Cooperative Extension Program

Costs of Small-Scale Catfish Production

University of Arkansas at Pine Bluff, United States Department of Agriculture, and County Governments Cooperating

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Making money from raising and selling catfish on a small scale requires careful planning and analysis. What land, equipment, capital, labor and skills can be applied to the enterprise? As each farm situation is different, budgets will only provide a general idea of potential costs and returns. Individuals must evaluate their own resources and abilities to determine how profitable the business could be. Potential farmers must decide if the potential income is satisfactory and if they are willing to spend the time and effort required to market the fish.

The risks involved in starting a small business should be fully understood. If one later decides to quit small-scale production and marketing, 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 a successful outcome.

This fact sheet provides estimates of production costs for catfish farming on a small scale with the intent of marketing fish directly to consumers. Harvesting and marketing costs are not included in this budget (see fact sheet on Small-Scale Catfish Production: Marketing Costs). While harvesting and hauling for commercial catfish farms typically costs $0.05/lb, it should be clear that costs associated with harvesting and marketing on a small scale will be higher.

Production Facilities

Production ponds on commercial fish farms are 10 to 20 acres in size. While smaller ponds are easier to manage, most commercial farmers build large ponds because the costs of construction per acre are considerably lower. Producing fish for direct sales generally requires small, more expensive ponds (less than 5 acres in size) because direct sales require a regular supply of market-sized fish.

Frequent harvests in the same pond are not advisable because harvesting fish from a pond stresses fish and puts them off feed for several days. Having a number of ponds allows a producer to rotate harvesting among them. Off-flavor is also a very common problem in catfish ponds. A greater number of ponds increases chances of finding on-flavor fish when needed.

Cost Estimates for a Small Pond Facility

Estimates of costs of production were calculated for a small-scale catfish production unit consisting of six 2-acre ponds. This sample plan (Figure 1) is only an example of a facility for small-scale production. Each situation will be different, and budgets for small-scale catfish production typically have not included pond costs for this reason. It is important to realize, however, that pond construction is a major expense, and for this reason, sample costs are included in this fact sheet.

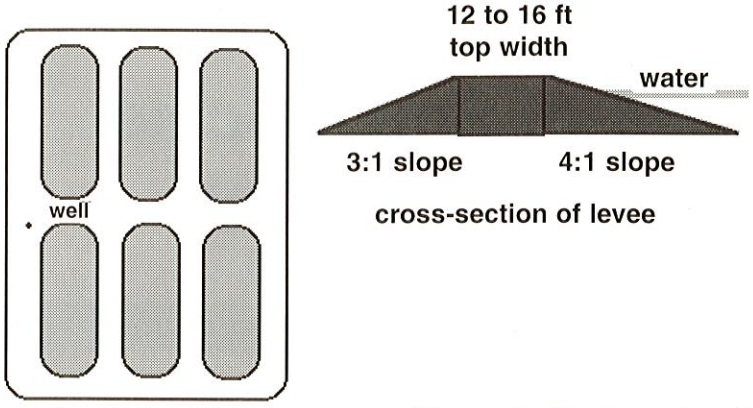

Figure 1. Design of a six 2-acre pond unit.

It is assumed that certain farm structures, equipment and tools will be available. For example, it is assumed that there will be a storage site for equipment and bagged feed (during winter), fuel storage and shelter for the ATV (All Terrain Vehicle: four-wheeled motorcycle) at no cost.

Site Selection

This budget assumes that land will be available that is suitable for pond construction and that an adequate quantity of suitable quality water can be obtained from a shallow well (see Extension fact sheet FSA 9011 for details on site selection).

Pond Construction

The six 2-acre ponds are built in a block, with each pond having a water surface area of 165 feet by 528 feet (Figure 1). The central levee is 16 feet wide and all other levees are 12 feet in width. 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, and 10 percent is added to total yardage to allow for compaction over time. Tractor-drawn pans should be used in construction in preference to bulldozers, and proper construction procedures are critical (see fact sheet FSA 9012 for details). Poorly-built ponds are impossible to repair adequately and can cause major problems in pond management.

Feed Storage

A 22-ton feed bin will be used for bulk storage in the summer months. Maximum daily feed usage is estimated to be 100 lb/acre (1,200 lb) which would empty a bin of 18 tons of feed in 30 days.

Water Supply

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

Equipment

An ATV is used for feeding and checking ponds (100 percent charged to the fish operation) a total of 2 hours per day during the summer (364 hours) and 30 minutes per day during the winter (91 hours). Limited use of 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 that will help pay the other 75 percent of ownership costs for the tractor.

Production Practices

Fish will be raised in multiple-batch production, and these budgets reflect annual costs after the first year. The first year is distinct because, while catfish sold to processors generally average 1 to 1.25 lb in size, a larger fish (1.75 lb average) is generally desired for the live market, requiring some 18 months to raise 1.75 lb fish from fingerlings. In the first year, a new producer may want to purchase stockers or food fish as well as fingerlings [e.g., stock 3,000/acre of stockers (large fingerlings at least 8 inches in length) and 3,750/acre of fingerlings}. Stocking some larger fish will allow a producer to start sales earlier.

After the first year, ponds will be stocked each year with catfish fingerlings at 3,750/acre. Expected

marketable yield is 4,500 lb/acre/year of 1.75 lb fish. At the same time, the 3,750 fingerlings/acre stocked in the spring are expected to reach 1/3 lb each by fall. These fish will grow to market size during the next year.

Survival is estimated to be 70 percent, and the feed conversion ratio (FCR) is estimated to be 2.2:1 (2.2 lb of feed will produce 1 lb of fish). A permanent 3-HP electric aerator in each pond (1.5 HP/acre) is placed on a timer and run nightly during the summer months. One spare electric aerator is included. Emergency aeration is provided by a tractor-powered aerator. Labor is charged at $6/hour and is based on 3 hours daily for 6 months (546 hours) and 30 minutes per day 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 this budget to accurately reflect production costs.

Production Costs

Long-term investments include land, ponds, water supply and a feed bin (Table 1). Pond construction costs are estimated at $43,755, and the water supply at $12,333, for an average cost of $4,674/acre of pond. Equipment costs total $27,410, or $2,284/acre (Table 2). Operating costs (feed, fingerlings, etc.) for these ponds are $34,745 (Table 3). Per pound, operating costs alone are $0.64/lb. On an annual basis, fixed costs, including interest on the investment, depreciation (Table 4) and taxes, total $15,042 for the six 2-acre ponds (Table 5). Summing annual fixed costs and operating costs, total costs for operating the pond facility are estimated to be $49,787/year, or $0.92/lb of fish produced.

Larger fish of the desirable size for live sales are more expensive to produce than 1 1/4 lb (average weight) fish for the processor market. Thus the estimated cost/lb for producing fish in this 12-acre unit cannot be directly compared to costs in budgets for large-scale catfish farms. If this 12-acre unit was used for producing 1.25 lb fish, assuming a stocking rate of 6,000/acre, an FCR of 2:1, survival of 70 percent and an annual yield of 5,250 lb/acre, total costs would be $0.85/lb (operating costs of $0.61/lb). Again, this does not include harvesting and hauling charges. As the average price per pound paid by processors has averaged $0.70 over the past 10 years, it is clear why sales to processors is not an option for small-scale operations.

Table 1. Long-Term Investment Cost for Six 2-Acre Catfish Ponds.

Item	Units	Unit Cost	Amount	Cost	Your Cost
Land	acres	$1,000	15	15,000	
Pond Construction					
Earthmoving	cu. yd.	0.70	58,127	40,689	
Drainpipe (6")	ft.	2.49	360	896	
Clay gravel	cu. yd.	6.00	332	1,992	
Grass cover	acres	34.48	3	103	
Drain elbows	each	12.50	6	75	
Water Supply 250 gpm					
Well	each	10,000	1	10,000	
Pipe, fittings	total	1,373	1	1,373	
Initial fill	acre-ft	20	48	960	
Structures					
Feed bin (22 ton)	each	5,000	1	5,000	
TOTAL LONG-TERM COST				$76,088	

Table 2. Equipment Cost for Six 2-Acre Pond Production Unit.

Quantity	Item	Cost ($)
1	4-Wheel Drive All-Terrain Vehicle	3,500
1	Feeder (gasoline-powered blower, on trailer, 500 lb capacity)	3,810
7	Electric P-A-P[a] Aerators (3 HP) @ $1,220 connections to electrical service	8,540 1,200
6	Timers for Aerators	360
1	Oxygen Meter	750
1	Water Test Kit	200
1	Flail Mower (50% time of $2,500)	1,250
1	Tractor 50 HP (25% time of $18,000)	4,500
1	PTO Paddlewheel	2,800
1	Other (waders, dipnets, etc.)	500
	TOTAL	27,410

[a] P-A-P is a type of aerator known as a Propeller-Aspirator-Pump, which is an electric motor on floats that spins a propeller at the end of a hollow shaft. Air is drawn down the shaft and forms a cloud of bubbles in the water.

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	637	6.00	3,822	
ATV					
Fuel/Oil/Lube	hour	455	0.90	410	
Maint./Repair	year	1	150	150	
Tractor					
Fuel/Oil/Lube	hour	200	2.41	482	
Maint./Repair	hour	200	1.76	352	
Electricity (aerators)	hour	8,400	0.24	2,016	
Levee Repair & Maintenance	year	1	2,200	2,200	
Well Operation	acre-ft	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	24,073	0.11	2,648	
TOTAL OPERATING COSTS				34,745	

[a] Stocking rate is 3,750 fish/acre. [b] Feed conversion ratio is 2.2:1.

Table 4. Estimated Useful Life of Equipment (For Depreciation Purposes).

Quantity	Item	Initial Cost ($)	Useful Life (yr)	Annual Depreciation
1	4-Wheel Drive All-Terrain Vehicle	3,500	7	500
1	Feeder (gasoline-powered blower, on trailer, 500 lb capacity)	3,810	10	381
7	Electric P-A-P Aerators (3 HP) connections to electrical service	8,540 1,200	5 10	1,708 120
6	Timers for Aerators	360	3	120
1	Oxygen Meter	750	7	107
1	Water Test Kit	200	5	40
1	Flail Mower (50% time of $2,500)	1,250	10	125
1	Tractor 50 HP (25% time of $18,000)	4,500	10	450
1	PTO Paddlewheel	2,800	10	280
1	Other (waders, dipnets, etc.)	500	2	250
1	Feed Bin	5,000	10	500
6	Ponds	43,755	20	2,188
1	Well	12,333	10	1,233
TOTAL				8,002

Table 5. Annual Ownership Costs for Six 2-Acre Catfish Ponds.

Item	Unit	Quantity	Cost
Ownership Costs			
Interest on Investment			
Equipment			1,170
Ponds and Land			5,750
Annual Depreciation	8,002	1	8,002
Taxes	acre	10	120
TOTAL OWNERSHIP COSTS			15,042
TOTAL COST			49,787
Breakeven Price[a]			
Above Operating Cost	per pound		0.64
Above Total Cost	per pound		0.92

[a]Total marketable production is 54,000 lb/yr.

Sources of Information

Budgets were constructed based in part on existing budgets from the following:

Crews, J. R., and J. W. Jensen. 1991. Budget sensitivity analyses for Alabama catfish production. Alabama Cooperative Extension Service, Auburn University, Alabama.

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