

# Facts, Insights & Data: A Global Perspective on Alternative Proteins

Healthy Innovation Conference  
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# Is the Alternative Protein Market Over?

bon appétit

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CULTURE

## Fast Food Took a Gamble on Fake Meat. It's Not Paying Off

McDonald's McPlant experiment reveals how fake meat at fast food restaurants is, as a whole, a grift.

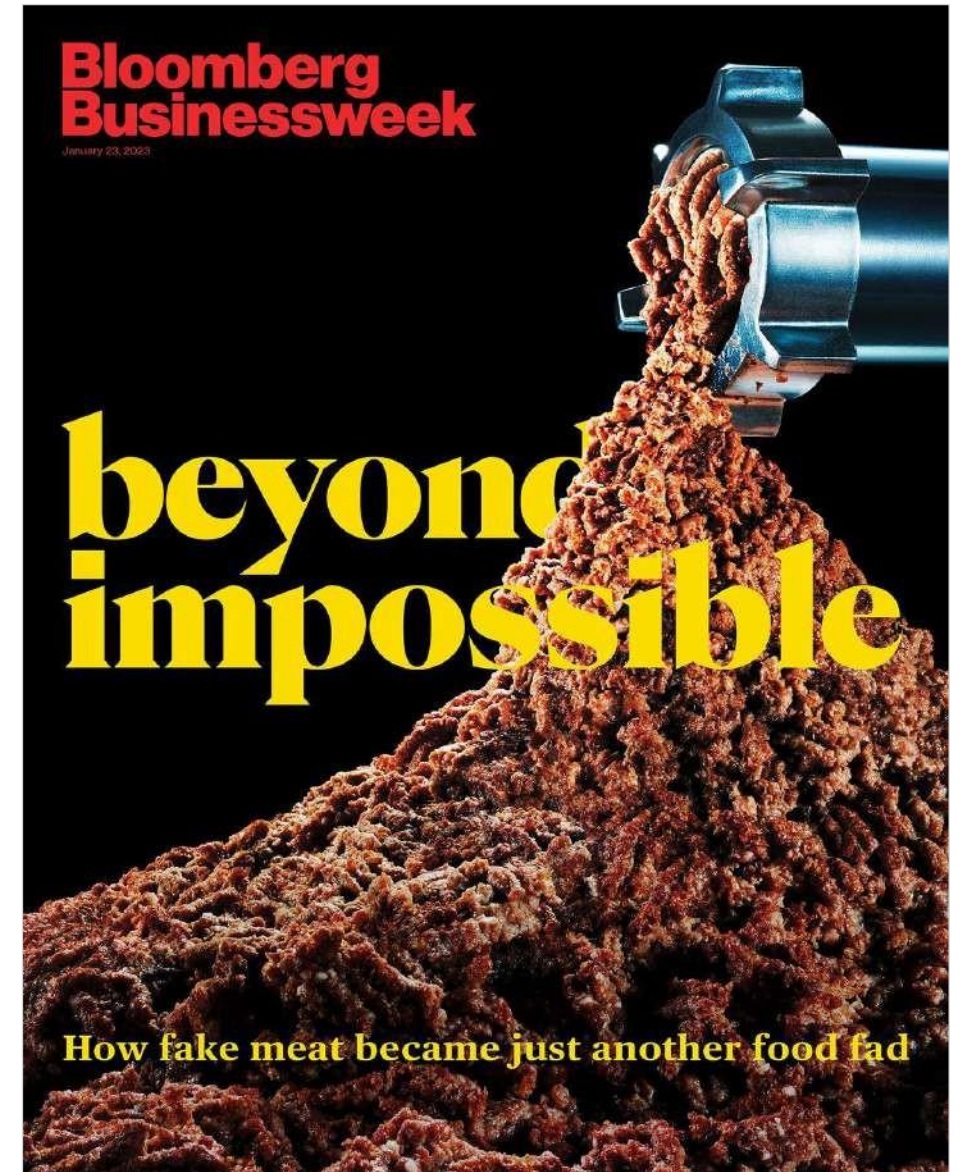
FORBES > BUSINESS > FOOD & DRINK

## Plant Based Fail: The Empty Promise Of Animal Meat Displacement

Michele Simon Contributor @

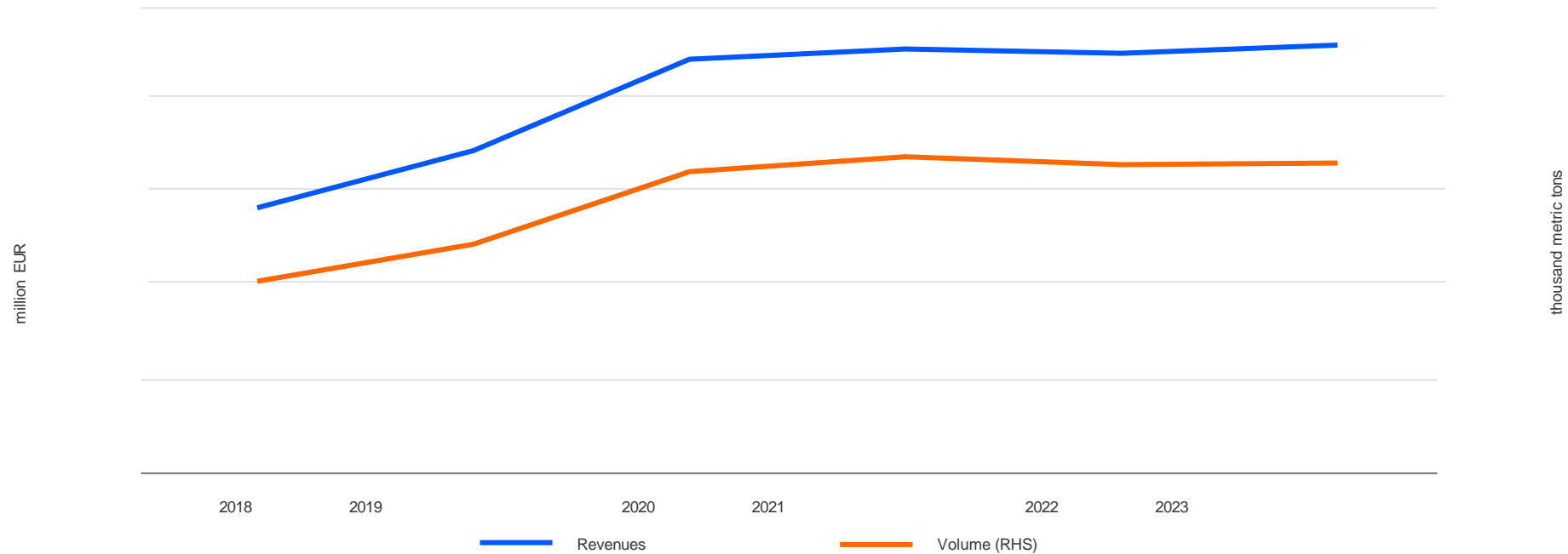
*I focus on disinformation in the plant-based and food tech sectors.*

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McKinsey & Company

# Chilled Plant-Based Meat Alternative Market Development in the Netherlands, 2018-2023



*Note: 2023 data is the moving annual total. Source: IRI, Rabobank 2023*

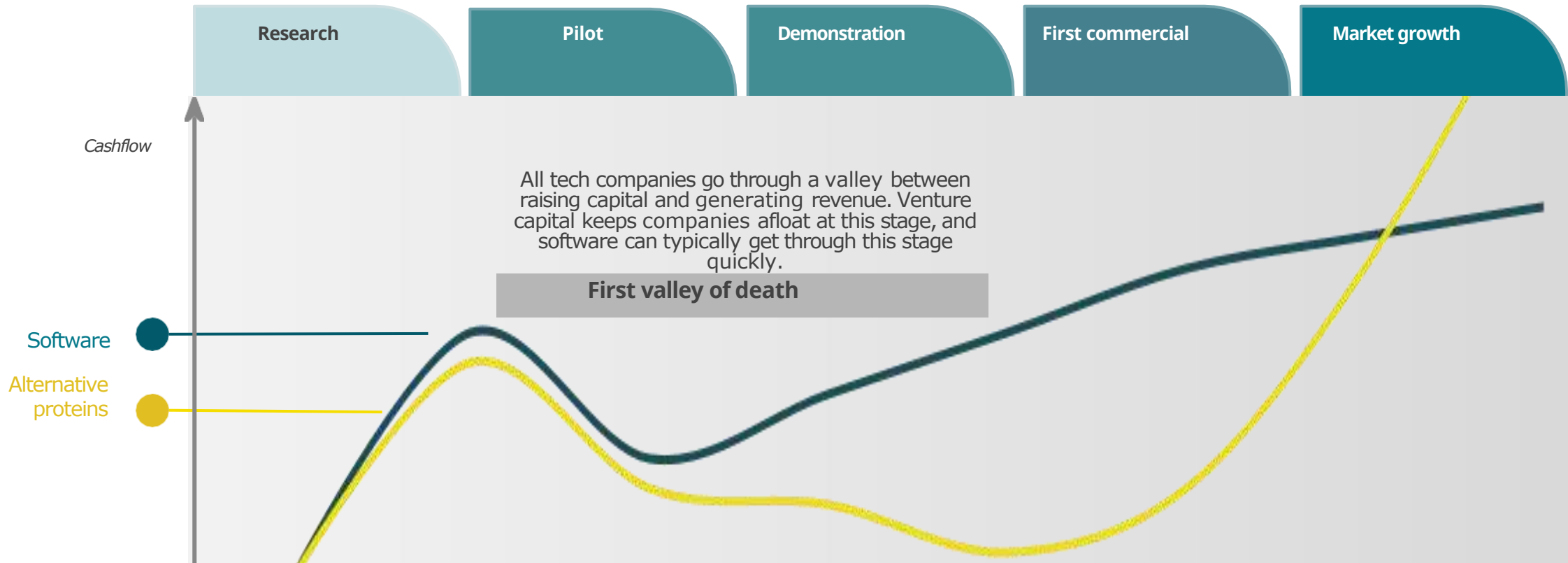
في الصحراء، يجد المسافر الحكيم قوت يومه في واحات غير متوقعة

**In the Desert, the wise Traveler Finds Sustenance in  
Unexpected Oases**

**Arab Proverb**



# Much of The Current Weakness Might Be Driven By Supply-Side Financing Issues



Source: Modified from Good Food Institute, *Alternative Proteins in APAC, 2023 Industry Report*

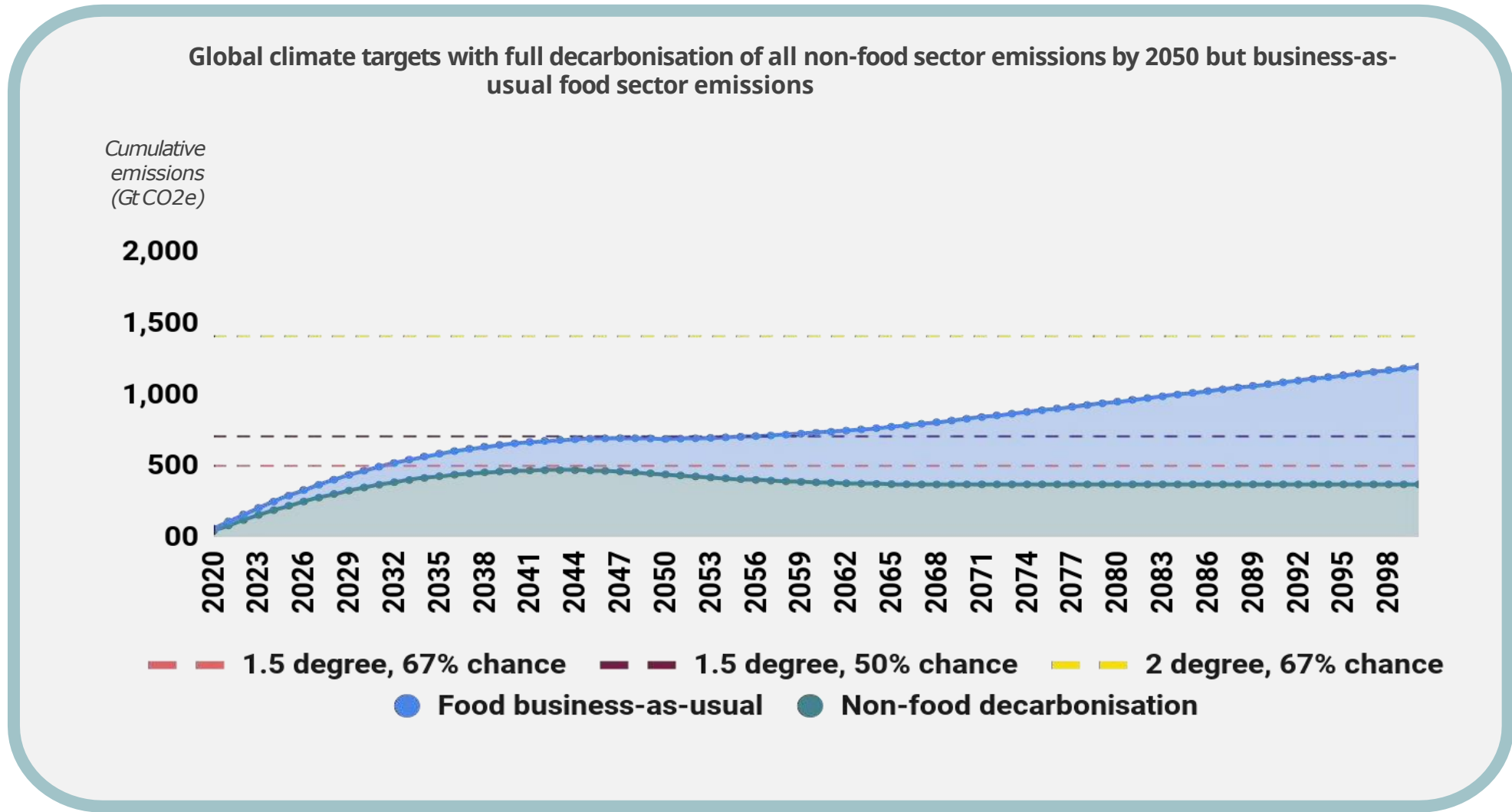
As often in climate tech, many alternative protein technologies have a longer pre-revenue road to scale. The majority of private capital providers are not suited to fund these later growth stages.

**Second valley of death**

## Flow of This Presentation

- Quick Intro
- Why Alternative Proteins
- Supply Side
- Demand Side
- The Market
- Financial Aspects
- Regulation and Policy
- Final Thought(s)

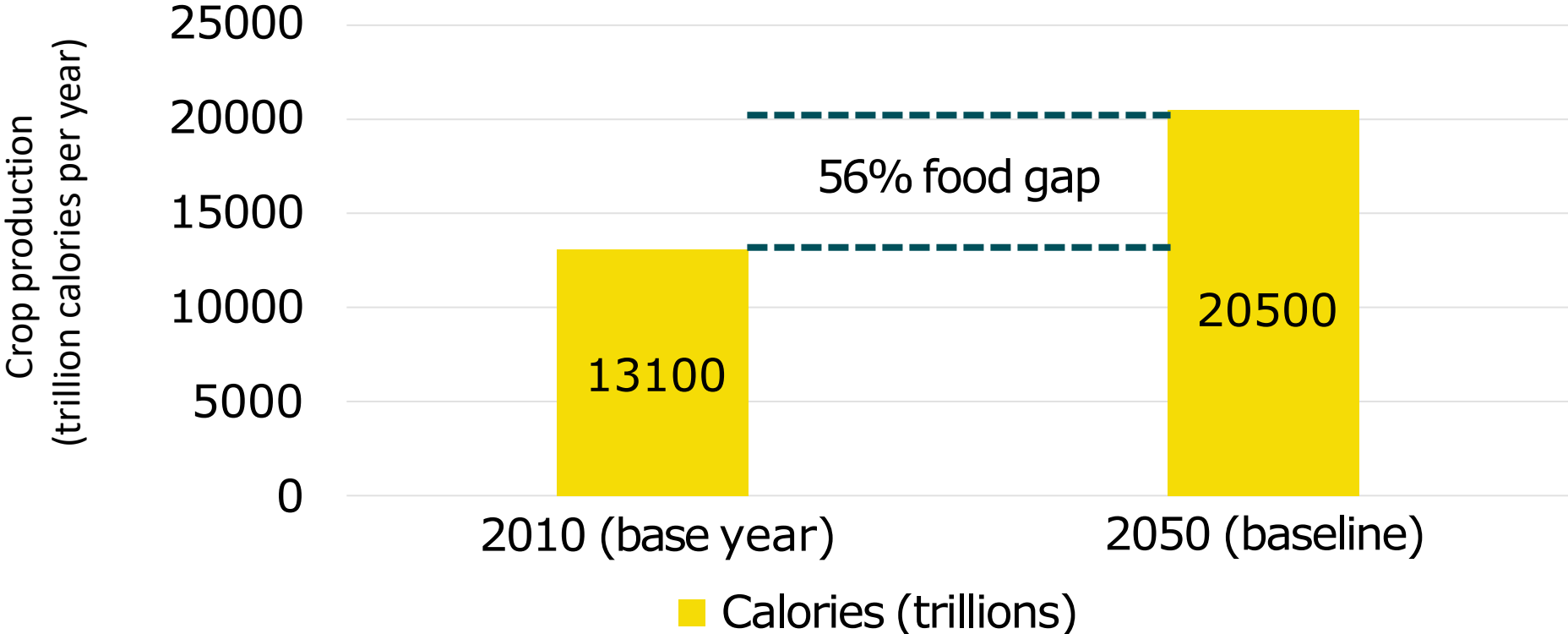
# The world cannot decarbonise without alternative proteins



Source: GFI analysis based on supplementary data files from Clark, M. A. et al. (2020)

# The World Will Have to Close a 56% Food Production Gap by 2050

## Total calorie consumption globally



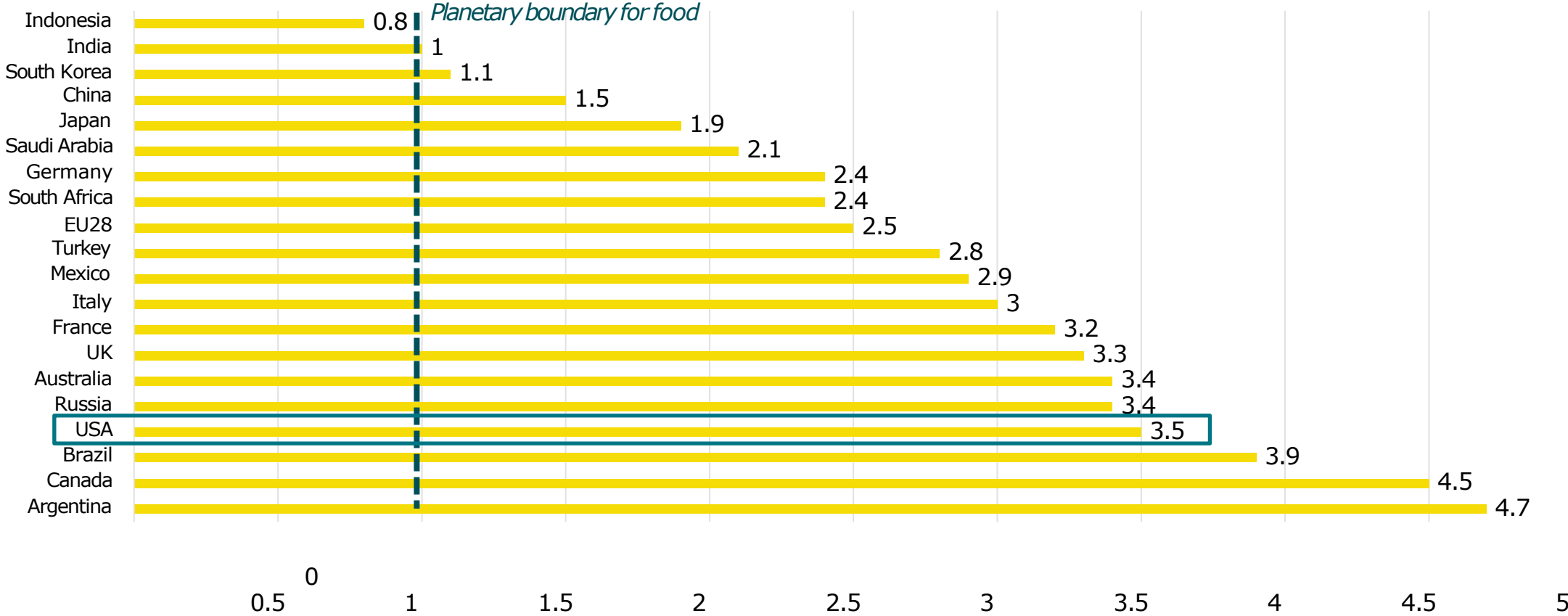
Source: The Good Food Institute, Reimagining Protein, August 31, 2023

*Note: Includes all crops intended for direct human consumption, animal feed, industrial uses, seeds, and biofuels. Source: WRI analysis based on FAO (2019a); UNDESA (2017); and Alexandratos and Bruinsma (2012)*



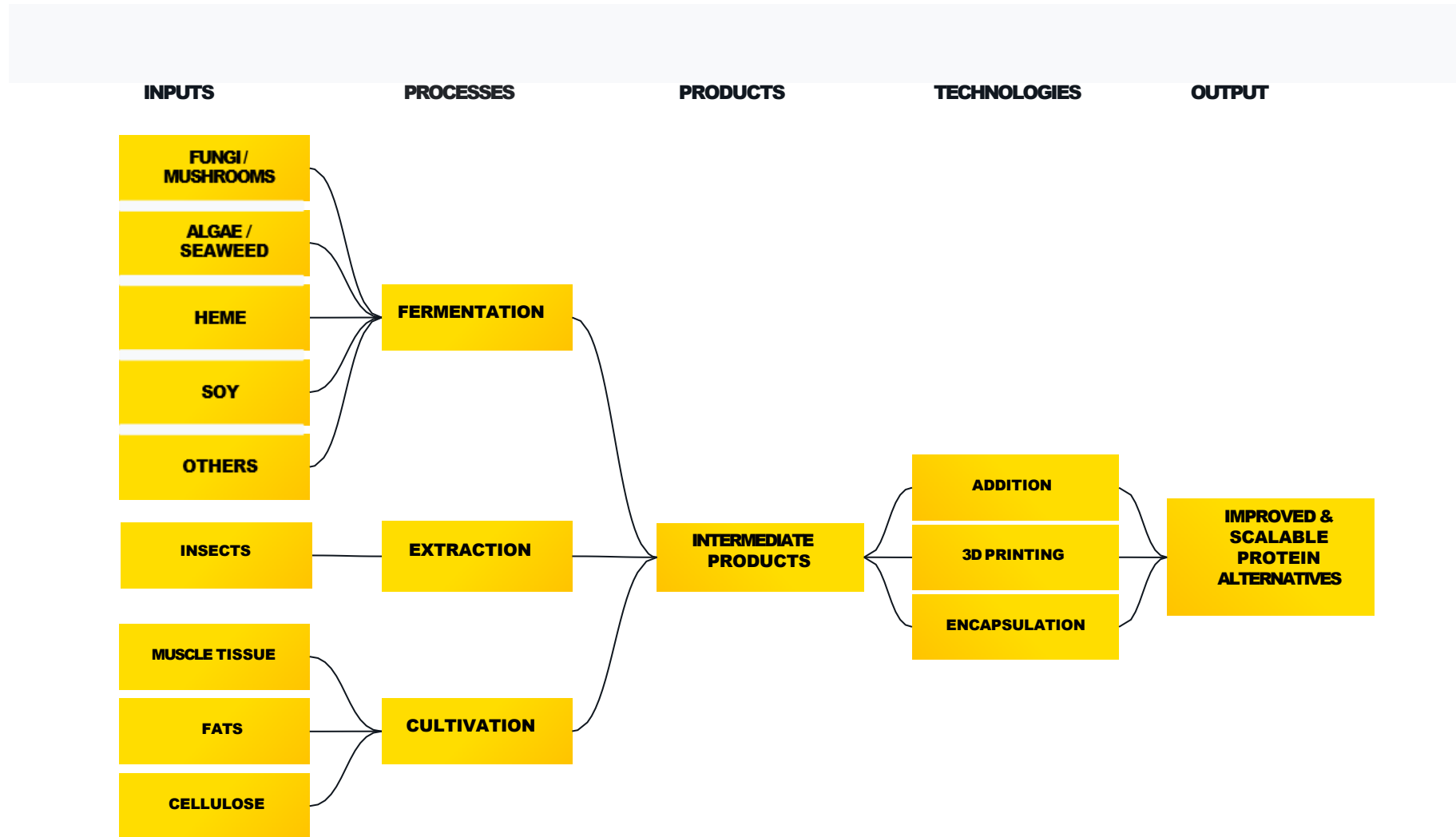
# The World Will Not Be Able To Produce Sufficient Food to Meet National Dietary Guidelines

The number of earths needed to provide sufficient food if all countries globally adopted the national food-based dietary guidelines used by the countries listed



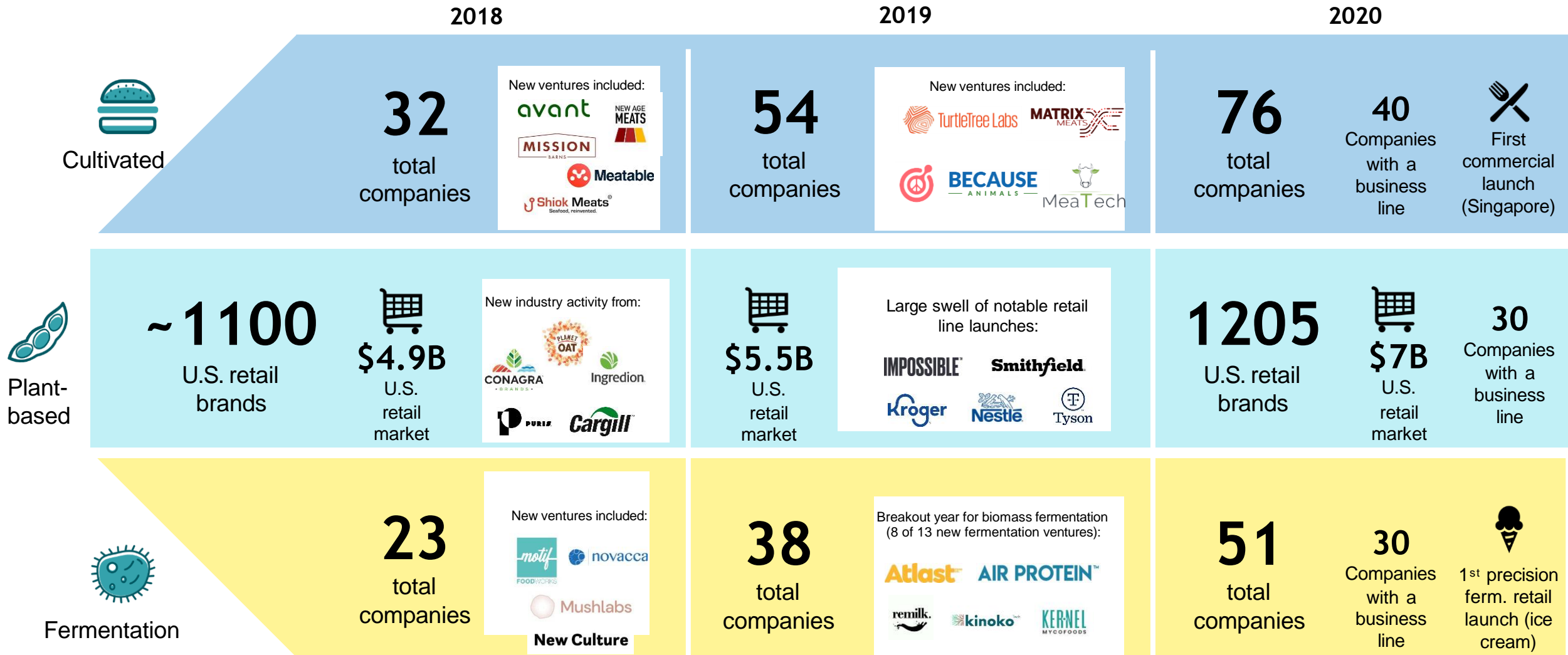
Source: FAO, Credit Suisse Research

# A Quick Look at The Supply Side Raw Materials, Processes, and Technologies



Overview of alternative protein processes and approaches. Unknown Group [1]

# The alternative protein commercial landscape has expanded vastly in the last several years



Source: Good Food Institute, Whitespace Opportunities in the Alternative Protein Sector

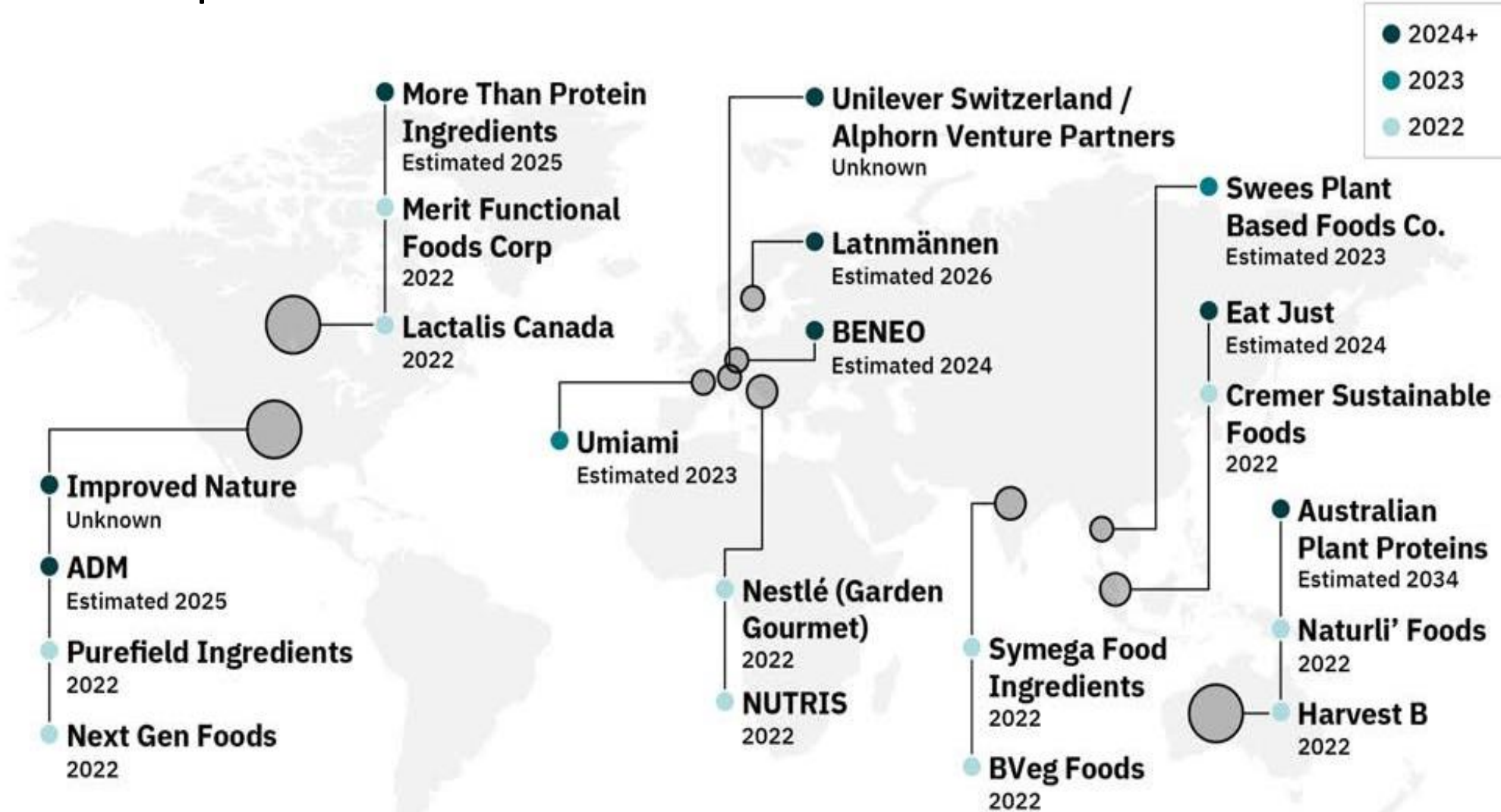
# Conventional companies with involvement in alternative proteins

	CPG Companies					Meat Companies				
	PEPSICO	Nestlé	KraftHeinz	ABInBev	General Mills	Tyson	JBS	Cargill	Smithfield	Hormel Foods
Investment	✓	✓	✓		✓	✓		✓		
Acquisition		✓	✓				✓			
Partnership	✓	✓	✓	✓				✓		✓
Manufacturing and R&D		✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ Cultivated meat
✓ Fermentation
✓ Plant-based

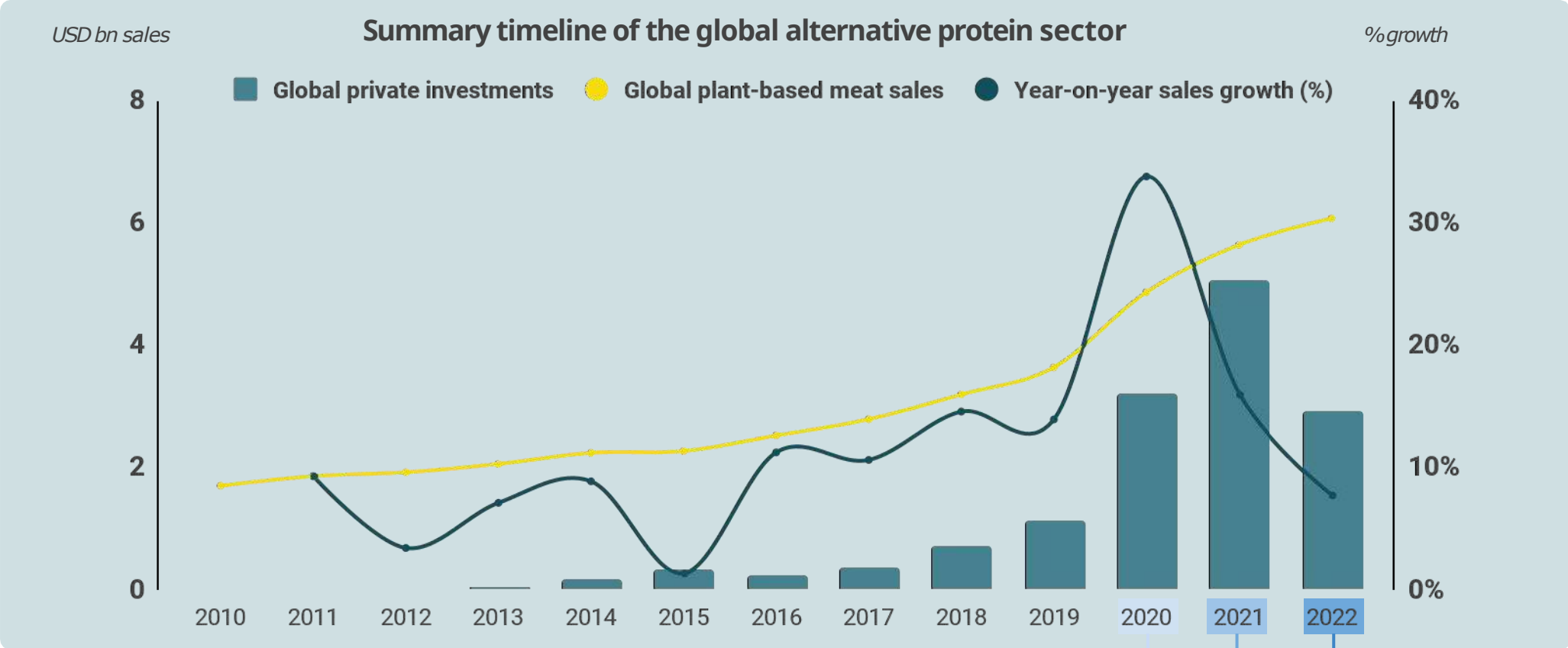
Source: Good Food Institute, 2022 State of the Industry Report, plant-based meat, seafood, eggs and dairy

# New plant-based facilities announced in 2022



Source: Good Food Institute, 2022 State of the Industry Report, plant-based meat, seafood, eggs and dairy

# The global alternative protein sector has made huge progress



More private capital is invested in the year of 2020 than in the entire sector's history

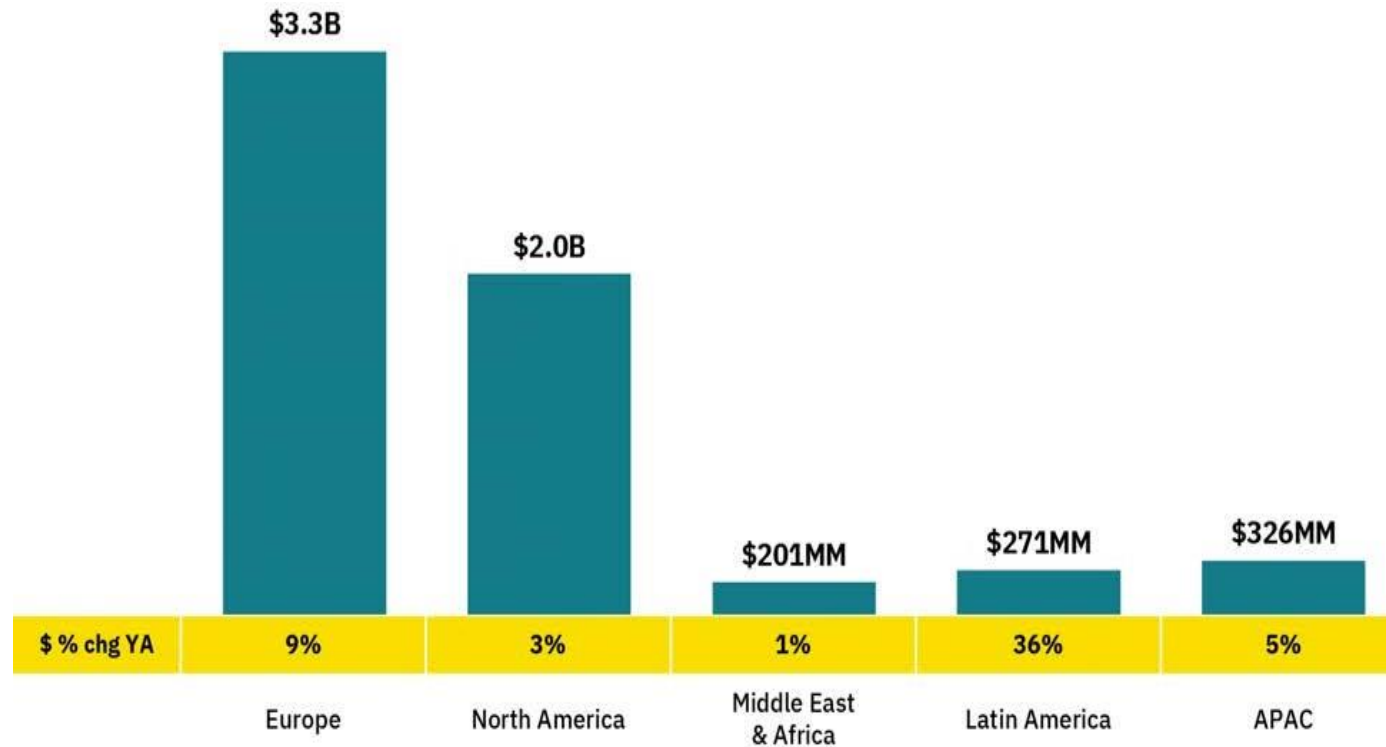
Year-on-year sales rise by 16 percent in 2021 after record 34 percent growth in 2020

Private investment drops as capital markets wane, but governments triple y-o-y funding

Source: Private investments based on GFI analysis of Pitchbook data. Sales based on Euromonitor data.

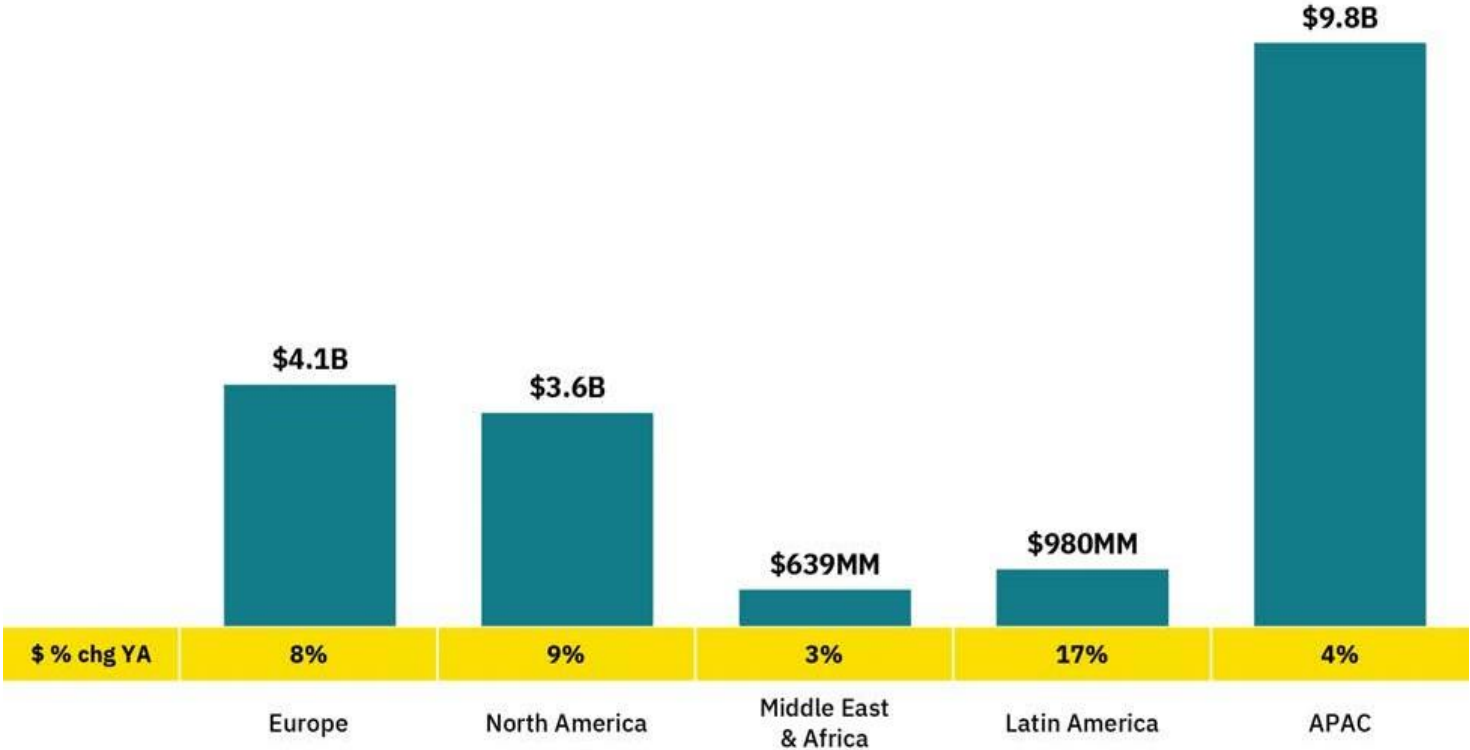


# Global plant-based meat and seafood retail dollar sales and dollar sales growth by region (2022)



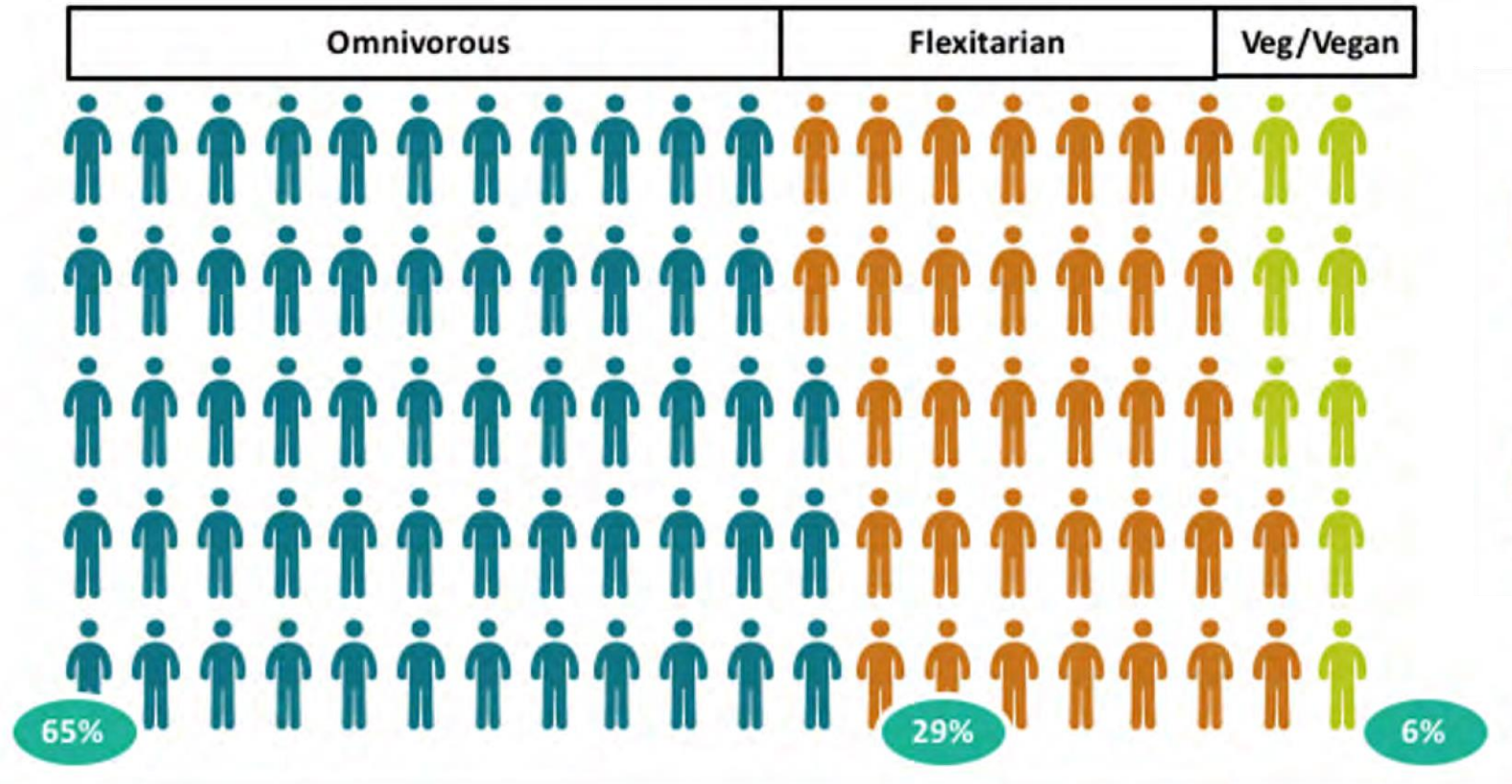
Source: Good Food Institute, 2022 State of the Industry Report, plant-based meat, seafood, eggs and dairy

# Global plant-based milk retail dollar sales and dollar sales growth by region (2022)



Source: Good Food Institute, 2022 State of the Industry Report, plant-based meat, seafood, eggs and dairy

# The Consumer Market is no longer just vegans and vegetarians



16%

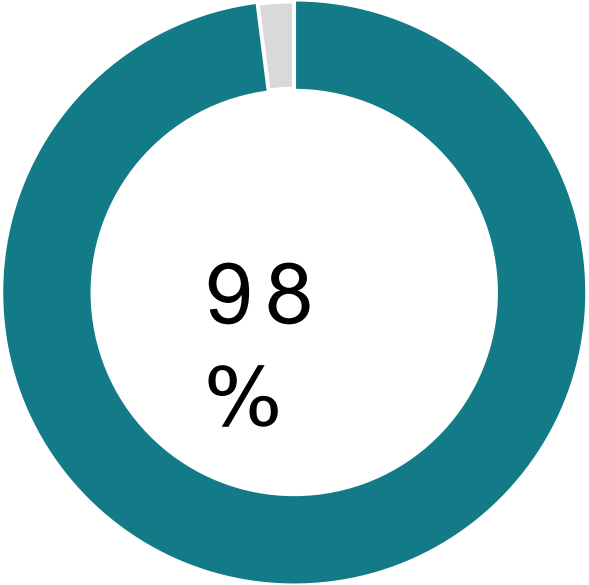
of consumers regularly use plant-based alternatives such as almond milk, tofu, and veggie burgers

89%

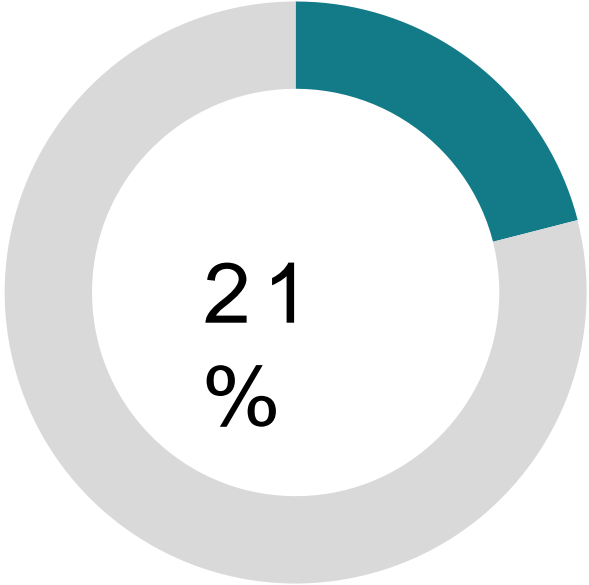
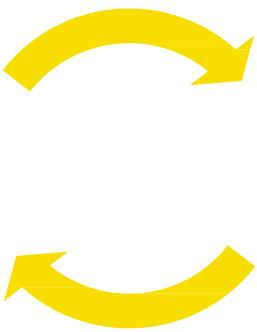
of these consumers do not consider themselves vegan or vegetarian

Source: Good Food Institute, Whitespace Opportunities in the Alternative Protein Sector

# Plant-based meat purchasing is driven by omnivores, as 98% of plant-based meat purchasers also buy animal-based meat



Of plant-based meat buyers also purchase animal-based meat

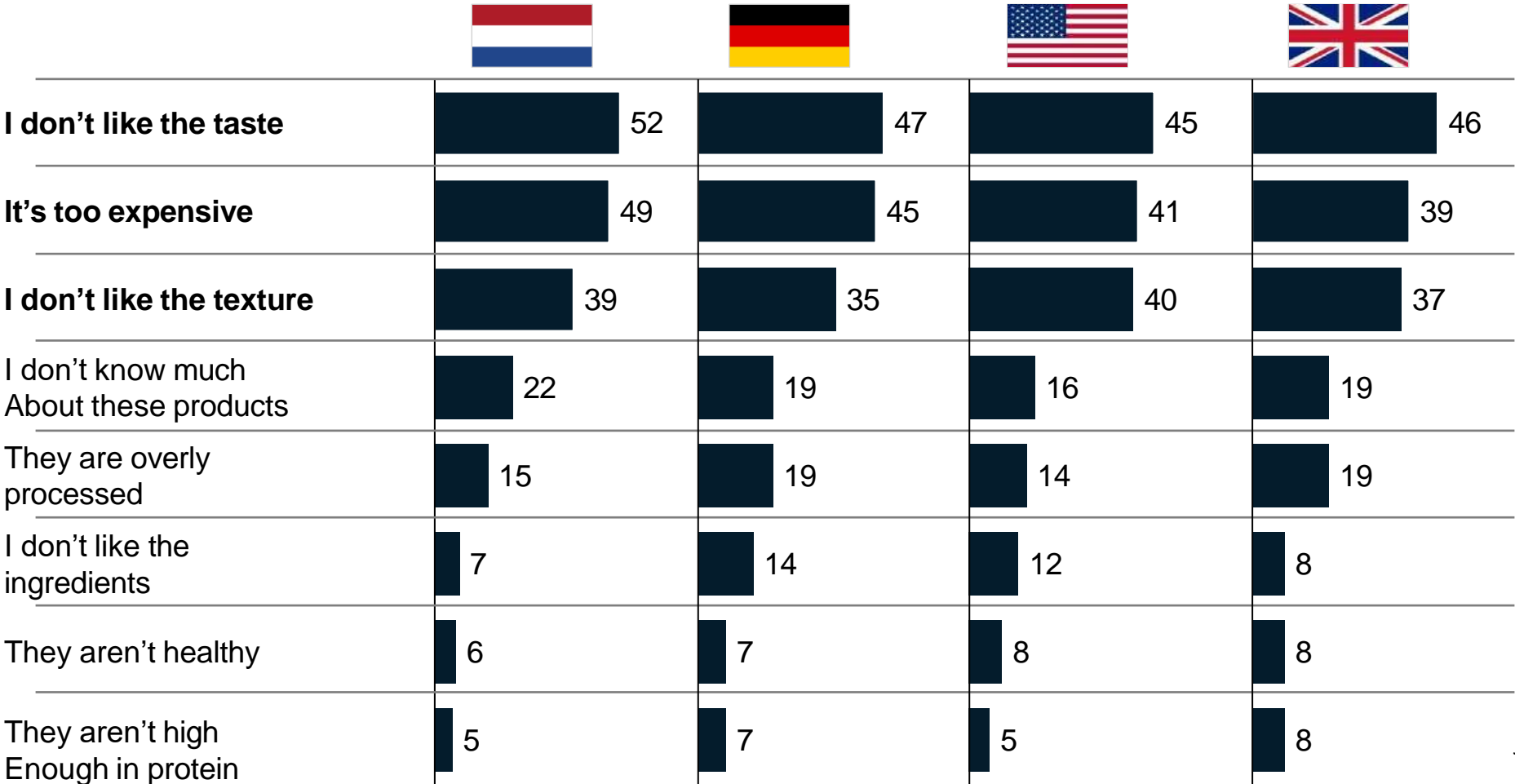


Of animal-based meat buyers also purchase plant-based meat

Source: Nielsen, "Meet the New 'Meat' Eater" (August 2019); Cultivate Insights, "Plant-Based Buyers and Their Favorite Brands" (September 2019)

# However, consumers consistently indicate that price and quality is limiting adoption

Why are you not consuming more alt meat? Pick 0-3 reasons, % respondents



Source: McKinsey Global Protein Survey 2022

# The top taste barriers reported for plant-based meat are focused on moisture, flavor, and texture



1

## Moisture

- Dry
- Lack of moisture/juiciness



2

## Flavor

- Too strong
- Beany taste
- Off flavor
- Unpleasant aftertaste



3

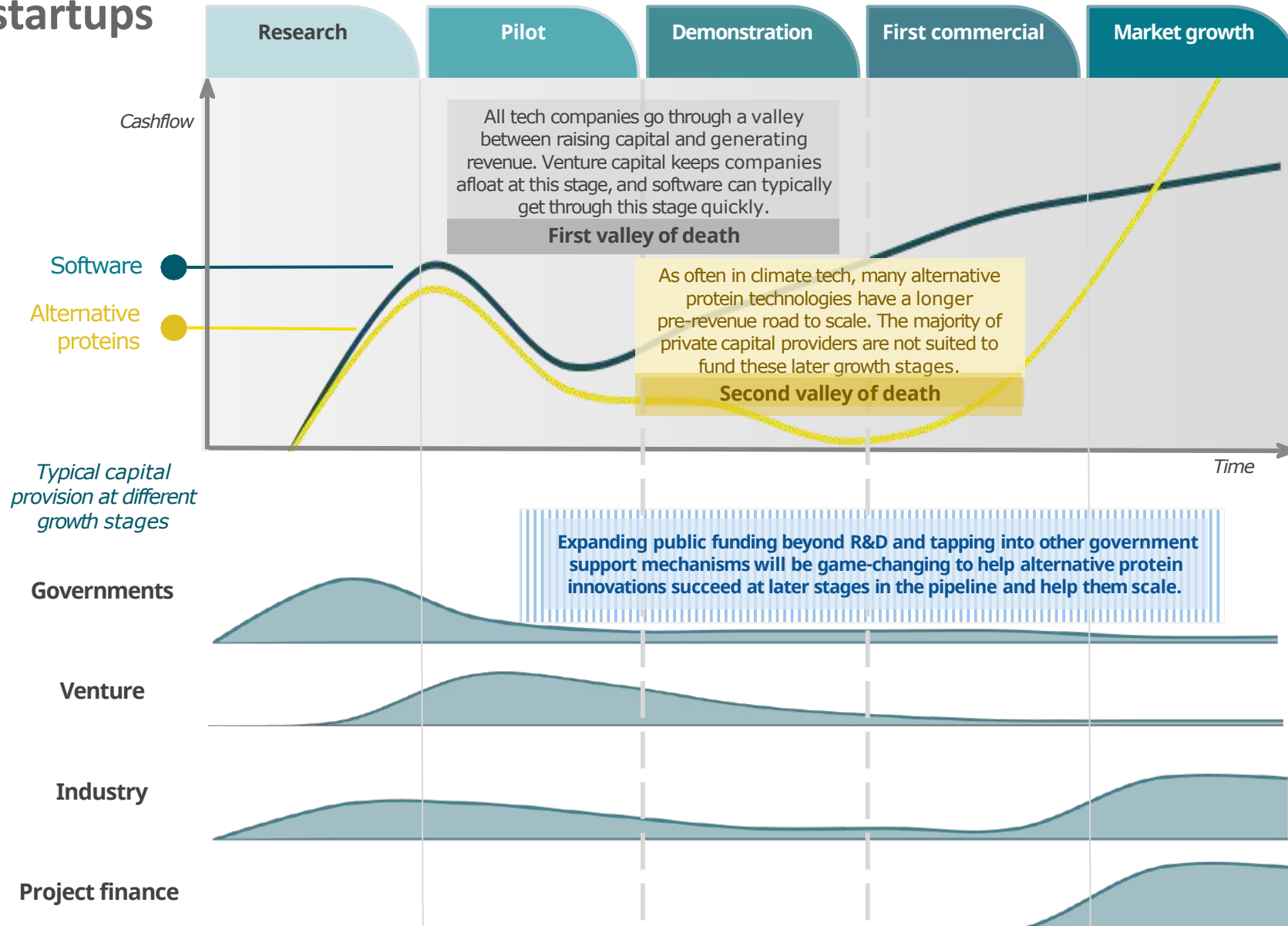
## Texture

- Too uniform
- Too compact
- Too soft or “mushy”

Source: Food Systems Innovations, “Chicken and Burger Alternatives: Taste Test Results” (December 2018)

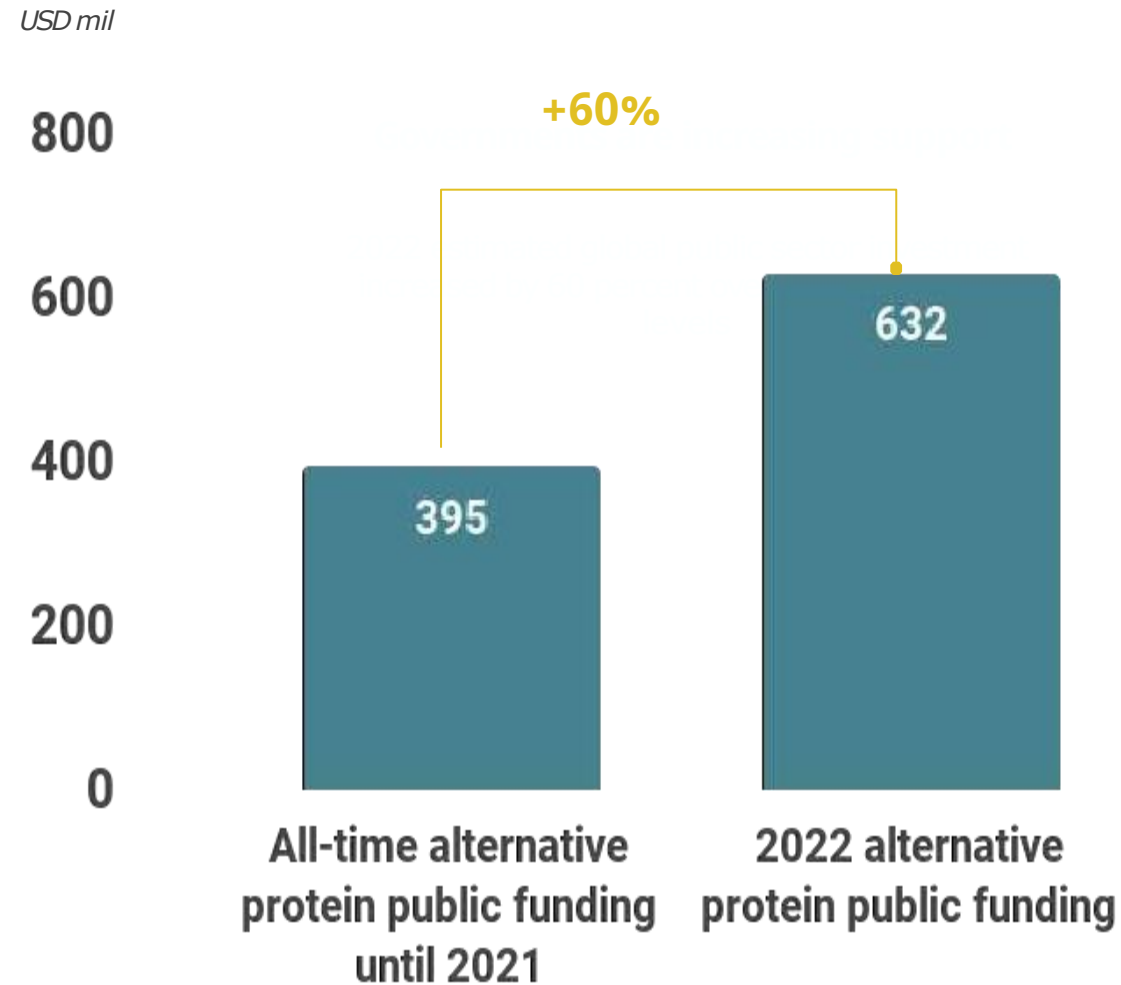


# Conceptual overview of unique scale-up (top) and funding (bottom) needs for alternative protein startups



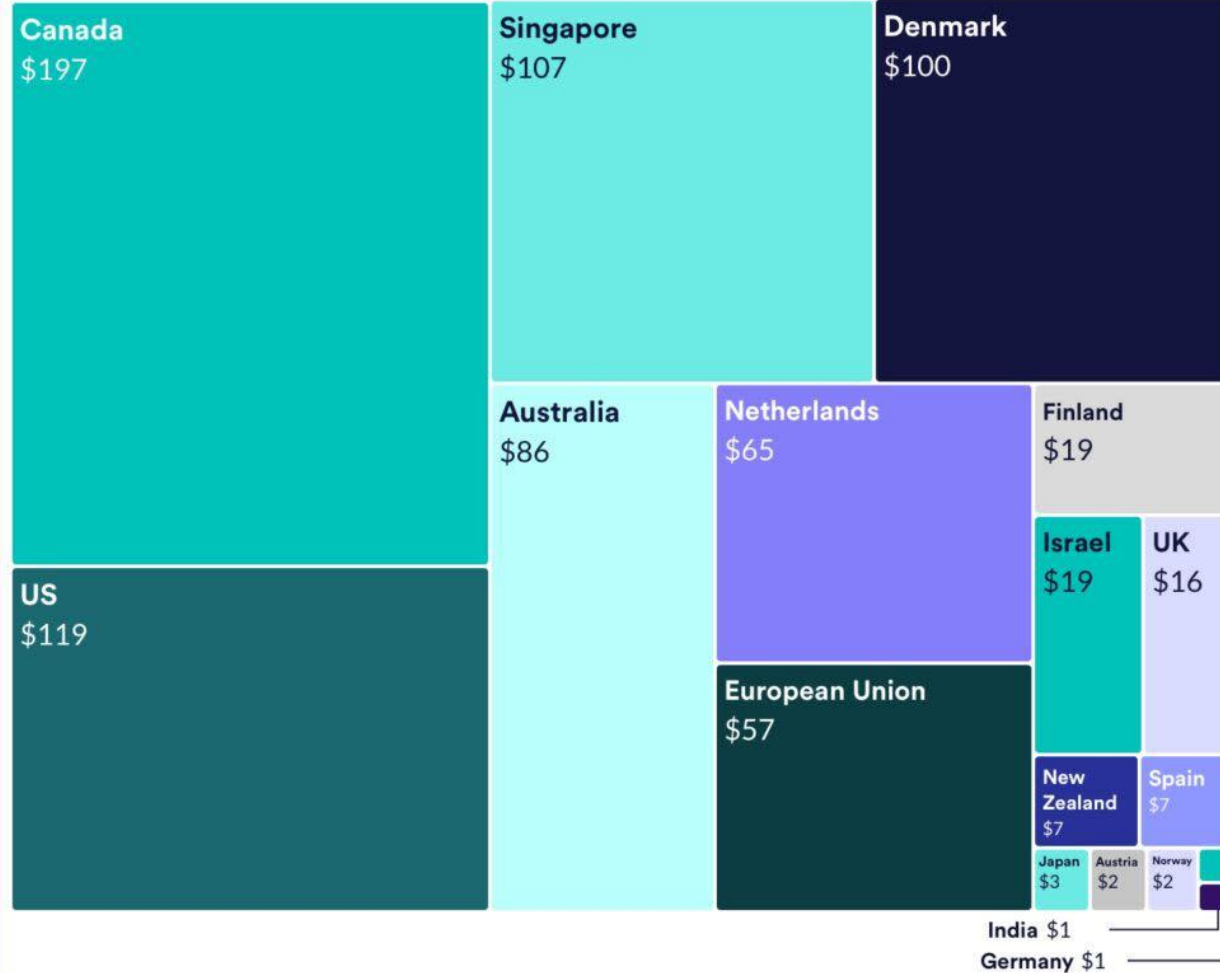
Source: Modified from Good Food Institute, *Alternative Proteins in APAC, 2023 Industry Report*

# Governments Are Stepping Up – Right Time, Right Place, Right Amounts?



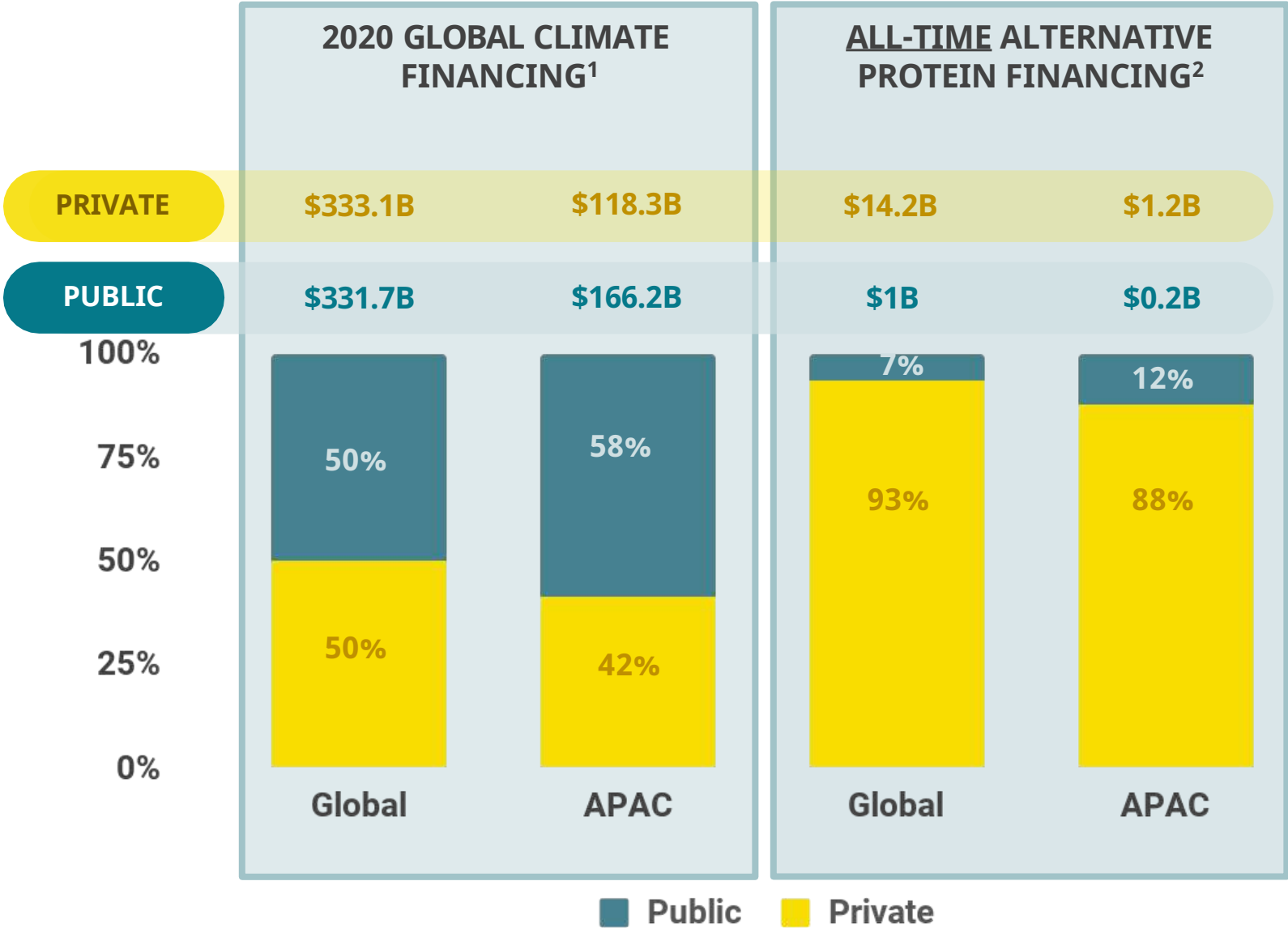
Source: Internal GFI analysis; based on year announced.

## Total government investments in alternative proteins based on public information (USD Million)



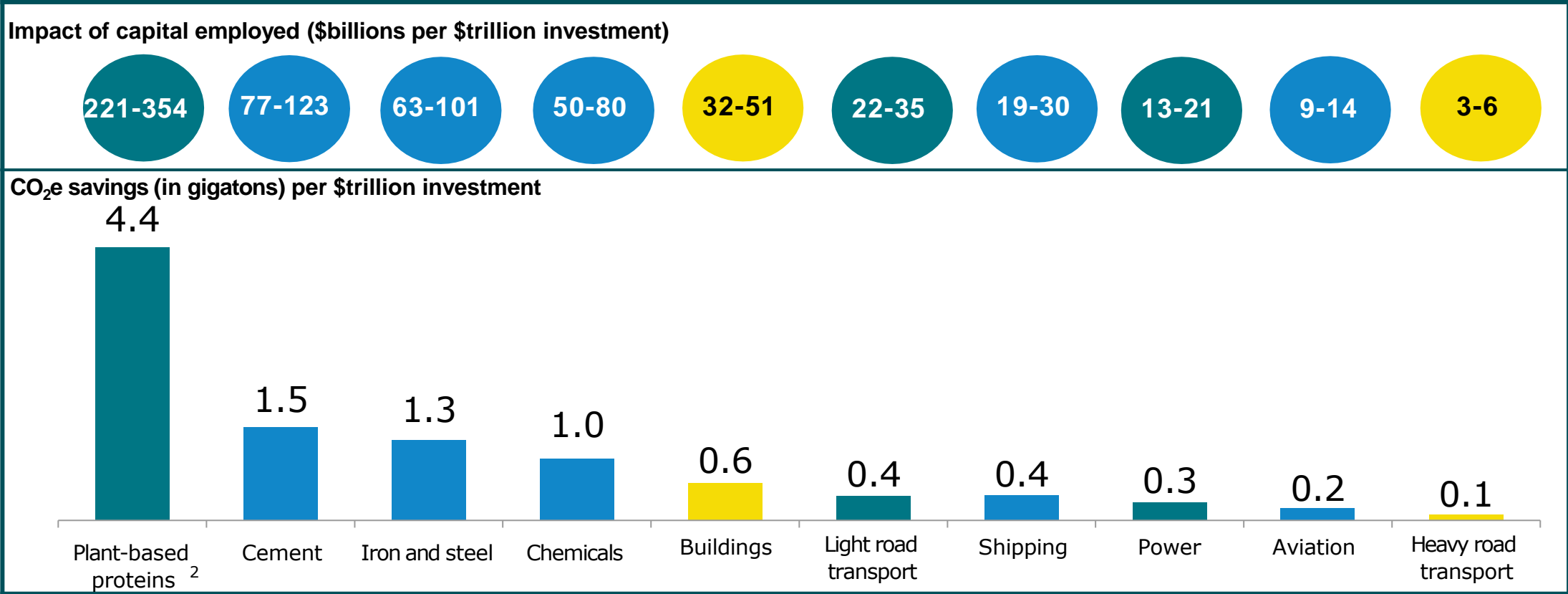
Note: This is a non-exhaustive list. Data collected is based on publicly disclosed investments supporting the alternative protein ecosystem. This means the total investments made by countries may be higher as not all investments are disclosed in the public domain. Source: FAIRR (2022)

# Funding for Alternative Proteins from Public and Private Sources Lags Behind Climate Financing



Source:<sup>1</sup> Based on most recent sector-specific datasets from Climate Policy Initiative. <sup>2</sup> Alternative protein financing from GFI analysis of policy and Pitchbook data.

# Investing in plant-based proteins has the highest CO<sub>2</sub>e savings per dollar of any sector



- **Mostly economic:** most investments in the sector, such as replacing animal-based proteins with alternative proteins at cost parity, are economically viable
- **Mixed:** some investments in the sector, such as building automation and roof insulation, are economically viable; others in the same sector, such as moving to heat pumps in older buildings, are not
- **Mostly uneconomic:** most investments in the sector, such as introducing carbon capture and storage in cement production plants (which adds costs, but no savings), are not economically viable

Source: BCG/Blue Horizon report: *“The Untapped Climate Opportunity in Alternative Proteins”*, Feb-April 2022, BCG/GFMA report, *“Climate Finance Markets and the Real Economy”*: BCG Analysis. 1)Market value for avoided tons of CO<sub>2</sub>e, assuming a price of \$50 to \$80 per ton. 2)CO<sub>2</sub>e savings from plant-based meat only (red meat, pork, chicken, fish, and seafood).

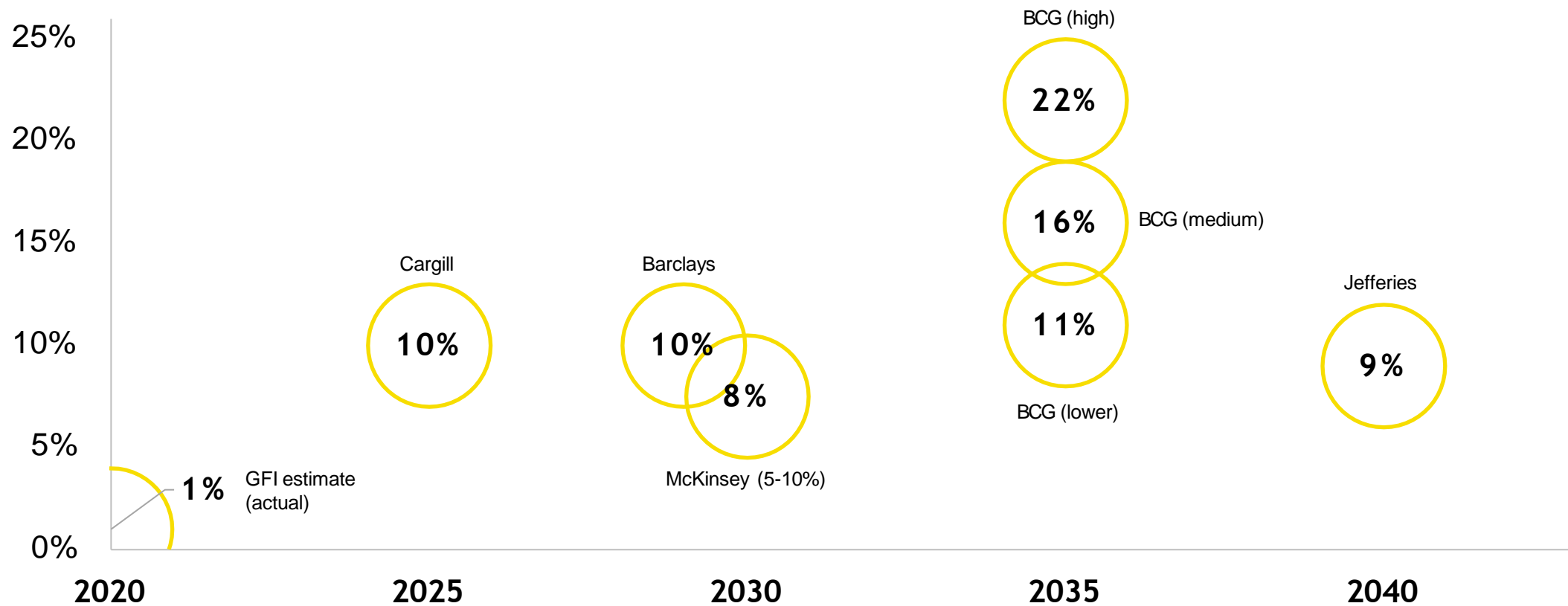
# Overview of Key Regulations on Plant Based and Cell Based Meat in the European Union

CRITERIA	PLANT-BASED MEAT	CELL-BASED MEAT
GMO Regulation (EU) No 1829/2003	Primarily applies to genome editing methods; hasn't been decided if leghemoglobin qualifies as a GMO.	If GMOs are used, GMO regulation will supersede the Novel Food Regulation; main GMOs pertain to genome editing methods.
Novel Food Regulation (EU) 2015/2283	Lacks a provision pertaining to plant-based products. Most plant-based ingredients have a history of safe consumption in the EU.	Has specific provision that includes cultured cells or tissues; always applies to CBM (unless superseded by GMO regulation).
EU Food Law Regulation (EC) No 178/2002	Typically the primary regulation for PBM as most do not contain GMOs or novel ingredients.	Applies to all food products in the EU but is not one of the prominent regulations for CBM.
Food Information to Consumers Regulation (EU) No 1169/2011	Impacts labeling requirements of the products. Must state that the food is plant-based and does not contain meat. Words such as "meat", "burger" and "sausage" might be restricted.	Impacts the labeling requirements of the products. Must state on the label that the meat was made from the tissue cultivation of animal cells. Words such as "meat", "burger" and "sausage" might be restricted.

Source: Josefine Andersson & Cassidy Hannah: To What Extent EU Regulations and Consumer Behavior Have Affected the Expansion of Alternative Proteins: A Comparison of the Plant-Based and Cell-Based Meat Markets, Master's Thesis, Uppsala University, Spring 2023



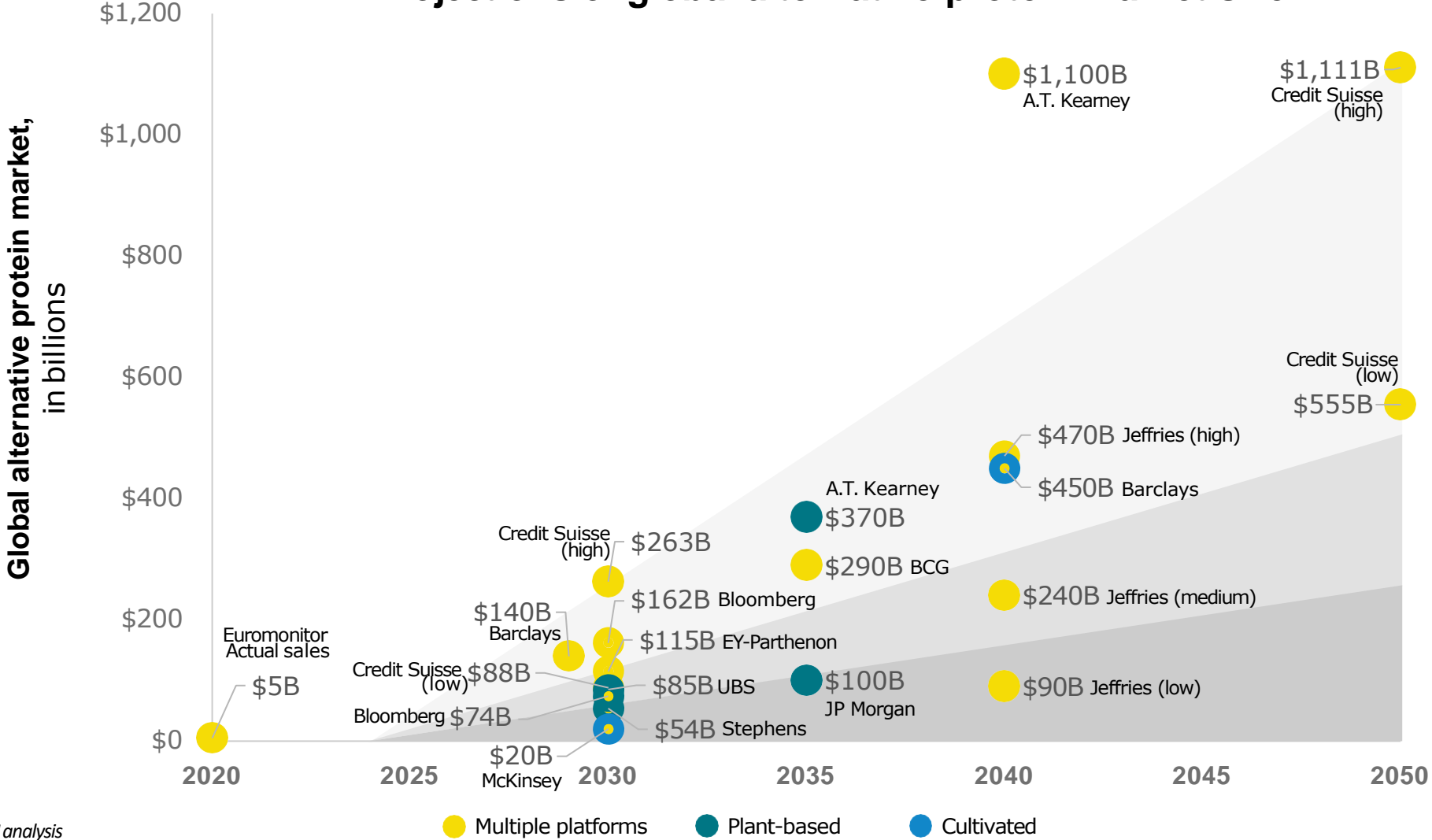
# Estimates for alternative protein's share of the global meat market



Source: Good Food Institute, *Whitespace Opportunities in the Alternative Protein Sector*

# Companies estimate the global alternative protein market may be as large as \$1T by 2050

## Projections of global alternative protein market size



**Global alternative protein market size by 2050:**

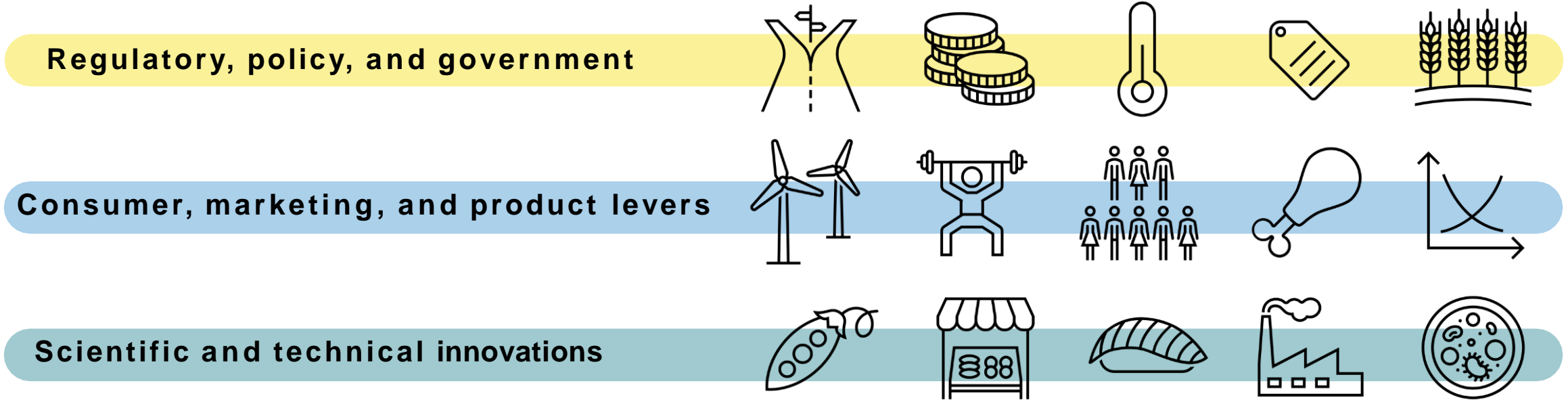
**High-yield scenario:**  
\$500+ billion  
20%+ CAGR

**Medium-yield scenario:**  
\$250 billion to \$500 billion  
~15-20% CAGR

**Lower-yield scenario:**  
Up to \$250 billion  
<15% CAGR

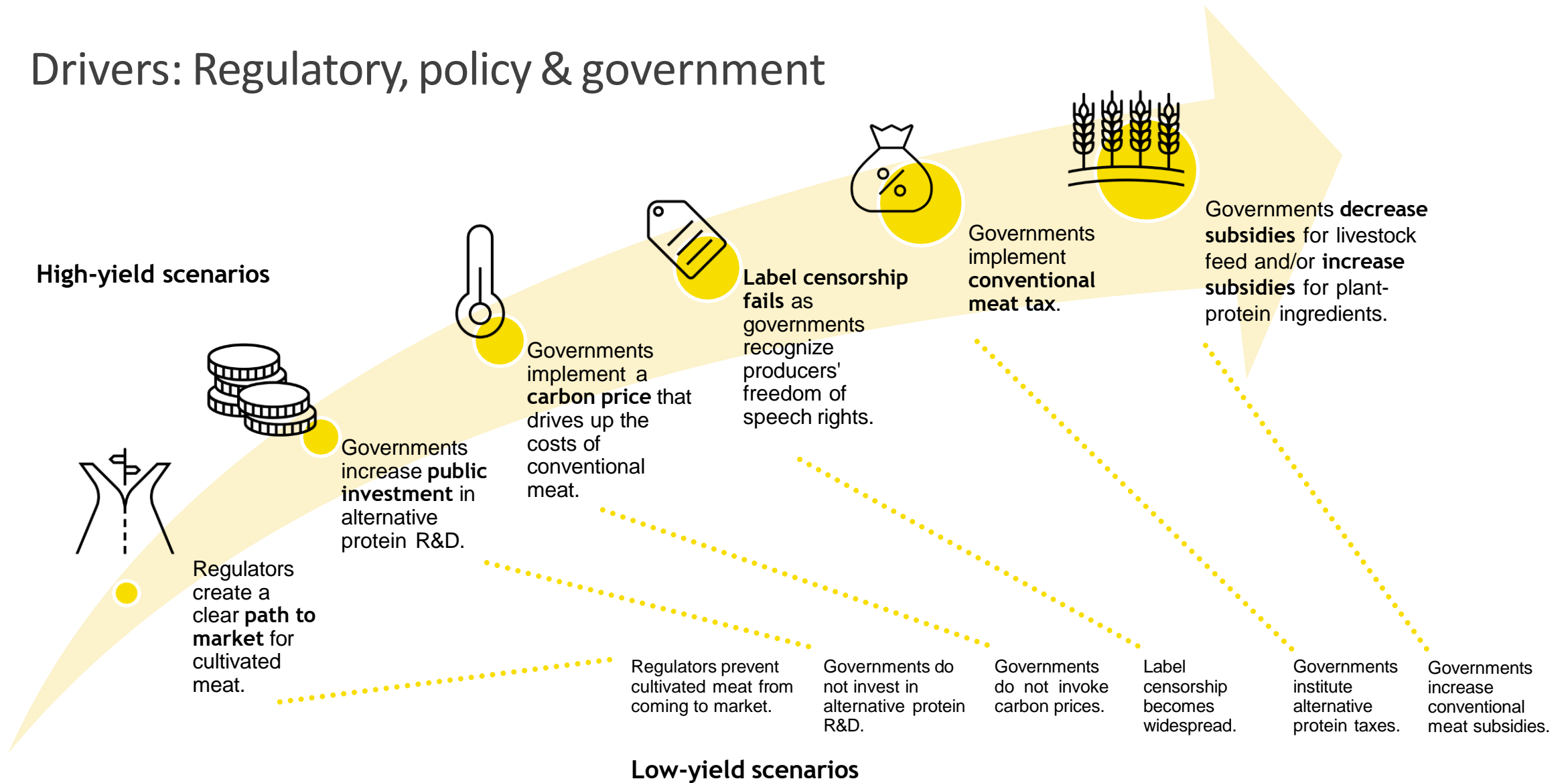
Source: GFI analysis

# What will determine the difference between a \$3 billion and a \$1 trillion market?



Source: Good Food Institute, Whitespace Opportunities in the Alternative Protein Sector

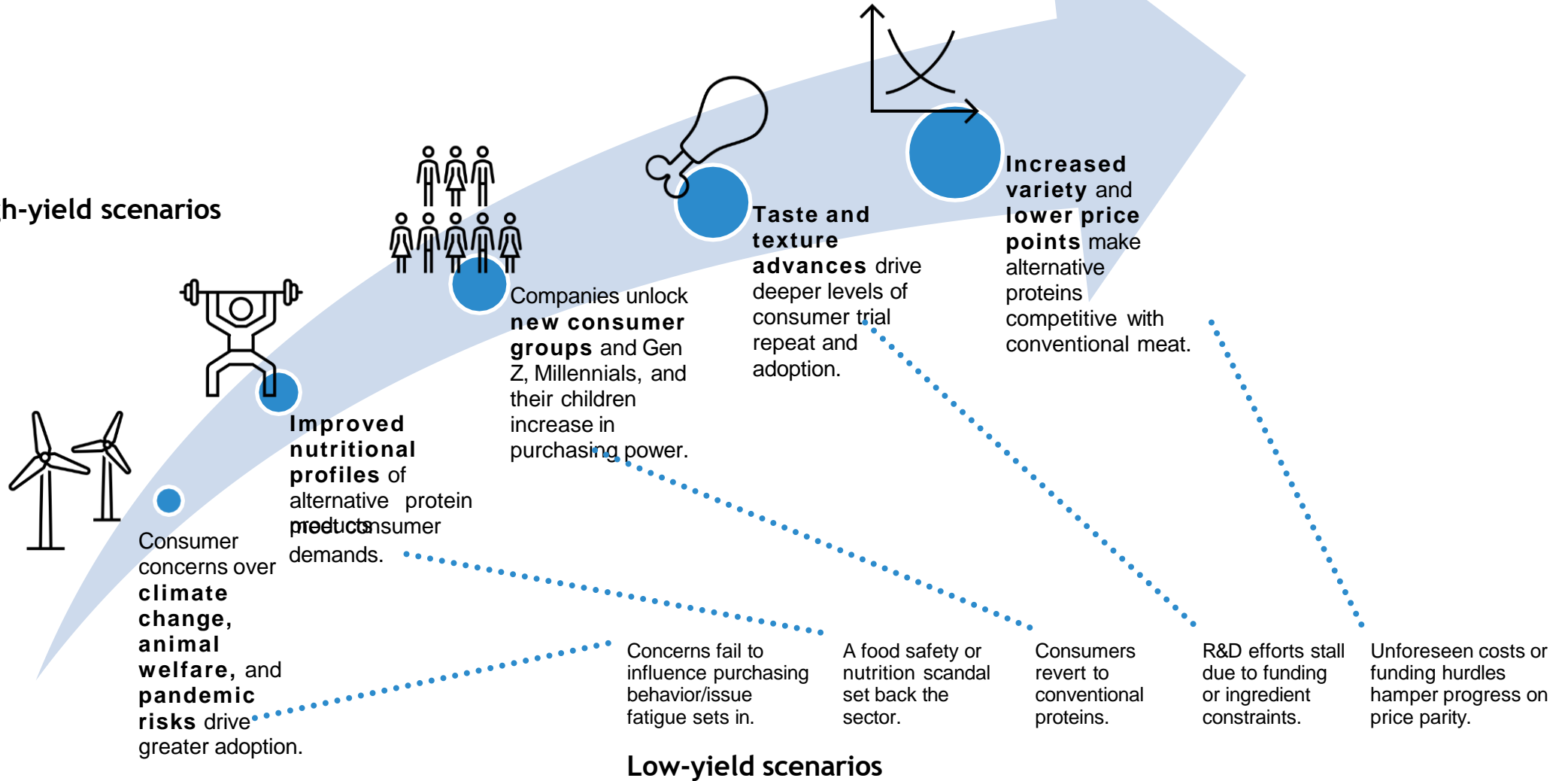
# Drivers: Regulatory, policy & government



Source: Good Food Institute, Whitespace Opportunities in the Alternative Protein Sector

# Drivers: Consumer, marketing, and product levers

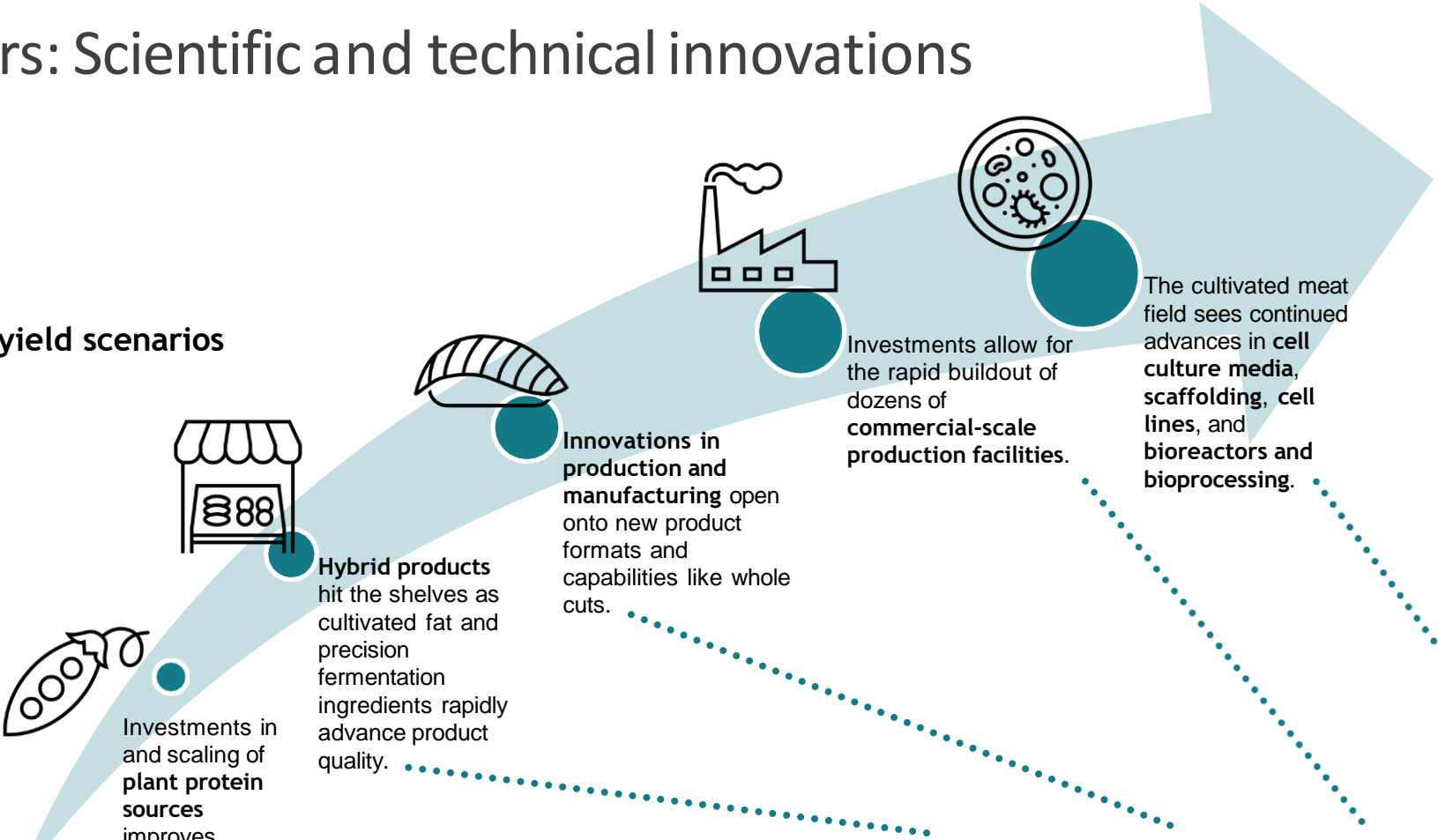
## High-yield scenarios



Source: Good Food Institute, Whitespace Opportunities in the Alternative Protein Sector

# Drivers: Scientific and technical innovations

## High-yield scenarios



Investments in and scaling of **plant protein sources** improves functionality and decreases prices.

**Hybrid products** hit the shelves as cultivated fat and precision fermentation ingredients rapidly advance product quality.

**Innovations in production and manufacturing** open onto new product formats and capabilities like whole cuts.

Investments allow for the rapid buildout of dozens of **commercial-scale production facilities**.

The cultivated meat field sees continued advances in **cell culture media, scaffolding, cell lines, and bioreactors and bioprocessing**.

Environmental changes stymie ingredient availability or commercial viability.

Lack of regulatory pathways impede ingredient development.

Lack of investments in production innovation/persistent technical challenges.

Lack of investor confidence in scaling solutions.

Researchers fail to identify cost-effective cultivation methods.

## Low-yield scenarios

Source: Good Food Institute, Whitespace Opportunities in the Alternative Protein Sector

# I Am Still Very Bullish On Alternative Proteins Because...

- Alternative Proteins are now on the Agenda of most Governments
- While Funds have taken a breather, there is still very high interest in this space, and much more diversity of investments
- We see that Consumers are still very interested and motivated to keep trying new products AND they are developing a differentiated taste
- Retailers are showing much more interest and are beginning to be drivers of a more differentiated offering
- Innovation in this space is accelerating (eg Bezos Earth Fund, Sustainable Protein Research Center Israel, EIT Food)





Thank you,

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