

The GAP Index™

In 2010, GHI calculated that global agricultural productivity (TFP) must grow by an average rate of at least 1.75 percent annually to nearly double agricultural output *through productivity* by 2050.

The 2017 GAP Index™ reveals that **for the fourth straight year global TFP growth is not accelerating fast enough** to sustainably double agricultural output by 2050. The U.S. Department of Agriculture’s Economic Research Service (USDA ERS) estimates that since 2004, TFP growth globally has been rising by an **average annual rate of only 1.66 percent**.

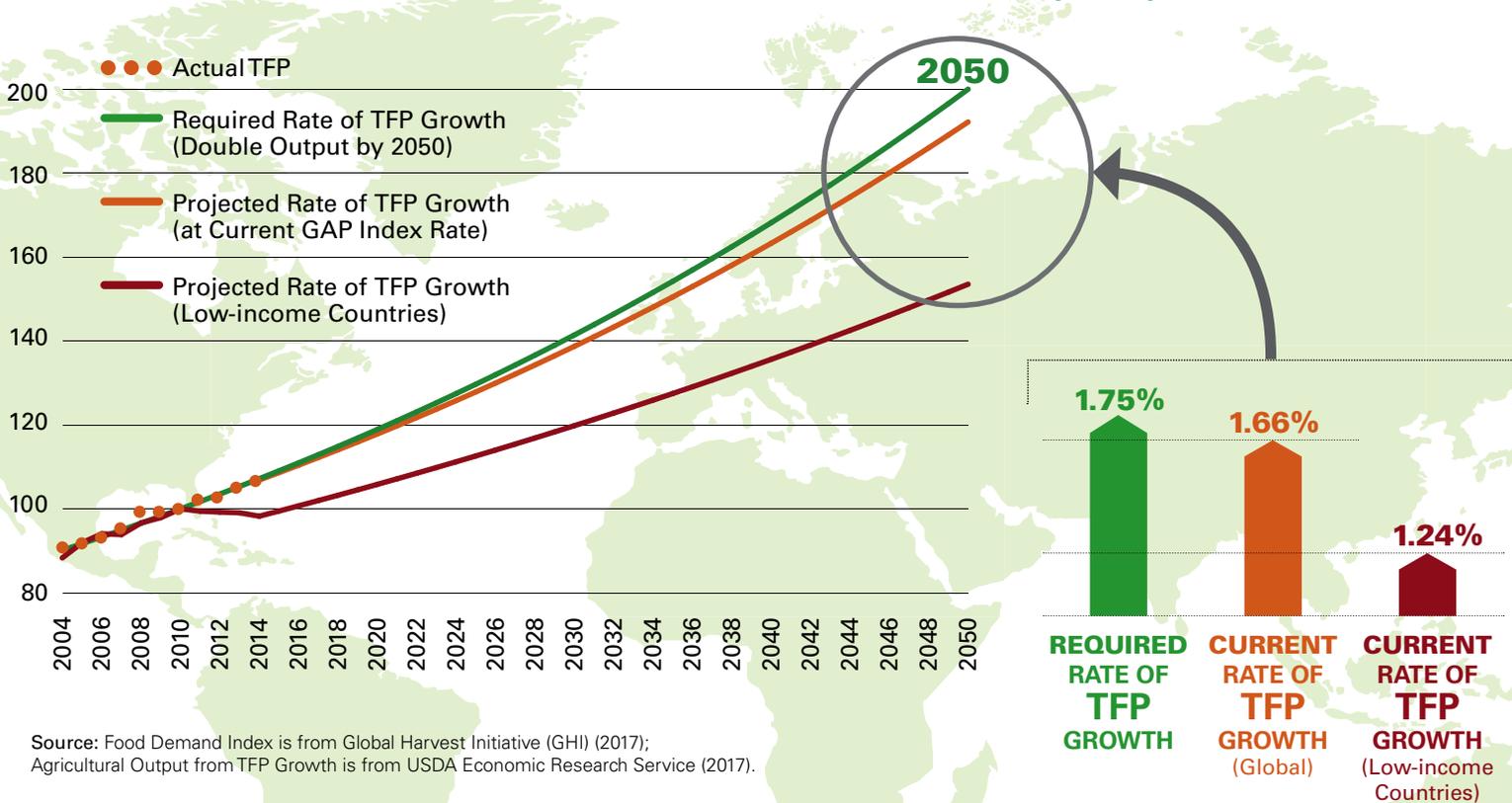
While the global growth rate is close to the target, the **TFP growth rate in low-income countries continues to decline**, as tracked by the GAP Index™ from 1.5 percent (2015) to 1.31 percent (2016) to 1.24 percent (2017).¹¹ **This is well below the TFP growth rates needed to achieve**

the SDG 2 target of doubling productivity for small-scale farmers in the lowest-income countries by 2030.

If this trend continues, farmers in low-income, food-deficit countries (where population growth is rapidly rising) will use more land and water to increase their output, straining a natural resource base already threatened by extreme weather events and climate change.

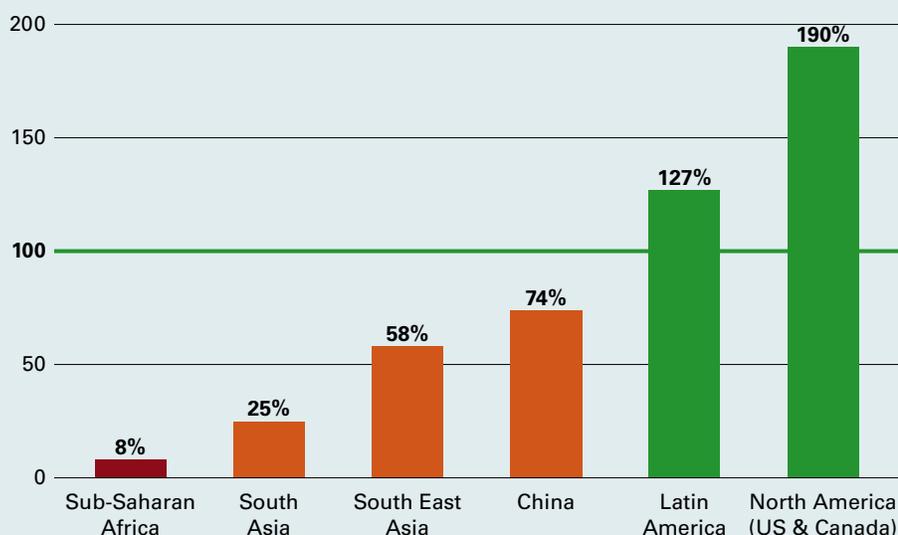
Many low-income countries will need to import food but lack sufficient income to purchase enough to meet the needs of their citizens. Poor urban households will bear the brunt of higher food prices in these countries, but they will also impact low-income rural populations since they are net food buyers. Some of the food demand will not be met and millions of people will be debilitated by hunger and malnutrition.

THE GLOBAL AGRICULTURAL PRODUCTIVITY (GAP) INDEX™



Source: Food Demand Index is from Global Harvest Initiative (GHI) (2017); Agricultural Output from TFP Growth is from USDA Economic Research Service (2017).

Figure 5: Percent of Food Demand Met Through Productivity (TFP) Growth in 2030



Source: Food Demand Index is from Global Harvest Initiative (2017).
Agricultural Output from TFP is from USDA Economic Research Service (2017).

Note on methodology: The projection of agricultural output from TFP growth uses USDA ERS (2017) estimates of average TFP growth during 2004–2014 and assumes this is maintained through 2030. The projected growth in food demand uses UN estimates of population, World Bank estimates of GDP forecasts and PricewaterhouseCoopers LLP (PwC) estimates of GDP growth in PPP, and estimates of the income elasticity of food demand from Tweeten and Thompson (2008). The income elasticity of food demand indicates the share of the growth in per capita income that will be spent on food. Multiplying the income elasticity by the growth rate in per capita income gives the growth rate in per capita food consumption holding food prices fixed. Adding this to the population growth gives the total growth in food demand for a given price level.

REGIONAL TFP GROWTH RATES RAISE CONCERNS

In the 2012 GAP Report®, GHI established a series of regional estimates comparing food demand indexes against projected agricultural output from TFP growth for the period 2000 to 2030. Figure 5 compares the percentage of the estimated food demand for 2030 that can be met with projected TFP growth for six world regions and China.

At current rates of TFP growth, sub-Saharan Africa (SSA) will meet only 8 percent of its food demand through productivity.

This is almost 50 percent lower than the 2014 projection of 15 percent, a troublesome trend. Trade plays a key role in closing Africa's food demand gap; 50 percent of its vegetable oils, 35 percent of its poultry meat and 23 percent of its sugar requirements are imported.¹²

Without significant increases in agricultural productivity growth, African countries will not meet their SDG targets for reducing hunger, malnutrition and poverty.

With 60 percent of the world's population and considerable economic diversity, the **Asian regions** (South Asia, South East Asia, East Asia, including China) exhibit varying degrees of capacity to meet food demand through productivity.

China has prioritized agricultural development and food security and has achieved great progress in reducing hunger. Yet with little arable land and growing affluence, China will require more investments in productivity and more trade to meet future demand.

Other Asian countries, such as **India, Indonesia and Vietnam**, could potentially reduce hunger and improve agricultural productivity, but face significant threats from climate change, requiring accelerated investments to keep up with the challenge.

Latin America (LAC) continues to position itself as a rising global breadbasket. At present TFP growth rates, LAC will be able to meet 127 percent of regional food demand through productivity growth, an increase of 11 percentage points since 2014.

The LAC region and particularly the southern cone nations of Argentina, Brazil, Paraguay and Uruguay comprise the world's largest net exporting zone of agriculture products.¹³ These countries and others in Latin America have the potential to vastly increase their productivity to sustainably supply food and other agricultural goods to a growing world.

Harmonizing trade rules and improving the trade capacity of low-income countries, coupled with improvements in supply chains and infrastructure, will foster timely and beneficial trade to close food and agriculture demand gaps.

In 2030, **North America** is projected to reliably supply safe, abundant food for the world, producing 190 percent of its own food demand. However, the potential for a new era of trade protectionism has sent a chill through agricultural producers who fear they will lose access to traditional trade partners or fail to access new markets at a time when prices are low and farmers are struggling.