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# The sustainable food revolution

**Future-proofing the  
world's food supply**



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## EXECUTIVE SUMMARY

### The coming sustainable food revolution

**The world is facing a food crisis. This crisis is immediate, but also long-term. Shortages caused by the war in Ukraine have amplified long-run challenges to the sustainability of global food production based on population growth, climate change, and increased reliance on resource-intensive farming. Food companies need to brace themselves for change.**

This article outlines the need for our food industry to become more sustainable, and describes the levers that the industry could pull to meet the challenge of food sustainability across its value chain:

- 1. Food substitutions at a consumer level**
- 2. Avoidance of food losses in the supply chain**
- 3. Cleaner/greener methods of food production**

We review options to improve food sustainability by influencing diet choices at the consumer level, accounting for the true costs of non-sustainable food, minimizing food loss across the value chain through advanced technologies, and applying the latest farming and food production techniques. These measures can help to improve the performance of the food industry as a whole and provide valuable insights for a new approach to Food Sustainability.

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## SECTION 1

### The tipping point is here

Food is life, and everywhere it is celebrated for that undeniable fact. Yet today the way we produce food is undermining the potential to feed ourselves in the future. Many of the critical challenges the world is facing are affected by food production, including climate change, water shortage, deforestation, forced labor and corruption.

Today, the world needs to treat food security and affordability as critical issues for global prosperity and well-being. Just as agriculture was a key building block in the post-Second World War era of reconstruction, our food economy needs to be rebuilt again. This time it should be done sustainably.

These issues should be top of mind for every person and organization in the food production chain. Producers, distributors, and retailers are all on the line. The good news is that sustainability concerns are increasingly understood and recognized. Consumers are calling for change, regulators are beginning to shape new requirements, and food producers and their partners are beginning to look at new sustainable agricultural practices. The bad news is that priorities in the large-scale agricultural economy remain different.

Change is possible though and it is necessary. Emerging production technologies, offering more plant-based alternatives, and smarter supply chains are part of the solution. Communication, intelligent use of data and informed engagement with consumers are at least as important. Above all this requires a change of mindset. Change is coming, and only companies with purpose will be ready to handle it.

#### The burning platform

It is not mere ideology to assert that global food production and distribution must change. It is a simple matter of facts and figures, inputs and outputs, as well as supply and demand. The long-term evolution of farming has resulted in a system that is intrinsically fragile and vulnerable to external shocks: the geo-political crisis around the war in Ukraine has already increased average global food prices by more than 58 percent this year and pushed some countries to the brink of starvation.<sup>1</sup> What was a slow crisis of sustainability has rapidly become a burning platform to address.

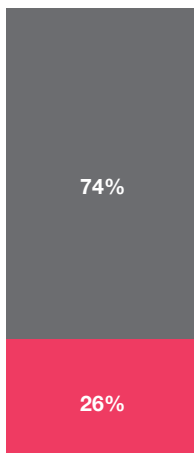
The current global food production system has become increasingly resource-intensive and inefficient – approaching a point of unsustainability that cannot last. According to the UN, if the global population continues its current growth trend and reaches 9.6 billion people by 2050, it will take three Planet Earths to support current food consumption patterns.<sup>2</sup> That means that long before 2050, the current system will either break down or will have to undergo radical change.

## EXHIBIT 1

### The environmental impact of food across the globe



#### Greenhouse gases



Food accounts for over a quarter (26%) of global greenhouse gas emissions



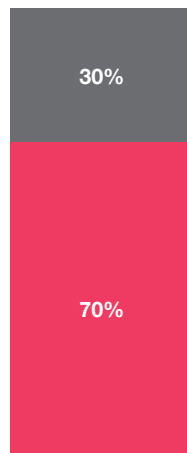
#### Land-use



Half of the world's habitable land is used for agriculture



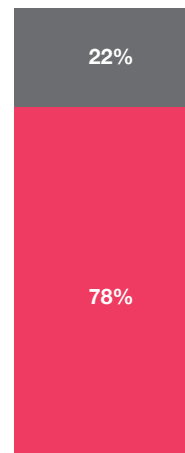
#### Freshwater withdrawals



70% of global freshwater withdrawals are used for agriculture



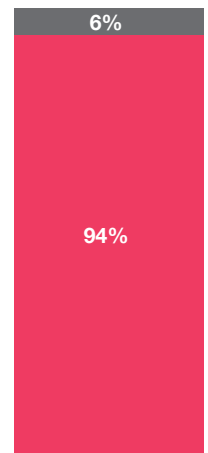
#### Eutrophication



78% of global ocean and freshwater eutrophication (the pollution of waterways with nutrient-rich pollutants) is caused by agriculture



#### Biodiversity



94% of mammal biomass (excluding humans) is livestock

Sources: Poore and Nemecek (2018); UN FAO; UN AQUASTAT; Bar-On et al. (20218); Our World In Data

The food industry's environmental profile is a vulnerability that can be easily quantified. Food production accounts for around two thirds of all global freshwater use, three quarters of its nutrient pollution (so-called eutrophication), as well as a quarter of all carbon and other greenhouse gas emissions, as *Exhibit 1* shows. Yet this vulnerability should become a platform for transformation because what can be measured can also be changed.<sup>3</sup>

Apocalyptic predictions rarely come true; total revolutionary change rarely happens. Yet the need for far-reaching change in food production and food consumption is a matter of fact and calculation. All participants in the industry will feel the effects of change – it is likely to be incremental, but incremental change can have powerful effects.

In a world where greenhouse gas emissions are rapidly becoming recognized as one of the challenges of our time and subject to increasingly strict regulation and consumer attention, the incentive for producers and distributors to adopt different practices and production models is certain to grow. But what should be done, and how much difference will it make?

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## LEVER 1: FOOD SUBSTITUTIONS AT CONSUMPTION LEVEL

### The power of incremental change

**There are many drivers of the over-use of agricultural resources, but the leading one is the long-term shift in the global diet towards eating more meat.**

The total volume and proportion of meat in the world's diet has grown dramatically. The quantity produced has grown threefold in the last fifty years, and per capita consumption has almost doubled since 1961 – from 23kg per person to 43kg per person. This growth is strongly correlated to rising incomes: in Ethiopia per capita meat consumption is just over 5kg, while in the US it is 124kg.<sup>4</sup> Yet, income is not the only determinant of attitudes towards meat – recent research in the US shows that younger generations are significantly less likely to see meat as central to their diet.<sup>5</sup>

Regardless of how and who consumes it, meat is a relatively inefficient form of food production, requiring as much as 100 times the amount of land resources compared to plant agriculture to produce an equivalent volume of calories. Beef – the third most consumed meat product – requires 25 kilograms of fodder to produce a single kilogram of meat.<sup>6,7</sup> Overall, meat accounts for around 80 percent of agricultural land use, but only generates around 11 percent of total calories.

Where greenhouse gas emissions are concerned, our growing reliance on meat is also driving environmental degradation: 1 kg of beef produces almost 10-36kg of CO<sub>2</sub> equivalent. In comparison, peas, potatoes, nuts, and fruits generate less than 2kg of CO<sub>2</sub> equivalent per kg of food produced.<sup>8,9,10</sup>

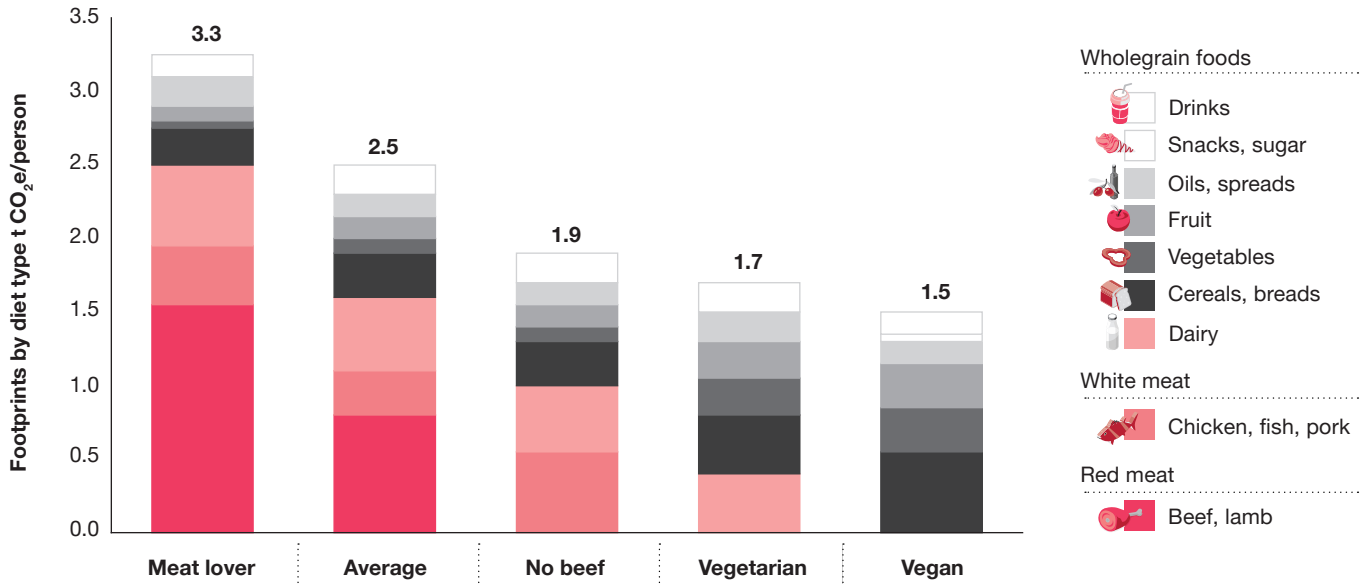
**In other words, if the world continues to invest heavily in the least productive form of food, we risk doubling down on a model that was never sustainable to begin with.**

The historic shift in the world's diet towards more meat consumption has been a slow-moving trend, only recently spreading in emerging and frontier markets. Similarly, the current shift in developed economies away from meat towards a more diversified, plant-based diet is also a slow change. But it is a change with the potential for far reaching impacts. Simple food substitutions – for instance substituting meats with a high environmental footprint with lower-impact alternatives – can alter environmental outcomes very significantly. For example, if the world were to substitute beef with chicken, meat-related CO<sub>2</sub> emissions would fall by roughly half, while water usage would be cut by around 30 percent.<sup>11</sup>

A more comprehensive shift of diet would have an even greater impact. A wholesale shift to vegan diets could more than halve the food-related CO<sub>2</sub> emissions per person in a wealthy meat-eating economy such as the US. Even more modest dietary shifts, such as removing beef from the diet, would have almost as great an impact, as *Exhibit 2* shows:

**EXHIBIT 2**

Carbon footprint of typical diets



Note: All estimates based on average food production emissions for the U.S. Footprints include emissions from supply chain losses, consumer waste and consumption. Each of the four example diets is based on 2,600 kcal of food consumed per day, which in the U.S. equates to around 3,900 kcal of supplied food. Sources: <https://shrinkthatfootprint.com/food-carbon-footprint-diet/>; ERS/USDA, various LCA and EIO-LCA data, Weber and Matthews 2008, Poor & Nemecek 2018

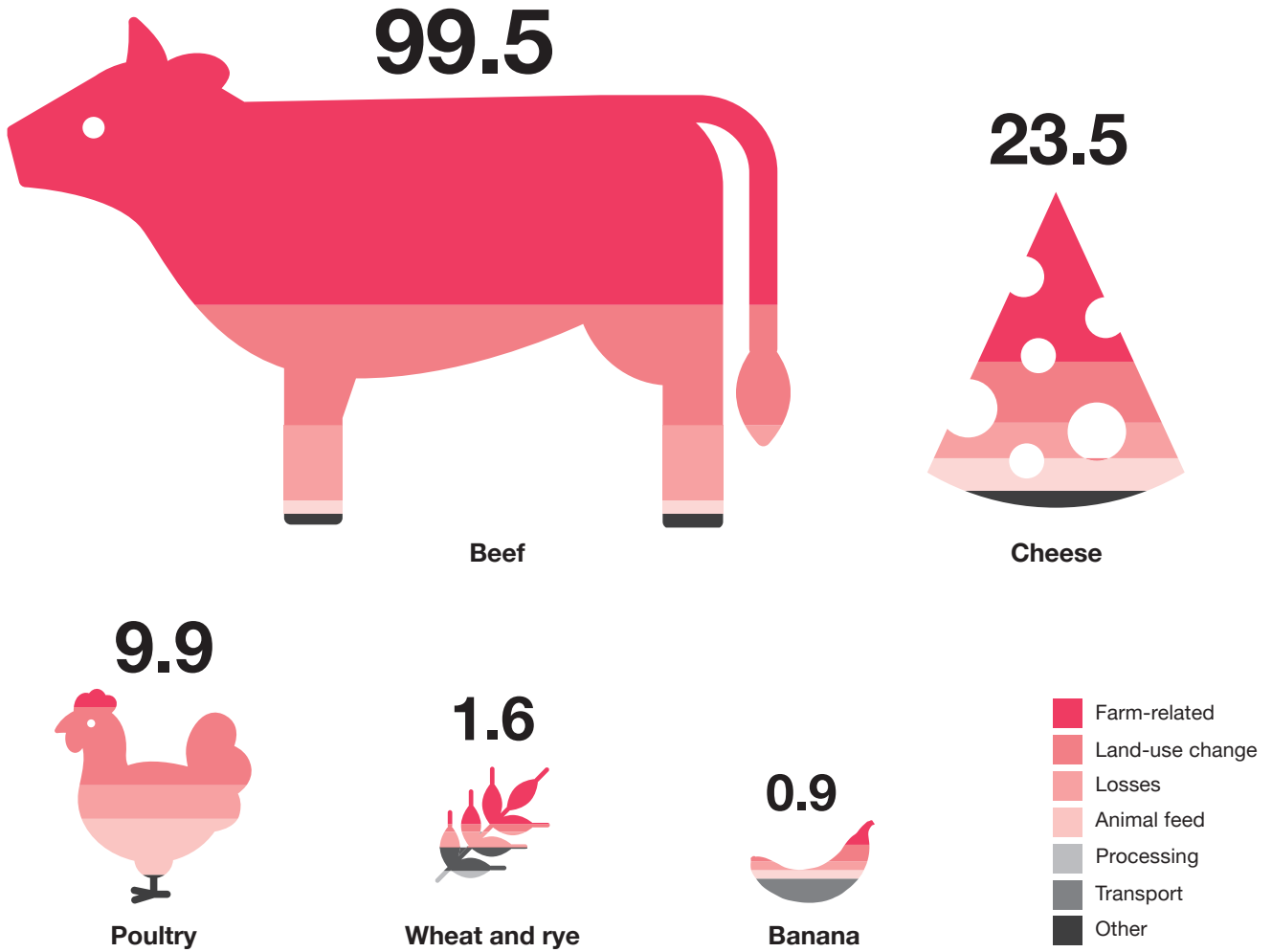
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If the world continues to invest heavily in the least productive form of food, we risk doubling down on a model that was never sustainable to begin with.”



**EXHIBIT 3**

Average greenhouse gas emissions per kilogram of product in CO<sub>2</sub> equivalent



Source: Strategy& analysis



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For the food production and distribution industry, such alterations could be game changing. Yet, they are not far-fetched – in fact, some elements of such a shift are already visible in the rise in consumption of non-dairy alternatives such as plant-based milk, the growing popularity of meat substitutes and cultured cell meats, and the popularity of meat reduction or ‘flexitarian’ diets. These trends began as niches and are now becoming fully mainstream: the UK’s biggest take-away food chain Greggs has credited the introduction of its vegan sausage roll as one of the main drivers of its record sales over the last few years<sup>12</sup>, while Germany’s Rügenwalder Mühle may be known for traditional meat sausages but now sells more meat-free than meat products.<sup>13</sup> Similarly, Burger King – typically associated with minced meat instead of vegan food – has drastically expanded its plant-based burgers and even opened a fully meatless restaurant in Germany.<sup>14</sup> While these developments are still more common in large cities, plant-based meat is gaining traction across the board. One reason for this move into the mainstream market is that rich-world consumers are willing to pay a premium for organic produce and a guarantee of sustainable sourcing.

Today the food industry has an opportunity to become a shaper of such trends, and not a victim of them. Particularly **retailers** have the chance to establish themselves as first movers in a changing market, improving brand reputation and gaining market share. They can guide consumer choices by making bold adjustments to their food offerings, as well as introducing simple innovations.<sup>15</sup> One such change is bundling fresh foods with ‘graduated’ ripeness (for example selling seven bananas of different ripeness for singles to last a week), to extend product life and reduce waste. They also have an opportunity to win consumer allegiance by offering greater transparency about the contents and sourcing of food.

**Governments** could mandate retailers to introduce genuine ‘externality’ pricing, using methodologies such as True Cost Accounting that reflect the environmental costs paid by society for a product, as well as the direct production costs of the food itself.<sup>16</sup> Similar to proposed mechanisms surrounding CO<sub>2</sub> taxes, governments could reimburse each citizen the average amount he or she paid. This would avoid raising taxes while particularly helping low-income households to pay their food bills. Distributors and producers also need to account for true costs.

**Distributors** could cement their competitive position by offering the supply chain efficiency and transparency that retailers and consumers will increasingly demand. And producers could adopt the digital technologies such as low-cost remote sensing and controls that are commonplace in the rest of the economy, to become the source of choice for an industry that will insist on lower-impact, higher-output production.

As these examples show, the crisis of sustainability in food is also an opportunity. So how can companies grasp the opportunity?



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## LEVER 2: AVOIDANCE OF FOOD LOSSES IN THE SUPPLY CHAIN

### Loss and waste are under-reported

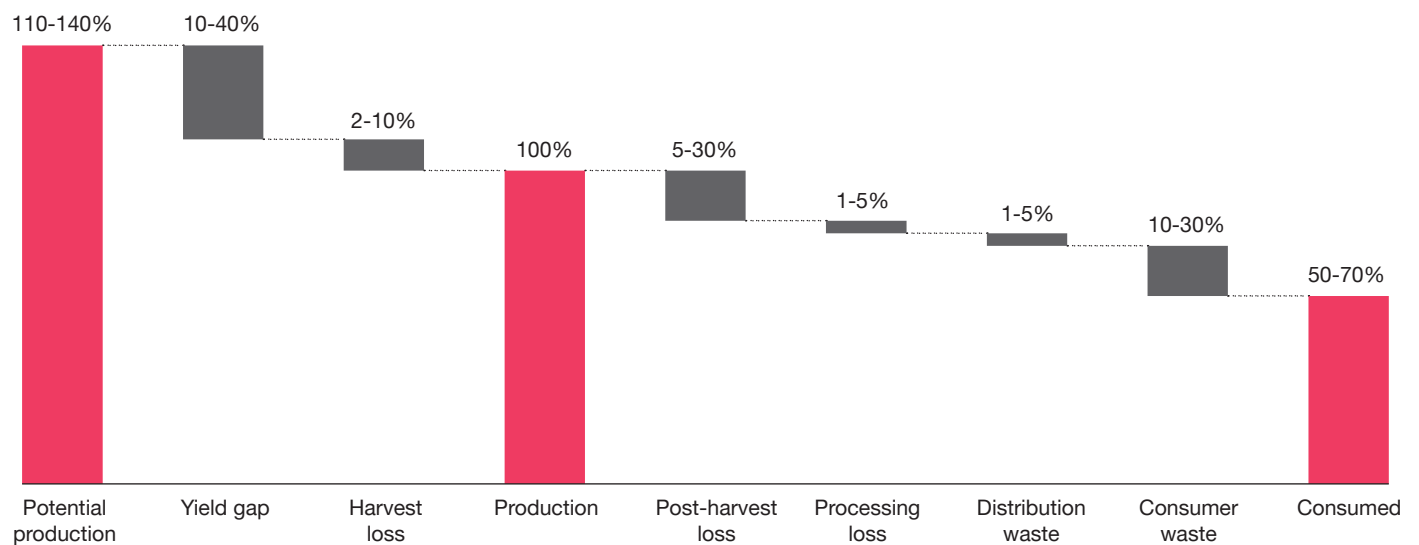
A major issue in the current agricultural system is supply chain inefficiency. According to the UN, around a third of all food produced today – equivalent to 1.3 billion tons – is lost due to delays and inefficiencies in harvesting, distribution, and retail.<sup>17</sup> Eliminating these losses alone would suffice to feed more than two billion people – more than the expected rise in the global population until 2050.

While losses and write-offs are inevitable in any production system, a loss rate of more than 30 percent is too high. A recent academic meta-study showed that while there are multiple causes of food loss in production and waste in retail and consumption, the chief causes lie within the distribution and retail process.<sup>18</sup> This includes supply chain design and under-investment, and slow implementation of digital technologies such as data-driven precision agriculture, and supply chain tracking.

Supply chains will become more transparent, as societies are increasingly demanding reliable information on where their food comes from. Transparency is also driven by the prospect of a better harvest and fewer losses across the food supply chain, while the costs of sensors, remote devices, and supply chain tracking is dropping as well.

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**EXHIBIT 4**  
Estimated range of global avoidable losses by production stage



Source: Strategy& analysis

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Consider tomatoes – a universal, global food. A likely scenario is that its future path from cultivation to consumption is determined by technology: autonomous vehicles could conduct sowing and the fertilization, while in-situ sensors using low power network radio links could yield forecasts. Distribution centres would be managed by drones equipped with scanners and sorting and packaging could be robotically controlled.

Precision agriculture begins to erode loss rates of a third or more (see *Exhibit 4, page 8*). Transport will be fully tracked with a full record of environmental conditions and retail will be increasingly automated and internet commerce ready. Such technologies have the potential to improve product quality and sustainability by minimizing waste, and to give the consumer access to a full database of sourcing and data. In the future no one should have to ask the retailer ‘where did this come from?’

Co-op, for example – the largest supermarket chain in Italy – offers a glimpse into this future with its ‘Supermarket of the Future’ concept store in Milan: augmented reality displays thereby visualize the entire supply chain of products from field to supermarket shelf.<sup>19,20</sup> When food production is concerned, X-Farm – a provider of digital farming equipment – is helping Swiss farmers optimize their planting, irrigation, and fertilizing by tracking soil, weather, and other data. Migros, a leading retailer in Switzerland, is tackling food-related waste by introducing a coffee pad system where the capsules are completely compostable, foregoing the typical use plastic or aluminum.

Food supply chain inefficiency contributes to the most significant cost of the global food supply system: the environmental costs. These often remain unacknowledged as environmental costs typically do not translate into higher prices for producers (yet). At the same time, they are paid by society at large and are measurable through carbon emissions, freshwater and land use, nutrient pollution, and biodiversity loss.



“ According to the UN, around a third of all food produced today – equivalent to 1.3 billion tons – is lost due to delays and inefficiencies in harvesting, distribution, and retail. Eliminating these losses alone would suffice to feed more than two billion people – more than the expected rise in the global population by 2050.”

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## LEVER 3: CLEANER/GREENER METHODS OF FOOD PRODUCTION

### The future is already here

New technologies, and changing consumer attitudes, can not only positively impact the transport of food, but are already reshaping what is arguably the world's most important industry: its production. And future food will look different, although some changes will take years or decades to come to fruition.

Over the next couple of years, we expect to see specific change. There will be more support for **agro-biodiversity** as historic regional crop products – previously displaced by standardized global products – are making a comeback. Foods like breadfruit or taro will re-appear in the supply chain on a bigger scale. Moving towards more diverse and less intensive forms of food production also comes with profit potential: a recent academic study of the performance of 55 crops grown on five continents showed that despite higher labour costs and lower yields, organic farming is up to 35 percent more profitable than conventional high-intensity farming, due to the premium price organic products command.

Change is expected to be even more far-reaching beyond 2025. Production will be different: farming will increasingly be supported by technology and big data allowing more focused and precise application of inputs such as water, light, fertilizer, or pesticides. This increases productivity and reduces environmental footprint. Additional opportunities arise from large scale '**vertical farming**' in small footprint, high rise facilities. This is particularly advantageous in cities or areas with difficult climatic conditions.<sup>21</sup> Farming closer to the final consumers also shortens supply chains and their environmental impact, although currently an environmental trade-off is made with often high energy consumption of vertical farming systems. "Traditional" farming can also benefit from this development: some of the technologies and cultivation methods created for vertical indoor farming could be transferred to crop fields and greenhouses to increase productivity. An open exchange of know-how and capabilities will therefore be key to optimize crop production on a global scale.<sup>22,23,24,25</sup>

There will be moves to increase **protein conservation**, as selected cuts of meat and the narrow choice of fish offered by supermarkets, for example, are supplanted by an 'eat everything' approach. **Plant-based meat substitutes** will continue their move to the mainstream, using compared to meat, low-emission crops such as peas, nuts and beans.<sup>26</sup>

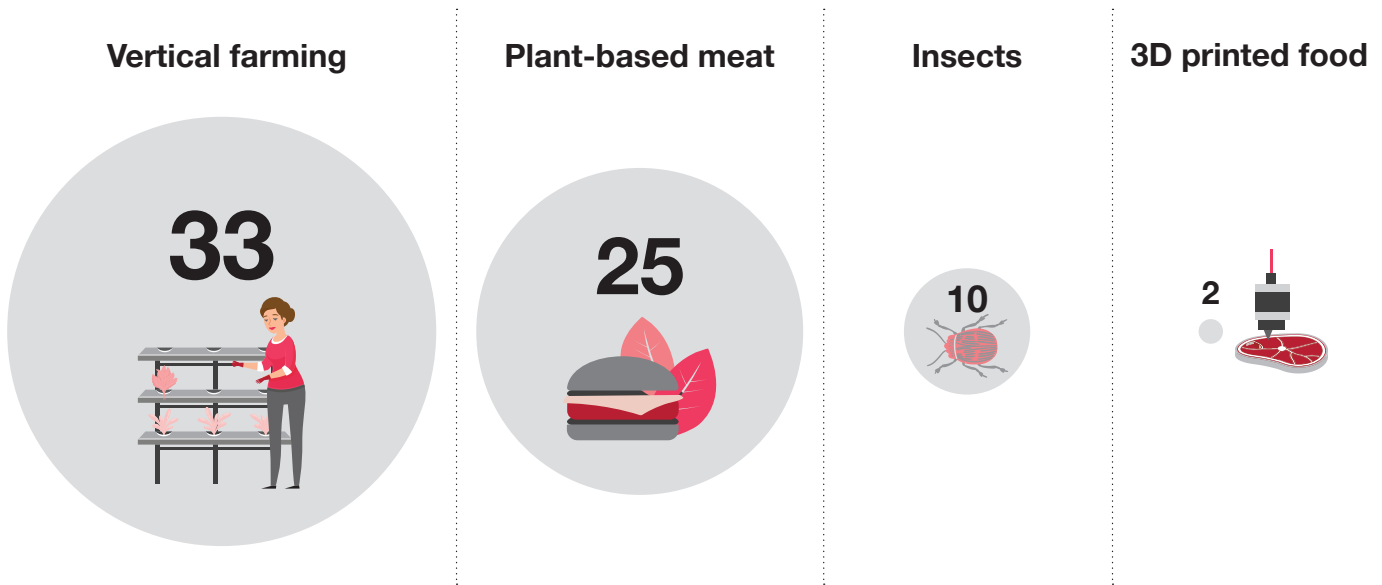
Alternative protein sources will proliferate, including meat based on cell cultures that mimic animal protein sources (cultured meat), and foods derived from **insects**. Meanwhile **fermentation** techniques are expected to become more diversified as well.<sup>27</sup> In addition to traditional fermentations like yoghurt making, biomass fermentation allows to produce protein at scale, while precision fermentation can create products like alternative milk using microbial hosts rather than dairy cows.

Food may even be manufactured at home, as **3D printing** of food emerges, and fully tailored **personalized** meals become possible.

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**EXHIBIT 5**

Projected market size of alternative foods by 2030 (USD bn)



Source: <https://www.prnewswire.com/news-releases/plant-based-meat-market-size-worth-24-8-billion-by-2030-grand-view-research-inc-301472227.html>;  
<https://www.prnewswire.com/news-releases/vertical-farming-market-size-worth-33-02-billion-by-2030-grand-view-research-inc-301492476.html>;  
[https://www.globenewswire.com/news-release/2022/06/16/2464060/0/en/3D-Food-Printing-Market-by-Ingredient-By-Vertical-and-Region-Global-Analysis-of-Market-Size-Share-Trends-for-2019-2020-and-Forecasts-to-2030.html#:~:text=Global%203D%20Food%20Printing%20Market,%2C%20i.e.%2C%202021%2D30](https://www.globenewswire.com/news-release/2022/06/16/2464060/0/en/3D-Food-Printing-Market-by-Ingredient-By-Vertical-and-Region-Global-Analysis-of-Market-Size-Share-Trends-for-2019-2020-and-Forecasts-to-2030.html#:~:text=Global%203D%20Food%20Printing%20Market,%2C%20i.e.%2C%202021%2D30;);  
<https://www.globenewswire.com/en/news-release/2022/05/25/2450095/0/en/Edible-Insects-Market-Worth-9-6-Billion-by-2030-Exclusive-Report-by-Meticulous-Research.html>;  
Strategy& analysis

These agricultural industries are already significant, and they are expected to grow fast, as *Exhibit 5* shows. Recent estimates put the market for plant-based meat substitutes at over \$24 billion by 2030, while the vertical farming sector is expected to be worth at least \$33 billion and 3D food printing more than \$1.6 billion by the same date.<sup>28</sup>

Many of these innovative sustainable farming concepts are already part of food retail or on the cusp of entering the market. Infarm – providing in-store crops from their vertical farm units – is for example partnering with retailers across Europe, including Edeka in Germany, Crisp in the Netherlands, Marks & Spencer in the UK, Irma in Denmark, and Kroger in the US.<sup>29</sup> BILLA is the first food retailer in Austria to test vertical farming across its urban markets and is also implementing a store offering 100% plant-based products in Vienna.<sup>30</sup>

Such developments are first steps – but there will be many more, as the sustainability shift challenges businesses in all segments of the food supply industry. Companies will need to find new sources of finance for investment in technologies for low impact farming, and for greenhouse gas reduction. They will need to engage with upstream and downstream partners to embed sustainability across the entire supply chain. They will need to communicate more proactively with customers, to demonstrate their credentials, and justify potential pricing adjustments.

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# Regulation will intensify

Regulation and standard setting will further alter the structure and cost base of global food production. This is already happening. Sustainability reporting cutting across the entire food supply chain is expected to be seen as increasingly important by consumers and investors; animal welfare standards will become a more significant driver of consumer choices; the use of water and fertilizers will also become a more important metric of corporate sustainability performance.

These are not merely 'nice-to-have' measures of corporate responsibility; the intensification of agriculture-related regulation will impact corporate profitability directly in at least two ways (*Exhibit 6, next page*).

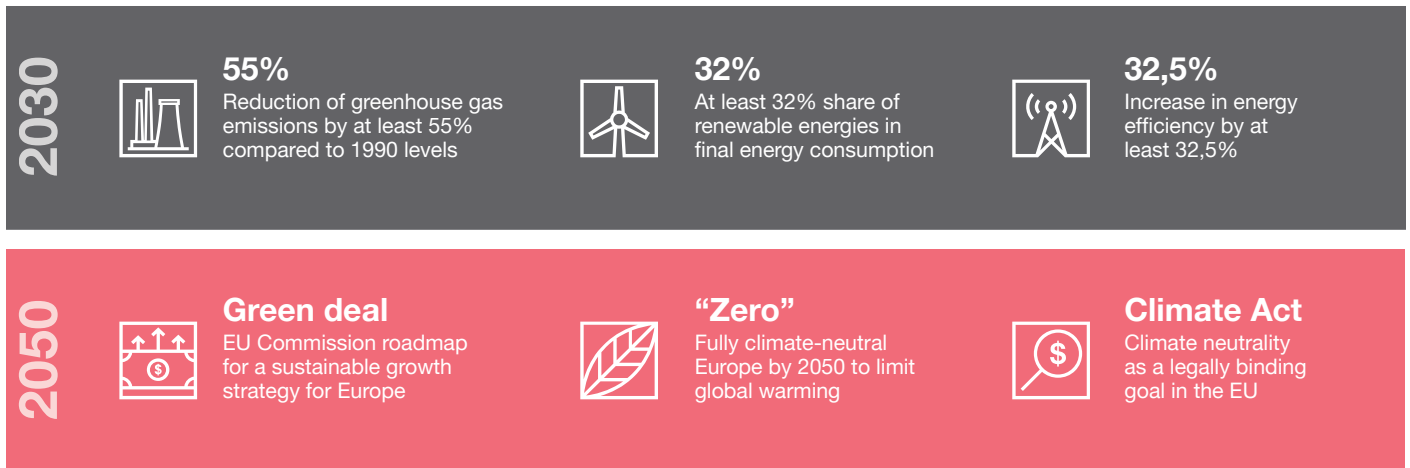
In the first place, mandated reporting on ESG performance will become an increasingly important factor in investor allocations, lowering the cost of capital for ESG-compliant businesses. In addition, the emergence of hard targets for greenhouse gas emission reductions by 2050 or earlier will increase the cost of carbon intensive agriculture.



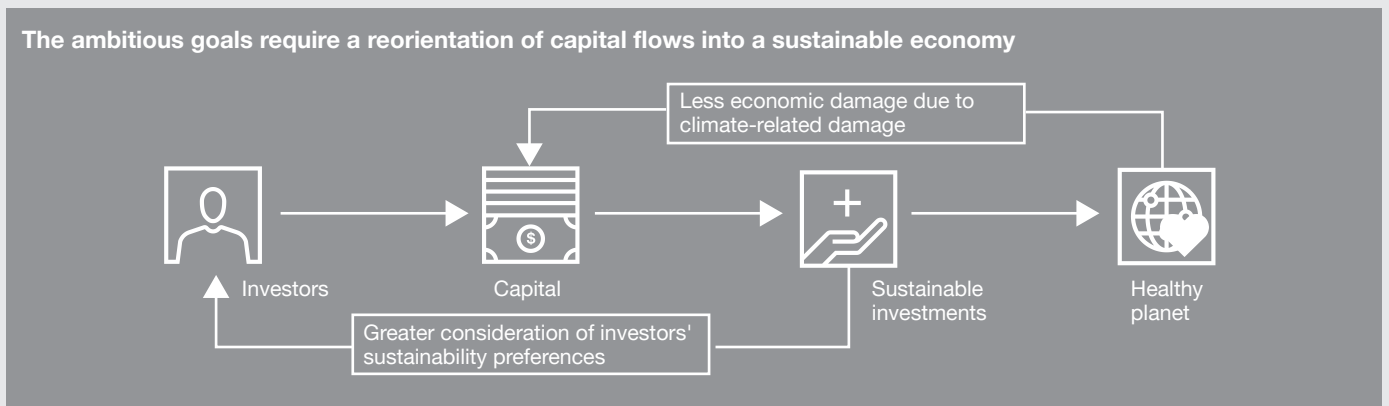
**EXHIBIT 6**

Increasing global legislation around environmental targets

**The European Union's climate goals from 2030 – 2050**



**To achieve the EU's ambitious goals, a reorientation of capital flows towards sustainability is needed**



**A sustainable economy can only be realized if ESG-relevant information is strongly integrated into**

**Main goal: stronger integration of ESG-relevant information into the core activities of all companies**

Source: EU Green Deal, non-financial reporting standards, Strategy& analysis

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## CONCLUSION: PATHS TO SUSTAINABILITY AND PROFIT

### The rise of new models and new markets

Feeding a population of around ten billion humans by 2050 in a sustainable way is one of the most important challenges humanity is facing.

This challenge has been greatly exacerbated by the long-term shift towards high-protein, resource-intensive meat consumption, fuelled by rising incomes in recently developed economies. This is a multi-decade trend that has shifted the focus of agriculture towards livestock, pasture, and animal feed production, upsetting the balance of the global agricultural economy and increasing the carbon emission profile of farming.

In light of the challenges ahead, we believe that the food sector cannot continue this fundamentally unsustainable path. It needs to optimize across a complex landscape covering production, transportation, and consumption, as well as shifting expectations on environmental and social justice.

Yet significant challenges remain when rolling out more sustainable forms of land use and food production. This article reviewed three key levers the food industry could pull to meet the expected demand for food in a sustainable way without significantly increasing prices. These include **food substitutions** at a consumer level, greater **avoidance of food losses and waste** in the supply chain, and **newer and cleaner methods** of farming and food production.





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For example, a food substitution shift from a meat-based to vegetarian diet could reduce CO<sub>2</sub> emissions from agriculture by 24%, reduce agricultural land use by 27% and cut freshwater withdrawals by 15%. A shift to a vegan diet more than doubles those improvements, with CO<sub>2</sub> emissions falling by 70%, land use falling by 86% and freshwater withdrawals falling by 70%.

Initiatives to avoid food losses and waste also translate into lower carbon emissions and lower environmental impact, as 6% of agricultural CO<sub>2</sub> emissions come from food loss and waste. If food loss was reduced to only 10% from the current level of roughly 33%, that would reduce land use by 23%, while precision agriculture including efficient soil moisture sensing could reduce water use by up to 30%.

Cleaner and greener methods of food production could also have significant impacts. It has been estimated that vertical farming could reduce CO<sub>2</sub> emissions by a factor of around two thirds for some greenstuffs, reduce land use by up to 95% wherever vertical farming replaces conventional agriculture, and cut freshwater use by more than 90% for certain common water intensive products such as tomatoes.

Each stakeholder needs to think about their part in this change and how to maximize impact. Players across the end-to-end food supply chain are particularly challenged to reduce their negative environmental impact, while also ensuring food security.

Revising the status quo of food production not only helps reduce risks related to climate change or supply chain disruptions. Adapting now helps food players prepare for a world where food production and supply evolve very rapidly, including new production models and viable new markets.

The current crisis is so profound that change is inevitable. Yet food industry stakeholders still have a choice: it is the choice of making changes now on own initiative, or merely waiting until they have to react to external pressures.

**The only question is, who will be first to act?**



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## ENDNOTES

- 1 <https://graphics.reuters.com/UKRAINE-CRISIS/FOOD/zjvqkgomjvx/>
- 2 <https://www.un.org/sustainabledevelopment/sustainable-consumption-production/>
- 3 <https://ourworldindata.org/environmental-impacts-of-food>
- 4 <https://ourworldindata.org/meat-production>
- 5 <https://www.statista.com/statistics/1090995/consumers-attitude-toward-meat-consumption-in-the-us/>
- 6 <https://ourworldindata.org/land-use-diets>
- 7 <https://www.forbes.com/sites/davidrvetter/2020/10/05/got-beef-heres-what-your-hamburger-is-doing-to-the-climate/?sh=1b8477a05206>
- 8 <https://ourworldindata.org/grapher/ghg-kcal-poore>
- 9 <https://pubs.acs.org/doi/10.1021/es702969f>
- 10 <https://earthscience.stackexchange.com/questions/10160/co2-emissions-per-calorie-food>
- 11 Strategy& analysis
- 12 <https://www.theguardian.com/business/2020/mar/03/greggs-profits-still-on-a-roll-with-a-boom-in-its-vegan-snacks>
- 13 <https://www.wiwo.de/unternehmen/industrie/mehr-veggie-als-fleisch-ruegenwalder-muehle-mit-dem-erfolg-kommen-die-probleme/28311624.html>
- 14 <https://vegnews.com/2021/5/meatless-burger-king-germany>
- 15 <https://www.independent.co.uk/life-style/food-and-drink/banana-packaging-ripe-hack-korea-supermarket-e-mart-ssg-plastic-waste-a8485066.html>
- 16 <https://link.springer.com/article/10.1007/s11625-022-01105-2>
- 17 <https://www.un.org/sustainabledevelopment/sustainable-consumption-production/>
- 18 <https://www.sciencedirect.com/science/article/pii/S0959652621006582>
- 19 <https://echochamber.com/article/coop-italia-future-food-district-milan/>
- 20 <https://echochamber.com/article/coop-italia-future-food-district-milan/>

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- 21 <https://www.pnas.org/doi/abs/10.1073/pnas.1423674112>
  - 22 <https://www.prnewswire.com/news-releases/plant-based-meat-market-size-worth-24-8-billion-by-2030-grand-view-research-inc-301472227.html>
  - 23 <https://www.prnewswire.com/news-releases/vertical-farming-market-size-worth-33-02-billion-by-2030-grand-view-research-inc-301492476.html>
  - 24 <https://www.globenewswire.com/news-release/2022/06/16/2464060/0/en/3D-Food-Printing-Market-by-Ingredient-By-Vertical-and-Region-Global-Analysis-of-Market-Size-Share-Trends-for-2019-2020-and-Forecasts-to-2030.html#:~:text=Global%203D%20Food%20Printing%20Market,%2C%20i.e.%2C%202021%2D30>
  - 25 <https://www.globenewswire.com/en/news-release/2022/05/25/2450095/0/en/Edible-Insects-Market-Worth-9-6-Billion-by-2030-Exclusive-Report-by-Meticulous-Research.html>
  - 26 <https://www.pnas.org/doi/abs/10.1073/pnas.1423674112>
  - 27 <https://www.globenewswire.com/en/news-release/2022/05/25/2450095/0/en/Edible-Insects-Market-Worth-9-6-Billion-by-2030-Exclusive-Report-by-Meticulous-Research.html>
  - 28 <https://www.globenewswire.com/news-release/2022/06/16/2464060/0/en/3D-Food-Printing-Market-by-Ingredient-By-Vertical-and-Region-Global-Analysis-of-Market-Size-Share-Trends-for-2019-2020-and-Forecasts-to-2030.html#:~:text=Global%203D%20Food%20Printing%20Market,%2C%20i.e.%2C%202021%2D30>
  - 29 <https://www.infarm.com/old/en>
  - 30 <https://www.billa.at/sortiment-und-marken/pflanzilla>



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