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# COST OF STORING AND HANDLING GRAIN IN COMMERCIAL ELEVATORS, 1970-71 AND PROJECTIONS FOR 1972-73

U.S. DEPARTMENT OF AGRICULTURE / ECONOMIC RESEARCH SERVICE

ABSTRACT

This report develops handling and storage costs associated with operating 251 commercial grain elevators in 1970-71. Standardized book costs for grain storage were estimated at 8.9 cents per bushel in 1970-71, compared with 6.7 cents in a similar study in 1964-65. Based on 1970-71 replacement value of the elevator's physical plant, the average yearly cost per bushel was 14.9 cents. Projecting storage costs to 1972-73 price levels and volumes shows an increase to 16.3 cents per bushel. In a purely competitive situation, the total space needed to store the anticipated 1972-73 volumes of grain could be obtained at a total cost of 15.5 cents per bushel; 6.5 cents would meet the out-of-pocket or cash expenses for 1972-73. A special study of 30 inland and port terminals shows capital and operating costs for dust control systems averaged 6.39 cents and 1.42 cents per bushel of storage capacity, respectively, and 1.23 and 0.27 cents per bushel of grain handled.

Key Words: Grain elevators, Average costs, Grain handling, Storage projections.

PREFACE

A grain handling and storage cost study of this type was originally developed from data collected in 1965 and reported in Costs of Storing and Handling Grain in Commercial Elevators, 1964-65, U.S. Department of Agriculture, Economic Research Service, ERS-288, April 1966. For each succeeding year, costs have been determined by estimating input cost changes and projecting volumes. This report, based upon a new survey of elevator cost data collected from a sample of 251 elevators in the fall of 1971, represents costs associated with the 1970-71 structure and practices of the commercial grain elevator industry.

The author gratefully acknowledges the cooperation of the individuals in the elevator industry who took valuable time from busy work schedules to provide the cost and operating data necessary for this study.

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Dust control system data were developed and analyzed by Carl J. Vosloh, Jr., Marketing Economics Division, ERS.

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By Allen G. Schienbein
Agricultural Economist
Marketing Economics Division
Economic Research Service

## HIGHLIGHTS

Costs associated with storing grain in commercial elevators have increased significantly since 1964-65. Comparable studies reveal the standardized book cost for grain storage was 8.9 cents per bushel in 1970-71 and 6.7 cents in 1964-65. 1/ At country warehouses, the standardized book cost in 1970-71 was 4.3 cents per bushel for receiving by truck and shipping by rail and 9.5 cents for storage (table 2). In 1964-65, the last year for which comparable data are available, the book cost of these services was 5.3 cents and 6.1 cents per bushel, respectively. At inland terminals the standardized book cost per bushel for receiving and shipping by rail in 1970-71 was 3.4 cents and for storage, 6.8 cents. This compares with 3.7 cents and 6.6 cents, respectively, in 1964-65. For port terminals, the standardized book cost per bushel for receiving by rail and shipping by water in 1970-71 was 2.2 cents and for storage, 10.0 cents; in 1964-65 such costs for comparable services were 2.1 cents and 7.5 cents. Increased cost of inputs and a lower average occupancy are the major reasons for higher storage costs.

When book costs are changed to replacement costs, the 1970-71 cost of storing a bushel of grain for 1 year increased to 14.9 cents for all facilities (table 3). 2/

Based on projections of cost and volume changes since 1970-71, the replacement cost for storage at commercial elevators is estimated to average 16.3 cents per bushel in 1972-73 (table 1). Although the estimated average occupancy is projected to be higher--57 percent in 1972-73, compared with 55 percent in 1970-71--it is not sufficient to offset increased input costs.

When facilities are utilized at projected 1972-73 occupancy levels, as shown in table 4, the average yearly storage cost per bushel is 16.3 cents at country elevators, 13.9 cents at inland terminals, and 24.2 cents at port terminal grain elevators (table 1). Comparable costs for 1970-71 were 15.0, 12.7, and 22.1 cents per bushel, respectively.

An increase of 10 percent in the 1972-73 projected volumes to be stored shows storage costs of 15.1 cents at country elevators, 12.9 cents at inland terminals, and 22.4 cents at port terminals (table 26). A decrease of 10 percent in volume results in storage costs of 17.6, 15.2, and 26.5 cents per bushel at country elevators, inland and port terminals, respectively.

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1/ Cost of Storing and Handling Grain in Commercial Elevators, 1964-65, U.S. Dept. Agr., Econ. Res. Serv., ERS-288, Apr. 1966.

2/ Replacement costs are the result of basing depreciation and interest on investment expenses for replacing the elevator's physical plant at 1970-71 price levels. Detailed information on the methodology used is given in appendix A.

The 1972-73 combined cost of handling and storing grain at country elevators is estimated at 21.5 cents per bushel. This includes the cost of storage for 1 year plus the cost of receiving by truck and shipping by rail. Comparable cost was 19.6 cents in 1970-71.

At inland terminals, the combined 1972-73 cost of receiving and shipping by rail plus storage for 1 year is estimated to average 19.2 cents per bushel, compared with 17.6 cents in 1970-71.

For port terminals, the cost of receiving by rail, storing for 1 year, and shipping by water is estimated at 27.8 cents per bushel in 1972-73, compared with 25.4 cents in 1970-71.

It is estimated that 3.6 billion bushels of storage space would be needed to handle and store the 1972-73 peak volume of grain. Longrun competitive costs of 22.0, 16.5, and 28.0 cents per bushel at country, inland terminal, and port terminal elevators, respectively, would be required to store and handle the projected maximum volume of grain (table 1). These longrun competitive costs would provide for replacement of elevator facilities at 1972-73 projected price levels and an 8.0 percent return on investment for the elevator space needed to handle and store the 1972-73 volumes, when utilized at 70 percent of capacity.

Disregarding the influence of handling costs, a longrun competitive cost of 15.5 cents per bushel for storage only would provide enough storage capacity for the maximum anticipated volume. These storage costs are 16.0, 12.0, and 24.5 cents per bushel at country, inland terminal, and port terminal elevators, respectively.

The shortrun competitive costs cover only the out-of-pocket or cash costs of the elevator under the same competitive conditions. These costs for storing and handling a bushel of grain are 12.5, 9.0, and 8.0 cents, respectively, while for storage only, the cost is 7.5, 4.5, and 6.5 cents per bushel at country elevators, inland, and port terminals, respectively (table 1). For all facilities combined, the shortrun competitive cost for storage only is 6.5 cents per bushel of grain in 1972-73.

The 1970-71 and estimated 1972-73 costs for each expense item by function and type of facility are shown in tables 18-25.

Active dust control programs were in operation in about 20 percent of the 251 elevators contacted in the general survey. (See appendix B). Twelve percent had developed plans for installing dust control equipment in the near future and the remaining 68 percent reported no plans for dust control.

Capital investment and annual operating costs incurred when complying with pollution control requirements of The Clean Air Act were estimated from a special study of 30 inland terminal and port terminals. Capital investment requirements for all facilities were: 6.39 cents per bushel of storage capacity, 1.23 cents per bushel of grain handled in 1970-71, and $2.75 per cubic feet of air per minute (c.f.m.) of dust control air.

Annual operating costs for dust control systems for these facilities were: 1.42 cents per bushel of storage capacity, 0.27 cent per bushel of grain handled in 1970-71, and $0.61 per c.f.m. of dust control air.

Table 1.--Estimated weighted average replacement costs and competitive costs per bushel for storing and handling grain by area, type of facility, and handling method, United States, fiscal 1972-73 1/

| Area, type of facility, and handling method | Average costs for-- | | | | | | | | Competitive costs 2/ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Receiving | | Shipping | | Storage | | Combined | | Storage | | Storage and handling | |
| | Out-of-pocket cost 3/ | Total cost 4/ | Out-of-pocket cost 3/ | Total cost 4/ | Out-of-pocket cost 3/ | Total cost 4// | Out-of-pocket cost 3/ | Total cost 4/ | Short-run 5/ | Long-run 6/ | Short-run 5/ | Long-run 6/ |
| | Cents | | | | | | | | Cents | | | |
| North Plains | | | | | | | | | | | | |
| Country: | | | | | | | | | | | | |
| Truck & rail 7/ | 2.0 | 2.2 | 1.6 | 1.9 | 8.7 | 18.1 | 12.3 | 22.2 | 9.5 | 17.5 | 15.0 | 25.5 |
| Inland terminal: | | | | | | | | | | | | |
| Rail & rail 8/ | 2.1 | 2.8 | 2.8 | 4.0 | 4.8 | 12.4 | 9.7 | 19.2 | 4.5 | 12.5 | 9.0 | 17.0 |
| Mid-Plains | | | | | | | | | | | | |
| Country: | | | | | | | | | | | | |
| Truck & rail | 2.1 | 2.5 | 1.9 | 2.5 | 5.2 | 14.5 | 9.2 | 19.5 | 6.5 | 14.5 | 10.5 | 19.5 |
| Inland terminal: | | | | | | | | | | | | |
| Rail & rail | 1.8 | 3.0 | 1.3 | 2.1 | 4.0 | 13.9 | 7.1 | 19.0 | 4.0 | 11.5 | 6.5 | 14.5 |
| South Plains | | | | | | | | | | | | |
| Country: | | | | | | | | | | | | |
| Truck & rail | 2.1 | 2.8 | 1.8 | 2.6 | 3.9 | 14.4 | 7.8 | 19.8 | 5.0 | 12.5 | 9.5 | 18.0 |
| Inland terminal: | | | | | | | | | | | | |
| Rail & rail | 1.5 | 2.8 | 1.5 | 3.3 | 3.5 | 16.1 | 6.5 | 22.2 | 4.0 | 11.5 | 9.0 | 17.5 |
| Port terminal: | | | | | | | | | | | | |
| Rail & water 9/ | 1.2 | 2.1 | 0.6 | 0.9 | 6.1 | 25.2 | 7.9 | 28.2 | 5.5 | 21.5 | 7.0 | 25.0 |
| West | | | | | | | | | | | | |
| Country: | | | | | | | | | | | | |
| Truck & rail | 1.9 | 2.8 | 2.5 | 3.7 | 6.2 | 18.8 | 10.6 | 25.3 | 7.0 | 15.0 | 11.0 | 21.0 |
| Inland terminal | | | | | | | | | | | | |
| Rail & rail | 1.6 | 2.2 | 1.8 | 3.0 | 4.6 | 13.8 | 8.0 | 19.0 | 4.5 | 10.0 | 8.0 | 15.0 |
| Port terminal: | | | | | | | | | | | | |
| Rail & water | 1.5 | 2.2 | 0.8 | 1.3 | 6.1 | 21.2 | 8.4 | 24.7 | 5.0 | 24.5 | 10.0 | 30.5 |
| Great Lakes | | | | | | | | | | | | |
| Country: | | | | | | | | | | | | |
| Truck & rail | 1.9 | 2.3 | 2.0 | 2.7 | 7.6 | 18.5 | 11.5 | 23.5 | 10.0 | 17.5 | 14.0 | 22.5 |
| Inland terminal: | | | | | | | | | | | | |
| Rail & rail | 1.7 | 2.4 | 1.3 | 2.0 | 3.7 | 11.9 | 6.7 | 16.3 | 4.0 | 10.5 | 6.5 | 15.0 |
| Port terminal: | | | | | | | | | | | | |
| Rail & water | 1.6 | 3.1 | 0.8 | 1.5 | 5.5 | 25.2 | 7.9 | 30.1 | 5.0 | 29.0 | 7.5 | 28.5 |
| South & East | | | | | | | | | | | | |
| Country: | | | | | | | | | | | | |
| Truck & rail | 2.4 | 2.9 | 3.2 | 4.4 | 8.1 | 23.2 | 13.7 | 30.5 | 10.5 | 18.5 | 20.0 | 30.5 |
| Inland terminal: | | | | | | | | | | | | |
| Rail & rail | 1.5 | 2.0 | 4.4 | 5.8 | 5.0 | 13.9 | 10.9 | 21.7 | 4.5 | 13.0 | 13.0 | 20.0 |
| Port terminal: | | | | | | | | | | | | |
| Rail & water | 1.4 | 2.4 | 1.1 | 2.0 | 4.3 | 22.4 | 6.8 | 26.8 | 3.5 | 19.5 | 7.0 | 23.5 |
| United States | | | | | | | | | | | | |
| Country: | | | | | | | | | | | | |
| Truck & rail | 2.0 | 2.5 | 2.0 | 2.7 | 6.1 | 16.3 | 10.1 | 21.5 | 7.5 | 16.0 | 12.5 | 22.0 |
| Inland terminal: | | | | | | | | | | | | |
| Rail & rail | 1.8 | 2.8 | 1.5 | 2.5 | 4.1 | 13.9 | 7.4 | 19.2 | 4.5 | 12.0 | 9.0 | 16.5 |
| Port terminal: | | | | | | | | | | | | |
| Rail & water | 1.4 | 2.4 | 0.7 | 1.2 | 5.5 | 24.2 | 7.6 | 27.8 | 6.5 | 24.5 | 8.0 | 28.0 |
| All facilities 10/ | -- | -- | -- | -- | 5.4 | 16.3 | -- | -- | 6.5 | 15.5 | -- | -- |

1/ Cost based on estimated 1972-73 replacement values and volumes assumed to be distributed at in 1970-71. 2/ Costs based on 1972-73 cost and volume estimates. Calculations based on assumption that all facilities would be utilized at 70-percent capacity and the described handling method would be used. 3/ Excludes depreciation and interest on investment. 4/ Includes depreciation and interest on investment. 5/ Cost of marginal firm excluding depreciation and interest on investment. 6/ Cost of marginal firm including depreciation and interest on investment. 7/ Grain received by truck, stored, and shipped by rail. 8/ Grain received by rail, stored, and shipped by rail. 9/ Grain received by rail, stored, and shipped by water. 10/ Average handling costs omitted due to different receiving and shipping methods for each type of facility.

Note: See table 4 for delineation of areas.

Table 2.--Standardized book costs, weighted average cost per bushel, for storing and handling grain, by area and type of facility, United States, fiscal 1970-71 1/

| Area and type of facility | Received by-- | | | Loadout by-- | | | Storage |
|---|---|---|---|---|---|---|---|
| | Truck | Rail | Water | Truck | Rail | Water | |
| | Cents | | | | | | |
| North Plains: | | | | | | | |
| Country | 1.93 | 2.81 | -- | 1.83 | 1.65 | -- | 11.33 |
| Inland terminal | 1.18 | 2.10 | -- | 2.20 | 2.67 | .97 | 5.87 |
| Port terminal | -- | -- | -- | -- | -- | -- | -- |
| Mid-Plains: | | | | | | | |
| Country | 2.16 | 2.72 | -- | 2.23 | 2.09 | .53 | 8.16 |
| Inland terminal | 1.86 | 1.80 | -- | 1.60 | 1.38 | .85 | 6.30 |
| Port terminal | -- | -- | -- | -- | -- | -- | -- |
| South Plains: | | | | | | | |
| Country | 2.13 | .67 | -- | 2.18 | 1.96 | -- | 6.42 |
| Inland terminal | 2.01 | 1.58 | -- | 1.73 | 1.56 | -- | 6.45 |
| Gulf port terminal | .97 | 1.45 | 1.68 | 5.78 | .92 | .66 | 16.52 |
| West: | | | | | | | |
| Country | 2.01 | -- | -- | 2.10 | 2.62 | -- | 10.04 |
| Inland terminal | 1.41 | 1.58 | -- | 1.76 | 1.97 | .51 | 7.39 |
| Port terminal | 2.18 | 1.48 | 1.35 | 1.93 | 2.92 | .82 | 10.93 |
| Great Lakes: | | | | | | | |
| Country | 2.04 | 10.86 | -- | 1.71 | 2.44 | 2.17 | 13.41 |
| Inland terminal | 1.61 | 1.70 | 2.83 | 2.50 | 1.59 | 1.45 | 6.67 |
| Port terminal | 1.62 | 1.54 | 2.28 | 2.24 | 1.99 | .82 | 6.93 |
| South and East: | | | | | | | |
| Country | 2.59 | 2.00 | -- | 3.04 | 3.77 | 1.34 | 13.72 |
| Inland terminal | 2.21 | 1.47 | 2.09 | 3.44 | 4.47 | 1.93 | 7.97 |
| East port terminal | 2.08 | 1.40 | 3.02 | 3.21 | 2.81 | 1.05 | 6.38 |
| United States: | | | | | | | |
| Country | 2.10 | 2.00 | -- | 2.02 | 2.17 | 1.21 | 9.46 |
| Inland terminal | 1.62 | 1.79 | 2.02 | 1.82 | 1.59 | 1.04 | 6.76 |
| Port terminal | 1.45 | 1.48 | 1.67 | 2.14 | 1.92 | .74 | 9.95 |
| All facilities | 2.00 | 1.61 | 1.81 | 2.00 | 2.00 | .83 | 8.90 |

1/ Depreciation based on standardized depreciation rates applied to original acquisition cost of buildings and equipment.

Note: See table 4 for delineation of areas.

Table 3.--Replacement costs, estimated weighted average cost per bushel, for storing and handling grain, by area and type of facility, United States, fiscal 1970-71 1/

| Area and type of facility | Received by-- | | | Loadout by-- | | | Storage |
|---|---|---|---|---|---|---|---|
| | Truck | Rail | Water | Truck | Rail | Water | |
| | Cents | | | | | | |
| North Plains: | | | | | | | |
| Country | 2.04 | 3.82 | -- | 1.92 | 1.77 | -- | 16.30 |
| Inland terminal | 1.41 | 2.54 | -- | 3.77 | 3.63 | 1.29 | 11.27 |
| Port terminal | -- | -- | -- | -- | -- | -- | -- |
| Mid-Plains: | | | | | | | |
| Country | 2.28 | 2.66 | -- | 2.28 | 2.34 | .65 | 13.27 |
| Inland terminal | 2.82 | 2.77 | -- | 2.99 | 1.91 | 1.11 | 12.63 |
| Port terminal | -- | -- | -- | -- | -- | -- | -- |
| South Plains: | | | | | | | |
| Country | 2.53 | 1.27 | -- | 2.87 | 2.39 | -- | 13.21 |
| Inland terminal | 3.23 | 2.57 | -- | 3.10 | 3.02 | -- | 14.57 |
| Gulf port terminal | 1.30 | 1.90 | 1.85 | 11.19 | 1.36 | .83 | 23.16 |
| West: | | | | | | | |
| Country | 2.52 | -- | -- | 2.96 | 3.29 | -- | 18.55 |
| Inland terminal | 1.76 | 1.94 | -- | 2.50 | 2.69 | .73 | 12.58 |
| Port terminal | 3.87 | 1.99 | 1.85 | 3.31 | 4.52 | 1.14 | 19.49 |
| Great Lakes: | | | | | | | |
| Country | 2.06 | 11.52 | -- | 1.76 | 2.45 | 2.23 | 17.33 |
| Inland terminal | 1.87 | 2.14 | 3.54 | 3.03 | 1.82 | 1.73 | 11.05 |
| Port terminal | 3.24 | 2.89 | 3.67 | 4.46 | 3.06 | 1.42 | 22.82 |
| South and East: | | | | | | | |
| Country | 2.66 | 1.93 | -- | 3.07 | 4.00 | 1.27 | 21.40 |
| Inland terminal | 2.30 | 1.80 | 2.60 | 4.20 | 5.24 | 1.67 | 12.56 |
| East port terminal | 3.87 | 2.23 | 4.97 | 10.52 | 6.31 | 1.80 | 20.74 |
| United States: | | | | | | | |
| Country | 2.25 | 2.19 | -- | 2.17 | 2.44 | 1.23 | 14.96 |
| Inland terminal | 2.15 | 2.58 | 2.83 | 3.10 | 2.31 | 1.31 | 12.69 |
| Port terminal | 2.61 | 2.24 | 1.94 | 4.36 | 3.01 | 1.06 | 22.11 |
| All facilities | 2.26 | 2.37 | 2.02 | 2.26 | 2.42 | 1.11 | 14.93 |

1/ Depreciation and interest on investment based on replacing building and equipment at 1970-71 price levels.

Note: See table 4 for delineation of areas.

Table 4.--Average occupancy levels by area and type of facility, United States, fiscal 1970-71 and 1972-73

| Area and type of facility | Average occupancy | |
|---|---|---|
| | 1970-71 1/ | 1972-73 2/ |
| | Percent | |
| North Plains 3/ | 69.5 | 70.7 |
| Mid-Plains 4/ | 56.4 | 58.3 |
| South Plains 5/ | 47.0 | 48.6 |
| West 6/ | 46.2 | 51.0 |
| Great Lakes 7/ | 58.3 | 61.5 |
| South and East 8/ | 46.2 | 48.0 |
| United States | 54.7 | 56.9 |
| Country | 52.8 | 55.2 |
| Inland terminal | 55.7 | 57.4 |
| Port terminal | 67.0 | 68.8 |

1/ Plants surveyed in 1970-71.
2/ Projections for 1972-73.
3/ N. Dak., S. Dak., and Minn., (excluding port facilities).
4/ Nebr., Kans., Colo., Wyo., Iowa, and Mo.
5/ Okla., N. Mex., and Texas plus all Gulf port facilities.
6/ Wash., Oreg., Idaho, Mont., Calif., Ariz., Nev., and Utah.
7/ Wis., Ill., Ind., Ohio, Mich., and Minn. port facilities.
8/ Ark., Miss., S.C., Tenn., Ky., N.Y., Va., Pa., N.J., Md., Del., La., Ala., Ga., N.C., W. Va., and New England. (All Gulf ports are included in the South Plains.)

Table 5.--Estimated maximum storage requirements by area and type of facility, United States, fiscal 1972-73 1/

| Area and type of facility | 1972-73 |
|---|---|
| | Million bushels |
| North Plains | 380 |
| Mid-Plains | 1,390 |
| South Plains | 750 |
| West | 280 |
| Great Lakes | 595 |
| South and East | 235 |
| United States | 3,630 |
| Country | 2,360 |
| Inland terminal | 1,010 |
| Port terminal | 260 |

1/ Estimated on basis of maximum stocks, adjusted for required working space. Maximum stocks estimated on basis of total supply and disappearance projections.

Note: See table 4 for delineation of areas.

Table 6.--Country facilities: Capacity available for storing and handling grain at indicated longrun cost levels, 70 percent average occupancy, by area and United States, fiscal 1972-73

| Longrun cost per bushel (cents) 1/ | Storage capacity of plants in-- | | | | | |
|---|---|---|---|---|---|---|
| | North Plains | Mid-Plains | South Plains | West | Great Lakes | United States 2/ |
| | 1,000 bushels | | | | | |
| Less than-- | | | | | | |
| 10.0 | -- | 18,544 | 33,936 | -- | -- | 52,480 |
| 11.0 | -- | 102,820 | 85,876 | -- | 21,976 | 210,672 |
| 12.0 | 3,009 | 230,949 | 155,199 | 7,953 | 54,793 | 461,792 |
| 13.0 | 7,718 | 355,382 | 243,481 | 25,485 | 65,103 | 707,056 |
| 14.0 | 7,718 | 450,855 | 290,430 | 25,485 | 105,913 | 904,433 |
| 15.0 | 33,778 | 593,055 | 334,011 | 52,897 | 123,686 | 1,178,337 |
| 16.0 | 33,778 | 727,364 | 375,721 | 74,294 | 139,961 | 1,392,029 |
| 17.0 | 46,139 | 779,856 | 389,303 | 125,134 | 200,885 | 1,582,226 |
| 18.0 | 88,921 | 877,812 | 411,233 | 159,264 | 252,079 | 1,870,767 |
| 19.0 | 128,618 | 877,812 | 411,233 | 166,856 | 313,279 | 2,001,375 |
| 20.0 | 213,129 | 940,356 | 424,862 | 178,427 | 329,463 | 2,189,814 |
| 21.0 | 213,129 | 986,303 | 437,880 | 206,932 | 329,463 | 2,277,283 |
| 22.0 | 222,215 | 1,037,880 | 437,880 | 221,936 | 377,373 | 2,400,129 |
| 23.0 | 233,218 | 1,053,596 | 448,892 | 221,936 | 396,854 | 2,458,075 |
| 24.0 | 243,582 | 1,070,064 | 468,429 | 231,882 | 413,637 | 2,531,172 |
| 25.0 | 243,582 | 1,070,064 | 468,429 | 242,415 | 413,637 | 2,553,840 |
| 26.0 | 281,529 | 1,070,064 | 468,429 | 252,415 | 413,637 | 2,613,653 |
| 27.0 | 320,470 | 1,094,529 | 490,730 | 242,415 | 413,637 | 2,699,360 |
| 28.0 | 320,470 | 1,126,396 | 490,730 | 249,545 | 423,275 | 2,747,995 |
| 29.0 | 320,470 | 1,147,424 | 490,730 | 252,263 | 423,275 | 2,750,713 |
| 30.0 | 320,470 | 1,147,424 | 490,730 | 252,263 | 423,275 | 2,774,139 |
| 31.0 | 320,470 | 1,147,424 | 498,558 | 252,263 | 423,275 | 2,794,713 |
| 32.0 | 320,470 | 1,147,424 | 498,558 | 260,373 | 423,275 | 2,819,910 |
| 33.0 | 327,836 | 1,147,424 | 498,558 | 260,373 | 448,184 | 2,852,185 |
| All plants | 343,694 | 1,171,961 | 523,189 | 260,373 | 477,525 | 2,954,284 |

1/ Cost of receiving by truck, storage for 1 year, and shipping by rail; includes depreciation and interest on investment based on estimated 1972-73 price levels.

2/ Includes South and East.

Note: See table 4 for delineation of areas.

Table 7.--Inland terminals: Capacity available for storing and handling grain at indicated longrun cost levels, 70 percent average occupancy, by area and United States, fiscal 1972-73

| Longrun cost per bushel (cents) 1/ | Storage capacity of plants in-- | | | | | |
|---|---|---|---|---|---|---|
| | North Plains | Mid-Plains | South Plains | West | Great Lakes | United States 2/ |
| | 1,000 bushels | | | | | |
| Less than-- | | | | | | |
| 10.0 | -- | -- | -- | -- | 6,510 | 21,681 |
| 10.5 | -- | -- | 20,822 | -- | 6,510 | 42,504 |
| 11.0 | 12,537 | 40,900 | 20,822 | 5,859 | 6,510 | 101,799 |
| 11.5 | 12,537 | 40,900 | 20,822 | 5,859 | 12,816 | 108,106 |
| 12.0 | 12,537 | 78,862 | 37,895 | 5,859 | 12,816 | 163,141 |
| 12.5 | 12,537 | 78,862 | 37,895 | 13,878 | 12,816 | 180,346 |
| 13.0 | 26,308 | 138,757 | 56,458 | 13,878 | 12,816 | 272,575 |
| 13.5 | 26,308 | 242,952 | 106,252 | 13,878 | 53,074 | 466,821 |
| 14.0 | 26,308 | 406,177 | 106,252 | 21,420 | 76,524 | 671,469 |
| 14.5 | 26,308 | 469,671 | 208,721 | 21,420 | 76,524 | 837,432 |
| 15.0 | 26,308 | 469,671 | 237,321 | 24,728 | 86,562 | 882,460 |
| 15.5 | 44,153 | 469,671 | 237,321 | 24,728 | 93,061 | 906,804 |
| 16.0 | 75,359 | 469,671 | 237,321 | 24,728 | 93,061 | 949,170 |
| 16.5 | 95,273 | 542,697 | 237,321 | 24,728 | 105,121 | 1,054,170 |
| 17.0 | 115,829 | 542,697 | 237,321 | 24,728 | 105,121 | 1,074,726 |
| 17.5 | 123,064 | 542,697 | 237,321 | 29,728 | 108,817 | 1,090,657 |
| 18.0 | 123,064 | 542,697 | 260,721 | 29,728 | 108,817 | 1,114,057 |
| 18.5 | 123,064 | 542,697 | 288,666 | 29,728 | 108,817 | 1,142,002 |
| 19.0 | 123,064 | 542,697 | 301,370 | 29,728 | 108,817 | 1,154,706 |
| 19.5 | 123,064 | 542,697 | 301,370 | 29,728 | 108,817 | 1,154,706 |
| 20.0 | 123,064 | 542,697 | 301,370 | 29,728 | 108,817 | 1,170,006 |
| 20.5 | 123,064 | 564,300 | 301,370 | 29,728 | 108,817 | 1,191,609 |
| All plants | 145,344 | 606,456 | 336,366 | 32,512 | 108,817 | 1,311,552 |

1/ Cost of receiving by rail, storage for 1 year, and shipping by rail; includes depreciation and interest on investment based on estimated 1972-73 price levels.

2/ Includes South and East.

Note: See table 4 for delineation of areas.

Table 8.--Port terminals: Capacity available for storing and handling grain at indicated longrun cost levels, 70 percent average occupancy, by area and United States, fiscal 1972-73

| Longrun cost per bushel (cents) 1/ | Storage capacity of plants in-- | | | | |
|---|---|---|---|---|---|
| | Gulf | West | Great Lakes | East | United States |
| | 1,000 bushels | | | | |
| Less than-- | | | | | |
| 14.0 | -- | 38,380 | -- | -- | 38,380 |
| 15.0 | -- | 38,380 | -- | -- | 38,380 |
| 16.0 | -- | 38,380 | -- | -- | 38,380 |
| 17.0 | -- | 38,380 | -- | -- | 38,380 |
| 18.0 | -- | 38,380 | -- | -- | 38,380 |
| 19.0 | -- | 38,380 | -- | -- | 38,380 |
| 20.0 | 24,725 | 38,380 | -- | -- | 63,105 |
| 21.0 | 36,308 | 38,380 | -- | -- | 74,688 |
| 22.0 | 36,308 | 38,380 | -- | 5,600 | 80,288 |
| 23.0 | 36,308 | 38,380 | 13,540 | 5,600 | 93,829 |
| 24.0 | 52,508 | 38,380 | 31,090 | 34,400 | 156,379 |
| 25.0 | 92,031 | 38,380 | 31,090 | 34,400 | 195,901 |
| 26.0 | 92,031 | 38,380 | 81,554 | 34,400 | 246,365 |
| 27.0 | 92,031 | 38,380 | 81,554 | 34,400 | 246,365 |
| 28.0 | 103,500 | 38,380 | 90,328 | 38,368 | 270,576 |
| 29.0 | 103,500 | 38,380 | 90,328 | 38,368 | 270,576 |
| 30.0 | 103,500 | 38,380 | 90,328 | 38,368 | 270,576 |
| 31.0 | 103,500 | 45,465 | 90,328 | 38,368 | 277,661 |
| 32.0 | 103,500 | 45,465 | 147,061 | 38,368 | 334,394 |
| 33.0 | 103,500 | 59,648 | 147,061 | 38,368 | 348,577 |
| All plants | 103,500 | 63,896 | 147,061 | 38,368 | 352,825 |

1/ Cost of receiving by rail, storage for 1 year, and shipping by water; includes depreciation and interest on investment based on estimated 1972-73 price levels.

Note: See table 4 for delineation of areas.

Table 9.--Country facilities: Capacity available for storing grain at indicated longrun cost levels, 70 percent average occupancy, by area and United States, fiscal 1972-73

| Longrun cost per bushel (cents) 1/ | Storage capacity of plants in-- | | | | | |
|---|---|---|---|---|---|---|
| | North Plains | Mid-Plains | South Plains | West | Great Lakes | United States 2/ |
| | 1,000 bushels | | | | | |
| Less than-- | | | | | | |
| 6.0 | -- | -- | 17,000 | -- | -- | 17,000 |
| 7.0 | -- | 140,165 | 124,267 | -- | -- | 264,431 |
| 8.0 | -- | 219,435 | 195,607 | 7,953 | -- | 422,994 |
| 9.0 | 7,718 | 342,090 | 238,142 | 18,154 | 40,178 | 656,170 |
| 10.0 | 19,913 | 530,720 | 308,478 | 53,156 | 54,793 | 976,948 |
| 11.0 | 19,913 | 608,330 | 371,866 | 75,544 | 93,107 | 1,208,638 |
| 12.0 | 19,913 | 693,098 | 395,258 | 137,282 | 123,686 | 1,448,609 |
| 13.0 | 63,865 | 747,226 | 430,770 | 147,429 | 159,872 | 1,652,740 |
| 14.0 | 102,049 | 849,579 | 441,782 | 201,488 | 242,623 | 1,941,099 |
| 15.0 | 120,388 | 937,734 | 441,782 | 206,932 | 348,944 | 2,170,505 |
| 16.0 | 213,738 | 993,251 | 468,429 | 221,936 | 382,713 | 2,394,793 |
| 17.0 | 256,695 | 1,031,864 | 468,429 | 232,469 | 382,713 | 2,486,894 |
| 18.0 | 265,781 | 1,106,491 | 468,429 | 249,545 | 396,854 | 2,624,680 |
| 19.0 | 276,144 | 1,122,959 | 468,429 | 249,545 | 396,854 | 2,666,789 |
| 20.0 | 287,265 | 1,147,424 | 490,730 | 249,545 | 413,637 | 2,736,459 |
| 21.0 | 299,559 | 1,147,424 | 490,730 | 252,263 | 413,637 | 2,751,471 |
| 22.0 | 311,123 | 1,147,424 | 490,730 | 252,263 | 423,275 | 2,772,673 |
| 23.0 | 327,379 | 1,147,424 | 498,558 | 252,263 | 423,275 | 2,808,800 |
| 24.0 | 327,379 | 1,147,424 | 498,558 | 260,373 | 448,184 | 2,849,260 |
| 25.0 | 327,379 | 1,147,424 | 498,558 | 260,373 | 448,184 | 2,849,260 |
| 26.0 | 327,379 | 1,147,424 | 498,558 | 260,373 | 448,184 | 2,849,260 |
| 27.0 | 327,379 | 1,147,424 | 498,558 | 260,373 | 448,184 | 2,851,728 |
| 28.0 | 334,745 | 1,147,424 | 498,558 | 260,373 | 448,184 | 2,859,094 |
| 29.0 | 334,745 | 1,147,424 | 498,558 | 260,373 | 448,184 | 2,859,094 |
| All plants | 343,694 | 1,171,961 | 523,189 | 260,373 | 477,525 | 2,954,284 |

1/ Cost of storage for 1 year; includes depreciation and interest on investment based on estimated 1972-73 price levels.

2/ Includes South and East

Note: See table 4 for delineation of areas.

Table 10.--Inland terminals: Capacity available for storing grain at indicated longrun cost levels, 70 percent average occupancy, by area and United States, fiscal 1972-73

| Longrun cost per bushel (cents) 1/ | Storage capacity of plants in-- | | | | | |
|---|---|---|---|---|---|---|
| | North Plains | Mid-Plains | South Plains | West | Great Lakes | United States 2/ |
| | 1,000 bushels | | | | | |
| Less than-- | | | | | | |
| 6.0 | -- | -- | -- | -- | -- | -- |
| 6.5 | -- | -- | -- | -- | -- | -- |
| 7.0 | -- | -- | 27,820 | -- | -- | 42,991 |
| 7.5 | -- | -- | 81,712 | -- | 6,510 | 103,393 |
| 8.0 | 26,308 | 40,900 | 81,712 | -- | 6,510 | 170,601 |
| 8.5 | 26,308 | 40,900 | 102,534 | 5,859 | 6,510 | 207,713 |
| 9.0 | 26,308 | 40,900 | 102,534 | 5,859 | 6,510 | 216,899 |
| 9.5 | 26,308 | 78,862 | 121,096 | 13,878 | 13,010 | 287,942 |
| 10.0 | 44,153 | 111,954 | 143,071 | 24,728 | 43,279 | 417,273 |
| 10.5 | 44,153 | 218,779 | 166,471 | 24,728 | 83,023 | 587,243 |
| 11.0 | 78,330 | 338,673 | 166,471 | 24,728 | 83,023 | 741,313 |
| 11.5 | 95,916 | 398,569 | 166,471 | 24,728 | 83,023 | 824,645 |
| 12.0 | 95,916 | 542,697 | 295,717 | 27,512 | 95,083 | 1,112,863 |
| 12.5 | 95,916 | 542,697 | 295,717 | 27,512 | 105,121 | 1,125,982 |
| 13.0 | 115,829 | 564,300 | 295,717 | 27,512 | 105,121 | 1,178,659 |
| 13.5 | 115,829 | 564,300 | 323,662 | 27,512 | 108,817 | 1,210,300 |
| 14.0 | 123,064 | 564,300 | 323,662 | 32,512 | 108,817 | 1,222,535 |
| 14.5 | 135,131 | 564,300 | 323,662 | 32,512 | 108,817 | 1,234,602 |
| 15.0 | 135,131 | 564,300 | 336,366 | 32,512 | 108,817 | 1,247,306 |
| All plants | 145,344 | 606,456 | 336,366 | 32,512 | 108,817 | 1,311,522 |

1/ Cost of storage for 1 year; includes depreciation and interest on investment based on estimated 1972-73 price levels.

2/ Includes South and East.

Note: See table 4 for delineation of areas.

Table 11.-- Port terminals: Capacity available for storing grain at indicated longrun cost levels, 70 percent average occupancy, by area and United States, fiscal 1972-73

| Longrun cost per bushel (cents) 1/ | Storage capacity of plants in-- | | | | |
|---|---|---|---|---|---|
| | Gulf | West | Great Lakes | East | United States |
| | 1,000 bushels | | | | |
| Less than-- | | | | | |
| 11.0 | -- | 23,860 | -- | -- | 23,860 |
| 12.0 | -- | 38,380 | -- | -- | 38,380 |
| 13.0 | -- | 38,380 | -- | -- | 38,380 |
| 14.0 | -- | 38,380 | -- | -- | 38,380 |
| 15.0 | -- | 38,380 | -- | -- | 38,380 |
| 16.0 | -- | 38,380 | -- | -- | 38,380 |
| 17.0 | 24,725 | 38,380 | -- | -- | 63,105 |
| 18.0 | 24,725 | 38,380 | -- | -- | 63,105 |
| 19.0 | 36,380 | 38,380 | -- | 22,400 | 97,088 |
| 20.0 | 36,308 | 38,380 | 13,540 | 28,000 | 116,229 |
| 21.0 | 36,308 | 38,380 | 44,496 | 34,400 | 153,584 |
| 22.0 | 92,031 | 38,380 | 44,496 | 34,400 | 209,307 |
| 23.0 | 92,031 | 38,380 | 81,554 | 34,400 | 246,364 |
| 24.0 | 92,031 | 38,380 | 81,554 | 34,400 | 246,364 |
| 25.0 | 103,500 | 45,465 | 90,328 | 34,400 | 273,694 |
| 26.0 | 103,500 | 45,465 | 90,328 | 38,368 | 277,662 |
| 27.0 | 103,500 | 45,465 | 90,328 | 38,368 | 277,662 |
| 28.0 | 103,500 | 45,465 | 90,328 | 38,368 | 277,662 |
| 29.0 | 103,500 | 53,708 | 147,061 | 38,368 | 342,638 |
| All plants | 103,500 | 63,896 | 147,061 | 38,368 | 352,825 |

1/ Cost of storage for 1 year; includes depreciation and interest on investment based on estimated 1972-73 price levels.

Note: See table 4 for delineation of areas.

Table 12.--Country facilities: Capacity available for storing and handling grain at indicated shortrun cost levels, 70 percent average occupancy, by area and United States, fiscal 1972-73

| Shortrun cost per bushel (cents) 1/ | Storage capacity of plants in-- | | | | | |
|---|---|---|---|---|---|---|
| | North Plains | Mid-Plains | South Plains | West | Great Lakes | United States 2/ |
| | 1,000 bushels | | | | | |
| Less than-- | | | | | | |
| 6.5 | 7,718 | 274,029 | 244,720 | 44,172 | 122,189 | 725,865 |
| 7.0 | 33,778 | 463,925 | 276,647 | 57,104 | 147,828 | 1,012,319 |
| 7.5 | 33,778 | 531,622 | 276,647 | 66,791 | 162,835 | 1,113,052 |
| 8.0 | 33,778 | 610,071 | 332,025 | 76,939 | 217,720 | 1,319,784 |
| 8.5 | 33,778 | 741,768 | 345,530 | 116,061 | 234,306 | 1,520,695 |
| 9.0 | 69,202 | 807,528 | 367,460 | 116,061 | 234,306 | 1,643,809 |
| 9.5 | 80,632 | 836,370 | 403,870 | 123,654 | 252,079 | 1,745,856 |
| 10.0 | 128,025 | 875,482 | 419,596 | 145,171 | 265,570 | 1,883,095 |
| 10.5 | 160,595 | 899,742 | 419,596 | 179,100 | 310,119 | 2,040,520 |
| 11.0 | 203,328 | 938,027 | 419,596 | 201,488 | 310,119 | 2,160,272 |
| 11.5 | 213,129 | 995,436 | 419,596 | 216,492 | 329,601 | 2,261,969 |
| 12.0 | 213,129 | 995,436 | 441,896 | 226,439 | 366,529 | 2,347,006 |
| 12.5 | 213,129 | 1,025,201 | 441,896 | 226,439 | 380,671 | 2,390,913 |
| 13.0 | 223,492 | 1,025,201 | 441,896 | 236,971 | 380,671 | 2,411,808 |
| 13.5 | 223,492 | 1,070,064 | 441,896 | 242,415 | 380,671 | 2,462,115 |
| 14.0 | 232,578 | 1,070,064 | 441,896 | 242,415 | 413,637 | 2,504,168 |
| 14.5 | 240,503 | 1,094,529 | 441,896 | 242,415 | 413,637 | 2,512,092 |
| 15.0 | 267,762 | 1,094,529 | 452,909 | 242,415 | 413,637 | 2,574,830 |
| 15.5 | 285,491 | 1,094,529 | 452,909 | 242,415 | 413,637 | 2,592,559 |
| 16.0 | 285,491 | 1,094,529 | 452,909 | 242,415 | 413,637 | 2,592,559 |
| 16.5 | 297,055 | 1,094,529 | 452,909 | 242,415 | 413,637 | 2,616,259 |
| 17.0 | 309,349 | 1,094,529 | 452,909 | 242,415 | 413,637 | 2,639,270 |
| 17.5 | 309,349 | 1,094,529 | 452,909 | 245,133 | 413,637 | 2,641,988 |
| 18.0 | 309,349 | 1,126,396 | 472,446 | 252,263 | 413,637 | 2,711,670 |
| All plants | 343,694 | 1,171,961 | 523,189 | 260,373 | 477,525 | 2,954,284 |

1/ Cost of receiving by truck, storage for 1 year, and shipping by rail; excludes depreciation and interest on investment.

2/ Includes South and East.

Note: See table 4 for delineation of areas.

Table 13.--Inland terminals: Capacity available for storing and handling grain at indicated shortrun cost levels, 70 percent average occupancy, by area and United States, fiscal 1972-73

| Shortrun cost per bushel (cents) 1/ | Storage capacity of plants in-- | | | | | |
|---|---|---|---|---|---|---|
| | North Plains | Mid-Plains | South Plains | West | Great Lakes | United States 2/ |
| | 1,000 bushels | | | | | |
| Less than-- | | | | | | |
| 4.5 | -- | 78,862 | 103,545 | -- | 6,510 | 188,917 |
| 5.0 | -- | 135,262 | 103,545 | 5,895 | 22,804 | 291,828 |
| 5.5 | -- | 299,352 | 154,120 | 5,895 | 36,390 | 520,078 |
| 6.0 | 12,537 | 299,352 | 154,120 | 5,895 | 76,524 | 575,830 |
| 6.5 | 46,222 | 469,671 | 172,682 | 9,167 | 76,524 | 801,704 |
| 7.0 | 64,067 | 469,671 | 172,682 | 17,186 | 86,562 | 837,606 |
| 7.5 | 64,067 | 491,274 | 200,502 | 17,186 | 86,562 | 887,029 |
| 8.0 | 64,067 | 564,300 | 200,502 | 24,728 | 98,622 | 979,657 |
| 8.5 | 64,067 | 564,300 | 200,502 | 24,728 | 98,622 | 979,657 |
| 9.0 | 123,064 | 564,300 | 251,847 | 29,728 | 98,622 | 1,095,000 |
| 9.5 | 123,064 | 564,300 | 288,666 | 29,728 | 102,318 | 1,157,106 |
| 10.0 | 123,064 | 564,300 | 301,370 | 29,728 | 108,817 | 1,176,309 |
| 10.5 | 123,064 | 564,300 | 301,370 | 29,728 | 108,817 | 1,176,309 |
| 11.0 | 123,064 | 564,300 | 301,370 | 29,728 | 108,817 | 1,176,309 |
| 11.5 | 123,064 | 564,300 | 301,370 | 29,728 | 108,817 | 1,176,309 |
| 12.0 | 123,064 | 564,300 | 301,370 | 29,728 | 108,817 | 1,176,309 |
| 12.5 | 123,064 | 564,300 | 301,370 | 29,728 | 108,817 | 1,176,309 |
| 13.0 | 123,064 | 564,300 | 301,370 | 29,728 | 108,817 | 1,179,819 |
| 13.5 | 123,064 | 564,300 | 301,370 | 29,728 | 108,817 | 1,179,819 |
| 14.0 | 123,064 | 606,456 | 301,370 | 29,728 | 108,817 | 1,237,274 |
| 14.5 | 123,064 | 606,456 | 301,370 | 29,728 | 108,817 | 1,237,274 |
| 15.0 | 123,064 | 606,456 | 301,370 | 29,728 | 108,817 | 1,237,274 |
| All plants | 145,344 | 606,456 | 336,366 | 32,512 | 108,817 | 1,311,552 |

1/ Cost of receiving by rail, storage for 1 year, and shipping by rail; excludes depreciation and interest on investment.

2/ Includes South and East.

Note: See table 4 for delineation of areas.

Table 14.--Port terminals: Capacity available for storing and handling grain at indicated shortrun cost levels, 70 percent average occupancy, by area and United States, fiscal 1972-73

| Shortrun cost per bushel (cents) 1/ | Storage capacity of plants in-- | | | | |
|---|---|---|---|---|---|
| | Gulf | West | Great Lakes | East | United States |
| | 1,000 bushels | | | | |
| Less than-- | | | | | |
| 4.5 | -- | 14,520 | -- | -- | 14,520 |
| 5.0 | -- | 38,380 | -- | -- | 38,380 |
| 5.5 | 36,970 | 38,380 | 13,540 | 5,600 | 94,490 |
| 6.0 | 36,970 | 38,380 | 13,540 | 5,600 | 94,490 |
| 6.5 | 53,170 | 38,380 | 31,090 | 5,600 | 128,240 |
| 7.0 | 72,982 | 38,380 | 68,148 | 12,000 | 191,510 |
| 7.5 | 72,982 | 38,380 | 81,554 | 12,000 | 204,916 |
| 8.0 | 72,982 | 38,380 | 132,886 | 34,400 | 278,648 |
| 8.5 | 72,982 | 38,380 | 132,886 | 34,400 | 278,648 |
| 9.0 | 72,982 | 38,380 | 132,886 | 34,400 | 278,648 |
| 9.5 | 72,982 | 38,380 | 141,661 | 38,368 | 291,391 |
| 10.0 | 92,031 | 45,465 | 141,661 | 38,368 | 317,525 |
| 10.5 | 92,031 | 45,465 | 141,661 | 38,368 | 317,525 |
| 11.0 | 103,500 | 45,465 | 141,661 | 38,368 | 328,994 |
| 11.5 | 103,500 | 49,712 | 141,661 | 38,368 | 333,241 |
| 12.0 | 103,500 | 49,712 | 141,661 | 38,368 | 333,241 |
| 12.5 | 103,500 | 49,712 | 147,061 | 38,368 | 338,641 |
| 13.0 | 103,500 | 49,712 | 147,061 | 38,368 | 338,641 |
| 13.5 | 103,500 | 49,712 | 147,061 | 38,368 | 338,641 |
| 14.0 | 103,500 | 55,652 | 147,061 | 38,368 | 344,581 |
| 14.5 | 103,500 | 63,896 | 147,061 | 38,368 | 352,825 |
| All plants | 103,500 | 63,896 | 147,061 | 38,368 | 352,825 |

1/ Cost of receiving by rail, storage for 1 year, and shipping by water; excludes depreciation and interest on investment.

Note: See table 4 for delineation of areas.

Table 15.--Country facilities: Capacity available for storing grain at indicated shortrun cost levels, 70 percent average occupancy, by area and United States, fiscal 1972-73

| Shortrun cost per bushel (cents) 1/ | Storage capacity of plants in-- | | | | | |
|---|---|---|---|---|---|---|
| | North Plains | Mid-Plains | South Plains | West | Great Lakes | United States 2/ |
| | 1,000 bushels | | | | | |
| Less than-- | | | | | | |
| 2.0 | 4,708 | 103,305 | 162,880 | 15,283 | -- | 296,065 |
| 2.5 | 4,708 | 189,250 | 213,924 | 25,487 | 18,202 | 461,457 |
| 3.0 | 16,904 | 349,398 | 242,570 | 56,902 | 28,434 | 704,096 |
| 3.5 | 16,904 | 462,180 | 317,697 | 74,627 | 75,335 | 964,972 |
| 4.0 | 27,838 | 593,127 | 332,047 | 94,903 | 122,189 | 1,188,333 |
| 4.5 | 27,838 | 673,307 | 351,584 | 102,495 | 173,382 | 1,392,104 |
| 5.0 | 27,838 | 745,484 | 410,411 | 146,512 | 173,382 | 1,574,998 |
| 5.5 | 54,064 | 804,609 | 424,040 | 190,619 | 250,559 | 1,795,261 |
| 6.0 | 84,925 | 826,093 | 424,040 | 190,619 | 271,560 | 1,884,953 |
| 6.5 | 106,762 | 953,623 | 455,411 | 190,619 | 289,233 | 2,083,364 |
| 7.0 | 174,503 | 971,156 | 490,730 | 205,624 | 323,002 | 2,252,730 |
| 7.5 | 224,558 | 1,031,864 | 490,730 | 236,971 | 323,002 | 2,405,988 |
| 8.0 | 224,558 | 1,048,331 | 490,730 | 236,971 | 382,713 | 2,498,028 |
| 8.5 | 238,782 | 1,072,797 | 490,730 | 242,415 | 382,713 | 2,542,162 |
| 9.0 | 238,782 | 1,102,562 | 490,730 | 242,415 | 382,713 | 2,571,927 |
| 9.5 | 249,786 | 1,119,010 | 490,730 | 242,415 | 382,713 | 2,599,379 |
| 10.0 | 269,235 | 1,119,010 | 490,730 | 249,545 | 396,854 | 2,650,817 |
| 10.5 | 269,235 | 1,119,010 | 490,730 | 249,545 | 413,637 | 2,679,736 |
| 11.0 | 269,235 | 1,147,424 | 490,730 | 249,545 | 413,637 | 2,708,150 |
| 11.5 | 269,235 | 1,147,424 | 490,730 | 252,263 | 413,637 | 2,710,868 |
| 12.0 | 280,799 | 1,147,424 | 490,730 | 252,263 | 413,637 | 2,722,432 |
| 12.5 | 297,055 | 1,147,424 | 498,558 | 252,263 | 413,637 | 2,766,441 |
| 13.0 | 320,470 | 1,147,424 | 498,558 | 252,263 | 413,637 | 2,789,856 |
| 13.5 | 320,470 | 1,147,424 | 498,558 | 252,263 | 413,637 | 2,792,253 |
| All plants | 343,694 | 1,171,961 | 523,189 | 260,373 | 477,525 | 2,954,284 |

1/ Cost of storage for 1 year; excludes depreciation and interest on investment.

2/ Includes South and East.

Note: See table 4 for delineation of areas.

Table 16.--Inland terminals: Capacity available for storing grain at indicated shortrun cost levels, 70 percent average occupancy, by area and United Stat States, fiscal 1972-73

| Shortrun cost per bushel (cents) 1/ | Storage capacity of plants in-- | | | | | |
|---|---|---|---|---|---|---|
| | North Plains | Mid-Plains | South Plains | West | Great Lakes | United States 2/ |
| | 1,000 bushels | | | | | |
| Less than-- | | | | | | |
| 1.0 | -- | -- | 17,073 | -- | -- | 17,073 |
| 1.5 | -- | 40,900 | 44,893 | -- | -- | 85,793 |
| 2.0 | -- | 78,862 | 81,712 | 2,784 | 6,510 | 194,224 |
| 2.5 | 31,617 | 111,954 | 81,712 | 2,784 | 6,510 | 258,934 |
| 3.0 | 44,153 | 168,355 | 208,721 | 11,951 | 13,790 | 471,327 |
| 3.5 | 64,710 | 253,451 | 232,121 | 19,970 | 70,217 | 683,208 |
| 4.0 | 98,243 | 493,198 | 260,721 | 19,970 | 82,277 | 997,149 |
| 4.5 | 98,243 | 564,300 | 295,717 | 27,512 | 95,083 | 1,139,875 |
| 5.0 | 115,829 | 564,300 | 259,717 | 27,512 | 105,121 | 1,167,499 |
| 5.5 | 115,829 | 564,300 | 323,662 | 27,512 | 105,121 | 1,195,444 |
| 6.0 | 127,896 | 564,300 | 323,662 | 27,512 | 105,121 | 1,207,510 |
| 6.5 | 127,896 | 564,300 | 336,366 | 27,512 | 108,817 | 1,235,017 |
| 7.0 | 135,131 | 564,300 | 336,366 | 32,512 | 108,817 | 1,247,306 |
| 7.5 | 135,131 | 564,300 | 336,366 | 32,512 | 108,817 | 1,247,306 |
| 8.0 | 135,131 | 606,456 | 336,366 | 32,512 | 108,817 | 1,289,462 |
| 8.5 | 135,131 | 606,456 | 336,366 | 32,512 | 108,817 | 1,289,462 |
| 9.0 | 135,131 | 606,456 | 336,366 | 32,512 | 108,817 | 1,289,462 |
| 9.5 | 135,131 | 606,456 | 336,366 | 32,512 | 108,817 | 1,292,971 |
| 10.0 | 135,131 | 606,456 | 336,366 | 32,512 | 108,817 | 1,292,971 |
| 10.5 | 135,131 | 606,456 | 336,366 | 32,512 | 108,817 | 1,301,339 |
| 11.0 | 135,131 | 606,456 | 336,366 | 32,512 | 108,817 | 1,301,339 |
| All plants | 145,344 | 606,456 | 336,366 | 32,512 | 108,817 | 1,311,552 |

1/ Cost of storing for 1 year; excludes depreciation and interest on investment.

2/ Includes South and East.

Note: See table 4 for delineation of areas.

Table 17.--Port terminals: Capacity available for storing grain at indicated shortrun cost levels, 70 percent average occupancy, by area and United States, fiscal 1972-73

| Shortrun cost per bushel (cents) 1/ | Storage capacity of plants in-- | | | | |
|---|---|---|---|---|---|
| | Gulf | West | Great Lakes | East | United States |
| | 1,000 bushels | | | | |
| Less than-- | | | | | |
| 2.0 | -- | -- | -- | -- | -- |
| 2.5 | -- | 38,380 | -- | -- | 38,380 |
| 3.0 | -- | 38,380 | -- | -- | 38,380 |
| 3.5 | -- | 38,380 | 26,946 | 28,000 | 93,326 |
| 4.0 | 36,970 | 38,380 | 44,496 | 34,400 | 154,246 |
| 4.5 | 36,970 | 38,380 | 81,554 | 34,400 | 191,304 |
| 5.0 | 56,782 | 45,465 | 81,554 | 34,400 | 218,201 |
| 5.5 | 72,982 | 45,465 | 81,554 | 34,400 | 234,401 |
| 6.0 | 72,982 | 45,465 | 81,554 | 34,400 | 234,401 |
| 6.5 | 72,982 | 45,465 | 132,886 | 34,400 | 285,733 |
| 7.0 | 72,982 | 45,465 | 141,661 | 34,400 | 294,508 |
| 7.5 | 72,982 | 45,465 | 141,661 | 34,400 | 294,508 |
| 8.0 | 92,031 | 45,465 | 141,661 | 38,368 | 317,525 |
| 8.5 | 92,031 | 45,465 | 141,661 | 38,368 | 317,525 |
| 9.0 | 103,500 | 45,465 | 141,661 | 38,368 | 328,994 |
| 9.5 | 103,500 | 49,712 | 141,661 | 38,368 | 333,241 |
| 10.0 | 103,500 | 49,712 | 147,061 | 38,368 | 338,641 |
| All plants | 103,500 | 63,896 | 147,061 | 38,368 | 352,825 |

1/ Cost of storing for 1 year; excludes depreciation and interest on investment.

Note: See table 4 for delineation of areas.

Table 18.--All facilities: Weighted average cost per bushel for storing and handling grain, United States, fiscal 1970-71

| Cost item | Received by-- | | | Loadout by-- | | | Storage |
|---|---|---|---|---|---|---|---|
| | Truck | Rail | Water | Truck | Rail | Water | |
| | Cents | | | | | | |
| Fixed costs | | | | | | | |
| Building & equipment: | | | | | | | |
| Depreciation 1/ | 0.329 | 0.628 | 0.298 | 0.359 | 0.485 | 0.256 | 4.435 |
| Insurance | .022 | .017 | .022 | .028 | .025 | .009 | .505 |
| Taxes | .040 | .042 | .011 | .048 | .048 | .017 | .956 |
| Licenses & bonds | -- | -- | -- | -- | -- | -- | .125 |
| Interest on investment 2/ | .191 | .343 | .172 | .206 | .270 | .151 | 5.566 |
| Total fixed cost per bushel | .582 | 1.030 | .503 | .641 | .828 | .433 | 11.587 |
| Variable costs | | | | | | | |
| Direct labor | .588 | .658 | .630 | .477 | .601 | .333 | 1.176 |
| Administrative overhead | .505 | .243 | .129 | .432 | .405 | .150 | .874 |
| Electricity, heat, etc. | .090 | .067 | .061 | .104 | .114 | .033 | .088 |
| Truck expenses | .142 | .009 | .004 | .217 | .081 | .006 | -- |
| Building repairs | .003 | .002 | -- | .004 | .003 | .001 | .333 |
| Equipment repairs | .083 | .084 | .063 | .096 | .122 | .042 | .081 |
| Insurance on grain | -- | -- | -- | -- | -- | -- | .294 |
| Taxes on grain | -- | -- | -- | -- | -- | -- | .057 |
| Fumigation | -- | -- | -- | -- | -- | .026 | .121 |
| Other 3/ | .232 | .255 | .610 | .256 | .241 | .070 | .236 |
| Interest on working capital 4/ | .030 | .024 | .027 | .029 | .029 | .012 | .085 |
| Total variable cost per bushel | 1.673 | 1.342 | 1.524 | 1.615 | 1.596 | .673 | 3.345 |
| Total cost per bushel | 2.255 | 2.372 | 2.027 | 2.256 | 2.424 | 1.106 | 14.932 |

1/ Calculations based on replacing building and equipment at 1970-71 construction costs and using standardized depreciation rates.

2/ Calculated at 8.0 percent of one-half of the 1970-71 replacement value of building and equipment.

3/ Includes such items as supplies, audit, legal, protective services, dues, subscriptions, travel, advertising, donations, etc.

4/ Calculated at 7.0 percent per annum, borrowed quarterly, of the total out-of-pocket cost.

Table 19.--All facilities: Weighted average cost per bushel for storing and handling grain, United States, fiscal 1972-73

| Cost item | Received by-- | | | Loadout by-- | | | Storage |
|---|---|---|---|---|---|---|---|
| | Truck | Rail | Water | Truck | Rail | Water | |
| | Cents | | | | | | |
| Fixed costs | | | | | | | |
| Building & equipment: | | | | | | | |
| Depreciation 1/ | 0.349 | 0.669 | 0.325 | 0.383 | 0.520 | 0.275 | 4.821 |
| Insurance | .023 | .018 | .024 | .030 | .027 | .010 | .549 |
| Taxes | .042 | .044 | .012 | .051 | .051 | .018 | 1.030 |
| Licenses & bonds | -- | -- | -- | -- | -- | -- | .130 |
| Interest on investment 2/ | .203 | .365 | .188 | .220 | .289 | .162 | 6.051 |
| Total fixed cost per bushel | .617 | 1.096 | .549 | .684 | .887 | .465 | 12.581 |
| Variable costs | | | | | | | |
| Direct labor | .659 | .737 | .706 | .534 | .673 | .373 | 1.317 |
| Administrative overhead | .566 | .272 | .144 | .484 | .454 | .168 | .979 |
| Electricity, heat, etc. | .095 | .070 | .064 | .109 | .120 | .035 | .092 |
| Truck expenses | .153 | .010 | .004 | .234 | .087 | .006 | -- |
| Building repairs | .003 | .002 | -- | .005 | .003 | .001 | .376 |
| Equipment repairs | .094 | .095 | .071 | .108 | .138 | .047 | .092 |
| Insurance on grain | -- | -- | -- | -- | -- | -- | .309 |
| Taxes on grain | -- | -- | -- | -- | -- | -- | .062 |
| Fumigation | -- | -- | -- | -- | -- | .028 | .131 |
| Other 3/ | .251 | .275 | .659 | .276 | .260 | .076 | .255 |
| Interest on working capital 4/ | .032 | .026 | .029 | .031 | .031 | .013 | .092 |
| Total variable cost per bushel | 1.853 | 1.487 | 1.677 | 1.781 | 1.766 | .747 | 3.705 |
| Total cost per bushel | 2.470 | 2.583 | 2.226 | 2.465 | 2.653 | 1.212 | 16.286 |

1/ Calculations based on replacing building and equipment at 1972-73 construction costs and using standardized depreciation rates.

2/ Calculated at 8.0 percent of one-half of the 1972-73 replacement value of building and equipment.

3/ Includes such items as supplies, audit, legal, protective services, dues, subscriptions, travel, advertising, donations, etc.

4/ Calculated at 7.0 percent per annum, borrowed quarterly, of the total out-of-pocket cost.

Table 20.--Country facilities: Weighted average cost per bushel for storing and handling grain, United States, fiscal 1970-71

| Cost item 1/ | Received by-- | | | Loadout by-- | | | Storage |
|---|---|---|---|---|---|---|---|
| | Truck | Rail | Water | Truck | Rail | Water | |
| | Cents | | | | | | |
| Fixed costs | | | | | | | |
| Building & equipment: | | | | | | | |
| Depreciation | 0.259 | 0.338 | -- | 0.294 | 0.409 | 0.159 | 4.214 |
| Insurance | .024 | .031 | -- | .028 | .031 | .008 | .651 |
| Taxes | .037 | .031 | -- | .046 | .052 | .009 | 1.059 |
| Licenses & bonds | -- | -- | -- | -- | -- | -- | .150 |
| Interest on investment | .156 | .211 | -- | .173 | .232 | .103 | 5.227 |
| Total fixed cost per bushel | .476 | .611 | -- | .541 | .724 | .279 | 11.301 |
| Variable costs | | | | | | | |
| Direct labor | .600 | .362 | -- | .470 | .630 | .353 | 1.161 |
| Administrative overhead | .544 | .539 | -- | .425 | .429 | .218 | .959 |
| Electricity, heat, etc. | .089 | .122 | -- | .101 | .127 | .067 | .089 |
| Truck expenses | .168 | .123 | -- | .236 | .111 | .019 | -- |
| Building repairs | .004 | .001 | -- | .004 | .003 | .007 | .414 |
| Equipment repairs | .079 | .115 | -- | .094 | .121 | .106 | .073 |
| Insurance on grain | -- | -- | -- | -- | -- | -- | .383 |
| Taxes on grain | -- | -- | -- | -- | -- | -- | .076 |
| Fumigation | -- | -- | -- | -- | -- | -- | .123 |
| Other | .254 | .288 | -- | .267 | .260 | .164 | .287 |
| Interest on working capital | .031 | .028 | -- | .029 | .031 | .017 | .095 |
| Total variable cost per bushel | 1.769 | 1.578 | -- | 1.626 | 1.712 | .951 | 3.660 |
| Total cost per bushel | 2.245 | 2.189 | -- | 2.167 | 2.436 | 1.230 | 14.961 |

1/ See footnotes, table 18, for explanation of various cost items.

Table 21.--Country facilities: Weighted average cost per bushel for storing and handling grain, United States, fiscal 1972-73

| Cost item 1/ | Received by-- | | | Loadout by-- | | | Storage |
|---|---|---|---|---|---|---|---|
| | Truck | Rail | Water | Truck | Rail | Water | |
| | Cents | | | | | | |
| Fixed costs | | | | | | | |
| Building & equipment: | | | | | | | |
| Depreciation | 0.275 | 0.345 | -- | 0.313 | 0.436 | 0.170 | 4.553 |
| Insurance | .025 | .032 | -- | .029 | .033 | .008 | .703 |
| Taxes | .039 | .031 | -- | .049 | .055 | .009 | 1.134 |
| Licenses & bonds | -- | -- | -- | -- | -- | -- | .155 |
| Interest on investment | .164 | .216 | -- | .184 | .248 | .110 | 5.647 |
| Total fixed cost per bushel | .503 | .624 | -- | .575 | .772 | .297 | 12.192 |
| Variable costs | | | | | | | |
| Direct labor | .672 | .405 | -- | .526 | .706 | .395 | 1.300 |
| Administrative overhead | .609 | .604 | -- | .478 | .480 | .244 | 1.074 |
| Electricity, heat, etc. | .093 | .128 | -- | .106 | .133 | .070 | .093 |
| Truck expenses | .181 | .133 | -- | .255 | .120 | .021 | -- |
| Building repairs | .005 | .001 | -- | .005 | .003 | .008 | .468 |
| Equipment repairs | .089 | .130 | -- | .106 | .137 | .120 | .082 |
| Insurance on grain | -- | -- | -- | -- | -- | -- | .414 |
| Taxes on grain | -- | -- | -- | -- | -- | -- | .082 |
| Fumigation | -- | -- | -- | -- | -- | -- | .133 |
| Other | .274 | .311 | -- | .288 | .281 | .177 | .310 |
| Interest on working capital | .033 | .030 | -- | .031 | .033 | .018 | .103 |
| Total variable cost per bushel | 1.956 | 1.742 | -- | 1.795 | 1.893 | 1.053 | 4.059 |
| Total cost per bushel | 2.459 | 2.366 | -- | 2.370 | 2.665 | 1.350 | 16.251 |

1/ See footnotes, table 19, for explanation of various cost items.

Table 22.--Inland terminals: Weighted average cost per bushel for storing and handling grain, United States, fiscal 1970-71

| Cost item 1/ | Received by-- | | | Loadout by-- | | | Storage |
|---|---|---|---|---|---|---|---|
| | Truck | Rail | Water | Truck | Rail | Water | |
| | Cents | | | | | | |
| Fixed costs | | | | | | | |
| Building & equipment: | | | | | | | |
| Depreciation | 0.504 | 0.624 | 0.399 | 0.972 | 0.610 | 0.263 | 3.985 |
| Insurance | .014 | .013 | .019 | .026 | .011 | .007 | .194 |
| Taxes | .056 | .052 | .035 | .063 | .041 | .042 | .738 |
| Licenses & bonds | -- | -- | -- | -- | -- | -- | .099 |
| Interest on investment | .277 | .339 | .217 | .523 | .333 | .150 | 5.031 |
| Total fixed cost per bushel | .851 | 1.028 | .670 | 1.584 | .995 | .462 | 10.047 |
| Variable costs | | | | | | | |
| Direct labor | .539 | .735 | 1.115 | .545 | .515 | .383 | 1.027 |
| Administrative overhead | .372 | .407 | .264 | .527 | .365 | .222 | .743 |
| Electricity, heat, etc. | .093 | .086 | .170 | .140 | .085 | .052 | .082 |
| Truck expenses | .022 | .012 | .014 | .026 | .022 | .004 | -- |
| Building repairs | .001 | .003 | .002 | .001 | .003 | .001 | .162 |
| Equipment repairs | .096 | .122 | .095 | .109 | .112 | .072 | .091 |
| Insurance on grain | -- | -- | -- | -- | -- | -- | .121 |
| Taxes on grain | -- | -- | -- | -- | -- | -- | .035 |
| Fumigation | -- | -- | -- | -- | -- | -- | .144 |
| Other | .153 | .154 | .464 | .144 | .193 | .102 | .174 |
| Interest on working capital | .024 | .028 | .038 | .028 | .024 | .015 | .063 |
| Total variable cost per bushel | 1.300 | 1.547 | 2.162 | 1.520 | 1.319 | .852 | 2.642 |
| Total cost per bushel | 2.151 | 2.575 | 2.832 | 3.104 | 2.314 | 1.314 | 12.689 |

1/ See footnotes, table 18, for explanation of various cost items.

Table 23.--Inland terminals: Weighted average cost per bushel for storing and handling grain, United States, fiscal 1972-73

| Cost item 1/ | Received by-- | | | Loadout by-- | | | Storage |
|---|---|---|---|---|---|---|---|
| | Truck | Rail | Water | Truck | Rail | Water | |
| | Cents | | | | | | |
| Fixed costs | | | | | | | |
| Building & equipment: | | | | | | | |
| Depreciation | 0.537 | 0.657 | 0.439 | 1.038 | 0.655 | 0.275 | 4.373 |
| Insurance | .015 | .014 | .021 | .028 | .012 | .007 | .213 |
| Taxes | .059 | .054 | .038 | .067 | .044 | .043 | .803 |
| Licenses & bonds | -- | -- | -- | -- | -- | -- | .104 |
| Interest on investment | .295 | .357 | .238 | .558 | .358 | .157 | 5.521 |
| Total fixed cost per bushel | .906 | 1.082 | .736 | 1.691 | 1.069 | .482 | 11.014 |
| Variable costs | | | | | | | |
| Direct labor | .604 | .823 | 1.249 | .610 | .577 | .429 | 1.150 |
| Administrative overhead | .417 | .456 | .296 | .590 | .409 | .249 | .832 |
| Electricity, heat, etc. | .098 | .090 | .178 | .147 | .089 | .055 | .086 |
| Truck expenses | .024 | .013 | .015 | .028 | .024 | .004 | -- |
| Building repairs | .001 | .003 | .002 | .001 | .003 | .001 | .183 |
| Equipment repairs | .108 | .138 | .107 | .123 | .127 | .081 | .103 |
| Insurance on grain | -- | -- | -- | -- | -- | -- | .127 |
| Taxes on grain | -- | -- | -- | -- | -- | -- | .038 |
| Fumigation | -- | -- | -- | -- | -- | -- | .156 |
| Other | .165 | .166 | .501 | .156 | .208 | .110 | .188 |
| Interest on working capital | .026 | .030 | .041 | .030 | .026 | .016 | .068 |
| Total variable cost per bushel | 1.443 | 1.719 | 2.389 | 1.685 | 1.463 | .945 | 2.931 |
| Total cost per bushel | 2.349 | 2.801 | 3.125 | 3.376 | 2.532 | 1.427 | 13.945 |

1/ See footnotes, table 19, for explanation of various cost items.

Table 24.--Port terminals: Weighted average cost per bushel for storing and handling grain, United States, fiscal 1970-71

| Cost item 1/ | Received by-- | | | Loadout by-- | | | Storage |
|---|---|---|---|---|---|---|---|
| | Truck | Rail | Water | Truck | Rail | Water | |
| | Cents | | | | | | |
| Fixed costs | | | | | | | |
| Building & equipment: | | | | | | | |
| Depreciation | 0.966 | 0.634 | 0.286 | 1.847 | 0.877 | 0.267 | 7.403 |
| Insurance | .016 | .019 | .022 | .028 | .015 | .010 | .542 |
| Taxes | .051 | .036 | .009 | .130 | .037 | .014 | .977 |
| Licenses & bonds | -- | -- | -- | -- | -- | -- | .041 |
| Interest on investment | .509 | .347 | .167 | .970 | .469 | .158 | 9.605 |
| Total fixed cost per bushel | 1.542 | 1.036 | .484 | 2.975 | 1.398 | .449 | 18.568 |
| Variable costs | | | | | | | |
| Direct labor | .517 | .611 | .577 | .678 | .720 | .322 | 1.760 |
| Administrative overhead | .223 | .133 | .115 | .222 | .289 | .129 | .732 |
| Electricity, heat, etc. | .108 | .055 | .049 | .153 | .117 | .026 | .105 |
| Truck expenses | .008 | .006 | .003 | .051 | .006 | .005 | -- |
| Building repairs | .002 | .001 | -- | .002 | .003 | .001 | .353 |
| Equipment repairs | .115 | .060 | .059 | .177 | .213 | .029 | .105 |
| Insurance on grain | -- | -- | -- | -- | -- | -- | .261 |
| Taxes on grain | -- | -- | -- | -- | -- | -- | .007 |
| Fumigation | -- | -- | -- | -- | -- | .034 | .036 |
| Other | .079 | .320 | .626 | .078 | .236 | .053 | .095 |
| Interest on working capital | .020 | .022 | .026 | .027 | .029 | .011 | .088 |
| Total variable cost per bushel | 1.072 | 1.208 | 1.455 | 1.388 | 1.613 | .610 | 3.542 |
| Total cost per bushel | 2.614 | 2.244 | 1.939 | 4.363 | 3.011 | 1.059 | 22.110 |

1/ See footnotes, table 18, for explanation of various cost items.

Table 25.--Port terminals: Weighted average cost per bushel for storing and handling grain, United States, fiscal 1972-73

| Cost item 1/ | Received by-- | | | Loadout by-- | | | Storage |
|---|---|---|---|---|---|---|---|
| | Truck | Rail | Water | Truck | Rail | Water | |
| | Cents | | | | | | |
| Fixed costs | | | | | | | |
| Building & equipment: | | | | | | | |
| Depreciation | 1.025 | 0.680 | 0.312 | 2.066 | 0.989 | 0.288 | 8.140 |
| Insurance | .017 | .020 | .024 | .031 | .017 | .011 | .596 |
| Taxes | .054 | .038 | .010 | .144 | .041 | .015 | 1.065 |
| Licenses & bonds | -- | -- | -- | -- | -- | -- | .043 |
| Interest on investment | .540 | .372 | .182 | 1.085 | .529 | .170 | 10.561 |
| Total fixed cost per bushel | 1.636 | 1.110 | .528 | 3.326 | 1.576 | .484 | 20.405 |
| Variable costs | | | | | | | |
| Direct labor | .579 | .684 | .646 | .759 | .806 | .361 | 1.971 |
| Administrative overhead | .250 | .149 | .129 | .249 | .324 | .144 | .820 |
| Electricity, heat, etc. | .113 | .058 | .051 | .161 | .123 | .027 | .110 |
| Truck expenses | .009 | .006 | .003 | .055 | .006 | .005 | -- |
| Building repairs | :.002 | .001 | -- | .002 | .003 | .001 | .399 |
| Equipment repairs | :.130 | .068 | .067 | .200 | .241 | .033 | .119 |
| Insurance on grain | -- | -- | -- | -- | -- | -- | .274 |
| Taxes on grain | -- | -- | -- | -- | -- | -- | .008 |
| Fumigation | -- | -- | -- | -- | -- | .037 | .039 |
| Other | .085 | .346 | .676 | .084 | .255 | .057 | .103 |
| Interest on working capital | .022 | .024 | .028 | .029 | .031 | .012 | .095 |
| Total variable cost per bushel | 1.190 | 1.336 | 1.600 | 1.539 | 1.789 | .677 | 3.838 |
| Total cost per bushel | 2.826 | 2.446 | 2.128 | 4.865 | 3.365 | 1.161 | 24.243 |

1/ See footnotes, table 19, for explanation of various cost items.

Table 26.--Weighted average cost per bushel for storing and handling grain with 10-percent increase and decrease in volumes, by type of facility, United States, fiscal 1972-73 1/

| Type of facility | Received by-- | | | | | | Loadout by-- | | | | | | Storage | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Truck | | Rail | | Water | | Truck | | Rail | | Water | | | |
| | Volume change of-- | | | | | | | | | | | | | |
| | -10% | +10% | -10% | +10% | -10% | +10% | -10% | +10% | -10% | +10% | -10% | +10% | -10% | +10% |
| | Cents | | | | | | | | | | | | | |
| Country | 2.5 | 2.4 | 2.4 | 2.3 | -- | -- | 2.4 | 2.3 | 2.8 | 2.6 | 1.4 | 1.3 | 17.6 | 15.1 |
| Inland terminal | 2.5 | 2.3 | 2.9 | 2.7 | 3.2 | 3.1 | 3.6 | 3.2 | 2.7 | 2.4 | 1.5 | 1.2 | 15.2 | 12.9 |
| Port terminal | 3.0 | 2.7 | 2.6 | 2.3 | 2.4 | 2.1 | 5.2 | 4.6 | 3.5 | 3.2 | 1.2 | 1.1 | 26.5 | 22.4 |
| All facilities | 2.5 | 2.4 | 2.7 | 2.5 | 2.4 | 2.2 | 2.5 | 2.4 | 2.8 | 2.6 | 1.3 | 1.2 | 17.7 | 15.1 |

1/ Costs were developed from the data used for tables 19, 21, 23, and 25 with an increase and decrease of 10 percent in volumes received, shipped, and stored.

# APPENDIX A: METHODOLOGY

## Sampling

Commercial grain elevators are classified into three types--country, inland terminal, and port terminal. Because each type of facility generally serves a distinct function in the grain marketing system, the survey plants were selected from an independent universe of 7,492 country, 435 inland terminal, and 62 port terminal grain elevators. All elevators were approved to store and handle Commodity Credit Corporation (CCC) grain under the Uniform Grain Storage Agreement.

All the plants in each universe were stratified by total capacity within six geographic regions. This total capacity array was divided into four equal capacity groups. A random sample of 168 country, 59 inland terminal, and 24 port terminal grain elevators was then selected within each capacity level. The total sample of 251 plants represents over 15 percent of the total universe capacity (app. table 1).

Detailed operating costs were obtained by personal interviews with officials of each plant in the sample. Additional information on operating equipment, types and capacity of structures, volumes handled and stored, handling rates, crew sizes (by functions), and other labor requirements were established for each elevator. Using the cost accounting approach, all costs were tabulated and allocated to specific grain functions performed by the facility. Plant cost data were summarized by area and for the United States.

## Depreciation and Interest

Plant data showed many differences in depreciation rates applied to identical assets. To eliminate the effect of these variations, depreciation allowances were calculated using the straight line method and the standard rates shown in the rate schedule below. These rates were applied to the acquisition cost of building and equipment as follows:

| | Percent |
|---|---|
| Concrete | 2.5 |
| Metal | 4.0 |
| Wood | 5.0 |
| Grain handling machinery and equipment | 8.0 |
| Office building (concrete, steel, wood) | 4.0 |
| Office furniture and equipment | 8.0 |
| Depreciable land improvement--driveway, fence, railroad siding and trackage, parking lots, etc. | 4.0 |

Some facilities--those newly constructed and older plants that had recently changed ownership--showed substantial interest expenses; many facilities of comparable age and structure showed no interest expense because company moneys

Appendix table 1.--Sample number and capacity of commercial grain elevators, by area and type of facility, United States, 1970-71

| Area and type of facility | Sample plants | Total capacity | Working capacity 1/ | Storage capacity 2/ | Universe capacity 3/ |
|---|---|---|---|---|---|
| | Number | 1,000 bushels | | | |
| North Plains: | | | | | |
| Country | 28 | 13,240 | 1,166 | 12,074 | 343,694 |
| Inland terminal | 10 | 69,248 | 2,717 | 66,531 | 145,344 |
| Port terminal | -- | -- | -- | -- | -- |
| Mid-Plains: | | | | | |
| Country | 45 | 37,383 | 1,828 | 35,555 | 1,171,961 |
| Inland terminal | 12 | 118,157 | 7,100 | 111,057 | 606,456 |
| Port terminal | -- | -- | -- | -- | -- |
| South Plains: | | | | | |
| Country | 28 | 37,963 | 2,965 | 34,998 | 523,189 |
| Inland terminal | 12 | 136,195 | 3,594 | 132,601 | 336,366 |
| Gulf port terminal | 7 | 38,333 | 5,281 | 33,052 | 103,500 |
| West: | | | | | |
| Country | 23 | 26,484 | 2,346 | 24,138 | 260,373 |
| Inland terminal | 6 | 13,712 | 974 | 12,738 | 32,512 |
| Port terminal | 6 | 19,362 | 1,623 | 17,739 | 63,896 |
| Great Lakes: | | | | | |
| Country | 27 | 20,599 | 2,650 | 17,949 | 477,525 |
| Inland terminal | 10 | 41,662 | 2,978 | 38,684 | 108,817 |
| Port terminal | 7 | 54,467 | 5,086 | 49,381 | 147,061 |
| South and East: | | | | | |
| Country | 17 | 19,080 | 5,903 | 13,177 | 177,542 |
| Inland terminal | 9 | 36,557 | 2,031 | 34,526 | 82,057 |
| East port terminal | 4 | 23,980 | 4,225 | 19,755 | 38,368 |
| United States | | | | | |
| Country | 168 | 154,749 | 16,858 | 137,891 | 2,954,284 |
| Inland terminal | 59 | 415,531 | 19,394 | 396,137 | 1,311,552 |
| Port terminal | 24 | 136,142 | 16,215 | 119,927 | 352,825 |
| All facilities | 251 | 706,422 | 52,467 | 653,955 | 4,618,661 |

1/ Warehouse operator's estimate of space needed to handle grain within the plant.

2/ Warehouse operator's estimate of space used primarily to store grain.

3/ Capacity approved to store and handle Commodity Credit Corporation grain.

Note: See table 4 for delineation of areas.

were used for investment or no capital debt existed. To minimize these variations, an allowance for interest on capital investment was computed at 8 percent of one-half the original acquisition cost of building and equipment.

An interest on working capital expense was computed for each plant using a uniform procedure. This cost was calculated at 7 percent per annum on one-fourth of the out-of-pocket expenses.

## Replacement Costs

Even by standardizing the depreciation and interest on investment rates, considerable variations existed between plants because some assets had been entirely depreciated, while other plants recently built or reorganized had much higher depreciation expenses. To eliminate these variations and estimate costs which would induce longrun investment or reinvestment in the commercial grain elevator industry, the physical plant replacement value was computed and used as a basis for recomputing depreciation and interest on investment expenses. Data from construction companies, engineering firms, and newly built elevator facilities were used to develop 1970-71 estimated average replacement costs of each type of structure--upright/flat, concrete or steel. The capacity of each specific structure of the plant was multiplied by an appropriate replacement cost per bushel. The total plant replacement value was then used to calculate depreciation and interest on investment expenses applicable to individual plants. The standard depreciation rates and 8 percent of one-half of the total replacement value were used to compute depreciation and interest on investment, respectively.

## Method of Cost Allocation

The following allocation procedures were used to allocate cost items among each of the plant's operating functions:

A. Fixed expenses
   1. Building depreciation--Based on estimates obtained from the elevator operator as to the portion of each building's total capacity utilized for storage and working purposes. The storage ratio is applied to the total building depreciation expense and this amount is allocated to the storage function. The working portion is divided among all handling functions--receiving, shipping, turning, cleaning, and drying--according to the volume handled.
   2. Equipment depreciation--Ratio of hours of operation for each handling function to the total operating hours of all functions. Hours of operation were ascertained by applying the warehouseman's estimate of the handling rate per hour for each function to the actual volume handled in that function.
   3. Insurance and taxes--Total insurance and tax expenses were proportioned between building and equipment in the same ratio as the total asset acquisition values is divided between building and equipment values. Building portion of insurance and tax expenses are allocated the same as building depreciation. The equipment portion of both expenses are allocated as with equipment depreciation.

4. Leases and rentals--Building leases are allocated to functions like building depreciation. Leases of equipment are allocated like equipment depreciation. It should be noted that actual building and equipment lease expenses are eliminated in the asset replacement cost concept for computing depreciation and interest on investment.
5. Licenses and bonds--All to the storage function.
6. Interest on investment--Same as insurance and taxes.

B. Variable expenses
1. Direct labor--Ratio of man-hours for each function to the total man-hours applicable to all functions. Man-hours were determined by multiplying the operator's estimate of the number of men (crew) utilized in performing each function by hours of operation per function.
2. Administrative overhead--Management, clerical, and home office expenses are included. Allocation is based on estimates from elevator management. Volume ratio is used as a basis for distributing costs to a specific function, such as receiving grain by truck and by rail.
3. Electricity and utilities--Based on the ratio of hours of operation for each function to the total operating hours for all functions.
4. Truck expense--Based on volume of receipt and shipments.
5. Building repairs--Same as building depreciation.
6. Equipment repairs--Same as equipment depreciation.
7. Insurance on grain--All to storage.
8. Taxes on grain--All to storage.
9. Fumigation--All to storage except in port terminals where a proportion is also allocated to water shipments.
10. Other--Ratio of volume handled in each function to total volume handled.
11. Interest on working capital--Based on total out-of-pocket applicable to each function.

## Projecting 1972-73 Storage and Handling Volumes

Per bushel costs depend on the volume of grain stored and handled in the elevator. The unit cost may vary considerably for different volume levels of activity. Thus, to estimate costs for some future fiscal period, it is necessary to make predictions of anticipated volume changes.

Storage and handling volumes were estimated by projecting production, disappearance, and carryover on a quarterly basis for fiscal 1972-73. These estimates take into consideration all the latest available USDA projections for the eight major grains reported in the Wheat, Feed, and Fats and Oils Situation reports. Also considered are historical trends and distribution patterns that might reflect in 1972-73 storage and handling volumes at commercial grain elevators.

Because these volume forecasts may be somewhat different than the actual volumes produced by the end of 1972-73, a range of estimated unit cost per bushel was developed for each function. The projected volumes were increased by 10 percent and decreased by 10 percent and costs were recalculated. The real costs for 1972-73 will probably be within these high and low cost limits.

To develop storage requirements for evaluating the costs that might prevail under conditions of perfect competition within the industry, the total amount of space needed to handle and store the peak volume of grain for the year must be ascertained. Estimates of this maximum demand for storage space needed in 1972-73 is based on the projected inventory on January 1, 1973, plus an adjustment necessary for working space. A ratio between this peak requirement and the 1972-73 estimated average volume in storage establishes an average occupancy rate.

To ascertain the volume of grain handled under these competitive conditions, the actual survey data were used as a basis for establishing a ratio of the bushels of grain handled to 1 bushel of grain stored.

When the average occupancy rate and handling volume ratios have been determined, costs for each plant are recalculated under these criteria. Plant costs are arrayed from low to high and their respective storage capacities are accumulated. When these capacities are equal to the year's peak storage requirement, the cost at that point would be sufficient to meet all the grain storage and handling volume needs for 1972-73.

## Projecting 1970-71 Costs to 1972-73

The following percentages were used to determine the effect of cost item price level changes on the estimated handling and storage costs expected to prevail in 1972-73. These estimates were applied to the sample plants from which actual 1970-71 cost data were collected.

| Cost item | Estimated percentage increase from 1970-71 |
|---|---|
| | Percent |
| **Fixed costs** | |
| Building and equipment depreciation | 13 |
| Building and equipment insurance | 13 |
| Building and equipment taxes | 12 |
| Building and equipment interest on invested capital 1/ | 13 |
| **Variable costs** | |
| Direct labor | 12 |
| Administrative overhead | 12 |
| Electricity, heat, etc. | 5 |
| Building and equipment repairs | 13 |
| Insurance on grain | 5 |
| All other items | 8 |

1/ Interest on invested capital was calculated at 8.0 percent of one-half of the 1970-71 and 1972-73 replacement value of building and equipment.

## APPENDIX B: COST OF DUST CONTROL SYSTEMS IN GRAIN ELEVATORS 3/

### General Survey

When the 251 elevators were surveyed for information on grain storing and handling costs, operators were asked to indicate what they had done or expected to do in compliance with regulations set forth in Public Law 90-148, The Clean Air Act. (A copy of this questionnaire appears at the end of this section.) As shown in appendix table 2, elevators were grouped into three categories, based on their level of compliance: (1) dust control program in progress, (2) dust control program in the planning stage, and (3) no definite plans for dust control program.

About 48 survey elevator managers indicated that during the past 4 years they had invested an estimated $7.5 million to reduce dust emissions. Of these, 21 terminal elevators reported expenditures of about $3.25 million since 1967. Specific expenses per elevator ranged from $30,000 to a high of $450,000. Programs to completely renovate a facility ranged in duration from about 1 to 4 years. Many were still in progress.

Ten port facilities reported they had spent about $2.6 million since 1967 to update their dust control systems. These programs ranged in cost from about $75,000 to $800,000. Many were not completed and management expected additional expenses, particularly relating to ship and barge loadout.

Seventeen country elevators reported they had spent about $500,000 since 1967. Many of those in the survey could not give any indication of the total expenses involved in a total dust control program. Expense per elevator ranged from $5,000 to $85,000. Most of the dust control renovation in these facilities related to grain drying.

The 32 elevators with dust control programs in the planning stage estimated these programs would cost about $2.6 million. Six port facilities expected to spend almost $1.9 million over the next several years to control dust pollution. Seven terminals estimated a minimum of $700,000 would be required to renovate their dust control systems.

The remaining 171 elevators, or about 68 percent of the elevators surveyed, reported no definite plans for pollution control. Many of the respondents believed grain drying and unloading would be their major problem areas. The majority of these firms are waiting for information from the local control boards before they attempt any renovation. A few indicated that if renovation expense was too high, they would have to close their doors.

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3/ Prepared by Carl J. Vosloh, Jr., Agricultural Economist, Marketing Economics Division, ERS.

Appendix table 2.--Response of grain elevators to 1971 survey of compliance under The Clean Air Act

| Area and type of facility | Dust control program in progress | Dust control program in planning stage | No dust control program or plans reported | Total |
|---|---|---|---|---|
| | Number | | | |
| North Plains: | | | | |
| Country | 3 | 3 | 22 | 28 |
| Inland terminal | 7 | 1 | 2 | 10 |
| Total | 10 | 4 | 24 | 38 |
| Mid-Plains: | | | | |
| Country | 2 | 2 | 41 | 45 |
| Inland terminal | 4 | 1 | 7 | 12 |
| Total | 6 | 3 | 48 | 57 |
| South Plains: | | | | |
| Country | 3 | 3 | 22 | 28 |
| Inland terminal | 2 | 3 | 7 | 12 |
| Port terminal | 3 | 3 | 1 | 7 |
| Total | 8 | 9 | 30 | 47 |
| West: | | | | |
| Country | 1 | 4 | 18 | 23 |
| Inland terminal | 3 | -- | 3 | 6 |
| Port terminal | 3 | 2 | 1 | 6 |
| Total | 7 | 6 | 22 | 35 |
| Great Lakes: | | | | |
| Country | 6 | 3 | 18 | 27 |
| Inland terminal | 2 | 2 | 6 | 10 |
| Port terminal | 3 | 1 | 3 | 7 |
| Total | 11 | 6 | 27 | 44 |
| South and East: | | | | |
| Country | 2 | 4 | 11 | 17 |
| Inland terminal | 3 | -- | 6 | 9 |
| Port terminal | 1 | -- | 3 | 4 |
| Total | 6 | 4 | 20 | 30 |
| Total, all areas | 48 | 32 | 171 | 251 |

Pollution Questionnaire

1. a. Have you made any changes or addition to your elevator facility since 1967 to comply with current pollution control regulations (Yes) _____, (No) _____.

   b. If Yes, answer question 2a.

   If No, go to question 3.

2. a. Please indicate all major changes (renovations or new installation of equipment) since 1967 to reduce emissions from your elevator.

| Changes made | Renovation or new | Year made | Cost of change |
|---|---|---|---|
| | | | Dollars |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

   b. Would you be willing at a later date to provide us with more detailed information on elevator alternations listed in the above table? (Yes) _____, (No) _____.

3. Do you plan any changes relating to pollution control during the next 12 months? (Yes) _____, (No) _____.

   If yes, please list nature of change and estimate of total cost.

_____

_____

_____

_____

_____

## Special Study

More detailed cost information, engineering data, and operating data were obtained from eight grain firms for 30 of their plants. The major criteria used for selection were: (1) the elevator's dust control system had been renovated during the last 4 years to meet local control standards, or (2) the plant was relatively new and up-to-date dust control equipment was installed when the plant was build. In effect, all elevators for which costs were obtained were using some type of bag or cloth filter.

Management of these eight firms indicated that a large percentage of their budgets were allocated to set aside pollution control, chiefly dust, at inland and port terminals. However, it was pointed out that dust control systems at their local country elevators would be renovated as soon as possible. Priorities are to be established between locations, with the most serious dust problems handled first. Among the decisive factors are the elevator's proximity to a residential area and whether it is considered a nuisance to the surrounding community.

## Capital Investment

Data obtained from these elevators were used to estimate capital investment requirements and operating costs (app. tables 3 and 4). Appendix table 3 analyzes investment requirements based on the storage capacity of the elevator, the volume of grain handled in 1970-71, and the cubic feet of air required per minute (c.f.m.) in the dust control system.

Investment cost per bushel of storage capacity was estimated to average 4.75 cents for inland terminals and 8.91 cents for port terminals. The weighted average investment cost per bushel of storage capacity was 6.39 cents.

When related to volume of grain handled, the inland terminals would require investment costs of 1.61 cents a bushel, compared with 1.03 cents for port terminals. The average for inland and port terminals combined was estimated at 1.23 cents per bushel of grain handled.

The grain trade usually relates the cost of dust control systems to the cost per c.f.m. The number of cubic feet of air is derived by combining the air required to control dust emissions from each piece of equipment and its respective handling operation in the elevator. Inland terminals estimated cost at $2.43 per c.f.m. and port locations at $3.09 per c.f.m. The combined weighted average for both types was $2.75.

## Operating Costs

Appendix table 4 estimates the annual operating cost of the dust control systems studied. Inland terminal elevators had an operating cost of 1.03 cents per bushel of storage capacity; and port elevators, 2.03 cents. The weighted cost of the two types was estimated at 1.42 cents per bushel of storage capacity.

Operating costs for dust control systems relative to the volume of grain handled were estimated at 0.35 cent a bushel for inland terminal elevators and 0.23 cent a bushel for port terminals. The average cost for both types of elevators would be 0.27 cent per bushel handled. The operating cost per c.f.m. was $0.53 for inland terminals, and $0.70 for ports. Combined, these facilities would have a dust control cost of $0.61 per bushel.

Appendix table 3.--Capital investment in dust control systems at terminal grain elevators: Cost per bushel of storage capacity, volume handled, and c.f.m., 1970-71 1/

| Type of terminal | Storage capacity | Volume handled | C.f.m. 2/ |
|---|---|---|---|
| | Cents | Cents | Dollars |
| Inland | 4.75 | 1.61 | 2.43 |
| Port | 8.91 | 1.03 | 3.09 |
| Weighted average | 6.39 | 1.23 | 2.75 |

1/ Capital investment reported by eight firms for 30 elevators. Investment represents cost of dust control system; no building cost is included.
2/ C.f.m. is the cubic feet of air delivered per minute by the dust control system in the elevator.

Appendix table 4.--Operating cost of dust control systems at terminal grain elevators: Cost per bushel of storage capacity, volume handled, and c.f.m., 1970-71 1/

| Type of terminal | Storage capacity | Volume handled | C.f.m. 2/ |
|---|---|---|---|
| | Cents | Cents | Dollars |
| Inland | 1.03 | 0.35 | 0.53 |
| Port | 2.03 | .23 | .70 |
| Weighted average | 1.42 | .27 | .61 |

1/ Operating costs reported by eight firms for 30 elevators. Depreciation is standardized to 10 years for all facilities. Only operating cost relating to dust control system is included. No building cost is included.
2/ C.f.m. is the cubic feet of air per minute delivered by the dust control system in the elevator.

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