Scholar Publishing Group
Academic Journal of Agricultural Sciences
https://doi.org/ 10.38007/AJAS.2021.020404
ISSN 2789-8415 Vol. 2, Issue 4: 41-53

Corn Supply and Demand and Income Fluctuation Based on Supply-Side Structural Reform

Linyuan Fan*

College of Mathematics and Data Science, Minjiang University, 350108, Fujian, Fuzhou, China

fanlinyuan@mju.edu.cn

**corresponding author*

Keywords: Supply-side Structural Reform, Corn Industry Development, Planting Scale Expansion, Corn Production Structure

Abstract: Recently, the country has promoted the supply-side structural reform of the corn industry, and has made certain progress and effectiveness in adjusting and optimizing the production structure, advancing the reform of the collection and storage system, and improving the market emergency control mechanism. Many challenges include low production costs, high production costs and weak long-term competitiveness, inadequate distribution infrastructure, and low distribution efficiency. The purpose of this paper is to study the supply and demand and income fluctuations of corn based on supply-side structural reforms. This paper uses Jilin Province in Northeast China as an example to study the fluctuation of corn production in Jilin Province in recent years. The experimental results show that in recent years, Jilin Province has continuously expanded the scale of corn plantation, promoted the rapid development of the corn industry, and created considerable economic benefits. From the perspective of total corn production, the total corn production in Jilin Province is 22.46777 million tons, up to 12.61% of the national total corn production. It can be seen that the production level of corn in Jilin Province is relatively high, and the yield of corn in Jilin Province ’s main corn production areas remains There is great potential to integrate natural and technical conditions, to further optimize the corn production structure, and supply-side structural reform strategies have great room for improvement in the future.

1. Introduction

Corn is one of the main industries of the agricultural economy. Among various crops, corn has the advantages of wide adaptability, high photosynthetic efficiency, and high yield potential. Therefore, corn production has received widespread attention from countries around the world. Its

growing area is constantly expanding and it now ranks third in cereal crops. Corn plays an important role in ensuring food security in China. In recent years, China's corn supply and demand pattern has undergone profound changes, structural contradictions have undergone tremendous changes, and the consumption structure has undergone significant changes, which has escalated rapidly.

Corn, as China's largest food crop, has experienced unconventional growth since 2009, and the total amount has exceeded one third of China's total grain output [1]. Since 2012, corn inventories have continued to increase, reaching 100 million tons in 2013, and thereafter increasing by an annual increase of more than 50 million tons. By July 2016, the total inventory reached 260 million tons, exceeding the 2015 output of the highest corn production year [2]. In the meantime, the high inventory backlog has become the primary goal of agricultural supply-side structural reform. The large amount of corn supply involves as many producers as other crops, and also brings severe challenges to the supply-side structural reform of the corn industry [3]. The strong pull in the price of corn reserves, the continued downturn in the processed corn market and the impact of cheap corn in the international market are the main reasons for the high backlog of corn, as well as the main difficulties faced by the structural reform of the supply side of the corn industry. Mainly manifested in the target price reform and determination of its level, the choice of farmers' income subsidy methods, the choice of corn alternative crops, and the transformation and upgrading of the corn processing industry [4]. Reforming the agricultural product price support system and agricultural support policy system, implementing the soybean industry revitalization plan, optimizing the internal planting structure of corn, implementing the policy of returning farmland to the northeast, and restructuring the spatial pattern of the corn market are alternative paths to solving the problem.

Li's comparative advantage theory studies the relative comparative advantages of Chinese and American corn production, and finds that US corn production funds and technology intensiveness determine that US corn production has a clear competitive advantage [5]. Compared with the United States, China has lower land productivity and technological efficiency in corn production. Qi studied the micro-factors that affect the total corn output value and planting scale in Jilin Province, and found that the main factors affecting the corn output value and planting scale are household agricultural equipment, the number of household farmers, the educational level of farmers, corn prices, fertilizer prices, etc. [6].

The state's proposal of supply-side structural reforms rather than adjustments is a decision based on the underlying causes of current supply-side structural imbalances [7]. As far as the development of the corn industry is concerned, the fundamental reason for the formation of a high inventory backlog is the macro decision-making system and mechanism, as well as the resulting biased decision-making. Therefore, only through reform can the problem of supply-side imbalance in the corn industry be solved. This article takes Jilin Province in Northeast China as an example to study the analysis of supply and demand and income fluctuations of corn in its supply-side structural reform. According to the statistics of the three Northeast provinces, the area of corn in 2019 will increase by 3.0356 million hectares, an increase of 36%. Among them, Heilongjiang Province alone increased 1.846 million hectares, an increase of 54%. According to the investigation in this article, it is known that how national industrial policies support processing enterprises to improve research and development capabilities, and how to cultivate a corn industry chain that effectively connects upstream and downstream, are issues that need to be considered during structural reform of the corn industry. The corn processing industry must adapt to the development of China's corn industry, especially when the market fluctuates, it can show the role of a strong industry. It must complete the transformation and upgrading of the processing industry as soon as possible, from raw material processing to deep development, and from policy-dependent to the market.

2. Proposed Method

2.1. Connotation of Supply-side Structural Reform

(1) Supply-side structural reform concept

When the Chinese economy entered a stage of medium and high-speed development and the speed of development slowed down, General Secretary Xi Jinping took the lead in proposing a supply-side structural reform at the meeting of the Central Finance Leading Group. Once this view was put forward, it attracted great attention from all walks of life [8]. The specific meaning of supply-side reform refers to the optimization and upgrading of various elements included in the supply-side through the point of supply, structural changes, and reform programs. Supply-side reform is different from previous reforms. It pays more attention to the self-development and adjustment ability of the market economy. It adjusts various links in economic development to change and change the economic structure, thereby spreading to the political and cultural fields, and ultimately affecting the social structure [9]. Through the reform plan, China's economic base and superstructure have become more closely connected. This shows that the focus of supply-side reform is reform.

(2) The task of structural reform on the supply side.

The five major tasks of supply-side structural reform are "three to one, one to reduce, and one to compensate", that is, to reduce production capacity, reduce inventory, reduce leverage, reduce costs, and shorten production cycles [10]. The so-called "de-capacity" is to reduce the production of too many products in the production process, but the occurrence of stagnant sales. After the global economic crisis, the international market and the domestic market have become saturated at the same time. In this context, China's production continues to grow. Therefore, China needs to reduce domestic production through supply-side structural reforms and optimize and upgrade the domestic industry. Improve quality to broaden external markets. Destocking still has a long way to go. We must accelerate the reform of the household registration system, continue to advance the process of urbanization, and further increase the urbanization rate. The purpose of deleveraging is to reduce the debt burden of enterprises.

(3) Factors affecting supply

China has recently carried out related supply-side reforms. The specific reason is that China's economic development slowed down when it entered the stage of rapid economic growth. The past development model is no longer sufficient to promote the sustainable development of China's economy. In the past, economic development developed the economy by stimulating economic demand. The economic development mode continued to be weak, and structural reforms that caused oversupply came into being [11]. At present, the factors affecting supply are mainly the quality of workers, the level of science and technology, the ability to innovate, the input of production factors and the efficiency of use [12].

2.2. Path Choice of Supply-side Structural Reform in the Corn Industry

The oversupply of corn is the result of a departure from the market mechanism. Therefore, the core issue of supply-side structural reform should be how to use the market price formation mechanism [13]. The market-oriented structural reform of the supply side of the corn industry will involve the adjustment of various interests, and therefore faces many difficulties.

(1) Target price reform and level determination

The end of the temporary corn reserve price does not mean that the corn industry is fully market-oriented, but how to establish a macro-control policy based on a grasp of market laws. From the experience of developed countries, the target price system is an effective policy based on the

market mechanism, and the government interferes in the market without directly causing market distortions. The 2016 Central Document No. 1 proposed the general idea of "separation of price and compensation", but the difficulty that followed was how to determine the appropriate target price level. Facing the huge backlog of corn stocks, in addition to increasing corn consumption capacity, we should also reduce corn supply, that is, reduce the new backlog. The conversion from temporary reserve prices to target prices requires, on the one hand, removing the role of government intervention in price support, and on the other hand, reducing the level of support prices [14]. The target price is used as a support price, and a reasonable level can help reduce supply and increase demand. It is not a simple cost-benefit assessment, but how to establish a new balance of interests and activate the corn industry chain. When the autumn grains are listed on the market in 2015, the state will reduce the average price of temporary corn by 0.24 yuan / kg in order to reduce the planting area. Looking at the main northeast maize production areas in 2016, the price reductions could not significantly restrain farmers from planting corn. A survey of 201 farmers in 10 counties (cities) in the main corn-producing areas of the Songliao Plain in Jilin Province showed that only 30% of the farmers reduced corn planting behavior, and the decrease was not large, mainly in the low-yield areas in the west. For core producing areas, farmers will not abandon corn cultivation without administrative intervention. Leaving aside farmers' interests, the easiest way to reduce the supply of corn is to determine prices based on market supply and demand. The essence of the choice of price level is the reduction of farmers 'income. The larger the price reduction, the greater the reduction in farmers' income. The government determines the appropriate intervention price to become a difficult point in determining the price level.

(2) Choice of farmers' income subsidies

Without giving up corn price intervention, the target price is an unavoidable choice, that is, how to subsidize farmers under the target price mechanism. Judging from the target price of soybeans that has been implemented in the Northeast region, it did not meet expectations. As a target price, there are at least two aspects: one is to guide farmers 'planting behavior, and the other is to protect farmers' income, but both goals have not been effectively achieved [15]. The level of the target price determines the ability to guide farmers 'planting behavior and the degree of protection of farmers' interests; the implementation method of the target price determines the efficiency and fairness of subsidies. Under the target price, subsidies are mainly provided to farmers based on the following two methods: one is the planting area, and the other is the actual sales of farmers. The former is extensive. The target price of soybeans is based on area and the statistical area is three times the actual planting area, which not only causes serious deviations, leads to inefficient subsidies, but also fails to guide farmers to grow soybeans. The latter is extremely difficult and needs to be carefully designed and systematically organized, but based on the information technology platform, it is feasible after trials and demonstrations.

(3) Selection of corn alternative crops

To solve the problem of oversupply of corn, the main purpose is to replace corn with other crops. Other major food crops that can be grown in the main northeast corn producing areas are rice and soybeans. Because rice is limited by water resources, replanting soybeans is the best choice, but with the changes in the comparative returns of soybeans and corn, the area of soybean cultivation has been declining. Based on current prices and yields, the soybean price is 2.12 times that of corn, and the corn yield is 3.7 times that of soybeans. There is a disproportionate return between the two, and farmers have no incentive to grow soybeans. If farmers do not grow soybeans, there are few alternative crops. Miscellaneous grain crops such as millet and sorghum that have been planted in history have very limited market space and are not as efficient as corn. Some local governments guide farmers to grow vegetables and cash crops, but the market space for such crops is limited and their sales are unpredictable. Therefore, under the current market structure, the replacement of

corn-free crops has become an unsolvable problem.

(4) Transformation and upgrading of corn processing industry

In addition to the aforementioned factors, China's high corn backlog also has its own processing industry reasons. The weak processing industry and the short industrial chain are factors that cannot be ignored. China's corn processing industry has developed for nearly three decades. The main products are still primary products such as starch and alcohol. There are not many deep-processed products, low scientific and technological content, and weak anti-risk capabilities in the market for many years. The corn consumed by the corn processing industry accounts for 20% -25% of the total output. If the processing industry chain is too short, the market risk mitigation ability is poor, which will lead to the blocking of the plantation market. The difficulties faced by the corn industry largely reflect the worrying development prospects of China's corn processing industry. The corn processing industry is yet to be transformed and upgraded. How can the corn processing industry effectively solve the lack of competitiveness when solving the problem of high corn inventory backlog? How does the state adjust industrial policies? How does the national industrial policy support processing enterprises to improve their research and development capabilities and how to cultivate a corn industry that effectively connects upstream and downstream? Chains and other issues are important issues to be considered in the structural reform of the corn industry. The corn processing industry must adapt to the development of China's corn industry, especially when the market fluctuates, it can show the role of a strong industry, and it must complete the transformation and upgrading of the processing industry as soon as possible, from raw material processing to deep development; from policy-dependent to the market Competitive transformation. Cultivate new agricultural operators and promote the implementation of large-scale corn production. New agricultural operators can rent agricultural machinery when the farm is busy. At the same time, rural cooperatives can not only reduce machinery costs, increase utilization, improve land utilization, but also realize corn Large-scale planting, thereby reducing the cost of corn production, the flow chart of the choice of structural reform of the supply side of the corn industry is shown in Figure 1:

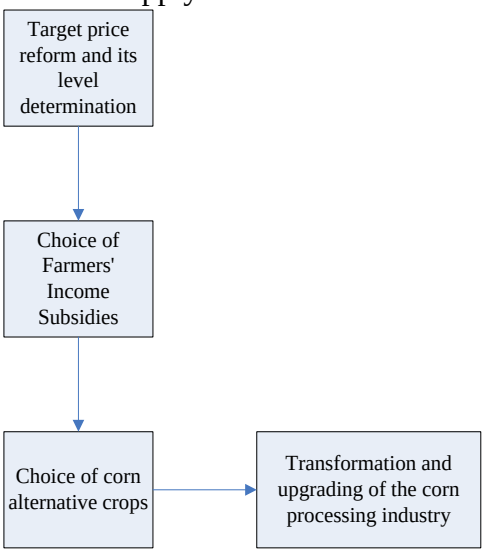

Figure 1. Flow chart of the path selection for the supply-side structural reform of the corn industry

2.3. Reforming the Agricultural Support Policy System

Among the causes of corn oversupply, policy orientation and promotion are fundamental factors. Reflection on agricultural policy in recent years is largely a univariate thinking mode. Regarding the price policy of corn temporary storage, it only focused on the leverage effect of price on

farmers' enthusiasm for grain production, and ignored the restraining effect of price on the development of downstream industries. At the same time, the total amount and structure and the relationship between the domestic market and the international market have also been ignored. More importantly, the role of market laws has been ignored. The formulation and implementation of agricultural support policies must be constrained by multiple goals, and they must be good at constructing diversified agricultural policies under the constraints of multiple goals. This multi-policy consideration should consider the above-mentioned four relations, namely the total and structural relations, the upstream and downstream industrial relations, the domestic market and international market relations, and the relationship between production areas and sales areas. At the same time, agricultural support policies should also take into account the current and long-term interests of farmers, internal and external interests of agriculture.

2.4. Problems in Structural Reform on the Supply Side of Corn

As an important pillar of China's food security, corn's supply-side structural reform is not only due to the urgent need for its own industrial transformation and upgrading, but also has to do with the profound changes in the internal and external environment of China's agricultural development, and its most direct motivation should also be It is the accumulated problems and contradictions of the corn temporary reserve purchase policy that began to be implemented in 2008 that have become increasingly difficult to sustain and have to be changed. Its specific performance can be summarized as follows:

First, the imbalance between supply and demand. The temporary collection and storage of corn focuses on the protection of the production side from the policy design, mainly to solve the problems of farmers' planting income and production enthusiasm, but ignores the coordinated development of the entire industrial chain, leading to the continuous development of corn production, and consumer demand is subject to a continuously rising price. Suppression continues. From 2008 to 2015, corn production increased by 47.5%. From 2013 to 2015, consumer demand continued to decline, and in 2015 corn consumption fell to 175 million tons. Due to the mismatch between production and demand, the quality of corn supply has dropped significantly, the supply-demand relationship has plummeted, the situation of oversupply and demand over periods has intensified, and the purchase of national corn reserves has continued to rise, reaching a record 125 million tons in 2015.

Second, the inventory backlog is serious. From 2012 to 2015, the country successively initiated large-scale temporary collection and storage of corn. In the past four years, the total amount of storage and storage exceeded 300 million tons. At the same time, the amount of outbound storage was very small, which has increased the pressure on the national corn inventory. The corn inventory balance was as high as 279 million tons, and the storage capacity in the Northeast production areas was full, forming a situation of "unable to receive, adjust, sell, and store".

Third, the financial burden is heavy. The expenditures of the state finance for the temporary collection and storage of corn, such as acquisition costs, storage costs, interest on funds, and storage costs, amounted to 252 yuan per ton per year, and the total corn temporary storage inventory cost exceeded 60 billion yuan. Fourth, the pressure on imports of corn and substitutes is high. Temporary purchases and storages have caused domestic corn prices to continue to rise, while international corn prices have continued to fall. Domestic and foreign corn prices are upside down and the price gap has continued to widen. In 2015, the post-tax CIF price of imported corn in southern ports was lower than domestic corn prices by an average of 778 yuan / ton. Expansion of 153 yuan / ton. Corn imports were 4.728 million tons that year, up 82.0% year-on-year. In order to alleviate the pressure of rising costs, domestic enterprises have begun to import a large number of

alternative corn such as sorghum and barley as raw materials without quota restrictions. In 2015, imports of corn and sorghum, barley, and cassava substitutes continued to increase by 52.2% to 42.26 million tons on the basis of an increase of 55% in the previous year. Fifth, the downstream industry has been significantly affected. The temporary reserve purchase made the domestic corn price inflated, significantly increased the cost of downstream industries, and produced a squeeze effect on downstream entities. Corn deep-processing enterprises generally have difficulties in operation, low operating rates, and losses in the industry. Due to the double squeeze of high feed material costs and the downturn in the downstream aquaculture industry, feed companies have seen their output decline for a time. Trading enterprises basically have no market business and only rely on participating in temporary collection and storage to obtain subsidies to maintain operation.

3. Experiments

3.1. Experimental Data

This article takes Northeast Jilin Province as an example to investigate and analyze the supply and demand and income fluctuation of corn based on supply-side structural reform. Jilin Province is located in the northeast of China, adjacent to Heilongjiang Province in the north and Liaoning Province in the south, bordering Russia in the east, bordering the Inner Mongolia Autonomous Region in the west, separated by a river in the southeast, high in the east and low in the west, and a vast plain in the middle. As of the end of 2015, the total population of Jilin Province was 27.533 million, ranking 21st in the country, and the agricultural population was 12.305 million, accounting for 44.69% of the total population of Jilin Province.

Jilin Province is known as the "Hometown of Black Land". As of the end of 2019, the area of cultivated land is 5.796 million hectares, which is 30.31% of the total land area of Jilin Province; the area of cultivated land per capita is 0.21 hectares, which is 10 times the area of cultivated land per capita in China; the land of Jilin Province is fertile and rich in organic matter. , Suitable for crop growth and mechanized operations, which shows that

Except for parts of Jilin Province that are dry, dry and rainless, and high and cold mountainous areas, most areas are particularly suitable for corn production.

3.2. Experimental Analysis

The proportion of corn production in total grain output in Jilin Province has been increasing year by year. In 2015, the planting area of corn in Jilin Province has reached 3799.96 thousand hectares, second only to Heilongjiang Province, ranking second in the country. The total corn output reached 28.057 million tons in 2015, which is 77% of the total grain output of Jilin Province. From the perspective of total power, the total power of Jilin Province increased from 14.713 million kilowatts to 31.525 million kilowatts in 11 years, an average annual increase of 152.883 kilowatts. In terms of the number of machinery, Jilin Province’s holdings of large and medium-sized tractors in the past 11 years increased from 90,800 To 541,400 units, the average annual growth rate is 45,100 units, and the growth trend has stabilized; while small tractors have increased from 538,000 units to 646,400 units, an average annual growth rate of 9,800 units, a slower growth rate than large machinery. Overall, the number of farm implements has grown steadily.

4. Discussion

4.1. Production Status of Corn in Jilin Province

(1) The 13 major corn producing provinces in China are Hebei, Shanxi, Inner Mongolia, Liaoning, Jilin, Heilongjiang, Anhui, Shandong, Henan, Sichuan, Guizhou, Yunnan, and Shaanxi. This section analyzes the average value of total corn production, sown area, and single yield in 2009-2019 and its share of the country's corn and grain. As can be seen from Table 1, in terms of sown area, the sown area of corn in Jilin Province is 3,326.39 thousand hectares, which is the second largest in the country, behind Heilongjiang Province. In terms of total output, Jilin's total corn production is 22.46777 million tons, up to 12.61% of the country's total corn production, which is only 0.36 percentage points lower than Heilongjiang Province, and nearly 2 percentage points higher than the third place in Shandong Province. In second place, it is 4.47% of the country's total grain output. From the perspective of yield, Jilin Province has a yield of 7106.91 kg / ha, which is the third largest in the country. It can be seen that corn is in a very important position in terms of corn planting area, total yield and yield. Table 1 is a comparison of corn production in Jilin Province with other major corn producing provinces across the country.

Table 1. Maize production in Jilin compared with other major provinces

Province	Total output (10,000 tons)	Percent of National Corn	Percentage of National Grain	Sown area	Percent of National Corn	Percentage of National Grain	Food yield
Ji Lin	2246.77	12.31	4.47	3161.39	9.71	2.90	7106.91
Mountain east	1912.15	10.48	3.80	2951.00	9.07	2.70	6479.69
Liaoning	1242.33	6.81	2.47	2087.92	6.42	1.91	5950.07
Heilongjiang	2312.93	12.67	4.60	4274.57	13.13	3.92	5410.91

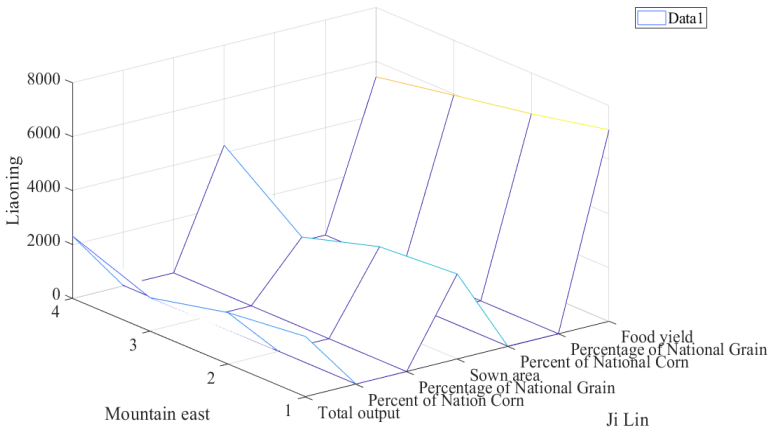

Figure 2. Maize production in Jilin compared with other major provinces

(2) According to the statistics of the three northeast provinces, the area of corn in 2019 increased by 3.0356 million hectares compared to 2018, an increase of 36%. Among them, Heilongjiang Province alone increased 1.846 million hectares, an increase of 54%. In addition to adjusting the existing crop planting area and replanting corn, we also increased the planting area of corn by deforestation, grass and wetness (land). From 2009 to 2019, China's grain output increased by 176 million tons, of which corn output increased by nearly 100 million tons, and its contribution to the increase in total output was 56.7%. Increasing corn prices year after year has a huge stimulating effect on corn planting and has become an important lever for grain growth. Table 2 shows the corn reserve prices in Northeast and Inner Mongolia from 2017 to 2019.

Table 2. Corn reserve prices in Northeast and Inner Mongolia from 2017 to 2019

Year	Heilongjiang	Increase	Jilin	Increase	Liaoning	Increase
2017	2.22	0.12	2.24	0.12	2.26	0.12
2018	2.22	0	2.24	0	2.26	0
2019	2.00	-0.22	2.00	-0.24	2.00	-0.26

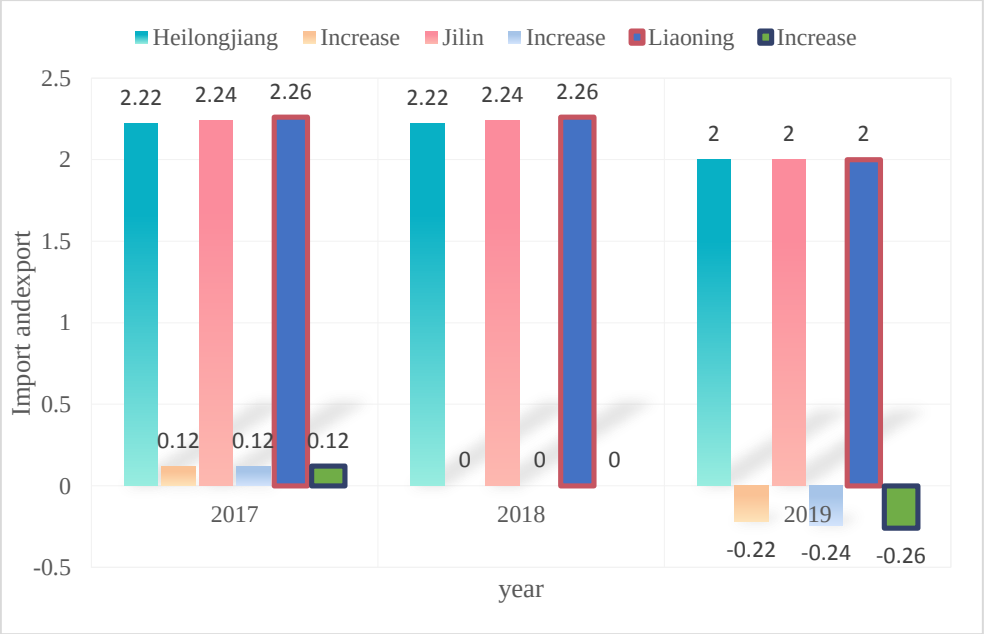

Figure 3. Corn reserve prices in Northeast and Inner Mongolia from 2017 to 2019

4.2. Corn Yield Fluctuations

(1) According to the calculation of production fluctuations, since 2017-2019, the overall corn production fluctuations in Jilin Province have continued to rise, from 98,000 tons in 2017 to 111,000 tons in 2019. Judging from the annual output fluctuations, there has been no significant change over the years and there is a gradual decrease. This shows that the Jilin Provincial Government has continuously strengthened its control over grain production capacity. The area of corn planted in Jilin Province increased from 282,000 mu in 2017 to 326,000 mu in 2019. The increase in food production is faster than the increase in arable land. This data illustrates the role of agricultural technology in increasing food production. From the perspective of specific grain varieties, the significance of corn as the main crop in Jilin Province is very important in the agricultural development plan of Jilin Province. Table 3 shows the acreage of corn industry in Jilin

Province from 2017 to 2019.

Table 3. Maize yield of corn industry in Jilin Province from 2017 to 2019

Year	Total output (10,000 tons)	Sown area (10,000 acres)	Yield per mu (ton)
2017	9.8	28.2	2.86
2018	10.4	30.3	2.88
2019	11.1	32.6	2.88

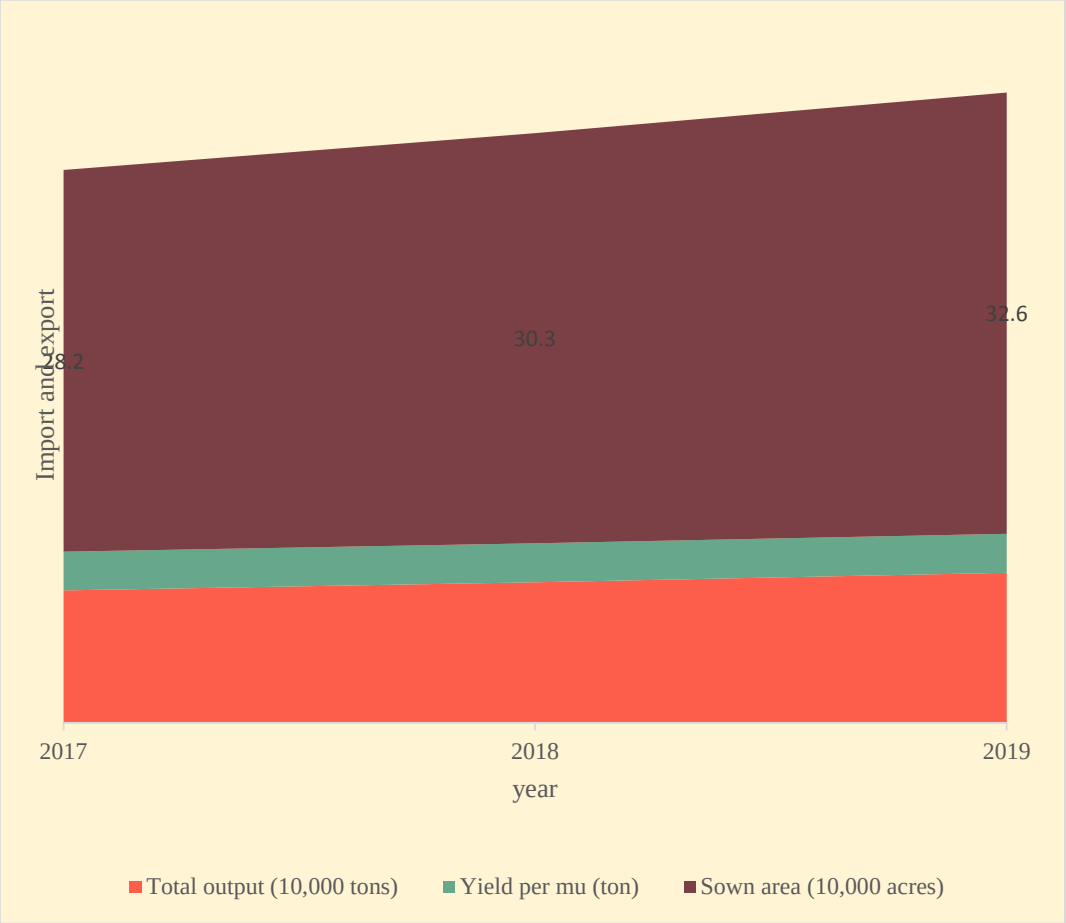

Figure 4. Maize yield of corn industry in Jilin Province from 2017 to 2019

(2) The United States is one of China's major corn importers and the world's largest corn producer. Jilin's corn hoarding, high prices, and large quantities of corn are imported from low-priced regions such as the United States. In the past two years, the total corn production in Jilin Province has grown rapidly, and the total output has increased by 54.58% in the past two years. The total output has increased as a proportion of the total grain. Although the total output of rice has increased year after year, compared with 2017, the output of 2019 has increased from 478 thousand hectares to 630.1 thousand hectares, but the proportion of grain has decreased from 18.52% to 17.28%. Figure 5 shows the proportion of total output and grain output in 2017 and 2019:

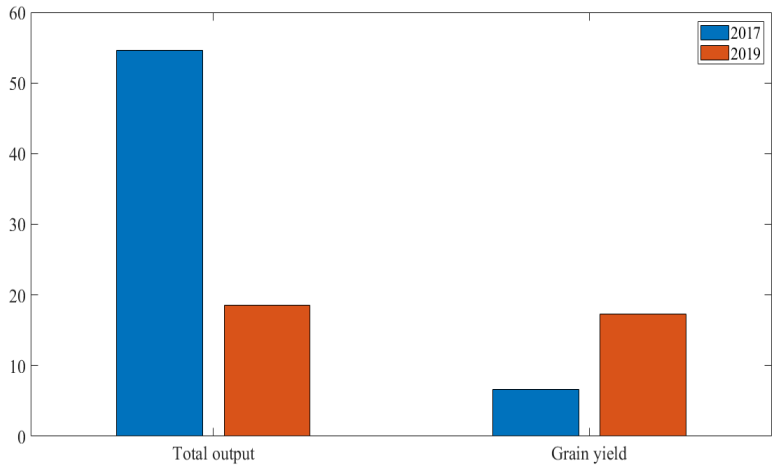

Figure 5. Proportion of total output to food output in 2017 and 2019

5. Conclusion

(1) Jilin Province has its unique geographical location and superior natural conditions, and is an excellent area for corn production. As the main corn planting country in China, it has a long history of corn planting, and its planting area has always been within a stable range. In recent years, Jilin Province has continuously expanded the scale of corn plantation, promoted the rapid development of the corn industry, and also created considerable economic benefits. However, the benefits must be accompanied by the emergence of disadvantages, which has become a resistance in the development of the corn industry in Jilin Province. According to the survey found in this article, there are some problems with the agricultural supply in Jilin Province. After comparing the corn planting industry in other cities and counties, it is found that the corn production in Jilin Province has been growing, resulting in overstocking, and large-scale planting requires huge labor. And corn farmers' income has been low. Further analysis of the corn industry in Jilin Province using supply-side related theories found that the corn inventory in Jilin Province is too large, which is likely to cause slow sales. The corn industrial structure cannot match the market demand, and the market information acquisition speed is slow. When the market is completely in a competitive state, it is not suitable for the development of the corn industry. Blind competition with each other will only cause a vicious circle, which will eventually cause serious damage to the corn industry; the industrial structure does not match the market demand, and the products supplied are not what the market needs This will only cause the product to fail to sell, which is also one of the important reasons for the sluggish corn sales in Jilin Province; market information has not been updated in a timely manner, which has greatly damaged the efficiency of corn supply.

(2) According to the survey in this paper, corn as a ternary crop can provide a variety of use values. From the perspective of linking with downstream industries, the corn planting industry should establish a "ternary" planting structure composed of edible corn, forage corn, and processed corn that is compatible with the development of downstream industries. Within the processing corn, it can be divided into several specialized varieties. Whether from the perspective of promoting the development of downstream industries and increasing farmers' income, or from the perspective of promoting the ecological construction of farmland and achieving sustainable agricultural development, it is necessary to optimize the structure of corn planting. Over the years, adjusting the internal structure of corn has been constrained by a variety of factors, including policies, technology, market management, land systems, and management structures. According to the experience of

developed countries such as the United States, the best way to manage corn is to establish a combined farming and pastoral management structure based on farmers, and at the same time develop the cattle or dairy farming industry, and store corn directly to achieve indoor conversion and consumption, which is beneficial to reducing costs and reducing Market risks are also conducive to improving farmers' operating efficiency and rational use of labor.

(3) According to the research and investigation in this paper, compared with other major corn-producing provinces in China, the corn planting area in Jilin Province is the second largest in the country, accounting for 9.96% of the total corn planting area in the country; The proportion is as high as 12.61%, accounting for 4.50% of the country's total grain output, and it also ranks second in the country's total corn production; Jilin Province has a relatively high level of corn production technology. The yield of corn in the main corn producing areas in Jilin Province still has great potential. Integrating natural and technical conditions to further optimize the structure of corn production. In terms of seeds, the government can pay more attention to corn varieties research institutions and do more research and continue The development and research are more suitable for the corn varieties grown and grown in the main production areas of Jilin Province; while maintaining the current level of corn production in Jilin Province, give play to its advantages to ensure the sustainable and stable development of corn production in Jilin Province.

Funding

This work is supported by Special Fund granted by Minjiang University.

Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

References

[1] R. Gul Guven, N. Aslan, K. Guven, F. Matpan Bekler, & O. Acer. (2016) "Purification and Characterization of Polyphenol Oxidase from Corn Tassel",Food Science & Technology, 62(13), pp.6-11. https://doi.org/10.14715/cmb/2016.62.13.2

[2] Adil, M., Khan, M. K., Jamjoom, M., & Farouk, A. (2021). MHADBOR: "AI-enabled Administrative Distance based Opportunistic Load Balancing Scheme for an Agriculture Internet of Things Network". IEEE Micro. https://doi.org/10.1109/MM.2021.3112264

[3] Chi Fulin. (2016) "Transformation Through Structural Reform",Beijing Review, 59(11), pp.40-40.

[4] Paulo C. Coradi, Dirk E. Maier, Lakshmikantha H. Channaiah, & Carlos Campabadal. (2016) " Effects of the Processing on the Distribution of Aflatoxin and Fumonisin Levels in Corn Fractions and Feeds", Journal of Food Process Engineering, 39(3), pp.215-225. https://doi.org/10.1111/jfpe.12212

[5] Zhaoyong Li, Mohammad Q. Hassan, Mohammed Jafferji, Rami I. Aqeilan, & Jane B. Lian. (2019) "Correction: Biological Functions of Mir-29b Contribute to Positive Regulation of Osteoblast Differentiation", Journal of Biological Chemistry, 294(25), pp.10018-10018. https://doi.org/10.1074/jbc.AAC119.009552

[6] Qi Sun, Shuangfeng Han, Chin-Lin I, & Zhengang Pan. (2017) "On the Ergodic Capacity of Mimo Noma Systems", IEEE Wireless Communications Letters, 4(4), pp.405-408. https://doi.org/10.1109/LWC.2015.2426709

[7] Surinder Kaur , Diksha Kumari , Vandana Kumari, "Control of Enviornmental Parametrs in A Greenhouse", Fusion: Practice and Applications, 2020, Vol. 1, No. 1, pp: 14-21 (Doi: https://doi.org/10.54216/FPA.010102) https://doi.org/10.54216/FPA.010102

[8] Jing Zhang, & Jian Chen. (2017) "Introduction to China's New Normal Economy", Journal of Chinese Economic & Business Studies, 15(1), pp.1-4. https://doi.org/10.1080/14765284.2017.1289454

[9] Liu, Xiaoli. (2017) "Spotlight on China: Changes in Education under China's Market Economy", Comparative and International Education, 46(4), pp.1-3. https://doi.org/10.5206/cie-eci.v46i1.9313

[10] Fatih Yılmaz, & M. Tolga Balta. (2016) "Energy and Exergy Analyses of Hydrogen Production Step in Boron Based Thermochemical Cycle for Hydrogen Production," International Journal of Hydrogen Energy, 42(4), 2485-2491. https://doi.org/10.1016/j.ijhydene.2016.04.017

[11] Muhammad Naveed Jafar, Muhammad Saqlain, Ahmad Raza Shafiq, Muhammad Khalid, Hamza Akbar, Aamir Naveed, "New Technology in Agriculture Using Neutrosophic Soft Matrices with the Help of Score Function", International Journal of Neutrosophic Science, 2020, Vol. 3, No. 2, pp: 78-88 (Doi: https://doi.org/10.54216/IJNS.030204)*

[12] Haiyang TANG, & Jin ZHOU. (2016) "Changes and Influencing Factors of Maize Production Pattern in Cina",asian agricultural research, 08(3),pp.47-53.

[13] Eun-Ah Ko, Hye-Ri Kim, Yong-Bin Kim, Hee-Su Kim, & Sung-Ho Lee. (2017) "Effect of High Fructose Corn Syrup (hfcs) Intake on the Female Reproductive Organs and Lipid Accumulation in Adult Rats", Development & Reproduction, 21(2), pp.151-156. https://doi.org/10.12717/DR.2017.21.2.151

[14] Nan Li, Felix T. S. Chan, S. H. Chung, & Allen H. Tai. (2016) "A Stochastic Production-Inventory Model in a Two-state Production System with Inventory Deterioration, Rework Process, and Backordering",IEEE Transactions on Systems Man & Cybernetics Systems, 47(6), pp.1-11. https://doi.org/10.1109/TSMC.2015.2422267

[15] Arif Nirsatmanto. (2016) "Early growth of improved acacia mangium at different planting densities", Jurnal Manajemen Hutan Tropika, 22(2), pp.105-113. https://doi.org/10.7226/jtfm.22.2.105