Analysis of Feed Management Practices for *Penaeus Vannamei* (Boone) in Modi Village, Narasapuram Mandal, West Godavari District.

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Abstract:
Shrimp farming attracts a lot of interest due to the high profits. *Vannamei* shrimp is one variety of shrimp that is frequently exported. The purpose of this study was to examine the *vannamei* shrimp feed management in Modi village, Narasapuram Mandal, West Godavari District. Using both primary and secondary data, the descriptive method was the working method employed in this study. P-C2, P-C4, P-C5, P-C6, P-C7, P-C8, P-C9, P-C10, P-C13 were observed. observation period until the harvest of shrimp. Feeding was done by boat to distribute the feed evenly. At harvest, the feed conversion ratio was 1.09,1.09,0.86,0.86,0.91,0.82,1.34,1.09 and 0.88 respectively in the above ponds. Thus, it could be said that the Modi village, Narasapuram farms produced positive outcomes.

Introduction:
One of the most extensively grown shrimp species worldwide is *Penaeus vannamei*, commonly referred to as Pacific white shrimp. Its production is essential because of the rising demand for shrimp as a food source worldwide, the fact that it contributes significantly to the aquaculture industry's earnings, that it employs millions of people in farming, processing, and trade, that it offers a valuable source of human protein, and that it is a major source of foreign exchange for many nations.
50–60% of the total production costs are related to feed costs (Tacon & Cody, 2006). Optimal growth and survival rates are guaranteed by adequate nutrition (Davis & Arnold, 2017). Waste production and water quality are impacted by feed management (Boyd & Tucker, 2017). Disease susceptibility is decreased by effective feed management (Mohanty et al., 2020).
In the cultivation of *Penaeus vannamei*, feed management is essential because it accounts for 50–60% of total production costs, provides optimal growth and survival rates, influences water quality and waste production, reduces disease susceptibility, and minimizes environmental impact through efficient feed use.
Feed management challenges include the availability and cost of feed, nutrient deficiencies, disease outbreaks, managing water quality, and the effects of climate change. Future research priorities include creating sustainable and affordable feeds, looking into alternate feed sources (such as plant- or insect-based), enhancing feed nutrition and formulation, combining feed management with disease prevention, and creating precision feeding systems.
According to Anderson *et al.* (1987), pond-raised shrimp (*P. vannamei*; stocking density 20/m2) derived 53–77% of their growth carbon from natural pond biota, while an exogenously supplied pelleted shrimp diet provided 23–47%.
Shrimp (*P. vannamei*, stocking density 50/m2, initial body weight 1g) raised in indoor aquariums with unfiltered shrimp pond water or in outdoor experimental zero-water-exchange culture systems fed a 35% crude protein shrimp pellet with or without a complete vitamin/trace mineral premix did not differ in growth or survival rates, according to Tacon (1999), Tacon et al. (2000, 2001b).
Shrimp (*P. vannamei*; stocking density 39 to 78/m2) raised in plastic-lined ponds with a sandy soil substrate and no water exchange and fed either a 20% or 40% crude protein shrimp pellet showed no difference in growth rates, according to Hopkins, Sandifer, and Browdy (1995).

Study Area:

Materials and methods:

Using both primary and secondary data, the descriptive method was the working method employed in this study. P-C2, P-C4, P-C5, P-C6, P-C7, P-C8, P-C9, P-C10, P-C13 were the nine ponds that were seen. observation period until the harvest of shrimp.

parameter calculation

$$ABW = \frac{\text{Weight Sampling}}{\text{Total Sampling}}$$

The study's parameters were SR (survival rate), FCR (feed conversion rate), and ABW (average body weight). The following formula showed the average body weight.

$$SR\% = \frac{Nt}{N0} \times 100$$

SR - Survival rate (%)
Nt - Final number of fish (fishes)
N0 - Initial number of fish (fishes)
FCR was calculated by using the formula

$$FCR = \frac{F}{(Wt + Wd) - Wo}$$

FCR = Feed Conversion Ratio
F = Amount of feed given (g)
Wo = Initial weight (g)
Wt = Final weight (g)
Wd = Weight of death fish (g)

Calculations:

1. Stocking Density (Pcs/Sq.mt.) = Total Seed Stocked (Lakhs) / Pond Area (WSA in Acres) x 10000
2. Survival (%) = (Total Harvest (Kgs) / Total Seed Stocked (Lakhs)) x 100
3. Feed Conversion Ratio (FCR) = Total Feed Used (Kg) / Total Harvest (Kgs)
4. Average Daily Growth (ADG) = (Harvesting Size (gms) / Days of Culture)

The water parameter quality measured in this study were Temperature (˚C), pH, DO (ppm) and Salinity (ppt). The water quality parameters in the culture pond were monitored regularly. The parameters measured included temperature (thermometer), pH (pH meter), dissolved oxygen (DO meter), and salinity (refractometer), to ensure optimal conditions for aquatic life.

Results and discussion:

Pond-wise Performance shown in Table 1 and average values of water quality parameters shown in table 2.

C2 (2 acres, 71 days): 215,000 seeds stocked at 25 pcs/sq.mt density yielded 3,830 kg harvest at 18.87g size, with 53 harvest count, 94.41% survival, and 1.09 FCR.

C4 (2 acres, 63 days): 220,000 seeds stocked at 27 pcs/sq.mt density yielded 2,536.3 kg harvest at 13.51g size, with 74 harvest count, 85.31% survival, and 1.09 FCR.

C5 (2.03 acres, 54 days): 250,000 seeds stocked at 31 pcs/sq.mt density yielded 2,524.5 kg harvest at 12.5g size, with 80 harvest count, 80.78% survival, and 0.86 FCR.

C6 (1.94 acres, 56 days): 180,000 seeds stocked at 23 pcs/sq.mt density yielded 2,269.3 kg harvest at 16.13g size, with 62 harvest count, 78.16% survival, and 0.86 FCR.

C7 (1.91 acres, 51 days): 180,000 seeds stocked at 23 pcs/sq.mt density yielded 2,004.5 kg harvest at 14.29g size, with 70 harvest count, 77.95% survival, and 0.91 FCR.

C8 (1.88 acres, 55 days): 200,000 seeds stocked at 25 pcs/sq.mt density yielded 2,882.6 kg harvest at 18.18g size, with 55 harvest count, 79.27% survival, and 0.82 FCR.

C9 (0.5 acres, 62 days): 50,000 seeds stocked at 25 pcs/sq.mt density yielded 734.8 kg harvest at 15.15g size, with 66 harvest count, 96.99% survival, and 1.34 FCR.

C10 (1.3 acres, 63 days): 120,000 seeds stocked at 23 pcs/sq.mt density yielded 2,067.5 kg harvest at 23.81g size, with 42 harvest count, 72.36% survival, and 1.09 FCR.

C13 (2 acres, 61 days): 230,000 seeds stocked at 28 pcs/sq.mt density yielded 4,086.4 kg harvest at 16.39g size, with 61 harvest count, 108.38% survival, and 0.88 FCR.

key Performance Indicators- Average harvest size: 15.55g, Average harvest count: 62, Average survival rate: 85.59%, Average FCR: 0.97, Average ADG: 0.27g/day

Ponds with higher survival rates (>90%) include C2 (94.41%), C9 (96.99%), and C13 (108.38%). Concerning FCR (<1), C5 (0.86), C6 (0.86), and C8 pond (0.82) . Other noteworthy results include the largest harvest size (C10, 23.81g), the highest ADG (C10, 0.38g/day), and the highest harvest (C13, 4086.4 kg).

During the study period nine culture ponds, C2, C4, C5, C6, C7, C8, C9, C10, and C13, demonstrated impressive performance during the recent harvesting cycle. Pond C2, spanning 2 acres, yielded 3830 kg harvest with 18.87g size, 53 harvest count, and 94.41% survival rate.

Pond C4, also 2 acres, produced 2536.3 kg harvest with 13.51g size, 74 harvest count, and 85.31% survival rate. Notably, Pond C9, with just 0.5 acres, achieved an exceptional 96.99% survival rate.

Pond C13, at 2 acres, recorded the highest harvest of 4086.4 kg with 16.39g size and 108.38% survival rate. In terms of Feed Conversion Ratio (FCR), Ponds C5, C6, and C8 performed well with 0.86, 0.86, and 0.82 FCR, respectively. Comparing Average Daily Growth (ADG), Pond C10 excelled with 0.38g/day. Survival rate champions: C2 (94.41%), C9 (96.99%), and C13 (108.38%). FCR winners: C5 (0.86), C6 (0.86), and C8 (0.82).

Table 1: Shrimp culture results in the study area

S.no		P-C2	P-C4	P-C5	P-C6	P-C7	P-C8	P-C9	P-C10	P-C13
1	Pond Area (W.S.A. in Acres)	2	2	2.03	1.94	1.91	1.88	0.5	1.3	2
2	Days of Culture	71	63	54	56	51	55	62	63	61
3	Total seed stocked (Lakhs)	215000	220000	250000	180000	180000	200000	50000	120000	230000
4	Stocking Density (Pcs/Sq.mt.)	25	27	31	23	23	25	25	23	28
5	Total Harvest (Kgs)	3830	2536.3	2524.5	2269.3	2004.5	2882.6	734.8	2067.5	4086.4
6	Total seed Harvested	202990	187686.2	201960	140696.6	140315	158543	48496.8	86835	249270.4
7	Harvesting Size (in gms.)	18.87	13.51	12.5	16.13	14.29	18.18	15.15	23.81	16.39
8	Harvest count	53	74	80	62	70	55	66	42	61
9	Survival (%)	94.41	85.31	80.78	78.16	77.95	79.27	96.99	72.36	108.38
10	Total Feed Used (in Kg)	4167	2771	2168.5	1960	1820	2358.5	988	2251.5	3600
11	Feed Convertion Ratio (FCR)	1.09	1.09	0.86	0.86	0.91	0.82	1.34	1.09	0.88
12	Average Daily Growth (ADG)	0.27	0.21	0.23	0.29	0.28	0.33	0.24	0.38	0.27

Table: 2 Average values of water quality parameters during culture

No	Parameter	Average
1	Temperature (˚C)	28^0C
2	pH	8.2
3	DO (ppm)	>6
4	Salinity (ppt)	8 PPM

Conclusion

Culture ponds performed exceptionally well, demonstrating effective management techniques and ideal growing circumstances. Impressive results from nine ponds are shown in the culture pond performance report, indicating effective management techniques and ideal growing conditions. The survival rates in Ponds C2 (94.41%), C9 (96.99%), and C13 (108.08%) are exceptionally high. Ponds C5, C6, and C8 have exceptional feed conversion ratios (FCRs) of 0.86, 0.86, and 0.82, respectively. Ponds C13 (4086.4 kg), C8 (2882.6 kg), and C2 (3830 kg) had notable harvests. Ponds C10 and C8 have impressive Average Daily Growth (ADG) rates of 0.38 and 0.33 grams per day, respectively. These findings demonstrate the value of culture management techniques and point to areas that could use more development. Our aquaculture operations can become more productive and sustainable if we keep improving feeding procedures, stocking densities, and water quality control. This report offers insightful information for future expansion and improvement, guaranteeing that our aquaculture initiatives continue to be efficient, competitive, and ecologically conscious.

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