

# Healthier, greener alternatives are changing the future of food



- As the global population grows, food production faces a paradox – how to provide more nutrition while shrinking its environmental footprint.
- Change is coming as policymakers focus on solving the problem and consumers seek sustainable foods.
- There's a major opportunity to develop precision agriculture, organic foods and alternative proteins.

Hunger is a surprising growth trend in the 21<sup>st</sup> century. In much of the southern hemisphere, the prices of basic food like wheat, maize, flour, cooking oil, sugar, eggs and meat have risen in recent years due to major food shortages. Even in advanced northern hemisphere countries like the UK, scarcities of fruit and vegetables have been pushing up prices.

The future of food is a mounting challenge. How can the world feed a population that's set to expand fast even though it's already struggling to put enough on tables today? And how can it do so in a way that's both healthy and environmentally sustainable?

There's a search for the answers to these questions. Forward-looking policymakers are aware of the problem and looking for ways to fix it. For instance, the European Union's Farm to Fork Strategy underlines the importance of a robust food system. Yet major food companies and

innovative young businesses are rapidly looking to develop new ways of producing food that are both healthier and less carbon intensive.

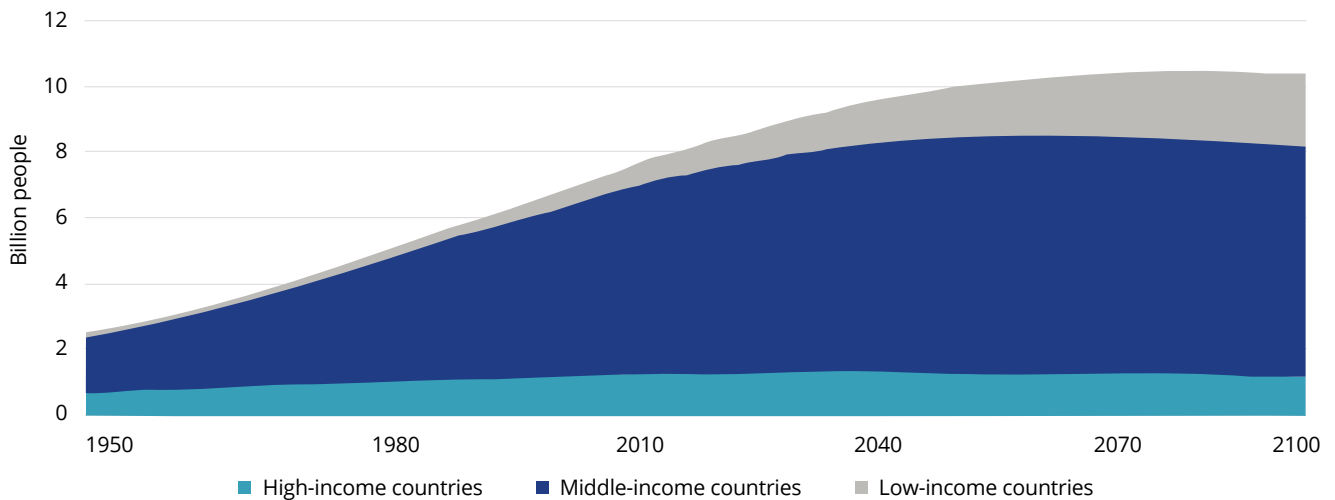
The VanEck Sustainable Future of Food ETF invests in the available publicly listed companies. At this early stage in the move towards new means of food production, many of these are the current major food companies that have either organic food businesses or small alternative protein businesses. Others are developing precision agriculture to increase land yields.

It's clear that a major shift in food production is under way, propelled by powerful trends. Already, there's a change in consumers' tastes as they seek to consume more sustainably produced and healthy foods. Looking to the medium term, food companies face the challenge of solving the paradox of feeding a growing population while shrinking greenhouse gas (GHG) emissions.

## 10bn people by 2060

Population growth in Africa and parts of Asia is expected to drive the global population up by approximately a quarter from 8bn to 10bn by 2060, according to United Nations estimates (see chart). With some regions already facing food crises, this threatens to exacerbate the problem.

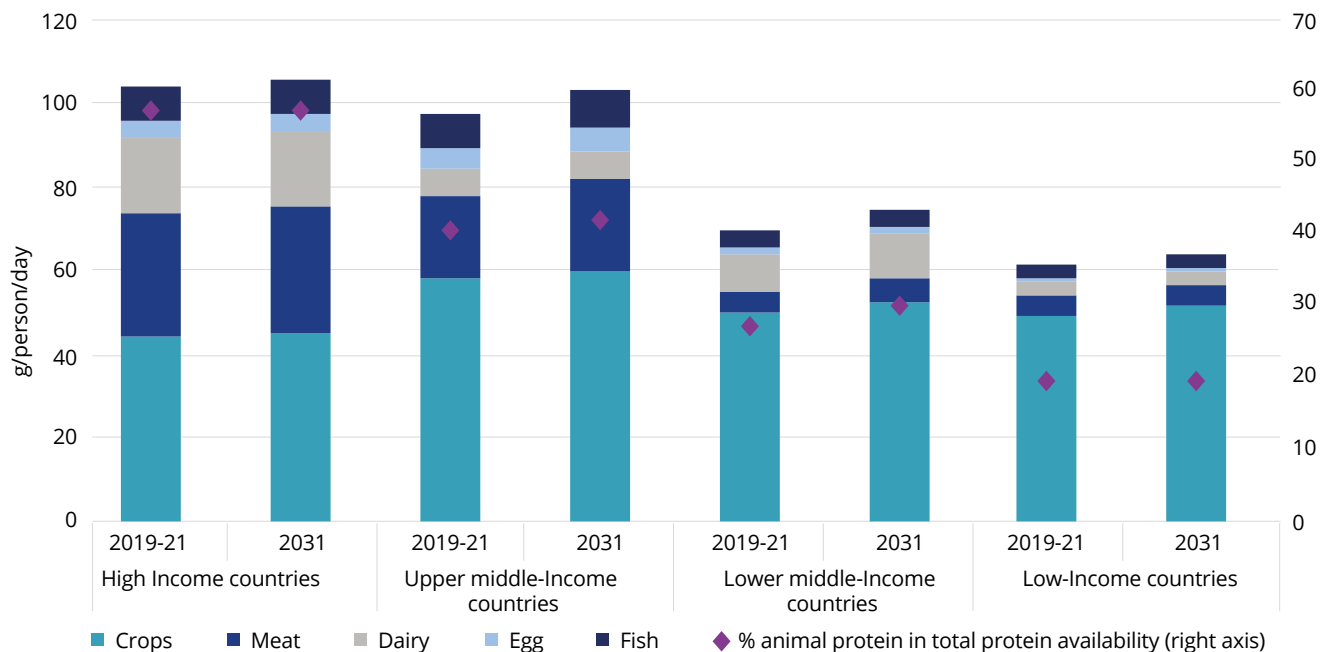
### Middle-income countries drive population growth



Source: United Nation

### Shifts in protein consumption

(Per capita protein availability, by country income group)



Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database).

Just to compound the difficulty, as emerging market middle classes become wealthier, so they are consuming more meat. It's widely anticipated that meat consumption will continue to grow as the newly affluent adjust their diets. By contrast, lower income countries rely largely on crops.

To satisfy rising demand, it's estimated that total calories from agricultural production must increase by 35% to 56% by 2050 compared to a baseline of 2010.<sup>1</sup> At the same time, the amount of arable land and water may shrink as parts of the world reach the kind of temperatures where agriculture is no longer viable.

<sup>1</sup> Source: van Dijk, M. et al. (2021), "A meta-analysis of projected global food demand and population at risk of hunger for the period 2010-2050", Nature Food 2021 2:7, Vol. 2/7, pp. 494-501

### Agriculture's climate implications

Agriculture is a major contributor to climate change, responsible for up to 29% of GHG emissions, according to a paper published by the CGIAR research partnership for a food-secure future.<sup>2</sup> It increases climate change in two ways. Firstly, by emissions linked to food production. And secondly, due to changes in land use – for instance when forests are cut down to make way for beef cattle.

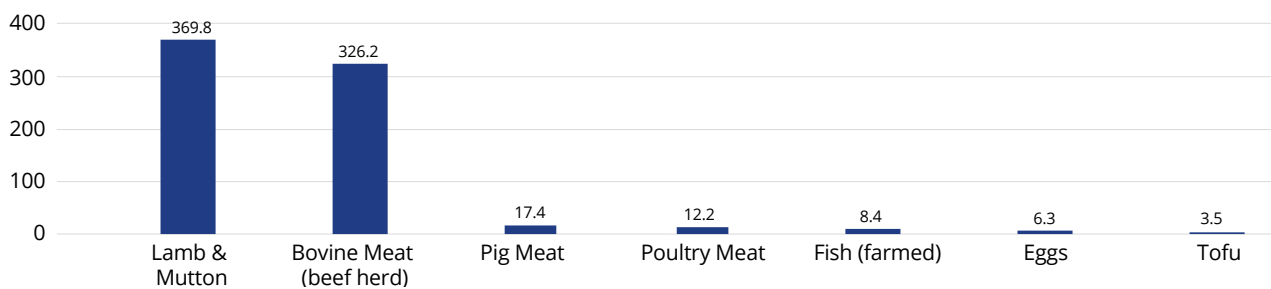
Protein derived from any farm animal pollutes the environment far more than plant protein with an equivalent nutritional value, regardless of production method. By contrast, based on GHG emissions, eutrophication and acidification, plant-based protein sources (beans, peas,

nuts and tofu) have the lowest average environmental impact. Even when comparing the least impactful producers of animal protein, emissions from meat, dairy, aquaculture and eggs still exceed the average emissions from plant-based proteins.<sup>3</sup> Taken together, it's estimated that animal products use 83% of farmland and generate 56-58% of emissions from food – yet they provide only 37% of protein and 18% of calories produced globally.<sup>3</sup>

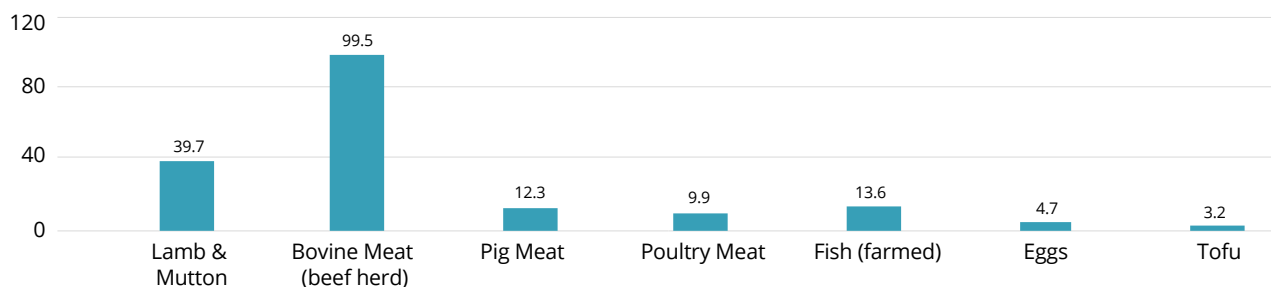
There are several ways to counter this pressing problem. For a start, consumers can change their diets, eating less meat and more plant-based protein.

### Land use and greenhouse gas emissions for different foods

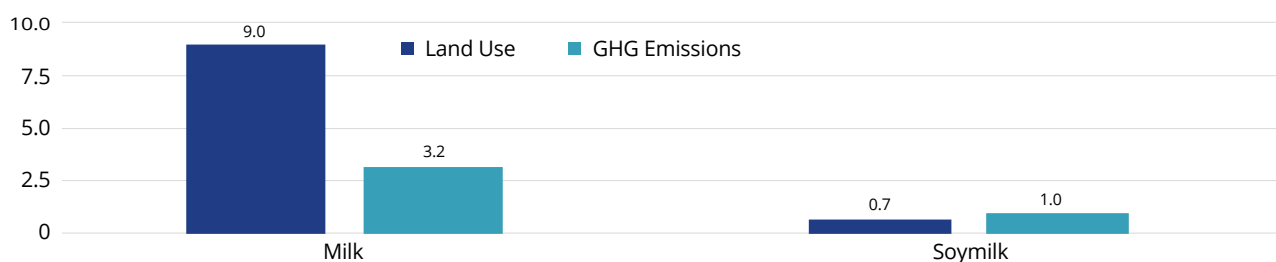
Land Use (m<sup>2</sup>/FU)



GHG Emissions (kg CO<sub>2</sub>eq/FU)



### Milk versus alternative



Source: J. Poore T. Nemecek ,Reducing food's environmental impacts through producers and consumers. Science360,987-992(2018).DOI:10.1126/science.aaq0216

<sup>2</sup> Source: CCAFS Program Management Unit

<sup>3</sup> Source: Poore, J. and T. Nemecek (2018), "Reducing food's environmental impacts through producers and consumers", Science, Vol. 360/6392, pp. 987-992

### Sustainable foods – from organic to white meat

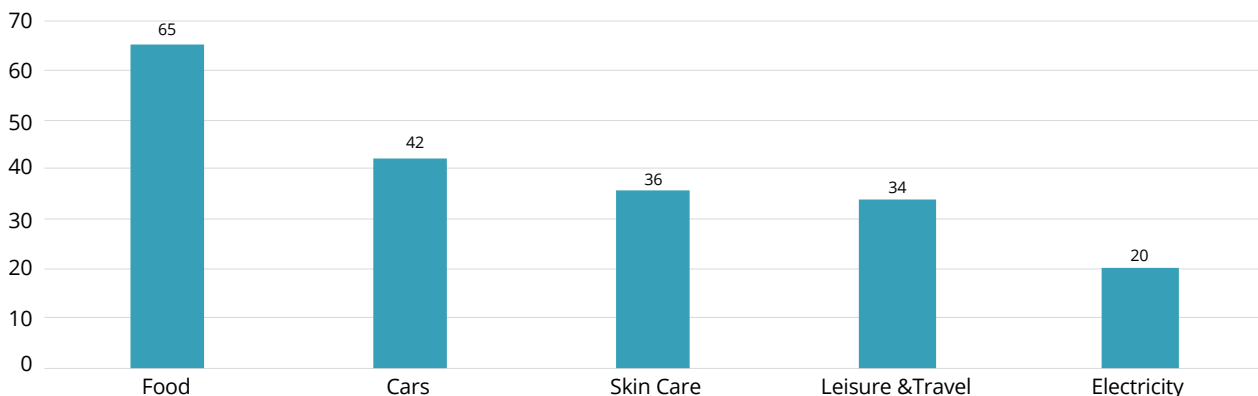
In many developed economies, consumers are becoming concerned about the sustainability of the food they eat. Consumers are beginning to express their concerns about climate change and environmental sustainability through the purchases they make every day. A recent BCG survey showed that among product categories, food is one where concerns are quite strong (see chart below).<sup>4</sup> While they are reluctant to pay a premium for sustainable food, there remains an opportunity for food companies to produce and market more sustainable products.

Indeed, this has led to an increase in organic food sales, which rose by roughly 2% to US\$57.5 billion in North America during 2022, according to the Organic Trade Association.

In many developed economies, consumers’ concerns about the sustainability of food are leading to the rise of the vegetarian, vegan or “flexitarian”, particularly among the young. Some of them are turning to plant-based proteins, or alternative protein sources (e.g. insects, cultured meat).

What’s more, many people prefer white meat to red. That’s translating into a strengthening shift toward poultry. In high-income countries, people find poultry more convenient to prepare, as well as a healthier food choice. Consumers in low- and middle-income countries are opting for poultry because it’s cheaper. By 2031, it’s estimated that poultry will constitute almost half (47%) of the protein consumed from meat, followed by pig, sheep and bovine, according to an OECD study.<sup>5</sup>

### Consumers citing sustainability among their top three reasons to purchase



Source: BCG

### Meat that’s cultivated rather than bred

Cultivated meat, also known as cultured meat, is animal protein that is produced by cultivating animal cells in the lab. This eliminates the need to raise farm animals. Cultivated meat has the same cell types that can be arranged in a similar structure to animal tissues, so replicating the sensory and nutritional profiles of conventional meat. By the nature of its more efficient production process, cultivated meat is expected to have a variety of benefits over conventional animal agriculture. Prospective life cycle assessments indicate that cultivated meat uses significantly fewer resources and can reduce agriculture-related pollution and eutrophication. One study showed that cultivated meat, if produced using renewable energy, could reduce GHG emissions by up to 92% and land use by up to 90% compared to beef.<sup>6</sup> Additionally, 4. cultivated meat is likely good for human health: it does

not involve widespread use of antibiotics and is likely to result in fewer incidences of foodborne illnesses due to the lack of exposure to enteric pathogens.

Over the next few decades, cultivated meat and other alternative proteins are predicted to take significant market share from the \$1.7 trillion conventional meat and seafood industry.<sup>6</sup> This shift will mitigate agriculture-related deforestation, biodiversity loss, antibiotic resistance, zoonotic disease outbreaks, and industrialized animal slaughter.

In a 2022 survey, consumers were asked about their willingness to substitute red meat with a lab-grown alternative: 28% of respondents indicated a willingness to do so, while 44% said that they would not, with the rest undecided. That suggests likely growth in demand.

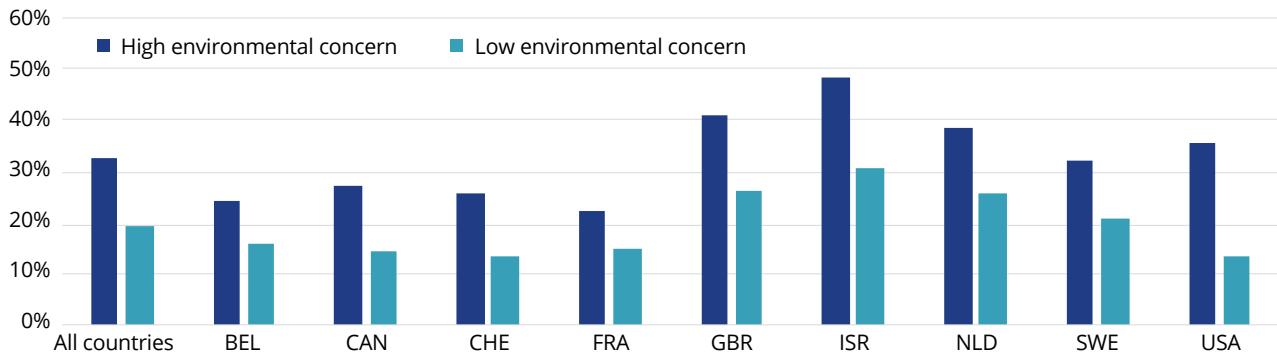
<sup>4</sup> Whetting consumers’ appetites for sustainable foods. BCG. May 30, 2023.

<sup>5</sup> OECD/FAO (2022), “OECD-FAO Agricultural Outlook”, OECD Agriculture statistics (database).

<sup>6</sup> Source: Good Food Institute The science of cultivated meat



### Willingness to substitute with lab-grown meat



Source: OECD (2022), Environmental Policies and Individual Behavior Change Survey.

### Will plant-based proteins become a solution?

Turning again to consumer surveys, there’s clearly demand building for plant-based proteins, especially dairy. About 11% of consumers in the US, UK, and Germany report being very interested in alternative proteins; 66% are somewhat interested, indifferent, or somewhat not interested; and only 23% are not interested at all, according to a recent study.<sup>7</sup>

Indeed, food companies are already building substantial plant-based dairy businesses. For instance, Danone’s Alpro business sells plant-based drinks, as well as alternatives to yoghurt and cream. Plant-based meats sold by companies like Kerry Group are recently finding it harder to gain acceptance from a wide-ranging group of consumers.

What will increase their interest? It’s likely that a lower price and improved taste should tip the balance.<sup>8</sup> In short, alternative proteins must reach parity with animal proteins in three key areas:

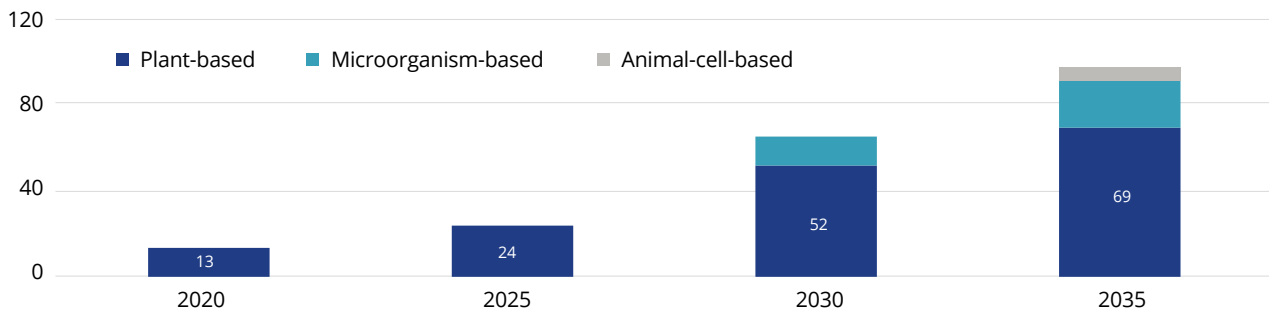
1. **Taste:** Alternative proteins must effectively imitate the well-known flavor—and smell—of meat, seafood, dairy and eggs, which several flavoring and ingredients companies are currently addressing.
2. **Texture:** They must also look and feel the same as animal proteins. The experience of eating meat depends largely on its fibrous structure; fish appears flaky; cheese feels hard or stretchy. Alternative eggs and dairy must also behave like real eggs and dairy when being cooked.
3. **Price:** At present, alternative proteins are more expensive than meat. If consumers are to make alternative proteins part of their regular diets, they must not cost more than protein from farm animals.

Even so, it’s estimated that plant-based alternative protein consumption will significantly increase (see chart on next page).



<sup>7</sup> Source: OECD (2022) Environmental Policies and Individual Behaviour Change Survey  
<sup>8</sup> Source: BCG, Food for Thought: The Protein Transformation (2021)

### Consumption of alternative proteins by source (million metric tons)



Source: BCG


Milk alternatives had a strong performance in the last years, partly due to people with lactose intolerance wanting milk in their morning latte. The use of alternative meat is more of a choice. Sales of meat substitutes have stagnated in the last two years, after several years of explosive growth. Indeed, the long-term forecast for the alternative proteins market remains positive (to reiterate the point made in the chart above).

#### Looking forward

Consumers clearly have a burgeoning appetite for more sustainable foods. At the same time, the paradox of a growing population requiring more food with lower carbon emissions means food production needs to change. That puts food and agriculture at the center of the global economy’s push for net zero carbon emissions. In the first instance, this trend is evident in the increasing interest in sustainable foods such as organic food and plant-based dairy. Over time, plant-based meats may also grow their sales: if the industry can effectively convey that alternative meat has health and environmental benefits, there remains a significant opportunity for growth, according to a report from the Good Food Institute.<sup>9</sup>

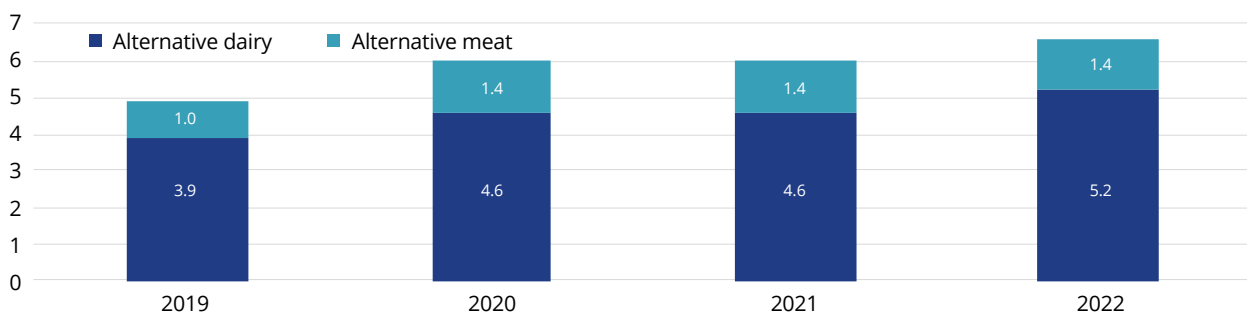
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VanEck

### Alternative protein, grocery retail sales in USD bn



Source: BCG

<sup>9</sup> Source: The Global Food Institute. 2023 outlook: The state of the plant-based meat category.

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