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ECONOMIC ASPECTS OF FRESHWATER FISHING IN CHINA, (U)  
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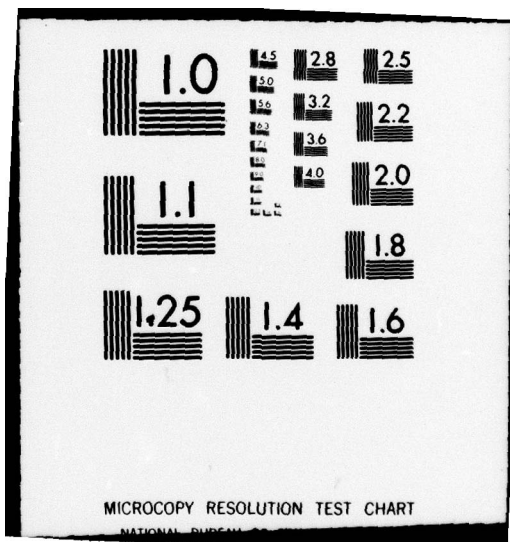
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Producing enough food for its people is a major concern for China. This paper discusses 3 development aspects of freshwater fishing in China: 1) fishing methods, 2) fish marketing practices and 3) fisheries production. China's rice paddy fields proved to be an effective fishing method. The deep water and shallow water methods are 2 methods employed in these fields. The fish thrive in these fields because of the good supply of nutrients found (Continued)

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20. ABSTRACT (Continued)

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there. The fields also benefit from the fish. The fish are a good source of fertilizer and they also aerate the soil.

With more fish being produced, so has the expansion of fish marketing practices. These practices include selling of the fish and the many by-products of the fish. Freezing and canning fish and fish by-products allows China to expand its fishing market both within and out of the country.

The discovery of new areas and methods have contributed to China's expansion. China will always search for new and better ways to expand its fishing industry.

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## Economic Aspects of Freshwater

### Fishing in China

Freshwater fish production is a culture in China which is easily learned. Freshwater fish production includes waterways such as ponds and rice patties.

Pond cultures have been in China since the 5th century B.C. Tao Chu-king developed a method which involved placing fish eggs of fry into earthenware vessels, located in rearing pools or paddy fields. These rearing ponds were 5-12 feet deep with a north side elevation for protection purposes. The surrounding pond areas were cultivated with plants that were beneficial for the fish. Tortoises, freshwater crustacea, and molluscs were added directly to the pond for the benefit of the fish fry. These fry were fed egg yolks, fine bran, or beans ground to a powder. Once the fry attained a length of 12 inches, they were transferred from their earthenware vessels to the pond. Here they were fed young grass. It was necessary that the kind of fish reared in these ponds be herbivores because of their characterized fast growth.

Rearing fish in rice paddy fields dates back into China History. It has been proven a productive means of rearing fish. It not only does not harm crop cultivation, but enhances it by the fish feces, aeration of the soil caused by fish movement, and insect control.

There are two methods of paddy field fish culture. The "deep water" method characterized by a water depth of two feet. This method is practiced in the Szechwan, Kwaichow, Kwangsi and Hupeh providences. The main species reared with this type of condition are the common carp and

the gold carp. However, in Hunan there are attempts being made to culture grass carp, silver carp and big head.

The "shallow water" process is used in the south, Kwangtung and other providences. This process consists of digging cross-shape ditches that are eight inches deep with fish holes of two to three feet deep. The purpose of the holes is to provide cooler water for the fish. In Kwangtung, they add reeds and wood to the holes to provide a nest. The same species as used in the "deep water" method are cultivated.

These fish require a minimum amount of two to three inches of water. When planning fish rearing there are 4 characteristics of the rice paddy:

- "a) Winter water fields which never dry and which were said to be ideal for culture;
- b) Wild fields near lakes and rivers, also suitable for all year culture;
- c) Irrigated flat land fields which may either be drained after the harvesting, or the water left for the following crop; and
- d) Terraced fields in which fish culture depends on the water level." (p. 40) Using rice paddys for fish fry has steadily increased over the years.

As China has been increasing its fish production so have the problems associated with it. Some of these problems include: "a) shortage of fry (which was being solved through artificial spawing): b) maintaining the water level in ponds during the dry season (the solution to this problem is sought in digging holes for fish to gather in during such a period: this has produced another problem, over crowding) c) with



industrialization of the country the problem of water pollution has become urgent and must be solved before serious damage results." (p. 44, & 45)

China has created solutions, through slogans which contain informative instructions for improving fish production. These slogans are divided into three groups and are referred to as "one-four, two-eights" they are:

**I. Four General Principles**

- 1) Fish culture should be practiced everywhere.
- 2) The necessary manpower should be made available.
- 3) Supply of manpower for single undertakings should be provided.
- 4) Labour efficiency should be improved through harder work and better organization.

**II. Eight Principles for Fish Culture**

- 1) Make the pool sufficiently deep.
- 2) Eliminate stagnation of water.
- 3) Ensure the close laying of eggs and prolific spawning.
- 4) Promote good breeds.
- 5) Provide sufficient food.
- 6) Modernize tools.
- 7) Eliminate disease.
- 8) Strengthen the management of pools.

**III. Eight Principles for fishing**

- 1) Practice multiple-purpose operations.
- 2) Locate fishing grounds.
- 3) Renovate techniques.

- 4) Observe safety measures.
- 5) Encourage growth of resources.
- 6) Mechanize operations.
- 7) Use steel cables for net hauling.
- 8) Direct operations by modern means of communication. (p 45 & 46)

These slogans have improved the quality and quantity of fish production in every China province.

#### Fish Marketing Practices

Aquatic product markets in China, first opened in 1956 as a result of decontrol of the fishing market by the government. These markets flourished in the large cities such as Sunkiang, Soochow, Tangchow, Chekiang and Anhwei. Once these markets were established the prices for the main species of fish (black carp and culter) were raised but were kept under government control. The prices for secondary type of fishes were left free to fluctuate.

The fish in the Northern part of China are usually sold in live fresh or frozen form, while the subtropical regions usually sold its' fish in the deep-salted or dried form. The frozen fish industry is increasing about 60,000 tons a year. China has kept up with this increase by producing ice plants.

There are approximately 100 products from the fishing industry, including fish oil preparates, capsules, vitamin emulsions, sweet pastes and multivitamin candies. The production these products was considered to be sufficient for the people of China. However, when exportation began so did standardization of the quality of these products.



The canning industry in China has been expanding rapidly to deal with the needs at home as well as in exporting. During the decade of the 1950's, the canning industry became a valuable industry. The Choushan Marine Products cannery is one of the most important canning plants by canning 75 tons a day. They can eels in tomato sauce, croaker in oil spiced hairtail fish, braised culture fish.

The improvements with refrigeration and the canning industry has contributed to the increase in exportation. The major country in which China exports is Russia. China also exports large quantities to Great Britain and Czechoslovakia.

#### Fisheries Production

The following table shows the output of aquatic products in China during the years of 1934-1959.

Table 1. Output of aquatic products in China.

| YEAR | PLANNED OUTPUT<br>(metric tons) | ATTAINED OUTPUT<br>(metric tons) |
|------|---------------------------------|----------------------------------|
| 1934 | -                               | 1,500,000                        |
| 1949 | -                               | 450,000                          |
| 1950 | 736,000                         | 911,000                          |
| 1951 | 1,100,000                       | 1,330,000                        |
| 1952 | -                               | 1,660,000<br>(1,710,000)*        |
| 1953 | -                               | 1,890,000<br>(1,900,000)*        |
| 1954 | -                               | 2,160,000<br>(2,290,000)*        |

| YEAR | PLANNED OUTPUT<br>(metric tons) | ATTAINED OUTPUT<br>(metric tons)                          |
|------|---------------------------------|---|
| 1955 | -                               | 2,500,000   |
| 1956 | 2,580,000                       | 2,550,000<br>(2,640,000)*                                 |
| 1957 | 2,807,000<br>(2,816,000)        | 2,950,000<br>(3,100,000)*<br>(3,120,000)*<br>(2,980,000)* |
| 1958 | -                               | 4,060,000<br>(6,020,000)*<br>(8,200,000)*                 |
| 1959 | -                               | 5,020,000   |

\* = estimates of output given by alternate sources.

The year 1934 proved to be the highest peak year until 1952. The years between 1952 through 1959 showed a dramatic increase of aquatic products. The following factors can be attributed to this growth.

According to Kao Wenhva:

- "a) Expansion of the fishing industry took place not only along the coast, but also in all areas of China.
- b) New varieties of aquatic products were introduced and uses found for them.
- c) Where as in the past the main product was fish, the emphasis is now spread to include fish, clams, marine plants, with aquatic products being used widely as raw materials for individual processing.



d) Modernization of craft and year accounted for some increase.

e) A systematic summary past experience was made and put in an easily acceptable form of eight character solgans ensuring their popularization and application.

f) There was an increase in the number of experts available to advise the fishing industry.

g) There was a rapid increase in the area used for fish culture which reached 7.8 million hectare by 1960 and way still increasing." (p. 145)  
Other significant factors have affected fish production. Some of them are 1) the increase of women workers, 2) modernization of equipment 3) a better organized and centralized organization and 4) the new out look of the China people in using modern fishing technique.

China has improved it's fishing production culture dramatically during the last 30 years, increase was due to the economic need to feed the China population. The reasons behind the great expansion of fish production during the 1950's was due to the discovery of new areas, and methods. However this is now becoming exhausted. China is now searching for new areas of fish production and will most likely turn to the ocean.

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