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Effects of Regulation on Efficiency of Grain Marketing

by Lowell D. Hill*

I. INTRODUCTION

Increased efficiency in agriculture is frequently circumscribed by rules and regulations which control and organize production and marketing systems.¹ These rules of the game— legal, cultural, and ethical rules— generate incentives as well as place restrictions on the performance of the industry.² Regulations determine incentives, incentives direct decisions of private firms and the conjunction of these numerous private decisions set the performance characteristics of the market. Performance criteria, such as efficiency and an adequate supply of food, are linked directly to the policies and regulations established by government. “Overall, the most severe shocks to the global food system have been manmade [i.e., government decisions] and are avoidable.”³ An understanding of the relationships between economic efficiency and the policies and regulations of public agencies is necessary to provide guidance for public decisions and private action.

The relationship between regulation and performance in the grain industry is the primary focus of this article. Cereal grain⁴ is the major source of sustenance for a majority of the world’s population, accounting for about thirty-five percent of total calories consumed worldwide.⁵ Because of the large volume involved, even minute increases or decreases in

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¹ Schultz, *Markets, Agriculture, and Inflation*, in *ROLE OF GOVERNMENT IN A MARKET ECONOMY* 67 (L. Hill ed. 1982).

² Gardner, *Macroeconomic Policies and Agricultural Programs*, in *ROLE OF GOVERNMENT IN A MARKET ECONOMY* 100 (L. Hill ed. 1982).

³ Donaldson, *Food Security and the Role of the Grain Trade*, 66 *AM. J. AGRIC. ECON.* 193 (May 1984).

⁴ Grain is interpreted broadly in this paper to include soybeans. However, the term cereal grains excludes oil crops such as soybeans, rapeseed and sunflowers. The major cereal grains used for food and feed in world markets are wheat, corn, oats, barley, rye, and grain sorghum.

⁵ L. HILL & A. MUSTARD, *Economic Considerations in Industrial Utilization of Cereals*, in *CEREALS: A RENEWABLE RESOURCE* 25 (1981).

production and marketing efficiency can have major impacts on world food supplies and the general welfare of individuals and nations.

II. THE REGULATION OF GRAIN MARKETING DECISIONS

Grain marketing decisions of farmers, merchandisers and international traders are shaped by a wide range of regulations. Some policies are very general in nature. For example price support programs in the United States⁶ and the European Community (EC)⁷ influence farmers' storage and marketing decisions. Other regulations are quite specific. The U.S. Department of Agriculture (USDA), for example, under the authority of the U.S. Grain Standards Act,⁸ specifies the brand of moisture meter acceptable for determining grain grades.⁹

Within the United States, state government regulations provide much of the institutional and regulatory environment for grain marketing. Many of the regulations relate to the operation of grain warehouses. Typical statutory schemes¹⁰ require warehouses to be licensed,¹¹ bonded¹² and insured¹³ and often include detailed provisions dictating the form of warehouse receipts.¹⁴

The forms and terms of contracts under which grain is traded in the United States are also regulated by state provisions. For example, delayed pricing¹⁵ is a marketing tool frequently used by U.S. farmers to retain the opportunity for price speculation without the responsibility of

⁶ GRAIN MARKETING ECONOMICS 266-72 (G. Cramer & W. Heid eds. 1983) [hereinafter cited as Cramer & Heid].

⁷ P. Noyrez, *The French Grain Storage Industry: An Evaluation of Price Performance Over Time for Selected Grains in France* 42-45 (1980) (unpublished M.S. thesis from University of Illinois at Urbana-Champaign).

⁸ U.S. Grain Standards Act, 7 U.S.C. § 71 (1982).

⁹ Hunt & Neustadt, *Factors Affecting the Precision of Moisture Measurement in Grain and Related Crops*, 49 J. ASS'N OFFICIAL ANALYTICAL CHEMISTS 757 (1966).

¹⁰ See, e.g., ILL. REV. STAT. ch. 114, § 214 (1983); N.D. CENT. CODE § 60-02 (1983); OHIO REV. CODE ANN. § 926 (Page Supp. 1983). See also GRAIN ELEVATORS TASK FORCE, U.S. DEP'T OF AGRICULTURE, REPORT TO THE SECRETARY OF AGRICULTURE 6-9 (Aug. 18, 1981).

¹¹ See, e.g. ILL. REV. STAT. ch. 114 §§ 214, 214.3, 214.4 (1983); N.D. CENT. CODE §§ 60-02, 60-02-07 (1983).

¹² ILL. REV. STAT. ch. 114, §§ 214, 214.8 (1983); N.D. CENT. CODE §§ 60-02, 60-02-09 (1983).

¹³ ILL. REV. STAT. ch. 114 §§ 214, 214.13 (1983); N.D. CENT. CODE §§ 60-02, 60-02-35 (1983).

¹⁴ N.D. CENT. CODE §§ 60-02, 60-02-16-3 (1983). A warehouse receipt is a certificate of title that the farmer receives for stored grain from the warehouseman and it is administered under federal or state warehouse laws.

¹⁵ Delayed pricing is a marketing technique used by farmers and country elevators. A delayed price contract permits the seller to establish the price of the grain after ownership of the grain has been transferred to the buyer.

storing and maintaining quality.¹⁶ Misuse of delayed pricing has sometimes been associated with financial failure of country elevators and subsequent financial loss to farmers.¹⁷ As a result, delayed price is regulated by statute in the major grain producing states.¹⁸

At the federal level, many legislative and regulatory actions affect the performance of the domestic and export markets. For example, the U.S. Grain Standards Act of 1916¹⁹ eliminated many of the inefficiencies resulting from the frequent arbitrations required to settle disputes over quality when grading and standards were at the discretion of individual boards of trade, grain exchanges, chambers of commerce and state agencies.²⁰ The provisions of the 1916 Act authorize the Secretary of Agriculture to develop standards for grain²¹ and specify that all export grain must be graded by official inspection personnel under these standards.²² The development of uniform national standards decreased the cost of marketing and the ensuing welfare gains were distributed between farmers and consumers.²³

Federal laws also influence the efficiency in transportation of grain in the United States. Article IV of The Northwest Ordinance of 1787 stated that "the navigable waters leading into the Mississippi . . . shall be common highways and forever free . . . without any impost or duty therefor."²⁴ Implementation of this principle obviously reduced the cost of barge transportation, since waterways were maintained with public funds.²⁵ Passage of the Inland Waterway Revenue Act of 1978²⁶ reversed this principle by requiring barge companies to pay user fees to cover part of the cost of the waterways in the form of a tax on diesel fuel.²⁷ The increased taxes were reflected in higher rates, shifting grain

¹⁶ ECONOMICS RESEARCH SERVICE, U.S. DEP'T OF AGRICULTURE, REPORT NO. 320, FARMER'S USE OF FORWARD CONTRACTS AND FUTURES MARKETS 4 (1976).

¹⁷ GRAIN ELEVATORS TASK FORCE, *supra* note 10, at 49-51.

¹⁸ N.D. CENT. CODE §§ 60-02, 60-02-19.1 (1983); OHIO REV. CODE ANN. §§ 926, 926.29 (Page Supp. 1983).

¹⁹ Grain Standards Act of 1916, Pub. L. No. 64-190, 39 Stat. 982 (1917) (current version at 7 U.S.C. § 71 (1982)).

²⁰ Address by J. Shanahan, National Grain Dealers Association, Des Moines, Iowa (Oct. 1901).

²¹ Grain Standards Act, 7 U.S.C. §§ 71, 76 (1982).

²² *Id.* §§ 71, 79(a).

²³ Bailey, *Standardizing and Grading Grain in the United States*, 49 BULL. PAN-AM. UNION 400, 414 (1919).

²⁴ DOCUMENTS OF AMERICAN HISTORY 131 (H. Commager ed. 1963).

²⁵ W. HULL & R. HULL, THE ORIGIN AND DEVELOPMENT OF THE WATERWAYS POLICY OF THE UNITED STATES 9-10 (1967).

²⁶ Inland Waterway Revenue Act of 1978, 26 U.S.C. § 4042 (1982).

²⁷ *Id.* §§ 4042, 4042(a).

traffic to other modes and reducing grain prices to farmers.²⁸

The efficiency of grain marketing has also been affected by the existence and enforcement of antitrust legislation in the United States. Large traders within the grain industry are quite sensitive to their potential liability and attempt to avoid actions that might be construed as violations of these laws, even at the expense of profit or efficiency opportunities.²⁹ Some segments of the grain industry enjoy a limited immunity from anti-trust legislation. The Capper-Volstead Act of 1922³⁰ allows farmer cooperatives to be more competitive with other marketing firms by limiting the antitrust liability of farmer owned cooperatives. The result is a shift in the balance of power among firms and an alteration in the structure and performance of the industry.³¹ The Export Trading Company Act of 1982 also limits the antitrust liability of companies in the grain trade.³² The goal of the Trading Act, to tap the export potential of U.S. businesses and to expand export markets, is facilitated in part by encouraging the formation and operation of export trading companies and associations. A certification process is available to these companies through which they may obtain exemption from potential antitrust liability relating to the pricing and marketing activities described in the certificate. After a certificate is obtained, few legal barriers to export should remain.³³ Antitrust legislation and regulation has both increased and decreased marketing efficiency.

Not all regulations have resulted in increased efficiency and, of course, some regulations have welfare objectives that conflict with economic efficiency. The Occupational Safety and Health Administration (OSHA)³⁴ enforces regulations to protect the health and safety of workers in grain elevators.³⁵ In general, these regulations have increased costs and reduced efficiency in elevator operations.³⁶ A study conducted by the Midwest Research Institute shows that enforcement of the OSHA standard on dust control in grain elevators would result in annual recur-

²⁸ D. Conley & L. Hill, *Impact of Waterway User Fees on Illinois Agriculture 1* (Dep't of Agricultural Economics, University of Illinois at Urbana-Champaign, No. AE-4527, Mar. 1982).

²⁹ Miller & Nelson, *Relationship Between the Grain Processing Industries and the Federal Antitrust Laws*, in *MARKETING GRAIN: PROCEEDINGS OF THE NCM-30 GRAIN MARKETING SYMPOSIUM 355-76* (Purdue University, Jan. 1968).

³⁰ Co-operative Marketing Association (Capper-Volstead) Act, 7 U.S.C. § 451 (1982).

³¹ Manchester, *Agricultural Marketing Cooperatives and Antitrust Law*, in *ANTITRUST TREATMENT OF AGRICULTURAL MARKETING COOPERATIVES 8-54* (E. Jesse ed. 1983).

³² Export Trading Company Act of 1982, 15 U.S.C.A. § 4001 (West Supp. 1983).

³³ B. JONES & M. ANDERSON, *THE SOUTHERN STATES AND EXPORT TRADE LEGISLATION 5* (Council of State Governments, 1983).

³⁴ Occupational Safety and Health Act, 29 U.S.C. § 651 (1982).

³⁵ The term grain elevator is used to mean the firm as well as the physical facilities that receive, store, dry, and ship grain in U.S. and foreign countries.

³⁶ Hubbard, *OSHA Dust Standard is No Safety Guarantee*, *CARGILL BULL.*, Feb. 1983, at 2.

ring costs of \$269,488,000 during the first ten years of the program.³⁷ However, society (or the political reflection of society's preference function) has determined that worker safety justifies the additional costs.

U.S. policies and farm programs to support farm prices and income illustrate an important but indirect influence on performance in the grain markets. U.S. export subsidies on wheat provided by the Agricultural Act of 1970³⁸ were intended to support prices paid to farmers while keeping export prices low enough to be competitive on the world market. However, these subsidies effectively insulated foreign buyers from rising prices caused by increased export sales.³⁹ Consequently, large purchases of grain by the USSR⁴⁰ in 1972 raised domestic prices but not export prices. The use of U.S. tax dollars to lower prices to the USSR raised a public outcry⁴¹ that resulted in new regulations requiring U.S. exporters to report all future grain sales in excess of 50,000 tons to the export sales agency of the USDA.⁴²

The suspension of sales to the USSR in January, 1980, was a political decision whose legal and moral enforcement generated inefficiencies in trading patterns and distortions in price relationships.⁴³ "In the Russian grain embargo, Canada, the European Community nations and Australia agreed not to increase their exports to the Soviet Union. The Soviet Union redirected its trade to Argentina, thus increasing the Argentine feed grain price."⁴⁴ The change in relative prices altered the origin-destination patterns of world trade. Countries not supporting the embargo increased sales to the USSR and decreased sales to Western Europe. Conversely, countries supporting the embargo shifted sales from USSR to Western Europe,⁴⁵ often increasing transport costs and reducing efficiency relative to the previously established grain flow patterns.⁴⁶

Trade associations as well as government agencies generate regulations that govern members of the grain industry in domestic markets. In

³⁷ G.E.M. Consultants Inc., Evaluation of the Proposed OSHA Standard for Grain Handling Facilities 73 (May 30, 1984), reprinted in OCCUPATIONAL SAFETY AND HEALTH ADMIN., U.S. DEPT'T OF LABOR, DOCKET H No. 117 (June 8, 1984).

³⁸ Agricultural Act of 1970, Pub. L. No. 91-524, 84 Stat. 1358 (1971).

³⁹ D. MORGAN, MERCHANTS OF GRAIN 135 (1979).

⁴⁰ *Id.* at 210.

⁴¹ *Id.* at 172.

⁴² Agriculture and Consumer Protection Act of 1973, Pub. L. No. 93-86, § 812, 87 Stat. 221, 238 (1973).

⁴³ A. WEBB, PROTECTION IN AGRICULTURAL MARKETS 19 (U.S. Dep't of Agriculture, ERS Staff Report No. AGES 840524, Sept. 1984).

⁴⁴ B. English, R. Schatzer, R. Roberts & E. Heady, Potential Long-Term Agricultural Impacts of the Russian Grain Embargo 6 (The Center for Agricultural and Rural Development, Iowa State University, Report No. 97, Apr. 1971).

⁴⁵ ECONOMIC RESEARCH SERVICE, U.S. DEP'T OF AGRICULTURE, CORN: BACKGROUND FOR 1985 FARM LEGISLATION 14 (Sept. 1984) [hereinafter cited as CORN].

⁴⁶ B. English, R. Schatzer, R. Roberts & E. Heady, *supra* note 44, at 6.

the United States, The National Grain and Feed Association has a system for trade arbitration that dates back to 1901, providing "the machinery for compulsory arbitration of trade disputes between members. Arbitration is based on the National's Trade Rules which are commonly accepted in the making of contracts."⁴⁷ The trading rules adopted in 1902 govern all disputes of a financial, mercantile or commercial character connected with grain. "Arbitration under these rules is compulsory among members and contributes to the orderly marketing of grain, feed and their by-products."⁴⁸ Efficiency in marketing is encouraged by rules that permit the purchase and sale of "enormous volumes of grain and feedstuffs . . . largely on the basis of mutual trust."⁴⁹

Other countries have regulations which are similar in many respects to those of the United States. All major importing and exporting countries operate under some form of grading standards to facilitate efficient trading by descriptive contracts.⁵⁰ Argentina,⁵¹ South Africa,⁵² and Canada⁵³ have numerical standards and multiple factor grades similar to those of the United States. The USSR publishes standards for each grain that are more descriptive than numerical and vary depending on the use of the grain.⁵⁴ The Canadian Wheat Board not only establishes wheat standards but also buys and sells all export wheat, sets producer prices and storage rates, and negotiates export contracts with foreign buyers.⁵⁵

Transportation policies of grain exporting countries influence the cost of transportation and the efficiency with which grain is marketed and delivered to the port. Canadian policy dating back to 1897 regulates rates for moving grain to port elevators under a regulation known as the Crows Nest Pass Act.⁵⁶ A study of the economic effects of these rail rates concluded that under the government rate regulation railroads were

⁴⁷ 1979-1980 DIRECTORY-YEARBOOK OF THE NATIONAL GRAIN & FEED ASS'N 15 [hereinafter cited as 1979-1980 DIRECTORY].

⁴⁸ Cf. Bloem, *Avoiding and Resolving Trade Disputes—An Overview*, in A GRAIN MERCHANT'S GUIDE TO AVOIDING TRADE DISPUTES 10-11 (1982).

⁴⁹ See 1979-1980 DIRECTORY, *supra* note 47, at 204.

⁵⁰ Shellenberger, *Development of an International Grain Quality Certificate*, in PROCEEDINGS 7TH WORLD CEREAL AND BREAD CONGRESS 431 (1982).

⁵¹ JUNTA NACIONAL DE GRANOS, NUEVAS NORMAS PARA LA CLASIFICACION DE SORGO Y MAIZ (1982) (Resolucion "J.N.G." No. 20.275) [hereinafter cited as Resolucion No. 20.275].

⁵² Regulations for Regulating the Requirements in Connection with the Export of Maize from the Republic of South Africa, No. R 1070 (June 17, 1977).

⁵³ CANADIAN GRAIN COMMISSION, GRAIN GRADING HANDBOOK FOR EASTERN CANADA (Aug. 1980).

⁵⁴ STATE STANDARDS OF THE USSR, GRAIN AND PULSE CROPS (V. Kothekar trans. 1974) (published for U.S. Dep't of Agriculture).

⁵⁵ CANADIAN INTERNATIONAL GRAINS INSTITUTE, GRAINS AND OILSEEDS—HANDLING, MARKETING, PROCESSING 30-31 (2d ed. 1975).

⁵⁶ Crow's Nest Pass Act of 1897, ch. 5, §§ 1(c), 1(e) 1896-1898 Can. Stat. 59.

forced to operate at a loss in moving grain to export points.⁵⁷ The authors predicted that unless the rate regulations on railroads were altered the system would degenerate into "an even less efficient and capable rail operation than we have presently."⁵⁸

Nationalization of the Argentine railway system in 1946⁵⁹ did not resolve problems of inefficient grain transportation. Six different lines were incorporated into the railroad system and the three different gauges of track limited the interchangeability of equipment.⁶⁰ Average operating speeds of 6.25 miles per hour, car shortages and inefficient box car design also reduced efficiency.⁶¹ Regulations in the barge industry created additional inefficiencies. "A regulation that requires a minimum number of laborers on board has tended to make barges more costly than they would be otherwise."⁶²

Export policies and domestic support prices are frequently used by many countries to stimulate exports and production and to bolster farm income.⁶³ The effects on market performance are not always consistent with the policy objectives. For example, price and export strategies for soybeans were instituted by Brazil to encourage production and increase their share of world soybean markets.⁶⁴ However, an analysis of Brazilian policies by Williams and Thompson⁶⁵ demonstrated that government intervention in the Brazilian soybean industry generally benefited the United States rather than Brazil. "The policies boosted world prices of soybeans while lowering those of soybean products. Production, use and exports of soybeans and products in the United States were all larger as a consequence."⁶⁶

Support prices in the European Community (EC)⁶⁷ and their system

⁵⁷ D. HARVEY, *CHRISTMAS TURKEY OR PRAIRIE VULTURE? AN ECONOMIC ANALYSIS OF THE CROW'S NEST PASS GRAIN RATES 2* (1980).

⁵⁸ *Id.* at 76.

⁵⁹ S. CHIANG & O. BLAUH, *ARGENTINA'S GRAIN MARKETING SYSTEM 13* (U.S. Dep't of Agriculture, Report No. AGES 830916, Nov. 1983).

⁶⁰ *Id.* at 13.

⁶¹ *Id.* at 15-16.

⁶² *Id.* at 19.

⁶³ C. JABARA & A. BRIGIDA, *VARIABLE LEVIES: BARRIERS TO GRAIN IMPORTS IN FRANCE, THE NETHERLANDS, FEDERAL REPUBLIC OF GERMANY, AND UNITED KINGDOM 2* (U.S. Dep't of Agriculture, Foreign Agricultural Economic Report No. 156, Mar. 1980).

⁶⁴ M. Schultz, *Effects of Government Actions on Pricing Efficiency in the Brazilian Soybean Market 5-6* (1983) (unpublished thesis from University of Illinois at Urbana-Champaign).

⁶⁵ Williams & Thompson, *Brazilian Soybean Policy: The International Effects of Intervention*, 66 AM. J. AGRIC. ECON. 497 (Nov. 1984).

⁶⁶ *Id.* at 498.

⁶⁷ The European Community was founded by the Treaty of Rome, signed by Belgium, France, Italy, Luxembourg, the Netherlands, and West Germany. It became effective on January 1, 1958. The United Kingdom, Denmark, and Ireland joined the Community on January 1, 1973.

of variable levies⁶⁸ have generated large surplus stocks of several commodities that require public expenditures to pay storage costs.⁶⁹ For example, under the Treaty of Rome,⁷⁰ the EC established a set of grain trade regulations as part of the Common Agricultural Policy (CAP) in 1962.⁷¹ The purpose of the CAP was to increase EC agricultural productivity while simultaneously providing EC farmers with an income level equal to that of the non-farm sector.⁷² In order to accomplish these goals, two trade mechanisms were established.⁷³ The first mechanism is a grain pricing system that raises EC grain market prices above their free market levels⁷⁴ using a system of target and intervention prices.⁷⁵ The target price "reflects the market price which the EC feels farmers should get for their grain."⁷⁶ The intervention price is a floor price at which the EC government must buy all the grain offered.⁷⁷

The second trade mechanism involves a threshold price and a variable levy. "The threshold price is the minimum price at which grain imports are permitted to enter EC markets."⁷⁸ The threshold price deters the "much more competitively priced non-EC grain" from flooding the EC market and consequently displacing the EC domestic grain sales.⁷⁹ A variable levy is applied to all grain imports from countries outside the EC⁸⁰ in order to raise the price of any imported grain above the guaranteed price of the identical, EC produced commodity.⁸¹

Although the pricing system and the variable levy have both increased EC grain production and supplemented farm income, the EC CAP causes several negative side effects.⁸² Inter-EC problems caused by

⁶⁸ A variable levy is a variable tax used by the European Community to stabilize prices for producers in member countries and also limit the impacts of variations in world prices. It is the difference between the EC threshold price and the world price.

⁶⁹ COMPTROLLER GENERAL OF THE UNITED STATES, *GRAIN MARKETING SYSTEMS IN ARGENTINA, AUSTRALIA, CANADA AND THE EUROPEAN COMMUNITY; SOYBEAN MARKETING SYSTEM IN BRAZIL* 54 (May 28, 1976) [hereinafter cited as *GRAIN MARKETING SYSTEMS*].

⁷⁰ Treaty Establishing the European Economic Community, Mar. 25, 1957, 298 U.N.T.S. 3.

⁷¹ H. McNITT, *THE EC MARKET FOR U.S. AGRICULTURAL EXPORTS: A SHARE ANALYSIS* 3 (U.S. Dep't of Agriculture, Foreign Agricultural Economic Report No. 179, Mar. 1983).

⁷² FOREIGN AGRICULTURE SERVICE, U.S. DEP'T OF AGRICULTURE, *FOREIGN AGRICULTURE CIRCULAR: GRAINS 2* (Dec. 11, 1981) [hereinafter cited as *FOREIGN AGRICULTURE CIRCULAR*].

⁷³ C. JABARA & A. BRIGIDA, *supra* note 63, at 2.

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ FOREIGN AGRICULTURE CIRCULAR, *supra* note 72, at 5.

⁷⁷ *Id.* at 6.

⁷⁸ C. JABARA & A. BRIGIDA, *supra* note 63, at 4.

⁷⁹ FOREIGN AGRICULTURE CIRCULAR, *supra* note 72, at 6.

⁸⁰ C. JABARA & A. BRIGIDA, *supra* note 63, at 4.

⁸¹ H. McNITT, *supra* note 71, at 11.

⁸² *Id.* at 3, 11.

the CAP include expensive farm surpluses and escalated food prices for the EC consumer.⁸³ Not only does the CAP pricing system transfer extra costs to the consumer, but it also presents the EC governments with the expense of maintaining the price supports that encourage the domestic production.⁸⁴ Inefficient use of resources is another problem caused by the CAP. The incentive is to grow those crops for which prices are supported above equilibrium levels. Consequently, large surpluses of certain crops accumulate,⁸⁵ while other crops not receiving a subsidy are in short supply.

The CAP causes problems outside of the EC as well. The variable levy is largely responsible for the steadily decreasing level of U.S. exports to the EC.⁸⁶ Not only do the threshold prices and variable levies reduce U.S. exports into the EC, but the CAP support prices have generated such an increase in EC grain production that the EC was a net exporter of total grains for the first time in 1980.⁸⁷ The EC has already exercised its newly attained status as an exporter, displacing grain exports from Argentina, Australia, Canada and the United States.⁸⁸ Returning the major food producing nations to a more rational and efficient use of resources will require major revisions in trade and production policies of the EC and other nations.

In addition to the rules and regulations governing marketing activities within individual countries, many trade regulations and policies have consequences which extend beyond national borders. The cost of marketing grain is dramatically reduced by the enforcement of contracts in domestic and foreign trade, permitting the purchase or sale of millions of bushels with no more than a phone call.⁸⁹ Standardized contracts developed by organizations such as The Grain and Feed Trade Association of London (GAFTA) also simplify transactions and reduce the cost of exchanges of title. Such contracts are very detailed and attempt to cover all possible contingencies, and are used by all major grain importing and exporting countries. Despite these attempts to avoid misunderstandings, contract disputes do occur. When this happens, an agreement to submit to arbitration can speed resolution. The 1958 United Nations Convention on the Recognition and Enforcement of Foreign Arbitral

⁸³ AGRICULTURE COUNCIL OF AMERICA, U.S. FARM EXPORT EDUCATION PROJECT, U.S. FARM EXPORT STRATEGIES FOR THE EIGHTIES 159 (Feb. 1981) [hereinafter cited as U.S. FARM EXPORT STRATEGIES].

⁸⁴ GRAIN MARKETING SYSTEMS, *supra* note 69, at 50.

⁸⁵ H. McNITT, *supra* note 71, at i.

⁸⁶ H. McNITT, *supra* note 71, at 12.

⁸⁷ FOREIGN AGRICULTURE CIRCULAR, *supra* note 72, at 2.

⁸⁸ *Id.*

⁸⁹ D. MORGAN, *supra* note 39, at 64.

Awards⁹⁰ has aided in the enforcement of arbitration awards in the international grain trade. Courts of most major grain trading nations respect contractual obligations for arbitration and arbitration conditions are generally included in these contracts. U.S. courts are favorably disposed to recognize such agreements and once it is determined that a valid contract containing a valid arbitration clause exists, the agreement cannot be easily revoked.⁹¹ Only if the arbiters "deliberately disregarded what they knew to be the law in order to reach the result they did"⁹² can the agreement be vacated.⁹³ Clauses stipulating that disputes be resolved pursuant to the law of a given jurisdiction are generally honored. Time and money of both the litigants and arbitors is conserved by the consolidation of related proceedings of commodity and maritime cases which deal with common facts and issues.⁹⁴ U.S. courts may compel consolidation "if the issues [in the several arbitrations] are substantially the same and if no substantial right is prejudiced."⁹⁵ Standardized contracts and organized markets, combined with the current regulatory climate, produce a system whose performance closely approximates that of the theoretical perfect market in terms of pricing efficiency and responsiveness to incentives.⁹⁶

World War I was a major stimulus for agricultural trade between the U.S. and Europe. However, the increased trade only lasted until the armistice and the subsequent recovery of European agriculture greatly reduced U.S. agricultural exports.⁹⁷ Without export markets to absorb surplus production, U.S. farmers "called for higher tariffs against foreign imports." This demand for import restrictions prompted Congress to enact the Hawley-Smoot Tariff in 1930, which generated some of the highest tariffs in U.S. history.⁹⁸ Although the tariffs successfully limited U.S. imports, it became apparent that international markets were important for the growth of U.S. agricultural trade and for the expansion of mar-

⁹⁰ Convention on the Recognition and Enforcement of Foreign Arbitral Awards, done June 10, 1958, 330 U.N.T.S. 3 (codified at 9 U.S.C. §§ 201-08 (1970)).

⁹¹ See, e.g., *In re Ferrara S.P.A.*, 441 F. Supp. 778 (S.D.N.Y. 1977).

⁹² A. SLABOTZKY, *GRAIN CONTRACTS AND ARBITRATION FOR SHIPMENTS FROM THE UNITED STATES AND CANADA* 99 (1984) (citing U.S. District Court for the Southern District of New York, 82 Civ. 1302 (PNL)).

⁹³ *Id.*

⁹⁴ See, e.g., A. SLABOTZKY, *supra* note 92, at 94 (citing U.S. District Court for the Southern District of New York, 82 Civ. 2886 CSH). See generally *id.* at 83-102.

⁹⁵ M. DOMKE, *THE LAW AND PRACTICE OF COMMERCIAL ARBITRATION* 272 (1968), quoted in A. SLABOTZKY, *supra* note 92, at 92.

⁹⁶ S. THOMPSON & R. DAHL, *THE ECONOMIC PERFORMANCE OF THE U.S. GRAIN EXPORT INDUSTRY* 3 (Agricultural Experiment Station, University of Minnesota, Technical Bull. 325, 1979).

⁹⁷ Cramer & Heid, *supra* note 6, at 280.

⁹⁸ *Id.*

kets for grain farmers. Federal legislation was needed to re-open foreign markets that had been restricted by high U.S. tariffs.

The Reciprocal Trade Agreement Act of 1934⁹⁹ emphasized the importance of world markets for U.S. products and fostered several new marketing strategies. One of the most important elements of the Act was the authorization of bilateral trade agreements.¹⁰⁰ Trade agreements with over thirty countries opened new markets and provided the conditions necessary for expanded trade.¹⁰¹

Continued concern over trade barriers stimulated development of an international agreement to move the participating nations toward freer trade.¹⁰² The resulting document, the Charter for the International Trade Organization (ITO), was never ratified. Instead, the General Agreement on Tariffs and Trade (GATT)¹⁰³ replaced the ITO as an international agreement for the conduct of trade: "The provisions of GATT include: unconditional most-favored-nation treatment of member nations,¹⁰⁴ no quantitative restrictions,¹⁰⁵ free transit of goods,¹⁰⁶ equality of internal taxation of imported and domestic goods,¹⁰⁷ simplification of custom procedures,¹⁰⁸ and periodic examination of members' subsidies."¹⁰⁹

Although the provisions of the GATT should greatly reduce international agricultural trade barriers, several policy problems restrict its effectiveness. The first is the lack of power to enforce agreements. There are only two punitive courses of action available under the GATT: (1) bring public opinion to bear on the offending country,¹¹⁰ or (2) permit the plaintiff country to retaliate through the imposition of its own trade barriers.¹¹¹ A second problem is that GATT membership does not include most of the centrally planned and less developed countries. Unfortunately, these two particular groups have expanded their agricultural trade most rapidly. Because these countries are not members of the GATT, a major portion of world agricultural trade can neither benefit

⁹⁹ Reciprocal Trade Agreement Act of 1934, 19 U.S.C. § 1351 (1982).

¹⁰⁰ A bilateral trade agreement is an agreement between an exporting and an importing country to purchase or sell a certain amount of products per year.

¹⁰¹ Cramer & Heid, *supra* note 6, at 281.

¹⁰² *Id.*

¹⁰³ General Agreement on Tariffs and Trade, *opened for signature* Oct. 30, 1947, 61 Stat. A3, T.I.A.S. No. 1700, 55 U.N.T.S. 194 [hereinafter cited as GATT].

¹⁰⁴ *Id.* at art. I.

¹⁰⁵ *Id.* at art. XI.

¹⁰⁶ *Id.* at art. V.

¹⁰⁷ *Id.* at art. III.

¹⁰⁸ *Id.* at art. VII.

¹⁰⁹ *Id.* at art. XVI.

¹¹⁰ A. WEBB, *supra* note 43, at 34.

¹¹¹ *Id.*

from nor be restricted by the provisions of GATT.¹¹² Third, most of the GATT negotiations have not dealt with agricultural trade barriers.¹¹³ Only the last three rounds, the Dillon Round (1960-61), the Kennedy Round (1963-67) and the Tokyo Round (1973-79), have included agricultural trade barriers and these achieved only limited success in increasing efficiency of international grain trade through reductions.¹¹⁴ If the GATT is to be more effective in the future, these policy problems must be resolved in order to slow the trend toward protectionism and the consequent inefficient use of resources.

In an effort to moderate the erratic effects of foreign grain production and demand on domestic and world prices, the United States has periodically entered into bilateral or long-term agreements (LTA) with several countries, including Poland, Mexico, and most recently the People's Republic of China (PRC) and the USSR.¹¹⁵

The provisions of a bilateral agreement "specify the flow of one or more commodities between two countries for a given time period."¹¹⁶ An exporting country benefits from an LTA through expanded markets and a stabilized demand for exports.¹¹⁷ It was largely this feature that made the recent U.S.-USSR and U.S.-PRC long-term agreements so attractive. Both the USSR and PRC are large, unpredictable customers in the world grain market; an LTA allows the United States to "stabilize to some degree the quantities directly purchased" from the United States, while at the same time providing the United States with valuable market information disclosed through the agreement.¹¹⁸

Importing countries also benefit from bilateral agreements. To the importer, a long-term agreement represents a guaranteed grain supply for a specified time period. When world population is growing at a rate faster than world agricultural production, an increasing number of countries want to lock in grain supplies through the provisions of an LTA.¹¹⁹

The United States is not the only nation to utilize LTA's; other countries that have negotiated bilateral agreements include China, Argentina and Canada. China has negotiated agreements with Argentina,

¹¹² P. O'Brien, *World Market Trends and Prospects: Implications for U.S. Agricultural Policy* 23 (May 15, 1984).

¹¹³ U.S. FARM EXPORT STRATEGIES, *supra* note 83, at 148-49.

¹¹⁴ See A. WEBB, *supra* note 43, at 35.

¹¹⁵ Cramer & Heid, *supra* note 6, at 245-46.

¹¹⁶ A. Webb & E. Wilson, *An Overview of Bilateral Trade Agreements for Agricultural Commodities in International Markets 2* (U.S. Dep't of Agriculture, ESS Staff Report No. AGES 810616, June 1981).

¹¹⁷ *Id.* at 3.

¹¹⁸ R. BAIN, *CHANGES IN THE INTERNATIONAL GRAIN TRADE IN THE 1980's*, at 14 (U.S. Dep't of Agriculture, Foreign Agricultural Economic Report No. 167, July 1981).

¹¹⁹ Cramer & Heid, *supra* note 6, at 29.

Australia, Canada, the EC and the United States.¹²⁰ Argentina has had agreements with the Iraq, Mexico, Algeria, Cuba and the PRC.¹²¹ Canada has had agreements with Brazil, China, Jamaica, Mexico, Poland, and the USSR.¹²² As the previous list indicates, long-term agreements are very popular, largely because they "help stabilize trade flows between two countries."¹²³

Regardless of their benefits, bilateral agreements have distinct disadvantages. The most obvious problem created by bilateral agreements is the restriction of free market mechanics.¹²⁴ "As an increasing share of global grain trade is brought under such agreements, one can expect more severe adjustment burdens in countries that rely on relatively free market conditions to balance changing supplies with demand."¹²⁵ The decreasing available grain supply in turn increases price instability for nonparticipating countries.¹²⁶

Another problem that arises with LTA's is that bilateral agreements are government-to-government, instead of private grain company transactions.¹²⁷ Many importers prefer government agreements because "agreements with private firms are easily negated by political and foreign policy considerations."¹²⁸ Understandably, private grain firms do not share this attitude and look at bilateral agreements as government interference that negatively affects their business.¹²⁹ In the long run, the increased utilization of bilateral agreements will only be feasible if price and supply compensation is provided for those parties who are unable to participate in the agreements.

The regulations in the preceding examples have an influence on the efficiency of grain marketing and indirectly on the cost and availability of food in the United States and around the globe. Although a complete review of regulations is not available, economic analyses of individual policies or categories of regulations provide abundant examples of the

¹²⁰ ECONOMIC RESEARCH SERVICE, U.S. DEP'T OF AGRICULTURE, CHINA: OUTLOOK AND SITUATION REPORT 27 (June 1984).

¹²¹ CORN, *supra* note 45, at 17.

¹²² Cramer & Heid, *supra* note 6, at 311.

¹²³ A. Webb & E. Wilson, *supra* note 116, at 5.

¹²⁴ Nuttal & Sorenson, *Bilateral Agreements as a Response to Emerging International Market Conditions*, in CONSORTIUM ON TRADE RESEARCH: AGRICULTURAL IMPORT DEMAND IN LOW INCOME, MIDDLE INCOME AND CENTRALLY PLANNED COUNTRIES 24 (U.S. Dep't of Agriculture, Foreign Agricultural Economic Report No. 173, Aug. 1982).

¹²⁵ THE WORLD FOOD INSTITUTE, WORLD FOOD TRADE AND U.S. AGRICULTURE, 1960-1982, at 50 (Iowa State University, Aug. 1983).

¹²⁶ Nuttal & Sorenson, *supra* note 124, at 24.

¹²⁷ A. Webb & E. Wilson, *supra* note 116, at 8.

¹²⁸ *Id.* at 10-11.

¹²⁹ *Id.* at 10.

economic consequences of government involvement in the operation of international grain trade.

An incentive-response model provides an explanation of the connection between regulatory policies and economic efficiency as identified in the preceding examples. The conceptual model is one in which informed decision makers respond to economic incentives within the limits created by the regulatory environment. Changes in these decisions and in operational efficiency can be induced by altering the incentives or the regulatory environment. The orderly, regulated system for marketing grain and the availability of sophisticated pricing and marketing institutions lowers the cost of marketing and accounts for much of the economic progress in developed economies.¹³⁰ The production of adequate food supplies is also technically feasible in most developing economies,¹³¹ but the distortion of incentives leads to inefficiencies in the marketing and distribution system which in turn thwarts attempts to increase food supplies.¹³² Legislation and regulations, and the institutions which they foster, influence the cost of grain marketing and generate the incentives to which farmers and marketing firms respond.¹³³ The quantity and quality of grain available to consumers are the result of responses to these incentives and the regulations from which they emanate.

III. THE IMPACT OF REGULATORY POLICY ON EFFICIENCY

Three examples will be selected from the preceding list to illustrate the role of regulatory policy on efficiency. The three examples are: (1) state and federal warehouse laws and related legislation which protects producers in case of elevator bankruptcy, (2) federal grades and standards for grain, and (3) marketing practices in international trade.

A. State and Federal Warehouse Laws

In the United States, state¹³⁴ and federal¹³⁵ warehouse laws provide legal protection for farmers storing grain in commercial facilities. Since farmers often wish to retain ownership of grain in anticipation of price rises after harvest, storage is a necessary function. The least cost pattern of storage would allocate most of the grain marketed to commercial

¹³⁰ Cramer & Heid, *supra* note 6, at 141, 239.

¹³¹ Islan, *World Agricultural Growth—Short and Long-Term Aspects, Past and Future—An Overview*, in GROWTH AND EQUITY IN AGRICULTURAL DEVELOPMENT 197 (Proceedings of the 18th Int'l Conference of Agricultural Economists, 1983).

¹³² Schultz, *supra* note 1, at 67.

¹³³ CORN, *supra* note 45, at 31.

¹³⁴ *E.g.*, Public Grain Warehouse and Warehouse Receipts Act, ILL. REV. STAT. ch. 114, § 214 (1983).

¹³⁵ *See, e.g.*, United States Warehouse Act, 7 U.S.C. § 241 (1982).

warehouses, because economies of scale¹³⁶ favor large commercial bins over small farm bins.¹³⁷ Use of commercial warehouses by farmers is encouraged by assurance that the quantity and quality of grain deposited for storage will be maintained. This assurance is provided by federal and state warehouse laws that regulate public grain warehousemen. Despite these regulations and the accompanying inspection of facilities, farmers have frequently suffered losses associated with financial failures of country elevators.¹³⁸ During recent bankruptcy proceedings, farmers received payment for less than seventy percent of the full value of grain warehouse claims at elevators filing for bankruptcy.¹³⁹ Additional changes in Illinois law provide an insurance fund¹⁴⁰ for protection against losses, especially where illegal actions by a manager might leave insufficient grain in the warehouse to cover the amount represented by outstanding warehouse receipts.

Early warehouse laws required the warehouseman to maintain the integrity of each lot of grain absent the consent of the owner.¹⁴¹ Since grain identified by federal grades is, in general, a homogeneous, interchangeable commodity, the need for segregating each lot unnecessarily increased the cost of storing grain. This increased cost of storage was in turn passed on to the farmer and inefficiencies resulted.

These inefficiencies have been largely eliminated. Changes advocated by the grain industry and later by state regulatory agencies¹⁴² have been adopted and warehouse laws now commonly permit the practice of comingling grain of the same kind and grade.¹⁴³ In fact, Illinois law allows a warehouseman to refuse to accept grain when the identity of the lot is to be preserved.¹⁴⁴

Under current warehouse laws, each farmer-seller receives a warehouse receipt for the quantity and quality of grain delivered.¹⁴⁵ The ele-

¹³⁶ C. CHASE & D. HELGESON, COST ANALYSIS OF POTENTIAL NORTH DAKOTA SUB-TERMINAL SYSTEMS 3 (Dep't of Agricultural Economics, N. Dakota State University, Agricultural Economics Report No. 156, Feb. 1983).

¹³⁷ Hill and Blokland, *Grain Marketing*, in ADVANCES IN CEREAL SCIENCE AND TECHNOLOGY 21 (Y. Pomerantz, American Association of Cereal Chemists, Inc. ed. 1976).

¹³⁸ R. CASEY, D. CONLEY & J. AHLEN, GRAIN ELEVATOR INSOLVENCIES AND BANKRUPTCIES IN EIGHT NORTH CENTRAL STATES, 1974-1982, at 9 (Ill. Legislative Council, Mem. File 9-391, Mar. 1984).

¹³⁹ REPORT OF THE AD HOC SUBCOMMITTEE ON GRAIN ELEVATOR BANKRUPTCY TO THE HOUSE COMM. ON AGRICULTURE, 98TH CONG., 1ST SESS. 37 (Comm. Print 1983).

¹⁴⁰ ILL. REV. STAT. ch. 114, § 3701 (1983).

¹⁴¹ See, e.g., ILL. CONST. OF 1870 art. XIII, § 2.

¹⁴² See *Review of Grain Elevator Bankruptcies: Hearings Before the Ad Hoc Subcomm. on Grain Elevator Bankruptcy of the House Comm. on Agriculture*, 98th Cong. 1st Sess. (1983).

¹⁴³ See, e.g., ILL. REV. STAT. ch. 114, § 214 (1983).

¹⁴⁴ *Id.* §§ 214, 214.11.

¹⁴⁵ See, e.g., 7 U.S.C. §§ 214, 259 (1982); ILL. REV. STAT. ch. 114, §§ 214, 214.17, 214.21 (1983).

vator manager is held responsible for maintaining on the premises the quantity and quality represented by the sum of all the individual warehouse receipts,¹⁴⁶ but need not maintain the identity of each individual lot. Thus, costs of storage are reduced and the increased efficiency is reflected in lower storage charges to the producer.

These lower charges are an incentive to farmers to store in commercial facilities rather than to build storage bins on the farm.¹⁴⁷ Thus, the changes just described in warehouse laws altered the balance between on-farm and off-farm storage capacity, reduced investment in farm storage bins, increased the value of stored grain warehouse receipts and improved the profitability of storing grain in commercial facilities.

The warehouse laws become especially important when elevators encounter financial problems and are unable to pay producers and other creditors. Although state warehouse receipts were intended to protect farmers with grain stored for them by commercial grain warehousemen, several bankruptcy cases in Illinois and other states left insufficient funds to repay holders of warehouse receipts as well as unsecured creditors.¹⁴⁸ From January 1974 through May 1982 Illinois farmers lost \$1.5 million through elevator insolvencies and bankruptcy proceedings.¹⁴⁹ Neither bankruptcy regulations or warehouse receipts were sufficient protection for farmers. Changes in the Illinois Public Grain Warehouse Act¹⁵⁰ and the Grain Dealers Act¹⁵¹ provided increased protection for producers. The Illinois warehouse law as amended gave the Department of Agriculture authority to raise bonding requirements for dealers of questionable financial position¹⁵² to restrict speculation,¹⁵³ and to require annual financial statements prepared according to generally accepted accounting principles.¹⁵⁴ These requirements increased costs to elevator managers but reduced the risk of financial loss to farmers storing grain in commercial warehouses. This increased protection was still considered inadequate by many and on August 16, 1983, Illinois passed the Grain Insurance Act.¹⁵⁵ Collection of mandatory premiums from grain warehousemen created an insurance fund that has provided more complete

¹⁴⁶ See, e.g., ILL. REV. STAT. ch. 114, §§ 214, 214.9 (1983).

¹⁴⁷ J. SCOTT, THE ECONOMICS OF CORN CONDITIONING AND STORAGE ALTERNATIVES FOR FARMERS 13 (Dep't of Agricultural Economics, University of Illinois at Urbana-Champaign, No. AERR-98, Jan. 1969).

¹⁴⁸ R. CASEY, D. CONLEY & J. AHLEN, *supra* note 138, at 11.

¹⁴⁹ *Id.*

¹⁵⁰ ILL. REV. STAT. ch. 114, § 214 (1983).

¹⁵¹ *Id.* ch. 111, § 301.

¹⁵² *Id.* ch. 114, §§ 214, 214.8.

¹⁵³ Letter from Ill. Dep't of Agriculture to all Illinois Grain Dealers (June 24, 1980) (discussing policy).

¹⁵⁴ ILL. REV. STAT. ch. 114, §§ 214, 214.3 (1983).

¹⁵⁵ *Id.* § 701.

protection. According to statements by Illinois Department of Agriculture officials, "every claim by farmers that has been adjudicated valid has been paid in full, either by elevator assets or from the insurance fund," since the implementation of the Act.¹⁵⁶

Most other grain exporting nations also have warehouse laws to protect storers of grain. For example, Argentina has separate warehouse regulations for grain for internal consumption¹⁵⁷ and for export.¹⁵⁸ Warehouse receipts are registered by the Junta Nacional de Granos and delivery is guaranteed to purchasers in case of loss of grain, theft or failure to comply with warehouse regulations. The strength of the warehouse law protects farmers with grain in commercial storage, but other losses are handled under general bankruptcy regulations.¹⁵⁹

B. Grain Grades and Standards

Perhaps the best illustration of the role of regulation in creating incentives can be found in the application of grading standards to domestic and international grain trade.

Grading standards for any product have the objective of enabling buyers to specify a numerical grade and know the quality they will receive without personally inspecting and analyzing every lot sold.¹⁶⁰ Standards also eliminate the necessity of exchanging samples in widely separated geographical markets.¹⁶¹ U.S. grain grading standards affect the international as well as the domestic markets; first, because the U.S. supplies a major share of world trade in coarse grains¹⁶² (sixty percent in fiscal 1983)¹⁶³ and, second, because many grain producing nations have patterned their standards after those of the United States.¹⁶⁴ The U.S. grain standards developed out of a need for increased marketing effi-

¹⁵⁶ Interview with Tom Jennings, Division of Agricultural Industry Regulation, Illinois Department of Agriculture, in Springfield (Jan. 4, 1984).

¹⁵⁷ Telephone conversation with Eduardo Regunaga, Junta Nacional de Granos, Buenos Aires (discussing Argentina Resolution 37).

¹⁵⁸ *Id.* (discussing Argentina Resolution 1825).

¹⁵⁹ Law No. 19.550 (Argentina).

¹⁶⁰ Cramer & Heid, *supra* note 6, at 120.

¹⁶¹ *Id.*

¹⁶² Coarse grains include feed grains (corn, barley, oats, grain sorghum) and rye, plus millet in some foreign countries.

¹⁶³ ECONOMIC RESEARCH SERVICE AND FOREIGN AGRICULTURAL SERVICE, U.S. DEP'T OF AGRICULTURE, OUTLOOK FOR U.S. AGRICULTURAL EXPORTS 10 (May 17, 1984).

¹⁶⁴ South Africa, Brazil, Canada, and Argentina have grain grades similar to those of the United States—numerical grades with factor limits. See Regulations for Regulating the Requirements in Connection with the Export of Maize from the Republic of South Africa, No. R 1070 (June 17, 1977); CANADIAN GRAIN COMMISSION, GRAIN GRADING HANDBOOK FOR EASTERN CANADA (Aug. 1980).

ciency over a period of several centuries¹⁶⁵ and a description of the issues and their resolution demonstrate the effect of regulations on incentives and efficiency.

1. History of Grain Grading

Grain grading and quality standardization dates back at least to thirteenth century London when town ordinances prohibited the mixing of moldy corn with good corn.¹⁶⁶ Ordinances from thirteenth-century records also specified that the quality of corn was to be regulated in cities of medieval France.¹⁶⁷ With the development of more formal marketing systems, additional regulations were needed to facilitate handling an increasingly large volume of grain traded over an ever larger geographical area.¹⁶⁸ To satisfy their trading needs, dealers prepared samples of the grain to be sold and exhibited or exchanged them in establishing price.¹⁶⁹ As trade volume continued to grow, they began issuing statements to describe the general quality or character of the grain. The terms "sweet, dry, and merchantable" trace to a proclamation issued by the Lord Mayor of London in 1511.¹⁷⁰ The use of descriptive terms became widely adopted and by the eighteenth century were common throughout the grain trade. In 1846, the Buffalo market reported the sale of "forty-nine hundred bushels, Massillion wheat, a beautiful sample, the berry being plump and of a bright yellow hue."¹⁷¹

As production in the United States increased in the beginning of the nineteenth century and grain exports became an important source of foreign exchange, the various exporting agencies, port authorities and boards of trade began to establish more formal quality standards in each market.¹⁷² In 1856, the Chicago Board of Trade (CBT), a volunteer organization of businessmen organized in 1848, formally adopted a system of grain grading using descriptive terminology.¹⁷³ In the following year, inspectors were appointed to grade grain received in Chicago using those standards.¹⁷⁴ International trade was an important influence in this de-

¹⁶⁵ U.S. DEP'T OF AGRICULTURE, MISC. PUB. NO. 328, *THE SERVICE OF FEDERAL GRAIN STANDARDS 1-5* (Dec. 1938) [hereinafter cited as U.S. DEP'T OF AGRICULTURE PUB. NO. 328].

¹⁶⁶ N. GRAS, *THE EVOLUTION OF THE ENGLISH CORN MARKET FROM THE TWELFTH TO THE EIGHTEENTH CENTURY 69-72* (1915).

¹⁶⁷ *Id.* at 71 n.4.

¹⁶⁸ U.S. DEP'T OF AGRICULTURE PUB. NO. 328, *supra* note 165, at 1-2.

¹⁶⁹ *Id.* at 2.

¹⁷⁰ N. GRAS, *supra* note 166, at 78 n.1.

¹⁷¹ *Milwaukee Daily Sentinel and Gazette*, Sept. 25, 1846, at 2, col. 2.

¹⁷² C. PHILLIPS, *HISTORY OF GRAIN INSPECTION IN THE UNITED STATES, 1838-1936*, at 51-54 (U.S. Dep't of Agriculture, Bureau of Agricultural Economics, Grain Division, 1936).

¹⁷³ *HISTORY OF THE BOARD OF TRADE OF THE CITY OF CHICAGO 220-21* (C. Taylor ed. 1917) [hereinafter cited as Taylor].

¹⁷⁴ *Id.* at 227-28.

velopment of grading by descriptive term.¹⁷⁵ Chicago tradesmen started shipping grain directly from Chicago to Liverpool¹⁷⁶ and by 1856 the United States exported nearly 500,000 tons of corn and wheat into the United Kingdom.¹⁷⁷ This export trade required descriptive terms on official documents and the CBT grading standards provided the early language. The standards were refined in subsequent years and by 1860 they were being applied to all grain received into Chicago warehouses.¹⁷⁸ One of the earliest attempts to specify numerical grades was introduced by the Chicago Board of Trade in 1857; spring wheat was classified into "club spring," "No.1 spring," and "No. 2 spring."¹⁷⁹

Other commercial organizations, including the Boards of Trade at Milwaukee, Detroit, Toledo, Cleveland and St. Louis, followed the lead of the Chicago Board of Trade in establishing grades and inspection procedures, but each agency selected its own set of standards and terminology.¹⁸⁰ The diversity of descriptive terminology and grading practices soon created inefficiencies and disputes within the grain markets.¹⁸¹ The standards adopted often represented the regional practices in a fairly local market.¹⁸² Moreover, inspection equipment was crude and inspection procedures varied from inspector to inspector as well as between markets.¹⁸³ The grades themselves made objective and uniform interpretation and application difficult. Most had no quantifiable factors attached to them and descriptive terms were subject to the interpretation of each inspector.¹⁸⁴

When the trade changed from the use of submitted samples to the use of numerical grades in domestic trade, European grain buyers had to rely upon the certificate of inspection rather than on visual inspection of a sample.¹⁸⁵ Variations in grading and the quality of grain received gen-

¹⁷⁵ J. SHANAHAN, C. LEIGHTY & E. BOERNER, AMERICAN EXPORT CORN (MAIZE) IN EUROPE 1-5 (U.S. Dep't of Agriculture, Bureau of Plant Industry Circular No. 55, Mar. 26, 1910).

¹⁷⁶ 1 A. ANDREAS, HISTORY OF CHICAGO FROM THE EARLIEST PERIOD TO THE PRESENT TIME 243 (1884).

¹⁷⁷ ANNUAL REPORT OF THE BOARD OF MANAGERS OF THE NEW YORK PRODUCE EXCHANGE 415, 417 (1873).

¹⁷⁸ CHICAGO BOARD OF TRADE, THIRD ANNUAL STATEMENT OF THE TRADE AND COMMERCE OF CHICAGO, FOR THE YEAR ENDING DECEMBER 31, 1860, at 13 (1861).

¹⁷⁹ Taylor, *supra* note 173, at 227.

¹⁸⁰ C. PHILLIPS, *supra* note 172, at 26.

¹⁸¹ *Uniform Rules for Grading Grain*, Grain Dealers J., Oct. 25, 1908, at 549, 549-50 [hereinafter cited as *Uniform Rules*].

¹⁸² *Id.*

¹⁸³ Phillips, *Supervision of Grain Inspection*, Grain Dealers J., Apr. 25, 1918, at 654.

¹⁸⁴ *Uniform Rules*, *supra* note 181, at 549.

¹⁸⁵ GRAIN GRADING AND INSPECTION AND INTERSTATE AND FOREIGN COMMERCE IN GRAINS, S. DOC. NO. 116, 60th Cong., 1st Sess. 1 (1907) [hereinafter cited as GRAIN GRADING].

erated dissatisfaction on the part of the European buyer.¹⁸⁶ In 1906, USDA investigations of grain shipments in U.S. and European ports demonstrated that the quality upon arrival in Europe was sometimes far below that shown on the certificate issued at origin ports.¹⁸⁷ On January 1, 1899, the incoming President of the Chicago Board of Trade reported that English merchants found the method of certification unreliable, and the CBT had received bitter complaints from individual exporters.¹⁸⁸ Importers from Marseille, France, sent a cable to CBT stating that because of the low quality received they would handle no more U.S. wheat except by sample.¹⁸⁹ Inequities and inefficiency resulting from the grading of grain, both at home and abroad, prompted members of the trade to search for more uniform and consistent methods for grading.¹⁹⁰

Some members of the industry turned to state government for solutions to these problems. The Illinois Constitution of 1870 gave the General Assembly power to pass laws governing the inspection of grain¹⁹¹ and in 1871 a warehouse act took inspection out of the control of the private inspectors and placed it in the hands of the State Railroad and Warehouse Commission.¹⁹² Other states adopted state wide standards,¹⁹³ but state control did not solve the problems of subjectivity and the variation among grading standards and procedures from market to market and state to state.¹⁹⁴

Industry and government spokesmen and trade associations working for voluntary uniform national standards were unable to obtain acceptance by the industry.¹⁹⁵ Even standards that were tentatively accepted by the various inspection agencies could not be enforced.¹⁹⁶ Although the Grain Dealers National Association (GDNA) made major strides towards reconciling differences within the industry and developed a set of grades based on a more scientific approach and more objective

¹⁸⁶ 42 CONG. REC. 4074 (1908) (letter to the President of the United States from Robert Patterson, Chm. of the European Int'l Comm. on American Grain Certificates).

¹⁸⁷ 42 CONG. REC. 4074-50 (1908).

¹⁸⁸ C. PHILLIPS, *supra* note 172, at 42.

¹⁸⁹ *Id.*

¹⁹⁰ See GRAIN GRADING, *supra* note 185, at 1, 4.

¹⁹¹ ILL. CONST. art. XIII, § 7.

¹⁹² 1871 Ill. Laws 762.

¹⁹³ W. Combs, How the U.S. Grain Standards Originated and How They Facilitate the Marketing of Grain at Country Points 5 (February 21, 1945) (U.S. Dep't of Agriculture paper delivered at Oklahoma City).

¹⁹⁴ See Address by J. Shanahan, *supra* note 20.

¹⁹⁵ Duvel, *Grain Standardization*, 6 CANADIAN MILLER AND CEREALIST 139-41 (1914).

¹⁹⁶ *Oppose M'Cumber Bill and National Ass'n Grades*, Grain Dealers J., Feb. 25, 1909, at 258; *Annual Meeting Indiana Grain Dealers' Association*, Grain Dealers J., Jan. 25, 1909, at 108; *13th Annual Meeting Grain Dealers National Association*, Grain Dealers J., Oct. 10, 1909, at 456-57; Grain Dealers J., June, 10, 1909, at 729.

factors,¹⁹⁷ it failed to obtain voluntary nationwide adoption of the standards. An alternative approach of federal control was suggested in Congress as early as 1890,¹⁹⁸ but these early efforts conflicted with the GDNA's efforts to generate voluntary standards and without industry support the bills made little progress. When the GDNA admitted failure in their attempt to obtain voluntary cooperation, they shifted their support to federal legislation.¹⁹⁹ The GDNA assisted in writing the U.S. Grain Standards Act of 1916,²⁰⁰ and their support was essential to its passage.²⁰¹

The legislation that finally passed was a compromise between those groups demanding complete federal control over all aspects of grading and inspection of grain and those preferring federal grades of a voluntary nature.²⁰² The Grain Standards Act of 1916²⁰³ gave the Secretary of Agriculture authority to establish a single set of standards and to enforce exclusive use of standards for grading all grain moving in interstate and foreign commerce.²⁰⁴ Inspectors were to be licensed by the U.S. Department of Agriculture but were not to be employees of the federal government.²⁰⁵ A system of appeals was established whereby dissatisfaction or disputes could be resolved by federal employees using the standards and procedures established.²⁰⁶ In 1916, under the authority of the Grade Standards Act, the USDA adopted the 1914 preliminary grades for corn that the industry had been using on a trial basis for two years.²⁰⁷ Standards for other grains were developed as market volumes increased.²⁰⁸

Establishing federal standards, however, did not resolve the conflicts

¹⁹⁷ *New Inspection Rules Adopted*, Grain Dealers J., Oct. 25, 1908, at 558-60.

¹⁹⁸ In 1890 Senator Algernon S. Paddock of Beatrice, Nebraska, introduced S4027, a bill to provide for both federal grading and inspection of grain. S4027, 51st Cong., 1st Sess., 21 CONG. REC. 5674-75 (1890).

¹⁹⁹ Grain Dealers J., Mar. 10, 1909, at 311; *The Federal Inspection Agitation*, Grain Dealers J., Apr. 10, 1909, at 441; *Law Needed to Require Uniform Rules*, Grain Dealers J., Mar. 25, 1909, at 373.

²⁰⁰ Grain Standards Act of 1916, Pub. L. No. 64-190, 39 Stat. 482 (1917).

²⁰¹ 53 CONG. REC. 7044 (1916).

²⁰² *Id.* at 7043.

²⁰³ Grain Standards Act of 1916, Pub. L. No. 64-190, 39 Stat. 482 (1917).

²⁰⁴ *Id.* §§ 2, 4.

²⁰⁵ *Id.* § 7.

²⁰⁶ *Id.* § 6.

²⁰⁷ OFFICE OF MARKETS AND RURAL ORGANIZATION, U.S. DEP'T OF AGRICULTURE, SERVICE AND REGULATORY ANNOUNCEMENTS NO. 11, OFFICIAL GRAIN STANDARDS OF THE UNITED STATES FOR SHELLED CORN (1916).

²⁰⁸ The USDA prepared and promulgated grades for winter wheat in July, 1917 and for other wheat in August, 1917. These were followed by standards for feed oats in June, 1919, grain sorghum in December, 1924, barley in August, 1926, and flaxseed in August, 1934. Grades for soybeans were promulgated in November, 1940 after an amendment to the Grain Standards Act assured its applicability to soybeans. FEDERAL GRAIN INSPECTION SERVICE, U.S. DEP'T OF AGRICULTURE, HISTORICAL REVIEW OF CHANGES IN THE GRAIN STANDARDS OF THE UNITED STATES (May 1980).

between the various buyers and sellers who sought the maximum competitive advantage or attempted to determine those rules that would provide increased efficiency or profits. The debates and disputes prevalent in the 1800's resurfaced many times over the next century despite numerous regulatory changes in the standards and seven legislative changes in the Grain Standards Act.²⁰⁹ The recurrence of these issues reflect concern over the incentives created by the regulations and their effect on grading, pricing and operational efficiency in the industry.

Many of these issues are unresolved, in part because of lack of agreement among the parties on the purposes of grading standards. While the USDA accepts the principle that the purpose of grading standards is to provide information from which buyers and sellers can determine value,²¹⁰ grain merchandisers are more concerned with obtaining uniform, interchangeable quantities to facilitate transactions with a minimum of description. It has been argued that grading standards are in principle neutral and that market forces establish value and discounts.²¹¹ However, in practice the neutrality principle is subject to question. For example, the market places price differentials only on those grade factors²¹² included in the standards even though other factors are economically important.²¹³ Conversely, price differentials are generally put on all factors in the standards even though some of these factors have little relevance to value in feeding or processing.²¹⁴

The role of standards in generating incentives can be illustrated through a comparison of grading standards in the U.S. and Argentina. Blending of high and low moisture corn in the U.S. has been blamed for some of the moisture problems in the export market.²¹⁵ In U.S. standards and marketing practices, 15.5 percent moisture is used as the basis for price. Much of the corn is stored at lower moisture levels and the standard of 15.5 percent is attained in the market by blending high and

²⁰⁹ See, e.g., Pub. L. No. 750, 54 Stat. 765 (1940); Pub. L. No. 861, 70 Stat. 780 (1956); Pub. L. No. 85-509, 72 Stat. 352 (1958); Pub. L. No. 90-487, 82 Stat. 761 (1968); Pub. L. No. 94-582, 90 Stat. 2867 (1976); Pub. L. No. 96-437, 94 Stat. 1870 (1980).

²¹⁰ FEDERAL GRAIN INSPECTION SERVICE, U.S. DEP'T OF AGRICULTURE, REPORT ON THE ADEQUACY OF EXISTING OFFICIAL U.S. STANDARDS FOR GRAIN (Nov. 1978).

²¹¹ S. BIRMINGHAM & L. HILL, A FAIR AVERAGE QUALITY FOR GRAIN EXPORTS 6 (Dep't of Agricultural Economics, University of Illinois at Urbana-Champaign, July 1978).

²¹² Numerical grades are determined by comparing test results with minimum or maximum values on each of several quality factors specified in the grading standards. E.g. No. 1 soybeans must contain not more than 13.0 percent moisture, 10.0 percent split beans, 2.0 percent total damage, etc.

²¹³ Hill, *Improving Grades and Standards for Soybeans*, in WORLD SOYBEAN RESEARCH CONFERENCE II: PROCEEDINGS 825-26 (1980).

²¹⁴ Hill & Jensen, *The Role of Grades and Standards in Identifying Nutritive Value of Grain*, in FEED COMPOSITION, ANNUAL NUTRIENT REQUIREMENTS AND COMPUTERIZATION OF DIETS 258-63 (Utah State University, 1977).

²¹⁵ Letter from Japan Feed Trade Association to Foreign Agricultural Service, U.S. Dep't of Agriculture (Feb. 28, 1983).

low moisture corn. Argentina, however, experiences few problems with moisture. First, because base moisture is set at 14.5 instead of 15.5 percent,²¹⁶ corn can be safely stored and shipped at the base moisture content. Second, because moisture is not a grade determining factor, there is no incentive for blending wet corn with dry corn. Regulations related to grades thus influence the cost of marketing and the value of the product delivered to the buyer.

U.S. corn standards combine broken corn and foreign material into a single factor, with maximum limits for each numerical grade.²¹⁷ Argentine corn standards classify broken corn and foreign material as separate factors.²¹⁸ This distinction reduces the amount of dirt or weed seeds that can be included in any grade. U.S. corn²¹⁹ and soybean²²⁰ standards also include test weight as a grade factor despite the lack of scientific evidence relating test weight to economic value. The standards for corn and soybeans in Brazil and Argentina, and for corn in South Africa and USSR, do not include test weight. Test weight in U.S. standards has generated an incentive for farmers to select high test weight varieties in order to avoid price discounts for low test weight.

The factors included and excluded from grading standards, as well as the limits placed on each factor to determine numerical grade, create incentives which are viewed as beneficial to one group or another. The search for rule changes in grading standards that will alter the economic opportunities and distribution of profits has generated a debate over grading that has continued for over one hundred years.

2. The Issue of Moisture in the Grading Standards

One of the issues that has surfaced many times and in many forms throughout the history of grain grading is the question of moisture. Clearly, grain with different moisture levels must also have different intrinsic value²²¹ since soybean meal or pounds of beef cannot be produced from water.

Overall marketing efficiency is decreased if grading and pricing practices motivate farmers and elevators to incur costs that generate income but do not increase the intrinsic value of the grain. For example, if water can be added to grain without reducing its price per weighed quan-

²¹⁶ Resolucion No. 20.275, *supra* note 51.

²¹⁷ FOREIGN GRAIN INSPECTION SERVICE, U.S. DEP'T OF AGRICULTURE, OFFICIAL UNITED STATES STANDARDS FOR GRAIN 2.3 (Jan. 1984) [hereinafter cited as OFFICIAL U.S. STANDARDS FOR GRAIN].

²¹⁸ See Resolucion No. 20.275, *supra* note 51.

²¹⁹ OFFICIAL U.S. STANDARDS FOR GRAIN, *supra* note 217, at 2.3.

²²⁰ *Id.* at 8.4.

²²¹ Intrinsic value of grain is the value of the grain after it has been converted to products through feeding or processing.

tity then, while income to the seller is increased, no additional value is obtained since it is only the dry matter in the grain that generates the final product. The standards established in 1916 require moisture to be less than 15.5 percent for No. 2 corn.²²² Over time, the market established No. 2 corn as the basis for price bids and any corn with moisture above 15.5 percent receives less than full price.²²³ Corn with moisture below 15.5 percent receives an implicit discount because of a loss of weight not compensated by increased price.²²⁴ Thus, the regulation establishing standards has determined that 15.5 percent moisture corn provides the seller the maximum returns. However, 15.5 percent moisture corn cannot be safely stored during warm weather²²⁵ and cannot be safely shipped in closed ocean vessels.²²⁶ Moreover, it is not the optimum moisture content for processing.²²⁷ In short, almost no one in the grain industry prefers corn at 15.5 percent except for purposes of meeting an arbitrary moisture standard established for No. 2 corn.

Although the yield of dry corn per acre is fixed at the time of harvest, the weight delivered to the elevator varies with moisture content. Excess water in the corn (above the 15.5 percent price base) receives a price discount because there is less dry matter per ton or per bushel. However, the market does not pay a premium for corn below 15.5 percent even though drier corn contains more dry matter per ton or per bushel. When corn is dried to safe storage moisture, the farmer will deliver less total weight to the elevator and be paid the 15.5 percent moisture price, thus reducing the farmer's income.

A similar situation exists for soybeans, although moisture levels below the base of thirteen percent often occur in the field before harvest is completed. Soybean processors prefer soybeans at ten percent moisture. Again, however, farmers who deliver at this moisture level receive an implicit discount through less total weight. With no price or quantity adjustment for moisture level below the base, farmers who deliver grain

²²² OFFICIAL U.S. STANDARDS FOR GRAIN, *supra* note 217, at 2.3. Number 2 is a numerical grade in the standards for corn. To be graded No. 2 the sample of corn tested must contain not more than 15.5 percent moisture, 3.0 percent broken corn and foreign material, 5.0 percent total damaged kernels, and .2 percent heat-damaged kernels and test weight must be 54 lb/bu. or greater.

²²³ Cramer & Heid, *supra* note 6, at 126-36.

²²⁴ P. Bloome, Management Implications of the Market Value of Moisture in Grain (paper prepared for 1983 Winter Meeting of Am. Soc. of Agricultural Engineers, Dec. 1983).

²²⁵ Shove, *Wet Grain Aeration for Holding and Drying Shelled Corn*, in ALTERNATIVES FOR CONDITIONING AND STORING CORN AT FARM AND ELEVATOR 7 (Proceedings of a Regional Conference, University of Illinois at Urbana-Champaign, Feb. 1970).

²²⁶ G. AYERST & H. LENIGER, REPORT ON HEAT DAMAGE TO ARGENTINE MAIZE DURING SHIPMENT TO EUROPE 46 (Dec. 1967).

²²⁷ J. Freeman, Quality Factors Affecting Value of Corn for Wet Milling 8 (paper prepared for 1971 Winter Meeting of Am. Soc. of Agricultural Engineers, Dec. 1971).

at optimum moisture levels are penalized.²²⁸

For any grain below the base moisture, the standards and pricing methods create an incentive to increase the moisture content in order to avoid implicit discounts. Many farmers and elevator managers have discovered several methods to increase the moisture content of soybeans and corn which is below the base moisture level.²²⁹ One method is to blend high moisture grain with low moisture grain, permitting moisture to move from wet kernels to dry kernels until they reach an equilibrium. Another alternative is the use of aeration fans to force high moisture air into stored grain. Moisture from the air is absorbed by the kernels and moisture content increased. Water may also be added directly to the grain. All three methods achieve the same end result. When research describing techniques for adding water directly to corn, soybeans or wheat was published in 1980,²³⁰ the United States Food and Drug Administration (FDA) offered the opinion that any method of adding water to grain constitutes adulteration of food as defined under section 402(b)(4) of the Federal Food, Drug and Cosmetic Act.²³¹

The regulations in the grade standards that establish moisture levels for each grade in each grain are translated into incentives through the pricing practices of an industry that has accepted these moisture levels as a basis for price discounts. Sellers who respond to these incentives by rewetting grain to the moisture levels the market has established, however, are in violation of the FDA regulations. Thus, while moisture may be removed to reach base moisture levels in grain, the same moisture may not be returned without violating federal regulations. The grain quality, however, is the same whether grain is dried to the base moisture or rewetted to the base moisture.

These conflicting incentives result in inefficiencies. First, market incentives encourage storing grain at moisture levels above those recommended for safe storage. Losses from spoilage are frequent. Second, market incentives encourage the addition of moisture to meet grade standards. Rewetting and blending in response to the arbitrary moisture levels dictated by the standards involve an additional cost without any real increase in value. The inefficiency is one of creating economic incentives for uneconomic actions.

Removal of moisture as a grading factor is one step toward rationalizing these inconsistencies. In the United States, on September 12, 1984, regulatory action by the USDA removed moisture as a grade determin-

²²⁸ P. Bloome, *supra* note 224, at 1-2.

²²⁹ Hill & Shove, *What are Farmer's Alternatives Concerning Moisture Content of Grain Going to Elevator?*, 10 SOUTHWEST FARM PRESS 14, 14-15 (Jan. 13, 1983).

²³⁰ Bloome, *Moisture Shrink in Stored Wheat May Be Biggest Loss Factor*, 7 SOUTHWEST FARM PRESS (May 15, 1980).

²³¹ Federal Food, Drug and Cosmetic Act of 1938, Pub. L. No. 717, 52 Stat. 1046 (1938).

ing factor for corn, soybeans and grain sorghum, to become effective September 9, 1985.²³² However, an additional step is required before the market will make the necessary adjustment. The quantity of grain should be defined in terms of the dry matter it contains rather than the present "legal bushel"²³³ definition based on weight of water and grain combined. As early as 1916, the USDA published recommendations that grain be priced on the basis of the dry matter it contained, not on its wet weight.²³⁴ Redefining the legal bushel would remove the incentive for altering moisture content except to obtain the optimum storage and handling moisture levels. The quantity of grain would be determined by its weight, adjusted for differences in moisture. The weight of grain at various moisture contents would be adjusted to the equivalent weight of grain at the base moisture content.²³⁵ This change in the rules and regulations would resolve several problems. It would: (1) remove incentives for rewetting; (2) eliminate the conflict between the FDA and general practices in the trade; (3) eliminate the need for and the cost involved in blending diverse moisture contents solely for the purpose of meeting the USDA standard; and (4) pay sellers on the basis of the quantity of dry matter delivered regardless of the moisture level.²³⁶

However, managers in the grain industry object to this proposal on the grounds that: (1) the equivalent bushel concept would eliminate the income elevators now receive from blending wet and dry grain; (2) moisture meters are not accurate enough to use as a basis for determining equivalent bushels; (3) measuring moisture on all grain purchased would require additional expense; and (4) separate bins would be needed for each moisture level.²³⁷

There is a response to each of these concerns. First, elevator income is determined by competitive forces setting prices for services performed. Elimination of elevator profit opportunities from blending may require higher charges for other services, but the total income from all sources

²³² Rules and Regulations, 49 Fed. Reg. 35,743 (Sept. 12, 1984).

²³³ Quantities and prices for grain in the U.S. are generally quoted in terms of bushels. However, the bushel is determined by weight without regard to volume. The weight per bushel specified for each grain is called the "legal weight per bushel" and was established for purposes of estimating duties by the 39th Congress. In subsequent years individual states moved toward uniformity in setting legal weights for each grain based on a Winchester bushel of 2150.42 cubic inches in capacity.

²³⁴ E. BOERNER, *THE INTRINSIC VALUES OF GRAIN, COTTONSEED, FLOUR AND SIMILAR PRODUCTS, BASED ON THE DRY-MATTER CONTENT* (U.S. Dep't of Agriculture, Bull. No. 374, Oct. 17, 1916).

²³⁵ Hill, *The Standardized Bushel—Solution to the Grain Moisture Debate*, in *EVALUATION OF THE ISSUES IN GRAIN GRADES AND OPTIMUM MOISTURES 25, 25-29* (Dep't of Agricultural Economics, University of Illinois at Urbana-Champaign, No. AE-4548, Dec. 1982).

²³⁶ *Id.* at 27.

²³⁷ Irmen, *Grain Moisture and Dry Weight Matter Marketing*, National Grain and Feed Association Newsletter, Aug. 25, 1983.

will be limited only by competing elevators. Second, commercial meters have been sufficiently accurate for measuring moisture above the base and have been used to determine discounts.²³⁸ It seems illogical that the industry accepts the current degree of meter accuracy for discounting farmers but not for establishing premiums. Third, the only time moisture is not measured on farm-delivered corn is when the manager knows the moisture will be below the base and he will receive a bonus of extra bushels. Again, the expense is readily justified when farmers are being discounted, but the argument asserts that the same procedure is too expensive to measure moisture when farmers may receive extra value. Fourth, grain is already segregated according to moisture. The equivalent bushel approach would eliminate the need to separate moisture for purposes of standards and permit blending and segregation according to good storage practices. The number of separate bins required might even be reduced because all moisture levels would be priced on the basis of dry matter and, whether separated or blended, their price and quantity would remain unchanged.

Resolution of this debate between buyers and sellers of grain is only possible if the justification for changing regulations is shifted to efficiency rather than a redistribution of total value between buyers and sellers. If rewetting grain is illegal and inefficient, but current marketing institutions provide economic incentives to add water, then a change of incentives through changes in policy is a more viable solution than policing farmers and elevators to prohibit blending, rewetting and aeration. Changing the "rules of the game" (i.e. regulations) can alter the distribution of income among the players, but it may also increase the total income available for distribution.

C. *Marketing Practices in International Trade*

Quality loss and the condition of grain at foreign destinations has been a constant concern throughout the history of grain exporting.²³⁹ The chief complaints from foreign buyers are:

1. A high percent of broken kernels and foreign material at destination.²⁴⁰
2. Excessive moisture at the time of unloading.²⁴¹

²³⁸ L. HILL & M. PAULSEN, SHRINK FACTORS FOR CORN USING RECALIBRATED MOISTURE METERS 4 (Dep't of Agricultural Economics, University of Illinois at Urbana-Champaign, No. AE-4542, Sept. 1982).

²³⁹ J. SHANAHAN, C. LEIGHTY & E. BOERNER, *supra* note 175, at 3-4.

²⁴⁰ L. HILL, M. PAULSEN & M. EARLY, CORN QUALITY: CHANGES DURING EXPORT 26 (College of Agriculture, University of Illinois at Urbana-Champaign, Spec. Pub. No. 58, Sept. 1979).

²⁴¹ J. SHANAHAN, C. LEIGHTY & E. BOERNER, *supra* note 175, at 21.

3. Low yields of final processed products from U.S. origin grain.²⁴²

These complaints often take the form of recommendations for producers to grow better varieties, for grain exporters to load better quality, for grain marketing firms to avoid blending and for export elevators to clean grain just before loading.²⁴³ But these complaints generate little action on the part of producers or grain marketing firms because they are not accompanied by any economic incentives. When foreign buyers specify No. 3 yellow corn in their contract, they are permitting a maximum of seven percent moldy kernels and four percent broken corn and foreign material.²⁴⁴ The economic incentives are very strong for the exporter to load as close to that quality as his equipment and technology will permit. Most corn received by the export elevator contains less than seven percent moldy kernels, thus providing an opportunity for the elevator to purchase badly damaged corn at a discount, blend it into the corn as it is being loaded at a rate to achieve seven percent and receive full price for the moldy kernels. This obviously decreases the total "value" of the corn for most uses, but it does not affect "price." Therefore, it enhances the income of the exporter and reduces value to the foreign buyer. Maximum limits on foreign material generate incentives for the same type of blending practices.

Breakage could be reduced at foreign destinations if producers would select varieties and drying practices that would generate corn able to stand up better under export handling.²⁴⁵ However, no economic incentives exist for producing this corn. If farmers incur a yield loss or additional cost in producing the better quality, the lack of premium would have the effect of penalizing farmers for producing good quality corn for the foreign market.

Uniform grades, terminology and measurement devices contribute to efficiency in international grain markets. Despite the progress over several centuries of grain trading, uniformity has still not been achieved in some areas. For example, the United States is one of the few nations not using the metric system for measuring grain quantity and quality. Moreover, moisture is one of the more objective factors in the standards and its accurate determination is essential to establishing value. Yet, no uniform measurement method has been accepted by all countries in-

²⁴² Address by William Rankin, U.S. Feed Grains Council Seminar (Oct. 27, 1980) (quality of U.S. grain for scotch grain whiskey).

²⁴³ Wichita Eagle Beacon, Oct. 7, 1984, at 9C.

²⁴⁴ FEDERAL GRAIN INSPECTION SERVICE, U.S. DEPT OF AGRICULTURE, THE OFFICIAL UNITED STATES STANDARDS FOR GRAIN 2.1-2.5 (Jan. 1978).

²⁴⁵ See Paulsen, Hill, White & Sprague, *Breakage Susceptibility of Common Corn-Belt Genotypes*, 26 TRANSACTIONS OF THE AM. SOC. AGRIC. ENGINEERS 1830 (1983).

volved in international trade,²⁴⁶ basic reference methods differ among countries²⁴⁷ and calibration validation in the United States is left to individual state agencies, often with the result that moisture meters in different states do not give comparable readings.²⁴⁸ The lack of uniformity and the confusion created by inconsistent moisture readings among points in the market channel generate inefficiencies in marketing. In general, it will require changes in international institutions in order to reduce these inefficiencies.

Perhaps the most dramatic quality problem in the international markets is that many quality factors important to the foreign buyer are not included in the U.S. standards.²⁴⁹ Consequently, there are no incentives at any point in the market channel for improving quality on those characteristics. Thus, farmers are not encouraged to choose varieties or technology that would increase the yield of starch or flaking grits²⁵⁰ or even nutritional value because current grading standards include very few factors that relate to value for processing or feeding. Farmers producing soybeans with higher protein or oil content do not receive higher prices. Improvement in grading standards requires adequate incentives at each point in the market channel. Since the procedures for changing standards²⁵¹ involve public hearings and support from the grain industry, changes at the federal level are difficult to make. However, history has demonstrated that state or local grade standards lead to inequities and inefficiencies.²⁵² The industry is best served by federal regulations that establish uniform standards for use throughout the industry.

Export procedures for most U.S. grain are based on an export certificate where origin quality and weight are final.²⁵³ This means that the sellers' responsibility ends when the required weight and quality are loaded in the final shipping bin in the export elevator above the vessel. Changes that take place in the quality of the grain during loading, transit or unloading at final destination become the responsibility of the buyer.

²⁴⁶ Multon & Martin, *Méthods de références normalisées de dosage de l'eau dans le cas du maïs: Justification des méthodes ICC*, REVUE DE METROLOGIE PRACTIQUE ET LEGALE 9 (1978).

²⁴⁷ FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, REPORT OF THE SECOND SESSION OF THE CODEX COMMITTEE ON CEREALS AND CEREAL PRODUCTS 9, para. 54 (1981).

²⁴⁸ Paulsen, Hill & Dixon, *Moisture Meter-to-Oven Comparisons for Illinois Corn*, 26 TRANSACTIONS OF THE AM. SOC. AGRIC. ENGINEERS 576-83 (1983).

²⁴⁹ L. Hill, *Improved Quality of U.S. Feed Grain Exports* (May 15, 1978) (paper presented at a grain trade seminar in London).

²⁵⁰ Grits are segments of the hard endosperm of the corn kernel obtained during separation of germ, bran, and endosperm in dry milling. Flaking grits are those grits large enough to be used for making flakes such as those used in breakfast cereals.

²⁵¹ 7 U.S.C. §§ 71, 74 (1982).

²⁵² *Uniform Rules*, *supra* note 181, at 549-50.

²⁵³ S. BERMINGHAM & L. HILL, *supra* note 211, at 1.

However, at the foreign port, the vessel is frequently allocated among as many as 50 different buyers with significant variation in the quality they receive.²⁵⁴ The importer's responsibility is so diffused that processors or feeders cannot obtain accountability for quality changes during unloading. The primary change that takes place after the grain is graded at the export point is one of increased breakage during subsequent handling.²⁵⁵ Drying techniques and varieties of grain are available that would dramatically reduce the amount of breakage taking place during this handling.²⁵⁶ However, no incentives exist to reward those farmers who use lower drying temperatures or select varieties that will better withstand subsequent handling.²⁵⁷

The solution is to change incentives. Every firm in the marketing channel, from farmer to final processor, responds to economic incentives that currently exist. If a change is desired in marketing practices, the rules which generate these economic incentives must be changed. For example, breakage during transit could be reduced by including a test for breakage susceptibility in federal grade standards to facilitate price differentials at the point of first delivery. Farmers who are currently selecting varieties and using drying techniques to produce corn suited to the export market (e.g., resistance to breakage) would receive a higher price per bushel than those farmers producing corn not suitable for these purposes. Quality characteristics such as starch content, yield of flaking grits or measure of total digestible nutrients and protein, once incorporated in the grade standards, would become the basis for price differentials generating the incentives for an increase in quality throughout the market channel. Without such incentives, no change is likely to occur.

IV. CONCLUSIONS

Resolution of the issues in grain quality and grading standards requires a perspective beyond national legislation and regulation. Local, national and international laws and regulations with moral as well as legal enforcement interact in world grain markets to promote efficiency or inefficiency. Individual firms make decisions based upon incentives. Incentives are generally prescribed by marketing institutions and regulations. Therefore, any improvement in efficiency requires changes in regulations and government policies. Legislation and regulations developed to solve specific problems are seldom evaluated for their effects upon in-

²⁵⁴ L. HILL, M. PAULSEN & M. EARLY, *supra* note 240, at 20.

²⁵⁵ *Id.* at 26.

²⁵⁶ Paulsen, Hill, White & Sprague, *supra* note 245, at 1830-36, 1841.

²⁵⁷ L. HILL, M. PAULSEN, T. MOUNTS, A. HEAKIN & G. LIST, CHANGES IN QUALITY OF CORN AND SOYBEANS BETWEEN UNITED STATES AND ENGLAND 14 (College of Agriculture, University of Illinois at Urbana-Champaign, Spec. Pub. No. 63, 1981).

centives and marketing efficiency. Yet these relationships often determine total product and profits available for distribution among the various participants in the production and marketing of goods.

Few regulatory changes will receive unanimous support from all sectors of a national economy or from all nations because regulations are, by their nature, intended to help balance the marketing power of one group against that of others. Existing rules and regulations, as well as potential additions or changes must be evaluated for indirect effects upon the total available supply of goods and services as a consequence of their role in creating incentives or disincentives in the market. There are very few opportunities for decisions that make everyone better off without making someone worse off in a welfare context.²⁵⁸ For the most part, decisions of this type are spontaneously initiated by individual participants in the market. Most issues revolve around the trade-offs between individuals and groups and resolution of the issues requires regulations accompanied by legal enforcement. Changes in regulations often result in a reallocation of the total income among firms, individuals or nations. These changes can increase the total income, even though not all groups will gain. If changes increase total income and are made under conditions of economic growth, losers can be compensated to counter undesirable effects of redistribution. However, the rules of the game must be properly structured to generate incentives for increased efficiency, greater output and allocation of the total product according to socially acceptable criteria.

Efficiency in grain production, marketing and international trade is largely determined by the regulatory environment and enforcement climate within which private firms make marketing decisions. This article has reviewed only a few of the numerous regulations affecting the grain industry in order to illustrate the important influence of national and international policies on the cost and availability of grain. In order to avoid serious consequences in terms of adequacy, stability and cost of food supplies, it is essential that agencies and individuals responsible for developing, interpreting and enforcing local, national and international regulations understand the economic implications of their decisions.

²⁵⁸ P. SAMUELSON, *ECONOMICS: AN INTRODUCTORY ANALYSIS* 602 (1948).

