

# Study on China's Timber Resource Shortage and Import Structure: Natural Forest Protection Program Outlook, 1998 to 2008

Hongqiang Yang  
Ying Nie  
Chunyi Ji

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## Abstract

The state of China's ecological environment has improved to some extent since the Chinese government initiated the Natural Forest Protection Program (NFPP) in 1998. The logging prohibition and limitation policies adopted by the NFPP, however, have reduced domestic timber supply. Together with the thriving economy, decreasing domestic timber supply continues to widen the gap between supply and demand. Importation is considered to be the primary solution to this issue, making China the world's largest timber importer. China's major timber suppliers are Russia, Malaysia, Papua New Guinea, New Zealand, and Gabon, among which Russia accounts for more than 61 percent of China's total timber imports. The relatively cheaper conifers imported from Russia account for more than 60 percent of all imported timber, with volumes continually increasing because of the rapid pace at which China has been implementing its infrastructure projects. In addition, as living standards continue to improve, requirements for home decor and furniture also grow, further increasing the demand for tropical to temperate timber. In the long term, imports will remain the main solution to the insufficient domestic timber supply in China.

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China began importing timber in the 1960s; by 2008, it had set up trade relations with more than 160 countries (China State Forestry Administration [SFA] 2009a). From 1998 to 2008, China's annual growth rate in its gross domestic product (GDP) averaged 9.1 percent. In 2008, the GDP, measured on a purchasing power parity basis that adjusts for price differences, was estimated at US\$7.8 trillion, making China the world's second-largest economy after the United States (Global Consultants and Services Limited 2009). The rapid growth of China's economy has engendered a drastic increase in demand for resources, but its domestic timber supply is limited, hindering the country from satisfying demand in that area. Before 1998, domestic timber supply from natural forests could meet market demands, and timber exports and imports were balanced. Since the inception of the Natural Forest Protection Program (NFPP) in 1998, however, timber logging prohibition and limitation policies have been applied to forest areas in southwestern and northeastern China as well as Inner Mongolia, thereby causing domestic timber supply to decline. For 10 years (1998 to 2008), timber importation served as the primary solution to the issue of timber shortage (Yang and Nie 2008a).

China's timber supply is inadequate in terms of both resource demand and sustainable ecological variety, with resources lacking both in quantity and quality. Overall, the forest resources in China are limited. The seventh national forest survey (2004 to 2008) showed a national forest area of 0.19 billion ha and a forest coverage rate of 20.36 percent—only two-thirds of the world average (SFA 2009b). The general forest reserve was found to be 13.71 billion m<sup>3</sup> (10.15 m<sup>3</sup> per capita, or only one-seventh of the world average). The Chinese government has adopted two measures to address the timber supply shortage: (1) encouraging the growth of man-made forests and stimulat-

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The authors are, respectively, Associate Professor and Associate Director, Professor and Director, and Senior Research Associate, College of Economics and Management, Nanjing Forestry Univ., Research Center for Economics and Trade in Forest Products of the State Forestry Admin. (SINO-RCETFOR), Nanjing, China (yhnfnu@gmail.com, ynieh@njfu.edu.cn, jcynfu@gmail.com). This paper was received for publication in July 2010. Article no. 10-00024.

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ing timber importation to close the timber supply-and-demand gap, and (2) rejuvenating forests through the NFPP to ensure the sustainable growth of these resources.

## Situation of China's Forest Resources and Introduction to the NFPP

### Situation of China's forest resources

Given its large land area and population of more than 1.3 billion, China is relatively forest-poor. Its per capita forest coverage is estimated at only 0.12 ha, or about one-fifth of the global average (Table 1; Food and Agriculture Organization of the United Nations [FAO] 2003, Zhu et al. 2004).

According to the SFA (1999), the majority of suitable lands for forests are located in Inner Mongolia and northwestern China, among which high- and low-quality lands account for 13.1 and 52.3 percent, respectively. The quality of domestic timber supply also is poor. The high-quality forest reserve averages only 85.88 m<sup>3</sup>/ha, or about 78.2 percent of the world average, while the man-made high-quality forest reserve is as low as 49.0 m<sup>3</sup>/ha. China's forest resources are located in three main areas (Fig. 1): northeastern China and Inner Mongolia (28% of forest area), Sichuan and Yunnan provinces in southwestern China (19%), and 10 other provinces in southern China (36%; Zhu et al. 2004). Nearly 50 percent of the forest area is in the provinces of Inner Mongolia, Heilongjiang, Sichuan, Yunnan, and Tibet. The northeast and southwest of China are home to most of the remaining natural forests, almost all of which are managed by state forest enterprises. The majority of plantations, primarily run by collectives, are located in the south.<sup>1</sup>

### Introduction to the NFPP

China instituted the NFPP in late 1998 soon after devastating floods occurred along the Yangtze River in the south and the Songhua and Nen rivers in the northeast. The program became one of the Six National Key Forest Programs approved in 2000. The government allocated total funds of 96.2 billion RMB (US\$11.6 billion) for program implementation (SFA 2001).

According to Zhu et al. 2004, within the Yangtze and Yellow river catchments, the objectives of the NFPP included

- a logging ban on approximately 30 million ha of natural forests, 27 million of which are collectively owned, until 2010;
- permanent protection of an additional 31 million ha of existing forests, shrub forests, and newly planted forest lands; and
- creation of nearly 13 million ha of restored forests and grasslands by closing access to more than 3 million ha of mountain lands, seeding more than 7 million ha, and replanting 2 million ha.

For Inner Mongolia and northeastern China, as well as for the northwestern provinces of China and Hainan, the objectives of the NFPP were

Table 1.—Comparison of China's forest resources (2000).<sup>a</sup>

	Forest area (billion ha)	Forest volume (billion m <sup>3</sup> )	Portion of total land with forest cover (%)	Per capita forest area (ha)
Russia	0.85	89	50	5.8
United States	0.23	31	25	0.5
Canada	0.24	29	27	7.9
China	0.16	8	18	0.12
World	3.9	386	30	0.6
China as % of the world	4.1	2	60	20

<sup>a</sup> Data from Food and Agriculture Organization of the United Nations (2003).

- permanent protection of 33 million ha of existing but overlogged natural forests, and
- a reduction in commercial timber production of 40 percent by 2003, with production to be maintained at this level until 2010 (Zhu et al. 2004).

In 2003, China issued a directive that set targets for increasing forest cover of total land area in China: 19 percent by 2010, 23 percent by 2020, and 26 percent by 2050 (China State Council 2003).

The data (SFA 1999) suggest that production was declining in these regions before the logging ban was launched in 1998. In southwestern China, production peaked in 1994 and declined thereafter, but the region saw the most rapid drop beginning in 1998. In northeastern China and Inner Mongolia, production began a slow decline in 1988, with the rate increasing slightly after that year. Declining production in these areas has resulted in a smaller supply of high-grade logs. For example, between 1997 and 1999, the annual production of high-grade logs decreased from 1.4 million to 0.9 million m<sup>3</sup> (Zhu et al. 2004).

### China's timber resource shortage

Implementation of the NFPP generated different impacts on domestic timber supply during different stages. From 1998 to 2002, the NFPP reduced timber production by an average of 7.0 percent per year—that is, by 5 million m<sup>3</sup>/y. In 1999, the rate of decline in timber production reached 12.2 percent; during that same year, timber imports increased by 97.8 percent (Table 2). From 2003 to 2008, as the achievements of the forest protection policy were gradually realized, timber production increased by 10.7 percent on average, in comparison with an average GDP growth rate of 10.2 percent.

The NFPP has placed 0.108 billion ha of forest lands under protection—an area roughly the equivalent of 1.5 times the size of Texas or 1.9 times the size of France—and cultivated 0.016 billion ha within these reserved lands. This has gradually improved the ecological environment in China. In part because of the implementation of logging prohibition and limitation policies, however, the domestic timber supply has failed to meet increasing demand, causing the supply-and-demand gap to widen year after year. Domestic supply fell behind demand by 36 million m<sup>3</sup> in 2000 and by 109 million m<sup>3</sup> in 2004. It is expected that by 2015, the demand for timber for use in construction will reach 480 million m<sup>3</sup>—and that 190 million m<sup>3</sup> of this amount will have to be imported (Yang and Nie 2008a).

<sup>1</sup> This area includes 10 provinces: Guangdong, Hainan, Hunan, Hubei, Jiangxi, Fujian, Guizhou, Zhejiang, Guangxi, and Anhui.



Figure 1.—China's forest area locations (10 million ha).

Referring to the yearly rate of increase in average demand for timber from 1998 to 2008 (3.7%) enables us to forecast that timber demand in China will reach 678 million m<sup>3</sup> by 2020. Thus, the supply-and-demand gap will widen further, and timber importation will be the key solution to addressing this shortage (Yang and Nie 2008b). Although timber imports in 2008 decreased by 16 percent because of the worldwide financial crisis, imports still accounted for 37 percent of China's overall timber supply from 2003 to 2008.

Insufficient domestic timber supply has been and will remain a serious problem.

## China's Timber Trade Policy and Structure

### Trade liberalization

China's trade policies changed significantly during the last 10 years. The country formally joined the World Trade Organization (WTO) in December 2001, and the increasing

Table 2.—The growth rate of Chinese timber production and imports of primary timber resources (1998 to 2008).<sup>a</sup>

Year	Domestic timber		GDP growth rate (%)	Imported timber	
	Production (million m <sup>3</sup> )	Growth rate (%)		Volume (million m <sup>3</sup> )	Growth rate (%)
1998	59.7	-6.7	7.8	6.5	12.3
1999	52.4	-12.2	7.1	12.9	97.8
2000	47.2	-9.8	8.0	17.2	33.9
2001	45.5	-3.6	7.5	20.9	21.3
2002	44.4	-2.5	8.3	29.7	42.2
2003	47.6	7.3	9.5	30.9	4.2
2004	51.9	9.2	10.1	32.3	4.4
2005	55.6	7.0	10.4	35.3	9.4
2006	66.1	18.9	10.7	38.2	8.1
2007	69.8	5.5	11.4	43.6	14.2
2008	81.0	16.2	9.0	36.7	-15.9

<sup>a</sup> Data from "China Forestry Development Report" (SFA 2009a) and UN Comtrade database.

wood supply gap has prompted China to loosen controls over most wood-product imports. Tariffs on wood products have been reduced several times in the last 10 years, and tariffs for logs, sawn wood, wastepaper, and pulp have been eliminated. Plywood tariffs, which were 32.5 percent in 2001, were reduced to 12 percent in 2009. The current tariff rates for wood-based products are shown in Table 3 (Chinese Customs Office 2010). The import permit requirements for wood products were also relaxed in 1999, causing the number of companies with importing authorization to increase considerably.

The changes in tariff levels, nontariff barriers, and domestic policies have resulted in significant shifts in the trade flows of major forest products. In 1998, wood products became the largest single import group for China. By 2000, China had become a net importer in all major categories of forest products.

In 1996, China adopted a preferential import policy toward Russia, Vietnam, and Myanmar. Imports from these countries have been subject to only one-half the regular charge for tariffs and value-added tax. Originally designed to be a temporary measure to encourage border trade, this policy remains in place today (Zhu et al. 2004).

### Timber import origin structure of China

Trade data were obtained from the United Nations (UN) Comtrade database using 1998 to 2008 Standard International Trade Classification (SITC) Rev. 3 data. The UN Comtrade database is considered to be the most compre-

Table 3.—Chinese tariff rates on wood and wood products (2001 to 2009).<sup>a</sup>

Items	2001	2004	2009
Logs and sawn wood	0–5	0	0
Paper and paperboard	10–32.5	10–22	2–7.5
Veneer	4–10	4–10	1–8
Plywood	9–32.5	4–12	2–12
Fiberboard and particleboard	8–13.8	6.2–9.6	4–7.5
Other processed wood products	5–15	3–6.8	0

<sup>a</sup> Values are percentages. Data from the Chinese Customs Office (2010).

hensive trade database available, containing annual statistical data for international trade detailed by commodities and partner countries. A sufficient time series of data enables the identification of longer-term trends.<sup>2</sup> The data show that China's sawn timber imports are less significant in comparison with log imports, which accounted for 81 percent of overall imported timber products from 1998 to 2008.

During this period, the combined timber imports of China, Japan, India, Finland, and Korea accounted for 57 percent of world timber imports. China accounted for 24 percent, with US\$30 billion of accumulated imports, ranking it at the top of the list (Fig. 2).

Since the initiation of the NFPP in 1998, China's timber imports have consistently increased each year, even during the financial crisis of 2007 to 2008. China's imports accounted for 31 percent of the world timber imports during the recent worldwide economic downturn. From 1998 to 2008, China imported timber mainly from Russia, Malaysia, Papua New Guinea, New Zealand, and Gabon. The Russian share was 61 percent, or 153 million m<sup>3</sup>, and the shares for Malaysia and for New Zealand and Gabon combined were 8 and 4 percent, respectively (Fig. 3).

Although the volume of growing stock per hectare in the world remained at 110 m<sup>3</sup>/ha from 2000 to 2005, the decrease in the overall volume of world forestry resources has become an unambiguous fact (FAO 2006). During this period, the reduction in worldwide forest area was 7.3 million ha, or 0.18 percent, per year (Table 4). The most notable decreases have occurred in developing countries (Table 5). China's import of timber resources undoubtedly faces a severe challenge from the reduction in global timber resources.

China imports the majority of its timber from fewer than 10 countries. In 2008, for example, 80 percent of China's imported timber came from seven countries—namely, Russia (49%), Gabon (8%), Papua New Guinea (7.9%), New Zealand (4.7%), Myanmar (3.5%), Malaysia (3.3%), and the Congo (3%) (Fig. 4). These figures have raised

<sup>2</sup> The UN Comtrade database does not include statistics for the illegal timber trade.

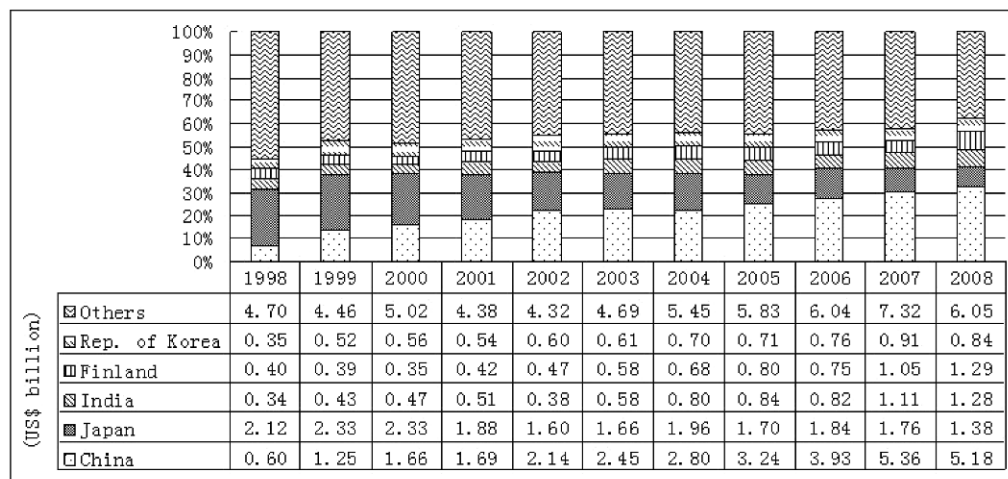


Figure 2.—Amount of timber imports in US dollars of world major timber importer (1998 to 2008).

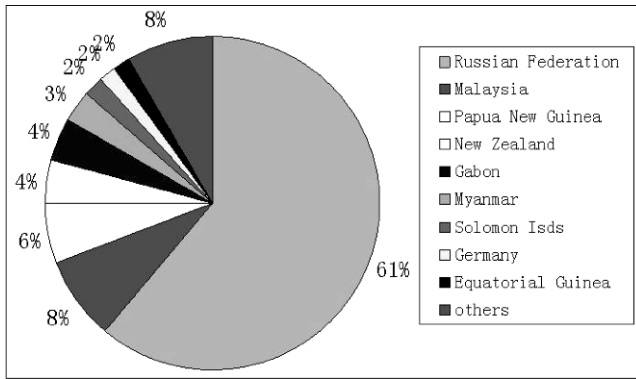


Figure 3.—Share of China's timber import origins (1998 to 2008).

Table 4.—Changes in several key global forest resource statistics (2000 to 2005).<sup>a</sup>

Year	Description	Data
2000	Area of forest (million ha)	3,988.6
	Volume of growing stock of forests (billion m <sup>3</sup> )	439.0
	Volume of growing stock per hectare (m <sup>3</sup> /ha)	110
2005	Area of forest (million ha)	3,952.0
	Volume of growing stock of forests (billion m <sup>3</sup> )	434.2
	Volume of growing stock per hectare (m <sup>3</sup> /ha)	110
2000–2005	Annual net change in forest area (million ha)	-7.3
	Annual net change rate in forest area (%)	-0.18
	Annual net change rate in growing stock per hectare (m <sup>3</sup> /ha)	0

<sup>a</sup> Data from “Global Forest Resources Assessment 2005” (FAO 2006).

Table 5.—Major countries with largest annual net loss in forest area (2000 to 2005).<sup>a</sup>

	Brazil	Indonesia	Sudan	Myanmar	Zambia	Tanzania	Nigeria	Congo
Annual change (1,000 ha/y)	-3,103	-1,871	-589	-466	-445	-412	-410	-319

<sup>a</sup> Data from “Global Forest Resources Assessment 2005” (FAO 2006).

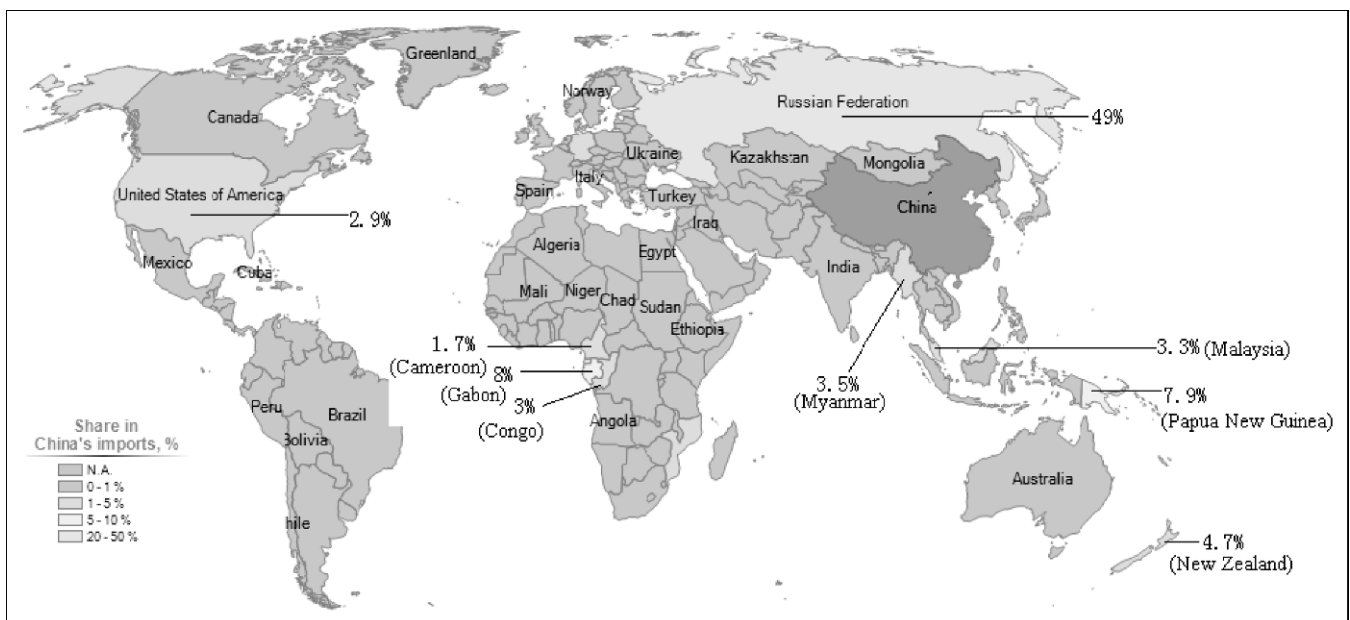


Figure 4.—Share of China's timber import origins in 2008.

worldwide concern. International trade has increased the global supply of illegally harvested timber by more than 70 percent (Dieter 2009), and the latest trade data show that more than 90 percent of the logs and sawn wood imported across the Myanmar–China border was illegal (Global Witness 2009). Thus, as the world's top-ranked timber importer, China should shoulder the responsibility of ensuring legal timber trade and ecological compensation for import origins, particularly for underdeveloped countries, such as Papua New Guinea, Gabon, and Myanmar.

The Chinese government is actively implementing bilateral and international communication and cooperation. China and Russia signed the Agreement on Sustainable Running of the Forestry Resources in the Far East in 2000, and China signed the Cooperation Memo on the Regulation of Illegal Timber Trade with Indonesia in 2002. In 2005, China and the European Union (EU) signed the Sino-EU Summit Joint Declaration, with the aim of mitigating, through cooperation, the illegal logging and timber trade in Asia. In 2007, China and the EU held the “Forest Law Enforcement and Governance” conference, which strongly endorsed sustainable forest management and mitigation of illegal timber logging and trade (Qian and Cheng 2010).

### Imported timber category structure of China

Principal timber species are categorized in the SITC (Rev. 3) list of the UN Comtrade database (Table 6). The present study analyzed the amount of timber from different categories imported by China from 1998 to 2008 (Fig. 5).

From 1998 to 2008, the main timber species group imported by China was conifer (SITC 440320), with total imports amounting to 148 million m<sup>3</sup>, or 60 percent of all

Table 6.—Definition of SITC goods by type of wood.<sup>a</sup>

Code	Description
4403	Wood in the rough, whether or not stripped of bark or sapwood, or roughly squared
440310	Wood, in the rough, whether or not stripped of bark/sapwood/roughly squared, treated with paint/stains/creosote/other preservatives
440320	Wood, in the rough, whether or not stripped of bark/sapwood/roughly squared (excl. of 4403.10), coniferous
440341	Dark Red Meranti, Light Red Meranti, and Meranti Bakau, in the rough, whether or not stripped of bark/sapwood/roughly squared
440349	Topical wood spec. in SH Note 1 to Ch. 44 (excl. of 4403.41), in the rough, whether or not stripped of bark/sapwood/roughly squared
440391	Oak ( <i>Quercus</i> spp.), in the rough, whether or not stripped of bark/sapwood/roughly squared
440392	Beech ( <i>Fagus</i> spp.), in the rough, whether or not stripped of bark/sapwood/roughly squared
440399	Wood, in the rough (excl. of 4403.10–4403.92), whether or not stripped of bark/sapwood/roughly squared

<sup>a</sup> From the UN Comtrade database.

imported timber. Conifer species were imported mainly from Russia (84%), New Zealand (10%), and other countries, including Australia, Canada, and the United States. In 2008, the average price paid for conifer logs was US\$129.8 per m<sup>3</sup> (Table 7). Imported conifer is used mainly in infrastructure projects, such as roads, bridges, and houses. Although conifer is relatively cheap, it is the most-needed timber resource in China, and the increasing conifer importation is closely related to the rapid growth of infrastructure construction.

From 1998 to 2008, the total amount of imported tropical to warm-temperate broad leaf timber (SITC 440399 and 440349) totaled 89 million m<sup>3</sup>, or 35 percent of overall imported timber. The imported amount of this type of timber, including nanmu, camphorwood, rosewood, and teakwood, was less than that of conifer. In addition, these were relatively more expensive than conifers, at a price of US\$231.6 (SITC 440399) and US\$324.4 (SITC 440349) per m<sup>3</sup> in 2008. Warm-temperate broad leaf timbers were

Table 7.—Average product prices paid by major importing countries (2008).<sup>a</sup>

Code	Country	Unit price (US\$/m <sup>3</sup> )
Conifer logs, 440320	World	129.8
	Canada	197.3
	United States	183.8
	Russia	129.2
	New Zealand	128.0
	Australia	114.1
Other logs, 440399	Myanmar	69.1
	Korea	63.4
	World	231.6
	Vietnam	925.4
	United States	648.1
	Congo	647.3
Other tropical logs, 440349	Gabon	528.2
	Solomon Islands	182.9
	Papua New Guinea	172.5
	Russia	160.3
	World	324.4
	Cameroon	443.7
	Papua New Guinea	386.6
	Myanmar	378.1
	Congo	354.8
	Equatorial Guinea	297.1
	Gabon	289.2
Malaysia	239.7	

<sup>a</sup> From the UN Comtrade database.

imported mainly from Papua New Guinea (30%), Russia (29%), and the Solomon Islands (16%). The average prices (by unit price) of warm-temperate broad leaf timber from Vietnam, the United States, and the Congo reached US\$925, US\$648, and US\$647, respectively, per m<sup>3</sup> (Table 7). This type of timber is primarily intended for household use, including floor decorations and furniture, and increased consumer spending is a significant driver of its increasing importation. China has maintained rapid economic progress, making it the second-largest economic entity in the world in 2010 (United Nations Economic and Social Commission for Asia and the Pacific 2010). The country's average GDP is expected to exceed US\$4,000 per capita (Ru and Lu 2009). The improvement in the spending capacity of the Chinese

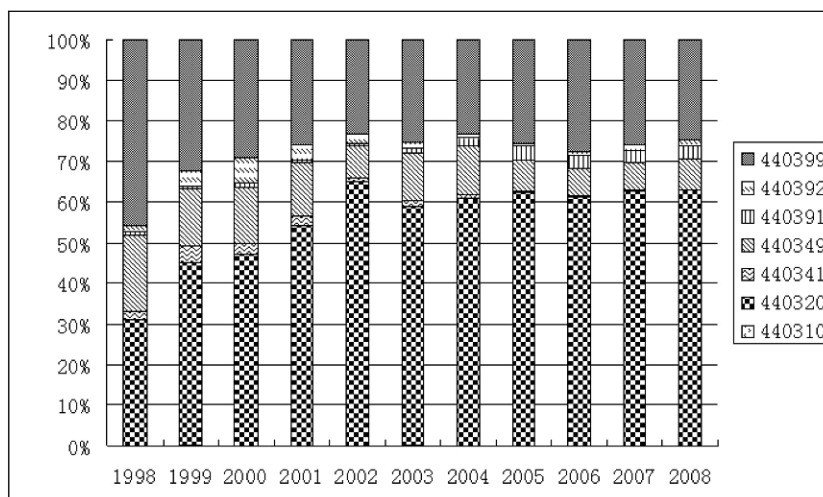


Figure 5.—Breakdown of timber species imported by China (1998 to 2008).

people will further encourage household consumption of tropical to warm-temperate broad leaf timber.

China gained its trade balance against the large volume of imported timber resources mainly by exporting processed products. The recent financial crisis greatly reduced consumption in the United States and EU and, thus, their imports from China. To encourage exports, China has adjusted the export rebate seven times since 2008. In April 2009, the export rebate ratio of 36 kinds of forest products went up, and some paper products' export rebate ratios increased to 13 percent. In June 2009, the export rebate ratio of furniture increased to 15 percent. In August 2009, the ratio of bamboo products increased to 11 percent. By increasing the export rebates of forestry products (Ministry of Finance 2009), China overcame, to some extent, the trade imbalance caused by importing large volumes of timber resources.

### Summary and Conclusions

The NFPP has been implemented for more than 10 years now, and its achievements in terms of national environmental protection continue to be realized. Nevertheless, the logging prohibition and limitation policies have reduced the domestic Chinese timber supply. Although the timber resource reservation in China continues to grow and its capability for sustainable development has improved, timber production lags behind domestic timber consumption. The supply-and-demand gap has widened considerably, and timber imports have been the primary result. After joining the WTO, timber imports in China have also risen because of trade liberalization and China's policies encouraging such imports. From 1998 to 2008, timber imports in China accounted for 24 percent of the world overall timber imports, making China the world's largest timber importer.

From 1998 to 2008, China's imported timber originated mainly from Russia, Malaysia, Papua New Guinea, New Zealand, and Gabon, with those five countries accounting for 80 percent of overall timber imports. Relying on the timber supply of a small number of countries, many of which have very poor environmental and social practices, has raised global concern over excessive use of the forest resources of other countries. Thus, to relieve the pressure of environmental degradation in those developing countries, China should diversify its import origins by increasing the import of timber products from other areas, such as the countries in northern Europe, which are rich in forestry resources.

Among all the imported timber, conifers imported from Russia accounted for 60 percent, and conifer imports are encouraged largely by the rapid implementation of infrastructure projects. Improvements in the spending and consumption capability of the Chinese people have enabled tropical to warm-temperate broad leaf timber to become an important imported timber category.

Insufficient forest resources as well as the logging prohibition and limitation policies adopted by the NFPP have caused China's timber supply-and-demand gap to

widen. China's rapid economic development will further increase this gap. Timber imports will continue to serve as the primary solution to the issue of China's domestic timber supply shortage.

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