

THE FUTURE OF
**AGRICULTURE
CHECKOFFS**



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AGRICULTURE CHECKOFFS

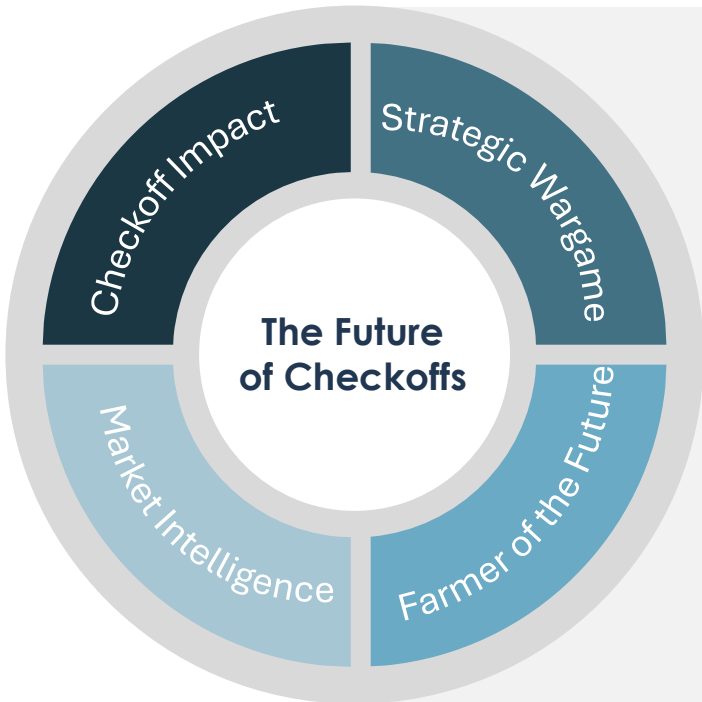
INTRODUCTION

Over the past four decades, U.S. agriculture checkoff programs have been instrumental in driving domestic demand, expanding export markets, fostering innovation, and promoting sustainability. These programs bring together industry stakeholders, creating a unified effort to enhance their respective commodities. Recently, these significant achievements have been somewhat overshadowed by a surge in political and legal scrutiny, prompting questions about the ongoing value of checkoff programs. This scrutiny has emerged during a transformative period in the agri-food system, further complicating discussions about the future of agriculture and the evolving role of checkoffs to ensure they remain effective, inclusive, and aligned with the future needs of U.S. agriculture.

PURPOSE

Determine what the future environment requires of checkoffs and the actions they must take to ensure strategic impact, continued relevance, and long-term producer success.

This report analyzes past checkoff impacts and emphasizes how the checkoffs must position and resource themselves to both deliver on their core missions and inform local and national food and agriculture strategy in the future.



METHODOLOGY

Aimpoint Research employed a robust methodology that included producer research, expert interviews, market intelligence, and a strategic wargame. The analysis also incorporates future state projections on geopolitics and the evolution of the agri-food system, as well as insights from the comprehensive Aimpoint Research® Farmer of the Future syndicated research report and segmentation. Each section distills key takeaways for the checkoffs to consider, culminating in a set of comprehensive recommendations for the future. This rigorous approach ensures the reliability and accuracy of findings, providing valuable insights to guide strategic decision-making.

RESEARCH OVERVIEW

NATIONAL SECURITY

SOCIAL BETTERMENT

ENVIRONMENT

The research highlights how checkoff initiatives have been crucial in bolstering national security, enhancing social betterment, and promoting environmental sustainability. The analysis underscores the increasing importance of these three pillars, which embody a mission-driven focus for the betterment of society. Through this lens, checkoffs can serve as a unifying force to influence and improve agri-food systems and human health around the globe.

> *National Security*

For more than half a century, the U.S. national strategy has outlined elements of national power as diplomatic, informational, military, and economic (DIME). National power provides strength domestically and allows the U.S. to project vital leadership worldwide to secure national interests and advance fundamental ideals (human rights, the rule of law, and the pursuit of prosperity). Agriculture and food have played a quiet, yet genuinely foundational role in all four elements of national power.

China's aggressive investment in agriculture and food security relationships is tied directly to its competition with the U.S. At the same time Russia continues to weaponize food to advance its goals and policies of aggression. Now more than ever, agriculture must be more widely understood and viewed as part of the U.S. defense industrial complex. Checkoffs have a uniquely U.S. and holistic producer focus, which are essential elements for national security. Checkoffs must play a more strategic role in maintaining and advancing the viability of U.S. agricultural production and food systems.

> *Social Betterment*

Underserved U.S. populations across urban, suburban, and rural populations require access to high-quality, safe, affordable nutrition. Access to nutritious food not only promotes individual health, but also brings stability to households and sets the conditions for educational and economic advancement. High-quality, safe, affordable nutrition is a national benefit that transcends race, age, and social background.

Advancements in human health, focusing on the pivotal relationship between nutrition and well-being, can mitigate chronic diseases currently affecting six out of every ten U.S. adults. The economic burden of treating these diseases is significant, and checkoffs can act as formidable allies to government and private industry in the quest for healthier futures.

> Environment

Climate, clean water, water scarcity, and land stewardship have become a more significant part of the daily dialogue and interaction of all citizens, not only in the U.S., but around the globe. These topics pervade schools, consumer products, and agendas for leaders and policymakers. Active environmental stewardship is vital to maintaining our national security advantage and delivering on the nutrition imperative for human health.

Checkoffs substantially contribute to environmental sustainability initiatives, notably by advancing clean energy biofuels, and through agronomic and livestock research that fosters generational sustainability. These efforts bolster soil preservation, minimize runoff, and reduce water usage.

As the U.S. moves into a future characterized by heightened environmental awareness and accountability, checkoffs can lead the charge in agricultural research and implementation, ensuring sustainable outcomes for farmers and citizens for generations to come.

NATIONAL CHECKOFFS

In order to fully understand the future role of the checkoffs, it is essential to consider their original intent and current impact. The following section outlines the history and significant achievements of the checkoffs.

> Program History

Agriculture commodity research and promotion programs (checkoffs) grew from grassroots efforts of forward-thinking producers to address common challenges.



Checkoff programs give producers a method to improve commodities independent of direct control by government agencies, domestic and multinational companies, or individual brands.

Authorized by statute and overseen by USDA's Agricultural Marketing Service (AMS), checkoffs are producer-funded and producer-led. The structure of checkoff programs allows producers to prioritize initiatives based on their understanding of the challenges and opportunities of farming and ranching, resulting in significant, documented returns on producer investment.

The National Agricultural Law Center notes:

In general, checkoffs represent a flow of investment into different aspects of the agricultural industry that could never be obtained in other methods.¹

According to USDA AMS:

Congress has authorized industry-funded research and promotion boards to provide a framework for agricultural industries to pool their resources and combine efforts to develop new markets, strengthen existing markets and conduct important research and promotion activities.²

NATIONAL CHECKOFFS (CONT.)



Congress authorized checkoffs to address economic, food security, and social impact issues. For example, the Congressional intent in authorizing the beef³ and pork⁴ checkoffs stated:

- › Beef and pork “are basic foods that are a valuable and healthy part of the human diet.”
- › Production of beef and pork “plays a significant role” in the U.S.
- › Beef and pork should be “readily available and marketed efficiently to ensure that the people of the U.S. receive adequate nourishment.”



For the soybean⁵ checkoff, Congress declared:

- › Soybeans and soybean products are an important source of nutritious foods that are a valuable part of the human diet and an important feedstuff for the livestock industry.
- › Soybeans “should be readily available and marketed efficiently to ensure that consumers have an adequate supply.”
- › The cooperative development, financing, and implementation of a coordinated national program of soybean promotion, research, consumer information, and industry information are necessary to maintain and expand existing markets and develop new markets for soybeans and soybean products.

There are currently 22 national checkoff programs supporting the United States agriculture industry.

COMMODITY	2023 PRODUCER INVESTMENTS	YEAR IMPLEMENTED
Dairy	\$350.4M	1984
Soybeans	\$150.5M	1991
Pork	\$82.3M	1986
Cotton	\$81.8M	1966
Fluid Milk	\$78.4M	1993
Hass Avocados	\$70.9M	2002
Beef	\$42.1M	1986
Eggs	\$22.6M	1976
Paper & Packaging	\$20.7M	2014
Softwood Lumber	\$17.5M	2011
Potatoes	\$15.1M	1972
Mangoes	\$11.3M	2005

COMMODITY	2023 PRODUCER INVESTMENTS	YEAR IMPLEMENTED
Blueberries	\$10.2M	2000
Peanuts	\$9.6M	1999
Sorghum	\$8.0M	2008
Pecans*	\$8.0M	2021
Honey	\$7.4M	2008
Mushrooms	\$4.5M	1993
Watermelons	\$3.1M	1990
Lamb	\$3.1M	2002
Christmas Trees	\$1.5M	2014
Popcorn*	\$0.6M	1997
TOTAL	\$1000.6	

Source: USDA AMS. All figures are audited unless indicated by *

³ 7 U.S. Code Chapter 62 - BEEF RESEARCH AND INFORMATION | U.S. Code | US Law | LII / Legal Information Institute (cornell.edu)

⁴ 7 U.S. Code § 4801 - Congressional findings and declaration of purpose | U.S. Code | US Law | LII / Legal Information Institute (cornell.edu)

⁵ 7 U.S. Code § 6301 - Findings and declaration of policy | U.S. Code | US Law | LII / Legal Information Institute (cornell.edu)

NOTABLE IMPACTS

The following section highlights some notable past impacts of the national checkoff programs.



American Egg Board

The American Egg Board (AEB) was established in 1976 to promote the sale and consumption of eggs and egg products in the United States. The program functions under the authority of the Egg Research and Consumer Information Act,⁶ which was signed into law in 1974.

- The “*Incredible Edible Egg*” campaign was launched in 1977 to reverse declining egg consumption, combat misinformation about cholesterol, and promote eggs as a nutritious, versatile, and appealing food.
- In addition to substantial consumer education and research funding, the egg checkoff has invested heavily in culinary innovation. By supporting cooking and baking competitions and partnering with chefs, the AEB has fostered innovation in how eggs are used in cooking and baking and has expanded the culinary potential of eggs beyond breakfast dishes.



Cattlemen's Beef Board

The beef checkoff was authorized in 1985 through the Beef Promotion and Research Act,⁷ after a decade of producers' involvement and interest in addressing declining consumer demand in the mid-1970s.

- The beef checkoff has invested heavily in food safety research, notably reducing *E. coli* 0157H7 by 42 percent from 1996 to 1998 through research, best beef safety practices and contamination prevention measures. Additionally, the *Beef Quality Assurance* (BQA) program, which provides information to producers on best production practices, achieved considerable success, with more than 85 percent of U.S. beef now sourced from BQA-certified producers. BQA's continuous expansion and educational efforts have bolstered consumer trust in the industry.
- Beef Checkoff funding identified and developed new high value cuts to increase carcass cutout value. These include the Flat Iron Steak, Petite Tender, and Delmonico cuts. Once developed, Checkoff education and promotion programs marketed the cuts to food service, retail, and consumer buyers under the “*Beef. It's What's for Dinner*” theme.



NOTABLE IMPACTS (CONT.)



Cotton Board

The Cotton Board was formed in 1966 following the Cotton Research and Promotion Act⁸ to counteract the declining market share of cotton against synthetic fibers by enhancing demand and supporting industry research. The Cotton Board oversees funding for Cotton Incorporated, which conducts marketing and research to improve production techniques, fiber quality, and consumer awareness.

- Launched in the early 1990s, the iconic *“Fabric of Our Lives”* campaign built strong emotional connections with consumers by emphasizing the comfort, versatility, and natural qualities of cotton. The campaign featured memorable jingles and advertisements that highlighted everyday uses of cotton, significantly boosting consumer awareness and preference for cotton products.



National Dairy Promotion & Research Board

The National Dairy Promotion and Research Board (NDB) was established in 1983 as part of the Dairy Production Stabilization Act,⁹ which is a component of the broader Agricultural Act. The formation of the NDB responded to the need to stabilize and support the dairy industry, which faced fluctuating market conditions due to varying production levels and significant competition.

- The dairy checkoff has funded many campaigns and initiatives that have been vital in maintaining and growing the consumption of dairy products, supporting farmers, and ensuring sustainable practices within the industry. Arguably, the most famous, *“Got Milk?”* was launched in 1993 by the California Milk Processor Board and supported by the NDB. This campaign aimed to boost milk sales by focusing on the inconvenience of running out of milk and quickly became one of the most iconic advertising campaigns in history, featuring celebrities with milk mustaches.
- The Dairy Checkoff program effectively tackled declining fluid milk sales by concentrating on value-added dairy products. This strategy fundamentally transformed fluid milk by increasing its fat content, and resulted in nearly doubled cheese consumption and a 50-year high in butter consumption. This approach led to higher farmgate income for dairy farmers, improved processing efficiency for manufacturers, and a consistent supply of high-quality, nutritious dairy products in stores.



⁸ 7 U.S.C. §§ 2101-2122

⁹ 7 U.S.C. §§ 4501-4514; 4531-4538; 4551-4553

NOTABLE IMPACTS (CONT.)



National Pork Board

The pork checkoff was authorized in 1985 through the Pork Promotion, Research, and Consumer Information Act,¹⁰ but its inception traces back to the efforts of a group of Illinois producers nearly 20 years prior.

- To address consumer concerns regarding the fat content of pork, the checkoff launched its groundbreaking “*The Other White Meat*” campaign. This initiative aimed to highlight the industry’s advancements in producing leaner protein. The campaign’s impact was profound in the expansion of pork demand. The promotional campaign built around the changed nutrition profile of pork earned widespread consumer recognition. In a 2020 Northwestern University study, it ranked as the fifth most memorable promotional tagline in contemporary advertising.
- Additionally, the pork checkoff emphasizes critical disease research, most recently in its proactive measures to prevent potential outbreaks of African Swine Fever (ASF), a threat with a possible \$50 billion impact on national food security. The pork checkoff also invests heavily in food safety, animal welfare, sustainability, public health and community well-being through its “*We Care*” initiative. This initiative provides producers with resources for best practices, ensuring consumer transparency and accountability.



National Potato Promotion Board

The National Potato Promotion Board, commonly known as Potatoes USA, was formed in 1971. The board was established under the Potato Research and Promotion Act,¹¹ which aimed to support the marketing and promotion of potatoes and potato products.

- The Potato Checkoff program has significantly advanced food security by funding research to develop new potato varieties with improved field and shelf qualities. A prime example is the Innate® potato, created by the J.R. Simplot Company with support from Potatoes USA. This innovation exemplifies a successful public-private partnership, featuring reduced bruising, lower acrylamide levels, and extended shelf life, benefiting farmers, consumers, and the environment.
- The rise of the Atkins Diet and other low-carb diets in the early 2000s posed a significant challenge to the potato industry. Potatoes USA implemented several strategic responses to counter the negative impact of these diets and restore the positive image of potatoes. One component was the launch of the “*Potatoes: Goodness Unearthed*,” Campaign, which aimed to highlight that potatoes are a natural, whole food rich in vitamins, minerals, and fiber.



NOTABLE IMPACTS (CONT.)



United Soybean Board

The soybean checkoff was authorized in 1990 through the Soybean Promotion, Research and Consumer Information Act.¹² The national checkoff grew from state checkoff programs, which supported the American Soybean Association (ASA) in international market development, labeling campaigns, and research through the 1980s. ASA delegates ultimately advocated for a national checkoff.

- The national soybean checkoff's research and development into new uses yield breakthroughs in the expanded use of soybeans, including in tires, car interiors, aquaculture feed, biodiesel, and renewable diesel. Further, in responding to consumer demand, high-oleic soybeans, a healthier soy option rich in beneficial fatty acids, were discovered and widely commercialized. These efforts supported producer profitability, human health and environmental sustainability through innovation, product diversification and production best practices.



Additional Checkoff Programs

In addition to the 22 national checkoff programs overseen by the AMS, numerous state and regional checkoff programs are managed by local agricultural departments or boards. These programs cater to the distinct needs of their specific geographic areas or specialty crops, tailoring their efforts through localized marketing campaigns and research initiatives. They aim to enhance the market presence and profitability of the commodities they represent and often collaborate on larger projects to boost the industry's overall success.

Moreover, state checkoff programs frequently work together and with other commodity-focused and national programs to support the broader agricultural sector. This collaboration fosters innovations in farming practices, sustainable agriculture, and integrated marketing campaigns, benefiting the entire agriculture industry. These organizations represent diverse agriculture sectors, including corn, wheat, pulse crops, and specialty oilseeds.

- An excellent example of the value of these checkoff programs is ethanol production from corn, which advanced sustainable energy and economic growth by reducing greenhouse gas emissions and fossil fuel reliance. It has supported rural economies through job creation and increased corn demand, stabilizing prices. This promoted agricultural efficiency and innovation and generated valuable co-products like livestock feed. Such impacts illustrate the importance of checkoff programs in fostering benefits across the agricultural sector.



SUMMARY OF HISTORICAL CHECKOFF IMPACTS

Checkoff programs, rooted in a grassroots, producer driven approach, have been instrumental in shaping the strategic landscape of U.S. agriculture. By representing all producers, these initiatives have not only driven market development and innovation, but also underpinned national security, social betterment, and environmental sustainability. Checkoff programs exemplify the collective strength of the agricultural community, making them pivotal in shaping the future of the industry. In summary, the checkoffs have:

- Expanded demand for commodities domestically and internationally, improving the resilience of U.S. agriculture and national food security.
- Advanced disease management and prevention, safeguarding the health of livestock, crops, and consumers.
- Increased the adoption of sustainable farming practices, reducing environmental impacts and improving soil health.
- Improved the food safety standards and nutrition profiles of their commodities.



Future Resourcing

Consistent funding has historically enabled long-term research and investment, yielding significant advancements and benefits across various agricultural sectors. Looking to the future, funding must keep pace with the involvement required of checkoffs to meet emerging challenges and maintain the competitiveness of the United States. Checkoff programs uniquely position themselves to convene and facilitate collaboration between multiple public and private entities, driving innovation and development for the betterment of consumers and U.S. farmers and ranchers. This synergistic approach not only enhances resource efficiency but also fosters a united front in addressing industry-wide issues and opportunities.

FARMER OF THE FUTURE

To inform future state analysis and farmer orientation, Aimpoint applied its Farmer of the Future body of research. Farmer of the Future 2.0 is a syndicated research report produced by Aimpoint Research in 2023 that includes comprehensive secondary research of the agricultural supply chain, global dynamics, and innovation trends. The report leverages future state scenario exercises from four annual Agri-food Industry Wargames conducted from 2018 to 2022. It also includes a nationwide market research study of farmers in the U.S. At the heart of the research is a psychographic and behavioral segmentation that details how farmers approach the business of farming and view the future.

FUTURE STATE DRIVERS

Aimpoint Research has identified five primary drivers of change that will have major impacts on U.S. farmers and ranchers over the next decade. While each will create change on its own, the collective impact will further propel the industry to a shorter, more connected supply chain.

> *Environmental Pressure*

Environmental pressures will create additional investment and innovation across production agriculture. Consumers are more environmentally conscious than ever, which will continue over the next decade, impacting all industries. For those farmers and ranchers reluctant to step into this space, it will be one of their most significant constraints to growth and risk mitigation. For those who see it as an opportunity, it presents a chance for business growth.

> *Data and Traceability*

Agricultural data will become the backbone of value-added agriculture. On-farm data, while currently important to production, will radically transform how farmers and ranchers, consumers, and value chain stakeholders engage, giving farmers a new tool to increase resource efficiency and obtain new market opportunities. For companies serving consumers directly, data will enable their ability to supply differentiated products and help prove sustainability claims.

> *Precision Technology*

Precision farming improvements will enable the adoption of new technologies. Advancements in precision technology will enable farmers and ranchers to put data collected on their operations into action. Farmers may further improve the accuracy of rates, timing, and placement of inputs for both crops and livestock. Advancements also increase the viability of alternative inputs, which require more exact rates and timing.

FUTURE STATE DRIVERS (CONT.)

> *Biotechnology*

Biotechnology will be the most critical component of food's availability, nutritional content, and sustainability. Biotechnology will progressively shake the negative stigma of genetically modified organisms, and the industry will see a rapid improvement in crops and livestock production. Gene editing will accelerate the breeding of all living organisms.

> *Food as Health*

Food as health will position the producer closer to the end consumer. Consumer demand will shift toward healthier food options and higher awareness of how food is integral to long-term human health. More emphasis will be placed on breeding and raising crops and livestock that have proven human health benefits. This will open various new opportunities and value-added revenue streams for farmers and ranchers.



FARMER OF THE FUTURE SEGMENTS

Aimpoint Research has developed a farmer segmentation and provides clarity on farmers' current attitudes and mindsets. It includes psychographics, demographical, and behavioral data, as well as powerful insights that help organizations better understand, engage, and ultimately serve their existing and future customers. Farmer of the Future 2.0 is comprised of five distinct segments, each with characteristics that set them apart from the others.

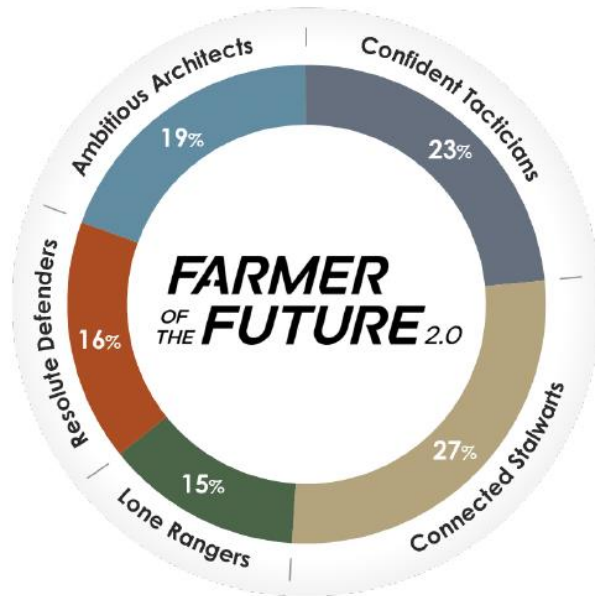
Farmer of the Future Methodology

Aimpoint Research fielded a multi-mode survey among adult farmers and ranchers who are the primary or a shared decision maker for their operation with gross farm incomes at least \$50,000 operating in the U.S., gathering a representative sample balanced on age, region, and acreage. After collecting 691 surveys, analysts appropriately weighed the results by these same dimensions, as well as by crops/livestock split to align with recent USDA data.

Data was statistically tested at 95% confidence level and has a margin of error +/-4.6 percent.

FARMER OF THE FUTURE

FARMER OF THE FUTURE SEGMENTS



> **Ambitious Architects – 19%**

are innovators, growth-oriented, willing to take risks, and highly collaborative. They see change as an opportunity and are willing to alter their practices to adapt to consumer demand.

> **Confident Tacticians – 23%**

are fiercely independent and confident. Rather than growth, this segment has opted for prudent stability. They are willing to embrace new technology and sustainability measures quicker than most. They look to partners for consultation rather than proactive collaboration.

> **Connected Stalwarts – 27%**

are characterized by loyalty and endurance. They are changeable and view partnerships as key assets to their operation. While they have moderate growth aspirations, their primary goal is safety and stability for their operations. They are hesitant to innovate and view the future with apprehension. This segment is slow to adopt new farming practices.

> **Lone Rangers – 16%**

are individualistic creatures of habit who value the traditional farming lifestyle. While generally averse to change, they have growth aspirations and will alter practices if the ROI is clear. They do not actively seek collaboration.

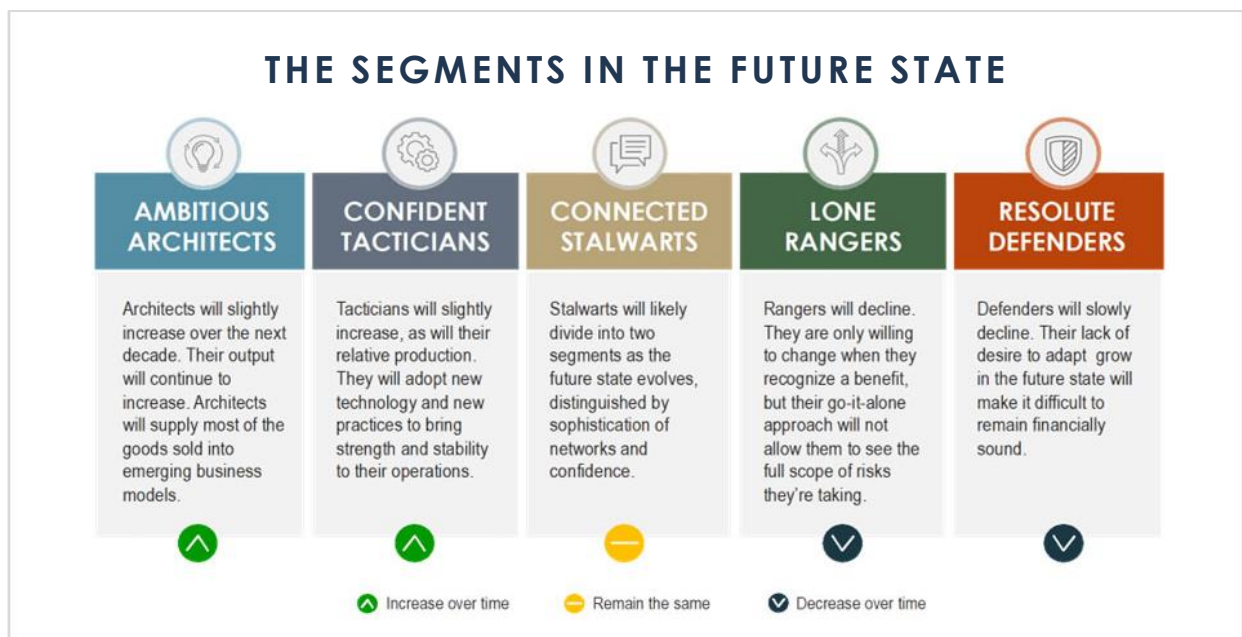
> **Resolute Defenders – 16%**

view farming as a lifestyle and place a high priority on maintaining long-standing farming practices. They are resistant to change and opt to play it safe. This segment has very few partnerships.

FARMER OF THE FUTURE TAKEAWAYS FOR CHECKOFFS

In order to best serve U.S. producers in the future, it is important to understand how the segments will respond to the five primary drivers of change, how each will transform and what they will need from their partners.

- > **Ambitious Architects** will need business partners who bring new ideas and innovations. They want a collaborative partner to help them fit ‘the new’ into their operations and maximize value. You must be able to show value and help them maximize profit, not just turn a profit.
- > **Confident Tacticians** will need business partners who respect their independent approach, offering products, ideas, and services with an open hand. They must build trust before the Tactician will consider them an advisor.
- > **Connected Stalwarts** will need partners who can translate advancements into meaningful and realistic action steps. Partners for Stalwarts must be ready for the farmer to contradict themselves, hoping to change but acting too slow on their own accord to become a leader. However, they can be an excellent client or stakeholder because they will learn to rely on you.
- > **Lone Rangers** will need partners who respect the tenured Ranger’s history and “the way things have always been done.” They have growth aspirations but are not fully aware of their exposure to risk. Approach them with humble strength.
- > **Resolute Defenders** will seek out partners who support them in their traditional approach. They likely have off-farm income, and their operations will exist on positive cashflows but declining balance sheets. Defenders will be brand loyal to locally-positioned businesses.



FARMER OF THE FUTURE

TAKEAWAYS FOR CHECKOFFS (CONT.)

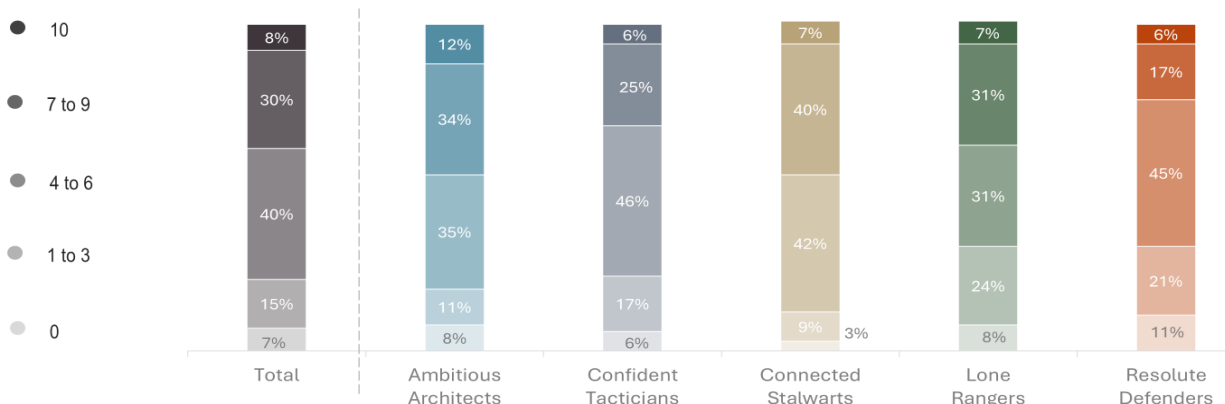
Not all farmer segments value checkoffs at the same level, and producers who do value the checkoff will value it for different reasons.

- Checkoff support varies across the segments, particularly those strongly supporting such programs. There is room to improve, and understanding the values and motivations of individual segments, as well as expectations of business partners and ag organizations like checkoffs, will enhance effectiveness of outreach and programming.
- Additionally, producers who do value the checkoff will find value in the checkoff for different purposes. For example, Ambitious Architects will look for checkoffs to proactively lead innovation and provide opportunities to collaborate and provide expertise. They expect industry partners to be one step ahead of them. Confident Tacticians and Connected Stalwarts seek stability and clarity and will look for checkoffs to set industry standards to help streamline their paths for adoption and transformation.

Highly consolidated commodities like Pork and Poultry over index in the Ambitious Architect segment, with 37% of swine producers falling into this segment and 31% of poultry producers, compared to the national producer average of 19%. The hallmarks of the Ambitious Architect segment are growth, innovation and collaboration. This difference is likely attributed to the recent growth and modernization of these two industries specifically and maintaining close business relationships with packers and processors.

However, it is important to note that while Ambitious Architects are well-positioned to deliver on the requirements of the future food system, they do not make up the majority of producers for any commodity. Checkoffs have an obligation to serve all farmers. Engaging with a diverse cross-section of segments is important for any checkoff organization as they work to collectively advance producers in their respective commodities.

Checkoff programs provide a good value for commodities producers.



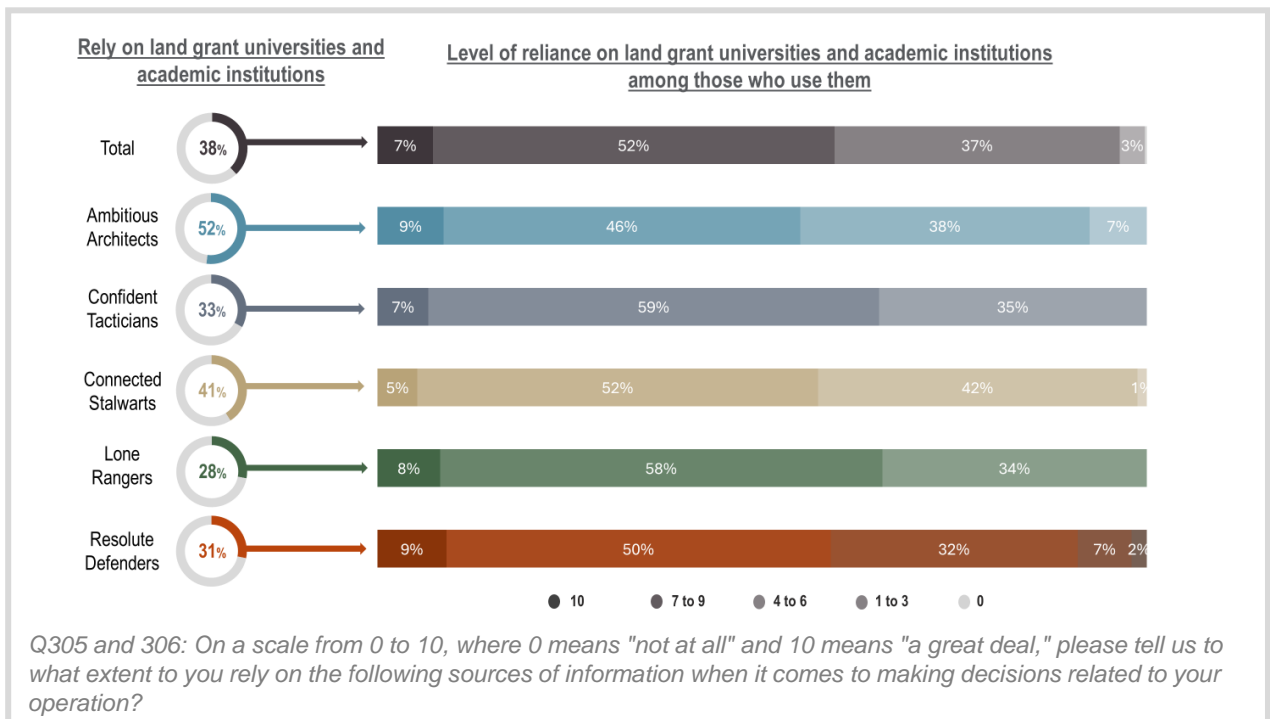
Q202: On a scale from 0 to 10, where 0 means it does not describe you at all and 10 means it perfectly describes you, please rate to what degree each of the following statements describe how you think about your operation's needs and support.

FARMER OF THE FUTURE TAKEAWAYS FOR CHECKOFFS (CONT.)

Land grant colleges and academic institutions continue to play an important role for producers.

- When it comes to making decisions related to their operations, 38% of producers say they rely on land grant universities and other academic institutions. Ambitious Architects and Confident Tacticians cite a particularly high reliance on academic institutions, two of the more future-focused segments.
- As highlighted earlier in the report in the notable checkoff impacts section, the checkoff organizations play a vital role in funding research, often through land grant institutions. The Farmer of the Future research reveals the importance of this continued partnership.
- It is important to emphasize that Ambitious Architects are early adopters and have a higher risk tolerance. Future-focused research, speed and ease of access to results will be exceptionally important to this segment. Ambitious Architects are also a primary target to incorporate into research trials.

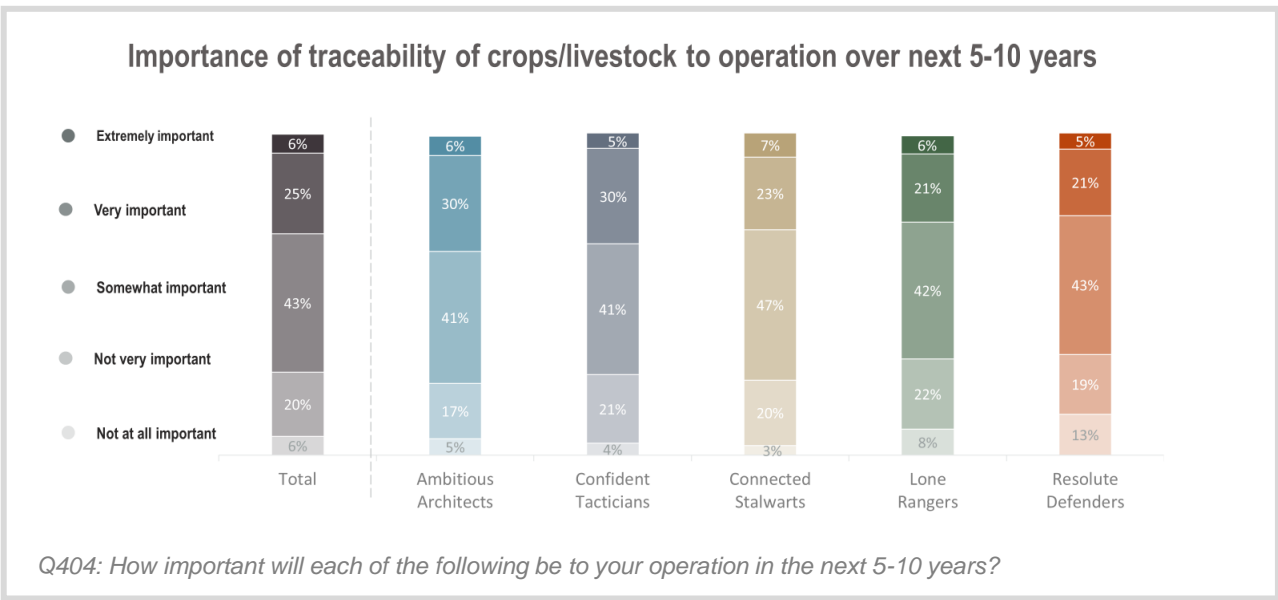
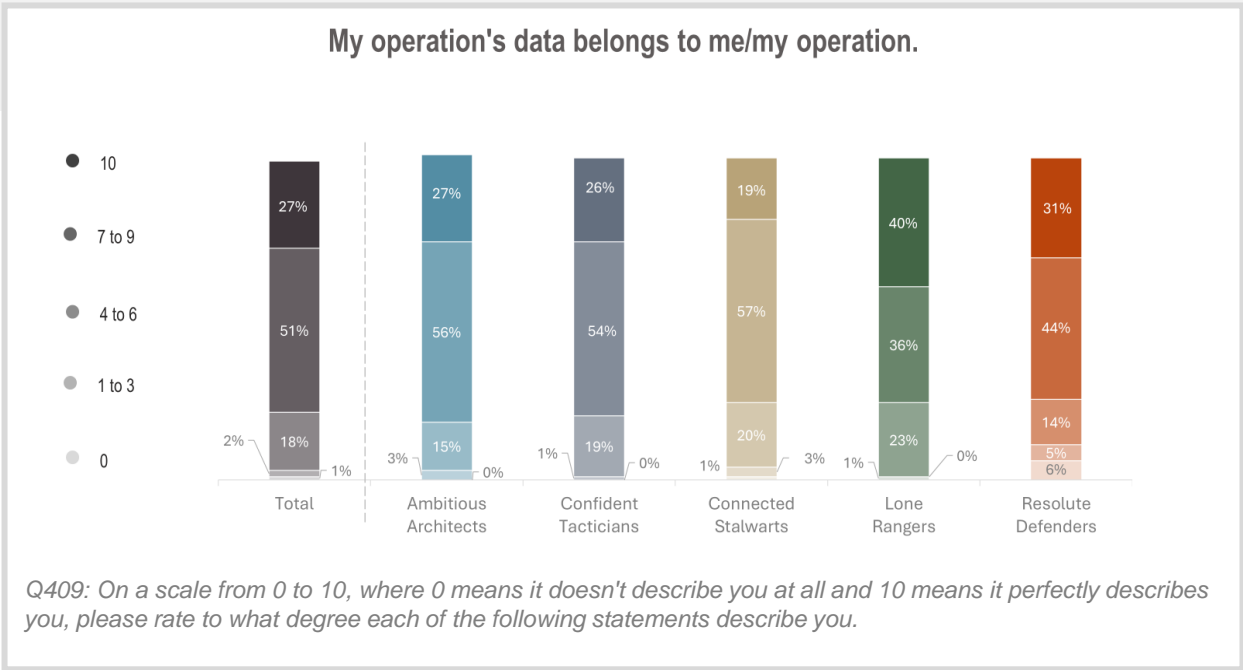
Confident Tacticians and Connected Stalwarts are motivated by stability and will leverage academic institutions to provide confidence in implementation.



FARMER OF THE FUTURE TAKEAWAYS FOR CHECKOFFS (CONT.)

In the current state, producers are largely out of position to deliver on the data and traceability requirements of a connected, future food system.

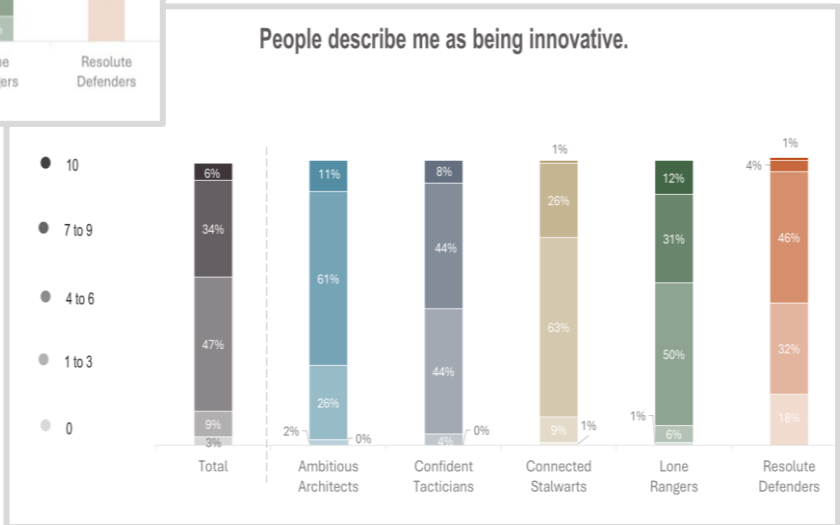
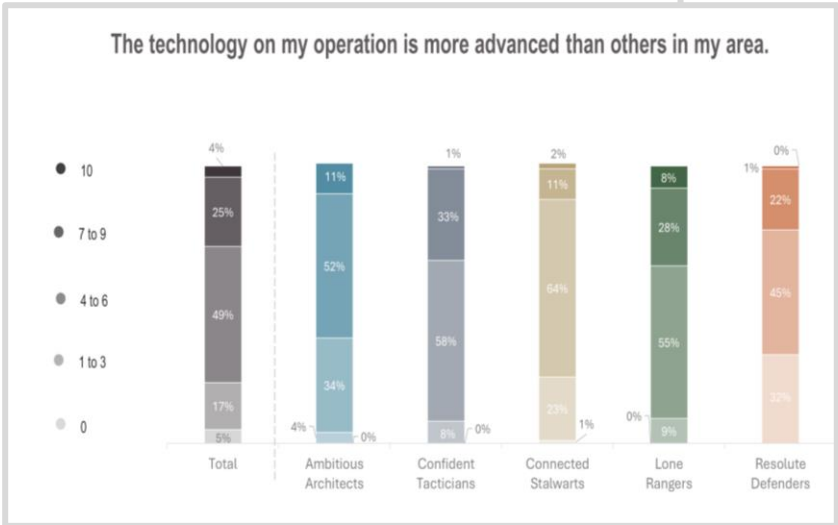
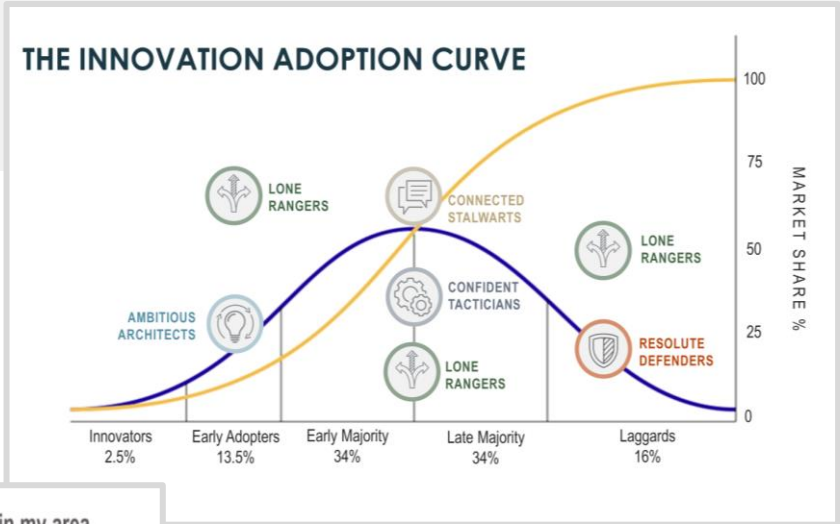
- When it comes to the importance of data and traceability, producers are unclear in the value that data can deliver to them via traceability, and even more unclear in the value of their operational data. Farmers and ranchers continue to hold strong in the belief that producers should retain ownership of their data. The checkoff organizations can have a significant impact by promoting "producer-led" data standardization efforts and developing commodity-specific standards.



FARMER OF THE FUTURE TAKEAWAYS FOR CHECKOFFS (CONT.)

Segments have different needs when it comes to embracing innovation.

- To meet the needs of the future state and increase efficiency, farms and ranches will have to adopt new technology, implement new practices, and increase diversification. Some segments of farmers and ranchers will be early adopters. However, checkoffs play a crucial role in driving innovation beyond early adopters and can significantly accelerate impact. Examples include research initiatives, demonstration farms, and setting industry benchmarks.



WARGAME

Methodology

As an essential part of the analysis, Aimpoint conducted a wargaming exercise to generate and assess potential reactions to the future environment. The wargame included a custom wargame board, an intelligence review, a set of player-selected future challenges, and a matrix wargaming system for generating and collecting player actions. Players were assigned to one of five actor personas to represent throughout the exercise:

> **Producer**

The farmers, ranchers, and growers who generate the commodities represented by the checkoffs.

> **Checkoff**

A government-recognized program created to enhance the market position of a commodity by funding initiatives like advertising, nutrition research, and development of new uses for each commodity.

> **Advocate**

A broad group of organizations and individuals aligned with and willing to support or act on behalf of the checkoff and producers.

> **Antagonist**

A broad group of organizations and individuals actively seeking to reduce the influence and presence of checkoffs.

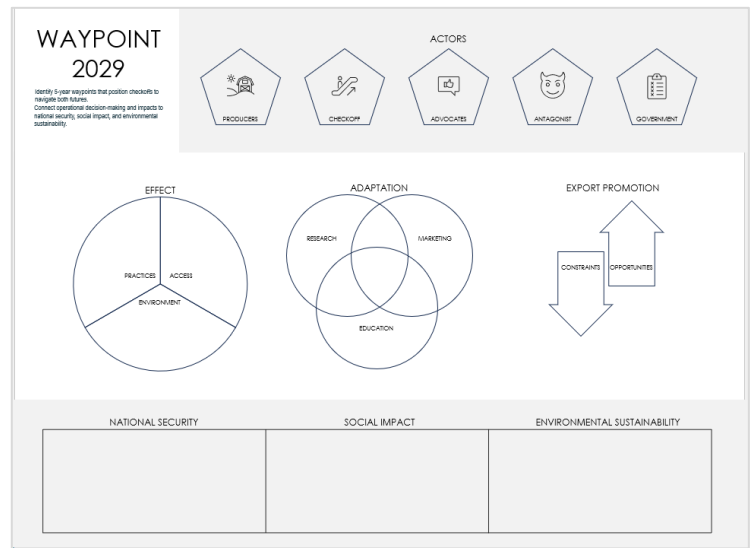
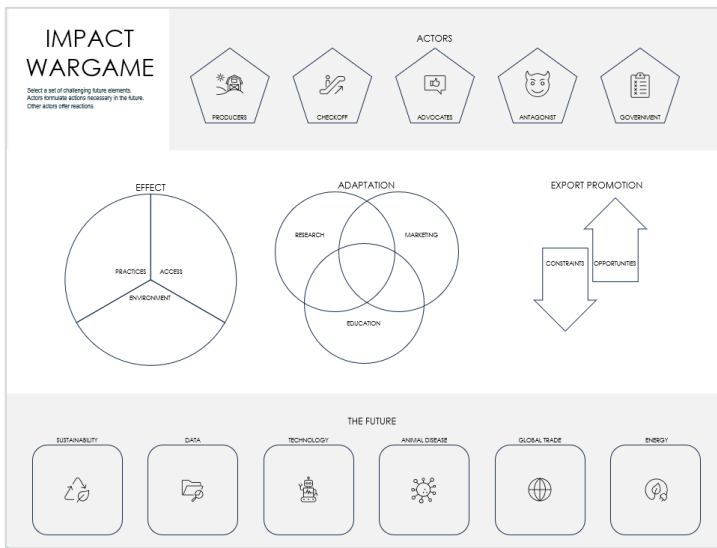
> **Government**

Executive, legislative, and regulatory entities at the local, state, and national levels responsible for deciding and implementing public law, regulation, and policy.

WARGAME (CONT.)

Gameplay

- > Aimpoint conducted an intelligence review to create a baseline understanding of the current state of U.S. agriculture. The players selected one of five detailed descriptions for each challenge area to represent the 2034 future environment. The group then conducted a cycle of action and reaction for five key Actors (producers, checkoffs, advocates, antagonists, and government) in response to the 2034 future challenge areas. Each actor formulated an action for the future and designated the desired area of impact (practices, access, environment, research, marketing, education, and/or export promotion). In turn, other actors reacted to the primary actor's actions.
- > The group reviewed the proposed 2034 actions to connect operational decision-making with impacts to national security, social betterment, and environmental sustainability. The group identified 5-year waypoints in 2029 to give a multi-horizon perspective, outlining how to best position in the short term to provide the most value for the future.



	PRODUCER	CHECKOFF	ADVOCATE	ANTAGONIST	GOVERNMENT	NOTES
PRODUCER		→				
CHECKOFF			→			
ADVOCATE				→		
ANTAGONIST					→	
GOVERNMENT						→

	2034 ACTION(S)	2029 WAYPOINT	NATIONAL SECURITY	SOCIAL IMPACT	ENVIRONMENTAL SUSTAINABILITY	NOTES
PRODUCER						
CHECKOFF						
ADVOCATE						
ANTAGONIST						
GOVERNMENT						

Scenarios

- > The following categories served as foundational components of the wargame scenarios. The Aimpoint WatchDesk team of intelligence analysts included a broad swath of current drivers and developed four potential scenario statements within each category.
- > The wide-ranging number of topics within each category highlight the complexity of thinking within the agri-food industry. The intensity and length of discussion to get to a single choice within each category even among a small group of like-minded stakeholders highlights the need for prioritization and aligned messaging that will resonate and drive toward common purpose. The key areas of focus for each individual category include:

Sustainability

- > Climate change
- > Intense weed pressure
- > New practices
- > Water efficiency

Technology

- > Reliability of technology
- > Artificial intelligence
- > Technology divide
- > Cyber security threats

Global Trade

- > Blockchain powered trade ledger
- > BRICS versus West conflict
- > Dissolution of trade agreements
- > Brazil and Russian rapid commodity expansion

Data

- > Data as a commodity
- > Data privacy
- > Data-driven transparency
- > Data protection

Animal Disease

- > New pathogen strains
- > Increase in cultured meats
- > Genetic engineering
- > Increased confinement

Energy

- > Accelerating the food versus fuel debate
- > U.S. carbon neutral by 2040
- > Waste as energy solution
- > Fossil fuels exhausted early

Wargame Action Highlights...

- “Producer,” “Checkoff,” and “Advocate” personas faced challenges in framing initiatives to resonate with a broader, strategic audience, especially on issues of human well-being and the environment. Although national security saw more agreement, debates during the wargame emphasized the need for messaging that appeals to both producer members and non-agricultural decision-makers.
- “Producers” often found themselves in heated debates about how to address scenario dynamics, torn between the risks to current operations and the need to seize emerging opportunities, particularly regarding innovation and tech adoption.
- When “Antagonist” personas created corporations and startups, they focused on big-scale operations and risk-taking to adopt new tech and tackle challenges. This favored larger, more risk tolerant producers, leaving many other farmers behind due to industry-centric discussions that ignored inclusive approaches.
- The unfolding actions and tensions within gameplay often demanded, or could have been resolved by, some form of policy backing from the “Government,” underscoring a pressing demand for decision-makers to be well-informed. While “Checkoffs” acknowledged this responsibility, it became increasingly clear that equipping stakeholders with compelling arguments and data-driven potential outcomes is now paramount.



PRODUCER

CHECKOFF

ADVOCATES

ANTAGONIST

GOVERNMENT

WARGAME TAKEAWAYS FOR THE CHECKOFF

> ***Strategic importance***

Of all the challenges, opportunities, and actions taken, one resounding finding emerged: while various organizations boasted the capacity to address farmers' needs, they were either multinational corporations driven solely by shareholder interests or narrowly focused entities catering to very niche groups of farmers. Participants recognized the unique role of checkoffs in meeting future demands while safeguarding the best interests of all U.S. producers and national security.

> ***Need for agility***

When progressive farmers sought to solve problems in the future state scenario, they gravitated toward partnerships with large corporations and venture-like start-up companies. They viewed checkoffs as being too slow to act and not forward-thinking in their approach.

> ***Not all farmers are the same***

Evaluating farmer persona actions unveiled a spectrum of attitudes, abilities, and risk tolerances. As progressive farmers moved, the checkoff persona's responses exposed adoption agility and capability disparities. This highlights the diverse capacities of farm operations to embrace crucial innovation for future success. Acknowledging these differences in risk tolerance made it clear that an organization adept at tailoring solutions to individual producers is vital to meeting their diverse needs and cultivating success across the agricultural landscape. These insights underscore the importance of a segmented approach tailored to meet the diverse needs of farmers.

> ***Innovation strategy***

During the wargame, innovation discussions initially centered on technology and practices available today and promoting adoption. However, it became evident that some scenarios required wholly new and creative thinking that does not yet exist. It became apparent that authentic innovation leadership and support required a tiered strategy for adoption. This revealed the need for a three-tiered approach: implementation of the farm-ready solutions, development of emerging technology solutions, and envisioning future possibilities.

> ***Real-time demand signals***

Throughout the wargame simulations, participants grappled with the shifting nature of demand and market dynamics, which seemed unpredictable. This underscored the necessity for consistent, real-time intelligence within the value chain to gauge specific consumer demand longevity. Such insights are vital for individual producers as well as the entire value chain, informing strategic investment decisions, efficient resource allocation, and maximizing returns on capital.

MARKET INTELLIGENCE

Geopolitics



Retracing agriculture's impact on U.S. geopolitics demonstrates that since its founding, American agriculture output has been a major point of value to the world, fostering key geopolitical relationships and providing leverage to American leaders.

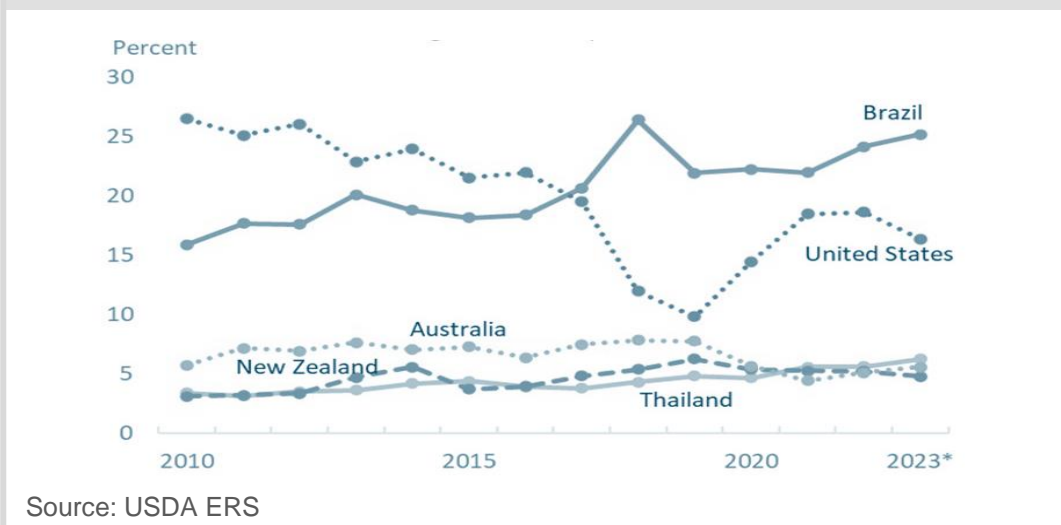
- > In the 20th century, the United States' agricultural output and impact worldwide was unrivaled. Access to U.S. agriculture products helped fuel developing economies by lifting millions out of poverty and hunger. U.S. agricultural exports abroad supported key interdependent relationships with developed countries and fostered order and progress in developing nations, playing a pivotal role in achieving national security objectives.



Looking to the future, this historical understanding is necessary to frame the value of agricultural production in national security. The United States has entered a heightened era of Great Power Competition (GPC) as China and Russia's presidents signed a strategic partnership in 2022 to counter U.S. influence. The two leaders reaffirmed this commitment and purpose in

April of 2024. As part of this strategy, China has enacted laws and made aggressive investments at home and abroad to boost agricultural production, increase food access, and reduce reliance on the U.S. This ultimately degrades the United States' advantage and global impact. At the same time, Brazil has outlined a national policy to improve agriculture production dramatically.

Countries providing largest share of China's agricultural imports

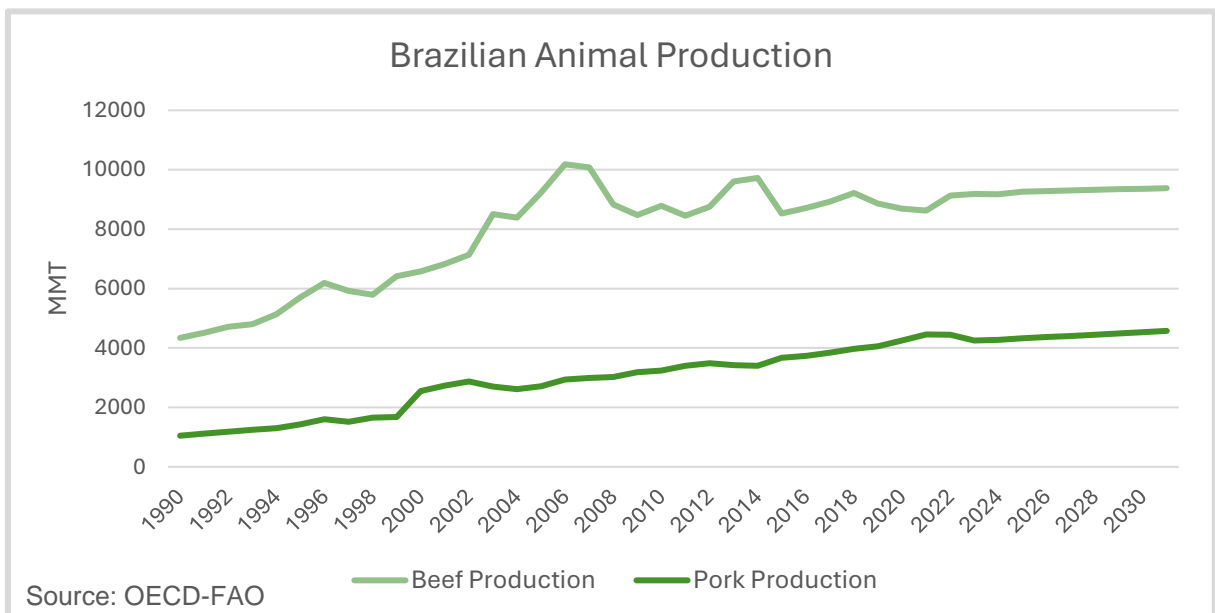
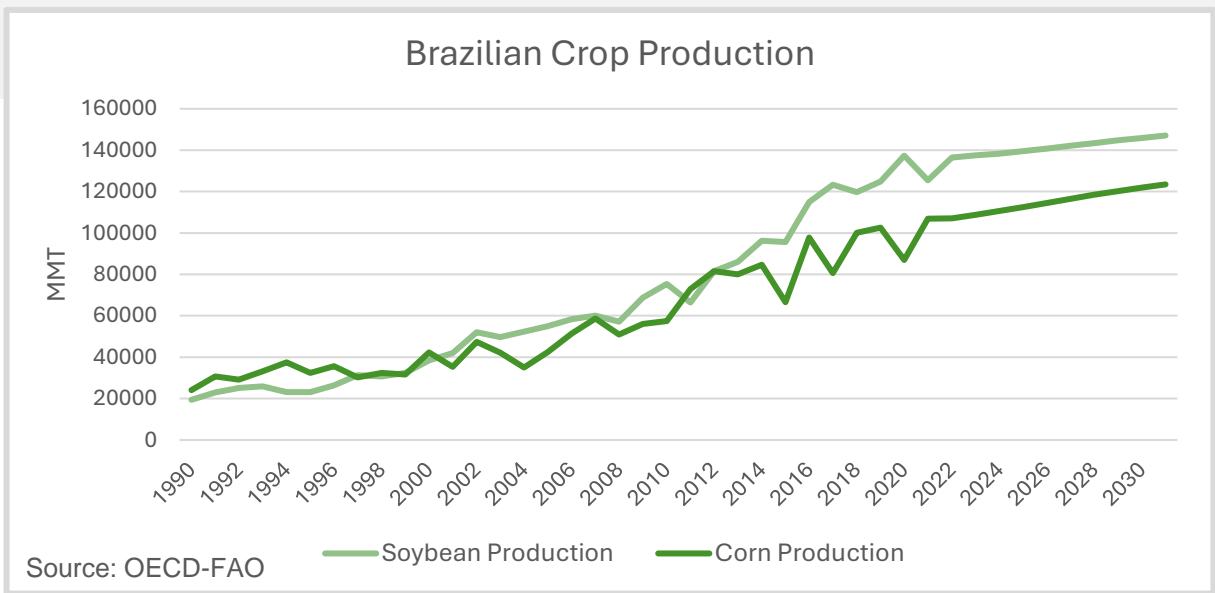


MARKET INTELLIGENCE

Geopolitics (CONT.)



Agriculture accounts for 25% of Brazilian GDP. Brazil currently enjoys the number-one spot for global exports of corn and soybeans and is making significant gains in beef and pork production.

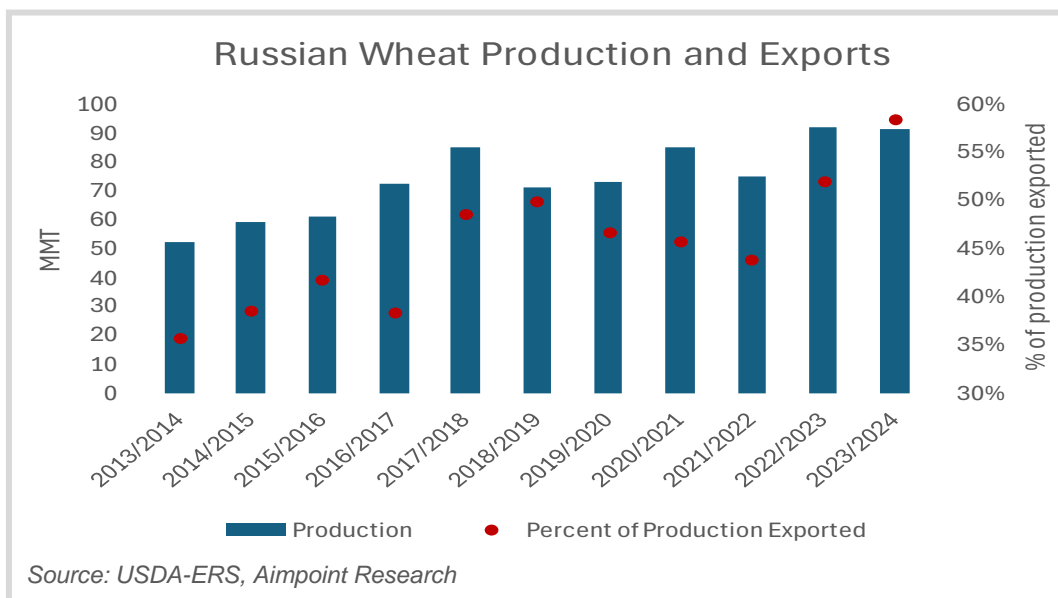


MARKET INTELLIGENCE

Geopolitics (CONT.)



Even amidst its aggression in Ukraine and resulting sanctions, Russia continues to increase its market share of global wheat exports and is now the world's largest exporter. Russia also remains a source of key agricultural inputs. Further, Russia's ties with China and Brazil for agricultural commodities, and their geopolitical commitments, continue to deepen. This not only supplants U.S. ag commodity trade with China, but also creates ambiguity for price discovery and global stocks, given the nature of the trade exchanges. This ambiguity can be used as a lever to disrupt U.S. agriculture and increase food production access as geopolitical influence or coercion worldwide. Russia now exports 58 percent of its wheat production, significantly affecting trade channels and the global balance sheet.



Early after its incursion into Ukraine, Russia leveraged its wheat exports to certain regions of the world by requiring export sales be made in rubles, leading to a period of appreciation for the ruble despite sanctions. Finally, given that Russia's export program is primarily focused not on supply and demand balance but rather on earning hard currency, combined with its geopolitical alliance with China, it is conceivable that in the coming decade Russia, which essentially has the same climate as the northern U.S. plains, will plant more soybeans and corn and less wheat.

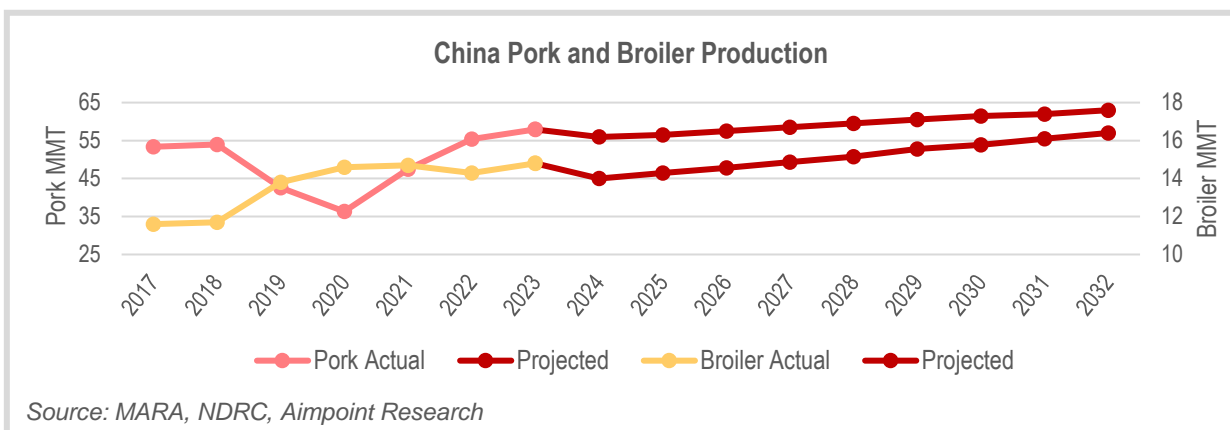
MARKET INTELLIGENCE

Geopolitics (CONT.)

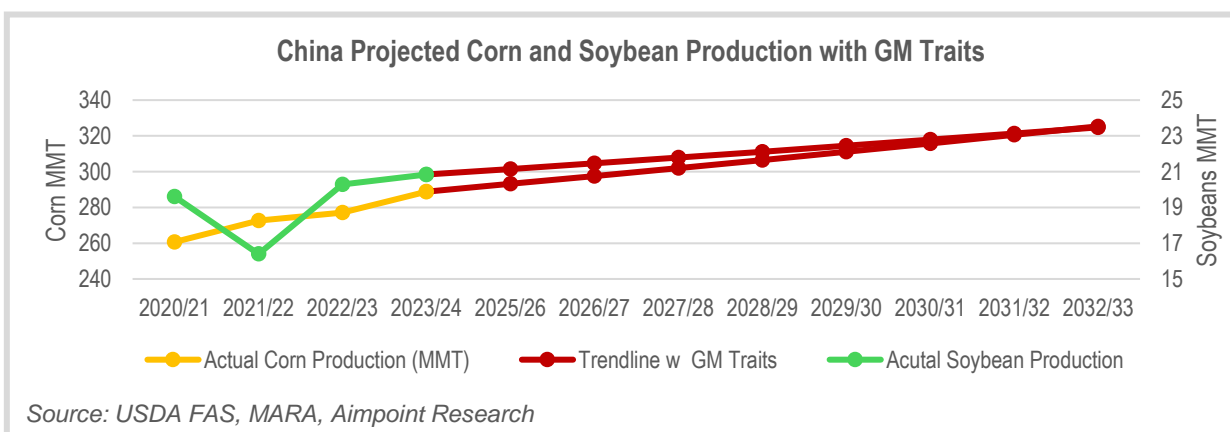


China's rapid and aggressive strategies in agriculture and research are exemplified in many recent examples...

- China revolutionized its hog production, accelerated by the COVID-19 pandemic and African Swine Fever outbreak, and swiftly transitioned from traditional backyard farms to modern, technology-driven operations that reflect a commitment to achieving food self-sufficiency. As part of its modernization a Live Hog futures contract was launched on the Dalian Commodity Exchange. China is now the only country besides the U.S. where hog futures are traded. Futures contracts help promote stable production from large-scale farmers.



- In December 2023, China's Ministry of Agriculture and Rural Affairs (MARA) approved 37 GM corn varieties and 14 GM soybean varieties. Already MARA has issued 85 seed production and operation licenses, including 26 GM corn and soybean seed production and operation licenses, effective for 2024. This is the first approval of GM crops beyond cotton and papaya. China anticipates significant yield improvements of up to 12% with widespread adoption.



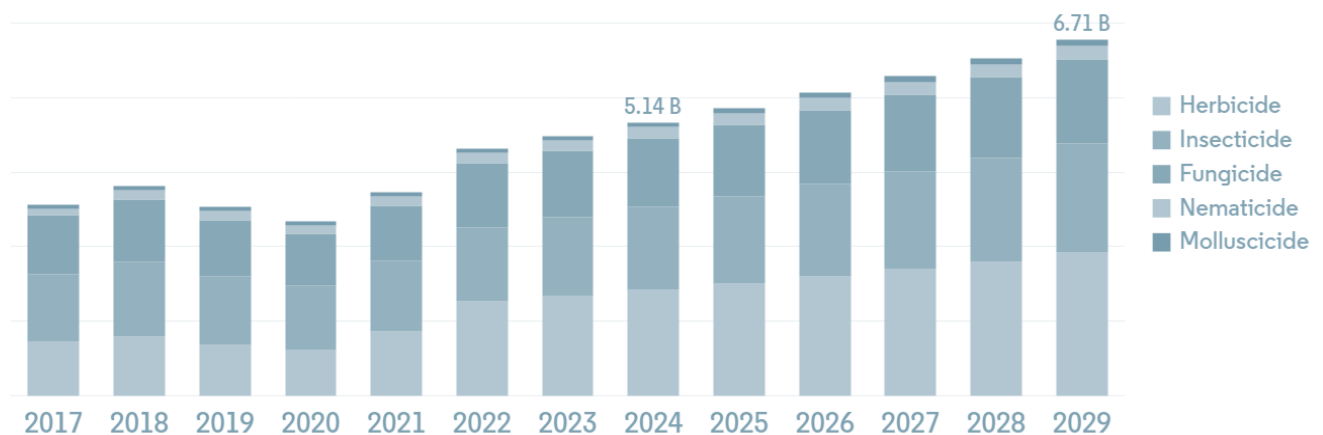
MARKET INTELLIGENCE

Geopolitics (CONT.)

- > Since 2019, China has undertaken a substantial overhaul of the legal framework governing its extensive genetic resources, categorizing them as a strategic national asset and imposing strict limitations on foreign access, citing concerns over national security.

- > Finally, the nation's intensified agricultural chemical production, aimed at flooding global markets with competitively priced products, particularly benefits BRICS nations, yet raises concerns of unfair competition and compromises in product quality and adherence to regulations, exacerbating international tensions.

Crop Protection Chemicals Market by function, USD, China, 2017 - 2029



Source: Mordor Intelligence

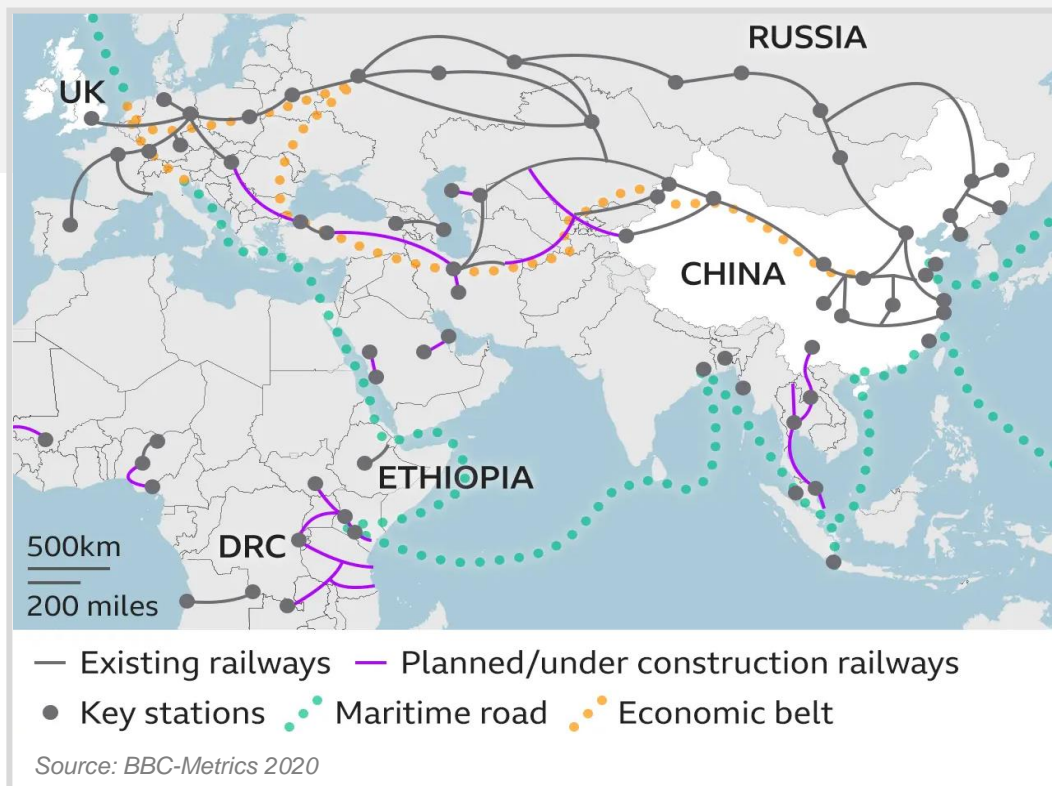


MARKET INTELLIGENCE

Geopolitics (CONT.)



China's ascendant economy and assertive global outreach, epitomized by initiatives like the Belt and Road Initiative, underscore its formidable presence on the world stage, particularly in direct competition with the United States.



- > Recognizing the pivotal role of agriculture production in both domestic stability and global influence, China strategically positions itself within the context of a Great Power Competition. In response, the United States must leverage programs such as checkoffs to fortify its agricultural sector and assert its influence in this dynamic geopolitical landscape.

MARKET INTELLIGENCE

Environment



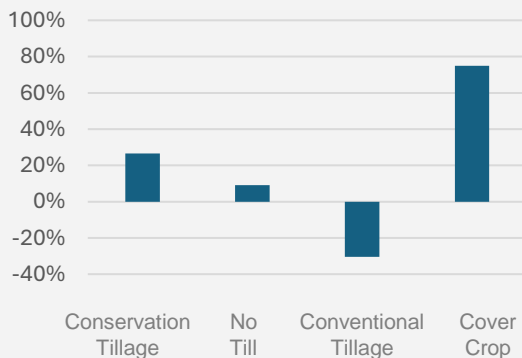
Over the years, there has been an increase in conservation tillage, no-till, and cover crops, as these practices maintain the land, conserve water, and also optimize farm productivity.

- > These practices help maintain organic mass in the field and decrease runoff potential, leading to better soil health and water quality and better nutritional quality of the crops grown. Though these two practices are some of the most common, farmers have also implemented others, including nutrient efficiency and integrated pest management programs to understand better the use of chemicals and fertilizers on their fields. This leads them to reduce their inputs, decreasing potential environmental harm while saving the farmer money.

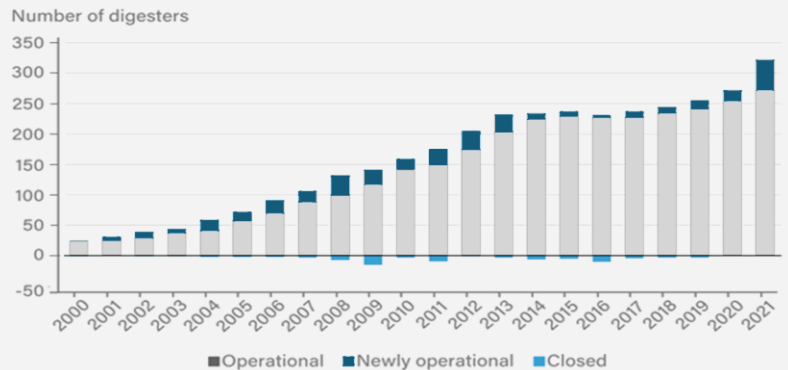
Livestock producers are adopting innovative practices like rotational grazing and using diverse grass mixes to enhance biodiversity and soil health. The industry is also embracing various technologies aimed at reducing water usage and recycling. For instance, feedlots are implementing systems that capture and recycle overflow water, alongside sophisticated waste management

processes facilitating water purification for reuse and the creation of nutrient-rich fertilizers. Companies like Livestock Water Recycling and Watermaster are providing producers with innovative systems to optimize resource utilization, minimize environmental impact, and mitigate concerns regarding runoff and groundwater contamination.

CHANGES FROM 2017 TO 2022 IN CONSERVATION PRACTICES



ON-FARM ANAEROBIC DIGESTER SYSTEM IN THE U.S.



Note: an anaerobic digester is an airtight vessel in which bacteria digest, or decompose, organic waste such as manure. Source: USDA, Economic Research Service using the data from the U.S. Environmental Protection Agency'

Source: USDA NASS, USDA Census of Agriculture

MARKET INTELLIGENCE

Environment (CONT.)

However, many practices and new technologies require capital investment and knowledge to implement correctly. Recent interest from both the government and private industry in sustainability has increased funding and support for regenerative practices, enabling more farmers to adopt. Additionally, the positive

impact regenerative practices have on carbon emissions, water quality, and other factors can be leveraged as another revenue stream for farmers, driving more value to their farms and increasing the economic feasibility of adoption.

Innovation is crucial in enabling farmers to produce more sustainably and has been rapidly advancing.

Biological solutions have emerged to be used with or as a replacement for traditional chemicals and fertilizers, decreasing the total amount of inputs required. Start-ups such as Vestaron, a biological crop protection provider, and established providers such as Corteva, work to provide producers with biological solutions. Crop intelligence platforms such as Arable, Cropin, and Taranis enable farmers to make precise decisions for crop management,

ultimately guiding their use of resources and inputs most efficiently and sustainably. For livestock, technologies such as Vence, a virtual fencing system, allow producers to implement regenerative practices such as rotational grazing more easily. Producers are also leveraging advancements in genetics, such as slick hair coat cows and nutrigenomics, to improve operations both on-farm and in the marketplace.

Ultimately, innovation will be vital to advancing sustainability in agriculture.

Still, it will require additional support, such as funding and on-farm trials to demonstrate use case and economic feasibility to farmers, which is foundational for widespread adoption. Continual advancement in environmental practices

and innovation will allow producers to increase their positive impact on the environment, producing more nutritional dense food and preserving our country's food and national security.

MARKET INTELLIGENCE

Human Health

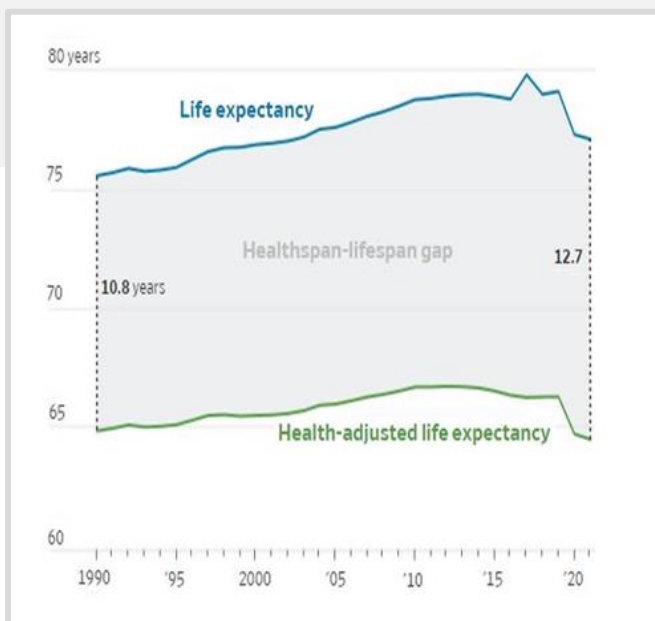


Six out of ten adults in the U.S. have at least one chronic disease, many of which are connected to poor-quality diets and are preventable.

In addition, there is a widening gap between the years the average American lives and the years they can expect to live in good health. As of the most recent WHO data in 2019, the average “health span” is now 12.4 years less than the average life span, up from 10.8 years in 1990.

Recently, the trend of preventing or treating health issues with diet choices has grown, often referred to as “food as health” or “food as medicine.”

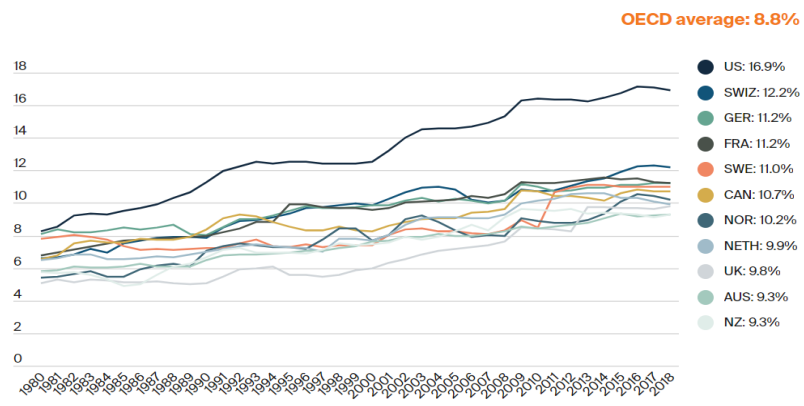
- Marketplace dynamics indicate a growing percentage of consumers increasingly conscious of, and invested in, food choices for better health. They seek a specific balance of such things as macro-nutrients, micro-nutrients, types of fats and oils, types of sugars, and proteins in the particular products they choose. Still, more consumers avoid potential allergens or seek out perceived anti-inflammatory foods. The COVID-19 pandemic further catalyzed the food as a health trend.



Source: Institute for Health Metrics & Evaluation

The U.S. Spends More on Health Care Than Any Other Country

Percent (%) of GDP, adjusted for differences in cost of living
Legend shows 2018 data*



Source: Commonwealth Fund, Jan. 2020



MARKET INTELLIGENCE

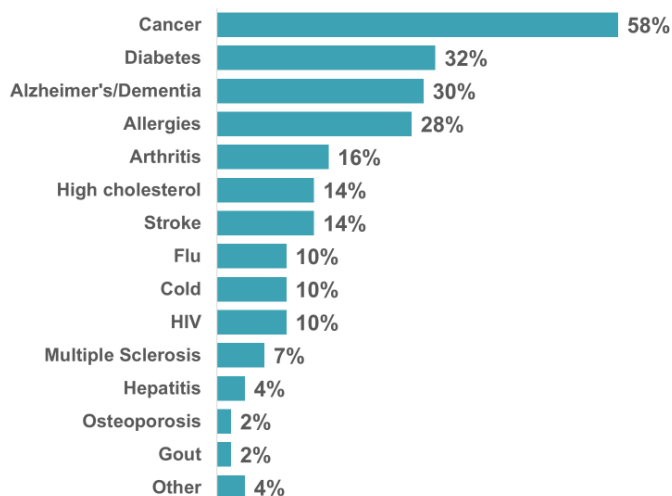
Human Health

Agriculture has a significant part to play in this movement, as well as simply providing a nutritious, available food supply to all consumers.

- The agriculture industry is not currently well positioned to offer de-commoditized products, but consumer demand is beginning to incentivize processors and manufacturers to change. Eventually, this will provide a market for farmers to meet consumer demand economically, whether with specific crop varieties, more local production, or higher quantities of less commoditized crops. However, there will always be a market for typical commodity crops. This shift can significantly change the U.S.'s health status, decreasing healthcare costs and the burden of poor health.

If gene-editing can help decrease the risk of cancer that could be very appealing to consumers.

Diseases Interested in Reducing Risk of Via Gene-Editing



Source: Aimpoint Research

INTELLIGENCE TAKEAWAYS FOR THE CHECKOFFS

> *Geopolitical Shifts*

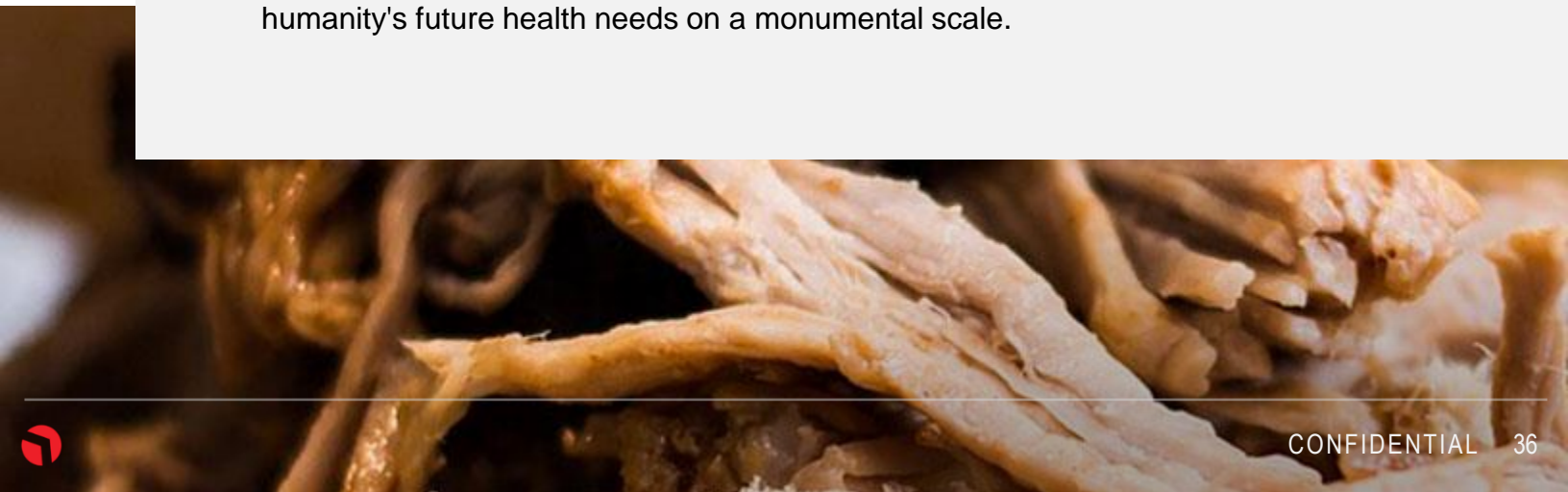
The rise of agricultural powers like China, Brazil, and Russia poses challenges to the dominance of U.S. agriculture in global markets. Considering the geopolitical environment and the importance that our competitors and adversaries place on agriculture, the United States must comprehensively promote commodities and support access to research and innovation for all farmers.

> *Technological Advancements*

The agriculture sector is experiencing a surge in technological innovations, ranging from precision farming tools to biological solutions. While these advancements offer opportunities to enhance production and promote sustainable environmental practices, the varying ability of farmers to adopt such technologies and their tolerance for risk adoption hinders the ability to leverage these opportunities fully.

> *Innovation and Health Nexus*

The burgeoning "food as health" movement highlights agriculture's untapped potential to revolutionize public health outcomes. Producers can unlock new health benefits by harnessing innovations like soil nutrient optimization and pave the way for meeting humanity's future health needs on a monumental scale.



RECOMMENDATIONS

Checkoff programs have significantly benefited their respective commodities by boosting demand, funding innovative research, developing new uses, and promoting sustainability initiatives. To continue their vital role in U.S. agriculture, it is crucial to ensure these organizations are adequately resourced, supported, and aligned to strategically address an increasingly complex future. By embracing the following recommendations, checkoff programs can further reinforce their common mission and drive future success.

> **Drive Agriculture Innovation**

The need for technological innovation in agriculture is crucial to address multifaceted challenges and unlock opportunities for increased efficiency, productivity, and sustainability. However, adoption hurdles such as cost, regulatory issues, infrastructure limitations, and low risk tolerance are limiting farmers' ability to capture the value. Checkoffs can drive agricultural innovation through direct investment and spearheading pilot programs to establish the value of new public and privately

developed innovations and technologies. Once value is demonstrated, they can then work to bring adoption to scale and drive innovation through to commercialization. By utilizing a tiered approach of implementing existing solutions, exploring emerging technologies, and envisioning future possibilities, checkoffs can bridge the gap between innovation and on-the-ground implementation, ensuring all farmers have access to cutting-edge tools and practices.



ENVISION FUTURE POSSIBILITIES

> Through industry collaboration

EXPLORE EMERGING TECHNOLOGIES

IMPLEMENT EXISTING SOLUTIONS

> **Lead Data Integration**

Checkoffs must take a leadership role in the collective data needs of agriculture. The research underscores the pressing need for interoperable platforms to improve collection, clarity and support on data ownership, standardized data protocols, and quality analysis to unlock the full benefits of data analytics. Fragmented data systems hinder integration and analysis, leading to inefficiencies and limiting the industry's

potential for data-driven insights. Checkoffs can address this challenge by advocating for standardized protocols, fostering collaboration, and driving initiatives to optimize farm operations and meet consumer demand. By shaping the industry's future with enhanced data-driven insights and operational efficiencies, checkoffs play a pivotal role in advancing agriculture and delivering value to producers and consumers alike.

RECOMMENDATIONS (CONT.)

> *Guide Strategic Decision Making with Predictive Insights*

To maintain the competitiveness of respective commodities nationally and internationally and capitalize on changing consumer demands, checkoffs should implement a predictive data-driven framework supporting strategic decision making. In today's dynamic and competitive market landscape, the significance of leveraging data for predictive modeling cannot be overstated. Checkoffs must analyze a wide array of drivers impacting an increasingly complex industry, including everything from geopolitics and global policy to consumer

trends and labor strikes. These factors require constant and consistent monitoring and synthesis to build a complete market picture. By establishing a comprehensive framework to enhance awareness and pinpoint areas of disruption and impact, checkoffs can be more agile, lead the industry proactively, and support farmers. This framework will enable checkoffs to anticipate long-term market trends, target emerging opportunities, and efficiently utilize resources to maximize strategic impact on the agricultural industry.

> *Align with Food as Health*

Checkoffs must actively engage in "food as health" dialogue and solutions. This is critical due to the societal imperative to address health challenges and meet growing consumer demand. Checkoffs play a vital role in aligning agricultural practices to meet consumer preferences and deliver the macro and micronutrients scientifically proven to promote positive health outcomes. This collaboration will ensure viable and scalable solutions and

encourage farmer adoption resulting in affordable healthy food and farmer profitability. Delivering health-promoting products will improve public health outcomes, nutritional security, and lower federal expenditures on nutrition related disease. Actively engaging in the food as health movement positions checkoffs as leaders driving positive change and enhancing consumer well-being.

> *Utilize Farmer Segmentation*

The checkoffs must utilize farmer segmentation to ensure future success in an increasingly personalized ecosystem. Understanding the diverse needs, challenges, and preferences of different farmer segments is paramount for ensuring the effectiveness and relevance of checkoff programs and initiatives. Progressive farmers highlight their inclination towards partnerships with large corporations and startups, indicating a gap in the perceived adaptability of checkoffs. However, opportunities abound for checkoffs to bridge this

divide by fostering environments that embrace innovation and cutting-edge practices, aligning with the evolving needs of farmers. By using tailored support strategies, checkoffs can enhance engagement, ensure efficient resource allocation, and build trust with stakeholders, ultimately contributing to the long-term sustainability and success of the agricultural sector. Overall, leveraging segmentation insights positions the checkoffs to play a central role in driving positive change and innovation for all farmers in the agri-food complex.



RECOMMENDATIONS (CONT.)

> *Safeguard the Interests of All U.S. Producers*

Amidst numerous challenges and opportunities facing U.S. agriculture, one pivotal revelation has surfaced: agriculture companies and start-ups often prioritize narrow interests or shareholder profit, leaving a critical gap in serving the broader needs of American farmers. Recognizing this void, checkoff programs stand uniquely positioned to meet future demands while safeguarding the interests of all U.S. producers and bolstering national security.

To maximize their impact, checkoffs must strategically emphasize their role in addressing key societal priorities, including national security, social betterment, and environmental sustainability. By launching targeted initiatives aimed at stakeholders ranging from local communities to policymakers, checkoffs can effectively communicate their strategic significance and secure robust support, thereby shaping a resilient and sustainable agricultural future for the nation.

CONCLUSION

- > While the checkoffs have traditionally played a pivotal yet often silent role in national security, social betterment, and environmental sustainability, the future necessitates a more deliberate focus on these strategic objectives.

Checkoffs are foundational to national security with their U.S.-centric, producer-focused mission. The commodity and research advancements driven by the checkoffs are essential to social betterment through nutrition-based human health. They are crucial to environmental sustainability through their ability to invest, pilot and scale innovation, bridging the gap from producer to consumer.

The checkoffs have successfully delivered on these unifying objectives, demonstrating intentional leadership and strategic investments that have guided their members through complex challenges. By seizing opportunities and aligning with overarching goals, checkoffs have significantly enhanced the United States' strategic advantage in the context of Great Power Competition. Leveraging their broad support base and extensive industry reach, they have ensured the resilience and sustainability of U.S. agriculture.

To maintain and strengthen America's agricultural leadership, they must continue to fulfill these roles. By consistently providing strategic direction and leveraging their industry-wide influence, checkoffs can navigate future complexities and secure the ongoing success and sustainability of U.S. agriculture.