



Cage Culture

Harvesting and Economics

Michael P. Masser
Kentucky State University

Being successful at raising fish in cages is not enough. Harvesting, keeping records, marketing, and looking at the economics of the venture are also essentials in successful cage culture. This is particularly true if the goal is to increase farm income.

Harvesting

Harvesting cages is simply a matter of removing the fish from the cage with a dip net. This is one of the major advantages of cages and usually the reason people picked cage culture in the first place.

Harvesting can begin whenever the fish reach market size. The market size depends on the species being raised and the market that has been identified. Time for fish to reach market size usually depends on the size of the fingerlings stocked and the overall conditions during the growing season. In the case of warmwater fish, harvest usually begins in September or October in the southeastern region. Trout and other coldwater species are usually harvested in March and April. Tilapia must be harvested before the water temperature drops much below 60° F in the fall. Trout must be harvested before the water temperature rises above 70° F in the spring. Most other warmwater species can be left in cages during the winter months and harvested at any time. This may help in planning markets.

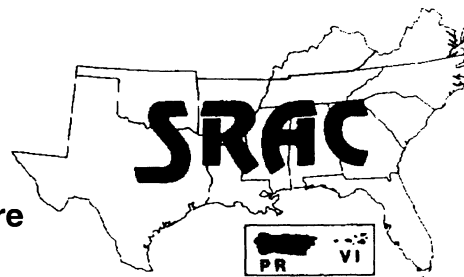
Fish do not all grow at the same rate. Some fish that reach harvest size early may be removed. However, it should be cautioned that reducing the stocking density by partial harvest, before the water temperature drops to around 60° F, may induce stress and increase fighting among the remaining fish due to the lower density. Fighting may also occur if fish in the cage get too large. Increased fighting may lead to injuries and related bacterial diseases.

Before harvesting it is important to sample the fish for possible off-flavor. Off-flavor is caused by more than one agent. Off-flavor is most common in the warmer months but can occur at any time of the year. If the fish taste muddy, musty, oily, or have any strange flavor, you should wait and harvest them at a later date. Off-flavor will go away given time (usually about two weeks) and good water quality. Your marketing efforts will be harmed if you sell off-flavor fish.

Stop feeding 2 days before harvest. This gives the fish time to empty their digestive systems and reduces holding and processing problems. At harvest, record the number of fish harvested and their weight (length records could also be useful). These records will be necessary to analyze the success of your venture.

Oklahoma Cooperative Extension Fact Sheets
are also available on our website at:
<http://osufacts.okstate.edu>

Southern
Regional
Aquaculture
Center



Marketing

Ideally, identify your market before you stock, but **always** plan your marketing before you harvest. Having no marketing plan will mean frustration and reduce your chances of a profitable venture. Most fish can be sold either live or dressed (processed). If you plan to process your fish you must be in compliance with state health laws. Contact your state Department of Health or the fisheries (or aquaculture) specialist with the Extension Service for information on processing regulations.

Several possible markets exist for your fish. Which markets are best for you may depend on the number or volume of fish you have to sell, your ability to transport the fish, your ability to process the fish, and your proximity to known markets. Possible markets include:

- live sales direct to consumers,
- direct sales to consumers of processed fish,
- live sales to fee-fishing lakes or live-haulers,
- sales to local processing plants,
- and sales to local restaurants or grocery stores.

Small producers, with only a few hundred fish to sell, will probably find their greatest profit in selling directly to the consumer. Direct sales of live or dressed fish reduce middleman costs and bring all the profit back to the fish farmer. Live sales at the pond bank or at local farmers' markets also eliminate the need to process the fish. Live sales markets may take a while to develop, but are exceptionally profitable markets.

Fee-fishing, fish-out, or pay lakes are good markets for live fish. Fish-out lakes usually buy fish to stock on a regular basis through the spring and summer and pay premium prices. However, harvesting of your fish in the fall is a problem, in that fish-out lakes may not want to stock close to the winter months. Also, it may be necessary to haul the fish to these

fish-out lakes. If you do not have the ability to haul your own fish you may want to contract with a live-hauler. The live-hauler may buy the fish directly from you or he may want a percentage of the sale price.

Finally, if your volume is great enough you may decide to start a processing operation or if you are close to existing processing plants you may wish to sell to them. This latter option is probably the least profitable but is also the most convenient and least time consuming.

Whenever marketing farm-raised fish stress quality and freshness. In the case of cage-raised fish emphasize that they have been completely away from the mud, that they were grain fed, and that they were grown in a pollution-free environment. Many producers believe that cage-raised fish are better tasting than those raised loose in ponds.

Recordkeeping

Any business must keep good records to be profitable and successful. Fish farming is no different. Good record keeping is essential to understanding the successes, failures and profitability of your fish farming venture. Records which should be kept include:

- cost of cage materials and other equipment,
- cost of fingerlings and their weight and length,
- cost of miscellaneous items (e.g., chemicals, etc.),
- cost of feed and total pounds purchased,
- stocking and harvesting dates,
- number and total weight of fish harvested,
- income from the sale of fish,
- and daily observations of the pond and fish.

Most of the above are self explanatory. The daily observations should include the amount of feed fed, weather conditions, pond conditions, fish appearance and fish behavior.

This information will be invaluable in understanding and predicting problems now and in the future.

Economics

The range of variability throughout the southeastern region in fingerling prices, feed prices, materials and equipment prices, length of growing season, and general weather conditions makes it very difficult to produce good regional budgets.

Fingerling prices for 6- to 8-inch channel catfish, for example, may range from \$0.10 to \$0.55. Feed costs may vary by \$100.00 per ton or more, depending on volume and location. Live weight price, again for channel catfish, varies from about \$0.70 per pound at large processing plants to \$1.50 or more per pound for direct consumer sales or delivered to fee-fishing lakes. Contact your local county Extension office or state fisheries (or aquaculture) specialist for budgets specific to your area.

Table 1 gives some estimates on fixed costs of cage materials and equipment. Cage and equipment costs are usually depreciated over 5 years or more.

Table 2 illustrates approximate production costs calculated on fingerling price and feed price, based on a feed conversion rate of 1.8 (it would take 1.8 pounds of feed to produce 1.0 pound of fish). As with most enterprises there are some economies of size. Cage materials, fingerling costs, and time involved per individual cage all diminish with increasing scale.

Any discussion on economics should probably include emphasizing the risks. Fish farming is a high risk type of agriculture. All agriculture has a degree of risk simply because it is at the whims of nature. This is particularly true of fish farming and cage culture.

Table 1. Fixed costs estimates of materials and equipment for cage culture.

<i>Item</i>	<i>Cost/cage</i>	<i>Cost/5 cages</i>
Cage materials ¹	75.00 ²	160.00
Dip nets	50.00	50.00
Scales ³	45.00	45.00
Miscellaneous ⁴	30.00	65.00
Total	\$200.00	\$320.00
Total/cage	\$200.00	\$64.00

¹ Calculated for a 4 x 4 foot cylindrical cage, purchasing the netting and hoops only.

² Calculated on buying an entire roll of netting (50 feet). Two rolls of netting will make 5 cages (second example).

³ Used for weighing fish and feed.

⁴ Includes chemicals, buckets, rope, etc. Cost for aerators is not included. Depending on pond size and stocking density, costs for aeration could range from \$300 to \$1,800.

Table 2. Production costs based on various fingerling and feed prices.¹

<i>Cost per fingerling</i>	<i>Feed costs (per 50-pound bag)</i>					
	<i>7.20</i>	<i>8.20</i>	<i>9.20</i>	<i>10.20</i>	<i>11.20</i>	<i>12.20</i>
0.10	0.36	0.40	0.43	0.47	0.50	0.54
0.15	0.41	0.45	0.48	0.52	0.55	0.59
0.20	0.46	0.50	0.53	0.57	0.60	0.64
0.25	0.51	0.55	0.58	0.62	0.65	0.69
0.30	0.56	0.60	0.63	0.67	0.70	0.74
0.35	0.61	0.65	0.68	0.72	0.75	0.79
0.40	0.66	0.70	0.73	0.77	0.80	0.84
0.50	0.76	0.80	0.83	0.87	0.90	0.94

¹ Calculated in cents/pound for producing a 1-pound fish with a feed conversion of 1.8.

Cage Culture

Record Keeping Sheet

Name _____
 Stocking Date _____

County _____
 Stocking Size _____

Week	S	M	T	Temperature				S	Feed Fed	Total Fish	Dead Weather Conditions
				W	T	F					

The Oklahoma Cooperative Extension Service ***Bringing the University to You!***

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.

- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

For more information about aquaculture in Oklahoma, see our OSU county Extension agent or contact Marley D. Beem, Extension Aquaculture Specialist, 303J Ag Hall, Stillwater, OK 74078-6013 (phone: 405-744-9636).

This publication was supported in part by a grant from the United States Department of Agriculture, Number 87-CRSR-2-3218, sponsored jointly by the Cooperative State Research Service and the Extension Service.

Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, gender, age, religion, disability, or status as a veteran in any of its policies, practices, or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert E. Whitson, Director of Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of 20 cents per copy. 0607