Seasonal Poverty and the COVID-19 Pandemic

Ahmed Mushfiq Mobarak [*]   Corey Vernot   Arjun Kharel [†‡]

July 16, 2020

Abstract

_____

[*]Yale University
[†]Centre for the Study of Labour and Mobility
[‡]Yale Research Institute on Innovation and Scale

1 Introduction

There is continued robust debate about the human costs of social distancing in low income countries, and how those compare against the benefits of limiting disease spread. Lockdown politics and policy have shifted back and forth in India, Pakistan, Ghana, Bangladesh, U.K., and several U.S. states, depending on how vociferous the complaints from consumers, business owners, and other interest groups have been regarding the economic toll of distancing, relative to the daily publicity surrounding the escalating numbers of infections and fatalities. Such comparisons miss a critical piece of information: The economic hardships already felt by the poor provides an incomplete picture of the longer-term costs of continued lockdowns given reductions in current investments. Furthermore, given the seasonality in crop cyles in rural agrarian economies, we are likely to see even more acute deprivations in the next few months. We highlight these effects using five rounds of panel data collected from 2600 households in rural Nepal during both lean and harvest seasons, before and after their COVID-19 lockdown.

The majority of the world's poor continues to live in rural, agrarian areas where incomes and work opportunities are seasonal and fluctuate with the crop cycle. In deciding whether to extend lockdowns, it is therefore imperative that we think carefully about whether the economic pressures currently experienced by the poor are expected to get better over the next few months, or worse. Many countries in Sub-Saharan Africa and South Asia suffer from pre-harvest lean or "hungry" seasons when the rural poor experience food deprivation even during 'normal' years. A continued lockdown can exacerbate that deprivation when the lockdown and lean periods overlap. A second concern is that investments that are being held back now will lower productivity in the near future, perpetuating cycles of poverty.

In 90 villages in Western Nepal, we tracked labour mobility, wages, remittances, food security, and mental health in monthly intervals since September 2019, and then conducted phone surveys in April, 2020, immediately after the lockdown measures were enforced. The sharp declines in post-lockdown welfare evident in the data are already quite stunning. Total work hours in April are significantly below even the pre-harvest lean season in September. The subdued local economic activity will push many families below the poverty line. Remittance earnings - which is another major income is sharply down. Migrants to Indian and Nepali cities returned home in a rush in early April. Further, migrants who remained are remitting only half of what they used to send before the lockdown. The usual outflow of migration during this period has almost stopped. A prolonged lockdown therefore implies lower future remittances, risking further poverty and deprivation in a few months. The substantial erosion of income is also likely to lower agricultural investments in the current

planting season, which will adversely affect yields during the November harvest.

Social distancing has been especially difficult for families that rely on a migrant wage earner, because there has been a 61 percent dip in the remittance receipts after lockdown. A large part of this is because migrants who would normally be away, earning income elsewhere, were forced to return home. 65% of the migrants who were in either India or urban areas of Nepal during January 1 – April 1, 2020 returned home in a rush during the first two weeks of April. Further, migrants who remained are remitting only half of what they used to send before the lockdown. The usual outflow of migration has almost stopped. A prolonged lockdown therefore implies lower future remittances.

When we provided some of these rural households loans during the pre-harvest lean season in 2019 in a randomized controlled trial, they invested a large portion of that money buying fertilizer. Agricultural investment was significantly higher than those who did not receive such loans. That creates an important worry that the substantial erosion of income we observe in April 2020 will lead to lower investments in the upcoming planting season in June-July. This will lower yield during the November harvest, perpetuating the cycle of poverty.

The income loss has also caused food insecurity in April to rise to levels typically only observed during lean seasons. 65% of our respondents worried about having enough food in the house when we spoke to them in late April. As a benchmark, that number was 67% in September-October 2019 (during the pre-harvest lean season), and 43% in January, after the rice harvest. Similarly, 22% were forced to reduce their portion size in April, compared to 26% during the 2019 lean season and 13% in January. What is most concerning about these numbers is that the April deprivation is being reported during the wheat harvest, a period when people should have comparatively easy access to food. It is fortunate that this COVID-19 crisis hit during the season when poor rural households still have some grain stocks to draw down. If the lockdown is prolonged into July or August, then the crisis will be layered on top of normal food insecurity, leading to greater desperation than what we are observing now. We have tracked the steady depletion of grain stocks in our data, which has declined 40% on net since January, and 25% between mid-April and mid-May. If the trend continues, the risk of hunger and malnutrition will reach dangerous levels during the upcoming lean season.

The seasonality inherent in agrarian economies has two important implications for policymakers in low-income countries. First, while the economic costs of lockdown we observe in the data are already quite concerning, it still does not provide a complete sense of how much worse it can get when the lean season arrives in August. 2019 was a "normal" year by all accounts, and even then, food deprivation quadrupled from April to September. Of grave

concern is how these poor families will fare when the combined effects of the lean season and the COVID-19 lock-down hits them simultaneously.

Second, the investments that are being held back now, in either reduced fertilizer or lower emigration rates, will have persistent effects on agricultural productivity, remittance income, and food security in a few months. Even if the rural poor are surviving right now, we cannot become complacent and extend the lockdown on that basis. The current food deprivation will permanently affect productivity, welfare, and the cognitive and physical development of children. The lower investment today will perpetuate poverty for years to come. The lower migration today will cause further deprivation and hunger in a few months.

2 Data and Context

2.1 Sampling Frame

Our sample consists of 2,636 households in rural villages in the districts of Kailali and Kanchanpur in the Westerin Terai (plains) region of Nepal. This sample of households reside in villages where we conducted a field experiment in partnership with the Nepali NGO *Backward Society Education* (BASE) that provided micro-loans during the pre-harvest lean season in Summer, 2019. Households were selected to approximate the bottom half of the wealth distribution of rural households in the two districts.

The initial sampling frame consisted of 15 of 20 sub-districts in the districts of Kailali and Kanchanpur. We randomly selected 33 of the 73 rural wards in these sub-districts, and we randomly selected 97 villages from the set of 227 villages in these wards. At the time of baseline data collection, seven of these 97 villages were dropped from the study because they were inaccessible due to flooding, leaving a data sample of 90 villages.

Within the study villages we collected survey data from 2,935 households from the approximate bottom two-thirds of the wealth distribution. In each village, survey teams from the Centre for the Study of Labour and Mobility (CESLAM) conducted a census and facilitated a participatory wealth ranking exercise. The wealth ranking involved gathering 10-12 knowledgeable community members, including at least one formal village leader, in a public space. With facilitation from the present researchers, the community members then developed consensus definitions of "Wealthy", "Middle Income", "Poor" and "Very Poor" in their community and assigned each member of the community present in the census to one of these four categories. Using the descriptions of each wealth category recorded during the wealth ranking exercises, researchers then harmonized wealth categories across villages to create equivalencies. Households in the top third of the wealth distribution according to

these harmonized wealth categories were excluded from the study sample.

2.2 Data Collection

Between July 2019 and May 2020, we collected seven rounds of survey data from our study sample: one round of in-person baseline surveys conducted in July of 2019, five rounds of phone surveys conducted from August 2019-January 2020, and a sixth round of phone surveys conducted in April of 2020, immediately following the beginning of the COVID-19 pandemic in Nepal.

Figure 1 shows the timeline of data collection for this project. In-person baseline surveys were conducted in July of 2019 and included 2,935 households across 90 villages. Of these, 2,636 responded to at least one phone survey between August 2019 and January 2020. Our first two rounds of phone surveys were conducted from late August to late September 2019, our third and fourth rounds of phone surveys were conducted from mid-October to late November 2019, and a fifth round of phone surveys was conducted from mid-December 2019 to early January 2020. Phone surveys collected data on labor and wage income, food security, subjective-wellbeing, migration and remittances, agricultural decisions and output, and grain storage.

Immediately following the onset of the COVID-19 pandeomc in April 2020 we launched a sixth round of phone surveys in our sample. The questionnaire covered labor, wage income, migration and remittances for all households, as well as data on food security, subjective well being, and grain stores for a subset of households. We resurveyed 2023 households in the post-COVID period, of which 1435 received the food security module and 485 received subjective well-being and grain storage modules. In addition, we collected retrospective data on food security during a typical year and on migration during important dates from 2018-2019 for a sample of 403 households.

2.3 Study Context

Our study population is characterized by both high levels of subsistence farming and circular labor migration. In our sample 86% of households cultivate rice and 75% of households have a circular labor migrant that returns home at least once during the 8 months of the panel. Agricultural income, migration, remittances, and food security also vary according to seasonal patterns. Agricultural income, return-migration, and remittances all peak in the fall, as migrants return for festivals and the rice harvest in October, and bring back remittances by hand. As we discuss more in subsection 3.1, this variation in income leads to seasonality in food security. Food insecurity peaks during the 'lean season' of July-September leading
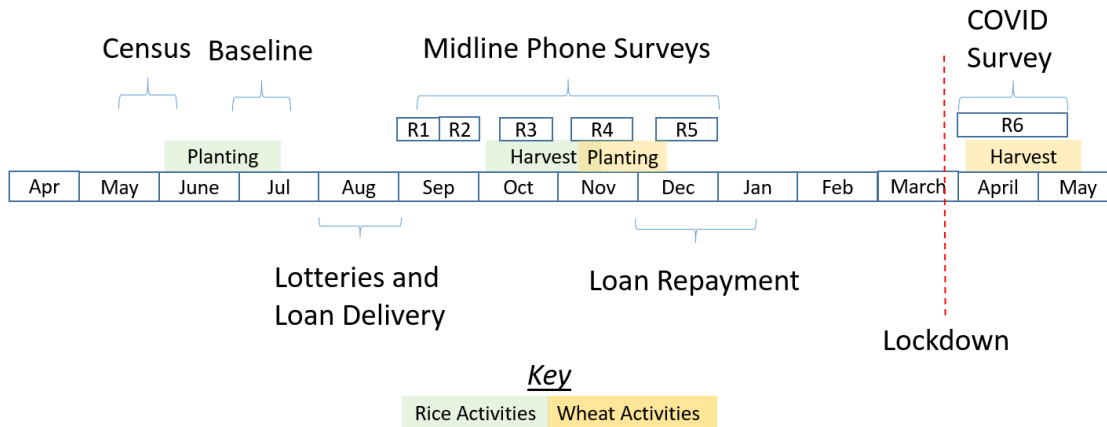
Figure 1: Project Timeline

up to the rice harvest, and drops in October as households receive increased remittances and income from the rice harvest.

3   Results

3.1   Seasonal Deprivation in Rural Nepal and Rural Bangladesh

We will report data from surveys we conducted during both lean seasons and harvest periods in 2019 and 2020. To help readers properly interpret those results, we need to benchmark them against *expected* seasonal variation in incomes and food insecurity at baseline. To that end, Figure 2a show month-by-month variation in food insecurity reported to us at baseline (in early 2019) by a sample of 160 rural households in our study districts. Most households are food-secure in the first half of the year (January-June), but food insecurity rises sharply during July, August and September. Nearly a quarter of households are forced to reduce food portion sizes in August. It is fortunate that COVID-19 hit Nepal during a period when the rural poor are otherwise food-secure, at least during a "normal" year when there is no global pandemic. Figure 2a also provides grave cause for concern about the possible economic effects of COVID in rural Nepal if the lockdown is extended into the traditional pre-harvest lean period of July, August and September.

Figure 2b, taken from Mobarak and Reimão (2020), further shows that such large seasonal variations in food insecurity is not limited to Nepal, but is also a feature of the agrarian economy of rural Bangladesh. In interviews conducted in 2016, up to a quarter of rural Bangladeshis also report "regularly" missing meals during their own pre-harvest lean season of September and October. The concerns we express below about the potential deleterious

effects on human welfare when the COVID-19 lockdown is extended into period of seasonal food insecurity is likely relevant for large swaths of agrarian societies in the global south where income and work opportunities fluctuate seasonally.

From subsection 3.2 onwards, we will turn to the six rounds of survey data we collected in rural Nepal between September 2019 and May 2020, to document the effects of the COVID-19 lockdown on labor supply, income, food security and mental health.
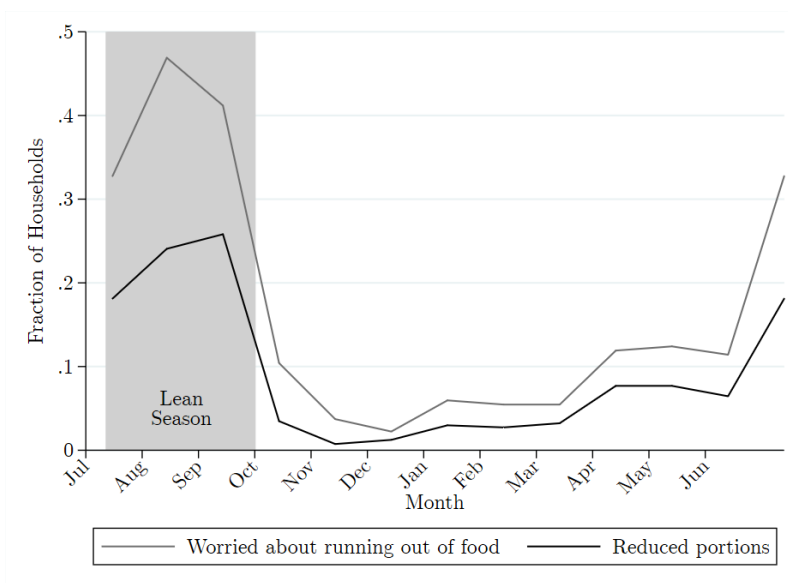
(a) Month-by-Month Food Insecurity in Western Nepal
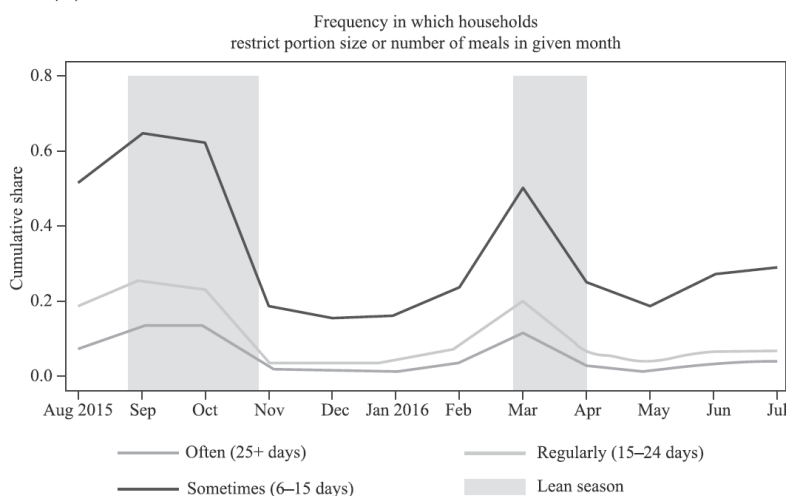
(b) Month-by-Month Food Insecurity in Northern Bangladesh, Reported in 2016

Figure 2: Seasonality in Food Security in Western Terai of Nepal and Northern Bangladesh

3.2 Economic Activity in the Village

Our panel is unbalanced both at the household level, due to non-response to our phone surveys, and at the individual level, due to variation in which household member are home across rounds. To correct for this we estimate the following fixed effect regression: $Y_{i,t} = \alpha_i + \delta_t + \epsilon_{i,t}$ where α_i and δ_t are individual and round fixed-effects. We then plot the predicted values and associated 95% confidence intervals for each round against the average survey date of that round. Results are robust to using only a sample of individuals present in the village across all survey rounds.

Figures ?? and ?? show the change in hours worked per week over time, for men and women respectively. The sample is limited to adults aged 18-65 who were living in the village at the time of the survey. Non-farm work (wage work and labor on family-owned businesses) is shown in blue. Total hours, which also includes work on the family farm, is shown in red. The rice and wheat harvest periods are shaded green, and the red vertical line at March 24 marks the beginning of the COVID-19 lockdown in Nepal.

Both non-farm hours and total hours have dropped significantly for both men and women relative to their averages during the rice harvest. For men, the total hours worked after lockdwon are significantly lower than the low number of hours worked during the pre-harvest lean season. Women generally work fewer hours outside the home, and the fall in labor hours is not as dramatic as it is for men.
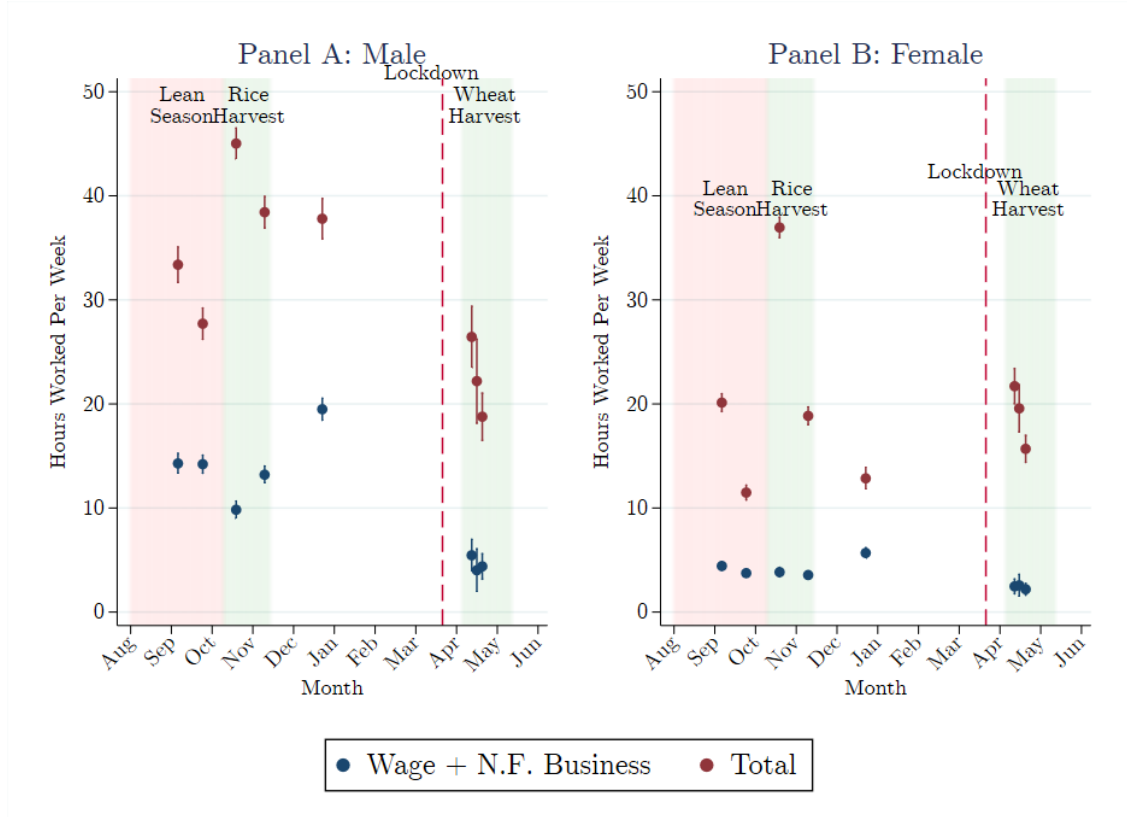
Figure 3: Hours Worked by Survey Round, Sex

3.3 Migration and Remittances

Figure 4 shows the temporary migration rate for men age 18-65 at the time of each of round of our phone surveys [1]. To benchmark against normal seasonal trends in migration, we also the migration rate for these same men during selected salient dates in the years 2018-2019. Temporary labor migration peaks during the pre-harvest period, then falls in October as migrants return for holidays and the rice harvest. Following the harvest, labor migration rises, but not to pre-harvest levels. During a typical year, we see that the fraction of men away around the wheat harvest and Nepali New Year in April is higher than the fraction away during the rice harvest and fall festivals. In the immediate post-lockdown period, the fraction away instead falls to six percentage points *below* the levels at rice harvest and nearly 10 percentage points below levels the previous year. The drop in labor migration increases from April to June as more migrants return home for the rice planting season than would typically arrive.

---

[1]Temporary migrants are defined as household members currently living away from home, but who are reported at home at the time of at least one survey in our panel.
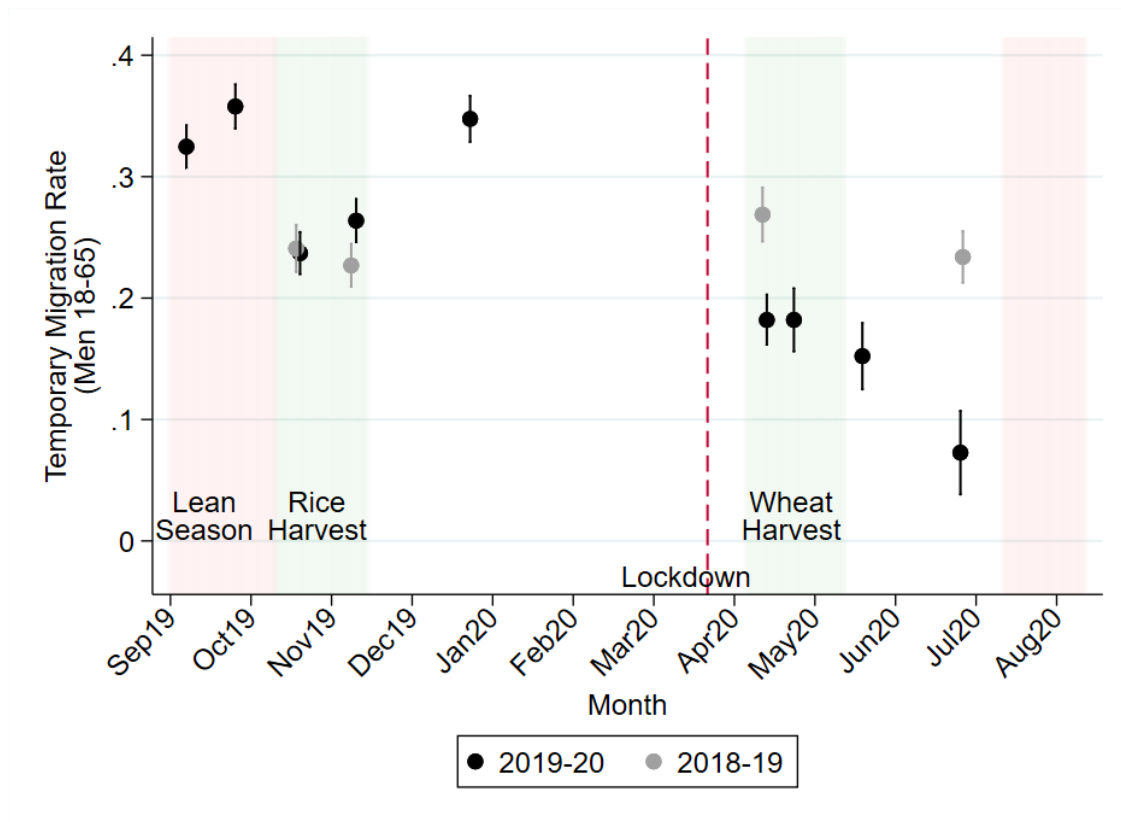
Figure 4: Male Temporary Migration by Survey Round

Non-farm income has dropped substantially relative to the rice harvest season in our sample. Figure 5 shows monthly remittances and total non-farm income in each round of our panel[2]. Non-farm income is the sum of remittances received in the last month and monthly wage income[3]. Remittances are lowest during the pre-harvest lean season, when labor migration is at its peak. As migrants return for the rice harvest in October they bring money with them, and remittances peak. Relative to rice-harvest levels, and despite a larger number of recently returned labor migrants, remittances drop by 64% in round 6 after the lock-down. This is driven by a drop in per-capita remittances both from migrants currently away and migrants that have recently returned. This drop in remittances coupled with substantially lower opportunities for wage work at home result in a large drop in total non-farm income. Total non-farm income, the sum of wage income and remittances, has dropped by 67% relative to the rice harvest season.

---

[2]The first round of data collection in August is missing because we did not collect data on remittances during this round

[3]Other income sources were not measured because they represent very small contributions to household income in our sample. Only 4% of adults in our sample work at a self-owned non-farm business in a given survey round, and other income sources are scarce.

Figure 5: Non-Farm Income by Survey Round

3.4 Food Insecurity

?? shows changes in food insecurity over time. The data shown are derived from four food insecurity questions adapted from Household Food Insecurity Access Scale (HFIAS), but adapted to use a two-week recall period instead of 30 day recall (Coates et al., 2007). In addition, we also include the fraction of households that ate no meat or no vegetables in the last 2 days [4]. All food insecurity measures are significantly higher during the post-COVID period relative to the post-harvest period in November. The fraction of people worried about running out of food has risen by over 20 percentage points, to levels normally observed in a lean season.

In addition to the overall decline, we can see two other trends in ??. First, there is some evidence that food security has improved between our first and second calls to households, although not to the levels seen in November and December. This may correspond with households finishing their wheat harvest. Second, the rise in food insecurity is driven more by changes in what households eat rather than how much they eat. The fraction of households

---

[4]Since our population is predominantly Hindu, meat consumption only varies among non-vegetarian households. We observe some meat consumption during the panel in 68% of the sample

worried about running out of food, switching to rice/wheat soup, and not eating vegetables or meat have all risen to levels previously seen in the lean season. In contrast, the fraction of households skipping meals or reducing portions has increased by much less. In the short-term, the pandemic has increased fears and reduced nutrition more than it has caused more severe hunger. This is consistent with the fact that the pandemic hit a few months after the rice harvest and at the beginning of the wheat harvest, when households may have sufficient grain savings to sustain themselves for a few months.

One shortcoming of **??** is that it doesn't show us the counterfactual trend in food security in the absence of the pandemic. It is possible that the increase in food insecurity we see following the pandemic is the result of normal seasonal trends as households spend down their savings from the rice harvest. To assess if this is the case, we asked 403 households to report on the frequency of two of our food insecurity measures (worrying about running out of food and reducing portions) during each month in a typical year. Figure 6 shows a standardized index of these two measures during a typical year and during the 2019-2020 year for this set of 403 households, where both indices are transformed so that their averages between September and January have mean zero and standard deviation 1. Normal seasonal trends in food insecurity can account for less than a third of the increase we see from January-April 2020. Although there is some evidence food insecurity fell between our first and second calls to households we cannot reject that the values are the same. Food insecurity remained well above typical levels in May and June, even after the wheat harvest.
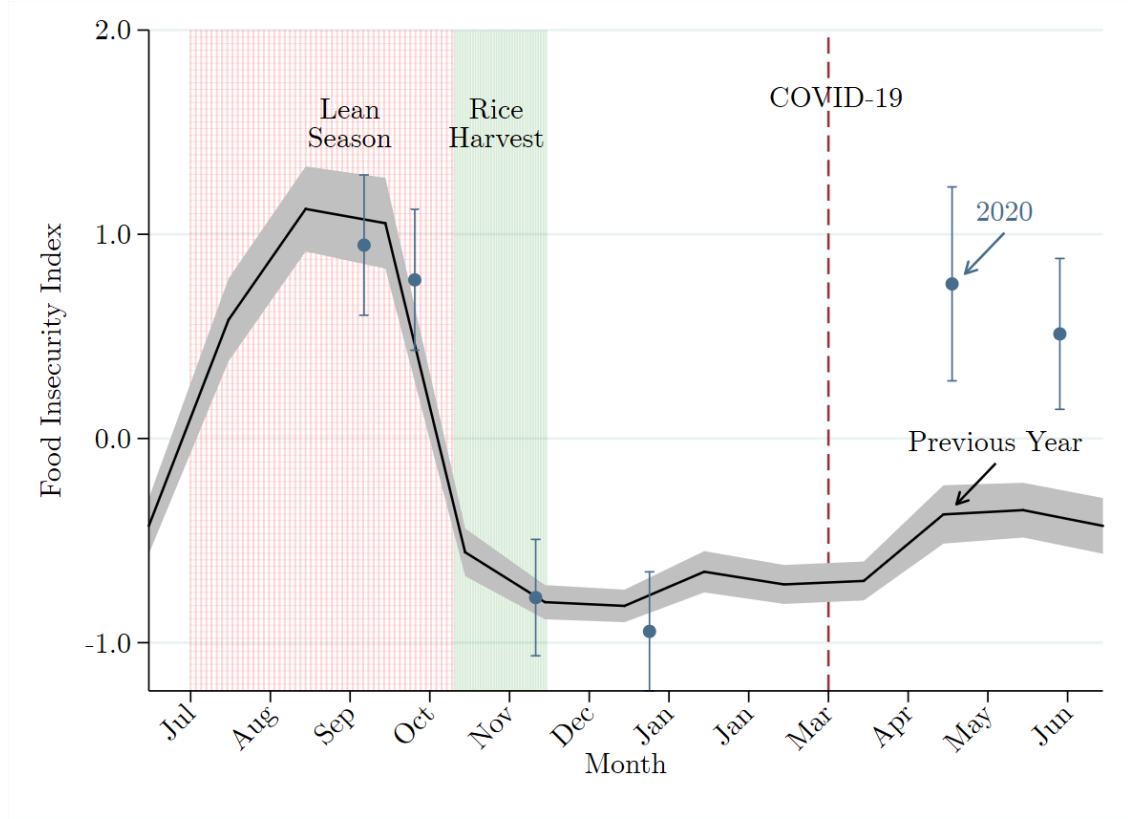
Figure 6: Food Insecurity Index by Survey Round

3.5 Mental Health

Measures of mental health have declined by an even larger degree than food security during the pandemic. Our phone surveys contained three questions relating to the severity of stress and anxiety, depression, and irregular sleep in the past 14 days. In Panel A of Figure 7, we show the fraction of respondents who report feeling stressed or anxious "Often" or "Always" (as opposed to "Sometimes", "Rarely", or "Never" in the last 14 days). We focus on stress in the first panel due to the strong evidence that increased stress levels can alter decision-making in ways that reinforce poverty (Cornelisse et al., 2013; Kandasamy et al., 2014). We see a dramatic increase in stress levels following the onset of the pandemic. The fraction has increase by 100*.23
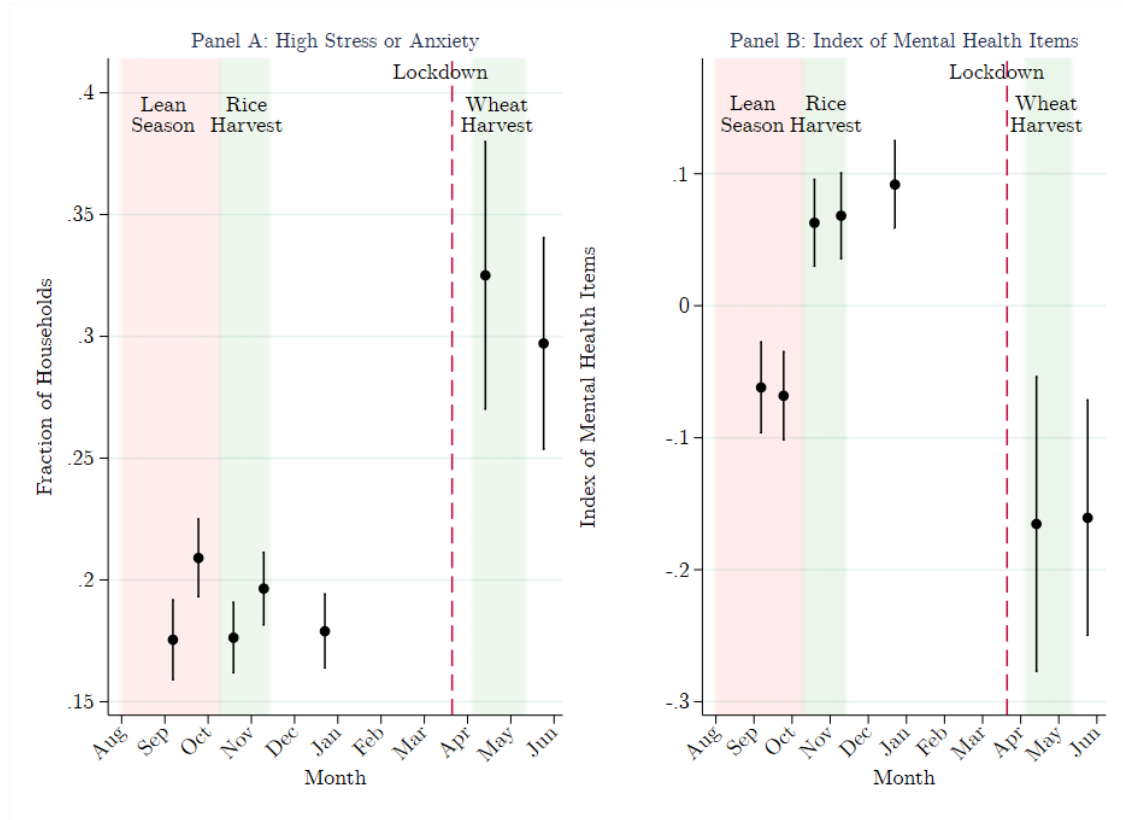
Figure 7: Subjective Well-being Outcomes by Survey Round

3.6 Depletion of Rice Stocks

?? shows the number of months households predict the rice currently stored in their dwelling will last. This data comes from a sub-sample of 408 households re-surveyed three times at high frequency from early April to mid May, allowing us to show trends in household savings over time during the pandemic. The grain stocks are steadily depleting. Our concern is that these stocks are not expected to be replenished until the next rice harvest in November. These data suggest that the period July to October, when households are typically short on food even during "normal" years, may prove to be especially difficult this year.
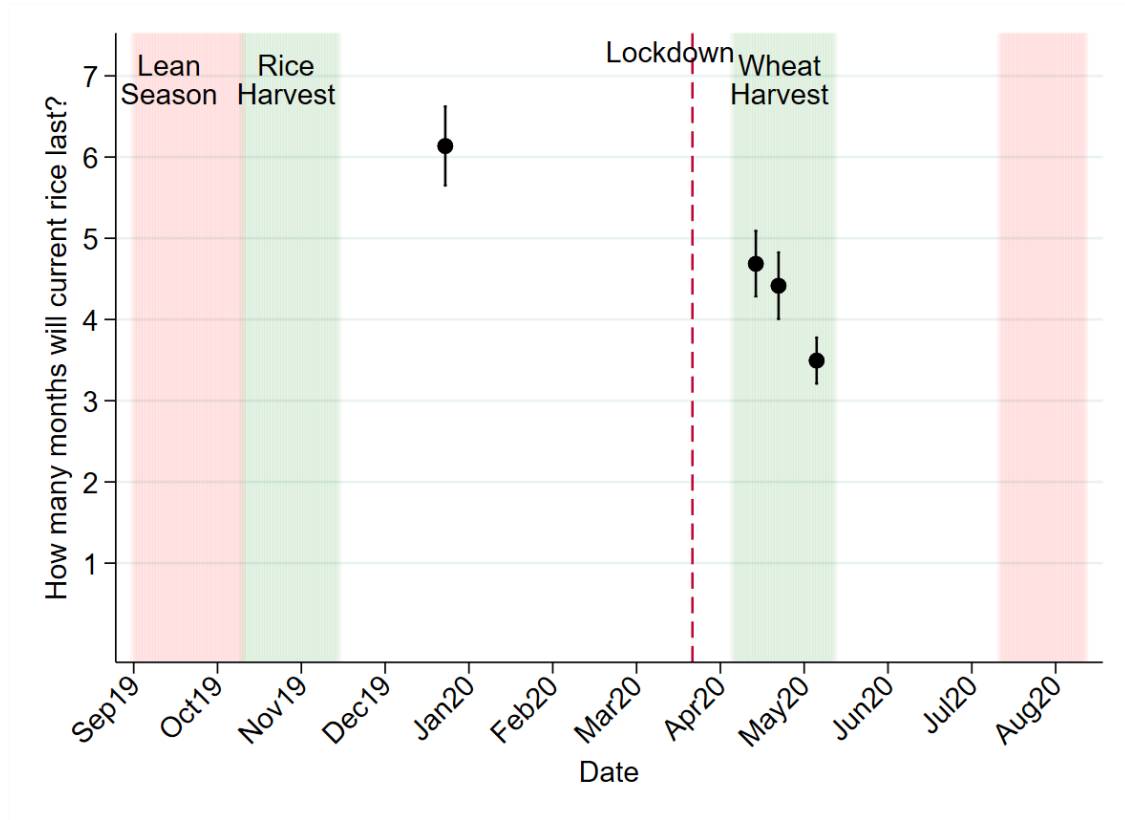
Figure 8: Grain Stored Over Time

4 Discussion

COVID-19 remains an important public health threat that needs to be brought under control. Given the urgent need to balance disease and mortality risk stemming from both the coronavirus and economic deprivation, governments should pursue smart containment strategies that pay attention to the regional variation in disease risk, to specific activities that are critical for maintaining food security, and to the specific sectors the poor depend on for maintaining their livelihoods, instead of extending broad-based lockdowns that impose large human costs on the poor.

References

Coates, J., A. Swindale, and P. Bilinsky (2007): "Household Food Insecurity Access Scale (HFIAS) for measurement of food access: indicator guide: version 3," .

Cornelisse, S., V. Van Ast, J. Haushofer, M. Seinstra, and M. Joels (2013): "Time-dependent effect of hydrocortisone administration on intertemporal choice," *Available at SSRN 2294189*.

Kandasamy, N., B. Hardy, L. Page, M. Schaffner, J. Graggaber, A. S. Powlson, P. C. Fletcher, M. Gurnell, and J. Coates (2014): "Cortisol shifts financial risk preferences," *Proceedings of the National Academy of Sciences*, 111, 3608–3613.

Mobarak, A. M. and M. E. Reimão (2020): "Seasonal Poverty and Seasonal Migration in Asia," *Asian Development Review*, 37, 1–42.

Tables

Table 1: Outcomes by Survey Round

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(sum) remit	(sum) remit_home	(sum) remit_aw	(mean) awayEH	(mean) remit_aw	(mean) remit_home	(mean) remi
round=2	1507.4***	-468.8	2013.8***	0.194***	2410.3***	675.1**	832.9***
	(417.2)	(313.2)	(274.3)	(0.0101)	(502.1)	(265.7)	(317.9)
round=3	3534.7***	1778.4***	1761.2***	0.0403***	2643.2***	2121.2***	2221.7***
	(412.2)	(309.4)	(271.0)	(0.00996)	(512.7)	(251.7)	(314.2)
round=4	2892.6***	1027.5***	1065.7***	0.0469***	2696.4***	1102.8***	1903.8***
	(401.4)	(301.4)	(263.9)	(0.00976)	(532.3)	(246.2)	(306.0)
round=5	2581.4***	606.3*	1991.9***	0.145***	2661.8***	820.7***	1844.9***
	(413.5)	(310.4)	(271.8)	(0.00999)	(499.4)	(259.0)	(315.1)
round=6	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Constant	1681.4***	761.1***	902.3***	0.175***	1415.9***	520.4***	1124.2***
	(299.4)	(224.8)	(196.8)	(0.00720)	(384.0)	(180.7)	(228.2)
Observations	12285	12285	12285	10771	6360	8837	12285

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Appendix A. Placeholder