

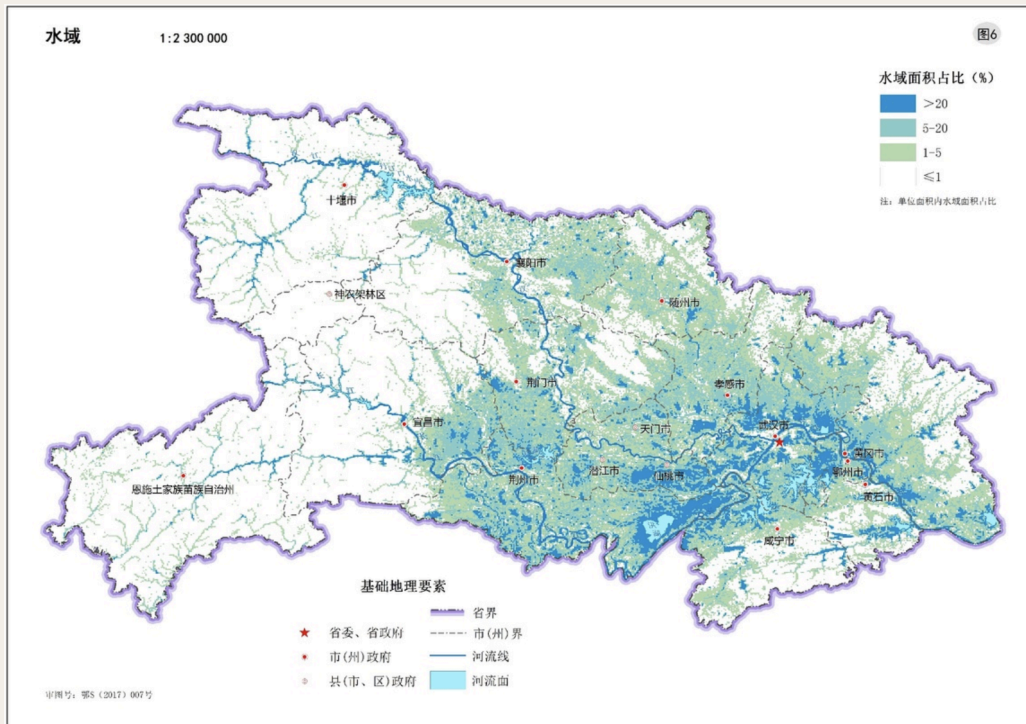


**The Potential for Breakthroughs and the Contemporary Value of China-Ghana Fisheries Cooperation: Analysis of Precise Alignment Between Hubei's Experience and Ghana's Needs (Part II)**

By IAPC, for ROOTS.

2026/03/11

## Benchmarking and Learning: China's Experience in Freshwater Aquaculture (Hubei Sample)

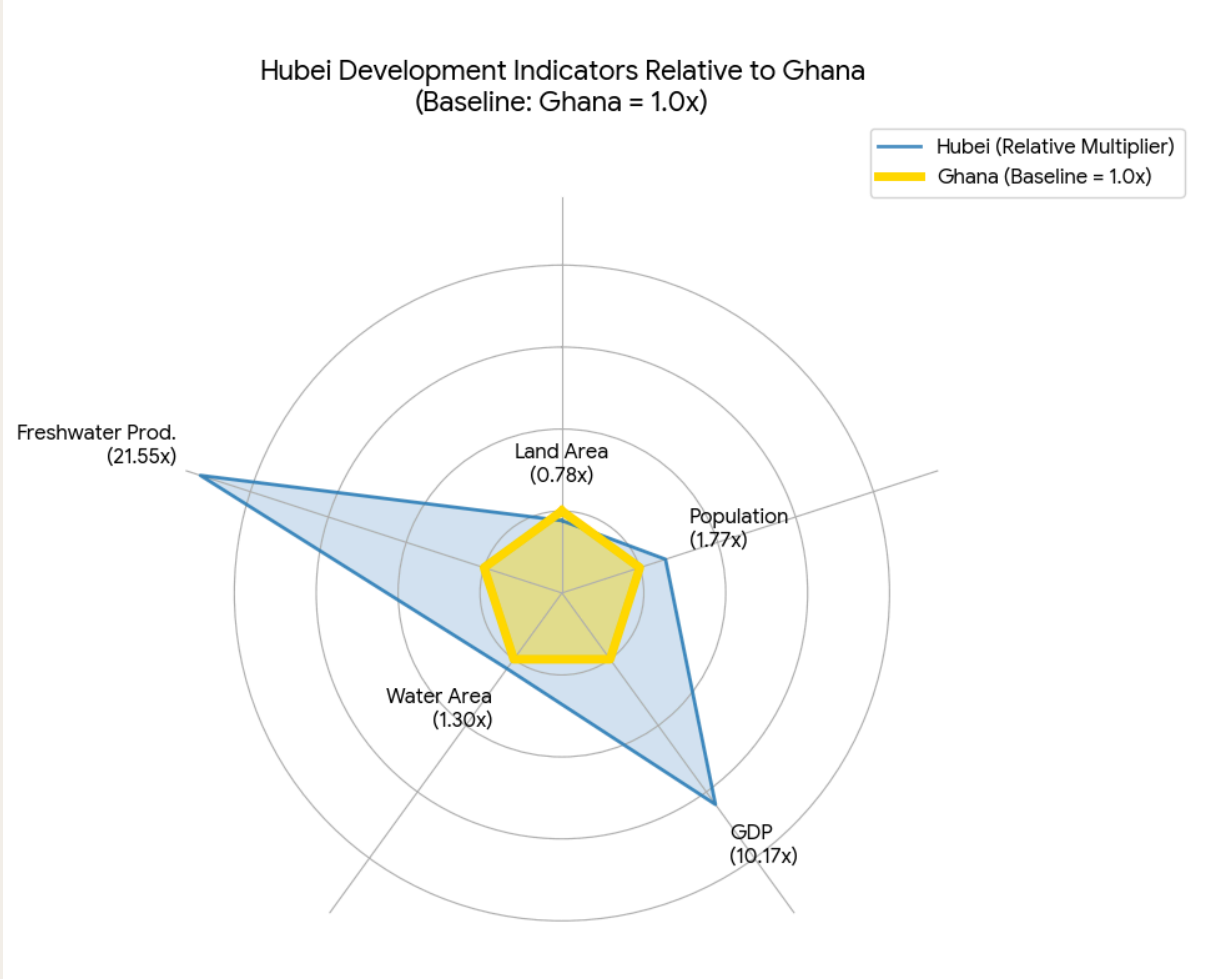


A Map of Hubei Province. Source: Department of Natural Resources of Hubei Province [ [source link](#) ]

Hubei Province, known as the "Province of a Thousand Lakes" in China, has a total population of 58.38 million, and its GDP reached US\$842.7 billion in 2024. The total area of Hubei Province is 185,900 square kilometers [1], of which the area of water and tidal flats is 19,254 square kilometers, and the water area for aquaculture is about 12,500 square kilometers (including pond aquaculture area, factory farming area, recreational fishing area, and rice-fish integrated farming area) [2]. In 2024, the total output of freshwater products in Hubei Province reached approximately 5.46 million tons, ranking first in China for 29 consecutive years, with an output value of about US\$24.2 billion [3].

This remarkable achievement has established Hubei Province as China's leading province in freshwater fisheries and serves as a paradigmatic example for the conversion of resource endowments in the Global South countries. But how did Hubei Province achieve the three-stage leap from "Lack of Fish to Eat" to "Have Fish to Eat" and then to "Eat Good Fish"? [2]

**Figure 1: Comparison of key data between Ghana and Hubei Province in 2024, using Ghana as a benchmark**



[Comparison of relevant data of 2024 between Ghana and Hubei Province, China]

1) Ghana has a total land area of 238,533 square kilometers, a total population of 33.01 million, and a gross domestic product (GDP) of US\$82.83 billion. The area of water and wetlands is about 14,784 square kilometers, and the total output of freshwater aquatic products (aquaculture output and inland fishing output) is about 253,362 tons.

2) Hubei Province, China: Total land area: 185,900 square kilometers, total population: 58.38 million, GDP: US\$842.7 billion; water and tidal flat area: approximately 19,254 square kilometers, total freshwater aquatic product output: approximately 5,460,000 tons.

**Stage 1: Lack of Fish to Eat (1949-1995)**

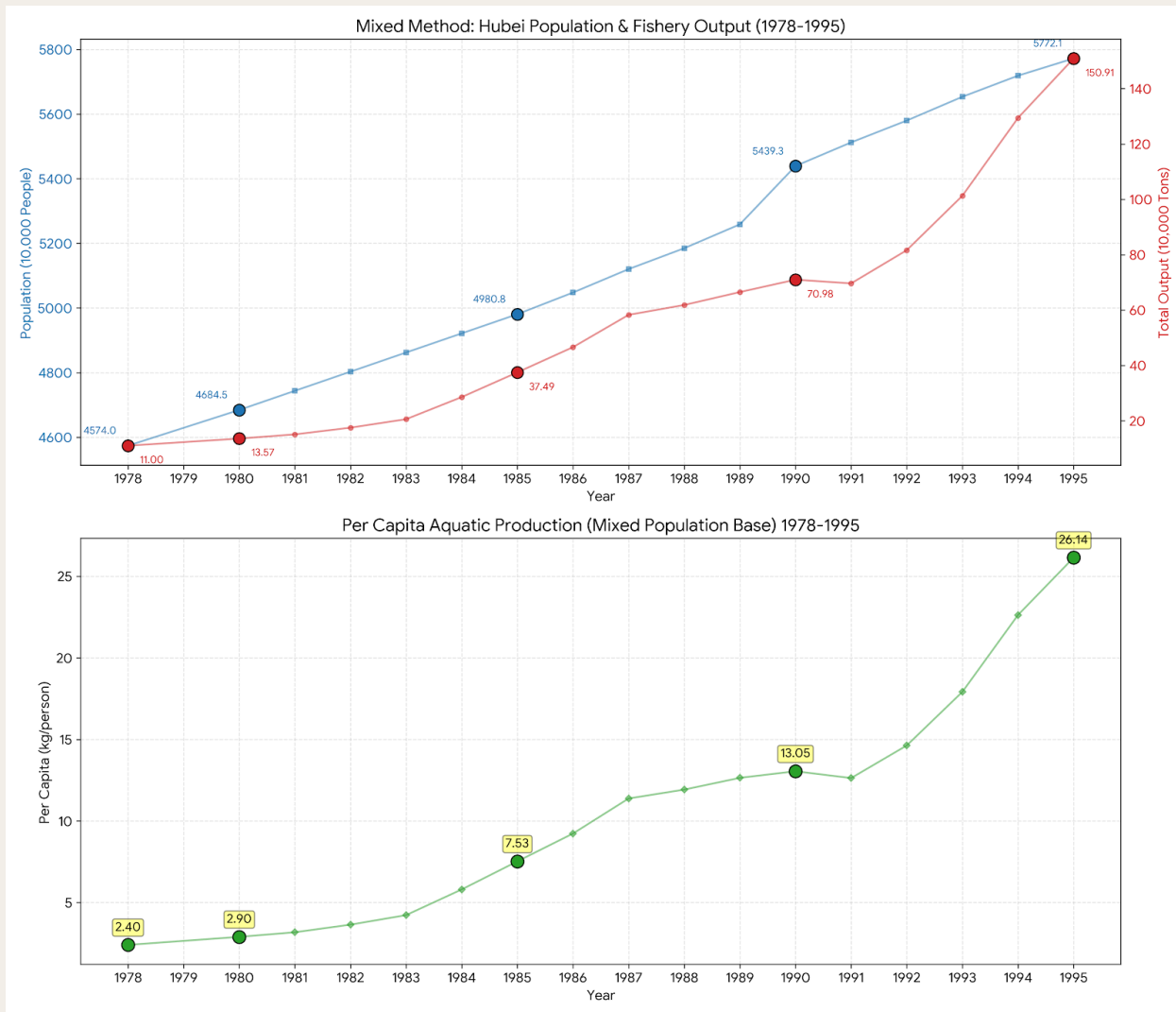
From 1949 to the 1990s, the institutional, scientific, policy, and industrial foundations for China’s aquaculture sector were laid, enabling the industry to grow and develop amidst setbacks. At the central level, the strategy of "Focusing on aquaculture while balancing it

with capture fisheries" was established in 1959, marking a historic shift from dependence on natural fishing to artificial aquaculture. After 1958, the state promoted "suburban fish farming" [4], which later evolved into freshwater commercial fish bases. After 1978, the National Fisheries Administration was re-established, the Chinese Academy of Fishery Sciences was established, fisheries supervision and management agencies were set up at all levels to implement resource protection policies [5]. In 1985, the Chinese government issued its first comprehensive directive on fisheries work, titled "Instructions on Relaxing Policies and Accelerating the Development of the Fisheries Industry" [6]. Subsequently, the prices of aquatic products were liberalized. Throughout this period, the state invested heavily in aquaculture: total investment exceeded 100 million yuan from 1949 to 1957, 1 billion yuan from 1958 to 1970, 2.2 billion yuan from 1971 to 1980, and over 600 million yuan from 1981 to 1985.

In science and technology, a major breakthrough was achieved in 1958 when Chinese scientists successfully artificially bred the four major domestic carps, putting an end to the reliance on wild fry for fish farming [7]. Between 1978 and 1985, the field of aquatic scientific research was extensive and fruitful, with large-scale resource surveys and fisheries zoning studies completed during this period, including a resource survey of the Chinese mitten crab in the Yangtze River [8]. In fish genetics and breeding research, the Institute of Hydrobiology, Chinese Academy of Sciences, reached world-class levels. The integrated rice-fish farming model was scaled up, and substantial advances were also made in fish disease research [9].

In Hubei Province, policy dividends translated into significant productivity. With the implementation of the suburban fish farming policy, by the winter of 1971, Wuhan City in Hubei Province had built over 40,000 mu (approximately 2,667 hectares) of intensive fish farming ponds in its suburbs [10]. These were subsequently transformed into freshwater commercial fish production bases. In 1982, the average yield per mu (approximately 0.16 acres) of the 30,000 mu (approximately 2,000 acres) of ponds and reservoirs in Xishui County, Hubei Province, reached 165 kg [11]. In the 1980s, the Hubei Provincial Government proposed a policy of "prioritizing aquaculture," comprehensively developing large water resources such as lakes and reservoirs. Statistics show that aquatic product output in Hubei reached 135,700 tons in 1980 [12], and freshwater aquaculture output rose to 330,000 tons in 1985 [13]. In 1996, Hubei Province's total freshwater product output ranked first nationwide for the first time, marking the initial resolution of the "Lack of Fish to Eat" problem.

**Figure 2: Showing a line chart of the growth of the permanent resident population, aquatic product output, and per capita aquatic product availability in Hubei Province, 1978–1995.**



Source: Hubei Provincial Bureau of Statistics

## Stage 2: Have Fish to Eat (1996-2015)

This stage spans 20 years, from the Ninth Five-Year Plan to the Twelfth Five-Year Plan, representing a critical two-decade period for Hubei’s fisheries sector to evolve from scale expansion and industrial upgrading to coordinated ecological development. It also constitutes the core trajectory of “leading scale, emerging distinctive industry, and ecological transition”.

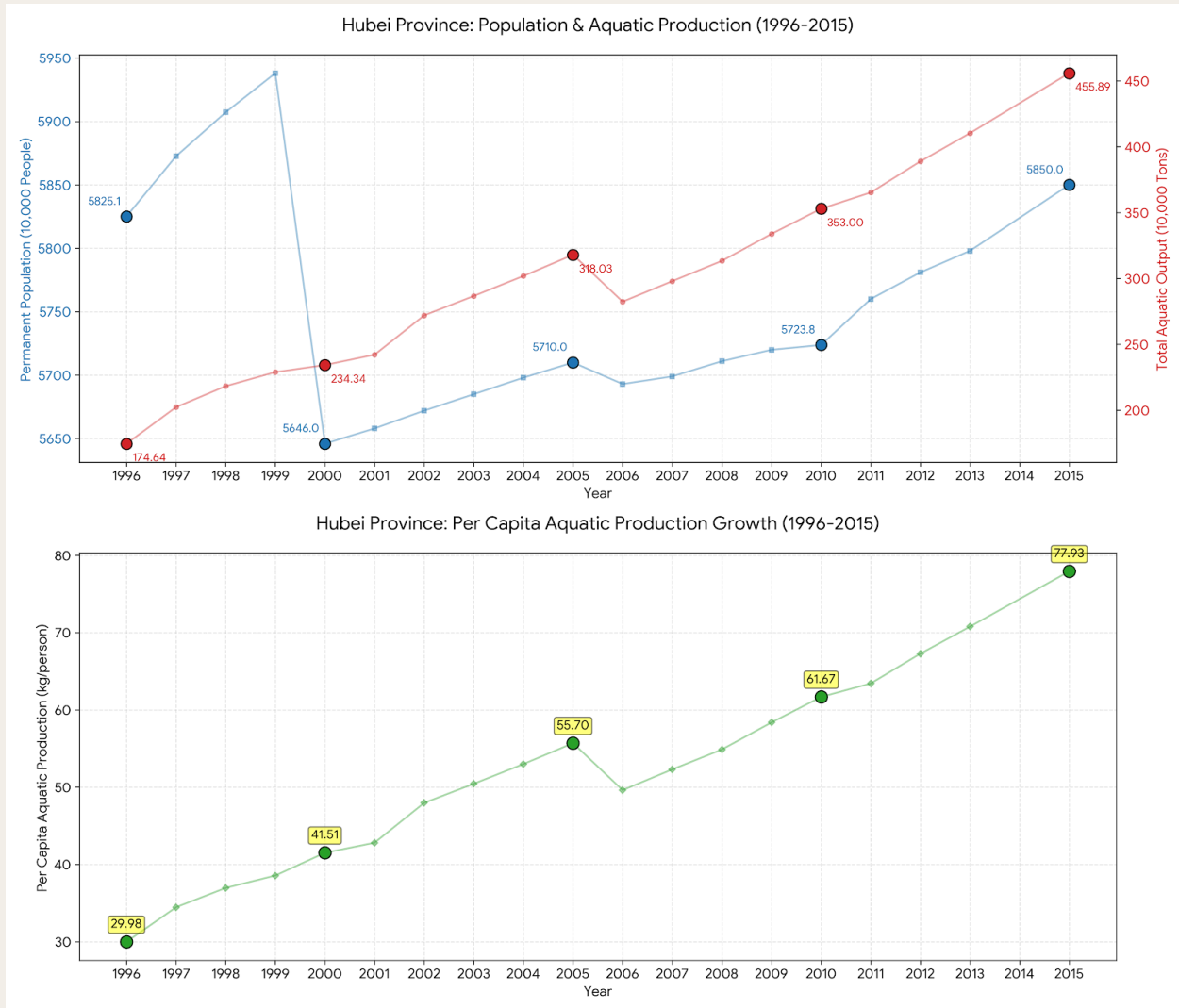
The government continuously provided policy guidance and financial support. Starting in 2006, Hubei launched the “One Fish, One Industry” initiative to accelerate the transformation of traditional fisheries [14]. Taking the 12th Five-Year Plan period as an

example, in March 2014, the provincial government issued *Opinions of the Provincial People's Government on Accelerating the Development of Modern Fisheries*. The central and provincial governments introduced a package of fishery-supporting and benefit policies, including programs for modern agricultural (aquaculture) development, refined oil price reform subsidies, fishermen resettlement and housing projects, the Vegetable Basket Project, stock enhancement and release, fisheries administration, improved fish breeds, the Three Gorges follow-up projects, provincial modern fisheries special funds, integrated rice-fish farming, and crayfish seed breeding. Total investment from central and provincial fiscal funds exceeded 32.7 billion yuan, an increase of 22.4 billion yuan compared with the 10.3 billion yuan during the 11th Five-Year Plan period [15].

In scientific research, Hubei fully leveraged its strengths in fisheries education and research, relying on fishery research institutions based in the province to vigorously develop, introduce, and promote new varieties and breeding technologies. New aquatic varieties were successfully bred and popularized, including the allogynogenetic silver crucian carp Zhongke 3, the all-male yellow catfish Quanxiong 1, the Changfeng silver carp, the hybrid culter Xianfeng 1, and the mandarin fish Huakang 1. Major breakthroughs were made in the artificial breeding of specialty species such as crayfish, Chinese mitten crabs, rice field eels, and loaches. New technologies and models represented by integrated rice-fish farming, the “18221” model, and the Huashan model were widely adopted. The aquatic animal epidemic prevention and control system was strengthened, a fishery science-education-industry linkage platform was established, and an interactive network was formed among fishery authorities, experts, technical instructors, and farmers. The contribution rate of scientific and technological progress to fisheries in the province surpassed 58% [15].

In terms of industrial development, the production structure was optimized, and the share of specialty aquaculture rose steadily. Hubei developed three 100-billion-yuan industries: crayfish, Chinese mitten crabs, and rice field eels & loaches. The output value of specialty species accounts for half of the province's total fishery output value. In 2015, Hubei was home to 8 national-level and 70 provincial-level leading agricultural industrialization enterprises, 4,468 fishery cooperatives, 1,797 family fish farms, and 36,000 large-scale aquaculture households. Fishermen and specialized cooperatives are actively linked with leading enterprises and processing & marketing entities, establishing diversified benefit-sharing mechanisms and forming a mutually beneficial and developmental pattern [15].

**Figure 3: Showing a line chart of the growth of the permanent resident population, aquatic product output, and per capita aquatic product availability in Hubei Province, 1996–2015.**



Source: Hubei Provincial Bureau of Statistics.

During this 20-year period of rapid growth, the conflict between environmental resources and industrial development became increasingly acute. Although the ecological fisheries transition, fishing bans, and ecological restoration and resource conservation programs were already fully advanced during the 12th Five-Year Plan period, by 2015, the overall water quality of major lakes across the province remained slightly polluted [16]. Lakes and wetlands had shrunk, their ecological service functions had weakened, biodiversity was under serious threat, and the number of endangered species was on the rise [17]. An urgent turnaround was imperative.

### Stage 3: Eat Good Fish (2016 to present)

In December 2015, the Ministry of Agriculture and Rural Affairs of China issued the Announcement on Adjusting the Fishing Ban System in the Yangtze River Basin,

bringing the main streams and tributaries of the Yangtze River, key lakes, and the main stream of the Huai River under full protection, extending the fishing ban to four months (March 1–June 30) [18]. In 2017, the Central Document No. 1 called for the full implementation of fishing bans in aquatic biological reserves in the Yangtze River Basin as a priority, and the Central Document No.1 in 2018 proposed establishing a compensation system for fishing bans in key waters of the Yangtze River Basin. Hubei and other provinces launched local fishing ban pilots in protected areas in parallel. On January 1, 2021, a 10-year provisional total fishing ban was enforced on the mainstream and major tributaries of the Yangtze River, as well as large river-connected lakes, including Poyang Lake and Dongting Lake (excluding protected areas), prohibiting commercial fishing of natural fishery resources. This marked the entry of the Yangtze River fishing ban into the core phase of the "Ten-Year Critical Campaign".

The Department of Agriculture and Rural Affairs of Hubei Province formulated the Hubei Provincial Agricultural Sustainable Development Plan (2016–2030) to address the deep contradiction between the ecological crisis in the Yangtze River Basin and the development of Hubei's aquaculture industry and provided a guiding framework [19]. Hubei's fisheries development shifted from quantitative expansion to quality competitiveness and ecological priority. Following the guideline of "ban fishing in rivers, restrict culture in reservoirs, remove enclosures in lakes, upgrade fishponds, develop intensive processing, and integrate brands", the province prioritized spatial optimization, water environment protection, and resource conservation, integrating ecological fisheries into the entire industrial development process [19]. In September 2021, the Department of Finance of Hubei Province and the Department of Agriculture and Rural Affairs jointly issued the Implementation Rules for the Administration of Fisheries Development Subsidy Funds in Hubei Province (E Cai Nong Fa〔2021〕No. 49), establishing dedicated fisheries development subsidies. Under the "construct first, subsidize later" model, financial support was provided for priority tasks, including standardized pond renovation, tailwater treatment, and facility-based fisheries (e.g., industrial recirculating aquaculture, tank-based cage culture), providing important financial support for ecological transition and facility upgrading. Hubei promoted the standardized renovation of aquaculture ponds and adopted non-fed extensive culture under "natural stocking and ecological rearing", realizing the ecological cycle of "purifying water with fish and nurturing fish with water".

The province has continuously explored new pathways for fisheries transformation, promoting modern facility-based models such as land-based recirculating aquaculture in 93 counties and cities across the province [20].



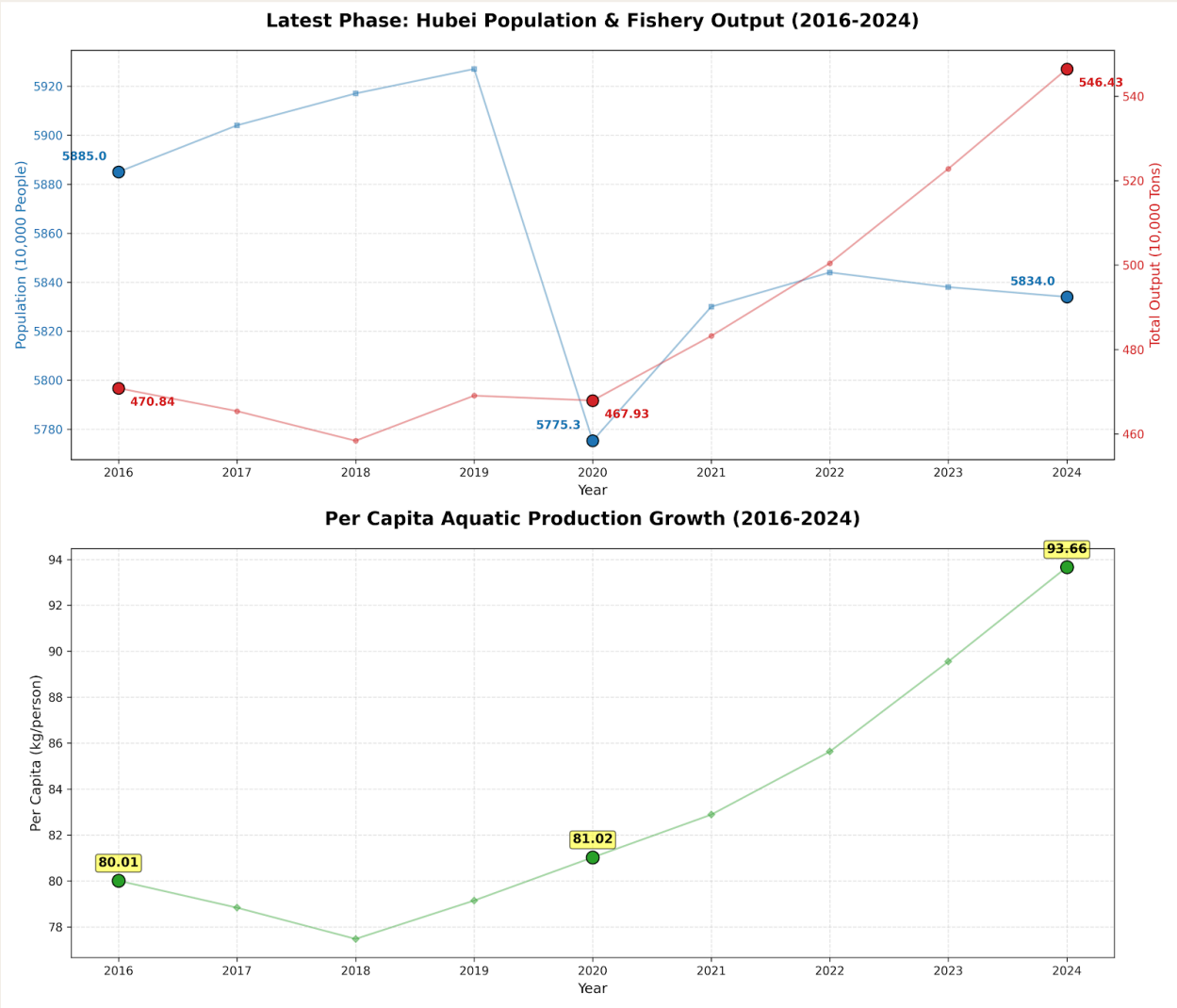
Caidian Facility Fisheries Project Base of Hubei Fishery Group, Source: IAPC Team

To meet public demand for “Yangtze River delicacies” after the fishing ban, the Provincial Agricultural Development Center led research teams to carry out key technological breakthroughs, focusing on the breeding and domestication of wild Yangtze fish species, including Chinese tapertail anchovy, longsnout catfish, and deepwater flathead [21]. This has successfully achieved the goal of “fishing banned, but flavors preserved”.

At the industrial development level, the Ten Policies for Crayfish and the Seven Policies for Eel were successively introduced to support characteristic fisheries through technological innovation, chain extension and upgrading, and brand enhancement. The development of the prepared meal industry was expanded, making aquatic products safer and more convenient to meet diversified consumer demand and strengthening regional public brands such as “Qianjiang Crayfish” and “Xiantao Eel” [20].

By the end of 2024, despite a 9.2% year-on-year decrease in freshwater aquaculture area, Hubei’s fishery output still grew by 4.9% year-on-year, and fishermen’s net income rose by 5.8% year-on-year [20], demonstrating the initial effects of high-quality development.

**Figure 4: Growth of permanent resident population, aquatic product output, and per capita aquatic product availability in Hubei Province, 2016-2024 (Graph)**



Source: Hubei Provincial Bureau of Statistics.

According to the 2015 Hubei Provincial Environmental Quality Report and the 2016–2024 Hubei Provincial Ecological and Environmental Status Bulletin released by the Hubei Provincial Department of Ecology and Environment, the water quality of Hubei’s lakes has improved significantly over the past decade from “slight pollution with a prominent problem of inferior Grade V water” to “generally good with complete elimination of inferior Grade V”. This confirms that meeting the demand for “high-quality fish” and protecting the aquatic ecological environment can coexist and achieve win-win results.

The underlying mechanism behind Hubei’s fisheries success lies in the construction of a trinity collaborative innovation system of government-research-industry. Within this

system, based on Hubei’s own fishery resource endowments and industrial foundations, the government provides policy planning, financial support, and institutional guarantees; research institutions achieve breakthroughs in core technologies; industry acts as the main body following market rules and commercializes innovations. Ultimately, the three parties form synergies, with an effective government and an efficient market translating into tangible development outcomes.

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