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IFC's Economics and  
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*New technologies  
and business practices  
can make farms more  
productive, curb  
malnutrition, and  
reduce emissions.*

# How to Bring More Meat, Eggs, and Dairy to Poor Countries

BY BELIYOU HAILE, NISACHOL MEKHARAT, AND DAVID HARRISON

Around the world, hunger and undernutrition are on the rise. Roughly 9.1 percent of the world's population was undernourished<sup>1</sup> last year, up from 7.1 percent in 2017. Almost 150 million children globally suffer from stunting (Box 1). One way to fight this is by making meat and dairy more available to hungry people, especially children.

Poor countries only get a fraction of the animal-sourced foods—meat, poultry, eggs, dairy, and seafood—that scientists recommend (Figure 1). And it's not as if plant-based protein sources are making up the difference: Residents of poor countries eat less than half the recommended amounts of pulses or peanuts. More worrisome is that those levels have not improved much over the past decade, data from the Food and Agriculture Organization (FAO) of the United Nations show.

Animal products cost almost 60 percent more in low-income countries than in high-income ones at purchasing power parity. Much of the food they produce comes from smallholder farms, which can be less efficient than bigger commercial operations. Africa produced less meat and dairy per capita in 2023 than in 2010, according to FAO data.

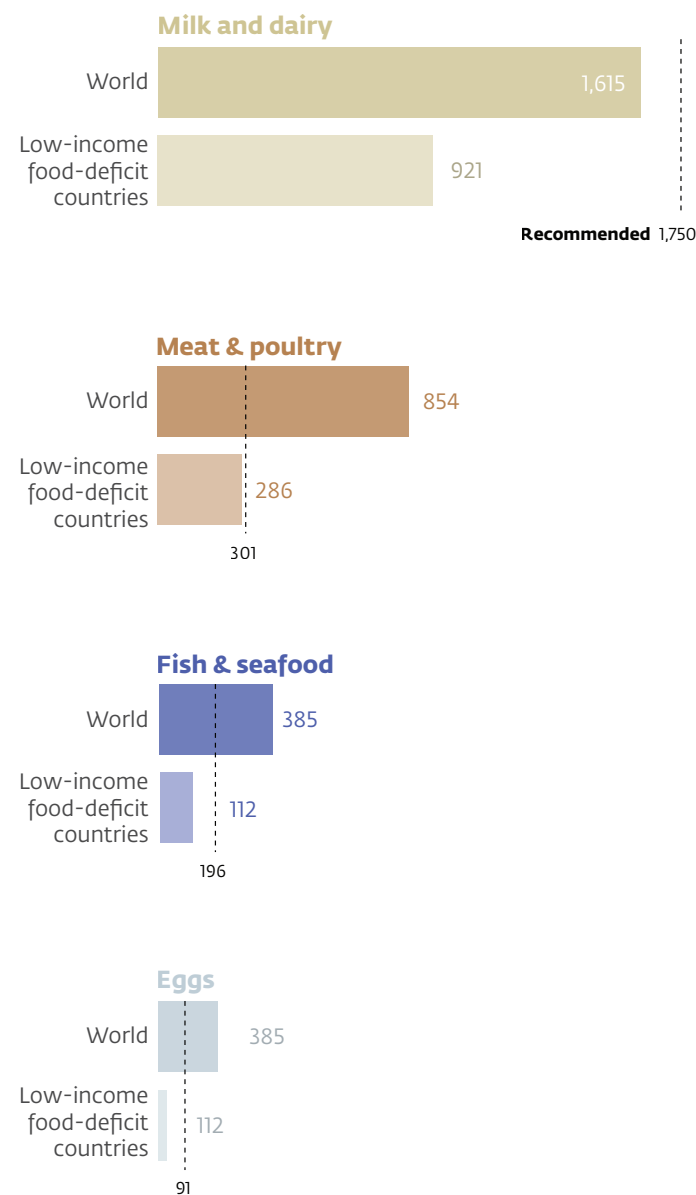
Boosting consumption of animal-sourced foods could have damaging climate implications, however. Livestock accounts for 12 percent of all greenhouse gas emissions<sup>2</sup> through cow belches and methane released from



FIGURE 1

## Weekly Consumption of Animal-Sourced Foods

Grams per person per week, 2022



**Source:** EAT-Lancet Commission (recommended amounts); FAO (consumption).

**Note:** EAT-Lancet recommendations date from 2019 and are under review.

manure. More emissions come from the cultivation of animal feed. Farms in low-income countries, because they are generally less efficient, release more greenhouse gases than in high-income countries for the same amount produced (Figure 2). Almost half of all emissions from beef production and a third from poultry come from low-income countries.<sup>3</sup>

It's possible, of course, to meet dietary needs with a fully vegetarian diet supplemented by essential nutrients that can't be found in plant-based foods such as vitamin B12. In fact, studies<sup>4</sup> in Europe and the United States find that eating red meat can raise the risk of diabetes and heart disease. But poorer locations suffer from such acute malnutrition that plant-based foods alone are less effective at delivering nutrients than those that come from animals. Research<sup>5</sup> consistently shows animal foods are among the best ways to quickly deliver nutrients to hungry people. Eggs, for instance, are packed with high-quality protein, essential fatty acids, and vitamins A and B12. They are easy to store and easy to digest. In one study,<sup>6</sup> infants in Ecuador who received one supplemental egg per day for six months were 47 percent less likely to show signs of stunting.

In an average week, people in low-income food-deficit countries, as classified by the FAO, each get around 286 grams of meat and poultry (around two small chicken breasts), 112 grams of fish or seafood (about 10 shrimp), three and a half cups of milk and half an egg, FAO data show. They also get 255 grams of pulses (such as lentils, beans or peas) and 66 grams of peanuts.

By contrast, scientists recommend about 300 grams of meat and poultry,<sup>7</sup> 196 grams of fish, seven cups of milk and two eggs per week. They also recommend 350 grams of pulses and 175 grams of peanuts. That's according to the EAT-Lancet Commission, a group of scientists, which published a benchmark diet in 2019 balancing health and environmental considerations.

### Filling the Gap

So how to make these foods more affordable in poor countries?

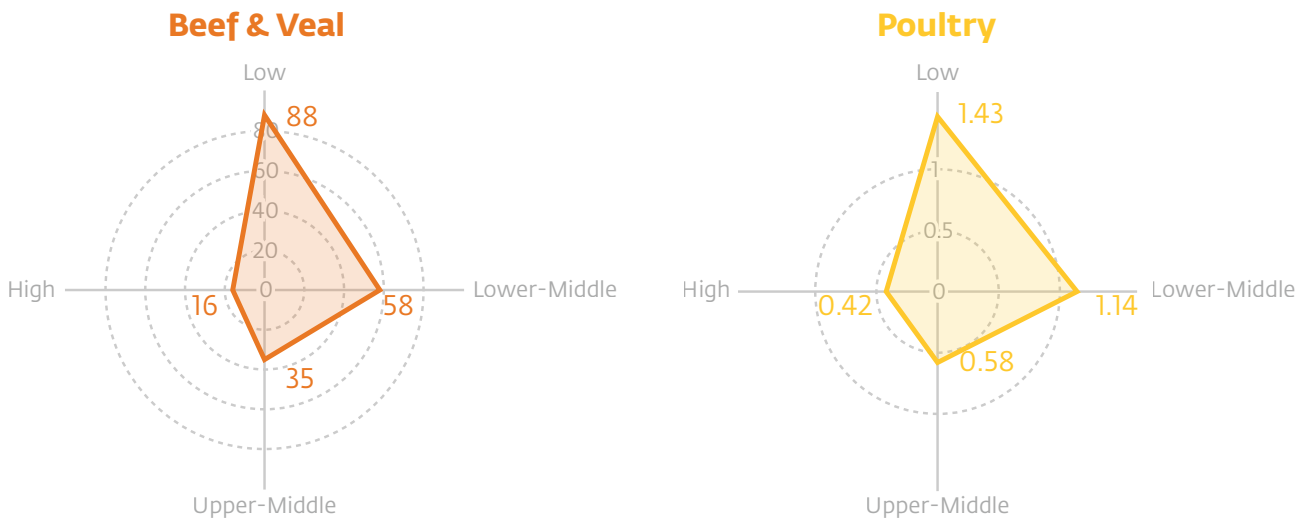
Farms must become more productive. Agricultural productivity in low-income countries has barely



FIGURE 2

## Low Incomes, High Emissions

*Kg CO<sub>2</sub> equivalent emitted per kilogram of meat produced, 2021 | By country income groups*



Source: FAO-OECD

### BOX 1

## The Benefits of Animal Foods

Animal-sourced foods, particularly milk, provide critical benefits during pregnancy, infancy, and early childhood. Research in Uganda<sup>14</sup> and Ethiopia<sup>15</sup> found that household livestock ownership can have beneficial consequences for child nutrition. A program in Rwanda<sup>16</sup> that gave households a cow or a goat improved the weight- and height-for-age measures of children in those households. Those that received a milk cow consumed nearly three times as much dairy as a control group and those that received a goat had nearly double the meat intake. Researchers

have also found that fish<sup>17</sup> can give children more necessary micronutrients and supports their growth.<sup>18</sup> Livestock ownership also raises incomes and employment, empowers women, protects against economic shocks, and recycles nutrients in soils through manure.

Many people in lower-income countries, however, rely on staple cereals and starchy roots and tubers, which lack the kind of essential nutrients which can be found in meat, eggs, and dairy. Iron-deficiency anemia affects 40 percent of children under

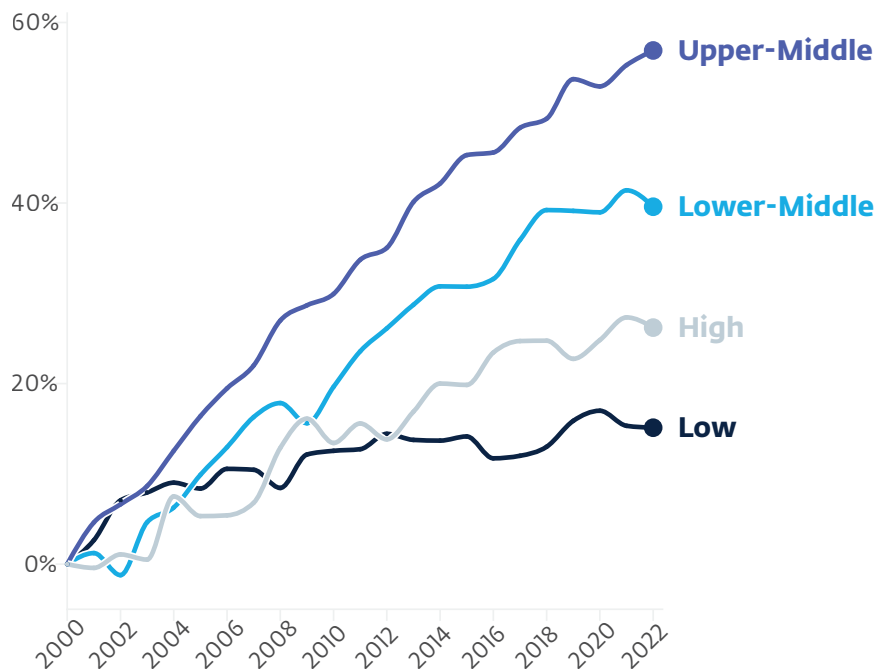
five globally and 30 percent suffer from Vitamin A deficiency. Almost 150 million children (22 percent of the global population under age 5) suffer from stunting and 45 million (7 percent) suffer from wasting. Stunting, or slower growth from malnutrition, typically occurs within the first three years and causes lifelong physical and cognitive damage. Wasting, a more extreme form of stunting, can raise mortality risk.



FIGURE 3

## Agriculture Productivity Changes

By country income level



**Source:** U.S. Department of Agriculture

**Note:** Percent changes in productivity here refer to changes in total factor productivity, that is, improvements in agricultural output beyond the contributions from inputs of land, labor, capital and other resources. Improvements in total factor productivity stem from better technology and organization of production.

improved in a decade, even as it has climbed in richer countries (Figure 3). Adopting new, more efficient animal breeds and farming techniques can keep animals healthier and improve yields.

Productivity improvements have the added benefit of reducing agricultural emissions and making farms more environmentally sustainable. One study<sup>8</sup> found that changing agricultural practices could reduce emissions from farming, forestry, and land use by 20 percent by 2050. These include making animal vaccines more accessible, adopting livestock breeds that produce less methane, converting emissions from manure into biogas, or including more whole seeds and plant oils in animal diets, which suppress methane production.

Some of those solutions would be costly to implement. Others, less so. Here, the private sector can help.

Across Sub-Saharan Africa several companies breed more resilient varieties of chickens for farmers to raise.

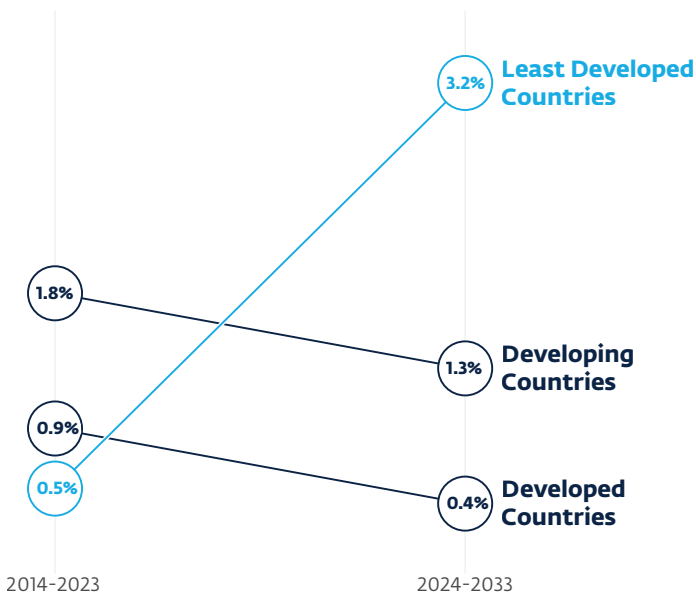
These companies sell day-old chicks to a network of trained field agents who care for them for the first few weeks of life before selling them on to farmers. Relying on local agents ensures that more of the birds reach maturity and allows for greater distribution across remote rural areas.

New businesses have also formed that breed flies to use as fish food. Traditionally, farmed fish are fed fishmeal made of smaller species such as mackerel or anchovies. Fishmeal accounts for more than 60 percent of operating costs at fish farms in developing countries and depletes global fish stocks. Flies are cheaper since they reproduce quickly and feed on organic waste, in the process reducing greenhouse gas emissions. One study<sup>9</sup> in Nigeria found that replacing fishmeal with maggots could reduce the cost of tilapia farming by up to 28 percent.



FIGURE 4

## Annual Change in Meat Consumption (%)



Source: FAO-OECD

## BOX 2

## How Asian Farms Boosted Productivity

In the mid- to late 20th century, technological and productivity improvements in Asia were spurred by policymakers. Starting in the late 1970's, the Chinese government built national breeding and feed programs and offered subsidies to industrial farms, accelerating the shift from family farming to commercial farming. The government of Thailand also promoted commercial farming, both through infrastructure spending and direct industry support. The country's first feed mill opened in 1953 and has since

become one of the world's largest feed manufacturers. That helped the country become a major producer of poultry, shrimp, and other aquaculture products.

In many low-income countries today, governments will likely not have the fiscal resources to make similar commitments, but they can provide a business-ready environment and, to the extent feasible, supporting infrastructure, so that private companies can boost production by taking advantage of technological advances.

Governments can also play a role in making farms more productive at relatively little expense. In India, the National Dairy Development Board has built an app helping farmers determine how to feed their cattle to yield the most milk, based on factors such as a cow's age and productivity. Over- or underfeeding cows and giving them an unbalanced diet can raise costs for farmers, reduce yields, and make animals less healthy. A study<sup>10</sup> of 30,000 cattle found the program reduced feed costs by 9 percent and raised yields by 3 percent. It also reduced methane emissions by more than 13 percent.

Farmers also need better infrastructure and supply chains to get their products to markets. Dairy or meat producers have an added challenge in that their products need to be refrigerated along the way. But many low-income countries don't have the necessary cold chain infrastructure. Rwanda and Ethiopia, for instance, all have less than 10 percent of Brazil's

refrigerated warehouse capacity per urban resident.<sup>11</sup> In response, several start-ups are testing solar power or thermal batteries for refrigerated trucks and coolers in countries such as Nigeria or India.

Besides opening up new markets, investments in refrigerated storage can also reduce waste, particularly of perishables such as milk or fresh meat. Right now, roughly a third of all food produced in the world is wasted. That adds to agriculture emissions since rotting food releases methane. Cutting waste and loss in half would reduce global agriculture emissions by 4 percent and keep 153 million from going hungry by 2030, according to the FAO and the Organization for Economic Cooperation and Development (OECD).<sup>12</sup>

Developing a sustainable local meat and dairy industry will only become more important as economies grow. As they get more prosperous, people tend to eat more animal-sourced foods, a phenomenon known as Bennett's law. Population growth and urbanization will



also push up demand. Total meat consumption in the world's least developed countries will rise much faster than in developed countries between 2024 and 2033, according to forecasts from the FAO and the OECD (Figure 4).

Entrepreneurs seeking to get ahead of that demand can look to Asia for inspiration. In 1973, Asia ate less meat per capita than Africa. Now, after a period of rapid economic growth, people in Asia are getting more than twice as much as people in Africa. Asian meat production has picked up over that time. China, the world's top meat producer, accounts for almost half the world's pork.

Boosting sustainable<sup>13</sup> production and productivity through technological improvements will require action by both governments and private companies, as suggested by past productivity surges such as those in Asia during the mid- to late 20th century (Box 2). Development finance institutions can also help by providing subsidized loans and technical expertise.

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