



Analysis on the Regional Types and Evolution Modes of Grain Production in China

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Abstract: By adopting the spatial transfer coefficient of grain production, this article divides the 31 provinces in China into three regional types of grain production, and on this basis, into six production evolution modes. This article studies the production and marketing structure of China in recent years by studying the regional types and the evolution modes of grain production, aiming at providing stronger theoretical support for the future development of grain production in China.

Keywords: Grain Production; Regional Type; Production Mode

Introduction

Issues of grain security are related to the survival of a country and the society. Among all grain-related issues, the yield and quality of grain are the most important and direct indicators. In other words, to maintain the safe production of grain is to improve its yield and quality. At present, China's grain yield is mainly affected by several aspects. Through studying the influence of natural factors from the perspective of environmental change, such as climate, precipitation and dimension, and the influence of economic factors including capital, labor, and agricultural technology, it can be seen that grain production is affected by both nature and markets. Due to China's vast national territorial area, regions with different levels of economic development and various climatic conditions have formed diverse modes of grain production.

According to the proportion of total grain yield, this article divides China into three types of grain production, namely, grain production transfer-out regions, stable regions and transfer-in regions. On this basis, six evolution modes of grain production are formed, which will be presented below.

1. Change of regional types of grain production

1.1 Regional types of grain production

According to the flow of grain production, China can be divided into three types: grain production transfer-in regions, transfer-out regions, and stable regions.

1.1.1 The number of grain production transfer-in regions increased first and then decreased

In 2001, China's grain production transfer-in regions were mainly concentrated in the whole northern and the whole western areas, including the whole semi-enclosed regions from the three northeastern provinces, Inner Mongolia to Yunnan. However, Tibet and Qinghai were removed in 2008, while this regional type transferred to the middle area of China, including Sichuan, Guizhou, Chongqing, Hunan, Shaanxi, Anhui and Zhejiang. In 2015, the transfer-in regions moved to the north of China, removing Yunnan, Chongqing and Hunan and adding Hubei, Henan, Jiangsu, and

Shandong. In terms of quantity, the number of transfer-in regions increased from 12 to 16, and then decreased to 14. To sum up, China's grain production transfer-in regions are mainly in the western and northern China.

1.1.2 The number of grain production stable regions increased first and then decreased

The grain production stable regions are with the least provinces in China. In 2001, there were only Guangxi and Jiangxi. Guangxi was removed in 2008, while Fujian, Central China, East China Plain and Beijing were added. The stable regions in 2015 changed to Yunnan, Chongqing, Gansu and Heilongjiang. The number changed from two to seven, and then decreased to four. It can be concluded that there are few grain production stable regions in China, so the level of grain security in most areas needs to be improved.

1.1.3 The number of grain production transfer-out regions decreased first and then increased

The number of transfer-out regions changed from 16 in 2001 to 9 in 2008 and then to 13 in 2015, and the coverage areas moved from the eastern coast, Yunnan, Guizhou, Sichuan, Chongqing and East China Plain to Tibet, Qinghai, Guangxi, Hong Kong, Jiangsu and Liaoning, and then to the North China Plain and the southernmost seven provinces. It is clear that China's grain production transfer-out regions are also the main sales areas, indicating that the main sales areas are less and less providing grain for the national grain depot and other grain transfer-in areas, further increasing the pressure on the main grain producing areas, which is not conducive to the security of China's overall grain production.

1.2 Reasons of the evolution modes of grain production regions and the spatial distribution

The evolution modes of specific growth and decline patterns of various Chinese regions in every period of time should be analyzed combined with local conditions, such as fertilizer usage, sowing area of grain and sowing time, irrigation area, total mechanical power, the urbanization degree and agricultural product prices.

From 2001 to 2015, areas experiencing the evolution modes of grain production in 31 Chinese provinces can be divided into six types. (1) The stable growth types During these few years, there have been steady growth in 12 provinces, mainly in production-marketing balance areas. (2) The significant growth types. Such type of growth has appeared in provinces except Fujian, and is the most frequent mode, mainly in the main producing areas and the production-marketing balance areas. (3) The slight growth types. This type has occurred in 17 provinces, concentrated in the main producing areas and production-marketing balance areas. (4) The mild decline types. There have been 22 provinces of such type, of which the main producing areas and production-marketing balance areas account for 87.5% of the total. (5) The severe decline type. This pattern has not appeared in Hebei and Fujian only, and appeared in large numbers of areas that experienced significant growth, mainly in the main sales area and the production-marketing balance areas. (6) The moderate decline types. 14 provinces once belonged to this type, with the most in the production areas and production-marketing balance areas ^[1].

2. Six evolution modes of grain production

2.1 Grain production transfer-out regions become stable regions

The occurrence of this mode is mainly due to the transformation caused by the expansion of sowing area of grain, the increase of farmers' income and raising grain prices. To expanding the sowing area in a specific area will help to promote the large-scale production of grain, forming agriculture in concentrated areas and large-scale industries and chains, driving the construction of local agriculture-related industries, and increasing grain yield. In addition, the of increase of farmers' income can also promote the enthusiasm of farmers for grain production, encouraging them to expand production. Besides, it can provide farmers with more financial support and promote food production by raising grain prices. Moreover, it should be noted that increasing the usage of chemical fertilizers in producing areas is not conducive to the transformation from the grain production transfer-out regions to stable regions ^[2].

2.2 Grain production transfer-out regions become transfer-in regions

This mode is formed due to expanding sowing area of grain and raising grain prices in this region that help to form a large-scale grain cultivating industry and promote farmers' production enthusiasm. Areas where this pattern occurs

most frequently are also main sales areas of grain, followed by production-marketing balance areas. The expansion of sowing area of grain and large-scale production can increase grain yield and promote transformation.

2.3 Stable grain production regions become transfer-in regions

This mode mainly appears in major grain producing areas, such as Hebei, Shandong, Jiangxi, and Liaoning. The main reason for this mode is the increase of sowing area of grain and the improvement of the total power of agricultural machinery. Increasing subsidies for farmers to use farm tools and improved varieties of grain through policy support can help expand sowing area and increase mechanical power, thus improving the scale level of grain production [3].

The above three modes are to increase grain yield and promote agricultural development, while another three modes are to reduce grain yield.

Conclusion

To sum up, grain production is affected by many factors. Because of China's vast land area, this article divides China into three grain production regions, and then into six evolution modes. The following conclusions can be drawn: (1) the regional types of grain production in China have a great degree of increase and decrease in terms of time and space evolution, including changes in quantity and region; (2) from the perspective of production evolution modes, main grain producing areas, main sales areas and production-marketing balance areas have changed significantly in terms of growth and decline; (3) the reasons for the evolution modes of different grain production regions are various, affected multiple factors of the usage amount of chemical fertilizer, sowing area, urbanization level, irrigated area, farmers' income, degree of mechanization and grain prices, etc. In order to achieve better development of agriculture in various areas, it is necessary to continuously strengthen the control over the above aspects.

Acknowledgements

This work was supported by the 2021 Strategic Consulting Research Program of Henan Academy of Chinese Engineering S&T Strategy for Development: Research on Production Support Policies to Ensure Grain Security under the New Development Pattern (Grant No. 2021HENZDA04).

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