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Loading and unloading procedures often cause breakage.  
Blending high and low moisture grain cause heating and mold.  
Photos by Betty E. Hill and University of Illinois Agricultural Communications Program.

# Grain Grades: They Lack Economic Rationale

By Lowell D. Hill

**C**ongressmen sponsoring the 1986 Grain Quality Improvement Act were motivated primarily by the loss of U.S. export markets attributed to problems of grain quality. Although the connection between quality and market share was never clearly established, publicity tying lost markets to foreign complaints provided adequate justification for Congress to revise the Grain Standards Act, anticipating it would restore the U.S. reputation in world grain markets. Unfortunately, the 1986 Grain Quality Improvement Act will not resolve the complaints of foreign buyers nor recapture lost export markets. The problems of grain export quality will continue and Congress, producer groups, and trade associations will continue to debate the proper role of government in controlling grain quality.

To those familiar with the history of grain grades in the United States, the recent rhetoric and heated debates in the press and Congressional hearings generate a sense of *deja vu*. The same issues, foreign complaints and debates, have been repeated many times in the media, in Congress, and in research with little evidence of a permanent solution.

For over a century these debates have revolved around three basic issues: The complaints of foreign buyers; the appropriate factors and factor limits for designating numerical grades; and whether deliberately increasing foreign material and moisture contents constitutes adulteration or is an acceptable practice for meeting contract specifications. The failure to resolve these persistent issues is due in part to the failure to apply economic principles to the alternatives.

## The Persistent Issues

**Foreign Complaints.** Complaints of overseas customers about low quality U.S. grain receive wide spread attention in the media. These complaints have a long history, dating back at least to 1857 when European buyers complained to the Chicago Board of Trade about moldy, dirty grain.

Lowell D. Hill is L.J. Norton Professor of Agricultural Marketing at the University of Illinois.

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Exporters argue that foreign buyers are using quality complaints to bargain for lower prices. Farmers and Congressmen point to loss of market share to prove the importance of quality, using examples of individual firms who have shifted origins because of low quality.

Without debating the validity of these arguments, it is sufficient to state that the problems—real and perceived—have persisted for nearly 100 years and neither industry response nor Congressional actions provided a satisfactory answer or reassured U.S. customers and farmers.

**Appropriate Factors and Factor Limits In The Grades.** A review of the 100-plus changes in grain grades between 1916 and 1986 suggests a lack of objective criteria and a certain arbitrariness in the changes. A few examples will illustrate. Minimum test weight for No. 4 corn was added to the standards in 1918, lowered by 1 pound per bushel in 1934, and raised by 1 pound per bushel in 1959.

Official soybean standards in 1940 combined all non-bean material (impurities) and fines into a factor called "foreign material." In 1941 these materials were separated into "dockage" and "foreign material." In 1949 dockage was eliminated and all impurities and fines were again called foreign material. In 1986 USDA and industry are again asking if soybean standards should define dockage as separate from foreign material.

Moisture was removed as a grade factor for wheat in 1934 amidst strong protests from many buyers and sellers. Fifty years later the USDA reviewed the standards for corn, soybeans and sorghum and removed moisture as a grade determining factor. Foreign and domestic processors and merchandisers opposed the action with the same arguments used in 1934, as if the issue had not been debated and resolved half a century before.

Inconsistencies in the standards abound. The legal weight of corn is 56 pounds per bushel and test weight for No. 1 grade is the same. The legal weight of soybeans is 60 pounds per bushel but the test weight for No. 1 is 56—the same as corn. Until 1985 moisture was not a grade factor in wheat, was a criterion for "tough" in oats and was a grade determinant in corn,



soybeans, and grain sorghum. These inconsistencies are due in part to failure to apply economic principles to the grain quality issue.

**Blending and Adulteration.** Farmers and Congressmen have been especially vocal on the issues of blending diverse qualities—described as commingling and upgrading by exporters, but labeled adulteration and fraud by many farmers and congressmen. Prohibitions against various forms of blending have been frequently recommended as a solution to many of the quality problems.

Blending provides a source of income to grain handlers, primarily because grain with less moisture, foreign material (FM) and damage (DKT) than No. 2 limits for corn or No. 1 limits for soybeans is purchased at the base price. For example, corn with 1% and 3% FM are purchased at the same price. Lower quality (e.g. 5%) purchased at a discount can be blended with the 1% to achieve 3% FM; the maximum allowed for No. 2 corn at a base price. The “better-than-grade” corn can be used to increase the value of the “less-than-grade” corn. The economic incentives for blending exists on all grade factors but moisture provides the most flagrant example.

Adding water to dry grain to bring it up to the base level or addition of screenings to clean grain to meet the FM level specified in the grade or contract have generated heated debate among Congress, producers and grain handlers. The technique has a long history. In 1914, Dr. Duvel of USDA stated “Within the past week it has been reported from reliable authority that some elevator operators resort to the practice of spraying dry wheat with water prior to loading for shipment, for the purpose of increasing the weight.”

The FDA has repeatedly stated its opposition to adding water to grain if done to increase the weight or value. They labeled as adulteration methods such as misting, blending, and aera-

tion with humid air if it is done for purposes of economic gain. Water is not the only grain additive labeled as adulteration. The farm press and Congress repeatedly surface accusations of “adulteration” of grain with corn screenings and foreign material.

The grain industry responded to the adulteration accusations by explaining that in normal handling procedures, the distinction between blending and adulteration is one of degree. One of the functions of a market is to provide uniform sublots from diverse qualities. Combining grain from separate truck loads that differ widely in quality is normal in periods of high volume deliveries from farmers. Drawing grain from several bins previously

filled with different qualities is a commonly accepted practice for meeting contract grade on domestic and foreign shipments. Even though the quality from one bin is raised and the quality from the other lowered by such blending, this is generally accepted as a

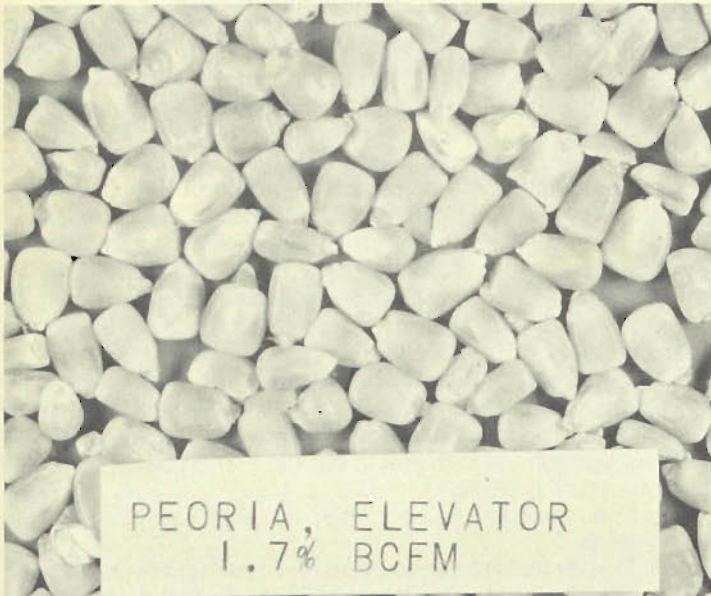
Dr. J. T. Duvel, USDA, 1914:

*“Within the past week it has been reported from reliable authority that some elevator operators resort to the practice of spraying dry wheat with water prior to loading for shipment, for the purpose of increasing the weight.”*

normal merchandising practice.

Cleaning dirty corn to exactly 3% broken corn and foreign materials (BCFM) is a practice that even Congressmen find acceptable. However, cleaning that same grain to 2% BCFM and returning enough screenings to produce corn with exactly 3% is labeled “adulteration”. To grain handlers, this appears as an arbitrary discrimination. They are being forced to use a less efficient method for no real improvement in final quality or value. The concerns of the critics seem to be focused, not on the quality delivered to the foreign buyer, but on the profit attached to certain methods for achieving the contract grade.

With all the efforts and professional time spent on improving quality measurement, one cannot help but ask why there appears to have been so little progress in resolving these persistent problems. More than 150 bills and amendments on grain quality have been submitted by U.S. Congressmen starting in 1890 when Senator Paddock first proposed a federal



Breakage accounts for most of the quality losses as corn moves from the Corn Belt into foreign ports.

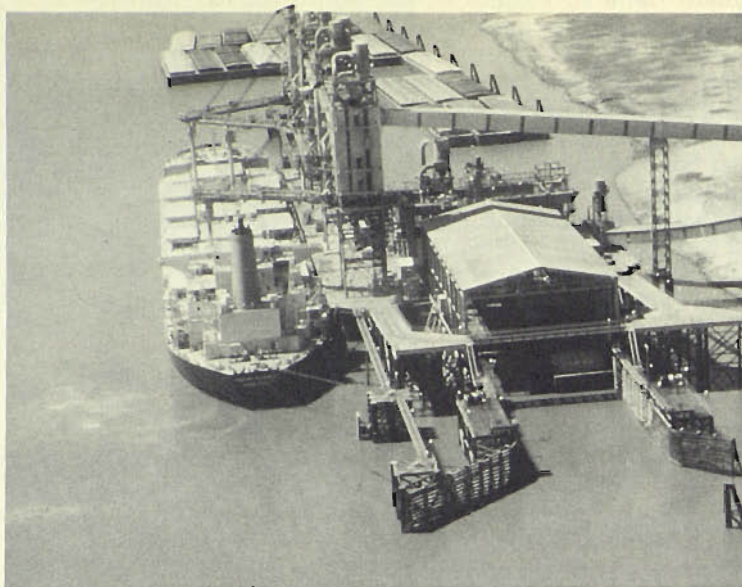


grading system. There is no simple answer to that question. The explanations range from changes in crop conditions and technology to claims that no real problems exist.

One of the most persuasive arguments has been the failure to base U.S. grain grades and revisions on economic principles. The economic incentives in grades are often ignored but they are implicitly present. For example, maximum BCFM for No. 2 corn is 3%. This creates economic rewards for blending to 3%. A minimum test weight of 54 pounds per bushel for No. 2 corn has encouraged major research expenditures to genetically raise the average test weight of several varieties to avoid discounts on light test weight corn. Since No. 2 soybeans may contain up to 3 percent damaged beans with no price discount, damaged beans blended with good beans receive full price up to that maximum. Adding damaged beans does not increase the real value of the shipment but the system rewards those who deliver the maximum. Failure to recognize that grades have economic purposes has led to many frustrated attempts to resolve the basic issues.

**Purposes of Grades and Standards.** Grades in conjunction with market prices should convey information about value without the need for buyers to visually inspect every lot. Grades should also provide incentives for improving quality. Unfortunately, current grades fail on both criteria.

Numerical grades have little relationship with value of processed products—oil and meal in beans, baking quality of wheat flour, or nutritional value of corn. Much of the debate and disagreement concerning methods to improve the grading standards and grain quality arise from the lack of agreement



*USDA certifies quality as vessels are loaded; most contracts read that these "origin grades and weights are final." Consequently, most complaints about quality are not legally valid unless origin grades can be proven false.*

The opposition argues that each factor in the grades must have an economic justification by describing characteristics related to value.

The divergence of these two views explains much of the inability to arrive at a mutually agreeable set of grading factors. Persons who accept the first position find nearly any set of factors and limits acceptable and see little justification for the disruption created by changing to another set of equally arbitrary grade factors and limits. Those who subscribe to the economic rationale for standards press for factors that reflect end use or processing value and enable the buyer at

each point of the market channel to relate price differences to value he will receive in processing, feeding, or reselling the grain. Failure to agree on the purposes of grades has precluded agreement on changes in grades.

**There May Be Light At The End of the Tunnel.** In the mid-1980's subtle changes in attitudes and actions generated a glimmer of hope for more permanent solutions to the historical problems. One of the more important developments was initiated by the North American Export Grain Association (NAEGA). In the winter of 1985, it organized a series of workshops focused on altering, augmenting or redefining technical aspects of grain grading standards which would address overseas complaints.

In creating the task force the Grades Committee of NAEGA urged the Board of Directors to "...demonstrate our concern and show willingness to solve the quality problem. We can no longer use the cliché that if better quality is wanted they can contract for it. Change is coming, and we can be a participant rather than the victim."

The most dramatic result of the six NAEGA workshops was the willingness of farmers and industry to search together for solutions to common problems. The attitudes of the

participants in the workshop gradually shifted from one of bristling animosity, to tolerant acceptance of diverse views, to an understanding of different approaches to the same general goal, to a consensus report to Congress: "Commitment to Quality".

The movement toward consensus was accelerated during the second workshop when the corn sub-group chaired by Marion Hartman, National Corn Growers Association, developed a set of purposes of standards. Sam Irmen, President Elect of the National Grain and Feed Dealers Association, formulated and presented the four purposes of a grading system, that were later incorporated verbatim in the 1986 Grain Quality Improvement Act (P.L. 99-641):

- Define uniform and accepted descriptive terms to facilitate trade.
- Provide information to aid in determining grain storability.
- Offer end users the best possible information from which to determine end-product yield and quality.

## *Debate continues over whether grades and standards are a means to facilitate merchandising activities or a means to identify value in end uses.*

on the objectives of grain grades and standardization. Early discussions about grain grading in this country focused on "intrinsic value" of grain. The term was used in reference to the value of the grain in producing final or intermediate products. However, the Grain Standards Act states the purpose of grades and standards is "to facilitate marketing". Over the years grain merchandisers and administrators responsible for grades have interpreted this to mean "uniform terminology in order to permit buying and selling by simple description." Almost any set of factors and factor limits will meet this criterion. Furthermore, the primary concern of industry is to maintain stability and minimize disruptive changes.

Debate continues over whether grades and standards are a means to facilitate merchandising activities or a means to identify value in end uses. In the extreme, proponents of the merchandising objective argue that grain quality is not affected by the grade assigned and the purpose of grades is to facilitate merchandising with all grain grouped into a few uniform lots.



- Create the tools for the market to establish quality improvement incentives.

P.L. 99-641 incorporated these purposes in the U.S. Grain Standards Act and provided the authority under which regulatory changes must reflect economic principles as well as merchandising convenience.

With the purposes of standards more explicit, the diverse positions on the grain quality problem began to converge. Congressional actions focused more on needed research and economic principles and less on accusations of illegal export practices. Grain exporters publicly recognized quality problems in a buyers' market and demonstrated a genuine concern by helping to organize the NAEGA workshops. Producer groups shifted their support from the concept of "premiums" to "producing for the market" and "payment according to value". Opinions were backed by research. Ten years of research under a 14-university regional research committee on grain quality provided significant additions to the body of literature on economics and technology related to quality, grades, and measurement. A 1985 Congressional mandate to the Office of Technology Assessment (OTA), to conduct a study of grain quality in the export market helped elevate the issues to a technical level and away from ideological questions. The OTA response was to initiate a major study of the issues in 1986. Finally, the dramatic decline in U.S. grain exports (regardless of the causes) attracted the serious attention of all segments of the grain industry.

## The Choices

There are two basic approaches to the grain quality problems: (1) prohibit practices which are considered detrimental to quality; (2) change grades and pricing practices so that participants are rewarded for improving quality and value. The first alternative is focused on controlling the process by which grain is marketed; the second is focused on accurately evaluating the product and the value of different qualities.

### The Role of Legislation.

Throughout the history of grades there have been numerous bills and amendments intended to legislate specifics in the grain grades. Few have been successful. Congress can be effective in setting policy but is seldom qualified to define specifics such as grade factors and factor limits. The 1986 Grain Quality Improvement Act is a case in point. It prohibits reintroducing dust or foreign material into the grain stream once it has been removed. However, implementing this control presents numerous difficulties.

Foreign material is defined differently in the different grain grades but usually relies in whole or in part on sieves, of vari-

ous sizes. Not all foreign material is actually separated from the grain and the portion designated foreign material almost always includes small particles of the grain. Congressional intent to prohibit adding foreign material to grain fails to address the question of identification. In addition, the prohibition does not prevent leaving dirt, dust and foreign material in the corn and soy beans nor does it prevent blending different lots of grain containing various levels of foreign material to achieve the maximum allowed. It only limits the procedure by which the maximum may be achieved. It is unlikely that the actual amount of "foreign material" (mostly broken grains at destination) delivered to the foreign buyer will change, but exporters will be obliged to use more expensive methods to meet the contract.

The most effective role of policy is to establish guidelines such as the criteria on which to judge grades and proposed changes. Having established purposes that include economic principles within the law, Congress' role should be one of assuring that the policy intent is administratively implemented.

If the policies are properly structured to generate an economically sound grading system, regulatory prohibitions can be replaced by market incentives. For example, an allowance of 4 percent FM in No. 3 corn, generates an automatic incentive to incorporate 4% FM in every shipment. If FM discounts started at zero the first .5 percent of FM will be discounted the same as the tenth .5 percent. Adding any FM to the grain would lower its price, thus, removing the incentive for blending.

Removing the incentive is a much more effective method for achieving the desired results (i.e., clean grain) than an act of Congress. The same principle applies to other factors such as damage and splits. If each quality characteristic were measured and recorded as accurately as measurement technology permits, the market would establish value, reward efforts to

improve quality, and eliminate incentives for diminishing value. There is no better enforcer and disciplinarian than market price.

Incentives to deliver the desired end product would render legislative prohibitions unnecessary and would generate responses by those

who control quality through their individual decisions on the farm and in the market channel. Grades based on economic principles of measuring value and creating desirable incentives could automatically resolve many of the problems of grain quality that date back to the days of the prophet Amos when he chided the grain merchants for "selling the dust of the wheat and the refuse which is left on the floor of the storehouse."

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*Grades based on economic principles....could automatically resolve many of the problems of grain quality.*

## GATT Agricultural Proposals

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