

### What if all our meat were grown in a lab?

*Could laboratory-grown meat be the answer to our environmental problems, and how would this impact on the EU agricultural sector?*

Livestock production has an enormous environmental impact. The total land used for keeping animals and growing crops for their consumption amounts to around [30 % of the world's ice-free land surface](#), and the livestock supply chain is responsible for about [14.5 % of global human-made greenhouse gas emissions](#) that contribute to climate change. This is due to a number of factors, including the industry's dependence on fossil fuels and its methane and nitrous oxide emissions. Chemical fertilisers are often used to intensify production, and synthetic nitrogen runoff pollutes waterways. Intensive cattle grazing can lead to land degradation.



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If the global population approaches the predicted 10 billion by 2050, global food production will need to [increase by 50 %](#). Moreover, economic development has historically led to increased consumption of animal protein, so it seems likely that meat consumption will increase in developing countries. This would exacerbate the negative environmental impact; for example, creating more space either to graze livestock or to grow crops to feed them is a [major cause of deforestation](#), which results in biodiversity loss and carbon dioxide emissions. In response, many organisations advise a [reduction](#) in meat and dairy consumption in order to meet climate goals. However, a widespread shift to a plant-based diet would require millions of people to alter their dietary habits, and this is likely to take some time.

Laboratory-grown meat, often referred to as 'cultured meat', is an alternative to conventional meat, biologically identical but with a [greatly reduced environmental impact](#). Lab-grown meat uses stem cell technology: a few cells are taken from a live animal and placed in a growth medium in a bioreactor where they proliferate independently. If meat cultured in this way became widely available, it could significantly alleviate the environmental problems currently caused by livestock production, but without requiring humans to alter their consumption patterns.

When the technology was first developed, the process was far more expensive than conventional farming. However, the cost of production has been steadily falling, suggesting that lab-grown meat could become a viable commercial product. Global interest is growing, as indicated by [China's US\\$300 million trade agreement with Israel](#) to import lab-grown meats. As the price of lab-grown meat continues to fall, it is possible that in the future it will become cheaper than conventional meat and thus come to dominate the market.

## ***Potential impacts and developments***

In an EU context, it is necessary to consider the potential impact that lab-grown meats would have on the agricultural sector, particularly on economics and employment. Agriculture and food production make up 4.4 % of EU GDP, and 8.3 % of total employment. Those who work in this sector are mostly concentrated in rural areas that are almost wholly dependent on agriculture. Any major changes in food production and consumption would have a profound impact on these individuals, communities and regions.

Switching from conventional meat to lab-grown meat could have a positive impact on human health. Animal products are the human diet's primary source of saturated fat, which is linked to health problems such as heart disease and strokes. The food value of lab-grown meat could be controlled to optimise the nutritional content, leading to an improvement in consumer health. Livestock are often fed antibiotics to prevent disease; this has been linked to the rise of antibiotic-resistance in bacteria strains that infect humans, leading the [EU to introduce rules](#) to limit antibiotic use in farming. Lab-grown meat would not require the use of antibiotics, which could have a positive effect on future public health. Conditions in factory farms and abattoirs are often unsanitary, and contact with contaminated meat can lead to the spread of harmful pathogens such as *Escherichia coli* and salmonella. Growing meat in laboratory conditions could limit the number of humans infected.

## ***Anticipatory policy-making***

Reducing the quantity of animals farmed for meat would represent significant progress towards meeting the [EU target](#) of cutting greenhouse gas emissions by 40 % for 2030. Policy-makers could seek to pursue these environmental benefits by facilitating the development of lab-grown meat and its introduction onto the market, whilst also easing the transition for farmers, who are currently dependent on livestock farming, towards new forms of economic activity.

By supporting their own research into lab-grown meat, EU Member States would be taking the opportunity to involve themselves in an area of technological development with great potential for a positive impact, as well as contributing to an expanding new market within the food industry. There is also the possibility for creating new jobs in this area (although these would require different skills, and retraining).

In addition, EU Member States could identify areas that are dependent on livestock farming and consider ways in which their local economies could be diversified. Where conditions allow, farmers could be supported in their transition from livestock farming to growing crops. These could be crops for human consumption, which is more space- and water-efficient than livestock rearing, or for biofuels, which would work towards the EU goal [of increasing the contribution of renewable sources](#), such as biofuels, to the transport fuel mix.

Policy-makers could also take proactive steps to ensure that if lab-grown meat is available for sale, consumers are well informed about the product which they are buying. This might include regulating whether lab-grown meat will be sold as a separate product to conventional meat, and how this difference is signalled to consumers.

While the development of lab-grown meat is usually seen positively by environmental activists, the future of lab-grown meat will ultimately depend on the degree to which the wider public is willing to go along with this new food and adapt their dietary habits.

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This 'What if ...?' publication is a product of the Scientific Foresight Unit (STOA) of EPRS. More information on the unit's activities can be found at <http://www.europarl.europa.eu/stoa/> and <http://epthinktank.eu/author/stoablogger/>

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