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Grain Quality Revisited



U.S. market shares of world trade in bulk agri-cultural commodities have stagnated or declined since the 1970s. What role, if any, has grain quality played in that decline, and how should it be addressed?

Buyers have complained publicly about the quality of U.S. grain for more than 130 years. In 1916, the federal government began to legislate grain grades and standards. The latest chapter in that story can be found in the 1990 Food, Agriculture, Conservation, and Trade Act (FACTA). Title XX directed the U.S. Department of Agriculture to determine the costs and benefits of providing cleaner grain in the marketplace. This research, done through both land grant universities and USDA's Economic Research Service, and including in-country interviews in twenty-two separate countries, is largely completed, with studies on the wheat and corn markets published and similar studies on the soybean market to follow shortly. The major findings of these and related studies provide implications for marketing decisions and public policy.

Grain quality from the supplier's viewpoint

Grain quality embodies physical characteristics of the grain (such as weight and moisture content), its cleanliness and phyto-sanitary condition (such as presence of weed seeds or pests), and its intrinsic characteristics (such as protein content), which determine end-use value. Grain importers often base purchases on intrinsic characteristics, but sometimes the other types of characteristics also affect purchasing decisions.

Growing conditions, farming practices, and inputs such as hybrid seed and fertilizer affect grain quality on the farm. Beyond the farmgate, quality can be affected by subsequent handling and other

practices, such as high-temperature drying of corn in the United States. In a few cases, notably wheat in Canada and Australia, governments actively maintain grain quality and promote exports by regulation of varieties and cleaning (see table). By enforcing single-desk control over exports, their marketing boards more readily address the preferences of importers, sometimes to the disadvantage of domestic users.

Government grading and inspecting influences the quality of product delivered to the importer. In the United States, for example, numerical grades encourage grain handlers to blend various lots to achieve the exact level specified in the standards or contract. Without additional incentives, the absence of intrinsic characteristics as grade-determining factors, such as protein content in wheat and soybeans, leaves producers with insufficient reason to maintain these quality attributes.

Grain quality from the importer's viewpoint

Many governments, particularly those in developing countries, prefer to maintain control over procurement and distribution of staple food commodities like wheat. However, purchases by state trading agencies usually reflect less attention to quality. State traders often fail to communicate with millers, processors, and bakers—the end-users of food commodities.

Commodities destined for human consumption and industrial processing tend to have tighter requirements for end-use characteristics than do feed ingredients. Contracts typically reflect this stringency. Still, in most of our in-country interviews, buyers ranked price above intrinsic quality characteristics, even for grains or oilseeds for food use. Price and quality are invariably closely linked. In

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Grain Quality Policies and Practices of Major Exporting Countries

Country	Commodities Traded	Variety Release	Mandated/ Available Cleaning	Marketing Boards	Export Subsidies ¹	Producer Support
Argentina	wheat, corn soybeans	Varietal licensing	No/Yes	Ended in 1991	No	No ²
Australia	wheat	Release restricted	Yes/Yes	Yes	No ³	Yes ⁴
Brazil	soybeans	Varietal licensing	No ⁵ /Yes	No	No	No ²
Canada	wheat	Release restricted	Yes/Yes	Yes	No ³	Yes
China	corn, soybeans	Plant breeding state-run	No/No	Yes	No	Yes ⁶
EC	wheat	Varietal licensing, declaration at delivery ⁷	No/Yes	No	Yes	Yes
South Africa	corn	No controls	Yes/Yes	Yes	No ³	No
United States	wheat, corn soybeans	No controls	No/Yes ⁸	No	Yes	Yes ⁹

¹ Export subsidies used primarily in wheat market.

² Soybean policies and marketing systems geared toward export of meal and oil rather than soybeans.

³ Extent of subsidization by state marketing boards is often unclear.

⁴ Federal payments under pool deficits are made in some years, as well as some state support.

⁵ Cleaning not mandated but Brazilian exporters typically offer FM guarantees.

⁶ Producers in China given input subsidies.

⁷ Regulations differ between member countries of EC.

⁸ Cleaning widely available for U.S. corn and soybeans but not wheat.

⁹ Limited support for U.S. soybean producers.

soybean crushing, for example, higher oil and protein content yields more value to the processor.

Of the quality factors, importers usually gave the highest rating to intrinsic characteristics. The exception was corn. Corn buyers ranked cleanliness (specifically broken corn and foreign material, or BCFM), moisture, and the presence of aflatoxin higher than intrinsic factors. Seventy percent or more of all U.S. corn exports go for livestock use, so importers value quality factors which improve corn storability and palatability.

Overall, the demand for clean grain in the world grain and oilseed markets does not seem to justify added across-the-board cleaning of U.S. commodities prior to export.

In terms of grain and oilseed quality, importing countries rank U.S. commodities in the middle of import sources. Importers usually rate Australian and Canadian wheat quality higher than U.S. wheat

quality, although some care must be taken when evaluating these rankings because of differences in the primary classes of wheat produced in the exporting countries. Importers prefer South African corn and in many instances Argentine corn for quality reasons, especially for wet- or dry-mill processing. Most buyers prefer Brazilian soybeans, while a few prefer U.S. soybeans because the red dust in Brazilian shipments can increase oil refining costs. The relative ranking depends on whether the country imports soybeans primarily for protein content or oil content. Brazilian beans tend to yield more oil, while the protein advantage can shift from year to year. Importantly, however, these quality-sensitive markets account for a relatively small share of total trade (15–30 percent for each commodity).

Market implications and policy consequences for the grain and oilseed sectors

Overall, the demand for clean grain in the world grain and oilseed markets does not seem to justify added across-the-board cleaning of U.S. commodities prior to export. Rather, our studies identified a handful of wheat and soybean importers willing to increase imports or pay a slightly higher price for a

cleaner product, but the revenue derived would not offset the cost of across-the-board cleaning. Selective cleaning of wheat and soybeans for cleanliness-conscious markets could reap small positive benefits for the U.S. agricultural sector. We found no evidence that any corn-importing country would be willing to buy more U.S. corn or pay a higher price for lower-BCFM corn than they already pay. Additional breakage occurs during handling and a low-BCFM level at export inspection does not guarantee a low BCFM level once it reaches its destination, so importers are not inclined to pay premiums on that basis.

The results of the study strongly suggest that the U.S. grain marketing system would find greater rewards by defining and improving the intrinsic quality of the commodities that it exports. Currently, the lack of premiums and discounts in the market have encouraged plant breeders and producers to emphasize yield and agronomic features in developing and selecting varieties, rather than end-use performance. Providing more and better information about the expected end-use performance of the grain and oilseeds may give both domestic and foreign buyers more confidence in the quality and consistency of the grain they purchase and support premiums and discounts based on intrinsic quality.

The diminishing role of export subsidies to expand markets will force major exporting countries, especially wheat exporters, to seek other grounds for competing. In effect, the presence of the Export Enhancement Program (EEP) has permitted U.S. exporters to sell wheat on a volume basis, premising sales to most markets almost entirely on low prices. In a post-GATT environment, U.S. exporters may need to treat each market individually, dealing with importers' preferences almost on a retail basis. With state marketing boards, Canada and Australia gear their entire system toward meeting or exceeding customers' expectations, both in terms of the product they sell and the service they deliver. The extent to which these marketing boards also engage in price competition is unclear, given the lack of published in-

formation on their transactions. This type of distinction (between a U.S. wholesale and competitors' retail attitudes) exists to some degree in course grain and oilseed trade as well, although export subsidies play lesser roles in these markets.

U.S. farmers and elevators already provide the level of cleanliness and other quality factors domestic millers and processors desire. The lack of technology to easily and accurately predict end-use grain quality characteristics makes domestic millers and other end-users reluctant to pay quality premia for grain. Instead, they achieve their quality needs in two ways. First, they purchase more grain than they need and re-sell the less desirable grain to feed outlets. Second, they take advantage of historical information they have on the physical quality of the crop to be harvested (or available from storage)

from different locations. While foreign users ostensibly have access to the same set of information, they are unable to act upon it without great cost. They would need to segregate grain of a particular quality as it moves through the marketing channel to export facilities in order to make full use of the quality information.

Some exporters, notably Canada and Australia in the wheat market and South Africa in the corn market, take steps to reduce the likelihood of grain quality variability. These countries restrict varieties

planted to provide some assurances on the important physical and intrinsic attributes of grain. Such measures, however, impose costs on producers because they forego gains in yield and sometimes the use of other innovations.

U.S. producers respond rationally to the current system by planting high-yielding varieties rather than those with consistent end-use characteristics. This response hampers the ability of U.S. exporters to meet unusually stringent quality specifications, since such grain is not readily available in the market pipeline.

USDA studies suggest that the use of contracts could allow some importers to identify and obtain U.S. grain with the desired characteristics. Con-



tracts can specify premiums and discounts for grain which depart from standard specifications. The interviews revealed that many efforts to negotiate such nonstandard contracts with U.S. exporters met with what importers regarded as too high an asking price, or if the deals were completed the buyers were not fully satisfied with the quality delivered. These studies also show that the composite quality measure represented by U.S. grades often fails to distinguish quality characteristics important to importers.

The government could improve this situation by providing better information. For example, inspection certificate information might include measures of breakage susceptibility in corn or gluten quality in wheat. The government already offers optional measures of protein and oil content for soybeans. Some respondents in the interviews suggested that these factors be added as grade-determining criteria. However, a large portion of importers of U.S. soybeans do not at present ask for such information, even though it would be provided free of charge. Each added measure of quality imposes additional costs on the marketing system, particularly the corn breakage measure, since no commercially available testing equipment for that purpose yet exists.

A government policy could also be adopted to further encourage research and development of high-value grain and oilseed varieties and more useful and/or more accurate measuring technology. The actual breakdown of costs versus benefits on such proposals has not yet been undertaken.

The bottom line

The quality-sensitive segments account for a fairly small share of the world market in the major commodities, but there are some prospects for growth. The goods produced in these market segments (such as white bread, corn sweeteners, tofu) are preferred by the higher-income groups in most countries, and income gains are likely to enhance demand for these products. Concerns about food wholesomeness could also augment demand for quality in grains and oilseeds.

The use of export subsidies has overshadowed

the role that relative quality plays in determining overall market share. This in turn has caused a lessening of U.S. exporters' attention to quality in the handful of markets where quality does matter, with negative consequences. With the successful completion of the Uruguay Round of GATT and the mandated reduction in export subsidies, the importance of factors such as grain quality will likely increase. The challenge is for U.S. grain exporters to contest the quality-conscious markets without sacrificing the advantage of flexibility in the current system. ■

■ For more information

A good summary of the impact of policies and marketing systems on the quality of grain of the major grain- and oilseed-exporting countries can be found in the two-volume set *Grain Quality in International Trade: A Comparison of Major U.S. Competitors and Enhancing the Quality of U.S. Grain for International Trade*, both published by the Congressional Office of Technology Assessment in 1989. A thorough description of the history and implications of grain grades and standards can be found in *Grain Grades and Standards: Historical Issues Shaping the Future*. Urbana, Ill: University of Illinois Press, 1990, by Lowell Hill.

The following reports are available from the Economic Research Service: *Economic Implications of Cleaning Wheat in the United States*, AER-669, Bengt T. Hyberg and others; *The Role of Quality in Wheat Import Decisionmaking*, AER-670, Stephanie A. Mercier; *Costs and Benefits of Cleaning U.S. Wheat: Overview and Implications*, AER-675, William Lin and Mack Leath; *The Role of Quality in Corn Import Decisionmaking*, AER-684, Stephanie A. Mercier; *Economic Implication of Cleaning Corn in the United States*, AER-686, Chin-zen Lin and William Lin; *Costs and Benefits of Cleaning U.S. Corn: Overview and Implications*, AER-688, William Lin. The soybean reports are not yet completed. Individual country case studies have also been published.

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