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Why Are There Great Fluctuations in the Prices of Vegetables?

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Abstract The normal supply of vegetables is related to the people's livelihood and social stability, and smooth prices of vegetables are vital to social development. Based on the phenomenon of great fluctuations in the prices of vegetables in recent years, we use living example to analyze the real reasons for great fluctuations in the prices of vegetables from the perspective of supply chain node of vegetables and macroeconomic policies. Finally, from the balance of supply and demand, industry standardization, circulation, market order and the government mechanism, we put forth the following management strategies for controlling great fluctuations in the prices of vegetables: establishing and improving the channels of information transmission, making the production and marketing information symmetrical, and balancing supply and demand; actively promoting the industry standardization of vegetables; reducing the intermediate links, and curtailing the circulation cost of vegetables; regulating the "green channel" of vegetables, and preventing uptick in the prices of vegetables in the "last mile"; cracking down on the vegetable speculation behavior to ensure the healthy development of the vegetable market; actively giving play to the role of government, and building the vegetable protection system.

Key words Supply chain of vegetables, Fluctuations in the prices of vegetables, Management strategies

1 Introduction

In recent years, in China's vegetable market, the prices of some vegetables show non-normal fluctuations (continuous rise or sharp fall), exerting a large impact on the people and vegetable growers' life, seriously affecting the social stability and economic development, which has attracted wide attention of the masses, government and scholars. Arresting the non-normal fluctuations in the prices of vegetables to ensure the people's stable life has become the current important topic.

For the phenomenon of fluctuations in the prices of vegetables, the central government has issued a series of related policies. On August 18, 2010, the State Council's meeting determined six measures to promote production, supply and marketing of vegetables and basic stability in the prices^[1]. On November 20, 2010, the State Council issued *Notice of the State Council on Stabilizing the Overall Level of Consumer Price and Protecting the Basic Livelihood of the Masses*, which made it clear that we should vigorously develop agricultural production, reduce the circulation cost of farm and sideline products, and implement "vegetable basket" mayor accountability system^[2]. On May 19, 2011, the National Development and Reform Commission issued *Notice on Improving the Prices and Promoting the Production and Circulation of Vegetables*, and came up with three policies (developing production, supporting circulation, and stabilizing prices^[3]). At the end of 2011, the Ministry of Finance, State Administration of Taxation issued a notice: From January 1, 2012, the value added tax of circulation of vegetables is exempted^[4]. In addition, according to the spirit of central government, combined with local market con-

ditions, some provinces adopted some measures to stabilize the prices of vegetables. In October 2011, the Ningxia Price Bureau decided that from October 24 to January 31, 2012, the direct sales outlets of vegetable in supermarkets and communities in all cities and counties of the region implemented the price ceiling on several types of vegetables^[5]. The aim of these policies and measures is to stabilize the prices of vegetables. However, in recent years, the fluctuations in the prices of vegetables are still large, failing to meet the expectation of the people and the government. Stabilizing the prices of vegetables and precluding sharp rise or fall in the prices of vegetables is the current focus of the work of the government, also the hot spot of scholars' research.

From different points of view, the scholars have conducted a large number of studies on fluctuations in the prices of vegetables and also achieved fruitful results. From the perspective of industry chain of vegetables, Zhang Liyang and Zhang Xicai (2011)^[6] took Shouguang vegetable production base in Shandong Province as an example, to describe the status quo of fluctuations in the vegetable industry chain prices in China, analyze the reason for the emergence of fluctuations in the vegetable industry chain prices, and put forth some recommendations for the regulation of prices of vegetables. Based on the characteristics of supply of vegetables in Beijing City, Ma Guoying, Yang Lei, Wang Jingjing, Chen Yongfu (2011)^[7] analyzed the reason for changes in the prices; conducted in-depth analysis of the problems in China's current vegetable industry chain and put forward the countermeasures. Based on the transport case of "Shouguang eggplant", Shi Kai, Xu Zhengda, Wenjie and Liang Libin (2011)^[8] analyzed the road map of the prices of vegetables; pointed out some problems in the current supply chain of vegetables, such as too many links, limited size of the retailer, information asymmetry and rise in the prices of vegetables caused by high logistics loss rate; came up with the specific implementation strategy. From the perspective of government, Feng Jiang, Zhou Zhihui (2011)^[9] analyzed the reasons for the

formation of "vicious circle" of the prices of vegetables, and put forward the countermeasures for the government to crack "vicious circle" of the prices of vegetables. From the perspective of correctly treating fluctuations in the prices of vegetables, Zhao Meihua, Wen Bianying, Lan Chuangye, Zhao Junliang (2011)^[10], analyzed the main reason for the instability in the prices of vegetables, and proposed to build long-term mechanism for stabilizing the prices of vegetables. From the means of production, circulation, technology adoption, logistics costs and hot money, Suwei (2011)^[11] analyzed the problem of unusual fluctuations in the prices of vegetables, and put forth targeted improvement measures. Wu Hao (2012)^[12] described the impact of great fluctuations in the prices of vegetables; from macroeconomic factors, changes in the production and supply of vegetables, and environmental policy, analyzed the reason for great fluctuations in the prices of vegetables; put forth relevant policy recommendations.

The above research work to a certain extent can reasonably explain the reasons for the current great fluctuations in the prices of vegetables, and some solutions offered have been adopted. However, the problems of market variability and policy implementation greatly abate the original force of these countermeasures. In addition, the above studies basically are based on one certain point or section to research great fluctuations in the prices of vegetables, lacking systematic analysis from the point of view of the whole vegetable supply chain. The supply chain is a concept based on macro overall perspective, which can comprehensively analyze the advantages and problems of the industry. The vegetable industry is an industry with strong concept of supply chain. If the supply chain of vegetables can be portrayed in detail, and the supply chain nodes can be analyzed one by one to subdivide the prices of vegetables into all nodes of supply chain of vegetables, we can conduct effective analysis of great fluctuations in the prices of vegetables, and give appropriate suggestions.

Based on the data on fluctuations in the prices of vegetables released by the National Development and Reform Commission and the price index released by the National Bureau of Statistics, this article conducts graphical portrayal of fluctuations in the prices of several vegetables in recent years and important position of the prices of vegetables in the residents' life, and analyzes the impact of great fluctuations in the prices of vegetables. Then based on the actual case of Shandong Shouguang, this article makes detailed description of supply chain of vegetables; from the perspective of supply chain, analyzes the reason for great fluctuations in the prices of vegetables, and gives the corresponding countermeasures and recommendations for stabilizing the prices of vegetables.

2 Analysis of great fluctuations in the prices of vegetables under the perspective of supply chain

2.1 The current situation of great fluctuations in the prices of vegetables

In recent years, there are abnormal fluctuations in the prices of some vegetables. In 2010, the prices of ginger, garlic, potato and other vegetables reached the peak value, and the high prices hurt the people. But in 2011, there were phenomena of draggy sale of vegetables and decline in the prices of vegetables;

the prices of some vegetables even fell below the cost line, hurting the vegetable growers. This article selects eight kinds of vegetables in daily life such as ginger and cabbage. As is shown in Fig. 1, we can clearly see the phenomenon of great fluctuations in the prices of these vegetables.

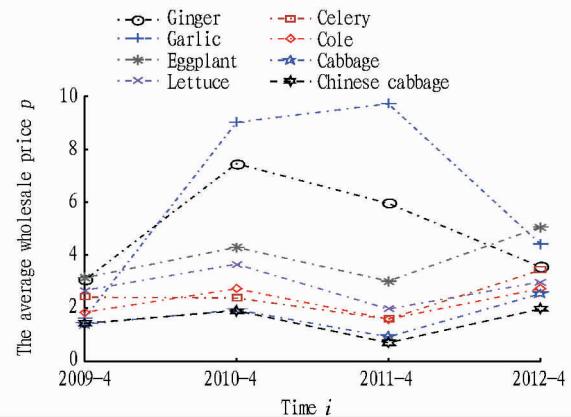


Fig. 1 Changes in the vegetable price by the end of April during the period 2009 – 2012

As can be seen from Fig. 1, in April from 2009 to 2012, the fluctuations in the wholesale prices of these vegetables were very obvious, and especially for ginger and garlic, the fluctuations were sharp. The residents also fully understood this phenomenon.

Since the first half of 2012, the fluctuations in the prices of vegetables have been still high. This article selects the main data on the prices of vegetables from the National Development and Reform Commission—the average wholesale prices of 18 kinds of vegetables in the major cities. The processing results are shown in Fig. 2.

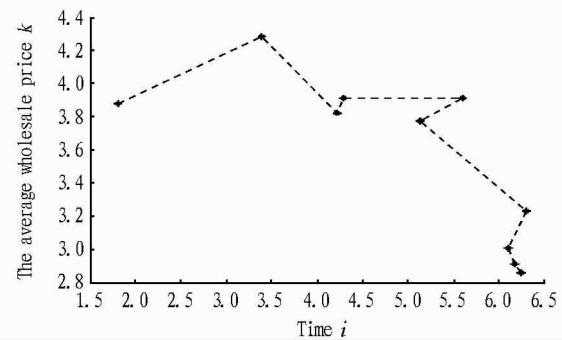


Fig. 2 Changes in the average wholesale price of 18 kinds of vegetables in the major cities of China in the first half of 2012

As can be seen from Fig. 2, the fluctuations in the prices of vegetables in China are still relatively large in the short term. The abnormal fluctuations in the prices of vegetables are frequent in China, so we must face the phenomenon of the abnormal fluctuations in the prices of vegetables.

2.2 The importance of the price of vegetables

From the microscopic point, as long as there is life, there will be vegetables, which are the basic consumer goods on the table. Under normal circumstances, residents can not live without vegetables. From the

macroeconomic point, the cultivation, transport, supply and price of vegetables are always the focus of attention of government. In the consumer price index published annually, the food price occupies an important position, which is the weather vane of CPI change, but in the food price, the prices of vegetables usually play the role of the leader.

Fig. 3 clearly shows that the vegetable price index is higher than the consumer price index in most cases. From another point of view, it also reflects the important impact of the prices of vegetables on the residents' life, and important position of the prices of vegetables in the national economy.

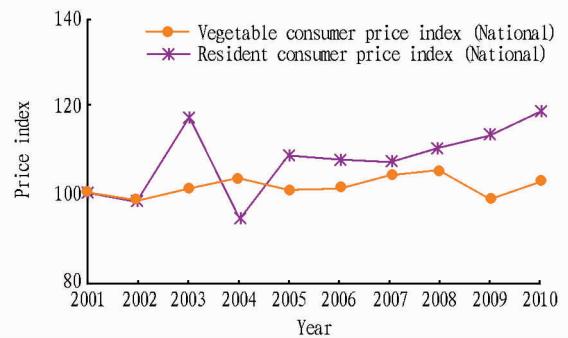


Fig.3 Comparison between vegetable consumer price index and resident consumer price index during the period 2001 – 2010

2.3 The impact generated from great fluctuations in the prices of vegetables

2.3.1 Affecting the consumers' life. Vegetables belong to the necessities of life, so regardless of the price level, consumers have a certain demand. From the analysis of the importance of the price of the vegetables, we know that the food price index occupies large weight in CPI, and the vegetable price index is the weather vane of the food price index. Through the price transmission mechanism, great fluctuations in the prices of vegetables simultaneously lead to fluctuations in the prices of other products, thus affecting the whole price level and consumers' life. Especially when the prices of vegetables rise too fast and the prices remain high continuously, it is likely to form the non-stable expectation of the entire non-agricultural market, thus driving the rise in the prices of other products. This will directly reduce the quality of daily life of consumers, and produce other unstable factors affecting society.

2.3.2 Affecting producers' economic income. Great fluctuations in the prices of vegetables will affect the vegetable growers' income. When market prices are low, the purchase prices of vegetables will fall, and the vegetable growers will suffer direct economic losses. When the market performs well and the prices of vegetables rise, the direct economic income will be increased, but the prices of means of agricultural production will also rise, leading to the increase in the cost of production activities.

2.3.3 Affecting part of the relevant industries. Great fluctuations in the prices of vegetables will cause certain impact on agricultural production. When the prices of some vegetables rise, a

large number of farmers will grow these vegetables chasing high returns, which may hide some dangers causing the next round of sharp decline in the prices of these products. When the prices of these vegetables are high, it will lead to increase in the prices of means of agricultural production and the cost of agricultural production; when the prices of some products are low, it is easy to dampen farmers' enthusiasm for production, affecting the cultivation of vegetables in the coming year.

In the short term, the area of farmers' arable land is fixed, and great fluctuations in the prices of vegetables can easily make farmers greatly change the cultivation types of agricultural products, thus affecting the agricultural industry. At the same time, the development of many non-agricultural industries is based on agriculture. When there are great fluctuations in the prices of means of production, the non-agricultural industries may not get corresponding support, vulnerable to the rise in the cost.

2.4 Analysis of the reasons for great fluctuations in the prices of vegetables under the perspective of supply chain

There are many reasons for great fluctuations in the prices of vegetables. In different time or different locations, the reasons for fluctuations may be different, but we can explore the general regularity reason from the perspective of supply chain, and analyze the nodes of the supply chain one by one. It can not cover all situations, but it will play a role in promoting the analysis of countermeasures for the general reasons. The supply chain of vegetables analyzed in this article is based on the entire operation process from the supply place (Shandong Shouguang) to consumption place (Beijing) (the final retail price 20 times the origin price). The government agencies are embedded within, which can play a role in restraining the supply chain of vegetable, as is shown in Fig.4.

2.4.1 Reason for great fluctuations in the prices of vegetables-suppliers.

(1) Information between the producers and the consumer market is asymmetrical. The information asymmetry between the producers and the consumer market is mainly reflected in two aspects: total amount of planting and planting structure. Under China's market environment, the vegetable producers are mainly the dispersed farmers. In terms of farmers' production, apart from the concentrated cultivation of characteristic agricultural products, the planting range of ordinary vegetables is very wide. But the land for farmers to grow vegetables is limited, and most of them often determine the planting varieties in the next production cycle based on the experience of previous years. Different varieties of vegetables will compete for land with each other, so that the output of some vegetable varieties falls into the trap of the agricultural cycle, that is, the prices of vegetables will experience ups and downs in the consumer market.

(2) Farmers' single-family operation makes them lack pricing power. In recent years, specialized cooperatives and contract farming have developed by leaps and bounds, but relative to the country's large market, farmers' vegetable growing is still the smallholder production, such as the Shouguang vegetable market,

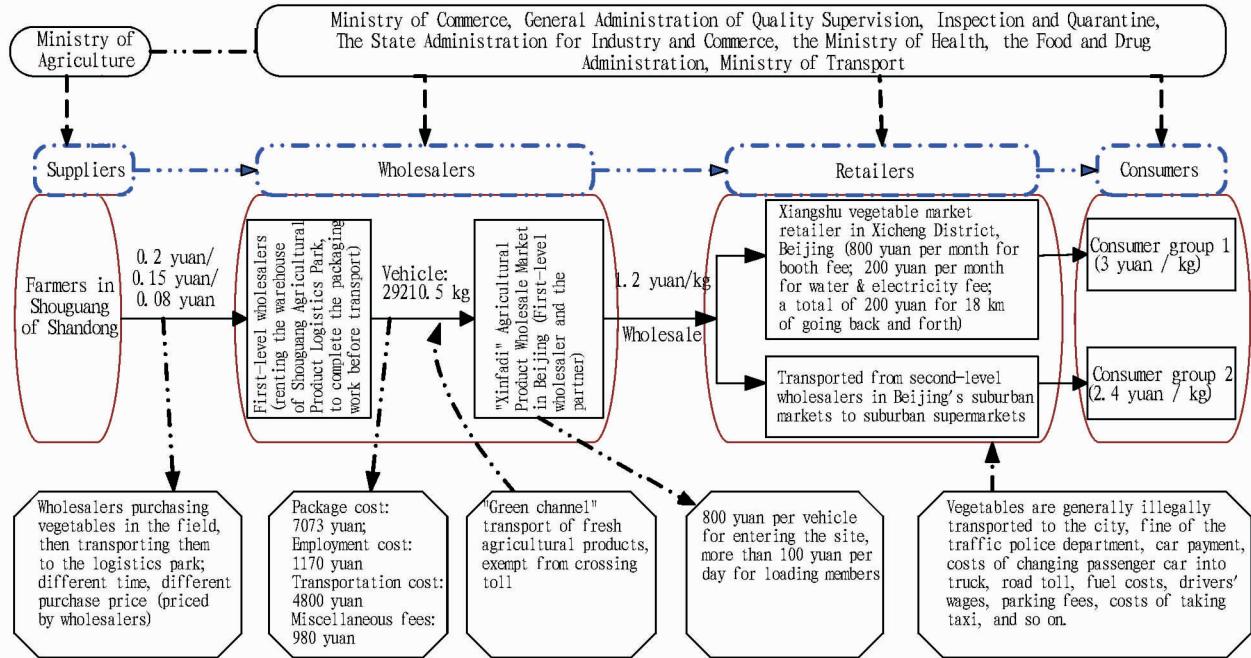


Fig. 4 Flow chart of the holistic supply chain of "marrow squash" in Shandong's Shouguang in one day of 2011

Beijing Xinfadi wholesale market. The reality that the prices of vegetables are determined by the consumer end, rather than the production end, makes the growers passively accept the price of the national market.

The appearance of brokers between the vegetable growers and wholesalers has reduced a lot of complicated problems for both sides, reduced transaction costs between the two, and saved a lot of time and effort, but in this situation, the vegetable growers completely lose bargaining power, and fail to grasp the changes in market information; they can make decisions only by virtue of experience and feeling, difficult to meet the needs of the market.

2.4.2 Reason for great fluctuations in the prices of vegetables-wholesalers. They occupy nearly half of the circulation, whose cost variation causes great fluctuations in the prices of vegetables. Wholesalers play an extremely important role in the circulation of vegetables, and changes in the circulation costs, to some extent, greatly affect fluctuations in the prices of vegetables, playing a role in fueling great fluctuations in the prices of vegetables.

In the whole process of purchasing vegetables in the place of origin to supply vegetables in the sale place, the wholesalers first need to hire warehouse in the logistics park in the place of origin, and the costs include warehouse rental fees, processing fees, packaging fees, handling fees and other miscellaneous fees. The costs during the transport include labor costs, fuel costs and toll fees. After being transported to the wholesale market in the sale place, there are entering fees and handling fees. The circulation costs involve many aspects. The fluctuation in any aspect will make the prices of vegetables fluctuate, and even pass certain conduction mechanism, generating substantial fluctuations.

2.4.3 Reason for great fluctuations in the prices of vegetables-retailers.

(1) "Logistics fortress" in the city. Retailers are at the end of supply chain of vegetables, directly facing the consumer market, and closely contacting with consumers. They most feel the sharp fluctuations in the consumer market. In the large supermarkets or vegetable bazaar, the retailers will inevitably face "logistics fortress" in the city. The limited access, traffic passes and other means of traffic control are implemented on the out-of-town freight vehicles in the city, making the vegetables more difficult to enter into the city, which to a certain extent increases transportation costs for retailers.

Beijing Logistics Association once done a survey, and found that in the last mile from the wholesale market of vegetables to the retail market, the circulation cost is at least 150% higher than the cost from Shandong Shouguang to Beijing. The reality of sudden hike in the prices of vegetables in the "last mile" also fuels great fluctuations in the prices of vegetables.

(2) Astronomical land price in the city. It is not easy for retailers to get vegetables from wholesalers, and even if the vegetables are obtained, they have to face the reality of exorbitant urban land prices. In order to enter the supermarket or vegetable bazaar, each retailer must first have a certain amount of admission fees, then the high pitch fees, water and electricity fees, labor costs and other incidental expenses must be allocated to the prices of vegetables for sale. These are the factors affecting fluctuations in the prices.

2.4.4 Reason for great fluctuations in the prices of vegetables-national macro-environment.

(1) Currency factor. Inflation is related to fluctuations in the prices of vegetables. In life, the consumers' expectations of inflation will cause fluctuations in the prices of vegetables. In 2011, the overall national consumer price level rose by 5.4% over the

previous year^[12], and the inflation pressure relatively increased. The vegetable is regarded as necessity of life. When residents have inflation expectations, it will speed up hike in the prices of means of production, and then increase in the prices of vegetables ensues. Similarly, if there is deflation, the prices of vegetables will accordingly fall. So the impact of inflation factors on fluctuations in the prices of vegetables can not be ignored.

(2) Market speculation factor. China's market information is opaque, and the speculation atmosphere is heavy. In addition to the small overall scale of vegetables market, the funds absorbed are extremely limited, and the flow of hot money can directly lead to ups and downs in the prices of some vegetables.

Since early 2010, the US dollar has showed the depreciation trend, driving the appreciation of the RMB, making a large number of international speculative funds flow into the country. The capital liquidity is strong, and a lot of hot money uses asymmetry of the vegetables market information, to speculate some storable vegetable products with small size of market, leading to irrational fluctuations in the prices of some vegetables, such as garlic, ginger, and cabbage.

(3) Constraint institutional management factor. In Fig. 4, we see that the supply chain of vegetable involves some government agencies. The big environment of the supply of vegetables in China is that the smallholder production is in the majority, but at a disadvantage. The main reason for severe information asymmetry between place of origin and sale place is the default of government regulatory agencies. Vegetable cultivation and marketing information involves a wide range of aspects, and the vegetable grower individual or organization is unable to provide it. Only the relevant government departments can provide such information.

The vegetable market order is not perfect, standardized, lacking unified planning. Vegetables, in a particular position of basic commodity, involve many administrative departments. The establishment of the market order requires many departments to conduct unified collaboration, develop uniform standards, simplify various entry barriers as far as possible, and in particular support vegetables logistics, so that the "last mile" is no longer a sign of soaring prices of vegetables.

3 Recommendations for controlling great fluctuations in the prices of vegetables under the perspective of supply chain

3.1 Establishing and improving the channels of information transmission, making the production and marketing information symmetrical, and balancing supply and demand

The main reason for ups and downs in the prices of vegetables is the severe information asymmetry between place of origin and sale place. When the prices of some vegetables are higher than historical prices, no matter what factors cause this result, the responding information in the vegetable origin is just the higher prices of these vegetables, and the first reaction of vegetable growers is to increase the planting area of these vegetables, and reduce the plant-

ing of other types of vegetables. This information is transmitted mutually, resulting in substantial increase in the growing area and supply amount of several kinds of vegetables, while the supply amount of other types of vegetables is reduced. In the sale place, oversupply and shortage will emerge one after another, and cyclical fluctuations in the prices of vegetables are inevitable.

Therefore, in order to curb violent fluctuation in vegetables, the relevant government departments should establish and perfect the information transmission channel between place of origin and sale place; make full use of the information advantage of the local government and the agricultural departments; make the vegetable growers able to know the real reason for ups and downs in the prices and scientifically predict supply and demand conditions; offer framework guidance on planting types for the vegetable growers, so that the balance of supply and demand of vegetables is reached, and great fluctuations in the prices of vegetables are eased.

3.2 Actively promoting the industry standardization of vegetables The standardized production of vegetables^[13], is to use the principles of unification, simplification, coordination and optimization, to carry out the whole-process control over the activities of production, processing, operation, and marketing of vegetables. Through the development and implementation of standards, it can promote the rapid promotion of advanced scientific and technological achievements and experience of vegetables, to ensure the safety and high quality of the vegetables, and maximize the economic, ecological and social benefits.

Unified standard can make vegetable growers, processors and operators scientifically improve product quality, reduce costs, and improve the competitiveness of products in the domestic market. So it is necessary to continue to promote the industrial management and standardization of agriculture, increase the yield per unit area to improve the efficiency of labor use and resources to reduce costs, and ensure the vegetable growers' benefit. What the standardization and industrialization highlight is stability, which can play a role in preventing great fluctuations in the prices of vegetables.

3.3 Reducing the intermediate links, and curtailing the circulation cost of vegetables Traditional supply of vegetables, from scattered vegetable growers to consumers, has to go through the transfer of wholesalers and retailers at all levels. When there is transfer, a percentage will be deducted from a sum of money in the middle links, which will inevitably increase the prices of vegetables in the sales place, a far cry from the purchase prices in place of origin.

To change this situation, reducing circulation is an effective way. For example, we can rely on large-scale leading enterprises and specialized cooperatives to vigorously develop "direct link between agricultural products and supermarkets", and other vegetable production and marketing modes with few circulation links.

3.4 Regulating the "green channel" of vegetables, and preventing uptick in the prices of vegetables in the "last mile"

The "green channel" for fresh agricultural products launched

jointly by many departments has played a role for the smooth circulation of vegetables, but the help of "green channel" is limited to the edge of the city, having not provided real help for the vegetables to smoothly enter into the city, resulting in the unique saying of the "last mile" in the vegetable field.

The entry of vegetables into the city is related to management issues of many urban departments, so the municipal departments should earnestly implement the national policy on "green channel" of fresh agricultural products; these departments should be unified and coordinated, so that the production and marketing mode of "direct link between agricultural products and supermarkets" is smoothly carried out, making due contribution to stabilizing the prices of vegetables.

3.5 Cracking down on the vegetable speculation behavior to ensure the healthy development of the vegetable market On May 27, 2010, the National Development and Reform Commission, the Ministry of Commerce, and the State Administration for Industry and Commerce jointly issued an emergency notice urging local governments to strengthen the monitoring of agricultural markets, crack down on hoarding, bull campaign and other speculation behaviors according to the law, to resolutely safeguard the normal market order, ensure the basic stability of the general price level, guarantee the healthy development of the market economy and social stability^[14].

Great fluctuations in the prices of vegetables will have a huge impact on society. The national departments have strengthened the management of the malicious speculation in vegetables by hot money, conducted prevention and control from a legal perspective, playing a role in mitigating fluctuations in the prices of vegetables to some extent, but the input of manpower and energy is still not enough. There is a need to establish a tracking mechanism, and arrange the special market managers to track and regulate large sums of money in vegetables market, crack down on the vicious purchasers, prevent hoarding behavior, in order to better safeguard the vegetable trading market order, and effectively reduce great fluctuations in the prices of vegetables.

3.6 Actively giving play to the role of government, and building the vegetable protection system Dispersed vegetable growers and consumers are in a relatively weak position in the supply chain of vegetables, with rare bargaining power. It is imperative for the government to intervene in the supply chain of vegetables in the form of policy, to build vegetable protection system and stabilize the price of vegetables, which is the current government's important responsibility.

(1) Giving subsidies to the vegetable growers. It can refer to the forms and standards of government's subsidies to the grain growers, such as production subsidies and price protection subsidies.

(2) According to the different circumstances in different regions, gradually exploring the vegetables insurance mechanism and relief mechanism with local specialties, and establishing a line of defense to protect the interests of farmers as soon as possible.

(3) Improving the agricultural information platform of government at all levels, broadening the channels for information dissemination, and timely releasing supply and demand information.

4 Conclusions

Great fluctuations in the prices of vegetables have increasingly become a prominent social problem, exerting a profound impact on the vital interests of the masses. Stabilizing the prices of vegetables and reducing great fluctuations in the prices of vegetables is the important responsibility of current society, government and scholars. From the perspective of the supply chain, we conduct a profound analysis of reasons for great fluctuations in the prices of vegetables.

Based on each node of the supply chain of vegetables and the policy environment, we put forth the recommendations for reducing great fluctuations in the prices of vegetables as follows: establishing and improving the channels of information transmission, making the production and marketing information symmetrical, and balancing supply and demand; actively promoting the industry standardization of vegetables; reducing the intermediate links, and curtailing the circulation cost of vegetables; regulating the "green channel" of vegetables, and preventing uptick in the prices of vegetables in the "last mile"; cracking down on the vegetable speculation behavior to ensure the healthy development of the vegetable market; actively giving play to the role of government, and building the vegetable protection system. The study will be of revealing significance to inhibiting great fluctuations in the prices of vegetables in the real life.

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innovation and found agricultural sci-tech undertakings.

2.5 Cultivating more talents of agricultural technology

2.5.1 Training leading agricultural technicians. Effective measures should be taken to cultivate top talents of agricultural technology, encourage them to carry out international pioneering researches, and establish projects by considering needs of agricultural production and peasants of China. Scientific research institutes have to improve their talent incentive mechanism, provide them favorable scientific research conditions, give rewards to staff with outstanding achievements, so as to arouse their enthusiasm and play their leading role.

2.5.2 Enhancing the training of grassroots agricultural technicians. Application and promotion of agricultural research fruits depend on grassroots technicians, thus the cultivation and training of these technicians have to be enhanced. Experts from agricultural colleges should organize more training courses for technicians from grassroots agricultural service stations to strengthen their capacity of mastering and applying new knowledge and technology.

2.5.3 Cultivating practical talents. Practical rural talents mainly refer to rural economy management talents, experts from county-level and town-level agricultural management departments and agricultural colleges should take charge of the training of such talents. More leading agricultural technicians, grassroots agricultural service staff and practical talents should be cultivated, their sci-tech quality, vocational skills and service quality should be improved comprehensively so as to play the backbone role of these talents in agriculture and rural economy^[3], and promote the development of agriculture, rural economy and society.

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