Center for Agricultural Policy and Trade Studies
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NEWSLETTER

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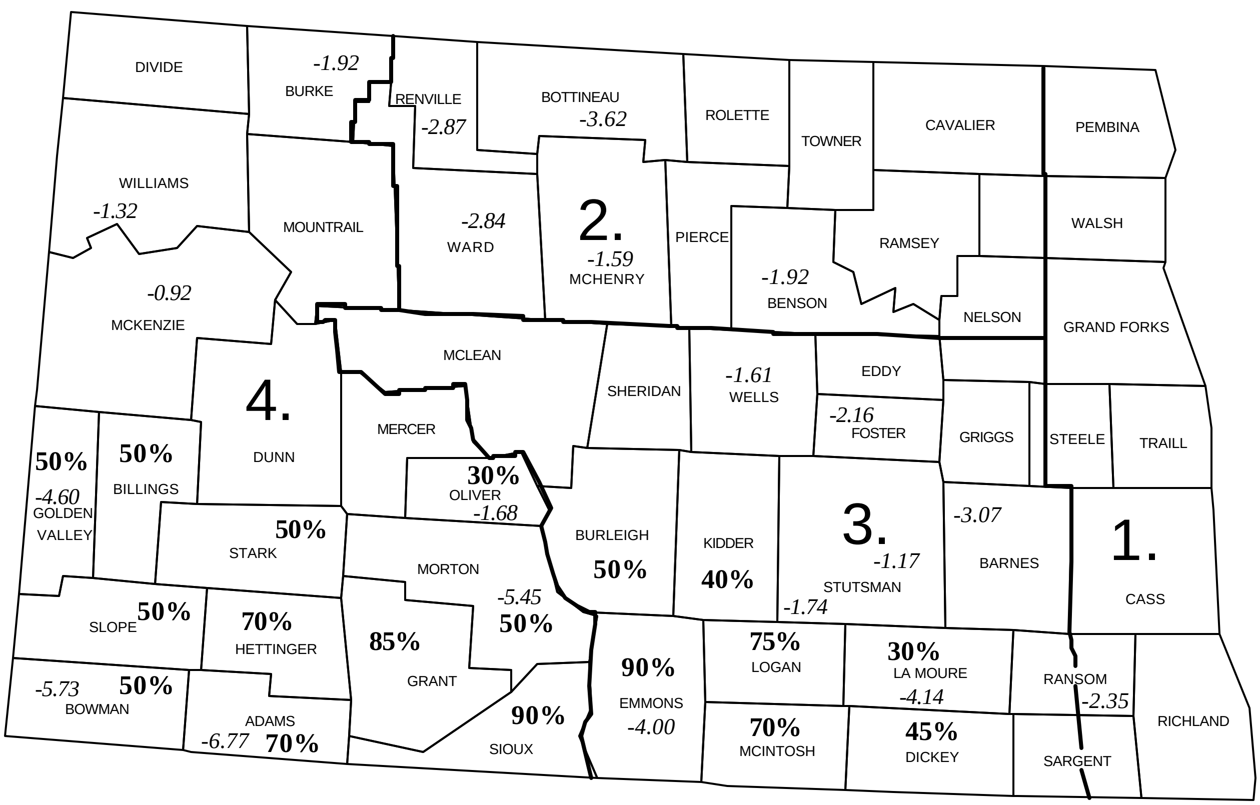
Drought of 2002 Effects on North Dakota Net Farm Income

Richard D. Taylor and Won W. Koo

U.S. agriculture is experiencing a major drought during the growing season of 2002. The most severe areas are in the western and central great plains states. North Dakota is on the edge of the drought area. The south-central and the southwestern areas of the state are under severe drought conditions, while the northeastern area has received excessive moisture. Figure 1 shows the shortfalls in growing season precipitation for the major drought areas of the state. Bowman has received 4.66 inches of rain this year, compared to an average of 10.39 inches. Hettinger has received 4.23 inches, compared to 11.00 inches for a normal year. By contrast, Grand Forks and Fargo have received 4.64 and 3.77 inches of rain, respectively, above the normal precipitation level.



Region 1. Red River Valley (RRV) Region 3. South Central (SC)
Region 2. North Central (NC) Region 4. Western (West)

Bold figures indicate percentage loss in total crop production
Italicized numbers indicate inches of precipitation under normal growing season precipitation

Figure 1. Drought Conditions and Production Loss Estimates for North Dakota Farms

The area of low precipitation is not limited to the southwestern and south-central areas of the state, but currently these are the only areas with crop loss estimates. Large areas in north-central North Dakota are also drier than normal.

The North Dakota Extension Service at NDSU has estimated total crop losses due to the drought for 18 of the most severely affected counties (Figure 1). Sioux and Emmons counties will have a 90% crop loss this year due to the drought. Grant county has lost 85%, and Logan county has lost 75% of the crop production this year. McIntosh, Hettinger, and Adams counties have lost 70% of the crop production. The remaining 13 counties have lost between 30% and 50%.

The Extension Service also estimated livestock losses at $54.8 million (16.6%) in 2002. As a base for comparison, total livestock receipts for these counties in 2000, as reported by the North Dakota Agricultural Statistics Service, was $329.9 million.

Our analysis evaluates the resulting drops in net farm income for different sizes and profit categories of representative farms. The representative farms are drawn from the North Dakota Farm and Ranch Business Management Education Program farm records and are forecasted over the 2002 to 2011 period under the Farm Security and Rural Investment Act (FSRIA) of 2002, the Uruguay Round Agreement (URA), and the Canada - United States Trade Agreement (CUSTA). The North Dakota Representative Farm model has 24 representative farms: six farms in each of the four regions of North Dakota. These regions are the Red River Valley (RRV), North Central (NC), South Central (SC), and Western (West) (Figure 1). The farms in each region are representative of the average-, high-, and low-profit farms and small-, medium-, and large-size farms enrolled in the North Dakota Farm and Ranch Business Management Education Program. A full description of the North Dakota Representative Farm model can be found in Taylor, Koo, and Swenson (Agribusiness & Applied Economics Report No. 485).

The USDA updated crop report, dated August 12, 2002, reduced U.S. crop production estimates for most major crops grown in North Dakota, including wheat, barley, corn, and soybeans. The USDA also raised projected price forecasts. The national average farm price for wheat increased from $2.75-$3.35 in July to $3.20-$3.80 in August. The corn price forecast increased from $1.80-$2.20 in July to $2.30-$2.70 in August. Soybean prices increased by $1.00 per bushel.

The FSRIA of 2002 provides price protection for the producers, but no production protection. The direct and counter-cyclical payments are based on historical production, while the loan program is based on actual crop production. As market prices increase, counter-cyclical payments to producers decrease. Therefore, during a drought situation, when little or no crop production occurs, the producers would still receive counter-cyclical payments. However, under a wide-scale drought, the prices of the commodities respond to smaller production estimates, thereby reducing or eliminating the counter-cyclical payments.

Table 1 shows the national loan rates, direct payments, target prices, and USDA national price forecasts for major crops grown in North Dakota. August price forecasts are, in most cases, near the target price which will eliminate counter-cyclical payments.

Table 1. National Loan Rates, Direct Payments, Target Prices, and USDA Price Forecasts for the Major Commodities

	Loan Rate 2002-2003	Direct Payment 2002-2007	Target Price 2002-2003	USDA July	USDA August
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Corn (bu)	1.98	0.28	2.60	1.80-2.20	2.30-2.70
Barley (bu)	1.88	0.24	2.21	1.95-2.35	2.40-2.80
Wheat (bu)	2.80	0.52	3.86	2.75-3.35	3.20-3.80
Soybeans (bu)	5.00	0.44	5.80	4.15-5.05	5.15-6.05
Minor Oilseeds (cwt)	9.60	0.80	9.80		

The updated prices were inserted into the model to represent current crop conditions. The crop loss estimates for the 18 counties were limited to 40% because of Federal Crop Insurance coverage. The drought counties are included in the SC and the West regions within the model, and their normal crop production within a region was calculated as an average of the 2000 and 2001 crop production. Table 2 shows the estimated regional impact of the drought, assuming that the 10 SC counties and 7 West counties outside the drought areas had normal production. Livestock receipts in the affected counties were estimated to be reduced 16.6% due to the drought. The effect for both regions was estimated to be a 10% reduction in total livestock receipts.

Table 2. Percent Reduction in Total Crop Production within the Region as a Result of Crop Losses in the 18 Drought Counties

	Barley	Canola	Corn	Soybeans	Sunflowers	Wheat
South Central	11.0	5.6	18.2	11.8	16.9	12.5
West	18.1	18.8	23.5	35.9	33.1	20.3

Table 3 presents net farm income for farms by size and profitability under the base and the 2002 drought conditions. Income in the RRV and NC regions of the state increases due to the adverse weather conditions throughout the United States. Increased market prices raise net farm income only slightly because much of the increased revenue from the market is offset by lower counter-cyclical payments by the government. The RRV large-size farm's expected counter-cyclical payments were $63 thousand; after the expected price increases, the counter-cyclical payments are $32 thousand. The counter-cyclical payments for the large-size farm in the NC region were $33 thousand before the drought; now, they are $13 thousand. Nonetheless, the RRV and the NC regions will benefit from the price increases.

Table 3. Net Income for North Dakota Representative Farms Under Normal and Drought Conditions of 2002, Dollars.

Region	Large	Medium	Small	High	Average	Low
RRV Base	145,307	66,618	20,210	147,814	76,372	27,970
RRV Drought	152,380	68,887	20,865	159,640	84,426	36,118
NC Base	80,068	29,360	16,470	96,054	32,903	9,116
NC Drought	82,948	44,110	22,645	101,933	34,832	8,440
SC Base	99,824	38,528	20,842	138,567	48,985	14,057
SC Drought	50,805	13,032	9,676	75,849	8,284	-26,416
West Base	105,121	48,124	13,989	127,626	49,670	6,957
West Drought	46,388	32,447	9,123	64,025	10,127	-14,220

The drought areas of the SC and West regions, however, will not benefit from price increases. The drop in counter-cyclical payments to these regions is substantial because the increases in market price have very little impact when no production occurs. The counter-cyclical payment for the large-size farm in the SC region will drop from $54 thousand to $26 thousand after the drought. The same reduction will occur in the West region.

The net farm income for the size representative farms in the SC region falls 49% for the large-size farm, 66% for the medium-size farm, and 53% for the small-size farm due to the drought. The net farm income for the profit representative farms in the SC region falls 45% for the high-profit farm, 83% for the average-profit farm, and is -$26 thousand for the low-profit farm. The net farm income for the size representative farms in the West region falls 56% for the large-size farm, 33% for the medium-size farm, and 35% for the small-size farm due to the drought. The net farm income for the profit representative farms in the West region falls 50% for the high-profit farm, 80% for the average-profit farm, and is -$14 thousand for the low-profit farm.

The drought of 2002 has dramatically changed the outlook for U.S. agriculture. Lower production in the United States and the world has increased price projections for the coming year. For large areas in the United States, the higher prices will not carry a benefit because of the drought conditions. Crop losses in certain counties in North Dakota are as high as 90%. Federal crop insurance will offset some of those losses, but at the 60% production level. Net farm income in the non-drought-affected areas will increase slightly because of the expected increases in prices. However, much of the increase in market revenue will be offset by reductions in federal counter-cyclical payments. In the drought-affected regions, SC and West, net farm income for the average-size and medium-profit farm will be reduced between 80% and 83%. These estimates are based on regional impacts, but the local impact will be much worse as the drought area covers about ½ of both regions.

Structural Changes in Japanese Beef Imports

Hyun J. Jin

Food safety is one of the most important issues facing consumers today. In addition to the traditional socio-economic factors influencing consumer choice, such as income level, product prices, and lifestyle, food safety significantly affects buyers' preferences. Consumer response to risk-related information can have potentially significant consequences within the food production industry as well as in the international trade of agricultural and food products. If a food safety panic creates an interim or long-term upheaval in purchasing patterns for a certain food, it can stimulate a shift in market demand.

The current concern over the declining levels of beef consumption in Europe and East Asia provides an excellent example. The root of the change in consumption is an outbreak of Bovine Spongiform Encelphalopathy (BSE, known as "mad-cow disease"), a lethal disease which targets the central nervous system and is characterized by the appearance of vacuous holes in the neurons of infected cattle's brain tissue.

The occurrence of BSE in cattle reached epidemic proportions in Europe by 1992, with more than 1,000 reported cases. Within a thirteen-year period (1987-2000), the total swelled to 180,000 infected cattle. Consumers were suddenly alerted to the danger on March 20, 1996, when the government of the United Kingdom announced a possible link between consumption of BSE-infected meat and the development of a new variant in its human equivalent, known as Creutzfeldt-Jacob disease. The pronouncement of these findings generated considerable media attention and resulted in an immediate and significant decline in beef consumption.

After the 1996 announcement, beef consumption in Japan began to decline at the same time that its economic growth was slowing. On September 10, 2001, the Japanese government reported the first case of BSE within the country. The Japanese beef industry reeled under the combined reaction in its domestic and import markets. Strict European standards and testing were adopted in an effort to fight the spread of the disease. At the same time, officials scrambled to reassure Japanese consumers; however, beef wholesalers and retailers still suffered a 5-20% drop in sales.

The damage was compounded by the discovery of a second infected cow in November of that year, followed by third and fourth cases during the next month. One-in-four Japanese consumers reportedly stopped eating beef because of the scare, and restaurants described a slump in sales of beef dishes. The recurrent cases of BSE continued to fuel consumer panic and ravaged the Japanese beef industry.

Consumer response to the BSE outbreak in Japan is tested to determine whether preferences are stable for beef consumption, or if there has been a structural change in consumer tastes. For this test, we used a nonparametric method which utilizes an economic logic established in the Axioms of Revealed Preference. The test results suggest a structural change in consumer taste for meats at the 99% level of confidence, with the most likely break point occurring in September 2001.

After the BSE outbreak, Japanese beef imports from the United States decreased, despite the potential for these imports to displace domestic production. U.S. beef exports had already begun to soften by spring of 2001, as a result of tight beef supplies, higher prices, an appreciating dollar value, and a worldwide weakening of demand. The discovery of BSE in Japan added to the downward trend, rather than reversing it.

It is reasonable to expect that both U.S. and Australian beef exports to Japan would eventually return to pre-BSE outbreak levels of growth, as neither country has reported any infected cattle. It is also possible that exports from both countries could additionally benefit from Japanese consumers' scepticism about their domestic beef producers. If the behavior of the Japanese consumer is similar to that of consumers in Europe, some rebound in beef consumption can be expected to help boost imports next year. However, Japan has historically consumed less beef than European states have, and consumer attitudes could evolve in a different way. Consumer preferences may hinge on the possibility of future discoveries of infected cattle.

Beef exporters to Japan, as well as Japanese policy-makers, should recognize the shift in Japanese consumer preference. Improvement in the Japanese economy may no longer guarantee an increase in beef consumption and imports. Economic recovery must be accompanied by efforts in promotion and advertising to alter the image associated with beef. The United States, as the largest beef exporter to Japan, must actively participate in this process in order to redeem its market sales.

Outlook of U.S. and World Wheat Industries

Won W. Koo and Richard Taylor

Total world wheat production has increased from 531 million tons in 1986/87 to 591 million tons in 2001/02. China was the largest producer of wheat in 2001 (95 million tons), followed by the EU (92 million tons) and the United States (53 million tons). However, the average export price of U.S. wheat at the Gulf ports decreased from $5.02 per bushel in 1996/97 to $3.30 per bushel in 2001/02. The major wheat exporting countries, including the United States, Canada, the EU, the Former Soviet Union (FSU), Australia, and Argentina, supply approximately 70% of the wheat traded in the world market. The United States is the largest exporter, followed by Canada and Australia. The United States exported an annual average of 27.2 million metric tons of all wheat classes in 1997-2001, of which 16.7 million metric tons were hard red winter (HRW) wheat, and 8.2 million metric tons were hard red spring (HRS) wheat. The United States also leads in exports of soft red winter (SRW) wheat to China, West Asia, and the northern African markets, and competes with the EU in the SRW market.

Canada is the leader in exports of durum wheat and competes with the United States and the EU. The United States and Canada are leading exporters of HRS wheat. Major U.S. markets for HRS wheat include Southeast Asia and East Asia, including Japan and South Korea. Major Canadian markets for HRS wheat include China and East Asia. Australia and Argentina compete with the United States in exporting HRW wheat. Major U.S. markets for HRW wheat include China and East Asia. Argentina exports HRW wheat mainly to South America and West Asia. Australia's major markets are the North African countries, China, and West Asia.

Total world wheat trade for the five major exporters is projected to increase 21.6% from 79.9 million metric tons in 2001 to 97.2 million metric tons in 2011. Trade of all wheat classes is expected to increase for the 2001-2011 period. Durum wheat production in Canada is predicted to increase faster than in other countries. The export price of U.S. common wheat is projected to increase by 17.3% from $3.30 per bushel in 2001 to $3.87 per bushel in 2011. The price of U.S. durum wheat is projected to increase 15.3% from $4.37 per bushel in 2001 to $4.91 per bushel in 2011.

Table 1 shows wheat production and exports in the major exporting countries. U.S. durum exports are projected to increase 59.3% from 408 thousand metric tons in 2001 to 651 thousand metric tons in 2011. However, projected durum exports are only 7.4% higher than the 3-year average from 1999 to 2001. Common wheat exports are predicted to increase gradually from 25.9 million metric tons in 2001 to 30.0 million metric tons in 2011.

Table 1. Wheat Production and Exports for Major Exporting Countries

	Average (1999-2001)	2001	2011	% Change (2001-2011)
	------------thousand metric tons--------------			
United States				
Production				
Common	61,019	57,526	69,419	20.7
HRW	27,974	23,032	29,273	27.1
HRS	13,038	13,672	15,719	15.0
SRW	12,406	12,831	12,934	0.8
White	7,689	8,244	8,351	1.3
Durum	3,176	2,986	3,253	8.9
Exports				
Common	27,627	25,857	30,049	16.2
Durum	606	408	651	59.3
Canada				
Production				
WRS	21,568	18,705	24,555	31.3
WAD	3,150	2,580	4,360	69.0
Exports				
WRS	9,919	13,000	16,291	25.3
WAD	3,042	3,000	3,186	6.2
European Union				
Production				
Common	87,173	84,105	92,425	9.9
Durum	8,426	7,830	8,946	14.3
Exports				
Common	11,236	6,561	11,980	82.6
Durum	793	730	798	9.3
Australia				
Production	23,508	22,000	25,540	16.1
Exports	17,038	17,450	19,829	13.6
Argentina				
Production	16,221	15,690	16,482	5.0
Exports	11,908	11,575	12,475	7.8
Former Soviet Union				
Production	74,443	92,985	111,689	20.1
Exports	1,179	4,580	5,056	10.4

Chinese imports of common wheat are projected to increase 349.8%, from 1.1 million metric tons to 4.9 million metric tons, for the 2001-2011 period. China's increase is due to reduced tariffs on wheat based on its trade negotiations with the United States and the EU for its membership in the World Trade Organization. Imports by Japan, Korea, and Taiwan are projected to increase 9.1%, 11.0%, and 38.8%, respectively, for the 2001-2011 period.

North African imports of wheat are projected to increase 21.1% between 2001 and 2011. Egyptian imports of common wheat are projected to increase 21.7%, from 5.8 million metric tons to 7.1 million metric tons, between 2001 and 2011. Algeria is expected to import both common and durum wheat. Algerian imports of common wheat are projected to increase 17.7% from 2.3 million metric tons in 2001 to 2.7 million metric tons in 2011, and durum wheat imports are projected to increase 20.9% from 2.2 million metric tons to 2.7 million metric tons. Morocco's imports of common wheat are projected to increase 45.8% from 2.7 million metric tons to 4.0 million metric tons. Tunisian imports of common wheat are projected to decrease 12.2%, from 1.2 million metric tons to 1.0 million metric tons, between 2001 and 2011. Its durum wheat imports are projected to increase 15.4% between 2001 and 2011.

Mexican imports are projected to increase 15.3% from 2.7 million metric tons in 2001 to 3.1 million metric tons in 2011. Venezuela is expected to import more common and durum wheat. Common wheat imports are projected to increase 18.0% from 1.0 million metric tons in 2001 to 1.2 million metric tons in 2011, and durum wheat imports are projected to increase 12.3%. Brazilian imports are projected to increase 19.0% from 6.5 million metric tons in 2001 to 7.7 million metric tons in 2011.

Major Shortfalls in Crop Production

Richard Taylor

The USDA's August 12th, 2002, release of the World Agricultural Supply and Demand Estimates lowers U.S. and world production estimates of all major crops. World wheat production estimates are down from 580.72 million metric tons in July to 572.27 million metric tons in August. End stocks are down from 147.08 million metric tons to 138.75 million metric tons. U.S. wheat production estimates are down from 47.59 million metric tons in July to 45.89 million metric tons in August. Average farm price projections increased from $2.75-$3.25 to $3.20-$3.80. Estimated ending stocks for hard red spring wheat and durum wheat were reduced from 143 million bushels and 32 million bushels, respectively, in July to 112 million bushels and 28 million bushels, respectively. Most wheat production estimates for major exporters were also reduced. Australian wheat production estimates are down 13%, Canadian wheat production estimates are down 22%, and EU wheat production estimates are down 1%. Other exporters and most importer production estimates remained constant.

World corn production estimates are down from 614.70 million metric tons to 586.49 million metric tons. Ending stocks are reduced from 114.74 million metric tons to 91.84 million metric tons. U.S. corn production estimates are down from 248.68 million metric tons in July to 225.72 million metric tons in August. Ending stocks are down from 37.24 million metric tons in July to 19.48 million metric tons in August. Average farm price projections increased from $1.80-$2.20 to $2.30-$2.70. Estimates of production from other exporters and importers remained constant.

World soybean production estimates are down slightly from 129.77 million metric tons in July to 129.59 million metric tons in August. U.S. production is projected to be down to 36.26 million metric tons from 37.07 million metric tons in July. Average farm price projections increased from $4.15-$5.05 to $5.15-$6.05. U.S. barley production estimates are down about 5% from July, with ending stocks down 14%. Average farm price projections increased from $1.95-$2.35 in July to $2.40-$2.80 in August. For more information, consult the World Agricultural Supply and Demand Estimates available from USDA at www.usda.gov/oce/waob/wasde/wasde.htm.

Recent Publications

U.S.-Canada Wheat Trade and its Effects on U.S. Price and Income - Agribusiness & Applied Economics Report No. 492, by Won W. Koo and Jeremy Mattson.

The Effect of Exchange Rate Volatility on Wheat Trade Worldwide - Agribusiness & Applied Economics Report No. 488, by Changyou Sun, Mina Kim, Won W. Koo, Guedae Cho, and Hyun Jin.

2002 Outlook of the U.S. and World Sugar Markets, 2001-2011 - Agribusiness & Applied Economics Report No. 487, by Won W. Koo and Richard D. Taylor.

2002 Outlook of the U.S. and World Wheat Markets, 2001-2011 - Agribusiness & Applied Economics Report No. 486, by Won W. Koo and Richard D. Taylor.

2002 North Dakota Agricultural Outlook: Representative Farms, 2002-2011 - Agribusiness & Applied Economics Report No. 485, by Richard Taylor, Won W. Koo, and Andrew Swenson.

U.S. Processed Food Exports and Foreign Direct Investment in the Western Hemisphere - Agribusiness & Applied Economics Report No. 484, by Jeremy Mattson and Won W. Koo.

To obtain these publications, contact Beth Ambrosio, Center for Agricultural Policy and Trade Studies, NDSU at (701) 231-7334 or download from this website: http://www.ag.ndsu.nodak.edu/capts/publication.htm

North Dakota State University
Dept. of Agribusiness & Applied Economics
P.O. Box 5636
Fargo, ND 58105-5636

CONFERENCE ANNOUNCEMENT

Bioterrorism and Food Security: Issues and Challenges

The Center for Agricultural Policy and Trade Studies (CAPTS) and the Great Plains Institute of Food Safety (GPIFS) at North Dakota State University are organizing a two-day conference on bioterrorism and food security in the trade of agricultural goods in international markets on October 28-29, 2002, at the Ramada Plaza Suites and Conference Center, Fargo, ND. The event will feature speakers from the federal government (USDA and the U.S. Customs Service), agricultural industry, and academia. The conference will address the possible impact of bio-terrorism on the U.S. agricultural industry and discuss strategies to prevent terrorism in the processing and distribution of agricultural goods in the United States. For more information on the conference, call 701-231-7334 or visit the CAPTS website: http://www.ag.ndsu.nodak.edu/capts/