

The Fruits and Vegetable Value Chain in Ethiopia: Transformation, Prices, and Implications for Consumption and Nutrition



Virtual Seminar |
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Prices of Vegetables and Fruits in Ethiopia

Trends and implications for consumption and nutrition

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Webinar Co-Organized by the National Information Platform for Nutrition (NIPN), the Ethiopian Public Health Institute (EPHI) and IFPRI-ESSP

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1. Background

- Significant improvements in reducing malnutrition in last two decades
 - Global antipoverty efforts and rapid income growth contributed for change
- Increased awareness on improving access to protein & micronutrients
 - Important for physical growth, cognitive development, and overall health
 - This contributes to human capital \Rightarrow labor productivity \Rightarrow future economic success
- Complete nutrition requires regular consumption of wide range of food/food groups
- Recent nutritional research emphasized the importance of achieving a diverse diet
- Overarching implication is the need for rethinking previous nutrition, agricultural, food system, and health policies
 - To provide more diverse diets complete with calories, protein, and micronutrients

1. Background (Ethiopia)

- Study covers 2005-2019, marked with remarkable economic growth in Ethiopia
- Rapid growth in income, cereals productivity & availability, and policies addressing poverty contributed to decline in malnutrition
- But malnutrition is still widespread, and Ethiopians consume among least diverse diets in sub-Saharan Africa.
- There is concern about the slow change in nutritional status and diet quality,
 - Improving nutritional outcomes among important policy agenda of the government
- Recent research attributes poor diet quality to, among others, rising food prices
 - Study investigates temporal & spatial patterns of vegetable and fruit prices
 - Retail-producer price margins and relative prices.
 - The supply side – vegetable and fruit production and marketed output

2. Data and method

Data

- Mainly use the retail price data from the Central Statistical Agency (CSA).
- Producer price data also used
- Nationally representative production and marketed output data,
- Analyses include 11 types of vegetables and six types of fruits
 - Vegetables: Ethiopian kale, cabbage, lettuce, spinach, carrot, tomato, onion, garlic, green pepper, pumpkin, and beet root
 - Fruits: banana, orange, lemon, papaya, avocado, and mango,
- Unless stated otherwise all prices are in December 2011 Ethiopian birr
- Prices deflated using smoothed regional general consumer price index (GCPI)

Method

- We rely on descriptive analyses

3. Vegetable and fruit (V&F) production and marketed output

Production

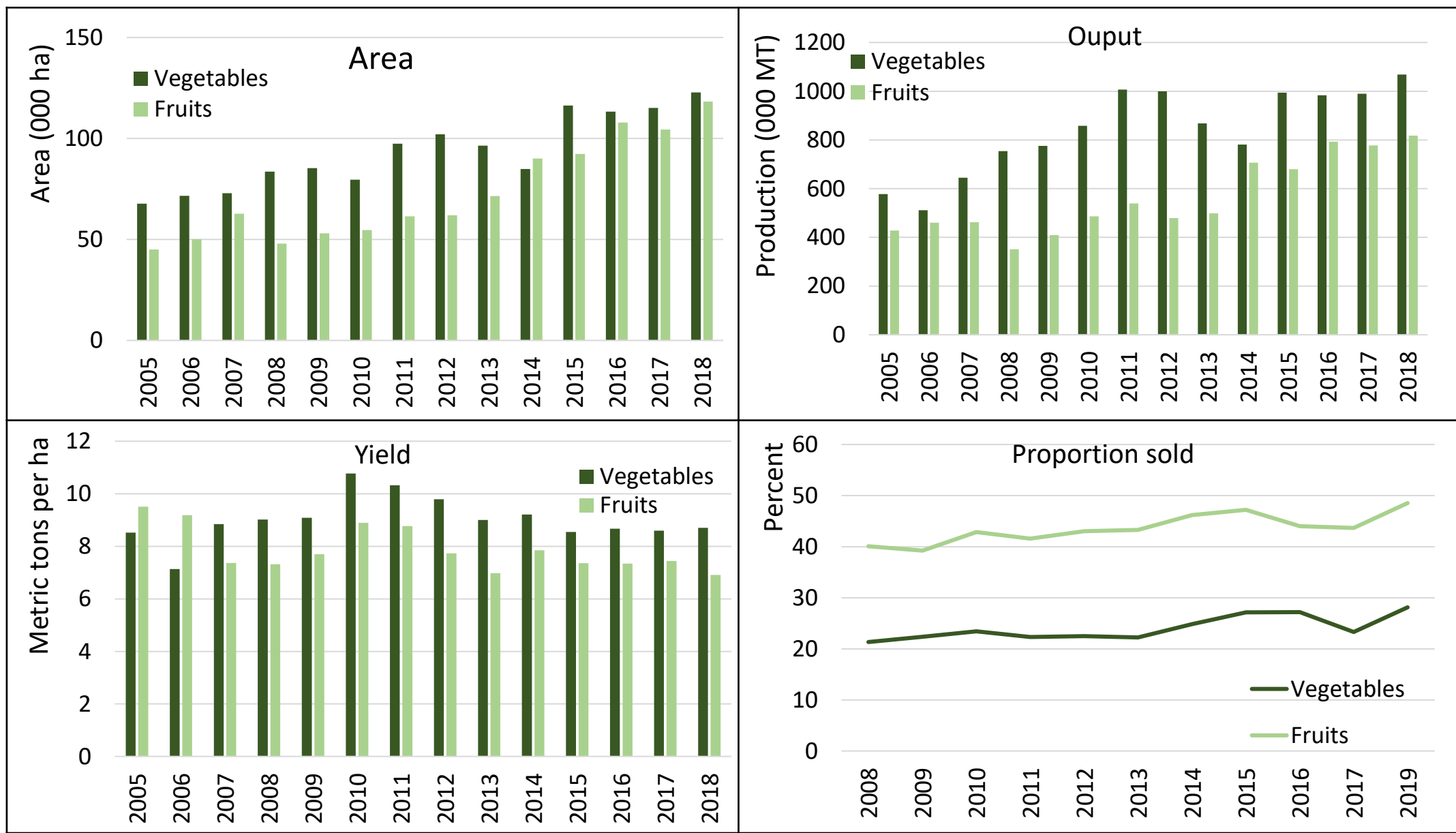
- Vegetable yields were about the same in 2005 and 2018 since area increased by 85% and output by 80%
- Fruits yields declined given area increased by 163% and outputs by 91%,
- V&F accounted for 1.5% of area under major crops & 11.3% of output in meher
 - Area under barley over five times the area under all 17 V&F combined
- Vegetables more important in belg than in meher & importance growing over time,
- Irrigation more important in V&F production (with >14% irrigated) than other crops
 - V&F area irrigated at least 8 times higher than most irrigated cereal, maize.

3. Vegetable and fruit production and marketed output...Contd.

Marketed output

- Smallholders sold less than 50% of fruits and less than 30% of vegetable outputs during 2008-2019.
 - Fruits marketed 17%-21% higher than share of vegetables marketed
- There has been slow increase in proportion of outputs marketed
- Quantities of vegetable and fruits marketed grew more rapidly (81% and 188%) than the quantities produced (66% and 77%)
 - This may imply more commercialization

Figure 1. Vegetable and fruit area, production, yields, and marketed output

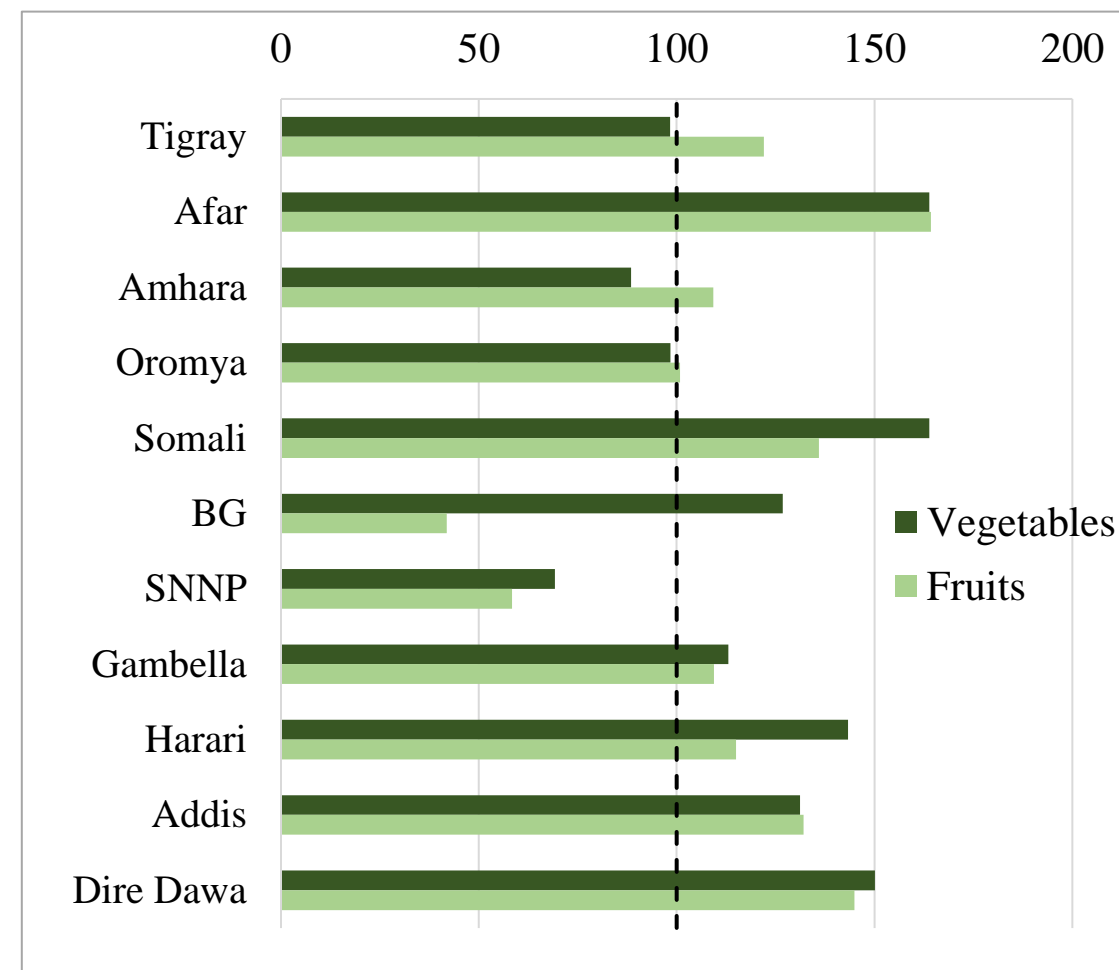


4. Spatial patterns in prices

Regional prices

- Figure 2 depicts % difference of regional V&F prices from national prices (100% line)
- Vegetable prices higher in Somali & Afar and lower in SNNP & Amhara
- Fruit prices higher in Afar, Dire Dawa, & Somali, and lower in BG & SNNP
- Patterns for the overall study period also hold when considering each year separately.

Figure 2: Regional median vegetable and fruit prices as a ratio of national prices, 2005-2019 (%)

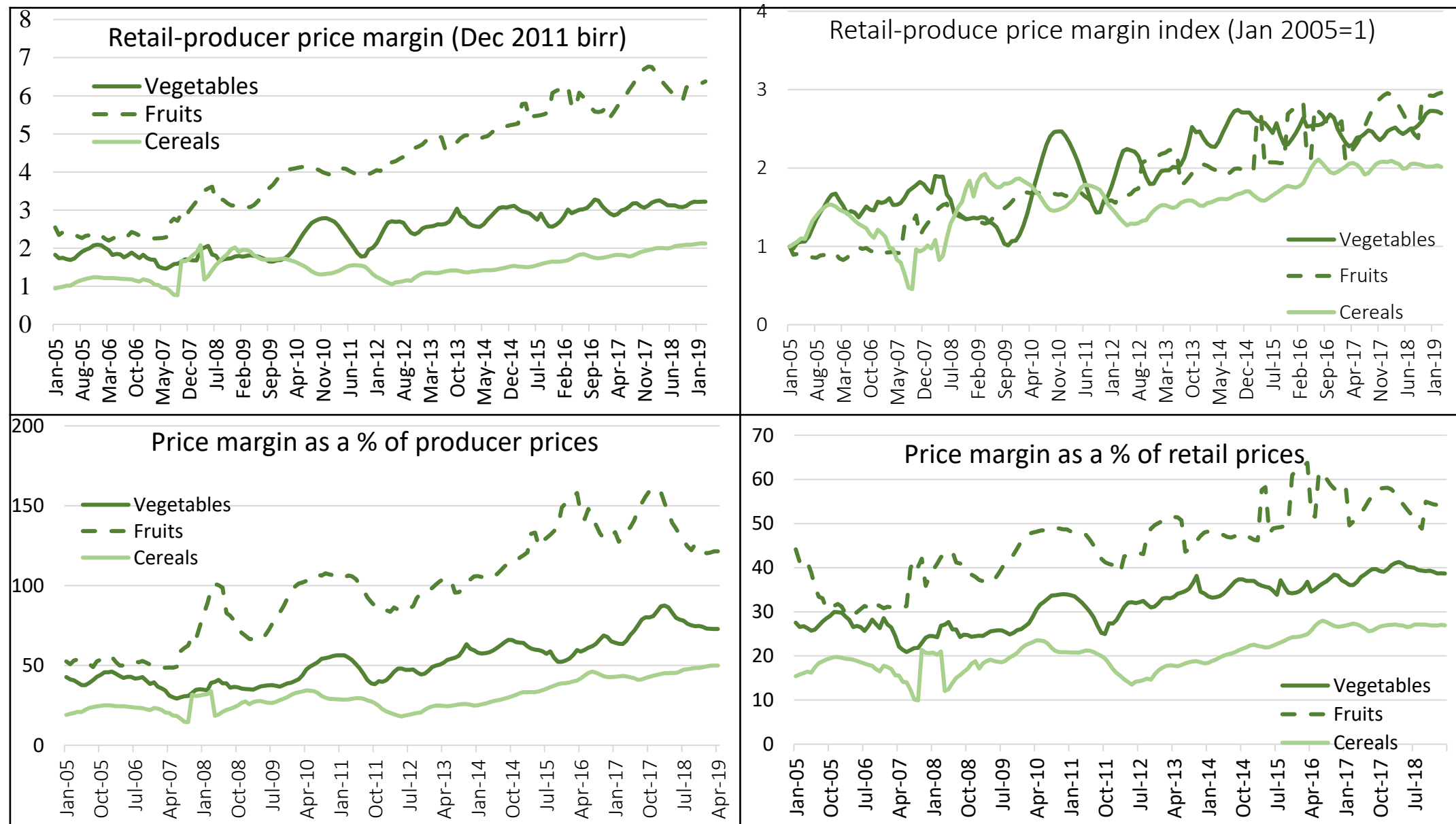


4. Spatial patterns in prices...Contd.

Retail-producer price margins (RPPM)

- RPPM of fruits highest in all months followed by vegetables, and then cereals,
 - Except in 2008 and 2009, when cereal RPPMs were higher than vegetables,
 - Extent of perishability may have to do with magnitudes of V&Fs Vs cereals RPPMs; but further investigation is needed
- Rapid growth in the RPPMs: 80% for vegetables (5.3% annually); 115% for fruits (6.8% annually); & 77% for cereals (8% per year)
- Rapid growth in RPPM expressed both as a ratio of producer prices and retail prices
 - RPPM/producer price ratio grew by 81%, 91%, and 111% for vegetables, fruits, cereals,
 - RPPM higher than producer price of fruits during most of the period
 - That RPPM to producer & retail price ration was increasing implies it grew faster than both and there was a large price gap that needs bridging

Figure 3. Retail-producer price margins for vegetables, fruits, and cereals, 2005 to 2019

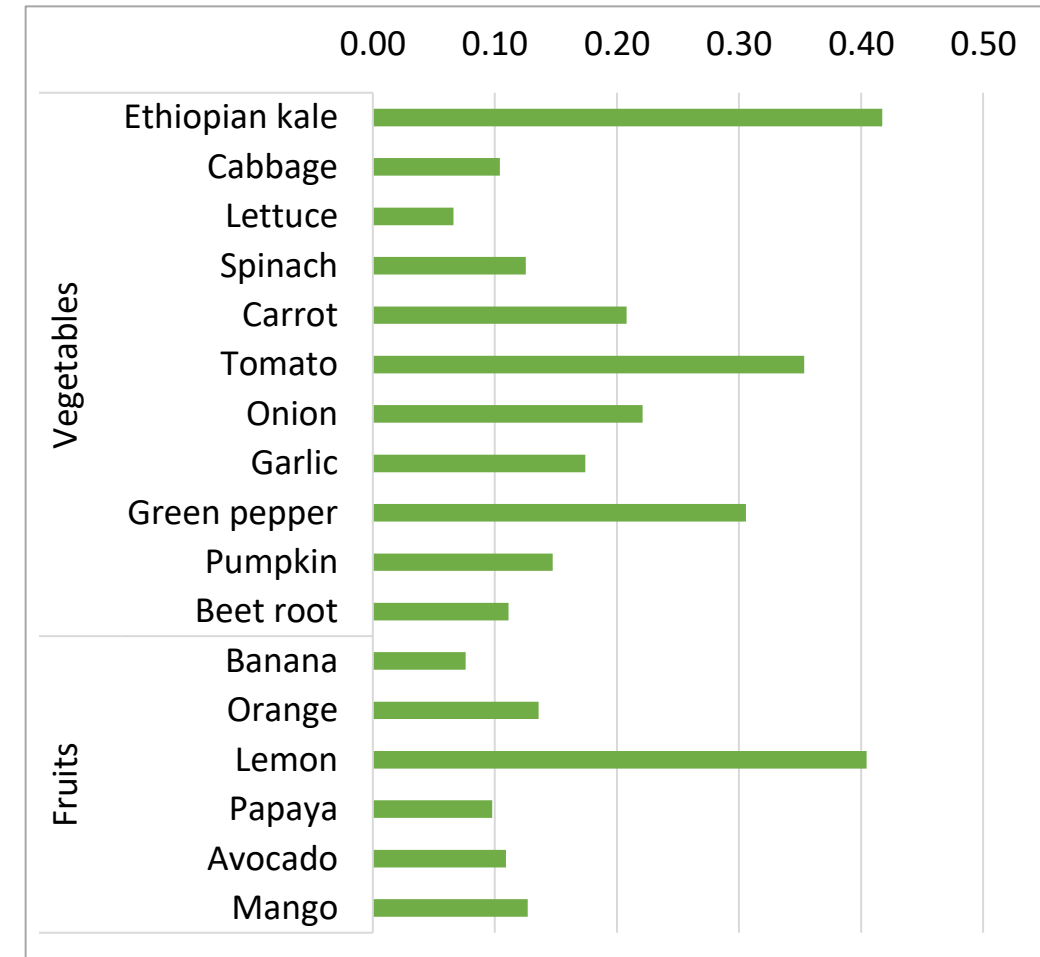


5. Price seasonality and trends

Price Seasonality

- Figure 4 depicts amplitudes (maximum – minimum) of monthly price indices
- Price seasonality is generally higher (>0) for vegetables than for other items (fruits, ASF)
 - Prices highly seasonal for all vegetables except lettuce,
- Vegetables prices higher during Orthodox Christian fasting (Lent) season,
 - Vegetables an important part of consumption during the lean season
- Seasonality low for fruits, likely because of the longer gestation period until fruition
 - Lemon differs from general pattern

Figure 4: Vegetable and fruit price amplitudes, 2005 to 2019



5. Price seasonality and trends...Contd.

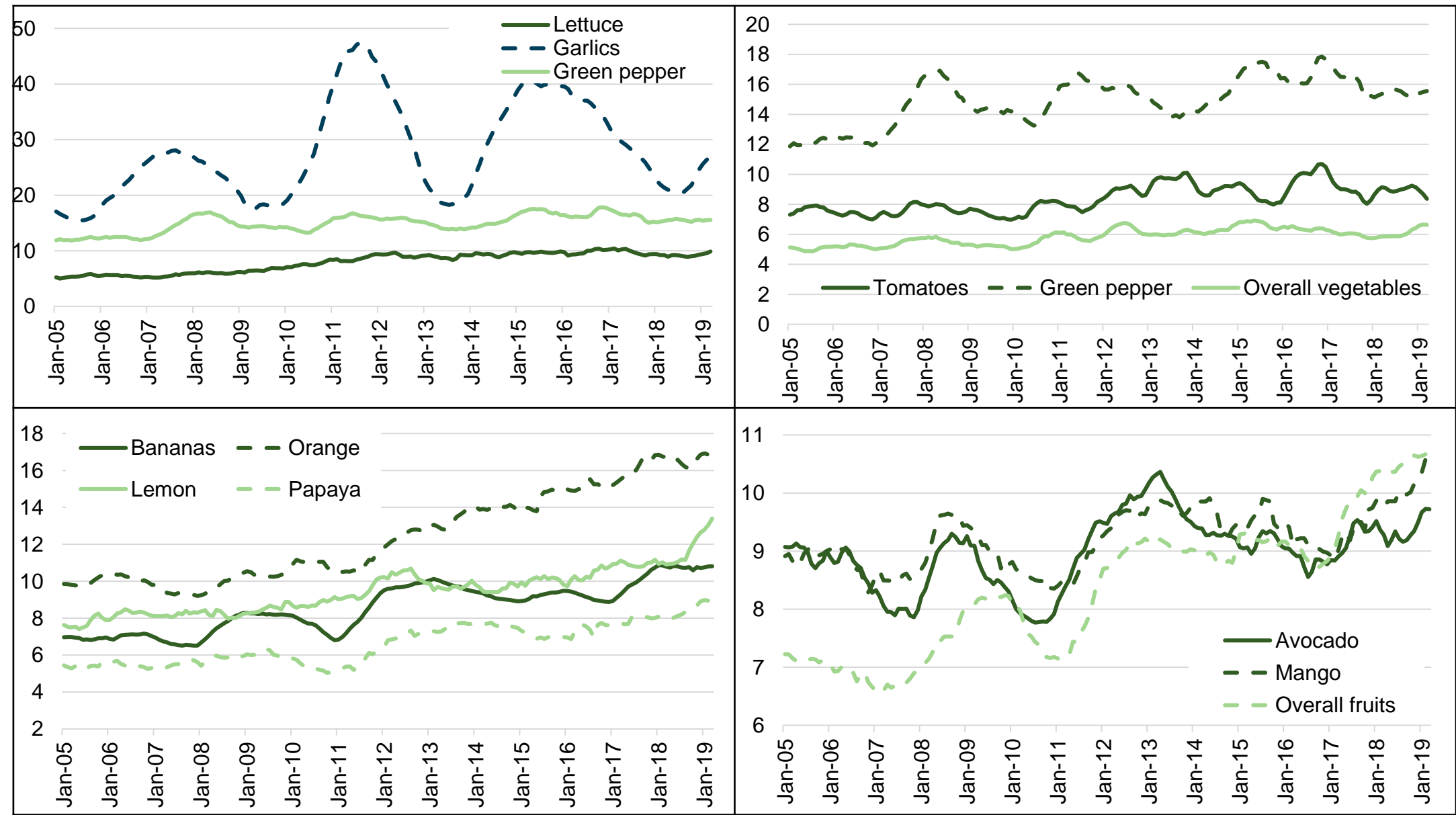
Vegetable and fruit price trends

- Vegetable and fruit prices in 2019 higher than in 2015 or any other year,
 - Overall vegetable prices in 2019 39% higher and fruit prices 60% higher than prices in 2005
 - 2019 Vegetable/fruit prices higher than 2005 in all but 4/1 administrative zones with data,
- Producer price growth generally lower than retail price growth,

Relative price trends

- Overall vegetable/fruit ToT increased by 24%/51% between 2019 and 2005
 - In 2005, 0.5 kg cereals bought a kg of spinach, it was 0.7 kg of cereals in 2019 (41% growth)
 - In 2005, 1.1 kg cereals bought 1 kg of banana; it was 1.7 kg of cereals in 2019 (60% growth)
- ToT increased for all vegetables except cabbage, onions, tomatoes, & avocados

Figure 5. Trends in real prices of vegetables and fruit, 2005 to 2019, December 2011 birr/kg



6. Policy Implications

1. Growth in noncereal productivity indispensable to reinvigorate agriculture's importance and contribute towards increased availability of nutrition-dense vegetables and fruits
 - Previous policy focused on cereals productivity & food security challenges
 - Despite rapid increase in output productivity of noncereal crops and livestock stagnated,
 - Agriculture still at the center of the transformation of food systems in Ethiopia,
2. Further investment needed in physical infrastructure & new technologies, e.g., cold chains
 - Investment in agricultural marketing and processing needs to be stimulated
 - Increases in price-gaps imply improvements in marketing infrastructure & technologies needed
3. Policymakers need to take advantage of slow urbanization and diversity/food culture,
 - Low urbanization may have slowed down nutrition-insensitive food production & consumption
 - Nutrition education can capitalize on some positive food culture and also provide information on the damages that can be caused by not having diverse diets

**Thank you for comments and
suggestions**



Emerging medium-scale tenant farming in Africa: The case of commercial horticultural clusters in Ethiopia

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Introduction

- Agricultural economies rapidly transforming in developing countries
- Increasing urbanization, population growth, income growth, policy reform, and better road and communication infrastructure leading to a 'quiet revolution'
- Enormous implications on agri-food system
- Smallholder agriculture a defining characteristic for most of Africa but recent emergence of medium- and large-scale farmers (Jayne et al. 2016, 2019, Sitko and Jayne 2014)
- Study the case of horticultural clusters in Ethiopia

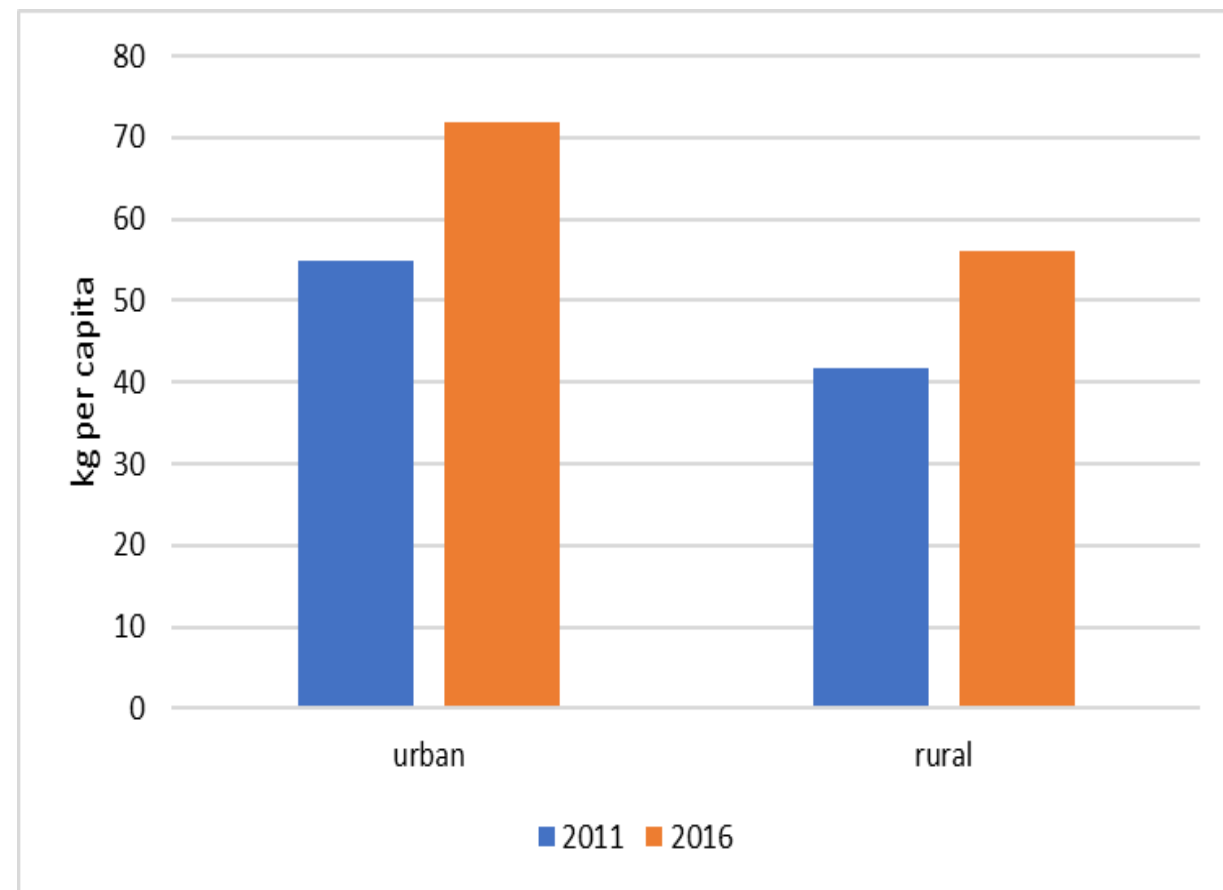
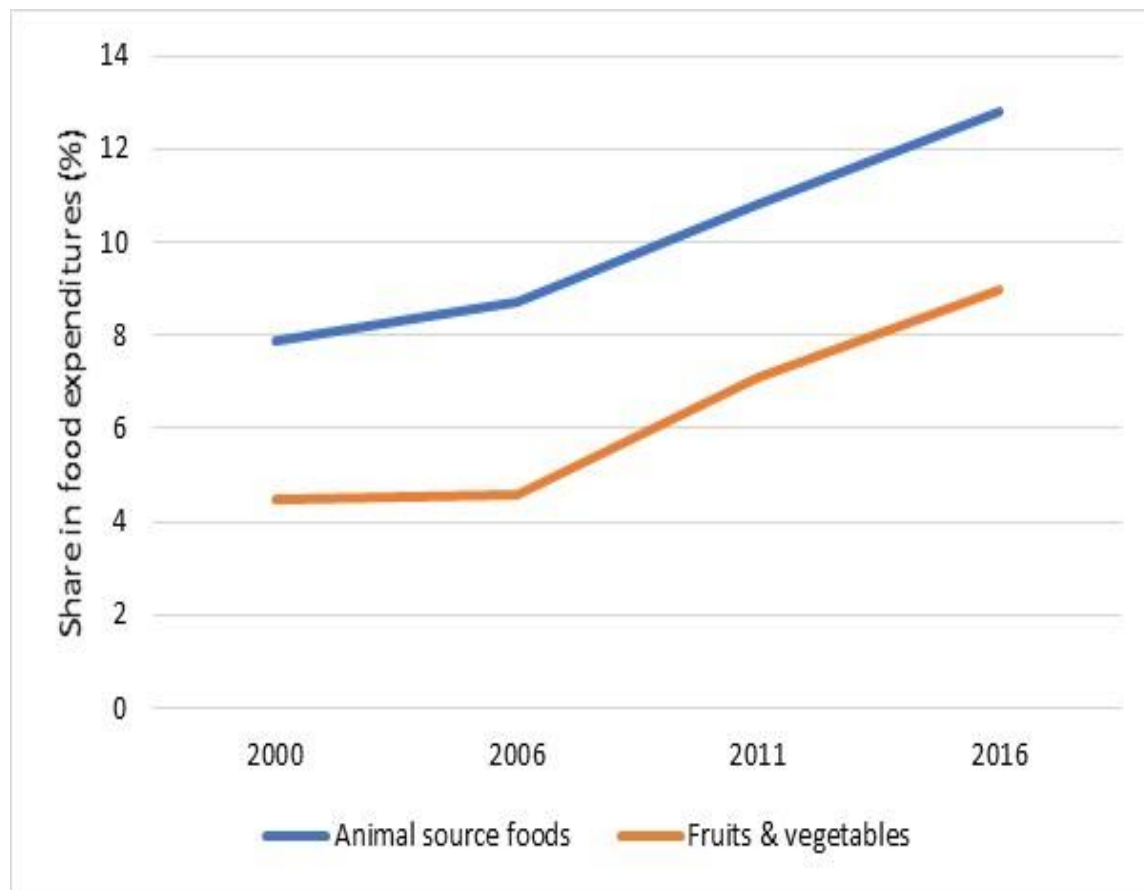
Introduction

Interesting because:

1. Rapid growth in cereal economy but unclear evidence on horticultural sector (production growth is much desired; diet diversity is low; prices are rapidly increasing; problems of more difficult growing conditions (pest and diseases) and marketing requirements (perishability)).
2. Job creation high on the agenda of policy makers. Relevant to study job creation in these commercial clusters (understand labor markets and service contracts in these rural economies).
3. Cluster-based development shown important successes in countries such as China. Models are increasingly being promoted elsewhere, including Ethiopia. However, little evidence on such clusters.

Background

In Ethiopia, vegetable consumption levels low but going up



Data

- Central Rift Valley (CRV) in Ethiopia.
- Almost three-quarters of the four main vegetables consumed in Addis Ababa from that area

Reasons:

1. A number of lakes (e.g., Lake Ziway, Koka Lake). Potential of river irrigation and groundwater levels in general good as well.
2. Area located on a good road at a three-hour drive from Addis Ababa. A number of major secondary cities close by as well.
3. Region is part of the sub-tropical semiarid agro-climatic zone, conducive for vegetable cultivation when irrigation water available.

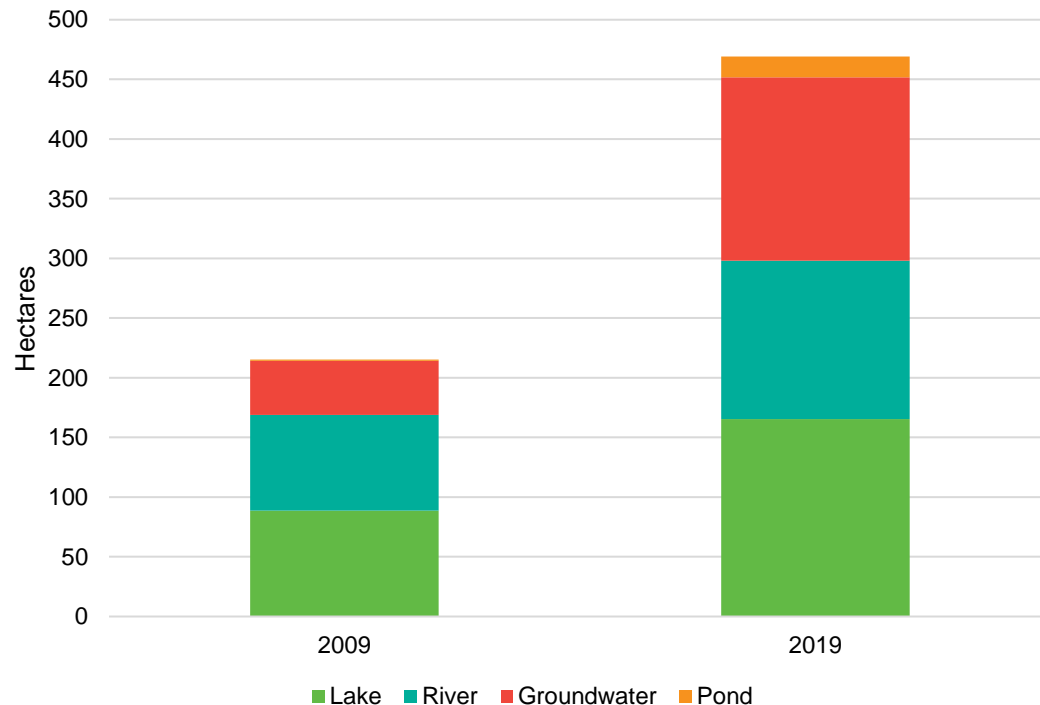


Data

- Survey fielded in January/February 2020
- 810 farmers interviewed
- Sample set-up:
 - a. All the irrigated areas - where vegetables are cultivated - in the East Shewa zone (Central Rift Valley).
 - b. Selected those kebeles in the 4 major woredas that had more than 100 hectares of irrigated land.
 - c. In each kebele, a list made of all vegetable cultivators (those cultivators that rented in more than 0.5 hectares were considered 'medium-scale tenant farmers'). 20 farmers interviewed in each kebele.
 - d. One-quarter of the farmers interviewed randomly selected from the medium-scale farmers list; three-quarters from the smallholder list.
 - e. Household as well as community survey implemented.

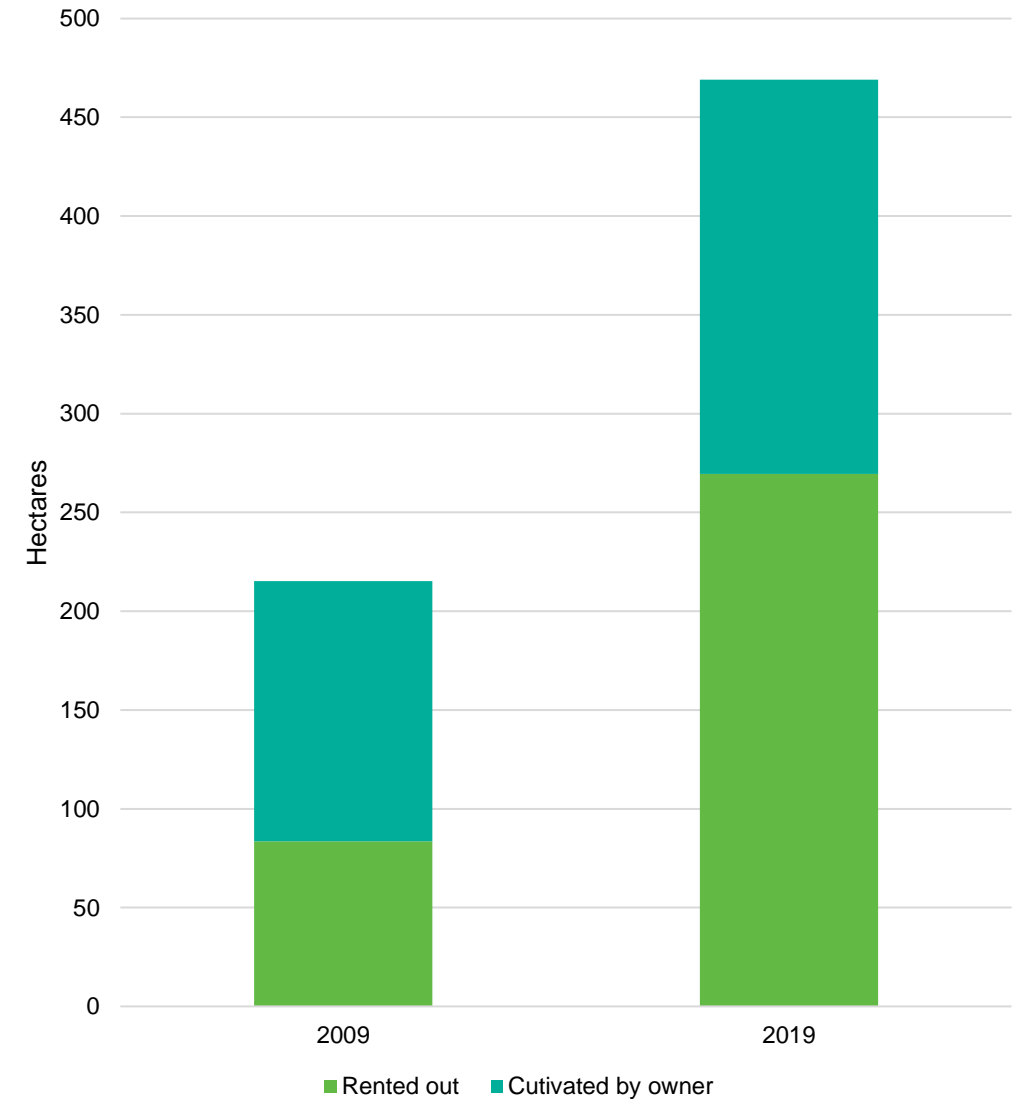
The role of irrigation

- In Ethiopia, majority of agricultural production rainfed
- Doubling of area irrigated – rapid increase in groundwater irrigation
- Private pumps have played a major role for expansion of irrigated areas (3/4 of the pumps owned by farmers themselves).
- Pumps mostly imported from China



Land rental

- Almost 60 percent of the vegetable land cultivated by medium-scale tenant farmers.
- Area cultivated by medium-scale tenants more than tripled over the last decade
- Short-term leases (2/3 one-year lease – 1/3 one-season)
- One-season lease is 340 usd per hectare (compared to an average output of 10,000 usd)



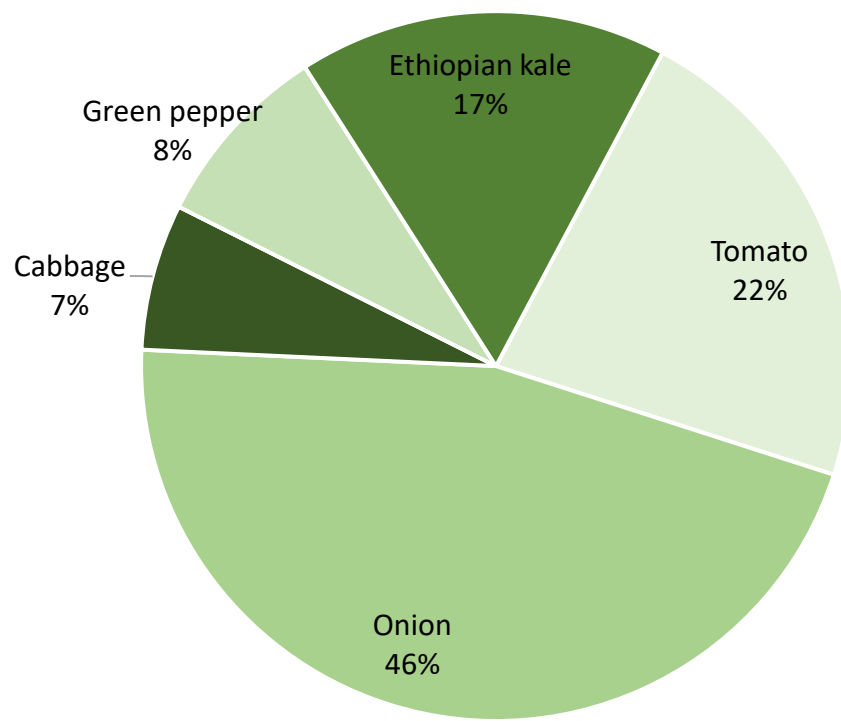
Characteristics medium-scale tenants

		Farmers		t-test	
	Unit	Smallholders	Medium-scale tenants	t-value	Prob()
Background					
Education level	years of schooling	5.1	7.5	6.74	0.00
Compared to rest of the kebele, household is					
Among richest in kebele	%	10.3	39.8	9.82	0.00
Richer than most in kebele	%	15.9	22.7	2.11	0.04
About average	%	57.3	35.2	-5.26	0.00
A little poorer than most in kebele	%	11.2	0.6	-4.43	0.00
Among poorest in kebele	%	5.4	1.7	-2.06	0.04
Area of vegetables cultivated					
Rainy season	has/farmer	0.6	0.9	1.82	0.07
Irrigation season	has/farmer	0.8	4.6	15.20	0.00
Area rented-in irrigation season	has/farmer	0.3	3.5	18.83	0.00

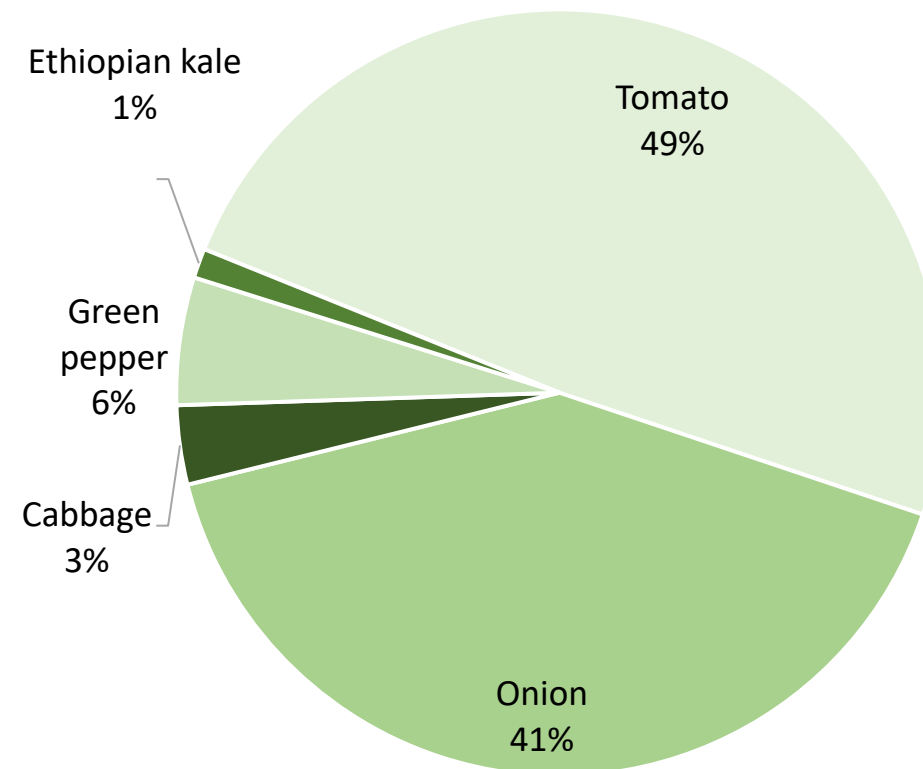
Crops grown – smallholders versus medium-scale tenants

Annual value of produce medium-scale farmers about 52,000 usd (60 times Ethiopia's GDP per capita)

Smallholders



Medium-scale tenants

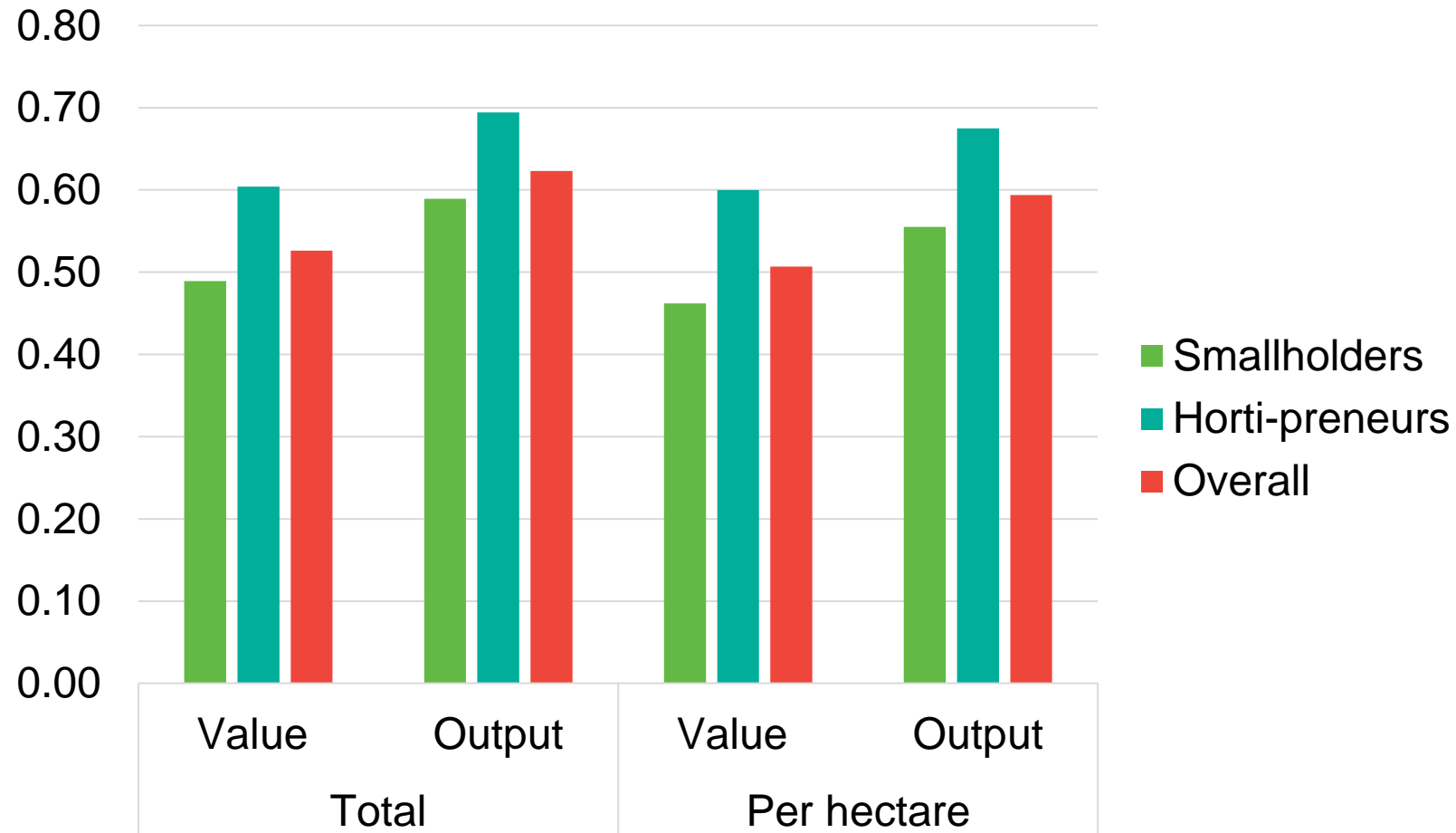


Input use and productivity

	Unit	Smallholders	Hortipreneurs	t-test	
				T-value	Prob()
Productivity					
Tomato	MT/ha	36.9	51.5	-4.4	0.00
Onion	MT/ha	18.6	22.3	-4.4	0.00
Cabbage	MT/ha	31.8	41.4	-2.0	0.05
Green pepper	MT/ha	10.1	18.5	-4.9	0.00
Ethiopian kale	MT/ha	29.1	29.2	0.0	0.99
Average cost per hectare					
Overall vegetables	Birr/ha	91,116	158,640	-16.5	0.00
Tomato	Birr/ha	190,614	235,785	-6.9	0.00
Onion	Birr/ha	119,208	131,537	-4.9	0.00
Cabbage	Birr/ha	63,136	71,862	-1.6	0.11
Green pepper	Birr/ha	63,008	128,480	-8.2	0.00
Ethiopian kale	Birr/ha	32,199	40,667	-2.3	0.02

Efficiency

[Based on stochastic vegetable production frontier]



Emerging rural gig economy for vegetable services

In total 4350 jobs, about 20% of the level of workers employed in the successful Hawassa industrial park nearby

		Farmers		Proportion test	
		Smallholders	Medium-scale tenants	t-value	Prob()
Own labor as share of activity					
a. Guarding field	%	29.9	3.6	-7.30	0.00
b. Plowing	%	37.1	4.5	-8.71	0.00
c. Fencing	%	35.1	6.4	-6.77	0.00
d. Planting	%	14.8	0.0	-5.51	0.00
e. Sticking/building ladders	%	21.6	0.0	-5.76	0.00
f. Tying plants	%	16.1	0.9	-4.32	0.00
g. Spraying	%	41.5	5.1	-9.49	0.00
h. Fertilizer use	%	46.8	8.0	-9.90	0.00
i. Irrigation	%	41.0	6.8	-8.88	0.00
j. Harvesting	%	16.0	0.0	-5.77	0.00

Emerging rural gig economy for vegetable services

		Farmers		t-test	
		Smallholders	Medium-scale tenants	t-value	Prob()
Diggings wells					
Done by whom:					
Daily laborers hired by cultivator	%	42.2	61.0	-2.16	0.03
Contractor	%	36.5	31.7	0.45	0.65
Of those that use tractors,					
Service providers rented in	%	90.4	87.9	0.87	0.38
Contractor contacted by mobile phone	%	68.9	90.3	-4.58	0.00
Seedlings grown by large enterprise-contractors					
Tomato	% area	25.1	54.8	-3.93	0.00
Green pepper	% area	10.5	54.0	-2.83	0.00
Output markets					
Share of vegetable sold on farm	%	62.6	94.9	-7.81	0.00
Buyer takes care of contracting of harvesting	% yes	7.4	6.8	0.07	0.94
Buyer takes care of contract for loading of truck	% yes	43.4	66.5	-4.19	0.00

Conclusions

- Rapid growth of a commercial vegetable cluster in the central Rift Valley in Ethiopia (200 million USD per year; close to the value of the much-heralded flower exports from Ethiopia)
- Important spatial spreads in irrigation uptake, more than a doubling of land under irrigation in the off-season.
- Wide use of improved imported seeds, of agro-chemicals, and fertilizers, mostly obtained from private agro-dealers.
- More productive and efficient medium-scale tenant farmers cultivate 60 percent of this irrigated land.

Conclusions

- Emergence of a service economy. Contractors organize the digging of wells and ponds, seed propagation, spraying, mechanized land preparation, harvesting, and loading of trucks.
- Inflow of laborers into the region, paid through daily, monthly, or piecemeal contracts, but with little employment benefits - such as health services - beyond these salaries.
- Gig economies, that are increasingly important for service sectors in developed countries, emerging quickly in these commercial agrarian settings in Africa as well.

Implications

- Lack of attention by government, holding back growth. Cereal sector transformation in Ethiopia explained by important role of government (extension advice and the distribution of modern inputs through government supported cooperatives). In contrast, the transformation in the vegetable sector mostly private-sector led. Changes happening mostly under the radar screen, largely driven by rapid demand changes, mostly from urban areas but important constraints.
- Clusters and statistical system. Importance of commercial clusters in food systems often not well understood (missed in national data collection systems). Better information and monitoring to better inform decision making called for.

Readings

- Bachewe, F., and Minten, B., Efficiency and profits of emerging medium-scale farms in Africa: Evidence from Ethiopia's commercial horticultural sector, ESSP Working Paper 156
- Minten, B., Mohammed, B., and Tamru, S., 2020. Emerging medium-scale tenant farming, gig economies, and the COVID-19 disruption, ESSP Working Paper 148
- Hirvonen, K., Mohammed, B., Minten, B. and Tamru, S., 2020. Food marketing margins during the COVID-19 pandemic: Evidence from vegetables in Ethiopia. ESSP Working Paper 150.

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