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## CONDITIONED SEED STORAGE - ECONOMIC CONSIDERATIONS

Warren C. Couvillion <sup>1/</sup>

A few years ago I made some rough calculations and it appeared that all seedsmen should have conditioned storage. At that time I had visited more than 25 seed processing plants but had not found a single air-conditioned warehouse. That led to the question, "Why don't seed companies use air-conditioned storage?" After discussions with several of my colleagues, I still was not able to develop a set of "clear cut" reasons as to why more seedsmen hadn't constructed air-conditioned warehouses.

Some of the reasons I developed were:

1. Maybe seedsmen hadn't looked into conditioned seed storage.
2. Seedsmen make enough money on seed not to worry about minimal added income.
3. Wholesalers do not want to take a chance on quality deterioration (especially soybeans and wheat).
4. Processors may be able to get higher returns on alternative uses of capital.
5. All of above.

Now I am convinced that everyone does not need conditioned storage. However, I am also firmly convinced there are situations where conditioned storage should be included as part of existing seed businesses. Let's consider some types of firms that could benefit from conditioned storage. The following list is not exhaustive nor complete:

1. Large volume firms.
2. Firms currently short of storage space.
3. Firms dealing with several types of seed; corn, rice, cotton, vegetable, clovers and grasses, vegetables, wheat, and soybeans.
4. Firms that often have carryover seed.
5. Firms that depend on outside sources for seed.

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6. Firms that deal with foundation and/or registered seed.
7. Firms that treat seed as they are processed.

Let us briefly examine each of the above listed firms.

Large volume firms - there appear to be considerable economies to size with conditioned storage facilities, and carryover seed is hopefully a small percentage of the volume of a firm's business.

Short of storage space - if a firm is currently short of storage space the added cost of attaining the conditioning capability may be important in calculating the feasibility of adding conditioned storage space rather than just storage space.

Often carryover deals with several types of seed - some seed are treated, others are not. Treated seed may be seed, or trash, if they deteriorate. With treated seed, conditioned storage is much more practical and if one has the conditioned storage capability at times non-treated seed may be stored profitably. Handling several kinds of seed increases the likelihood of carryover seed. We will discuss this in more detail later.

Carryover seed - the justification for conditioned storage facilities is based on the normal carryover seed. Some seed can be sold as grain and others can't. Regardless, the relative prices are such that seed is more valuable than grain and one would also have to undergo the expense of processing the amount equivalent to the seed that could be carried over. Replacement costs of seed is the key to the economic feasibility of conditioned storage. The "grain option" is not an alternative for seed that has been treated.

Outside sources - if a processor or dealer depends on other sources for seed rather than strictly his own or contract production; having the conditioned storage capability for his carryover seed may be more important since transportation charges and profit are added to the replacement costs of such seed when compared with the cost of seed one produces himself. Future orders for seed from outside sources could be reduced by the amounts of carryover when planning for next season's supply.

Foundation and Registered Seed - this is self explanatory since we know that these seed are the most valuable that enter trade channels.

Treated Soybeans - I have recently heard of some farmers wanting soybean seed treated with Captan; however, I have never interviewed a seedsmen who regularly treats soybeans. If soybean treatment becomes widespread in the future, having the capability to store seed under proper conditions would become a necessity in many operations.

We have discussed who may have economic justification for conditioned storage facilities. Let's now see how having this capability

may help a firm in its operation.

Advantages of conditioned storage:

1. Maintain quality of carryover seed.
2. Flexibility in processing and total operations.
3. Increased yields from valuable seed stocks.
4. Saves cost of breaking bags and reprocessing of "two-way" seed.
5. Avoid loss of treated seed.

Lets briefly consider the point of added flexibility gained by having conditioned storage. With conditioned storage one could be more liberal in calculations of expected sales and accumulation of seed supplies. It seems that a common practice is to clean seed for a portion of the expected seed sales and then clean additional quantities only as prospects for more sales are found. In most cases seed companies are engaged in activities other than seed processing. For example; chemical sales, fertilizer sales, etc. The same personnel are used in all facets of these operations and conflicts for labor use may arise. In addition, conditioned storage would allow one to take advantage of superior quality seed or "good buys" when available, especially in some "hot" varieties.

The savings from reprocessing are self explanatory. Without proper storage, seed may become trash if it is treated or cannot enter alternative trade channels.

Now let's consider the economics, dollars and cents, of conditioned storage. The cost data presented are not as detailed as that required when determining the feasibility of adding conditioned storage. They should, however, be close enough for you to determine whether you should pursue the matter in your operation. Figures given are general estimates of current costs supplied by local contractors. In addition, it is assumed that the price relationships between grain and seed are fairly close.

Buildings - Costs were calculated on a 50' x 100' x 16' building. The building would be of metal construction with a four-inch concrete floor. All walls and the roof would have 2½ inches of blown urethane insulation. The building would have refrigerator doors. Lighting would be with flouresent lights.

Cost estimates for such a building are shown in Table 1. Costs of land and site preparation were not included in the calculations. It was assumed that the individual had sufficient land. If this is not the case, land costs would have to be added to those presented.

Table 1. Estimated construction costs for a 50' x 100' x 16' building used for conditioned seed storage.

		Estimated Costs
		<u>Dollars</u>
Metal Building	@ 4.00/Sq. Ft.	20,000
Erection		3,500
Slab	@ 1.30/Sq. Ft.	6,500
Electrical		1,500
Doors <sup>1/</sup>		2,000
Insulation (2½ inches blown urethane)		3,500
Sub-Total		37,000
Taxes		1,850
Total Costs		38,850

<sup>1/</sup> Doors are refrigerator doors large enough for a forklift to drive through.

The building capacities assumed for calculating costs of the various types of seed are shown in Table 2. Calculations were made assuming 100% of capacity.

Equipment - The only equipment considered was for cooling and dehumidification. Forklifts, pallets, etc. were not included since the equipment, other than for air-conditioning, would already be on hand. It was assumed that the building would be kept at a temperature of 60F and a relative humidity of 50%. The outside temperature used for calculations of equipment needs was 95F. These estimates were provided by local contractors. As with building cost, much more detail should be used when estimates are made for your particular operation, even if the volume of air to be conditioned is the same.

It was estimated the cooling and dehumidification units should have a capacity of 120,500 BTU per hour. Four air units inside and two units outside were selected. Total costs including installation were estimated at \$14,016. It was estimated that these units would consume an average of 226 KWH per day for 180 days of the year.

Initial Investment - Initial investment in the building and equipment for cooling and dehumidification was estimated at \$52,866. There would be added investment and economies if one wanted to store seed in bulk in this facility.

Annual Costs - Estimated annual costs for the operation varies with the type of seed. Total fixed costs were estimated to be \$5,894 (Table 3). Variable costs considered were electricity and interest <sup>2/</sup> on seed based on the values of seed and electrical rates in effect for April, 1977. No interest charges were calculated for corn or rice since they are normally treated and do not have the alternative of entering the grain market. It was assumed that consumption of electricity was the same for each kind of seed. This total amount was estimated to be \$2,400 annually. You are aware that electrical rates vary widely from area to area.

Total costs, on a per unit basis, were estimated and are shown in Table 4. These cost estimates do not include funds for loan repayment or labor. It was assumed that the labor requirements for handling the seed would be necessary whether seed were sold as grain, disposed of as trash, or placed in conditioned storage.

Differences in value of seed as seed or as grain were estimated. The calculations for deriving the differences for soybeans are shown in Table 5. Estimates for the other kinds of seed considered were derived from conversations with professionals and industry personnel. These estimates are shown in Table 6. Total price was used as the value difference for treated seed corn and rice since they have no salvage value as grain.

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<sup>2/</sup> Based on 9% interest for 6 months.

Table 2. Estimated capacities for a 50' x 100' x 16' building used for seed storage.

Seed	Unit	Capacity (Units)
Soybeans	Bu.	22,000
Wheat	Bu.	22,000
Cottonseed (Machine)	Cwt.	7,333
Cottonseed (Acid)	Cwt.	11,000
Corn	50 lb.	22,000
Rice	Bu.	22,000

Table 3. Estimated fixed costs for 50' x 100' x 16' conditioned storage facility, 1977.

		Dollars
Depreciation - Straight Line - No Salvage		
Building	30 Years	1,295
Equipment	20 Years	701
Taxes <sup>1/</sup>		572
Insurance <sup>2/</sup>		418
Maintenance	1% Initial Investment	529
Interest on Investment	9%	<u>2,379</u>
Total		\$5,894

<sup>1/</sup> Taxes were based on average for Mississippi.

<sup>2/</sup> Insurance \$7.90/\$1000 of initial investment.

Table 4. Estimated total costs per unit for conditioned storage at 100% capacity for selected kinds of seed, Mississippi <sup>1/</sup>

Kind	Unit	Fixed	Variable	Total
----- Dollars -----				
Soybeans	Bu.	.27	.38	.65
Rice	Bu.	.27	.11	.38
Wheat	Bu.	.27	.25	.52
Corn	50 Lb.	.27	.11	.38
Cottonseed (Machine)	Cwt.	.80	.60	1.40
Cottonseed (Acid)	Cwt.	.54	.49	1.03

<sup>1/</sup> No provision for loan repayment nor labor costs were included.

Table 5. Estimated differences between soybean as seed and as grain and replacement costs (Mississippi).

	Grain	Replacement Seed Cost <sup>1/</sup>	Difference
----- Dollars -----			
July 72	3.30	5.05	1.75
July 73	6.80	6.42	-.38
July 74	6.26	8.14	1.88
July 75	5.33	5.09	-.24
July 76	<u>6.70</u>	<u>7.69</u>	<u>.99</u>
Total			4.00
Average 72-76			.80

<sup>1/</sup> Includes estimate of bag plus processing and a 35¢ per bushel premium for seed. Price is last quoted price for Central Delta of Mississippi for last week in December.



Table 6. Estimated differences between value of "seed" sold as grain and replacement costs of new seed (Mississippi, 1977).

Kind	Unit	Dollars
Soybeans	Bu.	.80
Cottonseed	Cwt.	15.00
Wheat	Bu.	2.00
Rice	Bu.	Price <sup>1/</sup>
Corn	50 lb.	Price <sup>2/</sup>

<sup>1/</sup> Rice price used for remaining calculations was \$7.65 per bushel.

<sup>2/</sup> Corn price was based on \$30 per 50 pound bag.

Payback Period - A simple payback period based on the value differences of seed and its replacement costs were used to estimate the economic feasibility of conditioned storage for several kinds of seed. Estimates were based on both 100% and 50% utilization of the facility (Table 7). The payback period for 50% utilization is slightly overestimated since interest on carryover seed would be less than 100%. In addition, most dealers would probably have a mixture of seed kinds rather than one kind. One could also include the possibility of custom storage for other dealers, if the storage capacity is not fully utilized.

As can be seen investment in a conditioned storage facility could prove to be lucrative under certain conditions and for certain seed kinds. If you need more warehouse storage, a careful analysis should be made of the added investment required to condition a facility to permit carrying over seed. The analysis shown in this paper is not as thorough as one would want to make in his own situation, however, I believe that the short payback periods for some seed kinds, even with 50% utilization, makes conditioned storage a viable alternative for many seed companies.

Table 7. Estimated payback periods for 50' x 100' x 16' conditioned storage facilities by seed kind with 100% and 50% utilization of facilities.

Unit	Annual Cost Per Unit	Value Difference Per/Bu.	Return Per/Bu.	Payback Period				
				Total Return 100% Utilization	Total Return 50% Utilization			
		----- Dollars -----		Dollars	Years	Dollars	Years	
Soybeans	Bu.	.65	.80	.15	3,300	16	1,650	32
Rice	Bu.	.38	7.65	7.27	159,940	1	79,970	1
Wheat	Bu.	.52	2.00	1.48	32,560	1.6	16,280	3.2
Corn	50 lb.	.38	30.00	29.62	651,640	1	325,820	4
Cottonseed (Mech)	Cwt.	1.40	15.00	13.60	99,729	1	49,864	1
Cottonseed (Acid)	Cwt.	1.03	15.00	13.97	153,670	1	76,835	1