Sustainable shrimp farming: Best practices for reducing crop failures

An analysis of key trends in farm success supports the importance of best management practices at farms

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Shrimp farming has emerged as a crucial sector within the aquaculture industry, contributing significantly to food production and economic growth. However, over the past several years, facing low farmgate prices, driven by a global oversupply situation, margins are squeezed and often farms struggle to be profitable. There is close attention to productivity and cost of production. Frequent disease outbreaks also make it difficult to consistently achieve profitable harvests.

With the assumption that farm success rates vary based on management practices, environmental conditions, and adherence to best practices, the technical team at Growel Feeds Pvt Ltd collected data from 100 farms in West Godavari and Krishna districts of Andhra Pradesh, India, to assess criteria that contribute to farm performance.

	A	B	C	D	Total/Average
Total no. of farms	30	40	20	10	100
Area of total farms (ha)	230.0	329.4	162.4	62.6	784
Average farm size (ha)	7.7	8.2	8.1	6.3	7.6
Average pond size (ha)					
Minimum	1.2	1.0	1.0	1.2	1.1
Maximum	6.0	4.1	4.4	5.5	5.0
Average	2.6	2.2	2.0	2.6	2.3
Farmer's age group					
Minimum	27	28	27	27	27
Maximum	62	60	60	57	60
Average	42	43	44	42	43

Table 1. General data on 100 farms categorised into grades—A, B, C, and D, in West Godavari and Krishna districts of Andhra Pradesh, India covered in the study. Source: Growel Feeds Pvt. Ltd.

The data covered farm performance over the last five years. In our final analysis, we categorised them into four distinct grades—A, B, C, and D—based on their adherence to farming criteria and their success rates (Table 2). Key trends in farm success were identified followed by recommendations based on the grading structure.

Grades	Points allocated	Criteria – Success rate	Interpretation
A	121–150	>80%	Highly sustainable and successful farm practices
B	91–120	60 - 80%	Moderate success, with key strengths and clear areas for improvement.
C	61–90	40 - 65%	Signs of chronic management/farming issues— often observed in failed farms.
D	<60	<40%	High risk of failure or ongoing farm failure

Table 2. The scoring system allocated to 100 farms from West Godavari and Krishna districts of Andhra Pradesh, India over the past five years. Source: Growel Feeds Pvt. Ltd.

Methodology and data analysis

The dataset comprises responses with evaluation criteria outlined across various feedback which are summarised in Table 3.

Feedback forms	Information collected
1. Contains raw data from all 100 farms	Water and oxygen management; seed quality and stocking; pond preparation and management; feeding practices; site and pond information/disease management and other challenges; and pond utilisation and production
2. Establishes grading benchmarks based on best farming practices.	Pond & water management; record keeping & technology utilisation; biosecurity & disease management; innovation and adaptation; feed & nutrition management; operations, finances, human resource & knowledge
3. Deeper investigations into specific criteria in grades A, B, C, and D farms	Show farm-specific grading results and categorise farms based on their adherence to success parameters such as those under pond and water management, best management practices in pond preparation; crop intervals, cleaning and pond preparation, monitoring of water parameters, aeration, sediment management.

Table 3. Summary of the questionnaires covering farm, pond, and feed management topics.

Scores for success

Farms that adhered to optimised protocols achieved higher success rates and profits, while those with poor management practices experienced lower yields. Table 4 explains the interpretation of farm success according to their grading structure.

Grades assigned to farms	A	B	C	D
Number of crops in last 5 years	12	12	13	10
Number of successful crops in last 5 years	9	7	5	2
Number of failed crops in last 5 years	3	5	8	8
% successful crops in last 5 years	75	58	38	20
Average production (kg/m^2/year)	1.6	1.3	1.0	0.5
Average feed conversion ratio (FCR)	1.2	1.3	1.35	1.5
Average survival (%)	85–90	80–85	75–80	60

Table 4. Success rate assessment according to grades of farms.

The grading system assesses several farm management aspects, including pond preparation, water quality monitoring, aeration facilities, disease prevention, feed conversion ratios, financial viability, and technology adoption.

Highly sustainable and successful farm practices (80%)
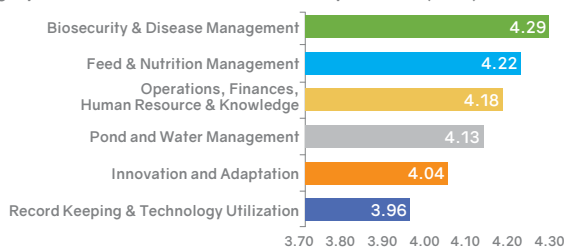
Figure 1. Analysis of responses from grade A farms. Data is the average of points (1-5; 1 being the lowest and 5, the highest) for each group of questions.

Key observations

Grade A farms

Farms categorised under Grade A with >80% crop success rate consistently followed best practices, such as:

- Implementing proper pond preparation techniques (adequate crop intervals, pond drying, liming).
- Routine monitoring of water quality (dissolved oxygen (DO), pH, salinity and temperature).
- Efficient aeration strategies, reducing stress on shrimp populations.
- Strict biosecurity measures to prevent disease outbreaks.
- Quality feed management with optimal feed conversion ratios (FCR) ranging from 1.2-1.3.

With an average survival rate of 85-90%, these farms were financially sustainable and achieved annual production levels of 1.6kg/m^2/year (16 tonnes/ha/year).

Grade B farms

Moderate crop success rate of between 60-80% was observed in Grade B farms, which achieved a survival rate of 75-80% and an annual production rate of 1.3kg/m^2/year. Weaknesses in these farms included:

- Inconsistent monitoring of water quality parameters.
- Biosecurity gaps leading to occasional disease outbreaks.
- Feed management practices showing slightly higher FCR (~1.3) than Grade A farms.

Moderate success, with key strengths and clear areas for improvement
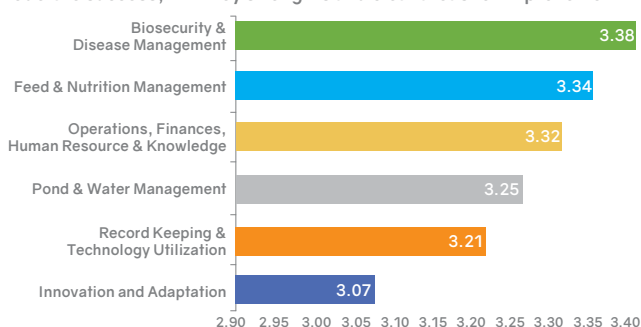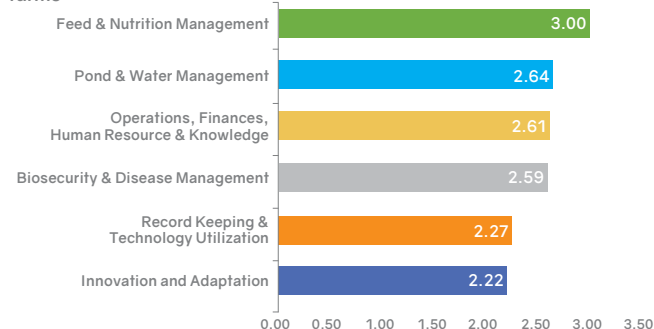

Figure 2. Analysis of responses from grade B farms. Data is the average of points (1-5; 1 being the lowest and 5, the highest) for each group of questions.

Grade C farms

Farms classified under Grade C had 40-65% crop success rates, faced chronic management issues, with survival rates between 65-70%, and annual production averaging 1.0kg/m^2/year. Key concerns for these farms included:

- Poor implementation of aeration and water exchange methods.
- Lack of disease control measures, resulting in higher losses.
- Inconsistent farm records, impacting operational efficiency.

Signs of chronic management/farming issues—often observed in failed farms

Figure 3. Analysis of responses from grade C farms. Data is the average of points (1-5; 1 being the lowest and 5, the highest) for each group of questions.

Grade D farms

Farms with <40% crop success rates under Grade D experienced significant challenges with survival rates below 60% and annual production averaging only 0.5kg/m^2/year. Key concerns for these farms included:

- Weak infrastructure for maintaining pond conditions.
- Limited disease management resulting in frequent outbreaks.
- Inefficient feeding schedules leading to high FCR (~1.5), reducing profitability. Poor water management practices negatively affect shrimp health.

High risk of failure or ongoing farm failure

Figure 4. Analysis of responses from grade D farms. Data is the average of points (1-5; 1 being the lowest and 5, the highest) for each group of questions.
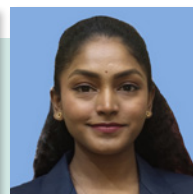
- Maintaining a minimum of 4-5ppm dissolved oxygen at the pond bottom, 3m away and 30cm above the sludge area for better feed intake, digestibility and to reduced stress levels.
- Optimised feeding schedules to improve FCR and reduce costs.
- Implementing strong biosecurity measures and disease prevention protocols to enhance farm sustainability.
- Leveraging technology, such as AI, IoT and digital monitoring tools, to aid in real-time tracking of pond conditions to proactively manage shrimp pond.

COP and profit margins

Comparing profit margins at farming to size 100/kg versus to size 50/kg, it was clear that notwithstanding the grade level, producing size 50/kg was better. Grade D farms were worst but still profitable at 17% of selling prices. Feed cost was the factor affecting the difference between the second crop in 2024 (feed cost was INR88/kg) and that for the first crop in 2025 (feed cost was less by INR4/kg). The FCR was better for production for size 100/kg but the better prices for size 50/kg shrimp compensated for the COP at larger sizes. Except for feed costs, the difference between crop in 2024 with that in 2025 was due only to selling price, and not production. Overall, we showed that for the farmers, it was better to farm larger sizes as harvesting at size 100/kg, grade C and D, and even Grade B they lost money.

Conclusion

In this study, we showed how by following best practices, Grade A farms can increase their success rates and financial stability, ensuring sustainable shrimp farming operations. These are vital to ensure high productivity and include:
- Enhancing pond preparation with regular cleaning, sun drying, liming and implementation of better management practices throughout the crop to improve crop success rate.
- Adopting routine water quality and shrimp health monitoring and immediate corrective measures/ proactive management to prevent major disease outbreaks such as EHP, Vibriosis, RMS and WSSV affecting sustainability and net profit margins.

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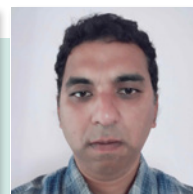
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Second crop of 2024 (July-Dec). Stocking at 25 PL/m²								
	Harvest size 100/kg				Harvest size 50/kg			
Grade assigned to Farms	A	B	C	D	A	B	C	D
Average FCR	0.90	1.00	1.10	1.20	1.20	1.30	1.35	1.50
Production cost/kg (INR)	230	248	273	311	205	220	237	282
Production cost/kg (USD)@INR 84.11	2.73	2.95	3.25	3.70	2.44	2.62	2.82	3.35
Farmgate price/kg (INR)*	249	249	249	249	342	342	342	342
*Farmgate price/kg (USD) @INR 84.11	2.96	2.96	2.96	2.96	4.07	4.07	4.07	4.07
Profit margin per kg of shrimp (INR)	19	1	-24	-62	137	122	105	60

Table 5. Cost of production and profit margins for the second crop of 2024 (July-December). Stocking density was 25 PL/m². *The average farmgate price of 100 & 50 shrimp/kg between July to December 2024 (INR); ** Feed cost was INR 88/kg.

First crop of 2025 (January-May) stocking at 25 PL/m²								
	Harvest size 100/kg				Harvest size 50/kg			
Grade assigned to Farms	A	B	C	D	A	B	C	D
FCR	0.90	1.00	1.10	1.20	1.20	1.30	1.35	1.50
Production cost/kg (INR)	227	245	270	307	201	216	233	277
*Production cost/kg (USD) @ INR 86.12	2.63	2.84	3.14	3.22	2.34	2.51	2.70	3.56
Farmgate price/kg (INR)*	237	237	237	237	348	348	348	348
*Farmgate price/kg (USD)@INR 86.12	2.75	2.75	2.75	2.75	4.04	4.04	4.04	4.04
Profit margin per kg of shrimp (INR)	10	-8	-33	-70	147	132	115	71

Table 6. Cost of production and profit margins for the first crop of 2025 (January-May). Stocking density was 25 PL/m². *The average farmgate price of 100 & 50 shrimp/kg between January to May 2025 (INR); ** Feed cost was INR 84/kg.