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Forest Resource, Timber Production and Poplar Culture in China

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1. An overview of China's forestry resource

Forest resource

According to the newest statistics of the fifth national survey on forest resources (covering the period 1994~1998) made by the State Forestry Administration (SFA), the land used for forestry in China is 263.29 million ha, of which forest area is 158.94 million ha, ranking China fifth in the world after Russia, Brazil, Canada and the United States in terms of forest area. The growing stock of standing trees nationwide is 12.49 billion m³, of which forest stock is 11.27 billion m³, ranking China seventh in the world. The survey is followed the revised standards for canopy density prescribed by rules for Implementation of Forest Laws. The area and the stock of natural forest respectively are 106.96 million ha and 9.07 billion m³, accounting for 69.62 % of forest area and 89.96 % of forest stock. As a whole, major part of forest resource is natural forest in China. There are several main features in China's forest resources as that as follows.

◆ *Deficient forest resources, low forest coverage and forest resources per capita*

China's forest coverage rate is 16.55% of the total land area, 61% of the world average 27%. The forest area per capita is only 0.128 ha, about one fifth of the world average. Forest stock per capita is only 9.048 m³, 12.6% of the world average (72 m³). Timber forest accounts for 77% of total forest area and 71% of forest stock. Average volume of timber forest is 72.5 m³ per ha.

◆ *Low quality and relatively low stock per unit area*

China's standing forest stock is 78.06 m³ per ha, or 68.5% of the world average. Average stock per ha is 72.5 m³ for timber forest and 34.76 m³ for standing plantation. China's plantation area is 46.667 million ha, which ranks China first in the world. However, quality of the plantation is lower than that of the

developed country. The production of timber plantation cannot meet the increasing demand of wood consumption.

Table 1: China's Forest Resources (1994~1998)

	<u>Units</u>	<u>Amount</u>
Forest land area	Million ha	263.295
Total growing stock	Million cubic meter	12487.864
Forest area		
Area	Million ha	158.941
Volume	Million cubic meter	11266.591
Conifer area	Million ha	64.498
Conifer volume	Million cubic meter	6326.709
Broadleaf area	Million ha	64.498
Broadleaf volume	Million cubic meter	4939.883
Forest coverage	%	16.55
Forest area per capita	Ha	0.128
Volume of forest area per ha	Cubic meter	83.86
Volume of forest area per capita	Cubic meter	9.048
Timber forest area	Million ha	99.395
Timber forest volume	Million cubic meter	7206.18

Source: Forest Resource statistics of China (1994~1998), Department of Forest Resources Management, State Forestry Administration, 2000.

◆ *Uneven distribution of forest resource*

China's forest is primarily distributed in state-owned forest area of nine provinces and south collective-owned forest area of ten provinces. Timber forest is also primarily distributed in those regions. These regions account for 87.73% of forest area and 83.93% of forest stock. Natural forest primarily distributed in state-owned forest area of nine provinces is 59.12% of natural forest area and 69.73 of natural forest stock. Plantation primarily distributed in south collective-owned forest area of ten provinces is 54.40% of plantation area and 52.02% plantation stock.

Table 2: Area and Stock of Natural Forest and Plantation in China

	<u>Units</u>	<u>Amount</u>
Natural forest area	Million ha	106.965
Natural forest volume	Million cubic meter	9072.648
Timber forest area	Million ha	75.244
Timber forest stock	Million cubic meter	6371.801
Timber forest area /natural forest area	%	75.2
Timber forest volume/natural forest stock	%	70.2
Plantation area	Million ha	46.667
Plantation volume	Million cubic meter	1012.995
Timber plantation area	Million ha	24.151
Timber plantation stock	Million cubic meter	834.387
Timber plantation area /plantation area	%	82.87
Timber plantation volume/plantation stock	%	82.37
Natural forest area/forest area	%	69.62
Plantation area/forest area	%	30.38
Natural forest volume/forest stock	%	89.96
Plantation volume/forest stock	%	10.04
Natural forest volume /per ha	Cubic meter	91
Plantation volume /per ha	Cubic meter	35

Source: Forest Resource Statistics of China (1993~1998), Forest Resource Management Department, State Forestry Administration, 2000.

◆ *Irrational structure of age of stand and insufficient fellable resources*

As a result of over cutting of mature forest, forest resources tend to be young in China. Young and middle forests accounts for 71.1% of standing forests and 74.4% of timber forests. The logging area of young and middle forests accounts for 78.5% of the total logging area of standing forests, leading to diminishing reserve resource.

Protection of natural forest and development of plantation

China's forest has been over-cut over a long time period due to the rapid economic development in infrastructure and construction that increased the demand of wood products. The Chinese government has been aware of the consequences of the over cutting and implemented a series of forestry polices in the last few years to protect the forest. These include in setting up annual harvesting quotas, encouraging the use of substitutive products for wood, and carrying on extensive forest plantation.

In the wake of the devastating floods in 1998, the State Forestry Administration imposed a complete logging ban in the upper reaches of Yangtze and middle reaches of Yellow River and gradual logging ban in northeast forest areas. This restricted logging policy reduced the annual timber production by 10 to 15 million m³, which in turn impacted the production of downstream industries. As a whole, implementing a natural forest protection program created shortage of wood and took great effect on wood market.

In order to regeneration forest resources and ease the conflict between increasing supply and increasing demand of timber, area with deficient forest resources and insufficient effective supply have been vigorously developing plantation to meet their own needs, in addition imports from areas. Corresponding with development of large-scale timber plantation, fast-growing and high-yielding timber base has been established. During the past 20 years, the total area of newly afforested timber plantation reached 53.992 million ha accounting for 46.8% of that of developed since the founding of the People's Republic of China. The afforested fast-growing and high-yielding timber plantation covers 8.234 million ha, accounting of 15.4% of the timber plantation in the same period.

2. Forest product production and consumption

Timber production

Timber harvest quota of tenth-five-year period (2000~2004) will be averagely 223.10 thousand m³ per year, 6.79 million m³ fewer than that of ninth-five-year period (1995~1999). Timber harvest quota of plantation will be 86069 thousand m³ per year accounting for 38.6% of total timber limited harvest. Timber production has turn from natural forest to plantation.

China's timber production increased significantly during the 20 years from 1975~1995 and peaked at 677 million m³ in 1995. Production has been declining since then to respond to the protection policies of natural forest. By 1994, China had formulated and enacted four forest laws and documents as well as

nine forest administrative regulations to protect forest resources and to restrict the over harvest of timber.

Table 3 Timber Production and Major Forest Products Production in China, 1994~2002 (thousand m³)

	1994	1995	1996	1997	1998	1999	2000	2001	2002
Total	66151.0	67669.0	67102.7	63947.9	59662.0	52368.0	47239.7	45520.3	44360.7
Log wood						48487.0	43957.2	41970.3	41272.1
Fire wood						3881.0	3282.5	3550.0	3088.6
Sawn wood	12943.0	41838.0	24424.0	20124.0	17876.0	15859.4	6344.4	7638.3	8516.1
Panels	6647.2	16846.0	12032.6	16484.8	10563.3	15030.5	20016.6	21112.7	29301.8
Plywood	2606.2	7592.6	4903.2	7584.5	4465.2	7276.4	9925.4	9045.1	11352.1
Fiberboard	1930.3	2164.0	2055.0	2759.2	2195.1	3905.9	5144.3	5701.1	7674.2
Particleboard	1682.0	4351.0	3382.8	3604.4	2663.0	2409.6	2867.7	3445.3	3693.1
Other panels	428.7	2738.4	1691.6	2536.7	1240.0	1438.6	2079.2	2921.2	6582.4

Source: China Forest Industry Statistics Yearbook (2002), State Forestry Administration.

From 2001 to 2002 harvests declined from 455.2 million m³ to 443.6 million m³ according to the China Forest Industry Statistics Yearbook. The proportions of each category forest products have been relatively stable for many years, although the total production has been gradually declining in recent years. However, production of the log decreased by 698.2 thousand m³ from 2001 to 2002, while the production of sawn wood still rose 11.49%. This shift reveals current and future problems with the balance between supply and demand for wood products from Chinese forests. There will most likely be decreased availability of log and increase demand for industrial sawn wood. The panels increased significantly (38.79%) from 2001 to 2002.

Paper, paperboard, pulp and furniture production in 2001

In 2001 production of machinemade paper and paperboard is respectively 16.4678 and 11.9309 million ton, in total 28.3987 million ton. This production increased by 14.19% from 2000 to 2001. Domestic pulp production is 10.1382 million ton, increasing 3.79% from 2000, of which wood pulp still remained at about 2 million ton. Import of wood pulp significantly increased, followed by paper and paper product made of wood pulp. Production of furniture is 109.2295 million piece, of which wood furniture is 49.9855 million piece and increased by 4.34% from 2000 to 2001.

Forest product consumption

The official data on annual wood consumption in China is not available from one single reliable source. Some publications that discuss the China wood market show various numbers for wood consumption. Therefore, these wood consumption figures can only be used as referenced because the collection sources are diversified, and data are usually incomplete and inconsistent. Wood consumption estimated by the commonly used calculation (production plus imports and minus export) in 2001 was 68.7 million m³. The table shows estimated wood consumption from 1995 to 2001.

Construction industry and interior decoration, furniture manufacture and papermaking are three major

wood consumption industries in China. Production of total wood floor is 48.49 million m², increasing 46.09% from 2000 to 2001. In 2002 pulp consumption is 34.70 million ton, increasing 16.4% from 2001, of which wood pulp is 7.4 million ton, accounting for 21% of total pulp consumption.

Table 4: Estimated Wood Consumption In China, 1995~2001 (thousand m³)

	1995	1996	1997	1998	1999	2000	2001
Production	67669	67103	63947.9	59662	52368	47240	45520
Import	6593	7105	8766	10068	16687	20235	22347
Export	4731	4770	5181	5003	1553	1323	878
Consumption	69531	69438	67533	64727	67502	66152	68745

3. Import and export of timber and major forest products

China's effective timber supply cannot meet its market demand. Imports of timber can help mitigate the shortage of domestic timber supply. China has become the world's second largest importer of forest after Japan. In recent years, imports and exports of forest products have grown rapidly and taken an increasing share in China's total imports and exports. Since 1981, it has been importing log and panels to meet domestic construction and consumer need every year. In the period from 1981~1997, China import 92.989 million m³ of log, with annual imports averaging 5.4699 million m³ and accounting for 9.43% of annual effective supply nationwide. In recently, China's imports of forest products have focused on wood products. Wood products take the largest share of forest product imports, and growth of import of wood products is much higher than that of non-wood forest products.

In 2001 exports of forest products generated foreign exchange revenues of US\$ 8.08 billion, accounting for 3.01% of China's total exports. Import value of forest products is US\$ 10.125 billion, accounting for 4.16% of China's total imports. Import of wood products accounts for 76.13% of the total import of forest products. The category structure of import and export wood products remains in 2001 same as those in 2000. Among the import wood products, paper, pulp and log take up the largest share (61.44% and 11.68%), followed by sawn wood (11.01%), board and veneer (7.03%), wooden product (7.03%), and furniture (0.32). Furniture and wooden products are the largest shares of exports, accounting for 39.04% and 33.27, followed by paper and pulp (10.79%), board and veneer (7.03%), sawn wood (6.14%), chip (2.22%) and log (0.12%).

In terms of wood product export in 2001, the five largest trading partners in 2001 are United State, Japan, Hong Kong, Korean, Great Britain, with 31.75%, 23.48%, 15.69%, 4.05% and 3.68% of total export value. The major countries of importing wood product were Indonesia, United State, Russian, Canada and Korean with 14.52%, 11.68%, 11.41%, 6.48% and 6.45% of the total import value.

4. Poplar resource and culture

Poplar resource and plantation

In China there are rich poplar resources and more than 50 species of five poplar sections. Poplar distribution area is relatively large, through 10° to the northern drainage of Changjiang River . Poplars

have been the primary timber producers in China. Recently, with implement of natural forest policies, the area of poplar resources is also extending and still lacks a reliable figure of area from related sectors. Existent natural poplar resources have been gradually preserved for breeding and afforestation purpose.

Due to fast-growing, fine wood quality and good adaptation, poplar becomes one of preferred tree species for fast growing and high-yield timber plantation. With the development of wood process and paper making, poplar wood has been more and more extensively used in wood process industries.

Area of poplar plantation in China is 6.28 thousand ha, accounting for 13.47% of total plantation. The stock of poplar plantation is 359.3 thousand m³. Young, middle, near-mature, mature and over-mature poplar plantations have areas of 1.9, 1.8, 1.1, 0.98, 0.44 thousand ha and stocks of 48.9, 115.1, 81.3, 70.94, 43 thousand ha.

However, existent poplar wood production cannot meet the need of wood process industries because of lacking directional cultivation, large-scale produced and undercapitalization. With the establishment of fast growing and high-yielding timber plantation base for relieving the conflict of demand and supply, the area of land planted to poplars is, nevertheless, increasing rapidly. Many problems need to be resolved in poplar plantation culture and development.

◆ *Pay attention to achieving a well-balanced relationship of timber yield to yield stability*

Poplar plantation is becoming part of the forest resources. Economic importance is still the important target of selecting poplar cones for plantation. In many parts to establishment of monoclonal plantations with fast growing tree species, these have created unstable forest structures with a high cultivation risk. Great importance is attached to building up multiclonal varieties with high growing potential and good adaptation to different climatic condition.

◆ *Improve international cooperation on forecasting and control of poplar insect pest*

The potential direct negative impact of China's accession to the WTO will probably come from the insects and pests that brought in by import of some species and large quantities of timber and wooden packaging. Therefore, more attention will be paid to the matter and improve an extensive international cooperation with other countries.

◆ *Strengthen information exchanges and shares of poplar varieties with IPC*

With the development of poplar breeding and selection, more and more new varieties were abstained and used for plantation. It is necessary to get register and open information of varieties, while protecting the legal right of breeders.

Table 5: Export and Import Volume of Wood Products in China, 1993~2001

Product		Unit	1993	1994	1995	1996	1997	1998	1999	2000	2001	
Log	Conifer	Export	m ³	35377	15959	23561	13588	6025	4330	3708	1135	646
		Import	m ³	1572514	1302314	617359	653038	955363	1486280	4573354	6400661	9142210
	Broadleaf	Export	m ³	118946	74805	73588	50612	57294	27596	19308	25576	17093
		Import	m ³	1886301	2032263	1965242	2532444	3506948	3336762	5562329	7211085	7721541
	Total	Export	m ³	154323	90764	97149	64170	63319	31926	23016	26711	17739
		Import	m ³	3458815	3334577	2582601	3185482	4462311	4823042	10135683	13611746	16863751
Sawn wood	Export	m ³	313033	365924	408860	384064	389640	258081	449748	414336	354591	
	Import	m ³	1413156	934867	862990	938483	1331473	1690315	4034120	3613693	2756371	
Veneer	Export	m ³	16318	16509	28184	26899	40625	45060	62324	53430	48495	
	Import	m ³	349979	232820	341638	380222	454029	538658	335736	649488	641292	
Special-shaped wood	Export	t	12794	17459	32358	10459	38224	38224	78006	80277	68745	
	Import	t	13870	14854	25861	12858	34590	34590	13000	11548	24799	
Particleboard	Export	m ³	2762	3967	8347	10459	16911	10967	24958	26273	16865	
	Import	m ³	85512	55657	55232	107613	147860	156329	447559	343773	248146	
Fiberboard	Export	m ³	27602	38263	62642	56141	36975	19779	26815	35308	18577	
	Import	m ³	170335	236932	273448	340132	462826	572401	1070243	1014513	794880	
Plywood board	Export	m ³	93788	102897	129018	176834	437703	176876	965361	686991	422542	
	Import	m ³	2228628	2108870	2082925	1775110	1488436	1690636	650859	1001808	1042430	
Furniture	Export	piece	18636597	26701765	34029260	39559551	53740664	68081315	93611649	91340898	78374918	
	Import	piece	445562	627504	712125	481962	600136	803745	576391	624847	728154	
Chip	Export	t	797348	1215272	1897652	1848712	1958365	1570723	1771351	1854972	1600959	
	Import	t	934	6268	607	1259	2060	1522	3596	1202	2835	
Pulp	Export	t	3327	7814	28517	11794	16388	13327	5776	12829	1676	
	Import	t	471642	788947	778617	1457572	1529007	2179198	4873085	3294418	3080230	
Paper and paper products	Export	t	77302	105958	148910	119835	146108	141244	352519	263340	134646	
	Import	t	2305216	2977301	2868379	4125104	4956593	5023409	4693795	5049529	5529826	
Charcoal	Export	t	7971	15191	26077	32688	45612	46842	97690	81540	63429	
	Import	t	582	148	1655	603	1047	3153	31279	24852	4952	

Source: Report of Chinese Forestry Development (2002), State Forestry Administration.

Note: ? Volume is converted from weight by using wood density: particleboard 650kg/m³, fiberboard 700kg/m³, Veneer board 50kg/m³.

? Wood pulp excluded in pulp from recycled paper and cardboard.

? Paper and paper product excluded in waste paper and cardboard, presswork and manuscript and so on.

Table 6: Export and Import Value of Wood Products in China, 1993~2001 (thousand US\$)

Product			1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Log	Conifer	Export	14721	7514	11914	5525	3865	2182	1304	231	178	
		Import	175178	113235	53300	48522	69360	95474	274828	378859	541914	
	Broadleaf	Export	56180	35670	35242	23771	25609	10277	6703	7706	5375	
		Import	283864	317137	315073	409257	607668	503617	973804	1276781	1152063	
	Total	Export	70901	43184	47156	29296	29474	12459	8007	7937	5553	
		Import	459042	430372	368373	457779	677028	599091	1248632	1655640	1693977	
Sawn wood	Export	133007	163987	194659	194156	193842	114983	139375	179143	196860		
	Import	153075	145615	149133	180087	268110	348260	661936	982031	988518		
Veneer	Export	13122	15282	28013	27436	43126	41550	46431	55669	69746		
	Import	75401	67677	77207	93604	168320	152635	204976	192257	95889		
Special-shaped wood	Export	10060	18585	38752	58739	51408	41865	82260	99777	94361		
	Import	13958	14283	18956	6301	7156	17396	11964	7723	9236		
Particleboard	Export	803	1353	2798	4694	9266	4727	6854	8879	6063		
	Import	13345	9777	11574	19971	28484	29679	50647	65595	83714		
Fiber board	Export	8991	11041	12881	11081	9146	5983	5339	10213	9280		
	Import	42033	54046	59518	70054	105937	134172	206841	282882	279101		
Plywood	Export	33539	31635	39068	62286	151509	64960	123648	188958	242272		
	Import	762163	816257	773676	643835	605492	543617	415837	436784	254445		
Furniture	Export	345347	493472	597905	697902	959138	1084662	1309540	1668491	1852066		
	Import	37576	48228	32668	17453	22510	31487	24816	23078	28567		
Chip	Export	62036	81935	180754	162816	154370	120906	111837	120365	105358		
	Import	401	582	395	1419	1029	1234	2525	1466	3873		
Pulp	Export	1334	3288	19243	7979	8648	7342	1002	6081	2704		
	Import	200824	391958	639490	768167	740830	912340	1403427	2093664	3061438		
Paper and paper products	Export	85372	104357	156972	153332	190206	188250	175732	309266	415259		
	Import	1296316	1637478	1857337	2377298	2772442	2883838	3185898	3170537	2919600		
Charcoal	Export	3605	7212	15365	18275	27009	26181	30323	42570	54710		
	Import	197	79	315	126	375	665	593	1553	2731		

Source: Report of Chinese Forestry Development (2002), State Forestry Administration.

Note: ? Volume is converted from weight by using wood density: particleboard 650kg/m³, fiberboard 700kg/m³, Veneer board 50kg/m³.

? Wood pulp excluded in pulp from recycled paper and cardboard.

? Paper and paper product excluded in waste paper and cardboard, presswork and manuscript and so on.

Table 7: Major Partner Countries and Their Rank Shares of Total Export Wood Forest Product Value in 2001 (%)

Sawn wood		Veneer		Plywood		Particleboard		Fiberboard		Furniture		Wooden product		Paper and paper product	
country	share	country	share	country	share	country	share	country	share	country	share	country	share	country	share
Japan	79.50	Japan	34.92	Hong Kong	16.07	Japan	35.70	USA	27.31	USA	47.72	USA	29.31	Hong Kong	35.94
Korean	12.23	Korean	19.31	Korean	14.89	Hong Kong	18.82	Hong Kong	15.10	Hong Kong	18.8	Japan	28.35	USA	17.95
		USA	14.14	Japan	14.15	Korean	16.40	Japan	12.53	Japan	12.98	Hong Kong	9.48	Japan	10.03
		Hong Kong	7.21	USA	13.20	Russia	13.68	Philippine	6.55	Britain	3.80	Britain	4.09	Britain	5.88
		Taiwan	5.82	Taiwan	7.46	Mongolia	4.16	Malaysia	6.26	Taiwan	2.47	Korean	3.19	Taiwan	3.21

Table 8: Major Partner Countries and Their Rank Shares of Import Wood Forest Product Value in 2001 (%)

Log		Sawn wood		Veneer		Plywood		Particleboard		Fiberboard		Furniture		Wood Pulp		Paper and paper product	
country	share	country	share	country	share	country	share	country	share	country	share	country	share	country	share	country	share
Russia	51.98	Indonesia	32.11	Malaysia	46.94	Indonesia	67.19	Thailand	28.20	Germany	27.52	Italy	27.91	Canada	23.73	USA	20.46
Malaysia	8.97	USA	10.88	USA	15.13	Malaysia	11.79	Malaysia	18.86	Malaysia	18.90	Germany	18.41	Indonesia	20.14	Korea	15.48
Indonesia	6.75	Malaysia	9.84	Cambodia	13.11	Korea	9.58	Belgium	15.44	Australia	10.13	Denmark	9.03	Russia	16.92	Japan	11.31
Gabon	6.67	Thailand	6.10	Taiwan	3.92	Cambodia	4.67	Germany	8.96	Thailand	9.9	Viet nam	6.90	Chile	11.79	Taiwan	10.10
Papua New Guinea	5.40	Germany	5.29	Indonesia	3.49			Indonesia	7.70	New Zealand	7.41	Spanish	4.78	USA	8.42	Hong Kong	7.80