

---

---

**Agricultural Economics Report No. 410-S****January 25, 1999**

---

---

## **Economic Analysis of The Proposed North Dakota Wheat Pool - Summary\***

---

---

North Dakota Farmers Union has proposed a wheat pool for marketing durum and hard red spring (HRS) wheat produced in the state. The primary objective of the pool would be to enhance net farm income. However, there are several concerns about the proposed wheat pool. These include the effectiveness of the pool in marketing HRS and durum wheat, the quantities of HRS and durum wheat that would be handled by the pool, needed incentive payments under alternative marketing conditions, how to finance the proposed incentive payments, and the structural mechanism necessary to implement the ND Wheat Pool.

### **Basic Characteristics of the North Dakota Wheat Industry**

Wheat can be divided into common and durum wheat. Common wheat is used to produce flour for bread, rolls, muffins, cakes, and crackers. Durum wheat is used for pasta. Common wheat is divided into four classes: hard red winter (HRW), hard red spring (HRS), soft red winter (SRW), and white wheat. For protein ranging between 11.5 percent and 14.5 percent, there is substantial substitution between HRS wheat and HRW wheat, but durum wheat is hardly substitutable with other wheats.

North Dakota produces about 85 percent of the durum wheat and 50 percent of the HRS wheat produced in the United States. North Dakota's market share for durum wheat is about 60 percent of U.S. consumption. The United States imports about 24 million bushels (0.67 million metric tons) of durum wheat, mainly from Canada, and also exports about 45 million bushels (1.23 million

metric tons) of durum wheat. North Dakota's market share of HRS wheat is about 40 percent of U.S. consumption. The United States imports about 45 million bushels (1.23 million metric tons) of HRS wheat, mainly from Canada, and exports about 239 million bushels (6.8 million metric tons).

### **What Is a Marketing Pool and How Does It Operate?**

#### **Purpose of a Pool**

The main purpose of a market pool is to provide additional revenue to its members through (1) improved marketing efficiency and (2) market power. There may be efficiency gains from handling larger volumes of grain, logistic advantage, and entrusting marketing decisions to trained specialists, who have greater access to information about available supplies and market opportunities than individual producers. A market pool also may be able to exercise limited market power. A pool exerts market power to the extent that it can raise the price of a commodity by restricting supply, or by effectively discriminating between markets—offering higher prices in some market segments, and lower prices in others, in order to maximize net revenue.

#### **Market Pool and Operation**

A market pool is an arrangement by which producers market their crops collectively. This arrangement is formalized by means of a marketing agreement between a cooperative and its members. The marketing agreement is a legal instrument

---

\*This leaflet summarizes Ag. Econ. Report No. 410 prepared by Dr. Won W. Koo, Dr. William Nganje, Dr. D. Demcey Johnson, Dr. Joon Park, and Mr. Richard Taylor. A copy of the report is available upon request from the Department of Agricultural Economics, P.O. Box 5636, North Dakota State University, Fargo, ND 58105-5636; Ph. 701-231-7441; fax 701-231-7400; or e-mail at [cjensen@ndsuxext.nodak.edu](mailto:cjensen@ndsuxext.nodak.edu). This publication is also available electronically at this web site: <http://agecon.lib.umn.edu/ndsu.html>

which outlines the rights and responsibilities of both producers and their cooperative.

A market pool combines the crops of many producers. Marketing functions are performed by specialists or professional staffs. The proceeds are divided among pool members with each member receiving the same average price for each unit of commodity delivered to the pool. However, adjustments are often made to reflect differences among pool members in commodity quality, transportation costs, or services rendered. The costs of operating the pool are deducted from the proceeds of the sale of the commodity. In a typical case, the producer receives an advance payment when he delivers the commodity. As commodities of the pool are sold, an interim payment may be made. Once the pool is liquidated, operating expenses and other costs are deducted and the remaining proceeds are divided among pool members in a final payment.

### **Voluntary and Mandatory Pools**

In a voluntary pool, producers are free to either join the pool or stay outside. This is contrasted with mandatory pooling, as exemplified by the Canadian Wheat Board (CWB) system. Another form of voluntary pool is a contractual pool; under this alternative, farmers sign a contract to deliver a specified portion of their production to the pool. Farmers who have contracted with the pool should be able to obtain the average price over the year. Also, a typical contract with producers is for more than one year. Hence, under this system, the pool can make a longer term marketing plan, which provides more stability in operating the pool than a pure voluntary pool. Marketing pools in the United States are all voluntary contractual pools. One of them is the Farmers Rice Cooperative located at Sacramento, California.

### **Advantages and Disadvantages of a Marketing Pool**

Advantages of a marketing pool are (1) to make marketing decisions at a specialized level, (2) to reduce price risk, (3) to establish more orderly marketing and increased price stability, (4) to provide producers with higher than market wide average returns, (5) to improve quality and quantity control, and (6) to promote unity of purpose among producers.

Disadvantages of a marketing pool are (1) delay in receipt of full payment, (2) change to cooperative marketing philosophy, (3) loss of marketing control by the producers, (4) possible inadequate pool size, (5) loss of some short-term marketing opportunities, and (6) producer misunderstanding of the need for capital retention.

### **Can the Pool Exercise Market Power to Maximize its Revenue?**

#### **Benefits of North Dakota Durum Wheat Pool**

Table 1 shows the quantities and prices of durum wheat under competitive and alternative pooling scenarios under two different types of pool: North Dakota pool and joint ND/Canada pool. Alternative market shares considered are 50 percent of the U.S. domestic consumption for the ND pool and 80 percent for the joint pool. In both cases, the pool seeks to exert market power by restricting sales to the domestic market and forcing up the domestic price, relative to competitive market conditions.

**The ND Pool:** Under the competitive market scenario, the quantity of durum wheat supplied by North Dakota is 41.47 million bushels at a market price of \$3.50 per bushel, given a 50 percent market share. The domestic revenue is \$144.51 million. The total revenue, including revenue from the world market, is \$220.3 million.

**Table 1. Quantities and Prices of Durum Wheat Under Competitive Market, North Dakota Pool, and Joint Options**

	North Dakota Pool*	Joint Pool*
<b>Competitive Market</b>		
Quantity Supplied by Pool (million bu)	41.47	66.06
World Price (\$/bu)	3.50	3.50
Domestic Sales Revenue (\$ million)	144.51	231.21
Export Sales (\$ million)	75.79	109.13
Total Revenue (\$ million)	220.30	340.34
<b>Unlimited Quantity Reduction Scenario</b>		
Quantity Supplied to Domestic Market	28.99	38.90
Price Set by Pool	4.40	7.46
Domestic Sales Revenue	127.45	289.35
Export Sales Revenue	117.98	185.50
Total Revenue	245.43	474.85
Changes in TR	25.14	134.52
<b>10% Reduction Scenario</b>		
Quantity Supplied to Domestic Market	37.07	59.45
Price Set by Pool	3.80	4.46
Domestic Sales Revenue	141.27	265.10
Export Sales Revenue	89.99	128.41
Total Revenue	231.26	393.51
Changes in TR	10.97	53.17
<b>15% Reduction Scenario</b>		
Quantity Supplied to Domestic Market	35.23	56.15
Price Set by Pool	3.95	4.94
Domestic Sales Revenue	138.71	277.29
Export Sales Revenue	97.07	137.86
Total Revenue	235.78	415.16
Changes in TR	15.49	74.82

\*The North Dakota Pool is based on 50% market share and the Joint Pool is based on 80% market share in the U.S. domestic market.

Under the unlimited quantity reduction scenario, the pool is allowed to reduce the quantity supplied to maximize the pool's revenue. Given a 50 percent market share, the pool reduces its supply of durum wheat from 41.47 million bushels to 28.99 million bushels to increase the price of durum wheat from \$3.50 per bushel to \$4.40 per bushel. The remaining durum wheat would be sold in the world market at the competitive market price. The world price decreases from \$3.50 per bushel to \$3.46, as the pool increases the supply of durum wheat in the world market. Revenue from durum wheat exports is \$117.98 million under the 50 percent market share case. Total revenue is \$245.43 million, which is the sum of the revenue from domestic sales and revenue from the world market. The increase in total revenue under this scenario, relative to the competitive scenario, is \$25.14 million.

Under the 10 percent reduction scenario, the pool's supply is 10 percent lower than the competitive market supply. The pool supply is larger than under the unlimited quantity reduction scenario, but prices are much lower. Total revenue under this scenario is \$231.3 million, which includes revenue from both domestic and foreign sales. The increase in total revenue under this scenario, relative to the competitive market scenario, is \$10.97 million. Under the 15 percent reduction scenario, the pool supply is 15 percent lower than the competitive market supply. The increase in total revenue under this scenario, relative to the competitive scenario, is \$15.49 million.

**The Joint Pool:** Under the competitive market scenario, both countries supply 66.06 million bushels at the market price of \$3.50, resulting in domestic revenue of \$231.21 million, given a 80 percent market share. Total revenue, including revenue from foreign sales, is \$340.3 million.

Under the unlimited quantity reduction scenario, the quantity of durum wheat supplied by the pool is reduced substantially from 66.06 million bushels under the competitive scenario to 38.90 million bushels. The domestic price of durum wheat increases from \$3.50 per bushel to \$7.46 per bushel. Total revenue under this scenario could reach \$474.85 million, which is the sum of domestic sales revenue (\$289.35 million) and export sales revenue (\$185.50 million). The increase in total revenue under this scenario, compared with the competitive market scenario, is \$134.5 million. However, the pool could be constrained in raising the domestic price. If the domestic price exceeds the world price by more than the transportation costs plus handling charges at ports, other exporting countries could export to the United States and the domestic price would decrease.

Under the 10 percent reduction scenario, total revenue from domestic sales is \$265.10 million and export revenue is \$128.4 million. The increase in total revenue under this scenario, compared with the competitive market scenario,

is \$53.17 million. Total revenue under the 15 percent reduction scenario is larger than under the 10 percent reduction scenario because of higher domestic prices. The increase in total revenue under this scenario, relative to the competitive market scenario, is \$74.82 million.

### North Dakota Hard Red Spring Wheat Pool

Since North Dakota supplies less than 50 percent of the hard wheat consumed in the United States, market shares considered are 40 percent of U.S. domestic consumption in the ND pool and 65 percent in the joint pool. The domestic price under the competitive market scenario is \$3.15 per bushel.

**Table 2. Quantities and Prices of Spring Wheat Under Competitive Market, North Dakota Pool, and Joint Options**

	North Dakota Pool*	Joint Pool*
<b>Competitive Market</b>		
Quantity Supplied by Pool (million bu)	112.67	183.13
World Price (\$/bu)	3.15	3.15
Domestic Sales Revenue (\$ million)	355.12	577.08
Export Sales (\$ million)	357.44	580.83
Total Revenue (\$ million)	712.56	1157.91
<b>Unlimited Quantity Reduction Scenario</b>		
Quantity Supplied to Domestic Market	105.33	164.78
Price Set by Pool	3.20	3.28
Domestic Sales Revenue	337.54	540.95
Export Sales Revenue	378.45	626.36
Total Revenue	715.99	1167.31
Changes in TR	3.43	9.40
<b>10% Reduction Scenario</b>		
Quantity Supplied to Domestic Market	101.29	164.78
Price Set by Pool	3.23	3.28
Domestic Sales Revenue	327.48	541.15
Export Sales Revenue	390.01	626.13
Total Revenue	717.49	1167.28
Changes in TR	4.93	9.37
<b>15% Reduction Scenario</b>		
Quantity Supplied to Domestic Market	95.79	115.61
Price Set by Pool	3.27	3.35
Domestic Sales Revenue	313.00	521.37
Export Sales Revenue	406.09	647.95
Total Revenue	719.09	1169.31
Changes in TR	6.54	11.41

\*The North Dakota Pool is based on 40% market share and the Joint Pool is based on 65% market share in the U.S. domestic market.

**The ND Pool:** The quantities of hard wheat supplied by North Dakota in the pooling option is 112.67 million bushels. Total revenue from domestic sales under the competitive market scenario is \$355.121 million (Table 2).

When the pool maximizes its profit by restricting its supply, the quantity of hard wheat supplied by the pool decreases to 105.33 million bushels with a 40 percent market share. However, there is a small increase in the price of HRS wheat under this scenario because of a high degree of substitution between HRS and HRW wheat. The increase in total revenue, relative to the competitive scenario, is \$3.43 million. Under both 10 percent and 15 percent reduction scenarios, increases in total revenue are insubstantial.

**The Joint Pool:** Quantity of hard wheat supplied is 183.13 million bushels with a 65 percent market share. Total revenue from domestic sales under the competitive market scenario is \$577.08 million.

When the pool maximizes its profit by restricting its supply optimally, the quantity of hard wheat supplied by the pool decreases to 164.78 million bushels, given a 65 percent market share. However, there is only a small increase in the price of HRS wheat under this unlimited quantity reduction scenario because of a high degree of substitution between HRW and HRS wheat. The increase in total revenue is \$9.4 million. Under both 10 percent and 15 percent reduction scenarios, changes in the pool's total revenue from both domestic and export sales are \$9.37 million and \$11.41 million, respectively.

### Benefits for the Canadian Durum Wheat Producers

Canadian producers would derive substantial benefits from cooperation with the ND pool. Since the CWB has mandatory pooling, there would be no free riders and consequently producers could get higher returns than the ND pool members.

Increases in the CWB's revenue from the pool operation for durum wheat range between \$60.6 million under the 100 percent scenario (Canadian exports to the United States equal the average level for the last five years) and \$52.7 million under the 60 percent scenario (Canadian exports to the United States are 60 percent of the average for the last five years) when the pool price is \$5.00 per bushel. As the pool price decreases, additional revenue for the CWB also decreases.

Increases in the CWB's revenue from the pool operation for HRS wheat range between \$64.5 million with the 100 percent scenario and \$52.8 million with the 60 percent scenario when the pool price is \$3.50 per bushel. However, when the pool price is set at \$3.20, increases in the CWB's revenue are \$9.3 million with the 100 percent scenario and become negative with the other scenarios.

### The Long-Run Effects of the Pool

If the pool succeeds in raising the domestic price, this may induce an increase in production. The increased supply would weaken the pool's market power and make the pool operation less effective. The pool operation was simulated for 10 years from 1999 to 2008 to evaluate the effects of increased supply on the pool operation. The pool prices considered in this analysis are \$5.00 per bushel, \$4.60 per bushel, \$4.20 per bushel, and \$3.80 per bushel for durum wheat and \$3.50 per bushel and \$3.20 per bushel for HRS wheat.

Average prices of durum wheat received by the pool members under alternative pool prices are shown in Figure 1. When the pool price is set at \$5.00 per bushel, average prices received by producers are \$4.40 per bushel in 1999, decreasing to \$4.12 per bushel in 2000, and stabilizing at \$4.17 per bushel for the remaining period. As the pool price decreases, the average price received by producers also declines. However, average prices received by farmers under alternative pool prices are much higher than the competitive market price (\$3.50),

indicating that the pool operation for durum wheat is beneficial in the short and long run.

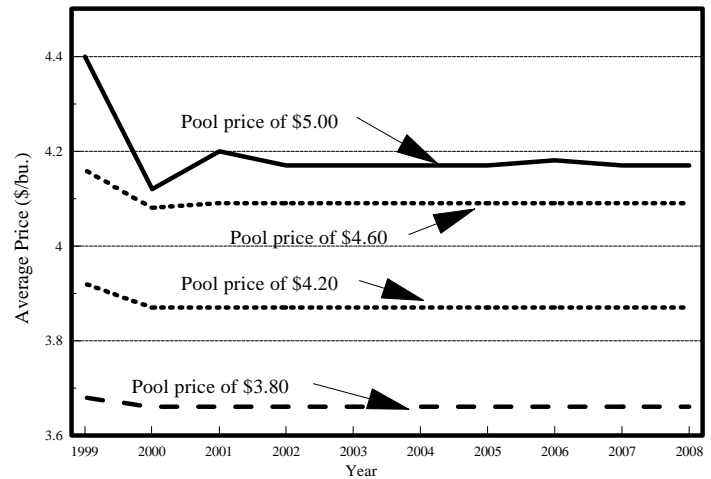


Figure 1. Average Price Received by Members of the Durum Wheat Pool

Average prices of HRS wheat received by the pool members under the alternative pool prices are shown in Figure 2. When the pool price is set at \$3.50 per bushel, average prices received by producers range between \$3.32 per bushel in 1999 and \$3.31 per bushel in 2000. When the pool price is set at \$3.20 per bushel, average prices received by producers are still higher than the competitive price, implying that the pool will provide additional revenue to producers in both the short and long run.

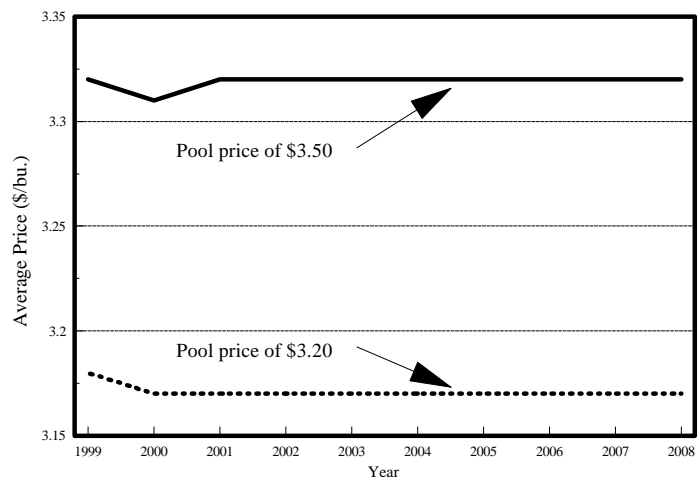


Figure 2. Average Price Received by Members of the Hard Red Spring Wheat Pool

# **Can the Pool Improve Marketing Efficiency?**

## **Management and Operational Efficiency**

Long-term viability of a pool may come to depend on operational efficiencies or competitive advantages that are not shared by other grain trading firms. Among the areas where the pool could develop competitive advantages are grain blending, logistics, and strategic quality management. As the pool's market share increases from 50 percent to 90 percent, it is estimated that producers could receive efficiency gains ranging from \$0.165 to \$0.284 per bushel for durum wheat and \$0.074 to \$0.09 per bushel for HRS.

## **Optimal Length of the Contracts**

The minimum required contract length for the North Dakota pool would be four or five years. That is the time required for payoffs to stabilize, based on supply response assumptions in the analysis.

## **Market Strategies**

The pool should adopt the following marketing strategies: (1) to provide consistent quality wheat for domestic and foreign customers through careful handling, cleaning, blending, and storage; (2) to establish long-term sale contracts with domestic and foreign customers through customized wheat quality; (3) to use quantity premiums to attract greater volumes to the pool and limit the free rider problem; and (4) to provide efficient risk management for its members, both intra- and inter-year.

## **Organizational Structure and Handling Mechanism**

### **Handling Mechanism**

The pool would collect wheat from member producers utilizing authorized local grain elevators. The grain elevators would contract

with the pool to maintain variety segregation and the level of quality control required by the pool. Wheat would be delivered by member producers according to their delivery commitments, arranged at the time of sign up. Wheat is either cleaned and blended at the local elevator or shipped to larger regional elevators for cleaning and/or blending to meet or exceed quality factors, as determined by the pool and its customers, with input from technical experts in the market. After blending and grading, it could be sold to either the domestic or foreign markets, depending on the quality standards required by those markets. A portion of wheat could be processed into semolina for durum wheat or flour for spring wheat by the pool and sold to domestic and foreign food processors. The pool could directly ship wheat from local elevators to domestic processors and contract with grain companies to ship durum wheat to international markets.

## **Scheduled Payments**

The initial payment would be paid to producers upon delivery of wheat to the local elevator. The initial payment would equal a percentage of current market price or the CCC loan rate for wheat in that county. The delivery of wheat would be spread out over the marketing year to ease the transportation of wheat. An interim payment could be made to producers after the committed volume of wheat is sold. The final payment would be made in April or May after the marketing activities of the pool are finished.

## **Organizational Structure and Operating Costs**

The pool would be organized as a cooperative with an elected board of directors. The manager would be responsible for the day-to-day operation of the pool and would answer to the board of directors. The pool could be divided into five divisions: Sales and Marketing, Membership Promotions, Accounting, Transportation, and Research.

Assuming that the North Dakota Durum Wheat Pool handles 50 million bushels of durum, the total estimated operating expense would be \$1,186,000, or about 2.37 cents per bushel. For a North Dakota Spring Wheat Pool handling 50 percent of the North Dakota spring wheat crop or about 136 million bushels, the total estimated operating expense would be \$2,484,000 or about 1.83 cents per bushel.

## **Conclusions**

The ND Durum Wheat Pool may provide additional revenue to durum wheat producers by raising the domestic prices jointly with the CWB in the North American market. If such cooperation is feasible, the domestic price could be driven substantially higher than the world equilibrium price, which would work to the mutual benefit of U.S. and Canadian producers. The pool also could provide additional revenue to its members by improving marketing efficiency. Efficiency gains through the pool operation are estimated to be \$0.16 - \$0.23 per bushel for durum wheat.

On the other hand, the ND Spring Wheat Pool is less likely to provide additional revenue to spring wheat producers in the state by raising domestic prices, even with full cooperation from the CWB. HRS wheat is highly substitutable with hard red winter wheat and the pool may not have enough market power in the North American market. Efficiency gains also could be smaller than for durum wheat. Efficiency gains are estimated to be \$0.07 - \$0.09 per bushel for HRS wheat.

## **Major Issues and Concerns**

### **Incentive Payments and Contracts**

The pool can offer incentive payments to those who participate in the pool. The purpose of this incentive payment is to attract producers to the pool operation. In general, higher incentive payments will attract more participants to the pool. The concern is how to finance the incentive payment. The payment could come from either

the state government as a form of subsidy or from the state bank or commercial banks as a loan. A state government subsidy might violate the World Trade Organization (WTO) agreement, and would require approval of the North Dakota legislature. If the incentive payment is subsidy-neutral, it must be financed by a bank and the pool would be responsible for the repayment of the loan. In this case, the pool would have to arrange multi-year contracts with its members; otherwise, members would exit after receiving the incentive payment. The magnitude of the incentive payment, therefore, should depend upon the contract period and expected additional revenue from the pool operation.

### **Payments to Producers**

Payments to producers will be lower than the domestic price of wheat set by the pool. The reason is that only part of the pool's wheat is sold at the high domestic price; the remainder is sold at a lower price in the world market. In addition, the pool will have operating expenses which should be paid from the pool's revenue. The final payment to producers would be the average price minus the pool's operating cost per bushel. The total payment to the member, therefore, is lower than the domestic price. Because of this difference, members could seek to exit the pool in order to receive the higher domestic price. These free riders would weaken the market power of the pool.

### **Supply Response**

The supply of durum wheat is very elastic in some regions in the United States. For instance, the price elasticity of supply of durum wheat is 2.0 in the desert region and 0.98 in other regions. The price elasticity of supply is 0.86 in North Dakota. This implies that a 10 percent increase in the price of durum wheat would induce about the same percentage increase in supply. To the extent that additional production is supplied by free riders, this will weaken the market power of the pool. An alternative would be to form a U.S. durum wheat pool by including producers in all

durum wheat producing states, mainly Montana, Minnesota, California, and Arizona.

### **Cooperation with the Canadian Wheat Board**

For effective exercise of market power, the durum wheat pool would require cooperation from the CWB. The CWB is capable of supplying large amounts of durum wheat to millers in the United States as long as the U.S. domestic price of durum wheat is higher than alternative markets, net of shipping costs. However, if the ND Wheat Pool and the CWB cooperate with each other, the two parties can jointly determine a minimum price of durum wheat, which would be much higher than the competitive price in the North American market. This cooperation would entail the CWB restricting its durum wheat exports to the United States to an agreed level. As long as the ND Wheat Pool and the CWB continue to honor the agreement, producers in the two countries could

earn additional revenue. However, the legality of such cooperation (if based on an explicit agreement) would have to be determined. In absence of an explicit market-sharing and pricing agreement, cooperation would have to be implicit, based on recognition of mutual interests.

### **On-farm Storage**

The carry-over stock at the end of the 1997-98 marketing year was about 23 million bushels for durum wheat and 228 million bushels for hard red spring wheat. Ending stocks for 1998-99 are projected to be even higher. The pool may have to absorb a major portion of these stocks to effectively exercise its market power, and some of the remaining stocks could be supplied to the domestic market by non-members. Large current carry-over stocks, therefore, may reduce the pool's effective market share and weaken its market power. An alternative is to export a large portion of the carry-over stocks under the Export Enhancement Program (EEP).

### **References**

- Armington, Paul S. *A Theory of Demand for Products Distinguished by Place of Production*, IMF Staff Papers 16. 1969.
- Benirschka, Martin, and W. Koo. *World Wheat Policy Simulation Model: Description and Computer Program Documentation*, Ag. Econ. Rpt. #340, Dept. of Ag. Econ., NDSU, Fargo, December 1995.
- Canadian Wheat Board (CWB), *Grain Matters*, September 1998.
- Carter, Colin, and R.M.A. Loyns, *The Economics of Single Desk Selling of Western Canadian Grain*, March 1996.
- Dahl, Bruce L., and Wilson, W. William. *Consistency of Quality Characteristics in Hard Red Spring Wheats*, Ag. Econ. Rpt. # 393-S, Dept. of Ag. Econ., NDSU, Fargo, 1998.
- Dunn John R., Stanley Thurston, and William Farris. *Some Answers to Questions About Commodity Marketing Pools*, EC-509, U.S. Department of Agriculture, Washington, DC.
- Fulton, Murray, and James Vercammen. *Dual Marketing and the Decisions Facing Western Canadian Farmers for Wheat and Barley Marketing: A Brief to the Western Grain Marketing Panel*, Centre for the Study of Co-operatives, University of Saskatchewan, Saskatoon, 1996.
- International Grains Council. *World Grains Statistics*, London, England, 1996/97.
- Kraft, Daryl, W. H. Furtan, and E. Tychniewicz. *Performance Evaluation of the Canadian Wheat Board*, January 1996.
- Kreps, M. David. *A Course in Microeconomic Theory*, Princeton University Press, 41 William Street, Princeton, NJ, 1990.
- Kreps, D., P. Milgrom, and R. Wilson. 1982. "Rational Cooperation in th Finitely Repeated Prisoners' Dilemma." *Journal of Economic Theory* 27:245-79, 1982.
- Nash, J. "The Bargaining Problem." *Econometrica* 18:155-62, 1950.
- Nash, J. "Two-Person Cooperative Games." *Econometrica* 21:128-40, 1953.
- National Agricultural Statistics Service. *Historical Data*. <http://www.usda.gov/Nass/sso-rpts.html>.
- Rubinstein, A. "A Perfect Equilibrium in Bargaining Models." *Econometrica* 50:97-109, 1982.



Schmitz, Andrew, R. Gray, T. Schmitz, and G. Storey. *The CWB and Barley Marketing: Price Pooling and Single-Desk Selling*, January 1997.

Schmitz, Troy, and W. Koo. *An Economic Analysis of International Feed and Malting Barley Markets: An Econometric Spatial Oligopolistic Approach*, Ag. Econ. Report #357, Dept. of Ag. Econ., NDSU, Fargo, September 1996.

Schmitz, Andrew, A. McCalla, D. Mitchell, and C. Carter. *Grain Export Cartels*, Ballinger Publishing Co., Cambridge, MT, 1981.

Simonot, David. *The Economics of State Trading in Wheat*, July 1997.

Statistics Canada, CANSIM. *Wheat Production*. <http://www.statcan.ca/english/CANSIM/index.html>

USDA Economics and Statistics System. *Field Crops/Wheat*. <http://usda.mannlib.cornell.edu/usda/usda.html>