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Changing Idaho Feed Crop Supply and Demand—Implications

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Introduction

The Idaho dairy industry has undergone substantial expansion since the early 1990s. The total number of animals in concentrated animal feeding operations (CAFOs), primarily dairy cows and beef cattle in feedlots, increased. This has led to changes in the supply and demand for crops used as feed, including the predominant crops of alfalfa hay, barley, and corn (silage and grain). The authors of this bulletin quantified the changes in the supply and demand for these feed crops over the period 2003–21 and provide a summary of their findings herein. They describe the implications that follow from their quantification analysis for agricultural businesses (e.g., feed crop buyers and sellers and crop input sellers) and aligned stakeholders, including University of Idaho Extension and the United States Department of Agriculture (USDA) Agricultural Research Service (ARS).

Several key facts that characterize supply and demand conditions for Idaho feed crop markets over the past several decades are as follows:

1. The growth in CAFOs in Idaho has been driven by the expansion of the dairy industry. Data from the USDA National Agricultural Statistics Service (NASS) show that dairy cow inventories, as of January 1 in each year, increased from 390,000 in 2003 to 646,000 in 2021 (USDA NASS 2022a). Comparatively, “cattle on feed” inventories neared 300,000 at both the start and end of this period (USDA NASS 2022b).
2. Corn is an increasingly important feed crop in Idaho, especially corn silage. Corn acres harvested, for both corn silage and grain, increased from 185,000 acres harvested in 2003 to 380,000 acres harvested in 2021. The percentage of corn silage acres out of total corn acres ranged from 61% to 75% over this period (USDA

NASS 2022c). The USDA Economic Research Service (ERS) reports that cash receipts from corn sales in Idaho more than doubled between 2008 (\$62.6 million) and 2021 (\$128.3 million). Notably, the share of total cash receipts from crop sales in Idaho accounted for by corn increased from 2.2% in 2008 to 3.5% in 2021 (USDA ERS 2022).

3. Alfalfa hay acres harvested decreased steadily from 2003 to 2021, with a value of 1.2 million acres harvested in 2003 and 960,000 acres harvested in 2021 (USDA NASS 2022d).
4. UI Extension dairy and cattle specialists determined that feed rations, primarily those for dairy cattle, have adjusted to include a reduced amount of alfalfa hay and relatively more corn silage from 2003 to 2021. Specifically, over this period, average daily rations, in pounds (lb) per day, of alfalfa hay decreased from about 18 lb/day to around 7 lb/day, while those for corn silage increased from about 27 lb/day to over 53 lb/day. Corn grain feed rations were estimated to decrease from about 7 lb/day to 5 lb/day. Barley amounts in feed rations were estimated to have remained around 3 lb/day.

Based on these background data, the main adjustments for supply and demand in Idaho feed crop markets have been driven by growth in the dairy industry; and, specifically, as of 2023, there is both greater supply and demand for corn, especially silage, and relatively less supply and demand for alfalfa hay.

Main Outcomes from Quantification Analysis of Supply and Demand for Idaho Feed Crops

A quantification analysis helped the authors to estimate supply, demand, and supply-demand balances (supply minus demand) for alfalfa hay, corn grain, corn silage, and barley for Idaho for the period 2003–21. The categories of supply accounted for include estimates of current year production,

stocks (carried in from the previous year), and imports from abroad. Demand categories include estimates for feed, stocks (carried out), and exports abroad. It is important to note that we were unable to account for all sources of supply and demand due to data limitations. For example, data on imports and exports only account for direct purchases or sales by an entity in Idaho with an international partner. Thus, they do not account for purchases or sales by entities in neighboring states, which occur frequently but for which data are unavailable. Despite these limitations, the estimates, especially those for feed, still provide insights regarding the changes in supply, demand, and supply-demand balances over the 2003–21¹ observation period. The key estimates from this quantification analysis include

1. Idaho remains largely “self-sufficient” (supply is either equal to or greater than demand) in alfalfa hay, barley, and corn silage over the observation period.
2. Demand for corn grain exceeded supply by about 300% in 2003, but that gap has declined to around 100% in recent years.
3. There are substantial fluctuations in corn grain supply–demand balances from year to year, largely due to changes in acreage planted and harvested.

The main outcomes from these estimates are that Idaho markets for alfalfa hay, corn silage, and feed barley are largely driven by factors in the local market, such as planting decisions by Idaho farmers and the availability of water for irrigation. Additionally, since Idaho corn grain demand exceeds supply, Idaho corn grain markets are influenced by both local market factors and external ones, such as growing conditions in the major corn-growing states in the US Midwest. Since most US corn grain is grown in the Midwest, the corn grain price in Idaho and elsewhere in the United States is largely based on growing conditions in the Midwest and supply-demand factors in global markets. Lastly, markets for all feed crops in Idaho are influenced by the prices and production quantities of feedlot beef and milk, which influence the ability of beef feedlots and dairies to purchase feed on the market.

¹ More details regarding the data and methods used in the quantification analysis are in Hatzenbuehler et al. (2023).

Implications for Idaho Feed Market Stakeholders

There are several implications of the feed crop supply and demand estimates for Idaho agricultural businesses (e.g., feed crop buyers and sellers and crop input sellers), other aligned stakeholders (such as UI Extension faculty and their Idaho-based research partners, like the USDA ARS), or both to consider. The primary implications and considerations for each entity are included in Figure 1 and largely relate to developing and/or adjusting their operational strategies and plans within the current market environment. Most of the implications and considerations for agricultural businesses are reflective of the increasing relative importance of conditions in corn markets in Idaho and the United States for business performance. Local market conditions for all major feed crops, including alfalfa hay, barley, and corn silage, are

particularly impacted by factors that influence the direct marketing of feed crops among local market participants. Those related to quality and associated nutritive characteristics deserve particular attention. It is also essential to maintain flexibility regarding identifying and engaging with sourcing and marketing partners who can help others achieve performance objectives amid volatile supply and demand conditions. This is especially the case if corn grain is consistently included in feed rations, because corn silage acreage harvested is more consistent from year to year than corn grain acreage (USDA NASS 2022c). Corn silage acres harvested vary less from year to year than corn grain acres harvested because dairies, and farms nearby them, commonly implement three-year continuous corn and three-year perennial forage rotations (Cornell CALS n.d.). In contrast, corn grain is a rotation crop that may only be produced once every four or five years (Spangler et al. 2022).

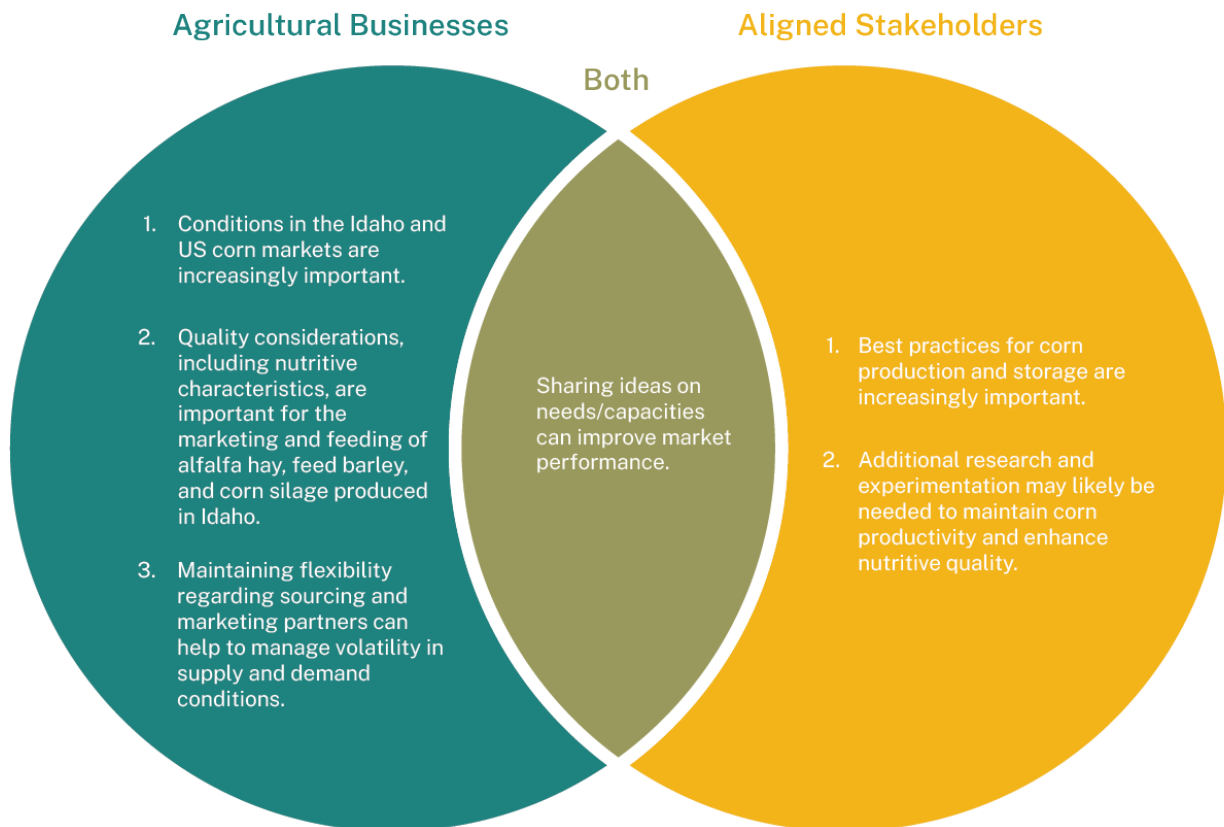


Figure 1. Implications and considerations of changing feed crop market conditions for Idaho feed market stakeholders.

Table 1. Potential action items for Idaho feed market stakeholders.

Agricultural Businesses

Gather and analyze market information:

- 1) Consider subscribing to the USDA World Agricultural Supply and Demand Estimates (WASDE) Report email list. These monthly reports are a primary source for updates on supply and demand conditions in global and US corn markets.
- 2) Review the USDA NASS “Prospective Plantings” report, released at the end of March each year, for planting intentions for corn and other crops in Idaho and the United States. A ratio of about 70% corn silage can be used to obtain an acreage estimate for corn grain from the total corn acreage.
- 3) Review the USDA NASS “Acreage” report, released at the end of June each year, for actual acreage planted and/or harvested.
- 4) Review the USDA Agricultural Marketing Service (AMS) Idaho Direct Hay Reports released weekly or biweekly. These reports occasionally have corn silage volumes of sales and associated prices.

Update and revise marketing/operational plans:

- 1) Review and revise marketing/operational plans on at least an annual basis, but likely more frequently (e.g., semiannually, quarterly).
- 2) Review plans for ration components and potential substitution opportunities based on macronutrient (e.g., protein) requirements. Consider using a “cost of nutrient” calculator such as the SESAME software developed by Ohio State University Extension.

Engage with aligned stakeholders:

- 1) Remain updated on best practices for testing and reporting feed-quality indicators and other information required to provide a buyer upon sale.

Aligned Stakeholders (e.g., UI Extension, USDA ARS)

Develop research and implement Extension:

- 1) Develop research experiment strategies that can help answer pressing production and/or storage questions and apply for grant funding to implement the research.
- 2) Expand and continually update Extension activities on production and storage best practices, quality/nutrient testing of feed crops for direct feeding, and/or marketing strategies based on research implemented locally or elsewhere.

Both

Engage and share information:

- 1) Maintain engagement regarding needs and capacities.
- 2) Brainstorm regarding the potential need for other information sources for corn silage price data, which are only sparsely reported in USDA AMS Idaho Direct Hay Reports.

Note: See Further Reading for more information about the reports mentioned herein, including associated website links.

Since the growth of the corn industry in Idaho has primarily occurred over the past two decades, for aligned stakeholders such as UI Extension and USDA ARS there may likely be a need for more research on production and/or storage best practices for corn. Experiment-based research is particularly important in consideration of varying farm characteristics such as physical storage facilities and open space on Idaho farms. Hines and Stokes (2020) provide a thorough overview of current standards of practice for harvesting and storing corn silage in Idaho, but there may likely be a need for other studies on specific aspects of corn production and storage under various conditions. Such research would ideally be developed mutually by feed crop producers, buyers, sellers, and aligned stakeholders to meet most pertinent needs.

Table 1 includes potential action items for agricultural businesses, aligned stakeholders, or both that follow from the implications presented in Figure 1. Those for agricultural businesses largely relate to obtaining and analyzing as much pertinent information as possible on supply and demand conditions (e.g., planted acreage, prices) in Idaho and US markets for corn grain and silage, as well as for potential substitute crops in both crop rotations and feed rations. Due to the volatility of planted and harvested corn grain acres in Idaho, sourcing and marketing strategies for both corn grain and substitutable feed crops need updating at least on an annual basis and ideally with greater frequency (e.g., semiannually, quarterly). Feed buyers may likely benefit from encompassing gathered market information into a “cost of nutrient” tool such as the SESAME software developed by the Ohio State University Extension to determine the relative costs of planned rations and their associated nutrition characteristics as market conditions change and evolve over time. Engaging with aligned stakeholders by sharing needs for research and experimentation for production and storage practices can help sustain productivity and reduce shrinkage as growing and environmental conditions change and farm characteristics evolve.

For aligned stakeholders, the main potential action items pertain to developing research experiments that can assist with answering pressing questions that arise in the corn production and storage process.

Production-related experiments could include field trials that investigate alternative integrated pest management (IPM) and other weed-control strategies, as well as determining the effects of alternating seed varieties within continuous corn rotations (Cornell CALS n.d.). Storage-related experiments could include investigations of corn-silage-quality changes under different storage systems and climates (e.g., silos versus drive-over piles) (Adesogan and Newman 2021). Additionally, expanding and continually updating Extension activities on best practices regarding production and storage, as well as testing for quality and associated information requirements, would help maintain productivity and performance for feed crop producers. For both agricultural businesses and aligned stakeholders, facilitating engagement among each other to share information on research plans, needs, and capacities helps to ensure that productivity gains are achieved over the long run. Since corn silage prices are presently very limited, there may also be an opportunity to facilitate more information sharing beyond those currently gathered and reported on a relatively sparse basis by the USDA Agricultural Marketing Service (AMS) in their Idaho Direct Hay Reports.

Further Reading

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