

**ANALYSIS OF WTO RELATED DOMESTIC FARM SUPPORT
REDUCTIONS AND COUNTER-CYCLICAL REVENUE
PROPOSALS IN THE US: FARM-LEVEL EFFECTS FOR
SOUTH DAKOTA**

BY

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**ANALYSIS OF WTO RELATED DOMESTIC FARM SUPPORT
REDUCTIONS AND COUNTER-CYCLICAL REVENUE PROPOSALS IN
THE US: FARM-LEVEL EFFECTS FOR SOUTH DAKOTA**

This thesis is approved as a creditable and independent investigation by a candidate for the Master of Science degree and is acceptable for meeting the thesis requirements for this degree. Acceptance of this does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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Abstract**ANALYSIS OF WTO RELATED DOMESTIC FARM SUPPORT
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The main objective of this study is to analyze the effects of: a) reducing domestic farm program support, b) replacing the Counter-cyclical Payment Program with the propose Counter-cyclical Revenue Program (CCR) and c) replacing both the Counter-cyclical Payment Program (CCP) and the Loan Deficiency Payments (LDP) with the Revenue Counter-cyclical Program (RCCP) on South Dakota farmers. The WTO has been advocating for substantial cuts in trade-distorting farm support programs as per the July, 2004, Framework Agreement. The United State Department of Agriculture (USDA) and the National Corn Growers Association (NCGA) respectively proposed to replace the CCP and the LDP with the CCR and the RCCP. Both the CCR and the RCCP are revenue based farm programs that use crop prices and yields for the calculation of the per acre revenue payments to the farmer.

A representative farm model with Spink County yield data and South Dakota price data is used to determine the impacts of these farm program changes. FAPRI baseline prices and the needed cuts in target prices and loan rates were used to heed WTO

cuts in domestic farm support programs. A multivariate empirical parameter distribution along with a stochastic simulation model was used to capture the impacts of these program changes in terms of future stream of prices and yields for the representative farm.

Under the average and maximum yield and price conditions, a 60 percent reduction in domestic farm support programs in the US resulted in no impact on farm income for South Dakota because of exceptionally high crop prices during 2007/08. Under the minimum yield and price conditions, the 60 percent cut resulted in a loss of 57.1 percent LDP and 16.8 percent CCP receipts to the representative farm over the five-year period.

It was estimated that no CCR and RCCP payments would accrue to the representative farm for the years 2007/08 through 2011/12 as the simulated prices for the program crops during this period were relatively high. Accordingly, the impacts of CCR and RCCP on the representative farm were analyzed assuming that these programs were in place during the years 2002/03 through 2006/07. Replacing the CCP with the CCR would have provided an additional farm income of \$60,000 to the representative farm over the five-year period. Replacing the LDP and CCP with the RCCP during this same period would have reduced the total receipts for the representative farm by 35 percent. Based on this analysis the CCR provides a better safety net for South Dakota farmers.

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CHAPTER 1

STATEMENT OF THE PROBLEM

1.1 Introduction

The November 2001 Doha Ministerial meeting in Qatar was the starting point for fresh negotiations on agriculture that led to the Doha Development Agenda (DDA) agreed to by WTO¹ member countries. Negotiations started with proposals for a new agreement on agriculture to replace the Uruguay Round Agreement on Agriculture (URAA) and continue efforts to reduce agricultural subsidies.

The July 2004 Agriculture Framework Agreement reached in Geneva formed the basis for the continued negotiations of full modalities in agriculture. The framework, approved by the WTO membership in August, 2004, outlined reforms in all three agricultural pillars of support established under the Uruguay Round Agreement on Agriculture, namely: i) market access, ii) export competition, and iii) domestic support. It also introduced other headings, such as least-developed countries, recently acceded members, and monitoring and surveillance.

The framework agreement called for all trade-distorting forms of domestic support for agriculture to be substantially reduced, with caps on support levels for specific commodities and cuts in the overall level of trade-distorting support (sum of

¹ World Trade Organization

Amber Box², Blue Box³ and *de minimis*⁴ support). The framework proposed that total trade-distorting support be cut by 20 percent from the currently allowed levels in the first year of implementation. The trade-distorting support targeted for reduction included Final Bound⁵, Total Aggregate Measure of Support (AMS)⁶, the permitted *de minimis* levels, and Blue Box support. The framework also called for further reductions in subsequent years according to a yet to be determined tiered formula (Koo, Mattson and Taylor, 2004, p.1).

Under this formula, members with higher levels of trade-distorting domestic support would have to make greater overall reductions in order to achieve a harmonizing result. It is expected that the Final Bound Total AMS will be reduced substantially, and product-specific AMS will be capped at their respective average levels. According to the agreement, Blue Box support will not exceed 5 percent of a country's average total value of agricultural production during a historical period, and the Green Box⁷ criteria will be reviewed and clarified to ensure that measures pertaining to this Box have no, or at most minimal, trade-distorting effects on production (Koo, Mattson and Taylor, 2004, p.1).

² Amber Box includes expenditures on policies subject to careful review and reduction overtime (such as market price support, direct payments, and input subsidies).

³ Blue Box includes payments made in conjunction with production-limiting programs (such as deficiency payments).

⁴ The *de minimis* support includes excludable support expenditures below certain thresholds (defined as 5% of the value of production for developed countries and 10% for developing countries) which are sufficiently exempted from the inclusion in trade-distorting support.

⁵ The maximum support permitted to be provided during any year of the implementation period or thereafter.

⁶ Total Aggregate Measurement of Support or "Total AMS" is defined to include the sum of all domestic support provided in favor of agricultural producers, calculated as the sum of all aggregate measures of support for basic agricultural products and all non-product-specific aggregate measures of support.

⁷ Green Box includes policies considered to be non trade-distorting and are not subject to any limitations (includes environmental programs and domestic food aid).

These potential changes in the policy guidelines for domestic support could have impacts on domestic farm support programs in many countries including the US. However, given the complex mix of reductions, caps, and criteria changes for the various types of domestic supports in the framework and continued political support for substantial domestic agricultural support in countries with a history of large agricultural support (e.g. the US, the EU, Japan and Canada), the final outcome of the agreement is hard to predict. Nevertheless, effective reduction of trade-distorting support will depend on instituting substantial reductions in Amber Box expenditure and overall domestic support.

Since September, 2006, there has been a substantial increase in agricultural commodity prices. Between September, 2006 and June, 2007, corn and soybean futures prices for nearby delivery have increased by about 50 percent and wheat futures prices have increased by about 25 percent. The futures contracts for nearby delivery at CBOT closed around \$3.82, \$8.21, and \$5.28 per bushel for corn, soybeans, and wheat, respectively. Due to the increased emphasis on biofuels, the corn use for ethanol production in the US is expected to increase during the next few years. Accordingly, many analysts are predicting high prices for corn as well as other agricultural commodities for many years in the future. Because the Loan Deficiency, Marketing Loan Gains, and Counter-cyclical payments to farmers are based on the legislated trigger prices and the market prices, presently set trigger prices and current levels of market prices will most likely result in no (or greatly reduced) Loan Deficiency, Marketing Loan Gains, and Counter-cyclical payments to producers. The reduction in (Loan Deficiency,

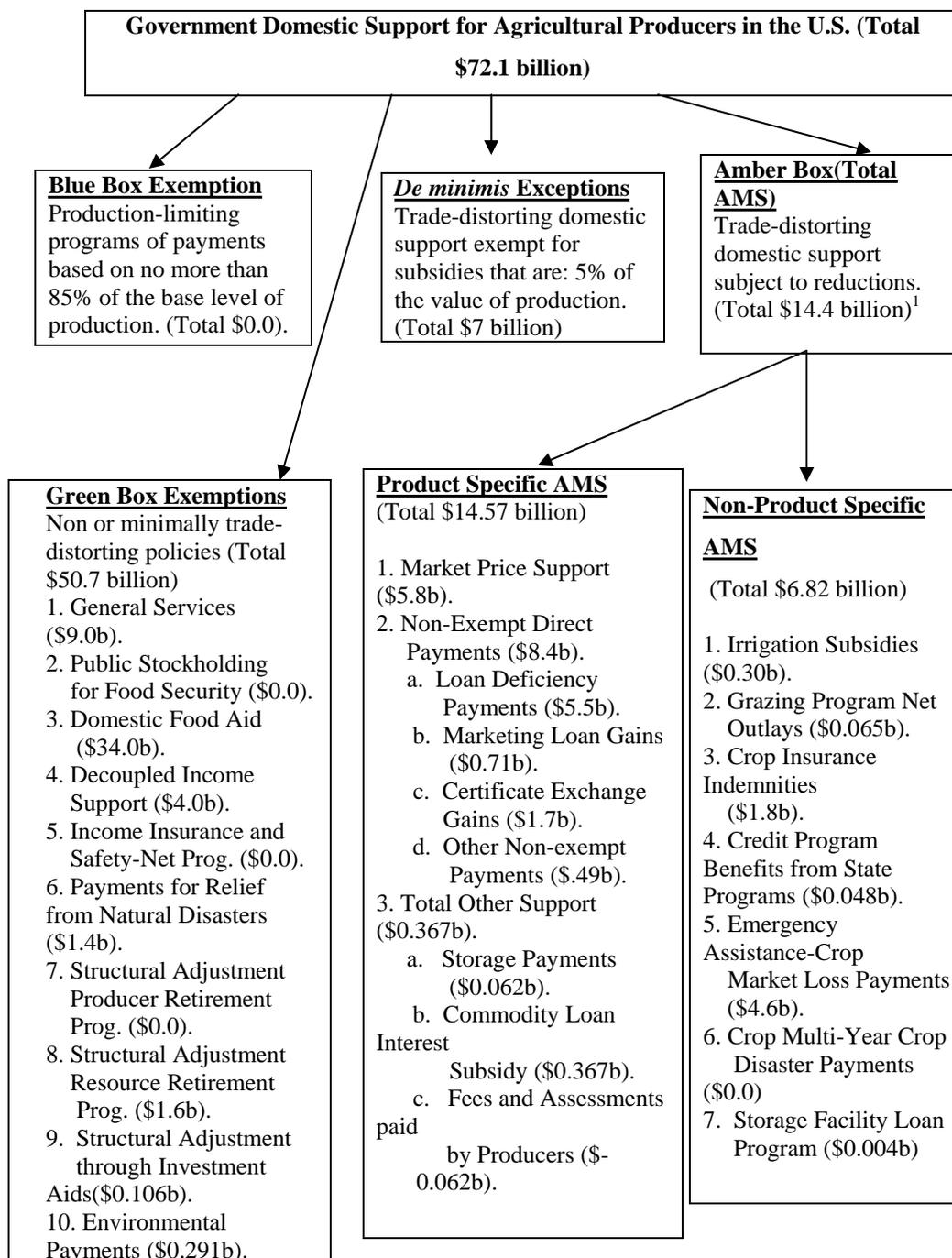
Marketing Loan Gains, and Counter-cyclical payments to producers) due to current levels of trigger prices and market prices will substantially reduce the Amber Box expenditure. However, this can change if market prices decrease or the legislated trigger price levels for these programs are elevated. Because the US domestic agricultural support consists of a complex array of many programs, a brief overview of these programs is necessary to understand how different programs fit into URAA categories.

1.2 An Overview of US Domestic Support

Expenditures on domestic support programs in the US amounted to \$72.1 billion in 2001. In accordance with URAA, the US domestic agricultural support programs are grouped into Green, Blue, and Amber Boxes (Fig.1). The Green Box contains ten broad headings and accounted for an expenditure of \$50.7 billion in 2001 with General Services, Domestic Food Aid, and Decoupled Income Support accounting for \$47 billion. The Blue Box contains production limiting programs. The US classified deficiency programs in this Box. However, the US did not use deficiency programs in 2001.

The most trade-distorting support is usually placed in the Amber Box and is measured by the “Total Aggregate Measure of Support” (AMS). The Amber Box support can be grouped into; a) Product-Specific Support and b) Non Product-Specific Support (Fig.1). The Product-Specific Support programs are considered more trade-distorting than the Non Product-Specific Support programs. The expenditures for Product-Specific Support and Non Product-Specific Support in 2001 were about \$14.6 and \$6.8 billion, respectively. The Product-Specific Support contains programs covering Market Price

Figure 1.1—U.S. Domestic Support Programs Notified to WTO and Expenditures on These Programs in 2001



¹ The value of Total AMS is less *de minimis* support.

Support, Non-exempt direct payment, and Other Product-Specific Support. Of these, the Non-exempt direct payment programs, especially the Loan Deficiency Program (LDP) and Marketing Loan Gains (MLG), are viewed as more trade-distorting and therefore, are expected to be cut substantially under the WTO agricultural framework agreement. The Non Product-Specific Support, on the other hand, contains programs such as Irrigation, Crop Insurance Subsidies, the Grazing Program, Disaster Payments and Emergency Assistance Payments. *De minimis* support is divided into Product-Specific and Non Product-Specific Support. If such subsidies are below the specified levels (5% of the value of production for developed countries and 10% for developing countries), these are exempted from reduction commitments. Hence, Amber Box spending (Total AMS) is adjusted by the amount allowed by *de minimis* expenditures.

The most trade-distorting and oldest element of US farm policy is the commodity loan program. It was introduced in the 1930s to boost market prices in the arable sector and is currently notified to the WTO under the Non-exempt direct payment programs in the Amber Box category. Its basic purpose has been to provide farmers with a guaranteed market price and income support. Previously the loan programs allowed the removal of surplus crops from the market when prices were low. In 1986, the program was modified to move it away from price support towards farm income support. Now the program allows farmers to repay their loans at a lower rate, with any accrued interest waived when market prices are below the loan rate. It is designed to encourage farmers to sell the crop in the market, rather than forfeiting it to the government. Marketing Loan Gains occur when the market price falls below the loan rate and is available to any

producer who has put that crop under loan [Monitoring Agri-trade Policy (MAP), 2005, pp.4].

Alternatively, farmers can directly collect the difference between the loan rate (the commodity program's floor price), and the market price as a Loan Deficiency Payment. This provision introduced in the Food Security Act of the 1985 Farm Bill provides farmers with an income safety net mechanism that makes up the difference between the loan rate and the actual market price, thus allowing producers to sell at a price that could be well below the cost of production. Officially, these provisions were introduced to help stabilize farm income, boost marketing opportunities, and encourage a better balance between supply and demand. Some critics claim that these provisions boost income stability at the expense of market stability and are increasingly expensive and trade-distorting [Monitoring Agri-trade Policy (MAP), 2005, pp.4 and 5]. Due to recent increases in commodity prices resulting from the increased demand for corn for ethanol production and strong export sales, there would be no (or much lower) expenditure on Loan Deficiency Payment and Marketing Loan Gains payments during the next few years as long as the market prices stay high and also the program trigger prices are not increased.

The Direct Payment Program (included in the Direct and Counter-cyclical Program, or DCP) provides payments to eligible producers on farms enrolled for the 2002 through 2007 crop years. DCP was authorized by the Farm Security and Rural Investment Act of 2002 (2002 Farm Bill) and replaced Production Flexibility Contract Payments (PFCP) (established under the Federal Agriculture Improvement and Reform

Act of 1996). The quantity of a crop eligible for direct payment is 85 percent of the crop's base acreage (a producer's historical acreage) *times* the direct payment yield per acre (a historical yield). The direct payment for each commodity is the direct payment quantity *times* the direct payment rate set by the 2002 Farm Bill. Because they are based on a fixed quantity and payment rate, direct payments are decoupled from production and are considered minimally trade distorting.

The Counter-cyclical Payments provide a "safety net" in the event of low crop prices. The Counter-cyclical payment rate is based on a statutory target price (target prices do not change) for each commodity, and it increases when the commodity's season-average farm price falls. Because DCP is based on the historical acreage and yields (not on current production) these payments are less trade distorting.

Ad Hoc, Emergency and Disaster Assistance Programs assist farmers who encounter natural disasters from drought, flood, freeze, tornadoes, and other natural calamities. Eligible producers can be compensated for crop losses, livestock feed losses, and tree damage as well as for the cost of rehabilitating eligible farmlands damaged by natural disaster. Low-interest loan assistance for eligible farmers can help cover production and physical losses in counties declared disaster areas. Ad Hoc, Emergency and Disaster assistance payment for US agriculture has a long history. During the 1970s and parts of the 1980s and 1990s, standing disaster legislation protected major field crop producers who were enrolled in commodity programs.

The federal crop insurance program, started in 1980 under the Federal Crop Insurance Act, was intended to free producers from disaster assistance needs. Despite

major crop insurance reforms and significant growth in insured acres in the federal crop insurance program, Congress has continued to pass Ad Hoc disaster assistance measures in reaction to drought and other adverse events⁸. Ad Hoc emergency and disaster payments to agricultural producers in the US, relatively large in recent years, have been a very contentious issue in WTO negotiations. Many believe that these expenditures are trade distorting and are strive for the tightening the “Green Box” criteria.

1.3 Counter-cyclical Revenue Proposals for the 2007 Farm Bill

The USDA proposed to reform the Title I, containing Commodity Programs, in the 2007 Farm Bill. Among other changes, the proposal replaced the current price-based Counter-cyclical payment program with a revenue-based Counter-cyclical Revenue (CCR) program for program crops. The proposed CCR will compensate producers when price and/or yield are low and the National Average Revenue (NAR) for a crop falls short of its National Target Revenue (NTR). The proposal calculates the crop’s NTR by multiplying the target price, adjusted for the direct payment rate, with the Olympic national average yield for the preceding five years. The NAR for a crop is based on the actual national average yield and the higher of the season average market price or the loan rate. The loan rate is responsive to 85 percent of the Olympic average for the preceding five years subject to a cap at the maximum Loan Rate. According to the

⁸ Some of the disaster assistance programs include Apple Market Loss Assistance Payments, The Crop Disaster Program, The Crop Disaster Assistance Program 2001/2002, The Crop Loss Disaster Assistance Program, The Dairy Indemnity Program, The Disaster Program, The Lamb Meat Adjustment Assistance Program, The Livestock Compensation Program, The Livestock Emergency Assistance Program, Loan Deficiency Payments for Non-contract Production Flexibility Contract Growers, The Marketing Loss Assistance Program, The Noninsured Assistance Program, The Oilseed Payment Program--Supplemental, The Pasture Recovery Program and Quality Losses Program. New programs in 2006 include the Crop Hurricane Damage Program, The Hurricane Indemnity Program, Feed Indemnity Program, and The Tree Indemnity Program. Source: ERS/USDA

proposal, a CCR payment is triggered when the NAR is lower than the NTR, and the per bushel National Payment Rate (NPR) is calculated based on the crop's national revenue shortfall and the Counter-cyclical payment yield. The CCR payment to producers will be based on NPR times CCP payment yield times 85 percent of the Base Acres (USDA 2007 Farm Bill Proposals).

$$\text{NTR} = [(\text{Target Price} - \text{DP Rate}) * \text{National Avg. Yield}]$$

Where the National Avg. Yield is the Olympic National Avg. Yield for the preceding 5 years.

$$\text{NAR} = \text{National Avg. Yield} * \text{Max} [\text{Season Avg. Market Price}, \text{Loan rate}]$$

$$\text{Loan Rate} = \text{Min} [(0.85 * \text{the preceding 5-year Avg. Price}), \text{Max Loan Rate}]$$

$$\text{NPR} = (\text{NTR} - \text{NAR}) / \text{National CCP Payment Yield}, \text{ and}$$

$$\text{CCR Payment} = (\text{NPR} * \text{CCP Payment Yield} * \text{Base Acres} * 0.85)$$

1.4 Revenue Counter-cyclical Program (RCCP) Proposal for the 2007 Farm Bill

The National Corn Growers Association (NCGA) has proposed an alternative proposal to replace the current set of farm programs in the 2007 Farm Bill. Among other changes, the proposal replaces the current price-based Counter-cyclical Payment and the Loan Deficiency Programs with a Revenue Counter-cyclical Program (RCCP). The American Soybean Association (ASA), National Sunflower Association, and the National Association of Wheat Growers (NAWG) also support this proposal. The proposed RCCP works somewhat like the current price-based CCP. The RCCP payments are directly tied to the local agricultural conditions for the crop, but these payments are responsive to low

prices as well as low yields. Payments to producers are triggered whenever the actual per-acre county revenue for a program crop falls below the RCCP Trigger Revenue for the county. The actual county revenue for a crop is computed as the product of the actual county yield per planted acre and the season average county price. The Effective Target Price is the larger of the Target Price and Pre-planting Insurance Price. The maximum RCCP payment equals 30 percent of the RCCP Trigger Revenue. The per-acre RCCP Trigger Revenue for the county is the product of the effective target price and the expected county trend yield. The expected county yield per planted acre for the crop for each year is the trend estimate for the county based on the NASS data back to at least 1980. The RCCP payment rate is the shortfall of actual county revenue from the RCCP Trigger Revenue. A farm's total payment would equal the RCCP payment rate multiplied by the number of planted acres of the crop (NCGA, 2007).

$$\text{Actual County Rev.} = \text{Actual County Yield per Planted Acre} * \text{Season Avg. Price.}$$

$$\text{Effective Target Price} = \text{Max} [\text{Target Price, Pre-planting Ins. Price}] - \text{DP Rate.}$$

$$\text{RCCP Trigger Rev.} = \text{Effective Target Rate} * \text{Expected County Yield.}$$

$$\text{Max RCCP Payment} = 0.30 * \text{RCCP Trigger Rev.}$$

$$\text{RCCP Payment Rate} = \text{Max} [0, (\text{RCCP Trigger Rev.} - \text{Actual County Rev.})].$$

$$\text{RCCP Payment} = \text{RCCP Payment Rate} * \text{Planted Acres.}$$

The overall objective of these new sets of programs is to better stabilize farm income for producers of all program crops. These proposals are to replace the CCP as it is less responsive to local agricultural conditions and tends to under-compensate (over-compensate) when yields are low (high). The NCGA proposes to integrate RCCP

payments with the crop insurance program so that the two programs work together to provide a cost-efficient safety net for farmers. Some of the differences between the CCR and RCCP Programs are that CCR uses the Olympic national average yield in its target revenue calculation, while the RCCP uses the county per-acre yields. The RCCP payments are directly linked to local agricultural conditions, but CCR payments, on the other hand, are directly tied to the national agricultural condition. Replacing CCP with CCR or RCCP will reduce the need for Ad Hoc disaster assistance programs for program crops.

1.5 Statement of the Problem

Total US domestic support (Amber Box, *de minimis*, Blue Box, and Green Box) increased from \$60.8 billion in 1995 to \$74.2 billion in 2000 (Appendix Table A-1). During this period, total domestic support decreased from \$120.0 billion to \$80.6 in the case of the EU, from \$70.0 billion to \$30.7 in the case of Japan, and from \$39.7 billion to \$16.0 billion in the case of all other countries (Table A-1). All WTO member countries, including the US, agreed to limit trade-distorting farm support under the July, 2004, framework. Trade-distorting domestic supports (AMS), which are subject to reductions, are basically the Amber Box spending adjusted for *de minimis* exceptions. AMS expenditure in the US increased from \$6.21 billion in 1995 to \$16.8 billion in 2000 (an increase of 171 percent). During this period, the Amber Box expenditure decreased from \$66.5 billion to \$39.8 billion (a decrease of 40 percent) for the EU, from \$36.8 billion to 6.5 billion (a decrease of 82 percent) for Japan, and from \$12.1 billion to \$4.7 billion for

all other countries (Appendix Table A-2). On the other hand, the AMS expenditure as a percent of the WTO AMS ceiling increased from 27 percent to 88 percent for the US but decreased from 64 percent to 63 percent for the EU and from 73 percent to 17 percent for Japan (Table A-2). Although the EU and Japan have a relatively higher level of trade-distorting domestic supports, both have clearly shown some progress towards significantly lowering these expenditures. While trade-distorting domestic support in the US is within the WTO ceiling, the expenditure on these programs is greatly increasing.

In the year 2000, out of the total domestic support spending of \$74.2 billion in the US, about \$22.9 billion was spent on farm programs. Farm program expenditure in the US decreased to \$11.24 billion in 2002 and has since reached a new high of \$24.35 billion in 2005 (Appendix Table A-3). LDP, MLG, DP, CCP, and Ad Hoc Emergency Assistance Payments, on an average, accounted for about 74 percent of total expenditure on farm programs in US during years 2003 through 2005 (Table A-3).

The average annual US spending on commodity subsidies (LDP, MLG, DP, and CCP) for the years 2003-2005 was \$12.5 billion, with corn, soybeans, and wheat accounting for \$5.6 billion (42.9 percent), \$0.9 billion (7.6 percent), and \$1.2 billion (10.4 percent), respectively. The average annual US expenditure on Ad Hoc Emergency Assistance for 2003-2005 was an additional \$2.19 billion (Table A-3).

The total expenditures on farm programs in South Dakota were \$789.7 million in 2000, dropped to \$334.8 million in 2002, and reached a new high of \$806.7 million in 2005. In 2005, the expenditure on LDP, MLG, DP, and CCP in South Dakota, amounted to \$209.9 million, \$18.84 million, \$267.2 million, and \$213.4 million, respectively.

These programs, combined, accounted for 87.9 percent of the total expenditures on farm programs in South Dakota during the 2005 (Appendix Table A-4). The average annual expenditures on commodity subsidies (LDP, MLG, DP, and CCP) for 2003-2005 was \$352.0 million, with corn, soybeans, and wheat accounting for \$227.6 million (59.3 percent), \$57.7 million (19.7 percent), and \$45.7 million (14.4 percent), respectively.

With the US offer to cut most trade-distorting “Amber Box” programs by 60 percent in the October, 10, 2005, proposal the likely targeted cuts are LDP, MLG, and DP along with dairy, water irrigation, and some other subsidies (*Financial Times*, 2005). There is also the realization that the US has to change the farm programs to alleviate the need for large Ad Hoc Emergency payments and make the Amber Box farm support programs compliant with the WTO Green Box criteria. In 2007, two such proposals were advocated, one by the USDA and the other one by the Corn Growers Association.

Among other changes relating to the Amber Box programs the USDA proposal calls for replacing the CCP with a Counter-cyclical Revenue (CCR) program. Under the CCR, the payment would be triggered when actual national revenue for a crop falls below a set value (either due to lower yield or lower prices or a combination of both) in contrast with the CCP, which is triggered only by low prices (USDA, 2007).

The National Corn Growers Association (NCGA) proposed a Revenue Counter-cyclical Program (RCCP) to replace LDP and CCP in the 2007 Farm Bill. Under this proposal, the RCCP payments are triggered when county revenues fall below the threshold. The RCCP payments are integrated with a crop insurance program and are directly tied to the local (County level) agricultural conditions (NCGA, 2007).

South Dakota's economy depends heavily on crop and livestock production with corn, soybeans, and wheat being the main crops. During the year 2005, farm level cash receipts from the marketing of crops amounted to \$2.26 billion (South Dakota Agricultural Statistics Bulletin, 2007). As discussed earlier, the LDP, MLG and DP have been important sources of cash receipts for producers in South Dakota. Any reduction in the expenditure on these programs or any change in these programs will impact the farming sector as well as the overall economy of the state.

1.6 Objectives

The anticipated changes in the US domestic farm support through the 2007 Farm Bill and their impacts are important for South Dakota farmers. These changes in the new farm bill could be a direct result of the final WTO agreement, if it is ever concluded. While the final WTO agreement, when concluded, may embody cuts in many other programs, this research is concerned with analyzing the impacts of 60 percent cuts in the trade-distorting domestic farm support, as proposed in the US proposal dated October 10, 2005. Even in the absence of WTO agreement, the policy makers' desire to make US domestic farm support programs WTO compliant so that some of these programs can be moved from the Amber Box to the Green Box is one of the underlying factors. The Counter-cyclical Revenue (CCR) program and the Revenue Counter-cyclical Program (RCCP), proposed by the USDA and the National Corn Growers Association, respectively, are examples of such effort.

The overall objective of this research is to analyze the impacts of the WTO proposal related to the 60 percent cuts in trade-distorting domestic farm support, the Counter-cyclical Revenue Program as proposed by the USDA, and the Revenue Counter-cyclical Program as proposed by the National Corn Growers Association. Specific objectives are as follows:

- (i) Analyze the farm-level impacts of 60 percent cuts in domestic farm support programs (LDP, MLG, DP, and CCP) in South Dakota.
- (ii) Evaluate the farm-level impacts of replacing the Counter-cyclical Payments (CCP) Program under the 2002 Farm Bill with the Counter-cyclical Revenue (CCR) Program as proposed by the USDA for the 2007 Farm Bill in South Dakota.
- (iii) Appraise the farm-level impacts of replacing the Counter-cyclical Payments (CCP) Program and Loan Deficiency Payments (LDPs) with the Revenue Counter-cyclical Program (RCCP) as proposed by the National Corn Growers Association for the 2007 Farm Bill in South Dakota.

1.7 Justification

South Dakota's economy depends heavily on agriculture. Domestic farm support programs have been important source of cash receipt for corn, soybean, and wheat producers in the state. Any reduction in the expenditure on domestic farm support programs or changing the related farm programs will impact the producers of these crops as well as the overall economy of the state. The importance of an in-depth analysis of

these cuts and program changes on a representative farm in South Dakota cannot be overstated.

A reduction in the domestic farm support programs to farms in the state will decrease: a) the net farm income in South Dakota and from farm related jobs in the state leading to a decrease in both consumption and savings, b) the purchase of farm related inputs and equipments, c) and the purchases from other local businesses. These will also reduce the state tax receipts. Taylor and Diersen, (2003) estimated that the receipts to the grain and oilseed producers are expected to have a multiplier effect on the whole South Dakota economy to the tune of 1.62. Accordingly, one dollar cut in government farm payments to grain and oilseed producers is expected to have an economy wide impact of about \$1.62 in the state. In the year 2005, total domestic farm support to South Dakota farmers was \$807 million and a cut of 60 percent in the support will amount to about \$323 million. With a multiplier of 1.62, total statewide impact of \$323 million cut will be about \$523 million.

The timely nature of this research will allow policy makers and others influencing the process such as policy influencers (lobby groups and individual constituents) to make informed decisions and reactions to these proposals. In addition, the approach taken in this study can form a basis for analyzing other possible changes in the domestic farm programs in the future.

1.8 Organization of Thesis

This thesis consists of five chapters. The problem statement, objectives, and justification for this study are discussed in Chapter one. In Chapter two, WTO policies in relation to farm program support and the reduction of trade-distorting domestic farm support in the US are reviewed. These topics are discussed along with the proposed Counter-cyclical Revenue, and farm simulations are reviewed. In Chapter three, the methodology used for this is discussed with the multivariate parameter estimation and stochastic simulation modeling approaches for the representative farm. A brief description of the development of the representative farm is discussed with details in Appendix B. The data used is also described in Chapter three with the data sources also indicated this chapter. In Chapter four, empirical results are discussed, and finally in Chapter five, the summary and conclusions, limitations, recommendations for future studies, and post script are discussed.

CHAPTER 2

LITERATURE REVIEW

In this chapter, the Uruguay Round Agreement on Agriculture (URAA), the Doha Development Agenda (DDA), the July 2004 framework, proposed changes in domestic farm support under the July 2004 framework, and impacts of the July 2004 framework agreement are reviewed. Following that, a couple of 2007 Farm Bill proposals relating to revenue-based Counter-cyclical revenue programs are discussed, and then different domestic farm support policy simulation models are reviewed. Finally, a few concluding remarks close the chapter.

2.1 The Uruguay Round Agreement on Agricultural

The General Agreement on Tariffs and Trade (GATT) was negotiated in Geneva, Switzerland, in 1947 among 23 countries, including the US, to increase international trade by reducing tariffs and other trade barriers. The agreement provided a code of conduct for international commerce and a framework for periodic multilateral negotiations on trade liberalization and expansion. Tariffs, quotas, subsidies, and other distortions of trade in manufactured goods have been progressively reduced and, in many instances, eliminated in a series of trade negotiating rounds under GATT. However, significant distorting policies in the agricultural sector continued until the Uruguay Round, negotiated from September, 1986, through April, 1994.

The Uruguay Round began the process of agricultural liberalization with the Agreement on Agriculture (AoA) which included the following: a) the Agreement on Agriculture itself; b) the concessions and commitments of members regarding market access, domestic support, and export subsidies; c) the Agreement on Sanitary and Phytosanitary Measures; and d) the Ministerial Decision concerning Least-Developed and Net Food-Importing Developing Countries. Overall, it provided a framework for a long-term reform of agricultural trade and domestic policies. It reflected a desire by the member countries to move towards the objective of increased market orientation in agricultural trade. The rules governing agricultural trade were strengthened to improve predictability and stability for both importing and exporting countries. The agricultural package also addressed many other issues of vital economic and political importance to many members. For example, provisions to encourage the use of less trade-distorting domestic support policies for maintaining the rural economy with a lower adjustment burden were introduced. The agricultural package also introduced tightly prescribed provisions that allowed some flexibility in the implementation of commitments. It provided for commitments in the areas of market access, domestic support, and export competition. The text of the Agricultural Agreement is mirrored in the GATT schedules of legal commitments relating to individual countries (Kennedy, et al., 2001).

The World Trade Organization (WTO) was established as a result of the Uruguay Round on January 1, 1995, to replace GATT as the legal and the institutional foundation of the multilateral trading system of member countries. GATT was the platform on which trade relations among countries evolved through collective debate, negotiation, and

adjudication. It provided the contractual obligations determining how governments frame and implement domestic trade legislation and regulations.

The basic structure of WTO regulation of trade-distorting policies in the agricultural sector established under the Agreement on Agriculture (AoA) has been carried over into the framework agreement for the Doha Round and will continue influencing these negotiations. The AoA called for liberalization in three major areas: a) market access, b) export subsidies, and c) domestic support. These three are often referred to as “the three pillars” of agricultural support.

Market access provisions required, among other things, tariffication or replacing all non-tariff trade barriers with tariffs, and bounds were set upon those tariffs. The export subsidy provisions established maximum ceilings on the trade quantity and budgetary expenditures for export subsidies and called for reductions in these ceilings over time.

The domestic support provisions outlined various types of support, classified them by their trade effects, and specified limits on programs deemed the most trade-distorting. What is considered to be domestic support and how is it defined for the purpose of reducing market distortions are important elements of the WTO structure (Beghin and Hart, 2004).

Since the focus of this research is on the US domestic farm support programs, the market access and export subsidy provisions of the URAA are not discussed here.

The key accomplishment of the URAA was greater transparency in agricultural policies (Kennedy, et al., 2001). The notification requirements have created a large body

of quantitative and qualitative information on agricultural policies in the WTO to the benefit of members, and the WTO has summarized this information and made it available to the general public. This has made the task of keeping up with the current negotiations easier.

Under the URAA, domestic support programs are divided into three “Boxes” that indicate the trade effects of the programs. These are the Amber, Green, and Blue Boxes, and they are elaborated on in chapter one of this thesis. Included in the Amber Box is the *de minimis* exemption, both the product-specific and non-product specific (Beghin, et al., 2004).

In the area of domestic support policy, the URAA was quite innovative in establishing new rules for distinguishing agriculture from industry. The URAA appears to have had a limited impact on actually reducing the total level of support for agriculture (Kennedy, et al., 2001). Support for the agricultural sectors in developed countries was generally very high at the beginning of the Uruguay Round and remained very high through the nineties. The year 2000 saw a modest decline in the domestic support levels in some of these countries (Diakosavvas, 2001).

The URAA scored somewhat better in terms of the nature of domestic support, as it reinforced the shift from non-exempt (Amber Box) to exempt (Green or Blue Box) domestic support. However, the URAA did not achieve much reduction in the total support. Countries have considerable flexibility under the provisions of the Green and Blue Box categories as well as under the *de minimis* exemptions. The impact of the domestic support rules in the URAA must, therefore, be evaluated for its effectiveness in

reducing trade distortions (Kennedy, et al., 2001). The URAA helped in bringing agricultural trade back into the multilateral system and in paving the way for future trade liberalization (Braga, 2004).

Kennedy, et al., (2001) identified the following factors that would need attention in the next agreement, as these potentially limit the effectiveness of the URAA in reducing domestic support:

- 1) Payments exempt under the Green and Blue Box provisions cover a broad range of support measures. Blue Box policies are still widely characterized as market distorting, and many argue that current Green Box policies can also result in distortions. Several countries have been able to meet their URAA obligations without reducing their support by moving and listing programs under exempt policies in the Blue and Green Boxes.
- 2) Since the commitments are on Total AMS, countries can reduce support for some products while leaving support for other products unchanged (or even increasing them).
- 3) The *de minimis* provisions create the potential for continued support of commodity production at high levels.
- 4) The domestic administered support price may be a poor proxy for the internal market price, while the fixed external reference price does not represent the actual border price. This brings into question the measures of price support as defined by the URAA.

- 5) The URAA does not provide specific criteria for determining a country's development status.

2.2 The Doha Round (Alternative Draft Proposal Modalities)

The Doha Development Agenda (DDA) was agreed upon by WTO member countries in November, 2001, during the Doha Ministerial meeting. At that meeting, WTO members agreed to launch a new round of trade negotiations. The meeting set out the goals of substantial reform across a number of sectors including agriculture and established a timeline for achieving the Doha round objectives (Podbury, et al., 2003).

The Doha mandate called for substantial reductions in all forms of trade-distorting domestic support. However, reaching an agreement was difficult as different members had different preferences. Accordingly, a number of draft modalities were tabled in 2003, before and during the Cancun Ministerial meeting.

Brink (2004a and b) assessed the domestic support provisions of the 2003 draft texts in the WTO agricultural negotiations by comparing and contrasting all of the draft texts presented at the various Ministerial meetings, including the 2002 proposals of the United States, Canada, and the Cairns Group⁹ for WTO discipline on domestic support. Harbinson, then Chairman of the General Council of the WTO, revised the March, 2003, draft and proposed a 60 percent reduction in the final bound Total AMS in equal annual installments over a period of five years with 40 percent for developing countries over 10

⁹ The Cairns Group is a coalition of 18 agricultural exporting countries. They are [Argentina](#), [Australia](#), [Bolivia](#), [Brazil](#), [Canada](#), [Chile](#), [Colombia](#), [Costa Rica](#), [Guatemala](#), [Indonesia](#), [Malaysia](#), [New Zealand](#), [Pakistan](#), [Paraguay](#), [Philippines](#), [South Africa](#), [Thailand](#), and [Uruguay](#).

years. Under Harbinson's proposal, Total AMS commitments could be made in the national currency, a foreign currency, or a basket of currencies¹⁰, and the 5 percent *de minimis* exemptions for developed countries would be reduced to 2.5 percent over a period of five years. Under Harbinson's proposal, the 10 percent *de minimis* exemptions for developing countries would be maintained, with credit for negative product-specific support up to a maximum of 10 percent of the value of production for that commodity. The Harbinson text was aimed at facilitating the establishment of the modalities proposed in the March, 2003, draft. It was comprehensive and detailed and used numerical values to represent parameters to be negotiated. However, it did not keep the negotiations on track, and other members came up with draft modalities texts of their own to supplement the Harbinson draft modalities.

The first of such texts was submitted jointly by the European Commission and the US (EC-US). This was followed by the text submitted by Mr. del Castillo, then Chairman of the General Council of the WTO. A group of developing countries known as the G-20 submitted its text immediately prior to the Cancun meeting in September, 2003. The chair for the Cancun meeting, Mexico's Mr. Derbez, also tabled a draft framework for agriculture known as the "Derbez text." Finally a revised version of the G-20 draft framework was submitted on the last day of the meeting by a group of 21 developing countries, comprising most of the G-20 members. All these texts were similar, as they kept the URAA concept of AMS and, with some adjustments, to the

¹⁰ This condition is designed to address the problems that can be faced by countries whose currencies are unstable. It opens up the possibility for strategic behavior based on expectations of future currency movements, but this issue is not analyzed in the paper.

Green and Blue Boxes and *de minimis* exemptions. In addition, they had certain special and differential provisions for developing countries.

Some of these proposals (G-20, G-21, Derbez, del Castillo, and the EC-US texts) were similar in introducing a harmonizing element into the domestic support discipline under which members with higher trade-distorting subsidies were to make greater efforts. Most of these texts also introduced a notion of capping and, in some cases, reducing product-specific AMS. Moreover, most of these proposals also introduced a declining ceiling on the sum of certain support classes, such as Total AMS, *de minimis* support, and payments similar to the Blue Box payments. However, the treatment of the URAA Blue Box varied in all the proposed draft texts.

The Harbinson proposal based a future Blue entitlement, on recent past use. This gave a large entitlement to the EU but not to others. Other texts widened the definition of exempt payments by dropping the production-limiting condition, allowing payments which are more distorting than the Blue Box program to escape the Total AMS cap. Green Box issues were addressed specifically only in the Harbinson text, including the possibility of new provisions for developing countries. Two of the framework texts introduced constraints on Direct Payments in the Green Box.

Brink concluded that, overall, the texts introduced a variety of new ideas for constraining certain types of support and exempting other forms of support from such constraint. He noted that it is not clear how all of these provisions help to achieve the substantial reductions in trade-distorting support mandated by the Doha declaration. He concluded that a large-enough harmonizing reduction of the existing final bound

commitment could possibly achieve the desired results directly. He also noted that the overall reduction of trade-distorting domestic support has the potential to achieve the Doha mandate if the harmonizing reduction is large.

The “Derbez text” does have some desirable features that are consistent with the level of ambition set out in the Doha mandate. Unfortunately, it also has serious deficiencies in some areas that would need to be addressed if the objectives of the Doha mandate are to be met (Podbury, et al., 2003).

Many countries, including the United States, the EU, Cairns group, India, and other developing countries, submitted interim proposals in the first phase of the negotiations. The US proposal divided the domestic supports into exempt and non-exempt measures. The exempt measures are a continuation of programs in the Green Box. They also maintained the *de minimis* provisions, thus producing minimal trade distortions. The exempt measures allow programs deemed essential to the rural development and food security goals of developing countries and to environmental protection, farm income safety, technology adoption, investment, and infrastructure improvement. The non-exempt measures will reduce AMS to a fixed percentage of the member’s value of total agricultural production (WTO 2000a, 2000b).

The US proposal for non-exempt supports called for deeper cuts by countries with larger domestic subsidies. Japan and Norway, given their rich tradition of supporting their farmers, were critical of the US proposal. The EU’s proposal called for maintaining the Green and Blue Box policies (WTO 2000c). The EU also recommended lowering AMS and *de minimis* support and would apply specific discipline to the Amber Box

subsidies aimed at expanding exports to compensate for market price gyrations. The EU's goal of supporting agriculture to preserve the non-trade concerns and multifunctionality role contrasts with its call for reducing AMS measures (Devadoss, 2002).

India's proposal called for rich countries to reduce all of their domestic supports by 50 percent from their 2000 level at the end of 2001 and eliminate them within a maximum period of 3 years (*The Economic Times*, 2001a). India also proposed that direct, decoupled, insurance, income safety payments be included in the non product-specific AMS and be reduced to the URAA *de minimis* level (Devadoss, 2002).

Developing-11 countries (i.e. Cuba, the Dominican Republic, Honduras, Pakistan, Haiti, Nicaragua, Kenya, Uganda, Zimbabwe, Sri Lanka, and El Salvador), overwhelmed by the Green Box subsidies of the rich countries (domestic supports through direct payments), proposed a complete overhaul of domestic support measures (Blandford, 2000). Their proposal combined the Amber, Green, and Blue Boxes into just one general subsidy box that would allow a common level of support. The Developing-11 proposal also had an additional development box containing import controls, tariff barriers, and a *de minimis* level of domestic support to protect the interests of the poor countries. Devadoss (2002) concluded that, due to the unsatisfactory outcomes of the Uruguay Round, the developing countries have heightened their concerns over reduction in domestic support levels by the developed countries.

In a nutshell, the developing countries and the Cairns group wanted a reduction in domestic support levels, but developed countries (the US, the EU, Japan, Norway, and Switzerland) opposed cuts in one or more of these policies (Hooke, 2001).

2.3 The July 2004 Framework Agreement

In July, 2004, the WTO Ministerial Council met in Geneva and agreed to continue the Doha negotiations on agriculture and finalized a “Framework for Establishing Modalities in Agriculture” (WTO, 2004). The July, 2004, Framework Agreement articulates the basis for continued negotiations of full modalities in agriculture. It addresses the three pillars of the existing Agreement on Agriculture (domestic support, market access, and export competition) and introduces other headings, such as least-developed countries, recently acceded members, and monitoring and surveillance. The domestic support provisions adopted from the previous AoA in the present Framework Agreement are (1) support in favor of agricultural producers measured through AMS, which excludes the supports that meet the criteria of Annex 2 of the AoA (“Green Box” support); (2) the commitment on Total AMS with certain AMS support excluded from the calculation of Current Total AMS; (3) the exclusion of AMS support meeting the criteria of Article 6.2 (certain support in developing countries), Article 6.4 (“*de minimis* exemption”), and Article 6.5 (“Blue Box”), (Brink, 2005, pp. 2-3).

The new ideas on domestic support in the July, 2004, framework are:

- 1) Commitment to provide no more than a given amount of distorting support of all kinds is the sum of the current Total AMS, the *de minimis* AMS

amounts, and the Blue Box payments. It basically covers all domestic support that is not in the Green Box and is called the Overall Distorting Support (ODS). The ODS reduction commitment, arrived at by reducing a base amount, includes a first year's reduction of 20 percent of the base ODS for most members (Table 2.1).

- 2) The ODS reduction and the reduction in Final Bound Total AMS will be of a harmonizing nature. Accordingly, members with higher levels of trade-distorting domestic support or ODS will have to make relatively greater reductions (Table 2.1).
- 3) Further reductions in ODS will take place in subsequent years according to a yet-to-be determined tiered approach. Each member will be placed in a particular tier, and all members in a tier will undertake the same percentage reduction commitment (Brink, 2005, pp. 2-3).
- 4) Existing and additional criteria will be negotiated to ensure that only payments that are less distorting than AMS measures will qualify for the Blue Box. The *de minimis* exemption percentages will be reduced for all members with the exception of those developing countries that provide almost all their *de minimis* support to subsistence and resource-poor farmers.
- 5) A cap will be placed on the Blue Box payments for all members, and this cap will not exceed 5 percent of a country's average total value of agricultural production during a historical period.

- 6) The Green Box criteria will be reviewed and clarified to ensure that Green Box measures have no, or at most minimal, overall trade-distorting production effects.
- 7) The monitoring and surveillance of the disciplines on domestic support will be enhanced, and timely and complete notifications will be required (WTO, 2004).

Members still need to agree on a number of issues, including: a) a methodology to be used to cap Product-specific AMS levels; b) reductions in *de minimis*, taking into account the principle of special and differential treatment; c) additional criteria for Blue Box payments, taking into account the balancing of WTO rights and obligations with no perverse effect of undoing the ongoing reforms; d) a tiered formula to reduce overall base level trade-distorting domestic support to achieve a harmonizing effect; e) the base year for reductions in trade-distorting domestic support; and, f) the first installment of cuts in Overall Trade-Distorting Support by member countries (WTO, 2004).

Table 2.1 Summary of the Domestic Support Provisions of the WTO Framework Agreement on Agriculture, July, 2004.

| | |
|--|--|
| Overall trade-distorting support | <p>Move to harmonize maximum allowed levels of or ceilings in overall trade-distorting support (OTDS) defined as Aggregate Measurement of Support (AMS) plus <i>de minimis</i> plus Blue Box. A tiered formula is to be used: reduce support by countries with higher OTDS ceilings.</p> <p>Reduce overall trade-distorting support substantially: down payment (20%) in first year.</p> |
| Amber Box | <p>Reduce the total AMS substantially by use of a tiered formula: greater efforts to reduce support by countries box support. Cap product-specific AMS levels at historical averages. Reductions in total AMS should lead to product-specific reductions.</p> |
| Blue Box | <p>Redefine to include payments with a production-limiting requirement and those with no production required: based on fixed areas and yields and headage as well as payments based on less than 85% of base production.</p> <p>Cap payments to 5% of agricultural production from start of implementation period</p> |
| Green Box | <p>Review Green Box criteria and improve surveillance and monitoring.</p> |
| <i>De minimis</i> Level | <p>Negotiate the reduction of the level of <i>de minimis</i> support.</p> |
| Special and Differential Treatment for Developing Countries | <p>Developing countries:</p> <ul style="list-style-type: none"> • Have longer implementation periods. • Have lower reduction coefficients and higher <i>de minimis</i> levels. • Retain the use of Article 6.2, allowing extra scope for domestic programs |

Source: Josling (2005).

2.4 Proposed Changes in Domestic Farm Support Under the July 2004 Framework

The July 31, 2004, Framework for Agricultural Agreement calls for substantially reducing all trade-distorting domestic support for agriculture, capping support levels for specific commodities, and cutting the overall level of trade-distorting support. The framework proposed that total trade-distorting support should be cut by 20 percent from currently allowed levels in the first year of implementation.

The US was the first country to come up with a proposal after the July, 2004, framework agreement. The former US trade representative, Rob Portman, offered a “bold” plan for cutting the most trade-distorting US domestic support by 60 percent (a 60 percent cut in AMS) over the next five years and limiting other less trade-distorting programs if the EU and Japan agree to cut their most distorting domestic support by 83 percent and both developed and developing countries agree to substantial cuts in their tariffs. Based on the usual definitions of the most-distorting “Amber Box” programs, the US programs that would be cut by 60 percent would be Direct Payments to farmers, Marketing Loan Gains, Loan Deficiency payments, some dairy subsidies, and water irrigation subsidies. The US hopes to put the Counter-cyclical program (established under the 2002 Farm Bill) in the “Blue Box,” a relatively less trade-distorting domestic support category. Under Portman’s proposal a cap on Blue Box programs would be at 2.5 percent of the total value of agricultural production, instead of the 5 percent as set in the July, 2004, framework. *De minimis* (product-specific and non-product-specific) exemptions are also targeted to be cut by 53 percent by the US (Table 2.2). This would imply a reduction in the US Amber, Blue Box, and *de minimis* expenditures by 53

percent, while the US wants the EU and Japan to cut their Amber, Blue Box, and *de minimis* support together by 75 percent (Table 2.2). In this October, 2005, proposal, Green Box programs such as Research, the Conservation Reserve Program, and the new Conservation Security Program (which do not distort production) would not be affected, and the criteria for inclusion of a program in the Green Box would not be changed (*Financial Times*, 2005). The US proposal would also reduce the disparity in allowed AMS between the US and the EU.

After the US attempted to revive the negotiations with the October, 2005, proposal, the EU also came up with a proposal for the negotiations to continue. Peter Mandelson, the then EU trade commissioner, offered to cut EU domestic support by 47 percent, reduce the highest tariff rates by 60 percent, and eliminate all subsidies to farm exports if its trading partners made similar moves. The EU did not give any time frame for the proposed cuts and described the offer as “substantial which will drive down trade-distorting domestic support.” The commissioner claimed that the new proposal abridged the different plans tabled by other WTO members (*Financial Times*, 2005).

A group of developing countries, the G-20, offered the most ambitious proposal with 80-75-70 percent (80% cuts for top tier, 75% cuts for middle tier, and 70% cuts for bottom tier countries, respectively) in overall trade-distorting support ceilings and 80-70-60 percent cuts in AMS ceilings (USTR, 2005).

The US and the EU also proposed product-specific caps in the Amber Box with different base periods. The US recommended a base period of 1999-2001, while the EU argued that product-specific caps should be based on the entire implementation period

(Cook, et al., 2005). Japan, Norway, Switzerland, and the other developed countries with larger subsidies are now expected to come up with proposals of their own for cutting trade-distorting domestic support to put the negotiations back on track.

Table 2.2 US October, 2005 Proposed Cuts in AMS and Overall Ceilings

| Bound AMS Level (billion \$US) | Reduction |
|---|------------------|
| \$25- (Top Tier) | 83% |
| \$12-\$25 (Middle Tier) | 60% |
| \$0-\$12 (Bottom Tier) | 37% |
| Overall Allowed Level (billion \$US) | Reduction |
| \$60- (Top Tier) | 75% |
| \$10-\$60 (Middle Tier) | 53% |
| \$0-\$10 (Bottom Tier) | 31% |

Source: <http://usinfo.state.gov/ei/Archive/2005/Oct/11-639505.html>

2.5 Impacts of the July 2004 Framework Agreement

Despite the fact that the exact cuts have not been agreed upon, a number of researchers have tried to gauge the possible impacts of plausible levels of cuts in trade-distorting domestic support in developed countries. Some of these studies are reviewed below. In these reviews, emphasis is on domestic support, as that is the focus of this study.

Koo, Mattson, and Taylor (2004) concluded that the possible negative effects of a cut in domestic support will include a reduction in farm subsidies. They noted that the initial 20 percent cut in allowable trade-distorting domestic support will not affect US

farm spending levels unless prices fall dramatically. They also noted that benefits of the July 2004 framework will be in the form of harmonization of trade-distorting domestic support, cuts in tariffs and the harmonization of tariff rates, elimination of subsidies, greater discipline over State Trading Enterprises (STE), and the creation of an even playing field.

Koo, et al., (2004) concluded that, the plan to reduce domestic support could affect future US farm programs, since the US is permitted to spend \$49 billion per year on total trade-distorting domestic support (the overall ceiling for the US) but has actually been spending considerably less. In the years 1999 through 2001, the US spent about \$14-\$17 billion annually on Amber Box support (Table A-1). Another \$7 billion was spent annually on trade-distorting support exempt from the Amber Box under the *de minimis* exemptions (Table A-1). A 20 percent cut in allowable trade-distorting subsidies in the first year of implementation proposed by the July, 2004, framework would reduce US subsidies from \$49 billion to \$39 billion and would not constrain the US farm spending levels. However, it would restrict the amount the US could spend on farm subsidies if prices were to fall significantly. While the initial reduction in permitted farm subsidies may not have any effect on actual US farm spending levels, future cuts under the WTO agreement could result in a reduction in future farm spending levels. The degree of those future cuts is presently not known.

The agreement also says that the final bound total AMS will also be substantially reduced. This cut would likely affect the level of US Amber Box payments and could lead to a restructuring of farm program payments. If the US October 2005 proposal were

to be adopted, the US Amber Box spending limit (the AMS ceiling) would drop from \$19.1 billion to \$7.6 billion. This would require a significant cut in current programs. Blue Box spending would be limited to about \$5 billion with the proposed 2.5 percent cap by the US on the Blue Box. The US has not used the Blue Box since 1996. The Counter-cyclical payments could possibly be classified under this category, as US spending on this program has been less than \$5 billion in recent years (Koo, et al., 2006).

Koo, et al., (2006 b) concluded that if the US proposal or another similar proposal is adopted, the 2007 Farm Bill would be significantly different from the 2002 Farm Bill. Payments under the Amber Box, including Marketing Loan Gains and Loan Deficiency payments, would have to be cut dramatically. Hence, to maintain the current farm program structure, significant reductions in the US loan rates, target prices, and milk and sugar price support levels would be unavoidable.

Roberts (2005) noted that the 5 percent limit on Blue Box payments is set at a level that would be well beyond US Counter-cyclical payment levels under current policy settings in any market conditions. The total value of US agricultural production fluctuates between approximately \$185 billion and \$205 billion a year, so the 5 percent cap would vary between \$9.2 billion and \$10.2 billion. These amounts are well beyond actual amounts notified for market loss assistance payments, the pre-2000 equivalent of Counter-cyclical payments (\$5.5 billion in each of 1999 and 2000). If the Counter-cyclical payments were to be covered under the new Blue Box framework, they would be in addition to the currently allowable AMS support (presently limited to \$19.1 billion a year). After allowance is made for historical AMS support levels for other products

(primarily price support for dairy, sugar, and peanuts and government payments for tobacco), about \$12 billion of this amount will be available for farm program crops. In a nut shell, the capacity of the US to provide support for its farm program crops within current WTO rules is clearly large, and it will be even larger if Blue Box eligibility is expanded to include the Counter-cyclical payments.

The EU, on the other hand, has been the main user of the present Blue Box arrangements, employing them for compensatory payments for arable crops (cereals, oilseeds, and protein crops) and livestock headage payments. During the years 2000-2001, EU Blue Box payments totaled €2.23 billion, 9.1 per cent of the total value of its agricultural production of €43.4 billion for that year (EU notification G/AG/N/EEC/49). The stipulation of the framework agreement that Blue Box support will not exceed 5 percent of a member's average total value of agricultural production in a historical period would mean that the EU would need to restructure much of the support level which has so far been notified under the Blue Box. This might not present a great difficulty for EU policy makers, because the EU has been making reforms through its 2003 mid-term review of its Agenda 2000 process to restructure much of the support that had previously been notified under the Blue Box, so that it could qualify for Green Box exemption.

The reforms in the midterm review include the aggregation of a range of present compensatory payments and headage payments into single farm payments that would not vary with production or prices, with such reforms being implemented from January, 2005. An objective of the change would be to seek Green Box exemption for the payments on the grounds of decoupling. The EU might choose to continue its area

reduction programs for its own internal management reasons or to meet environmental objectives. To give it the flexibility it requires, the EU is likely to make some use of the Blue Box. For example, in reforms in its 2003 midterm review, members were given the option, within defined limits, to maintain the present Blue Box support systems where they believed that the application of a single farm payment would lead to abandonment of production (Council of the EU, 2003). It is estimated that even if all members opted to maintain the present Blue Box support systems to the maximum levels permitted by the 2003 reforms and the single farm payments were notified as Green Box, EU-15 Blue Box payments would be 3.4 per cent of the total value of EU agricultural production. It is highly unlikely that all members would choose to maintain the present Blue Box arrangements in preference to the single farm payments and even less likely that they would all use them to the maximum levels permitted by EU regulations. Consequently, it appears that the EU would be able to accommodate the 5 per cent Blue Box cap without difficulty (Roberts, 2005).

Brink (2005) assessed how several of the provisions made in the framework under domestic support would constrain the future distorting domestic support of the US, the EU, Japan, Canada, Brazil, and China in the year 2014. Future support is projected with particular attention on the US and the EU. The analysis follows two approaches. First, it applies hypothetical 90-80-70-60 reduction scenarios to estimate the remaining entitlements to distorting support for each of the countries analyzed. It estimates the maximum amount of such support that can actually be used within the commitments and calculates the reductions. Secondly, it projects the support for each of the six members in

the fairly distant future and calculates the reductions that each member can accommodate without affecting projected future support.

Some of the assumptions Brink made concern the following: (a) the average value of the production in 2000-02 arbitrarily chosen to establish the *de minimis* (except for the EU) and the Blue Box component of the Base ODS; (b) the definition of tiers for the harmonizing reductions, the placement of each member in the tier, and the cut in each tier; (c) the reductions in *de minimis* (5 percent and 10 percent reductions of the value of production, and 8.5 percent in the case of China); (d) the implementation of the commitments under the DDA agreement on agriculture to start in 2008 and be completed by 2014; and (e) the value of production in 2014 for each of the six members.

Brink concluded that the US, the EU, Japan, Canada, Brazil, and China could accommodate large percentage cuts in commitments on overall trade-distorting support (Overall Ceiling) and on the total AMS. A 75 percent cut would not bite into the amounts of the 2014 domestic support that the US is projected to provide under continuation of the present policy. A 79 percent cut would not constrain the support that the EU is projected to provide in 2014 under presently known policy changes. Nor would substantial cuts (80 percent to 90 percent) in commitments force other members [Japan, Canada, Brazil, and China] to reduce distorting support from what they have provided in recent years. Larger cuts (90 percent to 100 percent) would, however, prevent reversals of policy. For example, the US would not be able to raise the amounts of distorting support (Amber Box spending) to the levels seen in recent years (1999 and 2000).

Brink (2005) showed that putting the countries with very high expenditures on domestic support in the upper tier and requiring these countries to cut these expenditures by a higher percentage can effectively address the problem of reducing Overall Distorting Support in an equitable way.

In conclusion, the framework has the potential to allow the negotiation of “substantial reductions in trade-distorting domestic support,” as called for in the Doha Ministerial Declaration. Delivering on this potential requires large percentage cuts in commitments on Overall Reduction (Overall Ceiling) and Total AMS (AMS Ceiling). The US can restructure farm programs under the 2007 Farm Bill and pave the way for reduction in the overall ceiling and the AMS ceiling and become compliant with WTO standards.

2.6 The 2007 Farm Bill Proposals

Loan Deficiency and Counter-cyclical payments were designed to provide producers with a safety net. However, under the 2002 Farm Bill, payments under these programs were largest during years of record harvests and record farm income. Yet in the same years, natural disasters caused complete crop losses for producers in some areas requiring large emergency expenditures. The current price-based programs tend to under compensate when yields are low and overcompensate when yields are high. These payments are being scrutinized and labeled trade-distorting by some of our trading partners. Some 2007 Farm Bill programs have already been found noncompliant with international obligations under WTO rules (USDA 2007 Farm Bill Proposals, p. 6). The

US classification of some payments in the Green Box has been questioned. With the expiration of the peace clause in the Uruguay Round Agreement, under which domestic support measures were generally protected from challenge, international competitors have already begun to challenge other US commodity programs (USDA 2007 Farm Bill Proposals, p. 6).

Under the 2002 Farm Bill, loan rates have been set at levels significantly above market prices year after year for many crops. Some critics claim that these high loan rates encourage farmers to plant more of these crops, further increasing supply and, thus, decreasing prices. These payments can also encourage production of crops in environmentally sensitive and drought-prone lands. Furthermore, farmers can take advantage of short-term market events (such as an export terminal closing due to a hurricane) to lock-in artificially high Loan Deficiency payments, while actually selling the commodity later at prices well above the loan rate. This allows the market price received, combined with the Loan Deficiency payment, to far exceed the intended loan rate protection. Payment limits and the Adjusted Gross Income cap have affected few producers. Only nine percent of all farms collect 54 percent of all government commodity payments. The complexity of the law allows virtually unlimited payments to the nation's largest and most wealthy farms (USDA 2007 Farm Bill Proposals, p. 6).

During USDA Farm Bill Forums, opinions varied about the commodity title, but many were calling for a change from business as usual. For example, Jeremy from South Dakota wrote, "Subsidies drive up prices all along the production chain, from land to equipment to labor prices....Let free market principles determine the price of a combine,

not commodity subsidies.” And Mary from Vermont wrote, “Congress needs to enact (and USDA needs to implement) effective payment limitations on the commodity program so that mega farms are not allowed to drive their neighbors off the land and raise land rental/sale values beyond reachable limits for beginning farmers” (USDA 2007 Farm Bill Proposals, p. 6).

In an effort to reform the farm program to address these problems and make it more in compliance with the WTO rules, a number of proposals have been advanced. The overall objective of these reforms is to better stabilize farm income for producers of program crops and make changes in the program(s) to comply with the “Green Box” criteria. Among others, the USDA and the National Corn Growers Association have offered two such proposals.

2.6.1 The USDA’s Counter-cyclical Revenue Program Proposal

The USDA has proposed to reform Title I containing Commodity Programs in the 2007 Farm Bill. Among other changes, the proposal replaces the current price-based Counter-cyclical Payment program with a revenue-based Counter-cyclical Revenue (CCR) program for program crops. The proposed CCR will compensate producers when price and/or yield are low and the National Average Revenue (NAR) for a crop falls short of its National Target Revenue (NTR). Specific details of the proposal are discussed elsewhere (Chapter 1). Major features of the commodity title package relating to this proposal are as follows:

- 1) Establish market-based loan rates at 85 percent of the 5-year Olympic average with maximum loan rates as established in the House-passed version of the 2002 Farm Bill.
- 2) Replace the current daily posted county prices (PCPs) used for determining Loan Deficiency payment (LDP) rates and repayment rates for marketing assistance loans with a monthly PCP for each crop. Revise requirements for establishing a producer's LDP and loan repayment rate to be based on the month that a beneficial interest is lost.
- 3) Increase overall Direct Payments and provide additional income support in the 2010-2012 crop years. Continue direct payment acres at 85 percent of the base acres and not update program payment bases and yields. This proposal would pay farmers an additional \$5.5 billion over ten years. A comparison of the direct payment rates for 2007 under the current law with the USDA's proposed direct payment rates for 2008-2017 crop years is shown in Table 2.3.
- 4) Further increase the Direct Payments to beginning farmers during their first five years of operation. These enhanced Direct Payments will invest \$250 million in the next generation of production agriculture over ten years.
- 5) Create a Counter-cyclical program that is more responsive to actual conditions by replacing current price-based payments with revenue-based payments for program crops.

- 6) Reform farm program payment limits, eligibility requirements, and attribution to reduce payments going to larger, higher income producers, increasing overall equity in farm programs.
- 7) Eliminate commodity program payments for all newly purchased land benefiting from Section 1031 of the U.S. Internal Revenue Code¹¹.
- 8) Update Section 1601(e) of the 2002 farm bill entitled “Adjustment Authority Related to the Uruguay Round Compliance” to allow USDA to adjust certain payments to meet current and future WTO commitments.

Table 2.3 The USDA's Proposed Direct Payment Rates for Selected Crops 2008-2017 Crop Years

| Crop | Current Law | USDA Proposal | USDA Proposal |
|-------------------------|-------------|---------------|---------------|
| | 2007 | 2008-2009 | 2010-2012 |
| Corn (\$/bu) | 0.28 | 0.28 | 0.3 |
| Sorghum (\$/bu) | 0.35 | 0.35 | 0.37 |
| Barley (\$/bu) | 0.24 | 0.25 | 0.26 |
| Oats (\$/bu) | 0.02 | 0.02 | 0.03 |
| Wheat (\$/bu) | 0.52 | 0.52 | 0.56 |
| Soybeans (\$/bu) | 0.44 | 0.47 | 0.5 |
| Other Oilseeds (\$/cwt) | 0.8 | 0.8 | 0.857 |

Source: USDA 2007 Farm Bill Proposals.

¹¹ Section 1031 of the U.S. Internal Revenue Code allows investors to defer capital gains taxes on the exchange of like-kind properties. Like-kind (tax-deferred) exchanges, or “1031 tax deferrals,” can affect rural farmland values. Under “1031 tax deferrals,” landowners selling land at a profit can defer taxes on that profit by using the proceeds to acquire similar property for business or investment purposes.

The 2002 farm bill contains a "circuit breaker" provision that provides the Secretary of Agriculture with the authority to adjust expenditures under certain domestic support programs to ensure that expenditures do not exceed total allowable domestic support limits under the Uruguay Round Agreements¹² (USDA 2007 Farm Bill Proposals, pp. 7, 8 and 38).

Richardson and Outlaw (2007) show that over the period from 2008-2016 total CCR payments would average \$7.345 billion, while total CCP payments would average \$8.806 billion. Thus, the proposed CCR would provide a \$1.46 billion budget savings over nine years and provide a better safety net than the CCP, as it is triggered by both low yields and prices and has no maximum payment rate.

2.6.2 The NCGA's Revenue Counter-cyclical Program Proposal

The National Corn Growers Association (NCGA) with the support of the American Soybean Association (ASA), National Sunflower Association (NSA), and the National Association of Wheat Growers (NAWG) has proposed an alternative proposal to replace the current Counter-cyclical Payment program in the 2007 Farm Bill. Among other changes, the proposal replaces the current price-based Counter-cyclical Payment and the Loan Deficiency Programs with a Revenue Counter-cyclical Program (RCCP). Proposed RCCP payments are tied to the county-level crop revenue and are integrated

¹² Section 1601(e) of the Act states: "If the Secretary determines that expenditures under subtitles A through E that are subject to the total allowable domestic support levels under the Uruguay Round Agreements ...will exceed such allowable levels for any applicable reporting period, the Secretary shall, to the maximum extent practicable, make adjustments in the amount of such expenditures during that period to ensure that such expenditures do not exceed such allowable levels."

with the crop insurance program. Specific details of the proposal are discussed in Chapter One. Major features of this proposal are as follows:

- 1) Actual county revenue for a crop is computed as the product of the actual county yield per planted acre and the season average county price.
- 2) The Effective Target Price is the larger of the Target Price less Direct Payment and Pre-planting Insurance Price.
- 3) Maximum RCCP payment equals 30 percent of the RCCP Trigger Revenue.
- 4) Per acre RCCP Trigger Revenue for the county is the product of the effective target price and the expected county trend yield.
- 5) Expected county yield per planted acre for the crop for each year is the trend estimate for the county based on the NASS data back to at least 1980.
- 6) The RCCP payment rate is the shortfall of actual county revenue from the RCCP Trigger Revenue, and a farm's total payment would equal the RCCP payment rate multiplied by the number of planted acres of the crop.

The Proposed RCCP works somewhat like the current price-based CCP. The RCCP payments are directly tied to the local county level conditions for the crop and these payments are responsive to low prices as well as low yields. Payments to producers are triggered whenever actual per acre county revenue for a program crop falls below the RCCP trigger revenue for the county (NCGA Farm Bill Proposal, 2007).

Swenson, et al., concluded that combining the Base Revenue Program¹³ with the Revenue Counter-cyclical Payments program (BRP-RCCP) is an innovative way to target both yield and price. This will combine the yield guarantee of the crop insurance program with the price guarantee of the current government program. The Soybean analysis showed that the BRP-RCCP program would pay more benefits to farmers than the current farm programs, while the corn and spring wheat analysis showed mixed results. The corn analysis showed that the yield variability of a county caused differences in payments, and the spring wheat analysis also showed that the county with the most yield variability fared much better under the BRP-RCCP programs. However, in all cases the BRP-RCCP programs showed promise to provide a safety net for farmers, although a significant weakness showed up when low yields occur multiple consecutive years (Swenson, et al., 2007).

Finally, a study by the National Corn Growers Association using a model farm in Faribault County Minnesota also concluded that the cost of delivery of the RCCP to the average corn grower would drop by 30 percent and the paid premium for crop insurance would also drop by 30 percent. Since the RCCP targets revenue, it would be more cost effective than current programs (NCGA, 2007).

¹³ BRP is an improved farm-level safety net program for farmers. Payments would be triggered when net farm revenue falls more than 30% below the previous five-year Olympic average of per-acre net revenue on the farm. Per-acre net revenue in any year would be calculated by multiplying farm-level actual yield per planted acre by a national market price and then subtracting per-acre average variable costs of production.

2.7 Domestic Farm Support Policy Simulation Models

Policy analyses of trade agreements pose unique challenges. Partial equilibrium analysis may be adequate for estimating the directional impacts of changes in subsidies, prices, production, and consumption. Trade agreements, however, typically result in a complex set of policy adjustments that have multiple, often contradictory, impacts on markets. Reforms frequently also have effects on non-agricultural sectors (e.g., energy, food processing, textiles, and apparel), with feedback effects on agricultural markets. Competent analysts can disagree not just about the magnitude of likely agricultural market impacts but even about the direction (Beghin, et al., 2004, p.1).

Consider estimating impacts of the new WTO framework agreement for the US agricultural commodity markets. The new framework agreement would limit permissible agricultural tariffs, export subsidies, and domestic support measures and would also change WTO rules in many other areas. In evaluating such an agreement, the analyst is required to make a series of important choices which will eventually dictate the modeling approach to be used.

Some of the key choices and questions analysts must address are as follows:

- 1) No single model can fully capture all the possible impacts of a complex trade agreement. Striking a balance between the desire for a broad sectoral commodity policy and that for country scope with the need for detailed coverage of particular markets and policies is always a challenge.

- 2) A comparison between the results of baseline projections and the results of simulations with different policy scenarios will provide a better measure of the likely impacts of a trade agreement.
- 3) Most complex models fail to capture all the nuances of current policies. Since agreements can be implemented in various ways, their representation in the model can be a challenge. Difficulty in finding the current data and conducting the analysis before the specific details of the agreement are spelled out are some of the challenges.
- 4) Insufficient model detail and changes in agent behavior in response to policy changes are difficult to fully capture even in a good model.
- 5) To indicate the impact of policy reforms, most modelers report impacts on market prices and quantities, trade flows, farm returns, and government budgets. These metrics do not address the concerns of all stakeholders (Beghin, et al., 2004, pp.1-2).

The problems are probably much greater in the area of domestic support policy measures. Models without detailed representation of government price and income support policies are ill equipped to examine the implications of an agreement like the July 2004 framework. For a given level of government support, measured by an aggregate measure, implications for commodity supply can vary greatly, and a good estimate of the impacts on crop supply are only possible when the cross-commodity effects are properly handled in the model (Beghin, et al., 2004, p.12).

Finally, trade agreements, by their nature, often require significant changes in policies that fundamentally change the decisions faced by economic agents. As a result, model parameters estimated from time-series data often may have limited relevance. Even when the basic structure of agent decision-making is not altered, major policy reforms can result in decision variables that take values far out of the range of the historical data. Accordingly, it may be unreasonable to expect time-series data to provide all the information needed to build models appropriate for policy analysis (Just, 2001).

Trade agreements affect many markets simultaneously. The new WTO agreement on agriculture, for example, could affect subsidies for a wide range of agricultural products in many countries. Accordingly, one could argue for a model that is multi-country and a multi-commodity and that tries to capture the cross-commodity effects. Trade agreements affect more than just agricultural markets. Accordingly, some features of the new framework agreement may have important effects on production, trade, and prices in other sectors of the economy.

Many alternative models can be employed to analyze the effects of changes in the trade policy. The most common of these models are briefly discussed below.

2.7.1 General Equilibrium Models

General equilibrium models typically involve a multitude of different goods markets. Modern general equilibrium models are usually complex and require large computing resources to help with numerical solutions. Until the 1970s, general equilibrium analysis remained theoretical. However, with advances in computing power

and the development of input-output tables, it became possible to model national economies or even the world economy and solve for general equilibrium prices and quantities under a range of assumptions. General equilibrium models may be either static or dynamic in nature.

Computable general equilibrium (CGE) models are a class of economic model that use actual economic data to estimate how an economy might react to changes in policy, technology, or other external factors. CGE models have become an increasingly important tool of analysis in economics. They represent an intriguing and powerful device for making predictions about the behavior of complex national economies in response to a variety of shocks. They are used to evaluate the probable economic consequences of various policy interventions (e.g. currency devaluation or an increase in food subsidies), as well as to identify the macroeconomic properties of a complex national economy. CGE models have also become a widely used tool for evaluating the effects of trade policy reforms in both regional and multinational initiatives (US International Trade Commission, 1992; Francois and Shiells, 1994; Martin and Winters, 1995). These models also provide an empirical foundation for policy analysis that can quantify the likely effects identified by theory.

Today there are many CGE models of different countries. Some of the examples of CGE models are MEGABARE/GTEM, RUNS, NAFTA CGE, APEC CGE, FTAA CGE, and the WTO house model. One well-known CGE model is the Global Trade Analysis Project (GTAP) model of world trade.

Spatial CGE models that explicitly account for interactions across countries and across sectors (agricultural and non-agricultural) of the economy have an obvious advantage in assessing the economy-wide impacts of trade agreements and also accounts for bilateral trade flows. These types of CGE models are better suited to capture the implications of regional trade agreements as compared to the non-spatial CGE models (Hertel, 1997; Goldin and van der Mensbrugghe, 1996).

Proper analysis of trade agreements would seem to require large-scale dynamic general equilibrium models. Indeed, some excellent analyses of trade agreements are based on the CGE models (Hertel, 1997; The World Bank, 2003). These models are useful in analyzing the impacts of trade agreements on the non-agricultural sector. These models are also useful in analyzing the impacts of trade agreements on developing countries where agriculture is a dominant sector. CGE models sacrifice commodity and policy details important in examining agricultural trade agreements and, often, details on policy and market information.

2.7.2 Partial Equilibrium Models

The partial equilibrium models concentrate on a particular subsection of the economy, with all other variables being treated as exogenous to the model. It is usually possible to model a particular industry or a group of related commodities in much greater detail and with much greater care than is the case with general equilibrium models (Matthews and O'Toole, 2002).

Partial equilibrium models can be either static or dynamic and also may cover multi-markets or a single market. Some examples of partial equilibrium models are AGLINK, FAPRI model, ESIM (European Simulation Model), GAPsi, WATSIM, FAO World Model, and SWOPIM (Static World Policy Simulation Model).

The FAPRI model and OECD's AGLINK model employ a multi-market, partial-equilibrium approach that lacks desirable general-equilibrium features but provides considerable and very current detail in representing markets and policies for selected countries and commodities. The OECD's AGLINK model is a recursive dynamic model which includes land allocation. The FAPRI model, on the other hand, is an econometric recursive dynamic model with a special emphasis on the US. The lack of sectoral interactions in these models can be crudely remedied by incorporating exogenous information from CGE analysis, such as shifts in growth of gross domestic product induced by trade liberalization (Beghin, et al., 2004, p. 6).

The ERS/Penn State trade model is an applied partial-equilibrium, multiple-commodity, multiple-region model of agricultural policy and trade. It is a non-spatial model, meaning that it does not distinguish a region's imports by their source or a region's exports by their destination. It is a gross trade model that accounts for exports and imports of each commodity in every region. The model can be used as a comparative static analysis tool or for analyses in which dynamics and adjustment paths are of interest. The model has been used to analyze scenarios involving a multi-year process of adjustment in policies, such as a trade liberalization that is phased in overtime.

SWOPSIM (Static World Policy Simulation Model) is a software system which produces global partial-equilibrium models in spreadsheet formats. SWOPSIM models are designed to simulate the effect of changes in producer and consumer support policies on production, consumption, and trade. SWOPSIM is an ERS/USDA trade model. ERS/USDA Baseline Projection is another trade model worth mentioning. It can also be used to analyze the impacts of domestic policy changes on trade.

A special characteristic of both the general and partial-equilibrium models is that they are very useful when estimating world, countrywide, and multi-commodity simulations. When it comes to doing a statewide or farm-level simulation, they do not do so well. However, the estimates of national level impacts of trade agreements from these models can be used as inputs to obtain farm-level impacts in other models such as the Farm Level Income and Policy Simulation Model (FLIPSIM).

2.7.3 The General Firm Level Policy Simulation Model

The Farm Level Income and Policy Simulation Model (FLIPSIM) is a computerized model developed to analyze the probable consequences of alternative farm policies, income tax provisions, and farm management decisions on the economic viability of farmers. This model embodies the economic system of a whole farm. It is a farm-level, recursive model which simulates the annual outcome (outcomes of production, farm-policy, marketing, financial management, growth, machinery replacement, family consumption, and income tax) for a representative farm over a 1 to 10 year planning horizon (Richardson, 1988).

2.8 Empirical Studies on Representative Farms and Multivariate Empirical (MVE) Probability Distribution and Stochastic Simulation Models

Taylor, et al., (2005) studied the agricultural outlook of representative farms in North Dakota for the period 2005 to 2014 based on the baseline results produced by the FAPRI global model and the North Dakota Global Wheat Policy Simulation Model. The North Dakota Representative Farm Model used in this analysis is a stochastic simulation model designed to analyze the impact of policy changes on farm income. The model uses the prices of the crops generated from the FAPRI and the North Dakota econometric simulation models. According to the authors, net farm income in 2014 for all the 24 representative farms may be lower than that in 2004. The authors concluded that low-profit farms, (comprising 25 percent of the farms in the study) may not have the financial resiliency to survive. Costs are projected to increase faster than yields. The 2002 farm bill removed much of the price risk that producers faced by transferring this risk to the federal government. Cropland prices and cash rental rates are projected to increase slightly in all regions. Debt-to-asset ratios for most farms are expected to increase slightly throughout the forecast period. Debt-to-asset ratios for the low-profit and small-size farms are expected to be higher than those for large and high-profit farms.

Washnok (1990) studied the effects of tenure, leverage, and farm commodity program participation on farm firm survival and growth in South Dakota. The analysis was conducted using the whole farm simulation model FLIPSIM and two representative farms developed at South Dakota State University (SDSU). The overall results of this study were similar for representative farm firms in the two different regions of South Dakota, the Southern Grain-Hog Farm and the Western Wheat-Cattle Ranch. The overall

results showed that the same relationships held for both regions. Higher ownership, lower debt, and participation in federal commodity programs had a positive effect on survivability and financial growth. The Western ranch was more sensitive to debt and ownership levels than the Southern Grain-Hog farm.

Koo, et al., (2005) studied the impacts of individual programs in the 2002 farm bill using the North Dakota Representative Farm model. The model has 24 representative farms. The model is a stochastic simulation model designed to analyze the effects of policy changes on farm income. The various programs within the farm bill were separated and examined individually. They concluded that, under the current farm program, the weighted average net farm income of representative farms is \$92 thousand and that the probability that the net farm income ranges between \$70 thousand and \$116 thousand is 90 percent. The average farm is likely to receive \$22 thousand in Counter-cyclical payments, indicating that there is a 90 percent probability for the Counter-cyclical payments to fall within the range of \$6 thousand to \$36 thousand. An average representative farm under the current loan benefit programs receives \$47 thousand in benefits with a 90 percent probability of falling within the range of zero to \$104 thousand. Direct payments also averaged \$18 thousand for the average representative farm, and less than both Counter-cyclical payments and loan benefits. They concluded that any major change in governmental programs would require about 2 years to adapt to the shock which would drastically affect North Dakota net farm income.

AcMoody, et al., (2006 b) studied the farm-level financial implications of the 2007 Farm Bill using a Multivariate Empirical (MVE) Probability Distribution and

Stochastic Simulation Model. The study was based on the effects of a reduction in government payments on farms with different typology and size, land tenure system, and capital structure. An MVE probability distribution and stochastic simulation model was used for the research. They concluded that the impact of the US proposal to the WTO has an expected negative impact on farm-level financial performance for traditional corn/soybean farms in the Midwest. Also the expected increase in commodity prices projected by FAPRI, as a result of the policy changes, lessened the impact that would otherwise have occurred. Again net farm income was the most affected by a reduction in government payments, and the largest impacts were realized for traditional typology¹⁴ farms.

2.9 Concluding Remarks

In order to achieve an effective reduction in the incidence of trade-distorting support by the WTO members, the overall cuts in trade-distorting domestic support have to be substantial. In an attempt to prevent world trade talks on agricultural subsidies from collapsing, both the US and the EU offered bold proposals to substantially reduce ODS. The US offered to slash 60 percent of its multi-billion-dollar agriculture subsidies and completely phase out these in a decade. The EU followed suit with an offer to cut farm subsidies by 47 percent. However, a review of a number of studies showed that a small percentage cut in ODS will not succeed in reducing the effective trade-distorting support.

¹⁴ Briggeman (2006) developed a set of US farm typology cluster groups from ARMS data using asset size, dependence on off-farm income etc. The 7 categories he developed were: single income ruralpolitan, double income ruralpolitan, dual career operator and spouse, active seniors, farm operator with spouse working off-farm, traditional and commercial.

A cut of 60 and 47 percent offered by the US and the EU, respectively, is not large enough to effectively reduce the incidence of trade-distorting domestic support.

Roberts (2005) concluded that aggregate limits on distorting support (AMS, *de minimis*, and Blue Box support) would need to be reduced well beyond the level indicated for the first installment of cuts in the July 2004 framework agreement (20 percent) before such cuts would reduce the incidence of distorting support in the US and the EU. Large cuts in the overall base level for distorting domestic support will be required before any meaningful reduction in actual distorting support is actually recorded.

Several ways to analyze the impacts of the trade agreements exist, and there are different types of trade models which can be used for the analysis of a trade-related policy change. The most commonly used models include Equilibrium Models, Representative Farm Models, Multivariate Empirical (MVE) Probability Distribution and Stochastic Simulation Models, and Dynamic Farm Simulation Models (FLIPSIM). Using a Stochastic Simulation Model in conjunction with a Representative Farm is an appropriate approach. In this approach, national level prices and yields from FAPRI projections are used as an input into a Multivariate Empirical (MVE) Probability Distribution and Stochastic Simulation Model to generate South Dakota prices and Spink County yields. These prices and yields along with all relevant domestic farm support programs are then plugged into the representative farm to generate net income.

CHAPTER 3

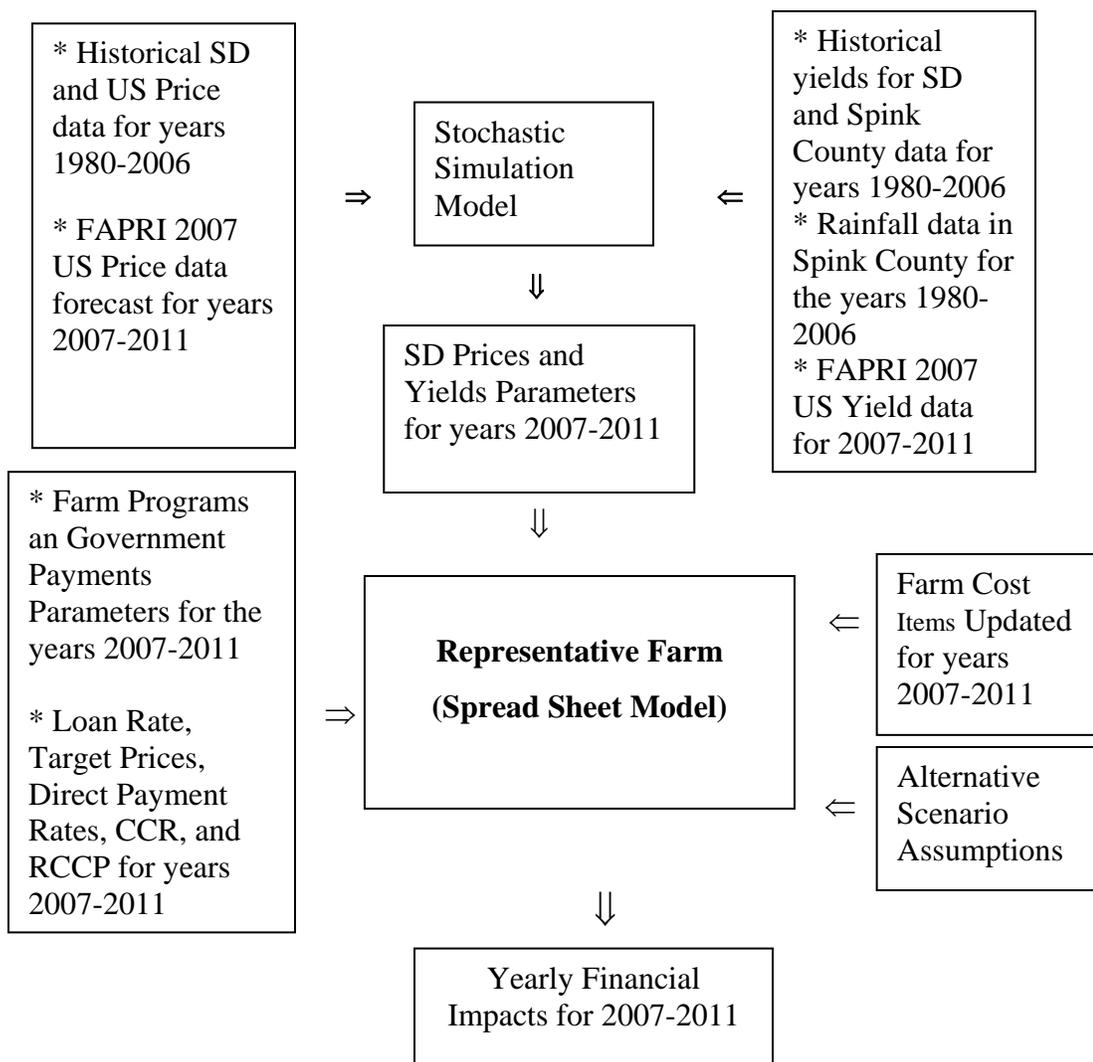
RESEARCH METHODS AND DATA

This chapter starts with a schematic outline of the model used in this study to analyze farm-level impacts of proposed cuts in domestic farm support programs and of the adoption of the Counter-cyclical Revenue Program (CCR) or the Revenue Counter-cyclical Program (RCCP) proposal for the 2007 Farm Bill. The model is essentially a spreadsheet-based representative farm model with five enterprises, namely, corn, spring wheat, soybeans, sunflowers and alfalfa hay. These crops are represented by K in the equations for the price and yield ($K = C, W, B, S$ and A for Corn, Spring Wheat, Soybeans, Sunflowers, Alfalfa Hay, respectively).

Since the analysis involves out-of-sample years, the future streams of crop yield and price parameters (mean values, upper as well as lower bounds based on pre-specified probabilities) are estimated through a stochastic simulation component of the model. For each analyzed year and scenario, the yield and price parameters, farm cost items, and farm program and government payment parameters are entered as input into the representative farm model to obtain the financial impacts. A schematic outline of the model is shown in Figure 3.1.

Following the schematic outline, the stochastic simulation component of the model is described, and validation of the simulated prices and yields is discussed. Then, the representative farm is described, and cost items for the representative farm, the

Figure 3.1 A Schematic Outline of the Methodology



alternative scenario variations, the changes in the government program payments, and a computation of farm financial impacts are discussed. Finally, the chapter ends with a description of the data used in the analysis.

3.1 Stochastic Simulation of Crop Yields and Prices

To simulate crop yields and prices, stochastic processes based on the residuals from the estimated yield and price models are defined. A multivariate empirical distribution for the stochastic component of each variable is constructed using the residuals from the estimated/deterministic model. This simulation procedure closely follows the steps outlined by Richardson, Klose, and Gray (2000) and Sung and Salassi (2004) with correlation across commodities.

3.1.1 Crop Yields

Crop yield data for the years 1980-2006 derived from the Spink County profile in the National Agricultural Statistics Service (NASS) archive was used to simulate yields. Spink County crop yields are modeled as a linear time trend with precipitation included as an independent variable. To capture the farm-level variability, Spink County crop yields are specified as a function of time trend, average precipitation for the previous year, and precipitation for the critical month pertaining to the crop.

$$Y_{Kt} = \alpha_{0K} + \alpha_{1K} Z_{Kt} + \alpha_{2K} R_{t-1} + \alpha_{3K} T + \mu_{Kt} \quad (1)$$

where Y_{Kt} = Spink County yield for commodity K for year t.

Z_{Kt} = Spink County Precipitation in month(s) critical for commodity K, July for Corn, July and August for Soybeans, May and June for Spring wheat, and May, August, and September for Alfalfa hay,

R_{t-1} = Spink County precipitation for the months October to December of the previous year,

T= Time trend in years, and

μ_{Kt} = Error term with normal distribution and a constant mean.

The regression coefficients and the stochastic component from the error terms (μ_{Kt}) are used to capture variability, so that the correlations in the error terms across commodities are maintained and the stochastic error processes are developed from the models.

3.1.2 Crop Prices

South Dakota crop prices are modeled as a function of US crop prices. The historical data from 1980 through 2006 was used. FAPRI projections for the years 2007-2011 were used as proxy for US prices for the years 2007 through 2011. The historical data for the crop prices were obtained from the National Agricultural Statistics Service (NASS) archive. The estimated crop price model for a given crop is:

$$P_{SDKt} = \beta_K P_{USKt} + \mu_{Kt} \quad (2)$$

where P_{SDKt} = South Dakota crop prices for commodity K for year t,

P_{USKt} = US crop prices for commodity K for year t, and

μ_{Kt} = Error term.

The regression model without an intercept term was chosen as it showed a better fit as compared to a model with an intercept term.

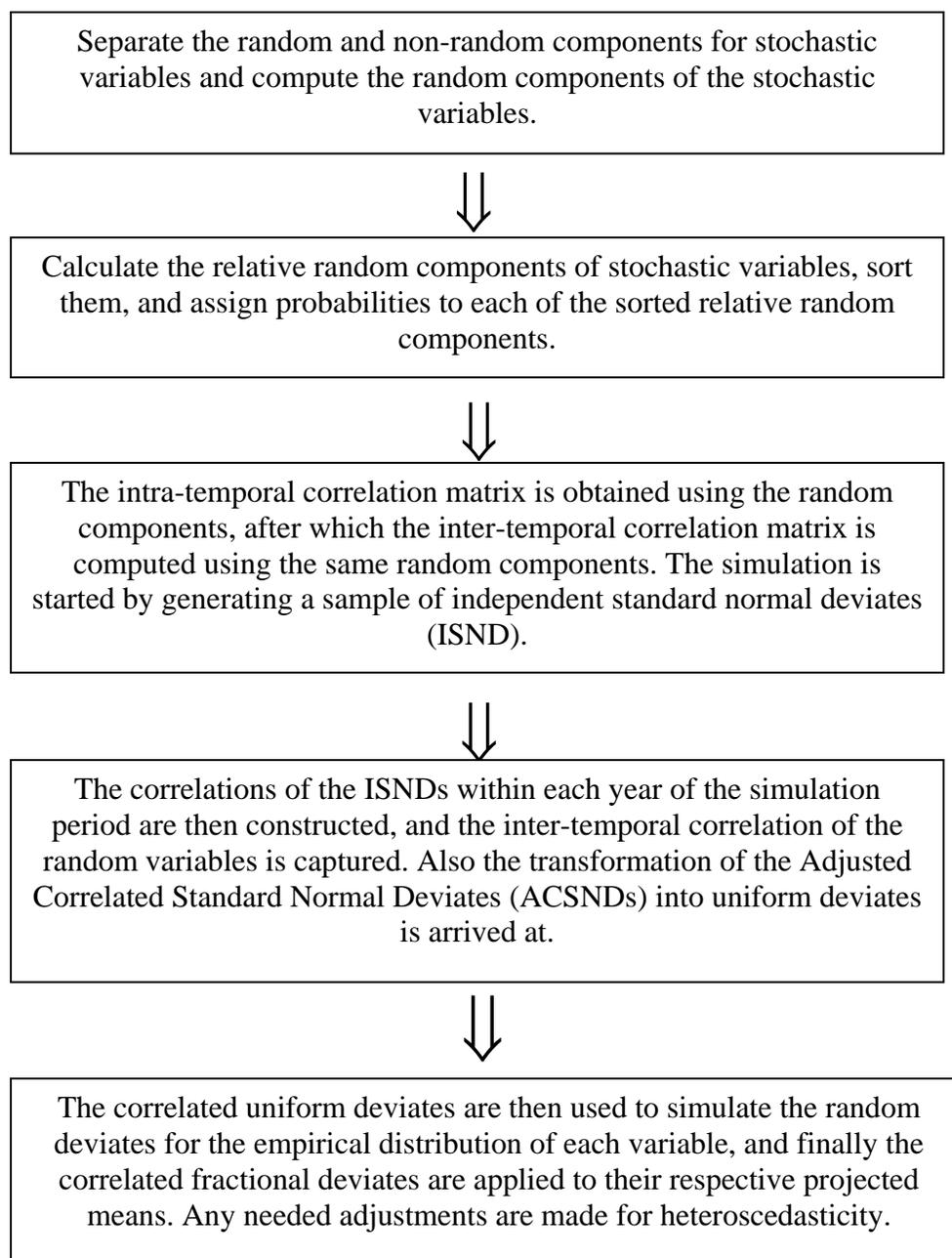
3.1.3 Parameter Estimation and Simulation for the MVE Probability Distribution

The approach used here follows the approach proposed by Richardson, Klose, and Gray (2000) and Sung and Salassi (2004). Accordingly this section draws heavily on these authors.

The model is required to simulate ten variables (five yields and five prices). The probability distributions for the variables need to be parameterized, and empirical distribution has to be such that the parameters are multivariate with random variables. This enhances the ability of the model to deal with correlation and heteroscedasticity. The parameter estimation involves the separation of random and non-random components for each stochastic variable and utilizes regression analysis to identify systematic variability. The random component for each stochastic variable is then calculated as the residuals (μ) from the predicted or non-random component of the variable (Sung and Salassi, 2004).

The residuals (μ) are then converted into relative deviates about their respective deterministic components, resulting in the relative variability of each observation. The relative deviates are then sorted, and probabilities are assigned to each of the sorted deviates. Assigning probabilities to sorted deviates is done by first getting probabilities for the end points, which are defined as 0.0 and 1.0, to ensure that the process conforms to the requirements of a probability distribution. The intervals created by adding the Min.

Figure 3.2 Steps Used in the Parameter Estimation and Simulation of the MVE Probability Distribution



Source: Adopted from Sung Chul No and Michael E. Salassi (2004), pp 2&7.

and Max. deviates are assigned one half of the probability assigned to the other intervals (Richardson, Klose, and Gray 2000).

Finally, the intra and inter-temporal correlation matrix for the random variables is calculated, after which the inter-temporal correlation coefficients for the random variables are calculated. This completes the parameter estimation process for the MVE probability distribution. The stochastic simulation of the MVE probability distribution follows the parameter estimations. The steps used in both the parameter estimation and stochastic simulation of the MVE probability distribution are outlined in figure 3.2.

3.2 Validation of the Stochastic Simulation Model

The model validation process in this research follows the historical data validation method, which consists of using part of the historical data (1980-2001) in the model to forecast for the remaining years (2002-2006) of the historical data and the predicted years 2007 to 2011. This examination involves comparing the actual, estimated, and the predicted values for errors and, hence, detects values that are clearly out of line (Balci and Sargent 1982a, 1982b, 1984b, pp.185–192, 620–629, and 375–406, respectively).

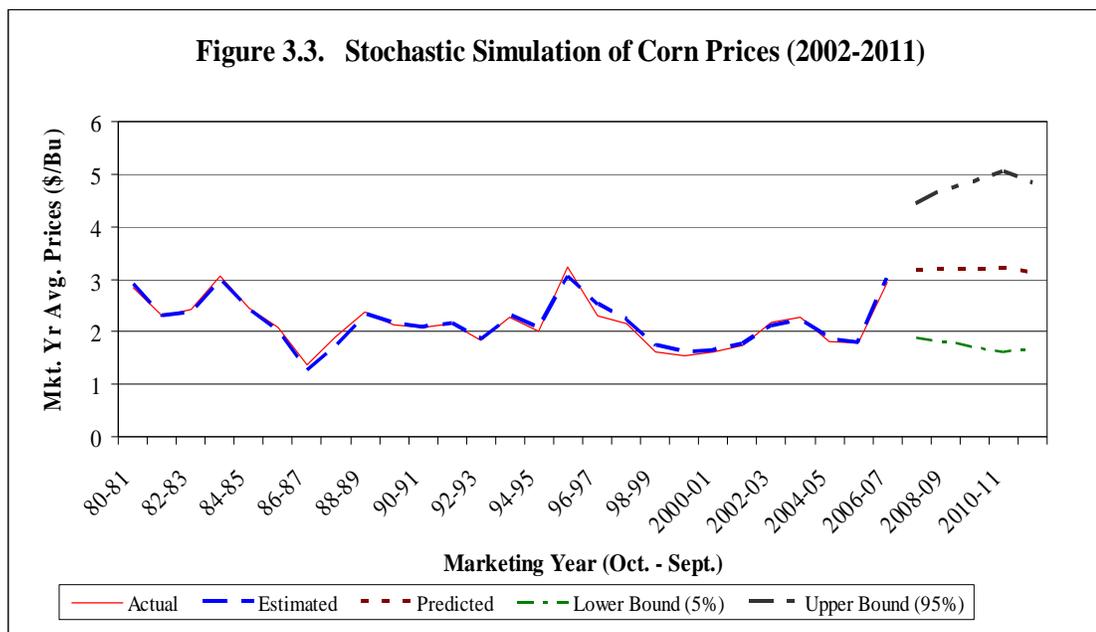
It must be pointed out that as the Spink County price data was not available, historical South Dakota average market year price data was used as a proxy for Spink County prices for different crops in the following analysis and simulations.

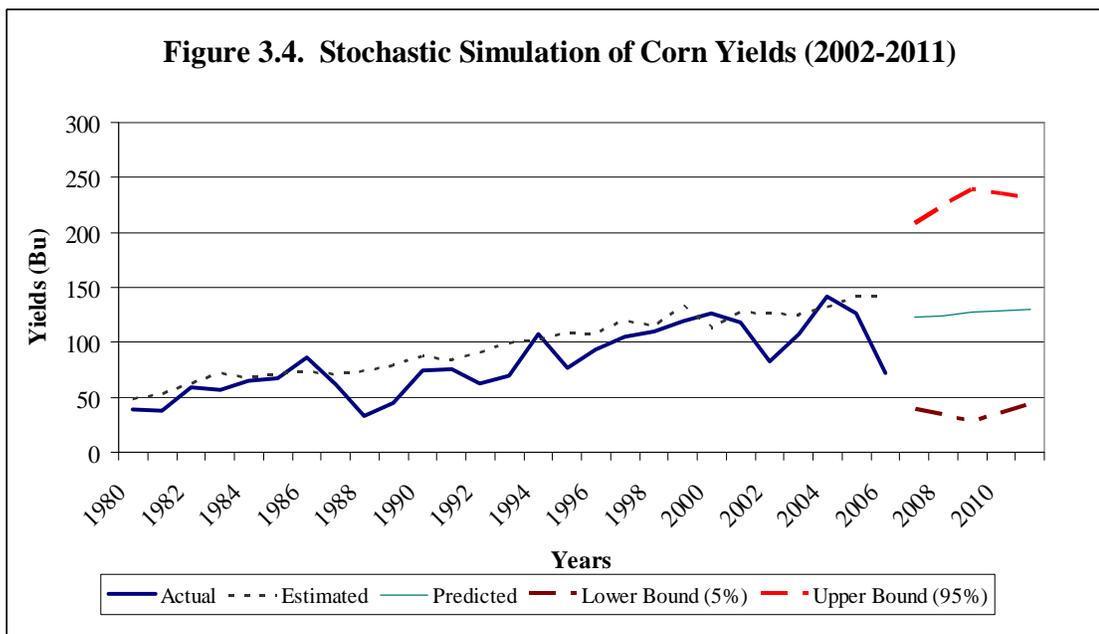
3.2.1 Historical and Simulated Corn Prices and Yields

The simulated outputs of the stochastic model are the mean values of the historical prices and yields with the variability maintained.

Figure 3.3 shows that the simulated corn prices compare reasonably to the historical corn prices. The variability of the mean for the historical corn prices was maintained. The simulated corn prices followed the historical mean for the FAPRI projections over the time period accurately. The lower and upper bound prices are all within the expected range.

Figure 3.4 shows that the simulated corn yields compare reasonably to the historical corn yields. The variability of the predicted mean for the historical corn yields was slightly lower. Both the lower and upper bound yields are within the expected range.



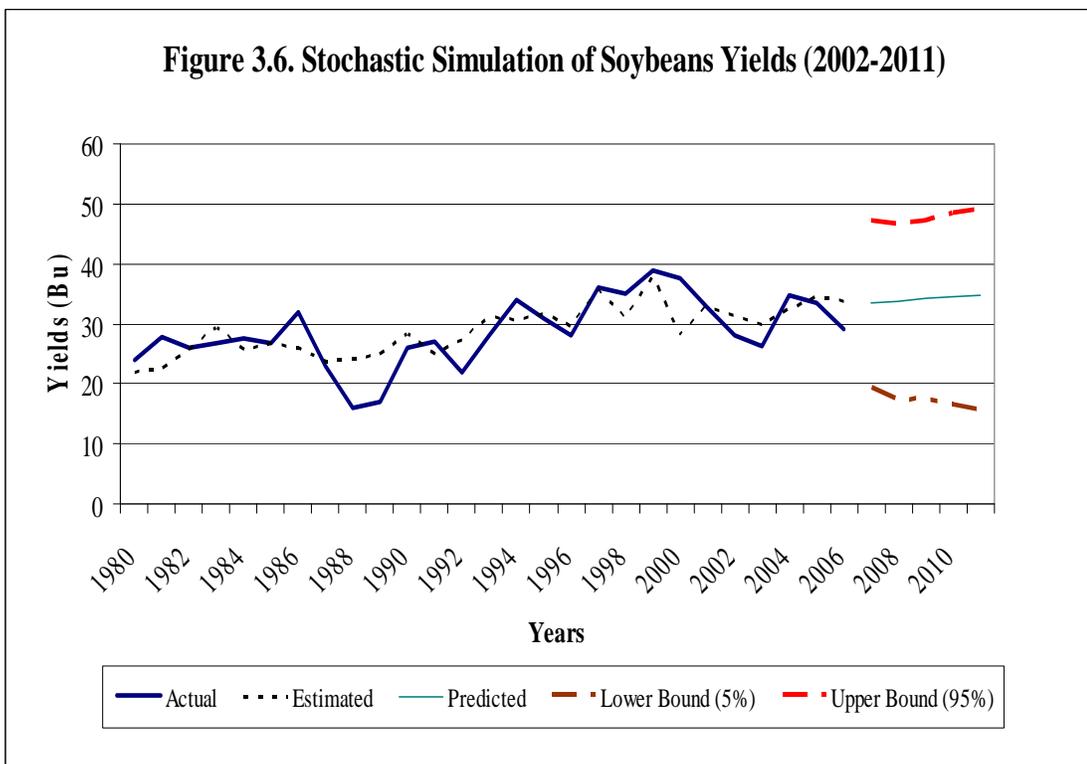
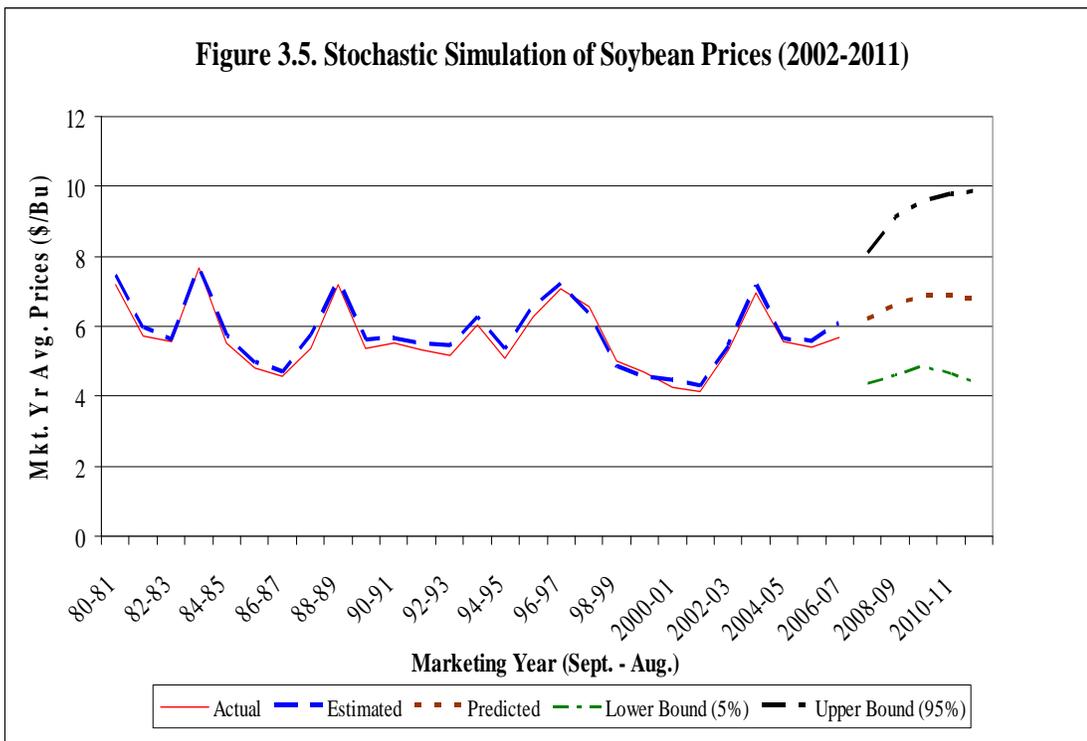


3.2.2 Historical and Simulated Soybean Prices and Yields

The simulated mean values of the historical yields and prices maintained the expected means for inputs.

Figure 3.5 shows that the simulated results maintained the variability of the mean for the historical soybean prices. The simulated prices for soybeans followed their historical means over the time period accurately. The lower and upper bound soybean prices behaved as expected and were within a reasonable range.

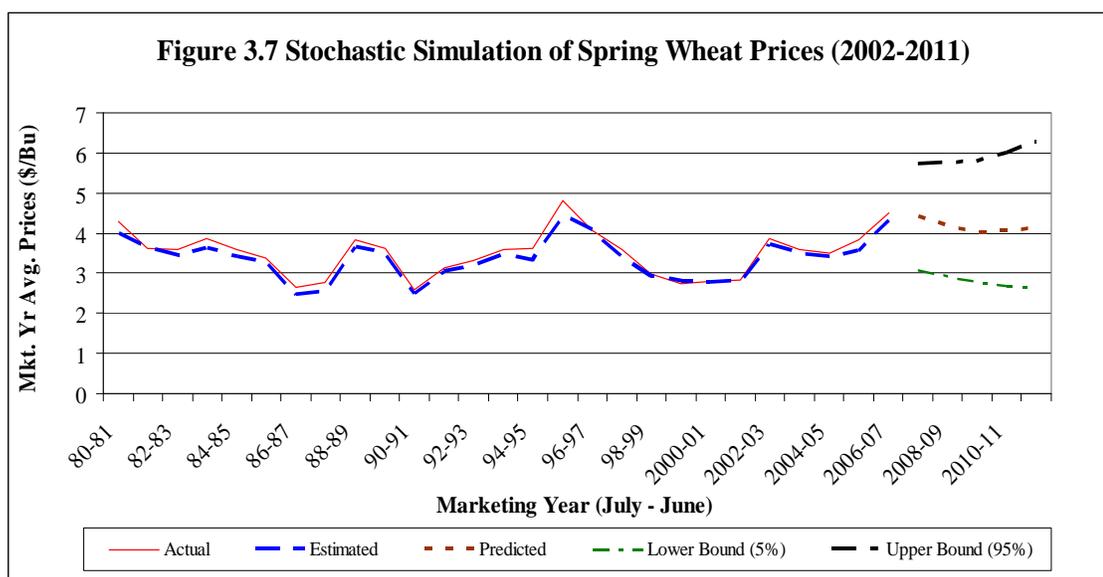
Figure 3.6 depicts that the simulated results maintained the variability of the mean for the historical soybean yields. The simulated yields for soybeans accurately followed the historical means, and the projections for the years 2007-2011 were reasonable. The estimated soybean yields showed somewhat lower variability. Lower and upper bound soybean yields are within a reasonable range.

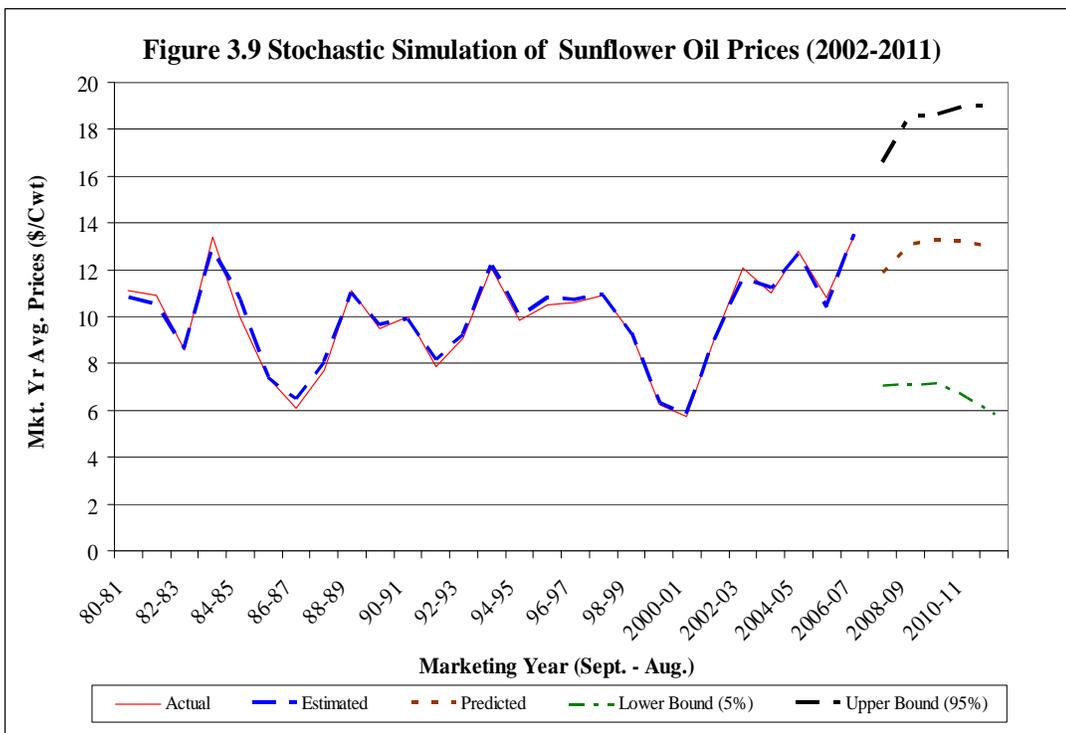
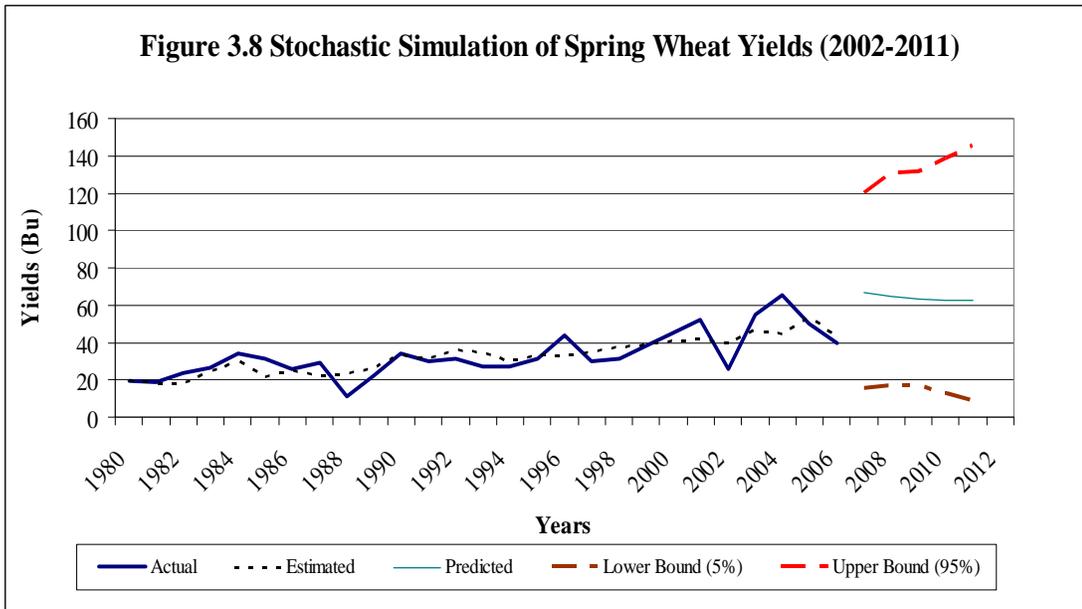


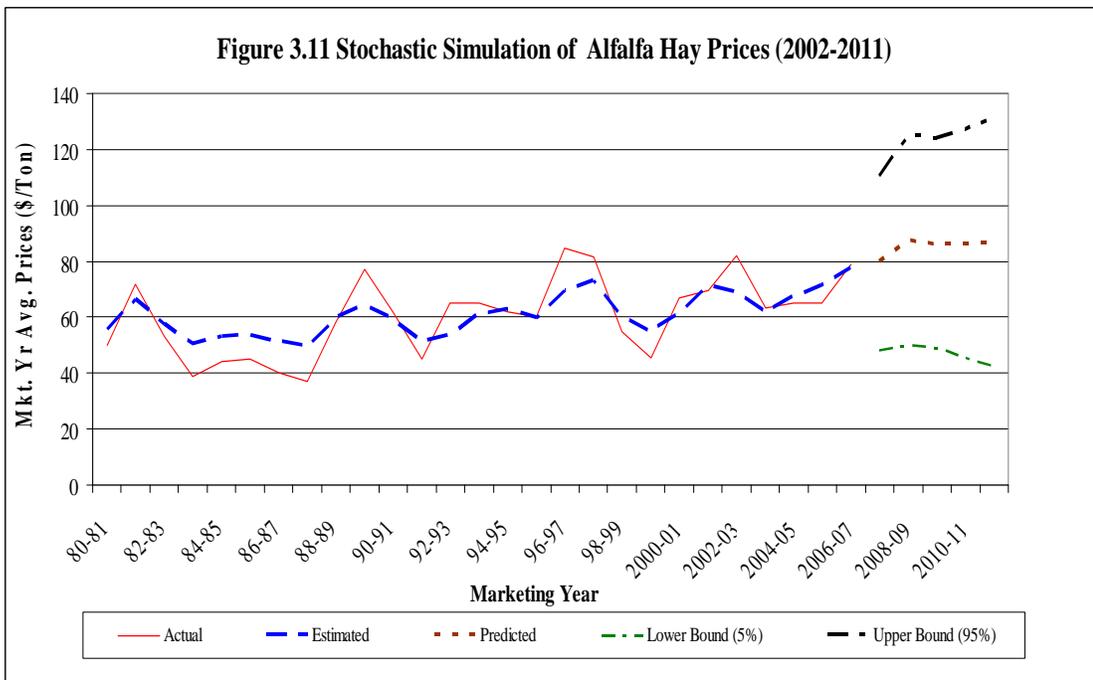
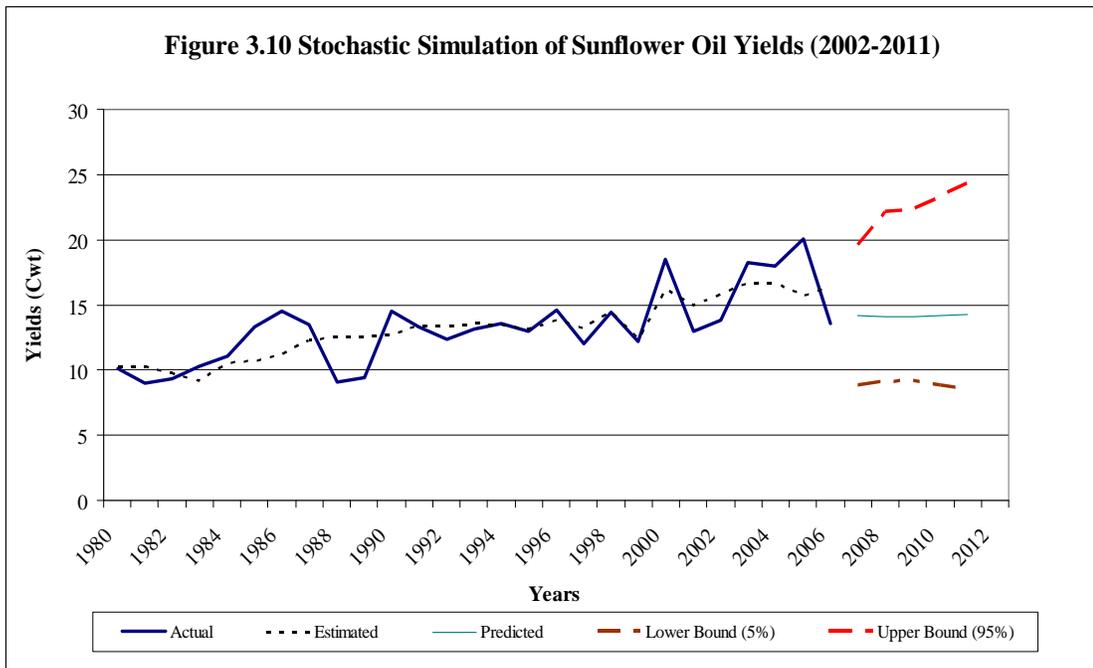
3.2.3 Historical and Simulated Prices and Yields for other Crops

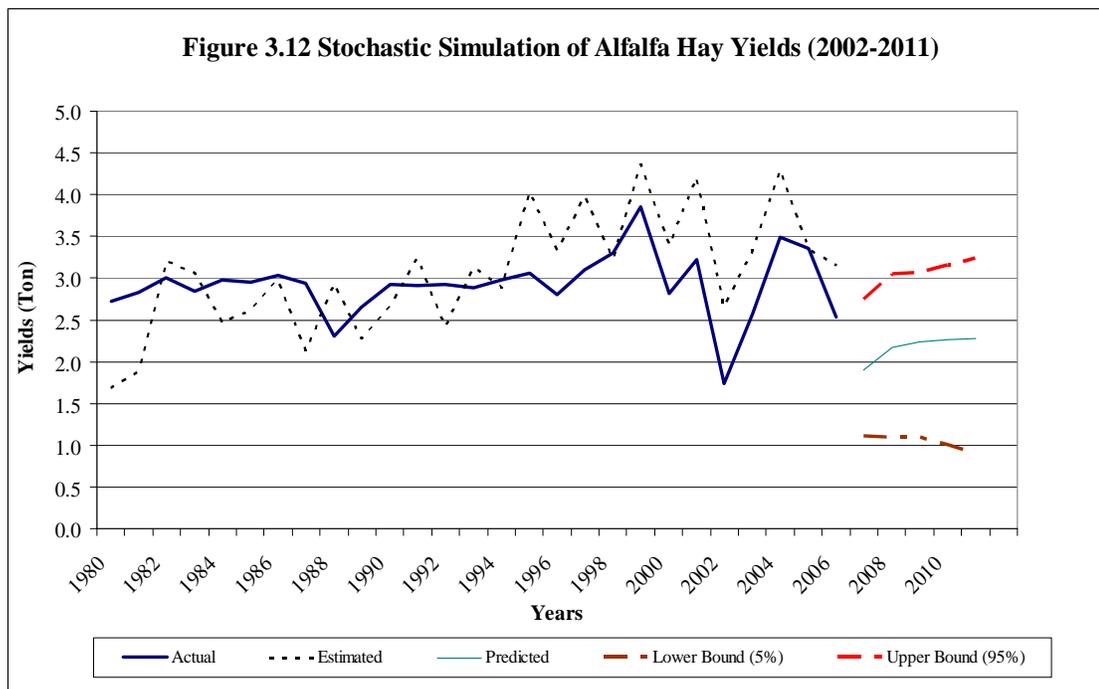
Spring wheat, sunflowers, and alfalfa hay are the other crops in the model. The stochastic simulation of yields and prices for these crops followed their respective historical means. Estimated prices and yields compared reasonably. The simulated results for these crops also maintained the variability of their respective historical series. The lower and upper bounds for both prices and yields for these crops behaved as expected and are shown in Figures 3.7 through 3.12.

Alfalfa hay yield stochastic simulation is for the period 1996-2006. The estimated value for alfalfa hay yield is consistently above the historical values. This can be attributed to the fact that the Spink County alfalfa hay historical yield data for the years 1980-1995 were estimated using the relationship between the South Dakota alfalfa hay yield and Spink County alfalfa hay historical yield data for the period from 1996-2006, and the South Dakota alfalfa hay yield data for 1980-1995.









3.3 Description of the Representative Farm

The representative farm is assumed to be located in Spink County in North Central South Dakota. The 2002 Census of Agriculture shows that Spink County is the second top county in terms of agricultural sales after Brown County, with 3.5 percent of total receipts for crops in the state. Farms in the Spink County primarily grow corn, soybeans, wheat, alfalfa hay, and other small grains. The representative farm is developed from detailed farm data collected from numerous secondary sources and modeled to represent a typical farm in Spink County after Pattanaik (2005). Available cropland for the farm is assumed to be 1400 acres which can be planted to corn, soybeans, spring wheat, sunflowers, and alfalfa hay. Historical data from 1980 through

2006 is used in the stochastic simulation model to obtain projections for the years 2007 to 2011.

This is a spreadsheet-based accounting model with the base years of 2002-2006. The simulation period is assumed to be from 2007 to 2011. Simulation results, with appropriate assumptions, are used to analyze the impacts of the selected 2007 Farm Bill proposals on representative farms in each scenario.

3.3.1 Baseline Assumptions for the Representative Farm

The purpose of the modeling and simulation is to understand the impacts of changes in selected farm programs on the net farm income of a typical farm in North East South Dakota. In order to study the impacts of the selected farm programs, a baseline scenario is developed.

Representative farm analysis is thus anchored to a set of baseline projections for the farm. This approach can provide farmers and policy makers with a benchmark to compare and interpret different policy alternatives. Since most agricultural policies introduce incremental changes from the current policy, providing impact estimates in the context of a marginal change from a baseline scenario for a representative farm is easy to interpret. The representative farm approach also estimates a dynamic impact path over the projection period. Thus, production and profitability paths associated with policy alternatives evaluated are traceable. Basic assumptions about the representative farm are listed below:

- 1) The base model assumes a trend yield with average precipitation for the crops and predicted prices received by farmers for the simulated period based on historical data. The predicted prices received by farmers are based on the historical relationships between FAPRI US prices and South Dakota prices. In addition, macroeconomic, trade, and agricultural policies are assumed to be incorporated by FAPRI in their price series predictions.
- 2) The representative farm is assumed to be a non-irrigated farm.
- 3) The size and operations of the farm are assumed to remain constant through the analysis period, and all acres planted are assumed to be harvested.
- 4) The farm equipment stock is assumed to remain constant, indicating that depreciation allowances are reinvested to replace the depreciated farm equipment. Approximately 30 percent of the total value of machinery stock is replaced during the study period.
- 5) No off-farm income, including family employment, was included in the analysis. Therefore, the representative farm reflects only the ability of the farm business to provide for family living and capital replacement.
- 6) The farm operator is assumed to be middle aged with three dependents to provide labor.
- 7) The model farm is assumed to carry Revenue Assurance (RA) and Actual Production History (APH) insurance at 70 and 50 percent, respectively, and also to participate in the appropriate federal agricultural commodity programs.

- 8) Crop sales and related federal commodity program payments provide the farm all of its gross farm income.
- 9) The analysis also assumes that the farm begins the simulation period with \$5000 of cash reserves.
- 10) The farm is assumed to face an inflation rate reflected in the Producer Price Index (PPI).
- 11) Farms in the Spink County area were flooded during the early part of the 2007 farming season, perhaps affecting crop yields in that area. Since this is an exceptional condition, it was ignored in this analysis. The exceptionally lower Spink County crop yields for 2007 were ignored so that the representative farm can represent the northeast region of South Dakota for the simulation period (2007-2011).
- 12) The lock-in date for loan rates for the farm is from the 1st to the 31st of October for all the crops except sunflowers, which have a lock-in date of the 1st to the 30th of September.

3.3.2 Cost Items for the Representative Farm

Cost items such as land values and rental rates, expenses, and other cost-related inputs are all included in the basic model inputs for the representative farm. The costs of machinery and its replacement, maintenance, fuel, chemicals, and property and other taxes included in the inputs are adjusted by CPI to reflect their current market value.

Detailed descriptions of these costs, land values and rental rates are given in Appendix B.

3.4. Scenario Variations for the Representative Farm

The base farm is altered to develop different scenarios regarding the proportion of owned and leased land. The variations in different scenarios also relate to changes in the different debt levels and alternative lease arrangements of cash rent or share rent. Only cropland is assumed to be leased in all scenarios, while farmstead and waste land are owned by the operator. In each scenario, the total cropland value changes by the amount of land owned multiplied by its per acre value. In a cash lease scenario the cost of additional leased cropland is derived by multiplying the amount of land leased by the rental rate. In the case of a share lease scenario the output as well as the cost for selected inputs (fertilizer, herbicides, insecticides, and drying) is shared between tenant and land owner at a 2/3-1/3 rate, respectively. Since principal and interest payments are paid from farm income, the amount of debt a farm is carrying plays a large role in determining the farm's ability to cash flow and net profit at the end of the crop year. The long-term debt to asset level varies from 5 percent to 25 percent and 45 percent. Each of the scenarios is simulated with the farm's cash rent or share rent leasing option. Table 3.1 shows the 12 scenarios simulated based on combinations of land ownership, long-term debt level, and cash or share leasing option.

Table 3.1 Scenario Variations for the Representative Farm

| Scenarios | Cropland | | Long-Term |
|-----------|-----------|-------------|----------------|
| | Owned (%) | Acres Owned | Debt Level (%) |
| 1 Cash | 60 | 840 | 5 |
| 1 Share | 60 | 840 | 5 |
| 2 Cash | 60 | 840 | 25 |
| 2 Share | 60 | 840 | 25 |
| 3 Cash | 60 | 840 | 45 |
| 3 Share | 60 | 840 | 45 |
| 4 Cash | 40 | 560 | 5 |
| 4 Share | 40 | 560 | 5 |
| 5 Cash | 40 | 560 | 25 |
| 5 Share | 40 | 560 | 25 |
| 6 Cash | 40 | 560 | 45 |
| 6 Share | 40 | 560 | 45 |

Note: Scenarios 1-6 Cash assumes cropland acres are cash leased, and Scenarios 1-6 Share assumes cropland acres are share leased.

3.5 Government Program Payments

Reductions in subsidy payments follow an analysis conducted by the Food and Agricultural Policy Research Institute (FAPRI) in order to meet WTO commitments on subsidy reduction. The analysis conducted by FAPRI on subsidy reduction involves a linear reduction in target prices and loan rates over a 5-year period from 2008 to 2012. According to FAPRI stochastic simulation results, the proposed changes bring US aggregate measures of support into compliance with FAPRI guidelines in no less than 95 percent of occurrences. These reductions consist of 7 percent reductions in target prices and 11 percent reductions in loan rates to be implemented from 2007 to 2011. These

same reductions were used in the calculation of LDPs for the simulation period 2007 to 2011.

The loan rates and target prices proposed by FAPRI are listed in Table 3.2. Loan rates, target prices, and direct payment rates do not change for the calculation of the CCP and DP, with the exception of the case in which administrative proposal changes were made in the calculation of the Counter-cyclical Revenue (CCR) payments in the 2007 Farm Bill proposal. Counter-cyclical Revenue (CCR) and Revenue Counter-cyclical

Table 3.2 Policy Assumptions

| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-------------------|-------|-------|------|------|------|------|------|
| Corn | | | | | | | |
| Loan Rate | 1.95 | 1.91 | 1.86 | 1.82 | 1.78 | 1.74 | 1.74 |
| Target Price | 2.63 | 2.59 | 2.56 | 2.52 | 2.48 | 2.45 | 2.45 |
| Direct Payment | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 |
| Soybean | | | | | | | |
| Loan Rate | 5.00 | 4.89 | 4.78 | 4.67 | 4.56 | 4.45 | 4.45 |
| Target Price | 5.80 | 5.72 | 5.64 | 5.56 | 5.48 | 5.39 | 5.39 |
| Direct Payment | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 |
| Wheat | | | | | | | |
| Loan Rate | 2.75 | 2.69 | 2.63 | 2.57 | 2.51 | 2.45 | 2.45 |
| Target Price | 3.92 | 3.87 | 3.81 | 3.76 | 3.70 | 3.65 | 3.65 |
| Direct Payment | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 |
| Sunflowers | | | | | | | |
| Loan Rate | 9.30 | 9.19 | 9.08 | 8.97 | 8.86 | 8.75 | 8.75 |
| Target Price | 10.10 | 10.03 | 9.96 | 9.89 | 9.82 | 9.75 | 9.68 |
| Direct Payment | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 |

Source: FAPRI-UMC Report #16-05, p.12.

(RCCP) payments are derived using the USDA and NCGA stipulated methodologies outlined in Chapter 2. The RCCP is calculated using the NCGA's RCCP calculator. Discussion of base acres and program yields can be found in Appendix B.

3.6 Computation of Financial Impacts

Several performance measures are used to analyze the financial impacts on the farm for each of the 12 scenarios. These measures include net farm income, debt-asset ratio, and cash flow. The scenarios are analyzed for the long-term effects of reductions in government subsidies and the introduction of the CCR and RCCP in the 2007 Farm Bill Proposals. Net farm incomes, and debt-asset ratios for the various scenarios are computed and compared to the base farm. The structures of financial measures used are described below.

The income statement is divided into two sections, namely, farm income and farm expense. Based on these two sections the farm cash income is calculated. Interest and land rent are included in the farm cash income. Depreciation is then subtracted from farm cash income in order to arrive at the net farm income as shown in equations 3 and 4 below.

The section on assets has the beginning cash reserve, the market value of the cropland, the market value of the buildings, the market value of the owned farmstead and wasteland, and the market value of all farm machinery.

$$\text{Farm Cash Income} = \text{Total Farm Income} - \text{Total Farm Expense} \quad (3)$$

$$\text{Net Farm Income} = \text{Farm Cash Income} - \text{Depreciation} \quad (4)$$

The liability section has long-term debt and intermediate term debt. Long-term debt is generally used to finance real estate (long-term assets), whereas intermediate term debt is used to finance machinery and equipment. The output of the financial statements is summarized in a set of financial values and ratios. Included in the financial ratios and outputs are net farm income, net worth and debt to asset ratio. Details of the income statement and balance sheet for the representative farm can be found in Appendix B.

3.7 Data Used

Historical commodity prices and yields data for corn, spring wheat, soybeans, sunflowers and alfalfa hay were collected from the National Agricultural Statistics Service and South Dakota Agricultural Statistics. The Spink County historical yield data for corn, spring wheat, soybeans, sunflowers and alfalfa hay were used for the simulation. South Dakota farm-level prices were used in place of Spink County prices for the simulation since county farm-level prices were unavailable. Data for alfalfa hay yields for Spink County were available for only the years 1996-2006. Accordingly, the Spink County alfalfa hay yield for the years 1980-1995 was estimated using the relationship between the South Dakota alfalfa hay yield for 1980-1995 and the Spink County alfalfa hay yield for the 1996-2006 period.

Historical precipitation data for Spink County was collected from the SDSU climate and weather station data. This included data from climate and weather stations in Mellette, Redfield, Doland, Ashton, and Conde, all in Spink County.

Representative Farm data was mostly collected from SD Budgets, SD Censuses of Agriculture in 1997 and 2002, SD Agricultural Statistics, the National Agricultural Statistics Service, Nebraska Crop Budgets, and FAPRI baseline data. Other data sources include the ERS/USDA database, the WTO notifications database, and the U.S. Department of Commerce.

CHAPTER 4

EMPIRICAL RESULTS AND DISCUSSION

This chapter starts with the empirical results for the stochastic simulation. Following that is the impacts of a 60 percent cut in domestic farm support for the representative farm under various scenarios for crop years 2007/08 through 2011/12 is discussed. Then the impacts of replacing CCP with CCR for the representative farm are presented. Finally the impacts of replacing LDP and CCP with RCCP for the representative farm are also discussed.

4.1 Results for the Stochastic Simulation for Prices and Yields

The parameter estimation and multivariate empirical (MVE) distribution were simulated for five crop years using Spink County historical data for corn, soybeans, spring wheat, sunflowers and alfalfa for the past 27 years. It was assumed that the relative variability of prices and yields would be the same in the future as it has been in the past. The simulation was run for 4,000 iterations, and the simulated statistics and correlation matrix were compared to the historical input values for validation. Results for the parameter estimation of MVE probability distributions and other related tables for the stochastic simulation are reported in Appendix D (Tables D-1 to D-19). The results of the stochastic simulation process are summarized in Tables 4.1 and 4.2.

Table 4.1 Results for Simulated Prices for the Representative Farm

| Year(s) | Simulation Statistics | South Dakota Prices | | | | |
|--------------------------------|-----------------------|---------------------|--------------|---------|-----------|-------------|
| | | Corn | Spring Wheat | Soybean | Sunflower | Alfalfa Hay |
| 1980/81 Through 2006/07 | Mean | 2.17 | 3.50 | 5.67 | 9.90 | 60.40 |
| | Std. | 0.45 | 0.55 | 0.91 | 2.06 | 13.70 |
| | Coeff. of Var. | 20.87 | 15.81 | 16.06 | 20.85 | 22.68 |
| | Minimum | 1.37 | 2.60 | 4.13 | 5.73 | 36.83 |
| | Maximum | 3.23 | 4.82 | 7.66 | 13.50 | 84.50 |
| 2007/08 | Mean | 3.25 | 4.26 | 6.81 | 12.88 | 88.26 |
| | Std. | 1.31 | 1.26 | 2.04 | 5.19 | 34.41 |
| | Coeff. of Var. | 40.24 | 29.69 | 29.98 | 40.27 | 38.98 |
| | Minimum | 1.93 | 2.96 | 4.78 | 7.65 | 53.18 |
| | Maximum | 4.55 | 5.49 | 8.86 | 18.03 | 122.01 |
| 2008/09 | Mean | 3.26 | 4.04 | 6.94 | 13.19 | 86.47 |
| | Std. | 1.35 | 0.96 | 1.55 | 3.99 | 27.05 |
| | Coeff. of Var. | 41.54 | 23.79 | 22.30 | 30.25 | 31.28 |
| | Minimum | 1.73 | 2.83 | 4.83 | 7.14 | 49.18 |
| | Maximum | 4.92 | 5.58 | 9.55 | 18.62 | 123.99 |
| 2009/10 | Mean | 3.29 | 4.02 | 6.87 | 13.16 | 85.85 |
| | Std. | 1.39 | 0.89 | 1.27 | 3.37 | 23.15 |
| | Coeff. of Var. | 42.14 | 22.25 | 18.42 | 25.59 | 26.97 |
| | Minimum | 1.64 | 2.75 | 4.82 | 7.09 | 49.03 |
| | Maximum | 5.16 | 5.79 | 9.53 | 18.49 | 123.60 |
| 2010/11 | Mean | 3.21 | 4.04 | 6.76 | 12.88 | 86.54 |
| | Std. | 1.39 | 0.89 | 1.24 | 3.23 | 24.00 |
| | Coeff. of Var. | 43.38 | 22.06 | 18.37 | 25.07 | 27.73 |
| | Minimum | 1.49 | 2.67 | 4.56 | 6.37 | 45.92 |
| | Maximum | 5.18 | 5.98 | 9.62 | 18.50 | 127.72 |
| 2011/12 | Mean | 3.13 | 4.07 | 6.69 | 12.75 | 86.97 |
| | Std. | 1.24 | 0.95 | 1.28 | 3.30 | 24.98 |
| | Coeff. of Var. | 39.69 | 23.33 | 19.10 | 25.88 | 28.73 |
| | Minimum | 1.57 | 2.58 | 4.33 | 5.75 | 42.62 |
| | Maximum | 4.81 | 6.16 | 9.75 | 18.72 | 131.38 |

Table 4.2 Results for Simulated Yields for the Representative Farm

| Year(s) Simulation Statistics | | Spink County Yields per Acre | | | | |
|--------------------------------|----------------|------------------------------|--------------|---------|-----------|-------------|
| | | Corn | Spring Wheat | Soybean | Sunflower | Alfalfa Hay |
| | | (bu.) | (bu.) | (bu.) | (cwt.) | (ton) |
| 1980/81 through 2006/07 | Mean | 82.25 | 33.33 | 28.7 | 13.26 | 2.88 |
| | Std. | 29.38 | 11.98 | 5.53 | 2.86 | 0.62 |
| | Coeff. of Var. | 35.72 | 35.93 | 19.26 | 21.58 | 21.54 |
| | Minimum | 33 | 11 | 16 | 9 | 1.55 |
| | Maximum | 141.8 | 65.1 | 38.8 | 20.1 | 3.86 |
| 2007/08 | Mean | 128.04 | 72.28 | 32.47 | 15.4 | 2.06 |
| | Std. | 87.41 | 56.86 | 13.37 | 5.9 | 0.89 |
| | Coeff. of Var. | 68.27 | 78.67 | 41.19 | 38.3 | 43.14 |
| | Minimum | 41.01 | 16.76 | 18.78 | 9.57 | 1.19 |
| | Maximum | 215.84 | 130.53 | 45.53 | 21.37 | 2.97 |
| 2008/09 | Mean | 127.19 | 64.88 | 34.13 | 14.24 | 2.19 |
| | Std. | 80.81 | 31.06 | 6.63 | 3.35 | 0.58 |
| | Coeff. of Var. | 63.53 | 47.88 | 19.43 | 23.52 | 26.41 |
| | Minimum | 34.58 | 16.88 | 17.46 | 9.21 | 1.09 |
| | Maximum | 229.59 | 131.47 | 47.18 | 22.31 | 3.05 |
| 2009/10 | Mean | 129.86 | 63.6 | 34.56 | 14.19 | 2.26 |
| | Std. | 81.56 | 23.77 | 4.86 | 2.48 | 0.47 |
| | Coeff. of Var. | 62.8 | 37.37 | 14.05 | 17.5 | 20.61 |
| | Minimum | 27.82 | 17 | 17.62 | 9.3 | 1.1 |
| | Maximum | 243.75 | 132.39 | 47.63 | 22.53 | 3.08 |
| 2010/11 | Mean | 131.15 | 63.28 | 34.81 | 14.3 | 2.27 |
| | Std. | 74.26 | 23.31 | 4.68 | 2.33 | 0.46 |
| | Coeff. of Var. | 56.62 | 36.84 | 13.45 | 16.26 | 20.35 |
| | Minimum | 36.07 | 12.76 | 16.52 | 8.93 | 1 |
| | Maximum | 239.48 | 139.52 | 48.93 | 22.5 | 3.16 |
| 2011/12 | Mean | 133.22 | 62.95 | 35.09 | 14.45 | 2.29 |
| | Std. | 67.69 | 22.67 | 4.75 | 2.42 | 0.47 |
| | Coeff. of Var. | 50.81 | 36.01 | 13.53 | 16.73 | 20.38 |
| | Minimum | 44.71 | 8.46 | 15.81 | 8.55 | 0.9 |
| | Maximum | 235.29 | 146.73 | 49.62 | 24.52 | 3.25 |

The simulated coefficient of variation (CV) for all the crops in the stochastic simulation were higher compared to the historic values. This can be attributed to the sharp increase in prices and yields for the last observation (2006/07) in the historical dataset. For corn prices, the CV for the simulated prices was twice the historical level for each of the five-years. The CV for the simulated prices for other commodities showed similarly large increases for crop years 2007/08, and 2008/09 and relatively smaller increases for the remaining years (2009/10-2011/12).

The CV for the simulated corn yields was also twice the historic level for each of the five-years. Changes in CV for the simulated yields for the other crops show a pattern similar to the changes in the CV for the simulated prices for these crops.

4.2 Impacts of 60 Percent Cut in Domestic Farm Support Programs

A 60 percent cut in domestic farm support programs in the US under the WTO proposal can potentially impact the farm receipts under the loan deficiency payments (LDP), Direct Payments (DP), and Counter cyclical programs (CCP). Potential impacts of this proposal on a South Dakota representative farm are analyzed below.

4.2.1 Impacts on Loan Deficiency Payment (LDP)

The LDP estimates based on historical price and yield levels for the representative farm varied from \$2,102 to \$30,890 per year amounting to a total of \$72,563 for the five crop years 2002/03 - 2006/07 (Table 4.3). In order to gauge the impact of 60 percent cuts in domestic farm support programs, first the LDP receipts for the representative farm

were estimated under three alternative FAPRI baseline conditions, namely the average price and yield conditions, maximum price and yield conditions, and minimum price and yield conditions for crop years 2007/08 – 2011/12. Since the simulated price levels were high, there were no LDP receipts for the representative farm under the FAPRI baseline average price and yield levels as well as the FAPRI baseline maximum price and yield conditions for these years (Appendix Table E-1.0¹⁵). Accordingly a 60 percent cut in domestic farm programs is not going to have any impact on the representative farm during the period (2007/08 – 2011/12) under the average and maximum conditions.

Under the FAPRI baseline minimum price and yield levels, the LDP estimates for the representative farm ranged from \$3,338 for 2007/08 to \$13,229 for 2011/12 (Table 4.3). A 60 percent cut in domestic farm support programs under the minimum price and yield condition is expected to significantly decrease the LDP receipts by the representative farm. The impact of a 60 percent cut in these programs on the LDP receipts to the representative farm is estimated to vary from -\$1,657 (-50%) in 2007/08 to -\$7,539 (-57%) in 2011/12 (Table 4.3). With a 60 percent cut in domestic farm programs, the representative farm is expected to receive much lower LDP receipts for soybeans and corn. Over the course of the five-year period the LDP receipts by the represented farm for soybeans and corn are expected to decrease by \$14,504 (-85.9%) and \$6,079 (-33.6%), respectively (Table 4.3).

¹⁵ Tables for Appendix E can be found on the disk located at the back cover of the thesis.

Table 4.3 The LDP for Representative Farm: Historical, FAPRI Baseline and the 60 Percent Cut in Domestic Farm Support

| Year | Corn | Spring Wheat | Soybean | Sunflower | Total |
|--|-----------------|-------------------------|------------------|------------------|------------------|
| LDP Based on Historical Price and Yield Levels | | | | | |
| 2002/03 | \$6,421 | 0 | 0 | 0 | \$6,421 |
| 2003/04 | \$2,017 | 0 | 0 | \$704 | \$2,722 |
| 2004/05 | \$20,660 | \$3,776 | \$6,454 | 0 | \$30,890 |
| 2005/06 | \$30,226 | 0 | \$202 | 0 | \$30,428 |
| 2006/07 | 0 | 0 | \$2,102 | 0 | \$2,102 |
| TOTAL | \$59,324 | \$3,776 | \$8,758 | \$704 | \$72,563 |
| ... LDP Based on FAPRI Baseline Min. Conditions (No Cuts) ... | | | | | |
| 2007/08 | \$385 | 0 | \$2,479 | \$474 | \$3,338 |
| 2008/09 | \$2,113 | 0 | \$1,781 | \$597 | \$4,491 |
| 2009/10 | \$3,138 | 0 | \$1,904 | \$617 | \$5,659 |
| 2010/11 | \$6,273 | \$204 | \$4,361 | \$785 | \$11,623 |
| 2011/12 | \$5,674 | \$288 | \$6,357 | \$911 | \$13,229 |
| TOTAL | \$17,583 | \$492 | \$16,882 | \$3,384 | \$38,340 |
| LDP Impacts of 60% Cut Under Simulated Min. Conditions (in \$) | | | | | |
| 2007/08 | 0 | - | -\$1,240 | -\$32 | -\$1657 |
| 2008/09 | -\$1,483 | - | -\$1,781 | -\$61 | -\$3305 |
| 2009/10 | -\$1,177 | - | -\$1,904 | -\$93 | -\$3174 |
| 2010/11 | -\$1,527 | -\$204 | -\$4,361 | -\$118 | -\$6212 |
| 2011/12 | -\$1,892 | -\$288 | -\$5,219 | -\$141 | -\$7539 |
| TOTAL | -\$6,078 | -\$492 | -\$14,504 | -\$444 | -\$21,886 |
| LDP Impacts of 60% Cut Under Simulated Min. Conditions (in %) | | | | | |
| 2007/08 | -100 | - | -50.0 | -6.8 | -49.6 |
| 2008/09 | -69.2 | - | -100 | -10.2 | -73.6 |
| 2009/10 | -37.5 | - | -100 | -15.1 | -56.1 |
| 2010/11 | -24.3 | -100 | -100 | -15.0 | -53.4 |
| 2011/12 | -33.4 | -100 | -82.1 | -15.5 | -57.0 |
| TOTAL | -33.6 | -100 | -85.9 | -13.2 | -57.1 |

4.2.2 Impacts on Direct Payment (DP)

Direct Payment depends on target prices and direct payment rates. Given the historic levels of target prices and the direct payment rates, total DP receipts for the representative farm were estimated to be \$14,906 per year for each of the crop years 2002/03 – 2006/07 (Table 4.4). Since both of these rates are expected to stay constant, the annual DP receipts for the representative farm are expected to remain at the same level under different FAPRI baselines for 2007/08 – 2011/12. The DP receipts for the representative farm are expected to remain at the same level (\$14,906) for the 60 percent cut simulation for the years 2007/08 – 2011/12.

Table 4.4 DP Receipts for Representative Farm: Historical Levels¹

| Year | Spring | | | | Total |
|---|-----------------|-----------------|-----------------|----------------|-----------------|
| | Corn | Wheat | Soybean | Sunflower | |
| DP Based on Historical Price and Yield Levels | | | | | |
| 2002/03 | \$5,236 | \$2,652 | \$6,732 | \$286 | \$14,906 |
| 2003/04 | \$5,236 | \$2,652 | \$6,732 | \$286 | \$14,906 |
| 2004/05 | \$5,236 | \$2,652 | \$6,732 | \$286 | \$14,906 |
| 2005/06 | \$5,236 | \$2,652 | \$6,732 | \$286 | \$14,906 |
| 2006/07 | \$5,236 | \$2,652 | \$6,732 | \$286 | \$14,906 |
| TOTAL | \$26,180 | \$13,260 | \$33,660 | \$1,430 | \$74,530 |

¹ DP levels for representative farm under FAPRI baseline conditions as well as under the 60% cuts in domestic farm support was the same as under the historical price and yield conditions.

4.2.3 Impacts on Counter-cyclical Payment (CCP)

Counter-cyclical payment receipts to the representative farm based on historical price and yield levels varied from 0 to \$18,360 per year amounting to a total of \$46,053 for the five-year period 2002/03 to 2006/07 (Table 4.5). In order to gauge the impact of the 60 percent cut in domestic farm support programs, first the CCP receipts to the representative farm were estimated under three alternative FAPRI baseline conditions, namely the average price and yield conditions, the maximum price and yield conditions, and the minimum price and yield conditions for years 2007/08 – 2011/12. It was estimated that under the FAPRI baseline for average price and yield conditions as well as for maximum price and yield conditions, the representative farm is not expected to receive any CCP receipts (Appendix Table E-1.2¹⁶). Accordingly, a 60 percent cut in domestic farm programs is not going to have any impact on the representative farm's CCP receipts during the period 2007/08 – 2011/12.

Under the FAPRI baseline for minimum price and yield conditions, per year CCP receipts for the representative farm are estimated to range from \$35,502 in 2007/08 to \$60,138 in 2011/12 (Table 4.5). A 60 percent cut in domestic farm programs under the minimum price and yield conditions is expected to significantly decrease the CCP receipts received by the representative farm. The yearly impact of a 60 percent cut in domestic farm support programs on CCP receipts to the representative farm is estimated to range from a decrease of \$3,337 (-8.2%) in 2008/09 to a decrease of \$14,010 (-23.3%)

¹⁶ Net farm income levels for the representative farm under the FAPRI baseline with minimum price and yield conditions can be found in the Appendix Tables E-2.1.7 to E-2.3.11 which is located on the disk at the back cover of this thesis.

in 2011/12 (Table 4.5). Over the course of the five-year period, the CCP receipts that would be received by the representative farm for soybeans, corn, and spring wheat are expected to decrease by \$24,683 (-34.8%), \$8,720 (-6.3%), and \$6,884 (-25.2%), respectively (Table 4.5).

Over the five-year period, under the minimum price and yield conditions, a 60 percent cut in domestic farm support programs is expected to decrease the total CCP receipts for the representative farm by 40,678 (-16.8%).

The decrease in LDP and CCP receipts in this study confirms the conclusions previously reported by Koo, et al., (2004, 2005 and 2006), Taylor, et al., (2005), Brink (2005) and AcMoody, et al., (2006). The main difference is that there were no LDP and CCP receipts predicted for the years 2007-2011 in this study, where as the previously reported studies did predict some LDP and CCP receipts in some of the years. The increase in crop prices in 2007/08 has rendered the loan rates, target prices and direct payment rates far too low to generate any LDPs and CCPs.

The results of this study indicates that, the proposed reduction in the domestic farm program payments under the WTO proposal would not have any impact as long as the commodity prices (corn, soybeans and wheat, in particular) stay high and the loan rates, target prices and direct payment rates are not increase.

Table 4.5 CCP Payments for Representative Farm: Historical, FAPRI Baseline and 60 Percent Cut in Domestic Farm Support

| Year | Corn | Spring Wheat | Soybean | Sunflower | Total |
|--|------------------|-------------------------|------------------|------------------|------------------|
| CCP Based on Historical Price and Yield Levels | | | | | |
| 2002/03 | \$6,885 | 0 | \$612 | 0 | \$7,497 |
| 2003/04 | \$1,836 | 0 | 0 | 0 | \$1,836 |
| 2004/05 | \$18,360 | 0 | 0 | 0 | \$18,360 |
| 2005/06 | \$18,360 | 0 | 0 | 0 | \$18,360 |
| 2006/07 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | \$45,441 | 0 | \$612 | 0 | \$46,053 |
| ... CCP Based on FAPRI Baseline Min. Conditions (No Cuts) ... | | | | | |
| 2007/08 | \$19,278 | \$3,740 | \$11,832 | \$652 | \$35,502 |
| 2008/09 | \$24,327 | \$4,845 | \$10,812 | \$854 | \$40,838 |
| 2009/10 | \$29,376 | \$5,525 | \$11,016 | \$874 | \$46,791 |
| 2010/11 | \$35,343 | \$6,205 | \$16,320 | \$1,158 | \$59,026 |
| 2011/12 | \$30,753 | \$6,970 | \$21,012 | \$1,403 | \$60,138 |
| TOTAL | \$139,077 | \$27,285 | \$70,992 | \$4,941 | \$242,295 |
| .. CCP Impacts of 60% Cut Under Simulated Min. Conditions (in \$) .. | | | | | |
| 2007/08 | -\$1,836 | -\$425 | -\$1,632 | -\$28 | -\$3,921 |
| 2008/09 | \$918 | -\$935 | -\$3,264 | -\$56 | -\$3,337 |
| 2009/10 | -\$1,836 | -\$1,360 | -\$4,896 | -\$56 | -\$8,148 |
| 2010/11 | -\$2,754 | -\$1,870 | -\$6,528 | -\$111 | -\$11,263 |
| 2011/12 | -\$3,213 | -\$2,295 | -\$8,364 | -\$138 | -\$14,010 |
| TOTAL | -\$8,720 | -\$6,884 | -\$24,683 | -\$388 | -\$40,678 |
| .. CCP Impacts of 60% Cut Under Simulated Min. Conditions (in %) .. | | | | | |
| 2007/08 | -9.5 | -12.8 | -13.8 | -4.3 | -11.0 |
| 2008/09 | -3.8 | -23.9 | -30.2 | -6.6 | -8.2 |
| 2009/10 | -6.3 | -32.7 | -44.4 | -6.4 | -17.0 |
| 2010/11 | -7.8 | -43.1 | -40.0 | -9.6 | -19.0 |
| 2011/12 | -10.5 | -49.1 | -39.8 | -9.8 | -23.3 |
| TOTAL | -6.3 | -25.2 | -34.8 | -6.8 | -16.8 |

4.2.4 Impacts of the Domestic Farm Support Cut on Net Farm Income

Financial impacts of the proposed 60 percent cut in the domestic farm support programs on the representative South Dakota farm under minimum price and yield conditions were analyzed for alternative farm ownership arrangements and debt levels. Specifically the impacts of these cuts on operator owned farm (60 percent owned cropland with the balance cropland either cash rented or share rented) and leased farm (40 percent cropland owned with the balance cropland either cash rented or share rented) in combination with three different levels of debt-to-asset ratios (5 percent, 25 percent and 45 percent) were investigated.

Under the FAPRI baseline with minimum price and yield conditions, the representative farms are projected to have a negative net farm income even before any cuts in the farm programs (Tables 4.6 and 4.7). On the operator owned farm with 40 percent cropland cash rented and a 25 percent debt, the additional net farm loss due to the 60 percent cut in domestic farm programs varied from \$5,578 in 2007/08 to \$21,549 in 2011/12 with a total of \$62,564 over the five-year period (Table 4.6). The impact was relatively low during the first two years of the simulation (2007/08 and 2008/09) but then increased overtime with the largest impact in the last year of the simulation (2011/12). The impact was similar to when the 40 percent of the cropland of the owner operator farm was share rented rather than cash rented (Table 4.6).

Regardless of the level of debt, the dollar impact of the cuts over the five-year period was the same (-\$62,564) for the operator owned farms. Since the operator owned farms with higher debt levels had higher levels of net farm losses before applying any

cuts under the minimum conditions, the relative impact of the dollar loss due to these cuts was lower on the farms with higher debt levels (Table 4.6).

On the leased farm with 40 percent cropland cash rented and a 25 percent debt level, the additional net farm loss due to the 60 percent cut in domestic farm programs also varied from \$5,578 in 2007/08 to \$21,549 in 2011/12 with a total of \$62,564 over the five-year period (Table 4.7). As in case of the owner operated farm, the impact on the leased farm was also relatively low during the first two years of simulation (2007/08 and 2008/09) and increased overtime with the largest impact in the last year of simulation (2011/12). The impact was similar to when the 40 percent of the cropland of the leased farm was share rented rather than cash rented (Table 4.7). Regardless of the debt level, the dollar impact of the cuts over the five-year period was the same (-\$62,564) for the leased farms. Since the leased farms with higher debt levels had higher levels of net farm losses before applying any cuts under the minimum conditions, the relative impact of the dollar loss due to these cuts was lower on the farms with high debt levels (Table 4.7).

Table 4.6 Net Farm Income Impacts of 60% Cut in Domestic Farm Support on the Operator Owned Farm¹ Under Minimum Price and Yield Conditions.

| Year | Cash Rent Land 40%, Debt 5% | Cash Rent Land 40%, Debt 25% | Cash Rent Land 40%, Debt 45% | Share Rent Land 40%, Debt 5% | Share Rent Land 40%, Debt 25% | Share Rent Land 40%, Debt 45% |
|---|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|
| Net Farm Income Before the 60% Cut in Domestic Farm Support (\$).... | | | | | | |
| 2007/08 | -63,494 | -84,262 | -103,707 | -69,699 | -90,467 | -109,911 |
| 2008/09 | -78,159 | -100,622 | -121,587 | -79,488 | -101,950 | -122,916 |
| 2009/10 | -84,281 | -108,916 | -131,263 | -82,582 | -107,216 | -129,564 |
| 2010/11 | -78,643 | -106,790 | -132,946 | -74,560 | -102,706 | -128,862 |
| 2011/12 | -83,893 | -115,004 | -143,998 | -79,367 | -110,478 | -139,473 |
| TOTAL | -388,470 | -515,594 | -633,501 | -385,696 | -512,817 | -630,726 |
| Net Income Impact of 60% Cut in Domestic Farm Programs (\$) | | | | | | |
| 2007/08 | -5,578 | -5,578 | -5,578 | -5,578 | -5,578 | -5,578 |
| 2008/09 | -6,642 | -6,642 | -6,642 | -6,642 | -6,642 | -6,642 |
| 2009/10 | -11,322 | -11,322 | -11,322 | -11,322 | -11,322 | -11,322 |
| 2010/11 | -17,473 | -17,473 | -17,473 | -17,473 | -17,473 | -17,473 |
| 2011/12 | -21,549 | -21,549 | -21,549 | -21,549 | -21,549 | -21,549 |
| TOTAL | -62,564 | -62,564 | -62,564 | -62,564 | -62,564 | -62,564 |
| Net Income Impact of 60% Cut in Domestic Farm Programs (in %) | | | | | | |
| 2007/08 | -8.8 | -6.6 | -5.4 | -8 | -6.2 | -5.1 |
| 2008/09 | -8.5 | -6.6 | -5.5 | -8.4 | -6.5 | -5.4 |
| 2009/10 | -13.4 | -10.4 | -8.6 | -13.7 | -10.6 | -8.7 |
| 2010/11 | -22.2 | -16.4 | -13.1 | -23.4 | -17 | -13.6 |
| 2011/12 | -25.7 | -18.7 | -15 | -27.2 | -19.5 | -15.5 |
| TOTAL | -16.1 | -12.1 | -9.9 | -16.2 | -12.2 | -9.9 |

Table 4.7 Net Farm Income Impacts of 60% Cut in Domestic Farm Support on Leased Farm¹ Under Minimum Price and Yield Conditions.

| Year | Cash Rent | Cash Rent | Cash Rent | Share Rent | Share Rent | Share Rent |
|--|----------------------|-----------------------|-----------------------|----------------------|-----------------------|-----------------------|
| | Land 60%, Debt 5% | Land 60%, Debt 25% | Land 60%, Debt 45% | Land 60%, Debt 5% | Land 60%, Debt 25% | Land 60%, Debt 45% |
| Net Farm Income Before the 60% Cut in Domestic Farm Support (\$)..... | | | | | | |
| 2007/08 | -71,915 | -86,046 | -100,016 | -78,119 | -92,250 | -106,221 |
| 2008/09 | -87,003 | -102,125 | -116,892 | -88,332 | -103,453 | -118,220 |
| 2009/10 | -93,119 | -109,561 | -125,869 | -91,420 | -107,861 | -124,170 |
| 2010/11 | -87,776 | -106,804 | -126,325 | -83,692 | -102,721 | -122,242 |
| 2011/12 | -93,783 | -114,418 | -134,419 | -89,257 | -109,892 | -129,893 |
| TOTAL | -433,596 | -518,954 | -603,521 | -430,820 | -516,177 | -600,746 |
| Net Income Impact of 60% Cut in Domestic Farm Programs (\$) | | | | | | |
| 2007/08 | -5,578 | -5,578 | -5,578 | -5,578 | -5,578 | -5,578 |
| 2008/09 | -6,642 | -6,642 | -6,642 | -6,642 | -6,642 | -6,642 |
| 2009/10 | -11,322 | -11,322 | -11,322 | -11,322 | -11,322 | -11,322 |
| 2010/11 | -17,473 | -17,473 | -17,473 | -17,473 | -17,473 | -17,473 |
| 2011/12 | -21,549 | -21,549 | -21,549 | -21,549 | -21,549 | -21,549 |
| TOTAL | -62,564 | -62,564 | -62,564 | -62,564 | -62,564 | -62,564 |
| Net Income Impact of 60% Cut in Domestic Farm Programs (in %) | | | | | | |
| 2007/08 | -7.8 | -6.5 | -5.6 | -7.1 | -6 | -5.3 |
| 2008/09 | -7.6 | -6.5 | -5.7 | -7.5 | -6.4 | -5.6 |
| 2009/10 | -12.2 | -10.3 | -9 | -12.4 | -10.5 | -9.1 |
| 2010/11 | -19.9 | -16.4 | -13.8 | -20.9 | -17 | -14.3 |
| 2011/12 | -23 | -18.8 | -16 | -24.1 | -19.6 | -16.6 |
| TOTAL | -14.4 | -12.1 | -10.4 | -14.4 | -12.1 | -10.4 |

¹ The Farm with 40 percent of the cropland owned and the balance of 60 percent cash or share rented.

4.2 Impacts of the USDA Counter-cyclical Revenue Payment Program

The USDA proposed a revenue-based Counter-cyclical Revenue (CCR) program to replace the current price-based Counter-cyclical Payment (CCP) program for program crops. The proposed CCR will compensate producers when price and/or yield are low and when the National Average Revenue (NAR) for a crop falls short of its National Target Revenue (NTR). The overall objective of this new program is to better stabilize farm income for producers of all program crops.

Calculations for the years 2007-2011 resulted in a higher National Average Revenue (NAR) and a lower National Target Revenue (NTR) for all program crops on the representative farm. Because CCR payments are triggered when the NAR is lower than the NTR, the CCR payments for the representative farm for the years (2007-2011) were zero. In other words, it was estimated that no CCR payments would accrue to the representative farm for years 2007-2011 as the simulated prices for the program crops during this period were high. Under these circumstances, comparing the simulated CCR payments accrued to the representative farm for the years 2007/08 through 2011/12 with the simulated CCP receipts for the same period does not serve any purpose.

Accordingly, it was decided that it would be better to compute and compare estimates of the CCR and the CCP receipts to the representative farm for the years 2002/03 through 2006/07 based on the actual historical South Dakota price and the Spink County yield data. This essentially provides the impact of replacing the CCP with the CCR on the representative farm for years 2003/04 through 2006/07 assuming that the change was in effect in those years.

4.3.1 Impacts of Counter-cyclical Revenue Program

Based on the historical prices and yield conditions, the CCP receipts to the representative farm varied from \$0 in 2006/07 to \$18,360 in each of the years 2006/07 and 2007/08, with a total of \$46,053 for the five-year period. If the CCR program had been in place, the CCR receipts to the representative farm would have varied from \$0 in 2004/05 to \$57,808 in the year 2002/03, with a total of \$105,715 for the five-year period (Table 4.8). During this period, almost all the receipts from the CCP was received by the corn producers, while about 71 percent of the CCR payments would have been channeled to corn, 25 percent to soybean and the remaining 4 percent to spring wheat.

The net farm income for both the operator owned and leased representative farms with medium level of debt (25%) were high in the years 2004/05 and 2005/06 (Table 4.9). The CCP receipts received by the representative farm are estimated to be the highest (\$18,360 per year) in these two years. The CCR payments to the representative farm are estimated to be the lowest (\$0) for year 2004/05 and the 3rd lowest (\$14,352) for year 2005/06 (Table 4.8).

The net farm incomes, for both the operator owned and leased representative farms with medium debt levels, were low in the years 2002/03 and 2006/07 (Table 4.9). The CCP receipts received by the representative farm are estimated to be the lowest (\$0) for year 2006/07 and the 3rd lowest (\$7,497) for year 2003/04. Hence, the receipts under the CCP program are high when the farm revenue from the market is high. On the other hand, the CCR receipts by the representative farm are estimated to be highest (\$57,808) for year 2002/03 and the 2nd highest (\$22,696) for year 2006/07 (Table 4.8).

Accordingly, the receipts were higher under the CCR program in the years when the net farm incomes were low as envisioned by the proponents of the CCR program.

According to this analysis, the CCR program would have provided the needed cushion at the time of the revenue “crunch.” It is quite clear that a revenue-based program can provide a better safety net. Farmers in Spink County and South Dakota in general, would have received more payments under the CCR program, as presently proposed by the USDA compared to the CCP program. The findings of this study are in contrast to some of the results reported by Richardson and Outlaw (2007). Based on the analysis of the CCR and the CCP payments for the period from 2008 to 2016 for the US using nine eligible crops, Richardson and Outlaw (2007) concluded that the CCR payments would average \$7.345 billion while the total CCP payments would average \$8.806 billion. Their conclusion was, the proposed CCR would provide a \$1.46 billion budget savings over the nine-year period and by so doing, US farmers are likely to receive lower payments under the CCR. Richardson and Outlaw also observed that the proposed CCR would provide a better safety net for total revenue which is consistent with the results of this study.

Table 4.8 CCP and CCR Payments to the Representative Farm

| Year | Corn | Spring Wheat | Soybean | Sunflower | Total |
|--|---------------|-------------------------|----------------|------------------|----------------|
| CCP Based on Historical Price and Yield levels | | | | | |
| 2002/03 | 6,885 | 0 | 612 | 0 | 7,497 |
| 2003/04 | 1,836 | 0 | 0 | 0 | 1,836 |
| 2004/05 | 18,360 | 0 | 0 | 0 | 18,360 |
| 2005/06 | 18,360 | 0 | 0 | 0 | 18,360 |
| 2006/07 | 0 | 0 | 0 | 0 | 0 |
| Total | 45,441 | 0 | 612 | 0 | 46,053 |
| National Target Revenue (NTR, \$/Acre) | | | | | |
| 2002/03 | 269 | 128 | 194 | 119 | - |
| 2003/04 | 269 | 128 | 188 | 124 | - |
| 2004/05 | 271 | 154 | 175 | 140 | - |
| 2005/06 | 288 | 173 | 170 | 155 | - |
| 2006/07 | 276 | 178 | 168 | 155 | - |
| National Average Revenue (NAR, \$/Acre)..... | | | | | |
| 2002/03 | 180 | 100 | 149 | 167 | - |
| 2003/04 | 245 | 198 | 183 | 200 | - |
| 2004/05 | 277 | 227 | 194 | 230 | - |
| 2005/06 | 246 | 192 | 181 | 217 | - |
| 2006/07 | 212 | 178 | 166 | 184 | - |
| CCR Payments (in \$) | | | | | |
| 2002/03 | 30,361 | 4,686 | 22,762 | 0 | 57,808 |
| 2003/04 | 8,346 | 0 | 2,513 | 0 | 10,858 |
| 2004/05 | 0 | 0 | 0 | 0 | 0 |
| 2005/06 | 14,353 | 0 | 0 | 0 | 14,353 |
| 2006/07 | 21,663 | 0 | 1,033 | 0 | 22,696 |
| Total | 74,723 | 4,686 | 26,308 | 0 | 105,715 |

Table 4.9 Estimates of Net Farm Income Accrued to the Representative Farm in South Dakota Based on Historic Price and Yield Data from 2002/03 to 2006/07

| Year | Net Farm Income for Operator Owned Farm ¹ with Cash Rent | Net Farm Income for Operator Owned Farm ² with Share Rent | Net Farm Income for Leased Farm ³ with Cash Rent | Net Farm Income for Leased Farm ⁴ with Share Rent |
|----------------------|---|--|---|--|
| (in, \$) | | | | |
| 2002/03 | 54,736 | 9,782 | 47,231 | 2,277 |
| 2003/04 | 111,694 | 42,886 | 105,415 | 36,607 |
| 2004/05 | 171,341 | 94,676 | 165,461 | 88,796 |
| 2005/06 | 131,835 | 66,449 | 126,501 | 61,115 |
| 2006/07 | 44,341 | -12,604 | 41,233 | -15,711 |
| Total | 513,947 | 201,189 | 485,841 | 173,084 |

¹Farm with 60% of the cropland operator owned, 40% of the cropland cash rented, and debt/assets ratio 25%.

²Farm with 60% of the cropland operator owned, 40% of the cropland share rented, and debt/assets ratio 25%.

³Farm with 40% of the cropland operator owned, 60% of the cropland cash rented, and debt/assets ratio 25%.

⁴Farm with 40% of the cropland operator owned, 60% of the cropland share rented, and debt/assets ratio 25%.

4.3.2 Impacts of Replacing the CCP with the CCR on Net Farm Income

The absolute net income impact of replacing the CCP with the CCR, on the owner operated farm with 40 percent cropland cash rented and 25 percent debt level varied from a loss of \$18,362 in 2004/05 to a gain of \$50,311 in 2002/03, with a gain of about \$60,000 over the five-year period (Table 4.10). The absolute net income impacts of replacing the CCP with the CCR did not vary much with the ownership of cropland or the level of the debt.

The net farm income with the CCP varied with the cropland ownership, cash or share rental of the balance cropland, and the level of debt. Accordingly, the relative

impact of replacing the CCP with the CCR on the net farm income on the owner operated representative farms also varied with these factors. In the case of operator owned farm with 40 percent cropland cash rented and a debt level of 25 percent, the gain of \$59,663 amounted to a 11.6 percent increase in the net farm income during the five-year period (Table 4.10). Because of the lower income level in the case of the operator owned farm with 40 percent cropland share rented and 25 percent debt level, the gain of \$59,657 amounted to a 29.7 percent increase in the farm income during the five-year period (Table 4.10). Keeping the other factors constant, the higher debt levels were associated with lower income levels and therefore the larger relative net farm income impact of replacing the CCP with the CCR (Table 4.10).

In the case of the leased farm with 60 percent cropland cash rented and 25 percent debt level, the gain of \$59,656 also amounted to 12.3 percent increase in the net farm income during the five-year period (Table 4.11). Because of the lower income level in case of the leased farm with 60 percent share rented cropland and 25 percent debt level, a gain of \$59,657 amounted to a 34.5 percent increase in the net income during the five-year period (Table 4.11). The higher debt levels on the leased farms were also associated with the lower income levels and therefore larger relative net income impacts of replacing the CCP with the CCR during the period of analysis (Table 4.11).

Table 4.10 Impacts of Replacing the CCP with the CCR Payments on Net Farm Income for the Operator Owned Farm¹

| Year | Cash Rent Land 40%, Debt 5% | Cash Rent Land 40%, Debt 25% | Cash Rent Land 40%, Debt 45% | Share Rent Land 40%, Debt 5% | Share Rent Land 40%, Debt 25% | Share Rent Land 40%, Debt 45% |
|--------------|---|------------------------------------|------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|
| | Net Income with CCP (in \$) | | | | | |
| 2002/03 | 63,047 | 54,736 | 45,652 | 18,093 | 9,782 | 698 |
| 2003/04 | 121,696 | 111,694 | 101,076 | 52,888 | 42,886 | 32,269 |
| 2004/05 | 182,784 | 171,341 | 159,529 | 106,118 | 94,676 | 82,864 |
| 2005/06 | 145,789 | 131,835 | 117,551 | 80,403 | 66,449 | 52,165 |
| 2006/07 | 62,494 | 44,341 | 26,590 | 5,550 | -12,604 | -30,354 |
| TOTAL | 575,810 | 513,947 | 450,398 | 263,052 | 201,189 | 137,642 |
| | Net Income Impact of Replacing CCP with CCR (in \$) | | | | | |
| 2002/03 | 50,309 | 50,311 | 50,310 | 50,311 | 50,309 | 50,311 |
| 2003/04 | 9,022 | 9,022 | 9,021 | 9,020 | 9,022 | 9,022 |
| 2004/05 | -18,360 | -18,362 | -18,360 | -18,358 | -18,360 | -18,360 |
| 2005/06 | -4,005 | -4,005 | -4,007 | -4,006 | -4,005 | -4,007 |
| 2006/07 | 22,695 | 22,697 | 22,694 | 22,696 | 22,695 | 22,696 |
| TOTAL | 59,657 | 59,663 | 59,658 | 59,657 | 59,657 | 59,662 |
| | ... Net Income Impact of Replacing CCP with CCR (in %) ... | | | | | |
| 2002/03 | 80 | 92 | 110 | 278 | 514 | 7208 |
| 2003/04 | 7 | 8 | 9 | 17 | 21 | 28 |
| 2004/05 | -10 | -11 | -12 | -17 | -19 | -22 |
| 2005/06 | -3 | -3 | -3 | -5 | -6 | -8 |
| 2006/07 | 36 | 51 | 85 | 409 | -180 | -75 |
| TOTAL | 10.4 | 11.6 | 13.2 | 22.7 | 29.7 | 43.3 |

¹ 60 percent owned and 40 percent cash or share rented cropland.

Table 4.11 Impacts of Replacing the CCP with the CCR Payments on Net Farm Income for the Leased Farm¹

| Year | Cash Rent Land 60%, Debt 5% | Cash Rent Land 60%, Debt 25% | Cash Rent Land 60%, Debt 45% | Share Rent Land 60%, Debt 5% | Share Rent Land 60%, Debt 25% | Share Rent Land 60%, Debt 45% |
|--------------|---|------------------------------------|------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|
| | Net Income with CCP (in \$) | | | | | |
| 2002/03 | 54,455 | 47,231 | 39,961 | 8,320 | 2,277 | -4,993 |
| 2003/04 | 113,727 | 105,415 | 97,041 | 43,805 | 36,607 | 28,233 |
| 2004/05 | 174,670 | 165,461 | 156,203 | 97,046 | 88,796 | 79,537 |
| 2005/06 | 137,295 | 126,501 | 115,589 | 70,855 | 61,115 | 50,202 |
| 2006/07 | 53,989 | 41,233 | 28,277 | -3,541 | -15,711 | -28,667 |
| TOTAL | 534,136 | 485,841 | 437,071 | 216,485 | 173,084 | 124,312 |
| | ... Net Income Impact of Replacing CCP with CCR (in \$) ... | | | | | |
| 2002/03 | 50,309 | 50,312 | 50,311 | 50,310 | 50,311 | 50,309 |
| 2003/04 | 9,021 | 9,020 | 9,022 | 9,021 | 9,020 | 9,022 |
| 2004/05 | -18,361 | -18,358 | -18,362 | -18,360 | -18,358 | -18,360 |
| 2005/06 | -4,008 | -4,006 | -4,005 | -4,007 | -4,006 | -4,005 |
| 2006/07 | 22,695 | 22,694 | 22,697 | 22,694 | 22,696 | 22,695 |
| TOTAL | 59,656 | 59,656 | 59,663 | 59,658 | 59,657 | 59,657 |
| | ... Net Income Impact of Replacing CCP with CCR (in %) ... | | | | | |
| 2002/03 | 92 | 107 | 126 | 605 | 2210 | 1008 |
| 2003/04 | 8 | 9 | 9 | 21 | 25 | 32 |
| 2004/05 | -11 | -11 | -12 | -19 | -21 | -23 |
| 2005/06 | -3 | -3 | -3 | -6 | -7 | -8 |
| 2006/07 | 42 | 55 | 80 | 641 | 144 | 79 |
| TOTAL | 11.2 | 12.3 | 13.7 | 27.6 | 34.5 | 48.0 |

¹40 percent owned and 60 percent cash rented or share rented cropland.

4.4 Results of the Revenue Counter-cyclical Program

National Corn Growers Association (NCGA) also proposed a Revenue Counter-cyclical Program (RCCP) to replace the current price-based CCP and LDP for the 2007 Farm Bill. The RCCP is slightly different from the USDA's CCR program. The proposed RCCP payments are tied to the county level crop revenue so that the payments are responsive to low prices as well as low yields. Under this program, payments are triggered whenever actual per acre county revenue for a program crop falls below the RCCP Trigger Revenue for the county.

During the simulation period (2007/08 through 2011/12), the RCCP payments accruing to the representative farm were estimated to be zero because of the increase in the program crop prices during the period. The CCP and LDP payments accruing to the representative farm were also estimated to be zero because of the high program crop prices during the period. Comparing the RCCP payments with the CCP and the LDP payments accruing to the representative farm during the simulation period (2007/08 through 2011/12) is meaningless since all of these payments were zero during the period. For this reason, the impact of replacing the CCP and the LDP programs with the proposed RCCP was analyzed for years 2002/03 through 2006/07 using the historical South Dakota prices and Spink County yield data for program crops. This essentially provides the impact of replacing the CCP and the LDP with the RCCP for the representative farm for years 2002/03 through 2006/07 assuming that the change was in effect in these years.

4.4.1 Impacts of Revenue Counter-cyclical Program (RCCP)

Based on historical prices and yield conditions, the CCP and the LDP receipts to the representative farm varied from \$2,102 in 2006/07 to \$49,250 in 2004/05, with a total of \$118,615 for the five-year period (Table 4.12). During the five-year period, corn, soybeans, and spring wheat accounted for 88.3 percent, 7.9 percent, and 3.2 percent of the total CCP and LDP receipts received by the representative farm, respectively. Based on the historical price and yield conditions, the RCCP receipts received by the representative farm are estimated to vary from \$0 in 2006/07 to \$35,322 in 2004/05, with a total of \$76,877 for the five-year period. During this period, the RCCP payments for corn accounted for 99.3% of the total RCCP payments to the representative farm (Table 4.12). Over the period of five-years, switching the CCP and the LDP with the RCCP, as proposed, would have reduced the representative farm receipts under these programs from \$118,615 to \$76,877 (a reduction of 35%). During this period, receipts accruing to the representative farm under these programs would have reduced from \$104,765 to \$76,373 for corn, from \$9,370 to \$504 for soybeans, and \$3,776 to \$0 for spring wheat (Table 4.12).

The main objective of the RCCP is to provide farm program payments to farmers in years when the farm revenue from the market place is low and provide much lower levels of payments in years when the farm revenue from the market place is high. As it was indicated earlier, the net farm income for both the operator owned and leased representative farms with medium debt level were high for the years 2004/05 and 2005/06 (Table 4.9). The CCP and the LDP receipts accruing to the representative farm

Table 4.12 CCP, LDP and RCCP Payments to the Representative Farm

| Year | Corn | Sp. Wheat | Soybean | Sunflower | Totals |
|---------------------------------|----------------|------------------|----------------|------------------|----------------|
| CCP and LDP (\$) | | | | | |
| 2002/03 | 13,306 | 0 | 612 | 0 | 13,918 |
| 2003/04 | 3,853 | 0 | 0 | 704 | 4,557 |
| 2004/05 | 39,020 | 3,776 | 6,454 | 0 | 49,250 |
| 2005/06 | 48,586 | 0 | 202 | 0 | 48,788 |
| 2006/07 | 0 | 0 | 2,102 | 0 | 2,102 |
| Total | 104,765 | 3,776 | 9,370 | 704 | 118,615 |
| RCCP Rate (\$/acre) | | | | | |
| 2002/03 | 12.4 | 0 | 0.8 | 0 | - |
| 2003/04 | 4.3 | 0 | 0 | 0 | - |
| 2004/05 | 75.2 | 0 | 0 | 0 | - |
| 2005/06 | 70.6 | 0 | 0 | 0 | - |
| 2006/07 | 0 | 0 | 0 | 0 | - |
| RCCP Payments (\$) | | | | | |
| 2002/03 | 5,844 | 0 | 504 | 0 | 6,348 |
| 2003/04 | 2,017 | 0 | 0 | 0 | 2,017 |
| 2004/05 | 35,322 | 0 | 0 | 0 | 35,322 |
| 2005/06 | 33,190 | 0 | 0 | 0 | 33,190 |
| 2006/07 | 0 | 0 | 0 | 0 | 0 |
| Total | 76,373 | 0 | 504 | 0 | 76,877 |

are estimated to be the two highest amounts (\$49,250 for 2004/05, and \$48,788 for 2005/06) for the five-year period (Table 4.12). The RCCP payments accruing to the representative farm are also highest (\$35,322 for 2004/05, and \$33,190 for 2005/06) for these years (Table 4.12). During the five-year period, the net farm income for both the operator owned and leased representative farms were lowest for the year 2006/07. The RCCP receipts accruing to the representative farm were also estimated to be the lowest (\$0) for 2006/07 (Table 4.12).

The RCCP is an innovative program as it is tied to the local revenue base. In this analysis, the RCCP payments were based on the South Dakota prices and Spink County yield levels. Switching the CCP and the LDP with the RCCP, as proposed by the NCGA, did reduce some payments in years of high net farm income (2004/05 and 2005/06) but did not increase payments during the years of low net farm income (2002/03 and 2006/07). Accordingly, replacing the CCP and the LDP with the RCCP, resulted in reduced support levels for corn and soybeans, and eliminated support for spring wheat and sunflower during the five-year period. In general, the RCCP provided lower level of total support during the period. Accordingly, the RCCP failed to provide a better safety net. These findings are in contrast with Swanson, et al., (2007) in an analysis of the Base Revenue Projection Program (BRP) and the RCCP for the crops (soybean, corn and wheat) for North Dakota for the years 2002-2005 and projections for 2006-2010. Swanson, et al., (2007) concluded that a combined impact of the BRP-RCCP would increase payments to soybean and corn farmers in North Dakota.

4.4.2 Impacts of Replacing the CCP and the LDP with the RCCP on Net Farm Income

The absolute net income impact of replacing the CCP and the LDP with the RCCP, on the owner operated representative farm with 40 percent cropland cash rented and 25 percent debt level varied from -\$2,101 in 2006/07 to -\$15,599 in 2005/06, with a total of -\$41,740 over the five-year period (Tables 4.13). The absolute net income impacts of replacing the CCP and the LDP with the RCCP did not vary much with the ownership of cropland or the debt level (Table 4.13).

The net farm income with the CCP and the LDP varied with the cropland ownership, cash or share rental of the balance cropland, and the level of debt. Accordingly, the relative impact of replacing the CCP and the LDP with the CCR on the net farm income of owner operated representative farms also varied with these factors. In the case of the operator owned farm with 60 percent cropland cash rented and a debt level of 25 percent, a decrease of \$41,740 amounted to 8.1 percent decrease in the net farm income during the five-year period (Table 4.13). Because of the lower income level in the case of the operator owned farm with 60 percent cropland share rented and 25 percent debt level, the loss of about \$41,739 amounted to a 20.7 percent decrease in the farm income during the five-year period (Table 4.13). Keeping the other factors constant, the higher debt levels were associated with lower income levels and therefore the larger relative net farm income decreased due to replacing the CCP and the LDP with the RCCP (Table 4.13).

The absolute net income impact of replacing the CCP and the LDP with the RCCP, on the leased representative farm with 60 percent cropland cash rented and 25 percent debt level varied from -\$2,100 in 2006/07 to -\$15,597 in 2005/06, with a total of -\$41,734 over the five-year period (Table 4.14). The absolute net income impact of replacing the CCP and the LDP with the RCCP did not vary much with the ownership of the cropland or the level of debt.

The net farm income with the CCP and the LDP varied with the ownership of cropland and the level of debt. Accordingly, the relative impact of replacing the CCP and the LDP with the CCR on the net farm income also varied with these factors. In the case

of the leased farm with 60 percent cropland cash rented and 25 percent debt level, a drop of income by \$41,734 amounted to 8.6 percent decrease in the net farm income during the five-year period (Table 4.14). Because of the lower income level in the case of the leased farm with 60 percent share rented cropland and 25 percent debt level, a loss of \$41,737 amounted to a 24.1 percent decrease in the net income during the five-year period (Table 4.14). The higher debt levels on the leased farms were also associated with the lower income levels and therefore larger relative net income impacts of replacing the CCP and the LDP with the RCCP during the period of analysis (Table 4.14).

Table 4.13 Impacts of Replacing the CCP and the LDP with the RCCP on Net Farm Income for the Operator Owned Farm¹

| Year | Cash Rent Land 60%, Debt 5% | Cash Rent Land 60%, Debt 25% | Cash Rent Land 60%, Debt 45% | Share Rent Land 60%, Debt 5% | Share Rent Land 60%, Debt 25% | Share Rent Land 60%, Debt 45% |
|--|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|
| Net Income with CCP & LDP (in \$) | | | | | | |
| 2002/03 | 63,047 | 54,736 | 45,652 | 18,093 | 9,782 | 698 |
| 2003/04 | 121,696 | 111,694 | 101,076 | 52,888 | 42,886 | 32,269 |
| 2004/05 | 182,784 | 171,341 | 159,529 | 106,118 | 94,676 | 82,864 |
| 2005/06 | 145,789 | 131,835 | 117,551 | 80,403 | 66,449 | 52,165 |
| 2006/07 | 62,494 | 44,341 | 26,590 | 5,550 | -12,604 | -30,354 |
| TOTAL | 575,810 | 513,947 | 450,398 | 263,052 | 201,189 | 137,642 |
| Net Income Impact of Replacing CCP & LDP with RCCP (in \$) | | | | | | |
| 2002/03 | -7,570 | -7,570 | -7,570 | -7,570 | -7,570 | -7,570 |
| 2003/04 | -2,540 | -2,541 | -2,540 | -2,540 | -2,541 | -2,541 |
| 2004/05 | -13,928 | -13,929 | -13,928 | -13,927 | -13,928 | -13,928 |
| 2005/06 | -15,597 | -15,599 | -15,598 | -15,597 | -15,598 | -15,599 |
| 2006/07 | -2,101 | -2,101 | -2,102 | -2,101 | -2,103 | -2,101 |
| TOTAL | -41,736 | -41,740 | -41,738 | -41,735 | -41,739 | -41,739 |
| Net Income Impact of Replacing CCP & LDP with RCCP (in %) ... | | | | | | |
| 2002/03 | -12 | -14 | -17 | -42 | -77 | -1085 |
| 2003/04 | -2 | -2 | -3 | -5 | -6 | -8 |
| 2004/05 | -8 | -8 | -9 | -13 | -15 | -17 |
| 2005/06 | -11 | -12 | -13 | -19 | -23 | -30 |
| 2006/07 | -3 | -5 | -8 | -38 | -17 | -7 |
| TOTAL | -7.2 | -8.1 | -9.3 | -15.9 | -20.7 | -30.3 |

¹ 60 percent owned and 40 percent cash or share rented cropland.

Table 4.14 Impacts of Replacing the CCP and the LDP with the RCCP on Net Farm Income for the Leased Farm¹

| Year | Cash Rent Land 60%, Debt 5% | Cash Rent Land 60%, Debt 25% | Cash Rent Land 60%, Debt 45% | Share Rent Land 60%, Debt 5% | Share Rent Land 60%, Debt 25% | Share Rent Land 60%, Debt 45% |
|--|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|
| Net Income with CCP & LDP (in \$) | | | | | | |
| 2002/03 | 54,455 | 47,231 | 39,961 | 8,320 | 2,277 | -4,993 |
| 2003/04 | 113,727 | 105,415 | 97,041 | 43,805 | 36,607 | 28,233 |
| 2004/05 | 174,670 | 165,461 | 156,203 | 97,046 | 88,796 | 79,537 |
| 2005/06 | 137,295 | 126,501 | 115,589 | 70,855 | 61,115 | 50,202 |
| 2006/07 | 53,989 | 41,233 | 28,277 | -3,541 | -15,711 | -28,667 |
| TOTAL | 534,136 | 485,841 | 437,071 | 216,485 | 173,084 | 124,312 |
| Net Income Impact of Replacing CCP & LDP with RCCP (in \$) | | | | | | |
| 2002/03 | -7,569 | -7,570 | -7,572 | -6,389 | -7,569 | -7,568 |
| 2003/04 | -2,540 | -2,541 | -2,541 | -1,427 | -2,539 | -2,541 |
| 2004/05 | -13,927 | -13,926 | -13,927 | -12,969 | -13,926 | -13,925 |
| 2005/06 | -15,598 | -15,597 | -15,599 | -14,544 | -15,599 | -15,596 |
| 2006/07 | -2,101 | -2,100 | -2,102 | -1,516 | -2,100 | -2,101 |
| TOTAL | -41,735 | -41,734 | -41,741 | -36,845 | -41,737 | -41,730 |
| Net Income Impact of Replacing CCP & LDP with RCCP (in %) ... | | | | | | |
| 2002/03 | -14 | -16 | -19 | -77 | -332 | -152 |
| 2003/04 | -2 | -2 | -3 | -3 | -7 | -9 |
| 2004/05 | -8 | -8 | -9 | -13 | -16 | -18 |
| 2005/06 | -11 | -12 | -13 | -21 | -26 | -31 |
| 2006/07 | -4 | -5 | -7 | -43 | -13 | -7 |
| TOTAL | -7.8 | -8.6 | -9.5 | -17 | -24.1 | -33.6 |

¹40 percent owned and 60 percent cash rented or share rented cropland.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Background and Justification

The US offered to cut most trade-distorting “Amber Box” programs by 60 percent in the October, 10, 2005, proposal. In order to implement this proposal, most plans call for cuts in LDP, DP, and CCP, along with cuts in dairy, water irrigation, and some other subsidies. There are also calls for changing the farm programs to alleviate the need for large Ad Hoc Emergency payments and for making the Amber Box farm support programs compliant with the WTO Green Box criteria and the July 2004 Agriculture Framework Agreement. In 2007, two such proposals have been advocated for the 2007 Farm Bill, one by the USDA and another one by the National Corn Growers Association.

Among other changes relating to the Amber Box programs, the USDA proposal calls for replacing the CCP with a Counter-cyclical Revenue (CCR) program. Under this proposal, the CCR payments would be triggered when actual national revenue for a crop falls below a set value in contrast with the CCP triggered by low prices (USDA, 2007). The National Corn Growers Association (NCGA) has proposed a Revenue Counter-cyclical Program (RCCP) to replace LDP and CCP in the 2007 Farm Bill. Under this proposal, the RCCP payments are triggered when the county level revenues fall below the set levels for the respective program crops (NCGA, 2007).

South Dakota's main crops are corn, soybeans, and wheat. The LDP, DP, and CCP have been important source of cash receipts in the form of subsidies for corn, soybean and wheat producers in South Dakota. During the period 2003-06, the average annual receipts from these programs in the state for corn, wheat, and soybeans amounted to \$221m, \$54m, and \$45m, respectively (Farm Subsidy Database, 2007). Any reduction in the expenditures on these programs or other changes in these programs will have implications on producers in South Dakota. Hence, the importance of an in-depth analysis of these cuts and program changes on a representative farm in South Dakota can't be overstated. This study evaluates the impacts of the proposed program changes on a representative farm in South Dakota. The timely nature of this research can help policy makers and South Dakota farmers in identifying the impacts of the proposed changes and profiles of the most impacted farm operations. The analysis can also help in designing measures to mitigate the impacts of the proposed changes.

5.2 Research Objectives and Research Methodology

Objectives of this study are to analyze the farm level impacts of:

- a) A 60 percent cut in domestic farm support programs (LDP, DP, and CCP) in South Dakota,
- b) Replacing Counter-cyclical Payments (CCP) with the Counter-cyclical Revenue (CCR) on South Dakota producers,
- c) Replacing the Counter-cyclical Payments (CCP) and Loan Deficiency Payments (LDPs) with the Revenue Counter-cyclical Program (RCCP) on South Dakota producers.

The representative farm in this study is modeled after Pattanaik (2005) farm in Northeast and North Central Regions of South Dakota with 2,050 acres of total land (50 acres of farmstead and wasteland, 400 acres of pasture, and 1,600 acres of cropland) and 80 cows. For this study Pattanaik's representative farm was modified to represent an average cash-grain farm in North Central South Dakota with 1,450 acres of total land (50 acres farmstead and 1400 acres cropland) with no livestock. The representative farm was assumed to be located in the Spink County in the North Central South Dakota. The cropland use was assumed to be roughly similar to the cropland use in the Spink County during years 2007/08-2010/11. The 50 acres farmstead was assumed to be owned by the operator and the cropland was assumed to be partly owned by the operator and partly cash leased or share leased.

A number of alternative scenarios with varying proportions of operator owned cropland in conjunction with land acquired under cash lease or share lease arrangements, and varying debt levels were developed. Financial impacts of the policy changes were analyzed under two forms of land ownerships, owner operated farm (60 percent owned cropland) and leased farm (40 percent owned cropland), two forms of the balance cropland leasing arrangements (cash rent leasing and share rent leasing), and three debt to asset ratios (5 percent, 25 percent and 45 percent).

Out of sample yields and prices for corn, spring wheat, soybeans, sunflower, and alfalfa hay were estimated using a stochastic simulation process. Multivariate empirical distributions for the stochastic components of these variables were constructed using the residuals from the respective estimated (deterministic) model. This simulation procedure

was run for 4,000 iterations in order to obtain projection ranges with a 95 percent confidence level for each of the years from 2007/08 through 2011/12. Under alternative scenarios, the projected price and yield levels along with cost information were entered in the representative farm model and the impacts of each policy change was analyzed.

5.3 Summary of Results and Conclusion

A 60 percent cut in domestic support programs in the US under WTO proposal can potentially impact payments under LDP, DP, and CCP. Major findings of a 60 percent cut in domestic US support programs on the representative farm in South Dakota are as follows:

- a) The increase in crop prices in 2007/08 has rendered the loan rates, target prices and direct payment rates far too low to generate any LDP and CCP payments under average yield and price conditions. Even before applying any cuts, no LDP or CCP payments are generated during the simulation period (for years 2007/08 through 2011/12) under average or maximum price and yield conditions. Accordingly, a 60 percent cut in domestic farm support programs in the US will not have any impact on farm income in South Dakota under the average or maximum price and yield conditions.
- b) A 60 percent reduction in domestic farm support programs in the US under the minimum price and yield conditions can result in a total loss of \$21,886 (57.1%) in LDP receipts, and a total loss of \$40,678 (16.8%) in CCP receipts to the representative farm over the five-year period. The decreases

in LDP and CCP receipts under minimum yield and price conditions confirm the conclusions previously reported by Koo, et al., (2004, 2005, and 2006), Taylor, et al., (2005), Brink (2005) and AcMoody, et al. (2006a).

- c) The loss of LDP receipts to the corn and soybean producers in the state during the period are estimated to be \$6,078 (33.6%) and \$14,504 (85.9%), respectively. The loss of CCP receipts to corn, soybean, and spring wheat producers in the state are estimated to be \$8,720 (6.3%), \$24,683 (34.8%), and \$6,884 (25.2%), respectively.
- d) Regardless of the land ownership or the debt level, the dollar impact of the combined loss of LDP and CCP receipts to the representative farm under the minimum yield and price conditions are \$62,564 over the five year period. Since farms with higher debt levels are projected to show higher levels of net farm loss under the minimum yield and prices conditions before applying any cuts, the relative impact of the dollar loss due to these cuts are lower on farms with high debt levels.

The USDA proposed a revenue-based CCR program to replace the current price-based CCP for program crops. The proposed CCR will compensate producers when price and/or yield are low and the National Average Revenue (NAR) for a program crop falls short of its National Target Revenue (NTR). The main impacts of replacing the CCP with the CCR program on the representative farm in South Dakota are as follows:

- a) It is estimated that no CCR payments would accrue to the representative farm for years 2007/08 through 2011/12 as the simulated prices for the

program crops during this period are expected to be relatively high.

Replacing the CCR for the CCP during the years 2002/03 through 2006/07 would have provided an additional income of \$60,000 to the representative farm over the five-year period. During the period, the receipts to the corn and soybean producers in the state would have increased from \$45,441 to \$74,723 and from \$612 to \$26,308, respectively.

- b) The CCR receipts would have been higher in years when the net farm incomes were low. Therefore, the CCR would have provided a better safety net.
- c) Absolute dollar impacts of replacing the CCP with the CCR does not change much with the proportion of operator owned cropland or level of the debt. Since the net farm income levels were inversely related to the proportion of the cropland owned by the operator and the debt levels, replacing the CCP with the CCR has larger relative impacts on farms with more leased or cash rented land and higher debt levels.

National Corn Growers Association proposed a RCCP program to replace the CCP, LDP for 2007 Farm Bill. Under the proposal, RCCP payments are triggered when actual per acre county revenue for a program crop falls below the RCCP trigger revenue for the county. Major impacts of replacing the CCP and the LDP with the RCCP program on the representative farm in South Dakota are as follows:

- a) It is estimated that no RCCP payments would accrue to the representative farm during the simulation period (2007/08 through 2011/12) as the prices

for program crops were high. Replacing the CCP and the LDP with the RCCP for the years 2002/03 through 2006/07 would have reduced the total receipts for the representative farm by 35 percent.

- b) In general, the RCCP would have provided lower level of total support and would have not provided a higher support in years with low farm income receipts. Therefore, RCCP would have failed to provide a better safety net.
- c) Replacing the CCP and the LDP with the RCCP would have resulted in reduced support levels for corn and soybeans, and eliminated support for spring wheat and sunflower during the five-year period but did not increase payments during the years of low net farm income (2002/03 and 2006/07). These findings are in contrast with findings of a related study by Swanson, et al., (2007) because, this analysis was done using only RCCP whilst Swanson, et al., (2007) used the BRP and the RCCP together as one program.
- d) Replacing the CCP and the LDP with the RCCP for the years 2002/03 through 2006/07 with the RCCP reduces the total receipts to the representative farm in South Dakota by about \$41,700. The absolute net income impact of replacing the CCP and the LDP with RCCP does not vary with the ownership of cropland or the level of debt. Since the net farm income is inversely related to the proportion of the cropland owned by the operator and the debt levels, replacing the CCP and the LDP with the RCCP

has larger relative impacts on farms with more leased or cash rented crop land and high debt levels.

5.4 Limitations

The representative farm is modeled to represent an average size grain farm (with no livestock) in northeastern and east central South Dakota. This is helpful in evaluating the impacts of the policy changes analyzed. However, as with any study analyzing policy changes, this study has its limitations. Some of the main limitations of the study are listed below:

- a) The farm size is limited to 1,450 acres with no livestock. The crop mix and the acres allocated to different crops are approximately similar to the average land use in Spink County.
- b) The crop mix and acres allocated to different crops are kept constant over the entire period of analysis.
- c) Out of sample prices and yields are estimated using a stochastic simulation process. Obviously, these projections are unable to account for unexpected large changes in prices and/or yields.
- d) The Spink County alfalfa yields data were not available for a number of years and were estimated using the relationship between the Spink County alfalfa yield and the South Dakota alfalfa yield.
- e) The impacts of the CCR and RCCP are analyzed as if these were implemented in 2002/03. Accordingly these analyses are based on the

historical prices and yield data for a period of five years (2002/03 through 2006/07).

While the results of this study seem reasonable for most grain farms in eastern South Dakota, a care must be taken in applying these results to exceptionally large farms, exceptionally small farms, and farms which are more responsive to relative commodity prices.

5.5 Recommendations for Future Studies

Many conclusions of this study are, in part, driven by relatively high commodity prices in conjunction with the low loan rates, target prices, and direct payment rates. Once the 2008 Farm Bill is passed, most likely, the loan rates, target prices, and direct payment rates and some other modalities of commodity programs may change. If and when these changes are announced, future studies should seek to update the study and determine the impacts under new direct payments rates, loans rates and CCP rates.

The analysis of replacing the CCP with the CCR, and replacing the CCP and the LDP is based on historical prices and yield data for a period of five years (2002/03 through 2006/07). Future studies should seek to evaluate the impacts of implementing CCR and RCCP program over a longer period.

5.6 Post Script on the New Farm Bill and Possible Implications on the Study Results

The New Farm Bill was enacted into law when the Senate and House of Representatives voted to override the President's veto marking its passage into law on the 27th of May, 2008 which marks its completion. Sixteen percent of the total expenditure of the Farm Bill is assigned to farm programs forming about \$46 billion.

The salient changes in the bill under the farm program payments are:

- (a) Direct payments would be increased and this is supposed to pay out \$5.5 billion over 10 years to farmers.
 - i. Direct payment rate for corn in the year 2007 is \$0.28 and this increases to \$0.30 in the years 2010-2012.
 - ii. Direct payment rate for soybean in the year 2007 is \$0.44 and this increases to \$0.47 in the years 2008-2009 and to \$0.50 in the years 2010-2012.
 - iii. Direct payments rate for wheat increased from \$0.52 in the year 2007 to \$0.56 in the year 2012.
 - iv. Finally the direct payments rate for Sunflower is \$0.8 in the year 2007 and increases to \$0.857 in the years 2010-2012.

The Total DP for the years 2007-2011 based on the increased direct payment rates for (Corn, Soybean, Wheat and Sunflower) are \$15,822, \$16,281, \$16,281, \$17,404 and

\$17,404 respectively representing an increase of \$916, \$1,375 and \$2,498 over the five year period.

(b) Increased direct payments would be provided to beginning farmers during their first 5 years of operation and by so doing it would invest \$250 million over 10 years in the next generation of production agriculture.

(c) The current price-based CCP is replaced by the optional revenue-based Average Crop Revenue Election (ACRE) program. This program is more responsive to actual conditions. For those producers who elect to participate in ACRE, participation continues until 2012. Producers give up 20 percent of their direct payments, or about \$5 an acre for corn and their loan rate would also drop by 30 percent.

(d) The current daily posted county prices (PCPs) used to determine LDP rates and repayments rates for Marketing Assistance Loans is replaced with monthly PCPs, and also the requirements for establishing a producer's LDP and loan repayment rate is to be based on the month that beneficial interest is lost.

The daily PCPs which is changed to monthly PCP will just average out the LDP rate instead of locking-in an LDP rate for a particular day and crop, and this in turn can either increase or decrease the LDP rates [corn (\$1.95), soybean (\$5), wheat (\$2.75), and sunflower oil (\$9.30)] and the LDP paid to farmers depending on the month it is locked-in. The LDP paid to farmers during the simulation period will depend on the month it is locked-in but this will not generally differ very much because of the higher commodity prices.

The increase in the DP will not change the final results of the study in terms of the CCR being a relatively better program than the current CCP and also the results of 60 percent cut in Farm Program Payments would not alter either. There will not be any CCP and LDP paid to farmers during the simulation period even though the direct payments are increased.

Overall, there would be a relative increase in the total farm income for the representative farm and hence a relative increase in the net farm income from \$916, \$1,375 and \$2,498 for the years 2008-2011 for the representative farm at all debt levels and hence the results of this study will not be altered very much.

REFERENCES

- AcMoody J., Balagtas V. J., and Gray A., (2006 a), "Farm Level Incidence of the US Farm Policy Proposal to the WTO." Paper Presented at the American Agricultural Economics Association Annual Meeting, Long Beach, CA. Available at <http://ageconsearch.umn.edu/bitstream/21260/1/sp06ac01.pdf> (accessed June 21, 2007).
- AcMoody, J. Balagtas, V. J., Gray, A. and Boehlje, M., (2006 b), "The 2007 Farm Bill: Farm-Level Financial Implications," Department of Agricultural Economics, Purdue University, Paper Presented at the Western Agricultural Economics Association Annual Meeting, Anchorage, Alaska. Available at http://agecon.uwyo.edu/waea/2006AssnMtg/Proceedings/acmoody_VA.pdf (accessed June 30, 2007).
- AFPC (2007), Comparison of the Counter-cyclical Payment Program to a Proposed Counter-cyclical Revenue Program," AFPC Briefing Paper 07-3, Agricultural & Food Policy Center, Texas A&M University. Available at <http://www.afpc.tamu.edu/pubs/3/467/bp-2007-03%20%20-%20CCP%20vs%20CCR.pdf> (accessed March 20, 2007).
- AFPC (2006), "Description of FLIPSIM: The Farm Level Income and Policy Simulation Model." Agricultural & Food Policy Center, Texas A&M University. Available at

<http://www.afpc.tamu.edu/models/flipsim/> (accessed Sept.15, 2006).

AFPC (2005), “Representative Farms Economic Outlook for the December 2005 FAPRI/AFPC Baseline,” AFPC Briefing Paper 05-6, Agricultural & Food Policy Center, Texas A&M University. Available at http://www.afpc.tamu.edu/pubs/index.php?content=altbrowse&alt_type=11 (accessed March 23, 2007).

AFPC (2005), “Farm Level Evaluation of the U.S. Doha Round Proposal on U.S. Representative Crop and Livestock Farms,” AFPC Briefing Paper 05-7, Agricultural & Food Policy Center, Texas A&M University. Available at <http://ageconsearch.umn.edu/bitstream/42104/2/bs-2005-07%20--%20WTO%20study%20.pdf> (accessed Feb. 10, 2007).

AFPC (1999), “The Impacts of Payment Limitations on Loan Deficiency Payments and Marketing Loan Gains,” AFPC Working Paper 99-10, Agricultural & Food Policy Center, Texas A&M University. Available at <http://www.afpc.tamu.edu/pubs/0/234/wp99-10.pdf> (accessed February 10, 2007).

Anderson, K., (2004), “Agricultural Reform and Poverty Reduction in Developing Countries,” World Bank Policy Research Working Paper #3396, The World Bank, Washington, DC. Available at <http://www.tcd.ie/iis/documents/discussion/pdfs/iisdp14.pdf> (accessed Sept. 8, 2006).

Anderson, K. and Martin, W., (2005), “Agricultural Trade Reform and the Doha Development Agenda,” Washington, DC, World Bank. Available at

http://www.wto-pakistan.org/documents/agriculture/World_Bank_-_Agricultural_Trade_Reform_and_the_Doha_Development_Agenda_2005.pdf

(accessed Sept 12, 2006).

ASAE (1999), Agricultural Machinery Management Data: D497.4 MAR99. American Society of Agricultural Engineers, 2950 Niles Rd., St. Joseph, MI 49085.

Balci, O. and Sargent, R. G., (1982a), "Validation of multivariate response simulation models by using Hotelling's two-sample T2 test," *Simulation* 39 (6): 185-192.

Available at <http://portal.acm.org/citation.cfm?id=809441> (accessed Aug. 22, 2007).

Balci, O. and Sargent, R. G., (1982b), "Some examples of simulation model validation using hypothesis testing," Proceedings of the 14th conference on Winter Simulation, December 06-08, 1982, San Diego, California. Available at

<http://www.informs-cs.org/wsc98papers/016.PDF> (accessed Aug. 22, 2007).

Balci, O. and Sargent, R. G., (1984b), "Validation of simulation models via simultaneous confidence intervals." *American Journal of Mathematical and Management Science* 4 (3): 375-406. Available at

<http://portal.acm.org/citation.cfm?id=1351570> (accessed Aug. 22, 2007).

Balci, O. and Sargent, R. G., (1984b), "Validation of simulation models via simultaneous confidence intervals." *American Journal of Mathematical and Management Science* 4 (3): 375-406. Available at

<http://portal.acm.org/citation.cfm?id=1351570> (accessed Aug. 22, 2007).

Beghin, J. C., and Hart, C. E., (2004), "Rethinking Agricultural Domestic Support under the World Trade Organization," Briefing Paper 04-BP 43, Center for Agricultural and Rural Development, Iowa State University. Available at

<http://www.card.iastate.edu/publications/DBS/PDFFiles/04bp43.pdf>

(accessed June 21, 2006).

- Beghin, J. C., Westhoff, P. C., Fabiosa, J. F., and Meyers, W. H., (2004), "Challenges in Modeling the Effects of Trade Agreements on the Agricultural Sector." *Working Paper 04-WP 358*, Center for Agricultural and Rural Development, Iowa State University. Available at <http://www.card.iastate.edu/publications/DBS/PDFFiles/04wp358.pdf> (accessed June 22, 2006).
- Blandford, D., (2005), "Disciplines on Domestic Support in the Doha Round," Trade Policy Issues Paper #1-2005, International Agricultural Trade Research Consortium (IATRC) & International Food & Agricultural Trade Policy Council. Available at <http://iatrcweb.org/publications/Trade.htm> (accessed June 22, 2006).
- Blandford, D., (2000), "Are Disciplines Required on Domestic Support?," Invited Paper Presented at the Canadian Agri-Food Trade Research Network Workshop, Agricultural Trade Liberalization: Can we make Progress?, Quebec City. Available at <http://ageconsearch.umn.edu/bitstream/23857/1/02010035.pdf> (accessed April 5, 2006).
- Braga, P.A. C., (2004), "Agricultural Negotiations: Recent Developments in the Doha Round," International Trade Department, Trade Note 19, The World Bank, Washington, DC. Available at <http://siteresources.worldbank.org/INTRANETTRADE/Resources/Pubs/TradeNote19.pdf> (accessed April 12, 2006).

- Brink, L., (2005), "WTO 2004 Agriculture Framework: Disciplines on Distorting Domestic Support," Working Paper #05-1, International Agricultural Trade Research Consortium (IATRC), ISSN 1098-9218. Available at <http://iatrcweb.org/publications/working.htm> (accessed Nov. 15, 2006).
- Brink, L., (2004a), "Assessing the 2002 Proposals of the United States, Canada and the Cairns Group for WTO Discipline on Domestic Support," Working Paper #04-1, IATRC. Available at <http://iatrcweb.org/publications/working.htm> (accessed Nov. 20, 2006).
- Brink, L., (2004b), "Assessing Domestic Support Provisions of the 2003 Draft Texts in WTO Agricultural Negotiations," Working Paper #04-2, IATRC. Available at <http://iatrcweb.org/publications/working.htm> (accessed Nov. 20, 2006).
- Brink, L., (2001), "Establishing Domestic Support Commitments Through a Harmonizing Formular," Working Paper #01-2, IATRC. Available at <http://iatrcweb.org/publications/working.htm> (accessed Oct. 3, 2006).
- Brink, L., (2000), "Domestic Support Issues in the Uruguay Round and Beyond," Economic and Policy Analysis Directorate, Agriculture and Agri-Food Canada, Publication 2021/E, Ottawa. Available at <http://dsp-psd.pwgsc.gc.ca/Collection/A22-199-1999E.pdf> (accessed Oct. 15, 2006).
- Cook, D. and de Gorter, H., (2005), "Domestic Support in Agriculture: The Struggle for meaningful Disciplines," Trade Note, International Trade Department, World Bank, Washington, DC. Available at

http://siteresources.worldbank.org/INTRANETTRADE/Resources/239054-1126812419270/7.DomesticSupport_updated_on12Dec05.pdf (accessed Dec. 20, 2006).

Crop Data, South Dakota Agricultural Statistics (1980-2006). Available at http://www.nass.usda.gov/Statistics_by_State/South_Dakota/index.asp (accessed April 17, 2006).

Council of the European Union, (2003), Brussels, Belgium. Available at http://consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/75136.pdf. (accessed July 20, 2006).

Devadoss, S. (2002), "Domestic Support and the WTO Negotiations from Developing Countries Perspective," A Paper Presented at Western Agricultural Economics Association Annual Meeting, Long Beach, California. Available at <http://ageconsearch.umn.edu/bitstream/36667/1/sp02de01.pdf> (accessed Dec. 13, 2006).

Diakosavvas, D., (2001), "The Uruguay Round Agreement on Agriculture: an Evaluation of Its Implementation in OECD Countries, Paris. Available at <http://www.oecd.org/dataoecd/50/55/1912374.pdf> (accessed Jan. 15, 2006).

Edwards, W., (2003), Fact Sheet. Cooperative Extension Service, Iowa State University. Available at www.extension.iastate.edu/Publications/FM1852.pdf (accessed Nov. 20, 2006).

Environmental Working Group (EWG) Farm Subsidy Database. Available at

<http://farm.ewg.org/farm/index.php?key=28220478&message=Successfully+updated+Supporter+information> (accessed June 20, 2007).

Environmental Working Group (EWG) Farm Subsidy Database. Available at <http://farm.ewg.org/sites/farbill2007/progdetail1614.php?fips=46000&progcode=corn> (accessed June 20, 2007).

Environmental Working Group (EWG) Farm Subsidy Database. Available at <http://farm.ewg.org/sites/farbill2007/progdetail1614.php?fips=46000&progcode=wheat> (accessed June 20, 2007).

Environmental Working Group (EWG) Farm Subsidy Database. Available at <http://farm.ewg.org/sites/farbill2007/progdetail1614.php?fips=46000&progcode=soybean> (accessed June 20, 2007).

Environmental Working Group (EWG) Farm Subsidy Database. Available at <http://farm.ewg.org/farm/progdetail.php?fips=46000&progcode=corn> (accessed June 20, 2007).

Environmental Working Group (EWG) Farm Subsidy Database. Available at <http://farm.ewg.org/farm/progdetail.php?fips=46000&progcode=wheat> (accessed June 20, 2007).

Environmental Working Group (EWG) Farm Subsidy Database. Available at <http://farm.ewg.org/farm/progdetail.php?fips=46000&progcode=soybean> (accessed June 20, 2007).

- FAPRI (2006), "U.S. Stochastic Baseline - A View of 500 Alternative Futures," FAPRI-UMC Report #05-06. Available at http://www.fapri.missouri.edu/outreach/publications/umc.asp?current_page=outreach (accessed Dec. 15, 2006).
- FAPRI (2005), "U.S. Proposal for WTO Agricultural Negotiations: Its impacts on U.S. and World Agriculture," CARD Working Paper OS-WP417, Center for Agricultural and Rural Development. Available at <http://www.card.iastate.edu/publications/synopsis.aspx?id=882> (accessed Aug. 5, 2006).
- FAPRI (2005), "Potential Impacts on U.S. Agriculture of the U.S. October 2005 WTO Proposal," FAPRI-UMC Report # 16-05. Available at http://www.fapri.missouri.edu/outreach/publications/2005/FAPRI_UMC_Report_16_05.pdf (accessed Sept. 13, 2006).
- Farm and Agricultural Service-US Department of Agriculture (FAS-USDA, 2005). Spink County Daily LDP and PCP Rates. Washington D.C. Available at <http://www.fsa.usda.gov/FSA/searchLDPRates> (accessed May 15, 2006).
- Farm Characteristics, South Dakota Census of Agriculture, 2002. Available at http://www.agcensus.usda.gov/Publications/2002/Census_by_State/South_Dakota/index.asp http://www.nass.usda.gov/Census/Create_Census_US_CNTY.jsp (accessed June 8, 2006).

- Farm Characteristics, South Dakota Census of Agriculture, 1997. Available at <http://www.agcensus.usda.gov/Publications/1997/index.asp> (accessed June 8, 2006).
- Farm Level Cash Receipts, *South Dakota Agriculture Statistics 2007* Bulletin No. 67 June. Available at http://www.nass.usda.gov/Statistics_by_State/South_Dakota/Publications/Annual_Statistical_Bulletin/2007/ab07046.pdf (accessed August 15, 2007).
- Francois, J., and Shiells, C., eds. (1994), "*Modeling Trade Policy: Applied General Equilibrium Assessments of North American Free Trade.*" Cambridge University Press.
- Goldin, I., and van der Mensbrugge. D., (1996), "Agricultural Tariffication under the Uruguay Round." In *The Uruguay Round and the Developing Countries*. Edited by W. Martin, and L.A. Winters. Cambridge: Cambridge University Press. Available at <http://www.cambridge.org/us/catalogue/catalogue.asp?isbn=0521586011> (accessed Feb. 15, 2006).
- Hertel, T.W., ed. (1997), *Global Trade Analysis: Modeling and Applications*, Cambridge: Cambridge University Press. Available at https://www.gtap.agecon.purdue.edu/products/gtap_book/default.asp (accessed March 5, 2006).
- Hooke, M., (2001), "Moving Towards a Broader Negotiations in the WTO," *Agri-Trade Forum*, Vol. 10. No.1.

- Josling, T., (2005), "The WTO Agricultural Negotiations: Progress and Prospects,"
Choices 20(2): 131-136. Available at <http://www.choicesmagazine.org/2005-2/wto/2005-2-08.pdf> (accessed March 16, 2006).
- Just, R. E., (2001), "Addressing the Changing Nature of Uncertainty in Agriculture."
American Journal of Agricultural Economics 83(5): 1131-53. Available at
<http://ideas.repec.org/a/bla/ajagec/v83y2001i5p1131-53.html> (accessed April 16, 2006).
- Kastens, T., (1997), *Farm Machinery Operation Cost Calculations*, Kansas State University, Manhattan, Kansas. Available at
<http://www.agmanager.info/farmmgt/machinery/mf2244.pdf> (accessed Dec. 22, 2006).
- Kennedy, P.L., Brink, L., Dyck, J., and Maclaren, D., (2001), "Domestic Support Issues in the WTO Negotiations on Agriculture," IATRC Commissioned Paper (draft). Available at <http://ageconsearch.umn.edu/handle/14622> (accessed June 2, 2006).
- Koo, W. W., Mattson, W. J., and Taylor, D. R., (2006 a), "Potential Impacts of WTO Negotiations on U.S. Agriculture Policy and Policy Alternatives," Agricultural Policy Brief, Center for Agricultural Policy and Trade Studies, Fargo, North Dakota. Available at <http://www.ag.ndsu.nodak.edu/capts/documents/February2006Newsletter.pdf> (accessed March 16, 2006).
- Koo, W. W., Mattson, W. J., and Taylor, D. R., (2006 b), "Progress of WTO Negotiations and their Potential Impacts on U.S. Agriculture Policy," Agricultural Policy Brief, Center for Agricultural Policy and Trade Studies, Fargo, North Dakota.

Available at <http://www.ag.ndsu.nodak.edu/capts/documents/AgPolicyBrief06-11.pdf> (accessed March 31, 2006).

Koo, W. W., and Taylor, D. R., (2005), "Analysis of Individual Programs within the 2002 Farm Bill," Newsletter Issue 05-6, Center for Agricultural Policy and Trade Studies, December 2005, North Dakota State University, Fargo, North Dakota. Available at <http://www.ag.ndsu.nodak.edu/capts/documents/December2005Newsletter.pdf> (accessed March 19, 2006).

Koo, W. W., Mattson, W. J., and Taylor, D. R., (2004), "Potential Effects of the WTO Framework Agreement on U.S. Agriculture," Agricultural Policy Brief, Center for Agricultural Policy and Trade Studies. Available at <http://www.ag.ndsu.nodak.edu/capts/documents/October2004Newsletter.pdf> (accessed March 20, 2006).

Law, M. A., and Kelton, W. D., (1991), "Simulation Modeling & Analysis", Second Edition, McGraw Hill, New York.

Martin, W., and Winters, L. A., eds., (1995), "*The Uruguay Round and the Developing Economies.*" Discussion Paper No. 307: World Bank Washington, D.C. Available at https://extopworkflow.worldbank.org/extop/ecommerce/catalog/product?context=drilldown&item_id=201044 (accessed May 16, 2006).

Mathews, A., and O'Toole, R., (2002), "General Equilibrium, Partial Equilibrium and the Partial Derivative: Elasticities in a CGE Model," Paper Presented to the International Conference on Global Modeling EcoMod2002, Brussels. Available at <http://www.ecomod.net/conferences/ecomod2002/papers/otoole.pdf>

(accessed Jan. 20, 2006).

Munisamy, G., Mullen, K., and Gulati, A., (2004), "Domestic Support to Agriculture in the European Union and the United States: Policy Developments since 1996," Markets, Trade, and Institutions (MTID) Discussion Paper No.75, MTID Division, International Food Policy Research Institute, Washington, DC 2006. Available at <http://ideas.repec.org/s/fpr/mtiddp.html> (accessed Oct. 12, 2006).

Monitoring Agri-trade Policy (MAP), (2005), D-G Agriculture & Rural Development: Agricultural Trade Policy Analysis unit, European Commission, No. 01-05.

Available at <http://ec.europa.eu/agriculture/publi/map/1.pdf> (accessed March 3, 2006).

Nalini K. P., (2005), "Survivability and Growth of Grain Farms in North Central and North East South Dakota" Unpublished Master's Thesis, SDSU.

National Agricultural Statistics Service. US and South Dakota Crop Database.

Washington D.C. Available at

http://www.nass.usda.gov:8080/QuickStats/PullData_US.jsp

(accessed June 5, 2006).

National Agricultural Statistics Service. South Dakota Agricultural Statistics Database.

Washington D.C. Available at <http://www.nass.usda.gov/sd/> (accessed June 5, 2006).

National Corn Growers Association (NCGA). Proposal for 2007 Farm Bill. Available at

<http://capwiz.com/ncga/issues/> (accessed March 15, 2007).

Peterson, D., (2003), South Dakota Budget.

Podbury, T., Shirshore, H. H., Andrews, N., and Wayne, G., (2003), "WTO Agricultural

Negotiations the way forward from Cancun," Australian Commodities Vol.10,

No. 4 December Quarter, ABARE, Australia. Available at

http://www.abareconomics.com/publications_html/ac/ac_03/ac03_dec.pdf

(accessed Aug. 16, 2006).

Rental Rates and Land Values, *South Dakota Agriculture Statistics 2003-2006*. Bulletin

No. 63-66, June.

Revenue Insurance Plans. 2004. Available at www.keystate.com/Crop_policies.htm

(accessed Jan. 5, 2007).

Richardson, J. W., and Outlaw, J. L., (2007), "Comparison of the Counter Cyclical

Payment Program to a Proposed Counter Cyclical Revenue Program," AFPC

Briefing Paper 07-3, Agricultural and Food Policy Center, Texas A&M

University; College Station, Texas, USA. Available at

<http://www.afpc.tamu.edu/pubs/3/467/bp-2007-03%20%20-%20CCP%20vs%20CCR.pdf>

(accessed April 15, 2007).

Richardson, J. W., and Nixon, C. J., (2004), "Description of FLIPSIM: The firm level

income and simulation model," Agricultural and Food Policy Center, Texas A&M

University, College Station, Texas, USA. Available at

<http://www.afpc.tamu.edu/models/flipsim/> (accessed Dec. 15, 2006).

Richardson, J.W., (2003), "*Simulation for Applied Risk Management with an Introduction to the Excel Simulation Add-in: Simetar*©. Texas A&M University, College Station, Texas, USA.

Richardson, J.W., S.L. Klose, and A.W. Gray., (2000), "An Applied Procedure for Estimating and Simulating Multivariate Empirical Probability Distributions In Farm-Level Risk Assessment and Policy Analysis." *Journal of Agricultural and Applied Economics* 32 : 299-315. Available at <http://ageconsearch.umn.edu/bitstream/15490/1/32020299.pdf> (accessed Jan. 30, 2007).

Richardson, J. W., (1988), "Modeling of Economic Systems," AFPC Staff Report SR-1988-5, Agricultural and Food Policy Center, Texas A&M University, College Station, Texas, USA. Available at <http://www.afpc.tamu.edu/pubs/index.php?content=browse&type=4&year=0> (accessed Feb. 15, 2007).

Roberts, I., (2005), "WTO Agreement on Agriculture-The Blue Box in the July 2004 Framework Agreement," ABARE eReport 05.4, Canberra, Australia. Available at http://www.abareconomics.com/publications_html/trade/trade_05/er05_wto.pdf (accessed April 24, 2006).

- Roberts, I., Buetre, B., and Jotzo, F., (2002), "Agricultural Trade Reform in the WTO: Special Treatment for Developing Countries," ABARE Report, Canberra, Australia. Available at <http://siteresources.worldbank.org/INTARD/Resources/ReformingAgTradeVolume2.pdf#page=162> (accessed June 30, 2006).
- Roberts, I., Podbury, T., and Hincy, M., (2001), "Reforming Domestic Agricultural Support Policies through the WTO," ABARE Research Report 01.2 Canberra, Australia. Available at http://www.abareconomics.com/publications_html/trade/trade_01/reforming_WTO.pdf (accessed Jan. 28, 2006).
- Selley, R. A., Barret, T., Clark, R. T., Klein, R. N., and Melvin, S., (2001), Nebraska Crop Budgets 2001. Nebraska Cooperative Extension EC01-872S. University of Nebraska-Lincoln. Available at <http://ianrpubs.unl.edu/farmmgmt/ec872/index.htm> (accessed July 6, 2006).
- Selley, R. A., Barret, T., Clark, R. T., Klein, R. N. and Melvin, S., (1999), Nebraska Crop Budgets 1999. Nebraska Cooperative Extension EC99-872S. University of Nebraska-Lincoln. Available at <http://ianrpubs.unl.edu/farmmgmt/ec872/index.htm> (accessed July 6, 2006).
- Stewart-Brown, R. (2005) "EU will be the Prime Culprit if Doha Trade talks fail," *Financial Times News*, Oct 28, London.
- Sung, C. N., and Salassi, E. M., (2004), "Multivariate Empirical (MVE) Probability Distributions in Farm-Level Assessment and Policy Analysis: An Implementation

of SAS Procedures.” Louisiana State University Agricultural Center, Staff Report No. 2004-09, Baton Rouge, LA. Available at

http://www.agecon.lsu.edu/Research_Publications/Electronically_Available_Pubs/SR2004-09.pdf (accessed Jan. 28, 2007).

Swenson, L. A., Aakre, G. D., and Haugen, H. R., (2007), “Base Revenue Protection and Revenue Counter-cyclical Programs for Corn, Soybean and Spring Wheat in North Dakota,” AAE 07003, 07004, 07005, Department of Agribusiness and Applied Economics, North Dakota State University, Fargo. Available at <http://ageconsearch.umn.edu/bitstream/7301/2/sp07005.pdf> , <http://ageconsearch.umn.edu/bitstream/7300/2/sp07004.pdf> , <http://ageconsearch.umn.edu/bitstream/7302/2/sp07003.pdf> (accessed May 16, 2007).

Taylor, R. D., Koo, W. W., and Swenson, A. L., (2005), “2005 North Dakota agricultural outlook: Representative Farms, 2005-2014,” Centre for Agricultural Policy and Trade Studies, Department of Agribusiness and Applied Economics Report # 569, North Dakota State University, Fargo, ND. Available at <http://ageconsearch.umn.edu/bitstream/23527/1/aer569.pdf> (accessed Sept. 30, 2006).

Taylor, G., and Diersen, A. M., (2003), “Examining Economic Impact and Recovery in South Dakota from the 2002 Drought,” Economics Staff Paper 2003-8, Department of Economics, South Dakota State University, Brookings, South

Dakota. Available at <http://ageconsearch.umn.edu/bitstream/32028/1/sp03-08.pdf> (accessed Nov. 21, 2007).

The World Bank (2003), "Global Economic Prospects 2004." In *Realizing the Development Promise of the Doha Agenda*. Washington, DC: The World Bank. Available at https://extop-workflow.worldbank.org/extop/e-commerce/catalog/product-detail?product_id=2581204& (accessed April 4, 2006).

The Economic Times, Jan 22, 2001.

The Joint EC-US Paper, (2003): Agricultural Paper Submitted to the WTO Secretariat, JOB (03)/157, Geneva. Available at http://www.trademinister.gov.au/releases/2003/useu_paper.pdf (accessed Dec. 2, 2006).

USDA 2007 Farm Bill Proposal. Available at [www.usda.gov/wps/portal/lut/p/s.70A/701UH?Contentidonly=true\\$contentid=2006/05/153.xml](http://www.usda.gov/wps/portal/lut/p/s.70A/701UH?Contentidonly=true$contentid=2006/05/153.xml) (accessed June 19, 2007).

U.S. Department of Agriculture, World Agricultural Outlook Board. *World Agricultural Supply and Demand Estimates*, WASDE-365, August 2000. Available at <http://future.aae.wisc.edu/outlook/wasde365.pdf> (accessed Dec. 10, 2006).

US Department of Agriculture/Economics Research Service (USAD/ERS). US and State Farm Income Database. Washington D.C. Available at www.ers.usda.gov/data/farmincome/finfidmu.htm (accessed June 30, 2006).

US Department of Agriculture/Economics Research Service (USAD/ERS). Domestic Farm Support Database. Washington D.C. Available at www.ers.usda.gov/briefing/FarmPolicy/gov-pay.htm (accessed June 15, 2006).

US Department of Agriculture/Economics Research Service (USAD/ERS). Available at www.ers.usda.gov/briefing/FarmPolicy/data/totalusa.xls (accessed June 22, 2006).

U.S. Department of Commerce, Bureau of Economic Analysis, October 2006.

U.S. Department of Agriculture/Economics Research Service (ERS/USDA). US Farm Income and Cost. Washington D.C. Available at <http://www.ers.usda.gov/Briefing/FarmIncome/Data/Va0305us.htm> (accessed June 28, 2006).

U.S. Department of Agriculture/Economics Research Service (ERS/USDA). Net Farm Income Forecast. Washington D.C. Available at <http://www.ers.usda.gov/Briefing/FarmIncome/nationalestimates.htm> (accessed July 5, 2006).

U.S. Department of Agriculture/Economics Research Service (ERS/USDA). Available at <http://www.ers.usda.gov/Briefing/wto/domestic.htm> (accessed July 20, 2006).

U.S. Department of Agriculture/Economics Research Service (ERS/USDA). WTO Domestic Support Notifications Database AMS Ceiling. Washington D.C.

Available at http://www.ers.usda.gov/db/wto/ams_database/standardreports/AMSceilings.xls (accessed July 2, 2006).

U.S. Department of Agriculture/Economics Research Service (ERS/USDA). WTO Domestic Support Notifications Total AMS Database. Washington D.C.

Available at http://www.ers.usda.gov/db/wto/ams_database/standardreports/AMSTotalsupport.xls (accessed July 5, 2006).

U.S. Information. The October, 2005 proposed cuts in AMS. Available at <http://usinfo.state.gov/ei/Archive/2005/Oct/11-639505.html> (accessed June 2, 2006).

Washnok, G. A., (1990), Effects of tenure, leverage, and farm commodity program participation on farm firm survival and growth in South Dakota. Unpublished MS Thesis. Economics Department, South Dakota State University, Brookings, SD.

Westcott P. C., and Price J. M., (2001), "Analysis of the U.S. Commodity Loan Program with Marketing Loan Provisions," Market and Trade Economics Division, ERS/USDA, Agricultural Economic Report No. 801. Available at <http://ageconsearch.umn.edu/bitstream/34035/1/ae010801.pdf> (accessed Sept. 25, 2006).

World Trade Organization, (2000a), "Proposal on Comprehensive Long-Term Agriculture Trade Reform," Submission from the U.S. to the Committee on Agriculture, G/AG/N/W/15.23. Available at <http://www.fas.usda.gov/itp/wto/WTO-062300.html> (accessed Jan. 29, 2006).

World Trade Organization, (2000b), “Note on Domestic Support Reform Negotiations on Agriculture,” Submission from the U.S. to the Committee on Agriculture, G/AG/NG/W/16.23.

World Trade Organization, (2000c), “The Blue Box and other Support Measure to Agriculture,” European Communities Proposal to the Committee on Agriculture, H/AG/NG/W/17.23. Available at http://ec.europa.eu/agriculture/external/wto/document/prop3_en.pdf (accessed Feb. 24, 2006).

World Trade Organization, (2004), “Doha Work Program: Draft General Council Decision of 31st July 2004,” WT/GC/W/535, Geneva.

US World Trade Organization Notifications:

World Trade Organization Domestic Support Notification for 1995 Marketing Year. Available at <http://docsonline.wto.org/DDFDocuments/t/G/AG/NUSA10.wpf> (accessed Dec. 12, 2005).

World Trade Organization Domestic Support Notification for 1996 Marketing Year. Available at <http://docsonline.wto.org/DDFDocuments/t/G/AG/NUSA17.doc> (accessed Dec. 12, 2005).

World Trade Organization Domestic Support Notification for 1997 Marketing Year. Available at <http://docsonline.wto.org/DDFDocuments/t/G/AG/NUSA27.doc> (accessed Dec. 12, 2005).

World Trade Organization Domestic Support Notification for 1998 Marketing Year.

Available at <http://docsonline.wto.org/DDFDocuments/t/G/AG/NUSA36.doc>

(accessed Dec. 15, 2005).

World Trade Organization Domestic Support Notification for 1999 Marketing Year.

Available at <http://docsonline.wto.org/DDFDocuments/t/G/AG/NUSA37.doc>

(accessed Dec. 15, 2005).

World Trade Organization Domestic Support Notification for 2000 & 2001 Marketing

Year. Available at

<http://docsonline.wto.org/DDFDocuments/t/G/AG/NUSA43.doc>

(accessed Dec. 15, 2005).

World Trade Organization Domestic Support Notification for the EU 2000 & 2001

Marketing Year EU notification G/AG/N/EEC/49

Xu, X. X. (2002), Economic Analysis of Agricultural Land Leasing Practices in South

Dakota, Unpublished Master's Thesis, SDSU.

GLOSSARY

Aggregate Measure of Support (AMS): Measure of government support to a sector. The AMS, as defined in the Agreement on Agriculture, includes both budgetary outlays as well as revenue transfers from consumers to producers as a result of policies that distort market prices. Total AMS is defined to include the sum of all domestic support provided in favor of agricultural producers, calculated as the sum of all aggregate measures of support for basic agricultural products and all non-product-specific aggregate measures of support.

Agreement on Agriculture (AoA): Part of the Uruguay Round Agreement covering issues related to agriculture (e.g., market access, export subsidies, and internal support).

Amber Box: Domestic support for agriculture that is considered to distort trade and therefore subject to reduction commitments. Technically calculated as a part of total “Aggregate Measurement of Support” (AMS).

Base Revenue Program (BRP): The BRP values are calculated for each farm by multiplying the actual yield by the crop price and subtracting the costs of production.

Blue Box: Permitted supports linked to production, but subject to production limits, and therefore minimally trade-distorting.

Cairns Group: Group of agricultural exporting nations lobbying for agricultural trade liberalization. It was formed in 1986 in Cairns, Australia just before the beginning of the Uruguay Round. Current membership: Argentina, Australia, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Guatemala, Indonesia, Malaysia, New Zealand, Paraguay, Philippines, South Africa, Thailand and Uruguay.

Ceiling Binding: In cases where an existing tariff was not already bound, developing countries were allowed to establish ceiling bindings. These ceiling bindings could result in tariffs that were higher than the existing applied rate. The ceiling bindings took effect on the first day of implementation of the WTO Agreement on Agriculture (April, 1994).

Common Agricultural Policy (CAP): The EU's comprehensive system of production targets and marketing mechanisms designed to manage agricultural trade within the EU and with the rest of the world.

Counter-cyclical Payments (CCP): Counter-cyclical payments are available to producers with historic program payment acres and yields of wheat, corn, barley, grain sorghum, oats, upland cotton, long-grain and medium-grain rice, soybeans, other oilseeds, peanuts, and pulse crops (dry peas, lentils, small and large chickpeas). Payments are made whenever the current effective commodity price is less than the target price. The effective price is calculated by adding: 1) the national average farm price for the marketing year, or

the commodity national loan rate, whichever is higher and 2) the [direct payment rate](#) for the commodity.

Counter-cyclical Revenue Payments (CCR): The CCR will compensate producers when price and/or yield are low and the National Average Revenue (NAR) for a crop falls short of its National Target Revenue (NTR).

Crop Insurance: Insurance that protects farmers from crop losses due to natural hazards. A subsidized multiperil Federal insurance program, administered by the USDA's Risk Management Agency, is available to most farmers. Federal crop insurance is sold and serviced through private insurance companies.

Cropland: Land used primarily for production of row crops, close-growing crops, and fruit and nut crops. It includes cultivated and non cultivated acreage, but not land enrolled in the [Conservation Reserve Program](#).

Crop Year (marketing year): The 12-month period starting with the month when the harvest of a specific crop typically begins. The 2008 wheat crop year, for example, is June 1, 2008, through May 30, 2009. The 2008 corn crop year, for example, is September 1, 2008, through August 31, 2009 and The 2008 Soybean crop year, for example, is also from September 1, 2008, through August 31, 2009. The amount harvested during these periods is then considered the "2008 crop."

Decoupled Income Support: Payments to farmers that are not linked to current levels of production, prices, or resource use. When payments are decoupled, farmers make

production decisions based on expected market returns. Under the WTO Agreement on Agriculture, for policies to be considered decoupled no production shall be required in order for producers to receive the payment.

Deficiency Payment: A type of agricultural domestic support, paid by government to producers of certain commodities and based on the difference between a target price and the domestic market price or loan rate, whichever is the less.

De minimis: Minimal amounts of domestic support that are allowed even though they distort trade- up to 5% of the value of production for developed countries, 10% for developing.

Direct Payments (DP): Fixed payments for eligible historic production of wheat, corn, barley, grain sorghum, oats, upland cotton, long and medium grain rice, soybeans, other oilseeds, and peanuts.

Disaster Payments: Payments made to producers through existing or special legislation due to crop and livestock losses because of natural disasters such as floods, drought, hail, excessive moisture, or related conditions.

Distortion: When prices and production are higher or lower than levels that would usually exist in a competitive market.

Domestic Support: In agriculture, any domestic subsidy or other measure which acts to maintain producer prices at levels above those prevailing in international trade; direct

payments to producers, including deficiency payments, and input and marketing cost reduction measures available only for agricultural production.

Doha Development Agenda (DDA): The current series of multilateral trade negotiations begun in January 2002 as agreed at the WTO Ministerial in Doha, Qatar, in January 2001; also called the Doha Round.

Export subsidies: Special incentives provided by governments to encourage increased foreign sales. Subsidies, which are contingent on export performance, may take the form of cash payments, disposal of government stocks at below-market prices, subsidies financed by producers or processors as a result of government actions such as assessments, marketing subsidies, transportation and freight subsidies, and subsidies for commodities contingent on their incorporation in exported products.

Formula-Based Tariff Reductions: A method of negotiating tariff reductions using an agreed-upon formula applied to tariff rates (with limited exceptions being granted for very sensitive items) by all contracting parties.

Free Trade Area: Trade within the group is duty free but members set their own tariffs on imports from non-members (e.g. NAFTA).

GATS: The WTO's General Agreement on Trade in Services.

General Agreement on Tariffs and Trade (GATT): An international agreement originally negotiated in 1947 to increase international trade by reducing tariffs and other

trade barriers. The agreement provides a code of conduct for international commerce and a framework for periodic multilateral negotiations on trade liberalization and expansion. The Uruguay Round Trade Agreement updated the General Agreement and established the World Trade Organization on January 1, 1995, to replace the institutions created by the GATT.

Green Box: Domestic support for agriculture that is allowed without limits because it does not distort trade, or at most causes minimal distortion.

Harmonized System: An international nomenclature developed by the World Customs Organization, which is arranged in six-digit codes allowing all participating countries to classify traded goods on a common basis. Beyond the six-digit level, countries are free to introduce national distinctions for tariffs and many other purposes.

Harmonizing formula: Used in tariff negotiations for much steeper reductions in higher tariffs than in lower tariffs, the final rates being “harmonized” i.e. closer together.

LDCs: Least-developed countries.

Loan Deficiency Payments (LDP): A provision begun in the Food Security Act of 1985 giving the Secretary of Agriculture the discretion to provide equivalent direct payments to producers who, although eligible to receive marketing loan program benefits or to obtain price support loans for wheat, feed grains, upland cotton, rice, or oilseeds, agree instead not to obtain loans.

Market Access: The extent to which a country permits imports. A variety of tariff and nontariff trade barriers can be used to limit the entry of foreign products.

Marketing Loan Gain (MLG): The difference between the announced commodity loan rate and the marketing loan repayment rate. This represents a program benefit to producers and is aimed at reducing government costs of stock accumulation.

Marketing Loan Program: Provisions that allow producers to repay nonrecourse commodity loans at less than the announced loan rate whenever the world price or loan repayment rate for the commodity is less than the loan rate.

MAP: Monitoring Agri-trade Policy

Modalities: A way to proceed. In WTO negotiations, modalities set broad outlines - such as formulas or approaches for tariff reductions - for final commitments. The Agreement on Agriculture was made up of three components, the text of the Agreement, the Country Schedules submitted to the WTO that included base year data and the commitments, and the "modality" documents of the Negotiating Group on Agriculture, which had no legally binding force but were agreed to by the negotiating parties as the suggested set of procedures to use to calculate various indicators and commitments. In WTO negotiations, modalities refer to the nuts and bolts - such as formulas or approaches for tariff reductions - that underpin each country's final commitments.

Multifunctionality: Idea that agriculture has many functions in addition to producing food and fibre, e.g. environmental protection, landscape preservation, rural employment, food security, etc.

National Average Revenue (NAR): The NAR for a crop is based on the actual national average yield and the higher of the season average market price or the loan rate.

National Target Revenue (NTR): NTR is calculated by multiplying the target price, adjusted for the direct payment rate, with the Olympic national average yield for the preceding five years.

National Payment Rate (NPR): NPR is calculated based on the crop's national revenue shortfall and the Counter-cyclical payment yield.

Non Product-specific Support: Government support to agriculture that is not linked to specific commodities or production activities. Examples include environmental programs, research, and irrigation subsidies. Also called ***Non Commodity-specific support***.

Non-Trade Concerns: Similar to multifunctionality. The preamble of the Agriculture Agreement specifies food security and environmental protection as examples. Also cited by members are rural development and employment, and poverty alleviation.

Notification: A transparency obligation requiring member governments to report trade measures to the relevant WTO body if the measures might have an effect on other members.

OECD: Organization for Economic Co-operation and Development.

Olympic Average: An average during a 5-year period, dropping the highest and lowest values.

Overall Distorting Support (ODS): Move to harmonize maximum allowed levels of or ceilings in overall distorting support (ODS) defined as Aggregate Measurement of Support (AMS) plus *de minimis* plus Blue Box. A tiered formula is to be used: reduce support by countries with higher ODS ceilings.

Payment Acres: Equal to 85 percent of the base acres for calculating direct and counter-cyclical payments. The 2008 Farm Act set payment acres at 83.3 percent of base acres for crop years 2009-11.

Payment Limitation: The maximum annual amount of commodity program benefit a person can receive by law.

Payment Yield (also called program yield): Farm's yield of record (per acre) for a specific commodity, determined by a procedure outlined in farm legislation and used in calculating direct payments and counter-cyclical payments.

Peace clause: Provision in Article 13 of the Agriculture Agreement saying agricultural subsidies committed under the agreement cannot be challenged under other WTO agreements, in particular the Subsidies Agreement and GATT.

Posted County Price (PCP): Calculated for wheat, feed grains, and oilseeds for each county by USDA's Farm Service Agency.

Product-Specific Support: Government support to agriculture that is not linked to specific commodities or production activities.

Producer Subsidy Equivalent (PSE): A broadly defined aggregate measure of support to agriculture that combines into one total value aggregate, direct payments to producers financed by budgetary outlays (such as loan deficiency payments), budgetary outlays for certain other programs assumed to provide benefits to agriculture (such as research and inspection and environmental programs), and the estimated value of revenue transfers from consumers to producers as a result of policies that distort market prices.

Production Flexibility Contract Payments (PFCP): Direct payments to farmers for contract crops through 2002 under the 1996 Farm Act.

Red Box: The color coded terminology was originally applied only to domestic policies. There was no agreement to apply the "stop" red light to any domestic policies, so the "red box" has been empty.

Revenue Assurance (RA): RA provides coverage to protect against loss of revenue caused by low prices or low yields, or a combination of both. RA protects a producer's crop revenue when the crop revenue falls below the guaranteed revenue.

Revenue Counter-cyclical Program Payments (RCCP): The RCCP payment is determined by subtracting the product of the county average yield and the NASS price from the product of the county trend yield and the effective target price. The effective target price is the current target price minus the direct payment rate.

Sanitary and Phytosanitary (SPS) Measures: Technical barriers designed for the protection of human health or the control of animal and plant pests and diseases.

Special and Differential Treatment: The provision allowing exports from developing countries to receive preferential access to developed markets without having to accord the same treatment in their domestic markets.

Target Price: Unit price level (e.g., for bushel, pound, or ton) established in the 2002 Farm Act used for calculating counter-cyclical payments for covered (program) commodities. Prior to 1996, target prices were used to calculate deficiency payments.

Tariff Quota: When quantities inside a quota are charged lower import duty rates, than those outside (which can be high).

Tariffication: Procedures relating to the agricultural market-access provision in which all non-tariff measures are converted into tariffs.

Tariffs: Customs duties on merchandise imports. Levied either on an **ad valorem** basis (percentage of value) or on a **specific basis** (e.g. \$7 per 100 kgs.). Tariffs give price advantage to similar locally-produced goods and raise revenues for the government.

Uruguay Round (UR): Multilateral trade negotiations launched at Punta del Este, Uruguay in September 1986 and concluded in Geneva in December 1993. Signed by Ministers in Marrakesh, Morocco, in April 1994.

Uruguay Round Agreement on Agriculture (URAA): The Agreement on Agriculture (AoA) was adopted at the conclusion of the Uruguay Round of multilateral trade talks on April 15, 1994. It introduced important new disciplines on the trade of agricultural products. WTO member countries made commitments to reduce domestic support to agriculture, reduce the use of export subsidies, and improve access to their markets

World Trade Organization (WTO): Established on January 1, 1995 as a result of the Uruguay Round, the WTO replaces GATT as the legal and institutional foundation of the multilateral trading system of member countries. It provides the principal contractual obligations determining how governments frame and implement domestic trade legislation and regulations. And it is the platform on which trade relations among countries evolve through collective debate, negotiation, and adjudication.