Webinar
The future of meat: from trend analysis to policy action

May 13, 2020

Plant-based meat, insect food & in-vitro meat

Results of a trend analysis study for policy makers about environmental impacts and required policy action

Stephanie Wunder, Ecologic Institut

Webinar organized by the German Federal Environment Agency (UBA) and European Environment Information and Observation Network (Eionet)

13.05.2020
Overview

1. Context and scope of the study
2. Environmental & health impact of meat alternatives
3. Options for policy interventions to support the shift towards healthy and sustainable diets
   • Related to the three studied alternatives (in vitro, insects, plant based)
   • Supportive regulatory/governance framework
Context and scope of the study

- Project funded by UBA, conducted by: iit, Adelphi, Ecologic Institute (more see https://www.ecologic.eu/16901), report available in May 2020

- Key questions:
  1. Are meat alternatives a more environmentally friendly and healthier alternative compared to meat?
  2. What role do meat alternatives play in the needed change for food system transformation?
  3. How can policy makers support this shift?
Scope: Three meat alternatives

Plant based alternatives

- legumes
- Algen
- Jackfruit
- fish alternatives
- Tofu etc.

Eadible insects (human consumption)

In-vitro meat

Out of scope: Tofu, algae, fish alternatives...

Sources
Quorn: www.quorn.com
Impossible Burger: https://impossiblefoods.com/
In-Vitro-Burger: © David Parry/PA Wirey
In-Vitro-Hühnchen: Ferrari/Zuma Press
Trends – all showing growth...

All studies show growth trends (globally/EU/Germany), but different scenarios, → those studies that predict a high(er) market share for meat alternatives assume a strong decline in „real“ meat consumption, e.g.

- Rethinkx
- AT Kearney:

**Global meat consumption:** By 2040, conventional meat supply will drop by more than 50% in billion US$

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<table>
<thead>
<tr>
<th>Year</th>
<th>Cultured meat</th>
<th>Novel vegan meat replacement</th>
<th>Conventional meat</th>
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</thead>
<tbody>
<tr>
<td>2025</td>
<td>10%</td>
<td>90%</td>
<td>10%</td>
</tr>
<tr>
<td>2030</td>
<td>18%</td>
<td>72%</td>
<td>18%</td>
</tr>
<tr>
<td>2035</td>
<td>22%</td>
<td>55%</td>
<td>22%</td>
</tr>
<tr>
<td>2040</td>
<td>35%</td>
<td>40%</td>
<td>10%</td>
</tr>
</tbody>
</table>

CAGR 2025–2040

1 Numbers are rounded to hundred billions.

Sources: A.T. Kearney 2019: “How will Cultured Meat and Meat Alternatives Disrupt the Agricultural and Food Industry?”
...meat alternatives with growing market share...

Sources:
Statista (Hrsg.): Global Meat Industry. 2018
Statista (Hrsg.): Meat substitutes market in the U.S. 2018
Statista (Hrsg.): Edible Insects. 2018
...but meat consumption might/will grow, too... so how big is the niche we are talking about?

Sources:
Statista (Hrsg.): Global Meat Industry. 2018
Statista (Hrsg.): Meat substitutes market in the U.S. 2018
Statista (Hrsg.): Edible Insects. 2018
Environmental and health impacts

1. Plant based alternatives

- Plant based alternatives rank by far as the best compared to meat as well as to other meat alternatives:
  - Least environmental footprint
  - Low risk and readily available technologies
  - Comparable protein content
  - Less healthy: highly processed products

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Meat and soy products: Comparison of environmental effects

With the same protein content, much more land, water and fossil energy is consumed for the production of meat than for the production of soy-based vegetable products.

Data: Reijnders, Soret 2003 (Production in industrialized countries as a reference)
Environmental and health impacts

2. Insects

- Relatively good environmental footprint as insects are very efficient “feed converters“, need less land and water, have a high share that is edible (no bones etc.)

- Footprint differs extremely depending on what they are fed they are very good “food waste converters“, too – this would be the preferred option from an environmental perspective (but is currently forbidden)

- Healthy option (protein content), but low public acceptance so far, allergenic potential

- Open ethical issues (do insects feel pain?)
Environmental and health impacts

3. In-vitro meat

- Impact assessment not yet possible:
  - In-vitro meat is not yet available on the market
  - Lifecycle assessments are not based on real data but anticipated data
    - Large uncertainties about potential
    - Assumption so far: Less land needed, more energy needed, less or similar water needs

- Large uncertainties if technology is scaled up:
  - Is serum free media available (so far developed with fetal calf serum as culture medium)?
  - „clean meat“ or need for antibiotics?
  - Bioreactors run on renewable or fossil energy?
  - Health impacts: likely similar to meat (quantity matters)
## Overview about specific entry points for improvements with regard to sustainability

<table>
<thead>
<tr>
<th>Cross cutting issues</th>
<th>Plant based alternatives</th>
<th>Using insects as food</th>
<th>In-vitro-meat</th>
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</thead>
<tbody>
<tr>
<td>Regional, diversified key ingredients</td>
<td>Permission to be fed on surplus food/catering waste</td>
<td>Research about serum free growth media</td>
<td></td>
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<tr>
<td>Processing and packaging</td>
<td>Permission as feed</td>
<td>Better lifecycle assessment</td>
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<tr>
<td>Labelling</td>
<td>X</td>
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<td>Public Procurement</td>
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<td>Organic certification</td>
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<td>Eductaion and training (for professionals)</td>
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<td>Acceptance for meat alternatives</td>
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<td>Need to undergo an Environmental Impact assessment</td>
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<td>Providing energy for the production plants</td>
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1. Plant based alternatives: How to improve

- Support use of diverse and regional ingredients
  - Particularly pulses (improve soil, high in protein), regional soy etc.

- Support of products that are not highly processed/packaged in order to support healthier products with low resource footprint
  - Though some unclarities still: Health recommendations for meat alternatives would need an (updated) comparison between meat and meat alternatives
  - Needed dialogue with food processors and retailers

Quelle: Pixabay, Katinka vom Wolfenmond
2. Insects: How to improve

- **Reconsideration to feed organic waste material (e.g. catering waste)**
  - Environmental footprint strongly depends on the kind of insect feed used
  - Insects (like black soldier fly) can use all kinds of organic material
  - Currently feeding organic waste is not allowed (Regulation 999/2001)

→ Would need updated risk analysis by EFSA to decide realallowance, while keeping high hygiene and food safety standards

➢ **Reallowance would speed up the growth of the sector**

24.06.2020

Künstler: John Gilroy/1940/UK
3. In-vitro meat: How to improve

- Support research for serum free growth media

- Support lifecycle analysis using real and up to date/open access data considering the most relevant parameters
  - Growth medium
  - Use of antibiotics
  - Energy use (renewables/fossil/quantities)
  - Production plant and size

Quelle: MosaMeat/NGinFood

24.06.2020
Cross cutting issues

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| Labelling | X | | X |
| Public Procurement | X | X | |
| Organic certification | | X | X |
| Education and training (for professionals) | X | X | X |
| Acceptance for meat alternatives | X | X | X |
| Production plants and facilities | | X | X |
| Need to undergo an Environmental Impact assessment | | X | X |
| Providing energy for the production plants | | X | X |
Cross cutting: Labelling

- **Plant based alternatives:**
  Ensure that labelling continues to allow using terms that refer to „meat“ (pending process by EP Agri Committee – to modify Regulation 1308/2013 about common organisation of agricultural markets and on specific provisions for certain agricultural products)

- Also relevant once **in-vitro meat** is available on the market/
  gets allowance through novel food regulation (also depends on how the cells are taken from the animal: before or after slaughter)
Cross cutting: public procurement, organic certification, education and training

- **Public procurement**: can support use of meat alternatives
- **Organic certification**: needed guidelines for insect production and in vitro meat
- **Education and Training**:
  - **Plant based alternatives**: Integrating knowledge on how to use in relevant job education (cooks, educators etc.)
  - **For insects and in-vitro-meat**: capacity building in regulatory authorities and veterinary offices for production/production plants

Source: Pixabay, free commons
Cross cutting: understanding/improving acceptance & requirements for production plants

- **Acceptance:**
  - Research to understand factors that influence uptake of meat alternatives

- **Production and processing plants/EIA**
  - Different rules/special requirements for allowance? (do these projects have significant effects on the environment and therefore require an Environmental Impact Assessment)
Open (research) questions with regard to indirect impacts

▪ What is the impact on job creation/loss with changed production and consumption patterns

▪ How will production and distribution patterns change (diversification of producers? market concentration?)

▪ What are the impacts on agricultural production and rural areas?

▪ Are there impacts in food literacy and food education? (e.g. if food is more processed, highly processed etc.)

▪ Are there gender/milieu specific differences?
Conclusions for policy makers (1)

- Entry points to improve the sustainability performance of meat alternatives are in most cases not within environmental policy (but within agriculture, hygiene, health, education, rural development, innovation and research policy)
- Policy options range from local and national (public procurement) to EU (food safety) and international (trade) and need to be coordinated
- Success/development of meat alternatives depends on the development and prices in the meat market

⇒ Strategies to support meat alternatives need to be embedded in coherent strategies for food system transformation
Role of meat alternatives with regard to food system transformation

Priority action points

1. Reducing meat consumption (animal welfare requirements, internalizing external costs etc.)
2. Support plant based diets (special focus pulses)
3. Development of national strategies for healthy and sustainable food (implementing the EU Farm to Fork Strategy) including the role of meat
4. Support research to clarify open questions and further develop the methods and technologies

→ Coherent action on EU (and international) level needed, particularly with regards to the CAP
Thanks! Any more Questions?

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