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THE PEOPLE'S REPUBLIC OF CHINA

STRUCTURE AND CHARACTERISTICS OF THE INDUSTRY

During the past ten years, China has achieved rapid development of its fisheries industry. Its total aquatic output increased from 12.37 million mt in 1990 to 41.22 million mt (algae production included) in 1999 with an average annual rate of increase of 23.3 percent per year.

Marine fisheries

Marine fisheries sector is an important component of China's fishing industry. In 1999, the production amounted to 24.7 million mt, of which capture fisheries contributed 15 million tons and marine culture 9.7 million mt.

In 1999, the marine fishing fleet consisted of some 470 700 vessels, with a total power of 13.7 million kW, or 3,224 vessels less than in 1998. The areas in which the vessels operated were both near shore and offshore. The fleet has 21 651 vessels (4.6 percent) with main engines of 147~440 kW. The state-owned fishery enterprises own 9 995 vessels with 0.9 million kW of power, which accounted for 2.1 percent and 6.6 percent, respectively, of the total number of vessels and total power. Collective or private enterprises own over 90 percent of the marine fishing vessels.

More than 3,000 species of marine life are found along the coast; 150 of these have some economic value. Over 100 species are targeted, such as hairtail, chub mackerel, Pacific herring, Spanish mackerel, Mackerel Scad *(Decapterus maruadsi)*, Chinese herring, sea eel, large yellow croaker, small yellow croaker, porgy, silvery pomfret, mullet, flukes, flounder, cuttlefish, squid, octopus, abalone, Chinese shrimp, Northern maoxia shrimp, rough shrimp, swimming crab, mud crab, sea cucumber, jellyfish, etc.

The most common fishing gear used is the trawl net. In terms of production, trawlers account for 47.1 percent of catches, set-nets represent 17.5 percent, gill and driftnets 13.7 percent, purse seines 4.3 percent, lines and hooks 3.2 percent and other fishing gear 14.2 percent.

China has over 60 distant water fishing enterprises, more than 1,600 vessels conduct distant water fishing, with an annual output of 0.8 million tons and a total value of US $ 560 million. The fishing grounds cover the high seas of the Pacific Ocean, Atlantic Ocean and Indian Ocean and the jurisdiction zones of over 30 countries.

Fresh water fishery

China has about 17.6 million ha of inland water area. There are 18 rivers whose length exceeds 1000 km, such as the Yangtze River, Yellow River, Heilongjiang River, Talimu River, Pearl River, etc. The lakes with areas exceeding 0.1 million ha include Qinghai Lake, Poyang Lake, Dongting Lake, Taihu Lake, Hulun Lake, etc. In addition, there are 80,000 reservoirs with a total area of about 2 million ha. Natural capture represents the major activity of the traditional inland fisheries.

More than 700 species of freshwater fish and 60 species of marine freshwater migrating fish are found in inland waters. The major commercial species are silver carp, bighead carp, grass carp, black carp, common carp, crucian carp, Chinese breams, catfish, snakehead, mud carp, eel, pond smelt, salmon, trout, mullet, bass, Japanese lamprey, Chinese mitten-handed crab, soft-shell turtle, etc.

The output of the freshwater capture fishery in 1999 was 2.28 million mt, the same amount as in the previous year. Compared with 1990, output has more than doubled.

The operating areas included lakes and rivers. The provinces of Hubei, Jiangsu, Anhui, Jiangxi and Hunan were the five larger contributors to the freshwater fishing industry and the catch of these fisheries was 413 872 mt, 300 073 mt, 298 627 mt, 258 098 mt and 155 272 mt respectively. The biggest river, the Yangtze, flows in these five provinces.

Aquaculture

In 1999, the national marine aquaculture covered an area of 1.1 million ha, consisting of 71 000 ha of fish culture, 238 000 ha of crustaceans, 711 000 ha of shellfish, and 55 000 ha of algae.

With the rapid development of the Chinese shrimp and scallop culture industry, Chinese shrimp culture production exceeded 200 000 mt in 1992. However, production sharply declined to less than 100 000 mt in 1993, due to the large-scale outbreak of shrimp disease as it happened throughout the rest of the world.

In recent years the production has risen to the highest historical level. In 1999, the shellfish output amounted to 7.93 million mt, and 1.17 million mt for algae. The top 10 species harvested in marine culture were oysters (2 988 000 mt), clams (1 797 000 mt), seaweed (895 000 mt), scallops (712 000 mt), mussels (618 000 mt), razor clams (479 000 mt), fish (339 000 mt), blood clams (188 000 mt), Chinese shrimp (171 000 mt) and laver (41,000 mt). Some new species have also been introduced to the marine culture industry in recent years, such as genuine porgy, black porgy, tilapia, grouper, mud crab, etc.

China has a long history of freshwater culture. In 1999, the total freshwater culture area was about 5.2 million ha, including 2.1 million ha of ponds (40.3 percent of the total area), 1.6 million ha of reservoirs, 0.9 million ha of lakes and 0.4 million ha of rivers. In addition, there are 2 million ha of paddy-cum-fish field areas not included. In 1999, the freshwater culture output reached 14.2 million mt, accounting for 59.3 percent of the total Chinese aquaculture output. Of this total, 10.2 million mt (71.8 percent) from pond culture, 1.4 million mt from reservoir culture, 0.88 million mt from lake culture, 0.6 million mt from river culture and 0.6 million tons from paddy-cum-fish field culture.

Compared with 1990, the freshwater culture area increased by 26.3 percent, with a 218.4 percent increment in production. The unit output of the four kinds of culture, namely, in ponds, lakes, reservoirs and rivers, has increased from 1 126 kg/ha in 1990 to 2 603 kg/ha in 1999 - more than double.

There has been a basic change in the field of freshwater culture, whereby emphasis has shifted from quantity to quality and profit, thereby developing both high quality and efficient aquaculture. Today's successful experiences are in polyculture, intensive culture and culture for exotic species. More than 30 high value species have been exploited or introduced to aquaculture; besides the traditional cultivated species such as silver carp, big head carp, grass carp, black carp, common carp, crucian carp, Chinese breams, dace and salmon, dozens of species are now being scale- cultivated, such as tilapia, rainbow trout, eel, catfish, snakehead, *Collosoma brachypomus*, perch, finless eel, American

Channel Catfish, Japanese Prussian carp, German mirror carp, Indian carp, labeo, peled, silver salmon, sturgeon, freshwater crab, Oriental river prawn, giant Malaysian prawn, white shrimp, soft-shelled turtle, frog, pearl culture, etc. Some artificial selected or cultivated new varieties, such as Jianli carp, Yingli carp, Pengzeji carp, Gaohan carp and triploid sterile carp, have reached the production stage.

Paddy-cum-fish culture and paddy-cum-crab culture are regarded as effective methods for the comprehensive utilization of agricultural resources.

Utilization of the catch

In 1999, total processed aquatic products amounted to 6.2 million mt, accounting for only 15.1 percent of total aquatic production, while the remaining 85 percent were sold fresh. The processed aquatic products are mainly frozen products, as well as dried, salted, canned products, sarumi and sarumi products, animal protein feed, additives, aquatic flavouring, aquatic medicine and other processed aquatic products. In 1999, there were a total of 6 443 fish processing plants in China.

State of fishing industry

Although the total marine catch has continued to increase, the catch of high- valued species has decreased. As a result, fisherman have been experiencing economic difficulties. Due to the decline in marine fishery resources, and the continued increase in fishing activities, China has been carrying out strategic adjustments to its marine capture structure. The industry is obliged to follow the strict rule of *Zero Increase,* and to reduce its fishing activities by carrying out an overall moratorium in coastal waters for two to three months each summer.

With regard to fresh water fisheries, resources have sharply declined, due to increase in fishing activities, building of dams, increased expansion of farming land and water pollution from industrial, agricultural and human waste. Since the 1980′s, the inland capture industry achieved increases by means of the following methods:

- improving management; enhancing comprehensive control and water environment control; giving up farming land to lakes and fisheries;
- establishing moratoriums in certain lakes; artificially releasing fish in order to conduct stock enhancement in open water; construction of fishery migration passes;
- modifying fishing vessels and fishing gear, conserving and utilizing inland fishing resources;
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restructuring the lake and reservoir management system.

Economic role of the fishing industry

The total value of national fisheries products reached US$ 30.52 billion or 10.3 percent of the national agricultural output. In 1999, the labour force engaged in fishery amounted to 12.57 million persons, with 6.52 million part-time workers; 59 percent of the full-time workers were engaged in aquaculture.

DEVELOPMENT PROSPECTS

The rapid development of Chinese fisheries over the past 20 years indicates that China has great potential for development in this industry. In line with the development situation in the industry, China has made continual readjustments in her objectives and strategy. By doing so, the development of the industry met the present requirements, as more attention has been paid to sustainable utilization, environmental protection and human health. The people involved in the industry chose to enhance communications and cooperation with the outside world and to merge into the global economy. China has gradually created an industry framework that is suitable to Chinese conditions in which aquaculture occupies a dominant part.

The general development goal for the years 2001~2005 is: to adhere to the guiding principles of "*Give Priority to Aquaculture and Develop Capture Fishery and Processing Simultaneously, Take Measures and Lay Emphasis in Light of Local Conditions*" . In addition, the following policies will be used to guide fishery development: further improve the fisheries industry structure, speed up the development of aquaculture, devote major efforts to spreading healthy cultivation methods, place emphasis on developing efficient ecological aquaculture; in suitable places, energetically develop technology and capital concentration on raceway fish farming; develop leisure fisheries. Aquaculture output is expected to reach 67 percent of the total fisheries output in 2005; the offshore fishing effort will be strictly controlled; marine capture fishery catches will be prevented from increasing; distant water fisheries will be developed; the aquatic processing industry will be developed; aquatic processed products will account for 40 percent of the total catch. During the next five-year period, the construction of fishery infrastructures and service systems will be enhanced, aquatic product quality and the safety control and inspection system will be established and completed; aquatic high quality and fine seed rate will reach 70 percent; major aquaculture diseases will be effectively prevented and controlled; the fisheries legal system will be strengthened. The objective for the next 5~10 years is that the fisheries of China will reach a new level, with a healthy capture fishery, advanced aquaculture, a newly developed leisure fishery and a sound fishery ecological environment.

FISHERIES MANAGEMENT

After the United Nations Convention on the Law of the Sea (UNCLOS) came into force, China decided to carry out her Exclusive Economic Zone management system. Before reaching agreements with relevant countries on the issue of marine delimitation, China

conducted bilateral negotiations with neighbouring countries (including Japan and Korea) separately, in order to make fisheries arrangement in the Yellow Sea and the East China Sea. (The Fisheries Cooperation Agreement between the Government of China and the Government of Japan came into force on 1 June 2000; the Fisheries Agreement between the Government of China and the Government of the Republic of Korea came into force on 30 June 2001.)

On the basis of the new marine management system, China started to amend her domestic Fisheries Law (the amended Fisheries Law came into force on 1 December 2000). The main principles of the amendment are: to gradually conduct quota management of the major fishing resources in the national jurisdiction of China; to strictly punish the violation of fisheries laws and regulations; to strengthen the management of aquaculture, etc.

In view of the decline of marine fisheries resources, China sought to regulate her marine

capture fishery structure, as follows:

- Strict control of offshore fishing activities, rectification of the inshore fishing order, ensuring a zero increase of the marine capture catch, limitation of trawler operations through an overall moratorium in coastal waters (3 month's moratorium from 15 June to 15 September in the Yellow Sea and the East China Sea, 2 month's moratorium from 1 June to 1 August in the South China Sea; more than 100 000 vessels and 1 million fishermen are effected by the moratoriums); strict implementation of the fishing vessel power control quota issued by the Government, strict enforcement of the approval and inspection system on fishing vessel renewal and replacement; strengthening of the management of fishing permits (all fishing operators must be trained by the fisheries administration and be issued a qualification certificate); resolute checking and penalization of "three no" fishing vessels (no boat name and number, no home port, no boat certification) which are unauthorized and built without permission.

- Protection of offshore fisheries resources, improvement of fishing ground environment, control of water pollution, exploitation of new fishing grounds, and enhancement of the resources survey.

RESEARCH

By the end of the 20th century, Chinese fisheries techniques and education had further evolved into a system with research, extension, education and training which could meet the needs of different levels and various fields. There are more than 210 institutes above the provincial and city level in the country, including the Academy of Fishery Science of China and its three subordinate research institutes established in accordance with regional seas, five research institutes established in accordance with river systems, the Fishery Machinery and Instruction Research Institute, the Fishery Engineer Research

Institute, four fishery stock enhancement centers, etc. China also has regional fishery research institutes in each province, city and autonomous region as well as the Marine Research Institutes under the Science Academy of China, etc. In the field of fisheries education, there are 29 colleges and universities including Shanghai Fisheries University, Dalian Fisheries College, Qingdao Marine University, etc. Furthermore, there are about 3 000 fishery technical extension services nationwide.

More attention is paid to the development and adoption of fishery technology, to enhance the combination of techniques with producing and marketing and to make more contact with enterprises. In recent years, the main characteristics of fishery technique achievements have been: further reduction of technical difficulties; preliminary establishment of technology covering biology, species, feed, disease prevention and treatment; aquaculture in open water areas, aquaculture in mud flats, paddy-cum-fish culture, raceway fish farming, aquaculture in saline-alkali land, resource assessment, polyploid fish cultivation, environmental inspection, light freezing to keep products fresh, fish genetic, fishing gear, etc. The hygienic criteria for the edible aquatic products and aquatic product quality are being formulated and a quality certification system is being established.

INTERNATIONAL COOPERATION

While developing her domestic fishery economy, China actively participates as well in international fisheries affairs: from 1992, China negotiated with the USA, Russia, Japan, Korea and Poland on the issue of establishing Pollack Resource Conservation and Management Mechanism in the Central Bering Sea, and finally formed " *The Convention on Conservation and Management of Pollack Resources in the Central Bering Sea"*, which is agreeable to each party; joining the "International Commission for the Conservation of Atlantic Tunas" (ICCAT) in 1996; joining the "Indian Ocean Tunas Commission" (IOTC); actively participated in the "Multilateral High Level Conference" (MHLC) called by the Forum Fisheries Agency (FFA). China also actively participated with other relevant international organizations in the field of fisheries resource protection, such as: the International Whaling Commission (IWC), the Commission of International Trade on Endangered Species (CITES), etc. Meanwhile, as a member of the Asia-Pacific Economic Cooperation (APEC) Fisheries Work Group and the North Pacific Marine Science Organization •PICES•, China contributes in promoting cooperation among members. With regard to bilateral fisheries cooperation, some Chinese fisheries companies increased their catch quota, or obtained permission to fish in other countries′ national jurisdictions, through non-governmental cooperation scheme. In order to help in solidifying international fisheries cooperation, the government of China has widely sought fisheries cooperation and signed governmental fisheries cooperation agreements with several countries. China has also signed dozens of bilateral fisheries cooperation agreements with relevant nations, including Japan, Korea, Vietnam, the United States of America, Russia, Papua New Guinea, Mauritania, Guinea and Yemen.

The Government of China has provided a beneficial cooperative environment for foreign companies to enable them to invest and create enterprises in the fishery industry. Chinese aquatic products have been exported to 77 countries, and China imports aquatic products from 69 countries. Since China adopted a policy of reform and opening to the

outside world, international cooperation in her fisheries technical field has opened unprecedented new prospects. Technical cooperation projects have increased in number, enlarged in scale and shown variety in style. In the past 20 years, China has introduced about 60 species for aquaculture and live feed from other countries. After much research, breeding and trials, about 20 percent of the imported species have been spread to suitable regions. In addition, China not only introduced her particular fish species to other countries, but transferred the technology of freshwater aquaculture and artificial breeding to other countries as well.

AID

During this period, foreign aid to the fisheries industry has come from FAO and the governments of Norway and Japan. A completed FAO project, namely, the "Healthy Shrimp Farming Project" in Luannan County, Hebei Province, totalled approximately US$ 300 000. The Government of Norway provided the *Beidou* Project to assist cooperative research and training in marine fisheries in 1991, 1993 and 1997, for a total amount of 14.85 million Norwegian kronor. The government of Japan provided three similar projects related to marine stock enhancement in three coastal provinces, Fujian, Guangdong and Shandong, amounting to approximately US$ 2 million for each project. The projects in Fujian and Guangdong were completed, while the project in Shandong is ongoing.

INTERNET LINKS

Information Net of Ministry of Agriculture of China	http://www.argi.gov.cn
Chinese Agricultural Technical Information Service System	http://www.caas.net.cn
National Fisheries Net	http://www.sino-fishery.com
Chinese Fisheries Technical Information Net (Chinese Academy of Fisheries Science)	http://www.cafs.ac.cn
Chinese Fisheries Society	http://www.fisheries.moa.gov.cn
Chinese Fisheries Net (Shanghai Fisheries University)	http://www.china-fishery.net http://www.fisheries.com.cn
Chinese Fisheries Information Net (Chinese Fishery)	http://www.ifishery.com.cn E-mail:magazine@ifishery.com
Chinese Fishery Net	http://www.china-fish,com
Chinese Fisheries News Net	http://www.fishery.online.sh.cn http://www.china-fisheries.org
Freshwater Fisheries Research Centre of Chinese Academy of Fisheries Science	http://www.ffrc.wx.net.cn
Chinese Fisheries Information Net (Scientific Fish Culture)	http://www.fish.net.cn

Fishery Machinery and Instruction Research Institute of Chinese Academy of Fisheries Science	http://www.fmiri.com
South China Sea Fisheries Research Institute of Chinese Academy of Fisheries Science	http://www.scsio.ac.cn
Animal Research Institute of Chinese Science Academy	http://www.ioz.ac.cn
Oceanic Research Institute of Chinese Science Academy	http://www.qdio.ac.cn
Aquatic Living Research Institute of Chinese Science Academy	http://www.ihb.ac.cn
Chinese Marine Information Net	http//http://www.nmdis.gov.cn
Shanghai Fisheries University	http://www.shfu.edu.cn
Daliang Fisheries College	http://www.dmp.com.cn
Qingdao Ocean University	http://www.ouqd.edu.cn
Zhanjiang Ocean University	http://www.zjou.edu.cn
Chinese Agriculture University	http://www.cau.edu.cn
South-West China Agriculture University	http://www.swau.edu.cn
Middle China Agriculture University	http://www.hzau.edu.cn
Shandong Agriculture University	http://www.sdau.edu.cn
Nanjing Agriculture University	http://www.njau.edu.cn
Hebei Agriculture University	http://www.hebau.edu.cn
Fujian Agriculture University	http://www.fjau.cn
Hubei Agriculture College	http://www.hbnxy.org.cn
Xiamen University	http://www.xmu.edu.cn
Zhongshan University	http://www.zsu.edu.cn
Jimei University	http://www.jmu.edu.cn
South China Teachers University	http://www.scnu.edu.cn
Fujian Fisheries Research Institute	http://www.fjscs.ac.cn
Weihai Fisheries Research Institute	http://www.yuwangaquatic.com
National Aquatic Product Quality Superintendence and Inspection Centre	http://www.china-fish.net.cn
Chinese Fishing Vessel Inspection and Fishing Engine Information Net	http://www.chinaaycj.org
Chinese Fisheries Market Information Net	http://www.argi.gov.cn-fish
Dalian Marine Fishing Company	http://www.lfg.com.cn
Yantai Marine Fishing Company of Chinese Fisheries Group	http://www.yantaifisheries.com.cn

[1] Estimate based on Chinese Fisheries (October, 1992 of FAO). No legal significance attaches to this assumption

[2] Rate of exchange(1999): US$ 100 = 827 yuan (RMB)

[3] This figure includes some 6 million tons of fish utilised for direct feed in aquaculture

[4] In 2000 China regained the level of imports of fish meal attained in 1997 (1.1 million tons in product weight, equivalent to some 5 million tons in live weight, becoming the leading world importer of fish meal)