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America's Broken Food System: Examining Food Affordability and Environmental Sustainability

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Executive Summary

Feeding the world sustainably and affordably is one of the most pressing challenges today and will only increase in severity in the coming decades.¹ New technological advancements during the Green Revolution intensified agriculture production, decreased food production costs, and lowered food prices.² However, this remarkable success polluted waterways, air, and soil, replacing small-scale farms with large industrial farms as well.³ Today, food affordability continues to be impacted by industrialization and the use and contamination of natural resources. The globalized food system and consumer influences also play a key role in food affordability.⁴ Despite access to cheap food, one in six Latinos still experience food insecurity, a rate 2.5 times higher than white individuals.⁵ To address this issue, it is important to consider the political and economic circumstances that promote unsustainable agriculture practices and prevent marginalized communities from accessing affordable, nutritious, and environmentally sustainable food. Ultimately, cheap food incurs costs not reflected in the selling price, costs external to the agricultural economy.

Background

Policy Framework: The Farm Bill

The United States food system is primarily governed by the Farm Bill, an omnibus bill that allows policymakers to address many areas related to the agricultural sector, including farm income support, food assistance, and conservation efforts. Prior to the farm bills, agriculture policy focused on land distribution, support for education and research to increase agricultural productivity, and programs to provide farmers with market information.⁶ The first farm bill, the Agricultural Adjustment Act of 1933, was created in response to a decline in U.S. crop prices following World War I and the effects of the Great Depression and the Dust Bowl on agricultural markets.⁷ It launched programs to raise crop prices by paying farmers to limit food production. This initiated the primary purpose of the farm bill—to support farmers.

Since the Agriculture and Consumer Protection Act of 1973, the farm bill has also authorized funding for food assistance programs that have prevailed until today,

like the Supplemental Nutrition Program (SNAP) and the Emergency Food Assistance Program (TEFAP).⁸ The farm bill became even more expansive in 1981 when policymakers included provisions to conserve soil and water.⁹ Both the nutrition and conservation titles have remained important fixtures in Farm Bills. The most recent Farm Bill is the Agriculture Improvement Act of 2018, which is set to expire in 2023. Given the fast-approaching deadline to create a new Farm Bill that will dictate the country's food system for the next five years, it is imperative to address the historical and current state of food production to promote a new food system that is not only environmentally sustainable but also affordable for all.

Historical Context: The Green Revolution

In the 1950s and 1960s, new farming technologies exploded across the globe, initiating the Green Revolution.¹⁰ New mechanized agricultural technologies, like fertilizers and pesticides, and new disease-resistant high-yield crop varieties, allowed farmers to produce more food than neces-

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sary for a growing population worldwide.¹¹ Research helped advance plant biology understanding to develop new varieties of crops with desirable traits such as high yields and increased resistance to pests and diseases. Corn, wheat, and rice varieties developed rapidly and spread around the world during the 1950s and 1960s. By 1980, new crop varieties accounted for a 21% increase in crop yields; by the early 2000s,¹² new crop varieties accounted for a 50% increase in crop yield. For instance, the United States imported approximately 50% of its wheat in the 1940s.¹³ However, after using Green Revolution technologies, the United States became self-sufficient in the 1950s and began exporting in the 1960s.¹⁴

Other advancements included the Haber-Bosch process, a procedure to create nitrogen fertilizer by fixing nitrogen from the atmosphere. It allowed farmers to input nitrogen directly into soils. With the application of additional nutrients, crop productivity increased by 40 to 60%.¹⁵ The increase in energy availability from fossil fuels also improved the mechanization of agriculture and the production of synthetic fertilizers and pesticides. Mechanization allowed farmers to produce food in larger acreages with less field variability.¹⁶ Countries around the world began benefiting from an increase in the number of crops per acre planted.¹⁷ After all, fewer people were needed in production, allowing farmers to increase their total output with fewer production costs. Ultimately it led to

lower food prices. The cost, however, was higher fossil fuel use.

The Present: Industrial Agriculture

In the 1980s, the Reagan administration propelled the mechanized agriculture model created during the Green Revolution and limited government intervention in the American farm economy.¹⁸ As a result, industrial farms expanded, creating large surpluses of food, reducing food input costs, and decreasing food prices for consumers.¹⁹ These results limited small-holder farmers' ability to enter the agriculture market.²⁰ Instead, it facilitated industrial agriculture growth, characterized by producing commodity crops, like corn, soybeans, wheat, and dairy and poultry, by creating market incentives and subsidies that promoted the use of fertilizers, pesticides, and technology to increase production and maximize efficiency.

Today, the food system is built on fertilizers and agricultural chemicals, mechanization, plant and animal breeding, monocultures, and a constantly evolving handling and processing system.²¹ The Farm Bill allowed the average farm size to grow through consolidation and industrialization, and consumer preferences in diets have shifted U.S. production from small independent producers, on which early farm policies were based, to one that causes environmental degradation by depleting natural resources, contaminating waterways and soil, and generating toxic waste.

Problem Analysis

Food Insecurity

Enough food is produced worldwide to feed everyone; however, the availability varies enormously.²² Changes in food prices fundamentally affect the quantity and quality of food available to an individual. According to the USDA, more than 34 million people in the United States are food insecure, and communities of color and rural communities are disproportionately impacted by changes in food prices.²³ For example, one in six Latinos experience food insecurity, which is 2.5 times higher than white individuals.²⁴ Food insecurity occurs when an individual experiences a prolonged lack of access to healthy, affordable, and nutritious food. In the Latinx community, food insecurity is often exacerbated by language and transportation barriers, immigration status, socially or culturally specific food preferences, limited knowledge of available resources and services, and the COVID-19 pandemic.²⁵ However, one of the leading causes of food insecurity is poverty.²⁶ In 2021, low-income households spent approximately 30% of their income on food, while wealthier households only spent approximately 7%.²⁷ The Supplemental Nutrition Program (SNAP) provides nutrition benefits to supplement the food budget of low-income families, but these benefits and eligibility criteria are too narrow for families to afford healthy and sustainably grown food. Despite the overproduction of agricultural commodities, food insecurity has not been eliminated.

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Farm Production

Between 1948 and 2019, U.S. farm production nearly tripled (Figure 1).²⁸ Soybean yields increased twofold, corn yields quadrupled, and labor productivity increased almost 16 times.²⁹ Innovations in crop genetics, agricultural chemicals, and advanced machinery enabled the growth in farm outputs, even as the use of traditional inputs, like land and labor, decreased by 76% and 28%, respectively.³⁰ In conjunction, farm inputs, such as energy, agricultural chemicals, machinery, and other materials, grew by 133%,³¹ as the cost of agricultural chemicals fell by approximately three-quarters.³² Furthermore, the costs of farm machinery, purchased services, and energy fell by roughly two-thirds.³³ Declining farm input prices encouraged farmers to substitute fertilizers, pesticides, farm machinery, and energy for labor.

Advances in mechanization and increasing availability of chemical inputs led to ever-increasing economies of scale, a phenomenon where larger companies have more cost savings and higher production levels, that spurred rapid growth in average farm size.³⁴ It was accompanied by an equally rapid decline in the number of farms (Figure 2).³⁵ Mechanization motivated farmers to scale up their operations and specialize in planting one crop species at a time or livestock production. The market concentration also created a pathway for industrial and large farmers to receive government support. Through the Farm Bill, farm

subsidies are distributed based on the type of crop grown and the amount of crops grown.³⁶ Therefore, rather than financing farms that need subsidies, government support is distributed to farms who grow more crops. Thus, large industrial farms that have managed to decrease production costs and increase their output are eligible for subsidies.

As a result, most of the funding allocated for agricultural programs supports the intensive agriculture production of corn, soybeans, cotton, wheat, and rice. Meat producers indirectly benefit from the increased and cheaper production of livestock feed. In 2019, U.S. taxpayers spent \$2.75 billion on corn and \$1.33 billion on soybean commodity payments.³⁷ Factory farms received \$1.8 billion from this money to subsidize feed crops.³⁸ However, industrial

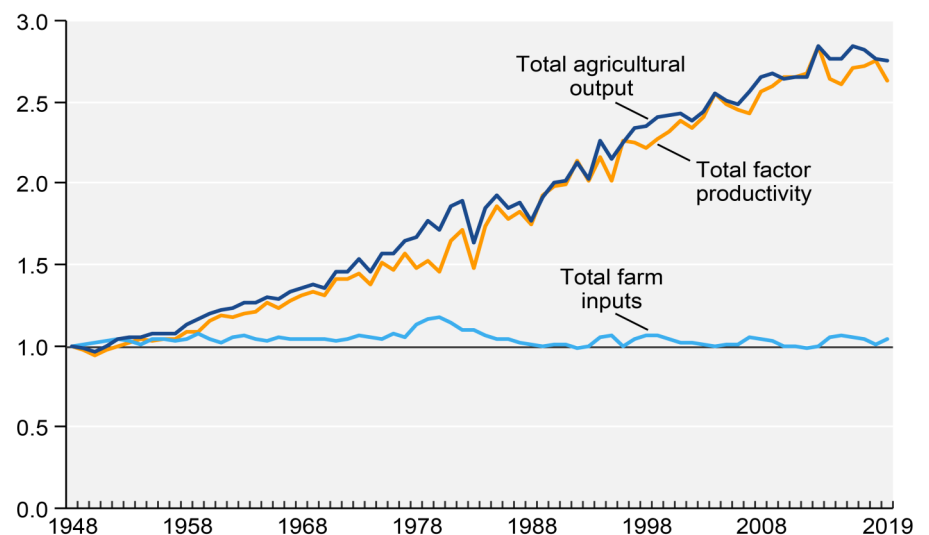
agriculture poses great environmental and social threats.

Environmental and Health Consequences

Agricultural activities, such as deforestation, methane released from livestock, and nitrous oxide from fertilizer use, contribute to 25% of global and 11% of U.S. greenhouse gas emissions.³⁹ These greenhouse gas emissions further drive climate change, increasing the number and severity of fire seasons, droughts, floods, and intense heat waves.⁴⁰ Overfertilization in agricultural lands contribute to the eutrophication of freshwater systems and coastal areas by encouraging the growth of algae blooms and death of marine life from lack of oxygen.⁴¹ Excess nutrients can also cause groundwater, soil, and air pollution that leads to less

U.S. agricultural output, inputs, and total factor productivity

Index, 1948=1

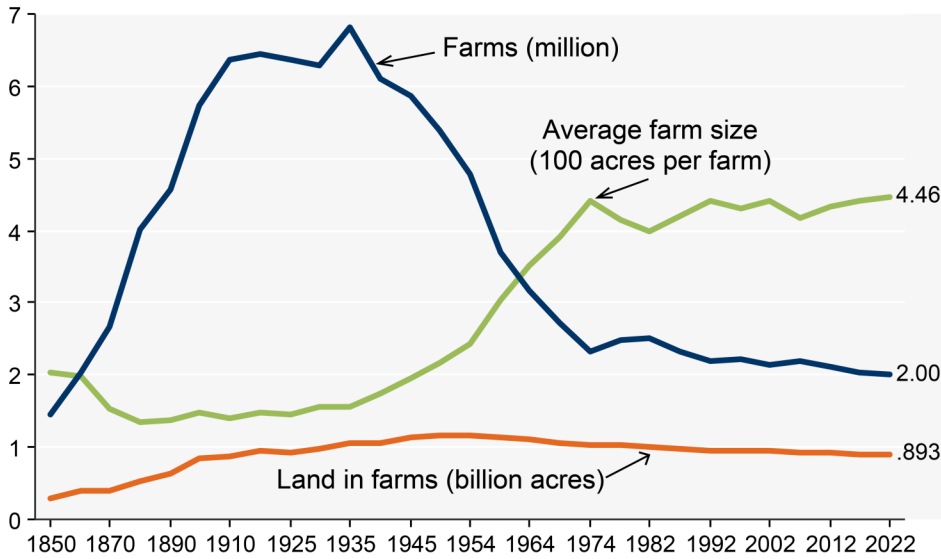


Source: USDA, Economic Research Service, *Agricultural Productivity in the U.S.* data series. Data as of January 2022.

Figure 1: Relationship between total agricultural output, total factor productivity, and total farm inputs from 1948-2019 in the United States.

Farms, land in farms, and average acres per farm, 1850–2022

Million farms, billion acres, or 100 acres per farm



Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, Census of Agriculture (through 2017) and *Farms and Land in Farms: 2022 Summary* (February 2023).

Figure 2: Relationship between farms, farm size, and land in farms from 1850-2022. The graph shows that as the number of farms decreased from approximately 6.8 million in 1935 to 2.0 million in 2022, the average farm size increased from 1.5 to 4.46 (100 acres per farm), and the total land in farms increased from 0.4 billion acres to 0.893 billion acres.

diversity of plant species making ecosystems vulnerable to climate disruptions.⁴² Pesticides are also used in industrial agriculture practices to enhance yield quantity and control pests. However, only 0.1% of pesticides reach their targeted pest.⁴³ Instead, pesticides lead to a decline in bird and beneficial insect populations, disrupting important food chains that would naturally manage pests.⁴⁴ For example, from 1947 to 2008, the number of honeybee hives dropped from 6 million to 2.4 million hives.⁴⁵ Exposure to pesticides weakens honeybees' immune system and disrupts their reproduction and development cycles.⁴⁶ Pesticide exposure also produces effects on human health, like elevated cancer risks and disruptions in the body's reproductive, immune, endocrine, and nervous system.⁴⁷

Industrial food production methods have also resulted in inexpen-

sive, nutritionally poor food, made from corn, wheat, and soybeans, that are known to cause health problems. Many obesity-related diseases, such as cardiovascular diseases, cancers, and diabetes are a result of high cholesterol levels from diets that are high in fat and low in fiber.⁴⁸

Consumer Influence

As consumers have grown more affluent, food demand has shifted towards an increase in the consumption of meat, refined products, and oils that demand more natural resources.⁴⁹ Efforts to meet these new demands have led to the development of crop commodities, further increasing the specialization and scale of livestock and crop commodities. More recently, consumers have demanded a stronger emphasis on environmentally sustainable agriculture production expanding markets for organic-produced foods and specialty crops, like vegetables, fruits, herbs, and

nuts.⁵⁰ Government-sponsored conservation programs have shifted from focusing on soil conservation and fertility to including agriculture practices that reduce carbon emissions, prevent water pollution, reduce energy use, and promote biodiversity.⁵¹

In the 1990s, consumer influence expanded globally, allowing American agriculture to integrate into the global market. Developing countries reformed their policies and adopted technologies already being used in the U.S. to compete internally.⁵² Global competition for international markets grew, pressuring U.S. producers in both export and domestic markets. The globalization of agricultural markets, however, has proved volatile at times. Most recently, Russia's War on Ukraine has reduced the global food supply and caused massive price spikes.⁵³

Conclusion

The current food system, as it exists, is ill-equipped to support the needs of a growing population sustainably. Politicians and industrial farmers have kept the status quo, claiming that the only pathway to achieve low-cost food is by producing at a grander scale. However, the current model heralded by technological advancements, dietary changes, and globalization has led to environmental degradation, increased price volatility, and increased barriers for marginalized communities to access affordable and healthy foods. Ultimately, cheap food does not internalize the environmental and social costs of the industrial agriculture model.

Recommendations

As climate change worsens, the debate on how to grow food intensifies. Sustainable agriculture has immense potential to sequester carbon, conserve biodiversity, improve local livelihoods, and amplify the voices of marginalized communities. However, the question remains: How can the U.S. produce environmentally sustainable food while ensuring food affordability? The following are possible steps to reform America's broken food system in the upcoming Farm Bill:

- Increase funding to USDA programs, like the Conservation Stewardship Program and the Environmental Quality Incentives Program, with a focus on assisting farmers transitioning to organic or regenerative food production models.
- Reallocate subsidy farm support from commodity crops to small-holder farmers growing specialty crops, increasing equitable land access.
- Invest in a research and development program that collaborates with marginalized farmers to find technologies and farming practices that improve soil health, reduce emissions, and enhance data collection on agricultural ecosystem services to make farms and communities resilient to climate change.
- Increase SNAP benefits and eligibility determination to reflect the real cost of a healthy diet and other expenses.

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