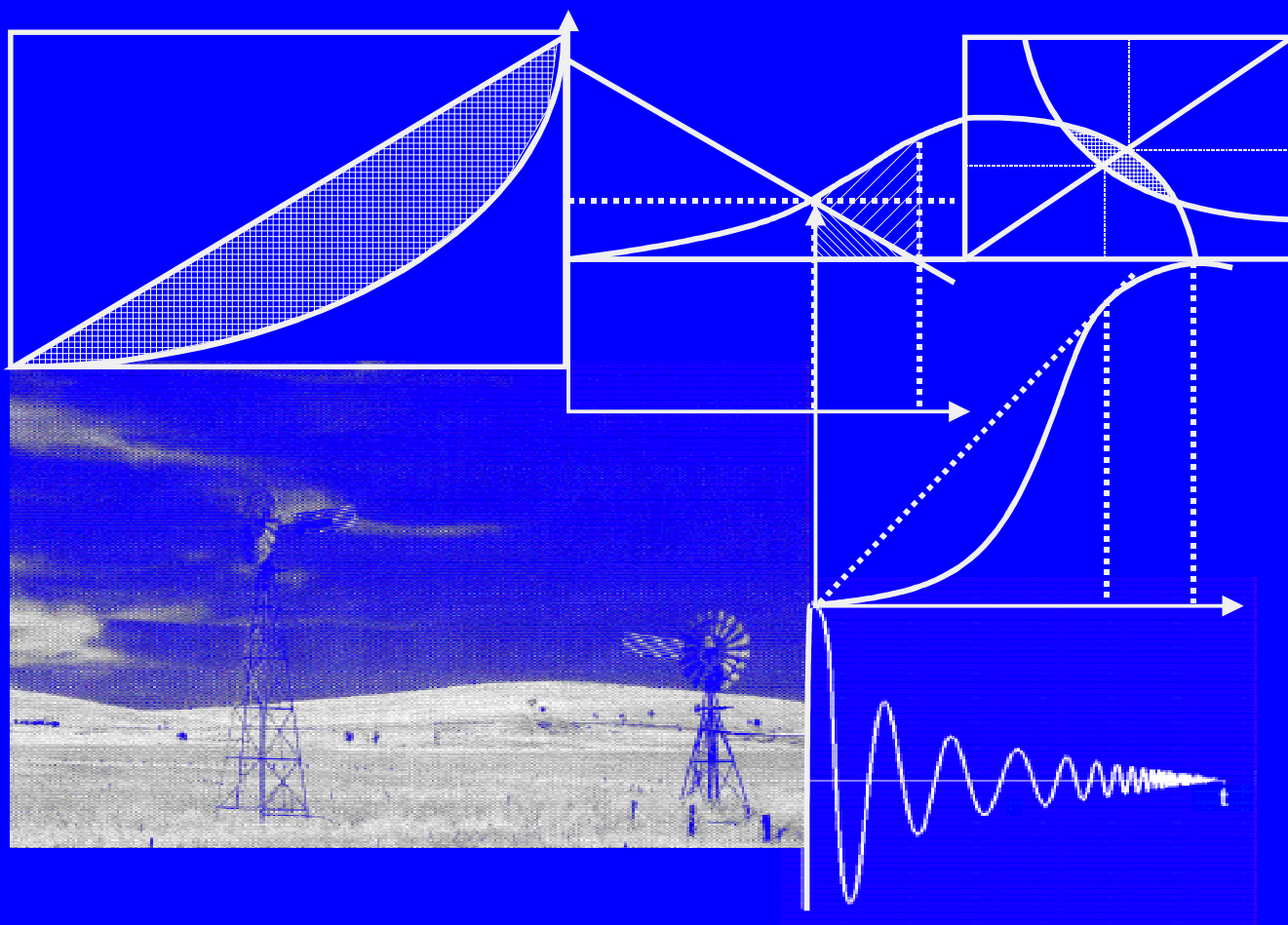


# Agricultural and Natural Resource Economics Discussion Paper Series



School of Natural and Rural Systems Management  
University of Queensland  
St. Lucia 4072 Australia

**The Livestock Revolution in China**  
**In Addition to Comment on the Implications**  
**of the Recent Economic Crisis on Livestock Sector**

Zhang Cungen  
Institute of Agricultural Economics  
Chinese Academy of Agricultural sciences  
Beijing 100081 CHINA

September 1999

Agricultural and Natural Resource Economics Discussion Paper 3/99

School of Natural and Rural Systems Management  
University of Queensland  
St. Lucia 4072  
Australia

© September 1999

# **The Livestock Revolution in China**

## **In Addition to Comment on the Implications of the Recent Economic Crisis on Livestock Sector**

Zhang Cungen  
Institute of Agricultural Economics  
Chinese Academy of Agricultural sciences  
Beijing 100081 CHINA

### **Abstract**

Since the 1980s, China has made great progress in livestock sector and has undertaken a "livestock revolution". The Chinese livestock sector will have a great revolution in the next century and face a new challenge and opportunity. The relationship between the growth rates of GDP and that of livestock sector had significant positive interrelations. The market of livestock products produced in China is mainly located within China and there were not significant implication of the recent economic crisis on import and export of major livestock products in 1997 and 1998 in comparison with 1996. Finally the paper provides some policy suggestions which may assist further development of the livestock revolution in China.

China is one of the largest agricultural and developing countries in the world, with 9.6 million square kilometres and 1.2 billion people. Since the 1980s, China has made great progress in agricultural and livestock development. It is an important fact that China, using 7% agricultural land of the world, feeds 21% population of the world. The "livestock revolution" has been undertaken in China.

The article will review the livestock revolution in China, comment on the implications of recent economic crisis on livestock production, marketing and consumption in China, and provide some policy suggestions which may assist further development of the livestock revolution in China.

## **1. Review of the Livestock Revolution in China**

### **1.1 General Situation**

In the past 18 years (1980-1998), Chinese major livestock production had a great growth. It is estimated that the meat output reached to 54.1 million ton in 1998 and was an increase of 4.2 times in comparison with 1980, the egg output reached to 22.2 million ton and was an increase of 8.6 times, the milk output reached to 8.2 million ton and was an increase of 6 times.

In Table 1, we can find that since the 1990s the growth rate of Chinese population has been well controlled. At the same time, the growth rate of meat, egg and fishery

output continued to increase and have reached to the highest level; while that of grain (including cereal, soybeans and tubers in Chinese statistics), milk and wool output decreased to the lower level, particularly that of grain output had reached to -2.1% in 1997. However, the growth rate of meat, egg and fishery output became to the lower level too in 1998.

In the past 18 years, although Chinese population was a 26% increase, per capita output of meat was an increase of 3.3 times (from 13.1 to 43.5kg), that of egg was an increase of 6.9 times (from 2.6 to 17.9kg) and that of milk was an increase of 4.8 times (from 1.4 to 6.7kg).

In Table 2, we can find that at present per capita output of meat in China has exceeded the level in the world, while that of egg has reached the level of developed countries. However, per capita output of milk was still low and less than 7kg in 1998, which was equal to one sixth of average level in developing countries and to less than one fortieth of average level in developed countries. So per capita Chinese animal protein supply (about 20g/day) is lower than the average level of the world (about 25g/day).

## **1.2 Macro Policies and Development Path**

For a long time, China suffered a great pressure on increasing food production (particularly grain production) for meeting demand of a large population. Increasing livestock production can improve food productivity on one hand, but it should increase feed grain consumption on the other hand. So China faces a strategic choice for developing livestock industry, which should be to full utilize all kinds of feed resources and to improve feed conversion.

Chinese government increases the investment to infrastructure of livestock sector, while China encourages diversified economic compositions to engage in livestock sector. At present, small holders are still a major body of livestock production in the rural areas. They can full utilize local feed resources and developing livestock production has become a major method of developing rural economy and making farmer rich in the underdeveloped regions.

For resolving "vegetable basket" (including meat, egg, milk, vegetable and fruits) problems of urban residents, some industrial (large-scale intensive) livestock enterprises have been set up in the suburbs of large and middle cities and the industrial and mining regions since the 1980s.

For full utilizing feed resources and improving feed conversion and livestock productivity, China has made a series of progress as follows:

**A. To develop the feed industry**      The output of formula, concentrate and pre-mixed feeds increased from 0.6 million ton in 1978 to 63 million ton in 1997.

**B. To establish and perfect livestock breeding systems and technical support services systems**      At present, the breeding systems of pig, layer, broiler,

dairy and beef cattle have been set up in their major producing areas. There are relevant technical support services systems at the national, provincial, prefecture and county levels.

- C. **To adjust and optimize the structure of livestock production** Ruminants and poultry are given a priority for developing. And the "Straw for Ruminants" Program has been carried out in the whole country since 1992. A progress on adjusting and optimizing the structure of meat production, for instance, has been made as showed in Table 3.
- D. **To formulate a series of laws, regulations and Standards on livestock, feed, veterinary and grassland fields**

### 1.3 Development Target for the 21st Century

It was forecasted that the global population would increase to 7.7 billion in 2020 and most growth in developing countries. The demand for livestock products will have a great increase, in which, meat demand from 185 million ton in 1993 to 3033 million ton in 2020, and milk from 413 million ton to 654 million ton. In the global demand growth, 65% growth in meat and 60% growth of milk will be in Asia.

It was forecasted that Chinese population would reach to the peak — 1.6 billion people by the 2030s. How to well feed such huge population will be a rigorous problem. With the development of Chinese economy and the increase of Chinese living standards, China should further develop her livestock industry and couldn't rely on importing a large quantity of animal products to feed 1.6 billion people. It is estimated that by the 2030s the output of meat, egg and fishery needs to increase to two times in comparison with that in 1997 and that of milk to four time, then the level of per capita animal protein supply could reach to that of middle developed countries (45g/day).

### 1.4 Problems and Constraints to Further Development

China will face the following problems and constraints to developing livestock in the next century:

#### A. Feed resources

**Lack of feed grain** The growth rate of grain output decreased to the lower level, while the output of feed grains (particularly maize) was not stable. In the normal years China usually export maize, but imported maize reached to 5.18 million ton in 1996 due to shortfall in maize output. From a long-term view, China might become a major maize importing country.

**Shortage of protein feed** The output of soybeans decreased year by year in China. Import of soybeans reached to 1.1, 2.8 and 4.5 million ton respectively in 1996, 1997 and 1998, while that of soybean meal reached to 1.87 and 3.47 million ton respectively in 1996 and 1997. In addition, China needs to import 1.05 million ton of fish-meal.

**Weak bases of feed industry** Some feed additives with high-technology content (e.g., methionine, lysine) relies on importing products.

**Serious degradation of the grassland** Particularly the rangeland in northwestern China.

**B. Lower level of livestock productivity** Lower productivity of livestock individual, labor power and feed conversion; and higher mortality rate.

**C. Environmental pollution** Mainly for some large-scale and intensive livestock sectors.

**D. Weak bases of market and information systems** China just entered into market economy and has not perfect market and information systems yet.

**E. Lack of strong macro-control capacity** There are not a perfect legal system on livestock sector on one hand; the administrative department of livestock sector, e.g., the Ministry of Agriculture, don't keep necessary macro-control means on the other hand. Some macro-control means, (e.g., price, tax revue, tax rate, credit and subsidy), decentralized into other departments.

## **2. Current Situation of Livestock Product Supply and Demand**

### **2.1 A Huge Change**

In the 1950s-1980s, the growth rate of food output was very low; the food supply couldn't meet the demand of population growth and living standard improvement. The government had to adopt a ration system — "certificates for buying grain ration, meat, and egg". Each person could get a limited ration of grain, meat and egg. This was an inevitable outcome of implementing planned economy.

In 1980s, China basically resolved grain problem. In the 1990s, the situation of livestock product supply and demand had a huge change. Although the growth rate of grain output decreased to the lower level in the 1990s, as mentioned above, the growth rate of meat and egg output continued to increase and reached to the highest level. At present, Chinese livestock product market is in transform from shortage to rich and from seller's market to buyer's market. This is an inevitable outcome of developing market economy.

### **2.2 A New Challenge**

Although Chinese livestock sector retained a higher growth rate in the 1990s, the fluctuations of pork and egg production and marketing always appeared once every 2-3 years. Because the pork and egg production relatively consume much more feed grains (particularly maize), the change on feed grain output will affect the feed prices and the relationship between its supply and demand. In addition, 80% maize output is concentrated in the Northeast China and the North China, while the South China mainly relies on importing maize from the North China or overseas. So the unsteadiness of feed

grain output and the regional disequilibrium finally lead to the above fluctuations.

The changing growth rates of national economy and the reform of state enterprises, housing and public health systems in urban town are also important factors caused in the fluctuations of livestock production and marketing. This means that supply of major livestock products slightly exceeded to their demand in recent years.

China has prepared to enter the WTO. The development of Chinese livestock sector will face another new challenge and opportunity. It will produce an important effect on import and export of livestock products.

### **3. Analysis of Factors affecting Livestock product Supply and Demand**

There are many factors affecting livestock product supply and demand in China, some of that, it is difficult to analyze these factors due to lack of enough detailed information or data to be used. Some researchers believe that there were some direct implications of the recent economic crisis on Chinese economic development but no direct implications on Chinese livestock sector. If the letter is positive, the implications only involved to import and export of livestock products.

Here the author will discuss tow questions: (1) What are the implications of the national economy development on livestock sector? And (2) What are the implications of the recent economic crisis on livestock product trade?

#### **3.1 The Relationship Between the Growth rate of GDP and Livestock Sector**

Chinese economy retained a higher growth rate in the 1990-1994. In Table 4, we can find that the Growth rate of GDP in reality reached the highest level (12.66%) in 1994 and that began to decrease to 10.5% in 1995 and continually down to 7.8% in 1998. At the same time, the Growth rate of livestock output value (LOV) in reality reached the highest level (16.71%) in 1994 and that began to decrease to 14.8% in 1995 and continually down to 5.0% in 1998. This shows that the relationship between the growth rates of GDP and that of LOV in 1994-1998 had significant positive interrelations. However, the growth rates of GDP were lower than that of LOV in 1994-1996; while the growth rates of GDP were higher than that of LOV in 1997 and 1998. This probably resulted from the reform of state enterprises, housing and public health systems in urban town started in 1997.

In Table 4, we can also find that the growth rates of LOV were all along higher than that of gross Agriculture output value (GAOV) in 1997 and 1998. And the proportion of LOV in GAOV possessed a light growth trend, the importance of livestock sector in the agriculture is continually increasing.

#### **3.2 The Relationship Between the Economic Crisis and the Import and Export of Livestock Products**

The import and export of major livestock products in 1996-1998 are shown in Table 5. We can find that the market of livestock products produced in China is mainly located

within China and there were not significant implication of the recent economy on import and export of major livestock products in 1997 and 1998 in comparison with 1996.

## **4. Policy Suggestions**

### **4.1 Strengthening the Macro-control to Livestock Sector**

The macro-control is an action of the government. So-called "macro-control to livestock sector" is the government administration undertakes control to the disposition of livestock resources and the amount and structure of livestock product output, market and consumption for coordinating the profits among producers, traders and consumers through formulating and implementing policies, laws and regulations and adopting control means of investment, credit, price, tax and subsidy.

Firstly, it is necessary to complete the laws and regulations of livestock sector and to continue to strictly implement the existing laws and regulations.

Secondly, it is necessary to accelerate the reformation of the government administration and to carry out unified management of livestock sector. The central government should give the administrative department of livestock sector (e.g., the Ministry of Agriculture) some necessary macro-control means.

Thirdly, it is necessary to further adjust and optimize the structure of livestock production and to support the development of dairy and broiler industries. The percentage of pork output in the total meat output will drop to 50% in the early 21<sup>st</sup> century.

### **4.2 Enhancing Livestock Product Market and Information Systems**

The complete livestock product market and information systems are essential conditions of exchanging livestock production means and products. The complete livestock product information systems are also essential conditions of macro-control undertaken by government.

It is necessary to set up diversified special livestock product markets step by step in the major producing regions and some suburbs of large cities. At same time, the agricultural and livestock product information systems connected livestock and feed enterprises and special product markets should be continuously complete. The Ministry of Agriculture should become the center of such information systems.

### **4.3 Developing feed Industry, Improving Feed Conversion and Reducing Production Costs**

For full utilizing feed resources and improving feed conversion and livestock productivity, it is necessary to continue to develop feed industry, particularly to develop concentrate and pre-mixed feeds most of small holders need.

Extending formula feed, improving feed conversion and cutting down mortality rate are major means of reducing production costs.

#### **4.4 Accelerating the Course of Livestock Agribusiness and Reducing Livestock Risk**

It is necessary to develop diversified livestock agribusiness groups or integrated bodies, which makes producers (particularly a large number of decentralized small holders) and traders combined together to form a profit community. It can reduce the middle chains of commodity circulation and the marketing costs, set up a guarantee regulation of "risk shared in common and profit enjoyed in common", strengthen the capacity against risk and improve the comparative advantage of livestock sector.

#### **4.5 Improving the Product Quality and Enhancing the Competitive Capacity of Product Export**

It is necessary to stabilize the existing bases for livestock product export and try their best to improve product quality and produce commodity accorded with the product demands and standards of international market. China has prepared to enter the WTO, for this reason China should enhance the competitive capacity of livestock products in international market.

## References

Greenfield, J. N. (1998) The Implications of Asian Financial Crisis on Agricultural Product Market (in Chinese). *Chinese Rural Economy*, No:12, 72-75.

ILRI (International Livestock Research Institute), (1999) The External Environment: Implications for ILRI's Systems Research (a lecture)

Jia, Y. (1999) Constrains to Chinese Livestock Development and its Macro-control. *Chinese Rural Economy*, No:1, 40-45.

Li, W. *et al.* (1998) The Implications of Asian Financial Crisis on Chinese Agricultural Product Trade. *Chinese Rural Economy*, No:4, 26-40.

Zhang, C. (1998) Current Situation of Chinese Livestock and Aquaculture and Their Development Prospects in the 21<sup>st</sup> century. *Guide To Chinese Poultry*, Vol:15, No:5, 3-4 and No:6, 3-5.

Zhang, C. *et al.* (1998) Beef Market Analysis in China. A report contributed to the WB's China small holder beef cattle development project.

Zhang, C. *et al.* (1998) Proper Recognizing and Introducing Livestock Agribusiness. *China Animal Husbandry Bulletin*, No:6, 6.

Zhang, C. (1996) Strengthen the Government's Macro-control Capacities to Livestock Sector. *China Animal Husbandry Bulletin*, No:1, 24.

**Table 1 Population and Major Agricultural Product Output in China  
(1980—1998)**

<b>Year</b>	<b>Population (million)</b>	<b>Grain output (‘000 ton)</b>	<b>Meat output (‘000 ton)</b>	<b>Egg output (‘000 ton)</b>	<b>Milk output (‘000 ton)</b>	<b>Wool &amp; other fibre (‘000 ton)</b>	<b>Fishery output (‘000 ton)</b>
1980	987.1	320 560	12 764	2 566	1 367	191	4 500
1985	1 058.5 (1.41%)*	379 110 (3.4%)	19 265 (8.6%)	5 347 (15.8%)	2 894 (16.2%)	191 (0.0%)	7 050 (9.4%)
1990	1 143.3 (1.55%)*	446 240 (3.3%)	28 570 (8.2%)	7 946 (8.2%)	4 751 (10.4%)	262 (6.4%)	12 370 (11.9%)
1995	1 211.2 (1.16%)*	466 620 (0.9%)	[41 000] (7.5%)	16 767 (16.1%)	6 728 (7.2%)	316 (3.8%)	25 170 (15.1%)
1996	1 223.9 (1.05%)**	504 540 (8.1%)	45 954 (12.1%)	19 652 (17.2%)	7 358 (9.4%)	343 (8.5%)	32 880 (30.6%)
1997	1 236.3 (1.01%)**	494 170 (-2.1%)	51 521 (12.1%)	21 254 (8.2%)	7 748 (5.3%)	336 (-2.0%)	36 020 (9.5%)
1998	1 248.1 (0.98%)**	490 000 (-0.8%)	[54 100] (5.0%)	[22 200] (4.5%)	[8 200] (5.8%)	[336] (0%)	39 060 (8.4%)

[ ] Estimated figures.

\* Average annual growth rate during previous 5 years.

\*\* Annual growth rate in comparison with the preceding year.

<b>(In 1997)</b>	<b>Population</b>	<b>Cereal</b>	<b>Meat</b>	<b>Egg</b>	<b>Milk</b>	<b>Wool</b>
	(million)	(‘000 t)	(‘000 t)	(‘000t)	(‘000 t)	(‘000 t)
<b>China</b>	1 236.3	443 493	51 521	21 254	7 748	292
<b>World</b>	5 848.7	2 096 430	221 025	51 764	546 644	2 474
<b>C/W (%)</b>	21.1	21.2	23.3	41.1	1.4	11.8

Source "China Statistical Yearbook" 1997 &1998.

"A Statistical Survey of China" 1999.

"Production Yearbook" 1997, FAO.

**Table 2 Per Capital Output of major Animal Products in China and in the World (1980-1998)**

	Meat	Egg	Milk	Wool & other fibre
<b>Per capital output in China (kg)</b>				
1980	13.1	2.6	1.4	0.20
1985	18.3	5.1	2.7	0.18
1990	25.2	7.0	4.2	0.23
1995	34.0	13.9	5.6	0.26
1996	37.7	15.4	6.0	0.28
1997	41.9	17.3	6.3	0.27
1998	[43.5]	[17.9]	[6.7]	[0.27]
<b>Per capital output in the world (kg)</b>				
1997	37.8	8.9	93.5	0.42*
1992	33.5	7.1	95.3	0.53*
Developed counties	80.5	14.7	277.4	1.47*
Developing counties	19.2	4.8	40.1	0.23*

[ ] -- Estimated figures.

\* Only wool output.

Source "China Statistical Yearbook" 1997 & 1998.

"Production Yearbook" 1992 and 1997, FAO.

**Table 3 Changes on Meat Structure in China (1980-1997)**

Unit: 1,000t,

Year	Grand meat	Pork	Beef	Mutton	Poultry meat	Rabbit	Others
1980	12 764 (100.0)	11 341 (88.8)	269 (2.1)	444 (3.5)	[650] (5.1)	[60] (0.5)	-- (--)
1985	19 265 (100.0)	16 547 (85.9)	467 (2.4)	593 (3.1)	1 602 (8.3)	56 (0.3)	-- (--)
1990	28 570 (100.0)	22 811 (79.8)	1 256 (4.4)	1 068 (3.7)	3 229 (11.3)	96 (0.3)	110 (0.4)
1995	[41 000] (100.0)	[28 450] (69.4)	[3 240] (7.9)	[1 560] (3.8)	[7 300] (17.8)	[210] (0.5)	[240] (0.6)
1996	45 954 (100.0)	31 580 (68.7)	3 557 (7.7)	1 810 (3.9)	[8 487] (18.5)	[240] (0.5)	[280] (0.6)
1997	51 521 (100.0)	34 643 (67.2)	4 150 (8.1)	2 102 (4.1)	[10 076] (19.5)	[250] (0.5)	[300] (0.6)

[ ] -- Estimated figure.

Source: "China Statistical Yearbook" 1997 & 1998.

**Table 4 Growth rate of GDP and Livestock Sector**

(1994-1998)

	1994	1995	1996	1997	1998
GDP in name (billion yuan)*	4675.94	5847.81	6788.46	7477.24	7955.28
GDP indices (1978=100)**	449.3	496.5	544.1	592.0	638.2
Growth rate of GDP in name (%)	35.01	25.06	16.08	10.15	6.39
Growth rate of GDP in reality (%)	12.66	10.50	9.59	8.80	7.80
Population (million)	1198.50	1211.21	1223.89	1236.26	1248.10
Growth rate of population (%)	1.12	1.06	1.05	10.1	9.6
Growth rate of per capita GDP in reality	12.52	10.39	9.49	8.71	7.73
Gross Agriculture Output Value (billion yuan)*	1575.05	2034.09	2342.87	2458.77	2510.34
GAOV indices (1978=100)**	263.3	292.0	319.5	336.4	351.9
Growth rate of GAOV in reality (%)	8.58	10.90	9.42	5.29	4.61
Livestock Output Value (billion yuan)*	467.20	604.50	708.30	762.03	772.98
LOV indices (1987=100)**	431.6	495.5	552.1	592.2	621.8
LOV/GAOV (%)	29.7	29.7	30.2	31.0	30.8
Growth rate of LOV in reality (%)	16.71	14.80	11.42	7.26	5.00

\* Calculated at current prices;    \*\* Calculated at comparable prices.

Source "China Statistical Yearbook" 1997 &1998.

"A Statistical Survey of China" 1999.

**Table 5 Import and Export of Major Livestock Products**

(1996-1998)

		1996	1997	1998
Pork*	Output ('000 t)	31580	34643	[36377]
	Export ('000 t)	297	262	259
	Import ('000 t)	175	356	160
	(Exp.+Imp.)/Output (%)	1.49	1.78	1.15
Beef*	Output ('000 t)	3557	4150	[4358]
	Export ('000 t)	52	48	62
	Import ('000 t)	3	3	3
	(Exp.+Imp.)/Output (%)	1.55	1.23	1.49
Mutton*	Output ('000 t)	1810	2102	[2207]
	Export ('000 t)	2	1	3
	Import ('000 t)	3	4	9
	(Exp.+Imp.)/Output (%)	0.28	0.24	0.54
Poultry*	Output ('000 t)	8487	10076	[10580]
	Export ('000 t)	381	377	352
	Import ('000 t)	312	210	194
	(Exp.+Imp.)/Output (%)	8.17	5.83	5.16
Egg**	Output ('000 t)	19652	21254	[22200]
	Export ('000 t)	45	64	57
	Import ('000 t)	0.5	0.8	0.4
	(Exp.+Imp.)/Output (%)	0.23	0.30	0.26
Milk**	Output ('000 t)	7358	7748	[8200]
	Export ('000 t)	58	102	99
	Import ('000 t)	186	262	277
	(Exp.+Imp.)/Output (%)	3.32	4.70	4.59

\* Calculated at carcass weigh; \*\* Calculated at fresh weigh.

[ ] -- Estimated figure.

Source "China Customs Statistics" 1997, 1997 &amp;1998.