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Green Revolution Saved Over 100 Million Infant Lives in Developing World, Yet Could Go Further

Increased global agricultural production had large and positive effects on child health

New research from the University of California San Diego shows that since modern crop varieties were introduced in the developing world starting in 1961, they have substantially reduced infant mortality, especially for male babies and among poor households.

The study assessed mortality rates of more 600,000 children across 37 developing countries, revealing global diffusion of agricultural technology reduced infant mortality by up to 2.4 to 5.3 percentage points. This translates to around 3 to 6 million infant deaths averted per year by the year 2000.

The global scale of the study—the most sweeping to measure the green revolution’s impact on child health—is critical because while the green revolutions represents one of the most important technological transformations in modern history, it did not reach all parts of the world equally.

“If the green revolution had spread to sub-Saharan Africa like it did to South Asia, our estimates imply that infant mortality rates would improve by 31 percent,” said Gordon McCord, study co-author and associate teaching professor of economics at UC San Diego’s School of Global Policy and Strategy.

In the course of the past 60 years, the green revolution catalyzed the spread of modern crop varieties for staple crops such as wheat, maize and rice throughout the developing world. It also exemplifies successful U.S. international cooperation—the Rockefeller and Ford foundations were the initial funders of the green revolution in the 1950s and 1960s, followed by the governments of wealthy countries, including the United States.

Developed by dozens of national agriculture programs with the support of international agricultural research centers, the crops have high yield potential such as resistance to stress, pests and disease, and improved quality of the harvested material. The increase of agricultural production worldwide has been credited with saving over a billion people from starvation.

In the paper, published in the *Journal of Health Economics*, McCord and co-authors combined geospatial crop data with child-level data of over 600,000 children across 21,604 locations in 37 developing countries between 1961 and 2000. Their findings imply that a substantial part of the infant mortality reduction observed in the developing world during the second half of the 20th century is due to diffusion of agricultural technologies and inputs. By the year 2000, more than three million infant lives were saved per year as a result.

The child-level data were provided by geo-located public health surveys of women of ages 15-49 regarding their fertility history, generating records for around three million children. McCord and co-authors culled down that information to focus on rural areas and to mothers who never migrated. This data set was spatially merged with crop distribution data, allowing for an analysis at high spatial resolution.

Modern crop varieties proved to have positive effect on all infants; however, the impact is greater among male than female babies. The researchers found impact on female infants only in countries with more gender parity, suggesting the larger impact on male babies is partly due to discrimination



Gordon McCord

by sex in resource allocation to children. Additionally, infant mortality rates declined more sharply among poorer households.

“The health benefits of broad-based increases in agricultural productivity should not be overlooked,” McCord said. “From the policy perspective, government support for inputs leading to a green revolution as well as investments in extension and R&D programs are important.”

At the global level, the researchers’ estimates suggest that an increase in modern crop adoption from 0 to 50 percent leads to a decline in infant mortality by 33-38 deaths per 1,000 children.

The authors conclude their work speaks to the importance of improving productivity in agriculture as a means of improving lives in developing countries, including the lives of the poor in rural areas.

“It is reasonable to view with some alarm the steady decline in funding for cereal crop improvement over the last few decades in sub-Saharan Africa, the continent with the least modern crop varieties,” they write. “As such, our research can inform the recent debate about whether investing in increased smallholder agricultural productivity is an effective strategy for economic development, health improvement and poverty alleviation in sub-Saharan Africa.”

The research was supported by the Gates Foundation and the Consultative Group on International Agricultural Research (CGIAR) Standing Panel on Impact Assessment.

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