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GENERATION AND MOBILIZATION OF NUTRITION EVIDENCE TO TACKLE MALNUTRITION: FROM DATA TO ACTION

Affordability of nutrient adequacy and dietary energy in Ethiopia, 2001-2017

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Motivation

In last two decades, Ethiopia has had:

- Rapid economic growth, ~10% per annum (from low base);
- Agricultural growth, growth in crop yields due to Green revolution type focus on fertilizer, seeds for cereal grains, fueled growth

Despite significant welfare improvements, widespread concern…

- High rates of u-5 stunting, wasting, micronutrient deficiencies, low BMI prevalence among women, particularly in rural areas
- Continued rural poverty, dependence on food imports/aid & safety nets;
- High food prices and vulnerability to food price shocks

This paper aims to measure and show changes in:

- The overall cost of foods needed for nutrient adequacy,
- The subsistence cost of calories needed for day-to-day energy; and
- Their affordability relative to daily wages for unskilled workers.

Data and methods

- Main data source is Central Statistical Agency consumer (CSA) price survey:
  - 76 food items, plus daily wages for unskilled laborers
- EPHI and USDA nutrient composition databases; CSA's 2010/11 Household Consumption Expenditure Survey (HCES) data; and WB 2011 PPP data used

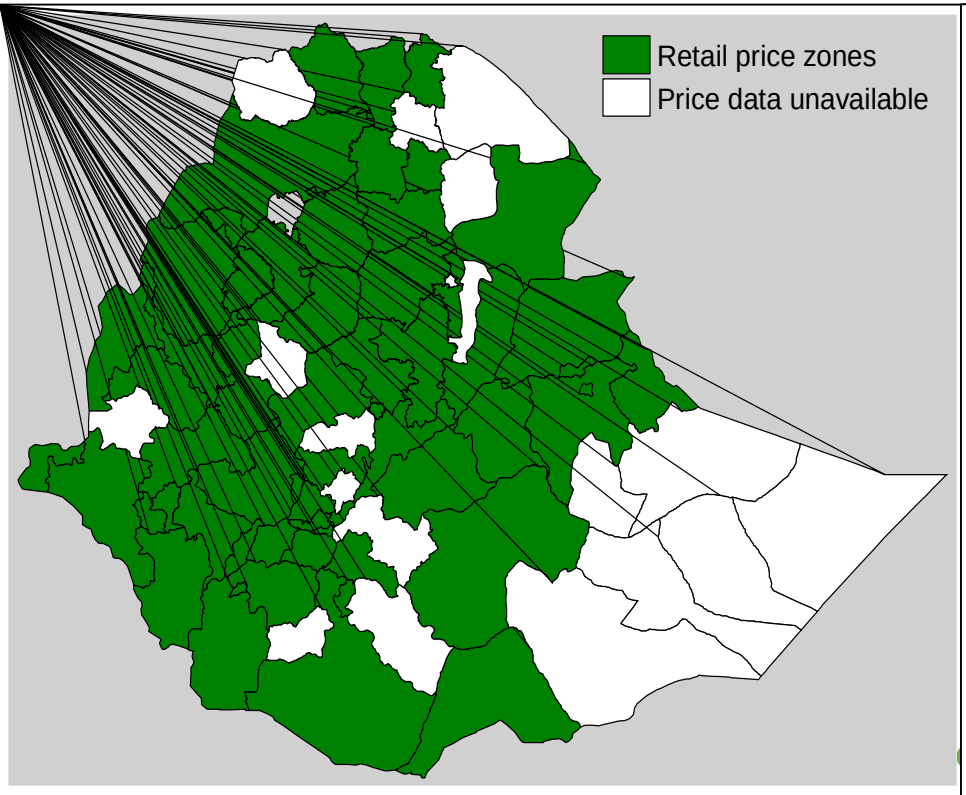
Table 1. Number of price observations in dataset

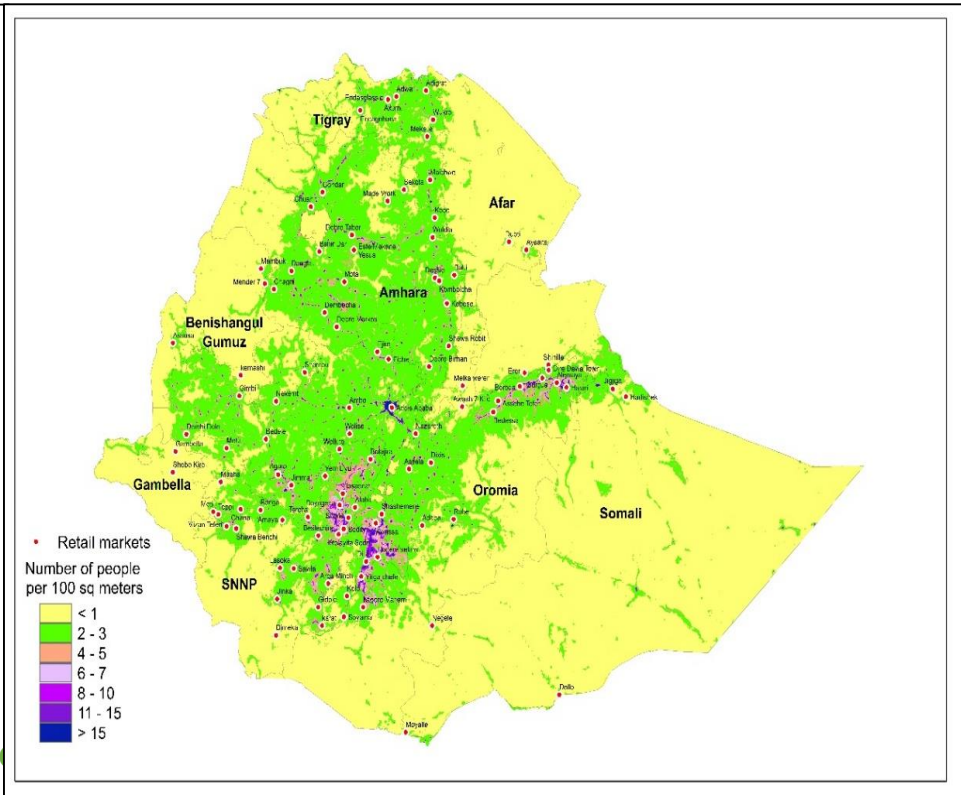
Food group	No. items	No. observations	Share of total obs.
Grains, roots and tubers	25	263,065	27.8
Legumes and nuts	14	195,224	20.6
Dairy products	4	43,945	4.6
Eggs	1	21,413	2.3
Flesh foods	3	31,861	3.4
Dark green leafy vegetables	2	20,168	2.1
Vitamin A rich veg. and fruits	5	60,521	6.4
Other fruits and vegetables	16	213,577	22.5
Oil/fats	4	62,347	6.6
Sugar/honey	2	35,561	3.8
Overall	76	947,682	100.0

Data and methods

- Monthly price data from July 2001 to June 2017
- Data includes 120 markets, including large and small urban centers
- Approximately nationally representative

Figure 1. Administrative zones and markets covered in retail price data

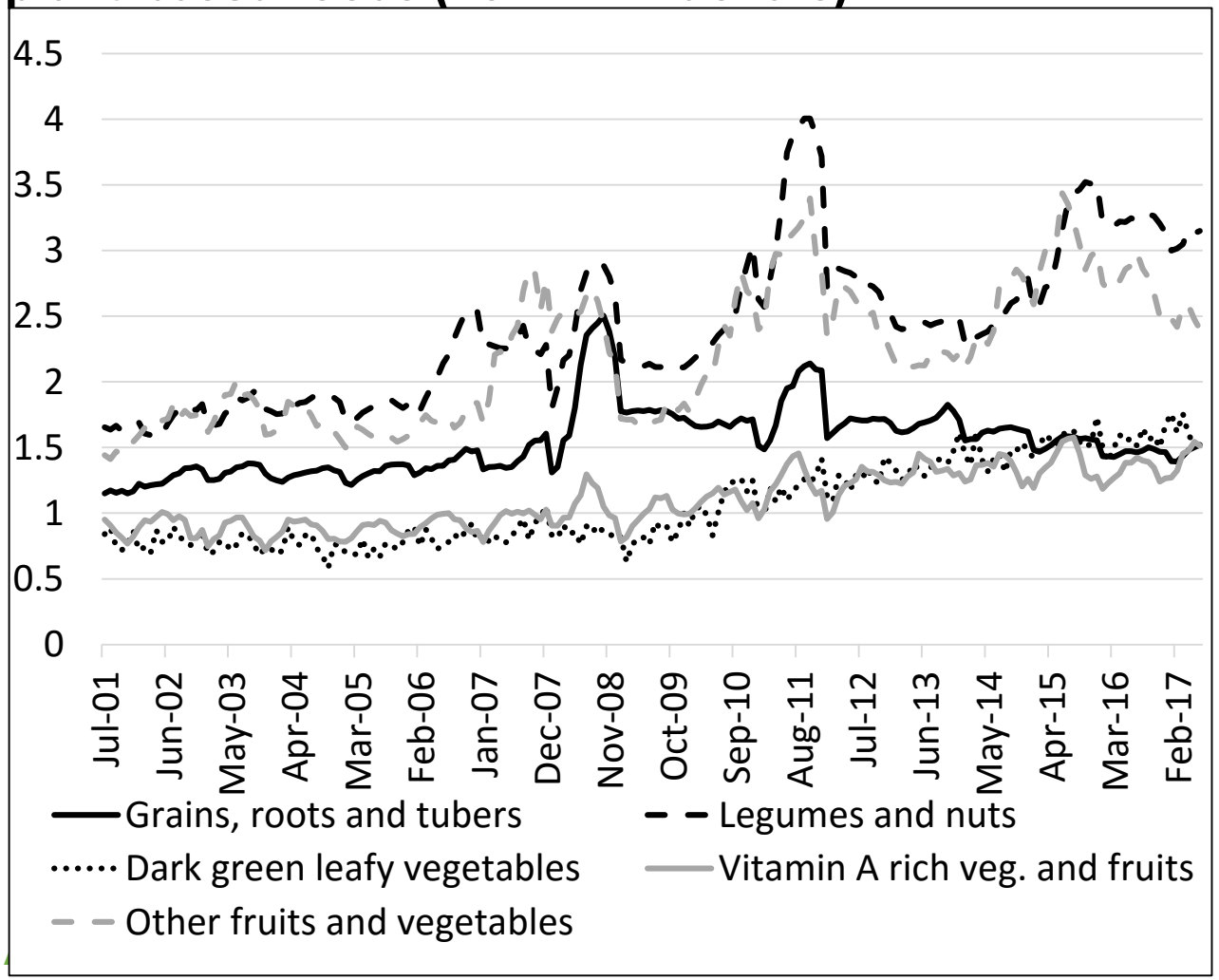




Descriptive results: trends in food group average prices

- Legumes and dark green leafy (DGL) vegetables prices increased faster, at a/b 90%
- Considerably low growth (30%) for grains, roots, and tubers (starchy staples)

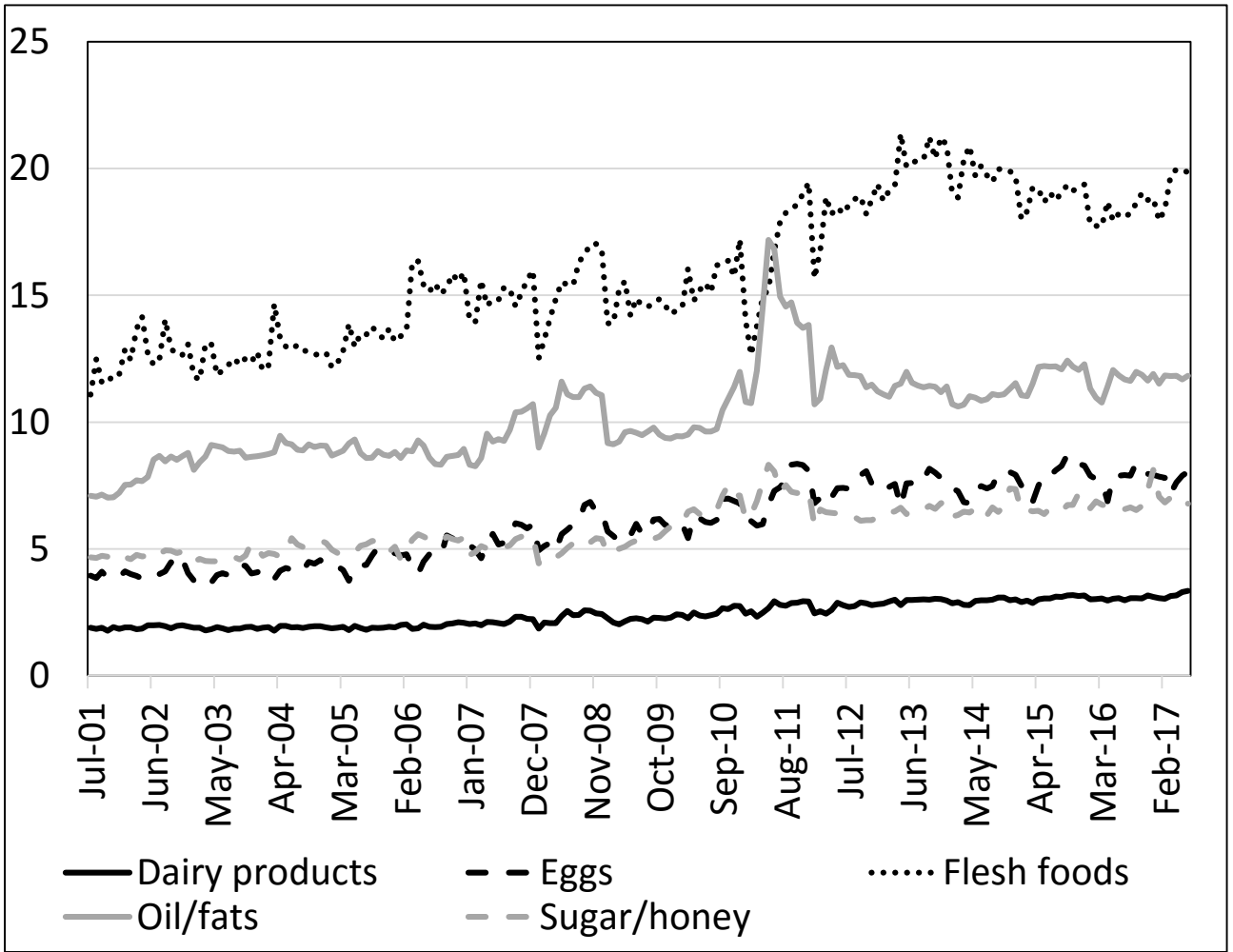
Figure 2. Monthly real consumer price trends for plant-based foods (2011 PPP dollars)



Descriptive results: trends in food group average prices

Figure 3. Monthly real consumer price trends for animal-source foods, oils and fats, and sweeteners, (2011 PPP$)

- Prices of eggs doubled, prices of dairy and flesh foods increased by over 70%
- Price increases lower for sweeteners, at nearly 50%



Methods

- All prices converted to kg terms and 2011 PPP$ units
- Nutrient-density primarily from EPHI publication; 8 nutrients for 50 items and all 21 nutrients for 26 items from USDA
- Affordability: CoNA/wages or CoCA/wages

CoNA computed for 23,040 (=120*192) market-month combinations as:

$$CoNA = Min \sum_i p_i q_i$$

Subject to: $a_{ij} q_i \geq EAR_j$

$$a_{ie} q_i = E_j$$

- Here the quantity of the jth nutrient in food i is denoted by a_{ij}; p_i & q_i denote price & quantity of i.
- Solution selects q_i's that meet estimated average requirement (EAR) for nutrient j, at lowest total cost given constraint ($a_{ie} q_i = E_j$).

Results: Common food items and average shares

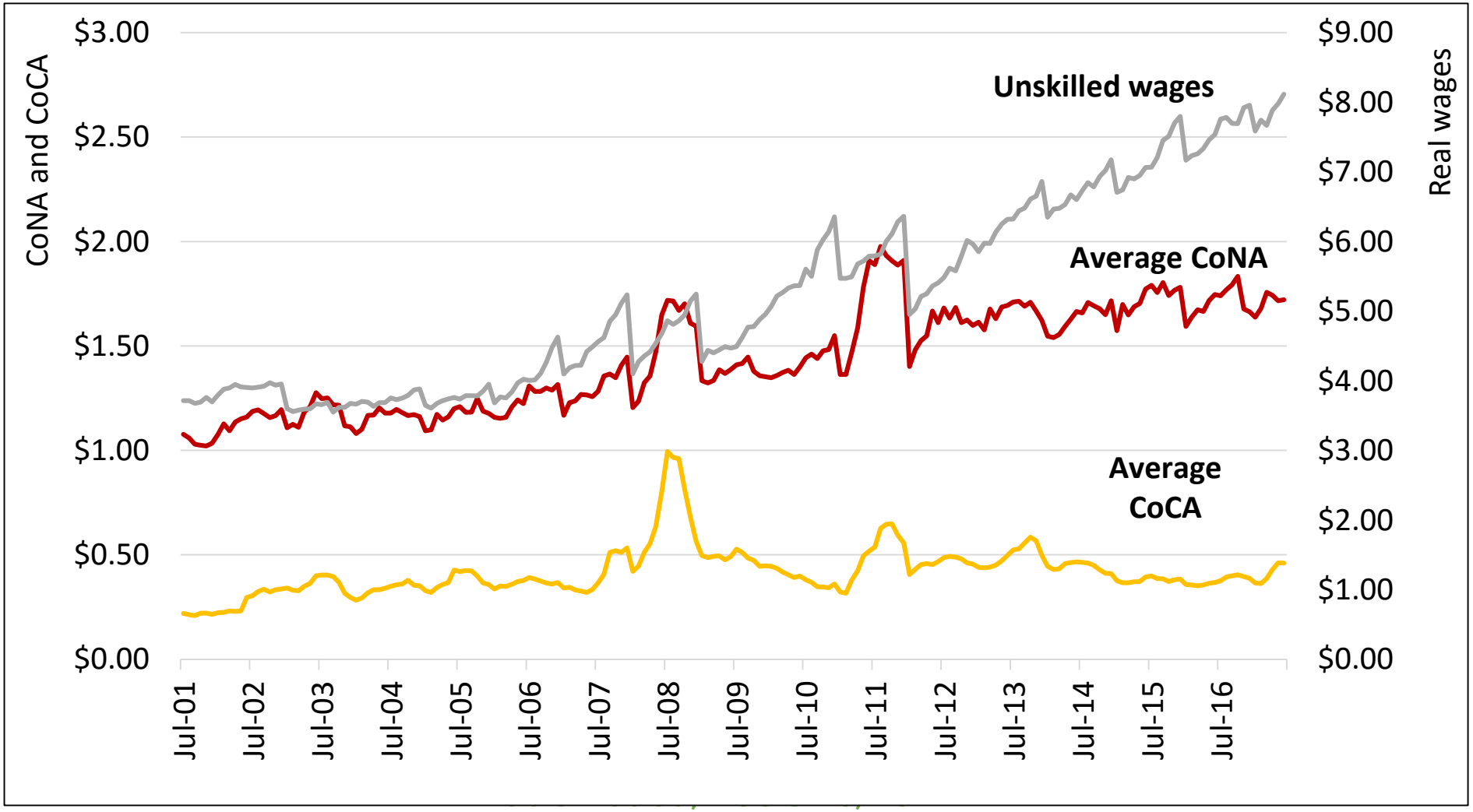
- Five (15) frequently selected items accounted for 39% (75%) of selections
  - Milk (10.5), sunflower (9.3), maize (7.7), cabbage (6.1), & sesame (5.4)
- 6.4/4.6 least cost items/food groups selected in average market-month

Table 2. Frequently selected least-cost items/food groups

Food group	Least cost items	Share selected (%)
Grains, roots, and tubers	Maize, sweet potato, sorghum, wheat, durrah, kocho	21.9
Legumes and nuts	Sunflower, sesame, haricot, ground nuts, linseed	33.4
Dairy products	Cow milk, cheese cottage	12.0
Eggs	Eggs	1.4
Flesh foods	Sardines, beef	4.1
Dark green leafy veggies	Spinach	4.0
vA rich veg. & fruits	Pumpkin, papaya, carrot	9.2
Other fruits & vegetables	Cabbage, lemon	8.7
Oil/fats	Cooking oil	5.4

Results: trends in CoCA, CoNA, and wages

Figure 4. Cost of nutrients (CoNA), calories (CoCA), and wages, 2011 USD/day



Results: trends in CoCA, CoNA & Wages

Key findings

1. CoNA 60% higher in Q2 of 2017 (1.73 PPP$) than in Q3 of 2001(1.06 PPP$); or it grew 3.5% per annum
2. CoCA more than doubled (from 0.21 to 0.45 PPP$); grew at 6.6% annually
3. Real wages from 3.7 to 8 PPP$ (by 111%); at 5.2% per annum

4. Wages, CoNA, and CoCA all correlated in short run
5. Wages, CoNA, and CoCA all highly volatile:
   - ❑ Food price crises of 2007-08 & 2010-11
   - ❑ Seasonality in CoNA & wages

Results: Affordability of CoNA as measured by real wage growth

What's the net result?

- Nutritious diets became 30% more affordable since 2001
- However, without inflation in nutrient-rich foods, nutritious diets would be even more affordable

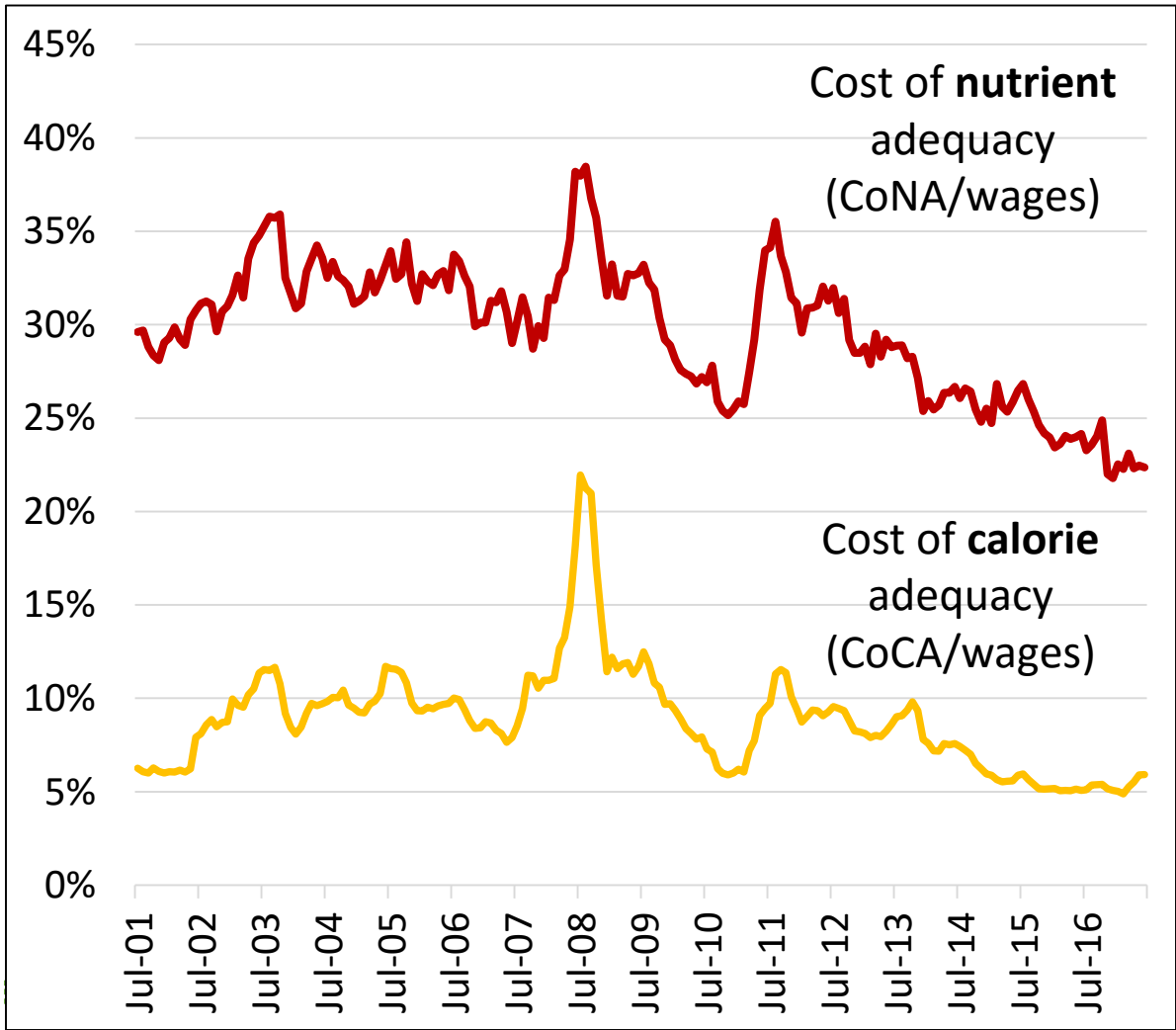
Counterfactual:

- Nutritious diets would now cost just 13% of wages if nutrient costs had stayed constant as wages rose

Caveats:

- Wages consider only worker
- Laborers do not work all the time

Figure 5. CoNA and CoCA relative to wages



Results: Food group shares in CoNA over time

Differential price trends across food groups driving changing shares in CONA over time:

- Dairy down by 11 points
- More staples, flesh foods & oils/fats
- Substitution between (eggs + meats) and dairy products?

Table 3. Average share of food groups in CoNA

	2001	2017	Change
Staples	11.8%	17.1%	5.3%
Legumes & nuts	17.1%	15.8%	-1.3%
Dairy products	38.3%	27.7%	-10.6%
Eggs	4.1%	5.7%	1.6%
Flesh foods	13.9%	15.8%	1.9%
Dark green leafy veg	2.3%	3.7%	1.3%
vA-rich fruit/veg	6.3%	3.9%	-2.4%
Other fruit & veg	4.3%	5.8%	1.4%
Oil/fats	1.9%	4.6%	2.7%

Comparing CoNA to actual diets of the poor

Findings:

1. Actual spending much larger for flesh foods, staples, oil/fats
2. Dairy and eggs consumption way too low
3. Fruit/veg & pulse consumption a bit low

Table 4. Expenditure shares in the actual diet of the poor and in CoNA, 2010

	Share in actual food spending (2010/11 HCES)	Share in least cost diet (CoNA analysis)	Difference
Grains, roots and tubers	33.94	16.19	-17.75
Legumes and nuts	12.78	17.94	5.16
Dairy products	6.54	34.87	28.34
Eggs	1.13	4.51	3.39
Flesh foods	26.66	10.48	-16.18
Dark green leafy veg	0.94	3.00	2.06
vA-A rich veg and fruits	2.90	5.50	2.59
Other fruits and veg	7.03	4.56	-2.46
Oil/fats	5.78	3.02	-2.76
Sugar/honey	2.35	0.00	-2.35

Main findings & implications

- Many nutrient-dense foods becoming more expensive over time while prices of staples grew slowest in recent years,
- CoNA increased over time, but wages have increased more
- Affordability of nutritious diets improved, but there is way to go
- Actual diet of the poor is too low in dairy, eggs & legumes/nuts
- Increased cereals productivity led to lower price growth;
  - Such transformation yet to happen for nutrient-dense foods
- Past efforts focused on improving nutrition through behavioral change communication;
  - Improving market access & stabilization of nutritious foods prices also important to improve nutritional outcomes

Thank you.