

Assessment report of effectiveness of license system and recommendations for improvement of license system in China

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1. Introduction

License system has been conducted in the Yellow Sea (YS) since the 1980s, it still plays an important role in fishery management. The license system reduces the number of fishing vessels and gears by common-of-piscary right, which can facilitate to reach the goal of TAC limit. The license system is easily to be conducted, but the effectiveness of license system is not well addressed until now. Our project is to achieve the goals of ecosystem-based, environmentally-sustainable management and use of the Yellow Sea Large Marine Ecosystem (YSLME) and its watershed by reducing development stress and promoting sustainable exploitation of the ecosystem from a densely populated, heavily urbanized, and industrialized semi-enclosed shelf sea, and the project focuses on sustainable fisheries management and reducing stress to the ecosystem. So, we will assess the effectiveness of license system, including legal and policy adequacy, institutional capacity, individual capacity, availability of capacity, fish landings changes, and give some recommendations to improve the license system in line with the targets of the YSLME Strategic Action Programme.

2. Background

FAO pointed out that the growth rate of global marine capture was approaching zero in 1994, which means traditional fishery resources was approaching the maximum yield. If no measure was taken to control the fishing intensity, traditional marine fishery resources will face complete deterioration, ecological unbalance and destruction of ecology environment. After then, the world marine capture catch kept between 77 million tons and 88 million tons. In the recent decade, the catch was around 80 million tons. According to the new FAO Fishery and Aquaculture Statistics yearbook published in 2018, global

marine capture catch was 79.3 million tons in 2016, reduced nearly 2 million tons compared with 2015.

China plays a great important role in sustainable exploitation of marine fishery resources. In the last two decades, the marine capture catch of China showed a declining tendency. According to China fishery statistical yearbooks (Fig.1), the coastal capture catch was declining between 2006 and 2008, and then kept stable between 2009 and 2015. In 2016, the coastal capture catch decreased further. For distant-water capture, the catch kept stable between 2003 and 2012, and then increased a little after 2013. Furthermore, the total marine aquaculture catch has exceeded coastal marine capture catch (except distant-water capture) since 2004, and kept stable increasing after 2007.

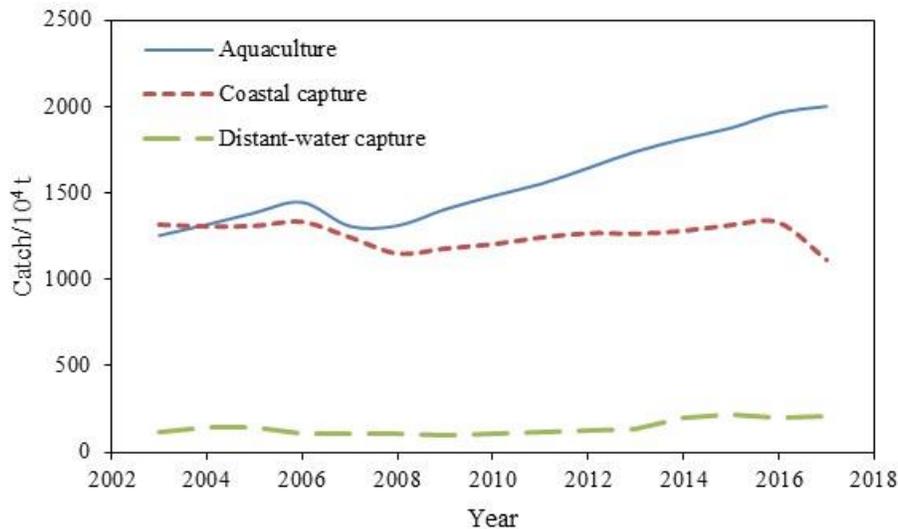


Fig 1 Catch tendency of marine fisheries between 2003 and 2017

As a big fishery country in the world, China plays an indispensable and important role in the world marine fishery resources management. In order to exploit fishery resources reasonably and sustainably, China has adopted a series of management systems for fishery since 1950s, such as midsummer moratorium system, license system, fishing intensity control system, fishing quota system and fishery resource enhancement system. License system is one of the main system to control marine capture catch by controlling fishing

intensity. It provides an important guarantee for the sustainable utilization of China's marine fishery resources. In this report, we will introduce the development of the license system in China and its impact on marine capture catch, on the number, tonnage and horsepower of marine fishing vessels, as well as on the number and income of marine fishermen. We did not include Zhejiang Province into this report because the fishing activities of Zhejiang mainly carried out in the East China Sea, while the Yellow Sea only accounts for a small proportion.

3. Results

3.1 The development of the license system in China

License system is to protect and reasonably utilize fishery resources, to control the fishing intensity, to adjust the fishery production structure, to maintain fishery production order and to protect the legal interest of producers. The license system is applied to citizen, legal person or other organization. Fishery administrative authority will issue licenses to applicants who meet the legal requirements for capturing. The license system is an input control and entry restriction system. By restricting the number or production capacity of fishing vessels and gears, the license system can control the fishing intensity at a level corresponding to a certain resource abundance. For the control of the number of fishing unit and production capacity, usually the license system will restrict the number of fishing licenses issued or restrict the fishing period, location, species and gear type and size.

In 1986, "Fisheries Law of the People's Republic of China" issued and implemented by the National People's Congress. Formalized license system pointed out that any unit or individual that intends to engage in inland water or inshore fishing must first apply to departments of fishery administration for fishing licenses. In 1987, "Detailed Rules for the Implementation of the Fisheries Law of the People's Republic of China" issued by Ministry of Agriculture, Animal Husbandry and Fisheries made it clearer that China implemented license system for fishing. In 2000, the amended "Fisheries Law of the People's Republic of China" further strengthen the license system, and specify the requirements for obtaining fishing license. According to the new "Fisheries Law of the People's Republic of China", fishing vessels must have "Fishing vessel inspection certificate", "Fishing vessel registration certificate" and "fishing license" simultaneously that can be engaged in fishing

activities. Fishing vessels that have part of the “three certificates” and those do not have the “three certificates” are IUU vessels. In 2002, Ministry of Agriculture issued “fishing license administrative provisions” (put into force in 1st December, 2002). The license system has been further strengthened, and pointed out that the requirements for obtaining fishing license and more stringent and detailed regulations for license management. The detailed regulations specified the fishing operation type, location, period, number and size of gears and target species, and proposed “fishing net instrument index management”. It also restrict the number of vessels, horsepower of the main engine and the maximum number of fishing nets and other fishing gears. The quantity of fishing vessels and total horsepower should be controlled by these regulations. In 2004, 2007 and 2013, Ministry of Agriculture has amended the fishing license regulations for several times.

China implemented nontransferable license system, which means fishing licenses are forbidden to be bought, sold, leased or transferred in other forms. The license system of China is a system that fishing license correspond directly to fishing vessels, i.e. “one vessel one license”. Applicants of the fishing license are the owners of the fishing vessel. Applicants become license holders after authorization. License holders should be responsible for fishing activities that they are applying for and should undertake the corresponding legal responsibility. In theory, this license system can achieve the “Double control” goal through restricting the fishing license.

For example, when authorizing the fishing license, Qingdao Municipal Ocean and Fisheries Administration followed the requirements of “fishing license administrative provisions”, and strictly checked the name and ID number of fishing vessels, and checked the acceptance of vessel inspection and authorization of fishing license. At the same time, they used “joint inspection by land and sea” method to check if the horsepower and fishing method of fishing vessels at sea are consistent with that in the port. If there are any discrepancy, the owner of the fishing vessel needs to make corrections within a time limit and the fishing vessel is prohibited to leave the port. Qingdao authorities also checked the shipyard and banned beach shipbuilding, and constrained appearance of IUU fishing vessels. All these regulations promoted the standardization of fishing license.

As one of the core systems of protecting marine fishery resources of China, license system has implemented for decades, and has been improved a lot. It has played a great role in promoting China's fishery production and helped fishermen to improve their income.

3.2 Impact of license system on total aquatic production (marine and inland) among provinces

Based on China Fishery Statistical Yearbook published by Ministry of Agriculture and Rural Affairs of the People's Republic of China (former Ministry of Agriculture of the People's Republic of China), we analyzed the total aquatic production (marine and inland) from 2002 to 2017 for each provinces (including Liaoning, Tianjin, Hebei, Shandong and Jiangsu) that had fishing activities in the Yellow Sea. In general, total aquatic production of each province has an increasing tendency except Tianjin (Fig.2). Liaoning, Hebei and Shandong declined a little from 2006 to 2007 and from 2016 to 2017. Jiangsu had a stable increasing tendency all the time, and Tianjin had a relative stable tendency. For total marine aquaculture production, each province had an increasing tendency except Tianjin and only Liaoning and Shandong declined a little between 2006 and 2007 (Fig.3). Statistical data showed that the coastal capture production had declining tendency for all provinces (Fig.4). For Liaoning and Shandong, the coastal capture production increased a little between 2003 and 2005, and declined sharply in the following two years, and then declined every year (there was a sharp decline between 2016 and 2017). Tianjin, Hebei and Jiangsu showed relative stable tendency for coastal capture production. For distant-water fisheries (Fig.5), Liaoning and Shandong had large fluctuations. Tianjin, Hebei and Jiangsu changed insignificantly, the production declined for the first few years and kept stable in the middle and then increased recently.

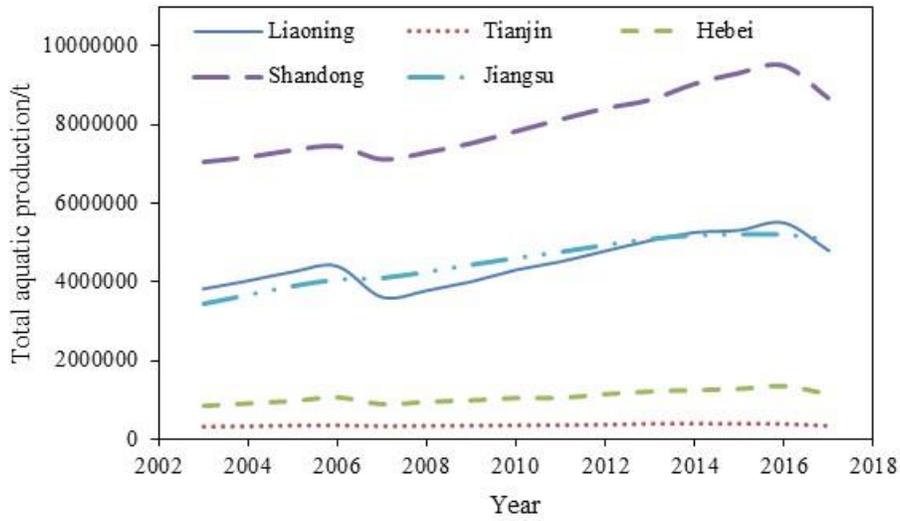


Fig 2 Total aquatic production (including marine and inland) of provinces that had fishing activities in the Yellow Sea

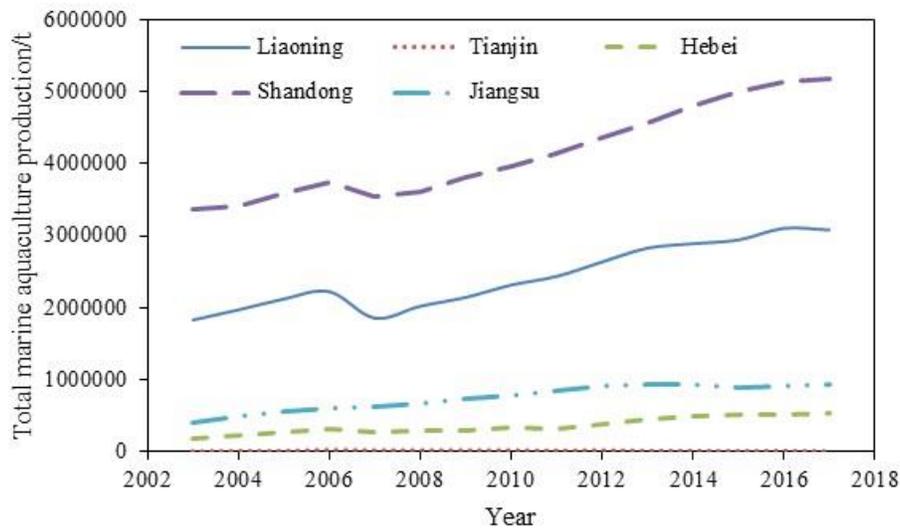


Fig 3 Total marine aquaculture production of provinces that had fishing activities in the Yellow Sea

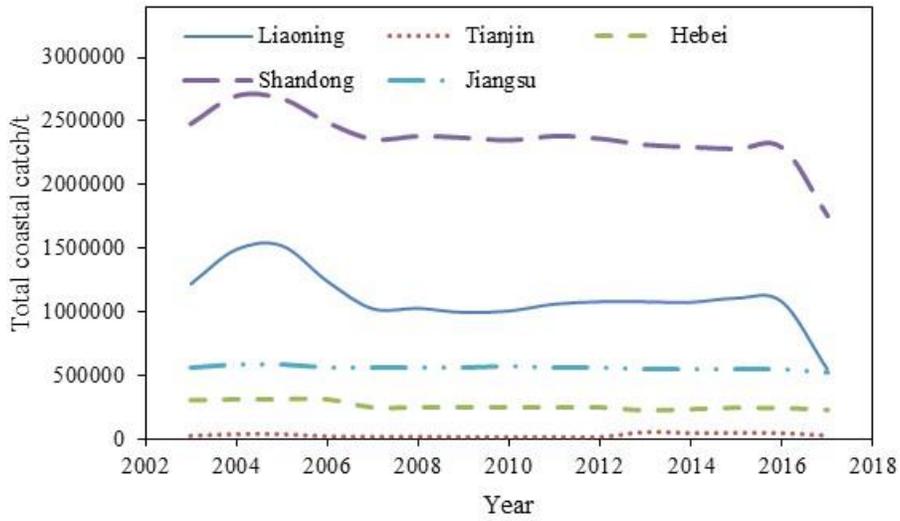


Fig 4 Total coastal capture production of provinces that had fishing activities in the Yellow Sea

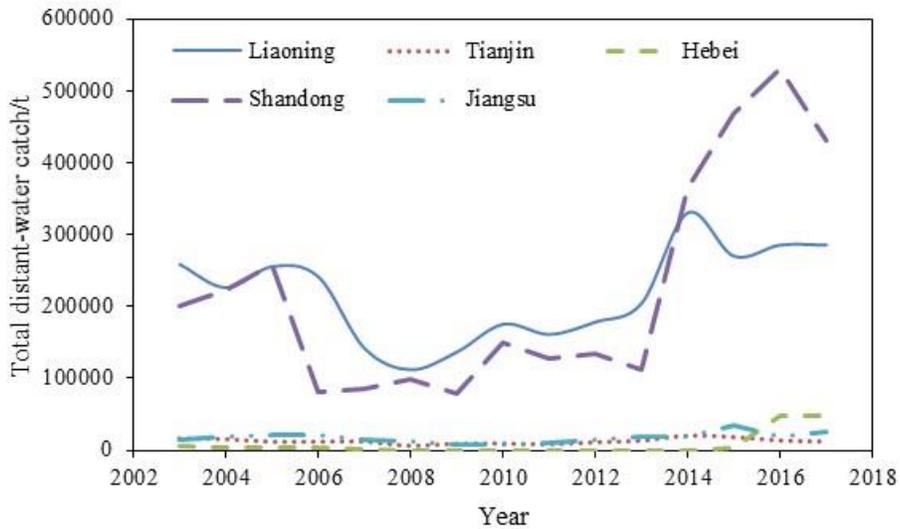


Fig 5 Total distant-water capture production of provinces that had fishing activities in the Yellow Sea

3.3 Impact of license system on marine motor fishing vessels among provinces

The implementation of license system have directly impact on the number, tonnage and horsepower of fishing vessels. Based on China Fishery Statistical Yearbook, since 2003, the total quantity, tonnage and horsepower of fishing vessels of provinces that had fishing activities in the Yellow Sea were different (Fig.6, 7, 8). The total quantity of marine motor fishing vessels had a declining tendency for each province (Fig.6). The total tonnage of marine motor fishing vessels had an increasing tendency for each province, and Tianjin, Hebei and Jiangsu increased much less than other provinces (Fig.7). The total horsepower of marine motor fishing vessels increased in Liaoning and Shandong, and it changed a little in Tianjin, Hebei and Jiangsu (Fig.8). Therefore, we concluded that license system has already restricted the quantity of marine fishing vessels that had fishing activities in the Yellow Sea. However, the total tonnage and horsepower increased, which means management still needs to be strengthened to control the fishing vessel quantity, tonnage and horsepower in a reasonable range, so that the fishery resources in the Yellow Sea can be utilized reasonable and sustainable.

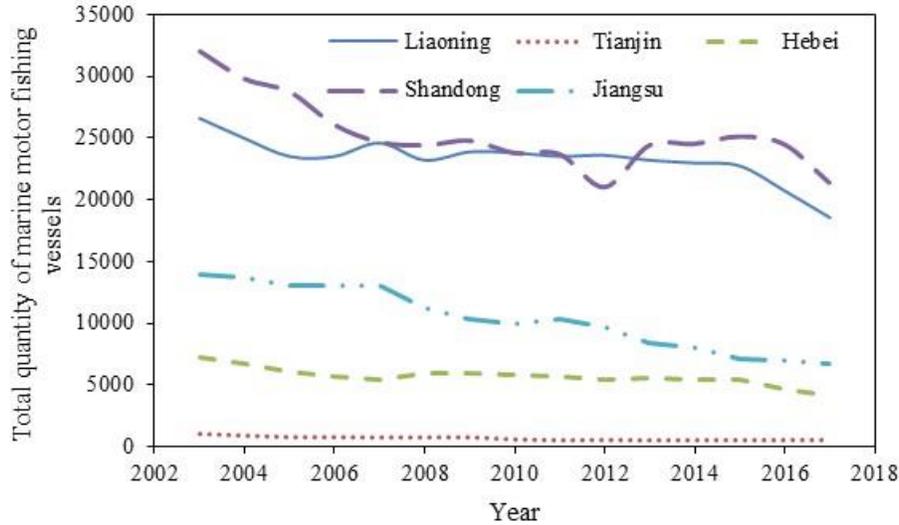


Fig 6 Total quantity of marine motor fishing vessels of provinces that had fishing activities in the Yellow Sea

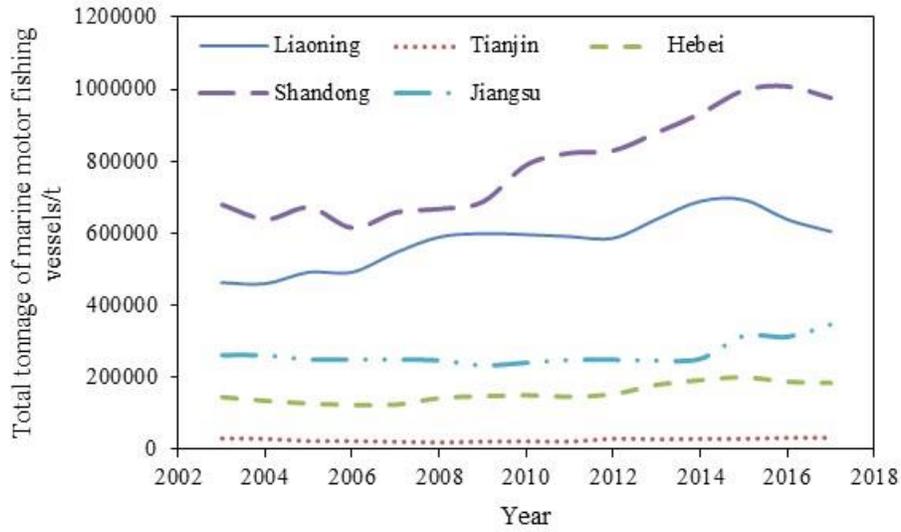


Fig 7 Total tonnage of marine motor fishing vessels of provinces that had fishing activities in the Yellow Sea

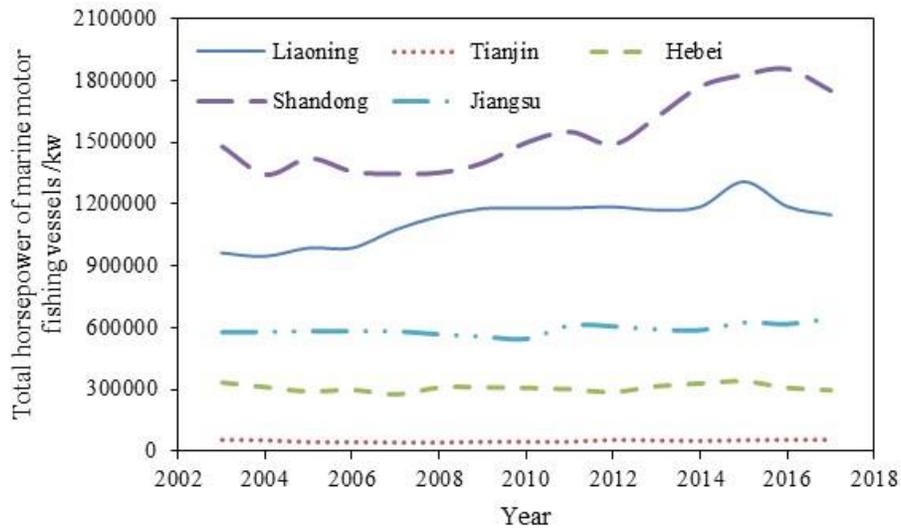


Fig 8 Total horsepower of marine motor fishing vessels of provinces that had fishing activities in the Yellow Sea

3.4 Fisherman quantity and income of provinces that had fishing activities in the Yellow Sea

Based on China Fishery Statistical Yearbook, fisherman quantity of provinces that had fishing activities in the Yellow Sea had different tendencies (Fig.9). For Shandong, fisherman quantity was stable between 2003 and 2007, then increased sharply between 2007 and 2012, and kept stable again after the increasing. Similarly, for Liaoning, fisherman quantity was stable between 2007 and 2009, then kept increasing tendency. For Hebei, fisherman quantity was stable between 2003 and 2007, and increased between 2007 and 2008, then kept stable again. The fisherman quantity of Hebei and Tianjin was relative stable compared to other provinces.

Based on China Fishery Statistical Yearbook, we analyzed the income of fisherman of provinces that had fishing activities in the Yellow Sea. It showed that the income of fisherman increased gradually for all provinces (Fig.10). Fisherman of Tianjin had the highest income, while those of Hebei had the lowest income. The ranking of Liaoning, Shandong and Jiangsu changed with time. Therefore, we concluded that although China has taken a series of measures to restrict fisherman getting into fishery, it has positive effect on fisherman's income, which is the best feedback for the future implementation of various fishery systems.

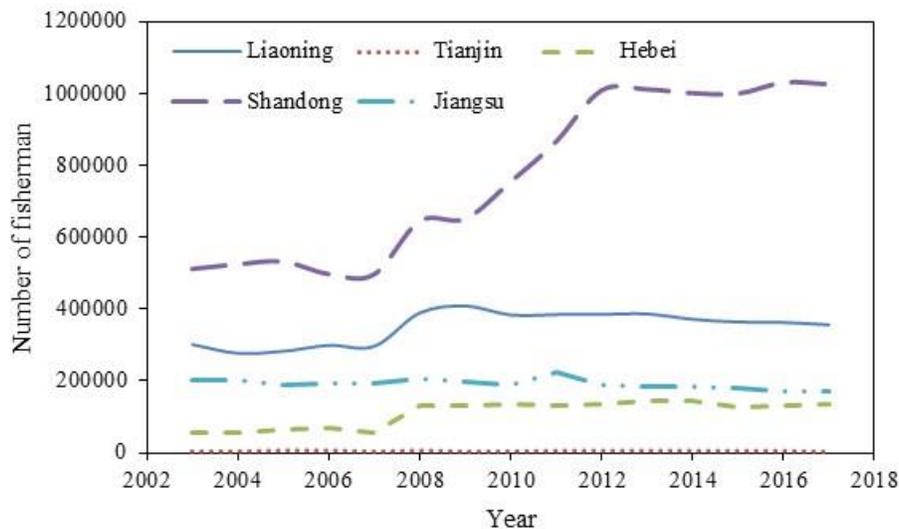


Fig 9 Fisherman quantity of provinces that had fishing activities in the Yellow Sea

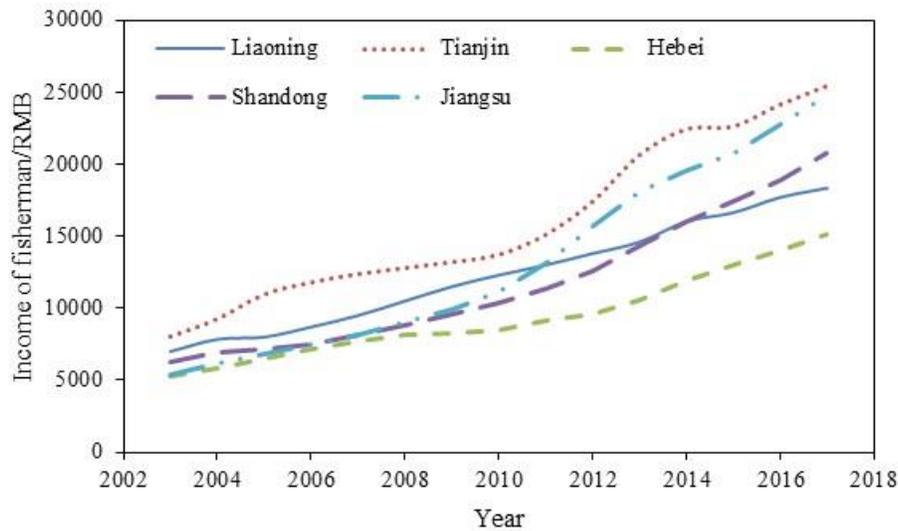


Fig 10 Fisherman income of provinces that had fishing activities in the Yellow Sea

4. Future prospect

According to the results, we concluded that the implementation of license system in China has made fruitful efforts. The system effectively controlled the continuous growth of marine capture catch, which provided great support for sustainable utilization of Yellow Sea fishery resources. Meanwhile, the implementation of license system did not affect the income and life quality of fisherman too much due to the implementation of several fishery systems. For example, although China has implemented a strict license system, which restricts fishermen's access to fishery, it has also implemented a system of transferring production and fishermen's career, providing new ways and directions for fishermen's livelihood. In this regard, the implementation of China's various fishery systems has been successful and other countries can get experiences from it. At the same time, China also needs to learn from developed fishery countries of their mature fishery systems, investigation methods and management methods.

For example, there are two main types of regulations for marine capture industry in global range. One is input control management. It controls the total catch indirectly by limiting the total amount of labor and capital invested in the fishery, such as specifying

fishing operation time, restricting the gear type and quantity. The license system, midsummer moratorium system and marine fishing intensity control system adopt by China all belong to input control. The other one is output control management, whose goal is to control the total catch by restricting the quantity and weight of target species. The catch quota system recently used by China and individual transferable quota system used internationally belong to output control. For output control, it usually determines the total allowable catch for each species in the same year. Once the catch reaches the limit, the fishing activities of this year are over. Therefore, to completely control fishing intensity and protect marine fishery resources, China should implement input control management together with output control, improving the existing input control management system and introducing advanced output control management system.

Also, we should conduct comprehensive surveys and stock assessment of fishery resources to serve scientific management and decision-making for fishery. Comprehensive and accurate understanding of fishery resources is the prerequisite of scientific management. Therefore, it is of great importance to conduct comprehensive surveys and stock assessment of fishery resources in China's coastal areas and strengthen the monitoring and investigation of the ecological environment for fishery resources of coastal areas. Firstly, we should strengthen investigation and research of fishery resources: carrying out comprehensive survey of fishery resources in China's coastal areas, conducting supplementary survey of the status of aquatic resources, deeply understanding the resource status, establishing a reliable information system, and identifying the status of exploitation, utilization and protection of fishery species, resource structure, distribution, habitat, population abundance and searching for protection measures and approaches. Secondly, we should master the spawning mechanism of major commercial species and their recruitment mechanism, understand the fluctuation pattern of abundance of fishery resources, get knowledge of community structure and population fluctuation of major commercial species, so as to provide scientific basis for establishing and adjusting resource conservation and fishery management regulations. Thirdly, we should establish evaluation system for sustainable utilization of marine fishery resources. The sustainable utilization of fishery resources is the essence and core of fishery sustainable development. There will be no sustainable development of fishery without sustainable utilization of fishery

resources. Comprehensive evaluation of the sustainable utilization capacity and level of fishery resources can objectively predict the potential development of fishery and coordinate the implementation process of fishery sustainable strategy.

Since we have assessed effectiveness of license system in Yellow Sea, our work plans in 2019 are to analyze advantages and disadvantages, the problems, the potential technical and administration needs, give some recommendations to improve license system; further to assess the legal and policy adequacy, institutional capacity, individual capacity, availability of capacity; to participate relevant workshops or training course conducted by the Project Management Office (PMO); to submit the draft recommendation plan for improving the license system in the Yellow Sea.