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The economics of mudcrab monoculture

Aquaculture Department, Southeast Asian Fisheries Development Center

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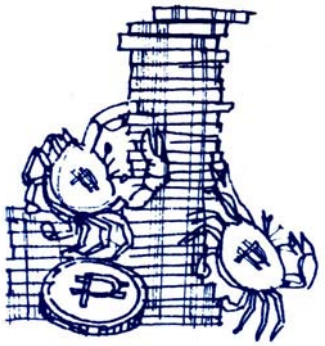


The economics of mudcrab monoculture

Mudcrab monoculture is a viable venture in the Philippines.

This was revealed by a study made by SEAFDEC Aquaculture Department researchers Renato Agbayani, Dan Baliao (now resigned), Giselle Samonte, Reuel Tumaliuan, and Romeo Caturao on the economic feasibility of monoculture of mudcrab (*Scylla serrata*).

The researchers noted the capital investment and annual depreciation of a 1-ha crab monoculture farm as ₱23 833 and ₱8 017, respectively. This is detailed in Table 1.

This farm outlay was projected based on the experimental pond yields at the Leganes Brackishwater Station of SEAFDEC/AQD (now closed) in Leganes, Iloilo. The experimental 0.12-ha pond was subdivided into 12 100-m^2 compartments, using bamboo screens as dividers. The bamboo screens, installed in an upright position, were 3-m high and woven with monofilament at 1-cm intervals between slats. The bamboo was driven 70-cm deep into the pond bottom. A 40-cm wide bamboo overhang was installed perpendicular to the wall to pre-

Table 1. Capital investment and annual depreciation for a 1 -ha crab monoculture farm

Capital outlay	Quantity	Unit cost (₱)	Total cost (₱)	Economic life (yr)	Annual depreciation (₱)
Pond development			10 000	5	2000
Perimeter fencing					
Bamboo poles (no.)	150	20	3000	2	1500
Banata fabrication (no.)	110	18	1980	2	990
Nylon monofilament (kg)	17	95	1615	2	808
Nails (kg)	4	15	60	2	30
Plastic sheet (rolls)	5	160	800	2	400
Construction of mounds (units)	100	40	4000	2	2000
Caretaker's hut[1]			1000	5	200
Tools and equipment[1]					
Digging blade	2	150	60	5	12
Bolo	2	60	24	5	5
Spade	1	185	37	5	7
Scoop net	2	50	20	2	10
Traps, bamboo	8	20	32	2	16
Basins, 201	2	95	38	3	13
Pails, 101	3	35	21	3	7
601	2	145	58	3	19
Total			**23 833**		**8017**

[1]Allocated per 5 ha.

Table 2. Stocking density, survival, and production data for mudcrab monocultured in 100-m² ponds

Stocking density (100/m²)	Working capital (₱/run)	Harvest/100m² No. recovered	Harvest/100m² Ave. wt. (g)	% survival	Relative growth increment (g/day/crab)	*Feed conversion	Gross production (kg/ha/crop)
50	19 480	44	231.60	88	2.28	1.72	1019.04
100	24 262	52	196.63	52	1.89	2.16	1022.48
150	34 440	57	171.11	38	1.61	3.85	975.33
200	40 608	62	178.11	31	1.69	4.04	1104.28

*Feed was trashfish, mainly chopped tilapia at 10%, 8%, and 6% of body weight per day, adjusted after 0, 30, and 60 days, respectively.

vent the escape of crabs, especially the berried females which try to migrate into the sea to hatch their eggs. A 5-cm² earthen mound was built in the middle of each compartment for the crabs to stay on during low oxygen tension. The mounds were made high enough such that their peaks remained above water even when the desired maximum depth of 50 cm had been reached. Pond preparation followed the *lablab* method.

Production data from these ponds which were stocked with 25.3 g mudcrab juveniles and reared for 90 days are given on Table 2.

Again, projecting these figures to a 1-ha farm (Table 3), the costs and returns given four stocking densities (5000, 10 000, 15 000, 20 000) show profit for the two lowest stocking densities.

Their comparative cost indicators of production are given in Table 4.

The researchers also noted that the lowest stocking density (5000/ha) produced the highest average weight (231 g), registered the highest survival rate (88%), and had the lowest feed conversion ratio (1.72).

A ₱23 833 capital outlay is constant regardless of stocking density. However, net income/ha/yr was highest (₱53 626) at lowest stocking density. Return on investment (124%) and return on equity (248%) were also highest in this density; average cost of production (46%) is also lowest.

Further economic analyses using partial budgetting and sensitivity analysis showed that (1) increasing stocking density to the next level tested or 10 000/ha resulted in a P4 611 decrease in net benefit, indicating further that 5000 crabs/ha is the most viable; and (2) if wholesale price were to drop 28% orto 16% for 5000 and 10 000/ha, respectively, return on investment will drop 60%. This shows that at 5000/ha, 28% drop in wholesale price is still attractive.

Table 3. Costs and returns for a 1-ha crab monoculture at various stocking densities

Stocking density (crab/ha):	5000			10 000			15 000			20 000		
Item	Quantity (kg)	Unit cost (₱)	Total value (₱)	Quantity (kg)	Unit cost	Total value (₱)	Quantity (kg)	Unit cost (₱)	Total value (₱)	Quantity (kg)	Unit cost (₱)	Total value (₱)
Revenue (per kg)	1019	50.00	50 952	1022	50.00	51 124	975	50.00	48 766	1104	50.00	55 214
Variable costs												
Chicken manure (kg)	1000	0.60	600	1000	0.60	600	1000	0.60	600	1000	0.60	600
Crab juveniles (no.)	5000	0.50	2500	10 000	0.50	5000	15 000	0.50	7500	20 000	0.50	10 000
Trash fish (kg)	1753	5.00	8764	2209	5.00	11043	3755	5.00	18 775	4461	5.00	22 306
Labor (man h)	1000	5.00	5000	1000	5.00	5800	1000	5.00	5000	1000	5.00	5000
Marketing expenses (2%)			1019			1022			975			1104
Sub-total			17883			22 665			32850			39011
Fixed costs												
Repairs and maintenance			397			397			397			397
Interest			1299			1443			1748			1933
Depreciation			2672			2672			2672			2672
Caretaker's salary			1200			1200			1200			1200
Sub-total			5569			5712			6018			6203
Total costs			23 452			28 378			38 868			45 213
Net income before tax (per run)			27 500			22 746			9898			10 001
Net income before tax (3 runs/yr)			82 501			68 239			29 694			30 002
Tax (35%)			28 875			23 884			10393			10501
Net income after tax (3 runs/yr)			53 626			44 355			19 301			19 501
Return on investment (%)			124			92			33			30
Return on equity (%)			248			184			66			61
Payback period (yr)			0.70			0.92			3.02			3.30

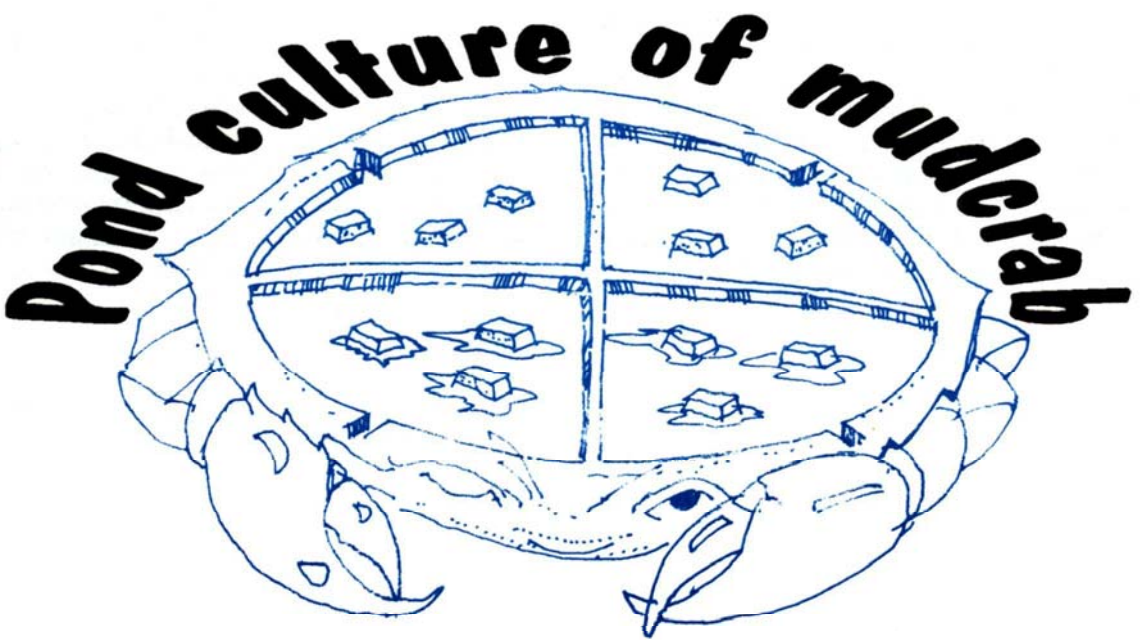
Table 4. Comparative cost indicators of production for a 1-ha crab monoculture (1 run)

Average cost (₱/kg)	Stocking density (crab/ha)			
	5000	10 000	15 000	20 000
Feed	8.60	10.80	19.25	20.20
Juvenile	2.45	4.89	7.69	9.06
Labor	4.91	4.89	5.13	4.53
Marketing	1.00	1.00	1.00	1.00
Debt	1.28	1.41	1.79	1.75
Variable cost	17.55	22.17	33.68	35.33
Total	**23.01**	**27.75**	**39.85**	**40.94**

The researchers concluded that 5000-10 000 crabs/ha stocking densities are most profitable. They urged traditional milkfish growers to allocate a portion of their ponds for mudcrab culture to take advantage of the higher returns on investment and to diversify their crops.

Source: RF Agbayani, DD Baliao, GPB Samonte, RE Tumaliuan, RD Caturao. 1990. *Economic feasibility analysis of the monoculture of mud crab (Scylla serrata) Forsskal.* **Aquaculture** 91:223-231.

Pond culture of mudcrab



The crab *Scylla serrata* Forsskal, locally known as *alimango,* is one of the highly esteemed and most expensive edible crab in the Philippines. The female, when the gonads are well developed, commands nearly double the price of males.

The crab pond

Pond is preferably located in estuarine areas where tidal difference is great to facilitate water change. Salinity should be within 15-30 ppt. Sandy bottoms are preferred.

The size of the pond is usually small, about 350-500 m^2. One good layout is to divide a square pond into four smaller compartments with a 1.5 m^2 water inlet tank in the center. When water enters, the crabs congregate in the tank and can be caught there.

Pond walls made of mud blocks are fenced with bamboo mattings 1.5-2 m high. These are staked vertically 1 m from the inside edge of the dike's crown and 30 cm or more into the soil to prevent the crabs from escaping either by climbing over the bamboo matting or by burrowing through the dikes during low tide.