

The Status of China's Agricultural Machinery Industry and the Prospects for International Cooperation

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Part A. The Status of China's Agricultural machinery Industry

China is a big developing agricultural country with a large population of 1.3 billion and limited cultivated farmland of 0.08 ha per capita.

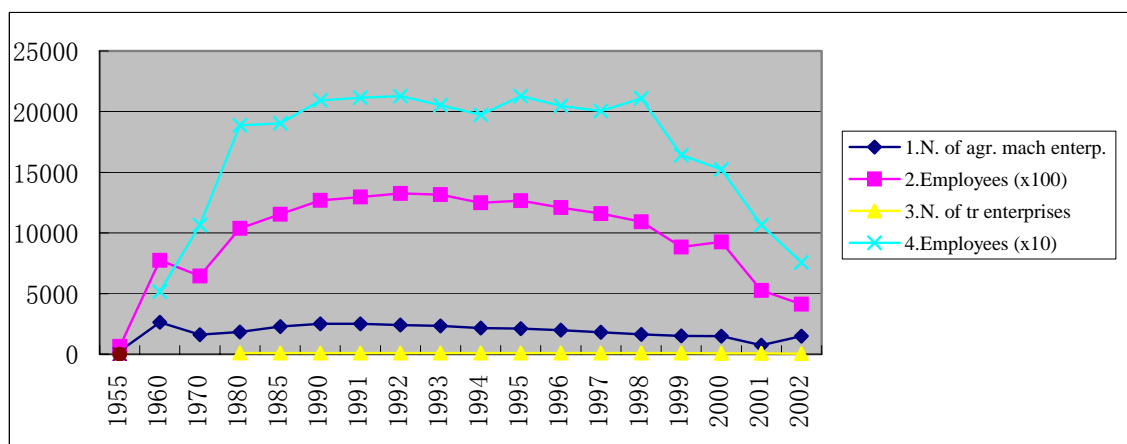
With only about 7% of the world's total cultivated farmland, China has managed support 20% of the world's population.

Agriculture is the foundation of the national economy. Agricultural machinery is the base of agricultural modernization. With the development of agriculture, China's agricultural machinery industry has achieved great successes. China has become a big nation of production of agricultural machinery.

1. Brief history of the development

China's agricultural machinery industry has undergone some rise and fall stages in the history of its development due to the adjustment, reform of the national economy and transform from planning economy to market economy (see fig. 1 and 2).

Fig. 1. Number of agricultural machinery enterprises and employees (1955-2002)



The history could be divided into 5 stages.

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First stage - from 1949 to 1960.

Before the foundation of new China in 1949, there were only 36 agricultural implement factories with 4,000 employees.

In 1955, China manufactured first farm crawler tractor.

In 1957, China produced first farm wheel tractor.

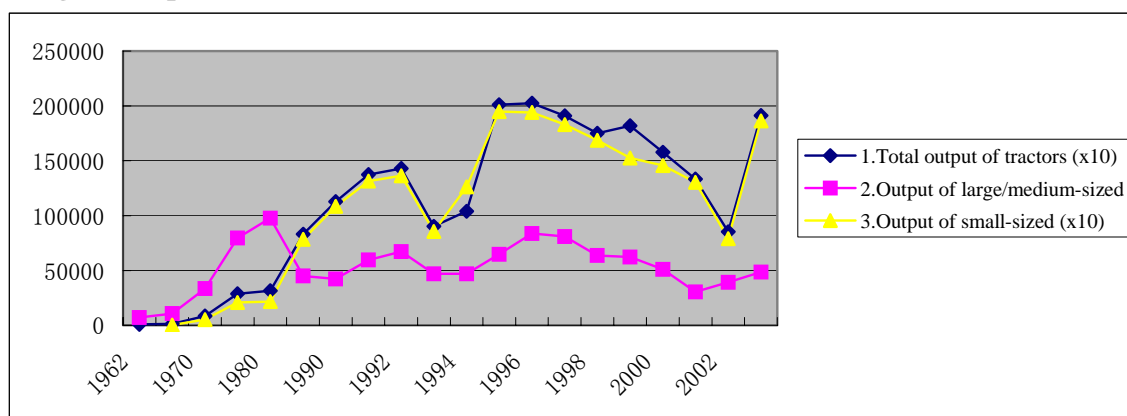
In 1959, China built first tractor factory – now named China First Tractor Group Co.

By the end of 1957, number of agricultural machinery factories reached 276 with 123,000 employees.

Since late of 1950s, China built its own agricultural machinery industry.

In the end of 1950s, former Chairman Mao called big jump, the number of agricultural machinery enterprises and employees increased rapidly, but it was not normal development.

Fig. 2. Output of tractors (1962-2003)



Second stage - from 1960 to 1980.

Chinese government had to take adjustment of the national economy. The number of agricultural machinery enterprises and employees reduced.

Then the central government made mistake again to set goal to mechanize agriculture basically in 1980. In 1970s, the number of agricultural machinery enterprises and employees raised rapidly (see figure 1 and also figure 2).

Third stage - from 1980 to 1992.

In 1978 China started reform of rural economy. Before, the governments bought tractors and farm machines for state farms and tractor stations. After 1979, the farmers bought farm machines by themselves. There were characteristic changes of the tractor structure (see fig.2): Output of large and medium-sized tractors dropped quickly, but output of small-sized tractors increased greatly, because farmers needed small-sized tractors for their small-scale farming.

Fourth stage – from 1992 to 2003.

The central government started economic reform since the beginning of 2000s: transfer the planning economy to marketing economy. Output of tractors dropped, then raised and dropped to the lowest tide in 2002.

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Fifth state – from second half of 2003 and beginning of 2004

From 2003, a new stage began: the central government started reform of ownership system, especially state-owned enterprises.

The State has adopted some policies and taken a lot of measures, which promoted the development of agricultural mechanization (see A-2).

2. The present situation of China's agricultural machinery industry

According to the State Statistics Bureau, there were 1,469 agricultural machinery enterprises with scale (with employees more than 100) in 2003 (total was 8,000 enterprises, most of them with employees less than 100), in which: 481 state-owned, accounted for 32.7%, 918 private (non-state-owned), accounted for 62.5%, and 70 foreign-invested, accounted for 4.8% (see fig.3 and 4)

Fig. 3. Number of agricultural machinery enterprises in 2003

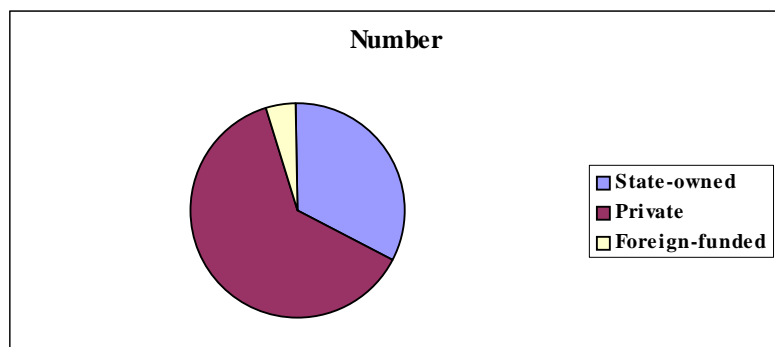
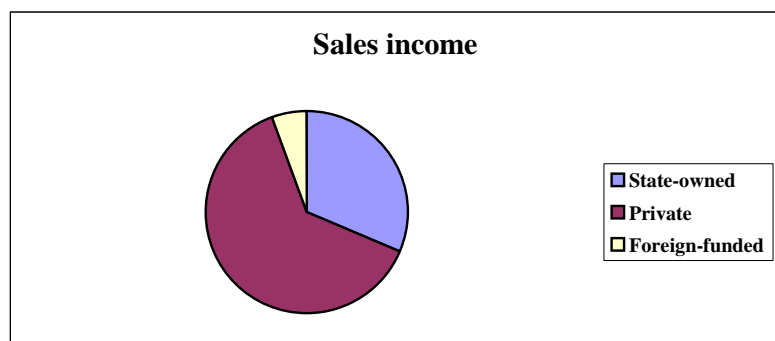


Fig. 4. Sales income of agricultural machinery enterprises in 2003



Recently, China can produce 14 different specialist categories, 95 merchandise items and more than 3,000 different machine/equipment models.

But the technical standards of China's agricultural machinery industry is still lower at the level of developed countries in 1970s.

Gross industrial output of agricultural machinery increased 18% in 2002, 22% in 2003 and 20% in the first half of 2004 (see table 1).

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Table 1. Gross industrial output value and sales income of agri machinery enterprises with scale

Year	Output value		Sales income	
	Billion yuan	Variation %	Billion yuan	Variation %
2002	64.48	18.0	55.18	16.0
2003	75.34	22.0	69.59	26.0
First half of 2004	43.74	20.0	40.08	22.0

Output of main agricultural machinery in 2003 and first half of 2004 are showed in table 2.

- Output of large and medium-sized tractors in the first eight months of 2004 increased 57.7% to 65,743 units, sales increased 68.3% to 64,522 units, both output and sales of large and medium-sized tractors have exceeded total output and sales in 2003 (see fig. 5).
- Output of small-sized tractors in the first eight months of 2004 reached 855,500 units, an increase of 1.9%, in which: small-sized 4W tractors dropped 8.3% to 481,000 units and walking tractors increased 15.45% to 415,000 units.

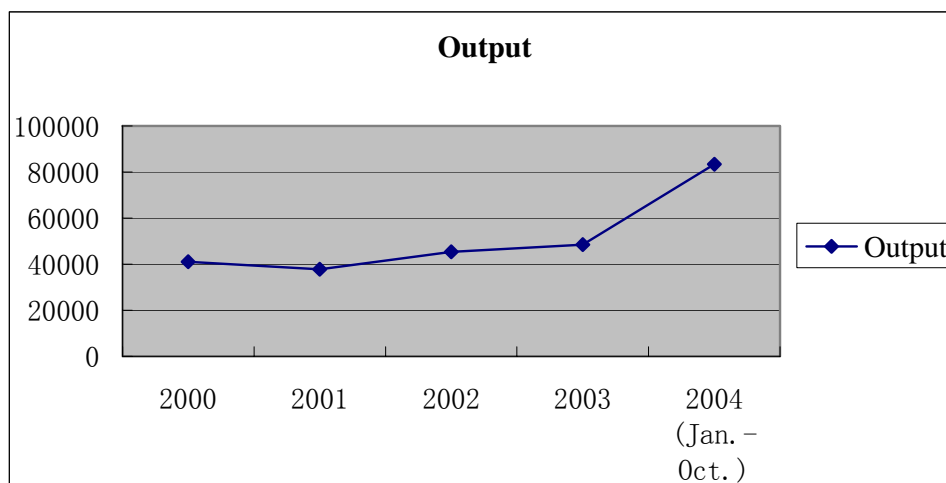
Table 2: Output of main agricultural machinery in 2003 and 2004

No.	Products	Output in 2003		Total output in Jan.-Aug. 2004	
		Output in 2003	Var.% 2003/2002	Output in Jan.-Aug. 2004	Var. % Jan.-Aug. 2004/2003
1.	Large/medium-sized tractors	48544	-6.14	69720	66.05
2.	Small-sized tractors	1864540	-2.33	1117418	-5.41
3.	Harvesting mach.	205894	5.99	161859	-5.98
4.	Barnyard machinery	138688	0.53	86198	4.49
5.*	Farm transport mach.	2645534	2.46	1357735	-9.52
6.	Grain processing mac	726091	9.24	519344	9.15
7	Feed processing mac.	130873	0	86390	4.72

Resource: China General Confederation of Machinery Industry

Note: * - Barnyard machinery includes: motor threshers, grain cleaners, grain driers, seed graders and others

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Fig. 5. Output of large and medium-sized tractors (2000-2004)

Output of large and medium-sized tractors are expected to reach 80,000 units in 2004, the highest record in recent years. Output of small-sized tractors will develop steadily in a high level.

The rapid development of China's economy and continuous adjustment of agricultural structure have brought China's agricultural machinery industry and also foreign farm machinery companies good opportunities for their development in China.

In the beginning of 2004, the State has adopted some policies and taken a lot of measures to support rural areas, agriculture and farmers:

- **No.1 document for 2004** to boost farmers' income;
- "Law on the Promotion of Agricultural Mechanization" has been put into effect from November 1, 2004;
- The Government has decided **to cut the agricultural tax** within five years;
- To provide subsidies for grain production;
- To provide subsidies to farmers for purchasing farm machines;
- The central government has decided to put its central financing of 70 million yuan (in which 30 million yuan for state farms) and local governments will also provide 410 million yuan to farmers for purchasing farm machines.

All these policies and measures have promoted and will promote rapid development of China's agricultural machinery industry.

A new stage of agricultural mechanization and agricultural machinery industry is coming. As the general manager of Deere-Tiangjin Tractor co said: the spring for agricultural machinery industry in China is coming soon.

There are bright prospects for China's agricultural machinery industry.

Part B. The Prospects for International co-operation

China has obvious advantages for exports of agricultural machinery with cheaper prices and variety of products.

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China's access to the WTO brought its agricultural machinery good opportunity into international markets.

In the meantime, China's market needs also new foreign farm machinery products and advanced technologies.

There are the possibilities and opportunities of co-operation and trade of agricultural machinery for foreign companies.

- More and more foreign farm machinery companies have recognized that China is a big potential market of agricultural machinery.
- China's agriculture must be mechanized, agricultural mechanization is the only way to increase agricultural productivity and effective tool to increase farmers' income;
- Agricultural machinery is an important base for modernization of agriculture;
- Recently, China's agricultural mechanization level is still lower and the technical level of agricultural machinery industry is also lower.

At present, China's agricultural machinery manufacturers can not supply all farm machines in quality and quantity for market demand.

The reliability of China-made farm machines is still unsatisfactory.

The quality of farm machinery products has yet to be improved.

China needs new foreign farm machinery products and advanced technologies.

China has to import some farm machines.

Chinese agricultural machinery manufacturers are seeking foreign partners for co-operation.

We can see the good opportunities and possibilities of co-operation and trade for foreign farm machinery companies in China.

1. Trade

China started agricultural mechanization with imports of foreign farm machines and the establishment of state farms and tractor stations in the beginning of 1950s.

China imported 16,750 units of large and medium-sized tractors and implements during the period 1949-1957 mainly from Soviet, Eastern European countries, and Britain.

"Beijing 12 foreign agricultural machinery exhibition", held in Beijing **in 1978**, was a historical turning point for foreign co-operation and trade in China. After the exhibition, foreign farm machinery companies started to enter Chinese market. Imports and exports of agricultural machinery increased rapidly since 1978.

State farms were the major importers of farm machines for field works.

From 1978 to 1996, only state farms in Heilongjiang province imported a total 4,000 units of large-sized tractors and implements through different ways (see table 3)

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Table 3. Imports of large-sized tractors and farm implements for state farms (mainly in Heilongjiang province)

No.	Items	1950-1957	1978	1980	1983	1985	1996	1997	1999
01	Name of projects	For State farms, tractor stations	Friendship state farm	Honghe joint farm	State farms	Sanjiang plain agri develop.	Honhhe joint farm	State farms	Sanjiang plain agri. develop.
02	Import units	16,750		700	450	2,800.	32	1,000	2,713
	In which: tractors		7 (110-130)		60	55 (4450)	25	1,000	363 (N.H.)
03	Volume (mil.USS)		1.00	13.50	60.00	76.00	20.00	24.00	200.00
04	Foreign partner			Nichimen co (Japan)			Nichimen co (Japan)		
05	Resource of funds			Japanese Loan		World bank Loan	Japanese Loan		Japanese loan
06	Form of Trade	Direct trade	Direct trade	Compensation trade	Direct trade	Direct trade	Compensation trade	Direct trade	Invitation for Bids
07	Importer	Ministry of Agriculture	Ministry of Agriculture	GBSF* of Heilongjiang	GBSF* of Heilongjiaang	GBSF * of Heilongjiang	GBSF* of Heilongjiang	Ministry of Agriculture	GBSF* of Heilongjiang
08	Supplier	USSR, UK	John Deere	USA, Japan	John Deere	John Deere, Hitachi	John Deere	Yugoslavian Belgrade co	New Holland, John Deere

Note: 1. * - General Bureau of State farms in Heilongjiang province.

2. From 1978 to 1996, only state farms in Heilongjiang imported about 4,000 units of large & medium-sized tractors, implements and combine harvesters, among them 1,000 units of large-sized tractors with 160 Hp, in which 600 units of 4WD and 50% from John Deere; 2,800 units of combine harvesters, 198 units of tractor-drawn implements and other farm machines from John Deere, Case, JCB, New Holland, F.M, Kubota.

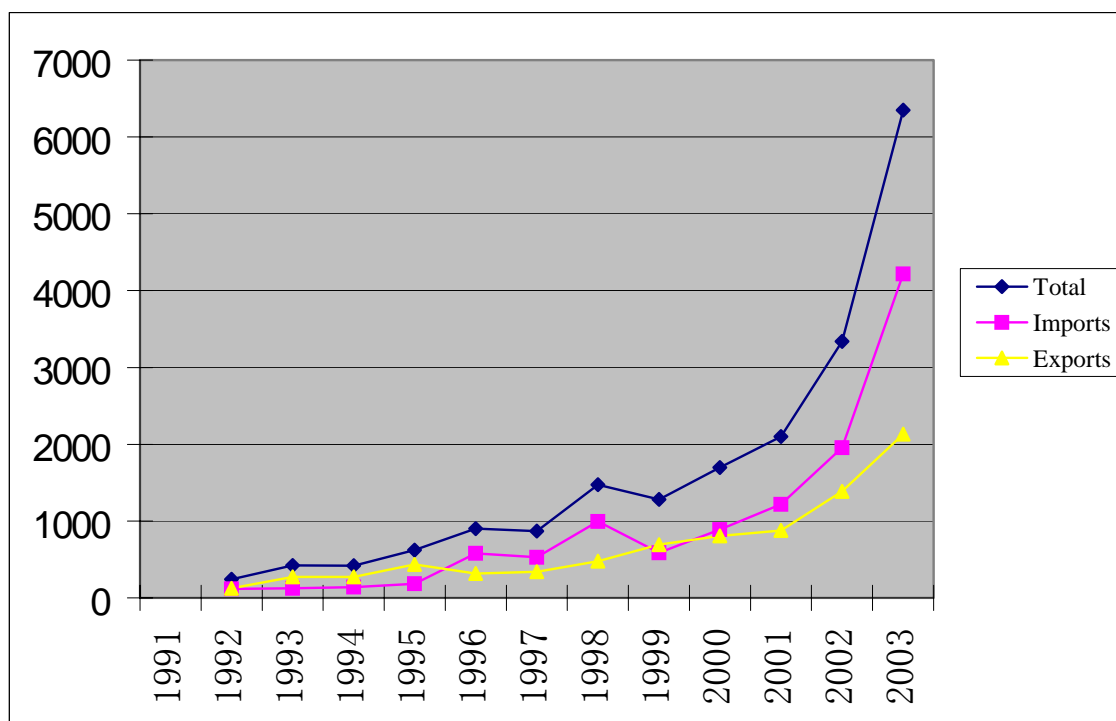
Imports and exports of agricultural machinery increased rapidly since 2000 (see fig. 6), especially in 2003, import and export volume hit US\$6.35 billion, an increase of 43.57%; In which imports increased 44.8%, while exports rose 41.2% (see table 4, 5 and 6 and figures 7 and 8).

Imports and exports of agricultural machinery in the first half of 2004 increased 57.88% to US\$4.73 billion; In which imports increased 64.5% and exports rose 45.3%.

Some possible ways for trade:

- (1) Direct trade;
- (2) Invitation for bids;
- (3) Compensation (barter) trade);

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Fig. 6. Imports and exports of agricultural machinery (1992-2003)**Table 4. Imports of agricultural machinery in 2003**

No.	Products	Units/tons	Var.%	Mil.US\$	Var.%
01	Diesel engines	646080	40.4	875.80	28.4
	In which: diesel engines with 18 Hp and smaller	3208	32.6	4.56	52.7
01a	Spare parts of diesel engines	167390t	31.8	1557.61	66.4
02	Drainage/irrigation machinery	16340530	61.3	688.97	51.1
02a	Spare parts	12839t	20.0	184.16	22.5
03	Tractors and tractor trucks	2177	40.5	102.20	31.9
03a	Spare parts of tractors and trucks	5165380t	27.3	29.07	55.4
04	Diesel engine generator sets and spare parts	2288300	72.5	561.09	33.8
05	Harvesting machinery & spare parts	1755605	79.6	78.51	39.9
06	Plant protection mach. & spare parts	209382	30.0	15.21	-4.3
07	Attached implements and spare parts	190403	10.0	19.24	44.7
08	Poultry breeding mach. & spare parts	549475	26.1	22.57	-12.2
09	Farm vehicles and trailers	421	-17.7	8.76	15.1
10	Grain processing mach. & spare parts	142561	43.2	65.34	84.4
11	Milk processing mach. & spare parts	467926	24.7	41.82	5.5
12	Other agricultural machinery	58680	39.1	28.42	126.2

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Table 5. Exports of agricultural machinery in 2003

No.	Products	Units/tons	Var. %	Mil. US\$	Var. %
01	Diesel engines	1935745	29.4	227.43	21.6
	In which: diesel engines with 18 and smaller	920065	8.4	116.48	10.9
01a	Spare parts of diesel engines	2630243t	18.1	376.56	10.3
02	Drainage/irrigation machinery	42511447	61.7	370.18	46.7
02a	Spare parts	891467	19.0	209.83	26.9
03	Tractors and tractor trucks	69941	12.0	92.24	31.2
03a	Spare parts of tractors an trucks	77375778t	6.3	107.28	-5.5
04	Diesel engine generator sets and And spare parts	25974709	69.6	325.08	148.1
05	Harvesting machinery & spare parts	36755697	51.8	192.95	119.9
06	Plant protection mach.& spare parts	13463148	66.9	27.86	17.6
07	Attached implements and spare parts	34642030	14.8	57.29	50.8
08	Poultry breeding mach. & spare parts	10853729	22.6	51.28	48.9
09	Farm vehicles and trailers	21126	66.5	61.46	81.1
10	Grain processing mach. & spare parts	8695005	25.2	41.36	33.5
11	Milk processing mach. & spare parts	837942	53.3	10.19	7.3
12	Other agricultural machinery	2801334	27.6	11.31	9.1

Table 6. Market for exports and imports of agricultural machinery in 2003

Countries & regions	Exports				Imports			
	No.	Mil. US\$	Var. %	Accounted for %	No.	Mil. US\$	Var. %	Accounted for %
Total	185	2131	41.20	100	82	4219.0	44.80	100
Asia	40	994.0	28.14	46.63	22	1662.0	19.32	39.40
In which:								
Japan		148.04	29.61			1176.0	46.84	
Korea		36.49	21.95			285.0	115.66	
Africa	51	203.0	86.58	9.54	20	8.0	563.933	0.19
Europe	42	336.0	44.68	15.77	31	1914.0	46.47	45.36
In which:								
France		17.36	-6.08			181.0	200.42	
UK		53.90	108.02			186.0	0.12	
Germany		86.26	36.42			1066.0	58.31	
Italy		48.77	96.44			93.46	45.38	
S. America	36	58.0	49.45	2.73	5	123.0	46.02	2.91
N. America	3	469.0	51.07	22.0	2	497.0	25.22	11.77
In which:								
USA		434.63	49.55			444.0	20.66	
Pacific	13	43.0	50.35	2.01	2	2.0	30.48	0.05

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Fig. 7. Percentage subdivision of exports of agri machinery in 2003

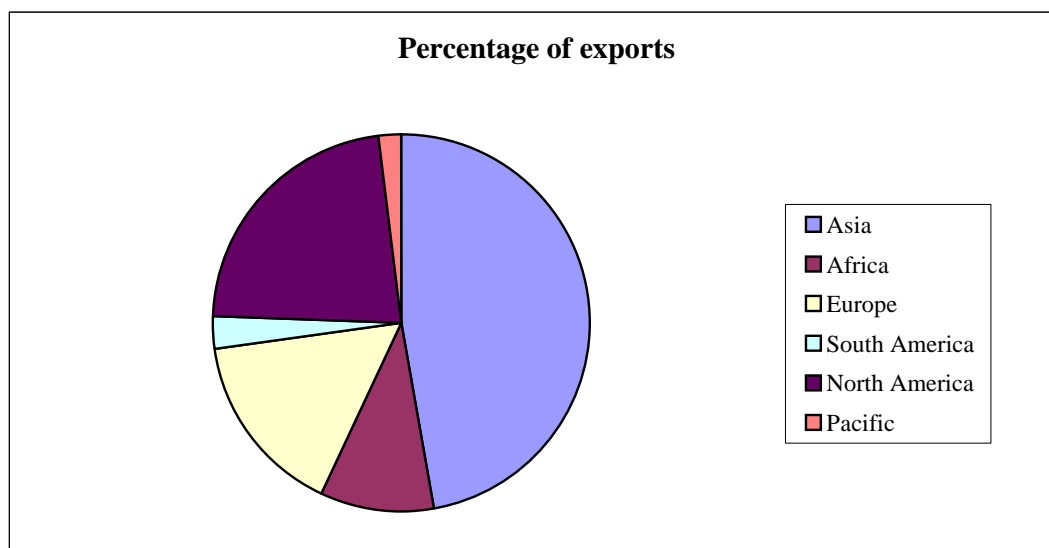
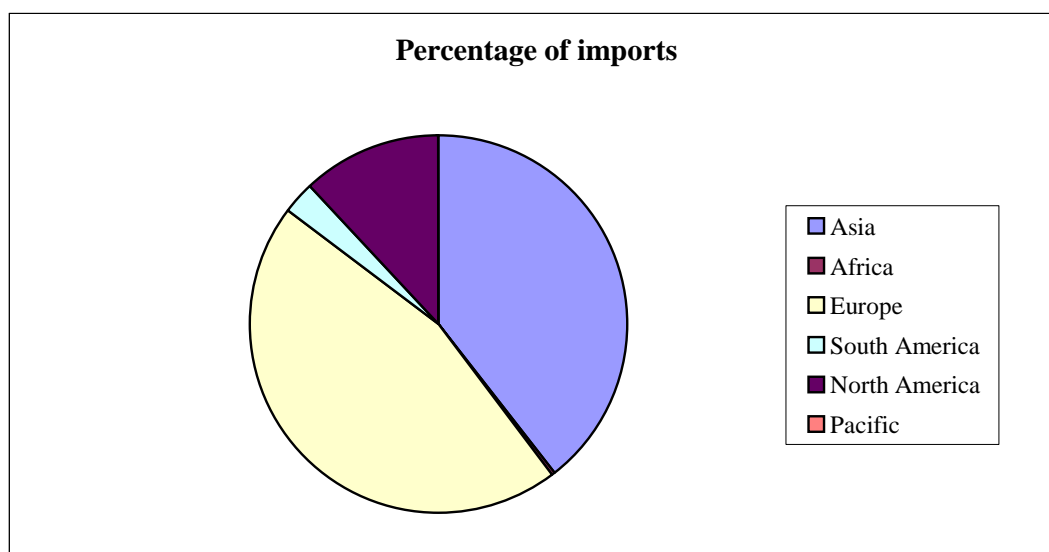


Fig. 8. Percentage subdivision of imports of agri machinery in 2003



- (4) Export credits of foreign governments;
- (5) Co-operation projects (joint farms).

2. Introduction of foreign manufacturing technologies for agricultural machinery in China started in 1978.

By 1993, China signed a total of 105 contracts for introduction of manufacturing technologies for agricultural machinery with foreign companies, in which 100 contracts signed from 1978

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to 1990. Most of these contracts were involved licences trade and technical consultancy (see table 7).

7 contracts for tractors, accounted for 6.7%; 72 contracts for engines and its spare parts,

Table 7. Projects of introduction of foreign manufacturing technologies for farm machinery (1978-1986)

No.	Projects	Chinese Co	Main imported contents	Forms	Foreign Country	Foreign Co	Date of contract
01	Tractor DFH-54	First Tractor W*	Manufact. technology & equipment	Licence	USSR		
02	Large & medium-sized tractors	Shenyang, Tianjin & Changchun T W.**	Same as above	Licence	USA	John Deere	12/09/83
03	Medium-sized 4 wheel tractors	First & Shanghai Tractor Co	Manufact. techn of chassis and necessary equipment	Licence	Italy	Fiat	07/06/86
04	Forestry tractor model 518	Harbin Tractor Works	Same as above	Licence	USA	Caterpillar	29/12/86
05	Deutz tractors	Shandong Tract. Co	Design & manufacturing technology & documents	Licence	Germany	DEUTZ	09/06/86
06	Small-sized tractors	Xingtai Tractor Fact	Manufact. technology	Licence	Italy	Goldoni	31/10/84
07	Internal combustion engine (1 st project)	Shanghai Int. Com. Eng. Research Inst.	Design & training	Consulting	Britain	Ricardo	18/11/78
08	95 series diesel engines	Weifang Machinery W	Design drawings	Consulting	Britain	Ricardo	19/03/79
09	Internal combustion engine (2 nd project)	Shanghai Int. Com. Eng. Research Inst.	Improvement	Consulting	Britain	Ricardo	13/11/80
10	Internal combustion engine (3 rd project)	Same as above	Technical know-how & documents	Consulting	Britain	Ricardo	10/03/82
11	492Q gasoline engine	Beinei Engine Co	Improvement of design	Consulting	Britain	Ricardo	07/11/83
12	100 series diesel engine	First Tractor Works	Same as above	Consulting	Britain	Ricardo	16/10/82
13	Internal combustion engine (4 th project)	Shanghai Int. Com. Eng. Research Inst.	Technical documents	Consulting	Britain	Ricardo	30/07/84
14	490 diesel engine	Same as above	Improvement	Consulting	Britain	Ricardo	31/10/84
15	4115 diesel engine	Beinei Engine Co	Improvement	Consulting	Japan		/09/84
16	B495Q diesel engine	Shanghai Int. Com. Eng. Co	Improvement of direct injection	Consulting	Austria	Lister	23/03/85

Note: W* - Works; TW** - Tractor works.

accounted for 68.5%; 26 contracts for agricultural implements, animal husbandry and agricultural product processing machinery, accounted for 24.8%.

Most of these machines have not put into massive production.

After 1993, China almost stopped to introduce foreign manufacturing technologies alone.

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3 Co-operation

China started to set up foreign-funded ventures of agricultural machinery in 1984. But real joint ventures of agricultural machinery were set up after 1990.

Recently, there are more than 10 foreign-funded agricultural machinery ventures in China (see table 8).

More and more foreign farm machinery companies have recognized also that it is not only way to directly sell their farm machine in the Chinese market, because the difficulties and problems, especially the prices of imported farm machines are very high and the purchasing

Table 8. Foreign-invested agri. machinery enterprises in China (1994-2004)

No.	Date of establishment	Name of ventures	Major products	Chinese partner	Foreign partner	Total investment (mil.US\$)	Foreign partner accounted for %
01	Sep.1994	Yarman (China) Agricultural Machinery Co Ltd	Rice combines		Yarman Farm Machinery Co	30	100%
02	May 12, 1997	Deere-Jiamusi Combine Harvester Co.Ltd	Combine Harvesters	Jiamusi Combine Factory	John Deere Co	29.9	60%
03	Sep. 8, 1998	Kubota (Suzhou) Agricult. Machinery Co	Rice combines		Kubota Farm Machinery Co		100%
04	Mar. 18, 1999	Harbin-New Holland Beidahuang Tractor Co Lts	Tractors (100-180 Hp)		New Holland		70%
05	Aug. 8, 2000	Deere-Tianjin Tractor Co Ltd	Tractors (80-130 Hp)	Tianjin Tractor Plant	John Deere		51%
06	Apr. 9, 2001	Shanghai-New Holland Farm Machinery Co Ltd	Tractors (100 Hp & less)	Shanghai Tractor Co	New Holland	75.80	60%
07	Dec. 5, 2001		Tractors (80-120 Hp)	First Tractor Co Ltd	Valtra		
08	June 2004	Iseki Farm Machinery (Changzhou) Co Ltd	Rice combines Transplanters		Japanese Iseki Farm Mach. Co	US\$4.2	100%
09			Grain driers		Jap. Kaneko Farm Mach Co		
10					Korean		

ability of farmers in China is still lower at present.

They have understood that co-operation with Chinese manufacturers to cut the selling prices, using the lower costs of Chinese labourers. Chinese manufacturer are also interested in co-operation with foreign farm machinery companies to produce advanced farm machines in China and to improve the technical performance, quality and reliability and management system. Foreign-funded agricultural machinery ventures are the important part of China's agricultural machinery industry.

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There are some forms of co-operation:

- (1) Joint ventures;
- (2) Wholly foreign-funded ventures;
- (3) SKD or CKD;
- (4) OEM.

Finally, I want to stress that foreign farm machinery companies have advantages of high technologies, but their products must satisfy the practical needs of Chinese users, including the market selling prices.

China is a big potential market for foreign agricultural machinery companies.

There are bright prospects for international co-operation in China.