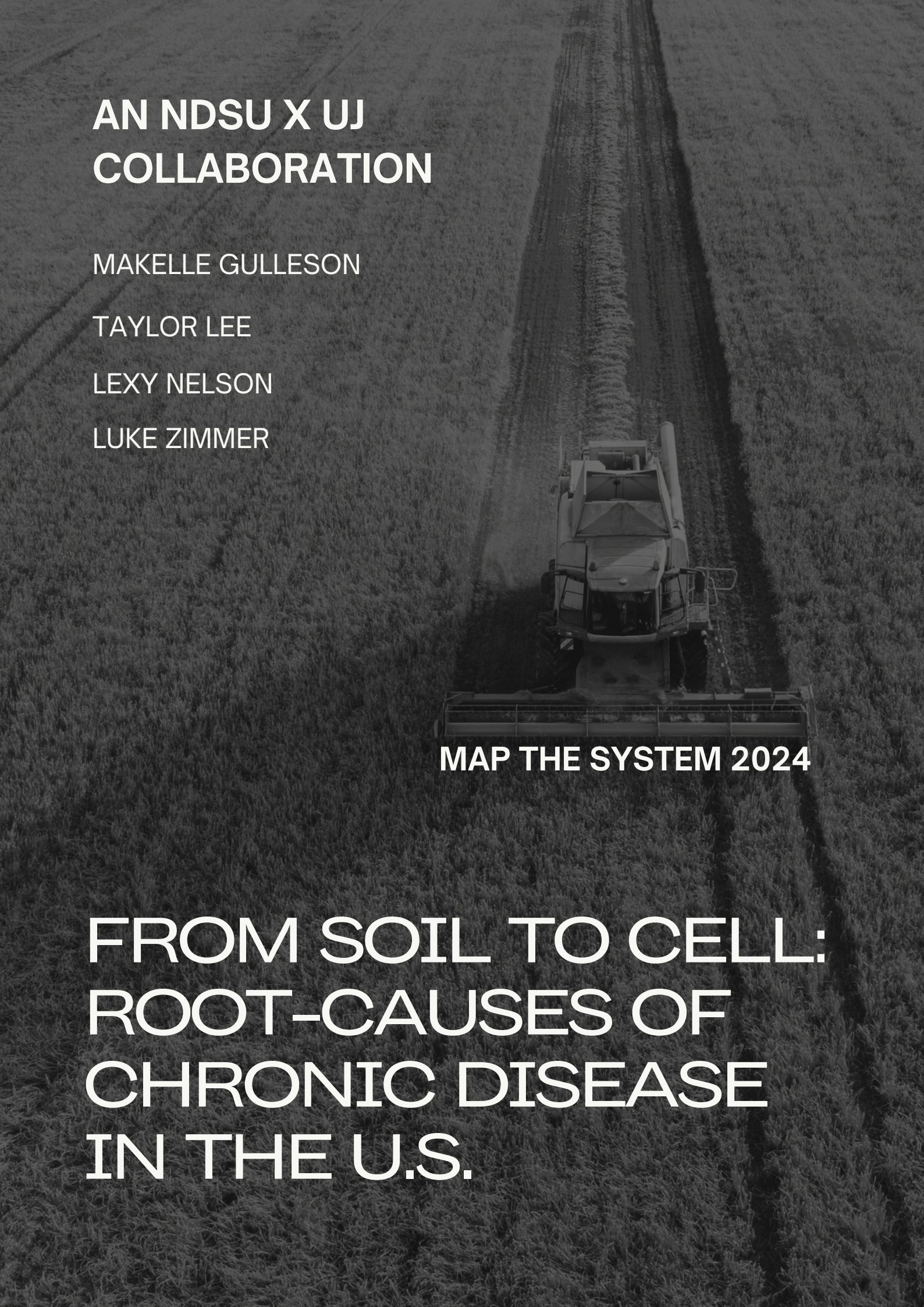

AN NDSU X UJ COLLABORATION

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MAP THE SYSTEM 2024

FROM SOIL TO CELL: ROOT-CAUSES OF CHRONIC DISEASE IN THE U.S.

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JOHN'S STORY

Meet John, a dedicated farmer on a **noble pursuit** to feed the world. John, however, isn't the only master of his daily activities. Unbeknownst to him, a complex web of **influences** guides his day-to-day and his pursuit may not be as noble as he believed.

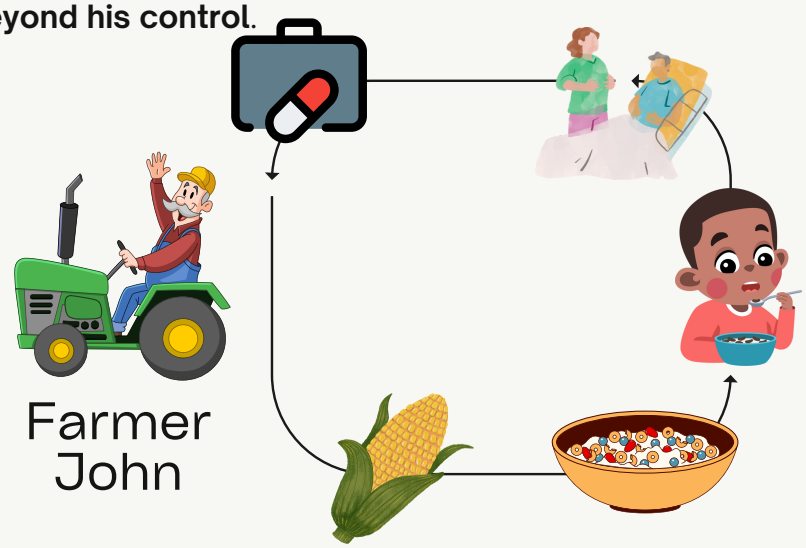
Long before John set foot in his fields, government **policies** had cast their shadow over his choices. Subsidies beckoned him towards crops like **corn**, **soy**, and **wheat**, promising financial stability in exchange for specific farming practices. These policies dictate the very seeds he sows and the ways he does it.

Yet, it wasn't just government mandates guiding John's hand; it was also the **invisible hand** of the **market**. Consumers want cheap, **convenient foods**, driving demand for ingredients derived from John's crops. In response, John found himself tethered to a system that prized **quantity** over **quality**, **uniformity** over **diversity**.

And looming over it all were the giants of **agribusiness**, their influence casting a long shadow. With promises of **higher yields** and **greater profits**, they whispered sweet temptations of all things shiny and new. Under their watchful gaze, he grappled with the tug-of-war between **tradition** and **innovation**, between **sustainability** and **profit**.

So, as John stood amidst his rows of corn, he was not merely a steward of the land but a **player** in a grand symphony **orchestrated** by the forces of the **Food Industrial Complex.** Each decision he made, each seed he planted, was a note in a song sung by countless farmers across the nation, each bound by the same **invisible influence**.

As the sun dipped below the horizon, casting its glow upon the fields, John knew that his story was but a **chapter** in the **larger tale** of agriculture shaped by **systems** far **beyond his control**.



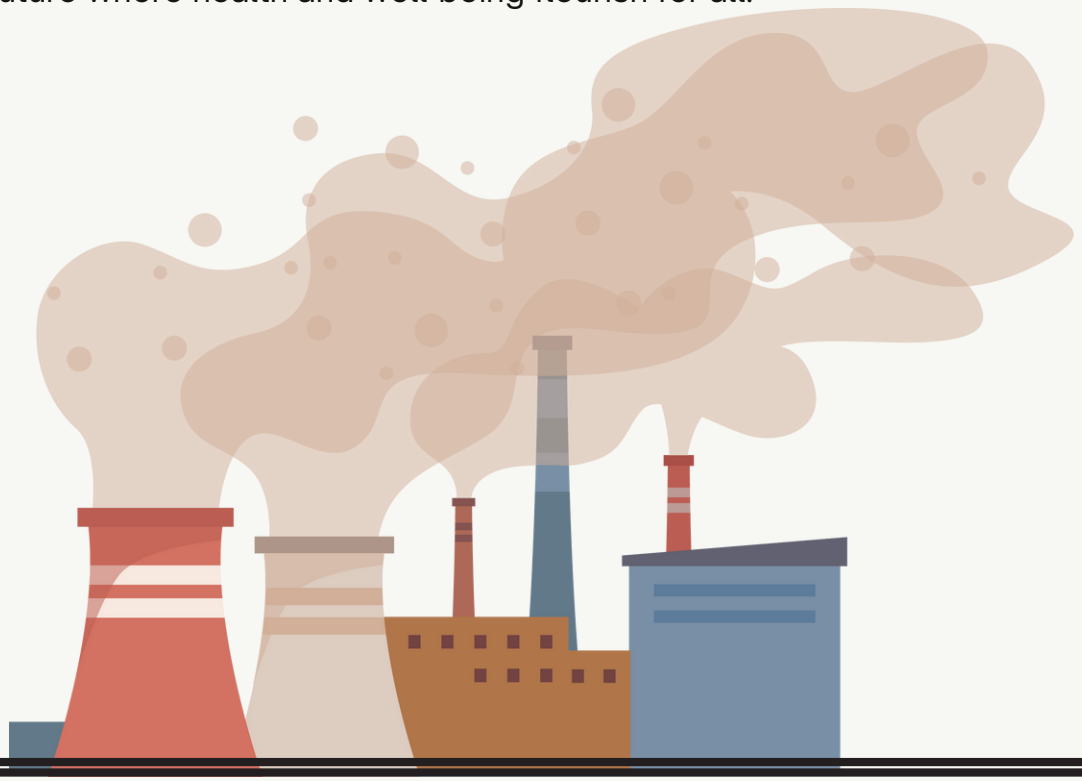
OVERVIEW

The American Food Industrial Complex (FIC) is the powerful force **shaping** the nation's **dietary landscape** and impacting the **health** of its populace. This term describes the complex **web** of interconnected **systems** impacting the food system.

Market shelves overflow with highly processed, nutrient-poor foods. Across the nation, communities, particularly those already burdened by socioeconomic disparities, grapple with the consequences, marked by soaring rates of obesity, diabetes, and all inflammatory chronic diseases**. Currently, 60% of Americans suffer from one or more chronic disease and 40% suffering from two or more.**

Recognizing the multi-faceted nature of the challenge at hand, we acknowledge that the current **chronic disease epidemic is not merely a matter of chance.**

It stems from the intricate workings of the industrial food complex, influenced by **profit-driven motives and systemic inequities.** Through collaborative efforts and innovative solutions, we aim to reshape our food systems and pave the way for a future where health and well-being flourish for all.

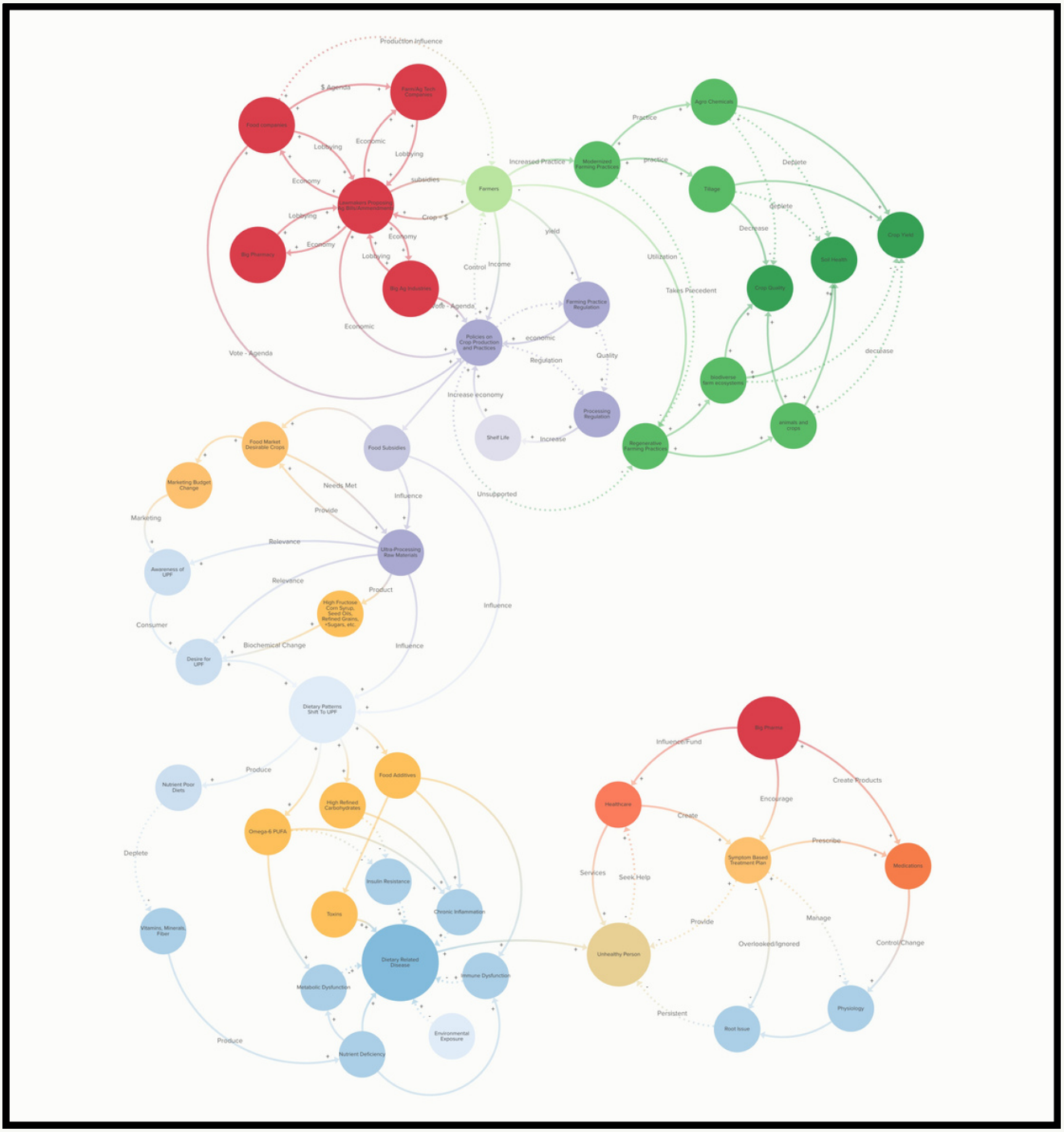


KEY PLAYERS

These are the stakeholders in influencing this system. They have the most power in influencing and enforcing the structure of the Food Industrial Complex.

1. **Food Production and Distribution (Big Ag):** Agricultural system that prioritizes **mass production** of specific crops - **corn, soy, wheat** - which are to be **processed** into unhealthy foods with high sugar, salt, and fat density.
2. **Food Processing and Manufacturing (Big Food):** Large food companies that transform cheap, subsidized ingredients into highly processed, **calorie-dense, nutrient-poor products**
3. **Pharmaceutical Industries (Big Pharma):** Large pharmaceutical companies that **profit** from **treatment of diet-related diseases** via developed medications for management of diabetes, hypertension, heart disease, etc.
4. **Advertising and Marketing:** Food and beverage companies that spend billions of dollars on **advertising** campaigns targeted at **vulnerable populations**, promotion consumption of unhealthy products and **influencing** dietary **choices**.
5. **Government Subsidies:** Government provided **subsidies** predominantly support production of **specialized crops** - corn, soy, wheat - further encouraging the production of unlta-processed goods.
6. **Healthcare Industry:** Healthcare industry profits from treatment of diet-related chronic disease, incentivizing a focus on **managing symptoms** rather than addressing root causes through preventative measures.
7. **Financial Interests:** Financial relationships between industries i.e. food companies funding pharmaceutical research or lobbying efforts, perpetuate the cycle of sickness and profit prevalence of chronic diseases.

These are the major relationships within the Food-Industrial Complex that form a complex web that perpetuates poor dietary habits, increases health inequities, and drives the epidemic of chronic diseases in America forward.



Visual System Map depicting all the key factors in our system and the cascade effect of the system to chronically ill Americans.

SYSTEM KEY

- **Red:** Key players and Stakeholders
- **Purple:** Policies and Policy Practices
- **Green:** Agricultural Events and Practices
- **Golden Yellow:** Stakeholder Influenced Events
- **Blue:** Social and Health Patterns of Consumers
- **Tan:** Chronically Ill Americans

ICEBERG MODEL

A root-cause evaluation of chronic disease, from soil to cell.

Mental-Models

Beliefs and Paradigms

Profit-First Food Production: Food industry prioritizes **profit** over **public health**, guiding agricultural practices towards **quantity** over **quality**. Marketing strategies **promote unhealthy**, **processed foods** for **economic gain**, shaping consumer choices and perpetuating the cycle.

Commodity Perspective: Society views **food** primarily as a **commodity** rather than a source of **nourishment** and **health**. This perception is reinforced by **advertising**, societal **norms**, and the widespread **availability** of cheap, convenient processed foods, fostering unhealthy dietary habits.

Cultural Value of Convenience: Farmers, **influenced** by government **subsidies**, prioritize **maximizing yield** over the quality of crops. This focus on quantity favors specialized crops and techniques that **compromise** sustainability, soil health, and crop nutrition.

Structures

Underlying Systems

Corporate Dominance & Regulatory Influence: Major corporations hold power within the food industrial complex through extensive **lobbying efforts** and **financial resources**, they shape U.S. dietary patterns through capitol.

Industrialized Production Systems: The food industrial complex prioritizes **large-scale production**, **processing**, and **distribution** methods designed for **efficiency,** promoting widespread availability of ultra-processed foods leading to skyrocketing rates of chronic disease.

Market Dynamics and Consumer Demand: Government crop **subsidies** for crops like **corn** and **soy** incentivize their **widespread production**. As a result, the food industry prioritizes the promotion of these now-cheap products. This cycle increases health disparities, as they are designed for people seeking inexpensive food.

ICEBERG MODEL

A root-cause evaluation of chronic disease, from soil to cell

Patterns and Trends

Themes and Behaviors

Processed Food Consumption:
With **57% of** the average **American diet** consisting of **processed foods**, dietary habits have shifted due to urbanization and marketing tactics, leading to health issues like **obesity** and **cardiovascular diseases**.

Corporate Dominance:
A small number of **multinational** corporations, including Nestle, PepsiCo, and The Coca-Cola Company, **control significant portions** of the food production sector, influencing market **trends**, setting **prices**, and prioritizing **profit** over **nutritional quality**.

Health Disparities:
Cheap commodity **crops** allow for the production of inexpensive food products, which are marketed to **low-income** families, increasing health **disparities** through dietary patterns.

Events

Surface-Level

Processed Food Impact:
Processed foods coupled with sedentary lifestyles, contribute to **metabolic dysfunction** and **insulin resistance**, leading to **chronic conditions** like type 2 diabetes and cardiovascular disease.

Inflammation and Immune Response:
Consumption of **processed foods** and exposure to **environmental toxins** from **industrial agriculture** cause **i**nflammation and immune dysregulation leading to **chronic disease** diagnoses.

Environmental Hazards:
Industrial agriculture and food processing practices contribute to **pollution** and **contamination** of air, water, and soil, **exposing** individuals to **toxins** and **chemicals** through their food supply, wreaking havock on cellular function.

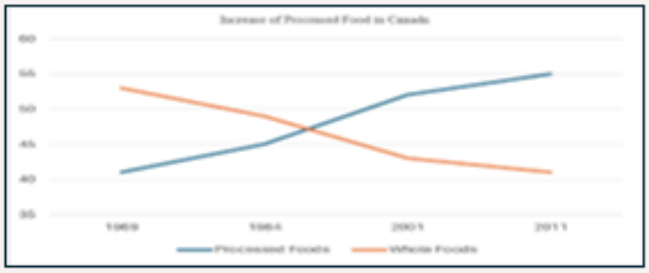
ICEBERG MODEL

Events

- 1 in 3 adults in the United States have metabolic syndrome.
- Ultra-processed food consumption grew from 53.5 percent of calories in the beginning of the period studied (2001-2002) to 57 percent at the end (2017-2018).
- It is estimated that 40% of children in the United States have enough cumulative pesticide exposure to impact their brains and nervous systems.

Pattern

Fig. 1



Structure

- Overall, only 15 cents of every dollar we spend in the supermarket goes to farmers. The rest goes to processing and marketing food.
- The United States Farm Bill encourages high production and lower prices for commodities such as corn and soybeans which become low price sugars and highly refined starches.
- In 2021 meatpackers made a record profit, while meat prices rose dramatically.

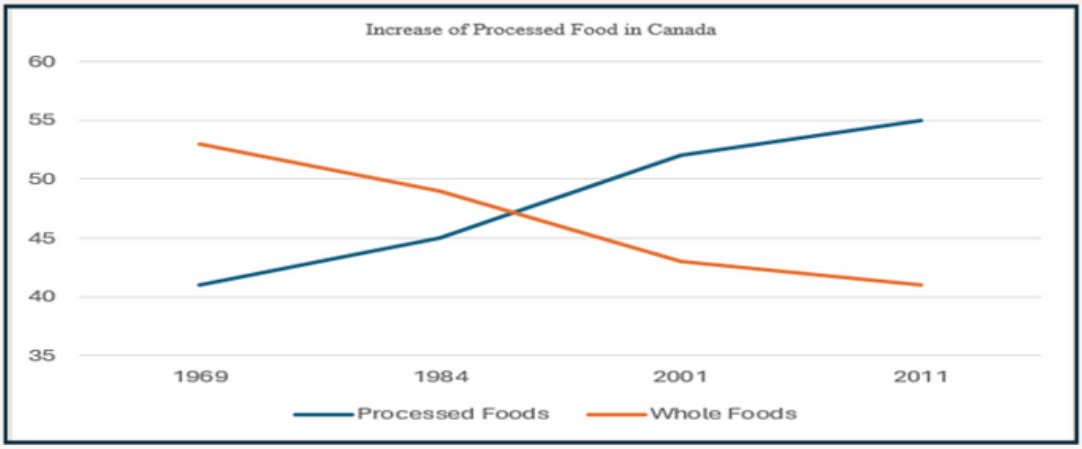
Mental Model

- A profit-driven mindset within the American food industry prioritize quantity over quality.
- Strategic marketing plans are employed that promote highly processed, unhealthy foods far more often than natural health foods.
- Society often views food as a commodity rather than a source of nourishment and the basis for our overall health.
- A commodity mindset is reinforced by societal norms, advertising, and the availability of cheap, convenient processed foods.

Vision

- The United States will develop a culture that prioritizes disease prevention for a healthy, thriving society.

Fig 1



EXISTING SOLUTIONS

There are many organizations, policymakers, and advocates working to improve our food system and health outcomes through a root-cause approach. Two organizations working **locally**, **nationally**, and **globally**, that stand out particularly. Although these groups set out to nurture the land, their work implicitly addresses the health of the people, as well.

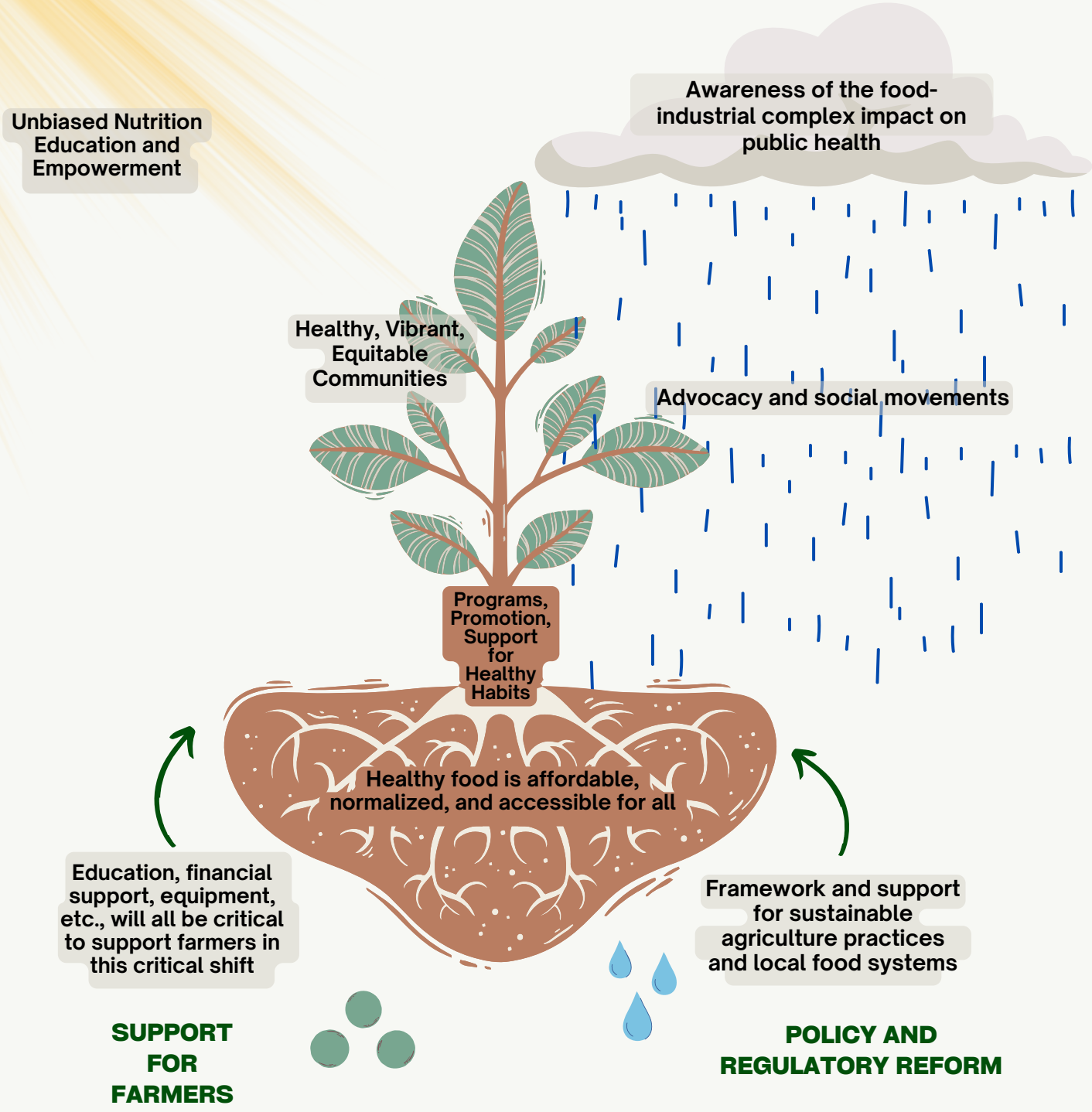
Savory Institute

The mission of The Savory Institute is to facilitate large-scale **regeneration** of the world's grasslands through holistic management practices. While their primary focus is on land regeneration, their mission contributes to the **health** of **people** by promoting sustainable agriculture practices that can improve soil **health**, **biodiversity**, and **ecosystem resilience**. By restoring grasslands and fostering healthy ecosystems, the Savory Institute aims to create a more sustainable food system that supports human health and well-being, potentially **mitigating chronic disease**s associated with environmental degradation and poor nutrition.

Soil Carbon Cowboys

The mission of Soil Carbon Cowboys is to promote regenerative agriculture practices that **restore ecosystem health**, and enhance agricultural productivity. By restoring soil health and promoting sustainable farming practices, Soil Carbon Cowboys **educate** and **equip** farmers on this critical **paradigm shift** to produce nutrient-dense foods that support human nutrition and well-being. Additionally, healthy soils contribute to **clean air and water,** reduce the need for chemical inputs, and mitigate environmental pollution, thereby potentially r**educing the incidence of chronic diseases** associated with poor environmental quality and dietary habits. Ultimately, their work plays a sneaky role in restoring the health of the population, from soil to cell.

LEVERS OF CHANGE AND INTERVENTION OPPORTUNITIES



GAPS & CHALLENGES	LEVERS OF CHANGE
Farmers **lack incentives** to **change** their practices	**Reallocate subsidies** to promote soil health and crop diversity.
Lack of consumer **awareness** about benefits of local foods	Implement **educational campaigns** promoting advantages of eating local foods
Local foods can be **high cost**	Provide **financial support** for small-scale farmers to **decrease** CSA **cost**
Local food can be **difficult** to **access**	Invest in building regional **food hubs** and **distribution networks**
Farmers **lack education** and **tools** to practice sustainable agriculture	**Provide education** and **equipment** through government funding
Extreme marketing for ultra-processed foods, particularly to the underserved	Advocate for policy to **restrict** junk food **ads**, and **promote healthy diet** patterns
Food industry **lacks incentives** for **nutrient-rich,** minimally processed **options**.	Implement **tax credits/grants** to incentivize healthier alternatives

KEY INSIGHTS & LESSONS LEARNED

There is no single problem or force guiding the hand of this damaged, harmful system, but multiple. We have grown a lot in our understanding, our four key takeaways are as follows:

The environment of people plays a larger role than individual choices themselves.
People make choices based on what kind of environment they are in. If people are living in an environment that is highly abundant in processed foods, low activity and over-exposure to unhealthy choices, people are more likely to make unhealthy choices.

Our system is so hyper-focused on profit, public health has been taken out of the equation as a result.
Instead of prioritizing on initiatives that promote the well-being of consumers, businesses take actions to make their processes and products as financially optimal as possible.

Major companies with financial advantages and an agenda have a role in policies that influence.
Companies invest in politics and policies that can help promote their own economic advantage, weather it positively or negatively effects general human health.

The relationship between the quality of plant products ecosystem(s) has a large role in human health.
Modernized farming practices with an emphasis on yield, has resulted in declining soil health and microbiota, which are responsible for providing plants with their micronutrient benefits. This has led to an inverse relationship between plant benefits and plant toxicity, so even those making healthy choices can be seeing decreased health from reduced micronutrient consumption.

AS WE NAVIGATE THE COMPLEXITIES OF FOOD SYSTEMS AND CHRONIC ILLNESS, IT'S IMPERATIVE TO RECALIBRATE OUR PRIORITIES, PLACING THE WELL-BEING OF INDIVIDUALS ABOVE PROFIT MARGINS. BY ALIGNING WITH NATURE'S PRINCIPLES AND FOSTERING A CULTURE OF HEALTH-CENTRIC VALUES, WE CAN PAVE THE WAY FOR TRANSFORMATIVE CHANGE AND A BRIGHTER, HEALTHIER FUTURE FOR GENERATIONS TO COME, ALL THE WAY FROM THE ROOT.

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