

Analysis of the Mechanism for Ecological Protection in Grain Production in Jilin Province

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ABSTRACT

This study focuses on the mechanism of grain production and ecological protection in Jilin Province, and discusses the contribution of grain production to national food security in Jilin Province as an important agricultural province in northeast China and the importance of ecological protection practice. The present situation of grain production and ecological environment in Jilin Province was analyzed, and the impacts of cultivated land protection and climate change on grain production were identified. On this basis, the paper puts forward some solutions, such as the construction of rigid regulation and elastic regulation framework, compensation mechanism based on development right and ecological value, protective development reserve and emergency reclamation system, and climate-resilient agricultural development, aiming at achieving the balance between sustainable development of grain production and ecological protection in Jilin Province.

KEYWORDS

grain production; Ecological protection; Cultivated land protection; Climate change

1 Introduction

With the increasing prominence of global food security and ecological protection, Jilin Province, as an important agricultural province in northeast China, has made an increasingly significant contribution to national food security and its ecological protection practice. Jilin Province, with its abundant black land resources, suitable climate conditions and sufficient water resources, has become an important grain production base in the country, which plays a key role in the stability of the national grain reserve and market. Major food crops such as corn, rice and soybeans have a place in both domestic and international markets. However, behind this achievement, Jilin Province is facing a series of challenges in ecological protection, such as the declining quality of black soil, soil erosion, water stress, biodiversity reduction and pollution from agricultural non-point sources.

2 Current situation of grain production in Jilin Province

2.1 Current situation of grain production in Jilin Province

Jilin Province, as an important agricultural province in northeast China, its grain production has a significant impact on national food security. In recent years, the grain output of Jilin Province has continued to grow, and the total grain output in 2023 has reached 83.73 billion jin, reaching a record

high, rising from the fifth to the fourth place in the total grain output in the country, and the per unit yield ranks first in the main grain producing areas in the country^[1]. In terms of planting structure, corn, as the main grain crop in Jilin Province, has a stable annual output of about 30 million tons, while rice, as the second largest grain crop, has an annual output of more than 6 million tons^[2]. From the perspective of regional distribution, corn is mainly concentrated in Changchun City, Songyuan City, Siping City, Baicheng city and Jilin City, among which Changchun's corn output exceeds 10 million tons, becoming the largest corn production city in Jilin Province. Rice is mainly distributed in Changchun City, Jilin City, Songyuan City and Baicheng City. Baicheng city has the largest rice yield in Jilin Province with the highest rice yield.

2.2 Ecological environment status of Jilin Province

In terms of ecological environment, the land use of Jilin Province is mainly agricultural land, accounting for about 87% of the total land area, of which the arable land area is about 6.99 million hectares, accounting for about 37% of the total land area. In terms of water resources, Jilin Province has abundant water resources, which provides suitable natural conditions for the growth of rice and sweet and glutinous corn. The annual sunshine duration is close to 3000 hours, and the temperature difference between day and night is large, which is conducive to the growth and development of food crops. In terms of biodiversity, the ecological quality index (EQI value) of Jilin Province was 66.99, which was better than the national average, and the ecological quality status remained good for 20 consecutive years.

The forest coverage rate of the province reached 45.42%, and the comprehensive vegetation coverage of grassland was 67.06%. Jilin Province has 22 national nature reserves and 17 provincial nature reserves, which reflects the province's active efforts in biodiversity protection. The Implementation Opinions on Further Strengthening Biodiversity Protection issued by the General Office of Jilin Provincial Party Committee and the General Office of Jilin Provincial Government aim to comprehensively improve the level of biodiversity protection and further promote ecological balance and sustainable development^[3].

3 Problems in ecological protection of grain production in Jilin Province

3.1 Protection of cultivated land

As an important grain production base in northeast China, the protection and utilization of cultivated land resources in Jilin Province is of strategic significance to national food security. However, the current cultivated land protection practice faces a series of challenges. There is an obvious division between the use of cultivated land and the quality construction, which leads to the imbalance of the multi-functionality of cultivated land, and then affects the maintenance of agricultural production efficiency and ecological service function. The single measures of cultivated land protection mainly focus on quantity protection but ignore the overall improvement of cultivated land quality, which limits the sustainable utilization of cultivated land resources. In addition, the opposition between cultivated land protection and territorial space control, especially in the face of land needs such as urban development and industrial construction, cultivated land protection is often marginalized, which not only affects the effective protection of cultivated land, but also restricts the sustainable development of agriculture in Jilin Province^[4]. Therefore, Jilin Province needs to adopt more comprehensive and innovative cultivated land protection strategies to achieve long-term stability of cultivated land resources and sustainability of agricultural production.

3.2 Impacts of climate change

Climate change poses a severe challenge to grain production in Jilin Province, especially the increase of extreme weather and climate events poses a direct threat to grain production. Under the background of global warming, the frequency and intensity of extreme precipitation events have increased in Jilin Province, resulting in frequent occurrence of flood, drought and other disasters, which have seriously affected agricultural production. These extreme climate events not only lead to the decline of food production, but also may damage the agricultural production structure and affect the growth cycle and quality of crops ^[5]. In addition, the ability of agriculture to adapt to climate change needs to be improved, including optimizing the use of agricultural climate resources, cultivating resilient crop varieties, strengthening the quality protection of black and cultivated land, and promoting climate-smart agriculture. These measures are essential to improve the adaptability and resilience of Jilin's agriculture to climate change, in order to ensure food security and promote sustainable agricultural development. Therefore, Jilin Province must fully consider the impact of climate change in agricultural policies and practices, and formulate and implement effective adaptation strategies to mitigate the negative impact of climate change on food production.

4 Suggestions on ecological protection mechanism of grain production in Jilin Province

4.1 Construction of rigid regulation and elastic regulation framework

In terms of land management, Jilin Province should further strengthen the rigid control measures of cultivated land protection and increase the flexible control mechanism. Specifically, the legal system of cultivated land protection should be refined and improved in accordance with the Regulations on Black Land Protection of Jilin Province and other laws and regulations ^[6]. In terms of land management, Jilin Province should further strengthen the rigid control measures of cultivated land protection and increase the flexible control mechanism. Specifically, Jilin Province should refine and improve the legal system of cultivated land protection in accordance with the Regulations on Black Land Protection of Jilin Province and other laws and regulations. Jilin Province will implement dynamic monitoring and evaluation, strengthen the monitoring and evaluation of cultivated land quality, regularly release cultivated land quality evaluation results, and dynamically monitor quality changes. In addition, Jilin Province will establish the cultivated land protection target responsibility system, implement the black land protection target responsibility system assessment and evaluation system and supervision system, and incorporate the completion of black land protection targets into the assessment content of governments at all levels.

4.2 Establish a compensation mechanism based on the right to development and ecological value

In order to balance the relationship between development and protection, Jilin Province can explore the establishment of a compensation mechanism based on the right to development and ecological value. The purpose of this mechanism is to provide economic compensation to those areas or farmers whose development is restricted because of the protection of farmland, in order to achieve the dual goals of social equity and ecological protection. At the same time, we should deepen the reform of the compensation system for ecological protection, promote the protection of natural ecosystems, and implement the relevant national compensation system for ecological

protection.

4.3 Establish protective development reserve and emergency reclamation system

Jilin Province should set up protective development reserve to deal with the possible shortage of land resources and ecological degradation. At the same time, an emergency reclamation system should be established to ensure that the production capacity of cultivated land can be quickly restored in emergency situations and food security can be guaranteed. In addition, protection and utilization modes should be explored by zoning and classification, and technical measures for black land protection should be implemented by zoning and classification according to characteristics such as hydrothermal conditions, landforms, and farming patterns^[7].

4.4 Climate-resilient agricultural development

Jilin Province should strengthen the basic research of agricultural adaptation to climate change in order to enhance the climate resilience of agricultural system. This includes the continuous improvement of crop varieties and the selection of excellent varieties that are resistant to high temperature, drought, waterlogging, disease and insects^[8]. "Jilin Province should strengthen the basic research of agricultural adaptation to climate change in order to enhance the climate resilience of the agricultural system. This includes the continuous improvement of crop varieties and the selection of excellent varieties that are resistant to high temperature, drought, waterlogging, disease, and insects. At the same time, Jilin Province should strengthen the research on the relationship and indicators between agricultural production and meteorological conditions, optimize the pattern of agricultural climate resources utilization, and cultivate and select widely resistant crop varieties. In addition, Jilin Province should promote climate change impact and risk assessment, and carry out climate change impact and risk assessment in key industries and areas such as agriculture and national food security, Songliao Basin, ecological environment, urban security, transportation, and tourism."

5 Conclusion

The present situation and challenges of grain production and ecological protection in Jilin Province were deeply discussed in this study, and it was revealed that Jilin Province must deal with ecological problems such as the decline of cultivated land quality and the impact of climate change while ensuring national food security. The study emphasized the importance of cultivated land protection, and proposed a framework combining rigid regulation and flexible regulation, as well as a compensation mechanism based on development rights and ecological values, in order to balance the relationship between development and protection. At the same time, it is suggested that Jilin Province should set up protective development reserve and emergency reclamation system to cope with the shortage of land resources and ecological degradation, and strengthen the development of climate-resilient agriculture to enhance the climate resilience of agricultural system. Through the implementation of these comprehensive strategies, Jilin Province can not only ensure food security, but also promote ecological protection and realize sustainable development of agriculture.

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References

- [1] ZHENG X X. Analysis on influencing factors of grain production in Jilin Province. Inner Mongolia Science and Economy, 2022(18): 57-59.
- [2] Alice lee. Based on the data of Jilin province grain yield prediction research [D]. Jilin agricultural university, 2023.
- [3] The General Office of the CPC Central Committee and The General Office of the State Council issued the Opinions on Further Strengthening Biodiversity Conservation [J]. Bulletin of The State Council of the People's Republic of China, 2021(31): 39-43.
- [4] Reply of The State Council on the Territorial Space Plan of Jilin Province (2021-2035) [J]. Bulletin of The State Council of the People's Republic of China, 2024(1): 93-94.
- [5] WANG D N, REN J Q, WANG M Y, et al. Meteorological conditions and their effects on grain production in 2023 in Jilin Province [J]. Meteorological Disaster Prevention, 2024, 31(3): 41-44.
- [6] GAO Jia, Zhu Yaohui, Zhao Rongrong. Black land protection in China: policy evolution, practical obstacles and optimization path [J]. Journal of Northeastern University (Social Sciences Edition), 2024, 26(1): 82-89.
- [7] Kong Xiangbin, Chen Wenguang, Dang Yu. Current situation, challenge and transformation of cultivated land protection in China [J]. Social Science Journal of Hunan Normal University, 2023, 52(5): 31-41.
- [8] WANG D N, Wang M Y, HU Y X, et al. Meteorological conditions of growing season and their effects on grain production in 2022 in Jilin Province [J]. Meteorological Disaster Prevention, 2023, 30(3): 40-44.