Long Range Financial Impact Of Changing Cotton Rotation Under Declining Irrigation Capacity

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Texas AgriLife Extension Service
Texas Southern High Plains Irrigation Situation

- Declining capacity
- Increased efficiency
- Increasing energy costs
- Varieties with higher potential yields
Model Farm to Evaluate Alternative Cropping Strategies

• 2100 acres
• Continuous cotton
• Contingent crop of grain sorghum
• 640 acres owned
• 1460 share leased (75/25)
• 860 acres center pivot irrigated
Baseline Financial Assumptions

- Total assets - $611,500
- Total debt - $224,953
- Debt-to-asset ratio – 37%
- Family living - $40,000
- Off-farm salary - $15,000
- Employee salaries - $64,000 (2 FT + PT)
Income & Expense Assumptions

- Cotton price - $0.65/lb.
- Wheat price - $8.00/bu.
- Irrigation energy cost - $12/ac in
- Nitrogen - $0.60/unit
- Phosphate - $0.60/unit
Baseline Production Assumptions

- Irrigate to 50% ET replacement on all of each pivot
- Cotton Yield
  - Irrigated 750 lbs/ac
  - Dryland 250 lbs/ac
- Irrigation capacity – 2.5 gpm/ac
- Water applied – 10 ac in
- Nitrogen applied – 90 units
- Phosphate applied – 25 units
First Alternative Analyzed

- Fully irrigate (100% ET replacement) 1/2 of each pivot, remainder is treated as dryland.
- Cotton Yield
  - Irrigated 1250 lbs/ac
  - Dryland 250 lbs/ac
- 20 ac in of water applied
- 180 units of nitrogen
- 50 units of phosphate
Second Alternative Analyzed

- Irrigate to 75% ET replacement on 2/3 of each pivot, remainder is treated as dryland.
- Cotton Yield
  - Irrigated 1000 lbs/ac
  - Dryland 250 lbs/ac
- 15 ac in of water applied
- 135 units of nitrogen
- 38 units of phosphate
Third Alternative Analyzed

• Fully irrigate (100% ET replacement) 1/2 of each pivot, remainder is irrigated wheat for grain.
• Yield
  – Irrigated cotton 1250 lbs/ac
  – Irrigated wheat 42 bus/ac
• 20 ac in of water applied to cotton
• 7 ac in of water applied to wheat
• 180 units of nitrogen (cotton)
• 50 units of phosphate (cotton)
Fourth Alternative Analyzed

- Irrigate to 75% ET replacement on 2/3 of each pivot, remainder is irrigated wheat for grain.
- Yield
  - Irrigated cotton 1000 lbs/ac
  - Irrigated wheat 42 bus/ac
- 15 ac in of water applied
- 7 ac in of water applied to wheat
- 135 units of nitrogen
- 38 units of phosphate
Fifth Alternative Analyzed

- Fully irrigate (100% ET replacement) 1/2 of each pivot, remainder is irrigated wheat for grazing stocker cattle on gain.
- Yield
  - Irrigated cotton 1250 lbs/ac
  - Irrigated wheat - 2 head per acre at 2 lbs gain/day
- 20 ac in of water applied
- 7 ac in of water applied to wheat
- 180 units of nitrogen (cotton)
- 50 units of phosphate (cotton)
- Stocker cattle lease rate $0.35/lb
Sixth Alternative Analyzed

- Irrigate to 75% ET replacement on 2/3 of each pivot, remainder is irrigated wheat for grazing stocker cattle on gain.
- Yield
  - Irrigated cotton 1250 lbs/ac
  - Irrigated wheat - 2 head per acre at 2 lbs gain/day
- 15 ac in of water applied
- 7 ac in of water applied to wheat
- 135 units of nitrogen (cotton)
- 38 units of phosphate (cotton)
- Stocker cattle lease rate $0.35/lb
Analysis Method

• The FARM Assistance model was used to evaluate the 10 year outcome and risk level of the baseline and each of the 6 alternatives.

• A comparison of key financial ratios was prepared.
<table>
<thead>
<tr>
<th></th>
<th>Base</th>
<th>Alt1</th>
<th>Alt2</th>
<th>Alt3</th>
<th>Alt4</th>
<th>Alt5</th>
<th>Alt6</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Change RNW</td>
<td>84</td>
<td>137</td>
<td>114</td>
<td>195</td>
<td>153</td>
<td>-148</td>
<td>-175</td>
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<tr>
<td>Ending Real Net Worth ($1000)</td>
<td>650</td>
<td>838</td>
<td>754</td>
<td>1041</td>
<td>894</td>
<td>-169</td>
<td>-263</td>
</tr>
<tr>
<td>Ending Debt to Asset Ratio (%)</td>
<td>34</td>
<td>25</td>
<td>29</td>
<td>17</td>
<td>21</td>
<td>124</td>
<td>137</td>
</tr>
<tr>
<td>Net Cash Farm Income ($1000)</td>
<td>98</td>
<td>131</td>
<td>116</td>
<td>169</td>
<td>141</td>
<td>-32</td>
<td>-44</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
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<th>Alt5</th>
<th>Alt6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Exp to Rcpt Ratio</td>
<td>.85</td>
<td>.81</td>
<td>.83</td>
<td>.77</td>
<td>.80</td>
<td>.97</td>
<td>.98</td>
</tr>
<tr>
<td>Ending Cash Reserves ($1000)</td>
<td>141</td>
<td>374</td>
<td>270</td>
<td>625</td>
<td>444</td>
<td>-877</td>
<td>-994</td>
</tr>
<tr>
<td>Prob. Of Ending Cash &lt; Zero (%)</td>
<td>34</td>
<td>22</td>
<td>27</td>
<td>11</td>
<td>17</td>
<td>93</td>
<td>94</td>
</tr>
</tbody>
</table>
Projected Variability in Net Cash Farm Income – All Cotton

All Cotton 50% ET

All Cotton 100% ET

All Cotton 75% ET

5% 25% Mean 75% 95%
Projected Variability in Net Cash Farm Income – Cotton/Wheat Grain

All Cotton 50% ET

Cotton/Wheat 100% ET

Cotton/Wheat 75% ET

FARM Assistance Planning Solutions

AgriLIFE EXTENSION Texas A&M System
Projected Variability in Net Cash Farm Income – Cotton/Wheat Graze

- **All Cotton 50% ET**
  - 5%
  - 25%
  - Mean
  - 75%
  - 95%

- **Cotton/Wheat/Stocker 100% ET**
  - 5%
  - 25%
  - Mean
  - 75%
  - 95%

- **Cotton/Wheat/Stocker 75% ET**
  - 5%
  - 25%
  - Mean
  - 75%
  - 95%
Probability of Having to Refinance Operating Note

Percent


Alt 1  Alt 2  Alt 3  Alt 4  Alt 5  Alt 6
Conclusions

• Least favorable – Anything to do with stocker cattle
• Most favorable - Irrigate to 100% ET replacement on 1/2 of each pivot, remainder planted to irrigated wheat.
• Next best - Irrigate to 75% ET replacement on 2/3 of each pivot, remainder planted to irrigated wheat.
Texas AgriLife Extension Service
Risk Management Resources

• Websites
  – http://agecoext.tamu.edu/
  – http://farmassistance.tamu.edu/
  – http://mastermarketer.tamu.edu/

• District Risk Management Specialist
  – Jay Yates – Lubbock
  – 806-746-6101
  – jayates@ag.tamu.edu