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AND ITS SUSTAINABLE DEVELOPMENT.

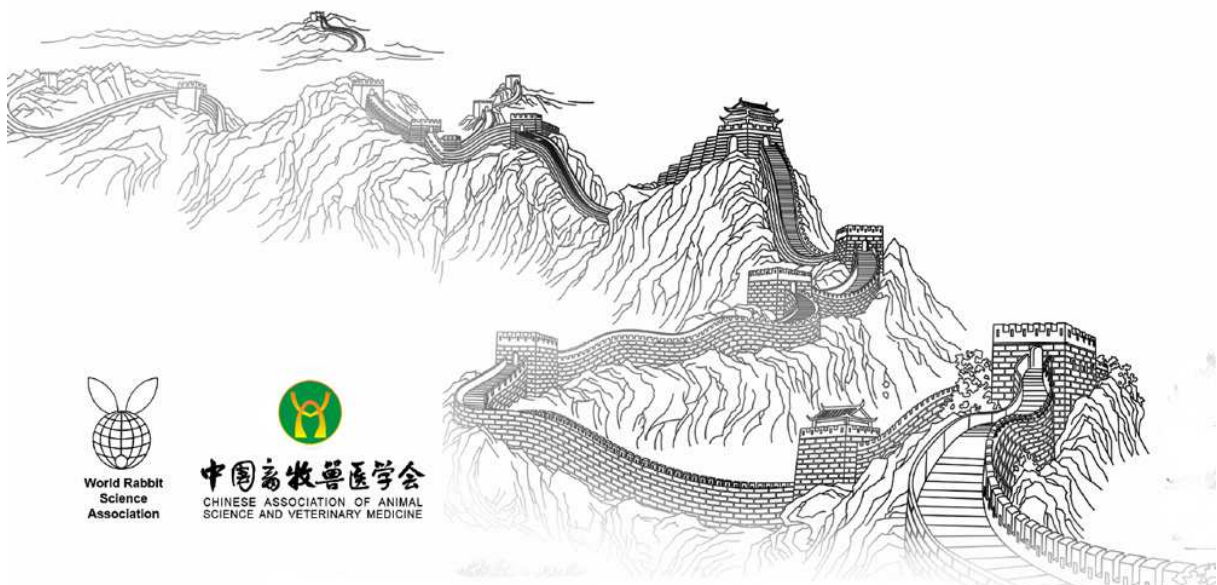
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THE CONTRIBUTION OF CHINESE RABBIT INDUSTRY AND ITS SUSTAINABLE DEVELOPMENT

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ABSTRACT

Based on industry development theory and Diamond model, this paper studies Chinese rabbit industry development and its contribution from following perspectives: resource endowment, market demand, related industry support, the strategy of rabbit farms and enterprises, so as to improve its sustainable development. The results show that Chinese rabbit sector has strong advantages in saving feed grain and creating more jobs in its animal and husbandry industry, but the major constraints in the short run are from small scale production, in the long run, China needs to upgrade its production modes and enhance its technical progress.

Key words: Chinese rabbit industry, Diamond model, Contribution

INTRODUCTION

In China, the rabbit sector is very small, but it ranks at top one in world rabbit industry. In 2013, rabbit meat output in China reached 785 thousand tons, which accounts for only 1% of its total meat output. From global view, the share of Chinese rabbit meat output in world total is about 44%. In the same year, the end-year rabbit stock, number of slaughtered rabbits and net export of rabbit meats were respectively 223.45 million heads, 503.67 million heads and 9.7 thousand tons, which account for about 30%, 43% and 27% of world's total. Meanwhile, Chinese rabbit sector shows strong growth potentials. From 2001 to 2014 the rabbit meat output were near doubled, annual growth rate reached 5.56%, while the growth rates of pork, beef, mutton and chicken meats were only 2.62%, 2.36%, 3.56% and 2.88%.

In China farmers raises meat rabbit, Rex rabbit and Angola rabbit. The big scale modern farms supply about 25% of slaughtered rabbit, small scale backyard farms raise about 35%, the medium scale farms (including Cooperatives) provide about 40% (Chinese Rabbit Research System¹, CRRS, 2014). Based on a national survey by CRRS in 2011, the share of meat rabbit, fur skin rabbit (Rex rabbit) and fur rabbit (Angola rabbit) are respectively 63.3%, 28.3% and 8.4%. Due to the price changes these three sectors substitute from each other. It is estimated the meat rabbit accounted for about 80% in 2015.

Rabbit industry has contributed much to economic growth and society in China. (1) it produces diversified products, including meat and its processed products, clothes and decoration products made of furs and skins etc. In the world total, more than 90% of Lex rabbit and Angola rabbit are raised in

¹ In 2009, Ministry of Agriculture of China launched a national project-China Rabbit Research System (CRRS), which focuses on technology and integrates scientific research with extension by laboratory research, farmer training and education, and marketing consultancy etc. Under the CRRS, 19 scientists are selected from universities or research institutes all over China to collaborate in four research areas: (1) Genetic, Breeding and Reproducing, (2) Disease Prevention and Control, (3) Nutrition and Feed, and (4) environment control, processing and economic analysis. In order to provide good conditions for trial in production practice, 15 experiment stations are selected from 12 provinces, which include rabbit breeding farms and product processing companies. Prof. Yinghe Qin from China Agricultural University is the chief scientist. The first two periods are 2010-2015 and 2016-2020.

China, for meat rabbit it also reaches about 40%, ranking top one; (2) it creates more jobs and help to reduce poverty. Due to the dominance of scattered middle and small farms, rabbit industry creates more jobs in China, especially for the elder rural labors. Compared with pig or other animals, raising rabbit has many advantages: less investment, less pollution, short production cycle, high return or profit, easy start-up. it is also given higher priority in government policy to reduce poverty; (3) it plays important role in solving food security problem. China faces fast decline in arable land area and rapid increase in population. From 2008 to 2013, arable land area decreased by 13.28 million hectares but population increased by 32.70 million. This has been and would be irreversible trend for a long time. These factors put much pressure on Chinese food security. Raising rabbit can contribute to meat supply and saving feed grain. Meanwhile the grain-conversion-ratio of rabbit is higher than pig and poultry, small scale backyard farms can also make full use of by-products from agricultural production or food waste.

Due to the above contribution, in 2011 Ministry of Agriculture of China (MOA) passed *National Development Plan on Grain-saving Livestock (2011-2020)*, rabbit industry was given higher priority. However, rabbit industry also encounters challenges, including small scale production, which causes market fluctuation, low efficiency and low standardization etc. How to improve rabbit industry to upgrade is still a problem that should be solved.

MATERIAL AND METHOD

Based on Diamond Theory (Michael Porter, 1975), we study the competitiveness and determinants of an industry. The theory shows that industry development is determined by six group of factors: (1) *production factor conditions*, including both endowed factors (natural resources, capital and others) and developed factors by R&D investment; (2) *demand situations*, including domestic demand and world market; (3) *related and supporting industries*, including upstream input company and downstream processing etc.; (4) *corporate strategy structure and rivalry*, such as marketing strategy, brand marketing etc. (5) *Chance*, it is occurrences outside of control of a firm; (6) *government policy*.

In above six groups of factors, *Chance* and *Government's policy* are exogenous, which are determined outside the system. In following part, we will mainly focus on other four kinds of factors. Data used in this paper is from MOA, State Statistical Bureau of China (SSB) and the Food and Agriculture Organization of the United Nations (FAO).

RESULTS AND DISCUSSION

Production factor conditions

Production factors include land, labour, feed and other inputs. (1) land. In China many medium and small rabbit farms are built on non-arable land areas (including farmer's backyard), they make full use of existing buildings, such as disused schools or plants/workshops etc. Therefore, though China faces land shortage, rabbit-raising will not put much pressure on land;(2) feed. China faces shortage of high quality fodder such as alfalfa, but in different areas China has various local feed resources that can be used. Especially those medium or small rabbit farms, they use many by-products, this can save grain greatly since this kinds of farmers account for more than 70%; (3) labour. In recent years China faced fast wage increases, from 2001 to 2014 the annual growth rate of rural labour wage was 12.24%, which is much higher than growth rate of agricultural GDP (8.07%) or growth rate of production value of animal husbandry (7.95%), but small and medium scale farms mainly rely on their own labours. Meanwhile, these labours are mainly elder people, who have less opportunity to find other better jobs. Therefore, the labour wage increase will not put too much pressure on rabbit farms as other industry.

Demand conditions

Chinese rabbit meat is mainly consumed domestically, in 2014 only about 1.2% was exported. In China rabbit meat has big market potential. The annual per capita consumption of rabbit meat is about 3-5 kg

or even more in developed countries such as France, Italy, Spain, while in China the consumption of rabbit meat is still very low (Table 2), in 2013 the average per capita use is only 0.57 kg. However, it increases much fast, from 2001 to 2013 it increased by 96.55%, annual growth rate was 5.79%. Meanwhile, there are big differences across regions. Major consumption areas include Sichuan, Chongqing and Guangdong, per capita consumption in these three provinces are respectively 3.955 kg, 1.929 kg and 0.632 kg (Table 3). But even in Sichuan province rabbit consumption is still less than many EU countries. It can be expected that with income increases more people will demand for high quality and healthy meat instead of traditional pork, there are big potentials for rabbit meat in China.

Table 2: Rabbit meat output, net export and per capita domestic uses

	Rabbit meat output (thousand ton) (1)	Net export (thousand ton) (2)	Population (million) (3)	Domestic uses* (kg per capita) (4)=[(2)-(1)]/(3)
2001	406	33.00	1276.27	0.29
2005	511	8.93	1307.56	0.38
2010	690	10.33	1340.91	0.51
2011	731	9.00	1347.35	0.54
2012	761	10.92	1354.04	0.55
2013	785	9.75	1360.72	0.57

Data sources: China Animal Husbandry Statistics, various years, China Agricultural Press; China Customs Statistics (<http://www.haiguan.info/onlineSearch/TradeStat/StatCOMSub.aspx?TID=1>). Domestic use refers to total uses, including direct consumption, company processing etc.

Table 3: rabbit meat consumption in major areas

	Per capita consumption(kg)	Total regional consumption(ton)	% in national total
Sichuan	3.955	318081.3	55.23%
Chongqing	1.929	55632.0	9.66%
Guangdong	0.632	65875.6	11.44%
Beijing	0.386	7575.8	1.32%
Hebei	0.318	22872.3	3.97%
Jiangsu	0.289	22732.0	3.95%
Henan	0.258	24264.2	4.21%

In each year from 2011 to 2013, China Rabbit Research System selects major provinces to do consumption survey; the total samples in three years are 2600 consumers in 26 big cities. Data of this table is from the surveys.

Related and supporting industry

There are many related and supporting industry, including rabbit breeding, feed processing, cages manufacturing, medicine, raising/feeding, product processing and marketing etc. In 1992 China started to build the *Socialist Market Economic System*, rural markets were more liberalized, since then the related supporting industries are growing rapidly. Many commercial feed companies are set up; more disease control services are provided; more rabbit product processing companies are built. More diversified processed rabbit products can be easily bought in supermarkets or other retail markets.

Meanwhile, due to the great contribution of rabbit to economy and society, governments also make policy to support rabbit industry development. The CSSR, the National Rabbit Breeding Scientific Committee and the National Standardization Technical Committee of animal husbandry were setup and gradually play important roles. The CRRS integrates scientific research with technology and technical extension, it provides prompt and efficient supports to farmers, processing companies etc. In past five years, the CRRS has bred 6 improved varieties and help farmers and government to preserve local varieties. The CRRS also train farmers in major rabbit-raising areas.

Company strategy structure and rivalry

As discussed previously, the rabbit farms in China are mainly medium or small scale. Due to a lack of information or decision-making knowledge, many small and medium farmers usually follow other big farmers' decision or suggestions from related companies, such decision normally cannot be optimal for smaller farm or company. When expecting price increase, they will increase production, but don't know how to maximize their profit. The adventurous farmers usually will increase production to the level

more than optimal. Even those risk-aversion farmers will also increase production to certain extent. This finally will cause over supply, vice versa. the production decision of small and medium scale farmers will enlarge price fluctuation. Now in China small and medium farms raise more than 70 % of rabbits, this will affect market greatly. This also means that they need help in decision-making.

It is also difficult for small farms to improve standardization, which impede the product processing, brand-building and marketing. Small scale farms also lack of bargaining power. Recognizing these problems, Chinese governments encourage to enlarge farm scale, and supporting farmers to organize by cooperatives so as to adapt to big markets.

CONCLUSIONS

Due to the significant position in world rabbit industry and great contribution in China, Chinese rabbit industry has attracted many attentions. Economically, rabbit industry needs less investment but has high return; Technologically, the CRRS, government and other institutes can provide technical support through training and extension; Environmentally, rabbit farming produces less wastes and can easily maintain recycle production mode; Socially and politically, rabbit farming in China can save feed grain, creates more jobs, increase farmers' income and reduce poverty, and has received much supports from governments. All these mean that Chinese rabbit industry has a solid basis and favorable conditions for sustainable development.

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THE CONTRIBUTION OF CHINESE RABBIT INDUSTRY AND ITS SUSTAINABLE DEVELOPMENT



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Outline



- 1. Background**
- 2. Method and Data**
- 3. Results**
- 4. Conclusions**



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1. Background: Growth of Rabbit Industry



1.1 Chinese rabbit industry and its role in the world

- Chinese rabbit industry: small domestically, top one internationally. In 2013:
- Rabbit meat output: 785 thousand tons, 1% of Chinese meat output, **44% of world.**
- Stock: 223.5 million heads, **30% of world;**
- Slaughtered: 503.67 million heads, **43% of world;**
- Meat export: 9.7 thousand tons, **27% of world.**



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1.2 Development of Chinese rabbit industry

Table 1. Meat output and growth rate from 2001 to 2014

	Meat	Pork	Beef	Mutton	Poultry	Rabbit
2001	61058	40517	5086	2718	12100	406
2005	69389	45553	5681	3501	14640	511
2010	79258	50712	6531	3989	16560	690
2011	79578	50531	6475	3931	17090	731
2012	83840	53350	6620	4010	18230	761
2013	85360	54930	6732	4081	17984	785
2014	87067	56714	6892	4282	17507	829
Growth rate 2001-2014	2.77%	2.62%	2.36%	3.56%	2.88%	5.64%

Data source: *China Rural Statistical Yearbook* (various years), China Statistics Press.

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Different production style

- big scale modern farms: 25% of slaughtered
- medium scale specialized farms: 40%
- small backyard family farms: 35%

Different species: meat rabbit, Rex rabbit,
Angola rabbit, pet rabbits and experiment rabbit.



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1.3 Contribution of Chinese Rabbit Industry



- Producing diversified products. meat products, clothes and decoration made of furs and skins.
- Creating more jobs and reducing poverty specially for elder rural labor.
- Saving feeding grain to help solve food security problem. Higher grain-conversion-ratio.



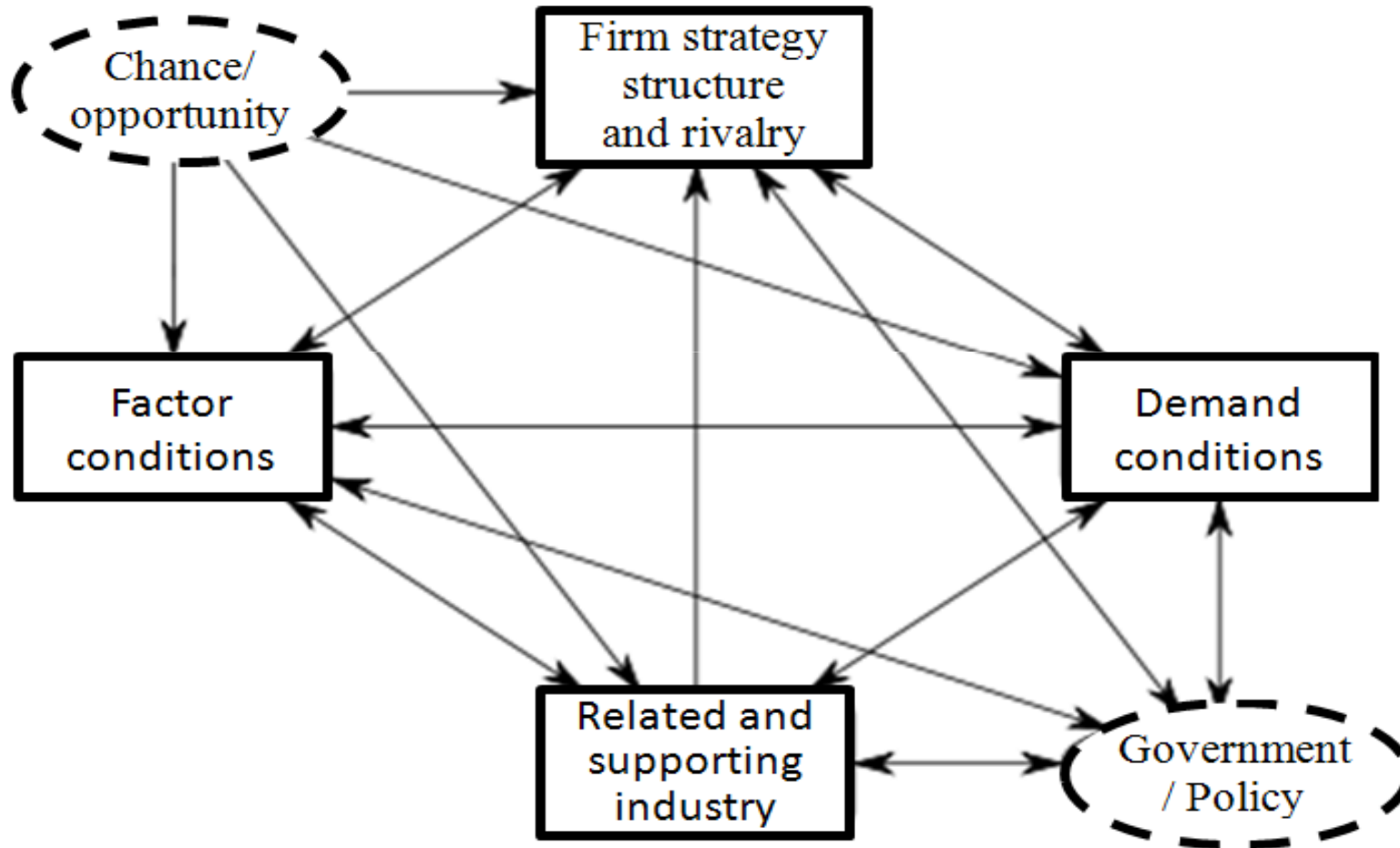
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2. Method and Data



2.1 Diamond theory



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3. Results



3.1 Production factor conditions

- **Land.** Built on non-arable land areas (like backyard), which won't put much pressure on land as other industries.
- **Feed.** Lack of high quality fodder, but various local feed resources that can be used, such as by-products, this can save feed greatly.

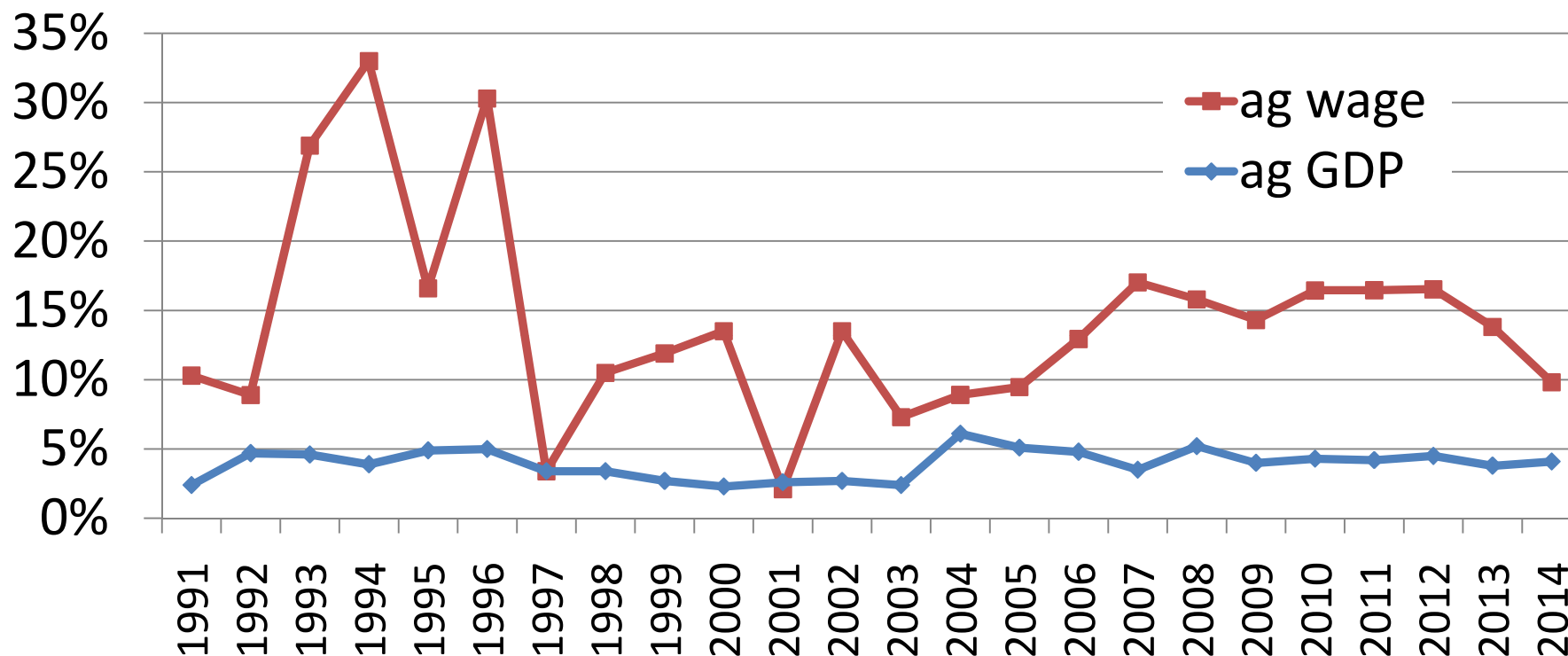


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■ Labor. Wage increase



From 2001 to 2014 the annual growth rate of rural labor wage was **12.24%**, which is much higher than growth rate of agricultural GDP (**8.07%**)

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3.2 Demand conditions



	Rabbit meat (thousand ton) (1)	Net export (thousand ton) (2)	Population (million) (3)	Domestic uses* (kg per capita) (4)=[(2)-(1)]/(3)
2001	406	33.00	1276.27	0.29
2005	511	89.25	1307.56	0.38
2010	690	10.33	1340.91	0.51
2011	731	9.00	1347.35	0.54
2012	761	10.92	1354.04	0.55
2013	785	9.75	1360.72	0.57
2014	829	12.87	1367.82	0.60

Data sources: China Animal Husbandry Statistics, various years, China Agricultural Press;
China Customs Statistics

(<http://www.haiguan.info/onlineSearch/TradeStat/StatCOMSub.aspx?TID=1>).

Domestic use refers to total uses, including direct consumption, company processing etc.

From 2001 to 2014 per capita domestic uses increased by more than 100%.

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3.3 Related industry support

- Breeding, feed processing, cages manufacturing, medicine producing, raising/feeding, product processing and marketing
- Growing fast since the beginning of 1990.



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3.4 Company strategy structure and rivalry

- Strategy and scientific decision.
- Standardization.
- Big market.

Face
challenges

However, farmers organize & build capacity by

- ✓ Cooperatives
- ✓ Leading company/contracting farming
- ✓ CRRS: training, extension, information service



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4. Conclusion



- Generally has comparative advantages.
- Saving feed grain, creating more employments, increasing farmers' income and reducing poverty, and receiving more supports from governments and research institutes.
- However, small scale production causes difficulty in disease control, low efficiency and low standardization.



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Summary: sustainable development

- **Economically:** low cost, less risk, high return
- **Environmentally:** recycle production system
- **Technologically:** CRRS and other breeding program
- **Politically:** saving grain, employment and income, policy priority



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***Thank you for
attention!***

