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The Impact of New Best Management Practices on Profitability of Dairies in the Lake Okeechobee Drainage Basin[1]

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Nineteen dairies in the Lake Okeechobee Drainage Basin (LODB) are challenged by the Florida Department of Environmental Protection (DEP) with achieving stricter water quality targets and developing a balanced nutrient budget based on phosphorous. An intensive analysis of these dairies has been completed. Plans were accomplished for each dairy dealing with issues such as housing cows to capture manure nutrients, storing rain water and waste water to reduce runoff, growing crops to take up nutrients, and using new technologies for treating water and manure to better control phosphorous. The plans developed Best Management Practices (BMPs) specific to each dairy farm. The proposed BMPs require significant investments on these 19 dairies. Therefore, the following questions need to be answered.

- What will the BMPs cost?
- What is the likely impact of these costs on the profitability of these 19 dairy farms?
- How many of the dairies are likely to comply and make this investment (and be successful thereafter)?

The Cost of BMPs

McMahon, et al. reported in 2003 that the cost of the new BMPs will total over $104 million, with an average per dairy of about $5.5 million. The population of permitted cows on 19 dairies is 24,151. The average cost per cow is $4,736, with a range among dairies of $2,420 to $7,474 (Table 1).

The investment in these BMPs will dramatically alter the structure of these dairies. The Dairy Business Analysis Program (DBAP), a cooperative effort of the Universities of Florida and Georgia, is an annual financial and production survey among dairies that provides insights into their cost structure and financial and productive performance. In 2001, the most recent summarized year, the 39 dairies that participated had on average $4,535 worth of total assets per cow (de Vries et al., 2003). This includes

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assets such as land, buildings and improvements, equipment, cattle, and other assets such as cooperative stocks. Thus, addition of the proposed BMP investments would double the pre-compliance investments of the average LODB dairy. Without cost share opportunities, the impact of this factor alone would place the LODB dairies at a significant competitive disadvantage in the industry.

What Is the Likely Impact of These Costs on the Profitability of These Dairy Farms?

The impact of the investments in BMPs on the profitability of LODB dairies is determined by cost share opportunities and the effects of the BMPs on cow performance, especially milk production and culling rate.

Cost Share Opportunities

Investment and maintenance costs of BMPs will be paid by cost share (state of Florida) and dairy share (individual dairies). Table 1 shows the result of amortizing the costs at 20%, 25%, and 30% dairy share. The amortization was calculated for the lowest, average and highest cost per dairy, respectively $2,420, $4,736, and $7,474 per cow. Milk production per cow per year was assumed to be 170 cwt (average of the 39 DBAP dairies in 2001 was 171). The calculated costs are then expressed as an annual cow payment per cow and per cwt.

At 25% dairy share, the average dairy will incur $0.91 per cwt increased cost. The difference in dairy share from 20% to 30% has the impact of $0.57 per cwt on the dairy with highest BMP cost.

The average net farm income per cwt (a good measure of profitability) of 85 dairies who participated in DBAP from 1995-2001 was about $1.30 per cwt. Net farm income must pay for IRS obligations, provide for family living, and reward the owners for risking their equity in the dairies. Data from table 2 indicates that if the LODB dairies are similar to DBAP dairies, their profitability may be significantly affected. For the average dairy, a $1.30 net farm income may be reduced by $0.91, a reduction of 70%. The dairy with the highest BMP cost would have a negative net farm income per cwt if the dairy's share in the total BMP costs is above 20%.

Will Enhanced Facilities Improve Milk Production and Reduce Culling Rates?

BMPs for some LODB dairies include new barns with cooling systems to house cows to enable greater nutrient capture and safe storage. Cows may be more comfortable, safe, and productive in new facilities. In 2001, a group of Central Florida producers that had constructed new barns were surveyed to develop an estimate of milk responses of cows during summer months (Giesy, 2001). The range of their responses was 0 to 12 more pounds per cow per day with an average of 6 pounds more milk during 120 summer days. A break even production response level of 7.8 pounds was estimated to make the new barns profitable. A response of 6 to 7 pounds per summer day is approximately equivalent to 2 pounds per year.

Table 3 contains estimates of potential impact on net farm income per cwt by milk production response. Potential improvement in milk productivity of 2 pounds per cow per day, was estimated to increase net income by $0.17 per cwt. Similarly, a 4-pound response improved the net farm income by $0.35 per cwt. Reduced cow culling of 2% and 4% was found to improve net farm income by $0.10 and $0.21 per cwt, respectively. These results are likely to be coincidental and additive. For example, if a dairy receives a 2-pound greater milk production and 2% reduced culling, the net farm income is expected to be improved by $0.27 per cwt.

How Many of the Dairies Are Likely to Comply?

Table 4 shows the results of total costs of the 19 LODB dairies by BMP cost per cow. The increased returns from table 3 (due to one level of milk production response [2%] and one level of reduced cow culling [2%]) were subtracted from the amortized annual cost per cwt. That difference is the net cost per cwt in table 4. Column 5 represents the estimated reduction in net farm income per cwt.

Data in table 4 shows that with 20% dairy share, 7 of the 19 dairies should expect to see profitability reduced by 45% or more. At 30% dairy share, 13 of the 19 dairies would expect the same result. If we assume that a reduction in profitability of 60% or more might lead to the decision to discontinue operation of the dairy, all dairies with BMP cost per cow above $5,000 would discontinue unless their dairy share is 20% or less. In the event of step-wise funding for BMPs, those BMPs that provide opportunities to improve milk production and reduce cow culling should be implemented first. Whether or not dairies implement the proposed BMPs in order to remain in the dairy business is determined by many factors beyond arithmetic and finances.

Conclusions

The investment in BMPs will dramatically alter the financial structure of dairies in the LODB. The total cost of implementing the requested BMPs was estimated to be $4,736 per cow. The impact of these additional expenses depends upon the level of cost sharing and improvements in milk production and cow culling.

Our estimates show that even with only 20% dairy share, 7 of the 19 dairies should expect to see profitability reduced by 45% or more. At the 30% dairy share level, 13 of the 19 dairies would expect the reduced profitability. If we assume that a reduction in profitability of 60% or more might lead to a decision to discontinue, all dairies with BMP cost per cow above $5,000 would discontinue unless their dairy share is 20% or less.

In the event of step-wise funding for BMPs, those BMPs that provide opportunities to improve milk production and cow culling should be implemented first.

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Table 1. Cost of Best Management Practices (BMP) on dairies in the Lake Okeechobee Drainage Basin (LODB) per cow.

New BMPs - Cost/cow	Number of dairies
$2,000 - $2,999	2
$3,000 - $3,999	4
$4,000 - $4,999	6
$5,000 - $5,999	2
$6,000 - $6,999	4
$7,000 - $7,999	1

Table 2. Impact of principal and interest payments for BMPs for various dairy share percentages for dairies in the LODB.

	Dairy share	Annual loan payment/cow*	Annual loan payment/cwt**
Minimum ($2,420/cow)	20%	$63.03	$0.37
	25%	$78.79	$0.46
	30%	$94.55	$0.56
Average ($4,736/cow)	20%	$123.36	$0.73
	25%	$154.19	$0.91
	30%	$185.03	$1.09
Maximum ($7,474/cow)	20%	$194.67	$1.15
	25%	$243.34	$1.43
	30%	$292.01	$1.72
*Terms were 5.5% interest rate, 10 year term per cow. **170 cwt milk sold per cow per year.			

Table 3. Estimated impact on net farm income per cwt with increased milk production and reduced culling.

Increased milk production/cow/day	Increase in net farm income/cwt
2 lb (4%)	$0.17
4 lb (8%)	$0.35
Reduction in cull rate/year	
2%	$0.10
4%	4%

Table 4. Estimated reduction in net farm income on dairies in the LODB with varying BMP costs and level of dairy share.

New BMPs - Cost per cow	Number of dairies	Dairy share	Net cost = amortized cost minus improved performance per cut*	Reduction in net farm income per cwt**
$2,000 - $2,999	2	20%	$0.11	8%
		25%	$0.21	16%
		30%	$0.30	23%
$3,000 - $3,999	4	20%	$0.27	21%
		25%	$0.40	31%
		30%	$0.53	41%
$4,000 - $4,999	6	20%	$0.42	32%
		25%	$0.59	45%
		30%	$0.76	58%
$5,000 - $5,999	2	20%	$0.57	44%
		25%	$0.78	60%
		30%	$0.99	76%
$6,000 - $6,999	4	20%	$0.73	56%
		25%	$0.97	75%
		30%	$1.22	94%
$7,000 - $7,999	1	20%	$0.88	68%
		25%	$1.16	89%
		30%	$1.45	111%

*Amortization taken at midpoint of range, 2% milk production response, 2% reduced cow culling.
**DBAP seven-year average net farm income per cwt ($1.30) divided by net cost.