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How Trade Benefits the U.S. Economy

FROM *ESSENTIAL GUIDE TO U.S. TRADE* PUBLISHED BY U.S. GRAINS COUNCIL

As a new U.S. presidential administration begins and new trade priorities begin to emerge, it's important to re-examine: why trade anyway?

Most every product we use has a complex story that involves trade. They are the culmination of ideas, engineering, materials testing, accounting services, design, coding, sales, farming, manufacturing production and countless other activities by workers who add their value along the way in this country and many countries beyond our borders.

It may sound counterintuitive, but the more production processes are spread across national boundaries through global value chains, the more integrated the U.S. economy becomes with other economies in the world. Having so many firms lead and participate in global value chains is an American strength.

Food trade has grown more than thirteen times its value since 1980. Even though the majority of food produced in the world is still grown and consumed locally, global trade in agriculture and food products has swelled over the last three decades. In 1980, the value of agriculture and food trade is estimated to have been $230 billion. By 2015, global trade had grown to $1.77 trillion in agriculture and $1.49 trillion in food products. Today, more than one-fifth of the calories grown in farm fields is ultimately traded in global markets.

As exporters, U.S. growers are second only to the European Union countries counted together.

U.S. productivity is growing faster than demand in the United States, which means that American farmers, ranchers and firms in U.S. agricultural supply chains rely on export markets as an important way to increase sales and revenues.

There's reason to worry that tariffs will dampen overseas sales, but in the aggregate, the U.S. Department of Agriculture still sees a bright future for U.S. agricultural exports. USDA's Economic Research Service projects fiscal 2019 agricultural exports at $144.5 billion, up $500 million from the revised forecast for fiscal 2018. The increase is attributed to higher exports of wheat and horticultural products, which could offset expected declines in oilseeds, livestock and dairy product exports.

The Idaho Barley Commission and Idaho Wheat Commission work with partners including U.S. Grains Council and U.S. Wheat Associates on developing export markets for growers, including hosting trade teams from around the world. Pictured here is a Mexican Malt Barley Trade Team visiting Idaho barley harvest.

According to U.S. trade statistics, the United States has maintained a surplus in agricultural trade since 1960, driven primarily by exports of bulk commodities. In 2017, the U.S. agricultural surplus totaled $17.4 billion.

What are our largest agricultural export markets today? In 2015, Canada bought the largest share of U.S. agricultural exports, followed by Mexico. Together, our North American neighbors consumed over $39 billion or 28.3 percent of total U.S. agricultural exports, making them vital markets. East Asia, including its lucrative markets of Japan and China, purchased nearly $46 billion in U.S. agricultural exports, overtaking North America in accounting for 33.2 percent of the total.

Demand is rising for U.S.-grown commodities and food in large emerging markets that are experiencing significant population growth. Cities in emerging markets are bulging at the seams, which is a result of global patterns of urbanization; more than 2/3 of the world's population will live in cities by 2050. Significant reductions in poverty and emergence of a robust middle class in developing economies has driven dietary "upgrading" as more people can afford meat poultry and fish. Livestock demand is up as well, spurring demand for the grains and oilseeds that comprise animal diets.

Some 70 percent of the increased demand for these proteins is from developing countries. Asia, Latin America and Sub- Saharan Africa are having the most impact on food consumption and changing patterns of agricultural and food trade. The recent tariff war with China further underscore the need to sow the seeds now for diversification into smaller but growing markets.

Taken together, emerging markets currently make up 20 percent of U.S. agricultural exports. An important step to growing U.S. exports to these markets is U.S. expertise and assistance both to develop appropriate regulatory frameworks for marketing approvals and to facilitate the clearance and movement of food once approved for sale.

Trade agreements and trade capacity building can be enormously helpful in promoting good regulatory practices across the board, opening the door to more purchases of U.S. agricultural and food exports.

The U.S. Grains Council, U.S. Wheat Associates and organizations like them working with other commodities do significant amounts of this work for the U.S. agriculture industry, engaging in trade negotiations, helping facilitate trade around existing policies, helping customers understand the value of purchasing U.S. origin and teaching those customers how to actually buy and use U.S. products. The Idaho Barley Commission and the Idaho Wheat Commission work with these partners on export market development programs in leveraging grower dollars to provide export market opportunities for Idaho growers.

To download a full copy of Backgrounder: The Essential Guide to U.S. Trade, go to: https://grains.org/learn-about-trade/.

Where's the Nitrogen? Fertilizer Recovery of Malting Barley

BY CHRISTOPHER W. ROGERS, GRANT LOOMIS & JARED A. SPACKMAN, USDA-ARS & UNIVERSITY OF IDAHO

- Fertilizer nitrogen recovery was similar for irrigated malting barley grown in Idaho compared to previous research in lower-yielding and typically lower-input, non-irrigated systems.
- Modern varieties (ABI-Voyager and Moravian 69) out-yielded a historical one (Harrington) with no reduction in fertilizer nitrogen recovery.
- While the incorporation of fertilizer did not result in a yield improvement, fertilizer recovery was improved by more than 10%: an important factor for long-term sustainability and environmental quality.


Rogers

Every grower understands the costs associated with running a profitable farming operation, and of these, nitrogen fertilizer additions are one that occurs nearly every year and for nearly every field to ensure that yield and quality specifications are met. It is important to consider where this fertilizer nitrogen goes, in terms of agronomic production as well as losses to the

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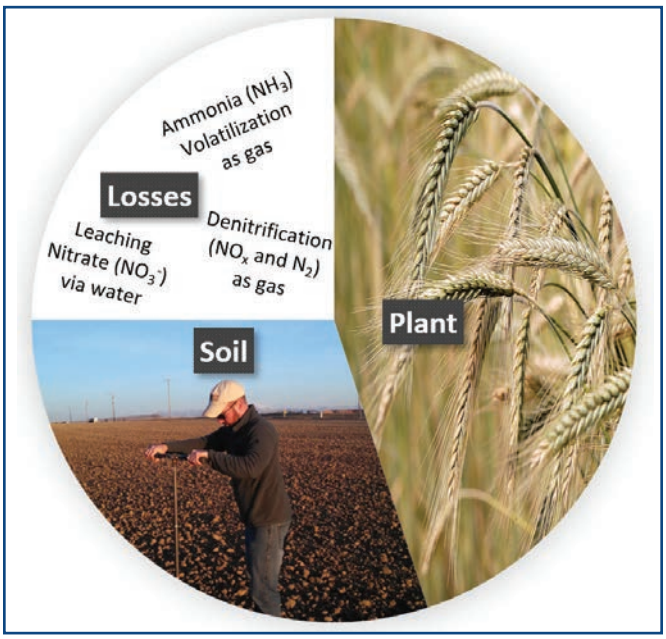

Figure 1. Portions of the circle represent the percentage of fertilizer nitrogen recovery in the plant and soil, and that which was lost to the environment.

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surrounding environment. Research has shown that globally and in the United States only 35% and 40% of applied N is recovered in cereals, respectively. Estimates have not been determined under high-yielding, high-input irrigated systems that are predominant in southern Idaho. Thus, in a recent study funded by the Idaho Barley Commission and the University of Idaho, we used labeled-nitrogen techniques to "trace" nitrogen throughout the plant-soil system, allowing us to determine where the applied nitrogen fertilizer ended up.

Our study compared the older variety Harrington, which was released in 1981, with two of the most widely grown modern malt lines produced in Idaho: ABI-Voyager and Moravian 69. The three varieties were planted on a loam soil at the Aberdeen Research and Extension Center in 2015 and 2016. Labeled nitrogen as urea fertilizer was applied at planting at a rate of 113 lb nitrogen/ac as either a surface or an incorporated application annually where the total applied nitrogen fertilizer plus soil inorganic nitrogen was 190 lb nitrogen/ac. Irrigation and rainfall for the season totaled an average of 16 inches in both years. Surface applied fertilizer resulted in total plant-soil system recovery of 66% and incorporated applications resulted in a nitrogen recovery of 77%. We determined that nearly 30% of the applied nitrogen was recovered in the soil, where the majority of this was in the top 1 foot of soil in the incorporated treatment. Despite differences in fertilizer recovery, there were no measurable yield differences between the surface and incorporated fertilizer applications, indicating that the soil N supply was sufficient to offset any nitrogen losses. ABI-Voyager and Moravian 69 averaged 161 bu/ac with 10.4% grain protein. This was 10 bu/ac greater than Harrington, which had a grain protein content of 11.3%.

Where's the nitrogen?

Overall, 40% or more of the fertilizer nitrogen was recovered in the plant and nearly 30% was recovered

Early season barley research plots.

Research combine harvest of barley plots.

in the soil. The remaining nitrogen fertilizer was lost through the processes of leaching, denitrification, and ammonia volatilization. Losses of 23% and 34% were noted for the incorporated and surface applied urea, respectively. Despite the use of best management practices, all of these loss mechanisms likely occurred during the study. While the exact breakdown of losses was not measured, we can predict the most possible loss pathways. Leaching likely represented only a small portion of the losses as the majority of nitrogen fertilizer was recovered in the top one foot of soil and only small amounts were found in the second and third foot. Denitrification losses were likely small as water-logged conditions are needed to produce an oxygen-depleted environment necessary for the process to occur. Previous research in Idaho has indicated that only a few percent of the applied N was lost via denitrification when malt barley was grown. Ammonia volatilization is likely the largest loss mechanism despite the usage of best management practices. Ammonia volatilization are favored in high pH soils commonly found in southern Idaho and late-season nitrogen losses from plant tissues can also occur. This study provides evidence of above average plant recovery and relatively high plant-soil system recovery of malting barley under high-input, irrigated production in southern Idaho when best management practices were used.

The full article is freely available from *Agronomy Journal*:

Rogers, C.W. and Loomis, G. (2021), Fertilizer nitrogen recovery of irrigated spring malt barley. Agron. J. Accepted Author Manuscript. https://doi.org/10.1002/agj2.20576