

1963

## EC63-822 Wheat, People and the Plains - Supply, Demand and Market Price of Wheat

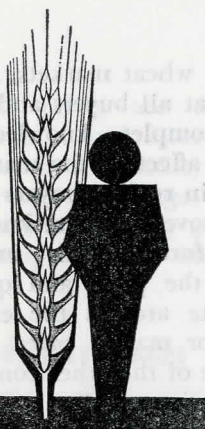
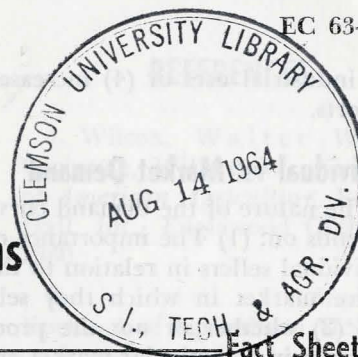
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# Wheat, People and the Plains

Fact Sheet II

## Supply, Demand and Market Price of Wheat

Why should the price of wheat be \$2 or \$1.50 or \$1? Why does the price drop to \$1 or \$1.20 if we produce a crop of 1.5 billion bushels? Why does it rise if we have a crop of 800 or 900 million bushels?

The interaction of sellers (producers) and buyers (consumers) results in the market price for a commodity. However, there are many forces that buyers and sellers take into consideration in arriving at the market price.

In this section we'll look at the forces that help determine the market price for wheat.

Let's begin with a simplified "scale model" of an economic system that will show how wheat prices would be set under conditions of a "completely free market" or perfect competition. Later we'll introduce more of the factors affecting wheat prices in our marketing system. This will help us move from our "model" to a situation which more fully explains wheat prices.

### DEMAND

Demand for a product is defined as the various quantities that consumers will take off the market at all possible alternative prices in a given period of time, other things being equal.

If we hold constant all the factors—except price—that affect consumers' desire for a product, we can take a less complicated look at the effect of price alone. Generally the higher the price of a product, the less will be purchased and vice versa.

To make this point a little clearer, let's refer to our "scale model" wheat market. If we were to charge \$2.50 per bushel, we

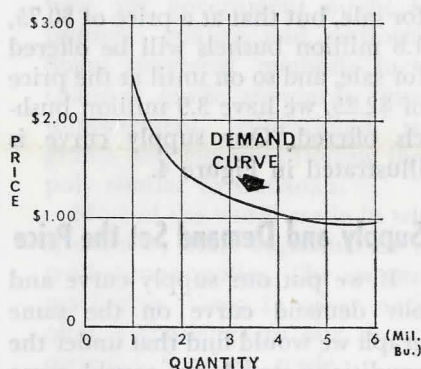


Fig. 1. Demand curve for "scale model" wheat market.

could sell only 1 million bushels. However, if we priced wheat at \$2.25, we could sell 1.1 million bushels. We find that if wheat is priced lower and lower, we can sell more and more until, at a price of \$1, we are able to sell 6 million bushels.

We have used these price-quantity relationships to produce the demand curve shown in Figure 1. The graph on which the demand curve is drawn has the quantity shown along the bottom. Price is illustrated on the side. Demand curves usually slope downward and to the right.

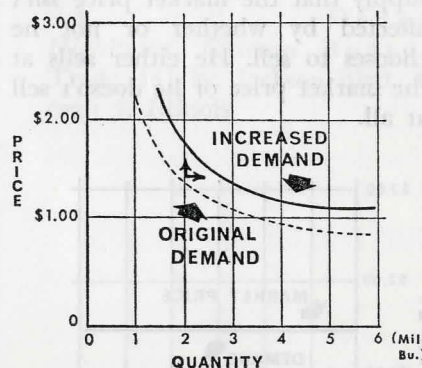


Fig. 2. Example of increased demand in "scale model" wheat market.

### Changing Demand

We haven't changed demand by pricing our wheat lower in order to sell more. There has simply been a movement along the same demand curve. This movement is distinctly different from the movement that might occur if we increased our market area, or undertook an advertising campaign, or if the people in the market area should suddenly have a sharp change in income. Changes of this sort would likely cause an increase in demand, such as is shown in Figure 2.

**Demand Shifters:** If we want to increase demand for wheat, we must be concerned with the things which shift demand. Demand shifters that might increase demand for wheat would be one or more of the following: (1) Increased domestic consumption for food, (2) increased domestic consumption for feed, (3) increased domestic consumption



for industrial uses or (4) increased exports.

## Individual vs. Market Demand

The nature of the demand curve depends on: (1) The importance of individual sellers in relation to the entire market in which they sell, and (2) whether or not the products sold in a particular market are similar.

Demand facing an individual wheat producer is quite different from demand faced by the total of all wheat producers. He furnishes such a small part of the total wheat supply that the market price isn't affected by whether or not he chooses to sell. He either sells at the market price or he doesn't sell at all.

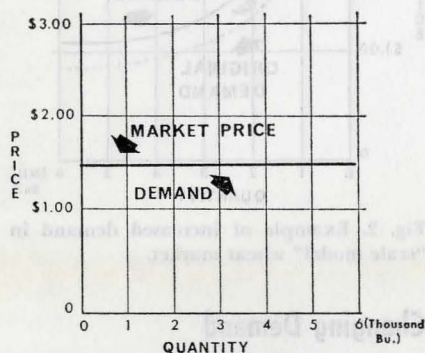


Fig. 3. Demand faced by an individual seller under pure competition. Note that quantity is just a fraction of the total in other demand examples.

The demand faced by an individual wheat farmer looks like Figure 3. He can sell none, all, or only a part of his wheat at the market price—whatever it may be—on a particular day. Of course, he could sell his grain at a price below the market price, but this would not be in his best interest, so he sells at market price.

So far we've seen only half of what makes market price. Let's look at the supply side of the picture.

## SUPPLY

Supply of a product is defined as the various quantities of a product that sellers will place on the market at all possible alternative prices in a given time period, other things being equal.

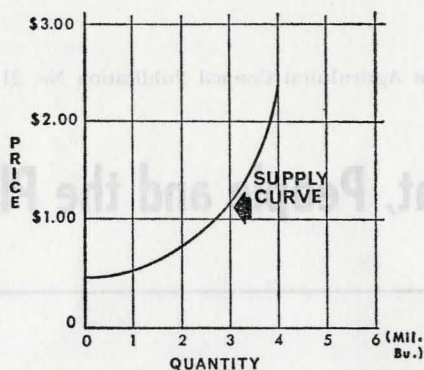


Fig. 4. Supply curve for "scale model" wheat market.

Usually the supply curve will be upward and sloping to the right, since a higher price will persuade sellers to place more of a product on the market and may encourage other producers to come into the field.

Again, let's look at our "scale model" wheat industry. Let's assume that at a price of \$0.50 per bushel no wheat would be offered for sale, but that at a price of \$0.75, 1.8 million bushels will be offered for sale, and so on until at the price of \$2.25, we have 3.9 million bushels offered. Our supply curve is illustrated in Figure 4.

## Supply and Demand Set the Price

If we put our supply curve and our demand curve on the same graph we would find that under the conditions stated, we would come up with a market price of \$1.25 per bushel and have 3 million bushels supplied to satisfy the requirements (Figure 5).

To arrive at this price and quantity as illustrated in our "scale

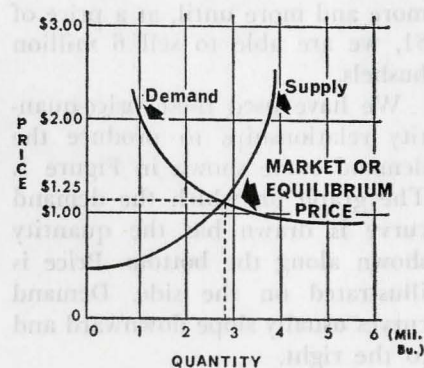


Fig. 5. How supply and demand set price in "scale model" wheat market.

model" wheat markets, it is necessary that all buyers and all sellers have complete knowledge of all factors affecting the market.

But in reality, buyers and sellers don't have complete knowledge of these forces. This imperfection causes the price and quantity to fluctuate around the equilibrium point or market price. Let's look at some of the other considerations in adapting our "scale model" supply-demand information to the existing marketing situation.

## ADAPTING THE "MODEL" TO THE "ACTUAL" MARKET

Farmers are sometimes reluctant to cut back production. This may be because they have high fixed costs in farming operations or because there isn't any suitable alternative enterprise. A North Central State's study recently concluded that, "Production will persist through a long unfavorable period and will decline sharply or stop when producers either can no longer produce, or when they find income earning opportunities more favorable than those in agriculture."

As we begin to adapt our model to the market situation, we find that the total demand for wheat is made up of separate demands for domestic food, seed, feed, and industrial uses, plus an export demand.

Let's look at these demands separately and then combine them to see where they fit in the total demand picture. In looking at these uses of wheat, we encounter a concept which we haven't mentioned before. It's called "elasticity of demand" and refers to the percentage change in amount of a product purchased in response to a given percentage change in price.

## Elasticity of Demand

If a 10 percent rise in price results in less than a 10 percent reduction in the amount purchased, we speak of the demand as being inelastic. If, on the other hand, a 10 percent increase in price results in a reduction of 11 or more percent in the amount purchased, the demand is referred to as elastic.



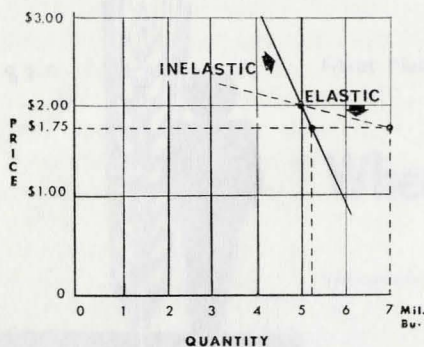


Fig. 6. Example of inelastic and elastic demand.

An estimate of whether the demand for a product is elastic may be obtained by comparing the total returns from the sale of the product before and after a price change. In the example, in Figure 6, with price at \$2.00, the amount sold is 500 million bushels—resulting in a total return of \$1 billion. If instead, the price had been \$1.75, 525 million bushels would have been sold—with total returns of \$919 million. Thus, the total revenue would have been less with the lower price, indicating an inelastic demand.

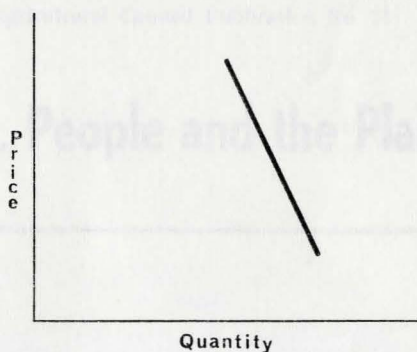
In the second example, with the price at \$2.00, 500 million bushels are sold—yielding a total return of \$1 billion. If the price had been \$1.75, then 700 million bushels would have been marketed—giving total returns of \$1.225 billion. In this case, lower price would have resulted in increased total returns so the demand is elastic.

There are a number of factors which affect the elasticity of demand for a product. One of the most important of these is whether or not the product is viewed as being a necessity. Others include the number of close substitutes available and the price or cost of the item in relation to the amount of money the budget has to spend.

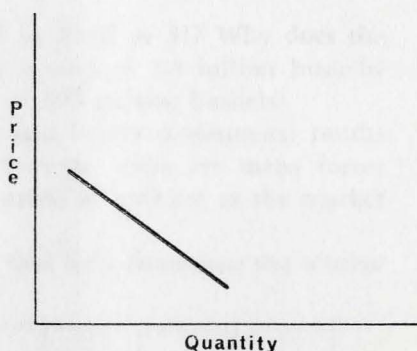
### Basic Demands for Wheat

As we apply these factors of demand to wheat, we can see why it is useful to differentiate between wheat for domestic food and other uses. Wheat for domestic food is a staple commodity which most people view as a necessity and for which there is no good substitute.

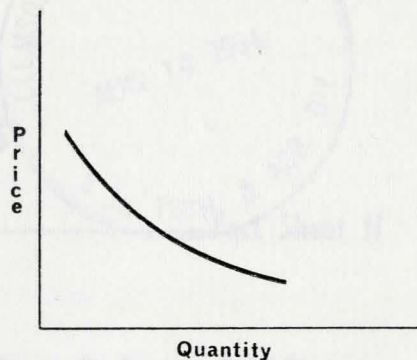
Fig. 7. The total demand for U. S. wheat is made up of differing demands for the various uses of wheat. The more vertical the curve, the more inelastic the demand.



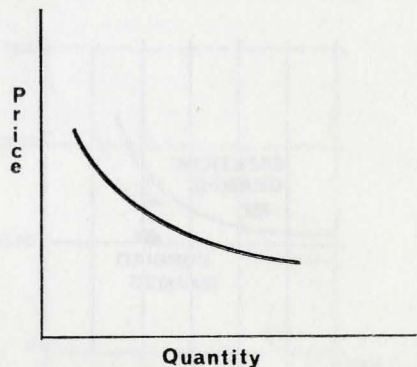
7a. Demand for wheat as domestic food.



7c. Demand for wheat for industrial uses.



7b. Demand for wheat as livestock feed.



7d. Export demand for wheat.

Therefore, the demand is inelastic (Figure 7a).

The market for wheat for feed, on the other hand, is somewhat elastic in the lower price range. At present prices, wheat is practically priced out of the feed market. But if prices should fall low enough so that wheat is priced competitively with feed grains, then a considerable amount of wheat might be moved into this use (Figure 7b).

The amount of wheat used industrially has been much lower than that consumed as food. Industrial demand may be elastic (Figure 7c). Substantial use of wheat for industrial purposes depends upon its being competitive with other sources of raw material. This has not been the case—except during World War II when the Federal government heavily subsidized some such operations.

Export demand for wheat has been greatly influenced by U.S. and foreign governmental policies. If we did not have these governmental policies, we would find that the price of U.S. wheat for export would be near the world wheat

price level. Demand would be elastic (Figure 7d).

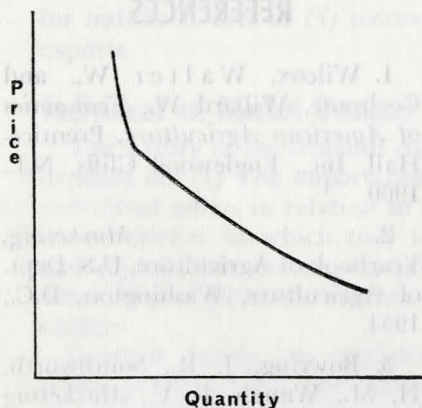
With domestic price support programs, but without programs to increase exports, U.S. wheat would be priced above the world wheat price, and foreign importers would seek more favorable purchases from other exporting nations. Conversely, if our price were below the world wheat price, we would attract buyers from the other countries until their prices also came down, assuming worldwide free trade.

### Total Demand for Wheat

When demands for the four uses above are combined, they reflect the total demand for wheat (except seed) and result in a demand curve which is relatively inelastic in the higher price range (influenced by demand for wheat as domestic food). As the price falls, total demand becomes more elastic (as purchases for the other purposes come into the picture). Combined demand is shown in Figure 7e.

By introducing the factors which affect supply of and demand for





7c. Combined demand for wheat.

wheat, we've attempted to show how they differ from our first simple "model." The importance of these factors will become evident in a later discussion dealing with alternatives. They also have application in the discussion dealing with the marketing system which follows.

## THE MARKETING SYSTEM

We have reviewed the role of pricing as it guides the production, distribution, and consumption of wheat. It is within the marketing system that pricing takes place. Let's look at the marketing system in more detail.

Marketing includes assembling, transporting, grading, pricing, distributing, storing, processing, financing, and risk bearing.

Demand expansion is considered a partial solution to the present wheat problem. Regardless of the potential for increasing usage of wheat, any success will depend heavily upon our marketing system. In this connection governmental agencies and grower organizations are thought of as part of the system.

### Assembly

When wheat leaves the farm, the first assembly point is usually a country or sub-terminal elevator. Ideally, the country elevators receive, grade, price, segregate, and store wheat for sale on the basis of end-use quality. In recent years—especially in the hard winter wheat areas—country elevators have become important storage warehouses, mainly for wheat under government loan. Emphasis on storage has tended to lessen their effec-

tiveness as wheat merchandisers. Few country elevators have adequate facilities for keeping the many grades of wheat segregated.

Wheat quality begins on the farm. Unless producers follow recommended cultural and harvesting practices, wheat quality improvement will be difficult—if not impossible. To improve farm-level quality, it's likely that greater price incentives for quality will be required—as well as educational programs.

Marketing firms, in turn, will need to secure economic gains if they are to create quality incentives for farmers and to develop better handling facilities and practices. It is vital that all firms that handle wheat in the marketing system work toward maintaining and improving quality of wheat as it moves through marketing channels. An alternative to price incentives may be loss of market due to competition.

We could well consider a question at this point: **What happens to the quality, value, and price of wheat as it leaves the farm and moves through marketing channels? Why?**

### Transportation

To the Plains, access to world markets is an absolute necessity if we are to sell wheat in quantities approaching present production. Transportation rates figure heavily in the competitive position of the Plains, compared with other producing areas.

Being in the middle of our country doesn't add up to a competitive advantage for the Plains. It really means we are further from the ultimate consumers than if we were located nearer centers of large population or terminal market facilities.

Rail rates play a dominant role in determining county loan rates. Here again, Plains wheat farmers are at a disadvantage.

Competition between various forms of transportation—plus new and better facilities—is causing widespread change in wheat transportation costs and direction of movements.

As new technology and competition between carriers change wheat transportation patterns, our whole wheat marketing structure becomes altered. For example, some truckers buy wheat directly from farmers, and by-pass country elevators. Also, recent rail rate reductions for western export movement has encouraged a larger flow of wheat in that direction, instead of to the traditional eastern markets. Truck and barge movements from the Southern Plains to the Gulf are making these market outlets more important than before.

**How do changes being brought about by transportation shifts affect you? Can you see conflict of interest arising between the various market segments?**

### Grading

One of the main purposes of a grading system is to provide a common language between buyer and seller so that prices can be determined more competitively on the basis of quality.

The grading system is especially important in foreign trade. This is because most foreign buyers, especially in dollar markets, rely on U.S. grades as measures of quality. They can't actually inspect or test what they're buying, so all they have to go on is grade.

A common criticism from foreign buyers concerns milling and baking uniformity in our overseas shipments. Our present grading standards don't give an adequate description of how the wheat will perform in the mill and bakery.

The U.S. has the most diverse wheat production pattern in the world. This is why it is so important to define or grade the quality of our wheat more precisely in buyers' terms. If we can do this, it may help importing nations become better customers. (USDA has held hearings on proposed new grading standards.)

It will cost more to grade and merchandise wheat on the basis of more precise quality measurements. **Who should pay this added cost? How can this added cost be recovered?**



## Pricing

Wheat prices are determined through cash and futures trading facilitated by commodity exchanges with levels and ranges of prices influenced strongly by government price support rates and storage policy.

## Commodity Exchanges

All price influences are focused on commodity exchanges by telegraph, telephone, radio, and cable. This information is interpreted, analyzed and acted upon by the traders who buy and sell for their producers, processors, warehousemen, and for their own accounts. Commodity exchanges don't set prices. They provide the facilities for trading.

## Futures Contracts

These are transactions in which the seller agrees to deliver a specified quantity, kind, and grade of wheat at some future date. The buyer, in turn, pays a stipulated price for the futures contract. Futures prices go up and down, along with cash prices. Market reporting services make this information readily available.

## Hedging

One of the principal functions of commodity exchanges is to provide hedging facilities for warehousemen, millers, country elevator operators, or farmers. Hedging is a form of insurance to protect the commodity owner against the risk of price change.

Here's an example: If an October buyer on the cash market wants to hedge, he sells a futures contract at the same time for the same amount of grain. If the price declines in November when he sells the wheat bought in October, he would lose money if it weren't for his hedging operations. But since futures prices also drop when cash prices decline, he can then buy a futures contract for the same amount of wheat, at a proportionately lower price. Thus, he has hedged — or insured — his transaction against loss. When he sells on

the cash market, he buys on the futures market. When he buys on the cash market, he sells futures.

Speculators, on the other hand, assume the risks of ownership in the hope of making profit. They don't hedge their transactions. Speculators help provide a market for those who hedge. They, in effect, gamble on making a profit.

## Effects of Government Policy

Government programs affect wheat marketing in many ways. Price support programs, the International Wheat Agreement, disposal programs (such as P.L. 480, school lunch, etc.), export subsidies, Food and Drug Administration regulations, and USDA grade standards, are the more important government programs affecting the wheat industry.

The experience of Canada in maintaining uniform quality of wheat sold raises the question of how our government might help improve quality and uniformity. Some suggested methods include changed grade standards, quality improvement, educational programs, and legalized trading monopoly similar to Canada's.

Most of the world trade in wheat is done by State regulated or controlled monopolies. The systems of marketing wheat in other nations offer a challenge to our privately owned U.S. wheat trade.

## QUESTIONS FOR DISCUSSION

Is our present system of grain marketing the best system—or are some modifications needed?

Should we develop a system something like the Canadian Wheat Board?

Should we make it possible for traders to form pooling arrangements, exempt from anti-trust action?

Are there other alternatives?

What are their advantages and limitations?

What economic and political problems arise when the price of wheat (or any other product) is set above the equilibrium price? Refer to Figure 5.

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This publication is one of five in a series, "Wheat, People, and the Plains" prepared by the following Agricultural Economists from the Land Grant Colleges or Universities of the Great Plains States: Raymond C. Stack, Colorado; Robert J. Bevens, Kansas; William Ewasiuk, Montana; Everett E. Peterson, Nebraska; Norbert A. Dorow, and H. W. Herbison, North Dakota; James R. Enix, Oklahoma; Thomas D. Aaron, Texas; Earl Moncur, Wyoming. E. Dean Vaughan served as chairman of the group while an economist at Montana State College and continued as a consultant after joining the staff of the Federal Extension Service, USDA. S. Avery Bice, associate director, Colorado, served as administrative advisor. Donald W. Dickson, information specialist, FES, was editorial consultant to the committee.

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An estimate of whether the demand for a product is elastic may be obtained by comparing the total revenue from the sale of the product before and after a price change. In the example in Figure 1, with price at \$2.00, the amount sold is 500 million bushels, giving a total revenue of \$1 billion. If instead the price had been \$1.75, 550 million bushels would have been sold, with total revenue of \$962.5 million. Thus the total revenue would have been less with the lower price, indicating an inelastic demand.

In the second example, with the price at \$2.00, 500 million bushels are sold, yielding a total revenue of \$1 billion. If the price had been \$1.75, then 700 million bushels would have been sold, giving total revenue of \$1,225 million. In this case, lower price would have resulted in increased total revenue, so the demand is elastic. There are a number of factors which affect the elasticity of the demand for a product. One of the most important of these is whether or not the product is a necessity. Other factors include the number of close substitutes available and the price of related items in relation to the demand for money. The budget line is used to measure the elasticity of demand.

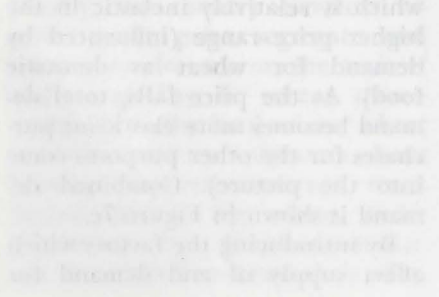
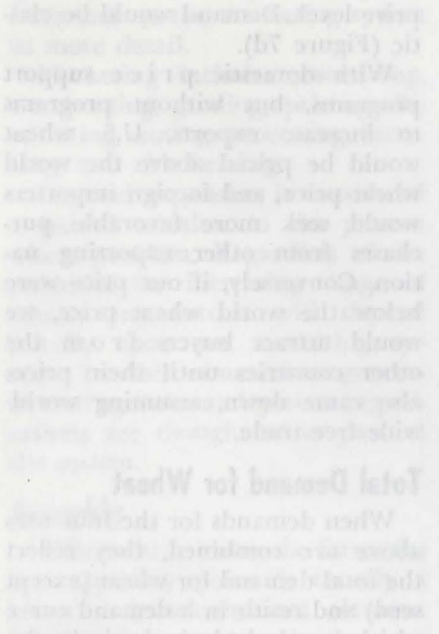
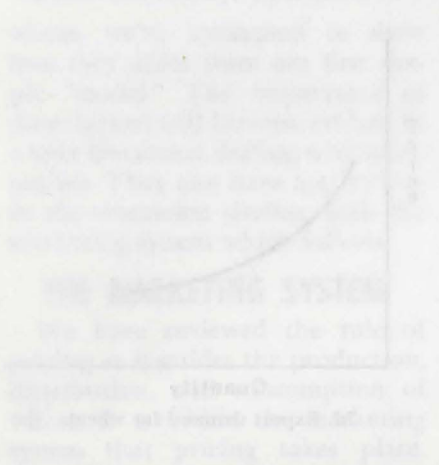
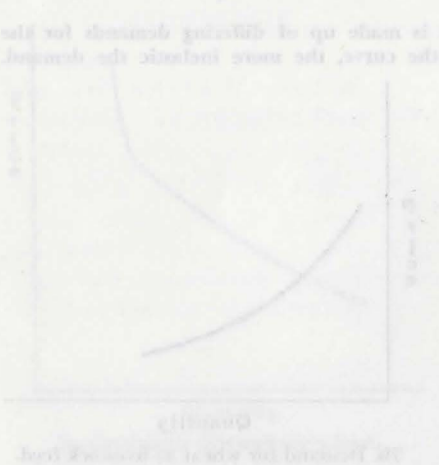
As we apply these factors to the demand for wheat, we can see why it is useful to distinguish between demand for domestic food and other wheat for domestic food. First, the demand for wheat is not a necessity, and the price of a substitute, such as corn, which there is no good substitute for, is not too high.

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