Restoring profitability in rice farming through improved management: II. Rice farming for profit

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ABSTRACT

Rice Farming For Profit (RFFP), a nine-step rice (Oryza sativa L.) production self-help management program designed to increase profit potential, was utilized by 255 producers in Arkansas in 1985 and 1986. The crop management recommendations in the RFFP program were designed to emphasize production practices that are most likely to be successful and profitable each year. The production practices concept was based on the principle of cumulative effects from proper timing and effectiveness of inputs. Special emphasis was given to minimizing cost in six production technology areas for which an extensive data base had been developed through research. These areas were: seeding rates; weed, disease, and insect control; fertilization; and irrigation pumping. The combination of high yield and lowered production costs increased net income for this group by an estimated 1.8 million dollars over budgeted production costs and state average yields. The RFFP program demonstrated that current technology for profitable rice production does exist. The success of the rice growers involved in the program was primarily due to an increase in management intensity, which surviving rice farmers should utilize during current economic conditions.

Additional Index Words: Oryza sativa L., Production economics.

HIGH PRODUCTION COSTS and low grain yields and prices have created a serious economic crisis that threatens the continuation of rice farming in Arkansas. The state average rice yield for Arkansas generally declined during the period 1971 to 1983 from 5645 to only 4788 kg ha\(^{-1}\). New yield records of 5846 and 5972 kg ha\(^{-1}\), respectively, were made in 1985 and 1986 (5) as a result of introducing new cultivars, improved management, and favorable weather conditions (3).

Rice production costs have declined over the past 2 yr as a result of lower prices for some inputs; however, the budgeted cost of producing rice excluding land, management, and general overhead is estimated at $840 per hectare (6). Using these budgeted costs and assuming that rice is still priced at $171 per megagram ($3.50 per bushel), there is little profit potential at average state yields.

However, Rice Research Verification Trials (RRVT) initiated in 1983 and continued through 1986 in Arkansas have illustrated that technology is available to make rice production profitable (1). Economic analysis of RRVT including all variable inputs, ownership, and land cost showed a net profit excluding direct government payments on 32 of 36 fields. In the RRVT program, the coordinator of the project, assisted by a team of research and extension specialists, made all rice production management decisions. The RRVT effectively showed the value of regular on-site monitoring and experienced judgement in maximizing profits using current rice production technology.

The University of Arkansas Cooperative Extension Service extended the management intensity of the RRVT to other rice growers through the Rice Farming For Profit...
(RFFP) program. The RFFP program was designed to challenge rice producers to use a nine-step crop management program, document the cost of six major variables, and report the results.

**RICE FARMING FOR PROFIT APPROACH**

The strategy for improving production efficiency and thus increasing the probability of higher profits is based on nine essential steps outlined in *Rice Farming for Profit* (5). Each of the areas in the crop management program are discussed and recommendations that are most likely to be successful and profitable every year are given. The concept is based on the principle of cumulative effects from proper timing and effectiveness of inputs. Often other available options may have a lower probability of success. Special emphasis was given to minimize the cost of the six high variable cost input items of seed; weed, disease, and insect control; and fertilization and pumping costs. For each production step, extension recommendations are made from an extensive research data base. The production steps concentrate on factors that are often influenced by decisions of producers.

The nine steps of production are:

1. Choice of cultivar
2. Stand establishment—see RICESEED (2)
3. Rice management decisions based on DD50 computer program (4)
4. Weed control
5. Fertilization
6. Water management
7. Insect control
8. Disease control
9. Harvesting

**RICE FARMING FOR PROFIT RESULTS**

In 1985, 98 rice producers participated by enrolling 3645 ha in 13 counties in the RFFP program. In 1986, the program expanded to 157 producers and 6705 hectares from 18 counties. Results from 1985 and 1986 are presented in Table 1. The average yield was essentially the same both years, but the cost of the six variables was $32.40 ha$^{-1}$ lower in 1986, reflecting a $5.38 reduction in cost per megagram.

The key to profitability is the combination of high yield and low variable cost. In 1986, the highest yielding field (9375 kg ha$^{-1}$) was not the field with maximum profitability. On this field, cost for the six input items was $341.82 ha$^{-1}$ and the production cost per megagram was $36.19. However, for another field the combination of a good yield (8064 kg ha$^{-1}$), low variable cost ($215.38 ha$^{-1}$), and low production cost of $26.41 Mg$^{-1}$ resulted in maximum profitability. The data indicate that it is possible to produce high yields using intensive management without increasing the cost of inputs. A high degree of production efficiency is usually associated with high per-hectare yields. Most rice producers actually are seeking maximum economic yields. This may imply only a good yield at minimum cost.

In 1985 and 1986, the 255 rice producers who participated in the RFFP crop management program increased their total income by an estimated 1.8 million dollars. Approximately $600 000 was attributed to savings on input cost compared to rice production budget estimates and 1.2 million dollars from increased rice grain yields compared to potential income from state average yields. The RFFP program demonstrated that current technology exists for profitable rice production. The success of the rice grower was primarily due to an increase in management efficiency, which rice farmers must utilize to survive the current economic conditions.

**EDUCATIONAL BENEFITS TO COOPERATORS**

The fertilizer and pumping costs for 1985 averaged $104.33 and $64.99 ha$^{-1}$, respectively. The range of these two variables (Table 1) demonstrates areas where profit potential could be increased. The farmer with the $254.41 fertilizer cost grew 'Lemont' rice, a semidwarf cultivar that is highly responsive to N fertilization. He also applied P, K, and Zn and used the higher-costing ammonium sulfate as the N source. The farmer indicated that he had heard that Lemont needed additional nutrients above the standard N fertilizer program of urea applied in split applications. Actually, rice rarely responds to applications of P, K, Zn, or S in Arkansas, especially when grown on clay soils. The farmer realized that he had not fully evaluated the fertilizer inputs and indicated that in the future he would follow the recommended fertility program for Lemont rice.

In 1985 the farmer with the $210.94 ha$^{-1}$ pumping cost enrolled a 47-ha field in the program. The power source for the well was an old electric motor. The farmer had noticed a relatively high pumping cost for the field previously, but had not documented the cost. In 1986 he enrolled the same 47 ha field but replaced the electric motor with a diesel power unit. In addition to this change, the farmer pulled an extra levee around the field, which enabled him to reuse tailwater and seepage from the levees.

### Table 1. Rice farming for profit, 2-yr summary, 1985 to 1986.$^\dagger$

<table>
<thead>
<tr>
<th>Field size, ha</th>
<th>1985 Avg.</th>
<th>1986 Avg.</th>
<th>2-yr Avg. Low High</th>
<th>1985 Low High</th>
<th>1986 Low High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield, kg ha$^{-1}$</td>
<td>6502</td>
<td>6552</td>
<td>6527</td>
<td>4284</td>
<td>9324</td>
</tr>
<tr>
<td>Cost, $ ha$^{-1}$</td>
<td>49.35</td>
<td>40.98</td>
<td>43.92</td>
<td>17.56</td>
<td>145.20</td>
</tr>
<tr>
<td>Seed</td>
<td>73.46</td>
<td>74.32</td>
<td>74.00</td>
<td>0.00</td>
<td>165.96</td>
</tr>
<tr>
<td>Herbicide</td>
<td>57.57</td>
<td>11.39</td>
<td>10.40</td>
<td>0.00</td>
<td>76.08</td>
</tr>
<tr>
<td>Fungicide</td>
<td>2.22</td>
<td>1.65</td>
<td>1.83</td>
<td>0.00</td>
<td>37.54</td>
</tr>
<tr>
<td>Insecticide</td>
<td>104.33</td>
<td>90.10</td>
<td>95.12</td>
<td>36.31</td>
<td>254.41</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>44.99</td>
<td>65.33</td>
<td>65.21</td>
<td>22.72</td>
<td>210.94</td>
</tr>
<tr>
<td>Total, $ ha$^{-1}$</td>
<td>316.20</td>
<td>283.80</td>
<td>293.75</td>
<td>197.03</td>
<td>340.49</td>
</tr>
<tr>
<td>Cost, $ Mg$^{-1}$</td>
<td>48.41</td>
<td>45.03</td>
<td>44.50</td>
<td>28.85</td>
<td>92.45</td>
</tr>
</tbody>
</table>

$^\dagger$ 1985 = 96 producers, 13 counties, 3644 ha; 1986 = 157 producers, 18 counties, 6703 ha.
by means of a portable relift. The pumping cost for this 47 ha field in 1986 was $35.94 ha⁻¹. This change in his power sources and water management practices resulted in a savings of $8272.00 excluding cost of the diesel unit and relift. The farmer admitted that without participation in the RFFP program he would have continued to use the less efficient system and would not have realized how this change could benefit him.

METHODS USED TO INFORM THE PUBLIC ABOUT THE RFFP PROGRAM RESULTS

The RFFP profit program received statewide publicity in multicounty rice profitability meetings. Emphasis was placed on methods of producing high rice yields without increasing input costs. The range of costs for the six input items (seed; weed, disease, and insect control; and fertilizer and pumping) were discussed, pointing out that these are the areas where input costs most likely could be reduced and profitability increased. The University of Arkansas Cooperative Extension Service produced a video entitled "Putting Profit Back in Agriculture—A Management Approach" based on the RFFP program. The TV program was aired on state and local stations. Several local, state, and regional newspapers and farm magazines published articles about the Arkansas RFFP program.

Awards banquets were held in some rice-producing counties and certificates were presented to participants that had maximum profit per hectare. The RFFP program offered encouragement to producers who accepted the challenge of trying the improved technology. The real pay-off to the farmer is the increased profit or possibly profit rather than a loss.

REFERENCES