

opportunities offered in expansion of this new industry. In areas where conventional farming is an important source of income, fish farming can be incorporated into the agricultural structure and, in many areas, can be introduced into the crop rotation patterns.

Farm and pond fish operators are mostly uninformed and inexperienced about fisheries commerce. Unless technical assistance is available, large investments could be wasted and the resulting confusion could set the industry back many years.

One of the biggest obstacles in pond fishing management is the lack of efficient practical harvesting and handling systems. Most farms do not yield enough fish to warrant individual investment of the \$7,000 to \$10,000 for required equipment. Without equipment, farmers resort to the most primitive methods of netting and removing fish from ponds. With poor methods, labor costs are higher, the time needed creates difficulties in taking advantage of market opportunities and shipping schedules, and the fish are subjected to undesirable conditions in shallow muddy waters. Manual harvesting methods often increase costs and reduce profits of otherwise sound business enterprises.

Many farm-raised catfish in the project area are sold alive, either as fingerling stock or as adult fish for fee-fishing recreational ponds. By contrast, catfish from river fisheries enter human food markets as processed products—primarily eviscerated fish on ice. This results from the widely scattered nature of the river fishery, serving only local markets. Because of the lack of centralized production and marketing, a sophisticated handling system did not develop. If farm-raised fish production continues to increase as projected, however, vast quantities of catfish have to move directly into human food markets. More modern products, such as frozen, convenience-type items, will have to be developed to attract new markets and meet existing competition.

Under current production methods, the industry is likely to suffer gluts during fall and winter. New concepts for the handling of fish during hot weather, and better processing techniques, should be considered. Promotional needs for the future should not be overlooked. Here, the Bureau of Commercial Fisheries, with its specialists in gear technology and market development, can complement and supplement the fish husbandry research of the Bureau of Sport Fisheries and Wildlife. Provisions for this kind of teamwork are included in development plans.

The immediate need for development is at the Kelso, Arkansas, demonstration area. Here is a unique opportunity for a joint effort by the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries. Large ponds of about 40 acres, when constructed, could be used to demonstrate production methods and to test new findings from the Stuttgart and Marion laboratories; at the same time the ponds can be used for gear research, fish handling research, and fish behavior studies.

A number of smaller reservoirs of varying sizes are also needed. These ponds should have uniform bottoms with only enough fall to assure drainage and should be free of borrow ditches on the inside. Construction of this nature has several advantages:

1. Shallow areas which encourage the growth of noxious plants are eliminated.
2. Usefulness for gear research is greatly enhanced.
3. Such ponds serve equally well for the purposes of both the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries.
4. The ponds can be farmed for rice or soybeans; this will allow research on crop rotation and its economics, soil improvement and enrichment, and water conservation methods.
5. Ponds of uniform-depth are most suitable for the chemical and temperature stability needed in intensive production.

Research is also underway to acquire data necessary to license for aquatic use certain drugs and chemicals needed in fish farming. These include antibiotics and sulfas for disease control; herbicides for weed removal; chemicals for external parasite treatment; anesthetics to facilitate handling, spawning, and transport of large live fish; and hormones to stimulate spawning. None of the most effective and desirable chemicals is licensed for use on food fish. The ponds at Stuttgart are insufficient for this needed research.

Until more ponds are available, it is not possible to pursue research on catfish hybrids with any degree of success. So far, 18 different catfish hybrids have been produced, and some of these promise to be valuable in fish farming and fish