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OFF-FARM COMMERCIAL STORAGE FACILITIES FOR GRAIN

MARKETING ECONOMICS DIVISION
ECONOMIC RESEARCH SERVICE
U.S. DEPARTMENT OF AGRICULTURE

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OFF-FARM COMMERCIAL STORAGE FACILITIES FOR GRAIN ^{1/}

Few industries in the United States require such a tremendous volume of space to store their products as does the grain marketing industry. Grain is stored in great quantities after harvest and before processing. ^{2/} As grain is harvested, a small volume is needed to fill immediate inventory requirements at grain processing facilities, but larger quantities are stored in commercial grain storage facilities for later use in this country and for export.

Storage Capacity Growth and Utilization

All commercial grain storage facilities in the United States, commonly referred to as grain elevators, have an estimated capacity of 5.4 billion bushels in 1965. However, an elevator generally needs some of its capacity for working space--space used for moving grain in and out and within the facility. Thus, the capacity available to store grain stocks is about 4.5 billion bushels.

From 1951 to early 1962, the total off-farm commercial grain storage capacity increased steadily from 2.2 billion bushels to 5.5 billion (table 12). Since 1962 this capacity has remained rather constant with only a slight decrease in the past 3 years. The present space available for storage likely will take care of most needs in the foreseeable future. Only local shortages are likely to occur.

The percentage of total storage space occupied increased substantially from 51 percent in 1957 to 69 percent in 1961. Since 1961, it has declined to about 50 percent (table 12). The peak volume of grain stored within the crop year comes after harvest is completed in the fall. Storage stocks then decline until the new harvest begins. Since the carryover of grain stocks has been declining in recent years, the difference

between the high and low has been much greater than in the past. Stocks filled nearly 63 percent of the storage space in January 1964, but, less than 41 percent 6 months later--a drop of 1.2 billion bushels. Large Government stocks were shipped during this period.

Much of the grain occupying commercial grain storage facilities is held under Government programs. On December 31, 1964, the Commodity Credit Corporation owned about 1.6 billion bushels of grain stored in grain elevators and warehouses. In 1960, CCC stored nearly 3 billion bushels of grain in commercial grain storage facilities.

The Government approves space for storage of CCC grain under Uniform Grain Storage Agreements. Approved capacity reached a maximum of 4.9 billion bushels in 1961, about double that in 1956. This increase accompanied the large carryover of Government grain in those years. Approved capacity had declined to 4.7 billion by 1964. Allowance for working space in approved houses reduced the space available to CCC grains by nearly 1 billion bushels to about 3.8 billion bushels in 1964. The U.S. Government pays only for approved space actually used to store grain owned by the CCC.

Location of Storage Capacity

Grain enters marketing channels at many country elevators in grain-producing areas throughout the United States. Terminal facilities are generally within the production region but may be long distances away. Both country and terminal elevators store grain but much of it is moved from the country elevators and reconcentrated in the larger terminal elevators at market and port cities.

^{1/} Prepared by Allen G. Schienbein, agricultural economist, Marketing Economics Division, Economic Research Service, USDA.

^{2/} General use of the term "grain" is defined as wheat, corn, soybeans, oats, barley, flaxseed, rye, and grain sorghums.

Table 12.--Commercial grain storage capacity and utilization, United States, 1951-65

Year	Storage capacity 1/		Grain inventory: Average for year	Percentage of total capacity utilized
	Total, Jan. 1 2/	Approved for U.S. Govt. grain: storage Dec. 31 3/		
	1,000 bu.	1,000 bu.	1,000 bu.	Pct.
1951	2,175,942	---	---	---
1952	---	1,240,277	858,904	---
1953	---	1,340,893	975,971	---
1954	2,873,639	1,904,766	1,222,132	42.5
1955	---	1,997,458	1,554,434	---
1956	---	2,565,510	1,736,185	---
1957	3,500,513	2,841,243	1,805,440	51.6
1958	---	3,528,255	2,165,745	---
1959	---	4,198,148	2,798,354	---
1960	---	4,467,797	3,130,413	---
1961	4,993,280	4,883,137	3,430,639	68.7
1962	5,472,160	4,790,898	3,197,228	58.4
1963	5,471,230	4,678,419	2,896,361	52.9
1964	5,438,150	4,675,908	2,759,842	50.7
1965	5,423,160	---	---	---

1/ These facilities include all commercial elevators, warehouses, terminals, merchant mills, ships under private control, oilseed crushers which store grains, flaxseed, and soybeans; and miscellaneous storage facilities. They exclude bins owned by the Commodity Credit Corporation, "mothball" ships under Government control used to store grains, and warehouses which store only rice, peanuts, cottonseed, and dry beans or dry peas.

2/ From Stocks of Grain in All Positions, Gr. Lg. 11-1 published quarterly by the Statistical Reporting Service, USDA. Estimates of storage capacity not available for all years.

3/ Capacity approved by U.S. Government under its Uniform Grain Storage Agreements for storage of Government-owned grain and grain under Government loan; payment is made only for space actually occupied by Government-owned grain. Data reported by Agricultural Stabilization and Conservation Service, USDA.

The Northern Plains wheat-producing area of the United States provides nearly one-third of the total grain storage space (table 13). Fifty percent of the total capacity in the plains area is located in Kansas. This region has particular need for commercial storage facilities because at harvest time great quantities move immediately off the farms into the grain traffic flow. Of the capacity in this area approved for storage of grain owned by the CCC, 63 percent was in country elevators and 37 percent in terminal elevators in 1963.

Storage capacity in the Midwestern corn

and soybean belt accounts for another third of the total U.S. space. Illinois, Iowa, and Minnesota have 64 percent of the space volume in this area. In addition to the usual inland city terminals, this area has terminal elevators at ports on the Great Lakes and Midwestern rivers. Country facilities made up 58 percent of the approved capacity and terminal elevators 42 percent.

The Southern High Plains, producing both wheat and grain sorghum, provides about one-fourth of the Nation's grain storage capacity. Texas is the major grain storer in this area. Even more of the approved

Table 13.--Total commercial grain storage capacity, capacity approved for storage of grain owned by the Commodity Credit Corporation, and proportion in country and terminal elevators, 1963-64

State and region ^{1/}	Capacity approved for U.S. Government grain storage			
	Total capacity, Jan. 1, 1964 ^{2/}	Total, Dec. 31, 1963 ^{3/}	Proportion of total in ^{4/} --	
	1,000 bu.	1,000 bu.	Country elevators	Terminal elevators
			Pct.	Pct.
New York	70,680	55,680	2.9	97.1
Maryland	23,340	12,850	---	100.0
Northeast	137,990	83,011	5.4	94.6
Tennessee	35,870	12,915	21.6	78.4
Kentucky	27,100	14,398	31.7	68.3
Southeast	180,850	64,056	42.9	57.1
Illinois	409,500	336,978	63.5	36.5
Iowa	348,300	317,785	82.1	17.9
Minnesota	312,900	259,977	47.1	52.9
Midwest	1,675,510	1,326,064	57.8	42.2
Kansas	851,200	835,675	50.8	49.2
Nebraska	492,000	477,476	67.2	32.8
North Dakota	136,900	136,248	89.4	10.6
Northern Plains:	1,700,000	1,645,896	63.3	36.7
Texas	910,000	856,912	52.1	47.9
Oklahoma	240,000	238,654	51.5	48.5
Southern Plains:	1,322,820	1,230,754	52.6	47.4
Washington	157,200	143,029	75.0	25.0
California	112,500	70,946	69.7	30.3
Oregon	73,760	56,265	72.5	27.5
West	420,980	328,638	74.8	25.2
Total	5,438,150	4,678,419	58.4	41.6

^{1/} State data do not always add to totals for regions because data for States with smaller capacities have been omitted. Northeast: New England States, N.Y., N.J., Pa., Del., Md., and W. Va.; Southeast: Va., N.C., S.C., Ga., Fla., Ky., Tenn., Ala., and Miss.; Midwest: Ohio, Ind., Ill., Mich., Wis., Minn., Iowa, and Mo.; N. Plains: N. Dak., S. Dak., Nebr., Kans., Mont., Wyo., and Colo.; S. Plains: Ark., La., Okla., Tex., and N. Mex.; West: Idaho, Ariz., Utah, Nev., Wash., Oreg., and Calif.

^{2/} From Stocks of Grains in All Positions, Gr. Lg. 11-1 published quarterly by the Statistical Reporting Service, USDA.

^{3/} Capacity under Uniform Grain Storage Agreements. Data reported by Agricultural Stabilization and Conservation Service, USDA.

^{4/} Estimates based on sample survey of grain elevators conducted by Economic Research Service.

capacity was in terminal facilities in this area--47 percent--than in the Northern Plains and Midwest. These include the growing number of elevator facilities on the Gulf of Mexico.

The West produces mainly wheat and barley. This region has about 8 percent of total U.S. capacity. Washington, California, and Oregon are the leading States. The proportion of country to terminal capacity is quite different from that in the major grain-producing regions. Nearly 75 percent of the approved storage space is in numerous country elevators. Much of the terminal capacity is in a few port facilities.

The Northeastern and Southeastern parts of the United States are not major grain production areas. Large capacities are not needed to store grain from 1 crop to the next. Most of the storage capacity is in the port facilities located on waterways from Maine to Mississippi.

Kinds of Grain Stored

During the year beginning July 1, 1963, the average monthly quantity of all grain stored in commercial grain warehouses was 2.8 billion bushels. The peak volume of nearly 3.4 billion bushels was in January. The low was 2.3 billion bushels at the end of the crop year. Wheat accounted for about 48 percent of the total (table 14). Grain sorghum and corn accounted for another 42 percent. Country elevators held nearly two-thirds of the grain inventory during the 1963-64 crop year. The other one-third was in terminal facilities. Much of the grain probably is stored for some part of the crop year in elevators of the producing area. This storage is apt to be in country elevators.

In the Northern Plains, wheat accounted for about 70 percent of the grain stored. In the Midwest, corn made up about three-fifths and soybeans one-fifth of the total.

Terminal facilities do not necessarily store grain produced within the geographical area. In the Northeast and Southeast, the inventory on hand is generally awaiting export sale and overseas shipment from port terminals.

Type of Storage Facilities

Prior to the early 1950's the typical grain storage facility was an upright concrete structure. However, to meet a quick need for storage capacity, many flat storage buildings were constructed between 1956-62. These structures can easily be used for other purposes when grain for storage is not available.

The total U.S. storage capacity in country elevators is divided about evenly between upright and flat structures. Upright grain elevator tanks make up about 60 percent of the capacity of terminal facilities. In the Southeast, the total capacity is still heavily concentrated in the upright facilities at the country level. This area did not experience the heavy demands for Government storage space.

The increased need for storage space in terminal warehouses in the Southern Plains, particularly to store grain sorghums, cause the proportion of capacity in flat structures in that area to increase to 60 percent of the total.

Kind of construction material is related to the type of structure of the building. Most upright terminal elevators and more than half of the country uprights are concrete. Steel and wood facilities make up 44 percent of the country upright buildings. Nearly three-fourths of the flat storage is steel. Each of the 3 materials has particular advantages for particular situations, so it is not likely that drastic changes will take place in the kinds of materials used.

Table 14.--Distribution of grain inventory, by kind of grain, type of elevator, and region, 1963

Region and type of elevator ^{1/}	Corn	Wheat	Grain sorghum	Soybeans	Other ^{2/}	Total
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
Northeast:						
Country ^{3/}	---	---	---	---	---	100.0
Terminal	27.9	58.7	0	3.2	10.2	100.0
Southeast:						
Country	21.8	2.8	---	66.8	8.6	100.0
Terminal	34.1	33.6	0.1	26.5	5.7	100.0
Midwest:						
Country	69.2	5.5	.2	19.4	5.7	100.0
Terminal	20.1	41.2	8.5	19.9	10.3	100.0
Northern Plains:						
Country	9.8	70.3	13.5	.3	6.1	100.0
Terminal	4.8	71.1	23.1	.2	.8	100.0
Southern Plains:						
Country	---	23.4	68.4	7.4	.8	100.0
Terminal	2.5	33.2	62.9	1.1	.3	100.0
West:						
Country2	42.7	33.7	---	23.4	100.0
Terminal	1.5	50.4	39.1	---	9.0	100.0
All regions:						
Country	9.2	51.9	29.5	5.7	3.7	100.0
Terminal	18.8	39.4	29.0	7.0	5.8	100.0
Total	12.2	48.0	29.3	6.1	4.4	100.0

^{1/} Distributions based on averages of monthly inventories; see footnote 1 of table 13 for lists of States in various regions.

^{2/} Includes barley, oats, rye, flaxseed, millet, dry beans, and dry peas.

^{3/} Not estimated because of the smallness of inventories. Estimates based on sample survey of grain elevators conducted by the Economic Research Service.

