Supply forecast of animal product in Sichuan Province based on GM Model

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Abstract. The research on the present situation and forecast of the supply of animal products in Sichuan Province is conducive to accelerating the agricultural supply-side structural reform and guaranteeing the effective supply of agricultural products. In this paper, on the basis of analyzing the situation of animal products in the past 10 years in Sichuan Province, using the Grey System Theory, and adopting GM (1, 1) Model, the supply of animal products in Sichuan Province in the next 10 years is forecast, through which the result shows that the model is highly precise and reliable. It concludes that, in the next 10 years, the output of animal products in Sichuan Province will increase in general year by year, except for somewhat decrease in that of herbivorous animals like cattle, sheep and rabbits in a few cities and regions, as regional difference exists. In the future, guidance provided for the development of husbandry should be based on the guarantee of products supply, change of consumers’ concept and increase of investment in science and technology, in order to promote the agricultural supply-side structural reform.

1. Introduction

China, as one of the biggest husbandry production countries in the world, has a long history in husbandry production. In recent years, along with the rapid development of industrialization and urbanization, the national economy grows stably, and people’s living standard improves continuously; additionally, with the development of agricultural technology, people have higher and higher demand on the species and quality of food. The per capita consumption of animal products like meat, egg and dairy increases fast, and the consumption structure is further optimized. Thus, animal products have become necessary commodities for people’s life. However, due to the natural, economic and social conditions, the supply of animal products is changing. The fluctuation of demand and supply, concerning the farmers’ income and people’s living quality, is one of the most important livelihood issues. Moreover, the structure of husbandry is changed, from a dual structure into a triple structure. It may not only help to make agriculture strong, but also promote the development of related industries like feed, food and leather. Currently, the development of agriculture is confronted with many problems, mainly for the reason that temporarily extra supply and insufficient supply co-exist, while the imbalance between supply and demand may result in a sharp fluctuation in product price, so that the farmers and middle- and low-end consumers may be exposed to risks. Under this background, the 2017 NO. 1 Central Document puts forward that agricultural supply-side structural reform should be further promoted, large-scale and high-efficient husbandry should be development, effective supply of agricultural products should be
guaranteed, and the transformation and upgrading of husbandry should be promoted. How to acquire the development status of husbandry, and forecasting the situation of animal products supply, have gradually become a central issue in husbandry researches and draw the society’s attention.

Currently, the study on animal products, from both the domestic and foreign scholars, mainly focuses on its price and influencing factors, supply and demand forecast, market supervision, and early warning system. As the price and factors influencing supply and demand of animal products, Tian Guiliang et al [1] thought that the growth of animal products consumption would result in the growth of animal products output, so that the cereal output might grow. Wang Chunmei et al [2] held the opinion that the different agricultural policies, festival effects and dietary habit are the main factors influencing animal products price. Shi Zizhong et al [3] used the model of time-varying parameter auto-regression (TVP-VAR) for analyzing the impact of uncertainties of economic policies on animal products price in China. Su Sinian [4] believed that production cost, industrial policies and pestilence are the main factors affecting the supply of animal products. However, population, income, price and quality safety are the main factors affecting its demand. In addition, urbanization, regional difference and household consumption habit also affect the consumption of animal products a lot [5]. Foreign scholars thought that health, security and environment might also affect it [6], and that advertisement might also affect the consumption of animal products [7]. Xia Xiaoping [8] used the model of extended linear expenditure system for analyzing the animal products consumption trend of urban residents in China, which showed that the animal products consumption structure of urban residents had problems, so that the government should enhance the macro control for animal products market. There are a number of studies on forecast of supply and demand of animal products. Yue Hong et al [9] built several data models to forecast the consumption of beef in China in 2015 to 2025. Hu Hao et al [10] forecast the consumption of animal products based on the assumption that household income grew in the future. Many other scholars also forecast the consumption of pork in China, by using the models of ARIMA, VAR, VEC [11] and GM (1, 1), GRNN and GA-GRNN neural network model [12]. However, Zhang Chao et al [13] adopted genetic algorithm and wavelet decomposition neural network performance for improving the models.

In conclusion, scholars have carried out many studies on supply and demand of animal products, and the forecast based on analyzing factors influencing supply and demand of animal products is rational and scientific. Currently, the economic development of China comes into the stage of a new normal, confronted with complex domestic and foreign environment, along with more diversified factors influencing supply and demand of animal products. Acquiring the consumption and development trend of animal products in a scientific way and forecasting the supply of animal products and industry status may help the government work out animal husbandry policies, as well as help the farmers and consumers comprehend the market and industry situation. Thus, it’s of great importance to enhance the macro control of animal husbandry and optimize the allocation of productivity, and thus to promote agricultural supply-side structural reform. Moreover, as Sichuan is a major agricultural province, the analysis and forecast on supply of animal products in Sichuan Province may contribute to promote the development of animal husbandry in Sichuan, strengthen the status of major agricultural province of Sichuan, and drive Sichuan to stride faster forward a strong agricultural province.

2. Status analysis of animal products in Sichuan Province

2.1. Regional status analysis

Sichuan, a major agricultural province in China, is well developed in traditional agriculture, and is the most reliable grain and subsidiary food production base in west China. With about 4.7% of cultivated land of China, Sichuan supports the life of about 6.8% of population of the whole country. In addition, Sichuan also has a large population, including people from 55 minorities. Sichuan has the only one Qiang ethnic minority enclave (Beichuan County) in China, the largest Yi ethnic minority enclave (Liangshan Prefecture), and the second largest Zang ethnic minority enclave (Ganzi Prefecture and Aba Prefecture). The climate of different regions of Sichuan varies a lot. In the east, it’s warm in winter and hot in summer, dry in spring and rainy in autumn, with little sunshine; in the west, it’s cold all year
round, especially the endless winter, while the dry and rainy seasons are separated, with abundant sunshine; as a whole, the climate in Sichuan varies a lot based on the altitude, with different climate types, which is advantageous for the comprehensive development of agriculture, forestry and husbandry. Moreover, Western Sichuan Plateau has the advantages in favor of the development of husbandry. In many places of Sichuan, especially plateau sections in west Sichuan like Ganzi, Aba and Liangshan, animal husbandry has become the pillar industry for rural economy.

Compared with the nationwide level, the development of animal husbandry in Sichuan Province is above the average, and the total production of livestock and poultry is quite high. In recent years, the overall output of animal products in Sichuan grows with certain fluctuations. From the output of the past 20 years, it’s known that there are several inflection points for the output of animal products. Before 2005, the output of animal products grew year by year; while after 2005, it declined dramatically; then after 2007, it grew slowly. In 1995, the total output of meat was 4.7296 million tons, with 3.9187 million tons of pork, 0.1551 million tons of beef, 0.0629 million tons of mutton, and 0.5531 million tons of poultry meat. In 2015, the total output of meat was 7.068 million tons, with 5.1242 million tons of pork, 0.3537 million tons of beef, 0.2635 million tons of mutton, and 0.9969 million tons of poultry meat. During 2005 and 2015, the output of meat has been increased by 1.5 times. In 2015, 72.365 million pigs were produced in Sichuan, which declined by 2.8% compared to that of the last year; 2.955 million cattle were produced, which rose by 6.0%; 16.980 million sheep were produced, which rose by 4.0%; 661.549 million poultries were produced, which rose by 2.3%. Therefore, the overall output of various animal products in Sichuan grew slowly in the 20 years, among which that of beef grew the fastest. See the trend of animal products output of Sichuan in Figure 1 below.

![Figure 1. Animal products output of Sichuan Province.](image)

Figure 1 shows that the development trends of the total output of meat and that of pork are quite similar. Thus, the most direct factor affecting the total output of meat of Sichuan is that of pork, as the two factors are highly correlated. However, the output trends of mutton and rabbit meat almost coincide, so their development situations are similar. At present, the new policies ask for focusing on the development of pig industry, in order to stabilize the pig production, to optimize the regional layout of pig production, to promote the scientific designation of non-husbandry regions in Sichuan, to carry out the pilot of recycling of planting and animal breeding, to promote the transformation and upgrading of pig industry, to stabilize the production of other animal products, to coordinate the development of various animal products, and thus to promote the overall harmonious development of animal husbandry and the transformation and upgrading of agriculture.

2.2. Analysis of existing problems

2.2.1. Unscientific animal husbandry structure and low production capacity. The animal husbandry structure is unscientific and monotonous, as most farmers cultivate pigs and chickens, resulting in
unnecessary excessive competition, which restricts the development of large-scale production. It hardly adapts to the diversified market demand, only to bring about the structural surplus of low-level animal products and the insufficient effective supply of some animal products. In terms of the pig industry structure, the quality of pig is not improved well, which is out of keeping with the national strategic that high-quality pig should be produced and is difficult to meet market demand. As for the entire animal husbandry structure, the development of herbivorous animals like cattle, sheep and rabbit lag behind, taking a quite low proportion of the animal husbandry. The comprehensive production capacity of herbivorous animals, lagging far behind that in other plateau sections in China like Inner Mongolia, should be improved. It may not make any contribution to making effective use of the abundant resources of grass and straw, nor satisfy the customers’ need for diversified, high-quality, differentiated and characteristic animal products.

2.2.2. Low husbandry organization degree and small production scale. Compared with other provinces or foreign countries, most animal husbandry organizers in Sichuan are confronted with the problems like insufficient fund, small production scale, and lag in technology. The weakness in specialization of animal husbandry and in risk tolerance deter the domestic and overseas advanced technologies from being promoted and used. Even though the industrialized operation of animal husbandry remedies certain defects to some extent, it has not experienced the long-term test from the market yet, as it’s still a new thing; furthermore, as the industrialized operation of animal husbandry takes little market share, and most farmers market products produced all by themselves, there are quite few farmers specialized in large-scale production. Due to the imperfect market system, most farmers fail to acquire all information to fulfill the fair transaction, which increases the cost for market transaction greatly. Therefore, innovations should be made for the industrialized operation of animal husbandry, production scale should be enlarged, and the organization degree of animal husbandry should be improved.

2.2.3. Inferior quality of animal products and lack of deep processing enterprise. Unscientific living environment and feeding mode exist in livestock and poultry breeding in Sichuan Province, bringing about various animal diseases. Furthermore, the production scale of most farms in rural areas is small, with the problem of inbreeding, so that breed can hardly be substituted or improved, and that it even become vestigial. In addition, the sustainable development of modern animal husbandry should be supported by processing industry. Nevertheless, there are a few deep processing enterprises for animal products in Sichuan Province, and most of them are engaged in selling preliminary animal products. Most slaughter houses in villages and towns are preliminary processing works, with inferior product quality, low technology content, and weak competitiveness; furthermore, most products marketed are produced by themselves, and the production scale is small. Thus, the product quality and processing scale should be improved.

3. Forecast of animal products of Sichuan

3.1. Model building
The supply of animal products is influenced by various factors. However, it’s difficult to collect the related data, and some data may not be quantized accurately. Moreover, the regular econometric models are reliable only if the result is based on large sample data and stable time series, and it needs a large number of data and a great deal of input and takes a long time. The method of grey system forecast may process the limited original data in an accumulated way, in order to find the corresponding rules, and thus to forecast the uncertain factors. Thus, for the purpose of studying the current situation and future development trend of animal products supply in Sichuan, the model of grey forecast GM (1, 1) is used in this paper for predicting the output of animal products in 10 years in Sichuan, based on the data of that during 2006 and 2015 in Sichuan. Then, the original data meeting the conditions are processed, so as to build a corresponding grey forecast model. The steps are shown as follows.
(1) Firstly, the method of grading judgement is used for estimating the feasibility of the model based on the original data.

\[
\sigma^{(0)}(t) = \frac{x^{(0)}(t-1)}{x^{(0)}(t)}, \quad t \geq 3
\]  

Hereinto, \( \sigma^{(0)}(t) \) indicates the grading; \( x^{(0)}(t) \) indicates the original data of the t year; the superscript “0” stands for the original data; if \( \sigma^{(0)}(t) \in (0.1353, 7.389) \), \( x^{(0)} \) may be regarded as a normal GM model.

(2) Secondly, the method of grey accumulation is used for processing the original data meeting the conditions.

If \( x^{(0)} \) is expressed as \( (x^{(0)}(1), x^{(0)}(2), x^{(0)}(3) \cdots x^{(0)}(n)) \), \( x^{(1)}(t) \) generated in time t of data series \( x^{(1)} \) is:

\[
x^{(1)}(t) = \sum_{i=1}^{t} x^{(0)}(i), \quad t=1,2,3 \cdots n
\]  

Hereinto: the superscript “1” in \( x^{(1)}(t) \) indicates that it’s the first time to accumulate the data.

(3) Thirdly, GM model is used for forecast.

GM \((N, h)\) indicates the grey model of h variables of Order \(N\). Generally, the grey model of 1 variable of Order 1 is often used, i.e., GM \((1, 1)\). Hereinto, the first figure “1” indicates Order 1 for the differential equation, and the second figure “1” indicates that there is only 1 variable, which is expressed as \( \frac{dx}{dt} + ax = b \). Hereinto, \( x=x(t) \), and a and b are constant (parameters to be estimated). The solution to the differential equation is:

\[
\bar{x}^{(1)}(t+1) = \left( x^{(0)}(1) - \frac{b}{a} \right) e^{-at} + \frac{b}{a}
\]  

Hereinto, the parameter \( a = \begin{bmatrix} a \\ b \end{bmatrix} \), and \( a = (B^T B)^{-1} B^T Y \). \[B = \begin{bmatrix} -\frac{1}{2} (x^{(1)}(1) + x^{(1)}(2)) \\ -\frac{1}{2} (x^{(1)}(2) + x^{(1)}(3)) \\ \vdots \\ -\frac{1}{2} (x^{(1)}(9) + x^{(1)}(n)) \end{bmatrix}, Y = \begin{bmatrix} x^{(0)}(2) \\ x^{(0)}(3) \\ \vdots \\ x^{(0)}(n) \end{bmatrix} \]

(4) Finally, the model is tested.

The residual error is tested in order to judge the accuracy of the model. With small average relative error, high correlation and large small-probability error, the model has high accuracy. There are two methods to test the accuracy of GM \((1, 1)\), namely, residual error test and accuracy test (or posterior error test).

3.2. Data source and explanation

Animal products generally include meat, egg, dairy, bee product and other by-products. However, in this paper, it mainly indicates the meat products, covering the output data of 5 types of animal products including pork, beef, mutton, poultry meat and rabbit meat. The fundamental data are collected from 2006-2015 Sichuan Statistic Yearbook, Sichuan Statistical Bulletin, Animal Agriculture Information Website of Sichuan Province, and Chinese Animal Husbandry Statistics. See the sample data in Table 1.
Table 1. Output of animal products of Sichuan Province in 2006-2015. Unit: t

| Year | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Meat | 6226677 | 5653871 | 5901229 | 6308901 | 6563464 | 6508292 | 6701182 | 6903235 | 7147448 | 7067951 |
| Pork | 4814183 | 4077634 | 4346065 | 4725437 | 4924000 | 4846903 | 4964822 | 5108000 | 333703 | 5124165 |
| Beef | 283411  | 286343  | 287252  | 289299  | 294170  | 288963  | 292946  | 311000  | 333703 | 353725  |
| Mutton | 213634 | 238802 | 240564 | 243211 | 247994 | 239119 | 240044 | 253085 | 263491 |
| Poultry meat | 680734 | 788241 | 807712 | 814931 | 841173 | 867278 | 930212 | 956278 | 974447 | 996860  |

3.3. Model forecast

Based on the steps stated above, grey forecast is carried out for the output of animal products of Sichuan Province, and then the forecast model may be achieved.

\[ \hat{x}(1)(k + 1) = \left[ x(0)(1) \right] - \frac{b}{a} e^{-ak} + \frac{b}{a} \]

Hereinto, \( a1 = -0.0207, b1 = 5598287; a2 = -0.0263, b2 = 4147378; a3 = -0.0255, b3 = 263328; a4 = -0.0091, b4 = 233882; a5 = -0.0322, b5 = 194991 \). The predicted value will be obtained when the model is reset. \( \hat{x}(0) = (\hat{x}(0)(1), \hat{x}(0)(2), \cdots \hat{x}(0)(10)) \). See the predicted value and predicted trend of animal products output of Sichuan in future 10 years in Table 2 and Figure 2 - 7.

Table 2. Forecast of animal products of Sichuan Province in 2016-2025. Unit: t

| Year | 2016  | 2017  | 2018  | 2019  | 2020  | 2021  | 2022  | 2023  | 2024  | 2025  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Meat | 7454910 | 7659146 | 7868978 | 8084559 | 8306046 | 8533601 | 8767389 | 9007583 | 9254357 | 9507892 |
| Pork | 5485264 | 5631248 | 5781118 | 5934976 | 6092930 | 6255086 | 6421559 | 6592462 | 6767913 | 6948034 |
| Beef | 344674  | 353571  | 362698  | 372061  | 381665  | 391517  | 401623  | 411990  | 422625  | 433534  |
| Mutton | 257012 | 259351 | 261711 | 264093 | 266496 | 268921 | 271368 | 273838 | 276330 | 278845  |
| Poultry meat | 1037487 | 1071442 | 1106508 | 1142722 | 1180121 | 1218744 | 1258632 | 1299824 | 1342365 | 1386298 |
| Rabbit meat | 316486 | 331322 | 346854 | 363114 | 380136 | 397955 | 416611 | 436140 | 456586 | 477989 |

\(^{\text{a}}\)a1 – a6 and b1 – b6 indicate the undetermined parameter values of meat, and pork, beef, mutton, poultry meat and rabbit meat, respectively.
Figure 2. Predicted trend of total meat output of Sichuan.

Figure 3. Predicted trend of pork output of Sichuan.

Figure 4. Predicted trend of beef output of Sichuan.

Figure 5. Predicted trend of mutton output of Sichuan.

Figure 6. Predicted trend of poultry meat output of Sichuan.

Figure 7. Predicted trend of rabbit meat output of Sichuan.
The table and figures above show that the total output of animal products of Sichuan Province in the future 10 years will grow in general, but slowly, year by year. The average growth rate of the total output of meat is about 2.74%, and that of pork, beef, mutton, poultry meat and rabbit meat are 2.66%, 2.58%, 0.91%, 3.27% and 4.69%, respectively, among which the output of poultry meat grows the fastest, while that of mutton grows the slowest. In addition, the output of pork, with about 73.3% of total proportion, takes the largest part; that of poultry meat, with about 14.3% of total proportion, takes the second largest part; while the average output of herbivorous animals including cattle, sheep and rabbit only take 12.4% of total proportion. Figure 2–Figure 7 show that the predicted value of poultry meat output has the smallest deviation from the actual value, while that of beef output has the largest deviation.

As a whole, even though the output of various animal products of Sichuan grows in general, regional differences still exist. According to the forecast, the total meat output and the output of pork and poultry meat will grow year by year in Sichuan Province and each cities and regions. However, it’s predicted that the beef output of Ya’an will decline year by year; the mutton output of Chengdu, Neijiang and Ganzi Prefecture will decline year by year; the rabbit meat output of Chengdu, Ziyang and Ganzi Prefecture will decline year by year. Thus, regional differences exist in the development of animal products, and the animal products of cattle, sheep and rabbit in Sichuan should be further developed. In particular, the plateau regions should make full use of the abundant grass resources to develop animal husbandry. Nevertheless, it’s predicted that the output of mutton and rabbit meat of Ganzi Prefecture will decline. Therefore, such problems should be explored and solved.

3.4. Model test

In the study, tests for the model include residual test, correlation test and precision test.

(1) Residual test, known as point-to-point test for model precision, indicates that, the smaller the relative error is, the better result it proves.

Relative error:

\[ \varepsilon = \frac{1}{n-1} \sum_{k=2}^{n} |\varepsilon(k)| \]  

Model precision:

\[ \rho^0 = (1 - \varepsilon) \times 100\% \]  

(2) Correlation test mainly tests the correlation degree between the curves of the model and the original data.

If \( \Delta(k) = |x^{(0)}(k) - \bar{x}^{(0)}(k)| \), then \( \Delta_{\text{max}} = \max_k \Delta(k) \) and \( \Delta_{\text{min}} = \min_k \Delta(k) \).

Calculation of correlation coefficient and correlation degree: \( \delta(k) = \frac{\Delta_{\text{min}} + \rho \Delta_{\text{max}}}{\Delta(k) + \rho \Delta_{\text{max}}} \), \( \gamma = \frac{1}{n} \sum_{k=1}^{n} \delta(k) \).

Hereinto, \( \rho = 0.5 \).

(3) Precision test may also be known as the posterior variance test for the model.

The deviations of the original data and residual error are calculated separately.

\[ S_1 = \frac{1}{\sqrt{n}} \sum_{k=1}^{n} (x^{(0)}(k) - \bar{x})^2, S_2 = \frac{1}{n-2} \sum_{k=2}^{n} (\Delta^{(0)}(k) - \bar{\Delta})^2 \]

The post-test odds (\( C = \frac{S_2}{S_1} \)) and minor error probability (\( p = \{ |x^{(0)}(k) - \bar{x}| < 0.6745S_1 \} \)) are calculated. See the test index values in Table 3.
Table 3. Test for values generated in animal products forecast model of Sichuan.

|                          | Total output | Pork   | Beef    | Mutton  | Poultry meat | Rabbit meat |
|--------------------------|--------------|--------|---------|---------|--------------|-------------|
| Relative error (ε)       | 0.0170       | 0.0270 | 0.0312  | 0.0175  | 0.0130       | 0.0435      |
| Model precision (ρ)      | 0.9830       | 0.9730 | 0.9688  | 0.9825  | 0.9870       | 0.9565      |
| Correlation degree (γ)   | 0.6287       | 0.6065 | 0.5965  | 0.6042  | 0.5308       | 0.6780      |
| Post-test odds (C)       | 0.0753       | 0.1778 | 0.2298  | 0.1636  | 0.0158       | 0.1497      |
| Minor error probability (p)| 1.0000     | 1.0000 | 1.0000  | 1.0000  | 1.0000       | 1.0000      |

The smaller the relative error of each test index is, the better result it proves. When the relative error is (0, 0.01), it indicates the level-1 precision; when the relative error is (0.01, 0.05), it indicates the level-2 precision; when the relative error is (0.05, 0.1), it indicates the level-3 precision; when the relative error is more than 0.1, it indicates the level-4 precision. The relative error of each type of animal product is (0.01, 0.05), so it belongs to level-2 precision; the model precision is more than 0.95, belonging to high-level precision; the minor error probabilities of each type of product are 1. Therefore, the model is precise, so that grey forecast is feasible.

4. Conclusions and suggestions

4.1. Conclusions

The result of the forecast on animal products output of the future 10 years in Sichuan, through grey forecast model, shows that, the model is precise, and that minor error probability is 1. The forecast result is reliable. The following conclusions are reached.

First, the total output of animal products of Sichuan Province in the future 10 years will grow in general, but slowly, year by year. Output of poultry meat grows the fastest, while that of mutton grows the slowest. In addition, the output of pork takes the largest part, that of poultry meat takes the second largest part, and that of herbivorous animals including cattle, sheep and rabbit take the least proportion.

Secondly, regional differences exist in the output trend of various animal products of Sichuan. According to the forecast, the total meat output and the output of pork and poultry meat will grow year by year in Sichuan Province and each cities and regions. However, it’s predicted that the beef output of Ya’an will decline year by year; the mutton output of Chengdu, Neijiang and Ganzi Prefecture will decline year by year; the rabbit meat output of Chengdu, Ziyang and Ganzi Prefecture will decline year by year.

4.2. Suggestions

Based on the above problems and forecast result, it’s known that the supply of animal products in Sichuan will rise slowly in the future, with few fluctuations. However, the animal product output should be controlled, the supply should be guaranteed, and the balance between supply and demand should be maintained. Thus, the following suggestions are proposed.

First, products supply should be stabilized. Large-scale and standard animal husbandry should be promoted, in order to enhance the livestock and poultry breeding efficiency and animal products quality safety, as well as to effectively solve the fluctuation of supply and demand caused by blind production. Thus, the central and local government should improve the policy system supporting the animal husbandry, strengthen the support on standard and large-scale animal husbandry and the construction of standard and large-scale farm, and enhance the breeding level and efficiency and anti-risk capability. In addition to retaining the existing policies to benefit agriculture, more subsidies on animal husbandry should be shifted to the key animal products, key regions and key links. The industrial structure of animal husbandry should be readjusted based on the market demand, so as to ensure the effective and rational output of animal products, to reduce the fluctuation of market demand, and to stabilize the effective supply of products.
Secondly, consumers’ concept should be changed. The losses of animal products caused in the processes of production, processing and transportation should be reduced by means of technical progress and equipment replacement. Based on consumers’ doubt on some livestock and poultry breeding, related departments and industry associations should work on popularizing the science and knowledge on livestock and poultry breeding, should make objective report in case of any emergent animal diseases, and should direct the consumers to consume animal products with a scientific and reasonable attitude. Meanwhile, the visibility of animal products quality safety should be enhanced. The production environment and production standard of animal products should be supervised jointly by the related departments and consumers, and the information on product quality inspection should be made public. A new concept of “healthy, scientific, balanced and appropriate food consumption” should be established, in order to strengthen the spread of the concept of economical consumption and green consumption, to change the conservative consumption concept, and to guide the urban and rural residents to develop a healthy and economical consumption habit.

Thirdly, technology input should be enhanced. The technical system reform should be accelerated, incorporating the establishment of a multi-level, multi-function, and diversified technical service system, the enhancement of technology reform, the cultivation of more professionals and experts on animal husbandry, the strengthening of comprehensive application of supporting technologies, the increase of input on scientific research fund, the improvement of publicity of scientific skills and knowledge on animal husbandry, the full use of information network, the establishment of a diversified information service subject, the exerting of the functions of various departments including media and agencies on animal products market information service, the transferring of information to various consumers by different methods, and the adequate exchange and share of information. The information network on production, supply and demand of animal products should be established according to the actual situation, in order to realize the information networking and fairness of animal products, and to promote the balance between supply and demand of animal products.

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