Horse and Wagon to Unit Trains: A NEW GRAIN MARKETING SYSTEM EVOLVES

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Moving agricultural products from farm to market is a vital concern to North Dakotans, farmers and agribusiness alike. North Dakota's rail line system was developed around the turn of the century, influenced by existing technology. The limiting factor then was the distance that a team of horses and a wagon could travel, resulting in branch lines no farther apart than 10 to 20 miles.

The same transportation constraints also influenced the development of the country grain marketing system. The result was a large number of country elevators spaced a few miles apart on grain-gathering branch rail lines.

Many of these small elevators have disappeared with the advent of farm trucks and the automation of North Dakota farms. There were fewer than 600 elevators in the state in 1980 compared to over 1800 in 1922. Much of the original branch rail system still exists, but the whole transportation and marketing system faces a whole new set of technical and economic forces that are vastly different from the ones that shaped the system's original development.

The fact is, a new transportation and marketing system is evolving. Some of the factors that are influencing this evolution include railroad deregulation, branch line abandonment, implementation of multiple-car and unit train grain rates, changing transportation technology, competition among modes of transportation and competition among producing regions. Impending changes will force many decisions by both public and private sectors, including location and size of marketing facilities, investment in grain facilities and transportation equipment, storage capacity and efficiencies of merchandising.

These decisions will have a profound effect on North Dakota for years to come. If the decisions are to be wise ones that best serve the state and its people, the decision-makers need to have the best possible information to guide them.

Providing the relevant information to make these decisions is the goal of a major research project undertaken by the Department of Agricultural Economics and the Upper Great Plains Transportation Institute.

Titled the "North Dakota Grain Handling, Transportation, and Merchandising Study," the project is unique in that it invovles a cooperative effort from a number of groups that are often competitors in the market. Cooperators include farm organizations, railroads, marketing organizations, financial institutions and state agencies as well as the Agricultural Experiment Station. The reason for the broad range of participants is simple; all of them will be impacted by changes in the system.

The overall objectives of the project are to identify cost characteristics of the existing country elevator system and potential subterminal elevators; evaluate the transportation and merchandising system for North Dakota grain; describe and analyze the marketing system in North Dakota; and determine the impacts of size and location on the efficiency of North Daktoa country elevators, including subterminals.

Some parts of the project are descriptive in nature — researchers analyze and describe what the situation is now. Other parts involve simulation, where the researchers attempt to model what will happen if specific changes are made in the existing situation.

The current structure of the North Dakota grain elevator industry was the subject of some of the descriptive phases of the research. Analysis shows that there are some definite differences among the state's elevators. The smaller, older elevators are most commonly found on branch lines. Many North Dakota elevators are quite old; 30 percent of them are over 50 years old. Cost analysis, comparing accounting data of elevators of different types and sizes, demonstrated that there are economies of size in the industry — average total costs decrease as more bushels are handled. The turnover rate is critical to costs — double the turnover rate and cut the average fixed cost in half.

The elevator industry is a competitive business. The efficient businesses will generally survive and grow; inefficient units will have more problems. Some of these elevators may find their role in the marketing system changing as the total system changes; some may play a larger role as storage facilities and a smaller role in marketing, for example.

In response to the trend toward multiple-car shipments, the load out capacity of North Dakota elevators has increased significantly. About a third of the elevator firms now have a load out capacity of over 5,000 bushels per hour. Most of the elevators with large increases in load out capacity are located on the main railroad lines.

Simulation of hypothetical elevators was used for a cost analysis of potential subterminal elevators in North Dakota. The technique used is called the economic-engineering or synthetic-firm approach. Cost information on buildings and equipment is provided by architects, contractors and engineers, and other known data regarding costs and operations are used to create hypothetical models of plants of different sizes. This approach is appropriate for comparing costs of various sized firms because the differences it identifies are a result of only differences in size. Differences in management or technology that would affect real firms can be held constant for the hypothetical firms in the model.

This approach was used to determine the profitability of four subterminal elevator facilities ranging in capacity from 300,000 bushels to 1.1 million bushels. Research results indicate that subterminal elevators can become an important part of the grain elevator industry in North Dakota because of the economies of size associated with such facilities — if they are operated efficiently. Initial construction costs may be prohibitive in some cases, and any proposed subterminals must carefully consider the number, size and location of existing and proposed elevators. The storage capacity of the existing elevator system is underutilized; additional construction might cause added financial problems.

Actually, the definition of a subterminal elevator is rather ambiguous. Some see oportunities in subterminals; others see threats. The underlying reason for the research was to provide information for making wise decisions, maximizing the opportunities and minimizing the threats. The question is one of what will happen, large new structures or existing elevators sliding into a subterminal role? The idea of subterminals is tied to the concept of unit train shipping rates. Some existing country elevators are already able to handle 26-car and 52-car unit trains.

Multiple-car grain rates provide an economic incentive for elevator managers to ship grain in multiple car lots. Discounts are offered by the railroads which generally means the rate decreases as the number of cars shipped increases. Based on 1982 rate differentials, some shippers could have saved roughly $50,000 from a 52-car shipment compared to shipping the same amount of grain in single-car shipments. These reduced rail rates are the major reason for constructing subterminals. However, some firms may have trouble obtaining enough grain to fill multiple car loads.

Previous subterminal activity has prompted elevator mergers. Management of some firms realized that their country elevators could not compete with new subterminals, so they chose to cooperate with other firms under a subterminal-satellite elevator system. These systems may be less efficient to operate than some single plant operations, however, The questions of density of grain production, competition, and size of trade area must be carefully considered by those planning potential subterminal sites.

Subterminal development could affect producers as well as existing country elevators. If subterminals force some local facilities out of the industry, farmers could be required to haul grain greater distances. More scheduled marketing may be required as managers are forced to increase planning and coordination to load multiple-car shipments. New marketing alternatives, such as delayed pricing arrangements, may also be offered to producers, more so than would be the case with traditional country elevators.

The NDSU researchers also used computer simultion models to analyze the comparative costs of alternative systems for moving grain from North Dakota to the terminal markets in Duluth-Superior, Minneapolis and the Pacific Northwest. The transportation modes considered were farm trucks for movement off the farm, semi-trailer and single-car rail shipments from country elevators, and 52-car shipments from selected locations in North Daktoa that might be sites for subterminal elevators in the future. Also considered was 26-car rail shipments from selected country elevators that have or could have the capacity to load such shipments.

The analysis indicates that there are opportunities for substantial cost savings with subterminal elevators. However, the larger the size of the subterminal plugged into the computer model, the smaller the number of subterminals that appeared in the least-cost scenario generated by the computer simulation. Again, and as expected, the analysis indicated significant potential savings in grain handling and transportation costs when country elevators could ship grain to terminal markets in 26-car shipments.

Several other elements of the grain handling and marketing system were also investigated by the NDSU researchers, including analysis of grain movements from North Dakota, costs and characteristics of the trucking industry, shipper-owned equipment, possible development of short line railroads, delayed pricing and grain merchandising.

The grain handling and marketing system that eventually emerges will be shaped by all of these factors and more, and the changes that take place will be an evolutionary rather than revolutionary process. In the final analysis, the producer shapes the marketing system by voting with his truck. Where he chooses to market his grain will determine the final shape of the grain marketing system.