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FARM FISH PRODUCTION IN ARKANSAS DURING 1972

by

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ABSTRACT

Fish farming in Arkansas continues to be a major industry with 1972 returns exceeding $21 million. This indicates an overall increase in value of 23.5 percent since 1969. Acreage of intensively-farmed waters increased 15.7 percent since 1969. Data collected during this survey indicates that a peak in the industry was reached between 1969 and 1972 and that during the past year acreages devoted to fish production declined slightly. Personal interviews of fish farmers provided the most useful data in determining the total production. Acreage, production and dollar values are presented in categories of food fish, bait fish, fingerlings, and fee fishing. Specialized fish-rearing facilities and the production of uncommon types of fishes are discussed.

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INTRODUCTION

An evaluation of Arkansas' fish farming industry has been reported every third year since 1966 to document its growth, production, and returns. Production almost doubled between 1966 and 1969. Returns of over nine million dollars were reported in 1966 (Meyer et al, 1967). Returns of over $17 million were reported in 1969 (Meyer et al, 1970). Growth since 1969 has continued, but at a somewhat slower pace, as indicated by a gross return of over $21 million in 1972.

Several factors account for the growth of the fish farming industry. Increased recreational demands by the general public have brought the production of bait fishes to the present levels and have made it possible to successfully operate fee fishing lakes. Technological advances, experienced management, and increased knowledge have also played an important role in increasing the production per acre and the total acreage in production.

This report is intended to relate what existed in 1972, to explain what happened and why, and to place a dollar value on the 1972 production.

Methods:

It was felt that a much larger percentage of the fish producers would respond if they were contacted either personally or by telephone than if we used a mail questionnaire as in the past. This method assured that a response would be obtained from all of the larger farms which, if missed by the questionnaire, might result in a low or biased estimate.

Interviews were first conducted with the larger producers to insure that they would not be missed. The remaining fish farmers were sampled randomly, including those who have less than one acre in production and those having irrigation reservoirs, which may yield only a few pounds of fish per acre. The results of the random samples were later expanded to estimate the production of those farmers not interviewed. This figure was then added to the results obtained from the large farms. Interviews were conducted with the managers of 77.2 percent of the total acreage of fish farms in Arkansas. The estimates of acreage, yield, and value were obtained by asking fish producers to estimate their own yield and the average price received. Each farm was considered individually to obtain data on total acres, total pounds or numbers produced, and total values. Figures on these parameters were tallied and the mean was used to determine statistics for the state total.

Bait Fishes:

By far, the greatest acreage in intensive fish culture in Arkansas is devoted to the production of bait fishes. In 1972, 29,091 acres were devoted to bait species. This represents an increase of 34.9 percent over the 21,550 acres reported (Meyer et al, 1970) for 1969. This indicates continued growth, but at a slower rate than during the previous three year period. Some producers indicated that they were changing production and the total acreages indicate a slight decline in acreage has occurred since a peak between 1969 and 1972. This peak is believed to have occurred in 1971.

Golden shiners (*Notemigonus crysoleucas*) were produced in 91.2 percent of the acreage. This is approximately equal to the 1969 production when golden shiners made up 93.7 percent. Total acreage devoted to the culture of this important bait fish increased by 31.3 percent. Production in total pounds increased by 41.8 percent, but prices received declined 5.8 percent. Although some farms reported receiving up to two dollars per pound for shiners, most farms were unable to market all their minnows at sizes which command the highest prices. Prices of minnows which had reached the size of 20 pounds per 1,000 fish usually approximatel $.50 per pound.

Fat head minnows (*Pimphales notatus*) live well when used by anglers and are becoming more popular as a cultured bait fish. The acreage devoted to this species increased by 112.2 percent. The market for "tuffies", as they are called by fish producers, is not strictly limited to retail bait dealers. Many catfish producers use them as forage for catfish to reduce the cost of feeding. Per acre production of fatheads increased by 28 percent over 1969, but the price received declined by 30.2 percent, resulting in a 10.8 percent reduction in the gross return per acre.

Goldfish (*Carassius auratus*) are being produced on more than twice the acreage in 1969. Production has increased by 60.3 percent on a per acre basis. The increases are due, in part, to the fact that goldfish can be raised very intensively. Less fresh water is necessary for the production of these fishes as they are more tolerant of low oxygen levels than other species.

Israeli carp (*Cyprinus carpio*) acreage declined by 30 percent but production on each acre increased 67.3 percent; resulting in greater total production than in 1969. Prices of carp declined by 12.3 percent over the three year period.

Generally, bait fish producers were most concerned about rising costs of production and the lack of corresponding rise in prices received for their product. In most cases, however, they anticipate a price increase which will compensate for rising costs. Some shifting of acreage occurred - from golden shiners or catfish to fathead minnows, soybeans or other arable crops, but it is expected that bait fish production will stabilize and have a rate of growth considerably slower than in past years.

Food Fishes:

In Arkansas, the leading cultured food fish is the channel catfish (*Ictalurus* punctatus). More research was conducted and more advances were made in the culture of this species than any others, as is evident by the tremendous growth of this industry since 1966 in several southern states. In Arkansas; 9,392 acres of intensively-cultured food fish were harvested in 1972. At least 1,505 acres of channel catfish were produced but not harvested in 1972, bringing the total acreage in food fish production to 10,897. Most of this figure was devoted to channel catfish.

Acreage devoted solely to channel catfish increased by less than one percent over the past three years. The tremendous growth of the previous three year period was halted, due for the most part, to the narrowing profit margin in 1969 and 1970. Some small farms stopped producing but the number of new operations going into production just about equaled those that quit. Some catfish farms expanded, which accounted for the small growth, but some shifting to minnows, polyculture, or other crops was apparent. Per acre harvest on catfish farms increased by 6.9 percent over 1969, but the number of acres not harvested in 1972 resulted in an overall decrease in the total pounds of fish sold. An increase of 16 percent in the average price received resulted in an increase of 11.8 percent in total value of the catfish produced (including those produced in polyculture).

Generally, the polyculture which has become most common in Arkansas during the past few years is a combination of channel catfish, buffalofish (*Ictiobus* sp.), largemouth bass (*Micropterus salmoides*), bream (*Lepomis* sp.), and occasionally crappie (*Pomoxis* sp.) and white amur (*Ctenopharyngodon idella*). It was reported that white amur (grass carp) increased production substantially in polyculture ponds. In most ponds used for polyculture, feeding is at a much lower level than in monoculture. Five hundred fifteen acres were devoted to polyculture in Arkansas in 1972. Two hundred acres of catfish ponds also produced small poundages of buffalofish or other species. A total of approximately one million pounds of all species was produced in polyculture in 1972 for an average of 1,914 pounds per acre.

Buffalofish were produced alone in only 363 acres in 1972. This, added to the 515 acres of polyculture, still represents a 57 percent reduction in the acreage devoted to buffalofish production. Total production of buffalofish in intensive culture decreased 68.8 percent. Prices for buffalofish averaged 18.8 cents per pound, considerably higher than the average received for wild buffalofish caught from the rivers and lakes, and more than double the price received in 1969.

Blue catfish (*Ictalurus furcatus*) were produced on only 54 acres in 1972. Although a few are produced in ponds with channel catfish, this was considered negligible. Production of this fish declined as most farmers discovered that the channel catfish is more domesticated and brings as high a price. Practically all the acreage in blue catfish production in 1969 had been switched to either channel catfish or polyculture by 1972.

Trout production has not changed significantly since 1969. Since trout production is in raceways, acreage figures have little meaning. Some shifting did occur as farms changed owners. The net change in production was a 5 percent increase. Prices received increased 44.7 percent, resulting in a total increase of 53.3 percent in the value generated by this portion of the fish farming industry.

Nine thousand nine hundred fifty-nine acres of irrigation reservoirs, duck hunting club lakes, and other private lakes were licensed by the state to produce and sell fish. These reservoirs are usually only partially harvested once each year or harvested every three to five years. Some of these lakes are being used as rearing ponds for buffalofish caught in the wild during spring runs while the price is low. They are then harvested with gill or trammel nets during the summer when the commercial fishing season is closed or when the demand for buffalofish is high. The harvest from these reservoirs in 1972 was low. An estimated 256,000 pounds of buffalo were harvested from these reservoirs in addition to 44,000 pounds of other species.

Food fish producers expressed several fears or areas of concern. Many reported that good labor is difficult to obtain for the pay they can afford to give. Increasing feed prices caused great concern. The price of catfish must be increased to maintain a suitable profit margin, and some farmers felt that dressed catfish may price itself off the market. While this is unlikely, the fears and risk involved have caused a shifting of acreage to soybeans, a crop which became much higher priced during 1972.

The market for food fish was varied. Some processing plants stopped buying fish due to the lack of profit, but others continued to provide a ready outlet for fish, although the price paid by the processor was much lower than at some of the other outlets. Fish dressed at the farm commanded a higher price than was paid by processing plants, but many large farming operations lack the time to dress fish. Large quantities of fish were sold in the round to retail fish markets or directly to the consumer. Other farms had contracts with supermarkets or restaurants to provide fish as needed. Pay-lake operators also provided an outlet for farm raised fish.

Fingerling Production:

Channel catfish fingerlings were produced on 1,540 acres in 1972, a 9.1 percent increase since 1969. This facet of the industry fluctuated markedly during the three year period. Overproduction in 1970 resulted in a surplus and a corresponding drop in price. During the following year production stabilized as some farms skipped a year. In 1972, although greater acreage was in fingerling production, fewer fingerlings were produced. The market required larger fingerlings and this resulted in the production of a smaller number of fish per acre. The net result of the change was a 47.1 percent reduction in the number of fingerlings produced, a 34.2 percent increase in price (and size) and a 10.2 percent decrease in total value.

Definite figures on buffalo fingerlings were difficult to obtain. Although farms acknowledged producing a few, none reported intensive production of buffalofish fingerlings and it is felt that production was negligible.

Blue catfish fingerlings were produced on 20 acres, a decline of 50 percent since 1969. As the channel catfish emerged as the most domesticated species of catfish, others were dropped. Production per acre of this species declined by 56.3 percent. Since the price was unchanged, the result was a decrease of 70.4 percent in the total value of the blue catfish fingerling industry.

Trout fingerling production increased by 21.3 percent, resulting in an increase of $6,900. Other species, except specialty cultures (discussed later), were insignificant to the total production.

Fee Fishing:

In 1972, 1,949 acres were used for fee fishing. Many fee fishing ponds are not intensively managed, but are simply stocked periodically with catchable or intermediate sized fish. Such ponds may be used for a variety of other purposes. Other ponds are used intensively, with managers keeping close records and restocking as needed. High prices were received where the public was assured of catching fish. Returns as high as $7,500 per acre were obtained on some intensively managed catfish fee fishing lakes. Trout pools produced even higher returns. However, all trout production was reported as simple intensive culture of trout and will not be included in the statistics for fee fishing (Table 1). By combining the intensive production with the extensive fee fishing operations, the gross value was $285,100, excluding trout.

Other Types of Culture:

Cages were used for the production of catfish during the three year period and in 1972 were used to produce trout in warm water lakes during the winter. The Arkansas Game and Fish Commission's program of leasing selected waters to fish producers for rearing fish in cages accounted for most of the caged fish production. Under this agreement, fish are fed in cages placed in an infertile lake. The lake receives added nutrients and the Commission receives a share of the fish produced to be used for stocking public waters. Two hundred fifteen thousand seven hundred pounds of channel catfish were produced in cages in 1972. Trout stocked in cages in 1972 were not harvested until the following spring and will be considered as part of the 1973 production.

Raceway culture was not significant in the production of fish in Arkansas except for trout, for which production figures have already been discussed. Some farmers were seriously considering a flow-through system, but were cautious because of the increased risk caused by recirculated water and the high cost of water required for a "once-through" system.

Tank and pool culture were insignificant.

Uncommon Exotic Fishes:

The production of white amur for the control of aquatic plants began in 1972. Several farms either imported fish from the Orient or took advantage of the Arkansas Game and Fish Commission's white amur fry distribution policy and produced fingerlings or intermediate fish for sale to private pond owners. An estimated 50,000 fish of this species was sold in 1972 at prices averaging $1.00 each. Some farms constructed white amur hatcheries to meet demands for this fish.

Fancy goldfish, koi carp, and various tropical fish were produced on small acreages in tanks, raceways, and aquaria. Production of these fishes totaled 424,000 fish, sold at an average of 7.3¢ each, and totaling $30,900.

DISCUSSION

Fish production in Arkansas appears to have stabilized, although the general trend since 1969 indicates that it is still an expanding industry. Increased profits from grain production encouraged some shifting from fish to these crops, primarily soybeans. The major effects of the shifts, however, will not be apparent until 1973 data are available.

Increasing prices of fish feed (which practically doubled at the end of 1972), rising costs of dependable labor, concern about discharge permits (required first by the U. S. Army Corps of Engineers then by the Environmental Protection Agency), are all having an adverse effect on fish farming. These factors forced some small farms out of business, but new farms replaced many of those that closed. An increase in the prices received for the various species is expected.

Polyculture is becoming more popular as a method to achieve fairly high production at lower feed costs. The species involved vary, but farmers generally plan to stock a major production species, plus several which compliment it. Catfish, buffalo, white amur, and fathead minnows are used on some farms successfully.

Income from fish culture in Arkansas was in excess of $21,000,000 at the farm level and does not include the income generated for the state through the related feed, chemical, fertilizer, equipment, and water industries. Retail prices at the consumer level were included in only the small portion of the report where fish were sold directly to consumers at the farm - thus cutting out the "middle man." Income computed at the second, and in some cases third, level would be greatly increased.

ACKNOWLEDGMENTS

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Table 1. Commercial Fish Production in Arkansas During 1972.

	Acres	Lb./A.	Total Lb.	Price/Lb.	Total Value
BAIT FISHES					
Golden Shiner	26,527	339	8,992,700	.98	$ 8,812,800
Fathead Minnow	1,848	384	709,600	.97	688,300
Goldfish	520	1,058	505,200	.79	434,700
Israeli Carp	196	1,333	261,300	.57	148,900
TOTAL	29,091	xxx	10,468,800	xxx	$10,084,700
FOOD FISHES - INTENSIVE (HARVESTED)					
Channel Catfish	8,433	1,892	15,955,200	.44	$ 7,020,300
Blue Catfish	54	2,000	108,000	.40	43,200
Buffalofish	363	529	192,100	.188	36,100
Trout	27	61,296	1,655,000	.89	1,473,000
TOTAL	8,877	xxx	17,910,300	xxx	$ 8,572,600
FOOD FISH IN POLYCULTURE (INTENSIVE)					
Channel Catfish	515	1,243	640,000	.44	$ 281,600
Buffalofish	Same	651	335,400	.188	63,100
Sport Fishes	Same	23	11,800	.954	11,300
TOTAL	515	xxx	987,200	xxx	$ 356,000
FOOD FISHES - EXTENSIVE					
Buffalofish	9,959	25	256,000	.188	$ 48,100
All Other Species	Same	4.4	44,000	.35	15,400
TOTAL	9,959	xxx	300,000	xxx	$ 63,500

FEE-FISHING					
Channel Catfish	1,049	431	452,100	.60	$ 271,300
Sport Fishes	Same	22	23,000	.60	13,800
TOTAL	1,049	xxx	475,100	xxx	$ 285,100
FINGERLINGS		No./A.	Total No.	Price/Ea.	
Channel Catfish	1,540	22,246	34,258,800	.051	$ 1,747,200
Blue Catfish	20	15,000	300,000	.05	15,000
White Catfish	4	6,000	24,000	.20	4,800
Trout	4	62,500	250,000	.11	27,500
TOTAL	1,568	xxx	34,834,800	xxx	$ 1,794,500
SPECIALTY CULTURES					
Koi Carp	13	16,385	213,000	.077	$ 16,400
Fancy Goldfish	---	---	200,000	.06	12,000
White Amur	---	---	50,000	1.00	50,000
Mixed Tropical Fish	---	---	10,000	.25	2,500
TOTAL	13	xxx	473,000	xxx	$ 80,900
CAGE CULTURE			Total Lb.	Price/Lb.	
Channel Catfish	---	---	215,700	.44	$ 94,900
TOTALS (Intensive)	40,064				$20,983,600
OVERALL TOTALS (Intensive and Extensive & Fee-fishing)	51,072				$21,332,200

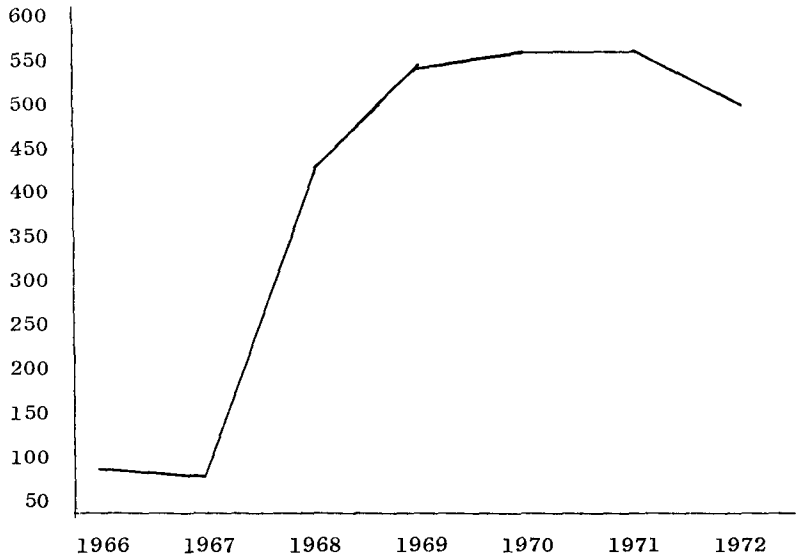

Figure 1. Number of Licensed Fish Farms in Arkansas.