

8 Chinese Wheat: Current Situation and Prospects

A. Zhang

China is the world's largest wheat producer and consumer, and for many years it was the largest wheat importer too. All kinds of traditional Chinese food made from wheat flour, such as noodles, dumplings, pastry and steamed bread, are very popular.

8.1 Wheat Production

China's wheat production in 2002 was estimated at 90.29 mio t, about 16% of the total world production of 565.48 mio t.

During the 1990s, favourable weather helped China produce bumper wheat crops, with 1997 production topping 123 mio t. Over the past five years, production averaged 101.5 mio t. From 1994 to 1998, the total grain planting area in China increased from 109.5 mio hectares to 113.8 mio hectares. Since 1998, the total grain area has decreased by around 9%, with only about 103.9 mio hectares seeded for grain in 2002. This decrease is the result of rising urban and industrial development and a trend toward growing other crops such as oilseeds, cotton, fruits and vegetables. The wheat planting area has declined by 22% over the past 10 years due to adverse weather and huge stocks, combined with government policies to discourage growing low quality wheat.

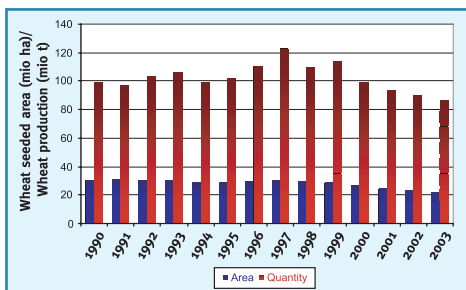


Fig. 25: Wheat-seeded area and production in China (1990 - 2003)

China's wheat area is expected to drop below 1.24 mio hectares in 2003, resulting in an estimated production of about 87 mio t. This represents a 3.6% drop from last year and a 14.3% drop from the five-year average of 101.5 mio t (see Tab. 31 and Fig. 25).

Wheat can be seeded almost everywhere in China, and winter wheat accounts for 84% of the total growing area. The regions for it are mainly located to the south of the Great Wall, in the provinces of Henan, Shandong, Hebei, Jiangsu, Sichuan, Anhui, Shanxi, Hubei and Shanxi. Another 16% of the area for spring wheat seeding lies to the north of the Great Wall in Heilongjiang, Inner Mongolia, Gansu, Ningxia and Qinhai.

8.2 Wheat Use

China's total domestic consumption of wheat averaged 108.5 mio t over the past five years, with about 93 mio t used for human consumption and about 4 mio t used for feed. The remainder included waste and wheat used for industrial purposes and seed. It is interesting to note that wheat for feed use has been increasing steadily from 1.2 mio t in 1998/99 to 6.5 mio t in 2002/03, due to the rapid development of the livestock industry and higher corn prices in the last few years. Milling wheat consumption has decreased over the last few years, from 95 mio t in 1998/99 to 90 mio t in 2002/03 (Tab. 32). Per capita consumption has dropped from about 77 kg per year to 70 kg, the result of increased health awareness and a rising per capita income, which have led to more diversified diets among the population.

8.3 Wheat Trade

Throughout the 1980s and much of the 1990s, China imported large quantities of wheat each

8.3 Wheat Trade

Tab. 31: Grain and wheat-seeded area and production in China, 1990 - 2003^a

Year	Grain-seeded area			Grain production			Yield Wheat t/ha
	Total	Wheat		Total	Wheat		
	1000 ha	1000 ha	%	1000 t	1000 t	%	
1990	113,466	30,753	27.10	451,841	99,356	21.99	3.231
1991	112,314	30,948	27.55	435,293	96,636	22.20	3.123
1992	110,560	30,496	27.58	442,658	103,437	23.37	3.392
1993	110,509	30,235	27.36	456,488	106,390	23.31	3.519
1994	109,544	28,981	26.46	445,101	99,297	22.31	3.426
1995	110,060	28,860	26.22	466,618	102,207	21.90	3.542
1996	112,548	29,611	26.31	504,535	110,569	21.92	3.734
1997	112,912	30,057	26.62	494,171	123,289	24.95	4.102
1998	113,787	29,774	26.17	512,295	109,726	21.42	3.685
1999	113,161	28,854	25.50	508,390	113,879	22.20	3.947
2000	108,548	26,675	24.57	462,180	99,636	21.56	3.735
2001	106,080	24,664	23.25	452,637	93,873	20.74	3.806
2002	103,891	23,908	23.01	457,058	90,290	19.75	3.777
2003	99,410	22,000	22.13	430,670	86,488	20.08	3.931

^a Source: China National Bureau of Statistics

year to meet rising consumption needs, the peak being 12.4 mio t in the calendar year 1991. Beginning in 1995, this figure began to fall considerably, and less than 1.5 mio t were imported in 1998. Subsequent years have seen further drops, with only 0.45 mio t imported in 1999 and 0.6 mio t imported in 2002 (Tab. 33 and Fig. 26). These reductions can be attributed to bumper wheat crops in the period 1992 - 1999 and high wheat imports in the first

half of the 1990s, which sent China's wheat stocks soaring to unprecedented levels.

China has been in a position to export some wheat for the past two years. In 2002, China exported around 0.69 mio t to Southeast Asian countries and imported 0.6 mio t, which made China a net wheat exporter for the first time in history. Poor harvests by major wheat exporters elsewhere in the world and price hikes

Tab. 32: Wheat use in China 1998 - 2003^a (June - May; 1,000 t)

Purpose	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04
Milling	95,000	94,000	93,000	92,000	90,000	90,000
Feed	1,200	2,000	4,000	5,500	6,500	5,500
Industrial	1,800	2,000	2,200	2,500	2,500	2,800
Seed	5,050	5,100	5,000	4,800	4,400	4,500
Waste	6,400	5,500	5,000	3,500	3,500	3,000
Total domestic	109,450	108,600	109,200	108,300	106,900	105,800

^a Source: Chinese National Grain & Oilseeds Information Centre

contributed to the unexpectedly sharp growth of exports. Moreover, China has exported around 1 mio t from January to August 2003, compared with imports of only 0.2 mio t during the same period.

Under the rules of the World Trade Organization, China opens a global tariff-rate quota of 7.3 mio t of wheat, rising with annual increments to 9.6 mio t by 2004.

8.4 Wheat Quality

Although China has sound wheat production to meet domestic consumption, it lacks high-quality wheat for the needs of food processing due to unreasonable quality structures, with less strong-gluten wheat suitable for bread and weak-gluten wheat for cookies and pastry.

More and more emphasis is being placed on the quality of wheat production in China as the

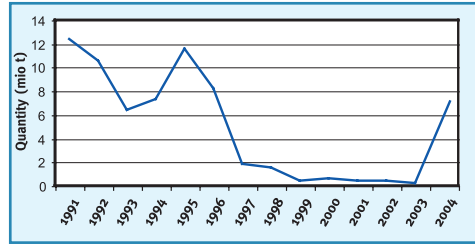


Fig. 26: Chinese wheat import data 1991 - 2004

standard of living of Chinese customers rises and the demand for higher-quality wheat products increases. Furthermore, East and Southeast Asian countries have a large market for the high-quality wheat exported from China each year.

Although the total wheat planting area and production have decreased over the past few years, the area for high-quality wheat growing has risen sharply to 6 mio hectares in 2001

Tab. 33: Chinese wheat import and export data, 1991 - 2004^a

Import (1,000 t)					
Countries	2000	2001	2002	2003	2004
Canada	624	406	373	204	2532
United States	154	225	162	213	2813
Australia	98	50	70	7	1783
Others	0	9	0	0	105
Total	876	690	605	424	7233
Export (1,000 t)					
South Korea	0	365	537	871	316
The Philippines	0	79	31	651	274
Vietnam	0	0	7	296	117
North Korea	0	3	4	95	11
Indonesia	0	0	103	121	0
Bengal	0	0	0	77	0
Others	2	8	5	126	65
Total	2	455	687	2237	783

^a Source: Chinese General Customs Administration

8.4 Wheat Quality

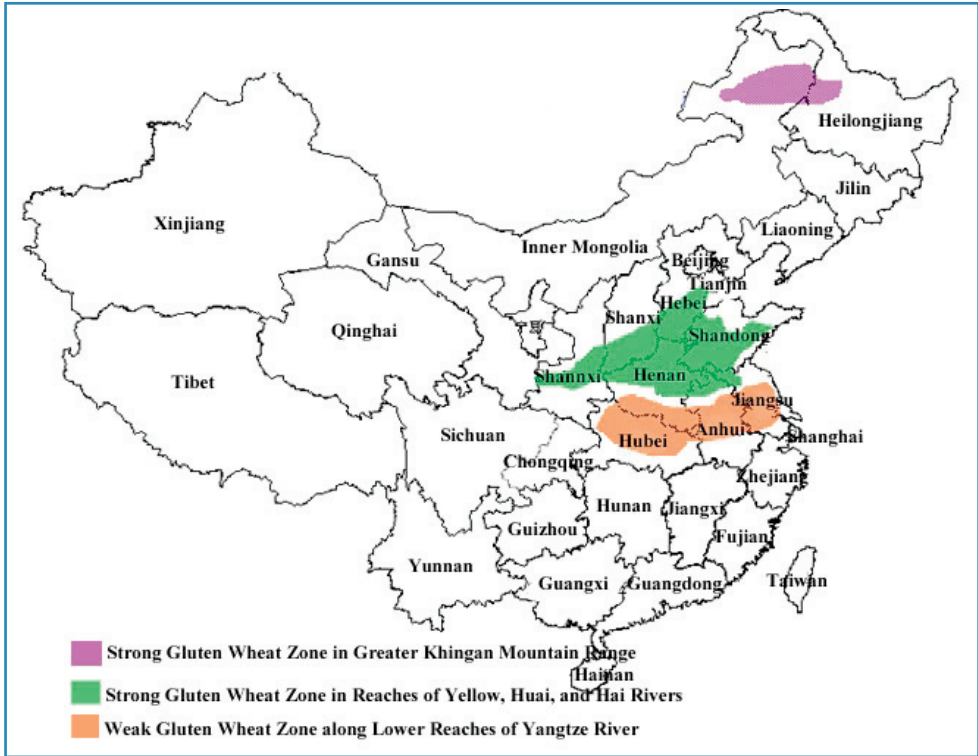


Fig. 27: Chinese wheat planting zones

from 1 mio hectares in 1996 (Tab. 34). However, there are some problems with regard to quality, for example, the stability time (Farinograph) and extension area (Extensograph) of dough average around 3

min and 52 cm² respectively, much less than the 12 min and 100 cm² for foreign dough.

Large differences between regions, scattered growing, backward technology, lack of proper

Tab. 34: Chinese high quality wheat seeded area and production^a

Year	Wheat-seeded area			Wheat production		
	Total 1000 ha	High quality 1000 ha	%	Total 1000 t	High quality 1000 t	%
1998	29,774	1,340	4.50	109,726	4,542	4.14
1999	28,854	1,700	5.89	113,879	6,385	5.61
2000	26,675	3,193	11.97	99,636	12,645	12.69
2001	24,664	3,916	15.88	93,873	15,320	16.32
2002	23,908	5,350	22.38	90,290	21,050	23.31
2003 ^b	22,665	6,400	28.24	87,000	26,300	30.23

^a Source: Chinese National Grain & Oilseed Information Centre

^b Prediction

Tab. 35: Chinese wheat classes

Class	Class name	Wheat variety	Kernels of same color, %	Structure	Kernels of same structure, %
1	Hard White Winter	white winter	≥ 90	vitreous	≥ 70
2	Hard White Spring	white spring	≥ 90	vitreous	≥ 70
3	Soft White Winter	white winter	≥ 90	opaque	≥ 70
4	Soft White Spring	white spring	≥ 90	opaque	≥ 70
5	Hard Red Winter	red winter	≥ 90	vitreous	≥ 70
6	Hard Red Spring	red spring	≥ 90	vitreous	≥ 70
7	Soft Red Winter	red winter	≥ 90	opaque	≥ 70
8	Soft Red Spring	red spring	≥ 90	opaque	≥ 70
9	Mixed wheat: wheat outside the above eight classes.				

management etc. are the reasons for the inferior quality of the wheat.

To solve the existing problems, three wheat planting zones will be established in China in the next few years. By the year 2007, China's planting area for fine breeds of wheat will be 40% of the gross wheat planting area, up 20% over 2001. The three special wheat planting zones are being created in the reaches of the Yellow, Huai and Hai rivers, along the lower reaches of the Yangtze River and the Greater Khingan Mountain Range, in the provinces of Shandong, Hebei, Jiangsu, Anhui and Heilongjiang (Fig. 27).

8.5 Wheat Standards

China updated standards for wheat and

formulated standards for strong/weak gluten wheat in 1999, and standards for wheat flour and strong/weak gluten wheat flour have existed since 1986 and 1988 respectively. There are 9 classes and 5 grades of wheat (Tab. 35 and Tab. 36). The wheat classes are subdivided into 2 classes of high quality strong gluten wheat (Tab. 37), two classes of high quality weak gluten wheat (Tab. 38) and 3 classes of wheat for specific end-uses (Tab. 39).

However, most experts suggest revising some of the tests in the standards because of out-of-date data and practical procedures.

China will prepare new standards for the following three special wheat planting zones by 2007:

Tab. 36: Grades of Chinese wheat

Grade	Test weight, g/L	Unsound kernels, %	Foreign matter, %		Moisture, %	Colour & odour
			Total	Minerals (part of total)		
1	≥ 790	≤ 6.0	≤ 1.0	≤ 0.5	≤ 12.5	Normal
2	≥ 770	≤ 6.0				
3	≥ 750	≤ 6.0				
4	≥ 730	≤ 8.0				
5	≥ 710	≤ 10.0				

Tab. 37: High quality wheat – strong gluten wheat

Item	Property	Grade		
		1	2	
Kernel	Test weight	g/L	≥ 770	
	Moisture	%	≤ 12.5	
	Unsound kernels	%	≤ 6.0	
	Foreign matter	Total	%	≤ 1.0
		Minerals	%	≤ 0.5
	Colour & odour		Normal	
	Falling Number	s	≥ 300	
Crude protein	%	≥ 15.0	≥ 14.0	
Flour	Wet gluten	%	≥ 35.0 ≥ 32.0	
	Farinogram stability	min	≥ 10.0 ≥ 7.0	
	Baking evaluation score		≥ 80	

8.5.1 Standards for Strong Gluten Hard White Wheat in the Regions of the Yellow, Huai and Hai Rivers

Standards for White Winter Wheat varieties and qualities, strong gluten Hard White Wheat, middle gluten Hard White Wheat and processing regulations for strong gluten Hard White Wheat in North China and north of the

Tab. 38: High quality wheat - weak gluten wheat

Item	Property	Grade ^a		
		1	2	
Kernel	Test weight	g/L	≥ 750	
	Moisture	%	≤ 12.5	
	Unsound kernels	%	≤ 6.0	
	Foreign matter	Total	%	≤ 1.0
		Minerals	%	≤ 0.5
	Colour & odour		Normal	
	Falling Number	s	≥ 300	
Crude protein	%	≤ 11.5		
Flour	Wet gluten	%	≤ 22.0	
	Farinogram stability	min	2.5	

^a Grade 1 and 2 have identical quality parameters

reaches of the Yellow and Huai rivers will be drawn up according to local wheat varieties and qualities and the demands of wheat processors.

8.5.2 Standards for Weak Gluten Soft Wheat along the Lower Reaches of the Yangtze River

Standards for White/Red Winter Soft Wheat varieties and qualities, Soft White/Red Wheat and processing regulations for weak gluten Soft White/Red Wheat on the banks of the Jiangsu and the regions of Hubei, Henan and Anhui will be drawn up according to local wheat varieties and qualities and the different requirements of cookies, pastry and Chinese steamed food.

8.5.3 Standards for Strong Gluten Hard Red Spring Wheat along the Greater Khingan Mountain Range

Standards for Hard Red Spring Wheat varieties and qualities, Hard Red Spring Wheat and processing regulations for Hard Red Spring Wheat in northeast China will be drawn up according to Canadian and U.S. standards for Hard Red Spring wheat.

8.6 Wheat Flour

At present about 10% of the wheat flour in China is high-quality special flour for making bread, cookies and dumplings; 50% is used for steamed bread, noodles and instant noodles, and the remaining 40% is poor quality flour consumed in towns and villages. The use of special flour will increase in the next few years as a result of the improving standard of living and different demands for foods and diets.

With the rapid development of the milling industry in China, the wheat processors with a capacity of over 50 t per day have now reached around 9,800 in number, 80 of which can mill 400 t of wheat per day; a further 500 can mill 200 - 400 t per day. China's annual milling capacity has reached 350 mio t, much more than the demand of 110 mio t of wheat. The wheat milling industry in China will therefore become more competitive in the near future.

Tab. 39: Wheat classes for specific end-uses

Property		Classes		
		Strong gluten	Medium gluten	Weak gluten
Test weight	g/L	≥ 770	≥ 770	≥ 770
Protein	%	≥ 14.0	≥ 13.0	< 13.0
Wet gluten	%	≥ 32.0	≥ 28.0	< 28.0
Zeleny	mL	≥ 45.0	30.0 - 45.0	< 30.0
Farinograph				
Water absorption	%	≥ 60.0	≥ 56.0	< 56.0
Stability	min	≥ 7.0	3.0 - 7.0	< 3.0
Extensograph				
Resistance	BU	≥ 350	200 - 400	≤ 250
Extension area	cm ²	≥ 100	40 - 80	≤ 50

8.7 Wheat Flour Standards

Wheat flour is divided into four main classes (Tab. 40). Furthermore, there are two grades each for high-gluten and low-gluten flour

(Tab. 41 and Tab. 42). This system is complemented by flour standards for bread, noodles, dumplings, steamed bread, fermented cookies, crisp cookies, cakes and pastry (not shown).

Tab. 40: Chinese wheat flour classes

Property		Grade			
		Special 1	Special 2	Standard	Common
Ash	%	≤ 0.70	≤ 0.85	≤ 1.10	≤ 1.40
Granulation					
Sieve 1		CB 36	CB 30	CQ 20	CQ 20
Mesh size	μm	160	198	336	336
through	%	100	100	100	100
Sieve 2		CB 42	CB 36	CB 30	
Mesh size	μm	137	160	198	
on sieve	%	≤ 10	≤ 10	≤ 20	
Wet gluten	%	≥ 26.0	≥ 25.0	≥ 24.0	≥ 22.0
Sand	%	≤ 0.02	≤ 0.02	≤ 0.02	≤ 0.02
Magnetic metals	g/kg	≤ 0.003	≤ 0.003	≤ 0.003	≤ 0.003
Moisture	%	13.5 ± 0.5	13.5 ± 0.5	13.0 ± 0.5	13.0 ± 0.5
Free fatty acid ^a		≤ 80	≤ 80	≤ 80	≤ 80
Odour & taste		normal	normal	normal	normal

^a KOH equivalents (mg) to neutralize free fatty acids in 100 g flour

8.7 Wheat Flour Standards

Tab. 41: Grading system for high-gluten flour

Property	Grade	
	Special 1	Special 2
Wet gluten	%	≥ 30.0
Protein	%	≥ 12.2
Ash	%	≤ 0.70
Colour	Compare with standard sample	
Granulation ^a	100% through sieve CB 36; no more than 10.0% on sieve CB 42	
	100% through sieve CB 30; no more than 10.0% on sieve CB 36	
Sand	%	≤ 0.02
Magnetic metals	g/kg	≤ 0.003
Moisture	%	≤ 14.5
Free fatty acid ^b		≤ 80
Odour & taste	normal	

^a See Tab. 40 for mesh size of sieves in μm

^b KOH equivalents (mg) to neutralize free fatty acids in 100 g flour

Tab. 42: Grading system for low-gluten flour

Property	Grade	
	Special 1	Special 2
Wet gluten	%	< 24.0
Protein	%	≤ 10.0
Ash	%	≤ 0.60
Colour	Compare with standard sample	
Granulation ^a	100% through sieve CB 36; no more than 10.0% on sieve CB 42	100% through sieve CB 30; no more than 10.0% on sieve CB 36
Sand	%	≤ 0.02
Magnetic metals	g/kg	≤ 0.003
Moisture	%	≤ 14.0
Free fatty acid ^b		≤ 80
Odour & taste	normal	

^a See Tab. 40 for mesh size of sieves in μm

^b KOH equivalents (mg) to neutralize free fatty acids in 100 g flour