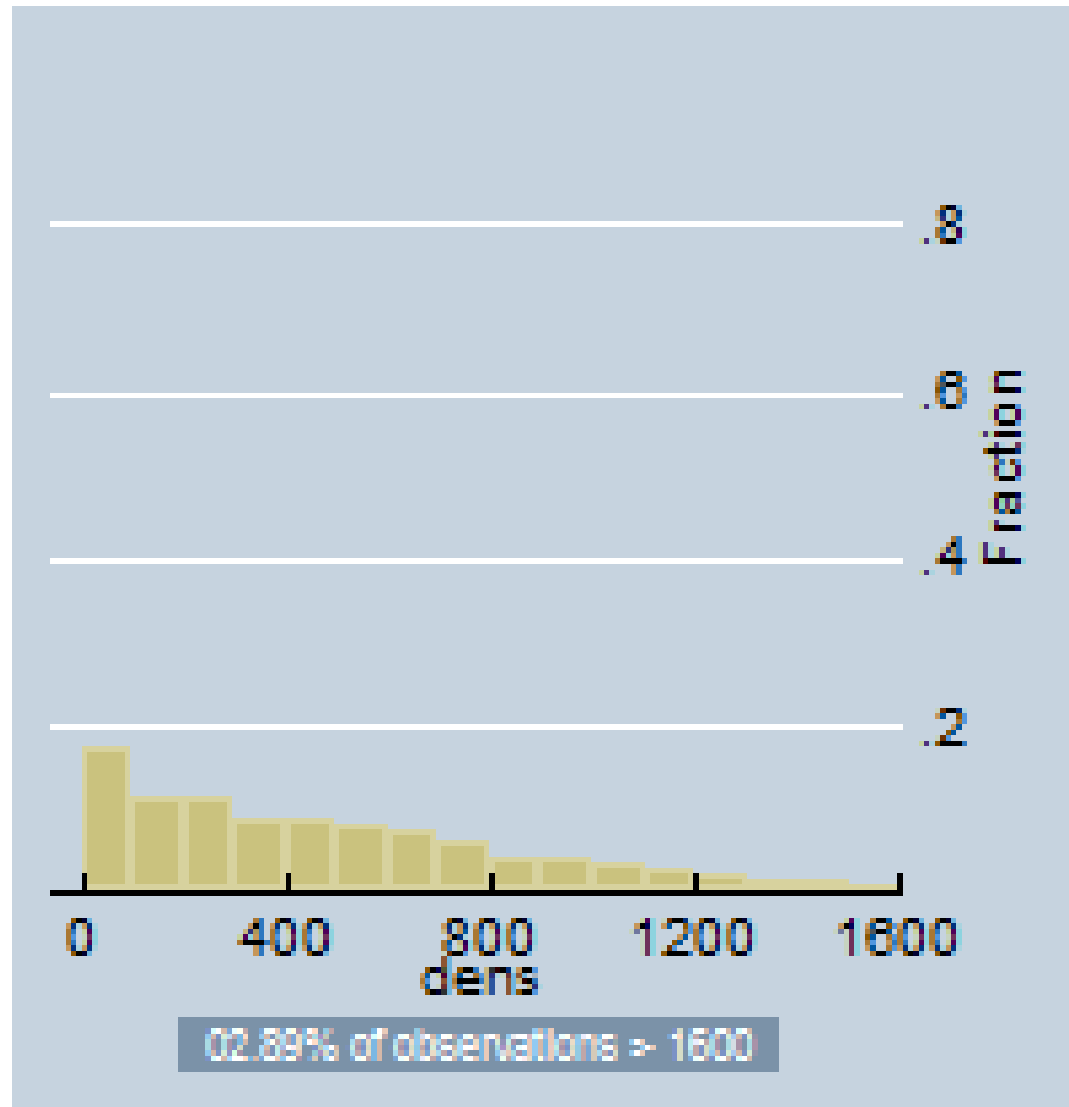
Population density histogram, Nigeria (counting all 1km² grid-cells designated as arable)



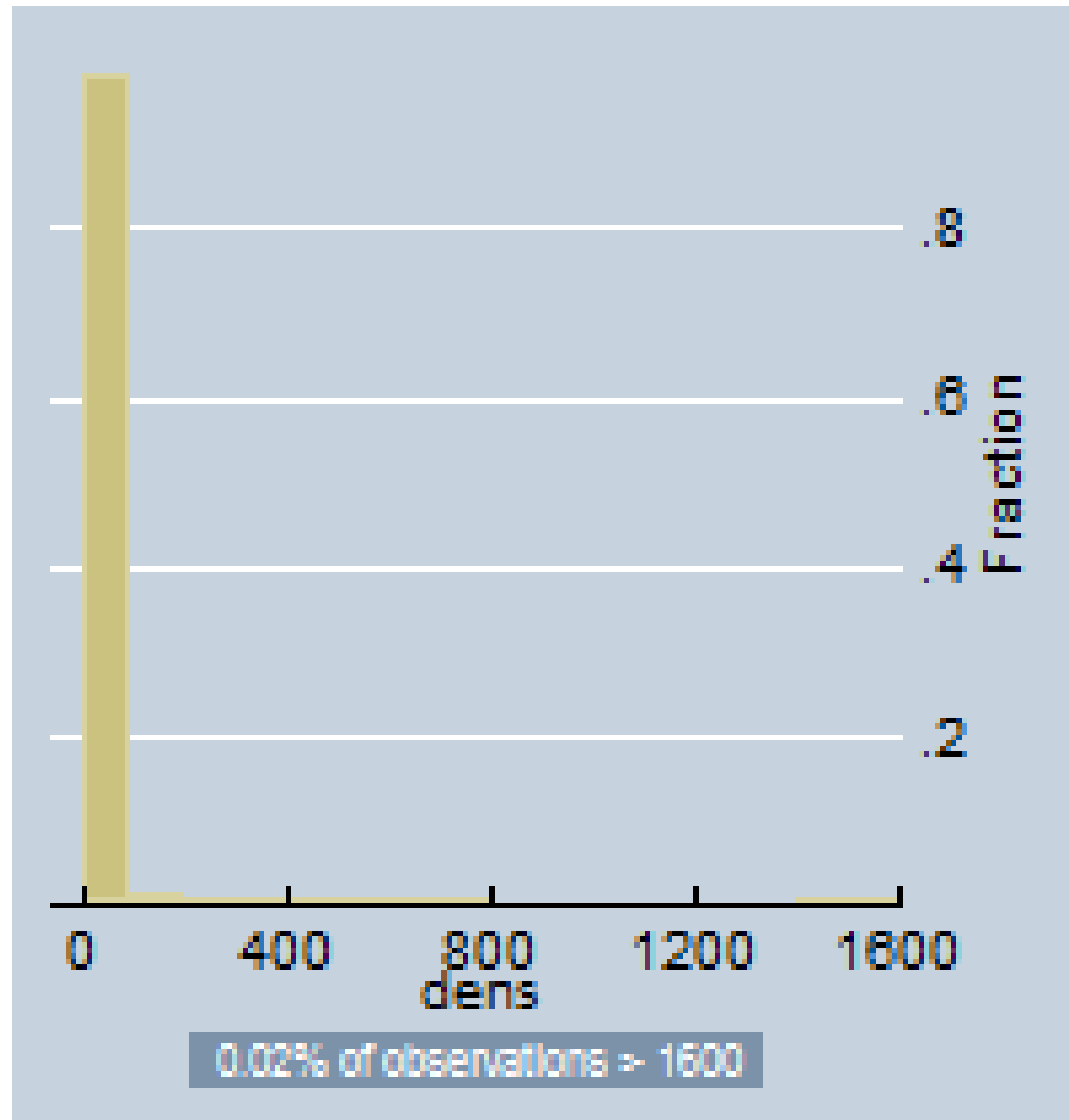
Population density histogram, Rwanda (counting all 1km² grid-cells designated as arable+grassland+forest land)



Population density histogram, Kenya (counting all 1km² grid-cells designated as arable+grassland+forest land)



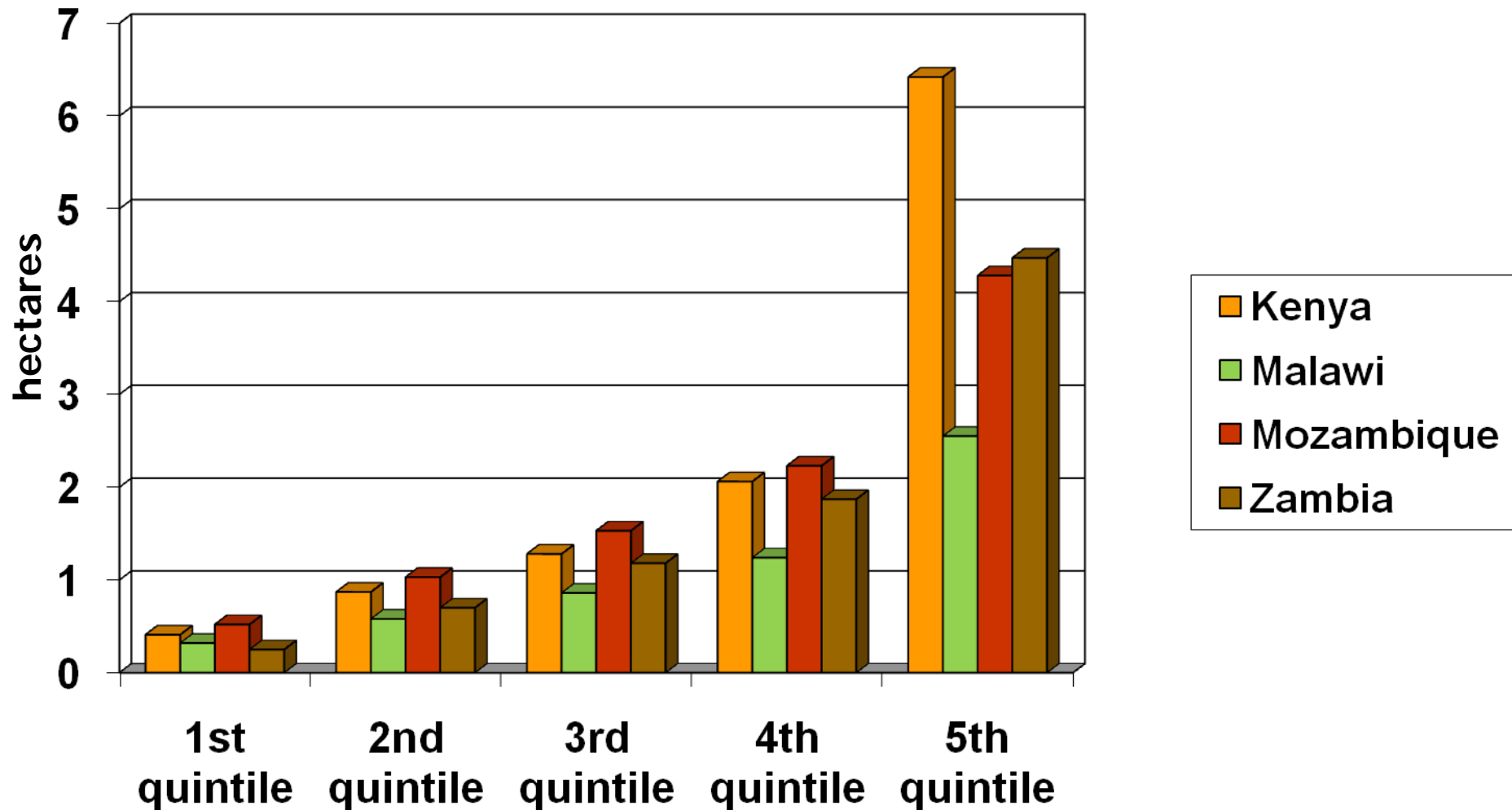
Population density histogram, Zambia (counting all 1km² grid-cells designated as arable+grassland+forest land)



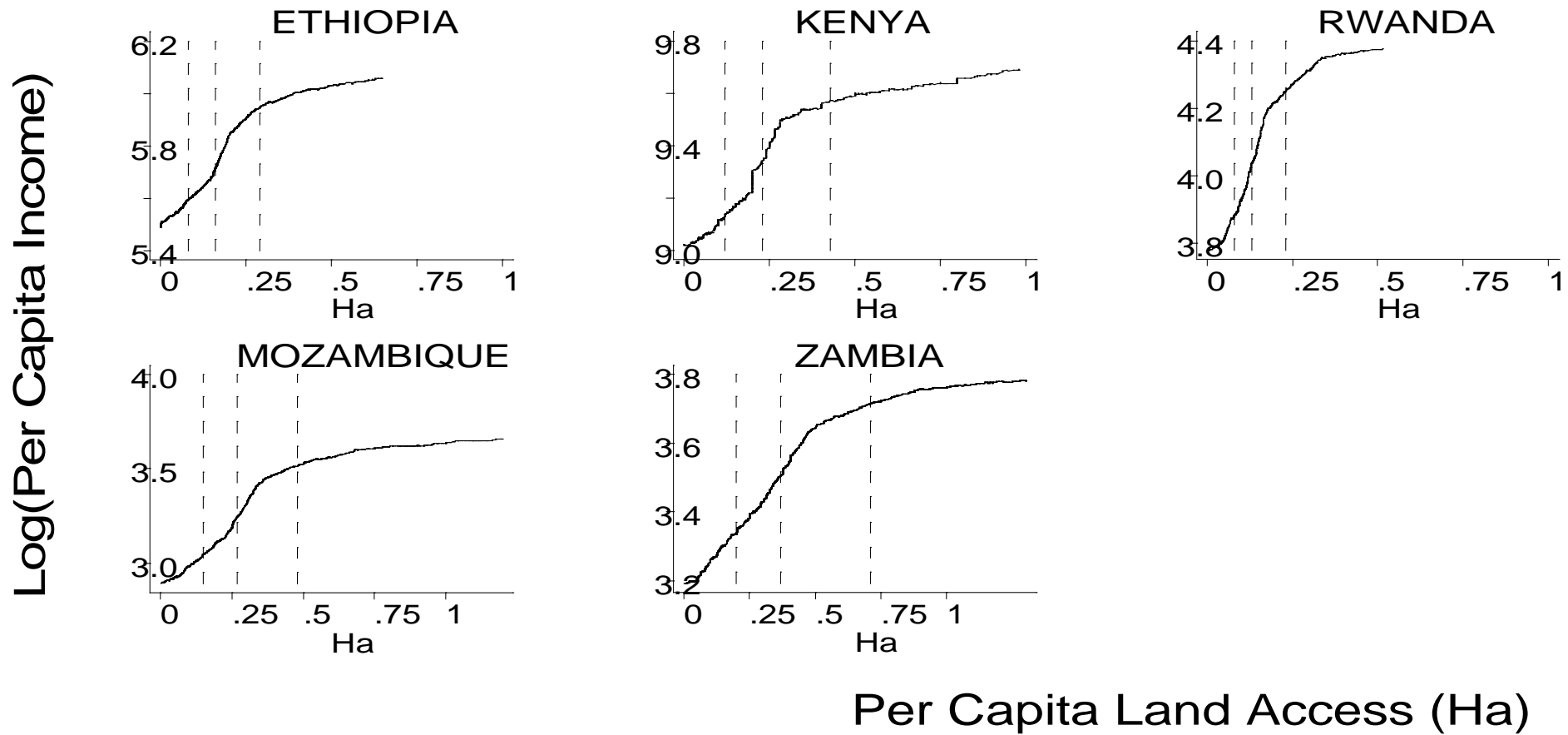
Take-away messages:

- Much of sub-Saharan Africa's rural areas are sparsely populated
- A high proportion of the rural people in sub-Saharan Africa live in densely populated areas

Distribution of farm sizes in smallholder farm sectors



Relationships between farm size and household income



II. Impacts of rising population density on African agriculture

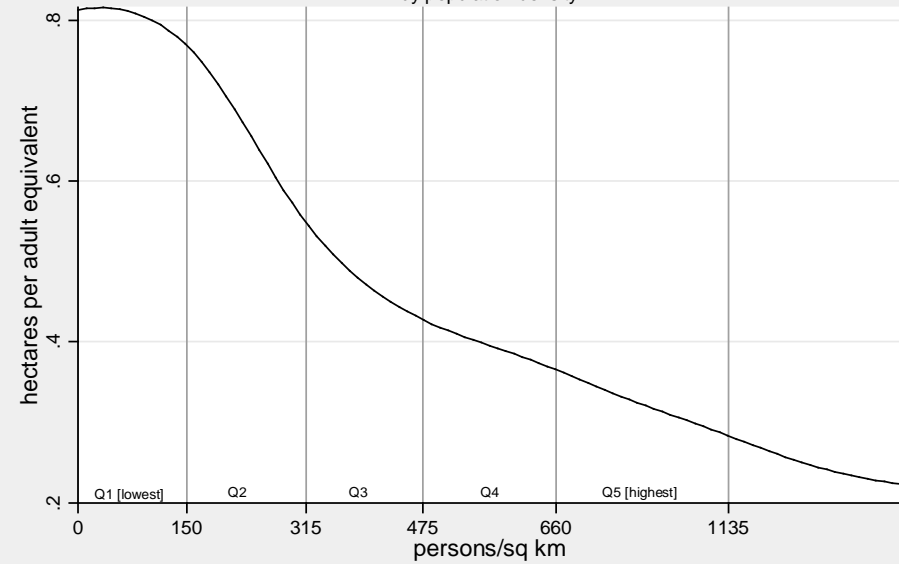




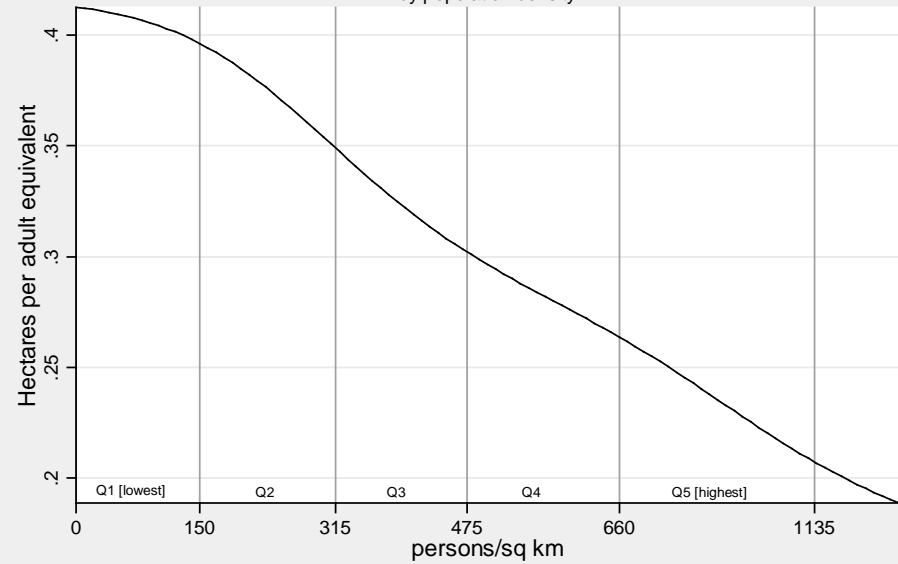
Main findings: how are farming systems changing?

1. Net outflow of adult labor highest in the relatively densely populated areas
2. Farm size is shrinking over time
 - e.g., fathers of hh respondents farm size 4.4 ha → 0.9 ha for respondents (in high density areas of Kenya)
 - 25% of young adults who grew up in rural areas did not inherit land in Kenya
3. Fallow area as % of total farm size is declining
4. Farmers in some high density areas are devoting a higher proportion of their land to high value crops
5. Most farm households derive only a minority of their incomes from off-farm employment

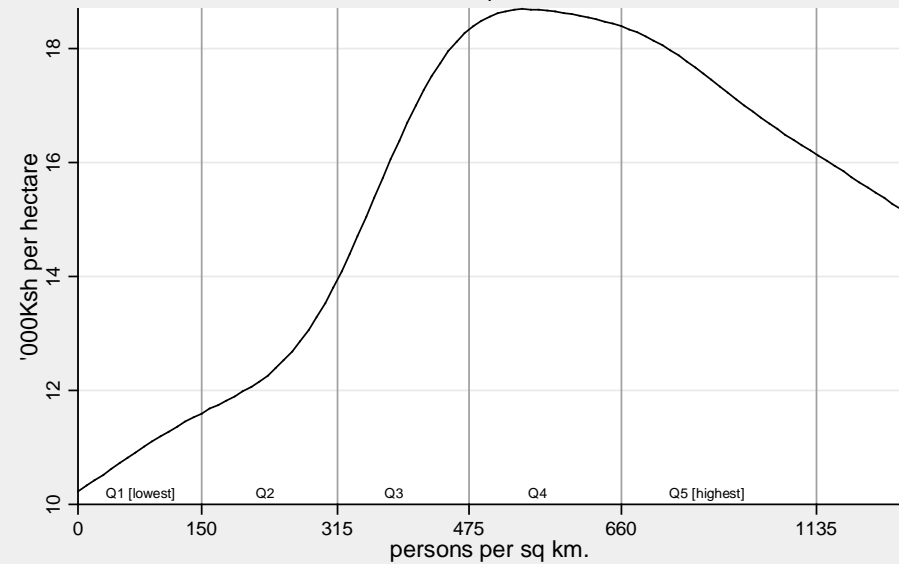
(a) Land holding
by population density



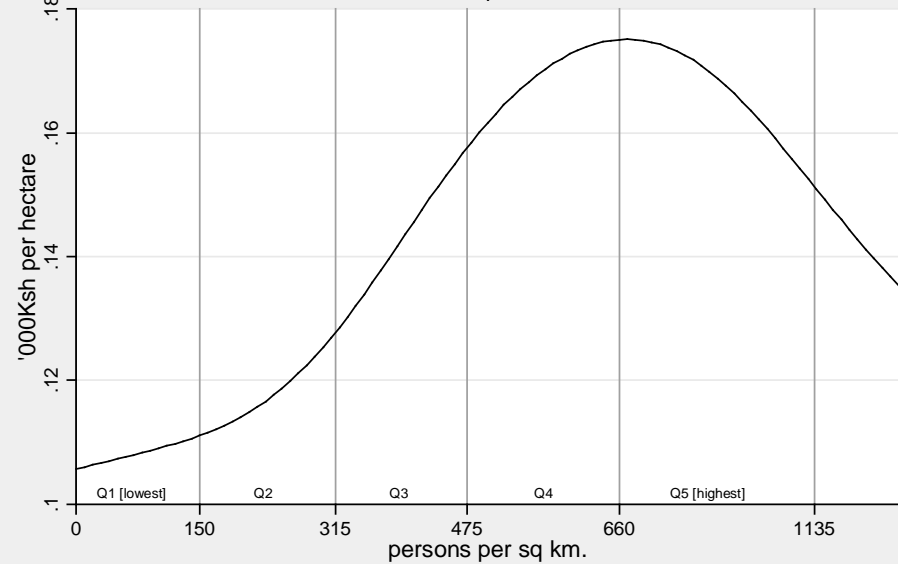
(b) Area under crop
by population density



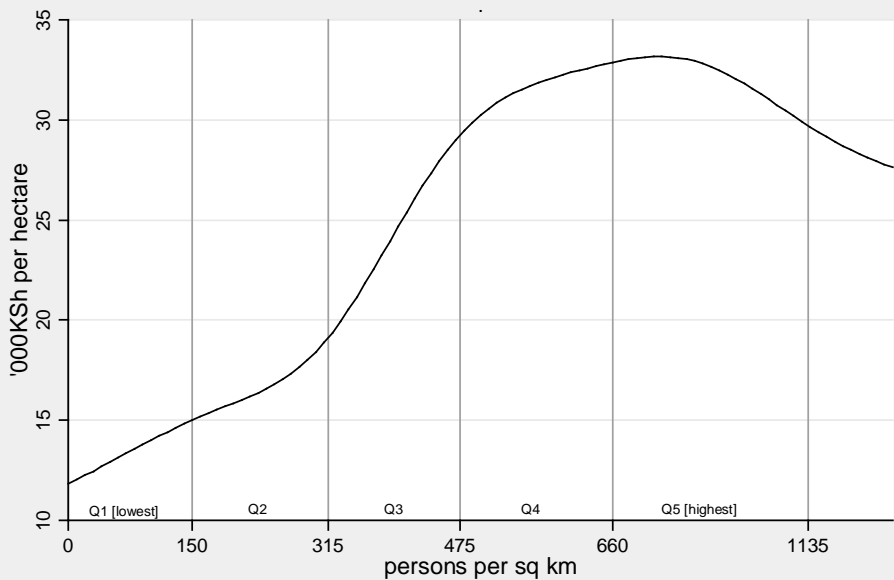
(c) Intensity of cash input use per hectare



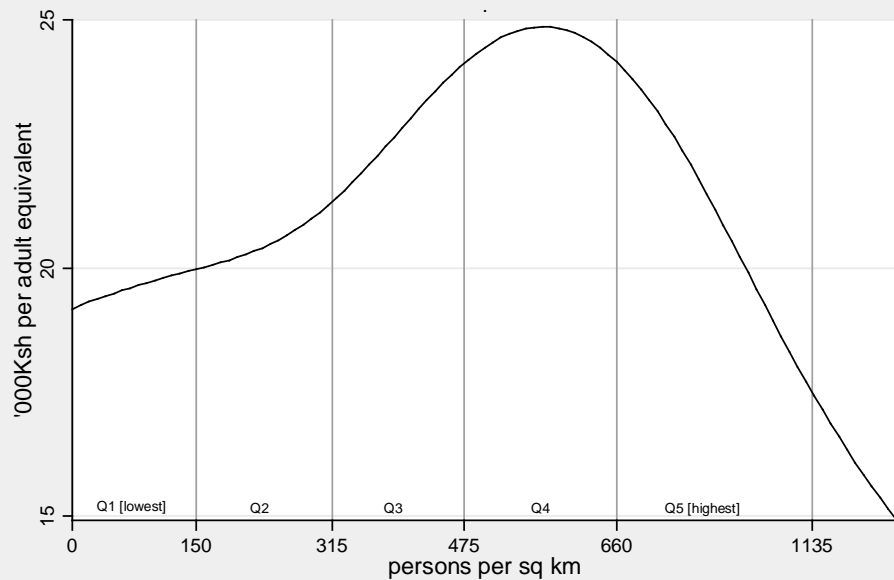
(d) Intensity of fertilizer input use per hectare



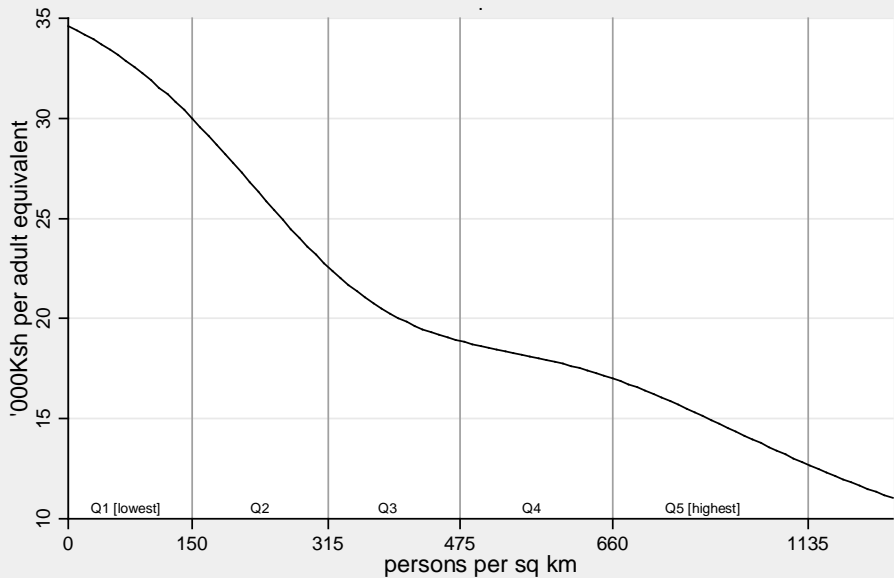
(e) Net farm income per hectare



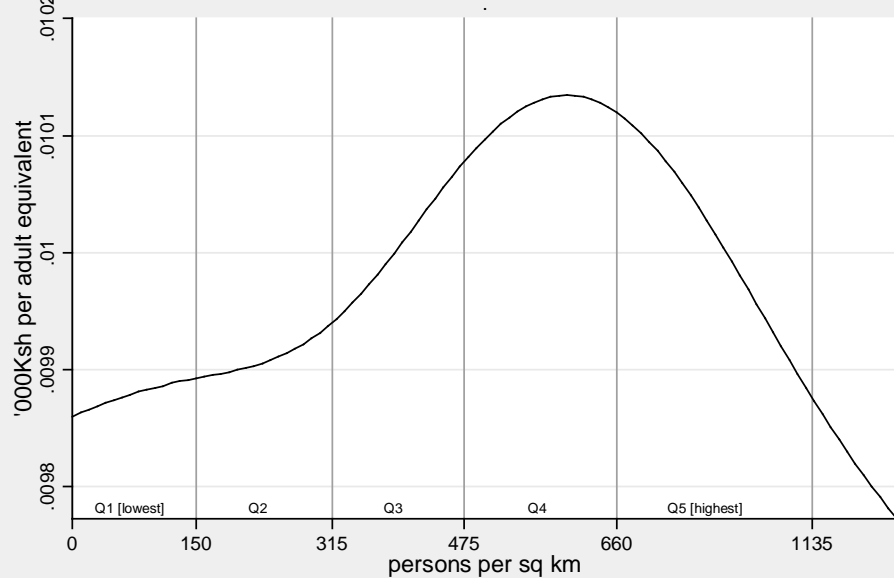
(f) Net farm income per adult equivalent



(g) Household asset value per adult equivalent



(h) Total household income per adult equivalent



Take-away messages:

1. Many areas have reached a level of population density where negative threshold effects are occurring
 - This is giving rise to significantly lower farm incomes and asset wealth per adult
 - About 14% of Kenya's rural population lives in areas exceeding this population density threshold
2. Boserup model in need of refinement
3. Reasons for potential threshold effects:
 - More difficult to produce a surplus as farm size declines
 - Capital constraints on farm intensification → lower productivity
 - Small farms tend to reduce fallows → soil nutrient depletion

III.

Why there are few viable alternatives to a smallholder-led rural development strategy?



Why there is no alternative to a smallholder-led agricultural development strategy

- 50-70% of the population is engaged primarily in agriculture
- Agricultural growth with poverty reduction requires that smallholders be the engine
 - Large-farm-led model → latifundia
- Multiplier effects of agricultural growth are highest in smallholder agriculture
- Broad-based agricultural growth leads to virtuous symbiotic rural-urban development

Zambia and Malawi (2004 - 2011)

- initiated major input subsidy programs and marketing board price supports in mid-2000s
- Production of maize – the main staple -- doubled during this period
- Rural poverty rates:
 - Zambia: 78% in 2004 → 78% in 2010
 - Malawi: 52% in 2004 → 53% in 2010

Smallholder maize production growth from the baseline period (2005/06–2007/08) to 2010/11, by farm size category

Total smallholder maize production

Total area cultivated (maize + all other crops)	Average number of farms, 2005/06 to 2007/08, and 2010/11		
	(A)		
0-0.99 ha	616,867		
1-1.99 ha	489,937		
2-4.99 ha	315,459		
5-9.99 ha	42,332		
10-20 ha	6,626		
Total	1,471,221		

Smallholder maize production growth from the baseline period (2005/06–2007/08) to 2010/11, by farm size category

Total smallholder maize production

Total area cultivated (maize + all other crops)	Average number of farms, 2005/06 to 2007/08, and 2010/11	% of Farms		
	(A)	(B)		
0-0.99 ha	616,867	41.9%		
1-1.99 ha	489,937	33.3%		
2-4.99 ha	315,459	21.4%		
5-9.99 ha	42,332	2.9%		
10-20 ha	6,626	0.5%		
Total	1,471,221	100%		

Table 1: Sources: MACO/CSO Crop Forecast Surveys, 2005/06-2007/08, 2010/11

Smallholder maize production growth from the baseline period (2005/06–2007/08) to 2010/11, by farm size category

Total smallholder maize production

Total area cultivated (maize + all other crops)	Average number of farms, 2005/06 to 2007/08, and 2010/11	% of Farms	Annual mean during 2005/06 to 2007/08 baseline period (MT)
	(A)	(B)	(C)
0-0.99 ha	616,867	41.9%	212,335
1-1.99 ha	489,937	33.3%	381,293
2-4.99 ha	315,459	21.4%	490,102
5-9.99 ha	42,332	2.9%	196,848
10-20 ha	6,626	0.5%	103,156
Total	1,471,221	100%	1,383,735

Table 1: Sources: MACO/CSO Crop Forecast Surveys, 2005/06-2007/08, 2010/11

Smallholder maize production growth from the baseline period (2005/06–2007/08) to 2010/11, by farm size category

Total smallholder maize production

Total area cultivated (maize + all other crops)	Average number of farms, 2005/06 to 2007/08, and 2010/11	% of Farms	Annual mean during 2005/06 to 2007/08 baseline period (MT)	2010/11 (MT)
	(A)	(B)	(C)	(D)
0-0.99 ha	616,867	41.9%	212,335	309,324
1-1.99 ha	489,937	33.3%	381,293	707,438
2-4.99 ha	315,459	21.4%	490,102	1,130,527
5-9.99 ha	42,332	2.9%	196,848	494,719
10-20 ha	6,626	0.5%	103,156	144,888
Total	1,471,221	100%	1,383,735	2,786,896

Smallholder maize production growth from the baseline period (2005/06–2007/08) to 2010/11, by farm size category

Total smallholder maize production

Total area cultivated (maize + all other crops)	Average number of farms, 2005/06 to 2007/08, and 2010/11	% of Farms	Annual mean during 2005/06 to 2007/08 baseline period (MT)	2010/11 (MT)	Absolute change (MT) (D-C)
	(A)	(B)	(C)	(D)	(E)
0-0.99 ha	616,867	41.9%	212,335	309,324	96,989
1-1.99 ha	489,937	33.3%	381,293	707,438	326,145
2-4.99 ha	315,459	21.4%	490,102	1,130,527	640,425
5-9.99 ha	42,332	2.9%	196,848	494,719	297,871
10-20 ha	6,626	0.5%	103,156	144,888	41,732
Total	1,471,221	100%	1,383,735	2,786,896	1,403,161

Table 1: Sources: MACO/CSO Crop Forecast Surveys, 2005/06-2007/08, 2010/11

Smallholder maize production growth from the baseline period (2005/06–2007/08) to 2010/11, by farm size category

Total smallholder maize production

Total area cultivated (maize + all other crops)	Average number of farms, 2005/06 to 2007/08, and 2010/11	% of Farms	Annual mean during 2005/06 to 2007/08 baseline period (MT)	2010/11 (MT)	Absolute change (MT) (D-C)	Change per farm (kg per farm) (E*1000/A)
	(A)	(B)	(C)	(D)	(E)	(F)
0-0.99 ha	616,867	41.9%	212,335	309,324	96,989	157.2
1-1.99 ha	489,937	33.3%	381,293	707,438	326,145	665.7
2-4.99 ha	315,459	21.4%	490,102	1,130,527	640,425	2,030.1
5-9.99 ha	42,332	2.9%	196,848	494,719	297,871	7,036.6
10-20 ha	6,626	0.5%	103,156	144,888	41,732	6,298.4
Total	1,471,221	100%	1,383,735	2,786,896	1,403,161	953.7

FISP fertiliser received (2010/11 crop season) and expected maize sales, 2011, by farm size category

Total area cultivated (maize + all other crops)	Number of farms	% of farms	% of farmers receiving FISP fertilizer	kg of FISP fertilizer received per farm household	% of farmers expecting to sell maize	Expected maize sales (kg/farm household)
	(A)	(B)	(C)	(D)	(E)	(F)
0-0.99 ha	616,867	41.9%				
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1-1.99 ha	489,937	33.3%	30.6%			
2-4.99 ha	315,459	21.4%	45.1%			
5-9.99 ha	42,332	2.9%	58.5%			
10-20 ha	6,626	0.5%	52.6%			
Total	1,471,221	100%	28.6%			

FISP fertiliser received (2010/11 crop season) and expected maize sales, 2011, by farm size category

Total area cultivated (maize + all other crops)	Number of farms	% of farms	% of farmers receiving FISP fertilizer	kg of FISP fertilizer received per farm household	% of farmers expecting to sell maize	Expected maize sales (kg/farm household)
	(A)	(B)	(C)	(D)	(E)	(F)
0-0.99 ha	616,867	41.9%	14.3%	24.1		
1-1.99 ha	489,937	33.3%	30.6%	69.3		
2-4.99 ha	315,459	21.4%	45.1%	139.7		
5-9.99 ha	42,332	2.9%	58.5%	309.7		
10-20 ha	6,626	0.5%	52.6%	345.6		
Total	1,471,221	100%	28.6%	77.1		

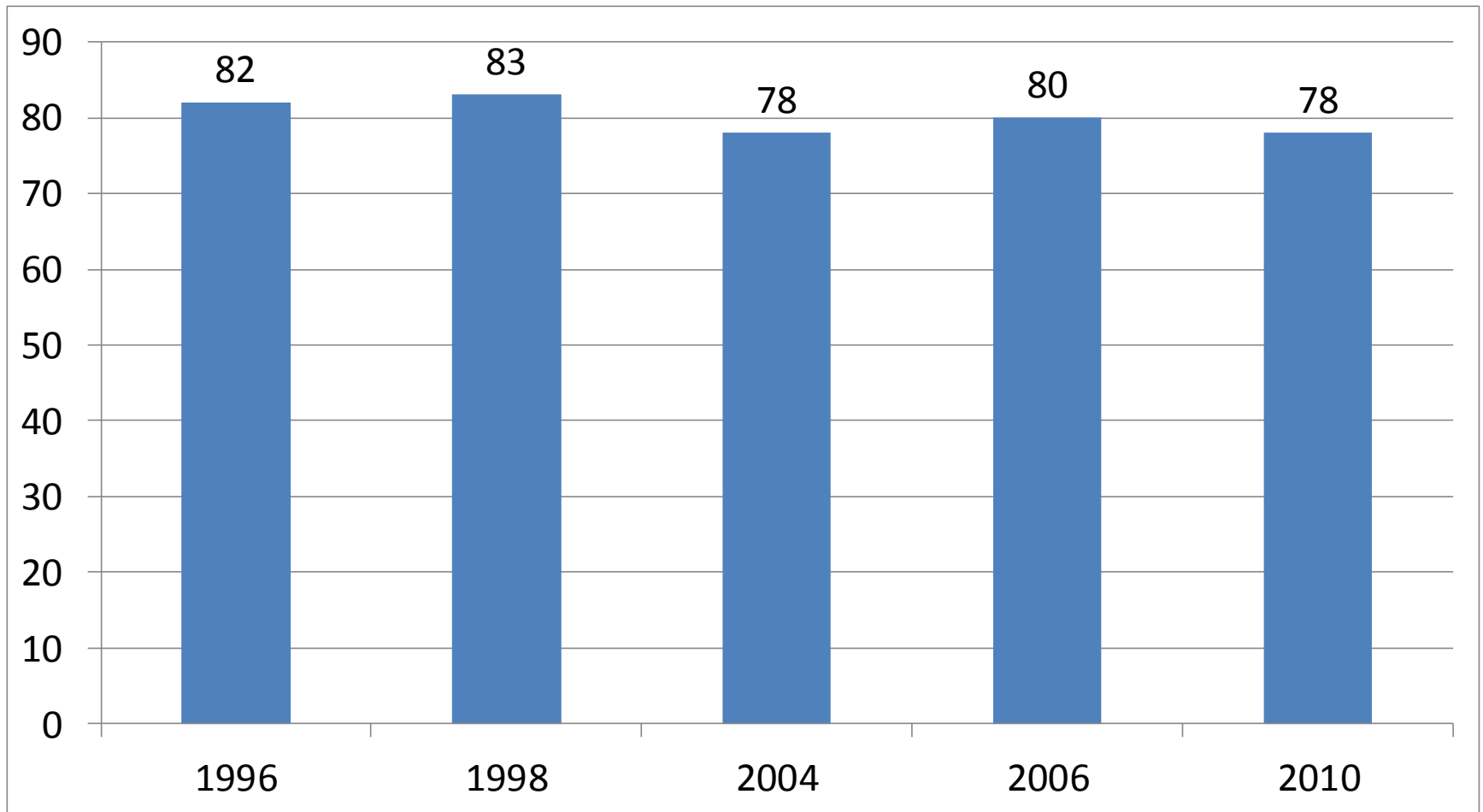
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Total area cultivated (maize + all other crops)	Number of farms	% of farms	% of farmers receiving FISP fertilizer	kg of FISP fertilizer received per farm household	% of farmers expecting to sell maize	Expected maize sales (kg/farm household)
	(A)	(B)	(C)	(D)	(E)	(F)
0-0.99 ha	616,867	41.9%	14.3%	24.1	22.2	
1-1.99 ha	489,937	33.3%	30.6%	69.3	47.7	
2-4.99 ha	315,459	21.4%	45.1%	139.7	64.0	
5-9.99 ha	42,332	2.9%	58.5%	309.7	82.1	
10-20 ha	6,626	0.5%	52.6%	345.6	86.8	
Total	1,471,221	100%	28.6%	77.1	42.7	

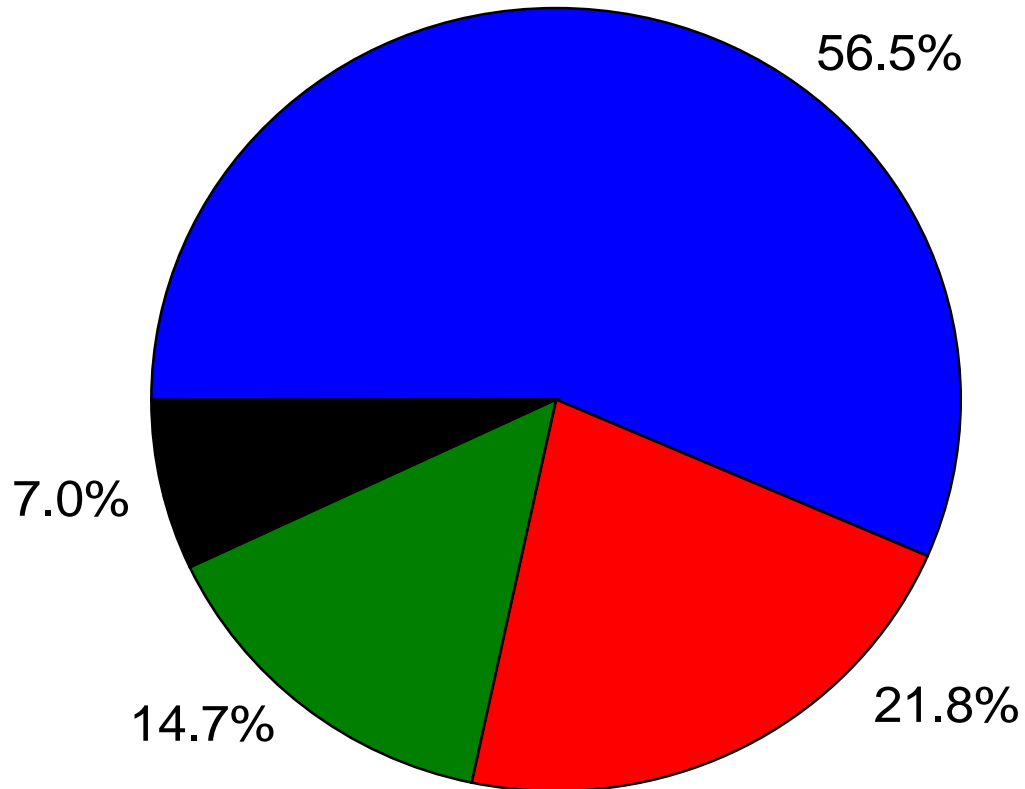
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0-0.99 ha	616,867	41.9%	14.3%	24.1	22.2	135
1-1.99 ha	489,937	33.3%	30.6%	69.3	47.7	609
2-4.99 ha	315,459	21.4%	45.1%	139.7	64.0	1,729
5-9.99 ha	42,332	2.9%	58.5%	309.7	82.1	6,613
10-20 ha	6,626	0.5%	52.6%	345.6	86.8	15,144
Total	1,471,221	100%	28.6%	77.1	42.7	950

Rural headcount poverty rates, Zambia



Public expenditures to agriculture, 2010, Zambia



A close-up photograph of two large, round, green melons hanging from a vine. The melons are the central focus, with their smooth, slightly textured skin catching the light. The background is a soft-focus view of a vineyard with green leaves and a bright, sunny sky, creating a warm and natural atmosphere. The text is overlaid in the center of the image.

IV.
Conclusions and Implications for
Policy

Conclusions

1. Problems of inadequate access to land almost never features in national development plans or poverty reduction strategies....

... despite the fact that an increasing share of Africa's rural population live in densely populated, land-constrained areas

Conclusions

2. Growing perception that the development challenge for the region is how to utilize the continent's under-utilized land resources.
3. Many states are stepping up efforts to transfer land out of customary tenure to the state or to private individuals who, it is argued, can more effectively utilize the land to meet national food security objectives.

Conclusions

4. Such efforts have nurtured the growth of a relatively well-capitalized class of “emergent” African farmers
5. The growing focus on how best to exploit unutilized land in Africa has diverted attention from the more central and enduring challenge of developing agricultural development strategies that effectively address the continent’s massive rural poverty and food insecurity problems

Tentative conclusions

- Large fraction of public expenditures to agriculture are being captured by narrow segment of rural population
- Land transfers to “emergent farmers” exacerbating the concentration of farm income
- Privatization of public expenditures?

more cross-country evidence needed to assess robustness of these conclusions

What to do?

Ranking of Alternative Investments: Meta-Study Evidence from Asia and Africa

	The Economist	IFPRI study
Policies		
Road investment		
Agricultural R&D		
Agricultural extension services		
Credit subsidies		
Fertilizer subsidies		
Irrigation		

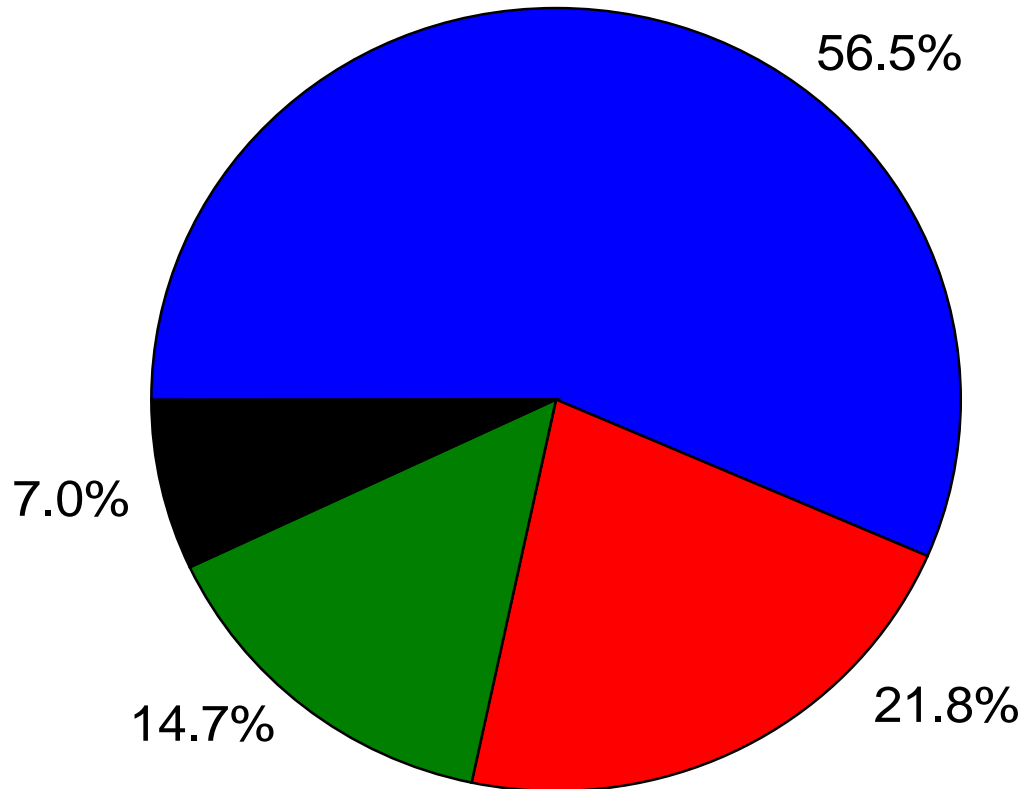
Ranking with respect to *agricultural growth*: Evidence from Asia

	The Economist	IFPRI
Policies	1	
Road investment	2	1
Agricultural R&D	3	2
Agricultural extension services	4	
Credit subsidies	7	3
Fertilizer subsidies	5	4
Irrigation	6	5

Ranking with respect to *poverty reduction*: Evidence from Asia

	The Economist	IFPRI
Policies	1	
Road investment	2	1
Agricultural R&D	3	2
Agricultural extension services	5	
Credit subsidies	7	3
Fertilizer subsidies	4	4
Irrigation	6	5

Public expenditures to agriculture, 2010, Zambia



What to do:

1. Research & Extension:

- Land constraints highlight need for land intensification and productivity growth
- Need greater investment in agricultural research and extension systems
 - focus on land-saving farm technologies and
 - practices appropriate for one-hectare farms

2. Coordinated public/private investments to encourage rural-rural migration:

- Gokwe example

3. Address land inequalities:

- conduct land audit
- land tax

Take-away message:

- A broad-based, inclusive form of agricultural growth has much greater prospects of reducing rural poverty
- Consistent with documented structural transformation processes in Asia:
 - Lipton (2006): "except in the cases of a handful of city-states, there are virtually no examples of mass poverty reduction since 1700 that did not start with sharp rises in the productivity in small family farms"

Consequences of “do nothing” option

- Inability of large % of rural population to participate in/ respond to agricultural growth opportunities
- Closing off the most effective policy option for poverty reduction
- Unviable rural livelihoods contributes to rural-urban migration and the myriad problems associated with rapid urbanization:
 - rise of urban slums, poor sanitation, health crises unemployment, etc.
- Possible civil instability?
- Inevitable rise of large commercial agriculture?
 - ...Depends on how public funds are allocated

Thank You



Disparities within smallholder agriculture, Zambia - 2008

	N=	Farm size (ha)	Asset values (US\$)	Gross rev., maize sales (US\$)	Gross rev., crop sales (US\$)	Total hh income (US\$)
Top 50% of maize sales	30,150 (2%)	7.2	3,703	3,199	3,354	7,624
Rest of maize sellers	467,320 (30%)	1.9	257	172	252	1,272
Households not selling maize	1,010,014 (67%)	1.1	129	0	57	756

Source: CSO Supplemental surveys, 2008