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# Economic evaluation of potential changes in farm program price support for typical Louisiana rice and cotton farming operations

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**ECONOMIC EVALUATION OF POTENTIAL CHANGES IN FARM PROGRAM  
PRICE SUPPORT FOR TYPICAL LOUISIANA RICE AND COTTON FARMING  
OPERATIONS**

A Thesis

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Master of Science

in

The Department of Agricultural Economics and Agribusiness

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## ABSTRACT

Increased government deficit has led the U.S. Congress to reduce federal spending. Proposed budget cuts are intended to decrease government spending in several areas, including agriculture. Reductions in farm program spending could cause significant adverse effects on the financial situation of many farms, particularly to rice and cotton enterprises, due to their high reliance on farm program payments as a source of income. Representative rice and cotton operations of one, two, three, and four entities as single crop enterprises were considered and developed for use in this study. Farm enterprise sizes were determined by estimating the acreage level at which a one, two, three, and four entity operations would reach the most restrictive payment limit. Rice and cotton farms were considered to plant and harvest 85 percent of base acreage (100 percent of paid base acreage). For each enterprise evaluated, gross income, variable production costs, fixed equipment costs, and general farm overhead expenses are included in the analysis. Projections of income and expenses are made for a five-year period (2005-2009). For each year of simulation, random market prices and crop yields are generated to allow for inclusion of price and yield risk. Random domestic market prices, world market prices and crop yields per acre, for both rice and cotton, were generated. The analysis includes a comparison of a baseline simulation of projected income and expenses with six alternative program payment reduction scenarios. Continuation of current policy without reductions in farm program spending has shown to generate insufficient net farm income to both rice and cotton enterprises. One entity operations under the baseline scenario have resulted as being non-viable operations. Increasing reductions in program payments had a detrimental effect on the financial situation of both rice and cotton operations. The combination of 5 percent reduction in program payments along with a 10 percent decline in market prices resulted as the worse case scenario for all rice and cotton

enterprises placing them in a higher risk of negative returns over variable and total costs. No program reductions below the baseline scenario are recommended for the viability of an already suffering agricultural sector.



# CHAPTER 1

## INTRODUCTION

The Farm Security and Rural Investment Act of 2002 (2002 Farm Bill) is the latest of a seven-decade history of farm subsidy laws that transfers price support subsidies to farmers, and regulates production of selected commodities in the United States. Rice and cotton are two of Louisiana's most important agricultural commodities under the farm bill law. These two crops are the back bone of a major sector of the agricultural industry located throughout the state that supports local economies and their rural communities. Rice planted acreage has fluctuated between 531,791 acres in 2002 and 455,080 acres in 2003 (Louisiana Summary, 2004). Cotton acreage has fluctuated between 491,299 planted acres in 2004 and 514,975 acres in 2003 (Louisiana Summary, 2004). These large extensions of land give us an idea of the importance of both commodities to Louisiana's agriculture and the amount of farmers that depend on these crops. The Louisiana State University Agricultural Center reports in its 2004 summary that rice crops were harvested by 1,550 producers in 2003, 155 fewer than 2002 and continues a steady decline over the past decade. The 2003 planted acreage represents a gross farm value of \$152,097,844 with an additional \$45,629,353 of value added through marketing, processing and transportation, increasing its value for a total of \$197,727,197. Estimates of 2,599 farms out of a total of 2,709 businesses related to the cotton industry in Louisiana creating a total of 11,858 jobs and revenue of \$ 581,690,010 was reported by the National Cotton Council in 1999.

In 1996, Congress enacted The Federal Agriculture Improvement and Reform Act (FAIR). Congress created this act to allow farmers more flexibility in planting crops, to decrease regulations, and reduce subsidy payments so the market would play a greater role in determining crop prices. This proposal left the secretary of agriculture with no mechanism to control the

amount of a given commodity that a farmer can produce for the first time in 60 years. Since the approval of this act, farmers had the freedom to determine the types and quantities of crops to produce, growers tended to produce as much as possible which resulted in great surpluses. Due to those surpluses, as well as other factors, world market prices became greatly disrupted generally sending prices downward.

The Farm Security and Rural Investment Act of 2002, commonly known as the 2002 Farm Bill, was passed into law by the president's signature in May, 2002. The farm bill seems to be an extended continuation of the policies contained in FAIR but also increases the amount of resources for the Conservation Reserve Program and also certain modifications in the calculations of the payments of the crops using counter cyclical payments.

Direct payments under the 2002 Farm Bill are fixed for each crop and are not affected by current production or by current market prices. Differences in direct payments per unit for each commodity can be seen in table 1.1. Direct payments under the 2002 Farm Bill are similar to production flexibility contract (PFC) payments of the 1996 Farm Act (also referred to as AMTA payments). These payments are based on historical acreage and on historical yields. In the 2002 Farm Bill, coverage was expanded to include soybeans, other oilseeds, and peanuts.

The main difference of the acts is that the 2002 Farm Bill sets fixed payment rates on a per unit basis for the entire life of the act. The 1996 Farm Act, on the other hand, fixed total expenditure levels for each fiscal year, creating income fluctuations. Under the current direct payment program, eligible producers receive annual payments. The payment is equal to the product of the national payment rate, the producer's payment acres (85 percent of historical base acreage), and the producer's historical yield. The general formula to calculate direct payments is:

$$DP = (\text{Direct payment rate}) \times (\text{historical yield}) \times (85\% \text{ of historical base acreage})$$

Table 1.1 Direct payment rates under the 2002 Farm Bill compared with production flexibility contract payment rates under the 1996 Farm Bill.

Commodity	Unit	PFC payment rates		Direct Payment rates 2002-2007
		1996-2002 average	2002	
-----Dollars per unit-----				
Wheat	Bu	0.62	0.46	0.52
Corn	Bu	0.33	0.26	0.28
Grain Sorghum	Bu	0.40	0.31	0.35
Barley	Bu	0.26	0.20	0.24
Oats	Bu	0.028	0.022	0.024
Upland cotton	Lb	0.0737	0.0572	0.0667
Rice	Cwt	2.57	2.05	2.35
Soybeans	Bu	n.a.	n.a.	0.44
Other oilseeds	Lb	n.a.	n.a.	0.008
Peanuts	Ton	n.a.	n.a.	36

n.a. = Not Applicable

Another difference between the 2002 Farm Bill and previous farm bills is the new program of counter cyclical payments (CCP), which are payments based on a difference between the current price and a target price. By establishing a target price, the government provides farmers with support when prices are low. The new counter cyclical payments associated with the farm bill guarantees the farmers a set amount for every unit of crop they produce if market prices are below the established target price (Table 1.2).

Table 1.2 Target Prices under the 2002 Farm Bill.

Commodity	Unit	2002-03	2004-07
		-----Dollars per unit-----	
Wheat	Bu	3.86	3.92
Corn	Bu	2.60	2.63
Grain Sorghum	Bu	2.54	2.57
Barley	Bu	2.21	2.24
Oats	Bu	1.40	1.44
Upland cotton	Lb	0.724	0.724
Rice	Cwt	10.50	10.50
Soybeans	Bu	5.80	5.80
Other oilseeds	Lb	0.098	0.101
Peanuts	Ton	495	495

When the higher of the loan rate or the season average price plus the direct payment rate is below the target price, a CCP is made at a rate equal to that difference. Another way to express this calculation of CCP's is when the higher of the loan rate or the season average price is below the target price minus the direct payment rate. The general formula to calculate a CCP would be:

$$(\text{CCP payment rate}) = (\text{Target Price}) - (\text{Direct payment rate}) - (\text{higher commodity price or loan rate})$$

The 2002 Farm Bill continues the commodity loan program with marketing loan provisions. Loan rates for the different commodities are fixed under the act, as seen in Table 1.3. Under the 2002 Farm Act, marketing loan provisions were extended to peanuts, mohair, wool, honey, small chickpeas, lentils, and dry peas. Marketing loans provide loan deficiency payments and marketing loan gains to farmers of loan commodities when market prices are low.

Table 1.3 Marketing assistance loan rates, 2002 Farm Bill compared with 2001 loan rates under the 1996 Farm Bill.

Commodity	Unit	2001	2002-03	2004-07
-----Dollars per unit-----				
Wheat	Bu	2.58	2.80	2.75
Corn	Bu	1.89	1.98	1.95
Grain Sorghum	Bu	1.71	1.98	1.95
Barley	Bu	1.65	1.88	1.85
Oats	Bu	1.21	1.35	1.33
Upland cotton	Lb	0.5192	0.52	0.52
ELS cotton	Lb	0.7965	0.7977	0.7977
Rice	Cwt	6.50	6.50	6.50
Soybeans	Bu	5.26	5.00	5.00
Other oilseeds	Lb	0.93	0.096	0.093
Peanuts <sup>1</sup>	Ton	610/132	355	355
Graded wool	Lb	n.a.	1.00	1.00
Nongraded wool	Lb	n.a.	0.40	0.40
Mohair	Lb	n.a.	4.20	4.20
Honey	Lb	n.a.	0.60	0.60
Small chickpeas	Cwt	n.a.	7.56	7.43
Lentils	Cwt	n.a.	11.94	11.72
Dry peas	Cwt	n.a.	6.33	6.22

n.a. = Not Applicable

<sup>1</sup>First number shown for peanuts in 2001 is quota loan rate; second number is additional loan rate.

Commodity loan programs allow producers of designated crops to receive a loan from the government at a commodity specific loan rate per unit of production by pledging production as collateral. After harvest, a farmer may obtain a loan for all or part of the new commodity production. The commodity loans may be settled in three ways:

- Repaying the loan at the loan rate plus interest costs (Commodity Credit Corporation (CCC) interest cost of borrowing from the U.S. Treasury plus 1 percentage point).
- Repaying the loan at a lower loan repayment rate, if applicable, or
- Forfeiting the crop pledged as loan collateral to the CCC at loan maturity.

When market prices are below the loan rate, farmers are allowed to repay commodity loans at a loan repayment rate that is lower than the loan rate. When a farmer repays the loan at a lower repayment rate, the difference between the loan rate and the repayment rate represents a marketing loan gain. In addition, any accrued interest on the loan is waived. When a marketing loan gain is received on a given collateralized quantity, that quantity is not eligible for further loan benefits.

Alternatively, loan program benefits can be taken directly as loan deficiency payments. Farmers may choose to receive marketing loan benefits through direct loan deficiency payments (LDP) when market prices are lower than commodity loan rates. The LDP option allows the producer to receive the benefits of the marketing loan program without having to take out and subsequently repay a commodity loan. The LDP rate is the amount by which the loan rate exceeds the loan repayment rate and thus is equivalent to the marketing loan gain that could alternatively be obtained for crops under loan.

Per person limitations on program payments include a \$40,000 limitation on direct payments, a \$65,000 limitation on counter cyclical payments, and a \$75,000 limitation on loan

deficiency payments. Total dollar limitations equal \$360,000 per person. The Bill retains current rules on spouses, 3-entities, and actively engaged requirement. It also adopts a \$2.5 million adjusted gross income cap on eligibility to participate in farm programs and retains the use of generic certificates in the loan program.

An increase in government deficit has led the congress to reduce federal spending. Proposed budget cuts are intended to decrease governmental spending in several areas, including agriculture. Changes in farm program spending are critical and can reduce the profitability of typical rice and cotton operations. The reduction in commodity price support is one of the proposed areas, intended to reduce government spending. Simulation of proposed budget cut scenarios that could be applied to reduce farm spending is needed to identify major issues for rice and cotton operations that could help producers adjust to future changes. Even though rice and cotton are two program commodities under the current farm bill law, producers also desire to produce high yields in order to assure the viability of their operations. Due to the fact that farm program payments are based on a combination of factors, including base acreage, program yield, market price and actual production, it is important to review the impact of possible reduction scenarios on our rice and cotton producer's economy.

### **1.1 Problem Statement**

Efforts by the Members of the US Congress to reduce farm program spending levels, as a possible result of reduced overall spending due to the projected federal budget deficit in 2005, or reductions in farm program payment limitations per farm, resulting from the continued efforts by some Members of Congress, could cause significant adverse effects on the financial position and strength of many farms, primarily rice and cotton farms, due to their relatively high reliance on farm program payments as a source of income. Information on the potential impacts of

alternative reductions in farm program payments on rice and cotton farms would be beneficial to the agricultural sector of Louisiana in adjusting farm business structure to remain viable business entities.

## **1.2 Objectives**

The general objective of this study is to evaluate the impact of potential reductions in farm program spending on the financial position of rice and cotton farms in Louisiana. The specific objectives of this study are:

1. To identify potential alternative reductions in farm program spending, including reductions in specific payments.
2. To develop a modeling framework which can be used to simulate the impacts of potential farm payment reductions over a multi-year time period on representative rice and cotton farms in Louisiana.
3. To estimate and analyze the projected impacts of potential farm program payment reductions on the financial position of Louisiana rice and cotton farms.

## **1.3 General Procedures**

Alternative potential farm program spending reductions will be identified for analysis. These spending reduction scenarios will include fluctuations in market prices as well as reductions in specific program payments. Industry groups will be contacted to provide input in this phase of the project.

Whole-farm simulation models will be developed. These models will be constructed for each farm type and size, based upon the information obtained concerning representative farm size. Simulation models will be used to evaluate the impact of changes in farm program payments policies on the profitability of farms over a multi-year period. A cash flow of farm's

net income will be calculated for a period of 5 years to estimate the financial stability of rice and cotton farms in Louisiana.

The impact of changes to the whole-farm financial structure and performance will be evaluated. Random yields and market prices will be used to calculate the impact of alternative farm program payment levels over a range of likely market prices and crop yields. Conclusions about the simulated financial status of Louisiana rice and cotton farm industry will be done to evaluate the impact of policy changes on their projected net income.



## **CHAPTER 2 - BACKGROUND**

### **2.1 Literature Review**

The cornerstone of the 1977 and 1981 farm bills for crops was a buffer stock-supply management program that involved the farmer-owned reserve and acreage adjustments. Burnstein, (1980), after reviewing the 1977 farm bill, described the major reasons for implementing the federal reserve program as a way to achieve moderate market stability, maintain reasonable prices for producers and consumers, and provide reliable supplies for domestic and foreign markets. All this assuming that managing these resources would produce better results than the free market.

The 1981 farm bill was approved under the philosophy of an economic recovery program during the administrations of President Reagan. During this period of time acknowledgement of the need to reduce government's involvement and regulation within the economy were a goal for the administration's farm bill proposal. The Department of Agriculture was one of the largest regulators in the government at that time, and yet has played too much of a role in the agricultural economy. A farm bill that would be free from unnecessary and burdensome involvement in the operation of farm businesses and markets was desired by the administration (Leshner, 1981). An example by Knutson, (1981), recognizing the role of government's contribution to uncertainty is due to its decisions to impose embargoes and price controls that have had a major destabilizing effect upon agricultural prices. Other program detail decisions such as not releasing grain from the federal reserves when required by published rules, or reversing a marketing order policy have also shown to have substantial destabilizing effects.

Mims et al., 1989, compared the most relevant differences between the 1981 and 1985 farm bill. The 1985 farm bill seemed to have been more restrictive in acreage control than the

1981 farm bill. Under the 1981 farm bill, a two year average was used to calculate the program base, to expand acreage under this farm bill, producers had to forego one or two years of the farm program benefits. Under the 1985 farm bill acreage calculations used a five year average which made more difficult for producers to expand their base acreage and modify planting patterns. The 1985 farm bill also limited producer's ability to change its crop mix. Cross compliance restrictions of the 1985 farm bill stated that any producer who opted to participate in government program for any one crop may not plant more than the base acreage of any other program crop, even if there is no program participation for the second crop. Salassi et al., (1987), also mention a reduction in price support levels with the approval of the 1985 farm bill for rice producers which limited the expansion of rice production during that time period.

Studies on economic survivability of rice farms in Mississippi area under the 1981 farm bill, conclude that farms with higher crop diversification that include a crop mixes such as cotton, rice, and soybeans were projected to be in a much stronger financial position at the end of the simulation period than farms that only produced rice and soybeans (Salassi et al., 1987). The study at the time shows restrictions due to low rough rice farm level prices for support floor levels. Producers are very dependent on government price support programs in order to provide sufficient farm income to continue their rice production, mainly due to the production costs, yields, and low levels of market prices of rice in relation to the established loan rate and target price levels.

Even though supply control has been a farm bill program objective, the 1985 farm bill included new reduced planting alternatives for cotton, feed grains, rice, and wheat program participants. The 50/92 provision as it was referred, allowed a producer who plants for harvest between 50 and 92 percent of his farm permitted acreage to receive 92 percent of the deficiency

payment. The 50/92 provision was modified by the Omnibus Budget Reconciliation Act of 1987 to become 0/92 options, allowing producers to receive 92 percent of their maximum deficiency payments by planting for harvest between 0 and 92 percent of their permitted acreage. Thompson et al., (1990), estimated the value of the reduced planting alternatives of the 1985 farm bill. The authors concluded that the planting alternatives of the 1985 farm bill afford program participants more flexibility to respond to market forces. They concluded that the reduced planting alternatives would have a significant value for risk-averse participants but would not be used by profit-maximizing producers in the study area. Risk neutral producers would not use the reduced planting alternatives and would therefore have no value, but conclude that 0/92 or similar provisions that afford participants more flexibility to respond to economic forces should be included in future commodity programs, especially when income stabilization is a significant policy procedure.

These acreage restrictions are voluntary as the decision to participate is left to the producer. Even though some producers will reduce their planting acreage there is also an incentive to expand current acreage in anticipation of future subsidies. Gorter and Fisher, (1993), modeled the farmer's planting decision as a deterministic dynamic program. The authors concluded that small farmers tended to increase their plantings, and that the family farm might have been too small to take full advantage of the government's price support programs at the time. In 1987 these crop restriction programs resulted in higher output than would have occurred in their absence. Around \$48 billion dollars were given away as subsidies to the crop programs due to these new restrictions in 1987.

Increased planting flexibility was granted to farmers with the approval of the 1990 farm bill. Deficiency payments were reduced in this farm bill but crop planting flexibility was

increased. The planting flexibility provisions provided farmers the opportunity to achieve higher returns by adjusting their crop mix in response to the market. Program participants were allowed to plant any crop with the exception of fruits and vegetables on normal flex acres and optional flex acres. Normal flex acres are 15 percent of the crop base acreage and optional flex acres are an additional 10 percent of the crop base acres. Nonrecourse loans were available to plant the normal and optional flex acres but no deficiency payments were available for the acreage planted of alternate crops. Chien and Leatham, (1993), used a mean-standard deviation analysis (E-S) to analyze the impacts of the planting flexibility provisions on crop selection, farm returns and farm risk. The authors concluded that the gains from adjusting crop shifts in response to market signals to maximize their expected utilities are not enough to offset the loss in deficiency payments. The study also found that the farms in each study area do not have many opportunities to plant crops that are not already in the government programs. The overall conclusion of their study states that the 1990 Farm Bill provisions do not provide as much financial support as the 1985 Farm Bill.

Duffy, et al., (1993), studied the effect of the changes in the new farm bill from a five year to a three year period for calculating cotton base; and the elimination of limited cross-compliance under the assumption that these changes in provisions would increase the cotton farmer's income. A mixed integer model was used to evaluate the effects of the 1990 Farm Bill on the crop mix decisions made on cotton farms. The results of their study show that prices, yields, production costs and acreage reduction requirements held constant, southeastern cotton farmers with low to moderate initial cotton bases would benefit from the change from the 1985 to 1990 Farm Bill. When initial base acreage is high, the 1990 Farm Bill would result in lower income than the 1985 farm Bill if all the other factors remain constant. A period of base building

strategy under the two farm programs remained the optimal decision and resulted in higher income for cotton farmers. Even though base expansion was inherently risky due to low income in the “nonprogram” early years this problem is more than offset by the benefit of increased earnings later on, which led to equal or greater likelihood of financial survival over the 5 year period of the study.

Taylor and Koo, (2001), estimated the effect of a Farmers Union Farm Bill proposal due to rapidly decreasing wheat and corn prices and rapid increase in government spending in North Dakota from \$353 million in 1996 to \$1.170 billion in 2000. The Farmer’s Union Farm Bill proposal was a targeted plan that utilized varying loan rates based on the USDA’s full cost of production for program crops and a Farmer Owned Reserve. Their research concluded that farmers under the proposed Farm Bill would receive greater returns than under the continuation of the FAIR act of 1996. The authors also pointed out that for North Dakota; the FAIR act has been insufficient to produce net safety for farm income due to the decreases in wheat and corn prices and the continuous need for emergency legislation to support it. There are obvious differences in production costs between the different states where the same commodities are produced, thus, the differences in farm income and survival.

Knutson et al., (1998), investigated the farm level impacts of the 1996 farm bill on Southern States. The authors found that producers perceived commodity price variability as the most important risk management issue. Higher levels of price variability would provide grain farms a possibly higher net cash farm income, as well as a higher risk. On the other hand, the marketing loan program for cotton and rice would aid these producers relatively more than grain producers in reducing risk. At the time, the authors could not predict trends in acreage shifts due to the new farm bill; but with survey results, expected returns over variable risk cost exposure

and the general economies of the representative farms of their study, they expected the 1996 Farm Bill provisions to favor feed grains, wheat, and oilseeds over cotton and rice.

The impact of feed grains and dairy policy provisions on the livestock sector are well known, the relation between cotton programs and the livestock sector have not been previously analyzed. Kouka, et al., (1994), incorporated farm program provisions on a stochastic dynamic model in order to demonstrate that these had a considerable impact on decisions made by farmers concerning livestock. The authors concluded that for a representative crop-livestock producer, acres allocated for winter stockering depended on expected prices for cotton and soybeans, as well as the amount of initial base on the farm. Results of the study underscore the important effect that farm program provisions for cotton can have on a winter stocker enterprise which relationship, based on the results, had important consequences.

Comparisons between different Farm Bills are needed to evaluate the impact on producer's income. In 2002, the new Farm Bill was approved and introduced greater complexity through direct and countercyclical payments. Ibendahl, 2004, compared the 1996 and 2002 Farm Bills to estimate how the new changes affected farmers and formulate suggestions for future Farm Bill policies. Prices were simulated and payments were projected for a period of six years for a representative group of farms in Kentucky. The author concluded that net returns for both Farm Bills were similar as well as their income variability for the six year period.

The new 2002 Farm Bill is probably one of the most complicated pieces of legislation for farmers to analyze and understand its numerous implications. Ibendahl, (2003), used a dataset of farms to calculate potential revenue losses from choosing a non-optimal option. The current Farm Bill has seven basic options, (FSA lists five main options but one of the main options contains 3 sub options), options vary from choice of updating crop yields or not, and update farm

acres. The results showed the need for farmers to update their crop yields and choose a correct option that would allow them to maximize their countercyclical payments as well as direct payment. Correct guidance and assistance from extension service to assure that farmers understand the new Farm Bill would allow increases in farm revenue by choosing the right alternatives.

One of the main priorities with the new 2002 Farm Bill was base and yield updating. Since direct and counter-cyclical payments would be calculated based on updated bases and yields, producers had until March 31, 2003, to update base and yield election, if not previous bases and yields would be used as default for the farm. McCorkle et al., (2003), used the case study approach using several representative farms on the economics of the base and yield update decision. The decision about updating or not is an individual decision that has to be made by the farmer due to its individualistic characteristic of each situation, however, there are some assumption that the authors have generalized and could help. First they conclude that the update base and yield if a farmer has increased acres does not apply if a farm is in an area where yields have not increased over time. The authors also concluded that updating, regardless, to capture higher yields also does not work when planted acres have declined, which was illustrated by many Texas rice farms.

The Agricultural and Food Policy Center (AFCP) at Texas A&M University develops and maintains data to simulate agricultural operations throughout the country, along with data provided by the Food and Agricultural Policy Research Institute (FAPRI). The main purpose of those studies is to determine the economic viability of agricultural operations through simulation of representative farms in major production areas. Outlaw et al., (2004), in their 2004 through 2008 period simulation, concerning cotton operations, 2 out of 18 were classified in good

financial condition, 2 in a poor condition and 14 in a marginal financial status. Rice farms had a worse scenario with eight out of sixteen being projected in a poor financial condition, five classified as marginal, and only 3 classified in a good financial situation through 2008. Raulston et al., (2003), in their study of cotton farm outlook given the August 2003 baseline, of 19 representative cotton farms in production areas in 8 states for the 2003 through 2007 time period, resulted in 2 operations in poor financial conditions, eleven were classified as marginal, and six of the total were classified in good financial condition. All production regions contained cotton farms in good or marginal condition, while the only two farms in poor financial condition were located in the south. Richardson et al., (2003), using the December 2003 baseline, reported ten cotton farms in marginal conditions, three in poor financial situation with a chance greater than 25 percent of losing their net worth, and six farms were rated in good a financial situation. Rice farms from the same study show worse projections than Outlaw et al., (2004), eleven of the 16 rice farms were projected in poor financial condition through 2007, four were projected as marginal, and one was projected to be in good financial condition. The authors estimated that chances greater than 50 percent of losing real net worth for the marginal rice farms due to persistent cash flow pressures are expected. Cotton farms are expected to be in better financial conditions when compared to rice farms in the country. Richardson et al., (2002), determined the economic viability for representative crop farms for a six year period between the years 2002-2007. The authors found that six out of 12 cotton farms under the 2002 farm bill were expected to have low probabilities of cash flow deficits and losses in real net worth; the remaining farms were classified as marginal having 25 to 50 percent chance of low cash flow deficits. The same study expected rice farms to have a much worse outcome than cotton farms throughout the country, 3 were classified in poor financial condition during the same time period, 6 were



classified as marginal and seven as in good financial condition with a chance between 25 and 50 percent of cash flow deficits. Results seem to fluctuate depending on the farms geographical location due to the inconsistent results that are provided by all the different simulation studies that have been made. Another study by Richardson et al., (2003), simulating representative grain farms for a period of time between 2003 to 2007, classified 3 cotton farms out of 14 as in good financial condition, six in marginal condition and the five remaining ones were classified as poor. These poor farms were estimated to have more than 25 percent chance of losing net worth. Rice farms studied under the same time frame reported much more dramatical results than cotton farms, 15 out of the 16 farms were classified as in poor financial condition over the same time frame and the remaining one was classified in marginal shape, cash flow deficits for these farms are so great that a probability greater than 50 percent of losing their real net worth was estimated.

Evaluations of risk management with the implementation of the new farm bill and its implications for Indiana corn and soybean producers were done by Rios and Patrick, (2003). From their non-parametric simulation model using @Risk software the authors conclude that implementing a risk management strategy involving both yield insurance and a marketing position produces additional returns for producers. They also established levels of hedging in the futures market along with timing at which those would be placed, supporting the hypothesis of pre-harvesting marketing of grains increased net returns for producers. The authors also concluded that the development of risk management guidelines appeared to be sensitive to both geographical location and the producer's level of risk aversion. From their study we can see that risk is influenced by the producer's geographical location in the state of Indiana alone, it is then more than likely that such differences are larger nation wide from one state to another; payment limitations could benefit some states more than others with differences in production risks.

Davis et al., (2003), studied crop enterprise selection in the Southeast region using a stochastic simulation model. A target MOTAD model using the stochastic data determined the risk-efficient crop-mix for alternative price and yield expectations for corn, soybeans, wheat, cotton, and peanuts was used. The simulation model was used to generate one thousand returns over variable costs for the mentioned crops, and wheat-double crop soybeans crop enterprises for alternative price and yield scenarios. The simulated were used as inputs in a target MOTAD mathematical programming model to determine the optimal crop enterprise mix for risk averse producers. Peanuts were excluded from the potential crop enterprises as they were produced under a contract receiving a premium, and peanuts produced without a contract or a premium. The results suggest that there is great potential for increased peanut production in the southeast area. Peanuts were in the optimal crop mix regardless of price and yield expectations under contract production and because risk is compensated with the premium. Peanuts are not robust when the premium is eliminated and they are not in the optimal solution under pessimistic price scenarios. The authors found that risk neutral producers may choose to produce both cotton and peanuts.

Miller et al., (2003), examined the potential impact of changes to government payment limits for Mississippi farms. From the 1996 Farm Bill to the new 2002 Farm Security and Rural Investment Act (FSRIA), payment limits have changed, and how these changes would affect Mississippi farm producers was the issue. The authors concluded that changes in payment limits would affect regions differently because of the different crops that are produced. Mississippi was expected to be more affected than those farms in the Midwest due to the number of rice and cotton farms in the state. Rice and cotton farms receive higher per acre decoupled payments relative to other crops, and reach payment limits with smaller base acreages. The authors also

stated that efficiency also was affected by changes in payment limits; payment limits that prevent a farm from producing at its minimum per unit costs can reduce a farm's profits. A farm's cost structure could ultimately determine the restriction level of the payment limits.

Smith and Bullen, (2003), reviewed the impact of the new farm bill changes on the profitability of a cotton and peanut for Georgia and North Carolina farms. Since the new 2002 Farm Bill eliminated the production quotas that have been applied to peanut producers for more than 60 years and replaced it with marketing loan type similar to the one for major program crops. Without incorporating price and yield risk, the authors concluded that there is potential to more than double net farm income; the net farm income is due to increases in base payments through the addition of peanut base and increasing of cotton base. Without the government payments the farms would not be profitable since government payments make up over 100% of net farm income.

Anderson et al., (2003), examined the new counter-cyclical payment program, and particularly the rationality of a risk-averse producer hedging the counter-cyclical payment. The decision of a representative Mississippi cotton-soybean farm was considered. The model that was constructed is considered unique in that hedging the marketing year average price potentially involved taking positions in multiple contract months. The authors concluded that for all cropping alternatives, the optimal hedge ratio is zero at a sufficiently low price. Hedge ratios initially increase as the February price of cotton futures contract (CTZ) increases, reaching a maximum at a February price of CTZ that is about equal to the loan rate. As prices continued to increase, the optimal hedge ratio declines to zero. The authors found that hedge ratios for soybeans on cotton base and 50-50 cotton and soybeans on cotton base are lower than for no crop but still follow the same basic pattern in relation to the February price of CTZ. For a

slightly risk averse decision maker, the optimal hedge ratio for cotton on cotton base is zero at any February price of CTZ. For a moderately risk averse decision maker, a small amount of hedging is optimal at a February price of CTZ near the cotton loan rate.

Brooks, (1997), in his paper on congressional voting, investigated the determinants of House and Senate votes on congressional amendments to limit payments to farmers. The author divided the determinants of a congressman's decision in three categories: (a) response to active lobbying, measure by campaign contributions; (b) a response to passive constituency concerns, typically captured by measures of interest group size; and (c) ideological factors. Results from this study showed that there is evidence of a two-way relationship between money and votes in the House. The gradient on contributions from producer's Political Actions Committee (PAC) suggests that an extra \$1,000 typically led to a 1.1% improvement in the probability of the congressman voting against the payment limitations amendment. At the same time, a 1% increase in the probability of a favorable vote typically elicited an additional \$5,400 from producer PACs. There was no evidence of this relationship in the Senate. Agribusiness contributions did not appear to be effective in either chamber. Probably due to their ambivalent approach to farm programs. Anti-amendment voters received nearly 10 times as much on average, as pro-amendment voters. The author estimated an equation in which a simultaneous probit-tobit system was specified such that the propensity of congressman to vote in favor of farm payment limitations depends on PAC contributions and the propensity of each coalition to contribute depends on the likelihood of the congressman voting in its favor. The overall fit of voting equations in terms of correct predictions shows 75% correct predictions in the House and 81% correct predictions in the Senate. The possible explanation of the difference between the House and the Senate by the authors is that PACs do not pay to congressmen unless they believe

their contributions are likely to enhance the probability of a favorable vote. Campaign contributions have an uneven impact on voting decisions, the two stage estimates support the view that measurable lobbying activity needs to be differentiated from other political pressures and that ideology should be viewed as endogenous to the political process.

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## **CHAPTER 3 – STUDY PROCEDURES AND RESULTS**

### **3.1 Introduction**

Proposed budget cuts are intended to decrease governmental spending in several areas, including agriculture. Rice and cotton are two agricultural commodities that are extensively produced in Louisiana. Changes in farm program spending are critical and can reduce the profitability of typical rice and cotton operations. Among the President's budget proposals is the reduction in commodity price support. Simulation of proposed budget cut scenarios that could be applied to reduce farm spending is needed to identify major issues for rice and cotton operations that could help producers adjust to future changes. Rice and cotton enterprise operations for the study were developed based on acreage, "enterprises" were used instead of "farms" since rice and cotton are the primary commodity produced in the South as opposed to corn and soybeans in the West. These enterprises are not diversified farms, but dedicated to the production of either rice or cotton as monoculture. Net farm income fluctuations due to reductions in program payment limitations as well as price fluctuations were analyzed in this study. Crop production revenues plus all government payments minus direct crop production expenses, depreciation (fixed costs) and general farm overhead expenses were included in the net income analysis. Share rent expenses are taken out of gross income (both market income and program payments). Basic labor costs for field operations are included in variable production costs, but no charge for management is included. Off-farm income and family expenses are also not included in the analysis.

### **3.2 Materials and Methods**

#### **3.2.1 Representative Farm and Farm Organization**

Representative rice and cotton enterprises were developed for use in this study. A typical cotton and rice enterprise operation as single crops with no rotation or interaction with other



program crops were considered. These typical farm enterprises have a rice and cotton program base acreage, located in the Northeast Louisiana for cotton, and Southwest Louisiana for rice.

The organization and characteristics of the four enterprises are listed in Table 3.1. Each of the rice and cotton operations is assumed to plant and harvest 85 percent of farm base acreage. For rice operations, 18 percent of the land is owned and 82 percent of crop land shared is leased at a 30 percent crop share arrangement. Cotton operations had 30 percent of crop land owned and 70 percent of crop land shared leased at a 20 percent crop share arrangement. The previous land tenure data was based on the 2002 Louisiana Census of Agriculture. Farm sizes and number of entities that were evaluated for rice and cotton operations in this study account for the majority of rice and cotton production in Louisiana.

Table 3.1 Farm organization of representative rice and cotton operations in Louisiana.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Organization	Single operator (A)	Two person partnership (A and B)	Two person partnership (A and B)	Three person partnership (A, B, and C)
Number of Entities	1	2	3	4
Payment Limitation per entity	A= \$180,000	A= \$180,000 B= \$180,000	A= \$180,000 B= \$180,000 A+ B= \$180,000	A= \$180,000 B= \$180,000 A+ B= \$180,000 C= \$180,000

A one entity operation represents a single farm operator “A” with a payment limit of \$180,000. Two and three entity organizations represent a two person partnership “A” and “B” as farm operators and individual payment limitations of \$180,000, with the difference that the joint partnership of “A+B” with a payment limitation of \$180,000 represents the additional entity in the 3 entity farm. A partnership of A and B could be represented by a husband and wife, father and son organization that could contribute to the same family income. Four entity operations are similar to a three entity farm in which “A”, “B”, the joint venture of “A+B”, are also present, and differ in the addition of operator “C” who represents the fourth entity with an equal payment

limit of \$180,000. Operators A and B in 3 and 4 entity enterprises, are both as individuals but also in 50 percent partnership (A+B) allowed by the 3 entity rule that could also allow them to participate in 50 percent of an additional farming operation that was not considered in this study.

### 3.2.2 Farm Enterprise Sizes

For rice and cotton operations, farm enterprise sizes for this study were determined by the payment limitations established in the farm bill program. Acreage level of the farms was determined by estimating the acreage level at which a one, two, three or four entity operation would reach the most restrictive payment limit.

Table 3.2 Characteristics of representative Southeast Louisiana rice farms.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Farm rice base acreage	647	1,294	1,941	2,588
Owned farm acreage (18%)	116	232	348	464
Leased farm acreage (82%)	531	1,062	1,593	2,124
Rice harvested acreage (85% of base)	550	1,100	1,650	2,200
Owned acreage (18%)	100	200	300	400
Leased acreage (82%)	450	900	1,350	1,800
Rice in rotation	245	490	735	980
Owned acreage (18%)	45	90	135	180
Leased acreage (82%)	200	400	600	800
Rice in Fallow	305	610	915	1,220
Owned acreage (18%)	55	110	165	220
Leased acreage (82%)	250	500	750	1,000
Rice ratoon crop acreage (60%)	305	610	915	1,220
Owned acreage (30%)	55	110	165	220
Leased acreage (70%)	250	500	750	1,000
Total machinery investment	\$544,513	\$690,708	\$1,155,004	\$1,479,029
Average annual MACRS depreciation	\$58,524	\$75,140	\$126,581	\$160,346
Average annual P&I payments	\$81,396	\$104,506	\$176,051	\$223,013
Average annual salvage value income	\$19,732	\$25,279	\$42,981	\$54,520
General farm overhead expenses	\$19,800	\$36,300	\$49,500	\$66,000

Calculation of farm acreage for this study was done by using state averages for rice and cotton operations in Louisiana. The most restrictive payment for rice in Louisiana is the direct

program payment and the counter cyclical program payment for cotton. Calculations for farm acreage requirement for the study showing the most restrictive program payment is showed on Appendix Table A.1 for rice and Appendix Table A.2 for cotton for a one entity operation.

Louisiana Census of Agriculture reports that farms with acreage levels higher than 500 acres of rice and cotton represent 32.7 and 38.6 percent of the total number of rice and cotton operations, respectively. These farming operations represent acreage levels of 77.85 and 75.76 percent of total harvested rice and cotton acreage, respectively. Farms with acreage levels higher than 500 acres represent most of the total harvested acreage of rice and cotton in Louisiana.

Characteristics of the four rice enterprise sizes used in the study are listed in Table 3.2. A one entity rice farm is a 647 rice base acre enterprise with a single farm operator and 550 acres of harvested rice. The other rice enterprises represent two-entity (1,100 acres), three-entity (1,650 acres) and four-entity (2,200 acres) of harvested rice farming operations.

Equipment investments were calculated based on the machinery needs for the harvested acreage level of each farming operation. Equipment, depreciation, useful life, salvage value, and other costs are listed on Appendix tables A3, A4, A5, and A6 for a one, two, three, and four entity rice operations, respectively. Modified accelerated recovery system depreciations (MACRS), also known as general depreciation system (GDS), principle and interest payments were estimated based upon the required machinery compliments for each rice and cotton enterprise. A 9 percent interest was charged as the financial purchase cost of the machinery. Estimates of variable overhead expenses were assigned to each operation. A total annual per acre cost of \$36, \$33, \$30, and \$30 for a one, two, three and four entity operations, respectively, was found for the established rice enterprises listed on Table 3.2.

For direct payments (DP), and Counter Cyclical payments (CCP), state average program payment yield was used to calculate acreage based on a one entity payment limitation. Two, three and four entity operations were also calculated.

Characteristics of the four cotton enterprise sizes used in this study are listed in Table 3.3. A one entity cotton farm is an 882 cotton base acre enterprise with a single farm operator with 750 acres of harvested cotton. The other cotton enterprises represent two-entity (1,500 acres), three-entity (2,250 acres) and four-entity (3,000 acres) of harvested cotton farming operations. Equipment, depreciation, useful life, salvage value, and other costs are listed on Appendix tables A7, A8, A9, and A10 for a one, two, three, and four entity cotton operations, respectively. A total annual per acre cost of \$36, \$33, \$30, and \$30 for a one, two, three and four entity operations, respectively, was found for the established cotton enterprises listed on Table 3.3.

Table 3.3 Characteristics of representative Northeast Louisiana cotton farms.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Farm cotton acreage	882	1,764	2,646	3,528
Owned farm acreage (41%)	265	530	795	1,060
Leased farm acreage (59%)	617	1,234	1,851	2,468
Cotton harvested acreage (85% of base)	750	1,500	2,250	3,000
Owned acreage (41%)	225	450	675	900
Leased acreage (59%)	525	1,050	1,575	2,100
Total machinery investment	\$745,341	\$1,248,040	\$1,870,881	\$2,321,970
Average annual MACRS depreciation	\$89,136	\$150,578	\$224,428	\$278,656
Average annual P&I payments	\$124,009	\$209,427	\$312,140	\$387,560
Average annual salvage value income	\$30,010	\$49,985	\$74,636	\$92,282
General farm overhead expenses	\$27,000	\$49,500	\$67,500	\$90,000

Random prices and yields were generated over a five-year projection (2005-2009). Random prices and yields were projected based upon mean forecasts over the stated period with correlations based on historical observations from a previous ten-year period (1993-2003). The projected data was simulated using a procedure developed by No and Salassi (2004). The model

followed a non-random approach in which an ARIMA procedure with the SAS® program was implemented. The resulting prices and yields were used to calculate market income and price support payments for rice and cotton. Farm sizes of 647 acres, 1,294 acres, 1,941 acres, and 2,588 acres for rice, and 882 acres, 1,764 acres, 2,646 acres, and 3,528 acres for cotton were calculated for one, two, three and four entity operations, respectively. Since only 85% of the total base acreage is eligible for farm programs, the resulting harvested acreage was 550 acres, 1100 acres, 1,650 acres and 2,200 acres for rice, and 750 acres, 1500 acres, 2250 acres, and 3000 acres for cotton.

### **3.2.3 Equipment Requirements**

To calculate total net farm income, besides variable costs, depreciation costs and annual principle and interest payments of equipment were required. Depending on farm size, different amounts of machinery and complement equipment are used for proper farm operation. Both machinery and complements were depreciated linearly on a seven year period and a salvage value of 30 percent of the initial cost was assumed. Annual fixed loan rate of 9% of the initial purchase cost amount, as well as principal payments were accounted for in the income statements of each type of farm operation. Annual estimates of average depreciation and principle interest payments were estimated based upon the required machinery complement for each operation. Specifications about machinery use and replacement, length of useful life and salvage value were based on the assumption that each of these rice and cotton enterprises were actively engaged in production and that equipment is replaced in a timely manner.

Number of machinery and implements that are used for each cultural practice were calculated based on historical weather impact on workable field hours (Zapata et al., 1997). Monthly average available working hours derived from their study were used to perform farm operations in a timely fashion. Total machinery investment was calculated for each rice and

cotton operation based upon acreage. Production costs and field operation data for rice were taken from Salassi and Breaux (2005). Production costs and field operation data for cotton operations were taken from Paxton (2005). While fixed costs remain the same through the time period of the study, variable costs were increased 1 percent per year, starting in 2006.

### 3.2.4 Simulations

Changes in program payment were compared to a baseline scenario in which no changes to the current policy parameters were made. The possible scenarios include changes in world and domestic prices, as well as reductions in farm program payments for Louisiana rice and cotton operations. Farm income was calculated using market income, DP, CC, and LDP for both commodities. Projections of income and expenses were made for a five-year period (2005-2009), with program spending reductions beginning in 2005 and continuing through 2009. Crop yields and variable production costs were assumed to be the same for all farm sizes, resulting in proportional gross income to farm acreage. Depreciation and overhead expenses were specific to each farm size reflecting economies of scale for each individual farm size operation. For each year of simulation, random market prices and crop yields were generated to allow for inclusion of price and yield risk. Random domestic market prices, world market prices, and crop yields per acre, for both rice and cotton, were generated using procedures outlined by Richardson et al. (2000), and adapted by No and Salassi (2004). Projected mean price and yield values used in the analysis are shown in Table 3.4 for rice and Table 3.5 for cotton.

Table 3.4 Five year projected mean price and rice yield values (2005-2009).

	2005	2006	2007	2008	2009
Rice Price (\$/cwt)	6.90	6.95	7.00	7.05	7.10
Avg. World Price	6.00	6.05	6.10	6.15	6.20
First Crop Yield (cwt/acre)	60.50	61.90	63.30	64.70	66.10
Ratoon Crop Yield (cwt/acre)	15.13	15.48	15.83	16.18	16.53

Table 3.5 Five year projected mean price and cotton yield values (2005-2009).

	2005	2006	2007	2008	2009
Mean Cotton Price (\$/lb)	\$0.50	\$0.51	\$0.52	\$0.53	\$0.54
Mean Avg. World Price (\$/lb)	\$0.40	\$0.41	\$0.42	\$0.43	\$0.44
Mean Cotton Yield (lb/acre)	960.0	970.0	980.0	990.0	1000.0

Domestic market prices for rice and cotton in years 2005-2009 were assumed to trend upward toward the previous ten year average. Relationships between domestic and world market prices were assumed to follow the same differences as occurring in 2005. Crop yields were projected to follow estimated trends. Our study includes a comparison of a baseline simulation of projected income and expenses and four alternative program payment reductions as well as two price fluctuations.

1. Baseline Scenario: Estimates of projected rice or cotton operation income, expenses and net returns based upon projected mean values of market prices and yields with continuation of current price support payment provisions as defined in the 2002 farm bill.
2. Scenario 1: Estimates of projected rice or cotton operation income, expenses and net returns based upon projected mean values of market prices and yields with the assumption that DD, CCP, and LDP as estimated under provisions of the 2002 farm bill, would be reduced by one percent.
3. Scenario 2: Estimates of projected rice or cotton operation income, expenses and net returns based upon projected mean values of market prices and yields with the assumption that DD, CCP, and LDP as estimated under provisions of the 2002 farm bill, would be reduced by two percent.
4. Scenario 3: Estimates of projected rice or cotton operation income, expenses and net returns based upon projected mean values of market prices and yields with the

assumption that DD, CCP, and LDP as estimated under provisions of the 2002 farm bill, would be reduced by five percent.

5. Scenario 4: Estimates of projected rice or cotton operation income, expenses and net returns based upon projected mean values of market prices and yields with the assumption that DD, CCP, and LDP as estimated under provisions of the 2002 farm bill, would be reduced by ten percent.
6. Scenario 5: Estimates of projected rice or cotton operation income, expenses and net returns based upon projected mean values of market prices and yields with the assumption of a ten percent increase in domestic and world market prices, with continuation of current price support payment provisions as defined in the 2002 farm bill.
7. Scenario 6: Estimates of projected rice or cotton operation income, expenses and net returns based upon projected mean values of market prices and yields with the assumption of a ten percent decrease in domestic and world market prices, with continuation of current price support payment provisions as defined in the 2002 farm bill.

### **3.3 Results and Discussion**

#### **3.3.1 Baseline Scenario**

Continuation of current policy generated average income statements for the five year projected period (2005-2009), for both rice and cotton farm operations, and are presented in Table 3.6 and Table 3.7, respectively. With the current policies in place, projected results for rice and cotton operations in Louisiana are not beneficial for small size rice farms. A one entity rice and cotton operations are not economically viable, mostly due to high fixed and overhead costs per acre.

Net farm income for a one entity rice operation averages \$838 over the five year period, and would face negative returns over total costs more than half the time, 52.7 percent (Table



3.6). A one entity cotton operation would produce an average income over the projected time period of \$4,889 and would face negative returns over total costs in almost half percent of the time, 45.6% (Table 3.7). The three entity rule described in the current Farm Bill, poses a restrictive effect on one entity rice and cotton operations. One entity enterprises can increase acreage as a tool intended to increase net farm income; with the same production costs and increasing overhead costs, government payment supports would not increase with this approach.

Table 3.6 Income statement for rice baseline scenario, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Rice market income	211,634	423,267	634,901	846,534
Direct Fixed Payments	39,985	79,970	119,956	159,941
Counter Cyclical payments	27,100	54,200	81,300	108,400
LDP payments	17,347	34,694	52,041	69,388
Total farm gross income	296,066	592,131	888,198	1184,263
Rice variable costs	236,636	473,273	709,910	946,546
Net returns above variable costs	59,430	118,858	178,288	237,717
Annual Salvaged equipment value	19,732	25,279	42,981	54,520
Depreciation expenses	58,524	75,140	126,581	160,346
General farm overhead expenses	19,800	36,300	49,500	66,000
Net farm income	838	32,698	45,188	65,891
Number of times net returns above variable costs are negative	2.2%	2.2%	2.2%	2.2%
Number of times net returns above total costs are negative	52.7%	37.6%	38.9%	37.4%

Under current policy, all Louisiana rice operations would be able to produce higher returns above their variable costs, with a 2.2 percent chance of negative returns. Cotton operations, on the other hand, would be able to produce higher net returns over their variable costs with a probability of one out of five years of negative income. The three larger rice and cotton farms are more typical of Louisiana farming operations. As seen in table 3.6, and table 3.7, higher returns are achieved; however, these are then divided among multiple operators/families. As seen in Table 3.7, cotton represents a better opportunity to achieve higher net returns when compared to

rice operations, at the same time, higher risks are also present due to a higher chance of negative returns over variable costs. Net rice farm income ranges from \$838 for a single operator farm to \$65,891 for a 4 entity operator enterprise. Cotton net income for the projected period ranges from \$4,889 for a single operator to \$87,790 for a four entity enterprise. Income results for higher acreage operations are positive but still represent low levels of income for multiple operator/family units.

Table 3.7 Income statement for cotton baseline scenario, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Cotton market income	329,170	658,340	987,510	1,316,680
Direct Fixed Payments	31,277	62,553	93,830	125,107
Counter Cyclical payments	38,570	77,140	115,709	154,279
LDP payments	52,929	105,858	157,787	211,716
Total farm gross income	451,946	903,891	1,354,836	1,807,782
Cotton variable costs	360,904	721,809	1,082,713	1,443,618
Net returns above variable costs	91,042	182,082	272,123	364,164
Annual Salvaged equipment value	30,010	49,985	74,636	92,282
Depreciation expenses	89,163	150,578	224,428	278,656
General farm overhead expenses	27,000	49,500	67,500	90,000
Net farm income	4,889	31,989	54,831	87,790
Number of times net returns above variable costs are negative	21.2%	21.2%	21.2%	21.2%
Number of times net returns above total costs are negative	45.6%	41.5%	40.5%	39.2%

### 3.3.2 Program Payment Reductions

A one percent reduction in DP, CC, and LDP payments represents changes in rice and cotton enterprise annual income and expenses, Table 3.8 and 3.9, respectively. A very minor change in gross income as a result of such reduction is noticed when comparing the reduction scenario to the projected baseline as seen in Table 3.16 and 3.17 for both commodities.

A total gross income decline of 0.29 percent for rice and 0.27 percent for cotton, from comparing to the current policy can be observed. Even though these seem like minor changes to the operation's gross income, the impact these reductions have on net farm income and net returns above variable costs are very noticeable, considering no change in the number of acres harvested or variations in production costs per acre.

Table 3.8 Income statement for rice with a 1% reduction in program payments, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Rice market income	211,634	423,267	634,901	846,534
Direct Fixed Payments	39,585	79,171	118,756	158,342
Counter Cyclical payments	26,829	53,658	80,487	107,316
LDP payments	17,174	34,347	51,521	68,695
Total farm gross income	295,222	590,443	885,665	1,180,887
Rice variable costs	236,636	473,273	709,910	946,546
Net returns above variable costs	58,586	117,170	175,755	234,341
Annual Salvaged equipment value	19,732	25,279	42,981	54,520
Depreciation expenses	58,524	75,140	126,581	160,346
General farm overhead expenses	19,800	36,300	49,500	66,000
Net farm income	-6	31,009	42,655	62,515
Number of times net returns above variable costs are negative	2.5%	2.5%	2.5%	2.5%
Number of times net returns above total costs are negative	53.6%	38.6%	40.1%	38.5%

A one percent reduction in program payments represents a negative average income for the projected five year period for one entity rice operations. A 0.29 and 0.27 reduction in gross income for rice and cotton, respectively, represents only an average net income loss of \$844 and \$1,228 for a one entity rice and cotton farm; however, when compared to a 4 entity the loss of net income becomes a net income reduction of \$3,376 and \$4,912 for rice and cotton operations respectively. This decline represents a 5.1 and 5.6 percent reduction in net farm income for a 4 entity enterprise for rice and cotton, respectively.

Table 3.9 Income statement for cotton with a 1% reduction in program payments, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Cotton market income	329,170	658,340	987,510	1,316,680
Direct Fixed Payments	30,964	61,928	92,892	123,855
Counter Cyclical payments	38,184	76,368	114,552	152,736
LDP payments	52,400	104,799	157,199	209,599
Total farm gross income	450,718	901,435	1,352,153	1,802,870
Cotton variable costs	360,904	721,809	1,082,713	1,443,618
Net returns above variable costs	89,814	179,626	269,440	359,252
Annual Salvaged equipment value	30,010	49,985	74,636	92,282
Depreciation expenses	89,163	150,578	224,428	278,656
General farm overhead expenses	27,000	49,500	67,500	90,000
Net farm income	3,661	29,533	52,148	82,878
Number of times net returns above variable costs are negative	21.4%	21.4%	21.4%	21.4%
Number of times net returns above total costs are negative	46.0%	41.9%	40.9%	39.6%

A two percent reduction in program payments reduces rice and cotton farm income. Changes in income statements are presented in Tables 3.10 and 3.11 for rice and cotton enterprises, respectively. The impact of a two percent reduction in program payments on farm gross income still seems insignificant when compared to the baseline scenario (Table 3.16 and 3.17). Gross income was reduced by 0.57 and 0.54 for rice and cotton farm operations. Even though these seem like minor changes to the operation's gross income, the impact these reductions have on net farm income and net returns above variable costs are very noticeable, considering no change in the number of acres harvested or variations in production costs per acre. The reduction of 0.57 percent in gross income represents a reduction in farm net income of \$1688, \$3378, \$5065, and \$6754 for one, two, three and four rice entities, respectively. For cotton a 0.54 percent decline in gross income represents a reduction in net income of \$2457, \$4911, \$6367, and \$9824 for a one, two, three and four entity cotton farm respectively. Along

with the decrease in gross income, a slight increase in the probability of negative net returns over variable costs are observed for rice and cotton, being cotton the one that always poses the highest risk.

Table 3.10 Income statement for rice with a 2% reduction in program payments, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Rice market income	211,634	423,267	634,901	846,534
Direct Fixed Payments	39,186	78,371	117,557	156,742
Counter Cyclical payments	26,558	53,116	79,674	106,232
LDP payments	17,000	34,000	51,001	68,001
Total farm gross income	294,378	588,754	883,133	1,177,509
Rice variable costs	236,636	473,273	709,910	946,546
Net returns above variable costs	57,742	115,481	173,223	230,963
Annual Salvaged equipment value	19,732	25,279	42,981	54,520
Depreciation expenses	58,524	75,140	126,581	160,346
General farm overhead expenses	19,800	36,300	49,500	66,000
Net farm income	-850	29,320	40,123	59,137
Number of times net returns above variable costs are negative	2.8%	2.8%	2.8%	2.8%
Number of times net returns above total costs are negative	54.2%	39.7%	41.0%	39.6%

Tables 3.12 and 3.13 present estimated changes in annual income and expenses resulted from a reduction in five percent of DP, CC, and LDP. Again, a change in gross income as a result of such reduction is noticed when comparing the reduction scenario to the projected baseline as seen in Table 3.16 and 3.17 for both commodities. A decline in total gross income of 1.43 percent for rice and 1.36 percent for cotton, when comparing to the baseline can be seen. Even though these seem like minor changes to the operation's gross income, the impact these reductions have on net farm income and net returns above variable costs are very noticeable, considering no change in the number of acres harvested or variations in production costs per acre.

Table 3.11 Income statements for cotton with a 2% reduction in program payments, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Cotton market income	329,170	658,340	987,510	1,316,680
Direct Fixed Payments	30,651	61,302	91,953	122,604
Counter Cyclical payments	37,798	75,597	113,395	151,193
LDP payments	51,870	103,741	155,611	207,481
Total farm gross income	449,489	898,980	1,348,469	1,797,958
Cotton variable costs	360,904	721,809	1,082,713	1,443,618
Net returns above variable costs	88,585	177,171	265,756	354,340
Annual Salvaged equipment value	30,010	49,985	74,636	92,282
Depreciation expenses	89,163	150,578	224,428	278,656
General farm overhead expenses	27,000	49,500	67,500	90,000
Net farm income	2,432	27,078	48,464	77,966
Number of times net returns above variable costs are negative	21.7%	21.7%	21.7%	21.7%
Number of times net returns above total costs are negative	46.4%	42.4%	41.3%	40.1%

This reduction of 1.43 percent in gross income represents an average reduction in net farm income of \$4,221, \$8,443, \$12,665, and \$16,886 for one, two, three and four rice entities, respectively. For cotton a 1.36 percent decline in gross income represents a reduction in net income of \$6,140, \$12,277, \$17,417, and \$24,562 for a one, two, three and four entity cotton farm respectively. Along with the decrease in gross income, a slight increase in the probability of negative net returns over variable costs is observed for rice and cotton. A five percent reduction in program payments is substantial and would represent a 26, 28, and 26 percent reduction in net income for a two, three, and four entity rice operation, respectively. For cotton enterprises, a five percent reduction in payment limitations would represent 38, 32, and 28 percent decline in net returns for a two, three, and four cotton farm entity. Table 3.18 and 3.19 show the annual changes in net farm income for rice and cotton operations, respectively.

Table 3.12 Income statement for rice with a 5% reduction in program payments, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Rice market income	211,634	423,267	634,901	846,534
Direct Fixed Payments	37,986	75,972	113,958	151,944
Counter Cyclical payments	25,745	51,490	77,235	102,980
LDP payments	16,480	32,960	49,439	65,919
Total farm gross income	291,845	583,689	875,533	1,167,377
Rice variable costs	236,636	473,273	709,910	946,546
Net returns above variable costs	55,209	110,416	165,623	220,831
Annual Salvaged equipment value	19,732	25,279	42,981	54,520
Depreciation expenses	58,524	75,140	126,581	160,346
General farm overhead expenses	19,800	36,300	49,500	66,000
Net farm income	-3,383	24,255	32,523	49,005
Number of times net returns above variable costs are negative	4.3%	4.3%	4.3%	4.3%
Number of times net returns above total costs are negative	56.1%	42.6%	43.9%	42.4%

Table 3.13 Income statement for cotton with a 5% reduction in program payments, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Cotton market income	329,170	658,340	987,510	1,316,680
Direct Fixed Payments	29,713	59,426	89,138	118,851
Counter Cyclical payments	36,641	73,283	109,924	146,565
LDP payments	50,282	100,565	150,847	201,130
Total farm gross income	445,806	891,614	1,337,419	1,783,226
Cotton variable costs	360,904	721,809	1,082,713	1,443,618
Net returns above variable costs	84,902	169,805	254,706	339,608
Annual Salvaged equipment value	30,010	49,985	74,636	92,282
Depreciation expenses	89,163	150,578	224,428	278,656
General farm overhead expenses	27,000	49,500	67,500	90,000
Net farm income	-1,251	19,712	37,414	63,234
Number of times net returns above variable costs are negative	22.9%	22.9%	22.9%	22.9%
Number of times net returns above total costs are negative	47.9%	43.7%	42.7%	41.4%

Estimations of changes in net farm income statements for a 10 percent reduction in program payments is presented in Table 3.14 and 3.15 for rice and cotton operations, respectively. This represents the largest cut compared to the other scenarios that have already been presented. The previous scenario, 5 percent reduction, already showed to be a drastic cut in crop program payments. A 10 percent reduction represents a 2.85 and 2.72 percent decrease in gross income for rice and cotton enterprises, respectively. This percentage represents a reduction in gross income of more than \$10,000 for a two entity rice farm, and more than \$17,000 for a two entity cotton operation. Such reduction in program payments would represent a decline in net farm income of \$16,887 for a two entity enterprise, \$25,330 for a three entity enterprise, and \$33,772 for a four entity rice enterprise. For cotton operations, a 10 percent reduction in program payments represents a decline in net farm income of \$24,555 for a two entity enterprise, \$35,833 for a three entity enterprise, and \$51,116 for a four entity cotton enterprise. Net farm income would be reduced by 52, 56, and 51 percent for rice operations, and 77, 65, 38 percent reduction for cotton farm enterprises for the same entities mentioned above. Changes in annual net farm income within the different program reduction scenarios can be seen in Table 3.18 for rice and Table 3.19 for cotton.

The risk of negative net returns over variable and total costs increased dramatically after a 10 percent reduction in program payments, especially for rice farm enterprises. The chance of negative net returns over variable costs for rice operations was increased by an average of 4.9 percent for rice and almost 2 percent for cotton. The probability of negative net returns over total costs increased on an average of 8.9 percent for rice and 3.4 percent for cotton operations. Rice enterprises seem to be the most sensitive to reductions in program payments, probably due to lower net income of their operations.



Our results indicate that reductions in program payments would increase the number of rice and cotton operations under poor and marginal financial status. Under the current Farm Bill, Outlaw et al. (2004) reported only 2 cotton farms in good financial condition out of a total of 18, 2 were in poor and 14 in a marginal financial status. For rice operations the authors reported 11 farms as in poor financial status through 2007, four were projected as marginal and only one was projected to be in good financial status. Marginal rice operations at the time were estimated to have a 50 percent chance of losing their net worth due to persistent cash flow pressures Richardson et al. (2003) under the December baseline, reported only 6 out of 19 cotton farms in good financial situation. A reduction in program payments would limit the expansion and reduce planted acreage of rice and cotton operations and having a similar impact than after the approval of the 1985 Farm Bill reported by Salassi et al. (1987).

Table 3.14 Income statement for rice with a 10% reduction in program payments, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Rice market income	211,634	423,267	634,901	846,534
Direct Fixed Payments	35,987	71,973	107,960	143,947
Counter Cyclical payments	24,390	48,780	73,170	97,560
LDP payments	15,612	31,225	46,837	62,450
Total farm gross income	287,623	575,245	862,868	1,150,491
Rice variable costs	236,636	473,273	709,910	946,546
Net returns above variable costs	50,987	101,972	152,958	203,945
Annual Salvaged equipment value	19,732	25,279	42,981	54,520
Depreciation expenses	58,524	75,140	126,581	160,346
General farm overhead expenses	19,800	36,300	49,500	66,000
Net farm income	-7,605	15,811	19,858	32,119
Number of times net returns above variable costs are negative	7.1%	7.1%	7.1%	7.1%
Number of times net returns above total costs are negative	58.6%	47.8%	48.7%	47.6%

Table 3.15 Income statement for cotton with a 10% reduction in program payments, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Cotton market income	329,170	658,340	987,510	1,316,680
Direct Fixed Payments	28,149	56,298	84,447	112,596
Counter Cyclical payments	34,713	69,426	104,138	138,851
LDP payments	47,636	95,272	142,908	190,544
Total farm gross income	439,668	879,336	1,319,003	1,758,671
Cotton variable costs	360,904	721,809	1,082,713	1,443,617
Net returns above variable costs	78,764	157,527	236,290	315,054
Annual Salvaged equipment value	30,010	49,985	74,636	92,282
Depreciation expenses	89,163	150,578	224,428	278,656
General farm overhead expenses	27,000	49,500	67,500	90,000
Net farm income	-7,389	7,434	18,998	38,680
Number of times net returns above variable costs are negative	24.2%	24.3%	24.3%	24.3%
Number of times net returns above total costs are negative	50.4%	45.8%	44.8%	43.6%

Table 3.16 Average rice farm annual change in gross income, comparison of program payment changes to baseline scenario, (2005-2009) Mean.

	Source of Income	1-Entity Farm		2-Entity Farm		3-Entity Farm		4-Entity Farm	
		\$US	Program Payment	\$US	Program Payment	\$US	Program Payment	\$US	Program Payment
Baseline	Rice Market	211,634		423,267		634,901		846,534	
	DP	39,985		79,970		119,956		159,941	
	CCP	27,100	84,432	54,200	168,864	81,300	253,297	108,400	337,729
	LDP	17,347		34,694		52,041		69,388	
	Gross Income	296,066		592,131		888,198		1184,263	
1% Reduction	DP	39,585		79,171		118,756		158,342	
	CCP	26,829		53,658		80,487		107,316	
	LDP	17,174	83,588	34,347	167,176	51,521	250,764	68,695	334,353
	Gross Income	295,222		590,443		885,665		1,180,887	
	Change from Baseline	<b>-0.29%</b>		<b>-0.29%</b>		<b>-0.29%</b>		<b>-0.29%</b>	
2% Reduction	DP	39,186		78,371		117,557		156,742	
	CCP	26,558		53,116		79,674		106,232	
	LDP	17,000	82,744	34,000	165,487	51,001	248,232	68,001	330,975
	Gross Income	294,378		588,754		883,133		1,177,509	
	Change from Baseline	<b>-0.57%</b>		<b>-0.57%</b>		<b>-0.57%</b>		<b>-0.57%</b>	
5% Reduction	DP	37,986		75,972		113,958		151,944	
	CCP	25,745		51,490		77,235		102,980	
	LDP	16,480	80,211	32,960	160,422	49,439	240,632	65,919	320,843
	Gross Income	291,845		583,689		875,533		1,167,377	
	Change from Baseline	<b>-1.43%</b>		<b>-1.43%</b>		<b>-1.43%</b>		<b>-1.43%</b>	
10% Reduction	DP	35,987		71,973		107,960		143,947	
	CCP	24,390		48,780		73,170		97,560	
	LDP	15,612	75,989	31,225	151,978	46,837	227,967	62,450	303,957
	Gross Income	287,623		575,245		862,868		1,150,491	
	Change from Baseline	<b>-2.85%</b>		<b>-2.85%</b>		<b>-2.85%</b>		<b>-2.85%</b>	

Table 3.17 Average cotton farm annual change in gross income, comparison of program payment changes to baseline scenario, (2005-2009) Mean.

	Source of Income	1-Entity Farm		2-Entity Farm		3-Entity Farm		4-Entity Farm	
		\$US	Program Payment	\$US	Program Payment	\$US	Program Payment	\$US	Program Payment
Baseline	Cotton Market	329,170		658,340		987,510		1,316,680	
	DP	31,277		62,553		93,830		125,107	
	CCP	38,570	122,776	77,140	245,551	115,709	367,326	154,279	491,102
	LDP	52,929		105,858		157,787		211,716	
	Gross Income	451,946		903,891		1,354,836		1,807,782	
1% Reduction	DP	30,964		61,928		92,892		123,855	
	CCP	38,184	121,548	76,368	243,095	114,552	364,643	152,736	486,190
	LDP	52,400		104,799		157,199		209,599	
	Gross Income	450,718		901,435		1,352,153		1,802,870	
	Change from Baseline	<b>-0.27%</b>		<b>-0.27%</b>		<b>-0.27%</b>		<b>-0.27%</b>	
2% Reduction	DP	30,651		61,302		91,953		122,604	
	CCP	37,798	120,319	75,597	240,640	113,395	360,959	151,193	481,278
	LDP	51,870		103,741		155,611		207,481	
	Gross Income	449,489		898,980		1,348,469		1,797,958	
	Change from Baseline	<b>-0.54%</b>		<b>-0.54%</b>		<b>-0.54%</b>		<b>-0.54%</b>	
5% Reduction	DP	29,713		59,426		89,138		118,851	
	CCP	36,641	116,636	73,283	233,274	109,924	349,909	146,565	466,546
	LDP	50,282		100,565		150,847		201,130	
	Gross Income	445,806		891,614		1,337,419		1,783,226	
	Change from Baseline	<b>-1.36%</b>		<b>-1.36%</b>		<b>-1.36%</b>		<b>-1.36%</b>	
10% Reduction	DP	28,149		56,298		84,447		112,596	
	CCP	34,713	110,498	69,426	220,996	104,138	331,493	138,851	441,991
	LDP	47,636		95,272		142,908		190,544	
	Gross Income	439,668		879,336		1,319,003		1,758,671	
	Change from Baseline	<b>-2.72%</b>		<b>-2.72%</b>		<b>-2.72%</b>		<b>-2.72%</b>	

Table 3.18 Annual rice net farm income, in dollars per enterprise, of baseline, and program reduction scenarios, (2005-2009).

Year	Scenario	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
2005	Baseline	-2,315	26,393	35,731	53,282
	1% Reduction	-3,179	24,664	33,138	49,825
	2% Reduction	-4,044	22,936	30,545	46,368
	5% Reduction	-6,636	17,750	22,767	35,997
	10% Reduction	-10,958	9,108	9,803	18,711
2006	Baseline	-553	29,917	41,017	60,329
	1% Reduction	-1,408	28,208	38,453	56,912
	2% Reduction	-2,262	26,499	35,890	53,949
	5% Reduction	-4,825	21,373	28,200	43,241
	10% Reduction	-9,097	12,828	15,384	26,153
2007	Baseline	1,263	33,548	46,463	67,592
	1% Reduction	419	31,861	43,933	64,218
	2% Reduction	-424	30,174	41,403	60,844
	5% Reduction	-2,955	25,113	33,811	50,722
	10% Reduction	-7,173	16,678	21,158	33,851
2008	Baseline	3,113	37,248	52,014	74,993
	1% Reduction	2272	35,568	49,493	71,631
	2% Reduction	1432	33,887	46,971	68,270
	5% Reduction	-1,089	28,844	39,408	58,185
	10% Reduction	-5,291	20,440	26,802	41,377
2009	Baseline	2,680	36,383	50,716	73,263
	1% Reduction	1861	34,745	48,259	69,987
	2% Reduction	1042	33,107	45,802	66,711
	5% Reduction	-1,415	28,193	38,431	56,882
	10% Reduction	-5,510	20,003	26,146	40,502

Table 3.19 Annual cotton net farm income, in dollars per enterprise, of baseline, and program reduction scenarios, (2005-2009)

Year	Scenario	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
2005	Baseline	5,209	32,632	56,795	89,075
	1% Reduction	3,898	30,008	52,860	83,829
	2% Reduction	2,586	27,385	48,926	78,583
	5% Reduction	-1,348	19,516	37,122	62,844
	10% Reduction	-7,906	6,401	17,449	36,614
2006	Baseline	5,327	32,867	57,147	89,545
	1% Reduction	4,048	30,310	53,312	84,432
	2% Reduction	2,770	27,753	49,477	79,318
	5% Reduction	-1,065	20,083	37,972	63,978
	10% Reduction	-7,457	7,300	18,797	38,412
2007	Baseline	5,550	33,312	57,816	90,436
	1% Reduction	4,321	30,855	54,130	85,521
	2% Reduction	3,092	28,397	50,443	80,606
	5% Reduction	-594	21,024	39,384	65,860
	10% Reduction	-6,738	8,736	20,952	41,284
2008	Baseline	3,899	30,011	52,864	83,834
	1% Reduction	2,715	27,643	49,313	79,099
	2% Reduction	1,531	25,276	45,761	74,363
	5% Reduction	-2,020	18,173	35,107	60,157
	10% Reduction	-7,939	6,334	17,349	36,481
2009	Baseline	4,455	31,123	54,532	86,058
	1% Reduction	3,319	28,850	51,123	81,513
	2% Reduction	2,182	26,578	47,714	76,968
	5% Reduction	-1,226	19,760	37,488	63,332
	10% Reduction	-6,908	8,396	20,444	40,607

### 3.3.3 Market Price Fluctuations

Tables 3.20, 3.21, 3.22, and 3.23 present changes in enterprise annual income and expense estimate that would result from changes in market prices from projected values. No changes in program payments were simulated and the scenarios are restricted to changes in market prices. Since market income accounts for more than half of the gross income of any operation, fluctuations in market prices are expected to create a higher impact than any of the program payment scenarios that have been analyzed so far. Chances of achieving negative returns over variable and total costs remain high, especially for one entity operations.

Changes in estimated income and expenses are presented in Table 3.20 and 3.21 for rice and cotton enterprises under a 10 percent price increase. The impact of such change resulted in interesting changes in rice and cotton program payment gross income. Rice enterprises under this scenario increased overall gross income by 2.49 percent and cotton by 2.41 percent.

Table 3.20 Income statement for rice with 10% increase in world and domestic prices, continuation of current policy, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Rice market income	232,736	465,473	698,209	930,945
Direct Fixed Payments	39,985	79,971	119,956	159,941
Counter Cyclical payments	23,222	46,444	69,666	92,889
LDP payments	7,501	15,002	22,503	30,004
Total farm gross income	303,444	606,890	910,334	1,213,779
Rice variable costs	236,636	473,273	709,910	946,546
Net returns above variable costs	66,808	133,617	200,424	267,233
Annual Salvaged equipment value	19,732	25,279	42,981	54,520
Depreciation expenses	58,524	75,140	126,581	160,346
General farm overhead expenses	19,800	36,300	49,500	66,000
Net farm income	8,216	47,456	67,324	95,407
Number of times net returns above variable costs are negative	2.4%	2.4%	2.4%	2.4%
Number of times net returns above total costs are negative	50.4%	39.3%	40.2%	39.2%

Changes in CC and LDP payments due to a market price increase were exhibited. With a market price increase, rice and cotton total gross income increases but CC and LDP payments decreased when compared to the baseline scenario. Changes in program gross income and comparison with the baseline scenario can be seen in Table 3.26 for rice and 3.27 for cotton operations with the four different entities. Counter cyclical payments for rice went down 14.3 percent; cotton CC payment was reduced by 19.4 percent when compared to the baseline. Loan deficiency payments for rice were reduced in 56.8 percent, and cotton LDP payment decreased by 27.5 percent. Overall rice net income increased \$14,758, \$22,136, and \$29,516, and cotton net income increased \$21,851, \$33,641, and \$43,520 for two, three, and four entities, respectively.

Changes in annual net farm income for rice and cotton can be seen in Table 3.24 for rice and 3.25 for cotton enterprises at the four different entities.

Table 3.21 Income statement for cotton with 10% increase in world and domestic prices, continuation of current policy, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Cotton market income	362,087	724,174	1,086,261	1,448,348
Direct Fixed Payments	31,277	62,553	93,830	125,107
Counter Cyclical payments	31,094	62,189	93,283	124,377
LDP payments	38,368	76,735	115,103	153,470
Total farm gross income	462,826	925,651	1,388,477	1,851,302
Cotton variable costs	360,904	721,809	1,082,713	1,443,618
Net returns above variable costs	101,922	203,842	305,764	407,684
Annual Salvaged equipment value	30,010	49,985	74,636	92,282
Depreciation expenses	89,163	150,578	224,428	278,656
General farm overhead expenses	27,000	49,500	67,500	90,000
Net farm income	15,769	53,749	88,472	131,310
Number of times net returns above variable costs are negative	19.8%	19.8%	22.3%	19.8%
Number of times net returns above total costs are negative	44.1%	39.6%	42.2%	37.3%

Changes in income and expenses due to a 10 percent reduction in rice and cotton market prices are presented in Table 3.22 and 3.23, respectively. Gross income due to a price reduction declined -0.76 and -1.84 percent for rice and cotton enterprises, respectively. This change in gross income has a great impact on farm net income, since farm size, total variable and overhead costs remain unchanged. Net rice farm income was reduced by 13.8, 15, and 13.7 percent, while cotton farm net income suffered a decline by 51.9, 43.6, and 37.7 percent for two, three, and four entity operations when compared to the baseline scenario, respectively. Net income losses of \$4,500, \$6,756, and 9,008 for rice and \$16,596, \$23,892, \$33,100 for cotton for two, three and four entity operations, respectively, were calculated as the result of market price reductions.



Table 3.22 Income statement for rice with 10% decrease in world and domestic prices, continuation of current policy, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Rice market income	190,410	380,819	571,229	761,639
Direct Fixed Payments	39,985	79,970	119,956	159,941
Counter Cyclical payments	31,699	63,398	95,097	126,795
LDP payments	31,720	63,440	95,160	126,880
Total farm gross income	293,814	587,627	881,442	1,175,255
Rice variable costs	236,636	473,273	709,910	946,546
Net returns above variable costs	57,178	114,354	171,532	228,709
Annual Salvaged equipment value	19,732	25,279	42,981	54,520
Depreciation expenses	58,524	75,140	126,581	160,346
General farm overhead expenses	19,800	36,300	49,500	66,000
Net farm income	-1,414	28,193	38,432	56,883
Number of times net returns above variable costs are negative	1.3%	1.3%	1.3%	1.3%
Number of times net returns above total costs are negative	56.6%	33.2%	34.9%	33.0%

Table 3.23 Income statement for cotton with 10% decrease in world and domestic prices, continuation of current policy, 2005-2009 Mean.

	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Cotton market income	296,253	592,506	888,759	1,185,012
Direct Fixed Payments	31,277	62,553	93,830	125,107
Counter Cyclical payments	51,404	102,807	154,211	205,614
LDP payments	64,715	129,429	194,144	258,858
Total farm gross income	443,649	887,295	1,330,944	1,774,591
Cotton variable costs	360,904	721,809	1,082,713	1,443,618
Net returns above variable costs	82,745	165,486	248,231	330,973
Annual Salvaged equipment value	30,010	49,985	74,636	92,282
Depreciation expenses	89,163	150,578	224,428	278,656
General farm overhead expenses	27,000	49,500	67,500	90,000
Net farm income	-3,408	15,393	30,939	54,690
Number of times net returns above variable costs are negative	23.2%	23.2%	25.8%	23.2%
Number of times net returns above total costs are negative	46.6%	42.9%	46.9%	41.1%

Even though CC and LDP payments were significantly higher than those from baseline scenario, price income represents more than half of total farm income, and therefore did not account for the loss in market prices. Program payments increased compared to baseline in 17 and 82.9 percent for CC and LDP for rice enterprises, respectively. For cotton operations, CC payments rose 33.3, while LDP increased 22.3 percent. Counter cyclical payments increased in \$9,198, \$13,797, and \$18,395 for rice operations of two, three, and four entities, respectively; CC payments for cotton were much higher than for rice enterprises increasing above the baseline from \$25,667, \$38,502, \$51,335 for the same entities mentioned before

Isolated effects of market price fluctuations and program payment reductions were previously presented. In Table 3.24 and 3.25 we compare net farm income as a result of a 5 percent program payment reduction and 10 percent market price increase for both rice and cotton commodities. In the same tables, a combined effect of a market price increase and a 5 percent program payment reduction is also compared to the baseline. Percentage differences between program payment reductions and price fluctuations between gross and net farm income can be observed and a bigger impact on these changes on net farm income can be noticed. Since one entity operations are more dependants in market prices and program payments, for both rice and cotton, bigger changes in net farm income are seen when compared to two, three and four entity farm operations. As seen previously, reductions in program payments had a great negative impact on net farm income for both rice and cotton operations, market price increases reduced program payments but since market income represents a higher source of income; when combined, both effects increased net farm income by 458.47, 23.51, 25.52, and 23.33 percent for one, two, three and four entity rice farming operations. Cotton net farm income was increased at a lower magnitude for one entity operations than rice, increasing in 119.49 percent. Two, three,

and four entity operations increased their net income by 36.53, 33.79, and 26.62 percent, respectively. A significant decrease of in net farm income for 4 entity cotton operations when compared to three and two entity operations was noticed, especially when there is a price increase involved. Reductions in cotton program payments at the 4 entity level when market prices are higher show that these cotton operations are more dependant to government payments due to their higher depreciation and overhead costs.

Ten percent rice market price reductions were also compared to the baseline (Table 4.24). The largest changes in net farm income were for one entity operations. For two, three and four entity operations, negative changes in net farm income of 13.78, 14.95, and 13.67 percent, respectively, were observed despite the relatively large increase in program payments. Cotton operations also had negative results with higher net farm income reductions of 51.88, 43.57, and 37.70 percent for two, three and four entity operations.

The worse case scenario for both rice and cotton operations was the combination of a 5 percent reduction in program payments and a 10 percent decline in market prices. After comparing this scenario to the baseline, rice and cotton operations would result with very drastic reductions in net farm income. Cotton operations had a higher percentage reduction in net farm income when compared to the baseline than rice (Table 3.25). Both rice and cotton enterprises become highly dependant on government subsidies when market prices are low. Reductions on program payments become almost an instant reduction on net farm income. As a result of this combination, reductions on net farm income of 45.40, 49.28, and 45.06 percent for rice, and 97.95, 83.90, and 71.38 percent for cotton operations at two, three and four entity level, respectively, were shown. For cotton, reductions in net farm income were lower for higher entity operations. This is probably due to the effect of program payments on cotton acreage levels,

higher acreage increased total program payments. A combined reduction of price and program payments would significantly increase the risk of rice and cotton farming operations. Reductions in market prices are more likely to occur, due to competition in the global market, producers would rely on program payments. A combined reduction of both sources of income would drive producers out of business and increase the number of farms in poor financial status.

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Table 3.24 Average rice farm annual change in gross income, net farm income, comparison of price fluctuations and program payment reductions to baseline scenario, (2005-2009) Mean.

Source of Income		1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
		\$US	\$US	\$US	\$US
Baseline	Rice Market	211,634	423,267	634,901	846,534
	Program Payment	84,432	168,864	253,297	337,729
	Gross Income	296,066	592,131	888,198	1,184,263
	Net Farm Income	838	32,698	45,188	65,891
5% Program Payment Reduction	Rice Market	211,634	423,267	634,901	846,534
	Program Payment	80,211	160,422	240,632	320,843
	Gross Income	291,845	583,689	875,533	1,167,377
	Net Farm Income	-3,383	24,255	32,523	49,005
	<b>Change from baseline</b>	<b>-503.7%</b>	<b>-25.82%</b>	<b>-28.03%</b>	<b>-25.63%</b>
10% Price Increase	Rice Market	232,736	465,473	698,209	930,945
	Program Payment	70,708	141,417	212,125	282,834
	Gross Income	303,444	606,890	910,334	1,213,779
	Net Farm Income	8,216	47,456	67,324	95,407
	<b>Change from Baseline</b>	<b>880.43%</b>	<b>45.13%</b>	<b>48.99%</b>	<b>44.79%</b>
10% Price Increase + 5% Program Reduction	Rice Market	232,736	465,473	698,209	930,945
	Program Payment	67,173	134,346	201,519	268,692
	Gross Income	299,909	599,813	899,728	1,199,637
	Net Farm Income	4,680	40,385	56,719	81,265
	<b>Change from Baseline</b>	<b>458.47%</b>	<b>23.51%</b>	<b>25.52%</b>	<b>23.33%</b>
10% Price Reduction	Rice Market	190,410	380,819	571,229	761,639
	Program Payment	103,404	206,808	310,213	413,616
	Gross Income	293,814	587,627	881,442	1,175,255
	Net Farm Income	-1,414	28,193	38,432	56,883
	<b>Change from Baseline</b>	<b>-268.74%</b>	<b>-13.78%</b>	<b>-14.95%</b>	<b>-13.67%</b>
10% Price Reduction + 5% Program Reduction	Rice Market	190,410	380,819	571,229	761,639
	Program Payment	98,234	196,468	294,702	392,936
	Gross Income	288,644	577,287	865,931	1,154,575
	Net Farm Income	-6,585	17,853	22,921	36,203
	<b>Change from Baseline</b>	<b>-885.80%</b>	<b>-45.40</b>	<b>-49.28%</b>	<b>-45.06%</b>

Table 3.25 Average cotton farm annual change in gross income, net farm income, comparison of price fluctuations and program payment reduction to baseline scenario, (2005-2009) Mean.

		1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
Source of Income		\$US	\$US	\$US	\$US
Baseline	Cotton Market	329,170	658,340	987,510	1,316,680
	Program Payments	122,776	245,551	331,493	491,102
	Gross Income	451,946	903,891	1,354,836	1,807,782
	Net Farm Income	4,889	31,989	54,831	87,790
5% Program Payment Reductions	Cotton Market	329,170	658,340	987,510	1,316,680
	Program Payments	116,636	233,274	349,909	466,546
	Gross Income	445,806	891,614	1,337,419	1,783,226
	Net Farm Income	-1,251	19,712	37,414	63,234
	<b>Change from baseline</b>	<b>-125.58%</b>	<b>-38.38%</b>	<b>-31.76%</b>	<b>-27.97%</b>
10% Price Increase	Cotton Market	362,087	724,174	1,086,261	1,448,348
	Program Payments	100,739	201,477	302,216	402,954
	Gross Income	462,826	925,651	1,388,477	1,851,302
	Net Farm Income	15,769	53,749	88,472	131,310
	<b>Change from baseline</b>	<b>222.54%</b>	<b>68.02%</b>	<b>61.35%</b>	<b>49.57%</b>
10% Price Increase + 5% Program Reduction	Cotton Market	362,087	724,174	1,086,261	1,448,348
	Program Payment	95,702	191,403	287,104	382,806
	Gross Income	457,789	915,577	1,373,365	1,831,154
	Net Farm Income	10,731	43,675	73,360	111,162
	<b>Change from Baseline</b>	<b>119.49%</b>	<b>36.53%</b>	<b>33.79%</b>	<b>26.62%</b>
10% Price Reduction	Rice Market	296,253	592,506	888,759	1,185,012
	Program Payment	147,396	294,789	442,185	589,579
	Gross Income	443,649	887,295	1,330,944	1,774,591
	Net Farm Income	-3,408	15,393	30,939	54,690
	<b>Change from Baseline</b>	<b>-169.71%</b>	<b>-51.88</b>	<b>-43.57%</b>	<b>-37.70%</b>
10% Price Reduction + 5% Program Reduction	Rice Market	296,253	592,506	888,759	1,185,012
	Program Payment	140,025	280,050	420,075	560,100
	Gross Income	436,278	872,556	1,308,834	1,745,112
	Net Farm Income	-10,779	654	8,829	25,121
	<b>Change from Baseline</b>	<b>-320.47%</b>	<b>-97.95%</b>	<b>-83.90%</b>	<b>-71.38%</b>

## CHAPTER 4

### SUMMARY AND CONCLUSIONS

The general objectives of the study were to identify alternative reductions in farm program spending, to develop a modeling framework used to simulate the impacts of such potential farm payment reductions over a multi-year time period, and to estimate and analyze the potential impacts on the financial situation of Louisiana rice and cotton farm operations. After identifying different spending reduction scenarios in specific program payments, simulation models were developed for the project. Representative rice and cotton operations for Louisiana were constructed. Random market prices and yields were estimated to calculate the impact of program payment levels over a range of likely market prices and crop yields. The models depended on farm type, and size; net farm income was calculated over a 5 year period to estimate financial stability of the operations.

One, two, three and four entity farm operations were used as representative enterprises for the study, with base acreage levels of 647 acres, 1,294 acres, 1,941 acres, and 2,588 acres of rice, and 882 acres, 1,764 acres, 2,646 acres, and 3,528 acres of cotton, respectively. Representative farms with only 85 percent of base acreage were used as being eligible for farm programs. Base acreage level was determined by estimating the acreage level at which one, two, three, and four entity operation would reach the most restrictive payment limit. The most restrictive payment for rice in Louisiana is the direct payment, and the counter cyclical payment for cotton.

Equipment and complement requirements for each farm operation were estimated depending on farm size for proper farm operation, as well as historical weather impact on workable field hours needed to perform farm operations. Both machinery and complements were

depreciated linearly on a seven year period and a salvage value of 30 percent of the initial cost was assumed. Annual fixed loan rate of 9% of the initial purchase cost as well a principle payments were calculated for each type of farm operation. Production cost and field operation data were obtained from previous studies and applied to our particular situations to estimate variable and overhead costs.

Changes in program payments were compared to a baseline scenario in which no changes to the current policy parameters were made. Scenarios include changes in world and domestic prices, as well as reductions in program payments. Farm income was calculated using market income, DP, CC, and LDP for both commodities. Projections of income and expenses were made for a five year period with program spending reductions beginning in 2005 and continuing through 2009. The resulting scenarios included a 1, 2, 5, and 10 percent reduction in program payments, and price fluctuations of 10 percent above and 10 percent below the estimated market prices. Interactions between market price fluctuations with a 5 percent price reduction were also made to calculate the effect of such outcomes on economic viability of rice and cotton operations in Louisiana. Economic comparisons of the resulting average parameters for the projected period of the different scenarios and the baseline were done to estimate the potential impact of such changes on rice and cotton farms at the different entity levels.

Continuation of current policy regarding rice and cotton program payments at the four different entity levels has shown to generate insufficient net farm income to both rice and cotton enterprises. Program payment limitations to smaller number of entities, such as one entity operations, do not allow producers to increase their acreage and program payments by such actions. An increase in the number of entities has been the response from producers to payment limitations that has allowed them to insignificantly increase net farm income.



One entity enterprises under the baseline scenario resulted as being non-viable operations. These enterprises under different payment reduction scenarios resulted in negative net farm income and became highly dependant on governmental subsidies. Two, three, and four entity operations increased significantly net farm income when compared to one entity enterprises at all times; however, due to a higher number of participants, net income dividends are still low and insufficient. Higher net farm income dividends were directly related to increasing number of entities per rice and cotton operations.

Apparently, program payment reductions resulted in insignificant changes on gross farm income, but at the same time, represented a highly significant impact on net farm income at all times. A one and two percent reduction in program payments for rice and cotton represented less than a one percent change in gross income but had a greater impact on the net farm income of the operations. Five and ten percent reduction scenarios showed to be highly undesirable for all entities and both commodities.

A highly unlikely ten percent increase in market prices for both commodities had a higher percent impact on net farm income than a ten percent reduction in program payments. This was due to the fact that market income for rice and cotton represents more than half of the total revenue. Ten percent decrease in market prices was not the worse case scenario for both rice and cotton operations. Program payment increases when low market prices are present, under current policies, reduced the impact of lost market price revenue.

Program payments are designed to decrease with increases in market prices; they are basically designed to support producers when market prices are low. When an increase in market prices of ten percent and a reduction in program payments by five percent are combined, the effect of such combination was not as detrimental as expected. The increase in market price for

both commodities was superior to the negative effect of program payment reduction. The resulting effect of the combination increased net farm income when compared to the baseline for both commodities at all entity levels. A combination of 5 percent reduction in program payments along with a 10 percent decline in market prices showed to be the worse case scenario for both rice and cotton operations. When prices are low, rice and cotton operations are highly dependant on program payments. Reductions in program payments at this point dramatically reduced net farm income for rice and even more for cotton farm enterprises. If forecasted prices for rice and cotton would decline, no reduction in program payments should be considered.

Reductions in program payments will have a detrimental effect on an already suffering agricultural sector. Continuation of current policy on the baseline scenario showed that net farm income for all entities is still not enough; income levels at the baseline scenario don't allow producers to cover their basic needs. Chances of negative returns over variable and total costs were increased by all program payment reduction scenarios, and low net income levels would turn into higher cash flow deficits than the already predicted by the Agricultural and Food Policy Center (AFPC) for rice and cotton operations.

## **APPENDIX: SUPPLEMENTARY DATA**

Table A1. Rice enterprise acreage level at direct and counter cyclical payment limits

Table A2. Cotton enterprise acreage level at direct and counter cyclical payment limits

Table A3. Estimation of machinery complements for a representative Louisiana 1 entity rice farm (550 acres).

Table A4. Estimation of machinery complements for a representative Louisiana 2 entity rice farm (1100 acres).

Table A5. Estimation of machinery complements for a representative Louisiana 3 entity rice farm (1650 acres).

Table A6. Estimation of Machinery complements for a representative Louisiana 4 entity Rice farm (2,200 acres).

Table A7. Estimation of Machinery complements for a representative Louisiana 1 entity Cotton farm (750 acres).

Table A8. Estimation of Machinery complements for a representative Louisiana 2 entity Cotton farm (1,500 acres).

Table A9. Estimation of Machinery complements for a representative Louisiana 3 entity Cotton farm (2,250 acres).

Table A10. Estimation of Machinery complements for a representative Louisiana 4 entity Cotton farm (3,000 acres).

Table A11. Annual rice net farm income of price fluctuation scenarios, (2005-2009)

Table A12. Annual cotton net farm income price fluctuation scenarios, (2005-2009)

Table A1. Rice enterprise acreage level at direct and counter cyclical payment limits

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**Southwest Louisiana Rice Farm Enterprise**

Land Tenure – 18% owned, 82% leased

Crop Share Paid on Leased Land – 30%

Rice Program Yield – 41.0 cwt. per acre (state average)

**(1) Direct Payments:**

Rice acreage level =

$$\begin{aligned} & \text{direct payment limit} / \{(\text{direct payment rate} \times \text{program yield}) \\ & \quad \times [(100\% \times \text{percent of land owned}) + (70\% \times \text{percent of land leased})]\} \\ & = \$40,000 / \{(\$2.35 \text{ per cwt.} \times 41.0 \text{ cwt.}) \times [(100\% \times 18\%) + (70\% \times 82\%)]\} \\ & = \$40,000 / (\$96.35 \times 0.754) = \quad 550.6 \text{ acres of rice} \end{aligned}$$

**(2) Counter Cyclical Payments:**

Rice acreage level =

$$\begin{aligned} & \text{counter cyclical payment limit} / \{(\text{max counter cyclical payment rate} \times \text{program yield}) \\ & \quad \times [(100\% \times \text{percent of land owned}) + (70\% \times \text{percent of land leased})]\} \\ & = \$65,000 / \{(\$1.65 \text{ per cwt.} \times 41.0 \text{ cwt.}) \times [(100\% \times 18\%) + (70\% \times 82\%)]\} \\ & = \$65,000 / (\$67.65 \times 0.754) = \quad 1,274.3 \text{ acres of rice} \end{aligned}$$

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Table A2. Cotton enterprise acreage level at direct and counter cyclical payment limits

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Northeast Louisiana Cotton Farm Enterprise

Land Tenure – 30% owned, 70% leased

Crop Share Paid on Leased Land – 20%

Cotton Program Yield – 727 pounds per acre (state average)

(1) Direct Payments:

Cotton acreage level =

$$\begin{aligned} & \text{direct payment limit} / \{(\text{direct payment rate} \times \text{program yield}) \\ & \quad \times [(100\% \times \text{percent of land owned}) + (80\% \times \text{percent of land leased})]\} \\ & = \$40,000 / \{(\$0.0667 \text{ per lb.} \times 727 \text{ lbs.}) \times [(100\% \times 30\%) + (80\% \times 70\%)]\} \\ & = \$40,000 / (\$48.49 \times 0.860) = \quad 959.2 \text{ acres of cotton} \end{aligned}$$

(2) Counter Cyclical Payments:

Cotton acreage level =

$$\begin{aligned} & \text{counter cyclical payment limit} / \{(\text{max counter cyclical payment rate} \times \text{program yield}) \\ & \quad \times [(100\% \times \text{percent of land owned}) + (80\% \times \text{percent of land leased})]\} \\ & = \$65,000 / \{(\$0.1373 \text{ per lb.} \times 727 \text{ lbs.}) \times [(100\% \times 30\%) + (80\% \times 70\%)]\} \\ & = \$65,000 / (\$99.82 \times 0.860) = \quad 757.1 \text{ acres of cotton} \end{aligned}$$

Table A3. Estimation of machinery complements for a representative Louisiana 1 entity rice farm (550 acres)

Machinery Complement	Number of Units	Purchase Cost	Useful Life	Total Machinery Investment	Salvage Value	Annual Fixed Cost
Disk Harrow 28 ft.	2	\$26,731	10	\$53,462	30%	\$3,742
Levee Plow 8 ft.	2	\$4,600	10	\$9,200	30%	\$644
Blade-Scraper 10 ft.	2	\$2,066	20	\$4,132	30%	\$145
Ditcher	1	\$2,330	10	\$2,330	30%	\$163
Land Level 13 ft.	1	\$7,500	15	\$7,500	30%	\$350
Boom Sprayer 30 ft.	2	\$3,000	10	\$6,000	30%	\$420
Backhoe 2 ft.	1	\$6,000	10	\$6,000	30%	\$420
Field Cult. 24 ft.	1	\$16,030	10	\$16,030	30%	\$1,122
Combine 25 ft.	1	\$165,000	10	\$165,000	35%	\$10,725
Grain Cart 500 bu.	1	\$15,237	12	\$15,237	30%	\$889
Tractor 170 hp	1	\$98,816	8	\$98,816	35%	\$8,029
Tractor 225 hp	1	\$122,500	8	\$122,500	35%	\$9,953
Rice Header	1	\$23,306	10	\$23,306	35%	\$1,515
Irrigation Power Unit	1	\$15,000	20	\$15,000	10%	\$675
Total				\$544,513		\$38,792

Table A3. Continued

Machinery Complement	Avg Annual Income Tax MACRS Depreciation	Avg. Annual Charge Per Year of Useful life Income Tax MACRS Depreciation	Annual Principle and Interest Payments	Avg. Charge per Year of Useful Life Principle and Interest Payments	Total Salvage Value	Avg. Annual Charge per Year of Useful Life Total Salvage Value
Disk Harrow 28 ft.	\$7,637	\$5,346	\$10,622	\$7,436	\$16,039	\$1,604
Levee Plow 8 ft.	\$1,314	\$920	\$1,828	\$1,280	\$2,760	\$276
Blade-Scraper 10 ft.	\$590	\$207	\$821	\$287	\$1,240	\$62
Ditcher	\$333	\$233	\$463	\$324	\$699	\$70
Land Level 13 ft.	\$1,071	\$500	\$1,490	\$695	\$2,250	\$150
Boom Sprayer 30 ft.	\$857	\$600	\$1,192	\$834	\$1,800	\$180
Backhoe 2 ft.	\$857	\$600	\$1,192	\$834	\$1,800	\$180
Field Cult. 24 ft.	\$2,290	\$1,603	\$3,185	\$2,229	\$4,809	\$481
Combine 25 ft.	\$23,571	\$16,500	\$32,784	\$22,949	\$57,750	\$5,775
Grain Cart 500 bu.	\$2,177	\$1,270	\$3,027	\$1,766	\$4,571	\$381
Tractor 170 hp	\$14,117	\$12,352	\$19,634	\$17,179	\$34,586	\$4,323
Tractor 225 hp	\$17,500	\$15,313	\$24,339	\$21,297	\$42,875	\$5,359
Rice Header	\$3,329	\$2,331	\$4,631	\$3,241	\$8,157	\$816
Irrigation Power Unit	\$2,143	\$750	\$2,980	\$1,043	\$1,500	\$75
Total	\$77,788	\$58,524	\$108,189	\$81,396	\$180,835	\$19,732

Table A4. Estimation of machinery complements for a representative Louisiana 2 entity rice farm (1100 acres)

Machinery Complement	Number of Units	Purchase Cost	Useful Life	Total Machinery Investment	Salvage Value	Annual Fixed Cost
Disk Harrow 32 ft.	2	\$30,136	10	\$60,272	30%	\$4,219
Levee Plow 8 ft.	2	\$4,600	10	\$9,200	30%	\$644
Blade-Scraper 10 ft.	3	\$2,066	20	\$6,198	30%	\$217
Ditcher	2	\$2,330	10	\$4,660	30%	\$326
Land Level13 ft.	1	\$7,500	15	\$7,500	30%	\$350
Boom Sprayer 30 ft.	2	\$3,000	10	\$6,000	30%	\$420
Backhoe 2 ft.	2	\$6,000	10	\$12,000	30%	\$840
Field Cult. 24 ft.	1	\$16,030	10	\$16,030	30%	\$1,122
Combine 25 ft.	1	\$165,000	10	\$165,000	35%	\$10,725
Grain Cart 500 bu.	1	\$15,237	12	\$15,237	30%	\$889
Tractor 170 hp	2	\$98,816	8	\$197,632	35%	\$16,058
Tractor 300 hp	1	\$137,673	8	\$137,673	35%	\$11,186
Rice Header	1	\$23,306	10	\$23,306	35%	\$1,515
Irrigation Power Unit	2	\$15,000	20	\$30,000	10%	\$1,350
Total				\$690,708		\$49,861



Table A4. Continued

Machinery Complement	Avg Annual Income Tax MACRS Depreciation	Avg. Annual Charge Per Year of Useful life Income Tax MACRS Depreciation	Annual Principle and Interest Payments	Avg. Charge per Year of Useful Life Principle and Interest Payments	Total Salvage Value	Avg. Annual Charge per Year of Useful Life Total Salvage Value
Disk Harrow 32 ft.	\$8,610	\$6,027	\$11,975	\$8,383	\$18,082	\$1,808
Levee Plow 8 ft.	\$1,314	\$920	\$1,828	\$1,280	\$2,760	\$276
Blade-Scraper 10 ft.	\$885	\$310	\$1,231	\$431	\$1,859	\$93
Ditcher	\$666	\$466	\$926	\$648	\$1,398	\$140
Land Level13 ft.	\$1,071	\$500	\$1,490	\$695	\$2,250	\$150
Boom Sprayer 30 ft.	\$857	\$600	\$1,192	\$834	\$1,800	\$180
Backhoe 2 ft.	\$1,714	\$1,200	\$2,384	\$1,669	\$3,600	\$360
Field Cult. 24 ft.	\$2,290	\$1,603	\$3,185	\$2,229	\$4,809	\$481
Combine 25 ft.	\$23,571	\$16,500	\$32,784	\$22,949	\$57,750	\$5,775
Grain Cart 500 bu.	\$2,177	\$1,270	\$3,027	\$1,766	\$4,571	\$381
Tractor 170 hp	\$28,233	\$24,704	\$39,267	\$34,359	\$69,171	\$8,646
Tractor 300 hp	\$19,668	\$17,209	\$27,354	\$23,935	\$48,186	\$6,023
Rice Header	\$3,329	\$2,331	\$4,631	\$3,241	\$8,157	\$816
Irrigation Power Unit	\$4,286	\$1,500	\$5,961	\$2,086	\$3,000	\$150
Total	\$98,673	\$75,140	\$137,236	\$104,506	\$227,393	\$25,279

Table A5. Estimation of machinery complements for a representative Louisiana 3 entity rice farm (1650 acres)

Machinery Complement	Number of Units	Purchase Cost	Useful Life	Total Machinery Investment	Salvage Value	Annual Fixed Cost
Disk Harrow 32 ft.	2	\$30,136	10	\$60,272	30%	\$4,219
Levee Plow 8 ft.	2	\$4,600	10	\$9,200	30%	\$644
Blade-Scraper 10 ft.	2	\$2,066	20	\$4,132	30%	\$145
Ditcher	3	\$2,330	10	\$6,990	30%	\$489
Land Level13 ft.	1	\$7,500	15	\$7,500	30%	\$350
Boom Sprayer 30 ft.	3	\$3,000	10	\$9,000	30%	\$630
Backhoe 2 ft.	3	\$6,000	10	\$18,000	30%	\$1,260
Field Cult. 24 ft.	1	\$16,030	10	\$16,030	30%	\$1,122
Combine 25 ft.	2	\$165,000	10	\$330,000	35%	\$21,450
Grain Cart 500 bu.	2	\$15,237	12	\$30,474	30%	\$1,778
Tractor 170 hp	3	\$98,816	8	\$296,448	35%	\$24,086
Tractor 300 hp	2	\$137,673	8	\$275,346	35%	\$22,372
Rice Header	2	\$23,306	10	\$46,612	35%	\$3,030
Irrigation Power Unit	3	\$15,000	20	\$45,000	10%	\$2,025
<b>Total</b>				<b>\$1,155,004</b>		<b>\$83,600</b>

Table A5. Continued

Machinery Complement	Avg Annual Income Tax MACRS Depreciation	Avg. Annual Charge Per Year of Useful life Income Tax MACRS Depreciation	Annual Principle and Interest Payments	Avg. Charge per Year of Useful Life Principle and Interest Payments	Total Salvage Value	Avg. Annual Charge per Year of Useful Life Total Salvage Value
Disk Harrow 32 ft.	\$8,610	\$6,027	\$11,975	\$8,383	\$18,082	\$1,808
Levee Plow 8 ft.	\$1,314	\$920	\$1,828	\$1,280	\$2,760	\$276
Blade-Scraper 10 ft.	\$590	\$207	\$821	\$287	\$1,240	\$62
Ditcher	\$999	\$699	\$1,389	\$972	\$2,097	\$210
Land Level 13 ft.	\$1,071	\$500	\$1,490	\$695	\$2,250	\$150
Boom Sprayer 30 ft.	\$1,286	\$900	\$1,788	\$1,252	\$2,700	\$270
Backhoe 2 ft.	\$2,571	\$1,800	\$3,576	\$2,503	\$5,400	\$540
Field Cult. 24 ft.	\$2,290	\$1,603	\$3,185	\$2,229	\$4,809	\$481
Combine 25 ft.	\$47,143	\$33,000	\$65,567	\$45,897	\$115,500	\$11,550
Grain Cart 500 bu.	\$4,353	\$2,540	\$6,055	\$3,532	\$9,142	\$762
Tractor 170 hp	\$42,350	\$37,056	\$58,901	\$51,538	\$103,757	\$12,970
Tractor 300 hp	\$39,335	\$34,418	\$54,708	\$47,870	\$96,371	\$12,046
Rice Header	\$6,659	\$4,661	\$9,261	\$6,483	\$16,314	\$1,631
Irrigation Power Unit	\$6,429	\$2,250	\$8,941	\$3,129	\$4,500	\$225
Total	\$165,001	\$126,581	\$229,486	\$176,051	\$384,922	\$42,981

Table A6. Estimation of Machinery complements for a representative Louisiana 4 entity Rice farm (2,200 acres)

Machinery Complement	Number of Units	Purchase Cost	Useful Life	Total Machinery Investment	Salvage Value	Annual Fixed Cost
Disk Harrow 32 ft.	2	\$30,136	10	\$60,272	30%	\$4,219
Levee Plow 8 ft.	3	\$4,600	10	\$13,800	30%	\$966
Blade-Scraper 10 ft.	3	\$2,066	20	\$6,198	30%	\$217
Ditcher	3	\$2,330	10	\$6,990	30%	\$489
Land Level13 ft.	1	\$7,500	15	\$7,500	30%	\$350
Boom Sprayer 30 ft.	3	\$3,000	10	\$9,000	30%	\$630
Backhoe 2 ft.	3	\$6,000	10	\$18,000	30%	\$1,260
Field Cult. 24 ft.	1	\$16,030	10	\$16,030	30%	\$1,122
Combine 25 ft.	3	\$165,000	10	\$495,000	35%	\$32,175
Grain Cart 500 bu.	3	\$15,237	12	\$45,711	30%	\$2,666
Tractor 170 hp	4	\$98,816	8	\$395,264	35%	\$32,115
Tractor 300 hp	2	\$137,673	8	\$275,346	35%	\$22,372
Rice Header	3	\$23,306	10	\$69,918	35%	\$4,545
Irrigation Power Unit	4	\$15,000	20	\$60,000	10%	\$2,700
Total				\$1,479,029		\$105,827

Table A6. Continued

Machinery Complement	Avg Annual Income Tax MACRS Depreciation	Avg. Annual Charge Per Year of Useful life Income Tax MACRS Depreciation	Annual Principle and Interest Payments	Avg. Charge per Year of Useful Life Principle and Interest Payments	Total Salvage Value	Avg. Annual Charge per Year of Useful Life Total Salvage Value
Disk Harrow 32 ft.	\$8,610	\$6,027	\$11,975	\$8,383	\$18,082	\$1,808
Levee Plow 8 ft.	\$1,971	\$1,380	\$2,742	\$1,919	\$4,140	\$414
Blade-Scraper 10 ft.	\$885	\$310	\$1,231	\$431	\$1,859	\$93
Ditcher	\$999	\$699	\$1,389	\$972	\$2,097	\$210
Land Level 13 ft.	\$1,071	\$500	\$1,490	\$695	\$2,250	\$150
Boom Sprayer 30 ft.	\$1,286	\$900	\$1,788	\$1,252	\$2,700	\$270
Backhoe 2 ft.	\$2,571	\$1,800	\$3,576	\$2,503	\$5,400	\$540
Field Cult. 24 ft.	\$2,290	\$1,603	\$3,185	\$2,229	\$4,809	\$481
Combine 25 ft.	\$70,714	\$49,500	\$98,351	\$68,846	\$173,250	\$17,325
Grain Cart 500 bu.	\$6,530	\$3,809	\$9,082	\$5,298	\$13,713	\$1,143
Tractor 170 hp	\$56,466	\$49,408	\$78,534	\$68,718	\$138,342	\$17,293
Tractor 300 hp	\$39,335	\$34,418	\$54,708	\$47,870	\$96,371	\$12,046
Rice Header	\$9,988	\$6,992	\$13,892	\$9,724	\$24,471	\$2,447
Irrigation Power Unit	\$8,571	\$3,000	\$11,921	\$4,172	\$6,000	\$300
Total	\$211,290	\$160,346	\$293,866	\$223,013	\$493,485	\$54,520

Table A7. Estimation of Machinery complements for a representative Louisiana 1 entity Cotton farm (750 acres)

Machinery Complement	Number of Units	Purchase Cost	Useful Life	Total Machinery Investment	Salvage Value	Annual Fixed Cost
Stalk Shredder 14 ft.	1	\$10,081	10	\$10,081	30%	\$706
Paratill 8-row	1	\$25,283	12	\$25,283	30%	\$1,475
Fert. Appl 8-row	1	\$10,809	8	\$10,809	40%	\$811
Disk Bed 8-row	1	\$15,263	10	\$15,263	30%	\$1,068
Row Cond 27 ft.	1	\$9,440	10	\$9,440	30%	\$661
Plant 8-row	1	\$32,921	8	\$32,921	45%	\$2,263
Trailer Utility 10 ft.	1	\$2,000	15	\$2,000	10%	\$120
Ditcher	1	\$2,330	10	\$2,330	30%	\$163
Spray (DR) 40 ft.	1	\$7,598	8	\$7,598	40%	\$570
Tractor 170 hp	1	\$98,816	8	\$98,816	35%	\$8,029
Tractor 190 hp	1	\$108,199	8	\$108,199	35%	\$8,791
Tractor 225 hp	1	\$122,500	8	\$122,500	35%	\$9,953
Cotton Picker 4-row	1	\$223,827	8	\$223,827	30%	\$19,585
Module Builder 4-row	1	\$25,869	10	\$25,869	35%	\$1,681
Boll Buggy 4-row	1	\$50,405	10	\$50,405	35%	\$3,276
Total				\$745,341		\$59,152

Table A7. Continued

Machinery Complement	Avg Annual Income Tax MACRS Depreciation	Avg. Annual Charge Per Year of Useful life Income Tax MACRS Depreciation	Annual Principle and Interest Payments	Avg. Charge per Year of Useful Life Principle and Interest Payments	Total Salvage Value	Avg. Annual Charge per Year of Useful Life Total Salvage Value
Stalk Shredder 14 ft.	\$1,440	\$1,008	\$2,003	\$1,402	\$3,024	\$302
Paratill 8-row	\$3,612	\$2,107	\$5,023	\$2,930	\$7,585	\$632
Fert. Appl 8-row	\$1,544	\$1,351	\$2,148	\$1,879	\$4,324	\$540
Disk Bed 8-row	\$2,180	\$1,526	\$3,033	\$2,123	\$4,579	\$458
Row Cond 27 ft.	\$1,349	\$944	\$1,876	\$1,313	\$2,832	\$283
Plant 8-row	\$4,703	\$4,115	\$6,541	\$5,723	\$14,814	\$1,852
Trailer Utility 10 ft.	\$286	\$133	\$397	\$185	\$200	\$13
Ditcher	\$333	\$233	\$463	\$324	\$699	\$70
Spray (DR) 40 ft.	\$1,085	\$950	\$1,510	\$1,321	\$3,039	\$380
Tractor 170 hp	\$14,117	\$12,352	\$19,634	\$17,179	\$34,586	\$4,323
Tractor 190 hp	\$15,457	\$13,525	\$21,498	\$18,811	\$37,870	\$4,734
Tractor 225 hp	\$17,500	\$15,313	\$24,339	\$21,297	\$42,875	\$5,359
Cotton Picker 4-row	\$31,975	\$27,978	\$44,472	\$38,913	\$67,148	\$8,394
Module Builder 4-row	\$3,696	\$2,587	\$5,140	\$3,598	\$9,054	\$905
Boll Buggy 4-row	\$7,201	\$5,041	\$10,015	\$7,010	\$17,642	\$1,764
Total	\$106,477	\$89,163	\$148,091	\$124,009	\$250,271	\$30,010

Table A8. Estimation of Machinery complements for a representative Louisiana 2 entity Cotton farm (1,500 acres)

Machinery Complement	Number of Units	Purchase Cost	Useful Life	Total Machinery Investment	Salvage Value	Annual Fixed Cost
Stalk Shredder 14 ft.	2	\$10,081	10	\$20,162	30%	\$1,411
Paratill 8-row	2	\$25,283	12	\$50,566	30%	\$2,950
Fert. Appl 8-row	2	\$10,809	8	\$21,618	40%	\$1,621
Disk Bed 8-row	1	\$15,263	10	\$15,263	30%	\$1,068
Row Cond 27 ft.	1	\$9,440	10	\$9,440	30%	\$661
Plant 8-row	1	\$32,921	8	\$32,921	45%	\$2,263
Trailer Utility 10 ft.	2	\$2,000	15	\$4,000	10%	\$240
Ditcher	1	\$2,330	10	\$2,330	30%	\$163
Spray (DR) 40 ft.	1	\$7,598	8	\$7,598	40%	\$570
Tractor 170 hp	1	\$98,816	8	\$98,816	35%	\$8,029
Tractor 190 hp	2	\$108,199	8	\$216,398	35%	\$17,582
Tractor 225 hp	2	\$122,500	8	\$245,000	35%	\$19,906
Cotton Picker 4-row	2	\$223,827	8	\$447,654	30%	\$39,170
Module Builder 4-row	1	\$25,869	10	\$25,869	35%	\$1,681
Boll Buggy 4-row	1	\$50,405	10	\$50,405	35%	\$3,276
<b>Total</b>				<b>\$1,248,040</b>		<b>\$100,593</b>



Table A8. Continued

Machinery Complement	Avg Annual Income Tax MACRS Depreciation	Avg. Annual Charge Per Year of Useful life Income Tax MACRS Depreciation	Annual Principle and Interest Payments	Avg. Charge per Year of Useful Life Principle and Interest Payments	Total Salvage Value	Avg. Annual Charge per Year of Useful Life Total Salvage Value
Stalk Shredder 14 ft.	\$2,880	\$2,016	\$4,006	\$2,804	\$6,049	\$605
Paratill 8-row	\$7,224	\$4,214	\$10,047	\$5,861	\$15,170	\$1,264
Fert. Appl 8-row	\$3,088	\$2,702	\$4,295	\$3,758	\$8,647	\$1,081
Disk Bed 8-row	\$2,180	\$1,526	\$3,033	\$2,123	\$4,579	\$458
Row Cond 27 ft.	\$1,349	\$944	\$1,876	\$1,313	\$2,832	\$283
Plant 8-row	\$4,703	\$4,115	\$6,541	\$5,723	\$14,814	\$1,852
Trailer Utility 10 ft.	\$571	\$267	\$795	\$371	\$400	\$27
Ditcher	\$333	\$233	\$463	\$324	\$699	\$70
Spray (DR) 40 ft.	\$1,085	\$950	\$1,510	\$1,321	\$3,039	\$380
Tractor 170 hp	\$14,117	\$12,352	\$19,634	\$17,179	\$34,586	\$4,323
Tractor 190 hp	\$30,914	\$27,050	\$42,996	\$37,621	\$75,739	\$9,467
Tractor 225 hp	\$35,000	\$30,625	\$48,679	\$42,594	\$85,750	\$10,719
Cotton Picker 4-row	\$63,951	\$55,957	\$88,944	\$77,826	\$134,296	\$16,787
Module Builder 4-row	\$3,696	\$2,587	\$5,140	\$3,598	\$9,054	\$905
Boll Buggy 4-row	\$7,201	\$5,041	\$10,015	\$7,010	\$17,642	\$1,764
Total	\$178,291	\$150,578	\$247,971	\$209,427	\$413,296	\$49,985

Table A9. Estimation of Machinery complements for a representative Louisiana 3 entity Cotton farm (2,250 acres)

Machinery Complement	Number of Units	Purchase Cost	Useful Life	Total Machinery Investment	Salvage Value	Annual Fixed Cost
Stalk Shredder 14 ft.	3	\$10,081	10	\$30,243	30%	\$2,117
Paratill 8-row	3	\$25,283	12	\$75,849	30%	\$4,425
Fert. Appl 8-row	3	\$10,809	8	\$32,427	40%	\$2,432
Disk Bed 8-row	2	\$15,263	10	\$30,526	30%	\$2,137
Row Cond 27 ft.	2	\$9,440	10	\$18,880	30%	\$1,322
Plant 8-row	2	\$32,921	8	\$65,842	45%	\$4,527
Trailer Utility 10 ft.	3	\$2,000	15	\$6,000	10%	\$360
Ditcher	2	\$2,330	10	\$4,660	30%	\$326
Spray (DR) 40 ft.	2	\$7,598	8	\$15,196	40%	\$1,140
Tractor 170 hp	2	\$98,816	8	\$197,632	35%	\$16,058
Tractor 190 hp	3	\$108,199	8	\$324,597	35%	\$26,374
Tractor 225 hp	2	\$122,500	8	\$245,000	35%	\$19,906
Cotton Picker 4-row	3	\$223,827	8	\$671,481	30%	\$58,755
Module Builder 4-row	2	\$25,869	10	\$51,738	35%	\$3,363
Boll Buggy 4-row	2	\$50,405	10	\$100,810	35%	\$6,553
Total				\$1,870,881		\$149,792

Table A9. Continued

Machinery Complement	Avg Annual Income Tax MACRS Depreciation	Avg. Annual Charge Per Year of Useful life Income Tax MACRS Depreciation	Annual Principle and Interest Payments	Avg. Charge per Year of Useful Life Principle and Interest Payments	Total Salvage Value	Avg. Annual Charge per Year of Useful Life Total Salvage Value
Stalk Shredder 14 ft.	\$4,320	\$3,024	\$6,009	\$4,206	\$9,073	\$907
Paratill 8-row	\$10,836	\$6,321	\$15,070	\$8,791	\$22,755	\$1,896
Fert. Appl 8-row	\$4,632	\$4,053	\$6,443	\$5,638	\$12,971	\$1,621
Disk Bed 8-row	\$4,361	\$3,053	\$6,065	\$4,246	\$9,158	\$916
Row Cond 27 ft.	\$2,697	\$1,888	\$3,751	\$2,626	\$5,664	\$566
Plant 8-row	\$9,406	\$8,230	\$13,082	\$11,447	\$29,629	\$3,704
Trailer Utility 10 ft.	\$857	\$400	\$1,192	\$556	\$600	\$40
Ditcher	\$666	\$466	\$926	\$648	\$1,398	\$140
Spray (DR) 40 ft.	\$2,171	\$1,900	\$3,019	\$2,642	\$6,078	\$760
Tractor 170 hp	\$28,233	\$24,704	\$39,267	\$34,359	\$69,171	\$8,646
Tractor 190 hp	\$46,371	\$40,575	\$64,494	\$56,432	\$113,609	\$14,201
Tractor 225 hp	\$35,000	\$30,625	\$48,679	\$42,594	\$85,750	\$10,719
Cotton Picker 4-row	\$95,926	\$83,935	\$133,416	\$116,739	\$201,444	\$25,181
Module Builder 4-row	\$7,391	\$5,174	\$10,280	\$7,196	\$18,108	\$1,811
Boll Buggy 4-row	\$14,401	\$10,081	\$20,030	\$14,021	\$35,284	\$3,528
Total	\$267,269	\$224,428	\$371,723	\$312,140	\$620,692	\$74,636

Table A10. Estimation of Machinery complements for a representative Louisiana 4 entity Cotton farm (3,000 acres).

Machinery Complement	Number of Units	Purchase Cost	Useful Life	Total Machinery Investment	Salvage Value	Annual Fixed Cost
Stalk Shredder 14 ft.	4	\$10,081	10	\$40,324	30%	\$2,823
Paratill 8-row	3	\$25,283	12	\$75,849	30%	\$4,425
Fert. Appl 8-row	4	\$10,809	8	\$43,236	40%	\$3,243
Disk Bed 8-row	2	\$15,263	10	\$30,526	30%	\$2,137
Row Cond 27 ft.	2	\$9,440	10	\$18,880	30%	\$1,322
Plant 8-row	2	\$32,921	8	\$65,842	45%	\$4,527
Trailer Utility 10 ft.	3	\$2,000	15	\$6,000	10%	\$360
Ditcher	2	\$2,330	10	\$4,660	30%	\$326
Spray (DR) 40 ft.	3	\$7,598	8	\$22,794	40%	\$1,710
Tractor 170 hp	2	\$98,816	8	\$197,632	35%	\$16,058
Tractor 190 hp	3	\$108,199	8	\$324,597	35%	\$26,374
Tractor 225 hp	3	\$122,500	8	\$367,500	35%	\$29,859
Cotton Picker 4-row	4	\$223,827	8	\$895,308	30%	\$78,339
Module Builder 4-row	3	\$25,869	10	\$77,607	35%	\$5,044
Boll Buggy 4-row	3	\$50,405	10	\$151,215	35%	\$9,829
Total				\$2,321,970		\$186,374

Table A10. Continued

Machinery Complement	Avg Annual Income Tax MACRS Depreciation	Avg. Annual Charge Per Year of Useful life Income Tax MACRS Depreciation	Annual Principle and Interest Payments	Avg. Charge per Year of Useful Life Principle and Interest Payments	Total Salvage Value	Avg. Annual Charge per Year of Useful Life Total Salvage Value
Stalk Shredder 14 ft.	\$5,761	\$4,032	\$8,012	\$5,608	\$12,097	\$1,210
Paratill 8-row	\$10,836	\$6,321	\$15,070	\$8,791	\$22,755	\$1,896
Fert. Appl 8-row	\$6,177	\$5,405	\$8,591	\$7,517	\$17,294	\$2,162
Disk Bed 8-row	\$4,361	\$3,053	\$6,065	\$4,246	\$9,158	\$916
Row Cond 27 ft.	\$2,697	\$1,888	\$3,751	\$2,626	\$5,664	\$566
Plant 8-row	\$9,406	\$8,230	\$13,082	\$11,447	\$29,629	\$3,704
Trailer Utility 10 ft.	\$857	\$400	\$1,192	\$556	\$600	\$40
Ditcher	\$666	\$466	\$926	\$648	\$1,398	\$140
Spray (DR) 40 ft.	\$3,256	\$2,849	\$4,529	\$3,963	\$9,118	\$1,140
Tractor 170 hp	\$28,233	\$24,704	\$39,267	\$34,359	\$69,171	\$8,646
Tractor 190 hp	\$46,371	\$40,575	\$64,494	\$56,432	\$113,609	\$14,201
Tractor 225 hp	\$52,500	\$45,938	\$73,018	\$63,891	\$128,625	\$16,078
Cotton Picker 4-row	\$127,901	\$111,914	\$177,888	\$155,652	\$268,592	\$33,574
Module Builder 4-row	\$11,087	\$7,761	\$15,420	\$10,794	\$27,162	\$2,716
Boll Buggy 4-row	\$21,602	\$15,122	\$30,045	\$21,031	\$52,925	\$5,293
Total	\$331,710	\$278,656	\$461,349	\$387,560	\$767,798	\$92,282

Table A11. Annual rice net farm income of price fluctuation scenarios, (2005-2009)

Year	Scenario	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
2005	Baseline	-2,315	26,393	35,731	53,282
	10% Price Increase	4,409	39,842	55,904	80,179
	10% Price Reduction	-3,891	23,242	31,004	46,979
2006	Baseline	-553	29,917	41,017	60,329
	10% Price Increase	6,346	43,715	61,714	87,926
	10% Price Reduction	-2,212	26,599	36,039	53,693
2007	Baseline	1,263	33,548	46,463	67,592
	10% Price Increase	8,684	48,391	68,727	97,277
	10% Price Reduction	-1,081	28,860	39,432	58,217
2008	Baseline	3,113	37,248	52,014	74,993
	10% Price Increase	11,065	53,133	75,841	106,762
	10% Price Reduction	-31	30,961	42,583	62,418
2009	Baseline	2,680	36,383	50,716	73,263
	10% Price Increase	10,588	52,199	74,439	104,893
	10% Price Reduction	142	31,307	43,102	63,110

Table A12. Annual cotton net farm income price fluctuation scenarios, (2005-2009)

Year	Scenario	1-Entity Farm	2-Entity Farm	3-Entity Farm	4-Entity Farm
2005	Baseline	5,209	32,632	56,795	89,075
	10% Price Increase	15,334	52,882	87,170	129,575
	10% Price Reduction	-2,701	16,811	33,063	57,433
2006	Baseline	5,327	32,867	57,147	89,545
	10% Price Increase	15,019	52,250	86,223	128,312
	10% Price Reduction	-2,578	17,057	33,433	57,926
2007	Baseline	5,550	33,312	57,816	90,436
	10% Price Increase	16,341	54,895	90,190	133,602
	10% Price Reduction	-2,776	16,662	32,840	57,135
2008	Baseline	3,899	30,011	52,864	83,834
	10% Price Increase	15,820	53,853	88,627	131,518
	10% Price Reduction	-4,862	12,488	26,580	48,789
2009	Baseline	4,455	31,123	54,532	86,058
	10% Price Increase	16,326	54,865	90,146	133,543
	10% Price Reduction	-4,131	13,951	28,774	51,715

## **VITA**

Manuel Estuardo Aldana was born on 1976, in Teculután, Zacapa, Guatemala. He attended the Escuela Agrícola Panamericana, El Zamorano, Honduras, where he received the title of Agrónomo in December, 1997, and the title of Ingeniero Agrónomo in December, 1998. In January, 2004, he enrolled in the Graduate School at Louisiana State University under the direction of Dr. Michael Salassi to pursue the degree of Master of Science in agribusiness management, which will be awarded at summer commencement, 2005.