

Chapter 10

Comparison of Technologies
and Policies Affecting
Grain Quality in Major
Grain-Exporting Countries

CONTENTS

	<i>Page</i>
Production Technologies and Practices.	237
Handling Technologies and Practices at First Point of Receipt	239
Drying	239
Cleaning	239
Storage and Handling	239
Transportation to Ports	239
Handling Technologies and Practices at Export	241
Storage.	241
Drying and Cleaning	241
Blending	241
Institutions and Regulations Affecting Grain Quality	241
Seed Variety Control.	241
Grain Receival Standards	244
Marketing by Variety.	244
Grain Inspection Authority and Grade Standards	244
Government Policies Affecting Grain Quality.	244
Price Policy.	244
Farm Storage	246
Comparison of U.S. Institutions, Policies, and Technologies With Those of Other Grain-Exporting Countries.	246
Policy	246
Institutions	246
Technologies and Grain-Handling Practices	247

Tables

<i>Table</i>	<i>Page</i>
10-1. Comparison of Production Technologies of Major Grain-Exporting Countries	238
10-2. Comparison of Handling Technologies and Practices at First Point of Receipt of Major Grain-Exporting Countries	240
10-3. Comparison of Handling Technologies and Practices at Export of Major Grain-Exporting Countries	242
10-4. Comparison of Institutions and Regulations Affecting Grain Quality of Major Grain-Exporting Countries	243
10-5. Comparison of Government Policies Affecting Grain Quality of Major Grain-Exporting Countries	245

Comparison of Technologies and Policies Affecting Grain Quality in Major Grain-Exporting Countries

This chapter focuses on the grain systems of the other major exporters—Argentina, Brazil, Canada, France, and Australia—in order to understand better their grain systems as they relate to quality and to consider adopting some aspects of those systems.

Observed differences among countries are important because the differing strategies influence incentives and the quality of the final product. A comparison of the major technologies, market channels, pricing strategies, and grading practices in each country provides the background for a comparison and analysis of the quality delivered into the domestic and export markets of each. Little published information is available about the grain systems of the other countries, especially with regard to technologies, institutions, and policies affecting quality; Canada is a major exception. To provide the documentation needed to prepare this chapter, OTA formed study teams to travel to

each country except Canada to gather needed information. The study teams arrived during the harvest to observe the system at work. Information was gathered via numerous interviews with producers, handlers, processors, exporters, grain inspectors, plant breeders, researchers, and government officials. Detailed reports on each country are found in a second report in this assessment, *Grain Quality in International Trade: A Comparison of Major U.S. Competitors*.

This chapter looks at the technologies, handling practices, institutions, and government policies that affect grain quality in each country and compares them in each case with the U.S. system. The technologies are basically the same, with some minor variations. But major differences exist in the use of technologies, in institutions established, and in policies that affect grain quality.

PRODUCTION TECHNOLOGIES AND PRACTICES

The major grains—corn, wheat, and soybeans—are grown under various soil and climate conditions and differing cultural practices (table 10-1). Most of the best soil conditions in each country are used to produce these grains. Cultural practices differ, depending on site conditions. All the countries, however, use mechanized soil preparation, seeding, and cultivation. Differences exist in the degree to which fertilizer, insecticides, and herbicides are used. France is the most intensive user of fertilizer, and this is reflected in its tremendous increase in wheat yield over the past 10 years. The high yields and fertilizer rates are primarily a response to economic incentives provided by the

Common Agricultural Policy of the European Community (EC).

Harvesting technologies are similar in all countries. The only difference of note is in Australia, where a second screen may be used on the combine to filter nonmillable materials from the wheat. Farmers have the incentive to use this practice because they do not want their wheat rejected at the country terminal. No such incentive exists in the United States at the point of first receipt.

Major differences among countries can be found in the capacity for and reliance on on-farm storage. The United States has the capacity

Table 10-1.—Comparison of Production Technologies of Major Grain-Exporting Countries

Activity	United States	Argentina	Brazil	France	Canada	Australia
Soils and topography	Major production areas are on stable soils. Low erosion. Fertility stabilized. Soybeans usually incorporated in a rotation with corn or other crops. Winter wheat grown under dry land conditions.	Flat, fertile soils in the corn belt. Rolling land farther south in wheat and sorghum area. Long rotations including legume pasture. Soybeans and wheat are often double-cropped.	Expanding production on newly cleared soils. Long slopes and year-round erosion and leaching create more problems of maintaining fertility. Extensive terracing required. Continuous soybeans not unusual in Parana and Mato Grosso do Sul.	Major production areas for wheat located north and southwest of Paris on stable, low erosion soils. Rolling land farther south in corn-producing area.	Wheat grown for export in four soil zones in western Canada. All wheat grown under dry-land conditions.	Major wheat production in areas include south and east coast, and western Australia. Rolling, dry land. Extended rotations with clover.
Cultural practices.	Fertilizer, insecticide, and herbicide used as needed. Mechanized soil preparation, seeding and cultivation.	Limited use of fertilizer on corn, increasing use on wheat. Limited use of herbicides and insecticides. Mechanized tillage seeding and cultivation.	Fertilizer, insecticide, and herbicide used as needed. Mechanized soil preparation, seeding and cultivation.	High use of fertilizer, insecticide, and herbicides. Mechanized soil preparation, seeding, and cultivation.	Fertilizer, insecticide, and herbicide used as needed. Mechanized soil preparation, seeding, and cultivation.	Phosphatic fertilizers, insecticides, and herbicides used as needed. Mechanized soil preparation.
Harvesting	Self-propelled combines. Wheat crop in Northern plains is swathed before harvest.	Self-propelled combines.	Self-propelled combines.	Self-propelled combines.	Self-propelled combines. Wheat crop is swathed before harvest.	Self-propelled combines.
On-farm storage	On-farm storage available for about 50 percent of corn and soybeans.	Only 5 to 10 percent stored on farms. Only very large farms use on-farm storage.	Virtually no on-farm storage.	Very little stored on farms,	On-farm storage for the majority of wheat.	Virtually no on-farm storage.

SOURCE: Office of Technology Assessment. 1989

to store about half the on-farm grain produced. In Argentina, Brazil, France, and Australia, on-farm storage capacity is small. Quality control is the major reason given by Government agencies for discouraging on-farm storage. In Australia, for example, the Wheat Board emphasizes cleanliness and insect control in wheat. It is their belief that storage provided off-farm by handlers, more experienced with and knowledgeable about the procedure, results in fewer

quality problems. Greater use of on-farm storage would, according to the Australians, increase infestation and/or pesticide residue. An important fundamental of grain marketing in many countries is that the establishment of stringent requirements at the first point of receipt precludes problems downstream in the marketing system. Minimal on-farm storage is an important component of that concept.

HANDLING TECHNOLOGIES AND PRACTICES AT FIRST POINT OF RECEIPT

Handling technologies and practices at first point of receipt include the receiving, drying, cleaning, storage, conveying, and transporting of grain (table IO-2). Few differences exist among the countries in how grain is received. Country elevators basically accept grain in either farm wagons or trucks. Some countries (the United States) are more mechanized than others (Brazil). But the differences are minor and inconsequential as far as quality is concerned.

Drying

The same type of drying technology basically is used in all countries. Most corn needs to be dried everywhere. Soybeans in Brazil are usually dried, but in Argentina and the United States this is done to a lesser extent. High-temperature dryers, either gas- or oil-fired, are used for the most part. Wheat drying varies by country. France harvests wheat above 15 percent moisture and dries it for safe storage. Australia, on the other hand, rarely needs to dry wheat because of the country's dry climate.

Cleaning

Cleaning practices differ by country. In the United States and Canada, grain is generally not cleaned at the first point of receipt. In Argentina, Brazil, and France, economic incentives exist to clean grain at this level in the market channel. In fact, in France it is not uncommon for wheat to be cleaned going in and coming out of country elevators. Not cleaning

grain at the first point of receipt ensures that foreign material remains, adding to the cost of transporting and handling grain throughout the rest of the marketing channel.

Storage and Handling

The technologies for storage and grain handling are the same for all countries. Differences arise in the configuration of storage units and in the speed of handling equipment. In some countries, such as the United States, vertical or upright storage facilities predominate. Flat storage is most prevalent in Brazil. And in Australia, storage facilities vary by state.

Transportation to Ports

Rail and truck are the major modes for transporting grain to port facilities in most countries. The United States is an exception in that it also has major waterways for transport. Barge transportation is more cost-effective than truck and rail. From a quality viewpoint, however, it has potential problems. As discussed in chapter 7, moisture uniformity is important in maintaining quality. During shipment, moisture migration can be significant if grain is exposed to several outside temperature and humidity changes. Barges seem to be more susceptible to these factors than railcars. In addition, grain may need to be handled more at times because of barge movement, which increases the likelihood of damaging the kernel—especially for corn. The United States may have an advan-

Table 10-2.—Comparison of Handling Technologies and Practices at First Point of Receipt of Major Grain-Exporting Countries

Activity	United States	Argentina	Brazil	France	Canada	Australia
Receiving	Truck dumps and hoists for virtually all farm wagons and trucks.	Truck dumps and hoists at larger facilities. A few receiving stations lack hoists. Waiting lines are common at harvest.	Truck dumps and hoists at larger facilities. Many vehicles unloaded by hand.	Truck dumps and hoists for farm wagons and trucks.	Truck dumps and hoists for farm wagons and trucks	Truck dumps and hoists for farm wagons and trucks.
Drying	The majority of corn is dried and stored on farms. Most of the corn delivered at harvest is dried by first handler in gas-fired elevators. Little drying of soybeans or wheat.	Majority of corn and some soybeans and wheat are dried in high-temperature dryers. Nearly all country elevators have dryers. Usually oil-fired.	Majority of soybeans dried. Wood and coal used for fuel.	Some drying of wheat if harvested above 15% moisture. Majority of corn dried with high-temperature dryers similar to those used in U.S.	The majority of wheat is dried and stored on farm. Propane dryers are most common.	Generally wheat does not need to be dried. No dryers at bulk handling authority (BHA) facilities.
Cleaning	Generally grain is not cleaned when it comes off the farm. It is placed in bins according to quality so that it can be blended with grains of different quality when loaded out.	Since there is a premium for No. 1 grain, most grain is cleaned to less than 1.0% foreign material.	Soybeans that exceed Brazilian export quality (foreign material 1.00%) are cleaned. Corn is cleaned to less than 1.0%.	Most wheat cleaned going into country elevator and some cleaned going out. Corn routinely cleaned because of broken kernels.	Very little cleaning done at this level of marketing system.	Generally wheat does not need to be cleaned. No cleaners at BHA facilities.
Storage	Flat and upright storage. Upright predominates.	Flat and upright storage. Determined by relative costs and handling requirements.	Flat and upright storage. Flat predominates.	Upright storage predominates. Grain often turned and sampled for end-use quality tests. Also use flat storage with numerous vertical bins,	Vertical cement bins; flat storage and steel tanks. Vertical predominates.	Upright, flat, and bunker. Predominance of any type varies by state.
Handling	Use augers, conveyors, belts, and vertical legs.	Use augers, conveyors, belts, and vertical legs.	Use augers, conveyors, belts, and vertical legs.	More use of chain conveyors than belts.	Use augers, conveyors, belts, and vertical legs.	Use augers, conveyors, belts, and vertical legs.
Transportation to ports	Trucks for short hauls. Rail and water for long distance.	Truck and rail choice determined by cost and distances. shortage of rail service. Barge available for movement to Buenos Aires.	Truck predominates for all moving beans to Rio Grande do Sul.	Grain predominantly transported by truck.	Grain predominantly moved by rail over long distances.	Most wheat is moved by rail, some by truck.

SOURCE Office of Technology Assessment, 1989

tage compared with other countries because barge transportation is more cost-effective than alternative modes of transportation. But from

a quality standpoint, this may not be an advantage.

HANDLING TECHNOLOGIES AND PRACTICES AT EXPORT

Many of the handling technologies at the final point in the marketing channel are similar among the countries (table IO-3). But, as with the practices at first point of receipt, how they are used differs.

storage

Storage technologies do not vary among the countries. The number of bins for segregating by quality does differ, however, as well as the speed of moving grain in and out of storage. The United States has the capacity to segregate grain into multiple bins for storage, which expedites blending. Other countries, such as Argentina and Brazil, have few bins into which grain can be segregated by quality.

Drying and Cleaning

No major differences exist in either technologies or practices of drying and cleaning grain at this point. As grain basically is dried and cleaned at the first point of receipt, there is little need for dryers or cleaners at export. The United States is somewhat of an exception because many export facilities receive grain directly from farmers. And grain must be con-

ditioned for safe storage and handling. But in most other countries, such as Argentina and Australia, grain received at export has already been conditioned at the first point of receipt. A major exception is Canada, which cleans wheat at the port facility. However, Canada is presently studying this practice and the research indicates that cost savings exist in cleaning wheat at inland terminals versus at export. A basic marketing fundamental of most exporting countries is to condition grain at the first point of receipt and avoid problems and costs at later stages in the marketing channel.

Blending

Canada blends wheat to a degree at primary elevators but is limited to the extent it allows blending at export terminals. Other exporters blend grains only to a small degree, mainly because it is uniform upon receipt. The physical facilities in these countries have been constructed to limit blending of wide margins of quality. In contrast, grain moving through the marketing channel in the United States is not uniform. Blending is done across diverse qualities in an attempt to produce a uniform product for export.

INSTITUTIONS AND REGULATIONS AFFECTING GRAIN QUALITY

Although the technologies of producing, transporting, and handling grain do not differ significantly among exporters, the use of them does. And they differ to a large extent because of the varying institutions in each country. This section discusses the institutions and regulations important in influencing grain quality in these countries (table IO-4).

Seed Variety Control

The fundamental area for influencing quality is through incentives to plant breeders. All major grain-exporting countries except the United States have instituted formal mechanisms for controlling variety development and release. In France, Canada, and Australia, va-

Table 10-3.—Comparison of Handling Technologies and Practices at Export of Major Grain-Exporting Countries

Activity	United States	Argentina	Brazil	France	Canada	Australia
Storage	Vertical storage with multiple bins, high speed in and out. Segregated by quality to expedite blending at time of shipping.	Vertical silos predominate. Few bins for quality segregation.	Vertical and flat storage. Small number of bins stored according to end-use qualities. limits segregation by quality.	Upright bins predominate, Small number of bins stored according to end-use qualities. limits segregation by quality.	Vertical, cement bins predominate. Blending is very gated by quality limited—grades must be kept separate.	Vertical storage segregated by quality
Drying	Most export facilities have large drying capacity. Corn is often dried if received direct from farmer but soybeans and wheat are seldom dried.	Grain dried by first handler; dryers at export are seldom used.	Grain dried by first handler, dryers at export seldom used.	Very few export elevators have dryers; grain is conditioned by first handler.	Most export facilities have modest drying capacity.	No dryers at export facilities
Cleaning	Most export facilities have capacity for cleaning. Grain (mostly corn) often cleaned prior to exporting.	Grain cleaned by first handler. Relatively small capacity cleaners.	Grain cleaned by first handler. Little or no cleaning capacity.	Most export elevators do not have cleaners; grain cleaned by first handler.	Most cleaning of wheat is done at this point in marketing system.	No cleaners at export facilities.
Blending	Normal practice. Economic incentive for blending of wide range of quality due to the extremes in quality of grain accepted into the system.	Limited blending because of uniform grain received and lack of physical facilities for blending.	Limited blending because of uniform grain received and lack of physical facilities for blending.	Some blending of wheat moving to export, but no incentive to blend wide of margins of differing qualities.	Blending at primary elevators, but at export only 2% of higher grade can be blend from a lower grade.	Limited blending at export but only for a few factors.

SOURCE Office of Technology Assessment, 1989.

Table 10-4.—Comparison of Institutions and Regulations Affecting Grain Quality of Major Grain-Exporting Countries

Activity	United States	Argentina	Brazil	France	Canada	Australia
Seed variety control	No State or Federal control. Release of varieties influenced to some extent by land-grant universities. Largely the market determines adoption of varieties.	Committee of government and industry must approve agronomic properties. Quality factors of minor influence.	Committee with broad representation directs research and approves varieties. Quality is potential criterion but not currently effective.	Formal mechanism exists that regulates release of varieties based on agronomic and quality criteria.	Formal mechanism used to license new varieties. Agronomic and quality criteria given equal weight in testing new varieties.	Formal mechanism followed as a prerequisite for release of varieties. Quality and agronomic criteria are used
Grain receipt standards	None. All types of quality are accepted with appropriate discounts for low-quality grain.	Grain not meeting a specified minimum quality (Condition Camara) is rejected at first point of sale.	Soybeans not meeting a minimum quality are rejected at first point of sale.	Grain not meeting export contract specifications can be rejected by surveying company or receiving elevator.	Developed eight grades for CWRS to differentiate quality. Lowest grade goes to feed market.	Wheat must meet minimum quality standards. if not it IS allocated to feed market.
Marketing by variety	No mechanism exists for variety identification.	Variety is not identified in marketing channel.	Variety is not identified in marketing channel.	Very common. Variety often specified in wheat contracts	Licensed grain must be visually distinguishable.	Very common-use variety control scheme to facilitate segregation by classes.
Grain inspection authority	Federal Grain Inspection Service (FGIS), U.S. Department of Agriculture.	Junta Nacional de Granos —Government agency responsible for agriculture	Private inspection agencies.	Private inspection agencies.	Canadian Grain Commission.	Export Inspection Service of Department of Primary Industry.
Grade standards	Official standards established by FGIS.	Official standards established by Junta.	Official standards are not used in export. Quality is based on Association Nacional dos Exportadores de Cereais contract.	No official standards. Only official quality criteria are requirements for intervention mechanism.	Grain standards established by Canadian Grain Commission.	Official standards established by Department of Primary Industry.

SOURCE: Office of Technology Assessment, 1989

riety approval and release must take into account quality as well as agronomic criteria. And quality is given equal weight with agronomic criteria for approval of new varieties. Argentina and Brazil also have formal structures for release of new varieties, but currently give more weight to agronomic criteria than quality. Improving yields in these countries is more important than quality improvement at present. But the mechanism is in place to consider quality criteria when it becomes necessary. The United States stands alone as the only major grain exporter with no State or Federal Government involvement in release of new varieties. The U.S. market largely determines the varieties adopted.

Grain Receival Standards

Another common characteristic of most exporters concerns receival standards. All countries except the United States have minimum quality standards that must be met for grain to be accepted at the first point of receipt. Grain that does not meet these standards is rejected, and is diverted to the feed market in most countries. However, the United States accepts all qualities of grain into the market channel, with appropriate discounts for low-quality grain. Uniformity of quality is more difficult to attain without minimum receival standards and provides the incentive for blending discussed earlier.

Marketing by Variety

In some countries grain is identified in the marketplace by variety, which is used as a proxy for end-use value. France and Australia are the countries that use variety in the marketing of wheat most extensively. Farmers in these countries must declare in an affidavit the variety of wheat marketed at the first point of receipt. France and Australia use variety to facilitate the segregation of wheat by class. The United States has no mechanism for variety identification.

Grain Inspection Authority and Grade Standards

Most of the countries have official standards established by the Government and the inspection of grain is conducted by a Government agency. Brazil and France are major exceptions. France has no official standards or Government involvement in grain inspection. Quality standards have been established by state and national agencies in Brazil but domestic and export trade is based on a contract under the Association Nacional dos Exportadores de Cereais. In France the quality requirements for the EC intervention mechanism provide the minimum standards. Private agencies in both countries provide grain inspection services.

GOVERNMENT POLICIES AFFECTING GRAIN QUALITY

As discussed in previous chapters, government policies on agriculture play a major role in determining the importance of quality in the market. These policies differ considerably among the grain exporting countries. The most important policies affecting quality include price policy and farm storage (table 10-5).

Price Policy

Price policy and the signals it sends through the market vary among the exporters. At one extreme is the United States. Through its loan

program, premiums and discounts are established for major grains, but as discussed earlier the level of the premiums and discounts has not reflected market conditions since the 1960s. In addition, economic analysis clearly shows that the price signals of the loan program favor yield over quality (see ch. 9). At the other extreme, the Argentine Government provides a minimum price and establishes premiums for high-quality grain. The grain industry of Argentina produces and conditions grain for the best quality grade. Brazil, France, Canada, and Australia also have Government price policies

Table 10.5.—Comparison of Government Policies Affecting Grain Quality of Major Grain-Exporting Countries

Policy	United States	Argentina	Brazil	France	Canada	Australia
Price	Loan rate is principal price policy. Includes premiums and discounts for major grains but has not been responsive to market conditions.	Government establishes minimum prices for farmers and exporters. Government also establishes premiums for high-quality grain.	Government establishes a minimum price prior to planting. It is adjusted during the crop year to account for inflation and political pressure.	Key policy is European Community intervention price, which includes premiums and discounts for quality factors. Lower qualities of wheat equated to feed values.	Initial producer price is the principal price policy. Separate prices established for each grade of grain. Lower qualities of wheat equated to feed values.	Guaranteed minimum price (GMP) is key price policy. It is established by class and provides differentials for quality. Lower qualities of wheat equated to feed values
Farm Storage	Farm policy in past decade has encouraged extensive on-farm storage and inter-year storage	Government policy through pricing does not encourage on-farm or inter-year storage	No Incentive for farmers to store on farm.	Farm policy through the Common Agricultural Policy (CAP) has not encouraged development of extensive on-farm storage. Also relatively limited inter-year storage due to CAP.	Producer deliveries are regulated to primary elevators via quotas. On-farm storage is substantial.	Use of GMP provides no Incentive for delivery in post-harvest period, leading to minimal use of on-farm storage.

SOURCE Office of Technology Assessment, 1989

that include quality incentives for the grain industry.

Farm Storage

Government policies also influence the amount of on-farm storage. Most countries do not have policies that encourage on-farm storage and/or inter-year storage. The exceptions—Canada and the United States—do have incentives for such storage. But there are differences. Canada establishes quotas to regulate farmer

deliveries to primary elevators. On-farm storage therefore is a requirement. However, grain is moved through the system during the marketing year. In contrast, the United States has encouraged extensive on-farm storage through the loan program and farmers' reserve. In addition, it is unusual to market the entire crop in any one year. Indeed, it is more common for grain to be stored on-farm for more than a year, creating more potential for quality problems to develop.

COMPARISON OF U.S. INSTITUTIONS, POLICIES, AND TECHNOLOGIES WITH THOSE OF OTHER GRAIN-EXPORTING COUNTRIES

This final section focuses on the major differences between the U.S. grain system and that of other countries. No one system is ideal. Only by understanding how the U.S. system compares with other exporters is it possible to begin considering potential changes here to enhance quality.

As noted, from a technological standpoint few differences exist among the countries. The major differences revolve around exporters' institutions and policies regarding grain quality which influence how these technologies are applied.

Policy

The United States has a farm price policy that affects grain quality in at least two ways: it provides economic incentive for yield v. quality, and it provides economic incentive for on-farm storage. This stands in contrast to other countries. As indicated in chapter 9, premiums and discounts are not reflective of market conditions. Even with price differentials, the economic incentive is for yield, and low-quality grain moves into government loan storage program.

On-farm storage is a unique characteristic of the U.S. and Canadian systems. The other coun-

tries do not provide incentives for on-farm storage. This allows grain to enter the market channel with a better likelihood that it will be handled and stored with a minimum of quality deterioration. In fact, Australia has built its entire system around the concept of controlling the grain as soon as possible off the farm to maintain quality. However, another distinguishing characteristic of the U.S. system is that grain has the potential for carry-over from one year to the next, sometimes for as long as 3 to 4 years. Other countries do not have the storage capacity for such carry-over. This forces the marketing of most grain within a year of production and nearly eliminates any problem regarding quality with inter-year storage.

Institutions

The U.S. grain system has three major institutional characteristics regarding quality:

1. lack of a seed variety development and release program,
2. lack of a variety identification mechanism, and
3. no minimum receival standards for grain.

These major, fundamental differences from other grain-exporting countries have a considerable influence on quality.

Seed Variety Development and Release

Chapter 6 discussed in detail the plant breeding programs for corn, soybeans, and wheat in the public and private sector of the United States. There is at best a loose mechanism for the development and release of new varieties. Committees, particularly at land-grant schools, can evaluate new varieties. But there is no State or Federal involvement in any formal way. Government basically gives no formal signal as to the criteria for release. The signal comes indirectly through the price support program, which emphasizes yield and the agronomic characteristics to achieve higher yields. In contrast, Governments of other countries have formal input into the criteria for development and release and they formally approve new varieties. Quality is a major criteria they consider in the release of new varieties, at least for wheat,

Variety Identification

In some countries, mainly France and Australia, not only is variety controlled for use by farmers but variety is also important as a proxy for end-use value. An important feature of the French marketing system is that variety is often a contract term. In practice, varieties are specified as either an individual variety, a category of varieties, or excluded varieties. Given that varieties are in general not usually distinguishable by visual inspection, various mechanisms are used at the first point of receipt to assure the integrity of variety specification. First, in most cases, the cooperative receiving the grain in France has sold the seed to the producer and knows its variety. Second, producers must declare the variety at the time of sale via an affidavit. Third, the buyer can perform a rudimentary testing procedure or request an electrophoresis test from a laboratory to verify the variety. By knowing the varieties at the time of receipt, country elevators are capable of binning by varieties, or categories of varieties, and of selling on that basis. The United States has no mechanism for variety identification and instead relies on grade structure for segregating quality, which is becoming more difficult as

new varieties, especially of wheat, are not easily distinguishable.

Grain Receival Standards

As noted earlier, the United States is the only country that does not have minimal receival standards for grain. Producers can deliver any quality of grain and it will be accepted with appropriate discounts. Other countries would not allow this. Grain that does not meet the established minimum quality may be rejected at the first point of sale. Keeping low-quality grain out of the market channel eliminates most quality problems at the export elevator and reduces the opportunity for blending diverse qualities. Once low-quality grain is in the system it is much more difficult to keep it segregated from higher quality grain or to keep it from being blended with such quality grain destined for export.

Technologies and Grain-Handling Practices

The policies and institutional structure of the U.S. grain system provide the framework for various grain-handling practices. The technologies for producing and handling are quite similar everywhere. The main difference is that the United States is slightly more efficient in their use. Differences do exist, however, as to when the technologies are used in the marketing channel,

A case in point is cleaning. Most countries except the United States clean grain at the first point of receipt. Canada and Australia are two exceptions, but for different reasons. Canada, however, is studying the economic feasibility of cleaning grain in the country versus at export and will probably change. Australia does not clean because unlike in the United States, the farmers deliver grain that does not need to be cleaned. Basically, no economic incentive exists to clean grain at the first point of receipt in the United States.

The other major handling practice in which the United States differs from all other ex-

porters is blending. Blending of grain over wide margins of quality to create a uniform product for sale is necessitated by the lack of any minimum receival standards. Blending does exist elsewhere, but not to the same extent. Blending in other countries is done over narrow ranges in quality. These countries basically have a uniform quality moving through the system at any point in time. The U.S. system lacks

uniformity in quality throughout the market channel. When grain reaches export, blending is used in an attempt to produce a uniform quality meeting the buyer's specifications. The OTA survey of foreign and domestic buyers of U.S. grain clearly indicated that lack of uniformity between shipments is buyers' biggest complaint (see ch. 4).