2015
University of Arkansas
Rice Research Verification Program

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RICE RESEARCH VERIFICATION PROGRAM, 2015

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INTRODUCTION

The 2015 growing season was the thirty-second year for the Rice Research Verification Program (RRVP). The RRVP is an interdisciplinary effort between growers, county extension agents, extension specialists, and researchers. The RRVP is an on-farm demonstration of all the research-based recommendations developed by the University of Arkansas Division Of Agriculture for the purpose of increasing the profitability of rice production in Arkansas. The specific objectives of the program are:

1. To demonstrate and verify research-based recommendations for profitable rice production throughout the rice-producing areas of Arkansas.

2. To develop a database for economic analysis of all aspects of rice production.

3. To demonstrate the benefits of available technology and inputs for the economic production of consistently high rice yields.

4. To identify specific problems and opportunities in Arkansas rice for further investigation.

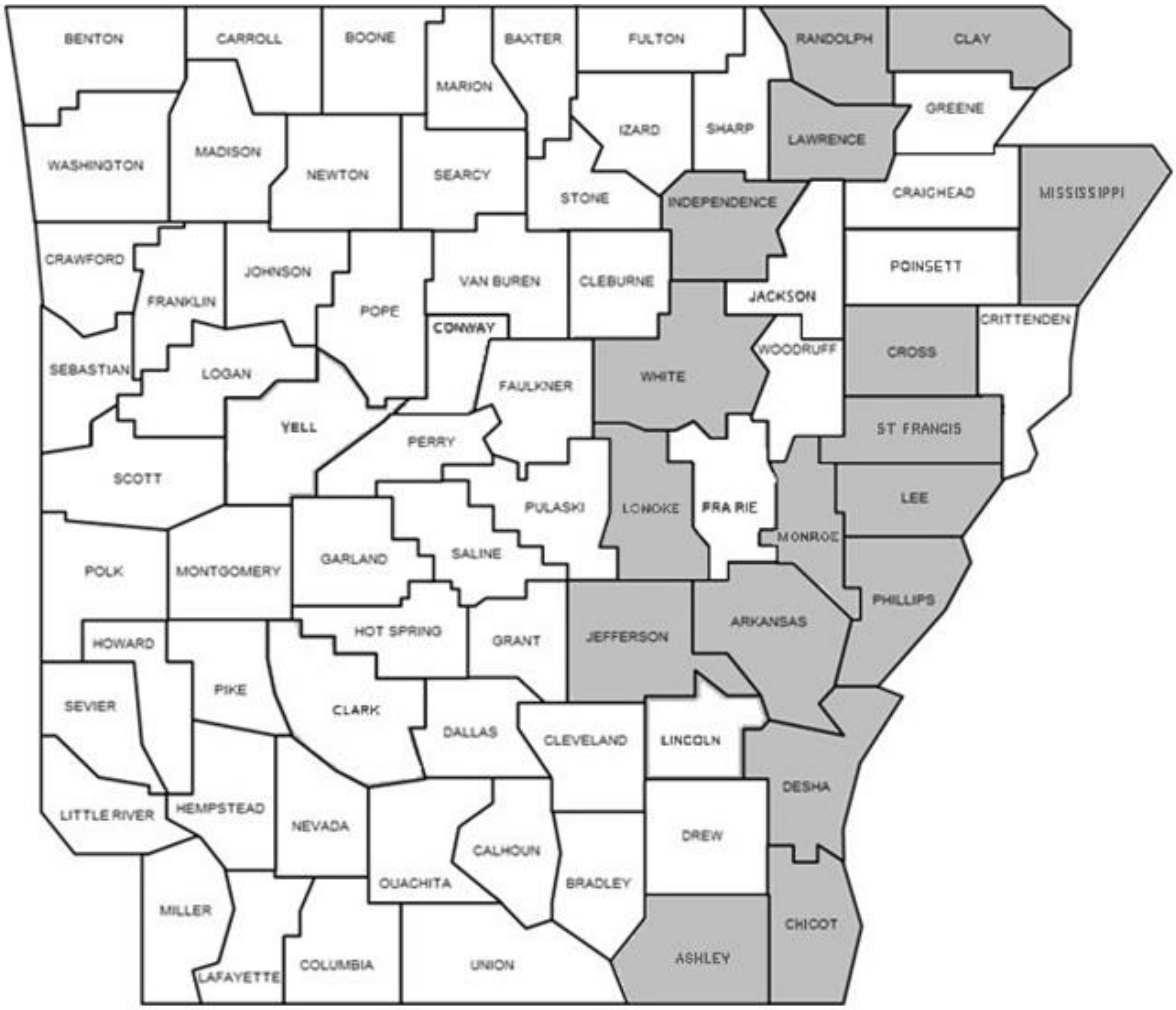
5. To promote timely implementation of management practices among rice growers.

6. To provide training and assistance to county agents and growers with limited expertise in rice production.

Each RRVP field and cooperator was selected prior to planting. Cooperators agreed to pay production expenses, provide crop expense data for economic analysis, and implement the recommended production practices in a timely manner from seedbed preparation to harvest. Seventeen fields were enrolled in the RRVP in 2015. The fields were located on commercial farms ranging in size from 19 to 235 acres. The average field size was 63 acres.

The 2015 RRVP fields were located in Arkansas, Ashley, Chicot, Clay, Cross, Desha, Independence, Lawrence, Lee, Lincoln, Mississippi, Monroe, Phillips, Randolph, St. Francis and White Counties. Eight different cultivars (CL151, CL271, CLXL745, Jupiter, LaKast, Mermentau, Roy J, and XL753) were planted. Management decisions were based on field history, soil test results, cultivar, and data collected from each individual field during the growing season.

Figure 1. County Locations (shaded) of 2015 Rice Research Verification Program Fields.



FIELD REVIEWS

Southern Coordinator – Ralph Mazzanti **Northern Coordinator** – Ron Baker

Arkansas County

The 48-acre field was located southeast of Stuttgart on a Stuttgart and Dewitt silt loam soil. The previous crop was soybean. Conventional tillage practices were used for field preparation and a pre-plant fertilizer based on soil test results was applied at a rate of 0-30-90-10 (lbs/acre N-P_2O_5-K_2O-Zn). RiceTec hybrid XL753 was drill-seeded on March 30th at 22 lbs/acre. CruiserMaxx Rice seed treatment was used in addition to the company's standard seed treatment. Rice emerged on April 13th with a stand density of 6.4 plants/ft^2. Glyphosate herbicide was used as a burndown on April 4th. Command and League were applied as pre-emergence herbicides on April 13th. Excellent residual herbicide activity was observed for 30 days. Facet and Permit Plus herbicides were applied May 15th and provided post-emergence control of dayflower and nutsedge. Using the N-STaR recommendation, nitrogen in the form of urea plus an approved NBPT product was applied preflood at a rate of 235 lbs/acre on May 15th. Multiple-inlet irrigation was utilized to achieve a more efficient permanent flood. On July 7th urea at 70 lbs/acre was applied at the late-boot stage. The field was clean throughout the year and a deep flood was maintained. No fungicides were needed for disease but rice stink bugs reached threshold levels and were treated with Karate insecticide on July 14th. The field was harvested on August 8th with a yield of 213 bu/acre*****. The average harvest moisture was 18%. The milling yield was 59/71. This was the second-highest yield in the 2015 Rice Research Verification Program. Irrigation water use totaled 31.9 acre-inches with rainfall amounts totaling 13.25 inches.

*****The yield for this and all other RRVP fields is reported in dry (12% moisture) bushels.

Ashley County

The zero-grade, 79-acre field was located east of Montrose on a Grubbs silt loam and Jackport silty clay loam soil. Pre-plant fertilizer was applied at a rate of 0-40-60 (lbs/acre N-P_2O_5-K_2O). The previous crop was soybean. Conventional tillage practices were utilized in the spring. RiceTec hybrid CLXL745 was drill-seeded at 23 lbs/acre on April 8th. The seed was treated with CruiserMaxx Rice seed treatment in addition to the company's standard seed treatment. A pre-emergence application of Command herbicide was made on April 11th. Rice emergence was observed on April 19th with 7.6 plants/ft^2. Ammonium sulfate was applied on May 8th as a starter fertilizer at 100 lbs/acre. On May 26th Clearpath and Permit Plus herbicides were applied. Nitrogen in the form of urea plus an approved NBPT product was applied on May 14th at 330 lbs/acre according to N-STaR recommendations. The late boot nitrogen application of urea at 70 lbs/acre was applied on July 17th. No fungicides were necessary since disease never reached threshold levels. Stink bugs reached threshold level and Lambda-Cy insecticide was applied on July 31st. The field was harvested on August 29th yielding 166 bu/acre. The milling yield was 53/69. The average harvest moisture was 18%. The irrigation water use totaled 28.4 acre-inches and rainfall for the growing season was 19.75 inches.

Chicot County

The 69-acre zero-grade field was located north of Lake Village on a Perry clay soil. On April 3rd, RiceTec hybrid CLXL745, treated with CruiserMaxx Rice seed treatment in addition to the company's standard seed treatment, was drilled at 33 lbs/acre. Pre-plant fertilizer was

applied on April 5th at the rate of 0-69-0 (lbs/acre N-P_2O_5-K_2O) according to soil test recommendations. Glyphosate, Command, and League were applied on April 4th as burndown and pre-emergence herbicides. Continuous rainfall on a weekly basis provided residual weed control for 58 days. Field emergence was recorded on April 30th with a stand density of 2.5 plants/ft^2 that eventually increased to 3.5 plants/ft^2. On June 8th Ricestar HT herbicide was applied post-emergence for sprangletop escapes. Based on N-STaR recommendations, nitrogen in the form of urea was applied pre-flood at 250 lbs/acre on May 8th. Late boot urea fertilizer at 70 lbs/acre was applied on June 14th. Rice stink bugs reached treatment levels and Lambda Cy insecticide was applied on July 16th. The field was harvested August 14th with a yield of 196 bu/acre and milling yield of 50/72. The harvest moisture averaged 12%. The grower was pleased with the yield considering the low stand count and unfavorable weather in April and May. Irrigation water used totaled 30.0 acre-inches. Rainfall amounts were 6.15 inches for the season.

Clay County

The precision-graded field was located 7.5 miles southwest of Corning on a Jackport silty clay loam soil. The field was 78 acres and the previous crop grown was soybean. In late April, conventional tillage practices were used for field preparation and a pre-plant fertilizer based on soil test analysis was applied at a rate of 0-0-60 (lbs/acre N-P_2O_5-K_2O). On April 29th, the medium-grain variety CL271 with CruiserMaxx Rice seed treatment was drill-seeded at a rate of 65 lbs/acre. Rice emergence was observed on May 12th and consisted of 13.4 plants/ft^2. Command was applied as a pre-emergence herbicide plus glyphosate as a burndown herbicide prior to crop emergence. This was followed by a post-emergence application of Clearpath followed later by Newpath. Excellent pre- and post-emergence control of weeds was achieved. Using the N-STaR recommendation, a single preflood N application was made with the intention of excluding a mid-season N application. Urea plus an approved NBPT product was applied at a rate of 207 lbs/acre on June 27th. However, nitrogen loss prior to flood-up made it necessary to apply midseason N to correct the problem. Urea at a rate of 100 lbs/acre was applied on July 16th. Once the permanent flood was established, flood levels were maintained well throughout the season. Although sheath blight lesions were found in the field, they remained low on the plant and cool nighttime temperatures helped hold the disease well below treatment threshold levels. Continued field evaluations resulted in no treatments for sheath blight or any other disease. Rice stink bugs were present in the field but remained below treatment threshold levels and no insecticide treatments were required. On September 21st, a sodium chlorate harvest aid treatment was applied at the rate of 1 gallon/acre. The rice was harvested on September 24th, yielding 202 bu/acre. Moisture at harvest was 17%. The milling yield was 57/74. Total irrigation water use was 32.92 acre-inches and total rainfall for the season was 18.52 inches.

Cross County

The traditionally contoured field was located 2.4 miles southwest of Hickory Ridge on Crowley and Hillemann silt loam soils. The field was 27 acres and the previous crop grown was soybean. Conventional tillage practices were used for spring field preparation and a pre-plant fertilizer based on soil test analysis was applied at a rate of 0-40-60-2 (lbs/acre N-P_2O_5-K_2O-Zn). On April 8th, the variety Roy J with CruiserMaxx Rice seed treatment was broadcast-seeded at a rate of 90 lbs/acre. Rice emergence was observed on April 16th and consisted of 21 plants/ft^2. Command herbicide was applied pre-emergence followed by a post-emergence application of Facet plus propanil followed by Ricestar HT. Levees were sprayed with 2,4-D plus Grandstand. Good pre- and post-emergence control of weeds was achieved. Using the N-STaR recommendation, urea plus an approved NBPT product was applied pre-flood on May 29th at

174 lbs/acre. Multiple-inlet irrigation was utilized to achieve a more efficient permanent flood. Once the permanent flood was established, flood levels were maintained well throughout the season. A mid-season application of urea was made on June 22nd at the rate of 100 lbs/acre. No fungicide applications were required. However, rice stink bugs reached treatment level on July 25th and were treated with Karate insecticide. Rice was harvested on September 12th, yielding 139 bu/acre. The low yield was notably similar to other fields in that part of the state, including two other RRVP fields that were in the same vulnerable stages of development during unfavorable weather conditions. Moisture at harvest was 15%. The milling yield was 66/74. Total irrigation water use was 24.42 acre-inches and total rainfall for the season was 22.81 inches.

Desha County

The zero-grade, 31-acre field was located just east of Tiller on a Herbert silt loam soil and Perry clay soil. No tillage practices were performed from the previous rice crop. Pre-plant fertilizer at 0-0-90-10 (lbs/acre N-P_2O_5-K_2O-Zn) was applied March 30th. The medium-grain variety Jupiter was drill-seeded at a rate of 70 lbs/acre on March 31st. The seed was treated with CruiserMaxx Rice seed treatment. Glyphosate, Command, and League herbicides were applied for burndown and pre-emergence weed control on April 1st. Rice emergence was observed on April 14th with 19 plants/ft^2. A post-emergence herbicide application of Permit was made on May 7th. Nitrogen in the form of urea plus an approved NBPT product was applied pre-flood at 270 lbs/acre according to N-STaR recommendations. Multiple-inlet irrigation was utilized to achieve a more efficient permanent flood. The spreader buggy application left the field streaked and on May 4th, 100 lbs urea/acre was applied by air to correct the problem. No mid-season urea application was necessary according to GreenSeeker technology. Stink bugs reached threshold level and Lambda-Cy was applied July 18th. The field was harvested September 2nd yielding 170 bu/acre with a milling yield of 57/68. The average harvest moisture was 18%. The yield was slightly disappointing but characteristic of the 2015 growing season. The irrigation water use totaled 27 acre-inches and the rainfall amount for the growing season was 18.65 inches.

Independence County

The precision-graded field was located 1.5 miles southwest of Oil Trough. The soil combination was Jackport silty clay loam, Engham silt loam, and Hontas silt loam. The field was 43 acres and the previous crop grown was soybean. Conventional tillage practices were used in the fall and spring for field preparation and a pre-plant fertilizer based on soil test analysis was applied at a rate of 0-46-96-0.5 (lbs/acre N-P_2O_5-K_2O-Zn). On April 9th, the medium-grain variety Jupiter with CruiserMaxx Rice plus Release seed treatment was drill-seeded at a rate of 70 lbs/acre. Rice emergence was observed on April 21st and consisted of 20 plants/ft^2. Command herbicide was applied pre-emergence April 9th followed on May 29th by a post-emergence application of Command plus Sharpen providing excellent pre- and post-emergence control of weeds except on the edges of the field. An additional treatment of Permit and Grasp was applied to field edges for full weed control. Using the N-STaR recommendation, a single preflood N application was made with the intention of excluding a mid-season N application. Urea plus an approved NBPT product was applied at a rate of 185 lbs/acre on June 6th. Unfortunately, some nitrogen loss occurred before flood-up took place making it necessary to apply midseason N to correct the problem. Urea at a rate of 100 lbs/acre was applied on June 27th. Once the permanent flood was established, flood levels were maintained well throughout the season. Although sheath blight lesions were present in the field, they remained low on the plant and cool nighttime temperatures helped hold the disease well below threshold treatment levels. Continued field evaluations resulted in no treatments for sheath blight or any

other disease. Rice stink bugs were found to overwhelm natural predators in the field, exceeding the threshold level for treatment. Control of the pest was accomplished with a single treatment of 2 oz/acre Karate on July 31st. No further insecticide treatments were required. The rice was harvested on September 25th yielding 196 bu/A. Moisture at harvest was 18%. The milling yield was 55/73. Total irrigation water use was 35.2 acre-inches and total rainfall for the growing season was 26.11 inches.

Lawrence County

The precision-graded field was located north of Alicia on a Dubbs silt loam soil. The field was 50 acres and the previous crop grown was soybean. Conventional tillage practices were used for field preparation in the spring. A pre-plant fertilizer based on soil test analysis was applied on April 24th at the recommended rate of 0-40-48-8-4 (lbs/acre N-P_2O_5-K_2O-Zn-S). On April 27th, the variety Mermentau was drill-seeded at a rate of 80 lbs/acre. Rice emergence was observed on May 9th and consisted of 25 plants/ft². Command pre-emerge herbicide plus glyphosate as a burndown herbicide were applied on April 28th. On May 30th a post-emergence application was made of Grasp Xtra plus Command to extend its residual activity. Good pre- and post-emergence control of weeds was provided. Using the N-STaR recommendation, urea plus an approved NBPT product at the rate of 250 lbs/A was applied pre-flood on June 12th followed by a normal mid-season application of 100 lbs of urea/acre on June 29th. Multiple-inlet irrigation was utilized to achieve a more efficient permanent flood. Once the permanent flood was established, flood levels were maintained sufficiently throughout the season but not without some difficulty due to the permeable nature of portions of the field. Lesions caused by sheath blight fungus reached treatment level. A application of Quadris fungicide was made on July 29th. No further fungicide applications were required. Rice stink bugs were present in the field but remained below threshold levels the entire season and no insecticide treatments were required. Harvest began on September 22nd and the yield average was 163 bu/A. Moisture at harvest was 18%. The milling yield was 64/73. Total irrigation water use was 82.02 acre-inches, reflecting highly permeable areas of the field. Total rainfall for the season was 18.69 inches.

Lee County

The 54-acre field was located just east of Moro on a Calloway and Henry silt loam soil. Soybean was the previous crop grown on the field. No tillage practices were performed on the contour field. A pre-plant fertilizer blend of 12-40-75-10-1 (lbs/acre N-P_20_5-K_20-Zn-S) was applied according to the soil sample analysis. On April 8th the variety LaKast, treated with CruiserMaxx Rice seed treatment and zinc, was broadcast at a rate of 75 lbs/acre. Sharpen, glyphosate, and Command were applied on April 8th as burndown and pre-emergence herbicides. Ammonium sulfate was applied at 100 lbs/acre as a starter fertilizer. Emergence was observed on April 28th with 12 plants/ft^2. Facet and Permit were applied on May 6th as post-emergence herbicides. Based on N-STaR recommendations, nitrogen in the form of urea plus an approved NBPT product was applied at 240 lbs/acre on May 26th. A minimal flood was maintained throughout the growing season with multiple-inlet irrigation. Using Greenseeker technology, mid-season urea fertilizer was applied June 16th on the south half of the field at 100 lbs/acre. Plant nitrogen on the north half of the field was sufficient without applying mid-season urea. Stink bugs reached threshold levels and Lambda Cy insecticide was applied on July 28th. The field was harvested on September 2nd yielding 119 bu/acre with a milling yield of 51/72. Broadcast planting, low stand counts, and excessive cloudiness in early- to mid-season all contributed to decreased yield. The average harvest moisture was 15%. The irrigation water use totaled 33.85 acre-inches and the season-long rainfall total was 15.75 inches.

Lonoke County

The 36-acre zero-grade field was located south of England on a Perry silty clay soil. No tillage practices were performed on the field from the previous rice crop. Based on soil test analysis no pre-plant fertilizer was needed. The variety CL151, treated with CruiserMaxx Rice seed treatment and zinc, was drilled-seeded at 65 lbs/acre on April 11th. Glyphosate, Command, and League herbicides were applied April 25th. Rice emergence was observed on April 26th with 16 plants/ft^2. Due to continual rainfall, residual herbicide activity was observed for thirty-five days. On June 1st, Command and Ricestar HT herbicides were applied for continued grass control. Nitrogen in the form of urea plus an approved NBPT product was applied at 190 lbs/acre on May 19th according to N-STaR recommendations. An adequate flood was maintained throughout the growing season. No mid-season fertilizer was necessary according to GreenSeeker technology. The field was harvested on September 2nd yielding 167 bu/acre. For comparison, the 2014 yield in the same field with the same variety was 188 bu/acre. The 21 bu/acre difference from 2014 to 2015 was consistent with 2015 growing season results. The milling yield was 59/72. Irrigation water use totaled 48 acre-inches. The rainfall for the growing season totaled 15 inches.

Mississippi County

The precision-graded field was located 3 miles east of Dyess on a Sharkey silty clay/Sharkey-Steele complex soil. The field was 30 acres which lay fallow the previous year. Conventional tillage practices were used for field preparation in the spring. Based on soil test analysis no pre-plant fertilizer was needed. On April 6th, the medium-grain variety Jupiter was drill-seeded at a rate of 90 lbs/acre. Rice emergence was observed on April 15th and consisted of 16 plants/ft^2. Prowl H_2O herbicide plus Roundup WeatherMAX plus Facet L was applied pre-emergence on April 6th. No post-emergence herbicide application was needed. Excellent control of weeds was provided. Urea plus an approved NBPT product at a rate of 250 lbs/acre was applied pre-flood on May 24th followed by a split mid-season application of urea of 150 lbs/acre (75 lbs on June 15th followed by 75 lbs on June 22nd**). Once the permanent flood was established, flood levels were maintained sufficiently throughout the season. Although sheath blight lesions were present in the field, they remained low on the plant and cool nighttime temperatures helped hold the disease well below threshold treatment levels. Continued field evaluations resulted in no treatments for sheath blight or any other disease. Rice stink bugs exceeded the threshold level for treatment and Karate was applied for control on July 27th. No further insecticide treatments were required. Harvest began on September 1st. The yield average was 191 bu/A and moisture at harvest was 21%. The milling yield was 65/68. Total irrigation water use was 21 acre-inches. Total rainfall for the season was 22.32 inches.

******Applying midseason N in a split application is no longer the preferred recommendation by the University of Arkansas System Division of Agriculture. Proper preflood N fertilization followed by a single midseason N application has been found to be the most cost effective and efficient means of split N fertilization in rice.

Monroe County

The precision-graded 60-acre field was located east of Clarendon on a Grubbs silt loam and Jackport silty clay loam soil. Conventional tillage practices were used for field preparation in the spring and soybean was the previous crop. Based on soil test analysis no pre-plant fertilizer was needed. The medium-grain variety Jupiter, treated with CruiserMaxx Rice seed treatment and Release, was drill-seeded at 72 lbs/acre on April 16th. Emergence was observed on April 28th at 15 plants ft^2. Glyphosate, Command, and League herbicides were applied on

April 17th giving 25 days residual control. Facet and RiceBeaux were applied May 12th as post-emergence herbicides. Nitrogen fertilizer in the form of urea plus an approved NBPT product was applied June 12th at 300 lbs/acre according to the N-STaR test. An adequate permanent flood was maintained throughout the growing season using multiple inlet irrigation. No fungicide or insecticide applications were necessary due to careful scouting and no mid-season nitrogen was necessary according to GreenSeeker technology. The field was harvested September 24th and the yield was 184 bu/acre. The milling yield was 57/69. The grower was very pleased stating the yield was 20 to 24 bushels better than his other two Jupiter fields yet with only a fraction of the input costs. Those input cost savings included lower chemical cost from the absence of fungicide and insecticide applications and no mid-season nitrogen application. Irrigation water use totaled 15.8 acre-inches. Rainfall amounts totaled 14.65 inches.

Phillips County

The contoured 47-acre field was located southeast of Marvell on a Calloway silt loam soil. Conventional tillage was used after the previous soybean crop. Based on soil test analysis no pre-plant fertilizer was needed. The variety LaKast was treated with CruiserMaxx Rice seed treatment plus zinc and was drill-seeded at 72 lbs/acre on April 17th. Emergence was observed on April 24th at 16 plants/ft^2. Facet, RiceBeaux, and Permit herbicides were applied post-emergence on May 14th. Nitrogen in the form of urea plus an approved NBPT product was applied on May 25th at 250 lbs/acre. Multiple-inlet irrigation was utilized to achieve a more efficient permanent flood. Stink bugs reached threshold levels and Karate insecticide was applied July 30th. No mid-season nitrogen was needed according to GreenSeeker technology. The field was harvested on September 7th with a yield of 160 bu/acre. Again, the yield was conducive to the 2015 growing season. The milling yield was 52/71. The irrigation amount was 30 acre-inches and the rainfall amount was 17.8 inches.

Randolph County

The precision-graded field was located 2.5 miles northeast of Pocahontas on Amagon and Dundee silt loam soils. The field was 235 acres and the previous crop grown was soybean. Spring conventional tillage practices were used for field preparation and a pre-plant fertilizer based on soil test analysis was applied at a rate of 0-46-120 (lbs/acre N-P_20_5-K_20). On May 6th, RiceTec hybrid XL753 with CruiserMaxx Rice seed treatment, in addition to the company's standard seed treatment, was drill-seeded at a rate of 22 lbs/acre. Rice emergence was observed on May 15th and consisted of 5.7 plants/ft^2. Command herbicide was applied pre-emergence on May 7th followed on June 5th by a post-emergence application of Prowl H_2O plus Grasp followed on June 30th by a post-flood application of Ricestar HT providing excellent pre- and post-emergence control of weeds. Using the N-STaR recommendation, urea plus an approved NBPT product was applied pre-flood at a rate of 217 lbs/acre on June 13th. Multiple-inlet irrigation was utilized to achieve a more efficient permanent flood. Even so, due to the very large size of the field there was an extended flood-up period. This delay, combined with weather conditions, resulted in nitrogen loss ultimately requiring additional nitrogen to correct the problem. Urea at a rate of 100 lbs/acre was applied July 1st. The normal 65 lbs/acre of urea at late boot for straw strength was also applied on July 27th. Once the permanent flood was established, flood levels were maintained well throughout the season. Although sheath blight lesions were present in the field, they remained low on the plant and cool nighttime temperatures helped hold the disease below threshold treatment levels. However, a preventative treatment for smut disease was applied using Quilt Xcel. Rice stink bugs were present in the field but remained below treatment levels. The rice was harvested on October 6th, yielding 237 bu/acre, the highest RRVP yield in 2015. Moisture at harvest was 14.3%. The

milling yield was 53/71. Total irrigation water use was 28.4 acre-inches and total rainfall for the season was 19.88 inches.

St. Francis County

The traditionally-contoured field was located 2.5 miles southwest of Palestine and consisted of Henry, Calloway, and Loring silt loam soils. The field was 84 acres and the previous crop grown on the field was soybean. Conventional tillage practices were used in the fall for field preparation and a pre-plant fertilizer based on soil test analysis was applied at a rate of 0-47-77 (lbs/acre N-P_20_5-K_20). On April 6th, the variety LaKast with Apron XL LS seed treatment was drill-seeded at a rate of 70 lbs/acre. Rice emergence was observed on April 15th and consisted of 26 plants/ft². Sharpen plus glyphosate were applied in early spring as a burndown treatment. Command, glyphosate, and League were applied pre-emergence on April 9th followed on April 27th by a post-emergence application of Facet plus Sharpen. An additional application of Sharpen was used to control weed escapes on levees. Good pre- and post-emergence control of weeds was achieved. Urea plus an approved NBPT product was applied pre-flood on May 29th at a rate of 272 lbs/acre. Multiple inlet irrigation was used in the form of multiple discharge points; however, permanent flood levels were difficult to establish and maintain due to a failing older well. A new well was drilled mid-season providing much improved flood control. A mid-season application of urea was made at the rate of 100 lbs/acre on June 20th. Based on field evaluations and established pest threshold treatment levels, no fungicide or insecticide applications were required. The rice was harvested on August 31st yielding 143 bu/A. Moisture at harvest was 15%. The milling yield was 62/72. Total irrigation water use was 37 acre-inches and total rainfall for the season was 15.65 inches.

White County

The fresh-cut, precision-graded field was located 1.5 miles east of Kensett on Calloway and Immanuel silt loam soils. The field was 42 acres and the previous crop grown was soybean. A fall application of poultry litter at a rate of 1.5 tons/acre was made to improve the fresh-cut soil conditions. Spring conventional tillage practices were used for field preparation and a pre-plant fertilizer based on soil test analysis was applied at a rate of 0-30-90-10 (lbs/acre N-P_20_5-K_20-Zn). On May 7th, RiceTec hybrid XL753 with CruiserMaxx Rice seed treatment, in addition to the company's standard seed treatment, was drill-seeded at a rate of 24 lbs/acre. Rice emergence was observed on May 15th and consisted of 11.25 plants/ft². Prowl H_2O herbicide was applied pre-emergence followed by a post-emergence application of Broadhead plus Facet plus Londax, providing excellent pre- and post-emergence control of weeds. Using the N-STaR recommendation, urea plus an approved NBPT product was applied pre-flood at a rate of 295 lbs/acre on June 13th. Due to weather conditions, nitrogen loss occurred on 12 acres of the field making it necessary to apply additional N to correct the problem. Urea at a rate of 100 lbs/acre was applied on the affected acres on June 23rd. The entire field received the normal 65 lbs/acre of urea at late boot on July 23rd. Once the permanent flood was established, flood levels were maintained well throughout the season using multiple inlet irrigation. Based on field evaluations and established pest threshold treatment levels, no fungicide or insecticide applications were required. The field was harvested on September 18th, yielding 162 bu/A. Moisture at harvest was 16%. The milling yield was 59/76. Total irrigation water use was 11.38 acre-inches and total rainfall for the season was 18.74 inches.

Table 1. Agronomic information for fields enrolled in the 2015 Rice Research Verification Program.

Field Location by County	Cultivar	Field size (acres)	Previous crop	Seeding rate (lbs/acre)	Stand density (plants/ft^2)	Planting date	Emergence date	Harvest date	Yield (bu/A)	Milling yield[z]	Harvest Moisture (%)
Arkansas	XL753	48	Soybean	22	6	03/30/15	04/13/15	08/13/15	213	59/71	18
Ashley	CL XL745	79	Soybean	23	7	04/08/15	04/19/15	08/29/15	166	53/69	18
Chicot	CL XL745	69	Rice	33	3	04/03/15	04/30/15	08/14/15	196	50/72	12
Clay	CL271	78	Soybean	65	13	04/29/15	05/12/15	09/24/15	202	57/74	17
Cross	Roy J	27	Soybean	90	21	04/08/15	04/16/15	09/12/15	139	66/74	15
Desha	Jupiter	31	Soybean	70	19	03/31/15	04/14/15	09/22/15	170	57/68	18
Independence	Jupiter	43	Soybean	70	20	04/09/15	04/21/15	09/25/15	196	55/73	18
Lawrence	Mermentau	50	Soybean	80	25	04/27/15	05/09/15	09/22/15	163	64/73	18
Lee	LaKast	54	Soybean	75	12	04/08/15	04/28/15	09/02/15	119	51/72	15
Lonoke	CL151	36	Rice	65	16	04/11/15	04/25/15	09/02/15	167	59/72	16
Mississippi	Jupiter	30	Fallow	90	16	04/06/15	04/15/15	09/01/15	191	65/68	21
Monroe	Jupiter	60	Soybean	72	15	04/16/15	04/28/15	09/24/15	184	57/69	13
Phillips	LaKast	47	Soybean	72	16	04/17/15	04/24/15	09/07/15	160	52/71	15
Randolph	XL753	235	Soybean	22	6	05/06/15	05/15/15	10/06/15	237	53/71	14
St. Francis	LaKast	84	Soybean	70	26	04/06/15	04/15/15	08/31/15	143	62/72	15
White	XL753	42	Soybean	24	11	05/07/15	05/15/15	09/18/15	162	59/76	16
Average		**63**		[y]	[x]				**176**	**57/72**	**16**

[z] Head rice milling yield / Total rice milling yield.
[y] Seeding rates averaged 74 lbs/acre for conventional cultivars and 25 lbs/acre for hybrid cultivars.
[x] Stand density averaged 19 plants/ft^2 for conventional cultivars and 7 plants/ft^2 for hybrid cultivars.
[w] Yield was omitted from average due to glyphosate drift damage.

Table 2. Soil test results, fertilization program, and soil classification for fields enrolled in the 2015 Rice Research Verification Program.

Field Location by County	Soil Test				Applied Fertilizer (lbs/acre)			Soil Classification
	pH	lbs/acre			Pre-flood[y] N-P-K-Zn[z]	Urea (46% N) rates applied by timing[x,w]	Total N rate (lbs N/acre)[v]	
		P[z]	K[z]	Zn[z]				
Arkansas	6.3	40	145	7.5	0-30-90-0	235-0-70	140*	Stuttgart and Dewitt Silt Loam
Ashley	8.1	43	487	4	0-40-60-0	330-0-70	184*	Grubbs Silt Loam and Jackport Silty Clay Loam
Chicot	6.9	32	788	5	0-60-0-0	250-0-70	147*	Perry Clay
Clay	5.8	96	278	19.6	0-0-60-0	207-100-0	141	Jackport Silty Clay Loam
Cross	6.2	42	194	3.8	0-40-60-2	174-100-0	126	Crowley & Hillemann Silt Loams
Desha	5.7	51	179	2.2	0-0-90-10	270-100-0	170	Herbert Silt Loam and Perry Clay
Independence	6.8	24	180	4	0-46-96-.5	185-100-0	131	Jackport Silty Clay Loam/ Engham Silt Loam
Lawrence	6.6	56	232	3.4	0-40-48-8	250-100-0	161*	Dubbs Silt Loam
Lee	7.8	32	185	3	12-40-75-10	240-100[s]-0	156*	Calloway and Henry Silt Loam
Lonoke	6.7	47	713	5	0-0-0-0	190-0-0	87*	Perry Silty Clay
Mississippi	6.9	56	844	9.6	0-0-0-0	250-150-0	184	Sharkey Silty Clay/Sharkey-Steele Complex
Monroe	6.7	58	320	6.2	0-0-0-0	300-0-0	138*	Grubbs Silt Loam and Jackport Silty Clay Loam
Phillips	6	86	375	2	0-0-0-0	250	115*	Calloway Silt Loam
Randolph	6	28	118	7.4	0-46-120-0	217-100[r]-65	176	Amagon/Dundee Silt Loams
St. Francis	7.2	52	184	8	0-47-77-0	272-100-0	171*	Henry/Calloway/Loring Silt Loams
White	5.8	42	178	2.6	24-129-170-10[t]	295-28[r]-65	203	Calloway/Immanuel Silt Loams

[z] N=nitrogen, P=phosphorus, K=potassium and Zn=zinc

[y] N-P2O5-K2O-Zn-S (includes seed treatments and pre-plant applications).

[x] Timing: preflood – midseason – boot.

[w] All preflood Urea applications utilized an approved NBPT product.

[v] Column values with an (*) were fertilized according to N-STaR recommendations.

[u] Analysis established from one ton of chicken litter per acre.

[t] Includes analysis established from one and one half ton of chicken litter plus 0-30-90-10 fertilizer application.

[s] Only half of the field received a midseason N application.

[r] Not a true midseason application but a pre midseason correction for N loss due to adverse weather conditions.

Table 3. Herbicide rates and timings for fields enrolled in the 2015 Rice Research Verification Program.

Field Location by County	Pre-emergence Herbicide Applications (Trade name & product rate/acre)[z]	Post-emergence Herbicide Applications (Trade name & product rate/acre)[z]
Arkansas	Command (11 oz) + League (3.2 oz)	Facet L (32 oz) + Permit Plus (0.75 oz) + COC[y] (1 pt)
Ashley	Newpath (4 oz) + Aim (1 oz)	Clearpath (0.5 lb) + Permit Plus (0.75 oz) + COC (1 pt)
Chicot	Glyphosate (1.5 pt) + Command (24 oz) + League (3.2 oz)	Ricestar HT (24 oz) + COC (0.5 pt)
Clay	Command (12.8 oz) + glyphosate (32 oz)	Clearpath (0.5 lb) + COC (1 pt) fb Newpath (4 oz) + COC (1 pt)
Cross	Command (12.8 oz)	Facet (0.33lb) + propanil (3 qt) fb Ricestar (24 oz) fb levee treatment 2,4-D (1 qt) + Grandstand (1 pt)
Desha	Command (11 oz) + League (3.2 oz)	Permit (1 oz) + COC (1 pt)
Independence	Command (11 oz)	Command (8 oz) + Sharpen (1 oz) + COC (12.8 oz) fb spot spray application Permit (1 oz) + Grasp (2 oz) + COC (1 qt)
Lawrence	Command (12.8 oz) + glyphosate (48 oz)	Command (8 oz) + Grasp Xtra (18 oz) + COC (1 qt)
Lee	Glyphosate (32 oz) + Command (11 oz [y]) + Sharpen (2 oz)	Facet L (32 oz) + Permit (1 oz)
Lonoke	Glyphosate (32 oz) + Command (12 oz) + League (3.2 oz)	Ricestar HT (24 oz) + Command (12 oz)
Mississippi	Prowl H_2O (2.1 oz) + Roundup WeatherMAX (22 oz) + Facet L (32 oz)	None
Monroe	Command (11 oz[y]) + League (3.2 oz)	RiceBeaux (4 qt) + Facet L (32 oz)
Phillips	Glyphosate (32 oz) + Command (11 oz [y]) + League (3.2 oz)	RiceBeaux (4 qt) + Facet L (32 oz) + Permit (1 oz)
Randolph	Command (12.8 oz)	Prowl H_2O (2 oz) + Grasp (2 oz) + COC (1 qt) fb post-flood application of Ricestar HT (24 oz)
St. Francis	Early Spring Burndown: Sharpen (2 oz) + glyphosate (26 oz) fb Pre-emerge: Command (12.8 oz) + glyphosate (28 oz) + League (3.2 oz)	Facet (0.4 lb) + Sharpen (1 oz) + COC (1 pt) fb levee treatment: Sharpen (1 oz) + COC (1 pt)
White	Prowl H_2O (2.1 oz)	Broadhead (9.2 oz) + Facet (2 oz) + Londax (1 oz) + COC (12.8 oz)

[z] The abbreviation 'fb' stands for 'followed by' and is used to separate herbicide application events.
[y] COC stands for Crop Oil Concentrate.

Table 4. Seed treatments used and foliar fungicide and insecticide applications made on fields enrolled in the 2015 Rice Research Verification Program.

Field Location by County	Seed treatments (trade name and product rate/cwt seed)	Foliar fungicide and insecticide applications (trade name and product rate/acre)			
	Fungicide and/or Insecticide Seed Treatment for Control of Diseases and Insects Attacking Seedling Rice	Fungicide Applications for Control of Sheath Blight/Kernel Smut/False Smut	Fungicide Applications for Control of Rice Blast	Insecticide Applications for Control of Rice Water Weevil	Insecticide Applications for Control of Rice Stink Bug/Chinch Bug
Arkansas	RTST[z] + CruiserMaxx Rice (7 oz/cwt)	------	------	------	Karate (3.7 oz)
Ashley	RTST + CruiserMaxx Rice (7 oz/cwt)	------	------	------	Lambda-Cy (4 oz)
Chicot	RTST + CruiserMaxx Rice (7 oz/cwt)	------	------	------	Lambda-Cy (4 oz)
Clay	CruiserMaxx Rice (7 oz/cwt)	------	------	------	------
Cross	CruiserMaxx Rice (7 oz/cwt)	------	------	------	Karate (2 oz)
Desha	CruiserMaxx Rice (7 oz/cwt)	------	------	------	Lambda-Cy (5 oz)
Independence	CruiserMaxx Rice (7 oz/cwt)	------	------	------	Karate (2 oz)
Lawrence	------	Quadris (10 oz)	------	------	------
Lee	CruiserMaxx Rice (7 oz/cwt) + Zinc	------	------	------	Lambda-Cy (4 oz)
Lonoke	CruiserMaxx Rice (7 oz/cwt) + Zinc	------	------	------	------
Mississippi	------	------	------	------	Karate (2 oz)
Monroe	CruiserMaxx Rice (7 oz/cwt) + Release	------	------	------	------
Phillips	CruiserMaxx Rice (7 oz/cwt) + Zinc	------	------	------	Karate (2 oz)
Randolph	RTST + CruiserMaxx Rice (7 oz/cwt)	Quilt Xcel (16 oz)	------	------	------
St. Francis	Apron XL LS (0.64 oz/cwt)	------	------	------	------
White	RTST + CruiserMaxx Rice (7 oz/cwt)	------	------	------	------

[z] RTST refers to 'RiceTec Seed Treatment' and is used to define those fields whose seed was treated by RiceTec, Inc. prior to seed purchase. Seed is treated with compounds intended to enhance germination and early-season plant growth.

Table 5. Rainfall and irrigation information for fields enrolled in the 2015 Rice Research Verification Program.

Field Location by County	Rainfall (inches)	Irrigation (acre inches) [z]	Rainfall + Irrigation (inches)
Arkansas	13.3	31.9	45.2
Ashley	19.8	28.4	48.2
Chicot	6.2	30.0*	36.2
Clay	18.5	32.9	51.4
Cross	22.8	24.4	47.2
Desha	18.7	27.0	45.7
Independence	26.1	35.2	61.3
Lawrence	18.7	82.0	100.7
Lee	15.8	33.9	49.6
Lonoke	15.0	48.0	63.0
Mississippi	22.3	21.0	43.3
Monroe	14.7	15.8	30.5
Phillips	17.8	30.0*	47.8
Randolph	19.9	28.4	48.3
St. Francis	15.7	37.0	52.7
White	18.7	11.4	30.1
	17.8	**32.3**	**50.1**

[z] Not all fields were equipped with flow meters to monitor water use for irrigation. Therefore, the average irrigation amount used in fields with flow meters was calculated and this average was used for fields with no irrigation data. Irrigation amounts using this calculated average are followed by an asterisk (*****).

ECONOMIC ANALYSIS

This section provides information on production costs and returns for the 2015 Rice Research Verification Program (RRVP). Records of field operations on each field provided the basis for estimating production costs. The field records were compiled by the RRVP coordinators, county Extension agents, and cooperators. Production data from the 16 fields were applied to determine costs and returns above operating costs, as well as total specified costs. Operating costs and total costs per bushel indicate the commodity price needed to meet each cost type.

Operating costs are those expenditures that would generally require annual cash outlays and would be included on an annual operating loan application. Actual quantities of all operating inputs as reported by the cooperators are used in this analysis. Input prices are determined by data from the 2015 Crop Enterprise Budgets published by the Cooperative Extension Service and information provided by the cooperating producers. Fuel and repair costs for machinery are calculated using a budget calculator based on parameters and standards established by the American Society of Agricultural and Biological Engineers. Machinery repair costs should be regarded as estimated values for full-service repairs, and actual cash outlays could differ as producers provide unpaid labor for equipment maintenance.

Fixed costs of machinery are determined by a capital recovery method which determines the amount of money that should be set aside each year to replace the value of equipment used in production. Machinery costs are estimated by applying engineering formulas to representative prices of new equipment. This measure differs from typical depreciation methods, as well as actual annual cash expenses for machinery.

Operating costs, fixed costs, costs per bushel, and returns above operating and total specified costs are presented in Table 6. Costs in this report do not include land costs, management, or other expenses and fees not associated with production. Operating costs ranged from $411.49/acre for Lonoke County to $749.15 for White County, while operating costs per bushel ranged from $2.24/bu for Mississippi County to $4.62/bu for White County. Total costs per acre (operating plus fixed) ranged from $526.87/acre for Lonoke County to $846.50/acre for Chicot County, and total costs per bushel ranged from $2.76/bu for Mississippi County to $5.35/bu for Lee County. Returns above operating costs ranged from $38.29/acre for Lee County to $680.11/acre for Mississippi County, and returns above total costs ranged from -$48.22/acre for Lee County to $579.75/acre for Mississippi County.

A summary of yield, rice price, revenues, and expenses by expense type for each RRVP field is presented in Table 7. The average rice yield for the 2015 RRVP was 176 bu/acre but ranged from 119 bu/acre for Lee County to 237 bu/acre for Randolph County. An Arkansas average long-grain cash price of $4.92/bu was estimated using USDA, National Agricultural Statistics Service (NASS) US long grain price data for the months of August through October. The RRVP had four fields planted to a medium-grain cultivar. The average medium-grain price contracted in Arkansas was estimated to be $5.68/bu and represented the average long-grain price plus an average medium-grain premium of $0.76/bu. The average medium-grain premium was estimated based on the average difference in Arkansas milled rice value between medium- and long-grain rice obtained from the Arkansas Weekly Grain Review for the period August 3 through November 2, converted to a rough rice equivalent. A premium or discount was given to each field based on the milling yield observed for each field and standard milling yields of 55/70 for long-grain rice and 58/69 for medium-grain rice. Broken rice was assumed to have 70% of whole grain price value. If milling yield was higher than the standard, a premium was made while a discount was given for milling less than the standard. Estimated long-grain prices adjusted for milling yield varied from $4.83/bu in Ashley County to $5.38/bu in Cross County. The

medium-grain price adjusted for milling yield varied from $5.59/bu for Desha County to $5.84/bu for Independence County (Table 7).

The average operating expense for the 16 RRVP fields was $571.43/acre (Table 7). Fertilizer & nutrients accounted for the largest share of operating expenses on average (21.1%) followed by post-harvest expenses (20.4%), seed (15.0%), and chemicals (13.3%). Although seed's share of operating expenses was 15.0% across the 16 fields, it's average cost and share of operating expenses varied depending on whether a Clearfield hybrid was used ($195.36/acre; 27.9% of operating expenses), a non-Clearfield hybrid was used ($130.56/acre; 18.6% of operating expenses), a Clearfield non-hybrid (pureline) variety was used ($95.62/acre; 19.7% of operating expenses) or a non-Clearfield non-hybrid (pureline) variety was used ($44.45/acre; 8.6% of operating expenses).

The average return above operating expenses for the 16 fields was $350.18/acre and ranged from $38.29/acre for Lee County to $680.11/acre for Mississippi County. The average return above total specified expenses for the 16 fields was $249.20/acre and ranged from -$48.22/acre for Lee County to $579.75/acre for Mississippi County. Table 8 provides select variable input costs for each field and includes a further breakdown of chemical costs into herbicides, insecticides, and fungicides. Table 8 also lists the specific rice cultivars grown on each RRVP field.

Table 6. Operating Costs, Total Costs, and Returns for fields enrolled in the 2015 Rice Research Verification Program.

County	Operating Costs ($/acre)	Operating Costs ($/bushel)	Returns to Operating Costs ($/acre)	Fixed Costs ($/acre)	Total Costs ($/acre)	Returns to Total Costs ($/acre)	Total Costs ($/bushel)
Arkansas	654.11	3.07	425.80	97.63	751.74	328.17	3.53
Ashley	670.49	4.04	131.29	80.75	751.23	50.55	4.53
Chicot	731.20	3.73	233.12	115.30	846.50	117.82	4.32
Clay	561.32	2.78	485.04	92.08	653.40	392.96	3.23
Cross	522.59	3.76	225.23	92.80	615.39	132.43	4.43
Desha	514.46	3.03	435.84	71.44	585.90	364.40	3.45
Independence	607.02	3.10	537.62	123.72	730.73	413.91	3.73
Lawrence	536.95	3.29	323.69	164.46	701.41	159.23	4.30
Lee	549.57	4.62	38.29	86.51	636.08	-48.22	5.35
Lonoke	411.49	2.46	443.55	115.38	526.87	328.17	3.15
Mississippi	427.69	2.24	680.11	100.36	528.05	579.75	2.76
Monroe	470.51	2.56	569.09	82.93	553.44	486.16	3.01
Phillips	474.40	2.97	311.20	88.17	562.57	223.03	3.52
Randolph	708.63	2.99	459.78	109.35	817.98	350.43	3.45
St. Francis	553.29	3.87	188.88	101.43	654.72	87.45	4.58
White	749.15	4.62	114.31	93.36	842.51	20.95	5.20
Average	**571.43**	**3.32**	**350.18**	**100.98**	**672.41**	**249.20**	**3.91**

Table 7. Summary of Revenue and Expenses per Acre for fields enrolled in the 2015 Rice Research Verification Program.

Receipts	Arkansas	Ashley	Chicot	Clay	Cross	Desha	Independence	Lawrence
Yield (bu.)	213	166	196	202	139	170	196	163
Price Received	5.07	4.83	4.92	5.18	5.38	5.59	5.84	5.28
Total Crop Revenue	**1079.91**	**801.78**	**964.32**	**1046.36**	**747.82**	**950.30**	**1144.64**	**860.64**
Operating Expenses								
Seed	126.72	164.76	225.96	94.06	42.30	32.90	32.90	37.60
Fertilizers & Nutrients	117.17	128.52	147.39	82.83	108.71	146.29	123.10	141.23
Chemicals	73.47	88.28	77.83	69.36	98.50	55.10	76.78	76.08
Custom Applications	51.45	58.10	56.00	48.28	53.18	53.90	45.95	38.50
Diesel Fuel	21.56	16.56	17.42	23.45	23.47	14.45	27.25	23.13
Repairs & Maintenance	31.41	26.85	36.17	29.21	28.38	23.35	36.88	46.00
Irrigation Energy Costs	61.63	54.87	17.36	54.25	47.18	52.34	103.11	31.30
Labor, Field Activities	11.99	9.42	9.08	10.47	12.21	8.53	13.48	14.06
Other Inputs & Fees, Pre-harvest	17.38	13.00	13.95	15.39	16.43	14.80	17.52	20.90
Post-harvest Expenses	141.33	110.14	130.05	134.03	92.23	112.80	130.05	108.15
Total Operating Expenses	**654.11**	**670.49**	**731.20**	**561.32**	**522.59**	**514.46**	**607.02**	**536.95**
Returns to Operating Expenses	**425.80**	**131.29**	**233.12**	**485.04**	**225.23**	**435.84**	**537.62**	**323.69**
Capital Recovery & Fixed Costs	97.63	80.75	115.30	92.08	92.80	71.44	123.72	164.46
Total Specified Expenses [z]	**751.74**	**751.23**	**846.50**	**653.40**	**615.39**	**585.90**	**730.73**	**701.41**
Returns to Specified Expenses	**328.17**	**50.55**	**117.82**	**392.96**	**132.43**	**364.40**	**413.91**	**159.23**
Operating Expenses/Yield Unit	3.07	4.04	3.73	2.78	3.76	3.03	3.10	3.29
Total Expenses/Yield Unit	3.53	4.53	4.32	3.23	4.43	3.45	3.73	4.30

[z] Does not include land costs, management, or other expenses and fees not associated with production.

Table 7. Summary of Revenue and Expenses per Acre for fields enrolled in the 2015 Rice Research Verification Program (Continued).

Receipts	Lee	Lonoke	Mississippi	Monroe	Phillips	Randolph	St. Francis	White	Average
Yield (bu.)	119	167	191	184	160	237	143	162	176
Price Received	4.94	5.12	5.80	5.65	4.91	4.93	5.19	5.33	5.25
Total Crop Revenue	**587.86**	**855.04**	**1107.80**	**1039.60**	**785.60**	**1168.41**	**742.17**	**863.46**	**921.61**
Operating Expenses									
Seed	60.38	97.18	42.30	57.10	57.96	126.72	37.59	138.24	85.92
Fertilizers & Nutrients	143.79	44.51	79.00	70.27	58.56	150.82	135.45	249.68	120.46
Chemicals	77.57	44.77	42.76	92.21	88.52	111.78	70.63	72.65	76.02
Custom Applications	51.80	27.30	45.50	28.00	31.50	56.19	53.04	54.65	47.08
Diesel Fuel	16.16	16.47	26.22	18.58	20.98	24.36	23.50	23.85	21.09
Repairs & Maintenance	28.18	35.73	30.65	27.49	26.19	32.53	31.96	29.87	31.30
Irrigation Energy Costs	65.38	18.40	12.15	30.52	57.96	16.43	71.48	33.33	45.48
Labor, Field Activities	10.00	9.36	9.93	10.69	11.58	9.76	12.17	13.55	11.02
Other Inputs & Fees, Pre-harvest	17.37	6.98	12.46	13.56	14.99	22.79	22.58	25.84	16.62
Post-harvest Expenses	78.96	110.80	126.73	122.08	106.16	157.25	94.88	107.49	116.44
Total Operating Expenses	**549.57**	**411.49**	**427.69**	**470.51**	**474.40**	**708.63**	**553.29**	**749.15**	**571.43**
Returns to Operating Expenses	**38.29**	**443.55**	**680.11**	**569.09**	**311.20**	**459.78**	**188.88**	**114.31**	**350.18**
Capital Recovery & Fixed Costs	86.51	115.38	100.36	82.93	88.17	109.35	101.43	93.36	100.98
Total Specified Expenses [z]	**636.08**	**526.87**	**528.05**	**553.44**	**562.57**	**817.98**	**654.72**	**842.51**	**672.41**
Returns to Specified Expenses	**-48.22**	**328.17**	**579.75**	**486.16**	**223.03**	**350.43**	**87.45**	**20.95**	**249.20**
Operating Expenses/Yield Unit	4.62	2.46	2.24	2.56	2.97	2.99	3.87	4.62	3.32
Total Expenses/Yield Unit	5.35	3.15	2.76	3.01	3.52	3.45	4.58	5.20	3.91

[z] Does not include land costs, management, or other expenses and fees not associated with production.

Table 8. Selected Variable Input Costs per Acre for fields enrolled in the 2015 Rice Research Verification Program.

County	Rice Type	Seed	Fertilizers & Nutrients	Herbicides	Insecticides	Fungicides and Other Inputs	Diesel Fuel	Irrigation Energy Costs
Arkansas	XL753	126.72	117.17	66.83	6.65	---	21.56	61.63
Ashley	CLXL745	164.76	128.52	83.88	4.40	---	16.56	54.87
Chicot	CLXL745	225.96	147.39	73.21	4.62	---	17.42	17.36
Clay	CL271	94.06	82.83	65.86	---	3.50	23.45	54.25
Cross	Roy J	42.30	108.71	94.91	3.59	---	23.47	47.18
Desha	Jupiter	32.90	146.29	48.54	6.57	---	14.45	52.34
Independence	Jupiter	32.90	123.10	69.69	3.59	3.50	27.25	103.11
Lawrence	Mermentau	37.60	141.23	56.68	---	19.40	23.13	31.30
Lee	LaKast	60.38	143.79	73.17	4.40	---	16.16	65.38
Lonoke	CL151	97.18	44.51	44.77	---	---	16.47	18.40
Mississippi	Jupiter	42.30	79.00	39.16	3.60	---	26.22	12.15
Monroe	Jupiter	57.10	70.27	92.21	---	---	18.58	30.52
Phillips	LaKast	57.96	58.56	84.93	3.59	---	20.98	57.96
Randolph	XL753	126.72	150.82	81.37	---	30.41	24.36	16.43
St. Francis	LaKast	37.59	135.45	70.63	---	---	23.50	71.48
White	XL753	138.24	249.68	72.65	---	---	23.85	33.33
Average	**---**	**85.92**	**120.46**	**69.91**	**4.56**	**14.20**	**21.09**	**45.48**