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U.S. Peanut Industry

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Summary

The United States, with 25 percent of world peanut exports and 10 percent of world peanut production, is the leading peanut exporter and the third largest producer; only India and China produce more. Canada, France, and the United Kingdom are the largest markets for U.S. peanut exports. Peanuts are the ninth most valuable cash crop grown in the United States—the 1981 crop had a farm value of just over $1 billion.

This report gives the most recent data available on the U.S. peanut industry, including peanut production, uses, trade, and Government programs (including changes in the 1981 farm bill) affecting peanut producers.

While most countries raise peanuts for oil, U.S. peanuts are raised chiefly for food. Peanut butter, practically unavailable outside the United States, accounts for nearly a fourth of the U.S. peanut crop; other food uses account for a quarter; exports for a quarter; and meal, oil, and farm losses account for the rest. U.S. peanut consumption doubled over the last 30 years, rising to nearly 2 billion pounds in 1977-79. Consumption rose from 6.5 pounds per person in 1950 to about 9 pounds today.

U.S. peanuts are grown on about 1.5 million acres, in rather small plots (50-acre average), concentrated in Alabama, Florida, Georgia, North Carolina, Oklahoma, Texas, and Virginia. Georgia leads all States with 43 percent of U.S. production. While the total acreage planted to peanuts has remained virtually constant since the early fifties, production has more than doubled because average yields nearly tripled.

The average peanut yield in 1981 soared to 2,668 pounds per harvested acre, compared with 898 pounds in 1950. Much of the yield increase has been due to improved varieties and improved farm practices. In particular, a new variety, Florunner, has been responsible for much of the yield increase since its introduction in the early seventies.

Until recently, U.S. peanut production was strictly regulated by Government-controlled acreage allotments and price supports. The 1981 farm bill discontinued the acreage allotments altogether but continued the two-tier price support policy first adopted in 1977 farm legislation. Now, any U.S. farmer may grow peanuts for export and peanuts for domestic oil and meal uses. Peanut production for domestic edible use is still controlled, however, and limited only to those farmers who held quotas in 1981. In addition, price supports for peanuts produced under quota (called quota peanuts) are considerably higher than those produced without quota. The volume of peanuts covered by the quota is scheduled to decline by nearly 25 percent between 1981 and 1985.

The United States grows four types of peanuts:

- *Runner,* 60 percent of which go into peanut butter. Kernels odd in shape and size. Dominant variety grown, accounting for 68 percent of total U.S. production. Grown mainly in Georgia, Alabama, and Florida.
- *Virginia,* account for most of the peanuts roasted and eaten out of the shell (ballpark peanuts). Large kernels. Account for 20 percent of total U.S. production. Grown mainly in Virginia and North Carolina.
- *Spanish,* used primarily for peanut butter, salted nuts, and confectionaries. Small kernels and higher oil content than other types. Account for 11 percent of total U.S. production. Grown mainly in Texas and Oklahoma.
- *Valencia,* sweeter than the others, usually roasted for eating out of the shell. High quality; excellent to grow for home use. Three or more small kernels per pod. Account for about 1 percent of U.S. production. Grown mainly in New Mexico.

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Abstract

The United States, with 25 percent of world peanut exports and 10 percent of world peanut production, is the leading peanut exporter and the third largest producer; only India and China produce more. U.S. production has nearly doubled since the early fifties, chiefly because of increases in yields. Most peanut consumption in the United States is for food, especially peanut butter, whereas most foreign countries use peanuts for oil. Canada is the leading importer of U.S. peanuts.

Keywords: Peanut industry, peanut production, peanut marketing, consumption, world trade, production costs, government programs.

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Introduction

With a 1981 farm value of over $1 billion, peanuts are the Nation's ninth largest cash crop and one of the most versatile: peanuts can be used for food, oil, and feed. The United States is the world's third largest peanut producer (behind only India and China) and the world's leading peanut exporter. This report gives the most recent data available on the U.S. peanut industry—peanut uses, production, and trade— and how Government programs, including modifications in the 1981 farm bill, affect peanut farmers.

Peanuts are a nutritious, high-protein food that are ready to eat with little preparation or can be eaten raw. They can be easily processed by roasting and can be ground into many food products. Most U.S. peanuts are used for food, chiefly peanut butter, while most foreign countries use peanuts chiefly for oil. U.S. peanut production and consumption for food nearly doubled over the last 30 years, although peanut acreage has remained nearly constant, at about 1.5 million acres.

Peanuts are the seeds of an annual legume that grows close to the ground and bears nuts below ground (hence the term "groundnuts" in some countries). The papery pods range from about three-fourths inch to 2 inches long and usually contain two kernels, although some varieties have three or more. The kernel consists of two halves (cotyledons), and a heart (germ) enclosed in a thin skin (testa).

The original place of cultivation of the peanut *(Arachis hypogaea* L.) was probably South America *(6).*[1] Peanut culture spread from this hemisphere to Europe, Asia, both coasts of Africa, and the Pacific Islands. Most evidence indicates that the peanut was brought to the United States from Africa by slave traders, but one can only speculate on the time and place of its introduction into this country.

An article in the 1925 Yearbook of Agriculture indicates that Thomas Jefferson spoke of peanut culture in Virginia in 1781*(4).* However, peanuts did not become a commercial crop of any importance until about the time of the Civil War. During the early years, production was confined largely to Virginia and North Carolina. The development of equipment for producing, harvesting, and shelling peanuts, as well as new processing techniques, contributed to expansion of the peanut industry around the turn of the century. According to the U.S. Census of Agriculture, total acreage increased from 398,000 acres in 1899 to 1,125,000 in 1919. Alabama and Georgia accounted for 48 percent of total U.S. acreage in 1919, the Virginia-North Carolina region had 23 percent, and Texas had 15 percent.

The increased demand for peanut oil and food during World War I contributed to increases in production during the war years. With the postwar period's emphasis on diversified farming in the South, in contrast to a system largely dependent on cotton, peanuts became a substitute for cotton as a cash crop.

During World War II, the demand for peanuts for oil, food, and feed induced additional expansion in production, largely through increases in the acreage planted. Food uses were mainly peanut butter, salted peanuts, and peanut candy. After the war, particularly in 1960-80, substantial production increases occurred, due largely to improvements in yield.

U.S. peanuts are grown in the Southeast (Georgia, Florida, and Alabama), the Southwest (Texas and Oklahoma), and an area spanning the Virginia-North Carolina border (fig. 1). In 1981, the Southeast produced 61.2 percent of total U.S. production, the Southwest produced 14.9 percent, and Virginia-North Carolina produced 22.1 percent.

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[1]Italicized numbers in parentheses refer to sources cited in the References (p. 23).

Over the last 30 years, the Southeast's share of peanut production grew considerably, the Southwest's share remained relatively stable, and the Virginia-North Carolina share dropped significantly:[2]

	Percentage of U.S. production	
	1950-52	*1979-81*
Southeast	51.0	61.5
Southwest	16.2	17.5
Virginia-North Carolina	31.2	18.9

Georgia leads all States in peanut production, with 42.4 percent of total U.S. production for 1979-81. Production in other States in the same period was 14.2 percent in Alabama, 11.7 percent in Texas, 11.9 percent in North Carolina, 7.0 percent in Virginia, and 5.8 percent in Oklahoma. Those six States accounted for 93 percent of the peanut production in 1979-81, and 94.1 percent of the acreage harvested.

Peanut Use

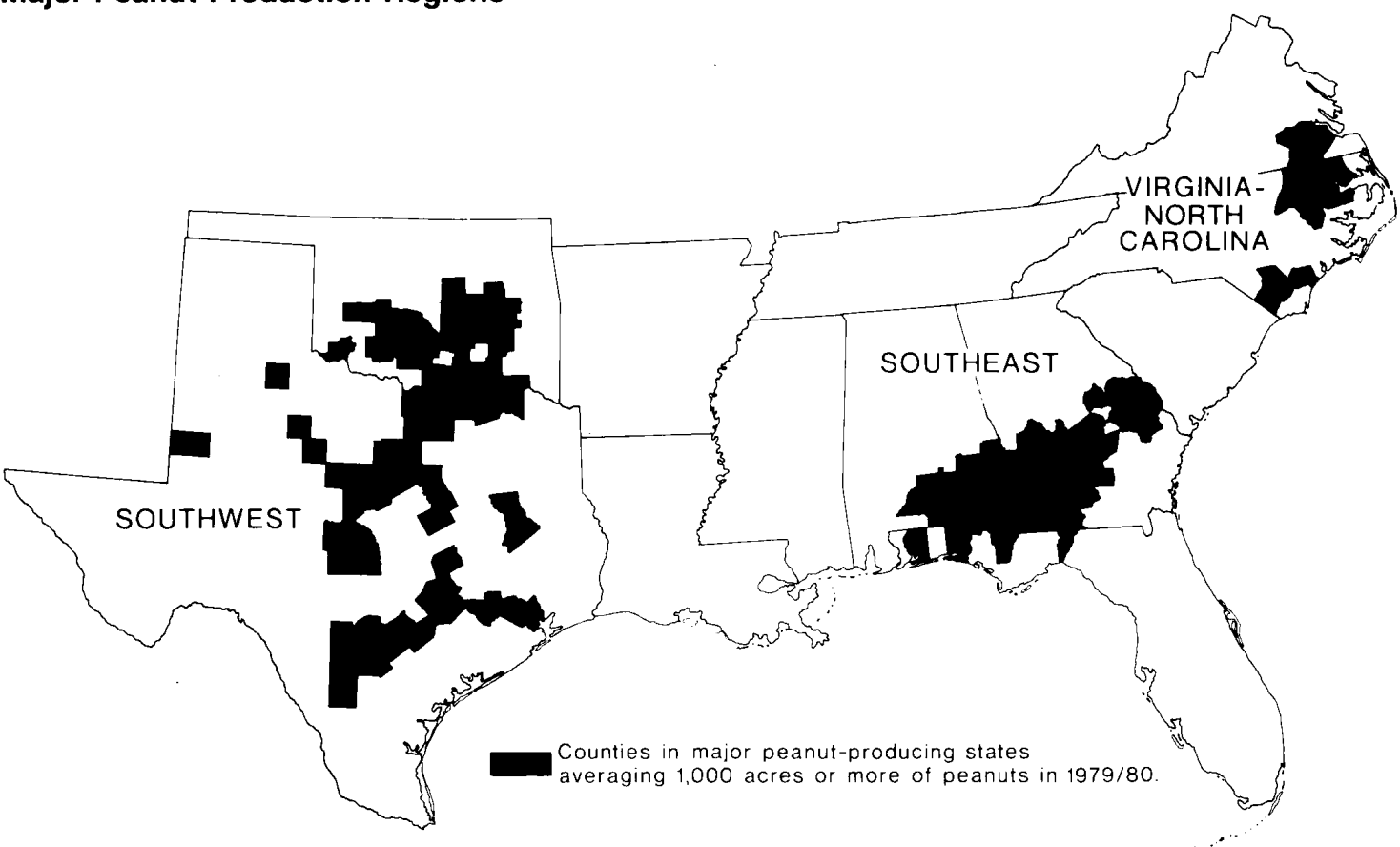
Processing of peanuts for human food usually includes the following steps after the farmer lifts them from the soil: removal of stones and other foreign matter; grading in shell; removal of shell; removal of peanuts that are shriveled, off-color, or otherwise unsatisfactory (commonly called pick-outs); and grading for size and other factors.[3] In many food applications, such as making peanut butter, the skin is removed both because it imparts off-colors and because the tannin in the skin makes the product bitter. The small peanut germs or hearts (so named because of their shape) located at one end of the kernel are also frequently removed when making mild-flavored products because they impart a gray color and a

[2]Mississippi, New Mexico, and South Carolina also produce a small amount of peanuts (about 2 percent in 1979-81).

[3]For information on the number and size of peanut-processing plants, see *(9, p. 22)*.

Figure 1

Major Peanut Production Regions



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bitter taste. The heart weighs about 4 percent of total kernel weight, the skin about 3 percent. In many food processes, peanuts are heated to deactivate antinutritional factors and spoilage enzymes. Based on 1970-74 crop averages, a ton of farmers' stock peanuts (that is, peanuts in the shell) yields about 56 percent shelled edibles, 19 percent oil stock (diseased, shriveled, or otherwise unsuited for edible use) and 25 percent hulls.

Peanut consumption as a food in the United States has increased greatly in recent years. On a farmers' stock basis, peanut consumption has nearly doubled over the last 30 years, ranging from an average of 1 billion pounds for the 1950-52 period to 1,954 million pounds for the 1977-79 period (table 1).

Per capita consumption also rose in the last 30 years. Consumption declined following the 1980 crop because of the short crop (due to dry weather) and the resulting higher prices (appendix table 1).

Peanut Use by Type

The four main types of peanuts grown in the United States are Runner, Virginia, Spanish, and Valencia. Each type has special characteristics that affect where it is grown and its food uses. Runners became the dominant type in 1979. Ten years earlier, the Spanish peanut was dominant.

Runner peanuts have become the dominant type because of the introduction in the early seventies of a new variety called Florunner. This variety is responsible for the dramatic increase in peanut yields. Florunner peanuts vary in size and are often oddly shaped, which causes problems in size grading and in marketing for salted use. Runner peanuts are used largely for processing, with 60 percent going into peanut butter (fig. 2). About one-fifth are used in candy. Recently, the larger kernels moved into the whole nut market, and now make up nearly a fifth of the total. Runner peanuts are primarily grown in the Southeast but are becoming more prevalent in the Southwest and Virginia-North Carolina areas.

Table 1—Peanuts used for food (3-year average)

Year beginning August 1	Total supply	Domestic food use	
		Total	Per capita
	—*Million pounds*—		*Pounds*
1950-52	1,995	1,001	6.5
1960-62	2,093	1,268	6.9
1970-72	3,488	1,633	8.0
1977-79	4,471	1,954	9.0

Source: *Fats and Oils Outlook and Situation*, various issues, U.S. Department of Agriculture, Economic Research Service.

Figure 2

Use of Runner Peanuts

(Percent of total edible use)

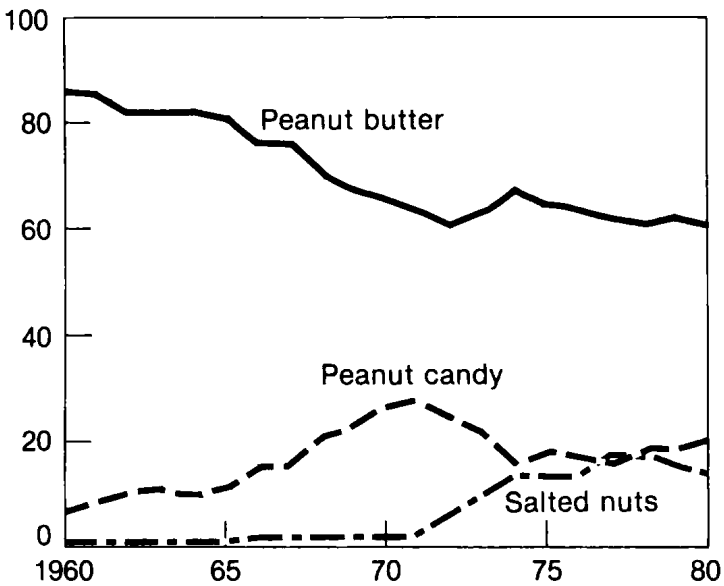
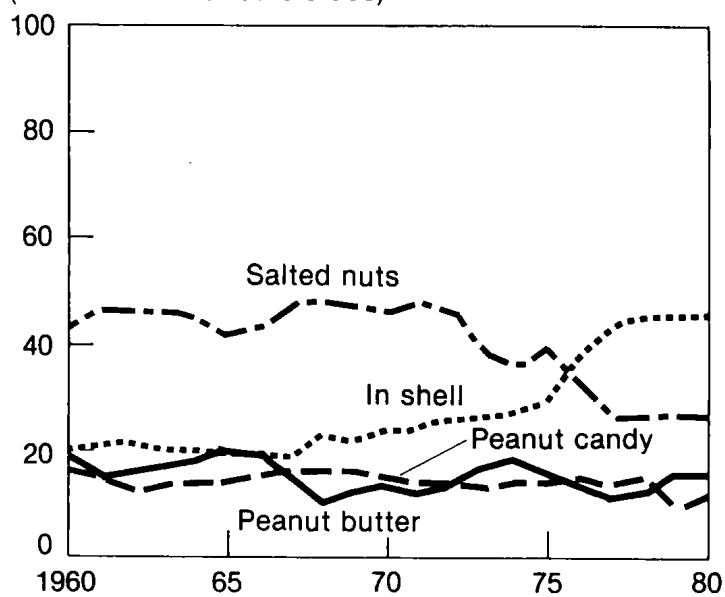


Figure 3

Use of Virginia Peanuts

(Percent of total edible use)



Virginia peanuts have the largest kernels and a red skin. Most peanuts roasted and sold in the shell are Virginia peanuts; that usage accounts for about 45 percent of all Virginia peanuts (fig. 3). When shelled, the larger kernels are sold as salted peanuts, with 24 percent going into this use. They are also used to a lesser extent in confectionary products and peanut butter. Virginia peanuts are primarily grown in Virginia and North Carolina.

Spanish peanuts have small kernels covered with brown skin. This type is about equally divided between the three major uses: peanut butter, salted nuts, and candy (fig. 4). The Spanish peanut has a higher oil content than other types of peanuts; this is an advantage when crushing for oil. Spanish peanuts are produced primarily in the Southwest.

Valencia peanuts usually contain three or more small kernels to a pod. They are very sweet peanuts, usually roasted and sold in the shell. This type is excellent for fresh use or for boiled peanuts. Most Valencia peanuts are grown in New Mexico.

Edible Peanut Uses

Edible products and related uses constitute about half of total U.S. disappearance of peanuts. About a fourth of the peanuts are exported and the remaining fourth are crushed for oil and meal, used for seed and feed, or lost on the farm. These proportions have changed in the last decade primarily because of the increase in exports of edible peanuts.

Total domestic food uses of peanuts are expected to increase at a slightly faster rate than the population during the next 10 years. The average annual rate of increase is projected at 40 million pounds or about 2.5 percent per year. Peanut butter accounted for 47 percent of the domestic use of edible peanuts during the 1977-79 period, compared with 20 percent for salted peanuts and 18 percent for peanut candy (table 2).

The total amount of peanuts going into the three major uses (peanut butter, salted nuts, and candy) has increased considerably in recent years (appendix table 2). Although total consumption has increased sharply, virtually no change has occurred in the share of the total going into the major uses.

Peanut butter is by far the most important product made from peanuts in the United States, but little peanut butter is consumed outside the United States. Peanut butter must contain at least 90 percent peanuts, according to the Food and Drug Administration definition; peanut butter usually contains 2 percent salt. Other ingredients such as hydrogenated oil, emulsifiers, and antioxidants are added to stabilize peanut butter and prevent the oil from separating and rising to the top of the container during storage. Bits of peanuts are added to make chunk-style peanut butter. Numerous peanut spread-type products on the market incorporate other ingredients such as jellies, honey, dried fruit, syrups, and many kinds of

Figure 4

Use of Spanish Peanuts

(Percent of total edible use)

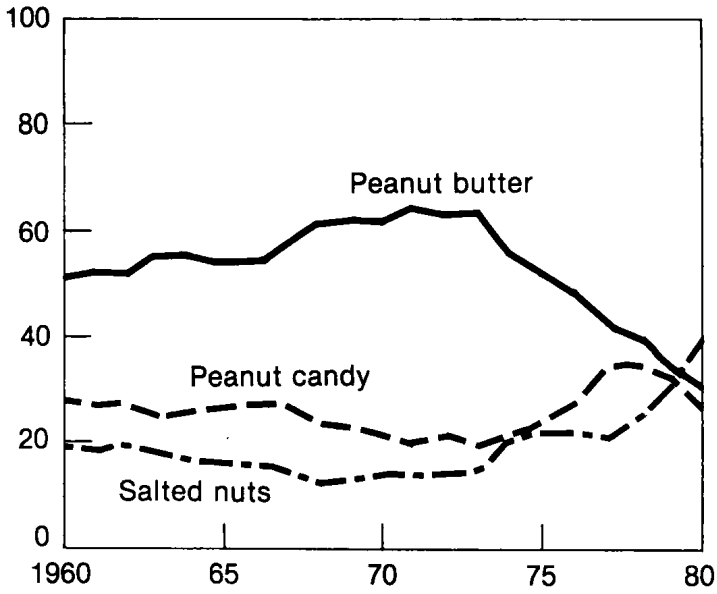


Table 2—Use of edible peanuts

Peanut use	Year beginning August 1			
	1964-66	1970-72	1974-76	1977-79
	Million pounds (shelled basis)			
Peanut butter	486	558	639	663
Peanut candy	179	250	231	254
Salted peanuts	215	245	278	284
Peanut butter sandwiches[1]	22	26	22	29
Other	17	18	16	19
Total shelled	920	1,096	1,185	1,248
Cleaned in shell[2]	69	88	109	151
Total	989	1,184	1,294	1,399

[1]Peanut butter used in sandwich snacks sold commercially.
[2]Factors for conversion of farmers' stock to shelled peanuts for 1964-66 are as follows: 1964, 72.05 percent; 1965, 72.23 percent; 1966, 71.27 percent. For 1967 and subsequent years, a factor of 75.19 percent was used.

Source: *Peanut Stocks and Processing Reports*, 1964-79. U.S. Department of Agriculture, Statistical Reporting Service.

flavors, both natural and synthetic. In 1979, over 85 percent of the peanuts used in making peanut butter were Runner type with Spanish and Virginia types constituting about equal parts of the remainder (fig. 5).

Peanuts used in the manufacture of peanut butter are roasted in revolving drum-type ovens. Salted peanuts, commonly called "salters," may be roasted like those used in making peanut butter; however, they usually are roasted or fried in oil. They are available in whole kernels, split kernels, or chopped nuts, either salted or unsalted. A popular product introduced in recent years is dry roasted peanuts. This product is different from regular dry roasted peanuts in that they are produced by a patented method, the details of which are proprietary information. The resulting kernels have a dull, nongreasy, ashy gray appearance, contain a much lower oil content, and are widely used as a snack item.

Another new product is partially defatted peanuts: blanched (that is, with the skin removed) whole peanuts are squeezed in a hydraulic press, which removes over 50 percent of the oil. The peanuts are soaked in brine afterwards to restore them to their original size and shape, and then deep fat fried. Partially defatted peanuts have about one-third fewer calories than regular peanuts. In 1979, over half of the peanuts used as salters were Runners, 30 percent were Virginias, and 15 percent were Spanish (fig. 6).

Peanuts are widely used as an ingredient in candies—sometimes constituting the main ingredient, as in candy bars of various kinds. They are also used for decorating or flavoring. Peanuts constitute one-third of the shelled nuts used in candies in the United States based on *1977 Census of Manufacturers* (published by U.S. Dept. of Commerce). In 1980, over 60 percent of the peanuts used in candies were Runners, over 20 percent were Virginias, and 15 percent were Spanish (fig. 7).

Another growing use is fresh roasted peanuts in the shell, commonly called "ballpark peanuts." These peanuts are sold by street vendors and are commonly sold at sporting events. They can also be purchased at grocery stores.

Peanut butter sandwiches are popular snack items that can be purchased at grocery stores or from vending machines. The sandwiches are made from two small crackers, with a layer of peanut butter in between. Crackers are plain or flavored with cheese, ham, chili, or other flavors. Like many snack items, consumption of peanut butter sandwiches has increased in recent years.

Some peanuts are sold fresh for use as a vegetable. Fresh peanuts in the shell are boiled in brine water, then cooled, shelled, and served. Some fresh peanuts are canned and frozen for use as a vegetable.

Figure 5

Types of Peanuts Used in Peanut Butter

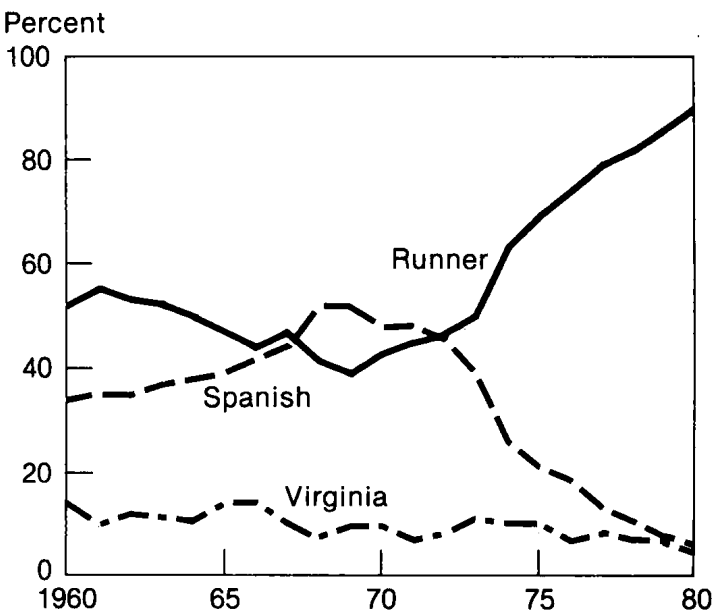
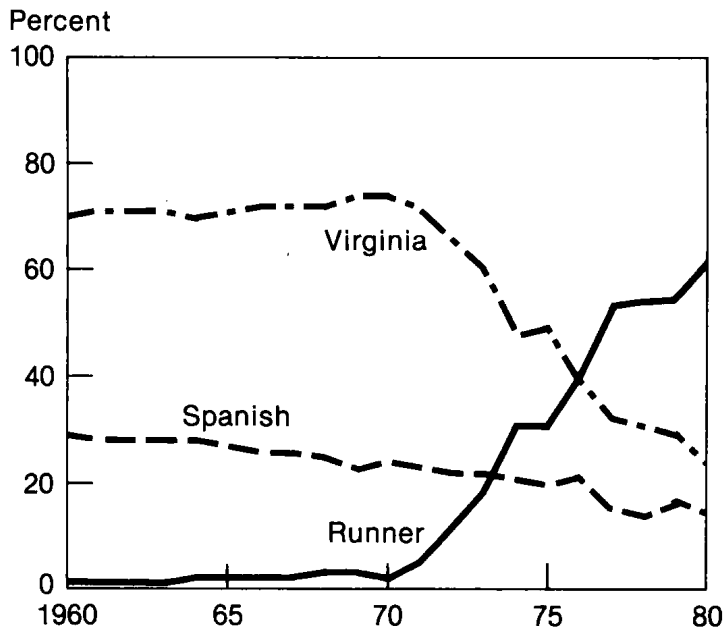


Figure 6

Types of Peanuts Used for Salted Nuts



Increased domestic demand for edible peanuts will likely depend on population growth and increased income. Other factors that will affect domestic consumption are prices, product quality, and merchandising and promotional programs of the peanut industry. Future hikes in consumption of edible peanuts will be more difficult to achieve because of increased competition from other snack foods. To share in the growing snack food market, peanuts must be competitively priced and the peanut industry must develop new products and innovative merchandising and promotional programs.

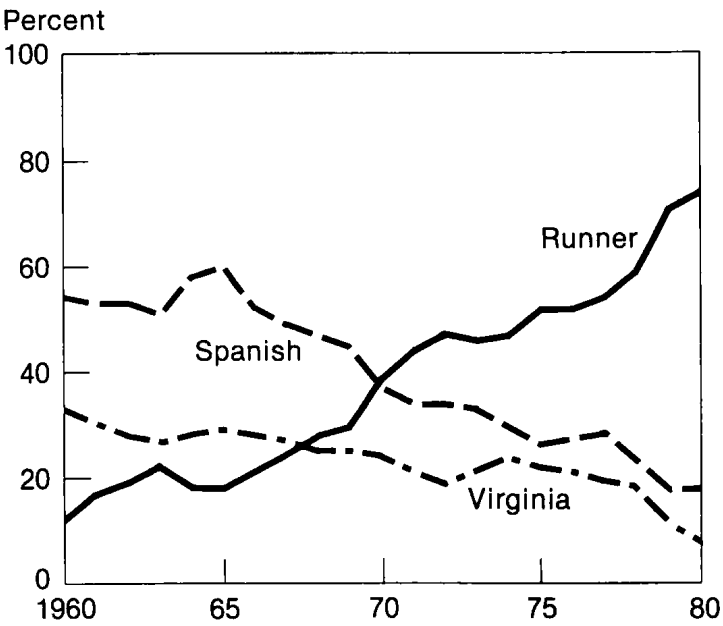
Oilseed Uses

Besides its edible uses, the peanut is an oilseed. Peanuts are grown abroad chiefly for their oil, although peanut oil is relatively unimportant in the United States in comparison with other edible oils. During 1977-79, peanut oil accounted for only about 1½ percent of total U.S. production of edible vegetable oils (appendix table 3).

When peanuts are crushed for oil, peanut meal is produced as a joint product. In the United States, peanuts are typically processed by precooking and continuous screw processing. Some may be processed by a prepress-solvent extraction process. In general, "oil stock" peanuts in the United States are peanuts that were rejected or diverted from edible channels. Diversion may be due to oversupply or a variety on hand that is not in demand. Rejections include "pick-outs" from edible nuts on the inspection tables and other low-quality peanuts such as Segregation 3 peanuts—peanuts containing a visible toxin-producing mold. (The mold is not transferred to the oil during crushing, but remains in the meal. Unless the mold is removed from the meal, which cannot be done economically, the meal can be used only to make fertilizer, not feed.) Rejections are also peanuts that were improperly stored and became weathered (shriveled and wrinkled), infested by insects, or moldy.

Figure 7

Types of Peanuts Used in Candy



Peanuts sold for export usually bring a higher return than those sold for crushing. Thus, in a given year, the volume of peanuts crushed in the United States is inversely related to peanut exports. Most U.S. exports are used as edible peanuts.

The major reason that peanuts in the United States are not grown for their oil and meal is apparent when comparing the cost of oil and meal from peanuts with soybeans. In 1981, the cost of producing oil from peanuts was 48 cents per pound compared with 15 cents per pound for soybean oil (appendix table 4). Likewise, the cost of producing a pound of 50-percent protein peanut meal was 15 cents per pound compared with 8 cents per pound for similar protein content soybean meal.

Peanut oil is refined and used as a liquid cooking oil. Peanut oil has an advantage over most other edible vegetable oils for pan or deep fat frying because of its high smoke point, about 440° F. It can be clarified and reused many times for frying foods. Some consumers prefer it over other cooking oils because of the slightly nutlike flavor it imparts to fried foods. Refined peanut oil, like cottonseed oil, solidifies in a refrigerator. Winterizing the oil to rid it of these characteristics is difficult because it forms nonfilterable crystals. Peanut oil can be used to make other oil food products such as margarine, mayonnaise, salad dressings, and shortening. In recent years, however, its use has been mainly confined to salad dressings and cooking oil because of competition from other oils.

The market for peanut oil is changing considerably, mainly because of increased competition from expanding U.S. production of two premium oils (sunflower and corn). Sunflower oil has been displacing a large amount of peanut oil in European markets in recent years because sunflower oil is now the preferred premium oil in Europe. U.S. sunflower production has increased rapidly in recent years, reaching almost 6 million acres in 1979. Crushing facilities have not kept pace with this expansion. A large new crushing plant that started operating in October 1980 raised sunflower crush capacity by one-third. Three additional large sunflower crushing plants being built are expected to be ready for operation in

1982. A large increase in corn sweeteners (liquid sugar) and corn alcohol (for gasohol) production is also underway. Corn oil is a byproduct of both of these expanding industries. Both sunflower and corn oils are premium grade oils with certain advantages over peanut oil for a number of uses. Therefore, high peanut oil prices relative to other premium oils are not expected to occur in the future.

In 1979/80, the United States crushed 571 million pounds of farmers' stock peanuts yielding 175 million pounds of crude oil (appendix table 1). In 1980/81, the total dropped to 446 million pounds of farmers' stock peanuts due to the drought-shortened crop. The United States is an exporter of peanut oil; however, the leading peanut oil exporters are Argentina and Brazil.

Peanut meal, a byproduct of peanut-crushing operations, is marketed as a livestock feed on a 50-percent protein basis. Practically all U.S. peanut meal is sold domestically for animal feed. Peanut meal is relatively unimportant as a high-protein feed in the United States, accounting for only about 0.5 percent of total production of all high-protein meal in 1977-79 (appendix table 3). Leading world exporters of peanut meal are India, Senegal, Brazil, Argentina, and Sudan.

Peanuts must be crushed under sanitary conditions if the peanut meal is to be used as a starting material for manufacturing peanut food protein products. Such products are produced in only limited amounts. Both fat containing and defatted peanut grits, meals, and flours can be produced. Grits, meals, and flour are made by the same process and differ only in the degree of final grinding. Partially defatted peanut flour is made from meal resulting from hydraulic pressing of blanched peanuts. Defatted peanut flour is made by prepressing peanuts and then subjecting the material to hexane extraction producing 60-percent protein flour. One manufacturer has produced small quantities of defatted peanut flour. Peanut flour can be used in a large number of foods such as bakery products, cereals, meat patties, snack foods, and other food protein uses. Peanut protein concentrates may also be prepared by subjecting peanut flour to alcohol and acid washes to remove sugars, flavor, and bitter compounds. Peanut protein concentrates contain 60 to 70 percent protein. Peanut protein isolate can also be prepared. Peanut flour is solubilized in alkali, and the protein is then precipitated with acid to produce a 90-percent peanut protein isolate.

Demand Relationships

The demand for edible peanuts is inelastic, meaning that if prices rise by *x* percent, the quantity demanded will decline by less than *x* percent. However, the degree of price inelasticity for edible peanuts is not known. In contrast, the demand for peanut oil and meal is elastic except for a small quantity of peanut oil.

There is a specialized market for small quantities of peanut oil where the quantity demanded is fairly unresponsive to price changes. Once this demand is fulfilled and peanut oil starts competing as one of many vegetable oils, the quantity demanded becomes very responsive to price. When the specialized market demand for peanut oil is fulfilled, peanut and other vegetable oils become essentially interchangeable.

Another important factor in the peanut oil market is that its specialized oil market (the inelastic segment where quantity demanded is unresponsive to price) is changing and becoming more elastic. The cause for this change is the much greater production and increased competition from two premium oils—sunflower and corn—which have certain advantages over peanut oil in some uses. This situation is shrinking the specialized market for peanut oil. Sunflower oil has largely displaced peanut oil in some European countries. There has been little change in the domestic market, but more competition is expected over the next several years.

Peanut meal constitutes only a minor part of the high-protein meal market in the United States. There is no specialized market for peanut meal. Peanut meal prices are slightly lower than soybean meal prices because the amino acid value (feeding value) of peanut meal is not as high as soybean meal.

Peanut oil and meal do not effectively compete with soybean oil and meal (appendix table 3). Because of this factor, future growth is much more dependent on the demand for peanuts for edible uses.

Acreage and Production Trends

U.S. peanut acreage reached 3.5 million harvested acres in 1943 in response to increased needs for peanuts during World War II. This record acreage was nearly three times that harvested in the early thirties and more than double current acreages.

	U.S. acreage harvested
1929-31	1,258,000
1939-41	1,953,000
1942	3,355,000
1943	3,528,000
1944	3,068,000
1949-51	2,184,000
1959-61	1,430,000
1969-71	1,457,000
1979-81	1,471,000

Peanut acreage remained relatively high during the forties, but dropped sharply in the early fifties to more nearly reflect demand. The harvested acreage has remained at about 1.5 million acres since 1954 when the Government set a national minimum peanut allotment of 1.61 million acres (appendix table 5).

While the peanut acreage has remained relatively stable since the midfifties, production has increased almost continuously (fig. 8, table 3). The 1980 drop in production resulted largely from unfavorable weather; 1981 output rebounded and surpassed the 1979 level (appendix table 6). The gains in total production are attributed to rapidly increasing yields.

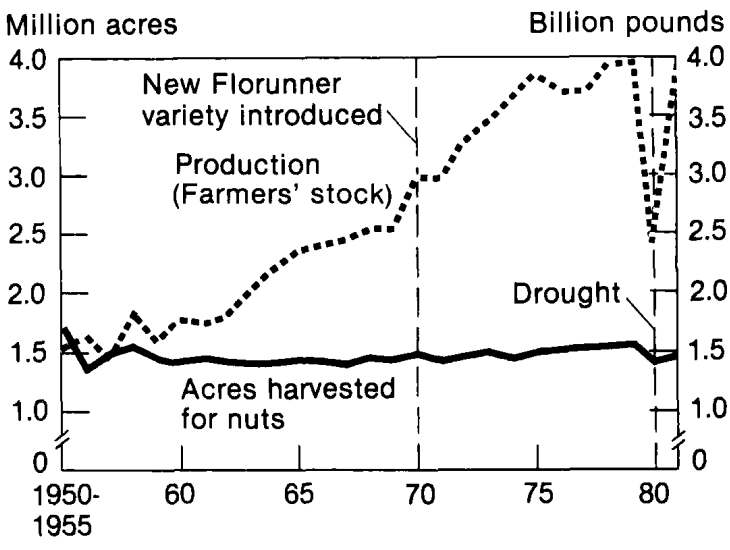
Peanut yields have increased sharply since the early fifties due largely to improvements in seed varieties and cultural practices (table 4 and fig. 9). For example, the U.S. average yield increased almost threefold from1950 to 1981 (898 pounds per acre to 2,668 pounds—appendix table 7).

The Southeast led all regions in yield increases, gaining 1,746 pounds per acre from 1950-52 to 1979-81. During the same period, yield increases amounted to 1,162 pounds in the Southwest and 898 pounds in the Virginia-North Carolina region.

Runner peanuts dominate U.S. production, accounting for about 68 percent of total production in 1977. Runners also had the highest yield per acre in most areas (appendix table 8). Spanish peanuts are grown mostly in the Southwest; Texas and Oklahoma accounted for about 94 percent of the total Spanish peanut production in 1977.

Figure 8

Peanut Acreage and Production



The Virginia peanut dominates production in the Virginia-North Carolina region. Valencia peanuts are grown primarily in New Mexico and Arizona.

The average peanut acreage per farm operating unit was about 52 acres, according to the 1978 Census of Agriculture.[4] Average peanut acreage varied from 90 acres per farm in Texas to 31 acres per farm in Florida (appendix table 9).

Many farm operating units combine more than one poundage quota—or combined more than one acreage allotment when allotments were in effect. (Beginning in 1982, the peanut acreage allotments were discontinued; only poundage quotas remain.) A poundage quota specifies the quantity of peanuts a producer can sell at a guaranteed quota loan price. Allotments were acreage constraints on production, used in conjunction with price supports to provide stability in supply and prices. Quotas are assigned to specific farms. More than one quota can be combined on an operating unit through ownership, rental, and leasing arrangements. The average size of allotment was about 30 acres in 1980, but varied from 17 acres in North Carolina to 46.6 acres in Texas (appendix table 10).

[4]An operating unit is defined as all the land and quota operated by an individual or group as a single farming operation.

Table 3—Regional peanut production (3-year average)

Region	Calendar year			
	1950-52	1960-62	1970-72	1979-81
	Million pounds			
Southeast	863	839	1,737	2,103
Southwest	275	378	644	604
Virginia-North Carolina	529	535	646	649

Table 4—Average peanut yields, by region (3-year average)

Region	Calendar year			
	1950-52	1960-62	1970-72	1979-81
	Pounds per acre			
Southeast	874	1,170	2,278	2,620
Southwest	491	929	1,546	1,653
Virginia-North Carolina	1,487	1,910	2,463	2,385
U.S. average	889	1,256	2,100	2,324

Source: U.S. Department of Agriculture. *Crop Production.* Various issues.

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The range in allotment size was large (appendix table 11). Eighteen percent of the allotments in the United States accounted for 58 percent of the total U.S. acreage allotment in 1976. These allotments all exceeded 40 acres. About 24 percent of the allotments ranged from 10 to 20 acres, while 38 percent of the allotments were 10 acres or less.

Production Practices and Technology

Most peanut growers use the same production practices with some variations from one region to another because of differences in climate, soil, topography, and economic forces.

Preplant tillage covers all tillage operations performed before seedbed preparation. The chief types of tillage operations include breaking the land with moldboard plows and disking with a tandem disk. Other equipment used on many farms for preplant tillage includes chisel plows, spike tooth or spring harrows, subsoilers, and rototillers. Farmers in Texas and Oklahoma commonly use bedders and listers.

Other preplant operations involve applying fertilizers and herbicides. Broadcast application of fertilizer, including lime, with a truck or trailer is the dominant method in all areas. Applying fertilizer with fertilizer attachments on planters or tillage equipment is also common. Herbicides are usually applied during disking, where the herbicide is applied and incorporated in the soil in one operation.

Growers of irrigated peanuts in Texas and Oklahoma used preplant tillage operations most frequently, according to a 1977 survey of peanut producers (appendix table 12). The least number of tillage operations occurred on nonirrigated peanuts in Oklahoma.

Planting is done mostly during April in the Southeast and during May in the Virginia-North Carolina and Southwest regions. A well-prepared seedbed is essential in peanut production. Most producers use four-row planting equipment. A small part of the acreage is replanted each year, depending largely on weather conditions at planting time. Seeding rates vary among regions, ranging from about 60 pounds per acre for nonirrigated peanuts in Texas to 120 pounds per acre in Georgia. Seeding rates are also affected by row spacing and the variety of peanut.

Weed and pest control is obtained chiefly through chemicals applied from tractor-mounted sprayers. Custom application is widely practiced. Mechanical weed control is common if weeds survive the chemical treatment. This practice varies markedly among regions, ranging from one to two cultivations in the Virginia-North Carolina region to about three cultivations in the Southwest (appendix table 12).

States differ widely in the number of pesticide applications. The 1977 survey found that Texas growers applied chemicals for insect and disease control about 1.6 times per season while North Carolina growers applied chemicals about 9.2 times per season.

Irrigation is a common practice in the Southwest. Although less common in the Southeast, irrigation of peanuts has been gaining in use in recent years. Little irrigation is used in the Virginia-North Carolina regions.

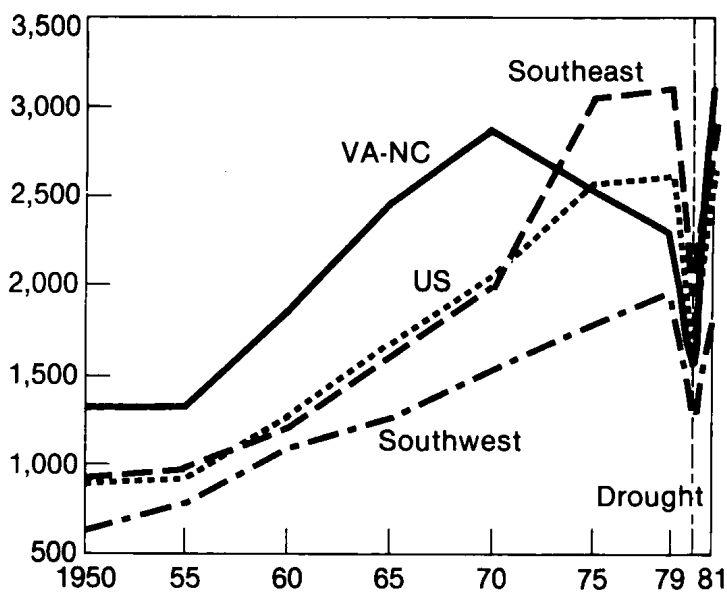
In Oklahoma, the side-roll and hand-move systems are dominant for peanut irrigation. The cable-tow and center-pivot systems are the next most common methods of irrigating peanuts in Oklahoma. The side-roll, hand-move, and center-pivot systems dominate in Texas. In Alabama and Georgia, irrigation water is applied largely by cable-tow systems. The next most common method is by center-pivot system.

Harvesting commences in August in the Southeast, and involves digging peanuts with either a digger-shaker machine or a digger-shaker-inverter. This operation includes digging peanuts from the ground, shaking to remove soil from the pods, and placing the plants in a

Figure 9

Peanut Yields by Region

Pounds per harvested acre



windrow. The digger-shaker-inverter inverts the plant, leaving pods exposed upright above the ground to facilitate natural drying. Vine cutters are used in a few cases, particularly in peanut fields where weeds or foliage are a problem. Reshaking (shaking the vines again to remove more dirt from the pods) is common in some areas, but less important in others.

All peanuts now are combined directly from the windrow. The combine lifts the plants from the windrow, separates the pods from the vines and trash, and deposits the pods in a bulk bin on the combine. The peanuts are then dumped in a trailer or truck and hauled immediately to a drying facility—either an on-farm drying installation or a commercial dryer. Moisture content must be reduced to 8-10 percent for proper storage.

Table 5—U.S. average cost of producing peanuts, 1978-81

Item	1978	1979	1980	1981
		Dollars per unit		
Cost per planted acre:				
Variable[1]	271.27	298.47	320.24	447.37
Machinery ownership[2]	54.76	62.49	71.65	88.85
Farm overhead[3]	7.22	7.99	7.42	8.12
Management[4]	34.36	36.90	39.93	54.43
Land charge[5]	93.81	102.49	95.84	122.99
Total cost	461.42	508.34	535.08	721.76
Cost per pound:				
Total cost	.177	.197	.357	.275
Value of secondary product	.005	.006	.006	.006
Net unit cost	.172	.191	.351	.269
		Pounds		
Yield per planted acre	2,602	2,587	1,526	2,628

Note: See appendix tables 13-18 for more detailed cost items.

[1]Variable costs include seed, fertilizer, chemicals, fuel and lubricants, repairs, custom operations, labor, drying and cleaning, and interest.

[2]Machinery ownership costs include charges for replacement, interest, taxes, and insurance.

[3]Farm overhead includes cost of such items as utilities, recordkeeping, farm insurance, general farm maintenance or other items that cannot be allocated to a specific enterprise.

[4]Management charge amounts to 10 percent of total cost minus the land charge.

[5]Land charge reflects a composite of land allocation at average of share rent, cash rent, and a charge based on acquisition value of owner-operator land.

Source: U.S. Senate Committee on Agriculture, Nutrition, and Forestry. *Cost of Producing Selected Crops in the United States.* Committee Prints.

Costs of Production

Peanut production costs increased substantially during 1978-81. The most significant increase occurred in machinery ownership costs, which more than doubled. The total U.S. average cost of producing peanuts rose from $461.42 per acre in 1978 to $721.76 per acre in 1981 (table 5). Variable costs accounted for 59 percent of total costs in 1978 compared with 62 percent in 1981. In contrast, the land charge amounted to about 20 percent of total costs in 1978 and about 17 percent in 1981.

Chemicals, including fertilizer, lime, and gypsum, accounted for about 29 percent of total variable costs in 1981 (appendix table 13). Although constituting a smaller proportion of total variable costs, energy cost increases were most dramatic of all, increasing from $22.01 per acre in 1978 to $49.10 in 1981. Peanut seed and labor costs also increased sharply. The cost increases resulted largely from substantial gains in the prices of production inputs rather than significant changes in the mix of inputs.

Peanut production costs differ greatly by region (table 6). Per acre costs were highest in the Southeast for 1978-81, and lowest in the Southwest (appendix table 14). In contrast, costs per pound of peanuts harvested were generally lowest in the Southeast and highest in the Southwest because of the regional differences in average yields (appendix table 15).

The input mix varies among regions because of differences in the production environment and input requirements. For example, chemical costs per acre for peanut production were substantially higher for the Southeast than for other regions during 1978-81 (appendix tables 16-18). This difference is largely due to a preponderance of pest control problems in the Southeast. Other components of cost also vary from region to region but the variation is less marked than for chemical inputs.

Table 6—Regional production costs, 1978-81 average

Item	Southeast	Southwest	Virginia-North Carolina
		Dollars per pound	
Variable	0.146	0.173	0.147
Other[1]	.046	.086	.049
Total, excluding land	.192	.258	.196
		Pounds per acre	
Yield	2,708	1,510	2,463

[1]Includes machinery ownership, farm overhead, and management charges.

Factors Affecting Production

Total production for a State or region depends on the yield per acre and the acreage planted to peanuts. Several factors affect yield response, including soil texture, cultural practices, peanut varieties, and climate (rainfall, temperature, and length of growing season).

Peanuts are best adapted to well-drained, light-textured soils. Soil texture affects not only yields but pod loss during harvest. Pod loss and damage tend to be greatest on heavy-textured soils. Methods of seedbed preparation and pest control are important in peanut culture. The use of poorly prepared seedbeds or inadequate pest control measures can substantially reduce yields as well as product quality.

Peanuts are sensitive to other crops in a rotation. Working peanuts into a well-planned crop rotation improves control of diseases and nematodes as well as nutrient balance in the soil. Peanuts are effective users of residual fertilizer in the soil from the last crop, particularly crops like corn that receive heavy applications of fertilizer. Production specialists generally recommend a 3-year rotation for peanuts, which restricts production to one year out of three on the same land. Generally, production improves most following corn, small grains, or sod in a rotation.

Significant changes in acreage depend on marketing quota and price support programs, competition from other crops for the use of land and other resources, and the quantity of land available that responds well to peanut production. The acreage planted to peanuts has remained essentially constant during the last 30 years because of acreage allotments and the high price support levels compared with other crops. In the absence of production controls (the acreage allotments discontinued in 1982), peanut acreage might rise in southwest Georgia and sections of Florida, which have cost and soil advantages. Market conditions and agronomic restraints will now be the major limits on production increases.

Competitive Advantages

The high price supports for edible peanuts assure farmers of greater returns than they can currently get on most other crops. The farm price of peanuts for the edible market has been determined in most years by price support loan rates for quota peanuts.

Breakeven price analysis can be used to determine equivalent returns from peanuts and other crops, given the production cost and yield levels. Table 7 indicates the price combinations required to provide equivalent returns from peanuts and soybeans in the Southeast based on average costs and yields for the 1978-81 period.

When priced at 16.1 cents per pound, peanuts in the Southeast region provided returns above variable costs equivalent to returns from soybeans priced at $7 per bushel. While this soybean price is slightly above the season-average price received by farmers in 1981, the breakeven peanut price of 16.1 cents per pound is substantially below 1981 loan rates (22.5 cents per pound) for quota peanuts. Raising the price of soybeans to $8 per bushel would require a peanut price of 19.3 cents per pound to equate returns from the two crops. The 19.3 cents per pound for peanuts is still well below the 1981 loan rate for quota peanuts. Equivalent returns based on the 1981 loan rate for quota peanuts would require the unlikely soybean price of $15 per bushel. Thus, these price relationships show peanuts' strong competitive advantage over soybeans under the cost and yield relationships that prevailed during the 1978-81 period.

Raw Peanut Industry

The peanut industry involves six physical stages—production, drying, shelling, storage or warehousing, processing, and distribution. The raw peanut industry encompasses the first four stages.

Before 1982, legislation prescribed a minimum national allotment of 1.6 million acres. The national allotment was allocated to peanut-producing States, which in turn allocated the State allotments to individual farms. In 1980, 55,126 farms had an acreage allotment for peanuts. Over three-fourths of the producers were located in four major peanut-producing States. Georgia led all States in the proportion of peanut farms and share of the national allotment (table 8).

Table 7—Breakeven price of peanuts and soybeans, Southeast

Assumed price of soybeans	Breakeven price of peanuts	
	Shortrun[1]	Longrun[2]
Dollars per bushel	*Cents per pound*	
5[3]	14.5	16.9
6[3]	15.3	17.7
7	16.1	18.5
8	16.9	19.3
10	18.5	20.9
15	22.5	24.9

[1]Shortrun breakeven prices equate returns above variable costs.
[2]Longrun breakeven prices equate returns above variable, machinery ownership, and overhead costs.
[3]Soybeans would not be produced in the long run at these prices, since returns would be negative.

Under the 1977-81 peanut program, each farm having an acreage allotment also received a poundage quota each year. Many of these same farms are eligible for poundage quotas under the 1982 peanut program. Quota peanuts are eligible for price support payments at the quota level (27.5 cents per pound in 1982). "Additional" peanuts (that is, peanuts over and above the quota) are eligible for price support at a lower level (10 cents per pound in 1982).

Table 8—Peanut farms with allotments, by State, 1980

States	Percentage of allotted acres to U.S. total	Percentage of peanut farms[1]
	Percent	
Georgia	32.9	31.0
Texas	22.1	13.9
Alabama	13.4	15.0
North Carolina	10.4	17.9
Oklahoma	8.6	7.1
Virginia	6.5	8.2
Other States	6.1	6.9

[1]Reflects number of farms growing peanuts after release and transfer of allotments.

First Handlers

Peanuts are moved from the farm to buying points or stations following harvest. Located near concentrations of production, the buying stations are operated largely by shellers, independent dealers, or warehouse owners. Services provided by these first handlers of peanuts include drying, cleaning, purchasing outright or making arrangements for price support loans from the Commodity Credit Corporation (CCC), and warehousing of peanuts going into the CCC loan program. The number of buying points or stations in 1981 in each State was (according to USDA's Food Safety and Quality Service):[5]

	Number of buying points
Alabama	55
Florida	10
Georgia	160
North Carolina	170
Virginia	72
Texas	74
Oklahoma	33
Other States[1]	11

[1]Arizona, Arkansas, Louisiana, Mississippi, New Mexico, and South Carolina.

Drying (curing) begins immediately after the peanuts are lifted from the soil. A digger-shaker-inverter—the most commonly used implement to dig peanuts—lifts peanut plants from the soil and places them in a windrow with the pods exposed. Some natural curing occurs while the peanuts remain in windrows before being combined. Weather conditions generally do not allow the peanuts to be completely dried in windrows. Consequently, nearly all peanuts are artificially dried with mechanical dryers either on the farm or at commercial drying facilities. A drying system includes bins or wagons, fans, a heat source, and controls for temperature and airflow.

The moisture content of peanut pods when they are dug up may be as much as 45 to 50 percent. Drying in windrows generally reduces the moisture level to 18 to 24 percent. Peanuts normally remain in windrows for 1 to 3 days before being combined. After being combined, they are dried mechanically, further reducing moisture content to 8 to 10 percent for safe storage.

The commercial drying facilities are located at buying points and are usually operated by the first handlers.

Inspection and Grading

Farmers' stock peanuts are inspected and graded at the location of the first handler to establish the quality of product available to the buyer. The overall quality of the shelled product determines the price for commercial sales and for price support loans.

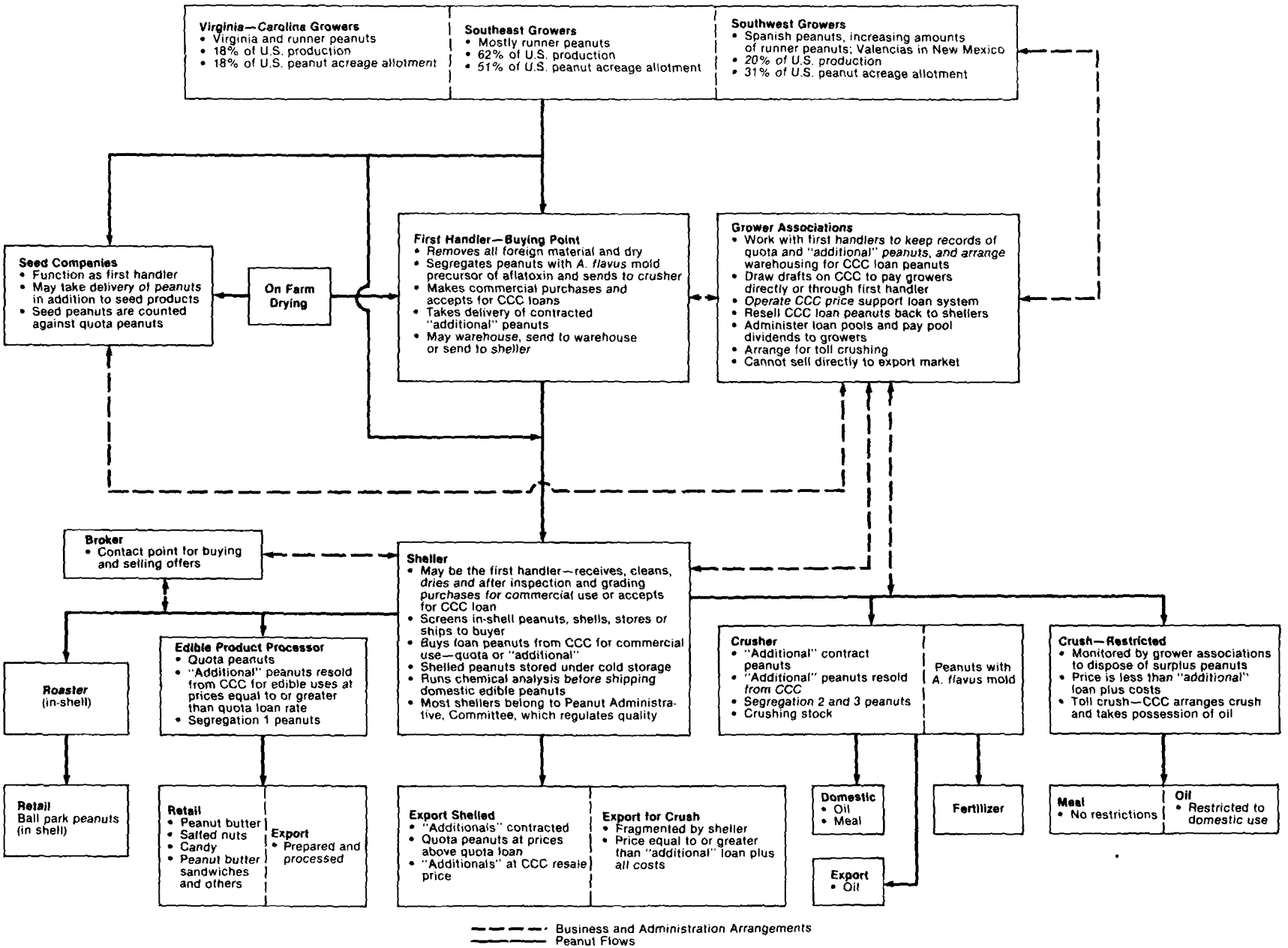
The inspection and grading services are provided by the Agricultural Marketing Service, which assigns inspectors to each buying point during the harvest season. Peanuts placed in storage must be cleaned when foreign material (dirt, vines or "hay," sticks, stones, insects, broken shells, and so forth) exceeds 10 percent. Peanuts are usually cleaned shortly after the drying operation.

The peanut price support program and the peanut marketing agreement program require the separation of peanuts into three classes: Segregation 1, Segregation 2, and Segregation 3. These classifications are mainly concerned with the amount and type of damage in each lot of peanuts. Peanut handlers (shellers regulated by the marketing agreement program) can buy only Segregation 1 peanuts for use in edible products. Quality factors determined in the inspection and grading process are:

[5]For additional detail, see (9, p. 6).

Figure 10

Growing, Handling, and Marketing Peanuts



sound mature kernels (SMK), sound splits (SS), other kernels (OK), loose shelled kernels (LSK), damaged kernels (DK), foreign material (FM), and kernel moisture content. These quality factors are used for establishing price support loan levels for batches of farmers' stock peanuts.

The following factors determine the segregation class of peanuts *(17)*:

Segregation 1 includes all farmers' stock peanuts with:

1. Less than 2.5 percent damaged kernels.
2. Not more than 1 percent concealed damage caused by rancidity, mold, or decay, or 0.5 percent freeze damage for peanuts placed in CCC loan.
3. No visible *A. Flavus* mold.
4. Foreign material: Commercial—no limit; CCC loan—cannot exceed 10 percent unless bought back.
5. If a lot has an offensive odor, the peanuts must not be sour, fermented, or taste affected.

Segregation 2 includes all farmers' stock peanuts with:

1. 2.5 percent or more damaged kernels.
2. More than 1 percent concealed damage caused by rancidity, mold, or decay (RMD kernels) and/or more than 0.5 percent freeze damage for peanuts placed in CCC loan.
3. No visible *A. Flavus* mold.
4. Foreign material: Commercial—no limit; CCC loan—cannot exceed 10 percent if stored.

Segregation 3 includes all farmers' stock peanuts with:

1. Visible *A. Flavus* mold. Peanuts with any amount of *A. Flavus* mold will go into this segregation group regardless of the percentage of damaged kernels or whether offensive odor is found in the load.
2. Foreign material: Commercial—no limit; CCC loan—percentage of foreign material and moisture to be specified by grower associations (described below).

Shellers

In 1981, there were 115 shelling plants in the major production regions. Most of the plants were in the Southeast.[6] The shelling operation includes basically five steps: (1) passing farmers' stock peanuts through cleaning machines to remove sand, stones, sticks, or other foreign material, (2) passing cleaned peanuts through a battery of shellers or separators that separate kernels from pods, (3) moving the shelled nuts over sizing screens that separate the nuts into four groups or classes (sound mature kernels, sound split kernels, damaged kernels, and other kernels), (4) moving the edible nuts over picking tables for inspection and removal of rejects, and (5) filling and weighing containers (generally burlap bags or heavy cardboard containers) for storage or shipment to a processing plant. Shelled peanuts are usually placed in cold storage warehouses. The shellers provide docks for receiving and shipping by rail or truck as well as storage space for farmers' stock and shelled peanuts.

In addition to the shelling operation, shellers perform both commercial market and CCC functions. Shellers sell edible peanuts to processors and also bid on CCC loan peanuts for crushing and export. Most sales between shellers and processors are arranged by brokers although some sales are direct.

Grower Associations

The peanut price support program is carried out primarily through nonrecourse warehouse-storage loans to approved grower associations. Each region is served by a growers' association. They include: (1) Peanut Growers Cooperative Marketing Association, Franklin, Va.; (2) GFA Peanut Association, Camilla, Ga.; and (3) Southwestern Peanut Growers Association, Gorman, Tex. These are cooperative associations acting for peanut growers. The grower associations serve both as an agent of the Commodity Credit Corporation (CCC) and as an agent for the growers. They serve as a clearinghouse for all transactions involved in the price support program. They issue price support loans to any peanut grower who wants a loan. Their operating budgets must be approved each year by the Agricultural Stabilization and Conservation Service (ASCS). The operating budget covers administration and supervision costs and loan outlays. If the loan activities deviate from expected levels, the operating budgets can be adjusted accordingly to assure, within reason, that the associations can cover their costs.

A grower normally takes harvested peanuts to one of about 525 buying points. Each buying point that has

[6]Based on information obtained from the Southeastern Peanut Association, the Virginia-Carolina Peanut Shellers Association, and the Southwestern Peanut Shellers Association. For more information, see *(9, p. 15)*.

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