FEED SUSTAINABILITY (/ADVOCATE/CATEGORY/FEED-SUSTAINABILITY)

To increase profits, consider the what-ifs

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Test new production strategies and techniques at very low risk

Feed and other inputs should be viewed as investments, as well as costs.

A wise business consultant once advised: "Profits are much like breathing; if we don't breathe, we are dead. If we don't achieve enough profit for the risk we take, we are also dead. Profits are a risk premium we need as we commit today's definite resources to tomorrow's uncertain return.

In aquaculture, a frequently used strategy to optimize profits is to carefully manage input costs and constantly try to reduce them. This cost-driven approach to profits certainly has merits. However, the profit equation has two components, namely, revenue and costs. Without considering the revenue side of the equation, profit opportunities are lost.

Since the cost of feed is usually the largest single cost item associated with the production of aquaculture products, it gets most of the attention when farm managers focus on cost reduction. Although the feed fed to the animals has a significant impact on growth rate, survival, water quality, processing yields, shelf life and nutritional quality of the final product – all important contributors to larger revenues – feed manufacturers remain under continuous pressure to reduce the unit cost of feed.

If a business is truly profit-driven, then the mental paradigm needs to shift from thinking of feed as a cost factor to feed as an investment that can have a huge impact on crop value at harvest. Other input costs should be viewed as investments, as well, suggesting that the most important question to be asked is, “How can the return on investment be maximized as profit?”

What if?

If one seriously addresses the above question, then a number of possible additional questions arise, such as:

- What if I invest in ways to improve oxygen levels?
- What if I invest in better-quality, faster-growing seedstock?
- What if I invest in improvements to my production system?
- What if I invest in a higher-quality and more nutritionally complete feed?
- What if I delay harvest by a week or two?
- What if I invest in probiotics?

Economic modeling

Assessing potential investments through economic modeling can help prioritize business decisions and result in greater profits.

To accomplish the above, a project was undertaken by the Zeigler Bros. team for the purpose of developing economic models for aquaculture according to the following criteria:

- simplicity
- reported on one page
- includes all input costs
- includes all relevant revenue from multiple sources

The outcome of this project appears in Table 1. Although this model can be used for almost any aquaculture production system, it is used here as a shrimp economic calculator evaluating the investment associated with two different feeds.

Zeigler, Shrimp economic calculator, Table 1

	Example A	Example B	Difference	Difference
1. Input Data				
Pond size, ha	1.0000	1.0000	–	0%
Stocking density, m^2	15	15	–	0%
Gain/week, g	1.1	1.3	0.20	18.2%
Average weight at harvest, g	15.00	15.00	–	0%
Survival %	70.0%	75.0%	5.00	7.1%
FCR	1.50	1.30	(0.20)	-13.3%
Postlarvae cost, 1,000, U.S. $	$4.50	$4.50	–	0%

Initial weight/animal, g	0.04	0.04	–	0%
Market value/lb, U.S. $	$2.15	$2.15		0%
Feed cost/lb, U.S. $	$0.40	$0.70	–	75.0%
Overhead/pond/day, U.S. $	$30.0	$30.0	0.30	0%
Farm size, ha	100.0	100.0	–	
2. Calculations				
Cycle, days	95.20	80.55	(14.65)	-15.4
Postlarvae stocked	150,000.00	150,000.00	–	0%
Harvest weight, lb	3,459.91	3,707.05	247.14	7.1%
Value at harvest, U.S. $	$7,438,81	$7,970.15	$531.34	7.1%
Cost of postlarvae, U.S. $	$675.00	$675.00	–	0%
Feed fed, lb	5,189.87	4,819.16	(370.70)	-7.1%
Cost of feed, U.S. $	$2,075.95	$3,373.41	$1,297.47	62.5%
Overhead cost, U.S. $	$2,856.00	$2,416.62	$(439.38)	-18.2%
3. Results By Unit				
Postlarvae cost/lb harvested, U.S. $	$0.195	$0.182	$(0.013)	-6.7%
Feed cost/lb harvested, U.S. $	$0.600	$0.910	$0.310	51.7%
Overhead cost/lb harvested, U.S. $	$0.825	$0.652	$(0.174)	-21.0%
4. Results – Profit				
Income over fingerling, feed and overhead costs, U.S. $	$1,831.86	$1,505.12	$(326.74)	-17.8%
5. Other Factors/Adjustments				
Additional production, U.S. $			$362.28	
6. Advantage Of B Over A				
For 1 ha			$35.54	
For farm			$3,554.10	

Table 1. Shrimp economic calculator.

Understanding the calculator

The calculator uses an Excel spreadsheet format, and the formulas can easily be determined by back calculating the data. It is divided into six sections and two production scenarios: example A and example B. In the example shown, the value of a superior feed is determined at near break-even, assuming certain improvements in shrimp production occur.

Section 1 contains the input data. The line for overhead/pond/day includes all production costs except for feed and postlarvae. It is calculated by adding all of the other farm production costs, both fixed and variable, for a year and then dividing this number by the number of unit days, the total number of days the ponds are in production per year times the total area of ponds on the farm.

Section 2 reports the important calculations for the model using the input data of section 1. Section 3 reports unit results by showing the postlarvae cost, feed cost and overhead cost per pound of product harvested. Section 4 reports the results as profits calculated by subtracting the total cost of postlarvae plus feed, plus overhead from the total income or revenue.

Section 5 allows the opportunity to consider other profit-related factors. In the example shown, the production time comparing B to A is reduced by 14.65 days. This has an economic benefit of $362.28, which is calculated as a reasonable 25 percent gross profit of the gross revenue generated in 14.65 days using the production scenario of example B. If the company is fully integrated, additional economic benefits may be achieved from the sale of additional postlarvae and feed, and/or greater efficiency of the processing activity.

Section 6 reports the advantage of example B over example A, both for a single production unit the total farm for one cycle.

By copying the formulas of either example to additional columns to the right, a comparison of various production scenarios can be observed and quickly analyzed. This particular economic calculator can be used to quickly determine the break-even value for postlarvae costs or overhead costs. In addition, it can be quickly adapted to evaluate the economics of fish production.

Interpreting results

Example A represents a typical production scenario. Example B represents improved production metrics in which the weekly gain is projected to improve by 18.2 percent, survival by 7.1 percent and feed-conversion ratio by 13.3 percent. All of these improvements are considered realistic and achievable.

Feed cost per pound for example A is $0.40. By gradually increasing the cost of feed in example B to $0.70 a pound, a near break-even cost is reached. At this point there is a small profit for Example B, although the cost of feed has been increased by 75 percent.

Farm managers frequently evaluate the feed they use by measuring the feed cost per pound of gain and selecting the feed with the lowest value. Feed cost per pound of gain in the example increased by $0.31 or 51.7 percent. Clearly, this standard of measurement will result in inaccurate conclusions and reduced profitability.

Using the same methodology, postlarvae costs could increase from $4.50 to $14.50/1,000, or daily overhead costs could increase from $30.00 to $48.00 and still nearly achieve break-even in each case.

If one assumes that the production results in Example B can be achieved with a feed costing $0.50 per pound, then the increased profits comparing B to A become $999/ha, $99,900/cycle or $299,700 for a farm operating three cycles per year. Does this represent a good business option to try?

Opportunity

Today, the economics of shrimp farming are very favorable if one is not faced with catastrophic environmental issues. One advisable strategy would be to experiment with improved production methods in four or five ponds. By selecting the higher-return opportunities and using only a portion of the available production area, new production strategies and techniques can be tested and evaluated at very low risk.

Now is the time, while the shrimp economy is positive, to take steps to get ready for the next downturn, which will surely come at some point.

Bottom Line: Economic modeling opens the door for substantially increased profits.

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