Cell-based agriculture

Abstract

Our growth plan is to make the Netherlands the global market leader for cell-based agriculture (e.g. cultivated meat, brewed milk), making animal products without the use of animals - except for a few cells, catering to growing markets, while decreasing environmental and health impacts, by creating enabling conditions, through public R&D/innovation and education, building on Dutch know-how in life science, agriculture and engineering, working with all stakeholders.

Strategy

The global market for animal products is growing rapidly, with an estimated increase of 40-70% by 2050, offering great commercial opportunities. However, the environmental and health impacts of livestock are significant.

We want to make animal products sustainable, by dissociating animal products from livestock, except for a few cells. This will be disruptive. We want to cooperate with all stakeholders to make this a positive transition.

The Netherlands has the unique potential to become the market leader for this innovation. We are already a market leader in agriculture, trusted and efficient. We are pioneering cell-culturing technology and have companies working on cultivated meat, leather, caviar, fur and brewed milk.

So far, specific technologies are developed by companies with investments and being researched by universities with NWA and EU funding. This happens in relative isolation and would benefit from better enabling conditions.

To boost the Netherlands into a global leading position, we need to quickly strengthen the public domain, creating the conditions for this innovation to thrive, way beyond the current companies. It would benefit many stakeholders and give us a competitive edge globally.

This would be done through public R&D/innovation and education, as elaborated below. It requires public, national funding. No other funds seem applicable for this purpose and scale. It is relatively low risk to invest in these sectors.

It will support LNV priorities: nitrogen and greenhouse gas reduction; protein transition; appreciated, healthy and safe food; and circular agriculture.

Elaboration

For companies, market introduction of some products is expected in 2-5 years, after approval in the EU. Further development (TRL level 6-9) will make it competitive and diversify products in 5-10 years.

To become the global market leader, we need public R&D/innovation and education. Education, giving the next generation skills and knowledge. Public R&D, developing options for stakeholders to step in: Farmers, piloting decentralized and hybrid prototypes. The cell-based companies, to facilitate scale-up. The sector, joining forces on protein transition and circular agriculture. The value chain, for business models, from field to fork. The energy sector, for green electricity. NGOs, on the impact on people and the environment. Banks, for finance. Other countries, including developing countries. The public, for information and communication. To be coordinated by an innovation hub.

Finance

It is estimated that the public funding required for public R&D/innovation and education is €450 million, mainly in the first 10 years.

This is next to €150-200 million in private capital and €3 million EU funding that the companies received to date. Their annual private return on investment depends on unknowns, and is market-sensitive information, but can be shared confidentially.

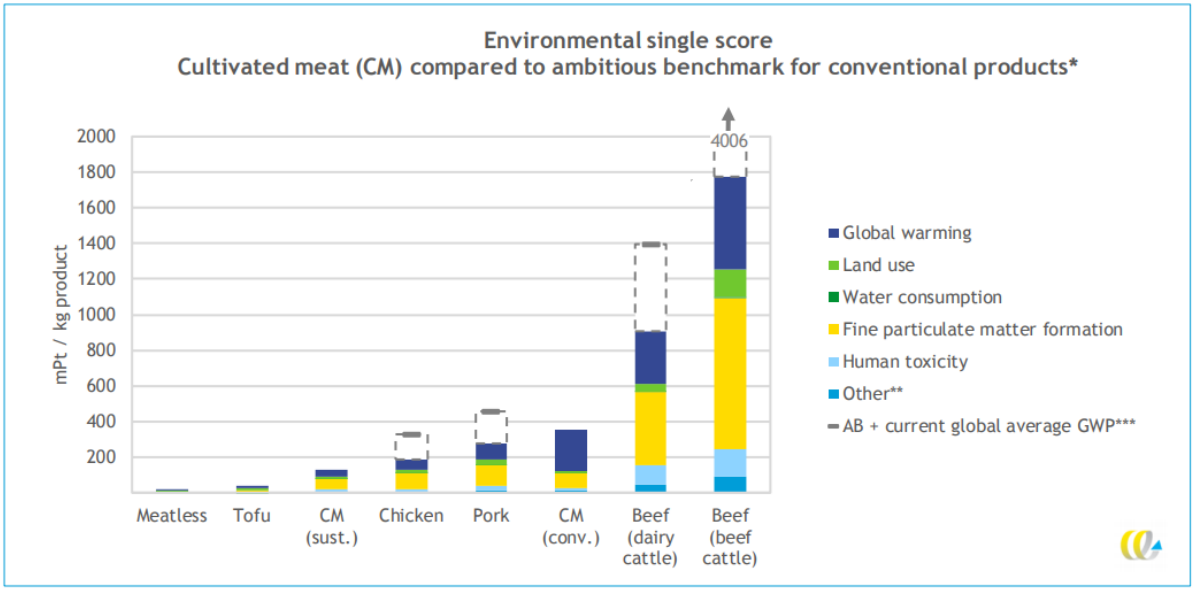
Impact analysis

The Netherlands becoming the market leader has the following benefits:

1. Catering to the growing global market: GDP increase assessed at 3.6% in 2030 and 13,8% in 2040, benefitting the whole value chain. Assumptions: 2030 - global meat market €1.1 trillion, milk €0.7 trillion, 10% cell-based, our Dutch target share is 20%. 2040 - €1.5 trillion meat market, €0.82 trillion milk, 35% cell-based; baseline GDP growth 1.5% annually.

2. Significantly reducing environmental and health impacts and costs: for climate, biodiversity, use of land and water, animal wellbeing, antimicrobial resistance, zoonoses. E.g. in the Netherlands, for nitrogen related to meat: replacing 25% with cultivated meat, amounts to half of the 2040 reduction goal, and €1-2 billion external costs avoided annually, or 0.07-0.14% of GDP. For all environmental benefits for meat, see graph. Relative benefits are similar for milk.

3. Capitalizing on knowledge: reactors, licenses, strengthening our biotechnology hub, etc.
The submitting partners are willing to put in the necessary time to elaborate this growth plan.



* Intensive, West-European, circular agriculture with LUC-free soy.

** 'Other' includes 14 impact categories, among which other toxicity categories, acidification and resource depletion. A complete list can be found in Annex A.

*** Current global average carbon footprint taken from Poore and Nemecek (2018).

Source: CE Delft (2021). LCA of cultivated meat.