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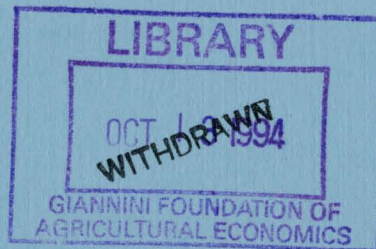
# FACULTY PAPER SERIES

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## THE ECONOMIC IMPACT OF THE TEXAS RICE INDUSTRY

Earl L. Taylor, M. Edward Rister,  
H.L. Goodwin, and Mark L. Waller



DEPARTMENT OF AGRICULTURAL ECONOMICS  
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# THE ECONOMIC IMPACT OF THE TEXAS RICE INDUSTRY

## Introduction

On an international scale, the economic importance of rice cannot be disputed, as it provides a primary food source for over fifty percent of the world's population (Holder and Grant). Although the U.S. currently ranks as the second-leading rice exporting country, U.S. rice production is minimal in comparison to the other rice producing countries (USDA). Primarily concentrated in five southern states -- Arkansas, Louisiana, Mississippi, Missouri, and Texas -- and in California, the economic impact of the rice industry is substantial in these key rice production and milling areas. Whereas the vast importance of the U.S. rice industry is recognized, the economic impact of the industry has not been addressed and quantified. Of key importance to researchers and industry members alike, the focus of this study is to identify and quantify the economic and employment impacts associated with the Texas rice industry.

Texas rice production is primarily contained within 18 counties located along the upper Texas gulf coast (Figure 1). Texas rice production since 1987 has varied from a low of 15.8 million hundredweight (cwt) in 1987 to a high of 23.3 million cwt in 1988. Annual production levels and the value of production for the Texas rough rice crop from 1985-1991 are presented in Table 1.

## Economic Impact Analysis

The rice industry is an important contributor to the economy of the upper Texas Gulf Coast. The economic impact of the agricultural sector, and in particular the rice industry, was examined by Wildenthal. Although Wildenthal addressed the Texas food processing industry as a whole, rice production, milling, value added processing, and distribution were all subsectors in the input-output (I-O) analysis. I-O analysis was used to quantify the economic impact of the respective sectors of the economy. Selected multipliers of interest are presented in Table 2. The income and output multipliers indicate direct monetary impacts associated with changes in final demand. The employment multiplier indicates the associated impact on employment within the respective sectors given an associated change in the final demand for rice. The results of this research suggest the rice industry has a substantial impact on the Texas economy.

The economic impact of the Texas rice industry is calculated for the 1992 marketing year (Appendix Exhibit 1). The key factors used to calculate the economic impact are the respective multipliers as reported by Wildenthal, the distribution of rice milled in Texas, and the production of rough rice in Texas. With the exception of the multipliers, the other measures were obtained from USDA sources. The 1992 Texas rice crop was valued in

excess of 204.5 million dollars. This is based on total production of 20.3 million hundredweight with a season average price of \$10.05/cwt<sup>1</sup>. Thus, the economic impact associated with rice production in Texas is valued at 405.1 million dollars.

The milling industry and further processing add considerably to the economic impact associated with the rice industry. The value of the rice milled in Texas was calculated using the value of the rice grown in Texas, net of any Government payments, and the value of any rice imported into Texas from other states for milling. The economic impact of rice milling is 229.3 million dollars. This includes the milling of 200,000 cwt of rice imported from other states for milling in Texas. Further processing and packaging of 40 percent of the rice milled in Texas contributes an additional 114.6 million dollars to the economic impact.

An analysis of the economic impact of the Texas rice industry would not be complete without addressing the contribution of the distribution system. The wholesale distribution system adds an additional 79.5 million dollars, whereas retail distribution adds 20.6 million dollars to the total. These values are based solely on the distribution of Texas milled rice. Currently, 40 percent of the rice milled in Texas is processed and packaged for wholesale distribution, with 10 percent entering the retail distribution channel in Texas. The economic impact associated with retail distribution includes only that rice sold through retail markets in Texas.

Based on the calculations outlined above, the economic impact of the Texas rice industry is 849.4 million dollars for the 1992 marketing year (Appendix Exhibit 1). The calculations presented are a conservative attempt to measure and quantify the economic impact that the Texas rice industry has on the economy of the upper Texas gulf coast. The 849.4 million dollar estimate does not include the additional impact associated with waterfowl and other wildlife aspects of rice production.

The impact of the Texas rice industry is not solely limited to the monetary valuation outlined above. The rice industry contributes a significant proportion of employment opportunities for communities within the Texas Rice Belt. The employment impacts of the respective subsectors of the rice industry are summarized in Table 3. Based on 1992 production data, the total statewide employment associated with the Texas rice industry is 6,265.70 person-years (Appendix Exhibit 2). This includes direct employment of 2,738.61 person-years, and indirect employment of 3,527.09 person-years. The direct employment associated with a particular subsector was determined by multiplying the dollar valuation of that subsector times its corresponding direct effect, as reported by Wildenthal. The total subsector employment was then calculated by multiplying the direct employment times the

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<sup>1</sup> This average price includes the weighted government deficiency payment of \$3.60/cwt.

employment multiplier for each of the respective subsectors. The indirect employment associated with each subsector is the residual between the total and direct employment values.

The statistics cited above indicate the employment effects for the state of Texas. Further delineation is beyond the scope of this study, but could be pursued using regional or national I-O models.

### **Conclusions**

In light of the analysis presented herein, it is evident that the Texas rice industry has a substantial impact on the economy of the Texas Gulf Coast. Although rice production in Texas is in a reduction phase, the impact that the rice industry has on the Texas economy is substantial. Based on the analysis presented herein, the economic impact associated with rice production during 1992 is valued at 874.0 million dollars. Further, 6,445.51 person-years of employment are created and maintained in association with the industry. The economic and employment effects are graphically represented in figure 2.

The analysis presented is a conservative attempt to identify and quantify the economic and employment impacts resulting from rice production in Texas. The impacts listed are the result of the production, milling, processing, and distribution of rice in Texas. An important segment of the rice industry was not included in the analysis. The analysis ignores the positive contribution of rice production to the environment and to recreation for the upper Texas Gulf Coast. The Texas rice industry provides vast environmental and recreational benefits for the upper Texas Gulf Coast. Rice producers in Texas manage a substantial number of wetlands that provide key nesting areas for migratory waterfowl. It is the economic and employment impacts associated with these environmental and recreational activities that were not addressed or quantified by this study. Given that it is hypothesized by many in the rice industry that the environmental and recreational benefits are substantial, and provide a key area for future research. In light of these environmental and recreational issues, the Texas rice industry generates substantial economic and employment opportunities beyond those identified and quantified in the realm of this study.



### References

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Table 1. Texas Rough Rice Production and Value of Production, 1985-1991.

Marketing Year	Harvested Acreage (1,000 AC)	Production (cwt)	Average Price (\$/cwt)	Total Value (1,000 dollars)
1985	329	18,071,000	7.38	133,364
1986	289	18,063,000	4.22	76,226
1987	269	15,871,000	8.07	128,079
1988	388	23,280,000	7.24	168,547
1989	338	19,266,000	8.02	154,513
1990	353	21,180,000	7.41	156,944
1991	343	20,580,000	8.15	167,727
1992	351	20,357,000	6.45	131,302

Source: TDA -- Texas Agricultural Statistical Service, and  
USDA, Rice Situation and Outlook.

Note: The total value is net of any deficiency payments.



Table 2. Income, Output and Employment Multipliers Associated with the Texas Rice Industry.

	Income (\$)	Output (\$)	Employment (Person-Years)
Rice Production	2.01	1.98	3.54
Rice Mill Products	2.45	1.73	2.77
Value Added Processing	0.17	1.25	1.43
Wholesale Distribution	0.57	1.50	1.53
Retail Distribution	0.55	1.56	1.20

Source: Wildenthal.

Table 3. Employment Impact of the Texas Rice Industry.

	Direct Employment	Indirect Employment	Total Employment
Rice Production	836.81	2,125.48	2,962.29
Rice Mill Products	466.75	826.14	1,292.89
Value Added Processing	522.11	224.50	746.61
Wholesale Distribution	510.24	270.43	780.67
Retail Distribution	402.70	80.54	483.24
Industry Total	2,738.61	3,527.09	6,265.70

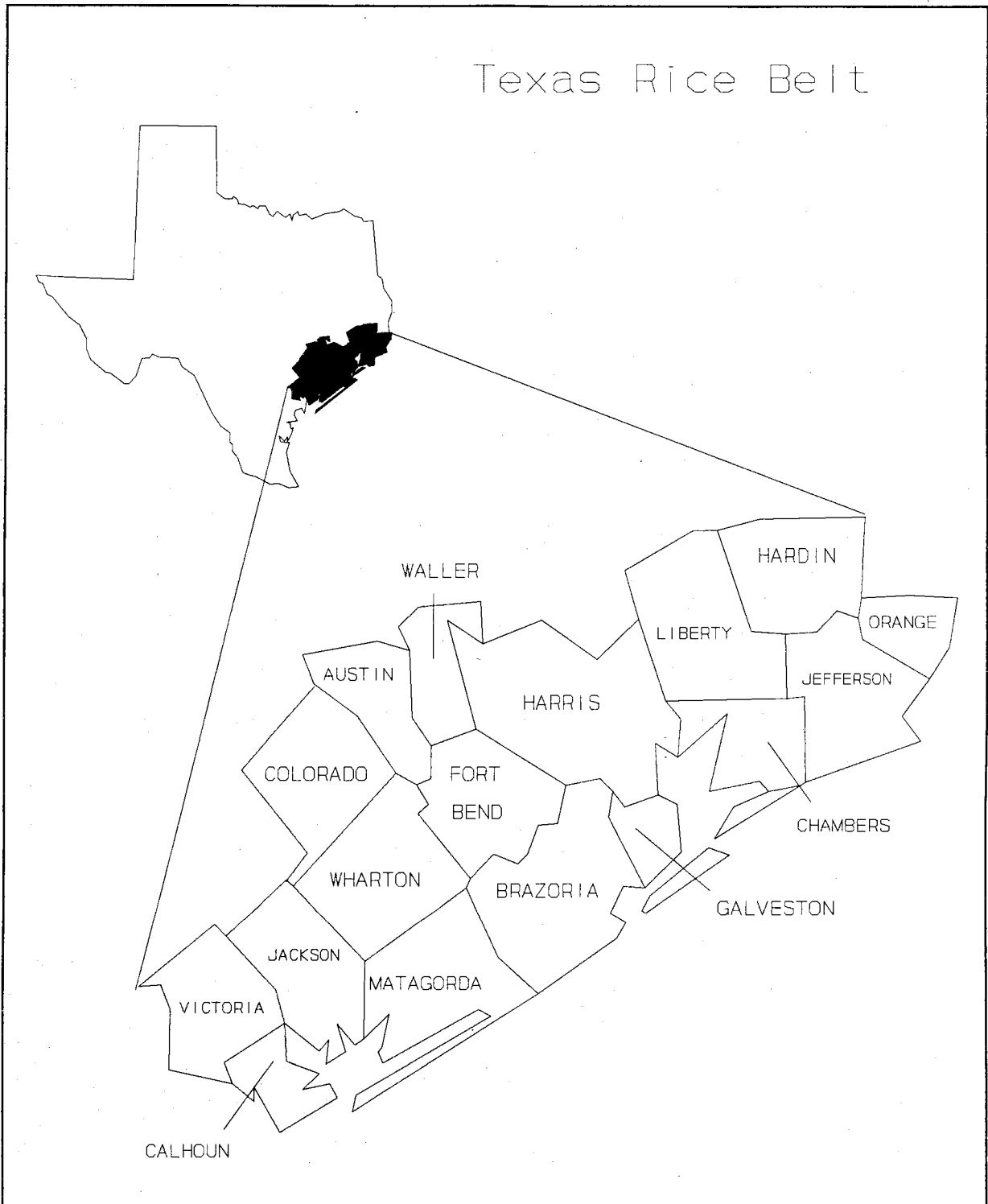


Figure 1. Texas Rice Belt and Principal Rice-Producing Counties.

**Figure 2. Economic Impacts of the Texas Rice Industry**

<b>\$849 million Dollar Impact</b>		<b>6,266 Jobs</b>	
<b>Retail Distribution</b>	<b>\$ 21 million</b>	<b>Retail Distribution</b>	<b>483 Jobs</b>
<b>Wholesale Distribution</b>	<b>\$ 80 million</b>	<b>Wholesale Distribution</b>	<b>781 Jobs</b>
<b>Value Added Processing</b>	<b>\$115 million</b>	<b>Value Added Processing</b>	<b>747 Jobs</b>
<b>Milling</b>	<b>\$229 million</b>	<b>Milling</b>	<b>1,293 Jobs</b>
<b>Production</b>	<b>\$405 million</b>	<b>Production</b>	<b>2,962 Jobs</b>
<b>Added Income</b>		<b>Added Employment</b>	

**APPENDIX 1**

**Economic Impact Analysis**

## APPENDIX 1

### Economic Impact Analysis

The economic and employment impacts were calculated in a Lotus 1-2-3 spreadsheet. The calculations are based on the value of Texas rice production. The necessary variables, harvested acres, yield, average Texas price, and average deficiency payment, are entered into the spreadsheet allowing for the calculation of the value of production. The production data are available from *Rice Situation and Outlook* (USDA). The next piece of information needed is the distribution patterns of Texas milled rice. These values were obtained from USDA sources (Childs). The final piece of information needed for the analysis are the respective income, output, and employment multipliers. With the necessary variables outlined above included in the spreadsheet, calculation of the economic and employment impacts is performed. The spreadsheet follows.

APPENDIX EXHIBIT 1.

ECONOMIC IMPACT OF THE TEXAS RICE INDUSTRY, 1992 WORKSHEET.

INCOME, OUTPUT AND EMPLOYMENT MULTIPLIERS [a]

	Income (\$)	Output (\$)	Employment
Rice Production	2.01	1.98	3.54
Rice Mill Products	2.45	1.73	2.77
Value Added Processing - Rice	0.17	1.25	1.43
Wholesale Trade	0.57	1.50	1.53
Retail Trade	0.55	1.56	1.20

EMPLOYMENT EFFECTS OF THE TEXAS RICE INDUSTRY [a]

	Direct ----- Person-Years-----	Total ----
Rice Production	4.09	14.48
Rice Mill Products	3.52	9.75
Value Added Processing - Rice	5.69	8.16
Wholesale Trade	9.62	14.67
Retail Trade	30.37	36.53

DISTRIBUTION OF TEXAS MILLED RICE [b]

% of Texas Rice Exported	60.00%
% of Texas Rice - Wholesale	40.00%
% of Texas Rice - Retail	10.00%

Note: Retail distribution includes only the rice sold in Texas.

TEXAS RICE PRODUCTION [c]

Harvested Acres	351,000 AC
x Yield	58 CWT/AC
Total Production	20,358,000 CWT
Average Texas Price	\$6.45 /CWT
+ Deficiency Payment*	\$3.60 /CWT*
Total Producer Price	\$10.05 /CWT
Total Production	20,358,000 CWT
x Total Producer Price	\$10.05 /CWT

VALUE OF TEXAS RICE PRODUCTION \$204,597,900

\* Represents the deficiency payment of \$4.21/cwt weighted by (Farm Program Yield/Expected Yield); that is, deficiency payments are based on the farm program yield. The weighting factor used is  $(4,962/5,800) = .856$  (Smith). It is assumed that all rice production stems from payment acres; that is, there are no wildcat acres, and no NFA acres are planted.

Sources: [a] Wildenthal, Marie.  
 [b] Childs, N. U.S. Rice Distribution Patterns, 1988/89. USDA, 1992.  
 [c] Rice Situation and Outlook Report, USDA, 1993.

**ECONOMIC IMPACT OF THE TEXAS RICE INDUSTRY****RICE PRODUCTION**

Value of Texas Rice Production	\$204,597,900
<u>x Production Output Multiplier</u>	<u>1.98</u>

<b>TOTAL ECONOMIC VALUE OF RICE PRODUCTION</b>	<b><u>\$405,103,842</u></b>
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**RICE MILLING**

Value of Texas Rice (Net of Deficiency Payment)	\$6.45/CWT
<u>x Total Production</u>	<u>20,358,000 CWT</u>
Mill Value of Texas Rice	\$131,309,100

Value of Imported Rice	\$6.45/CWT
<u>x Imports from other States</u>	<u>200,000 CWT</u>
Mill Value of Imported Rice	\$1,290,000

Value of Texas Rice	\$131,309,100
<u>+ Value of Imported Rice</u>	<u>\$1,290,000</u>
Total Value Of Rice Milled In Texas	\$132,599,100

Total Value Of Rice Milled In Texas	\$132,599,100
<u>x Milling Output Multiplier</u>	<u>1.73</u>

<b>TOTAL ECONOMIC VALUE OF RICE MILLING</b>	<b><u>\$229,396,443</u></b>
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**VALUE ADDED RICE PROCESSING**

Total Value of Rice Milling	\$229,396,443
<u>x % of milled rice further processed</u>	<u>40%</u>
Total of Value Added Processing	\$91,758,577

Total of Value Added Processing	\$91,758,577
<u>x Value Added Processing Output Multiplier</u>	<u>1.25</u>

<b>TOTAL ECONOMIC IMPACT OF VALUE ADDED RICE PROCESSING</b>	<b><u>\$114,698,222</u></b>
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<b>TOTAL ECONOMIC IMPACT OF RICE MILLING AND PROCESSING</b>	<b><u>\$749,198,507</u></b>
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**ECONOMIC IMPACT OF THE DISTRIBUTION SYSTEM****WHOLESALE DISTRIBUTION**

Total Value Of Rice Milled In Texas	\$132,599,100
<u>x % of Texas Rice - Wholesale</u>	<u>40.00%</u>
Value of Milled Rice For Wholesale Distribution	\$53,039,640

Value of Milled Rice For Wholesale Distribution	\$53,039,640
<u>x Wholesale Trade Multiplier</u>	<u>1.50</u>
<b>ECONOMIC VALUE OF WHOLESALE TRADE</b>	<b><u>\$79,559,460</u></b>

**RETAIL DISTRIBUTION**

Total Value Of Rice Milled In Texas	\$132,599,100
<u>x % of Texas Rice - Retail</u>	<u>10.00%</u>
Value of Milled Rice For Retail Distribution	\$13,259,910

Value of Milled Rice For Retail Distribution	\$13,259,910
<u>x Retail Trade Multiplier</u>	<u>1.56</u>
<b>ECONOMIC VALUE OF RETAIL TRADE</b>	<b><u>\$20,685,460</u></b>

<b>TOTAL ECONOMIC VALUE OF THE DISTRIBUTION SYSTEM</b>	<b><u>\$100,244,920</u></b>
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<b>TOTAL ECONOMIC IMPACT OF THE TEXAS RICE INDUSTRY</b>	<b><u>\$849,443,426</u></b>
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**EMPLOYMENT IMPACT OF THE TEXAS RICE INDUSTRY (Person-Years per Million Dollars)****RICE PRODUCTION**

Value of Production	\$204,597,900	
x Direct Employment Effect	<u>4.09</u>	
Direct Employment		836.81
Direct Employment Effect	836.81	
x Employment Multiplier	<u>3.54</u>	
Rice Production Employment Total (Person-Years)		<u>2962.29</u>

**RICE MILLING**

Value of Rice Milled in Texas	\$132,599,100	
x Direct Employment Effect	<u>3.52</u>	
Direct Employment		466.75
Direct Employment Effect	466.75	
x Employment Multiplier	<u>2.77</u>	
Rice Milling Employment Total (Person-Years)		<u>1292.89</u>

**VALUE ADDED RICE PROCESSING**

Value of Rice Processed in Texas	\$91,758,577	
x Direct Employment Effect	<u>5.69</u>	
Direct Employment		522.11
Direct Employment Effect	522.11	
x Employment Multiplier	<u>1.43</u>	
Value Added Rice Processing Employment Total (Person-Years)		<u>746.61</u>

**WHOLESALE DISTRIBUTION**

Value of Milled Rice For Wholesale Distribution	\$53,039,640	
x Direct Employment Effect	<u>9.62</u>	
Direct Employment		510.24
Direct Employment Effect	510.24	
x Employment Multiplier	<u>1.53</u>	
Wholesale Distribution Employment Total (Person-Years)		<u>780.67</u>

**RETAIL DISTRIBUTION**

Value of Milled Rice For Retail Distribution	\$13,259,910	
x Direct Employment Effect	<u>30.37</u>	
Direct Employment		402.70
Direct Employment Effect	402.70	
x Employment Multiplier	<u>1.20</u>	
Retail Distribution Employment Total (Person-Years)		<u>483.24</u>

**TOTAL INDUSTRY DIRECT EMPLOYMENT (Person-Years)** 2738.61

**TOTAL EMPLOYMENT OF THE TEXAS RICE INDUSTRY (Person-Years)** 6265.71

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