Food system ambitions & challenges to the livestock sector

Jess Fanzo
Bloomberg Distinguished Professor of Food Policy & Ethics
Johns Hopkins University
What are food systems and what does it mean to transform food systems?
Transformation of this system is not easy!

What do we mean by food transformation exactly?

- To ensure availability, access, and affordability to sufficient, nutritious, desirable, safe diets for everyone
- To be produced from sustainable and resilient food systems
- To promote fair and equitable livelihoods
- To benefit nature

Source: Michigan State University, values for regional food systems
Why do we need to transform food systems?
1. Achieving the Paris climate change targets requires multi-level food systems action

- **High Yields**: 1162 Gt (from 2020 to 2100) with a 14% reduction.
- **Half Food Waste**: 992 Gt with a 27% reduction.
- **Healthy Calories**: 946 Gt with a 30% reduction.
- **Best farm practices (lower emissions intensity)**: 817 Gt with a 40% reduction.
- **Plant Rich Diet**: 708 Gt with a 46% reduction.

If we achieve all of the above, partially (50%) or fully (100%),

- **Partial (50%)**: 506 Gt with a 6.5% reduction.
- **Fully (100%)**: 7 Gt with a 100% reduction.

*Based on the RL1 Tackled Planetary Health diet which includes reducing livestock and plant-based eating.

Source: Michael Clark et al. (2019). Global food system emissions could preclude achieving the 1.5°C and 2°C climate change targets. *Science.*

*Our World in Data*: Research and data to make progress against the world’s largest problems.
2. Food systems are contributors to climate change & environmental degradation

- Food systems generate 21-37% of total greenhouse gas emissions.
- Agriculture uses 70% of all freshwater resources.
- 1 million animal and plant species are now threatened with extinction.
- 60% of marine fish stocks are at their limit or overfished.

---

End-of-life (waste) 8.8% of food emissions
Post-retail 11%
Supply chain 19%

Agricultural production 39% of food emissions

Land use 32% of food emissions

Global Emissions (2015)
Non-food: 66%
Food: 34%

Six economies emit half of the world's food system greenhouse gases

Greenhouse gas (GHG) emissions are measured in metric gigatons of CO2 equivalents.

- Rest of the world
- China
- Brazil
- United States
- India
- Indonesia
- European Union

Data: M. Crippa et al/Nature Food 2021 • Visualization: Betsy Ladyzhets
3. Healthy diets are unattainable for some

% of the population who cannot afford a healthy diet

3.1 billion people cannot afford a healthy diet!

4. The scale of malnutrition is universal & worsening

811 million (10%) of the world’s population are undernourished

149 million (23%) children under five years of age are stunted

45 million children under five years of age are wasted

39 million children under five years of age are overweight

2.2 billion adults are overweight or obese

5. Zoonotic pandemics are not going anywhere

- COVID-19 is (likely) a zoonotic disease due to a spillover event that jumped from animals to humans.

- 60% of emerging infectious diseases are zoonotic, and of that 60%, 72% originate in wildlife.

- Food and agriculture have a big part in the rise of zoonotic spillover events.

6. Food systems are vulnerable with increased risk of multiple breadbasket failures

- Climate and weather events
- Geopolitical and economic events
- Mismanagement and policy change

What is important for the livestock community and what trade-offs do we face with food system transformation?
The EAT-Lancet report showed inequities

1. *Who suffers the consequences of world diet choices?*

Meat intake is very low in low/middle-income countries.

www.foodsystemsdashboard.org

Slide courtesy of Ty Beal at GAIN
Meat and other animal-source foods are top sources of commonly lacking nutrients.

Calories and grams needed to provide an average of one-third of recommended intakes of vitamin A, folate, vitamin B₁₂, calcium, iron, and zinc for children 6–23 months in South and Southeast Asia.


Slide courtesy of Ty Beal at GAIN.
Some countries/individuals could make bigger changes to their diets

Energy intensive lifestyles and dietary choices of those living in high-income countries are significant anthropogenic contributors to climate change.
2. *What kind of food* should be grown that is ethically permissible when we have people who are going hungry?

<table>
<thead>
<tr>
<th>Grain eaten by animals as feed</th>
<th>Whole milk</th>
<th>Eggs</th>
<th>Beef</th>
<th>Poultry</th>
<th>Pork</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed/food ratio</td>
<td>25%</td>
<td>22%</td>
<td>3%</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>Eaten by humans as animal products</td>
<td>10%</td>
<td>60%</td>
<td>17%</td>
<td>74%</td>
<td>118%</td>
</tr>
</tbody>
</table>

*Estimated worldwide calories from grain*

2019, trillion

- Pork: 1,182 trillion calories
If the world were to eat the EAT-Lancet diet, food production systems would look very different.

If the world were to eat the EAT-Lancet diet, food production systems would look very different. Almost no increase in cereal production. Vegetables +75%; Fruits >50%; Red meat production >65%; Fish >50%; Legumes >75%; Nuts >150%.

Land-based mitigation efforts can lead to increases in food prices and food insecurity.
3. What system? What diet? What substitutes?

Livestock sector and diverse livelihoods

Alternative proteins

“Now it’s our turn to eat meat”

Paleo/Keto: “I have never felt better

Deforestation and biodiversity threats
Some substitution of beef could halve deforestation

Replacing just one-fifth of global beef consumption with a meat substitute within the next 30 years could halve deforestation and the carbon emissions associated with it. Researchers modelled the effects of swapping beef with a fungus-based meat substitute called mycoprotein (e.g., Quorn). Replacing 80% of beef with mycoprotein would eliminate about 90% of forest loss.

Where will the alt-protein space go and how will it impact the livestock sector?

Exhibit 1 - Research Shows That Consumers Like Alternative Proteins

76% of consumers are familiar with alternative proteins

50% of experienced users increased their consumption of alternative proteins during the pandemic, mainly because of greater health consciousness

+100% is the potential increase in exclusive or near-exclusive users if the main inhibitors—health and nutrition, taste, and safety—are resolved

0% of consumers are willing to pay a price premium at taste parity, without value added over conventional animal protein

31% of consumers consider a major positive impact on climate as a primary reason to fully switch their diet to alternative proteins

Sources: Blue Horizon and BCG Customer Survey (February–April 2022, N = 3,729); BCG analysis.
Ethical and economic implications of the adoption of novel plant-based beef substitutes in the USA

<table>
<thead>
<tr>
<th>Changes within the food system</th>
<th>BEEF10</th>
<th>ALTP10</th>
<th>ALTP30</th>
<th>ALTP60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output</td>
<td>Employment</td>
<td>Output</td>
<td>Employment</td>
</tr>
<tr>
<td><strong>Beef sector</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live cattle</td>
<td>-6.9</td>
<td>-7.5</td>
<td>-7.0</td>
<td>-7.6</td>
</tr>
<tr>
<td>Beef processing</td>
<td>-7.6</td>
<td>-8.0</td>
<td>-7.6</td>
<td>-8.1</td>
</tr>
<tr>
<td><strong>Other meat</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live poultry</td>
<td>1.0</td>
<td>1.1</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Poultry processing</td>
<td>1.0</td>
<td>1.0</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Other live animals</td>
<td>0.7</td>
<td>0.7</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Other meat processing</td>
<td>1.2</td>
<td>1.3</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Selected plant products</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grain farms</td>
<td>-0.1</td>
<td>-0.1</td>
<td>1.5</td>
<td>1.7</td>
</tr>
<tr>
<td>Flour mills</td>
<td>0.9</td>
<td>1.0</td>
<td>7.4</td>
<td>7.5</td>
</tr>
<tr>
<td>Maize processing</td>
<td>0.6</td>
<td>0.5</td>
<td>2.8</td>
<td>2.7</td>
</tr>
<tr>
<td>Oilseed farms</td>
<td>0.2</td>
<td>0.3</td>
<td>1.9</td>
<td>2.3</td>
</tr>
<tr>
<td>Soya oil processing</td>
<td>0.5</td>
<td>0.5</td>
<td>3.6</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Mason D’Croz et al. Lancet Planetary Health 2022
Constraints of Pastoralists in a Changing World

‘We Buried Him and Kept Walking’: Children Die as Somalis Flee Hunger
From our ethnography and photo voice studies, East African pastoral communities are among the most politically and economically marginalized in society.
Questions for the panel and audience

• What do we want from food systems?
• Do the panelists and audience concur that there are inequities in meat consumption and that some, could afford to reduce their meat consumption while others could increase their meat consumption for optimal health?
• How can we ensure that livestock systems are more environmentally sustainable and what tools and management practices hold the most promise?
• What social protection mechanisms should be in place for ranchers and pastoralists if the sector contracts?
• With extreme weather events, heat, and other stresses, how do we ensure that animal welfare is prioritized?
Thank you!

@jessfanzo
jfanzo1@jhu.edu