

The impact of climate change on internal migration through the agriculture channel: Evidence from Bangladesh, India and Pakistan

South Asia is recognized as one of the most vulnerable regions to climate change because of its geographic location and large-scale poverty. Climate change and weather variability have a predominantly negative effect on crop yields in Bangladesh, India and Pakistan. This is leading to an increase in the number of people migrating from the countryside into cities. The scale of this problem is set to increase as climate change worsens and more farmers are unable to cope with the crop losses that it brings. Pragmatic policies and targeted investments should be put in place to help rural people adapt.

Background

According to a recent report by the Intergovernmental Panel on Climate Change (IPCC), average annual temperature is likely to rise by around 2°C in most of South Asia by the mid 21st century. Higher temperatures in winter, declining soil moisture and increasing drought during dry seasons are just some of the problems that climate change is expected to bring to South Asian countries.

These changes will have an immense impact on people living in this region, especially through the agriculture sector. Such impacts are especially significant for Bangladesh, India and Pakistan, where the agriculture sector is the largest employer of labor force. In these circumstances, in the absence of market-based coping strategies such as credit and insurance markets, migration is one of the most frequently adopted coping strategies that affected people use. Understanding these effects is vital for South Asian policy makers who need to plan how best to mitigate the impact of future changes. To help provide the information that is needed, researchers in Bangladesh, India and Pakistan have investigated



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the way in which changes in the weather affect crop yields and how these changes affect internal migration.

Approach

In each of these studies, instrumental variables regression model was estimated using district-level panel data. This approach allows to isolate the impacts of weather from other drivers of migration and analyze the impact of weather-driven changes in agriculture on internal migration.

Results from Bangladesh

Research shows that variability in precipitation and in minimum temperature in wet season have significant and negative impact on agricultural productivity. A 1 standard deviation weather-induced decrease in agricultural productivity induces 1.4 to 2.4 percent increase in the net out-migration rate from a district. It is estimated that the predicted increase in precipitation uncertainty in Bangladesh would increase net out-migration rates by 20 percent in 2030 relative to 1990.

Results from India

The study finds that pre-sowing and harvest period temperatures have significant and negative effects on wheat yield. In the case of rice, while increase in pre-sowing temperatures is likely to positively influence rice yield, the increase in the monsoon temperatures can adversely affect yield. State-level analysis shows that a 1 percent weather-driven decrease in wheat (rice) yield leads to around 1 percent (2 percent) increase in the rate of out-migration from a state.

Results from Pakistan

The average temperature in Pakistan is expected to rise by up to 2°C, and the variability in temperature is expected to rise by up to 1°C between 2016 and 2035, according to IPCC. Research shows that predicted increases in temperature are likely to decrease crop revenues in relatively warm districts and increase them in cooler districts. The study also finds that a 1°C increase in the variability (standard deviation) of temperature reduces the crop revenue per hectare by around 7.5 percent. A 1 percent weather-driven decrease in the crop revenue per hectare induces, on average, a 2 to 3 percent decrease in the in-migration rate into a district. This suggests that there will be decrease in the flow of labor into districts where climate change contributes to a decrease in farm revenue.

Recommendations

All three studies find that weather variability is likely to have a significant impact on internal migration through the agriculture channel in Bangladesh, India and Pakistan. It will be important for governments and donor agencies to formulate pragmatic adaptation policies and investment plans. Investment should focus on research to develop heat-, salinity- and water-resilient crop varieties, to develop institutions for agricultural credit and crop insurance and to create climate-shock free off-farm job opportunities in rural areas. All of these could help provide people with multiple options to adapt to climate change.

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