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Food Prices and the Wages of the Poor

A Low-Cost, High-Value Approach to High-Frequency Food Security Monitoring

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Abstract

International food prices have become increasingly volatile in recent decades, with "global food crises" in 2008, 2011 and most recently in 2022. The 2008 crisis prompted international agencies to ambitiously extend their monitoring of domestic food prices in developing countries to strengthen early warning systems and food and nutrition surveillance. However, food inflation by itself is not sufficient for measuring disposable income or food affordability; for that, one must measure either changes in income or changes in an income proxy. Here we propose the use of a low-cost income proxy that can be monitored at the same high frequency and spatial granularity as food prices: the wages of poor unskilled workers. While not all poor people are unskilled wage earners, changes in the real "reservation wages" of low skilled activities are likely to be highly predictive of changes in disposable income for poorer segments of society (Deaton and Dreze 2002). We demonstrate this by estimating changes in "food wages" – wages deflated food price indices – during well-documented food price crises in Ethiopia (2008, 2011 and 2022), Sri Lanka (2022) and Myanmar (2022). In all these instances, food wages declined by 20-30%, often in the space of a few months. Moreover, in Myanmar we use a household panel survey data to show that the decline in food wages over the course of 2022 closely matches estimate declines in household disposable income and proportional increases in income-based poverty. We argue that the affordability of nutritious food for "all people, at all times" is a critically important dimension of food security, and we advocate for monitoring the wages of the poor as a cheap and accurate means of capturing that dimension.

Key words: Food prices; food crises; food security; nutrition; wages; healthy diets; early warning systems.

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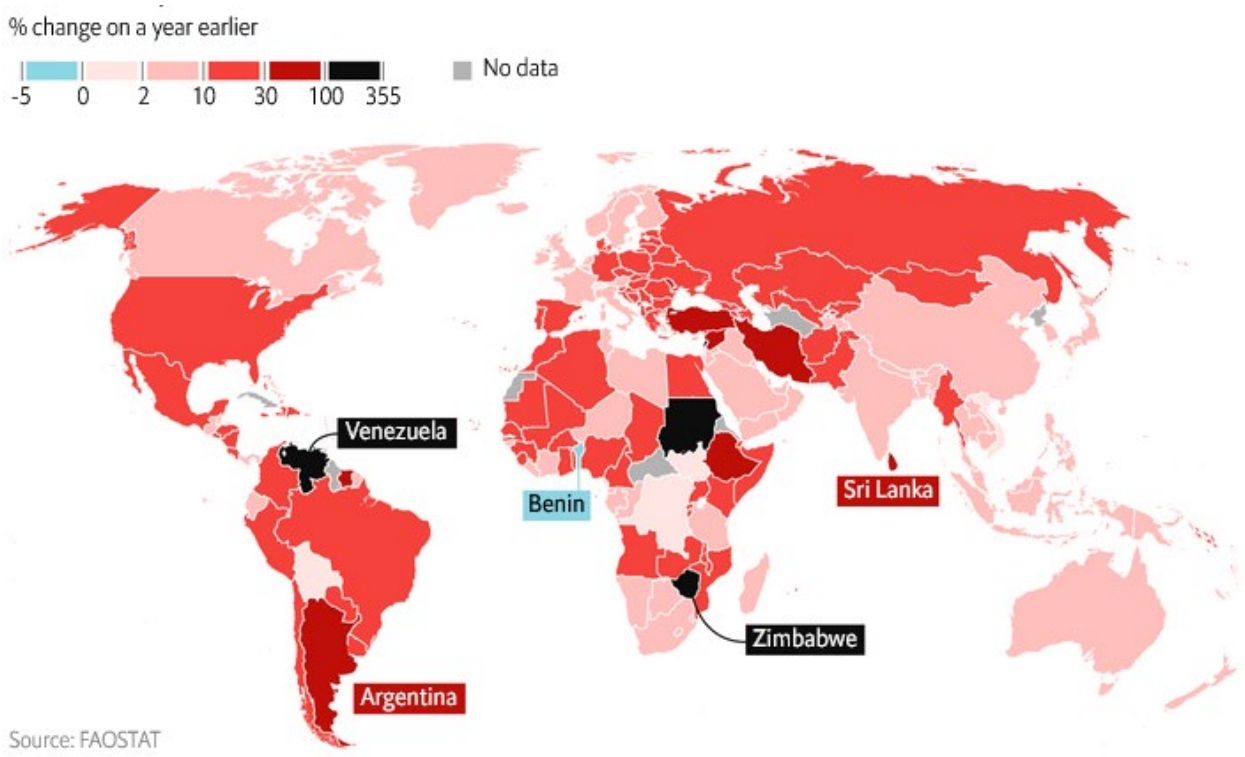
1. Background: Food price crises and food price monitoring in the 21st Century

The 21st Century has already witnessed a dramatic increase in food price volatility. After decades of stagnation, international food prices spiked sharply over 2007-2008 in what became widely known as the 2008 global food crisis. Prices spiked again 2010-11, however, and then more recently in 2021-2022 in the wake of COVID-19's economic tailwinds and Russia's invasion of Ukraine. In 2022, year-on-year food inflation reached 76% at the peak of Sri Lanka's financial crisis, 60% in war-torn Myanmar, and 40% in Pakistan where a macroeconomic crisis coincided with unprecedented floods, while countries like Sudan, Zimbabwe and Venezuela suffered from hyperinflation (Figure 1). Given that some 3 billion people could not afford a healthy diet even prior to this recent global food crisis (FAO, IFAD, UNICEF, WFP, & WHO, 2020), the development community at large should be deeply concerned about the consequences of food price crises for poverty and food insecurity (Arndt, Diao, Dorosh, Pauw, & Thurlow, 2023), as well as malnutrition (Headey & Ruel, 2022).

Figure 1. Food inflation in 2022: percentage change on a year earlier



Source: Underlying data from FAOSTAT (FAO, 2023) and map presented by The Economist (2022).

In the wake of 2008 food crisis, one perceived failure was inadequate national food price monitoring to inform early warning systems and provide timely data on national-level welfare impacts of rising food prices. As a result, the development community made significant efforts to improve monitoring of food prices and to integrate them into multidimensional food security surveillance and early warning systems. The most prominent examples include the FAO's *Global Information and Early Warning System on Food and Agriculture* (https://www.fao.org/giews/en/), USAID's *Famine Early Warning System* (https://fews.net/fews-data/337), the *World Food Programme's Market Monitor*

(https://www.wfp.org/publications/market-monitor) and its *Global Food Price Database* (https://data.humdata.org/dataset/wfp-food-prices), and The International Food Policy Research Institute's (IFPRI) *Food Security Portal* (https://www.foodsecurityportal.org/).[1] These international systems also rely on improved food price monitoring by developing countries themselves.

But while efforts to collect food price data are certainly necessary for more effective food and nutrition security surveillance, they are not sufficient. One limitation has been a focus on a limited number of food items, with many price surveillance systems focused on staple foods, but not a broader range of nutrient-dense foods necessary for cost a balanced healthy diet (Herforth, et al., 2019). Yet even where a wide range of food items are priced, there is still another critical omission in most of these efforts: the absence of any kind of income measure for tracking the ability of households to afford either the diets they typically consume, or the diets nutritionists recommend they consume for overall good health. In short, it is the affordability of healthy diets that matters, not their nominal cost.

Independently of developments in food price surveillance systems, the affordability dimension of food security has gained much needed attention through research studies. In the wake of the 2007-2008 and 2010-11 food crises in Ethiopia, Bachewe and Headey (2017) compared food price changes to trends in wages for unskilled workers in urban Ethiopia, and constructed a poor person's price index for food based on consumption patterns of the poorest 40% of the population. Studies in South Asia instead used new indices of the cost of a healthy balanced diet as defined by food-based dietary guidelines that set targets for consumption of different food groups (Dizon & Herforth, 2018; Dizon, Herforth, & Wang, 2019; Mahrt, Mather, Herforth, & Headey, 2019; Raghunathan, Headey, & Herforth, 2020). Those studies showed that the majority of people in these Asian countries cannot afford healthy recommended diets. Hirvonen, Bai, Headey, and Masters (2020) reached the same conclusion at the global level by assessing affordability of the EAT-Lancet diet. Subsequently, the UN's *State of Food Insecurity and Nutrition in the World* (SOFI) annual reports (FAO, IFAD, UNICEF, WFP, & WHO, 2022) have mainstreamed metrics of the cost and affordability of healthy diets using global food price data from the 2017 International Comparison Program (ICP) led by the World Bank (2023a). The key takeaway from all these global studies is that roughly 3 billion people cannot afford a healthy diet.

This renewed focus on healthy diet affordability is highly commendable, but insufficient as a high frequency food security monitoring tool because the national metrics in the SOFI report are derived through extrapolations from food price data collected in the 2017 ICP round, while income and expenditure data likewise come from national household surveys that are similarly infrequent. Moreover, SOFI healthy diet affordability estimates do not contain information at the subnational level, nor gender-disaggregated statistics. The FAO acknowledges this and has stated that:

> *"FAO is focusing attention on the pursuit of healthy diets and transformations of food systems to ensure healthy diets are affordable for all, all year round. FAO is encouraging Governments to put the affordability of healthy diets at the centre of their agricultural policies, social protection, and investment decisions."* [2]

[1] In many instances these food price monitoring dashboards report food prices collected by other agencies, but the WFP often collects its own food price data through surveys conducted primarily in its programming areas, while a number of UN organizations make use of national consumer price surveys to access data on item-level food prices, even though the main purpose of such surveys is to estimate both food and aggregate inflation.

[2] See https://www.fao.org/3/nf197en/nf197en.pdf

However, to put affordability of healthy diets "at the center" and "for all, all year round" requires not only collecting high frequency data for a more extensive array of foods, but also collecting high frequency data on household incomes, *or* some kind of income proxy.

Here we make the argument that the wages of the poor need to be incorporated into food security monitoring systems. Specifically, we argue that collecting wage quotations for unskilled workers will provide a sufficiently accurate and low-cost approximation for the income trends of those economic groups most vulnerable to higher food prices, namely households which rely on selling their labor to earn an income. This logic is acknowledged in two methodologically focused WFP publications that recommend WFP country offices collect and analyze wage data (Caccavale & Flämig 2017; Islam, 2013), and roughly 10% of WFP country offices issue bulletins that report what the WFP refers to as the terms of trade between crop prices and wages (See WFP (2022) for an example).

Without an income proxy such as wages, it is hard to know what kind of information is imparted by food price changes alone, because when food prices increase, so too could nominal incomes. Indeed, inflation can sometimes be the result of strong economic growth, which can raise the demand for both food and labor, leading to simultaneous food and wage inflation with little change in real incomes. Moreover, food prices and wages share complex causal relationships. Wage inflation could cause food inflation because labor is one of the largest input costs into food production, and rising food prices could cause wage increases because high food prices incentivize farmers to hire more labor to increase food output (Headey & Martin, 2016; Jacoby, 2016). Yet conversely, macroeconomic crises can trigger food inflation and reduce demand for labor, leading to steep declines in real wages and disposable income. In 2022, some of the countries with the highest food inflation rates – Venezuela, Zimbabwe, Sudan, Sri Lanka, Myanmar, Pakistan – were all experiencing major macroeconomics crises, including depleted foreign currency reserves, sharp depreciations in their exchange rates, business closures and reduced demand for labor. Previous research suggests that these kinds of crises can result in sharp declines in disposable income, significant deterioration in diet quality, and rising malnutrition (Block, et al., 2004).

In short, the welfare impacts of a 20% increase in the price of food need is entirely context-specific and need not imply anything like a 20% reduction in real income, since nominal incomes could also be rising, falling, or staying the same. The only indicator that truly matters from a welfare perspective is how food prices change relative to incomes or an income proxy, such as unskilled wages. In other words, we need to measure the "food wages" of the poor – wages deflated by some kind of food price index.

2. Why the "food wage" is a critically important food insecurity indicator: Theory and evidence

The measurement of "Food wages" is almost as old as economics itself. Long before the advent of complex household economic surveys, many of the most influential early economists (Malthus, 1798; Playfair, 1821; Smith, 1776) compared wages of working class households to the price of bread or other grains. Contemporary economic historians likewise analyze food wages to track historical changes in real incomes, as income estimates are typically available in the distant past (Allen, 2001; Bassino & Ma, 2006; Bhattacharya & Rama Deb, 1977; Broadberry & Gupta, 2006). Development economists have also regularly measured and analyzed "rice wages" in Asia because of the complex bidirectional relationships between agricultural intensification and wages, and the overwhelming importance of rice in the diet of

poor agricultural workers in countries like Bangladesh and Indonesia (Azam, 1993; Mazumdar & Sawit, 1986; Zhang, Rashid, Ahmad, & Ahmed, 2014).

However, the analysis of food wages has somewhat fallen by the wayside in development economics for one very good reason: the proliferation of household surveys such as the Living Standards Measure Study (LSMS) surveys led by The World Bank, which are now the primary tool for measuring secular changes in poverty. Of course, for early warning systems and high frequency monitoring of household welfare and food security, it would also be preferable to measure incomes, diet quality and food insecurity experiences at high frequency, and this has indeed become more feasible through cost-effective high-frequency phone surveys (Gourlay, Kilic, Martuscelli, Wollburg, & Zezza, 2021; MAPSA, 2022b). However, until LMICs and development partners make much-need investments in high-frequency welfare surveys (Headey & Barrett, 2015), the much cheaper option is to use wage data.

The presumption in this instance is not that the incomes of the poor consist solely of wages, but rather that:

1. Wage rates for unskilled labor activities represent what economists call a "reservation wage", meaning a fallback wage or wage floor for jobs that poor people can engage in if they cannot find any more remunerative activity, and
2. That trends in wages are strongly correlated with trends in the incomes of the poor.

Both of these assumptions are illustrated in a widely cited exploration of the validity of poverty trends in India by eminent economists, Angus Deaton and Jean Dreze (2002). Deaton and Dreze use state-level trends in wages of unskilled labor to cross-check official poverty trends, and write:

> "real wages can be used to provide some information about other poverty indexes … it is also possible to think about the real wage as a rough poverty indicator in its own right. The idea is that, if the labour market is competitive … then the real wage measures the 'reservation wage', i.e., The lowest wage at which labourers are prepared to work. This has direct evidential value as an indication of the deprived circumstances in which people live (the more desperate people are, the lower the reservation wage), independently of the indirect evidential value arising from the statistical association between real wages and standard poverty indexes such as the headcount ratio."
>
> Source: Deaton and Dreze (2002), page 3737

One concern with Deaton and Dreze's argument is that the correlation between wage dependency and poverty might be unique to Asia, where in rural areas, especially, there are high rates of landlessness, widespread use of hired labor in intensive agricultural systems, and therefore many poor people who rely on selling their labor for cash. Wage income is certainly important for the poor in more urbanized and commercialized economies of South-East Asia, Central Asia, the Middle East and North Africa and Latin America, but are wages likely to be predictive of poverty in Sub-Saharan Africa were labor markets and agricultural systems are often at an earlier stage of economic transformation?

There are several arguments and some evidence to assuage this concern. First, Africa is becoming increasingly urbanized, and food wages for unskilled labor are likely to be a strong indicator of food security for the urban poor, as we show below. Moreover, it is the urban poor in Africa who more frequently report food insecurity in the context of rising food prices, since they rarely grow much food

(Verpoorten, Arora, Stoop, & Swinnen, 2013). Second, a number of large African countries are much more land-constrained than they were several decades ago, resulting in greater intensification of agricultural production, including more use of hired labor, at least on a seasonal basis (Jayne, Chamberlin, & Headey, 2014). Third, global studies show that a large share of the world's poor population is dependent on wages or self-employment income (Castaneda Aguilar, et al., 2016; Robles Aguilar & Sumner, 2020). Indeed, self-employment income from highly informal small and micro enterprises (SMEs) can be very important for the poor, though it is likely that even trends in the profits of SMEs are correlated with trends in wages of unskilled workers, because to some extent these activities are integrated in a competitive labor market: both are low-entry, low-skill activities, and workers often switch between selling their labor in the market and providing their labor for small family-run businesses.

If these arguments hold, then one should expect that wage rates for unskilled occupations across countries are strongly correlated with the incomes of the poor. We test that in Table 1 by estimating cross-country correlations between the average income of the poorest 40% of the population in a given country and wages/salaries of different occupations sourced from the ICP 2011 round.

Table 1. Cross-country correlations between the average income of the poorest 40% of a population and wages/salaries for occupations of differing degrees of skill, formality and manual labor

Less skilled, less formal, more manual occupations			**More skilled, more formal, less manual occupations**		
	Observations (countries)	Correlation (*=p<0.01)		Observations (countries)	Correlation (*=p<0.01)
Servant	64	0.73*	Prison guard	60	0.36*
Garage, basic service	59	0.82*	Police	58	0.28
Construction labor	75	0.64*	Auxiliary nurse	67	0.44*
Bricklayer	75	0.61*	Primary school teacher	61	0.36*
Plumber	75	0.55*	Secretary	62	0.15
Carpenter	74	0.57*	Bookkeeper	50	0.35
Steelworker	70	0.62*	Computer operator	63	0.11
Electrician	74	0.50*	Public health official	62	0.15

Source: Authors' analysis from income estimates from the World Bank's (2022a) Poverty and Inequality Platform and wage and salary data from the 2011 International Comparison Program database (World Bank, 2013). Both wages and incomes are expressed in 2011 purchasing power parity dollars.

On the left of Table 1 we see strong correlations between the average incomes of the poorest 40% and wage rates of servants (0.73), garage services charges (0.82), and low skill construction labor (0.64). In contrast, correlations for more skilled occupations – reported on the right side of Table 1 – have much weaker and often insignificant associations with the income levels of poor people, as one would expect. This provides some assurance that wage rates for less skilled occupations are likely to be a good "global" proxy for the incomes of the poor, not just in specific regions or contexts. Indeed, the next section illustrates that with examples from a low income country from sub-Saharan Africa (Ethiopia), an upper-middle income country from South Asia (Sri Lanka) and lower middle income country from South-East Asia (Myanmar).

3. Food wages in food crises: are they sensitive to shocks and predictive of food insecurity?

The most important test of our claim that food wages are a useful high-frequency indicator of food security is that food wages should be sensitive to food price shocks. In this section we therefore present evidence from food crises in Ethiopia, Sri Lanka and Myanmar.

Food wages during multiple food price crises in Ethiopia

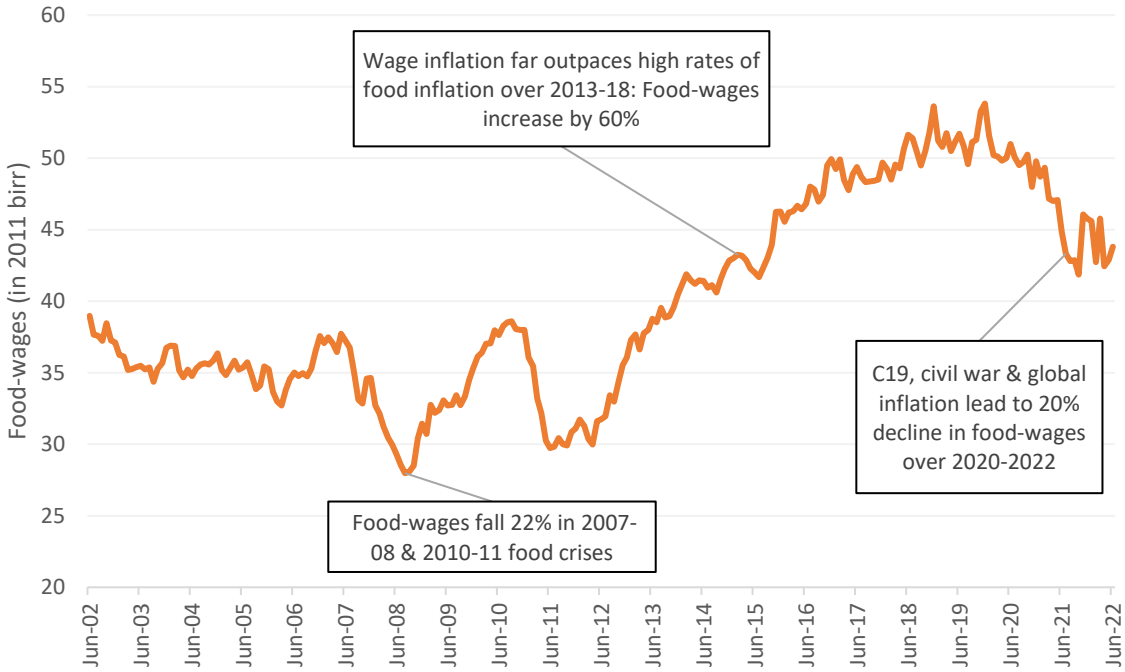
In 2007-2008 Ethiopia had one of the highest food inflation rates in the world, driven by international price increases, exchange rate movements, and local crop failures (Durevall, Loening, & Ayalew Birru, 2013). Survey-based research published just after the 2008 food price crisis concluded that the urban poor were hard hit by food inflation, while impacts in rural areas were more nuanced (Hadley, Stevenson, Tadesse, & Belachew, 2012; Kumar & Quisumbing, 2013; Ticci, 2011), as one would expect.

In previous work, Bachewe and Headey (2017) used the Ethiopian government's *Consumer Price Survey* to gauge the impact of the 2007-08 and 2010-11 food price crises on the real wages of the urban poor. This survey is exceptionally rich, surveying 120 market locations in urban Ethiopia for prices of food and non-food goods and services, including wages of daily laborers, largely working in the construction sector. Bachewe and Headey (2017) used these data to construct a poor person's food price index to measure the real wages of the poor (food wages) over 2001-2012. They showed that real food wages fell by 22 percent in urban Ethiopia over the course of just 12 months, from mid-2007 to mid-2008.

In Figure 2 we update Bachewe and Headey's calculations up to June 2022 when international prices had again been soaring in the wake of the Ukraine war and problems in the global palm oil sector. The data in Figure 2 show that wages hovered around 35 birr per day from 2003 to 2006 (about $5.67 in 2011 international dollars) before the 22% fall in food wages in 2007-2008. However, after wages recovered in 2009 and 2010, they again fell by 22% in 2011 when Ethiopia was further exposed to high international food inflation as well as domestic crop failures. Also striking is the strong growth of food wages after 2011, which increase by over 50% up until 2019, which was indeed a period of strong economic growth and rapid poverty reduction in Ethiopia (Bundervoet, et al., 2020). However, from 2020 to 2022 – a period of COVID-19 restrictions, civil war in northern Ethiopia and global food, fuel and fertilizer inflation – the food wage for unskilled urban workers again declined by roughly 20 percent up to June 2022, with declines in food wages likely to be much worse in conflict-affected Tigray.[3]

[3] The data in Figure 2 are national, but a WFP analysis of wages and cereal prices in war-affected Tigray showed a 67% decline in the ratio of unskilled wages to sorghum prices, for example.

Figure 2. Trends in monthly daily labor wages deflated by a poor person's food price index, averaged across 120 locations in urban Ethiopia from June 2002 to June 2022 (in constant 2011 birr, with 1 USD=5.57 birr)



Source: Authors' analysis using ESS retail price data (ESS, 2022). * Food wages are daily laborer wages deflated by the poor person's food price index, as described in Bachewe and Headey (2017).

Food wages in Sri Lanka's 2021-2022 food and financial crisis

From mid-2021 to the present in mid-2023 Sri Lanka has been facing an unprecedented food crisis in the wake of a near depletion of foreign currency reserves, a 40% depreciation of the rupee against major currencies from April-May in 2022, severe fuel shortages, and a 6-month ban on agri-chemical inputs in late 2021 that resulted in a 42% decline in rice production in 2022 (the main staple) and a 40% reduction in maize (a key input for the livestock sector) (FAO & WFP, 2022). The combination of these factors contributed to a 76% year-on-year increase in the consumer food price index by mid-2022 (Figure 2, Panel A). The FAO-WFP Crop and Food Security Assessment Mission used a nationally representative survey data collected in mid-2022 to estimate that 6.3 million of Sri Lanka's 22 million population were food insecure as a result of the crisis (FAO & WFP, 2022), despite Sri Lanka being an upper middle income country as recently as 2019. The World Bank (2022b) used a microsimulation approach to estimate that this crisis has doubled the $3.65/day poverty headcount has doubled from 13% in 2021 to 26% in 2022, in the space of just a single year.

Are trends in real food wages consistent predictive of these kinds of sharp increases in food insecurity and poverty in Sri Lanka's recent crisis?

Like many other countries, Sri Lanka collects extensive food price and wage data, but the two are never analytically linked, even though the Central Bank's *Monthly Economic Bulletin* releases both series (CBSL,

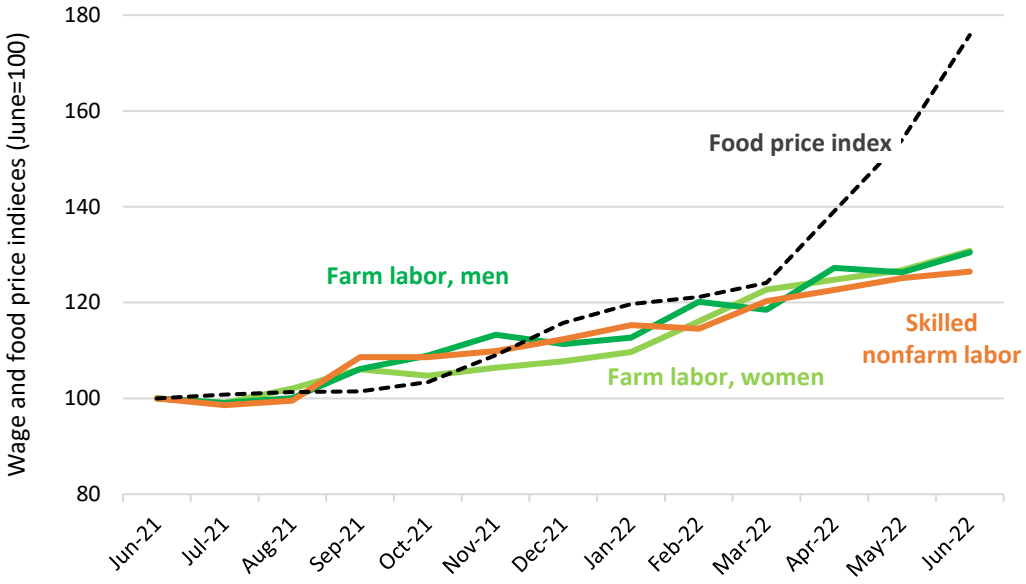
2022). Panel A of Figure 2 uses that data to first report nominal trends in the food price index and wages from July 2021 to June 2022 for farm labor (male and female separately), while here we also report non-farm skilled labor wages to assess impacts on lower middle income households that are reportedly also hard hit by the crisis. The corresponding trends in real food wages over 2021-2022 are reported in Panel B.

In Panel A we see that nominal wages and food prices gradually trended upwards from June 2021 until March 2022, when food prices exploded in April 2022, with food price inflation far outpacing wage growth. Slower growth in wages from April 2022 onwards was unsurprising given an 8 percent contraction in GDP and significant constraints to any positive agricultural supply response due to fertilizer and fuel shortages.

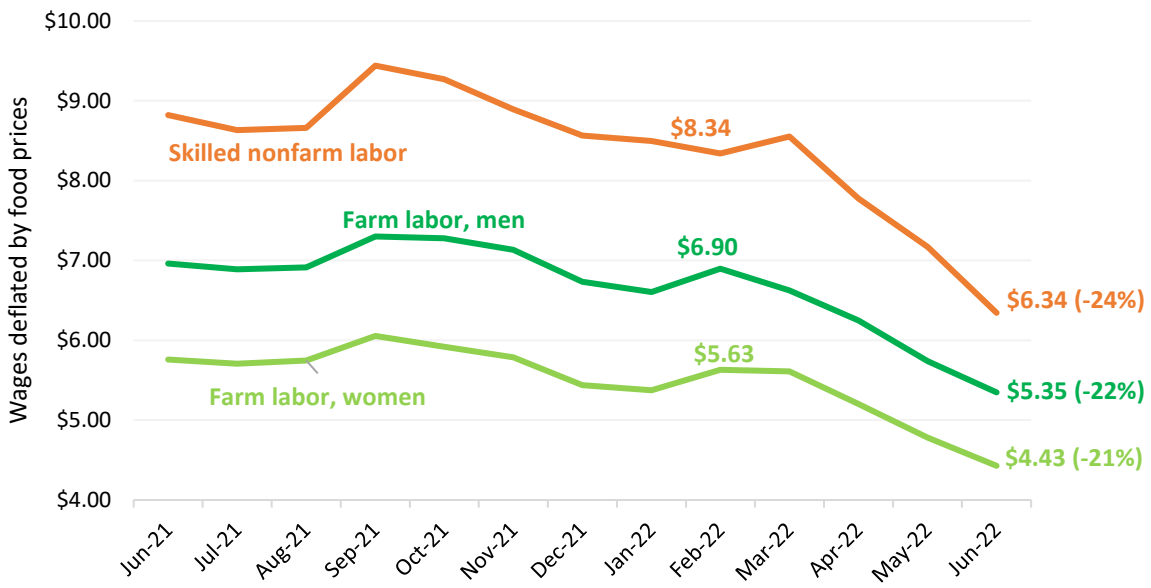
Panel B shows just how quickly real food wages declined. Wages of skilled nonfarm workers fell by 24% in the four months between February and June 2022, while wages of male and female agricultural workers fell by 22% and 21%, respectively. Moreover, women's wages in the farm sector are persistently almost 20% lower than male wages, similar to findings in rural India (Raghunathan, et al., 2020). Thus, Figure 2 convincingly illustrates that food wages were a very effective high-frequency indicator of the declining purchasing power of relatively poor rural and urban wage earners. Indeed, had more spatially disaggregated wage and price data been available in a timely manner, food wages could have revealed in "real time" how quickly purchasing power was deteriorating in the country.

Figure 2. Farm and non-farm wages, food inflation and the depreciation of the rupee in Sri Lanka's economic crisis: June 2021 to June 2022

Panel A: Trends in nominal wage indices and the national food price index (June 2021=100)



Panel B: Real "food wages" (wages deflated by the food price index) for male and female farm laborers, and skilled nonfarm labor



Source: Authors' estimates from data reported by the Central Bank of Sri Lanka (CBSL, 2022). Food wages are wages deflated by the food price index.

Monitoring "Healthy diet wages" in Myanmar's complex economic and political crisis over 2021-2022

Myanmar, like Sri Lanka, has been facing a prolonged and complex economic and political crisis with high rates of food inflation superficially brought about by a weakening exchange rate and high international prices of some key food imports, such as palm oil. However, the underlying trigger for the broader economic crisis was the military takeover of the country on February 1st 2021, which prompted widespread civil protests, a major financial crisis, a fuel, food and fertilizer crisis, and ultimately an escalation of the country's multiple civil wars. While other countries in the region were recovering from COVID-19's economic impacts, Myanmar experienced an 18 percent contraction in economic output in 2021 and continued stagnation in 2022 (World Bank, 2023b). A 19-country computable general equilibrium study from IFPRI researchers (Arndt et al., 2023) on the impacts of the food, fuel and fertilizer crisis on developing countries concluded that Myanmar would be the worst affected country in the sample, with real incomes declining by 10% and poverty increasing by 7.6 percentage points.

In addition to economic turbulence, the military takeover presaged a breakdown in a wide range of essential government services, including disruptions to food price monitoring and household welfare surveys. In this data-scarce environment USAID funded the Myanmar Household Welfare Survey (MHWS), a high-frequency large-scale phone survey intended to monitor welfare outcomes as well as the functioning of the agri-food system in a very volatile economy (MAPSA, 2022a, 2022b). MHWS surveyed 12,100 households four times over the course of 2022 just as food prices were rising steeply. Moreover, MHWS included collection of food price quotations from food vendors for an array of different food groups to allow us to calculate conventional food price indices (weighted by household consumption patterns) but also the cost of a healthy diet, as defined by food-based dietary guidelines

for Myanmar (Mahrt, Herforth, Robinson, Arndt, & Headey, 2022; Mahrt, et al., 2019). MHWS also collected wage quotations for unskilled construction and agricultural workers, while the main household survey module collected questions about household income sources that have been used to construct total household income per adult equivalent and an income-based poverty measure derived from a price-adjusted 2017 poverty line (MAPSA, 2022c). The simultaneous collection of this suite of variables allows us to estimate the cost of a healthy diet, "healthy diet wages", and how these healthy diet wages correlate with trends in incomes of the poorest 40% and income-based poverty rates.

Table 2 reports trends in the nominal cost of healthy diets in urban and rural areas, as well as nominal construction wages in urban Myanmar and nominal agricultural wages in rural Myanmar, separately for men and women.

Table 2. Trends in nominal healthy diet costs and sector- and sex-specific unskilled wage rates, which are then used to calculate real "healthy diet wages" across four rounds of a high-frequency national phone survey in rural and urban Myanmar

		URBAN MYANMAR			
	Healthy diet cost (kyat)	**Construction wages (kyat)**		**Healthy diet construction wage (wages divided by diet cost)**	
Demographic	**Both sexes**	**Men**	**Women**	**Men**	**Women**
Jan to Feb 2022	1,586	7,916	6,152	5.0	3.9
Apr to Jun 2022	1,785	8,074	6,274	4.5	3.5
Jul to Aug 2022	1,827	8,184	6,419	4.5	3.5
Oct to Nov 2022	2,327	8,427	6,543	3.6	2.8
Change in 2022	**47%**	**6%**	**6%**	**-27%**	**-27%**
		RURAL MYANMAR			
	Healthy diet cost (kyat)	**Agricultural wages (kyat)**		**Healthy diet agricultural wage (wages divided by diet cost)**	
Demographic	**Both sexes**	**Men**	**Women**	**Men**	**Women**
Jan to Feb 2022	1,375	6,058	4,681	4.4	3.4
Apr to Jun 2022	1,559	6,272	4,820	4.0	3.1
Jul to Aug 2022	1,708	6,425	5,022	3.8	2.9
Oct to Nov 2022	2,197	6,783	5,253	3.1	2.4
Change in 2022	***60%***	***12%***	***12%***	***-30%***	***-30%***

Source: Authors' calculations from the Myanmar Household Welfare Survey (MAPSA, 2022b). See text for details.

Myanmar experienced rapid food inflation over 2022, with the cost of a healthy diet increasing by 47% in urban areas and 60% in rural areas. Similar to Sri Lanka's crisis, nominal wages increased, but only by a fraction of the increase in food prices. Construction wages in urban areas for men and women increased by just 6%, while agricultural wages for rural men and women increased by 12% (likely reflecting increased demand for agricultural labor because of higher food prices).

Table 3 compares trends in these healthy diet wages over the course of 2022 to trends in real mean incomes of the poorest 60% of the population within urban and rural areas, as well as income-based poverty rates.

Table 3. Comparing trends in sex-specific real "healthy diet wages" to trends in real household incomes for the poorest 60% and income-based poverty rates across four rounds of a high-frequency national phone survey in rural and urban Myanmar

		URBAN MYANMAR	
	Healthy diet construction wage	**Real mean incomes of the poorest 60% (kyat)**	**Poverty rate (%)**
Demographic	**Both sexes**	**Household**	**Household**
Jan to Feb 2022	3.9	1,646	47%
Apr to Jun 2022	3.5	1,604	49%
Jul to Aug 2022	3.5	1,578	50%
Oct to Nov 2022	2.8	1,398	57%
Change in 2022	***-27%***	***-15%***	***20%***
		RURAL MYANMAR	
	Healthy diet agricultural wage	**Real mean incomes of the poorest 60% (kyat)**	**Poverty rate (%)**
Demographic	**Both sexes**	**Household**	**Household**
Jan to Feb 2022	3.4	1,235	52%
Apr to Jun 2022	3.1	957	60%
Jul to Aug 2022	2.9	809	66%
Oct to Nov 2022	2.4	737	69%
Change in 2022	***-30%***	***-40%***	***33%***

Source: Authors' calculations from the Myanmar Household Welfare Survey (MAPSA, 2022b). See text for details. a. Median income is per adult equivalent and is deflated by a food price index. The bottom 60% of households within urban and within rural areas is determined using spatially adjusted income.

In urban areas the 27% decline in healthy diet construction wages corresponds to a 15% decline in real incomes of the poorest 60% of the population, but a 20% increase in the poverty rate. Hence trends in the healthy diet construction wage in urban areas perhaps slightly over-estimate real welfare losses, although there is also imprecision in estimates of incomes and poverty rates in a phone-based survey

modality. In rural areas, however, the 30% decline in healthy diet agricultural wages corresponds to a 40% decline in real mean incomes and a 33% increase in the poverty rate, implying that food wage trends in rural Myanmar have been closely predictive of poverty trends.

4. Conclusions and recommendations

In conclusion, the addition of wage quotations to food price surveys is a low-hanging fruit for food security monitoring, and one which provides critically important added value to existing systems.

First, wages add the essential "real welfare" dimension to nominal food price changes, by accurately proxying for changes in disposable incomes of the poor. This is borne out best by the Myanmar example, but the steep reductions of food wages in Sri Lanka and Ethiopia are also consistent with independent analyses of these country's food crises.

Second, wage data is very cheap at the margin, because if not already collected, it can easily be collected in the same survey instruments that collect food price data at minimal extra cost. IFPRI, for example, has worked closely with Sri Lanka's Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI) to add wage quotations for unskilled labor activities at the farm level, at wholesale markets and at retail outlets, to its extensive food price collection efforts at those different components of the agri-food system. The extra cost of this effort was trivial.

Third, wage data can be combined with new healthy diet cost indices that better reflect caloric and nutrient needs, to provide a high-frequency analog to the infrequently updated "affordability of a healthy diet" metric now reported in the UN's annual State of Food Insecurity and Nutrition report (FAO, et al., 2022). High frequency wage data could likewise be combined with other kinds of nutrition-adequate diets, such as *Fill the Nutrient Gap* methods used by used by the WFP, largely for determining nutrition-sensitive social protection transfers.[4] High frequency data on prices of a wide range of food types and wages or incomes is a necessary condition for moving food security measurement closer to the conceptualization of food security as "all people, at all times, having physical and economic access to sufficient safe and nutritious food" (FAO, 1996).

Fourth, wages and food prices can be simultaneously collected in different geographies at a granular level (allowing for regional targeting), but also collected for different activities corresponding to different skill levels and different sectors, and separately for men and women to provide socioeconomic and demographic nuance to the concept of real wages and healthy diet affordability. In India, for example, Raghunathan et al. (2020) obtained wage data for 22 different agricultural activities disaggregated by gender and showed that men's wages were typically 50% higher than women's wages. In Sri Lanka, wages are collected for urban activities, crop activities and estate sector activities (tea, rubber), which is important given the much poorer economic and nutrition conditions of the estate sector population. It may also be advisable to combine wage rates for a range of different activities into a single index or series of indices (e.g. an agricultural wage rate index).

Fifth, food wages can be useful in thinking about social protection transfers, especially in the context of rapidly changing food prices and/or wages. In rural India Raghunathan et al. (2020) were able to

[4] See https://www.wfp.org/publications/2020-fill-nutrient-gap for a description of the various uses of the *Fill the Nutrition Gap* approach to costing nutrient-adequate diets adopted by the WFP.

compare the cost of a healthy diet to the state-specific minimum wages of one of India's most important social protection programs, the National Rural Employment Guarantee Act (NREGA), which entitles every rural household to 100 days of unskilled labor compensated at the state minimum wage. They showed that while NREGA wages were generally sufficient to purchase four days of a healthy diet in 2006 when the program started, the rising real cost of a healthy diet resulted in NREGA wages only being sufficient to purchase three days of a healthy diet by 2011; a 25% decline in the purchasing power of social protection wages.

There are, of course, limitations to wage data. Poor and near-poor households obviously have diversified income sources, so wages for unskilled workers are only a second-best proxy for income trends, but we believe they are generally a good (and cheap) second-best option. Moreover, wages may not be a good proxy for incomes of farming households, although it will typically be farming households who are less vulnerable to food inflation, unless they also earn incomes from selling their labor (in which case, wages become relevant again). The vulnerability of pure farming households stems more from weather shocks, pests and problems in accessing inputs (which can also cause food inflation), which is why early warning and surveillance systems do indeed need to be multi-dimensional and rely on a suite of economic and environmental indicators rather than any single metric.

One particularly important concern for using food wages as a food security indicator is that wage movements may not reflect situations of high unemployment or underemployment. In those circumstances even a decline in real food wages may not be fully indicative of the loss of welfare, because wage earnings could have declined proportionally more than wage levels. One solution is for wage surveys to collect estimates of "normal" daily hours of work in addition to wage rates, as is done in India (Raghunathan, et al., 2020).

Finally, one limitation of wage data is that it either is not collected or may be collected but not disseminated. The very rich district-level price and wage data for rural India analyzed by Raghunathan, et al. (2020) was no longer made publicly available by the Indian government after 2011. Lack of public dissemination of wage data is also matched by lack of dissemination of food price data in many countries (Bai, et al., 2021). But these data gaps are surely surmountable barriers precisely because of the low cost of new wage data collection efforts or the relatively low cost of diplomatic efforts to encourage national governments to share food price and wage data in a more timely fashion, or to develop their own food affordability monitoring systems or "real-time" dashboards.

On the basis of the arguments above, we strongly urge international aid agencies involved in food price monitoring – particularly the WFP, FAO, USAID, ILO, and the CGIAR – to more extensively collect and report wage data and "food wages" in their primary surveys, but also to seek out existing wage series in consumer price surveys and labor force surveys and encourage national government agencies to publicly disseminate food price and wage data; in short, to pluck this very low hanging fruit. The WFP already does this kind of analysis is some contexts with the reporting of wage-cereal terms of trade indices, but we recommend more extensive application of wage collection and use of broader food baskets to capture prices for nutrient-dense foods as well as staple foods, including a range of price necessary to cost out healthy diets.

The scientific community and UN agencies have made great progress on defining what we mean by "sufficient … nutritious food", but the challenge of monitoring the affordability of nutritious food for "all people, at all times" is not yet met (FAO, 1996). Measuring the wages of the poor is a big but cheap step towards meeting that challenge.

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