

The new ASTI Intensity Index: An Improved Way to Benchmark Research Investment Levels

The newly refined ASTI Intensity Index measures a country's investment in agricultural research by combining agricultural research spending as a share of agricultural GDP with two additional weighted intensity ratios related to the size of the country's economy and its income.

Q: How is the ASTI Intensity Index calculated?

A: ASTI uses the [Data Envelope Analysis](#) method to define weights to aggregate the three measures of investment intensity. This method is ideally suited for this purpose because it uses linear programming to find the most favorable, country-specific weights for the different components of the ASTI Intensity Index. The new weighted measure can be used to compare research investment intensity across countries and years as well as to calculate intensity gaps for individual countries.

Q: How does the ASTI Intensity Index differ from a conventional intensity ratio?

A: The conventional intensity ratio simply measures total agricultural research spending as a share of agricultural GDP. Although this intensity ratio provides useful insights into relative investment levels over time for particular countries, it encourages a "one size fits all" target for R&D investment and does not take into account other deciding factors. For example, countries such as China and India have very developed and successful research systems that are sufficient given the size of their economies and income levels. Yet, China and India only measure 0.6 and 0.3 percent, respectively, based on the conventional ratio—well below the world average.

The capacity of a country to invest in agricultural R&D depends on structural characteristics such as its level of development (as measured by its per capita income), the size of its economy and agricultural sector, and other factors such as its capacity to take advantage of knowledge produced by neighboring countries. The new ASTI Intensity Index measures the capacity of a country to invest in agricultural R&D based on a consideration of the level and combination of these variables.

Q: How does using the ASTI Intensity Index change our understanding of R&D investment intensity?

A: With the conventional intensity ratio, high income countries show the highest level of R&D intensity, with values around 1 to 3 percent, while most developing countries show values below 1 percent. Using the new measurement gives us much more refined findings and shows that some countries previously believed to be underinvesting in agricultural R&D are in fact doing quite well. For example, using the traditional intensity ratio measured in 2005, we find that research intensity in China and India is only 13 percent and 10 percent of that of the US, respectively. In contrast, using the ASTI Intensity Index we find that intensity in China and India is 80 percent of that of the US, a value that better reflects the research effort made by China and India in recent years. Using the new ASTI Index we also find high levels of R&D intensity in less developed countries, measured as a percentage of intensity in the US, such as Kenya (73%) and Uganda (61%).