

# Economic Analysis of Selected Rice Varieties

*Steven W. Martin and Joe E. Street*

## EXECUTIVE SUMMARY

Delta rice producers can currently choose among several rice varieties. The varieties differ in terms of rough rice yields, milling yields, straw strength, disease susceptibility, and herbicide tolerance. Rough rice yields and milling percentages were obtained from on-farm variety trials. The data are 3-year averages for Cocodrie, Lemont, Priscilla, and Wells (Kanter et. al). Only 1 year of data was available for the two Clearfield lines and for XL6. Direct and fixed costs were obtained by using the Mississippi State Budget Generator (MSBG). The analysis was based on a "worst-case" scenario in order to standardize the analysis. The cost of a fungicide treatment was added to the cost of producing a variety rated **very susceptible** to a disease. The cost of a fungicide was not added to all varieties rated susceptible based on the history of that variety. Based strictly on cost of production estimates, Lemont appears to have an advantage. The Clearfield varieties are the most expensive to produce. When calculated at loan value, Lemont provides the

highest returns per bushel. The two Clearfield lines follow closely. XL6 provides the lowest returns per bushel followed by Wells and Priscilla. XL6 provides the highest total returns per acre. Wells and Cocodrie follow closely. The Clearfield lines have the lowest returns per acre. Based on the cost of production budgets, Wells provides the highest per-acre returns above total costs followed by XL6. An interesting part of the analysis is the comparison of value per bushel and total returns. The varieties that provided the higher values per bushel (based on milling grade) provided some of the lowest total returns per acre because of lower (rough rice) yields. Thus, under the pricing structures used in this analysis, rough rice yield is very important. An interactive producer budget and per-acre returns table shown in the appendix are designed for producers to develop their own analysis. By placing individual cost of production estimates and milling grades in the spreadsheet, producers can estimate per-acre costs for their individual farms.

## INTRODUCTION

Delta rice producers can currently choose among several rice varieties. The varieties differ in terms of rough rice yields, milling yields, straw strength, disease susceptibility, and herbicide tolerance. In order to choose the variety that maximizes potential returns, all factors must be considered. This analysis is an attempt to quantify each of these factors

into either a cost or return value. The relationship between rough rice yield and milling yield is also considered. Additionally, a producer cost and return spreadsheet was developed that allows producers to perform their own analysis based on their farm yields and management practices.

Martin is an MSU Extension Service agricultural economics specialist and Street is an MSU-ES rice specialist at the Delta Research and Extension Center in Stoneville, Mississippi. For more information, contact Martin by telephone at (662) 686-3234 or by e-mail at [smartin@ext.msstate.edu](mailto:smartin@ext.msstate.edu). This information sheet was published by the MSU Office of Agricultural Communications, a unit of the Division of Agriculture Forestry and Veterinary Medicine.



**Experiment Station**  
Vance H. Watson, Director

**Mississippi Agricultural & Forestry Experiment Station**

J. Charles Lee, Interim President • Mississippi State University • Vance H. Watson, Interim Vice President

## MATERIALS AND METHODS

Rough rice yields and milling percentages were obtained from on-farm variety trials. The data are 3-year averages for Cocodrie, Lemont, Priscilla, and Wells (Kanter et. al). Only 1 year of data was available for the two Clearfield lines and for XL6 (Clearfield data provided by Horizon Ag, and XL6 data provided by Rice-Tec, Inc.).

Value per bushel was based on loan rate calculations of \$10.69 per hundredweight for whole grains and \$5.35 per hundredweight for brokens (assumes \$6.69 per hundredweight for 55/70 milling).

Direct and fixed costs were calculated using the Mississippi State Budget Generator (MSBG) and followed the general framework and procedures defined within the MSBG program (Laughlin and Spurlock). The MSBG is the program used to produce all of the Mississippi State Planning Budgets, as well as planning budgets for several other states. Direct costs are those costs associated with actually producing the crop. Fixed costs per acre are the costs associated with ownership of farm machinery and equipment. Total specified costs per acre, which are the sums of direct and fixed costs, are also presented. These

costs are referred to as specified costs because they represent only the costs specified in the budget. The specified costs in these budgets do not include land costs, general farm overhead, or any returns to management.

This analysis is based on a “worst-case” scenario in order to standardize the analysis. The cost of a fungicide treatment was added to the cost of producing a variety rated **very susceptible** to a disease. The cost of a fungicide was not added to all varieties rated susceptible based on the history of that variety. Every farm is different, and disease and insect pressure varies by field. Thus, all pesticide treatments would not have to be made in every situation as assumed in this analysis. Not all varieties will require an insecticide application each year; therefore, the cost of production will vary depending upon location and weather. Producers should consider their own situation on a case-by-case basis. The cost of draining Cocodrie for straighthead was not included, although it is rated very susceptible. Draining would be required if Cocodrie is grown on lighter soils but is generally not required for heavy clay soils.

## RESULTS

Table 1 presents cost of production estimates for each of the eight rice varieties included in this analysis. The first column shows direct costs per acre; the second column, fixed costs per acre; and the third column, total specified costs per acre.

Based strictly on cost of production estimates, Lemont appears to have an advantage. The Clearfield varieties are the most expensive to produce. The other varieties are grouped closely together in terms of cost of production. It should be pointed out that the cost of production estimates include a cost for hauling rice (10 cents per bushel) and a cost for drying rice (40 cents per bushel). Therefore, those

varieties with higher yields will incur higher costs in these categories. Tables 2-4 further explain the methods for determining cost of production for the rice varieties.

Table 2 shows the cost of production estimates by category. When considering Table 2, Tables 3 and 4 should also be considered. Table 3 shows estimated fungicide applications and the cost of those applications. The fungicide applications shown are based on “worst-case” scenarios.

Table 4 shows estimated insecticide applications and the costs of those applications. Again, this is based on a worst-case scenario, and producers should consider their

**Table 1. Production Costs per Acre for Selected Rice Varieties.<sup>1</sup>**

Variety	Direct costs per acre	Fixed costs per acre	Total specified costs
	\$	\$	\$
Cocodrie	380.06	56.72	436.79
Clearfield CL 121	399.37	56.72	456.10
Clearfield CL 141	389.30	56.72	446.03
Lemont	349.06	56.72	405.79
Priscilla	356.91	56.72	413.64
Wells	365.56	56.72	422.29
XL 6 Hybrid	370.83	58.63	429.46

<sup>1</sup>Specified costs do not include land charges, general farm overhead, or returns to management. Costs and returns are based on 3-year average yields for Cocodrie, Lemont, Priscilla, and Wells. Clearfield varieties and XL6 are 2001 only.

**Table 2. Per-Acre, Direct-Cost Comparison of Selected Rice Varieties**

Direct costs	Cocodrie	Clearfield 121	Clearfield 141	Lemont	Priscilla	Wells	XL 6 Hybrid Rice
	\$	\$	\$	\$	\$	\$	\$
Custom spray (airplane)	19.50	16.25	16.25	16.25	16.25	13.00	13.00
Fungicides	35.11	40.70	40.70	20.35	14.76	20.35	0.00
Herbicides	52.93	47.92	47.92	52.93	52.93	52.93	38.49
Seed	19.95	42.00	42.00	19.95	19.95	19.95	67.65
Operator labor	14.85	13.10	14.85	14.85	14.85	14.85	14.53
Unallocated labor	13.36	11.79	13.36	13.36	13.36	13.36	13.08
Haul rice	18.40	15.80	13.20	15.90	18.60	19.30	21.80
Dry rice (\$0.40 per bushel)	73.60	63.20	52.80	63.60	74.40	77.20	87.20
Interest on operating capital	11.45	12.70	12.30	10.96	10.90	10.99	11.46
Custom fertilizer application	18.45	18.45	18.45	18.45	18.45	18.45	5.33
Fertilizers (urea)	43.00	43.00	43.00	43.00	43.00	43.00	21.50
Diesel fuel	33.15	33.15	33.15	33.15	33.15	33.15	32.78
Repair & maintenance	24.37	24.37	24.37	24.37	24.37	24.37	24.26
Irrigation labor	2.34	2.34	2.34	2.34	2.34	2.34	2.34
Hand labor	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Insecticides	14.72	14.72	14.72	14.72	14.72	14.72	14.72
Irrigation supplies	0.25	0.25	0.25	0.25	0.25	0.25	0.25

individual situations. As can be seen in Table 4, all varieties are susceptible to both stinkbug and rice water weevil damage. Therefore, in comparing varieties, these insecticide costs are equal across all varieties. However, inclusion of these costs does affect the returns over costs shown in Table 6.

Other major differences in cost of production are in the herbicide, fertilizer, hauling, and drying categories. Again, those varieties with higher rough rice yields will incur more costs for hauling and drying.

Table 5 shows rice yields, milling percentages, and value per bushel. Rice prices above loan value might change this portion of the analysis. Additionally, loan deficiency payments (LDP) and/or marketing premiums above loan could increase value per bushel. Most often these premiums or LDPs are on a rough-rice basis, thus favoring higher yielding varieties.

When calculated at loan value, Lemont provides the highest returns per bushel. The two Clearfield lines follow closely. XL6 provides the lowest returns per bushel, followed by Wells and Priscilla.

**Table 3. Assumed Fungicide Applications per Variety for Three Diseases.**

Variety	Sheath blight <sup>1</sup>	Blast <sup>2</sup>	Smut <sup>3</sup>
Cocodrie	1 application		1 application
Clearfield CL 121	1 application	1 application	
Clearfield CL 141	1 application	1 application	
Lemont	1 application		
Priscilla			1 application
Wells		1 application	
XL6 Hybrid Rice			

<sup>1</sup>Treatment was \$20.35 per application plus aerial application fee. In 2001, approximately 50% of susceptible rice acreage was treated for sheath blight.  
<sup>2</sup>Treatment was \$20.35 per application plus aerial application fee. In 2001, approximately 5% of susceptible rice acreage was treated for blast.  
<sup>3</sup>Treatment was \$14.76 per application plus aerial application fee. In 2001, approximately 60% of susceptible rice acreage was treated for smut.

**Table 4. Assumed Insecticide Applications per Variety for Two Target Pests.**

Variety	Rice water weevil <sup>1</sup>	Stinkbug <sup>2</sup>
Cocodrie	1 application	1 application
Clearfield CL 1221	1 application	1 application
Clearfield CL 141	1 application	1 application
Lemont	1 application	1 application
Priscilla	1 application	1 application
Wells	1 application	1 application
XL6 Hybrid Rice	1 application	1 application

<sup>1</sup>Treatment was \$7.36 per application plus aerial application fee. In 2001, approximately 35% of total rice acreage was treated for rice water weevils.  
<sup>2</sup>Treatment was \$7.36 per application plus aerial application fee. In 2001, approximately 80% of total rice acreage was treated for stink bugs.

**Table 5. Rough Rice Yields, Milling Percentages, and Value per Bushel.<sup>1</sup>**

Variety	Rough rice yield	Head rice	Milling yield		Value per bushel (rough rice basis)
			Total	Whole	
	bu/A	lb/A	%	%	\$
Cocodrie	184	4,653	67.9	56.2	2.99
Clearfield CL 121	158	4,095	68.7	57.6	3.04
Clearfield CL 141	132	3,421	68.7	57.6	3.04
Lemont	159	4,093	70.4	57.2	3.07
Priscilla	186	4,311	67.4	51.5	2.86
Wells	193	4,204	70.0	48.4	2.85
XL 6 Hybrid	218	4,022	65.0	41.0	2.55

<sup>1</sup>Costs and returns are based on 3-year average yields for Cocodrie, Lemont, Priscilla, and Wells. Clearfield varieties and XL6 are 2001 only. Value per bushel based on \$10.69 for whole grain and \$5.35 for brokens or \$6.69 for 55/70.

Table 6 shows returns above costs for each of the rice varieties. Total returns are given in column one and are calculated based on the value per bushel and rough rice yield data given in Table 5. Columns two and three of Table 6 give returns above direct costs and returns above total specified costs. These costs are calculated based on the total returns given in column one and the costs of production estimates given in Table 1. XL6 provides the highest total returns per acre. Wells and Cocodrie follow closely. The Clearfield lines have the lowest returns per acre. However, they may still fit in a producer's program/rotation if red rice is a problem. Given the cost of production budgets in Table

1, Wells provides the highest per-acre returns above total costs, followed by XL6.

An interesting part of this analysis is the comparison of value per bushel and total returns. The varieties that provided the higher values per bushel (based on milling grade) provided some of the lowest total returns because of lower (rough rice) yields. Thus, under the pricing structures used in this analysis, rough rice yield is very important. Additionally, loan deficiency payments (LDP), and some marketing premiums could possibly be paid on a rough-rice basis.

**Table 6. Returns Above Costs – Specified Rice Varieties.<sup>1</sup>**

Variety	Total returns	Returns above direct costs	Returns above total specified costs
	\$	\$	\$
Cocodrie	549.27	169.21	112.48
Clearfield CL 121	480.40	81.03	24.30
Clearfield CL 141	401.34	12.04	-44.69
Lemont	488.03	138.97	82.24
Priscilla	532.00	175.09	118.36
Wells	549.72	184.16	127.43
XL 6 Hybrid	555.92	185.09	126.46

<sup>1</sup>Costs and returns are based on 3-year average yields for Cocodrie, Lemont, Priscilla, and Wells. Clearfield varieties and XL6 are 2001 only.

## REFERENCES

- Kanter, Dwight G., Theodore C. Miller, and Joe E. Street. 2001. Mississippi Rice Variety Trials, 2001. Mississippi Agricultural and Forestry Experiment Station Information Bulletin 383.
- Laughlin, David H., and Stan R. Spurlock. *Mississippi State Budget Generator User's Guide Version 5.5 for Windows*. Available on the web at <http://www.agecon.msstate.edu/researchandinformation/software.asp>.
- MSU Department of Agricultural Economics. 2000. Delta 2001 Planning Budgets. Mississippi State University Agricultural Economics Report 120.

## APPENDIX

**NOTE:** The producer budget and per-acre returns table are designed for producers to develop their own analysis. By placing individual cost of production expenses in each of the columns, producers can estimate per-acre costs for their individual farms. The per-acre returns section is designed to link with the producer budget in an Excel spreadsheet. (This program can be downloaded from the DREC web site at [www.msstate.edu/dept/drec](http://www.msstate.edu/dept/drec). Click on “Ag Econ News” and then “Winter 2002.”) Producers must put in a total milling yield (percentage) and whole grain yield percentage. The spreadsheet will calculate broken percentage and value per bushel (\$10.69 for whole grain and \$5.35 for broken). Producers must also enter a rough rice per-acre yield. The spreadsheet will then calculate total returns, returns above direct costs (based on the cost data the producer enters into the budget), and returns above total costs (based on the producer budget). This analysis is intended only as a guide. Additional years of data and different locations would provide further insight. Producers should consider their own farms, yields, and situations when selecting varieties.

<b>Producer Budget</b>	
<b>Direct Expenses per Acre</b>	
Seed	\$0.00
Fertilizers	0.00
Fungicides	0.00
Herbicides	0.00
Insecticides	0.00
Aerial fertilizer application charges	0.00
Aerial spray application charges	0.00
Labor charges	0.00
Irrigation supplies	0.00
Diesel fuel	0.00
Repair & maintenance expense	0.00
Electricity expense	0.00
Rice hauling expense	0.00
Rice drying expense	0.00
Interest expense	0.00
<b>Total Direct Expenses</b>	<b>0.00</b>
<b>Fixed Expenses</b>	
Fixed equipment expense	0.00
Fixed tractor expense	0.00
Fixed irrigation expense	0.00
<b>Total Fixed Expenses</b>	<b>0.00</b>
<b>Other Expenses</b>	
Land rent	0.00
Loan note	0.00
Other	0.00
Other	0.00
Other	0.00
<b>Total Other Expenses</b>	<b>0.00</b>
<b>Total Expenses</b>	<b>0.00</b>

<b>Returns Per Acre</b>									
	<b>Milling yields</b>			<b>Value per bushel<sup>1</sup></b>	<b>Premium above loan</b>	<b>Yield</b>	<b>Total returns</b>	<b>Total returns above direct costs</b>	<b>Total returns above total costs</b>
	<b>Total</b>	<b>Whole</b>	<b>Broken</b>						
	%	%	%	\$	\$	<i>bu/A</i>	\$	\$	\$
Example	67.9	56.2	11.7	2.99	0.00	184	549.27	549.27	549.27
Your farm	0.0	0.0	0.0	0.00	0.00	0	0.00	0.00	0.00
<sup>1</sup> Based on loan.									

# Mississippi State UNIVERSITY



Printed on Recycled Paper

**Mention of a trademark or proprietary product does not constitute a guarantee or warranty of the product by the Mississippi Agricultural and Forestry Experiment Station and does not imply its approval to the exclusion of other products that also may be suitable.**

Mississippi State University does not discriminate on the basis of race, color, religion, national origin, sex, age, disability, or veteran status.