Alternative Proteins: Hope or Hype?

(替代性蛋白質:希望還是炒作?)

Potential Implications for Animal Agriculture

(對畜牧業的潛在影響)

USDA

Christine McCracken
Executive Director, Senior Protein Analyst
February 21, 2019

Rabobank

Alternative Protein Reaches a Tipping Point

(替代性蛋白質抵達轉淚點)

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- Alternative proteins options are proliferating
  (替代性蛋白質的選擇正在急速增加)
- Plant-based products are gaining traction
  (植物性產品越來越受歡迎)
- Demand for alternative proteins is global
  (替代性蛋白質需求是全球議題)
- Regulation and supply chain are potential constraints
  (替代性蛋白規章及供應鏈為潛在約束)
- What does this mean for animal protein?
  (對動物性蛋白的意義所在?)

Plant-based proteins still relatively small
(目前植物性蛋白質供應量較動物性蛋白質少)

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Domestic
plant-based
protein
$1 billion
美國植物性蛋白質約1億美元

Source: Euromonitor, Rabobank 2020

(替代性蛋白質供應量已大幅成長)

Growth in alt proteins has been massive

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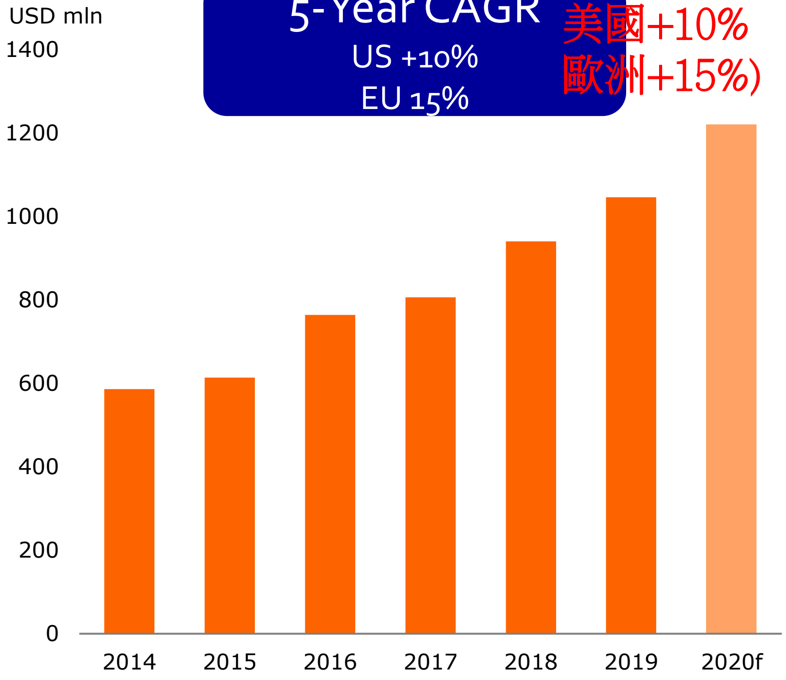
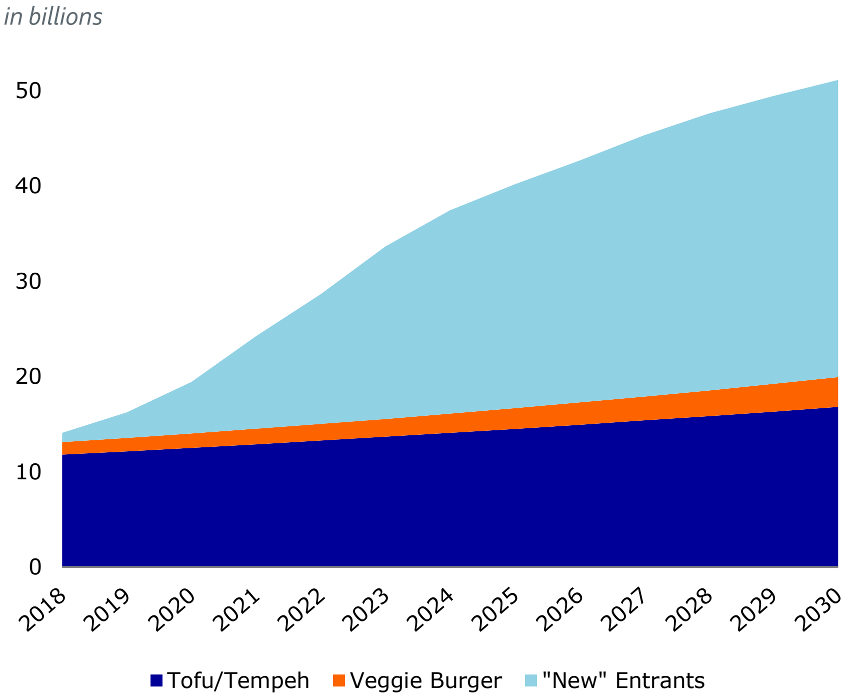
5-Year CAGR
US +10%
EU 15%

(複合年增長率
美國+10%
歐洲+15%)



Source Euromonitor, Rabobank 2019

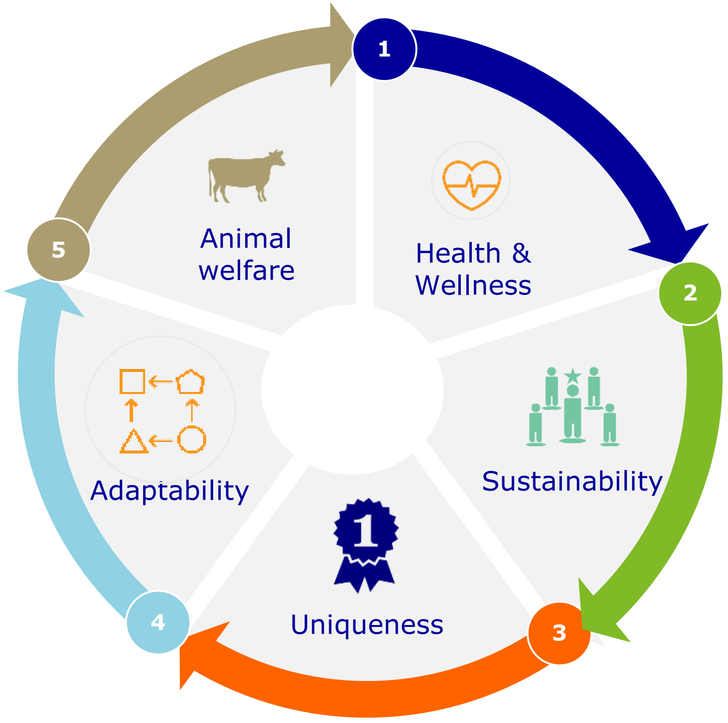


(豆腐/豆類製品、素食漢堡、新型態素食製品)

(替代蛋白質的多樣化成長因素)

Multiple drivers of alt protein growth

Rabobank



Source: Rabobank, 2019

1 Consumers striving to find "better-for-you" products
- Plant-based products have health halo
- Growing backlash on heavily processed items
- Next generation of products will be better

消費者努力尋找"對你更好"的產品
-植物性產品與健康掛勾
-對加工產品的反彈
-下一代的產品會更好

2 Growing interest in sustainable production
- Conflicting studies on animal footprint generate confusion
- Industry impact on water, land and air under scrutiny

對永續發展產品興趣濃厚
-引發對動物生產碳足跡的疑慮
-嚴格審查產業對環境影響

3 Consumers looking for "new and exciting"
- Younger generations increasingly experimental
- Global market driving interest
- Influencers have changed

尋求"新穎與刺激"的消費者
-年輕消費者對新產品接受度高
-全球市場推動興趣
-影響已經改變

4 Consumers looking for more versatile protein options
- Proteins viewed as an ingredient; not center-of-the-plate
- Ingredients tailored to meet nutritional or religious goals

消費者尋找更多植物蛋白質選項
-蛋白質只是一種成分，不是餐盤主要核心
-為滿足營養需求或宗教目的

5 Animal welfare advocates are gaining traction
- A small, but vocal minority of advocates toward veganism
- Shrinking involvement in agriculture distances consumer from source

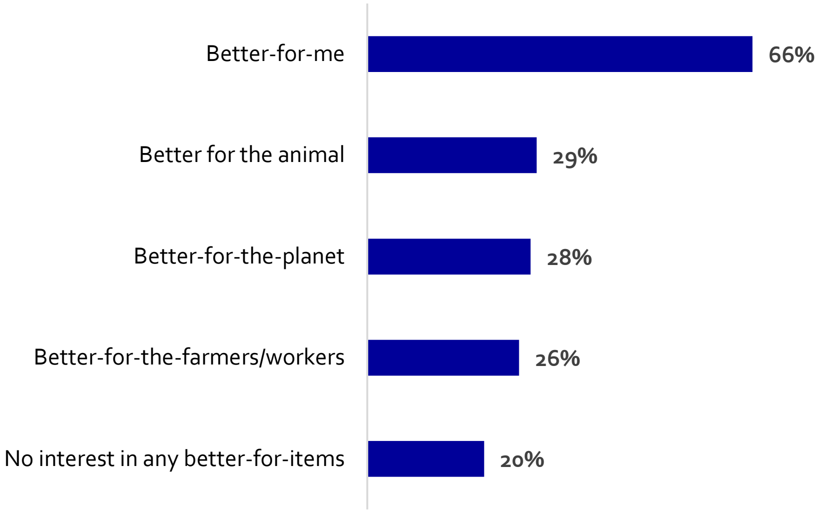
動物福利倡導者受到關注
-少數且反對素食主義者
-消費端與生產端越來越遠

(健康導向影響蛋白質選擇)

Health goals driving protein choices

(三分之二消費者尋找更健康的蛋白質選項)

2/3 of consumers looking for healthier protein options



Health #1 for baby boomers

Environmental impact #1 for millennials

Source: NAMI, 2019

(健康相關鬥爭正在升溫)

Battle over health is heating up

Rabobank

Chipotle says Beyond Meat is too processed to put in its stores -July, 2019

(植物肉過度加工)

Whole Foods CEO says plant-based 'meat' is unhealthy -August, 2019

(植物肉是不健康的)

How ultra-processed food took over your shopping basket-February, 2020

(過度加工食物佔據你的菜籃)

紐約時報:科學家稱吃更少紅肉是不好的建議

The New York Times

Eat Less Red Meat, Scientists Said. Now Some Believe That Was Bad Advice.

(營養不足)

Nutritional benefits are underwhelming

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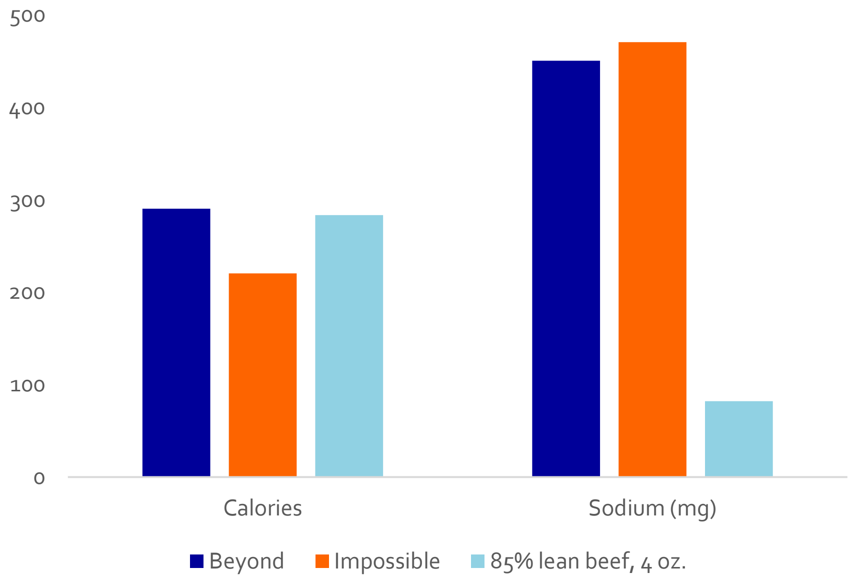
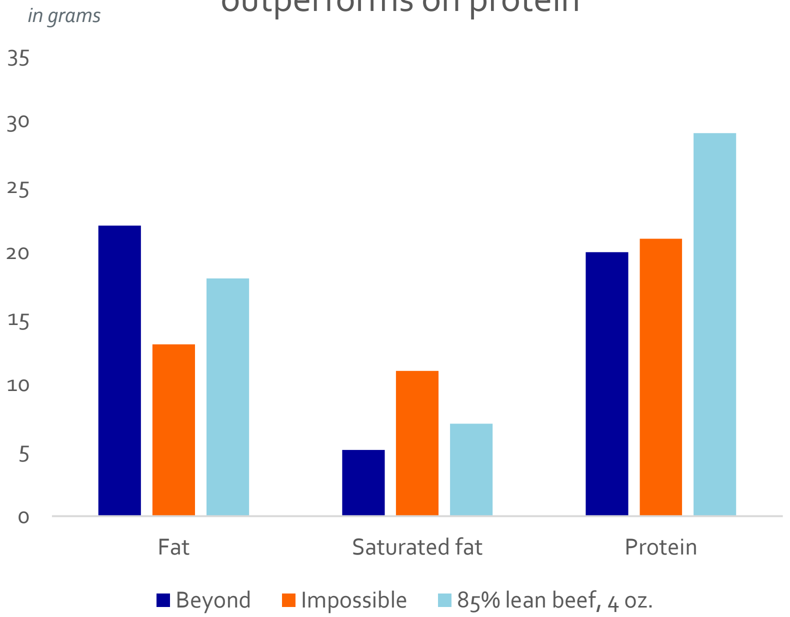
植物肉熱量差不多，但鹽分更高

Calorie counts are similar, but sodium differences are significant



脂質表現參差不齊，且純牛肉蛋白質含量最高

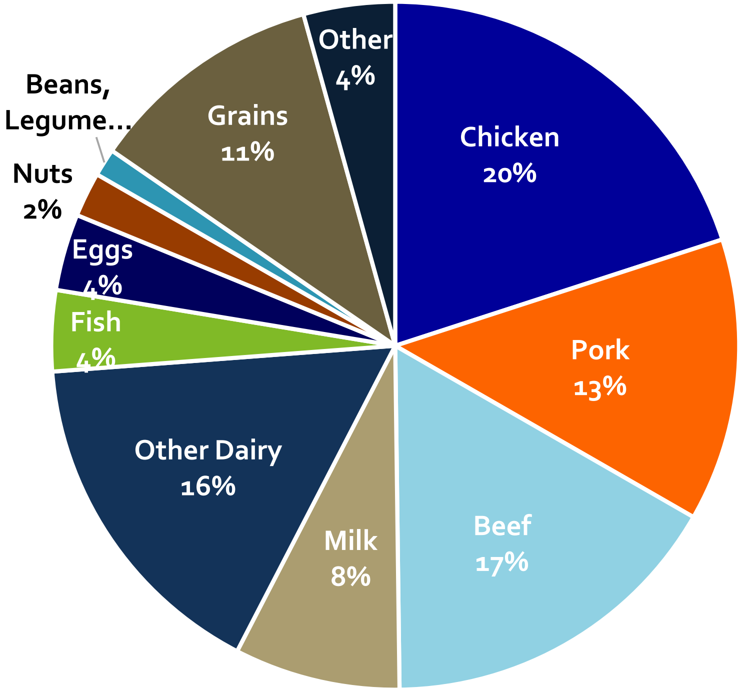
Fat levels are mixed, while beef outperforms on protein



Source: Company reports, USDA and Barclays, 2020

美國消費者尋求更高的蛋白質

US consumers seeking higher protein



Source NAMI, Stanford, Rabobank 2019

消費者對動物蛋白質認知不足

...yet few consumers able to identify animals as a source

45% failed to identify beef as high protein

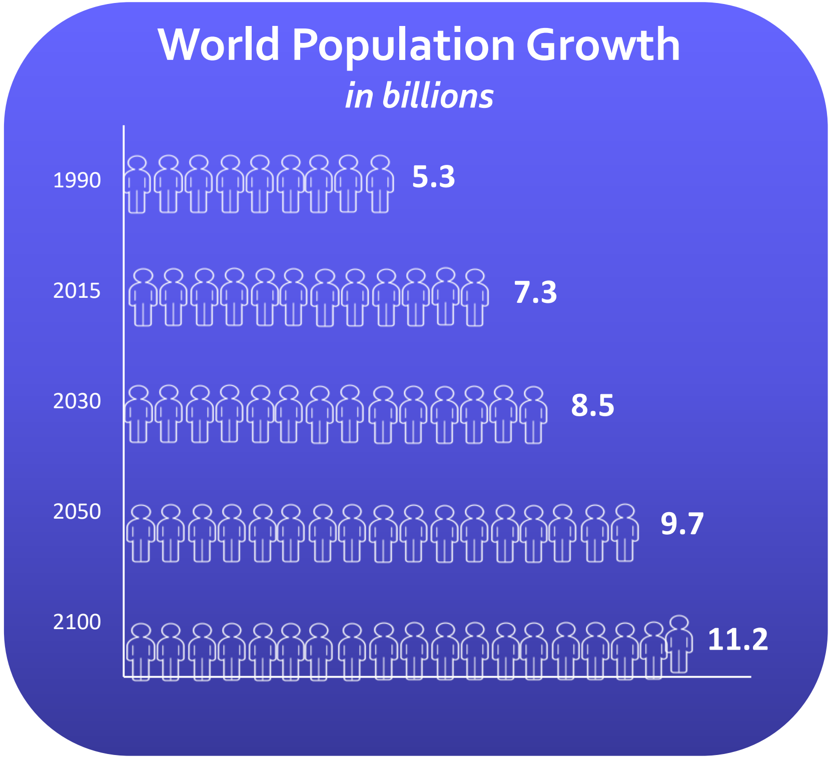
58% failed to identify chicken as high protein

64% failed to identify pork as high protein

蛋白質需求可能大於供給

Protein needs could outpace supply

世界人口成長預測



全球收入與動物蛋白質成長比例

Source: UN, FAO, and Rabobank, 2019

動物生產進步成果被忽視

Animal productivity gains overlooked

動物生產已減少水資源耗用及碳足跡

Industry water use

-20%

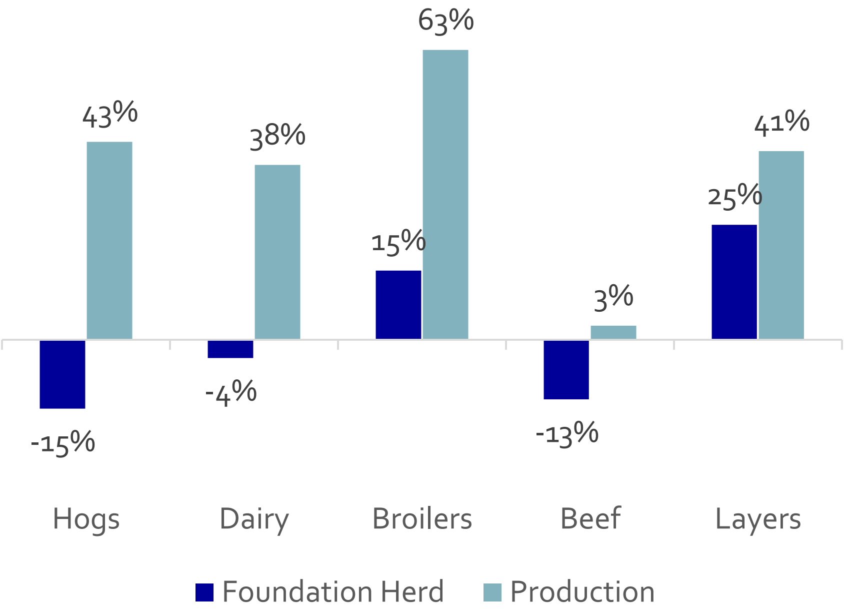
in 20 years

Carbon Footprint

Source: Animal Ag Alliance, Rabobank, 2019

美國20年生產變化

20-year productivity change in the US



在養頭數及產量比較，顯示生產效率有所提升

The Future is Flexitarian

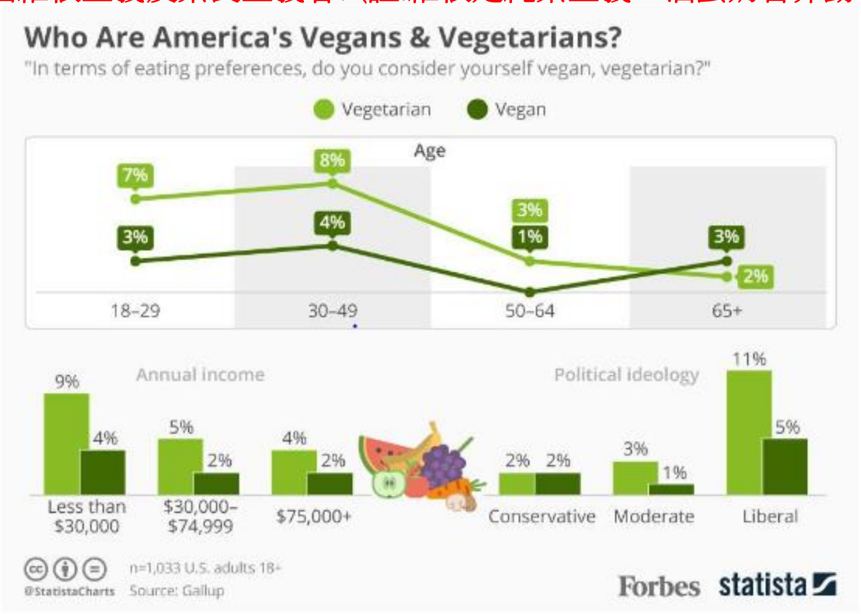
彈性素食者是未來趨勢(註:非純素但提高素食攝取比例)

彈性素食主義推動替代蛋白質趨勢

Flexitarians are driving alt protein trends

2019 Market Segmentation (in millions) 2019市場區隔分析

誰是美國維根主義及素食主義者? (註:維根是純素主義，油蛋奶皆非動物性產品)



"In terms of eating preferences, do you consider yourself vegan, vegetarian?" STATISTA

註:素食主義者特色為年紀較輕、年收入較低及政治傾向自由者

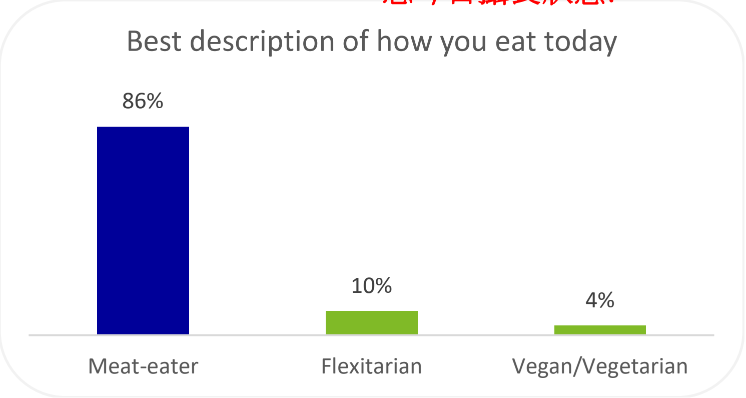
54%嘗試減少肉類消費

54% trying to reduce their meat consumption

24%消費者曾購買植物肉

24% of all consumers purchased plant-based meat

您今日攝食狀態?



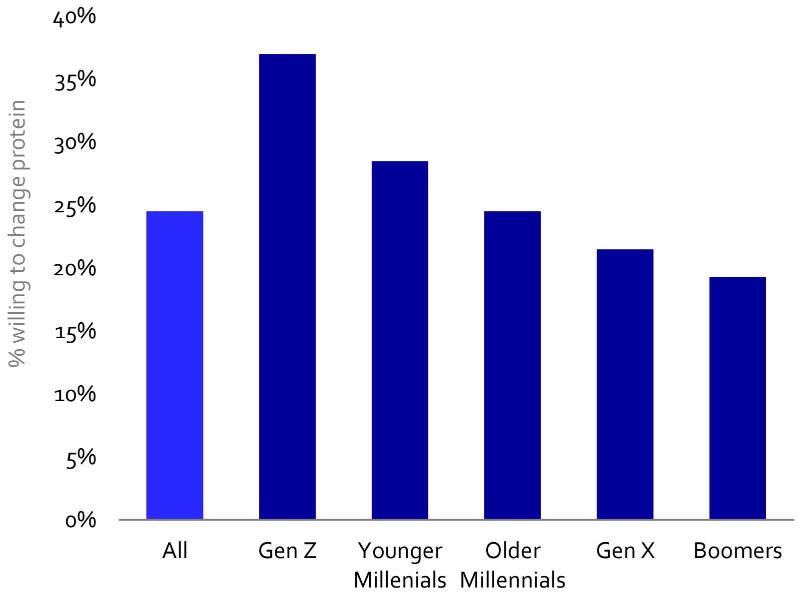
Source: Gallup, NAMI, Rabobank 2019

彈性素食者是消費目標

Flexitarians are the target customer

年輕者有更高意願改變蛋白質來源

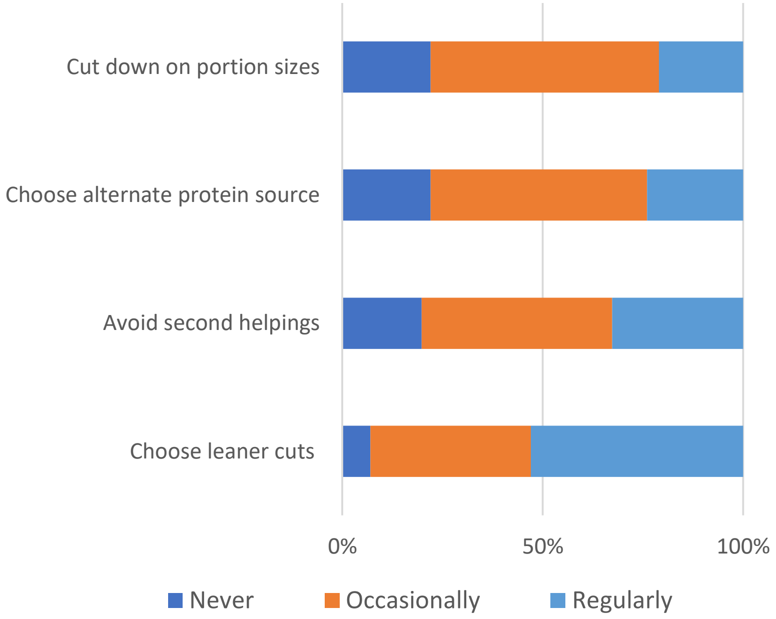
Youth more likely to change protein source



Source Euromonitor, Rabobank 2019

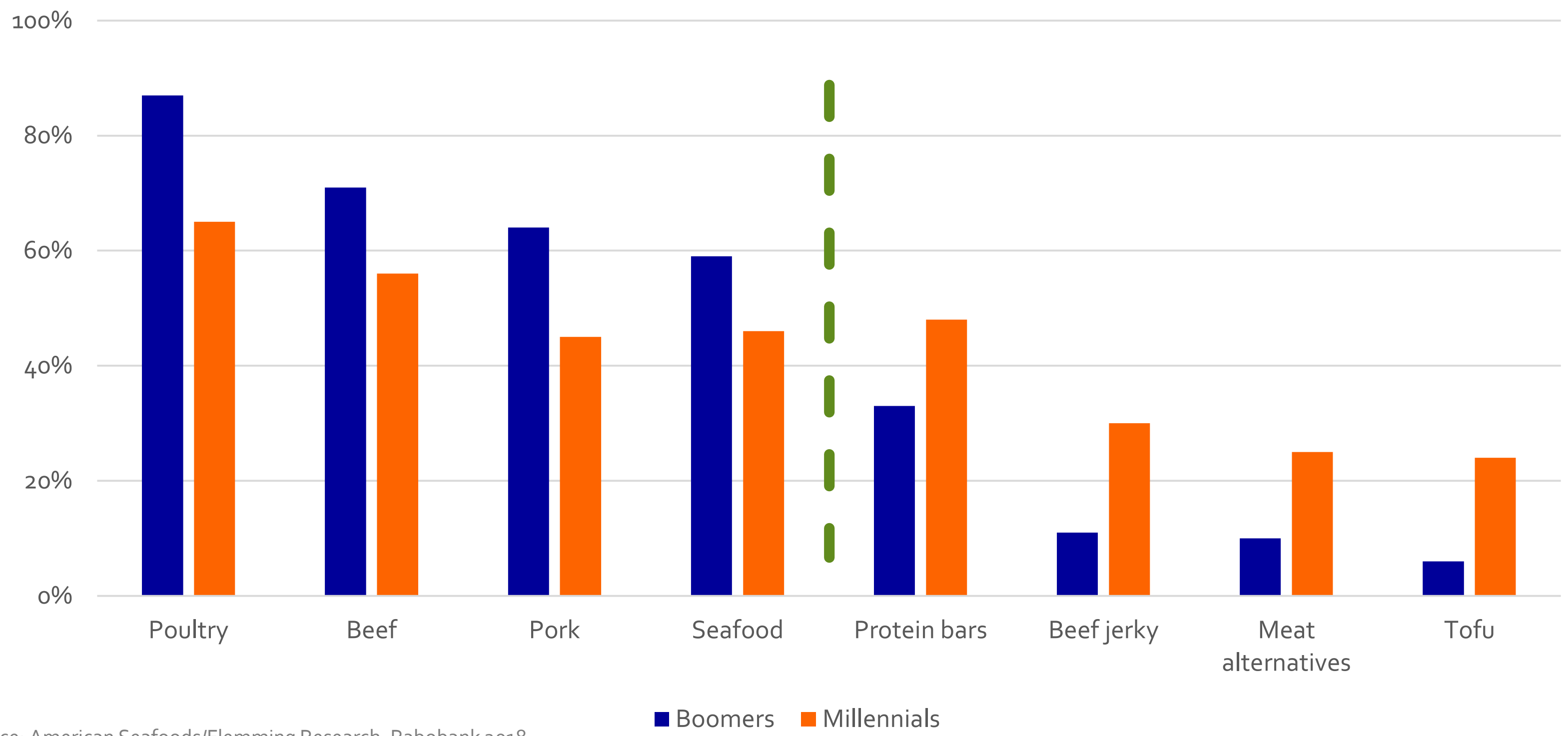
消費者減少攝食動物蛋白質，並非完全限制攝取

Consumers reduce, but not eliminate animal protein



千喜世代接受多樣蛋白質來源

Millennials favor more diverse proteins



戰後嬰兒潮、千喜世代

Source: American Seafoods/Flemming Research, Rabobank 2018

人口行為改變因素

Populations likely to shift behavior

K-12

Inconsistent school curriculum
Meatless Mondays
Information from people they trust

學校課程變化
星期一無肉日
仰賴信任者資訊

Colleges & Universities

More experimental
Food availability is key
Establishing buying patterns
Influence each other

更多試驗精神
食物供應方式是關鍵
並建立購買模式達到交互影響

Boomers

Less likely to shift channels
Health-focused
Health professionals influence
Media and friends are key

觀念難以轉換
高度專注健康
健康專業媒體或朋友是改變關鍵

替代性蛋白質正在緩緩進步

Alternative proteins are slowly evolving

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Plant-Based

Emerging

新興蛋白質

Cellular Meat

細胞培養肉

Today → *2030?*

植物肉曾是利基市場(小眾市場)

Plant-based had been a niche business

Rabobank

BEYOND MEAT

Lightlife

IMPOSSIBLE

dr. Praeger's

Hampton Creek

FIELD ROAST

Boca

MorningStar Farms

Amy's

Gardenburger

Tofurky

Quorn

gardein

Yves

現今各式品牌蓬勃發展

Plant-based now a crowded category

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The Herbivorous Butcher
Beyond Meat — The Future of Protein
Alt Foods
Lightlife — Since 1979 — Plant Protein
No Evil Foods — Asheville, NC
Naturli'
no cow.
Impossible
Before the Butcher
Upton's Naturals
samhoud
Primal Spirit Foods
Dr. Praeger's — Purely Sensible Foods
Daring Foods
Schouten
IKEA
Sol Cuisine — Plant Protein Solutions
Field Roast
Sweet Earth — Enlightened Foods
right{treat}
Vivera
Ojah — Producer of Plant
Boca
Mighty·Meat
MorningStar Farms
The Jackfruit Company
Amy's
Moving Mountains
The Vegetarian Butcher
Naturinni
Hari&Co — Prends-en de la graine !
The Craft Meat Co.
Vegafit
Gardenburger
wholly veggie!
Gusta — Artisanal • Vegan
Garden Gourmet
Yves Veggie Cuisine
Quorn
V Bites
Vegusto
gardein
JUST
Cauldron
Tofurky — Family Owned Since 1980
Very Good Butchers — Plant Based Butchery — British Columbia
Wicked Healthy
Like Meat
The Better Meat Co.
The Abbot's Butcher — Artisan Plant-Based Meats
Vegan Cartel London
Flowfood — By the Flowfood Company

替代漢堡肉比較

Battle of the burgers

Options have evolved

BEYOND MEAT

- Pea-based protein, coconut oil, beet juice (for color)
- Both retail and foodservice
- On 6 Continents & 50 countries
- In mainstream retail incl. Kroger, Safeway, Target, Whole Foods
- Beyond Burger; Beyond Sausage & Crumbles
- Chicken strips being reformulated

豌豆蛋白、椰子油及甜菜汁(調色用)
零售及餐飲通路

IMPOSSIBLE

- Wheat and potato proteins, canola oil, leghemoglobin (heme) - a genetically-modified ingredient
- Product 'bleeds' like a burger
- Focused on foodservice trade
- Recently launched in retail
- Impossible Burger, Breakfast Sausage Sandwiches, Meatballs

小麥及馬鈴薯、低芥酸菜籽油、豆製血紅蛋白
專注餐飲通路

Source: Company reports

市場策略區別

Go-to-market strategies differ

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Foodservice partnerships are key 餐飲通路合作關係是關鍵

BEYOND MEAT

A&W, Bareburger (Organic), KFC, Carl's Jr., Del Taco, Dunkin', veggiegrill, just salad, Subway, TGI Fridays, UNO Pizzeria & Grill (Est. 1943), Tim Hortons, BurgerFi

Giant, Kroger, Harris Teeter (Neighborhood Food & Pharmacy), meijer, Safeway, Publix, ShopRite, Sprouts Farmers Market, Target

IMPOSSIBLE

Burger King, The Cheesecake Factory, Hard Rock Cafe, Little Caesars, Fatburger, Red Robin (Gourmet Burgers and Brews), White Castle, Umami Burger, Qdoba Mexican Eats

Gelson's, Wegmans, Fairway (Like No Other Market)

Source: Company reports

餐飲通路是關鍵切入點

Foodservice a critical entry point

- ✓ Low cost trial 低成本通路測試
- ✓ Control and ease of preparation 便於掌控及準備
- ✓ Generate buzz 達到宣傳效應
- ✓ Not known for health food 不以健康食品著稱 (打入大眾食品市場)
- ✓ Often sell more beef when offering plant-based
  供應植物肉同時銷售告多牛肉
- ✓ Still underpenetrated at QSR
  在美國品質系統法規仍滲透不足?

零售市場機會可能有更多限制

Retail opportunity may be more limited

傳統通路溢價3至4倍?

- ✓ Current premium 3-4x traditional

  more promotion needed 需要更多推廣

- ✓ At home preparation ≠ foodservice

  more trial may be required 在家備餐不等於餐飲通路

- ✓ Competition will increase with new entrants 與新型態食品競爭更加激烈

  will help build redundancy

- ✓ Retailers introducing private label

  面對零售商自由品牌競爭

植物肉將傾向線上通路

Plant-based will over index on-line

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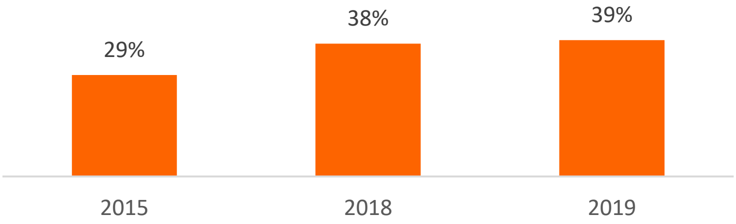
Meat-eaters still prefer in-store experience 肉食者依舊傾向商店購物體驗

Online shopping by generation	
All	39%
Younger Millennials	51%
Older Millennials	47%
Gen X	38%
Boomers	25%

Have purchased groceries online in the past year



Source: NAMI, POM 2019

植物肉的混雜因素

How will plant “blends” factor

Rabobank

− Cons	Pros +
Crowded category 品牌擁擠 (1)	(1) Limited growth in traditional protein 傳統蛋白質的成長限制
Low barriers to entry/IP 低門檻/低知識產權壁壘 (2)	(2) Double-digit growth in alternatives 替代蛋白質雙位數成長
Make vs. buy 製造與購買 (3)	(3) Consumers’ willingness to try 消費者嘗試意願

Kellogg's, Maple Leaf, Cargill, Hain Celestial, Perdue, Tyson, Hormel Foods, Conagra Brands, Nestlé, KraftHeinz, Unilever, JBS Making Your World Stronger

組織培養肉即將上市

Cultivated meat coming soon-ish

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Companies have "proof of concept"
Costs lower; but not at scale

擁有概念驗證公司成本更低，但不具規模

Regulation a potential constraint
Industry not aligned on core approach

監管行業潛在風險不符合核心方法

Consumer acceptance unknown
Likely to be introduced in foodservice, minced

消費者接受度未知，可能由餐飲通路開始推廣

Environmental impacts not fully estimated
Energy, water, & waste impact to be determined

對環境影響尚未通盤評估

A shorter, but growing list

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MISSION BARNS

JUST

SavorEat

mosameat THE MEAT REVOLUTION

biftek.co beef tech!

WILD EARTH

SuperMeat

NEW AGE MEATS

Integriculture

Finless Foods

NOVA MEAT

Meatable

redefine meat

FORK&GOODE

Hs Higher Steaks

FM TECHNOLOGIES

MEMPHIS MEATS

Aleph —Aleph Farms—

BlueNalu

CELL FARM Food Tech

WILD TYPE

Geltor

替代蛋白質的多重挑戰

Multiple challenges facing alt proteins

Consumer Acceptance

消費者接受程度

Cost Competitiveness

成本競爭

Financing

財政

Distribution

經銷通路

Regulatory Challenges

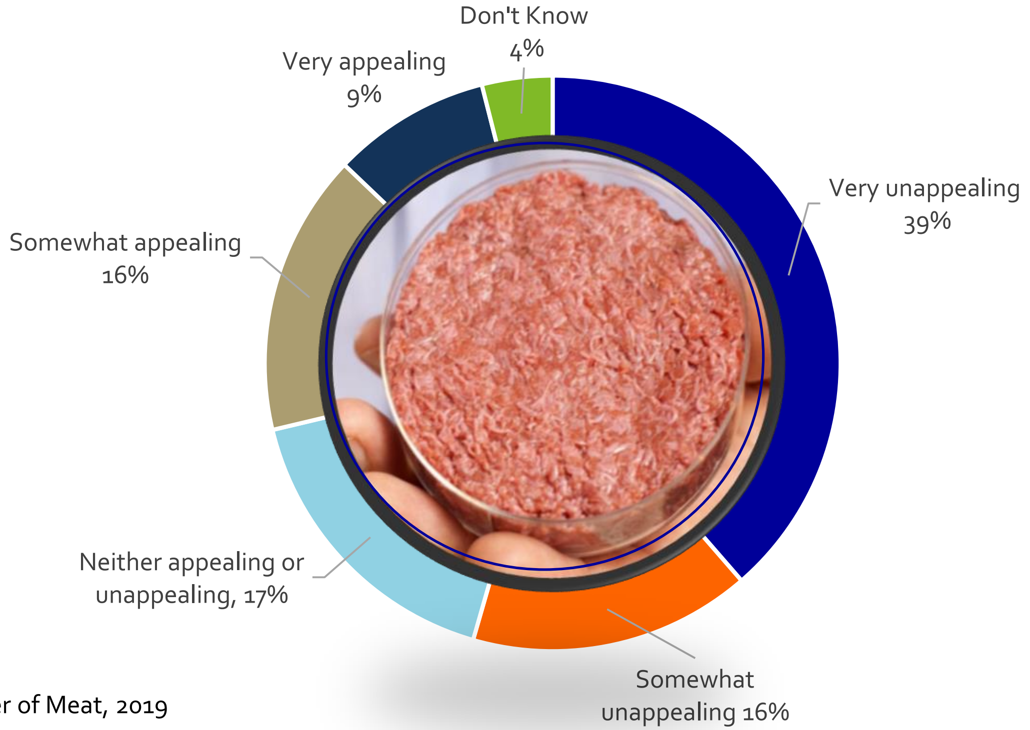
監管挑戰

11

消費者接受程度尚未明朗

Consumer acceptance still unclear

Consumer Willingness to Buy Lab-based Meat



Source: NAMI, Power of Meat, 2019

組織培養肉引發成本競爭?

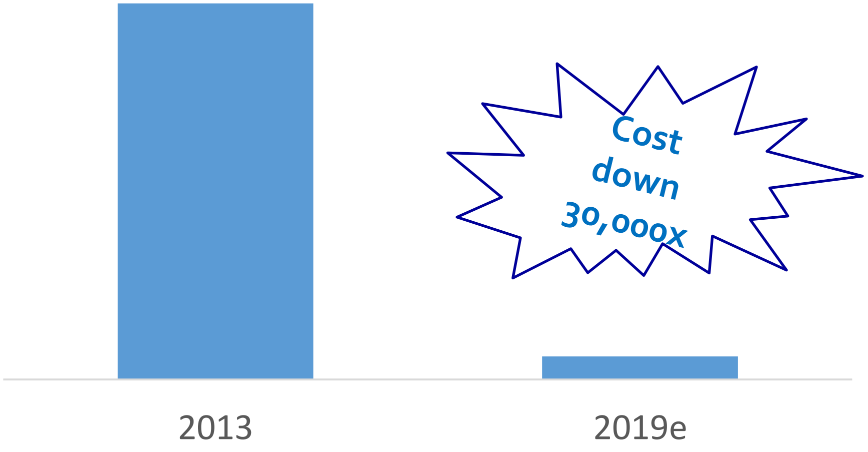
Can lab meat be cost competitive?

Rabobank

The cost of a lab-grown burger has dropped exponentially in 5 years!

組織培養肉五年內成本呈倍數下降

Cost of cultured meat, ($/lb)



Source: Rabobank, 2019

監管機關是潛在干擾者

Regulation is a potential disruptor

USDA及FDA看法一致

- USDA and FDA appear aligned
- Legal challenges to define “meat” at state level 州層級法律挑戰在於定義"肉"
- Global regulations vary 全球法律大不相同
- Hard to adapt labeling for a moving target 流通的替代蛋白質難以標籤化
- Industry players not always in agreement *Alliance for Meat, Poultry, & Seafood Innovation*

  傳統產業聯盟不一定同意畜肉、禽肉及海鮮創新發展

What is “Meat”?

WHAT IS MEAT? MISSOURI IS WORKING TO LEGISLATE AGAINST LAB-GROWN ALTERNATIVES

Zaid Jilani

April 9 2018, 1:57 p.m.

Cattlemen's group has a beef with 'fake meat'

Got Almond Milk? Dairy Farms Protest Milk Label on Nondairy Drinks

“The reasonable consumer (indeed, even the least sophisticated consumer) does not think soymilk comes from a cow.”

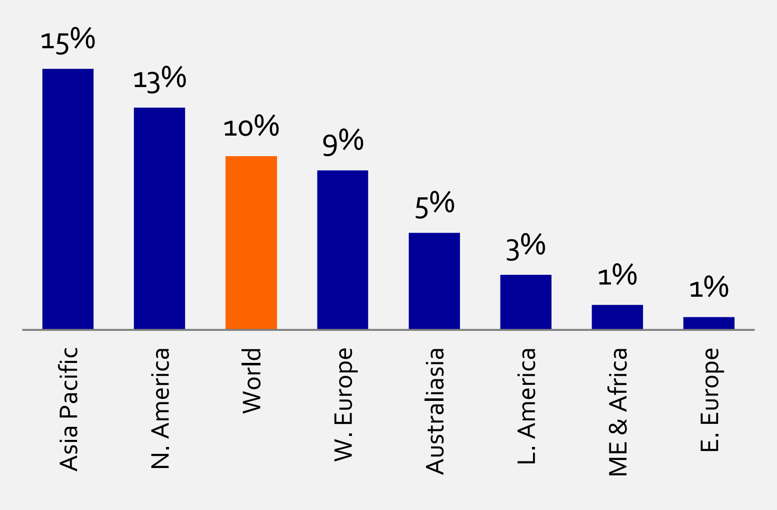
US District Judge Vince Chhabria

Dairy producers in a food fight over "fake milk"

Different than plant-based milk?

與植物奶有所不同?

Market penetration of plant-based milk 植物奶市場滲透率

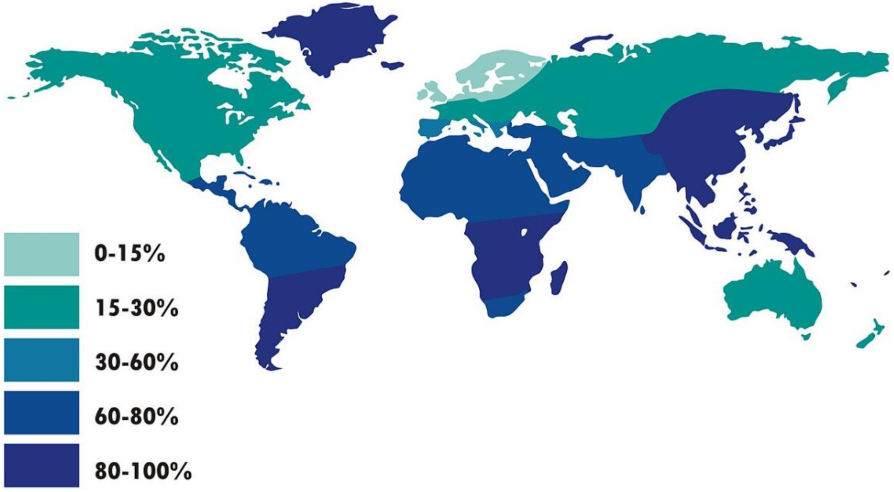


Fluid milk sales by market, in billions USD

76	21	178	26	5	22	19	9

North American milk alternatives penetration
13% dollars, 5% volume

Lactose intolerance in global population



Source: Euromonitor, Food Intolerance Network, Rabobank, 2019

供應鏈將是關鍵

Supply chain will be critical

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Soy

- Widely used
- Limited supply constraints
- US and South America
- Health-concerns (estrogen)
- GMO soy concerns

廣泛使用
基改作物疑慮

豌豆

Pea

- Rising in popularity
- Grown in France, growing in Canada and US
- Short-term supply constraints
- Some glyphosate concerns

北美市場逐漸成長
有除草劑殘留疑慮

黴菌蛋白質

Mycoprotein

- Non-GMO fungus-based product
- Gaining in popularity
- Requires significant processing/fermentation
- Ultra - sustainable

非基改真菌產品
越來越受歡迎
需要大量加工/發酵

Other

- Includes mung beans, chickpeas, and lentil
- Sustainability concerns in some cases
- Supply constraints

有綠豆、鷹嘴豆及小扁豆

Ingredients → Technology → Processing → Packaging → Distribution

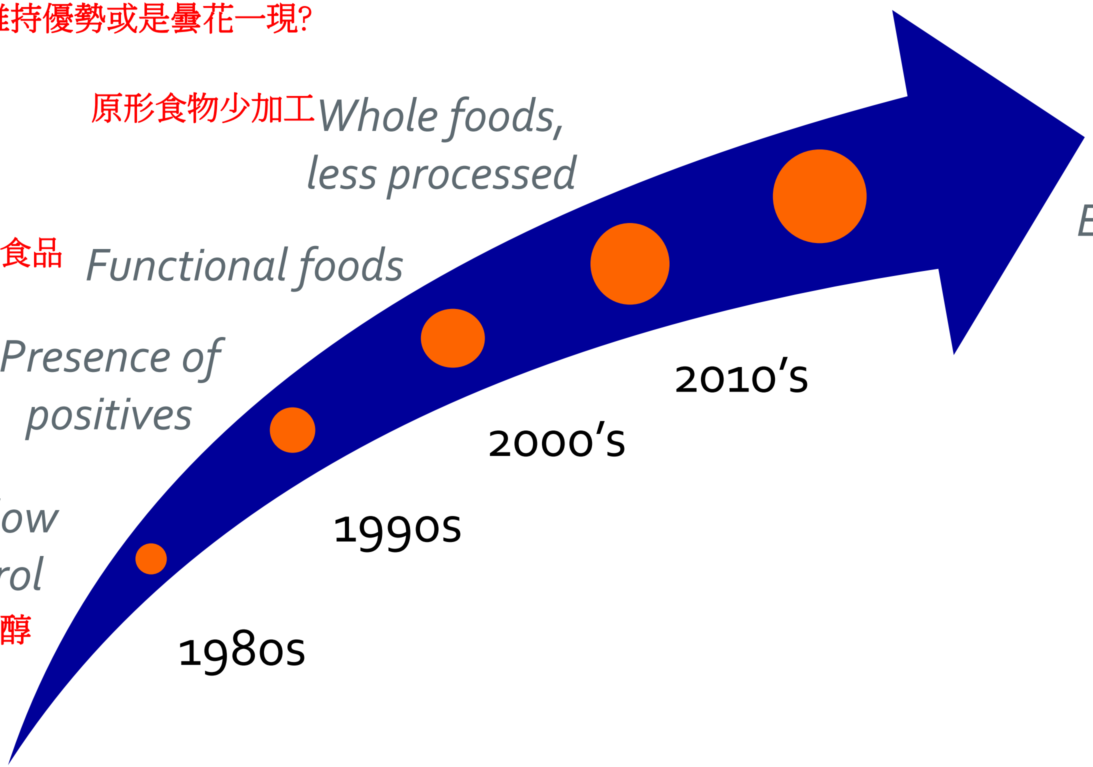
飲食習慣趨向週期性變化

Dietary trends tend to be cyclical

Rabobank

Could alternative proteins have staying power or is this a fad?

替代性蛋白質能否維持優勢或是曇花一現?



替代性蛋白質對前期的影響

Alternative protein impact in early innings

替代性蛋白質只會變得更好

Alternative protein products will only get better

加劇肉品市場競爭程度

Competition in the meat case will get more intense

引領健康及永續發展

Lead on health & sustainability

你無法成為他們，但你會加入嗎?

If you can't be them, do you join them?

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