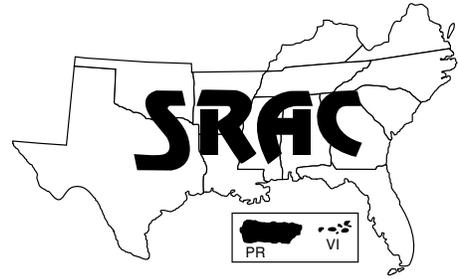


Southern Regional Aquaculture Center



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Costs of Small-Scale Catfish Production

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Catfish farming is a major aquaculture enterprise in the United States, and many people are interested in starting a catfish business. Experts suggest that commercial farms selling to processors have a minimum farm size of 100 water acres (e.g., ten 10-acre ponds), which requires an investment of more than \$500,000. Clearly, this is more money than many people can invest. Farmers with row crop operations (i.e., soybeans, grain sorghum) may enter catfish production gradually by building 20 to 30 production acres at a time. Thus, they start small and gradually work toward a large operation that sells fish to processors. Large farms can take advantage of economies of scale that result in lower per-unit production costs and higher per-unit profit margins than are usually found in small operations.

However, some catfish farmers are content with small, but profitable, operations. We define small-scale catfish production as farms less than 20 water acres in size. Small production systems must target markets other than processing plants. They may sell some fish to processors when prices are high, but in general a small operation must sell fish directly to consumers in order to make a profit.

To be profitable on a small scale requires careful planning and analysis. What land, equipment, capital, labor and skills can be applied to the enterprise? The risks involved in starting a small business should be understood. If one later decides to stop production, how easy will it be to get out of the business? Ponds and holding vats are permanent structures and are not easily converted to cash. Fish farming equipment is specialized and may be hard to sell. Careful planning and attention to all aspects of the business will help ensure success.

Each farm situation is different so the budget shown here gives only a general idea of costs and returns. Individuals must evaluate their own resources and abilities to determine how profitable a business could be. Prospective farmers must decide whether the potential income is satisfactory and whether they are willing to spend the time and effort required for raising and marketing fish.

The sample budget shows costs typical of the Delta region. Costs may be different in other regions. The budget contains only production costs, not marketing costs. Marketing costs for small operations are hard to estimate because so much depends on the particular situation, resources, and personality of the farmer. For example, the locations of catfish processing plants are known, but it is impossible to know of every local

street corner or farmers' market where live catfish might be sold. Local knowledge is essential for the success of a small-scale operation. A business based on local sales of fresh fish can be a profitable venture. Fish also might be sold to a small processing facility if one is nearby, or fish might be used in a fee-fishing operation.

Direct marketing requires interaction with customers and it takes a person who enjoys dealing with the public to be successful at it. Profits are made by selling fish, not by raising them, and marketing is critical to the financial success of a small business.

Production facilities

Catfish can be raised in levee or watershed ponds or in cages in a pond that would be unsuitable for commercial production (e.g., ponds with stumps or no drains). Most catfish are raised in ponds and cost estimates in this publication are based on producing catfish in small levee ponds.

Producing fish for direct sales generally requires small (less than 5 acres) ponds because there must be a regular supply of market-sized fish. Frequent harvests from the same pond are not advisable because harvesting stresses fish and can put them off feed for several days. With several small ponds a producer can rotate harvesting among them. Having a number of ponds also reduces the chance that all the fish

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will have off-flavor problems at a given time.

Costs estimates for a small facility

Production cost estimates were calculated for six 2-acre ponds. This sample plan (Fig. 1) is only one example of a small-scale facility. Remember that land and pond construction costs vary widely, but because they are major expenses, sample costs are included here. It is assumed that certain equipment, tools and farm structures (e.g., storage for equipment, feed and fuel) will be available.

Site selection and pond construction

This budget also assumes that an adequate supply of suitable quality water can be obtained from a shallow well. The six 2-acre ponds are built in a block with each pond having a water surface of 165 feet by 528 feet. The central levee is 16 feet wide and all other levees are 12 feet wide. Internal slopes are 4:1 (4 horizontal feet to each vertical foot) and external levees have 3:1 slopes. Freeboard (height of levee above the waterline) is 1 foot; 10 percent is added to total yardage to allow for compaction over time. Tractor-drawn pans should be used in construction rather than bulldozers, and proper construction procedures are critical. Poorly built ponds are impossible to repair well and usually very difficult to manage.

Feed storage

A 22-ton feed bin will be used for bulk storage in the summer. Maximum daily feed usage is estimated to be 100 pounds per acre (1,200 pounds), which would empty a bin of 18 tons of feed in 30 days. In some locations only bagged feed is available, at a 10 to 20 percent premium over bulk feed prices.

Water supply

A 4-inch submersible well capable of yielding 250 gallons per minute is used to fill ponds and maintain water levels. This rate would fill one 2-acre pond in 7 to 8 days. If a marketing building is constructed the well could also provide water to the holding vats (although in this budget the total cost of the well is charged to fish production).

Equipment

An all-terrain vehicle is used for feeding and checking ponds (100 percent charged to the fish operation) a total of 2 hours per day in summer (364 hours) and 30 minutes per day in winter (91 hours). A trailer is used to transport feed to the ponds for hand feeding. A tractor for cutting grass and emergency aeration is budgeted at 25 percent of time (200 hours per year). This means that the farm should have other enterprises to pay the other 75 percent of ownership costs for the tractor. A 250-foot seine with a mesh size of 1 7/8 inch and a live car with 2-inch mesh is included for harvesting.

Production practices

Fish will be raised in multiple-batch production, and this budget reflects annual costs after the first year. The first year is distinct because it takes about 18 months to raise fish to the size needed for the live market. In the first year a producer may want to purchase food fish or stockers (large fingerlings at least 8 inches long) so that sales can begin sooner.

After the first year, ponds will be stocked each spring with 3,750 fingerlings per acre. They should weigh 1/3 pound each by fall and grow to market size the next year. The expected marketable yield, after the first year, is 4,500 pounds of 1.75-pound fish.

Survival is estimated to be 70 percent. The feed conversion ratio (FCR) is estimated at 2.2:1 (2.2 pounds of feed will produce 1 pound of fish) using a 32 percent floating catfish pellet. A FCR of 1.3 to 1.5 was obtained during experimental trials. However, fish probably will be held for a time waiting for market and will need to be fed periodically during the winter so a conservative FCR is used.

A permanent, 3-hp, electric, paddle-wheel aerator in each pond (1.5 hp per acre) is placed on a timer and run nightly during the summer. One spare electric aerator is included. A tractor-powered aerator provides emergency aeration. Labor is charged at \$6 per hour and is based on 3 hours daily for 6 months (546 hours) and 30 minutes daily for the remainder of the year (91 hours). The farmer may provide all or most of this labor, but full labor costs are included in the budget to accurately reflect production costs.

Production costs

Long-term investments include land, ponds and water supply (Table 1). Pond construction costs are estimated at \$19,560, water supply at \$15,000, and land costs at \$15,000 for a total investment cost of \$49,560 (\$4,130 per water acre). Equipment costs total \$44,938, or \$3,745 per acre (Table 2). Operating costs (feed, fingerlings, etc.) are \$37,330 for the farm or \$3,111 per acre (Table 3). Operating costs add up to \$0.69 per pound of fish raised (Table 4). Fixed costs (including interest on the

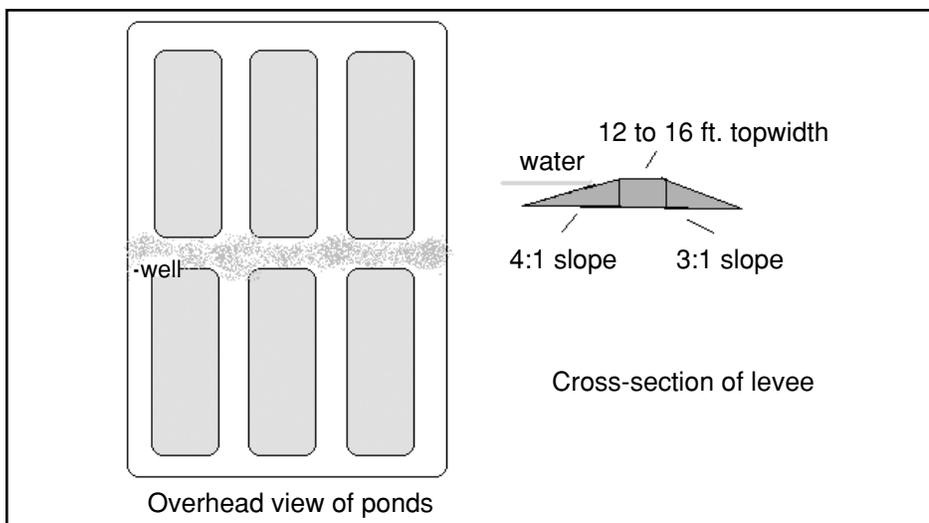


Figure 1. Design of a unit with six 2-acre ponds.

investment, depreciation and taxes) total \$15,391 annually for the six 2-acre ponds. The total of fixed costs and operating costs is estimated to be \$52,721 per year, or \$0.98 per pound of fish produced. Prospective catfish farmers should develop business proposals using their own costs.

The price paid by processors has averaged \$0.72 per pound, while prices received for live fish can range from \$1.00 to 1.20 per pound. The sample budget shows why

selling to a processor is not an option for small-scale operations. They must be designed and operated to supply live fish markets and capture the higher prices possible in live markets.

Sources of information

There are many other SRAC publications that can be helpful in planning and operating a small-scale catfish business. SRAC publications can be found at <http://srac.tamu.edu>.

Durborow, R. M. 2000. Catfish Farming in Kentucky. Kentucky State University Aquaculture Program.

Engle, C. R. and G. N. Whitis. 2000. Costs and Returns of Catfish Production in Watershed Ponds. FSA9084, Arkansas Cooperative Extension Program.

Table 1. Long-term investment cost for six 2-acre catfish ponds.

Item	Units	Unit cost (\$)	Amount	Cost (\$)	Useful life (yr.)	Annual depreciation (\$)
Land	acres	1,000	15	15,000	n.a. ^a	n.a.
Pond construction ^b	acres	1,630	12	19,560	10	1,956
Water supply ^c (250 gpm)	total	15,000	1	15,000	10	1,500
Total long-term investment cost and annual depreciation				49,560		3,456

^a not applicable. Land is not depreciable, does not lose value over time, and is not a depreciable asset.

^b Includes earthmoving, gravel, grass cover on levees, and drainpipes.

^c Includes the well, pipe, fittings and fill.

Table 2. Equipment cost for six 2-acres ponds, estimated useful life of equipment, and annual depreciation.

Quantity	Item	Initial cost	Useful life (yr.)	Annual depreciation
1	4-wheel drive, all-terrain vehicle (660 cc.)	\$7,000	7	\$1,000
7	Electric paddlewheel aerators, 3-hp (3-phase)	\$16,800	5	\$3,360
7	Connections to electrical service	\$1,500	10	\$150
6	Timers for aerators	\$390	3	\$130
1	Oxygen meter	\$900	7	\$129
1	Water test kit	\$240	5	\$48
1	Rotary cutter (6-foot)	\$1,000	10	\$100
1	Tractor, 57-hp (25% time, \$22,500)	\$5,625	10	\$562
1	PTO paddlewheel	\$2,625	10	\$285
1	Other (waderns, dipnets, etc.)	\$500	2	\$250
1	Feed bin	\$6,000	10	\$600
1	Catfish seine: 1 7/8-inch mesh, polyethylene, 250 feet long, 9 feet deep, mudline, 3 foot x 5 foot tunnel with frame	\$1,522.50	5	\$304.50
1	Live car, 10 feet x 30 feet, 2-inch mesh (half length of typical live car)	\$490.00	5	\$98.00
8	Seine stakes @ \$15.00	\$120.00	10	\$12.00
Total equipment investment and annual depreciation		\$44,937.50		\$7,028.50

Table 3. Annual production costs for six 2-acre catfish ponds.					
Item	Unit	Quantity	Unit price	Cost	Your cost
Operating costs					
Fingerlings ^a	Fish	45,000	0.09	4,050	
Feed ^b	Ton	59.4	275	16,335	
Labor	Hour	1,035	6.00	6,210	
ATV					
Fuel/oil/lube	Hour	455	0.90	410	
Maintenance/repair	Year	1	150	150	
Tractor					
Fuel/oil/lube	Hour	200	2.41	482	
Maintenance/repair	Hour	200	1.76	352	
Electricity (aerators)	Hour	8,400	0.24	2,016	
Levee repair and maintenance	Year	1	2,200	2,200	
Well operation	Acre-foot	36	20	720	
Disease control/depredation	Acre	12	80	960	
Telephone	Total	1	100	100	
Supplies	Total	1	350	350	
Insurance	Total	1	150	150	
Interest (9 months)	Dollars	25,864	0.11	2,845	
Total operating costs				37,330	
^a Stocking rate is 3,750/acre.					
^b Feed conversion ration is 2.2:1.					

Table 4. Annual ownership costs for six 2-acre catfish ponds.			
Item	Unit	Quantity	Cost
Ownership costs			
Interest on investment			
Equipment (7-year loan; 10% APR)			1,972
Land, ponds and well (20-year loan; 10% APR)			2,814
Annual depreciation on ponds, water supply		8,002	3,456
Annual depreciation on equipment			7,028.50
Taxes	Acre	10	120
Total ownership costs			15,390.50
Total cost			52,720.50
Breakeven price ^a			
Above operating cost	Per pound		0.69
Above total cost	Per pound		0.98
^a Does not include the principal portion of the annual payment.			

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