# From Seed to Scale:

## *Building the Plant-Based Value Chain*

# Shifting Winds in Agriculture: Farmer Craig's Story

# FOOD + FUEL

U.S. soybean farmers grow versatile and renewable soybeans to help meet food, feed and fuel demand globally. Soybeans are one of many choices we have to meet a range of needs for protein, as well as fats and oils. That's good news, because when it comes to providing food or renewable alternatives to petroleum, we don't have to choose. Here's a look at how soybeans in the United States are being used.

**80%**
**MEAL**
The primary component of soybeans is meal.

**20%**
**OIL**
The other soybean component is oil.

**61% FOOD**
Sixty one percent of soybean oil is used for frying and baking food, as a vegetable oil and as an ingredient in foods like salad dressings and margarines.

**97%**
**ANIMAL FEED**
Ninety seven percent of U.S. soybean meal is used to feed poultry and livestock.

**31% BIODIESEL & BIOHEAT®**
Thirty one percent of soybean oil is used for biodiesel and Bioheat.

**3%**
**FOOD PRODUCTS**
Three percent of soybean meal is used in food products like protein alternatives and soybean milk.


**8% INDUSTRIAL USES**
Less than eight percent of soybean oil is converted into industrial uses like paints, plastics and cleaners.

OUR SOY CHECKOFF

Source: USB Market View Database, 2017/2018 © 2019 United Soybean Board [5650-7-24]

# U.S. Agriculture Under Pressure

**-$1,830** — 2024 median farm-only income

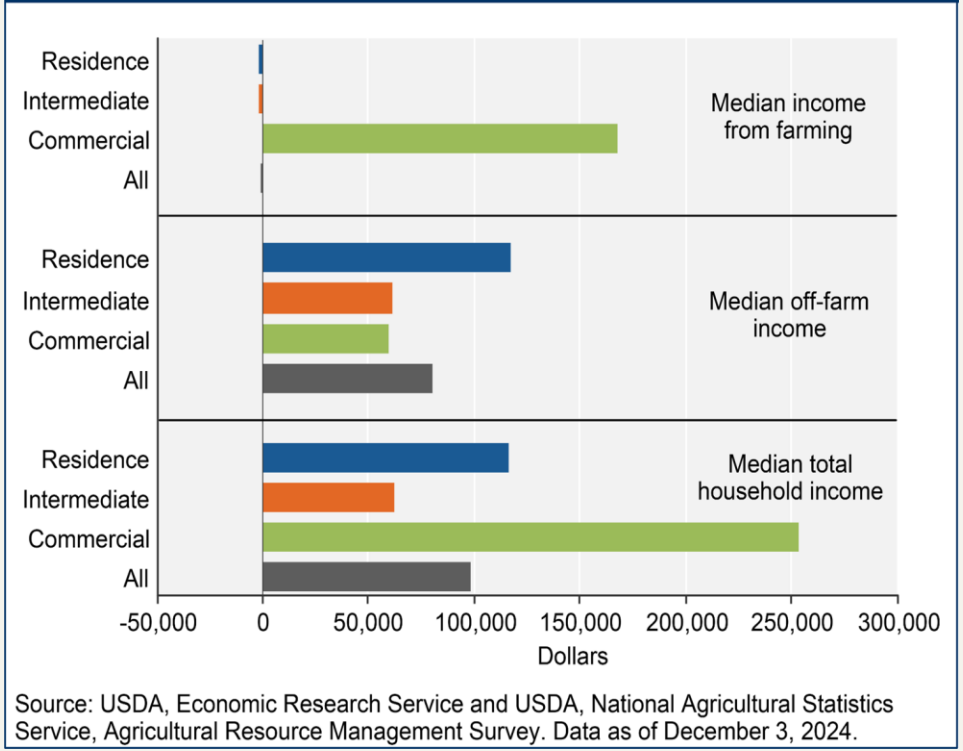
**20 million acres** — Farmland lost 2017-2022

**7% of farms** — Receive 85% of all farm income

**58.1 years old** — Average age of U.S. farmer

**7% decline** — In # of farms 2017-2022

**Median farm income, off-farm income, and total income of U.S. farm households, by farm type, 2023**




Source: USDA, Economic Research Service and USDA, National Agricultural Statistics Service, Agricultural Resource Management Survey. Data as of December 3, 2024.

*Sources: USDA NASS Census of Agriculture 2022; NASS ARMS and ERS Farm Income Reports 2024*

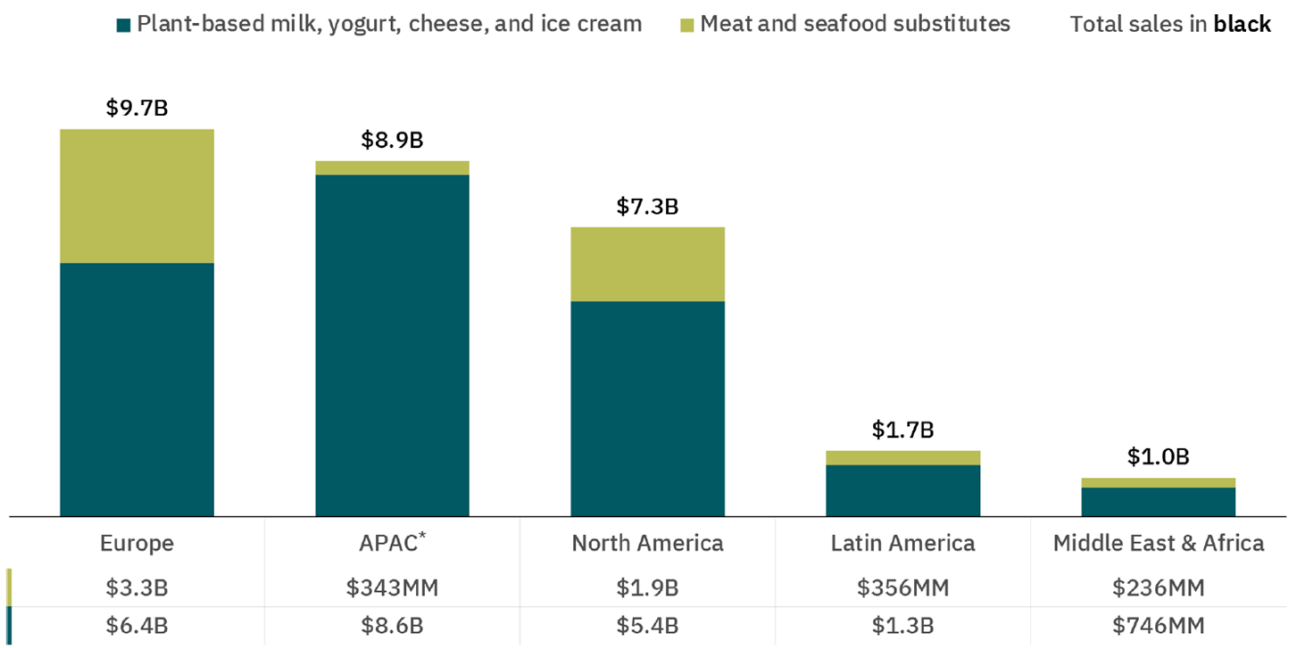
# U.S. Plant-Based Sector is Resilient

| | | |
|---|---|---|
| Total U.S. retail sales | $8B | retail sales overall held steady; in 2015 the total market was under $2B |
| Household penetration | 60% | of households purchased in 2024; 80% of them purchased more than once |
| Menu options in foodservice | 3x | since 2018, threefold increase in options at fast-casual, university dining, healthcare, corporate cafeterias |
| Plant-based milk market share | 15% | of total milk sales in conventional grocery while 36% in the natural channel |
| Plant-based share of e-commerce | 6% | in share of online sales (6.1%) vs. in brick-and-mortar stores (3.7%) |

# Global Plant-Based Sector is Growing

**Figure 7. Global plant-based foods retail sales estimates by region**
*2024*

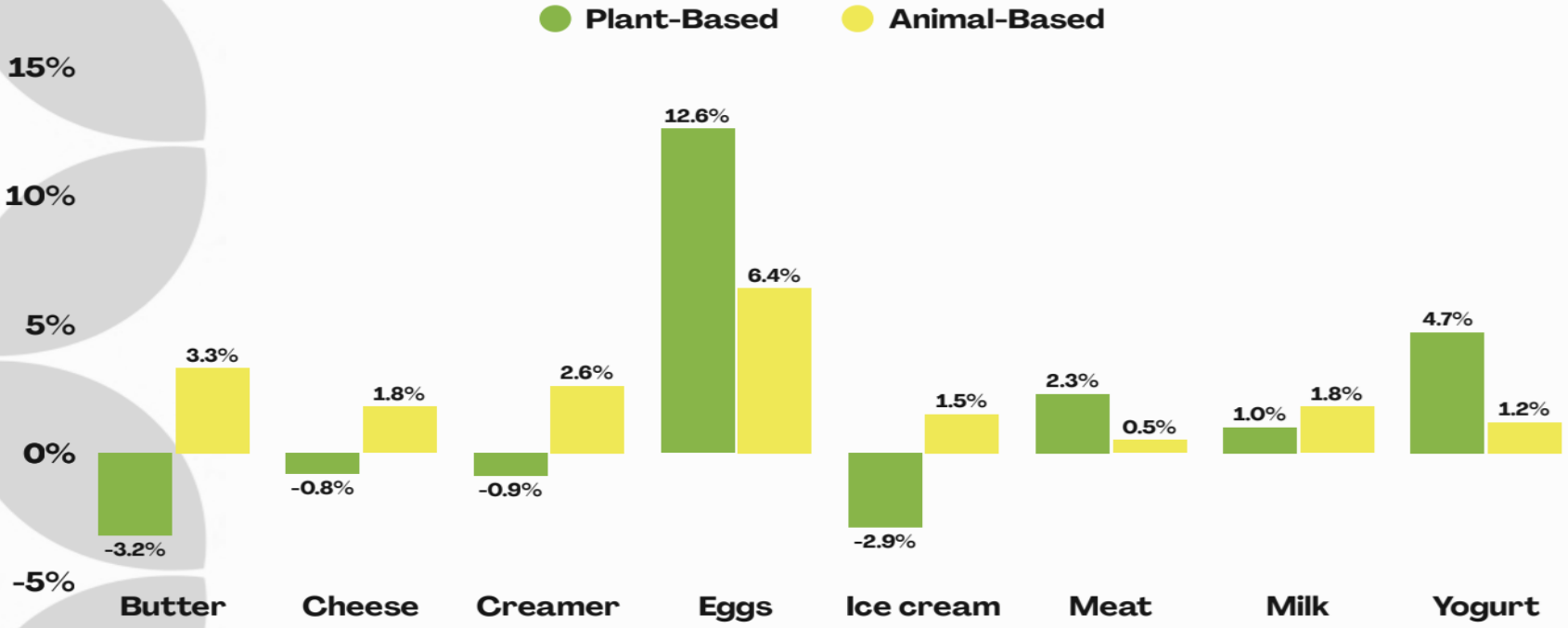
*Created by: The Good Food Institute*




Source: Euromonitor International Limited 2024 © All rights reserved: Staple Foods 2024, Meat & seafood substitutes; Snacks 2024, Plant-based ice cream; Dairy Products and Alternatives 2023, retail value RSP incl sales tax, US$ fixed 2024 exchange rate, current prices.
*APAC includes both the APAC and Australasia regions as defined in the Euromonitor dataset.

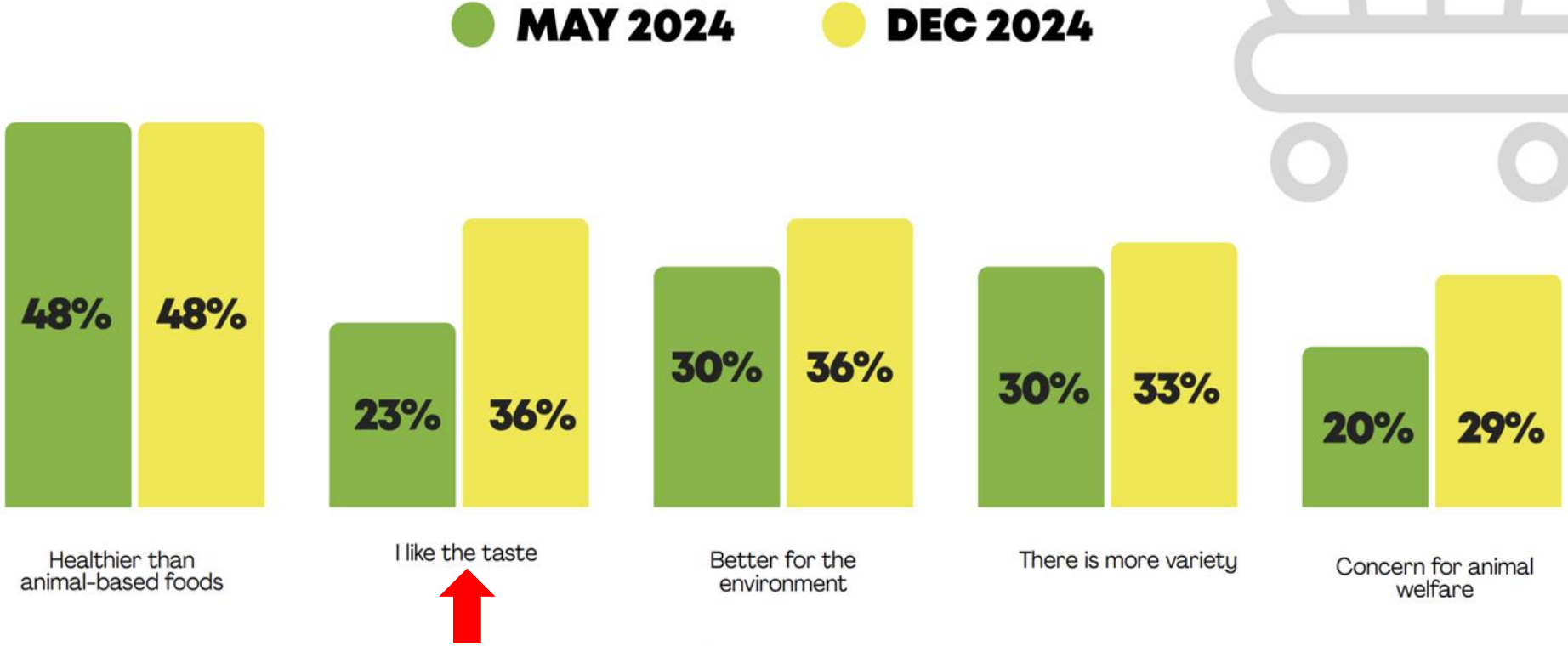
# AVERAGE RETAIL PRICE DECLINED IN FOUR PLANT-BASED CATEGORIES WHILE ANIMAL-BASED GREW ACROSS ALL CATEGORIES

Change in average retail EQ (equivalent unit) price of plant-based and animal-based categories, 2024 v. 2023



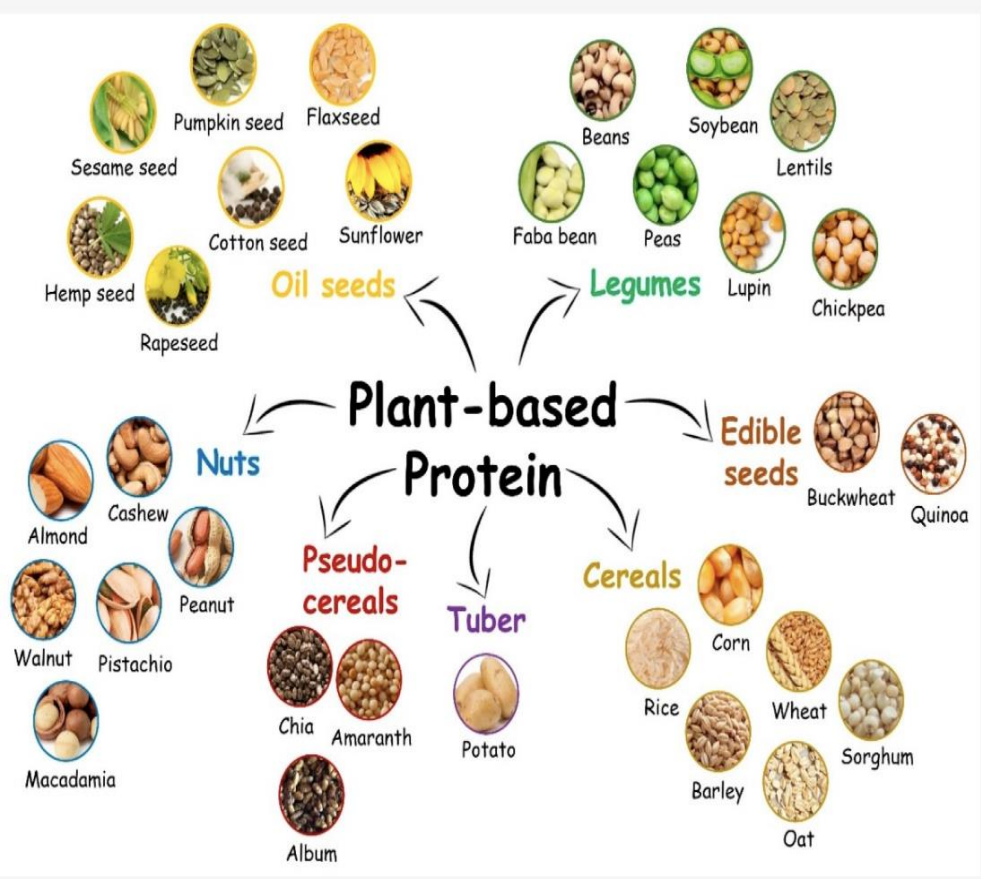

Source: SPINS Conventional Multi Outlet Channel, SPINS Natural Enhanced Channel, SPINS Convenience Channel (powered by Circana) | 52 Weeks Ending 12-1-2024

Increasers: Q: Which of the following reasons are driving your decision to consume more plant-based foods instead of animal-based foods?




Source: 84.51° Real-Time Insights Survey, Kroger Shopper Data, 2024

| Protein Source | Structural and Textural Characteristics |
|---|---|
| Chickpea | Low foaming capacity in comparison to soy, high foam stability, gelling ability similar to that of soy, high water and oil binding capacity, which is beneficial for use in meat analogues, can also be used as colorants |
| Lentils | Gelling capability comparable to whey proteins, but highly pH dependent, oil holding and foaming capacity comparable to soy, excellent emulsifying characteristics, high gel strength |
| Faba beans | Heat treatment and low-moisture extrusion cause a rise in water holding capacity, water solubility and gel strength, fibrous layered structure can be obtained with high-moisture extrusion |
| Mung beans | Albumins have better textural stability, texturization properties are temperature dependent |
| Peanuts | Arachin is the main protein that changes during extrusion forming layered structures, in combination with other ingredients (e.g., carrageenan, gellan gum, transglutaminase) giving increased gel strength, storage modulus and fracture stress |




*Source:*
*Benković M, Jurinjak Tušek A, Sokač Cvetnić T, Jurina T, Valinger D, Gajdoš Kljusurić J. An Overview of Ingredients Used for Plant-Based Meat Analogue Production and Their Influence on Structural and Textural Properties of the Final Product. Gels. 2023 Nov*

*Source:*
*Gomes, A.; Sobral, P.J.d.A. Plant Protein-Based Delivery Systems: An Emerging Approach for Increasing the Efficacy of Lipophilic Bioactive Compounds. Molecules. 2022*

# Value Chain Coordination is Crucial

**Enabling policies and regulations**


**Narrative, mindset, food culture shifts**

# Aligning Agriculture with Delicious, Nourishing, Flexible Diets








## Domestic Sourcing Spotlight: Lupii teams up with Timeless Seeds to trial innovative program in Montana

## Long prized for its cattle, Nebraska is joining the plant-based meat boom

In a state known for its beef prowess, farmers are now growing peas for the production of plant-based meat alternatives, writes **Richard Hall**


## Minnesota's Alt-Meat Revolution: Dawson Gets Ground Floor Start in Plant-Based Protein

## North Carolina farmers look to sesame as a profitable crop. 'So much promise here'

15 YEARS CIVIL EATS

## Plant-Based Diets and Regenerative Ag Have Sparked a Pea and Lentil Renaissance

Health and environmental concerns are driving 'phenomenal' growth for these

## Grant looks at breeding mung bean for plant-based protein market

July 11, 2022

## Clemson researchers receive grant to study growing the next generation of plant-based meats

## Bringing Oats Back to American Farms

Adding oats to a farm's rotation can improve soil health and reduce fossil fuels, but the crop has all but disappeared in the U.S. Now, a nascent movement fueled by oat milk's popularity may help reverse the trend.

## A NEXT-GENERATION REGENERATIVE FARMER BREAKS NEW GROUND


PLANT BASED FOODS INSTITUTE