



FIELD VISITS TO FISH FARMS IN CHINA (2022)

EXECUTIVE SUMMARY

June 2023

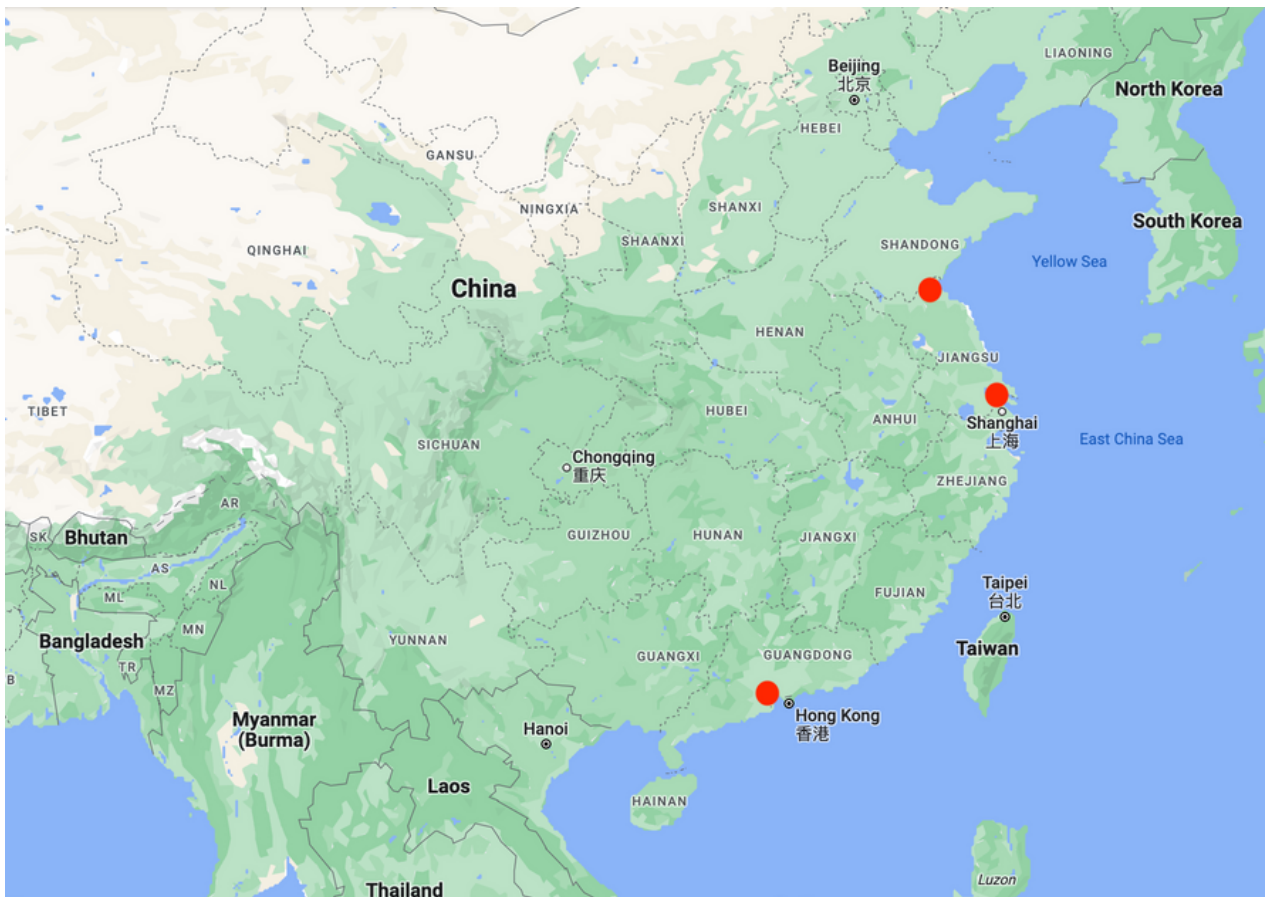
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This investigation was performed through a collaboration between Fish Welfare Initiative and the International Cooperation Committee of Animal Welfare. For more information, please write to us at lu.chen@fwi.fish or ficcaw@163.com.



Chinese aquaculturists farm the highest number of fishes in the world: by 2025 the total output of aquatic products from the Chinese industry is planned to reach over 66–230 billion* individual fishes. As a global leader in the industry, China is thus uniquely positioned to lead the welfare-centric operationalization of large-scale aquaculture practices.

Between October and November 2022, FWI worked with the International Cooperation Committee of Animal Welfare (ICCAW) to investigate the welfare status of commonly farmed species in China and deepen understanding of the current Chinese aquaculture practices and systems. This report details our fieldwork and findings from studying 12 freshwater fish farms in Guangdong (one farm), Shanghai (one farm), and Jiangsu (10 farms) provinces: five commercial farms and seven small-scale family farms.



Map 1. The red dots mark the three regions where we visited fish farms. (Source: GoogleMaps)

*This figure uses the estimated mean weights of different species in China as provided by [Fishcount.org](https://fishcount.org).

This Executive Summary presents the main findings of our field research categorized under four main aspects:

- Local Industry and Farm Characteristics
- Farmers' Practices
- Different Perspectives on Fish Welfare Among Stakeholders
- Implications of Our Field Research

Local Industry and Farm Characteristics

The species we encountered in all three regions were grass carp (*Ctenopharyngodon idella*) in Guangdong and Jiangsu; crucian carp (*Carassius carassius*) in Jiangsu; pond loach (*Misgurnus anguillicaudatus*) in Jiangsu; common carp (*Cyprinus carpio*) in Jiangsu; longsnout catfish (*Leiocassis longirostris*) in Jiangsu; and largemouth bass (*Micropterus salmoides*) in Shanghai. In each farm we visited, we recorded numerous features ranging from climate and geography to fish feed and medications used.

Water Sources and Water Quality

Water was generally sourced from China's three major river systems—the Yangtze, Yellow, and Pearl Rivers—and was used for aquaculture without treatment. Water quality varied across all 12 farms, with higher water quality found in two large commercial farms in Guangdong and Shanghai and lower water quality found in small-scale family farms in Jiangsu province. The latter group of farms, particularly high-density pond loach farms, faced issues such as excessive nitrite, ammonia, and nitrogen levels. Some farmers in the Jiangsu province stated that nearby factories and terrestrial animal farms may have polluted the water in their own farms.

Farming Systems and Stocking Density

Among the farms we visited, 10 were earthen, semi-intensive pond system, 1 (largemouth bass fry farm) was a recirculating aquaculture system (RAS), and 1 was locally known as an "ecological farming system". The "ecological farm" was a commercial grass carp farm that applied selective breeding to facilitate disease resistance. This allowed for a very high stocking density of 9,090–10,909 fishes per acre. The term "ecological" is used to refer to the low incidences of diseases and thus low doses of medicines applied on these farms. Meanwhile, **the stocking density in pond loach farms using traditional pond systems reached 606,060 fishes per acre.**



Photo 1. The water in one pond loach farm in Jiangsu province. (Source: personal photograph)

Traditional pond farms usually implemented polyculture systems, with grass carp reared as the main species alongside silver carp, bighead carp, and common carp. This was done, to utilize the maximum water space available and increase farming income through higher yields.

Here, the stocking density was typically 1,818–2,424 grass carp per acre, with an additional 1,818 other species (totaling 3,636–4,242 fishes per acre).

Climate and Extreme Weather

All 12 farms we visited were affected by China's extreme weather in 2022 to varying extents. **Persistent high temperatures and typhoons in the summer led to increased fish disease incidences and mortalities, especially in pond loach and grass carp farms.**

Feed and Medicine Sources, Quality, and Costs

Fish feed and medicine constituted a significant expense for farmers. The **five commercial farms we visited (one in Guangdong, one in Shanghai, and three in Jiangsu) had better access to higher-quality feed and medicine via better technology and a greater financial capital.** In contrast, small-scale family farmers, frequently lacking scientific knowledge and without access to farming technology,

relied heavily on sales representatives from feed- and medicine-selling companies for knowledge and recommendations.

While this relationship enhanced small-scale farmers' knowledge, it also placed them under the risk of purchasing inadequate and likely excessive inputs based on the commercial interests of the sale representatives.



Photo 2. A fish feed and medicine shop in Jiangsu province. (Source: personal photograph)

Farmers' Practices

We also observed regular farming practices executed by farmers, including pond preparation, feeding, water quality monitoring, disease prevention and treatment, harvest and transportation. We found significant differences in specific practices between large, commercial farms and small-scale family farms.

Feeding

We recorded three distinct feeding methods:

- automated AI feeding for remote monitoring farm data and precise feeding
- stationary, automated (electrical) feeding
- manual feeding, mainly for pond loaches.

The commercial farms we visited adhered to stricter feeding standards, while most

small-scale farmers determined feeding amounts based on their personal experience and feed-selling companies' recommendations. Some small-scale farmers carefully observed eating habits of fishes to judge the needed amount of but also **frequently overfed in an attempt to expedite market-readiness of these fishes.**



Photo 3. The automated AI feeding system in the commercial grass carp farm we visited in Guangzhou. (Source: personal photograph)



Photo 4. The regular automated feeding system at a small-scale family farm in Jiangsu province. (Source: personal photograph)

Water Quality Monitoring

In the **commercial farms we visited, water quality testing was regularly conducted by staff using professional equipment** (from what we observed mostly water test strips). Most small-scale family farms we visited did not have such equipment, and farmers sought help or water quality testing after sales visits from

fish medicine technicians, with an unstable frequency of approximately once every 1-2 weeks. Water quality control methods primarily included using cleaner fishes (mostly silver carp and bighead carp) to consume microorganisms (like plankton and algae) and regulate water quality, or applying biological compounds like beneficial bacteria, and pH-regulators like calcium oxide, sodium bicarbonate, and sodium hypochlorite. Farms affected by wastewater pollution from nearby factories needed more frequent water quality control.



*Photo 5. A fish medicine company technician helping a farmer test and record water quality.
(Source: personal photograph)*

Disease Prevention and Treatment

We observed two primary categories of fish diseases in the fish farms we visited: bacterial and viral. Farmers conceptualize these diseases as caused by either biotic factors—living or biological components like genetic factors, feed availability and quality, parasites, bacteria loads, etc.—and abiotic factors—temperature, water quality, sunlight etc. Internal factors include the sensitivity and weakness of fishes during the fry stage and genetic diseases in the fish species. External factors encompass high temperature, overcrowding, overfeeding, poor water quality, stress, and farmers' negligence. To prevent diseases, the fish farms we visited typically employed strategies such as controlling the water quality, controlling the quantity of fish feed, applying immunity-enhancing medications, vaccination (only in one commercial farm), and breeding virus-resistant fish species (only in one commercial farm). **When treating fish diseases, common methods included applying medication or disinfecting the water with quicklime, baking soda, or sodium hypochlorite.**

Some fish farmers also mentioned instances of medicine overuse in the area due to farmers' lack of scientific knowledge.



Photo 6. A local fish expert helping a farmer check for fish diseases. (Source: personal photograph)

Harvest and Transportation

All the 12 farms we visited conducted pre-harvest processes, such as sampling of fishes and forced fasting. Three farms sampled fishes before harvesting, and most fish farms reported fasting fish for 1–2 days before harvesting. One large commercial grass carp farm we visited in Guangzhou fasted the fishes for 30–45 days to reduce their fat content before harvest and sale. Per international welfare guidelines, fasting fish beyond 72 hours infringes on their welfare.

During harvest, all farms except pond loach farms applied disinfectants to prevent infections and death in fishes injured by nets. Professional harvest workers were hired to harvest fishes as quickly and carefully as possible to minimize harm to the fishes. After harvesting, fishes were usually sold live in nearby cities within several hours of harvest. To do so, they were transported in containers equipped for oxygen supply. Most pond loaches were exported live by ship to Korea and Japan in containers without additional oxygenation.



*Photo 7. Harvest workers crowding fish for harvest at a farm in Jiangsu province.
(Source: personal photograph)*

Different Perspectives on Fish Welfare Among Stakeholders

We also analyzed the understanding and consideration of fish welfare among different aquaculture stakeholders, such as farmers, fish experts, and sales representatives from fish feed- and medicine-selling companies.

Farmers, to achieve the goal of “raising fish well” and secure the economic benefits of fishes raised well, paid close attention to essential welfare factors, including fish nutrition, water quality control, disease prevention and treatment, etc. This indicates that most **farmers try to provide a favorable environment and sufficient care for fishes they raise.**

- Farmers’ knowledge, prices and quality of fish feed and medicine, and market demands have complex influences on fish welfare. Faced with a high-risk and unstable market, most farmers, especially small-scale family farmers, exhibit an understanding of fish welfare that amounts to **ensuring their own welfare first, and then ensuring the welfare of fishes.**



Photo 8. Farmers and a fish medicine company technician observe carp eating at a farm in Jiangsu province. (Source: personal photograph).

Implications of Our Field Research

Our investigation of the farming status, systems, and practices, and perceptions of fish welfare in Chinese aquaculture leads us to believe that the following are promising avenues for improving fish welfare.

- **Working with large-scale, commercial farms** may be better suited for practical welfare improvements than working directly with small-scale farmers in China. With their extensive resources and technology large-scale farms can implement higher-welfare farming practices and improve the lives of farmed fishes.
- **Small-scale farmers, and fish welfare, will benefit from free, professional training** in higher welfare farming practices. Most small-scale farmers currently lack knowledge on best practices that would also enhance welfare.
- During our fieldwork, we had five conversations with local citizens who expressed concern for the food safety of farmed fishes in the region. Therefore, although the data we collected is very limited, we believe that fostering a market and developing branding for higher-welfare fishes could meet middle-class consumers' demand for healthier, higher-quality fish products and motivate the aquaculture industry to support better lives for farmed fishes.