

Can Migration Patterns Help Predict the Spread of COVID-19 in South Asia?

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Within one week in March, the lockdowns ordered by South Asian governments to combat the COVID pandemic dramatically reversed rural-to-urban migrant flows. Our team's early analysis shows that migration patterns may help predict the location of COVID outbreaks.

The IMF's Gita Gopinath has called it [The Great Lockdown](#). In many countries, the spread of the virus is still in early days. It is the lockdown which is having the most immediate and sharpest consequences. As people stop going out, many households – particularly those that rely on income from microenterprise, informal labor, and agriculture – have no cash coming in.

The Great Lockdown is also affecting population flows, which has at least three immediate consequences:

- 1) The flow of remittances from urban migrants back to their rural families has dried up. Economic [difficulties in cities](#) have intensified difficulties in villages as much-needed income support from remittances has plummeted.
- 2) Migrants, having lost their jobs in cities, are now arriving back in the villages and towns where they grew up, adding burdens to communities struggling to support themselves.
- 3) Some migrants are spreading COVID-19 as they travel.

Before the pandemic hit, we had been following migrants in Bangladesh, India, and Pakistan who had left their rural homes to seek better jobs in cities. The most recent available data show that at least 1 in 6 households in India and Bangladesh count a migrant worker among their family members, while in Pakistan 10% of workers are migrants. In India, there may be as many as 120 million migrant workers. (Sources: Indian National Sample Survey (NSS) 2007-2008; Bangladesh Household Income and Expenditure Survey (HIES) 2016-2017; Pakistan Labour Force Survey (LFS).

In late March, the pandemic reversed the rural-to-urban migrant flow. Hundreds of millions of migrants across the subcontinent, many of whom were day laborers in cities, joined [mass migrations](#) back to their rural homes.

One way to track the migration is by using geo-location data from mobile phone sim cards. In the initial weeks of the pandemic, for example, as many as 10 million sim cards, or between 5.5 million and 10 million individual subscribers, left Dhaka for the rural areas of Bangladesh.

All of this means that information on pre-COVID migration patterns can potentially be very useful in predicting COVID-19 hotspots. One of us (Shonchoy), working with epidemiologists from the [ICDDR,B](#), found in early data that COVID outbreaks outside of Dhaka were strongly correlated with migration patterns.

Following that logic, we put together a map for the World Bank's [South Asia Economic Focus report](#) – released April 12, 2020 – is entirely on COVID-19. The map shows the prevalence of internal migration by district in India, Pakistan and Bangladesh.

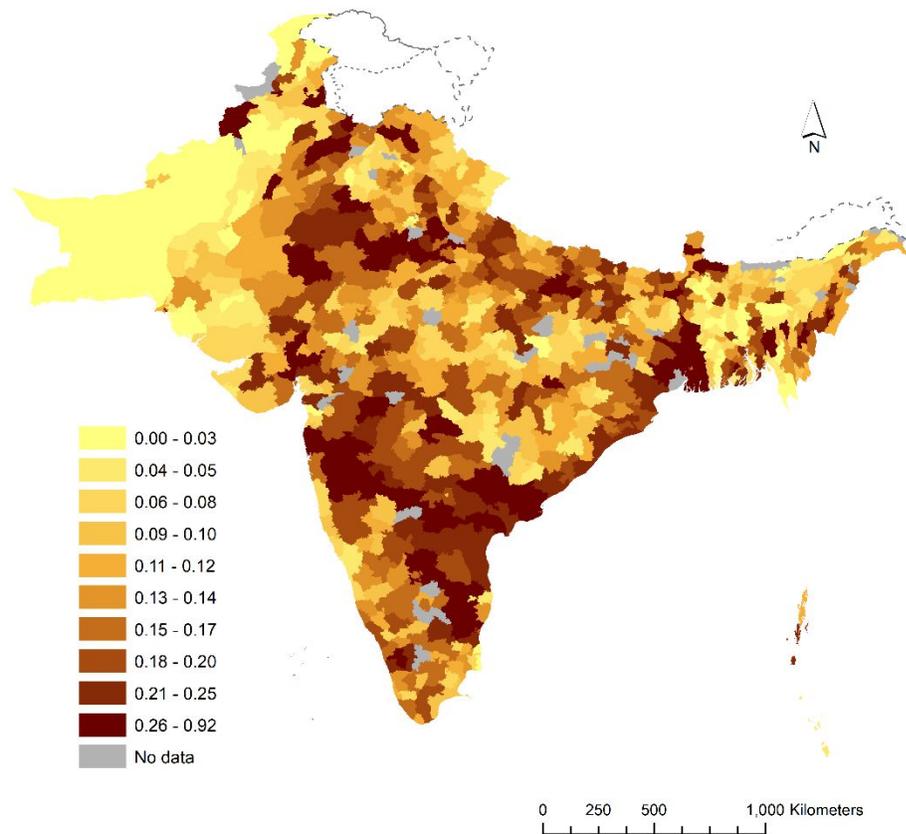
We considered two ways to map out-migration. The first was to show which districts sent most migrants out. We calculated that on a per household basis. The problem was that the map was dominated by sparsely-populated districts in which people were especially likely to leave. Those districts were not clearly the ones most at risk of migration-related COVID contagion.

The approach we show below flips the approach. We start by counting up all migrants in Bangladesh, India, and Pakistan and then map which districts they came from. So, which districts account for the greatest share of migrants?

Specifically, the map plots district-wise out-migration rates, defined as the number of migrants who migrated out of the district to another district in the same country as a fraction of the total number of such migrants across Bangladesh, India, and Pakistan. The areas in dark red account for the most migrants, while the districts in light yellow account for the smallest share.

As a start, governments and other organizations can use this data to know which districts to keep an eye on as possible nodes of contagion. We recognize that it only gives a partial view of the context. We assembled the data to supplement other social, political, economic, and epidemiological information used to inform resource allocation.

So far, we're using data on pre-COVID migration patterns to infer reverse-migration patterns in Spring 2020. In next steps, we're analyzing international migration as well, correlating migration patterns with COVID-19 cases, and integrating a broader range of economic and health data. The next steps will allow us to show the variation of experience and to test the hypothesis that migration and contagion are positively correlated to an important degree (while noting that correlation is not causation). The aim is to see more clearly the movement of people and the movement of the virus.



Source: World Bank, *South Asia Economic Focus*. Box 1.1. April 12, 2020.

Additional Notes on Map Data and Methodology: The data on migrants for India is obtained from the 2007-08 National Sample Survey and considers migrants who left their household within the past 5 years. Data was collected for 588 districts out of the 640 districts in India as per the 2011 Indian Census. The data on migrants for Pakistan is obtained from the 2007-08 Labor Force Survey. The data on migrants for Bangladesh is obtained from the 2016 Household Income and Expenditure Survey and considers migrants who left their household within the past 5 years. District boundary changes over the years have been manually accounted for in the plot. The plots reweights the number of migrants surveyed in each survey by the proportion of the population of the country surveyed to reflect estimates of the number of migrants in each district. The cutoff values reflect deciles of out-migration rates, which range from 0% to 0.92%.

The top three sending districts in India were West Tripura in the state of Tripura, Solapur in Maharashtra, and Imphal West in Manipur. In Bangladesh, the top three sending districts were Jhalokhoti and Patuakhali in Barisal division and Noakhali in Chittagong division. And in Pakistan, the top three sending districts were Karachi East in Sindh, Faisalabad in Punjab and Lahore in Punjab.