Cater or Guide the Demand—From the Perspective of Food Security

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Abstract. The rising income level has promoted the upgrading of Chinese residents' consumption level, and the demand for meat protein has an increasing trend. Under the constraint of China's cultivated land resources and environment, the import of feed grain continues to increase, which has an impact on the grain industry security. Combined with the 2016 Dietary Balance Guidelines for Chinese residents, the paper expounds the current situation of excessive supply of grain, livestock, poultry and fish in China. This paper puts forward the importance of guiding balanced diet consumption to food sustainable security. At the same time, it is necessary to guide the scientific diet behavior effectively and encourage the business entities to control the quantity, guarantee the quality and diversify the supply.

1. Introduction

Since ancient times, the security of food supply has a bearing on the stability of a country. Adequate food supply is not only a guarantee for the stability of people's lives, but also the cornerstone of economic development. The dynasties pursued the security of food supply to cope with the impact of war and famine on people's livelihood. In 1996, the World Food Summit stated that: “food security is achieved only when all people have, at all times, material and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life\textsuperscript{[1]}. At present, on the basis of solving the problem of people's food and clothing, the goal of food security begins to shift from food supply and quantity security to the pursuit of food nutrition security. To provide residents with healthy dietary needs that can meet their personal food preferences has become the main standard to measure the food safety of Chinese residents in the new era. On the one hand, the realization of food security targets depends on the stability of food production capacity and supply. on the other hand, it is affected by the dietary intake level of residents. With the application of science and technology, China's grain yield per unit area has been greatly increased, the grain supply capacity has been improved, and the problem of people's food and clothing has been solved. With the increase of household income, the demand for meat protein is on the rise, and the increase of meat consumption leads to the increase of import of feed grain soybean. However, in the context of climate warming and water shortage, the increasing demand for meat protein consumption requires more food and water resources conversion, which brings greater pressure to China's food security. Under the decreasing trend of per capita cultivated land area in China, the international grain market is an important way for China to effectively adjust domestic grain surplus and shortage. Economic development has promoted the increase of income and the change of consumption structure. During the continuous spread of COVID-19 globalization,
countries around the world have increased the level of grain reserves. Thailand, India and other countries have restricted the export of grain and other agricultural products to ensure domestic supply and demand. At the same time in the international logistics and transport costs rise, resulting in the increase of food import costs. In the future, the increasing uncertainty of international trade will put forward new requirements for the adjustment of China's grain import policy, and the policy of using the international market to relieve surplus and shortage will be confronted with practical challenges. Under the background of anti-globalization, trade frictions are frequent, and tariff and non-tariff barriers become the means to balance bilateral trade. When bilateral trade frictions occur, it is easy to destroy the stability of bilateral trade relations, bring trade losses to both sides and reduce the trade welfare effect. Diversification of trade strategies can overcome the impact of bilateral trade uncertainty, but the distance of multilateral trade, supply potential shortage and other transaction costs increase the risk.

Based on the limited rationality of consumers' demand for food, they will choose meat products that can bring more consumption utility if they are affordable. Scientific dietary structure guidance will help to improve consumers' rational consumption, promote producers' rational production and reduce production waste caused by excessive catering to consumers. This paper starts with the current situation of food consumption supply and demand in China and analyzes the rationality of the dietary consumption structure of Chinese residents in combination with the 2016 Dietary Balanced Guidelines of China. It is pointed out that the current supply of grain and meat in China has been excessive, the over-consumption of meat protein per capita has caused more hidden diseases, and the over-supply of grain has also caused the waste of consumption and the increase of storage cost. In terms of food security, China needs to change from quantity and self-sufficiency to meet people's demand for food quality and balanced food structure. Therefore, the establishment of the concept of sustainable food security in China needs to guide Chinese residents to develop a balanced diet structure to regulate the structural imbalance of China's food supply. Therefore, it is necessary to construct a diversified food supply system to guide residents to effectively choose food, so as to relieve the current pressure on cultivated land in China, reduce the excessive dependence on soybean imports and realize the strategy of sustainable food security.

2. The Quantity and Quality of Food Consumption in China Have Both Increased

2.1. China Has a Large Population with a Low Growth Trend, Increasing the Demand for Food

Since ancient times, food has been the key to survival outside the hunting grounds. Under the traditional way of life of Chinese residents, the main crops are grains and the planting structure is diversified. With the increase of population and the influence of staple food preference, China has adopted the main grain localization of maize, rice and wheat in high-yielding grain crops. And the increase of main grain yield has well solved the subsistence problem of residents. However, with the increase of income, the consumption of main grains in the diet structure of residents showed a downward trend, and the demand for protein food showed a rapid growth, which led to the increase of the demand for feed grains mainly soybean than that of main grains. Since the founding of the People's Republic of China, China's population has increased dramatically under the policy of encouraging children to have children. At the low level of overall economic development, the family burden is increased, the family consumption ability is low, food consumption is based on rations. By 1982, when the one-child policy was fully implemented, the child-support ratio had
dropped to 54.6 percent. The “two-child” policy, introduced in 2016, has further boosted China's population growth, with the natural growth rate rising to 3.34 per thousand, according to the 2019 China Statistical Yearbook. With a population of 1.4 billion, China's demand for food will grow at the same time.

2.2. Under the Trend of Income Growth, Meat Consumption Continues to Increase

The income of residents determines the level of food consumption. When the income level of Chinese residents is low, food consumption is mainly grain. According to the Statistics of China's statistical yearbook, in 1981, the average income of peasant families was RMB223, and the average salary of workers was RMB772. At the same time, Food consumption is dominated by cereals. With the advance of reform and opening up, urban residents' income has seen rapid growth. According to statistics, in 2019, the per capita disposable income in China reached RMB307, 32.8. Grain consumption is down, meat consumption is up, and grain consumption accounted for a small part percent of the total food consumption. MAO Xue feng, Liu Jing and Zhu Xin kai (2014) proposed that according to the income and consumption trends of developed countries, the increase of income would stimulate people's consumption of meat. China's per capita food consumption structure need to be adjusted. Meat gap is large. China will face the pressure of feed grain gap, which needs to be alleviated through a large number of imports.

2.3. According to the Dietary Guidelines, the Dietary Structure of Chinese Residents Presents an Unreasonable Level

According to the physical health and dietary habits of Chinese residents, the National Health and Family Planning Commission of the People's Republic of China issued the 2016 Dietary Guidelines for Chinese residents in order to put forward guidelines that meet the nutritional health status and basic needs of Chinese residents. According to the dietary guidelines, As shown in Table 1, China's population's grain intake is at normal levels. Livestock and poultry meat is in the state of excessive consumption. And low consumption in fish. Therefore, in the face of the increasing obesity group and the extreme coexistence of groups with insufficient nutrient intake, it is necessary to guide scientific diet effectively.

According to the physical health and dietary habits of Chinese residents, the National Health and Family Planning Commission has put forward the 2016 dietary guidelines for Chinese residents that meet their nutritional health status and basic needs. According to the dietary guidelines, China's population's grain intake is at normal levels. And animal flesh consumes excessive condition, and fish consumes slant little.

### Table 1. Statistical table of meal consumption.

| Species                      | Aquatic product | Livestock and poultry meat | Cereals and potatoes |
|------------------------------|-----------------|----------------------------|----------------------|
| The 2016 Dietary Guidelines  | Minimum 14.6    | Minimum 14.6               | Minimum 91.25        |
|                              | Highest 27.37   | Highest 27.37              | Highest 146          |
| Real per capita output & consumption |                |                            |                      |
|                              | consumption    | consumption                | Meat production      |
|                              | production     | consumption                | Grain yield          |

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### 2.4. A Diversified Diet Contributes to Nutritional Satisfaction and Health

A diversified diet contributes to nutritional satisfaction and health. The satisfaction of multiple nutrients, the need for diversified food rations, dietary diversity is more conducive to health. To encourage residents to consume a variety of food can effectively meet the intake of diverse nutrients. Dietary diversification refers to a diet containing a variety of foods of the same or different types, that is, different types of food or different foods within the same food group during a specific period of time. According to domestic and foreign scholars, a diversified diet, especially a diversified diet of fruits and vegetables, can effectively prevent the occurrence of cancer. A plant-based diversified diet is more effective in lowering cholesterol and LDL.\(^5\) As a major exporter of vegetables and fruits, China's dietary structure transformation will help alleviate the pressure of China's grain demand. The dietary structure of Chinese residents is similar to that of the United States. If the preference for meat continues to increase, it will affect the intake of other food types and promote the growth of feed consumption.

### 3. Grain Imports Increased and Trade Uncertainty Increased

#### 3.1. The Potential of Feed Grain Production is Insufficient, and the Demand for High-quality Wheat and Rice Increases

With the advance of urbanization and the opening of the market, the economic benefits of grain planting have declined, the area of grain cultivated land has gradually shrunk, and the area of cash crops has continued to increase. In order to reduce the dependence on soybean imports and optimize the planting structure, supply-side reform was carried out in 2016, which resulted in a decrease in the cultivated area of corn and a small increase in the cultivated area of soybean. In 2018, the sown area of soybean was 6,050 hectares. With the increase of demand for meat protein, soybean planting area will continue to increase in the future, but the growth rate is mainly limited by the low yield level of soybean per unit area. Under the policy of absolute self-sufficiency in grain rations, China's rice and wheat production has continued for many years. But as incomes rise, demand for high-quality rice and wheat imports from countries such as Thailand, Myanmar and Canada have risen.

#### 3.2. Feed Grain Demand Continues to Grow, and Imports Increase

China's soybean production is low, although it can meet the food consumption, but in the crush and
feed consumption of the continuous increase in demand, As shown in Table 2, soybean imports continue to increase. Soybean production is well below consumption.

Table 2. Statistical table of feed grain supply and demand.

| varieties | soybean | corn |
|-----------|---------|------|
|           | imports | consumption | production | import | consumption | Maize yield |
| The annual |         |             |           |        |             |             |
| 2019      | 1033    | 1161        | 163       | 35     | 2869        | 2863        |
| 2018      | 1081    | 1204        | 152       | 32     | 2772        | 2743        |
| 2017      | 979     | 1109        | 143       | 47     | 2548        | 2660        |
| 2016      | 908     | 1020        | 145       | 57     | 2448        | 2599        |
| 2015      | 802     | 948         | 150       | 37     | 2488        | 2570        |
| 2014      | 716     | 898         | 162       | 43     | 2352        | 2416        |
| 2000      | 41      | 222         | 179       | 3      | 1393        | 1481        |

Data source: USDA Supply and Demand report, Flush Shun database, unit: million tons.

The yield of corn has been in a stable growth state, corn for a long time to feed consumption. However, with the development of corn processing industry, the demand for corn increases, and the destocking effect is remarkable. Since 2018, corn production has been unable to meet consumer demand. Driven by domestic and foreign price differentials, opening the corn market will promote corn import growth.

3.3. China's Overall Food Security, Soybean Supply is Highly Dependent

Food self-sufficiency is usually used to assess a country's level of food security, and its ratio directly reflects whether the foundation of food security is solid. The international food self-sufficiency safety standard is defined as 90%, while China's food ration safety standard is absolute self-sufficiency. China's rice and wheat supply levels continue to exceed 90%. under the supply-side reform, the corn area was reduced, and the soybean area increased slightly. The corn self-sufficiency level dropped to 86% in 2018 and corn supply gap mainly depends on inventory.
In the context of limited land resources and increasing population demand, it is difficult to achieve self-security for all varieties, so import becomes an inevitable choice. According to Zhu Li Meng (2007), it is deduced that the degree of food security reflected by the net import dependence of grain: below 5% is the safe state, between 5% and 13% is the basic safe state, between 13% and 18% is the unsafe state, and above 18% is the crisis state.[6] As shown in Table 3, it can be found that corn, wheat and rice in China are highly self-sufficient and absolutely safe, while soybean is highly dependent on import. Soybean exports mainly come from the United States, Brazil and Argentina, which have abundant cultivated land and favorable climate. China's soybean imports account for more than 80% of the world's soybean exports, concentrated in Brazil, the United States and Argentina for many years. Due to the adjustment of national agricultural policy, Argentine soybean planting area decreased, while Brazilian planting area increased. Canada and Russia also saw small increases in soybean exports, with more than 90% of imports in 2018 mainly coming from Brazil and the United States, which have comparative advantages in resources.

3.4. Increased Excessive Import Pressure Driven by Food Price Differentials and Constrained by Trade Agreements

From 1949 to 2010, China had a large rural population, accounting for more than 50% of the total population. Agricultural labor force was employed by a dense population, which gave China a comparative advantage. Agriculture was still a labor-intensive industry. China has a large population, the per capita cultivated land area is lower than the world average level, and the grain production efficiency is low. By exporting agricultural products with comparative advantages, such as vegetables and fruits, and importing agricultural products with relative disadvantages, trade gains can be achieved. From 1980 to 1996, China's grain export was dominated by grain, with rice, corn and soybeans exported and wheat imported. In order to join WTO, China began to lower the threshold of import of some agricultural products, and soybean import increased sharply from 1996. After joining THE WTO, the demand for feed protein increases, soybean, sorghum, cassava and DSG implement a single tariff of 2%-5%. Under the lower tax rate, the rich land resource endowment and the comparative advantages of countries such as the United States, Argentina and Brazil with the application of GM technology are more competitive than the increase in China's
planting cost. Demand for imported soybeans increased, replacing demand for corn. In 2004, the minimum purchase price and the temporary purchase and storage policy protected the farmers' income and meanwhile reduced the international price competitiveness of soybean. Production technology of corn improvement per unit area, comparative advantages prominent, export increase. In 2008, China abolished export subsidies for agricultural products, resulting in a sharp decline in exports and an increase in imports. The population continues to grow at a rate of nearly 5%, and the land occupancy per capita continues to decline. As the number of people working in agriculture decreases, the input of machinery operation fee and labor cost increase, and the competitiveness of grain price in the international market declines. With the economic growth, the import demand for high-quality rice and wheat and soybean increases, and the export advantage of rice decreases. China's grain exports as a whole show a downward trend, into the overall net import stage. In the case of export decline, the risk of industrial damage to grain import increased. Driven by domestic and foreign price differences, the import demand increases, which is a great impact on the domestic prices of rice and wheat. While the output of rice and wheat increases, the increase of grain import will lead to the decrease of domestic market price and discourage the farmers of rice and wheat. Against the background of anti-globalization, the United States, as a major trading partner, protects its own industries through import restrictions. At the same time, the agreement will prompt China to improve tariff quotas on wheat, rice and corn, and increase imports of dairy, beef, soybeans, aquatic products, fruits, feed and other agricultural products from the US. Increasing the import of Agriculture products from the United States will have a substitution effect, correspondingly reducing the demand for China's own agricultural products and agricultural products from other countries of origin, thus inhibiting the diversification risk effect of diversified imports.

3.5. Increased Risk of Grain Trade Costs

With the increase of uncertainty of grain trade in the international market, countries have become more aware of grain risk prevention. Major exporters of wheat and rice once imposed export trade restrictions to maintain price stability in the domestic market. At the same time, the demand for grain imports on the international market has increased, and some major grain importers have adopted duty-free policies to attract food sources. Grain prices in the international market have increased to varying degrees, driven by multiple factors such as reduced tradable grains, increased demand and market speculation. International grain price rise, make trade cost increase; Due to the impact of the epidemic on population mobility in various countries, the timeliness of food import is also challenged, and the risk of interruption of international trade supply chain is increased.

4. To Safeguard Food Security, We Need to Establish a Sustainable Mechanism of Food Supply and Demand

The existing food policy maximizes the food supply when land resources are scarce. However, while ensuring the security of supply and quantity, the changes in the consumption structure of staple food are ignored. In order to meet people's diversified demands for a better life, in recent years, the No.1 Document of the CPC Central Committee has highlighted the utilization of "two resources and two markets" at home and abroad. We will adjust and improve the policy on minimum purchase prices for rice and wheat, ensure basic income for farmers, and expand the export of competitive agricultural products. This will play an important guiding role in promoting China's agricultural participation in the global division of labor and promoting the upgrading of the food industry. Based on this, the paper puts forward the following suggestions for policy optimization and improvement.
4.1. Encourage Diversified Cultivation to Meet Diversified Food Needs

While ensuring the supply of staple food, under the trend of diversified food demand, it is necessary to establish the overall food concept and adjust the existing planting structure. Our country is rich in natural resources and food. To encourage all regions to make use of the diversity of regional plants according to the regional resource conditions for diversified planting and management is not only beneficial to the diversified dietary needs of Chinese residents, but also can give play to the effect of regional resource endowment. And achieve sustainable high-quality development.

4.2. Optimize Feed Ratio Structure to Realize Import Diversification

The change of feeding revolution has changed China's animal husbandry from grass feeding to corn and soybean as the main feed formula, leading to the increase of import demand. Brazil, the United States, Argentina and other South American regions, relying on natural endowment advantage, soybean production has an absolute dominant position. Under the current demand structure, it is difficult to realize the fundamental transformation of the pattern of import diversification. Therefore, changing the way they are raised can reduce the demand for soybeans and the dependence on imports. Specific alternative forage and grain varieties can be selected to make full use of the world's biodiversity and realize diversified and multi-variety import.

4.3. Scientifically Guide Consumers to Eat

With the growth of people's consumption potential, more attention has been paid to the demand for balanced nutrition and healthy functions. However, due to information asymmetry, science popularization of healthy and nutritious grains is not comprehensive, resulting in consumers' actual purchase of grain grains, which is usually made by non-professional evaluation from external aspects such as taste experience, appearance, packaging and brand. In order to cater to the palatability of consumers, grain enterprises over-process grain, which results in the loss of grain's original nutrition elements. Chinese residents' preference for meat and excessive pursuit of taste bring potential health hazards, as well as food security crisis in China. Under the realistic background of the large amount of grain import in China and the increase of uncertain factors of supply in the international market, guiding consumers to scientifically choose nutritious and healthy grains and constructing the new consumption concept of whole grains can promote enterprises to reduce excessive fine processing and accelerate the development of whole grain products rich in various trace elements. Thus, the import demand of grain can be reduced, and the food security of China can be improved. Meanwhile, the diet structure of Chinese residents can be improved, and the health level of residents can be improved.

4.4. Increase Input in Sustainable Agricultural Policy Support

The minimum purchase price policy of rice and wheat has promoted the continuous increase of grain output and cost increase of processing enterprises. At the same time, the surplus supply of high-yield and low-quality grains of rice and wheat at the minimum purchase prices has led to a decline in the self-sufficiency rate of high-quality grains. Driven by domestic and foreign price differentials, higher demand for higher-quality rice and wheat imports when yields and stocks are abundant; At the same time, due to the high yield per unit area of corn, soybean acreage expansion is difficult to achieve significant progress. The increase of grain import will impact the domestic grain market price and affect the grain income of farmers. Therefore, while pursuing the grain supply and output, it is necessary to increase the input of grain quality and technology and the

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connection of sales channels, so as to encourage farmers to plant and manage varieties more in line with the needs of residents. Sustainable food security requires a wide range of agricultural policy support. From food breeding technology, food modernization infrastructure inputs to the end of diversified diet solution offered.

4.5. Closely Follow the Market Supply and Demand, and Establish a Dynamic Grain Storage Regulation System

On the one hand, the main role of grain reserves is to ensure that ordinary people, especially low-income groups, can buy grain at an acceptable price when the price of grain fluctuates abnormally. On the one hand, it is to satisfy the residents' preference for diversified diet. Therefore, China needs to establish a storage system suitable for flexible adjustment of market supply and demand, and make strict classification and differential pricing of grain varieties and grades. At present, under the excessive supply of low-price grain in China, the insufficient supply of middle and high-end demand restricts the benefit of grain storage in China. Therefore, it is necessary to strengthen the classification of high-quality varieties to purchase and improve storage standards. At the same time, the storage mode is transformed from national storage to national auxiliary mode, which is dominated by farmers and business entities, so as to reduce the national storage cost and drive the income generated by farmers' independent market sales. Therefore, it is necessary to strengthen the implementation of the differential incentive policy of high quality and high price in China's grain reserves, and the weight of reserves is more important to quality. Encourage and guide farmers to select and plant high-quality varieties.

5. Conclusion

To sum up, in the context of increasing population and income, the demand for food continues to grow. In order to meet the growing consumption demand, more food needs to be produced and imported. The traditional eating habits of Chinese residents are extensive, and lack of quantitative management of food nutrition. Different groups of people are not fully aware of the nutritional needs of food. When consumers lack sufficient knowledge of food nutrition, irrational food consumption will lead to more waste. The output of rice, wheat and corn has been increasing continuously, which ensures the security of the main grain supply. Meanwhile, with the increase of feed grain demand, the sown area of high-yield Corn continued to increase, the planting area of coarse grain and soybean is declining. With the spread of global biosafety events, countries' awareness of food risk prevention is increasing. The main exporting countries of wheat and rice implement export trade restriction measures to ensure the supply and demand of domestic market; at the same time, the import demand of grain in the international market is increasing, and the importing countries adopt tax-free policy to attract grain sources. Driven by the decrease of supply and the increase of demand, the price of grain in the international market has risen in different ranges. The rise of international food prices has increased trade costs. Due to the limitation of population mobility, the timeliness of grain import is also challenged, and the risk of disruption of international trade supply chain is increased. Under the background of resource shortage and increasing risk of supply uncertainty in the new era, China needs to build an overall perspective of sustainable food security strategy. We should not only meet the reasonable needs of residents for a better life, but also need to guide consumers to establish a healthy diet structure. With the advancement of urbanization and the improvement of residents' income, people's food consumption not only needs cereals, It also requires a balanced diet including protein, vitamins and other...
micronutrients, including livestock products, aquatic products and melons. The proportion of fruit and other food consumption gradually increased, while the proportion of grain consumption gradually decreased. Once the consumption demand changes structurally, the structure of grain production (including variety structure, quality structure, etc.) must also be changed. Therefore, the consumption concept needs to change from the demand side, and the planting structure needs to be adjusted from the production and supply. Under the food security policy of self-sufficiency of staple food, diversified food trade is needed to meet people's nutritional needs. Therefore, it is necessary to open China's agricultural products market, but at the same time, it also means that the lack of competitiveness of China's agricultural products will be more impacted. Under the constraints of climate, resources and environmental changes, guiding people to reasonably consume and control consumption is more conducive to building a sustainable food security strategy and avoiding supply shocks brought by uncertain risks.

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