

Analysis on the Abnormal Fluctuations of Vegetable Prices in Autumn and Countermeasures

Fantao Kong¹, Jing Zhang¹, Wei Sun¹, Jifang Liu^{1,a,*}

¹*Agricultural Information Institute, Chinese Academy of Agricultural Sciences/ Key Laboratory of Agricultural Big Data, Ministry of Agriculture and Rural Affairs, Beijing, 100081, China*
a. liujifang@caas.cn

*corresponding author: Jifang Liu

Keywords: Vegetables, prices, fall, countermeasures.

Abstract: The abnormal fall of vegetable prices in autumn 2018 was due to the result of such overlying as the expansion of planting area driven by continuous high vegetable prices all the year, the increase of per-unit-vegetable yield and centralized marketing given by fine autumn weather. Later, with the dramatic decrease of temperature as winter deepens, vegetable growth, development and circulation could be affected to a certain extent, and vegetable prices were expected to go to a seasonal rising range. For the area of vegetable field is basically stable, if the weather is fine and there is no severe weather such as large areas of rain, snow and freezing, it is expected that the vegetable supply in winter 2018 can be guaranteed as a whole. In the case of frequent fluctuations in vegetable prices, local governments should implement the mayor responsibility system of "vegetable basket project", do the job of production and marketing docking and information guidance well, ensure the market with stable supply, prevent vegetable prices from big rise after sharp fall, and the vast number of vegetable farmers should timely do the job in disaster prevention and mitigation well, rationally arrange vegetable production, and avoid blindly following the trend of business.

1. Introduction

Vegetables, as one of the agricultural industries with relatively short planting period and relatively high comparative benefits, have been paid more and more attention in recent years. Vegetable industry plays an important role in China's structural reform and industrial upgrading of agricultural supply side, the integration of primary, secondary and tertiary industries, and poverty alleviation program. Since the 12th Five-Year Plan, China's vegetable industry has been developing well on the whole. Apart from guaranteeing stable growth of output, citizens' vegetable consumption has gradually developed towards fine, high-quality and diversification, and the overall market supply and demand situation has remained relaxed [1].

In recent years, influenced by seasonal factors, monetary factors and irregular factors [2, 3], the prices of main vegetables in China fluctuates frequently and violently, especially the seasonal factors. Because of the strong seasonality of vegetable production and supply and perishability of vegetable, the price of most vegetables is affected by season, places of production and marketing, storage and transportation, etc. During the low supply period of January and February each year, the

price rises to the peak of the annual vegetable price curve, while in May and June, the price of vegetables falls during the high supply period. Not affected by the summer heat, warehousing and transportation costs are relatively small, and prices are in a trough position. From July, prices begin to rise gradually, and fall slightly in September and October, then enter the rising channel in November.

However, in the autumn of 2018, vegetable prices did not rise seasonally, but fell sharply. According to market monitoring data, in November 2018, the average wholesale price of 28 varieties of vegetables, which were monitored by the Ministry of Agriculture and Rural Affairs, dropped to 3.52 Yuan per kilogram, or 13.5% decrease over the previous month. "Farmers are hurt when vegetable is cheap and City residents are hurt when vegetable is expensive", and the price of vegetables went against the trend, with obvious off-seasonal characteristics. Vegetables in some areas had been unsalable or difficult to sell. In order to ensure stability of vegetable market, vegetable industry chain analysts dispatch and judge the vegetable market and its later period trend, analyze the characteristics of vegetable market and the reasons for the sharp decline of vegetable prices, predict the development situation of vegetable market, and put forward judgment and countermeasures of later period vegetable market trend.

2. Characteristics of Vegetable Market in Autumn 2018

Value determines price. Under market economy, the price of vegetable fluctuates with the change of supply and demand, which is the manifestation that price mechanism takes effect and normal phenomenon. However, if the price of vegetables fluctuates greatly or frequently, it will hurt the interests of vegetable farmers or consumers, and is not conducive to ensuring the smooth operation of vegetable market. Therefore, it is of great significance to summarize the characteristics of vegetable market development and master the development situation of vegetable market in time.

2.1 The Fluctuation of Vegetable Price is Basically Normal, and the Change is Obvious Under the Influence of Weather

In 2018, the trend of vegetable prices across China was basically in line with the normal trend, and only since late October, there presented obvious off-seasonal trend. According to the monitoring data of the Ministry of Agriculture and Rural Affairs, the average wholesale price of 28 vegetable varieties in January-November was 3.97 Yuan per kilogram, 6.2% higher than the same period in 2017. On a monthly basis, due to the strong rain and snow cold weather and the driving role of consumption during the Spring Festival, vegetable prices were higher in January and February, reaching the highest level of the lunar year in February - 4.91 Yuan per kilogram, up 20.0% over the previous month. Vegetable prices entered seasonal falling period in March as the weather improved, and fell to 3.51 Yuan per kilogram in June. Since the "low-summer" season in July, due to high temperature, rainfall and strong convective weather, prices stopped falling and steadily increased. The average wholesale price of 28 vegetables rose to 4.39 Yuan per kilogram in September, up 9.0% over previous month and up 13.9% year-on-year. Since October, a large number of autumn vegetables were presented on the market. Vegetable prices have fallen and the downward trend was obvious. But, by November, vegetable prices, unlike the previous year's rise, had fallen sharply and were at a low level in recent years.

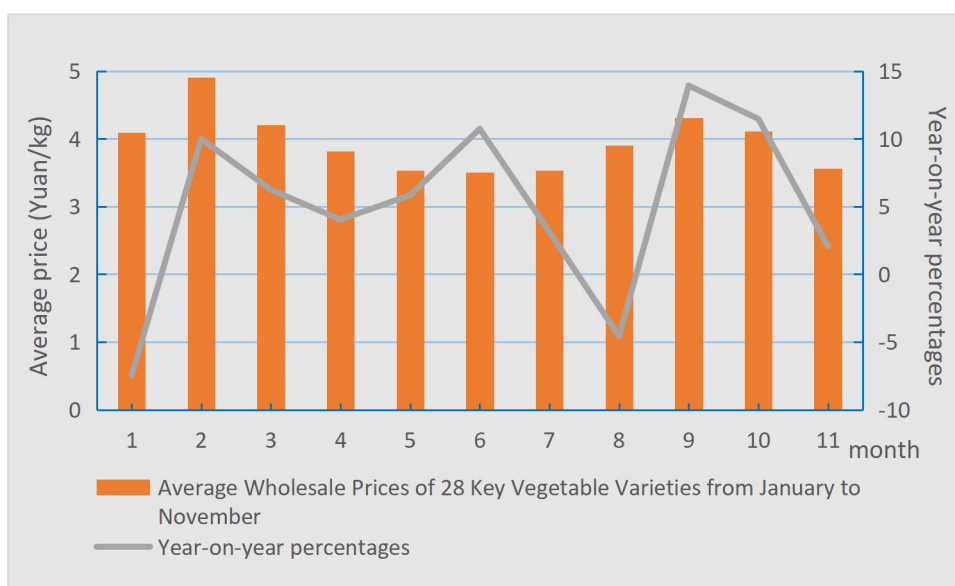


Figure 1: Average wholesale prices and year-on-year numbers of 28 key vegetable varieties from January to November 2018.

2.2. Vegetable Prices Go Against the Trend in Autumn, and the Characteristics of Off-season Operation are Obvious

From the data of the past 10 years, vegetable prices in China show obvious seasonal fluctuations. The average monthly vegetable prices in each year show "V" or "W"-shaped fluctuations. They are usually at the peak in winters and springs of the years. However, in the autumn of 2018, vegetable prices had been falling all the way. The decline lasted for a long time, and the range was wide, showing obvious characteristics of off-season fluctuations. From October to November, the average wholesale vegetable prices in China fell for eight consecutive weeks. According to the monitoring data made by the Ministry of Agriculture and Rural Affairs, the vegetable price index fell by 5.21% over the previous month in October 2018. After late October, vegetable prices did not rebound seasonally as in previous years, but fell considerably. In November, the vegetable price index fell by 18.98% over the previous month. The average wholesale price of 28 kinds of vegetables was 3.52 Yuan per kilogram, down 13.5% over the previous month. The volume of decrease was 7.9 percentage points larger than that of the previous month, but the year-on-year volume of decrease was basically the same, and it was 15.7% lower than that of 2016 and 1.7% lower than that of the same period in recent five years. In the last week of November, it was 3.46 Yuan per kilogram, down 21.3% over the first week of October.

2.3. The Differences of Varieties of Vegetable Price Fluctuations were Great, and the Prices of Leafy Vegetables Fell Sharply

The average wholesale price of 28 kinds of vegetables fell by 18.4% in November compared with September, but there was a big difference in price fluctuations of different vegetable varieties. Except for a few varieties of vegetable such as white gourd, pumpkin, tomato and leek, the prices rose over the previous month, the prices of other kinds of vegetable fell in varying degrees, among which those of which prices fell the biggest were leafy vegetables, accounted for over 40%, followed by cauliflower-like vegetables, of which decrease volume was more than 20%. Root-like vegetables and fruit-like vegetables declined by more than 10%, fungus-like vegetables and

stem-like vegetables declined slightly, namely 8.6% and 5.9% respectively. Among them, spinach, Chinese cabbage, lettuce and cauliflower declined by more than 50%; radish, mushroom, cucumber, celery, cabbage, rape and asparagus lettuce declined by more than 30%; leek, white gourd, etc. did not fall but rose by more than 10%.

2.4. Vegetable Growers Suffered Serious Losses in Some Areas due to Sales Difficulty

Vegetable price sharp decrease is good news for urban and rural consumers. Their vegetable-baskets are enriched and consumption expenditure is reduced. But it is also a double-edged sword, for vegetable producers, the phenomenon that low prices for grain hurt the farmers appeared again. Since late October, as vegetable prices dropped dramatically and continuously, that vegetables encountered poor sales showed from time to time, thus the enthusiasm of farmers to grow vegetables was frustrated. Guangmin Zhou, the Party Secretary of Dongxiangbei Village, Bianyuan Town, Feicheng, Tai' an City, Shandong Province, reported that in November, the in-field price of local net asparagus lettuce was about 4 cents per jin (half kg), and the yield per mu was about 6,000 Jin or more. The gross income per mu was about 240 Yuan, after deducting the costs of labor, fertilizer and land circulation 1,300 Yuan, in this case, farmers suffered terrible loss, and there was no broker coming to purchase, causing asparagus lettuce rotten in the fields. Shaodong Zhang, a radish grower in Dianbu Town, Laixi, Qingdao City, Shandong Province, said that the current price of radish was 0.2 Yuan per kilogram, but the cost of fertilizer, packaging, transportation, land circulation and labor was 3,200 Yuan per mu. The average yield per mu was calculated at 4,000 kilograms, the income was 800 Yuan, and the net loss per mu was as much as 2,400 Yuan.

3. Cause Analysis of Vegetable Price Decline

3.1. Benefit-driven, Multi-support, to Boost the Enthusiasm of Vegetable Growers

Since summer of 2018, there had been a continuous high temperature and rainy weather in many parts of the country. Some major vegetable producing areas had suffered from geological disasters such as floods and waterlogging, which had a greater impact on the production and circulation of vegetables than that in previous years, resulting in high vegetable prices. In May, the average wholesale price of 28 kinds of vegetables reached 3.54 Yuan per kilogram, which was the second historical high price only after the one of the same period in 2016, compared with those in the decade between 2008 and 2018. In August, the main vegetable producing areas in Weifang, etc. Shandong Province, suffered a rare typhoon disaster, which had a serious impact on vegetable growth and picking. In the meantime, bad weather conditions also greatly increased the cost of storage and transportation of vegetables, which directly led to the high price of vegetables in the third quarter. The sustained high price of vegetables had greatly increased the enthusiasm of vegetable farmers. In addition, the policy and technical support for vegetable production in some areas had led to the continuous increase of vegetable planting areas and the improvement of production and management technologies. For example, the area of hot pepper in Xuwen and Leizhou of Zhanjiang City, Guangdong Province, which are big cities for the production of "Southern Vegetable Transport to the North", increased by more than 3% year on year, and even increased by 10% in some areas. As a result, vegetable production in some areas of China had been greatly increased, seasonal and regional imbalances between supply and demand had occurred, and some vegetable varieties in individual areas were even unsalable and difficult to sell.

3.2.The Weather Gets Better, the Yield Per Unit Area Increases, and the Supply of Vegetables Increases

According to the monitoring by the Central Meteorological Observatory, since November 2018, the overall weather conditions in China have been good, with no large-scale natural disasters. The temperature in most areas is close to or slightly higher than that in the same period of the average year. Most of the areas north of the Yangtze River are 1-4 cent degrees higher than that in the same period of the average year, with adequate sunshine, good matching of water and heat conditions, and suitable soil moisture, which provides strong conditions for boosting vegetable yields. According to statistics, the yield per unit area of hot pepper in Western Guangdong increased by more than 35% year on year; the yield per unit area of radish in some major production areas of Qingdao, Shandong Province, was 4,000 kg, twice as high as in 2017; and the yield of green onion in Ningjiabu Town, Zhangqiu District, Jinan City, was 6,000 kg, an increase of 20% year on year. Fine weather conditions since autumn promoted the centralized marketing and cross-regional circulations of vegetables, and increased the overall supply of vegetables. In addition, adverse weather in summer, such as high temperature and heavy rainfall, etc. caused postponement of the planting time for autumn vegetables, which should be marketed in late September, but marketed in centralized way in November, which was over one month later than previous years, and overlapped with the in-advance marketing of some winter vegetables, which caused supply to exceed demand, and resulted in decline of vegetable prices.

3.3.Conversion of Production Areas, Overlapping Marketing, Expansion of Vegetable Marketing

In recent years, China's vegetable production, supply and market consumption have formed a basic pattern of large market and large circulation. Based on the analysis of geographical climate and location advantages, China's vegetable product area can be divided into such six vegetable planting advantageous regions as winter and spring vegetable dominant areas in South China and Southwest China, winter and spring vegetable dominant areas in the Yangtze River Basin and summer and autumn vegetable dominant areas in the Loess Plateau, summer and autumn vegetable dominant areas in Yunnan-Guizhou Plateau, summer and autumn vegetable dominant areas in north high latitude, and facility vegetable dominant areas in yellow Sea, the area centered around Xuzhou city and Bohai Rim [4]. Vegetable varieties, production cycles and harvesting time are different in different vegetable dominant regions. Consuming vegetables in accordance with geographical latitudes and converting supply areas have become the normal supply mode to meet the vegetable consumption needs of urban and rural residents [5]. However, due to the high temperature and heavy rainfall in summer of 2018, the planting period of autumn vegetables such as the Loess Plateau and Yunnan-Guizhou Plateau or in high latitudes was delayed, and the large-scale harvest met the beginning of the winter vegetable marketing, thus autumn vegetable and winter vegetable were marketed overlapping, and the vegetable market volume was greatly increased. In addition, some cold shed growers, in order to prevent vegetables from freezing in the coming winter, often adopt the strategy of early picking and preemptive selling, which also aggravated the market overlapping effect.

4.1.Vegetable Price Prediction in 2019

Although vegetable prices have encountered off-season dramatic fall recently, viewing from longer period, and vegetable prices in China still generally conform to the seasonal fluctuation laws, and the winter and spring season will still be at the peak of the year. From the monitoring data, since

late November, vegetable prices began to stabilize after a sharp decline. It is expected that with the dramatic decrease of temperature in most parts of the country, the impact on vegetable growth, development and circulation will gradually emerge, and vegetable prices will enter a seasonal rising range. According to the monitoring by the Ministry of Agriculture and Rural Affairs, by the end of October, the vegetable in-field area of 580 key vegetable counties was 1,180,000 mu, which was slightly reduced, compared with the same period last year. As the vegetable area is basically stable, with the facility vegetable of late Yellow Sea, the area centered around Xuzhou city and Bohai Rim, and winter and spring vegetable dominant areas in the Yangtze River Basin entering harvesting boom season, if the weather is good, no large area of snow and rain freezing weather, it is expected that the vegetable supply will be guaranteed in winter 2018, especially during New Year's Day and the Spring Festival. However, some varieties such as lettuce and cauliflower, etc. which have fallen sharply recently and caused heavy losses to vegetable farmers, are at risk of rising sharply in later period.

4.2. Counter-Measures

2019 is the key period to implement the structural reform of agricultural supply side and the strategy of rural revitalization. It is necessary to speed up the building of modern agricultural production system. Vegetables, as one of the important agricultural industries, are not only related to the sustained increase of farmers' income, getting rid of poverty and getting rich, but also to the daily life of city residents. Therefore, ensuring the stability and sustainability of vegetable industry development is also an important measure to promote the process of agricultural modernization.

4.2.1. Vegetable Field Management Should be Strengthened to Guarantee Winter Production and Supply

According to the spirit of the document Opinions on Promoting Building of the New Round of "Vegetable-Basket Project" in an All-round Way issued by the State Council in 2010, all cities should conscientiously implement the mayor responsibility system of "Vegetable-Basket", take market information as guidance, take the balance of supply and demand of high-quality vegetables as the goal, guide vegetable farmers to arrange vegetable production rationally in winter and strengthen farmland management in an effort to achieve production and marketing docking. The in-field contingency plan and counter-measures should be planned in detail when the disastrous weather such as winter snowstorm and severe cold occurs. In the meantime, enterprises involving agriculture should be encouraged to store goods, cold chain logistics system should be improved, in a bid to ensure the supply stability of some vegetable, smooth operation of vegetable supply and market should be guaranteed during New Year's Day and the Spring Festival, so as to prevent serious occurrences from out of stock of key vegetable varieties or sharp price soaring or falling.

4.2.2. Government's Support Should be Strengthened to Realize Reasonable Fluctuation of Vegetable Prices

In response to the policy guidance of the CPC Central Committee on vegetable insurances, we should promote the development of basic vegetable insurance system in the form of subsidies for price adjustment funds. Appropriate subsidies can be given to some vegetable farmers who suffer serious damage. Those who have been included in the price insurance pilot should implement insurance claims to support the timely recovery of vegetable production. In the meantime, in order to ensure the supply of vegetable market, and steadily increase the economic income of vegetable growers, the new vegetable cultivation cost insurance and vegetable price insurance system should be promoted, and operation should be made in pilot areas. Such modes as the vegetable disaster

insurance in Huizhou, Guangdong, the green-house vegetable insurance in Jiangsu, the cost price insurance for leafy vegetables supplying low season in Shanghai, and the target price insurance for vegetables in Shandong shall be learned [6].

4.2.3. Information Monitoring and Early Warning Should be Strengthened to Maintain the Balance of Vegetable Supply and Demand

For vegetable farmers, they should pay attention to meteorological early warning information in time, do a good job in disaster prevention and mitigation of farmland, avoid blindly following the trend of operation, and rationally arrange vegetable production and marketing. Government departments should improve vegetable information service facilities, strengthen information monitoring and early warning, guide vegetable farmers to make full use of facility vegetable technology, etc. fine management of farmland, standardized production and so on should be done, so as to improve the quality of vegetable industry. When the supply and demand of vegetables are unbalanced, the substitution of different kinds of vegetables can be used to temporarily alleviate the price rise of the unbalanced kinds of vegetables; government should ensure the adequate supply of relatively low prices and storage-tolerant varieties of vegetables, and alleviate the pressure of vegetable supply when necessary.

5. Conclusions

To accurately predict the trend of vegetable prices and solve the problem of large fluctuations in vegetable market prices, we need to base ourselves on the current situation and focus on the future. Overall planning, accelerating structural reform of vegetable industry supply side, implementing effective docking of vegetable supply and demand, and making contingency plan for early warning of abnormal vegetable prices and stabilizing vegetable prices under special conditions, in an effort to promote stable growth of farmers' income and sustainable development of vegetable industry.

Acknowledgments

This work was financially supported by National Natural Science Foundation of China (71573263).

References

- [1] Li Huishang, Kong Fantao, Shen Chen et al.: *Studies on the Development Strategy of Vegetable Industry in China during the 13th Five-Year Plan Period* [J]. *Economic Review*, P114-121, 2016(11).
- [2] An Yufa: *Analysis of Price Fluctuation in Wholesale Market of Vegetable Producing Areas* [J]. *Issues in Agricultural Economy* P51-53, 1996(11).
- [3] Li Chongguang, Song Changming: *Price Fluctuation and Regulation Policy of Vegetable and Fruit Products*[J]. *Issues in Agricultural Economy*, P17-24, 37(2), 2016.
- [4] Zhang Jing, Kong Fantao, Wu Jianzhai, Zhou Xiangyang: *Operational Analysis of China's Vegetable Market in 2018, and Prospects and Countermeasures in 2019* [J]. *China Vegetables*, P7-12, 2019(1).
- [5] Li Shanghui, Qu Chunhong, Wang Xiaodong, Yang Wei, Li Meiqi, Guo Xinzhu: *Analysis of China's Vegetable Market Situation in 2018 and Future Prospects*[J]. *Agricultural Outlook*, P16-21, 2019(1).
- [6] Chen Xiaodan, Wang Xinxiao: *Vegetable Insurance, How to Protect and Escort Vegetable Farmers*[J]. *Industry Observation*, P1-5, 2018, 11.