



# DEMAND AND SUPPLY OF WOOD PRODUCTS IN CHINA

**Forest Products Working Paper 1**

**DEMAND AND SUPPLY OF WOOD  
PRODUCTS IN CHINA**

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**FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS**  
**Rome, 2007**

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# Foreword

The study "Demand and Supply of Wood Products in China" is the first publication in the new Forest Products Working Paper series established by the FAO Forestry Department. The new series will assess and monitor major developments in global forest products and their markets.

It is symbolic that a theme on China opens the new publication series. In recent years, China has emerged not only as a leading economic power, but also as a major driving force behind global wood markets. In fact, consumption of wood products in China has been increasing faster than its economic growth. After the unprecedented flooding of the Yangtze River in 1998, which caused huge economic damage and affected the lives of the multi-million population of the river basin, the Chinese Government introduced drastic measures to boost its silvicultural programmes and reduce logging. Soon after, China became the world's largest importer of tropical timber and one of the most prominent traders of forest products.

This paper provides an estimate of China's domestic and international wood supply, using data and methods available in 2006 and gives an overview and forecast of product market trends. The new Forest Products Working Paper series will continue monitoring trends in the global wood markets, in which China is playing an increasingly prominent role.



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# Acronyms

<b>APP</b>	Asia Pulp and Paper
<b>CAF</b>	Chinese Academy of Forestry
<b>CCTF</b>	Conversion of Cropland to Forest and Grass Programme
<b>CIFOR</b>	Center for International Forestry Research
<b>COD</b>	chemical oxygen demand
<b>CPC</b>	Communist Party of China
<b>CSPABT</b>	Combating Sandification around Beijing and Tianjin Programme
<b>EU</b>	European Union
<b>FGHY</b>	fast-growing high-yielding
<b>FGHYFP</b>	Programme for FGHY Forest in Key Areas
<b>FGTF/CCICED</b>	Forest Grass Task Force of China Council for International Cooperation on Environment and Development
<b>FRA</b>	Forest Resources Assessment
<b>GDP</b>	gross domestic product
<b>HQ</b>	harvest quota
<b>HQS</b>	harvest quota system
<b>IIED</b>	International Institute for Environment and Development
<b>ILO</b>	International Labour Organization
<b>IMF</b>	International Monetary Fund
<b>ITTO</b>	International Tropical Timber Organization
<b>M&amp;CF</b>	maintenance and construction fee
<b>MDF</b>	middle-density fibreboard
<b>MOA</b>	Ministry of Agriculture of China
<b>MOC</b>	Ministry of Construction of China
<b>MOF</b>	Ministry of Finance of China
<b>NDRC</b>	National Development and Reform Committee
<b>NFI</b>	National Forest Inventory
<b>NFPF</b>	Natural Forest Protection Programme
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>RAFD</b>	Resolution on Accelerating Forest Development by the CPC Central Committee and the State Council
<b>RFIFL</b>	Regulations for the Implementation of the Forestry Law of China
<b>RPFDF</b>	Resolution on Protecting Forest and Developing Forestry
<b>RWE</b>	roundwood equivalent volume
<b>SAR</b>	Special Administrative Region
<b>SAT</b>	State Administration of Taxation of China
<b>SFA</b>	State Forest Administration
<b>SFAKR</b>	Shelter Forest Programme along the Yangtze and other Key Rivers
<b>SFP</b>	Shelter Forest Programme
<b>SKFP</b>	Six Key Forestry Programmes
<b>SPWP</b>	secondary processed wood product
<b>TDBOHK</b>	Research Division of Trade Development Bureau of Hong Kong
<b>TNSF</b>	Three North Shelter Forests
<b>UNECE</b>	United Nations Economic Commission for Europe
<b>UNIDO</b>	United Nations Industrial Development Organization
<b>VAT</b>	value-added tax
<b>WPNRP</b>	Wildlife Protection and Nature Reserves Programme
<b>WTO</b>	World Trade Organization





Source: [www.chinahighlights.com/map/china-provincial-map/](http://www.chinahighlights.com/map/china-provincial-map/).

# Summary

## SOCIO-ECONOMIC TRENDS AND DEMAND FOR WOOD PRODUCTS

### **Economic growth**

China's economy has experienced unprecedented growth over the past two decades. Gross domestic product (GDP) increased by an average of more than 9 percent a year during this period. This rapid economic growth has increased the demand for wood products, but recently consumption of wood products has increased more rapidly than economic growth. For example, consumption of wood-based panels has tripled over the past five years. In addition to GDP increase, other socio-economic factors have affected the demand for wood products. These include population trends, urbanization, booming housing sectors, investments in public construction, and conducive government policies.

### **Urbanization**

Progressing urbanization has increased the demand for wood products and will continue to do so in major cities in all provinces. Urban population still accounts for only about 40 percent of the total in China, and employment in primary industry for about 50 percent of total employment. Government policies to relax regulations on migration will encourage urbanization in all provinces, and this will maintain the strong demand for wood products in urban areas. On the other hand, the population will decrease in rural areas, leading to declining demand for wood products in these areas.

### **Trends in housing construction**

The quality of housing in China has been improving along with the rise in income. Urban per capita floor space increased from 20.3 m<sup>2</sup> in 2000 to 25 m<sup>2</sup> in 2004, at an annual increase of 1 m<sup>2</sup>. Per capita floor space in rural housing also increased, from 25 m<sup>2</sup> to 28 m<sup>2</sup> in the same period. Per capita floor space is expected to increase further in both urban and rural areas. China's housing and construction decoration sector (interior decoration for both public construction and housing) grew at an average annual rate of 19.9 percent from 2000 to 2004. This sector is expected to keep growing more rapidly than the economy in the future.

### **Disparity between urban and rural areas**

Tackling the expanding disparity between rural and urban areas has become one of the priority policy targets for achieving sustainable and balanced development of the country. The government has taken measures to raise rural incomes, and policy changes will lead to increased demand for wood products in rural markets.

### **Construction investments and government policy**

The recent rapid growth of the construction sector has had a significant impact on the consumption of wood products in China. Gross fixed capital formation has increased twice as quickly as GDP recently, surpassing 40 percent of GDP in 2005. This proportion is much higher than the average for Organisation for Economic Co-operation and Development (OECD) countries, which is about 20 percent. The public sector and State-owned industries account for a large part of investments in construction. Government capital spending was about 10 percent of GDP in 2002 – more than double the OECD average. The level of capital spending in government expenditure has more than doubled since 1998.

Vast savings in the banking sector are the result of transfers from the huge trade surplus and have contributed to booming investments in the construction sector. Lending policies in the banking sector may therefore have influenced the increasing investment in fixed capital formation. In this context, the ongoing reform of the banking sector and State-owned

enterprises will have significant impacts on the demand for wood products in the future. The introduction of stricter lending policies into the banking sector will eventually reduce the availability of finance for fixed capital investments. Improved financial management and investment strategies in State-owned enterprises will have similar effects on capital investments. These policy changes will curve the rising investments in the construction sector and, consequently, ease the soaring demand for wood products.

## **POLICY AND REGULATION FOR WOOD HARVEST**

### **Harvest quota system**

With the start of the 11th Five-Year Plan for 2006 to 2010, the annual harvest quota (HQ) of forest plantations increased to 157 million m<sup>3</sup>, surpassing that of natural forests, which decreased to 91 million m<sup>3</sup>. In the previous Five-Year Plan, the HQs of forest plantations and natural forests were 86 million and 137 million m<sup>3</sup>, respectively. Future HQs will allocate more volume to forest plantations because these are expected to expand further.

### **Restriction on the use of domestic wood resources**

Domestic forest resources do not seem to be fully utilized in China. For example, in spite of the strong demand for wood products, there are more than 5 million ha of mature and over-mature forest plantations throughout the country. This can be explained by several restrictive factors: regulation of the HQ; lack of timber markets and transportation infrastructure; high taxes on timber sales; and restrictive harvesting procedures.

Recent relaxation of the application of HQs will increase forest owners' interest in forestry and their flexibility in reacting to market conditions. This change will increase timber production from domestic forest plantations.

The logging ban currently imposed under Natural Forest Protection Programme (NFPP) also applies to forest plantations that are suitable for timber production and have been established by private and collective forest owners. To increase timber production from these forests plantations, designation of the logging ban should be improved in such a way as to be consistent with the management needs of each forest.

## **AFFORESTATION PROGRAMME**

### **The government's afforestation programme**

China's forest area has increased dramatically since 1980, owing to the government's efforts. Between the second National Forest Inventory (NFI) period (1977 to 1981) and the sixth NFI period (1999 to 2003), forest area increased by 60 million ha. It should be noted, however, that official statistics record the area of afforestation as about 100 million ha for the same period, excluding reforestation on harvested land. The disparity between these figures illustrates the difficulty of afforesting successfully, and the existence of deforestation.

Recently, China has started its Six Key Forestry Programmes. By 2005, the government had spent US\$22 billion, mainly for afforestation and conservation of natural forests, dispersing about US\$6 billion a year. Through these efforts, China's forests are expected to meet a large part of future domestic timber demand.

Government expenditure on forestry in 2005 was US\$5 billion, which was 2 percent of total government expenditure for that year and about 20 percent of agricultural expenditure. Over the past ten years, the government has increased its forestry expenditure more rapidly than its agricultural and total expenditures. This is backed by the rapid increase in government revenue supported by strong economic growth.

### **Towards financially sustainable and independent forestry**

Given the high taxes charged to forest owners on sales of harvested timber, and the large subsidies for afforestation paid by the government, it would be desirable to establish more financially sustainable and independent forestry development by introducing market incentives. This can be realized by reducing taxes on timber sales, to enhance investors' interest in forestry, while reducing subsidies for afforestation, to alleviate the burden on national budgets. The increasing demand for wood and the recent high stumpage prices have already provided a strong incentive for planting trees in many parts of China.

For this purpose, secure landownership and land-use right are indispensable. The recently started reforms of tax and land-use rights will create strong incentives to promote forestry by individuals and private enterprises.

## **OUTLOOK FOR THE DEMAND AND SUPPLY OF WOOD PRODUCTS**

### **Demand for wood products**

**Industrial roundwood:** A thematic study by the State Forest Administration (SFA) related to the 11th Five-Year Plan forecast that the future demand for industrial roundwood will reach 325.0 million to 352.0 million m<sup>3</sup> in 2010, and 457.0 million to 477.0 million m<sup>3</sup> in 2020. This volume includes wood for paper and paperboard, but not recycled paper, timber for private use and fuelwood for farmers. The lack of accurate statistics on the domestic production of industrial roundwood makes it difficult to forecast the production and consumption of this wood in China.

**Wood-based panels:** Given the close relationship between fixed capital formation and the consumption of wood products, it can be forecast that if fixed capital formation declines to 20 percent of GDP in 2020 – owing to government policies to cool down capital investments – the annual consumption of wood-based panels will reach 92 million m<sup>3</sup> in 2020. If fixed capital formation declines to 30 percent of GDP in 2020, annual consumption of wood-based panels will reach 160 million m<sup>3</sup>.

**Sawnwood:** According to official Chinese statistics, the production of sawnwood was 18.0 million m<sup>3</sup> in 2005. These government statistics do not capture sawnwood production by small-scale producers, however, which account for a large part of total production in the country. This makes it difficult to forecast the demand and supply of sawnwood. One recent study estimated sawnwood consumption in China at about 58.0 million m<sup>3</sup> in 2002.

**Paper products:** Compared with major paper-consuming countries, China consumes more wrapping and packaging paper and paperboard, and less newsprint printing and writing paper. This is probably a result of the rapid development of industrial sectors. China's per capita consumption of paper products is still below the world average. As incomes rise, China will consume more newsprint and printing and writing paper in the future.

**Pulp for paper:** Recovered paper is used for more than half the total pulp for paper production in China. However, non-wood pulp, mainly straw pulp, still accounts for 26 percent of this total. The government is promoting a shift from non-wood pulp to wood pulp for paper production to improve production efficiency, reduce water consumption and alleviate the contamination of water resources. This policy will continue to increase the demand for wood for pulp in the future.

### **Supply of industrial roundwood from domestic forests**

**Wood production from domestic forests:** The SFA thematic study forecast that the supply of industrial roundwood from domestic forests will reach 241.5 million m<sup>3</sup> a year in 2010, of which forest plantations are expected to supply 110.0 million m<sup>3</sup> and natural forests 73.0 million

m<sup>3</sup>. In 2020, the total production of industrial roundwood is expected to reach 304.0 million m<sup>3</sup>, of which forest plantations are expected to account for 213.0 million m<sup>3</sup> and natural forests for 91.0 million m<sup>3</sup>.

An average of 0.38 million ha of productive forest plantations are forecast to become mature each year between 2006 and 2015, equivalent to an estimated 66.9 million m<sup>3</sup> of growing stock a year. For the period of 2016 to 2025, 1.04 million ha of productive forest plantations will become mature each year. The growing stock in these new mature forests equals an estimated 183 million m<sup>3</sup> a year.

### **Imports of wood products**

**Imports of industrial roundwood:** Although timber production from domestic forests is expected to increase in the future, it will not meet the growing domestic demand for wood products. China's imports of wood products such as industrial roundwood, sawnwood and wood pulp will continue to increase. China will need to import large-diameter timber and high-quality hardwood timber in particular, because these woods are lacking in domestic forests.

Under these conditions, the Russian Federation's new policy of imposing high export duties (80 percent) on logs will have a significant impact on wood markets. At present, Russian logs account for nearly 70 percent of China's industrial roundwood imports. However, if the new duties are imposed, imports of Russian industrial roundwood will decline substantially, and import of sawnwood will increase dramatically.

Anticipated scarcity of forest resources in Southeast Asia will affect China's wood-based panel production. Shortages of large-size tropical wood will make plywood less competitive in the markets. In the future, fibreboard production will surpass that of plywood, because small logs and wood chip can be used for fibreboard production.

Increasing investments from China will bring significant changes to the financial conditions of some developing countries, where forests have not yet been exploited owing to insufficient funding of the forestry sector. Investments in the forestry sector may lead to the rapid depletion of natural forests in these countries. In this respect, the enforcement of laws and regulations for sustainable management by these exporting countries will become increasingly important.

**Imports of pulp for paper:** The shift in paper production from non-wood pulp to wood pulp will continue. China's imports of wood pulp and recovered paper affect the prices of these products on international markets. This trend will also affect the demand for wood chips; competition over wood chips with the domestic wood-based panel industry, and increased demand for wood chips for paper production in international markets are anticipated.

### **Exports of wood products**

**Exports of wood and paper products:** The production capacities of the wood-based panel, wooden furniture and paper industries have increased dramatically over the past decade in China. This trend will continue to increase China's exports of these products. Much of the recent investment in new factories for these industries has been directed to exports of the products.

The competitive advantages of production in China have largely been its low-cost and skilled labour force. Although value-added per employee in China is lower than in other countries, value-added per wage costs is similar to that in other exporting countries. In addition, Chinese producers have recently improved production efficiency and product quality by introducing new technologies. Exports of high value-added products such as paper and furniture will gradually increase.

### **Trade disputes and the currency exchange rate**

With the increasing trade surplus, China has been facing severe trade disputes with major importing countries. Anti-dumping measures have been taken in Europe and the United States. Many of China's policies to promote exports of industrial products will be examined more strictly in the light of WTO rules. These policies include preferential tax treatments and subsidies to enterprises that specialize in the export of certain products. Recently, the Government of China has started to revise these policies, and the resulting changes may have significant influence on exports of wood products.

The exchange rate of the Chinese yuan, which has been almost pegged to the United States dollar, has influenced China's trade, particularly its exports of industrial products. In 2005, the Government of China introduced a managed floating exchange rate system with respect to a basket of currencies, but slight changes in currency exchange rates have occurred since then. China is expected to introduce a more flexible exchange rate system, which would lead to an appreciation of the Chinese yuan and influence trade and economy in many areas. First, higher-valued Chinese currency would encourage the import of materials for production, such as roundwood. Second, a higher yuan would raise the real incomes of domestic consumers and expedite the shift from export-oriented growth to service sector-oriented growth, which depends more on domestic demand.

However, an appreciation of the yuan would reduce the profits of export industries and also damage less competitive industry sectors, particularly agriculture. This would have a serious impact on the country's social stability, as the economic disparity between urban and rural areas has been expanding. Under these circumstances, it is not conceivable that the government will move to a floating exchange rate system in the short term, although it may allow the present system a little more flexibility.



# 1. Introduction

Along with the remarkable economic growth and wood industry development, China has become one of the largest producers, consumers and traders of wood products in the world. This rapid development has led to substantial changes in the global picture of wood products trade and has drawn attention to the future demand and supply of wood products on a global scale.

Demand and supply of wood products is closely related to a country's economic growth, demographic trends and forestry related policies. Moreover, cross-sectoral policies related to urbanization, public construction, finance, investment, trade and industry development have impacts on production and consumption of wood products.

This paper aims at providing a critical overview of relation between demand and supply of wood products and a variety of socio-economic and policy factors in China. The paper also presents outlook for the future. This work was mostly done with the review of existing statistics, policy documents and literature. Wood products covered in the paper include industrial roundwood, sawnwood, wood-based panels, wooden furniture, and pulp and paper products.

The second chapter of the paper argues relevant socio-economic factors. The third chapter reviews recent trends in production, consumption and trade of wood products. Key policies are discussed in the fourth chapter on wood industry development, in the fifth chapter on wood raw material production and in the sixth chapter on afforestation. The final chapter focuses on the outlook for the demand and supply of wood products in China.





## 2. Economic growth and demand for wood products

Demand for wood products such as sawnwood, wood-based panels and paper is closely related to a country's economic growth. Social factors such as population movement also affect the demand. This chapter describes key socio-economic factors that have had an impact on the consumption of wood products in China. These factors include economic growth, population increase, urbanization, improving living standards and policies related to rapidly expanding fixed capital investment.

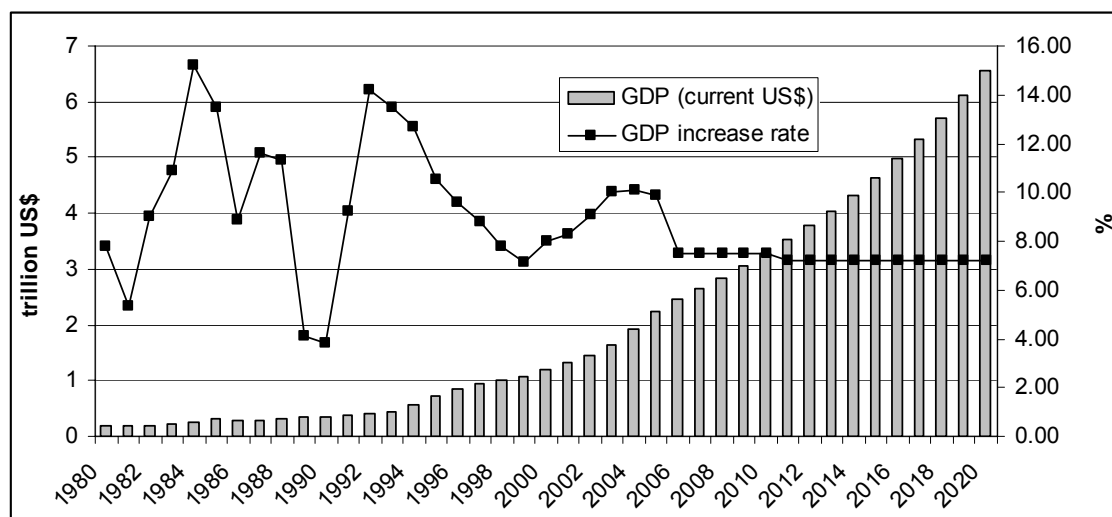
### SOCIO-ECONOMIC FACTORS

#### Economic growth

China's economy has experienced unprecedented growth over the past two decades. The annual gross domestic product (GDP) increase rate surpassed 9 percent on average, and was 9.9 percent in 2005. China's GDP reached US\$2.3 trillion in 2005, which ranked fourth in the world.

The 11th Five-Year Plan of the Government of China, approved in 2005, forecast that China's GDP will reach about US\$3.2 trillion in 2010 (based on the yuan/United States dollar exchange rate of 2005), with annual growth of 7.5 percent. Per capita GDP is expected to reach about US\$2 350 in 2010. In 2002, the Development and Research Centre of the State Council of China predicted that China's GDP will double between 2010 and 2020, at an annual growth rate of nearly 7.2 percent, to reach US\$6.6 trillion in 2020. With this assumption, per capita GDP will reach US\$4 490, which is similar to that of upper-middle-income countries<sup>1</sup>. Figure 1 shows the expectations for GDP growth in the future, and past trends since 1980.

Figure 1. Trends in GDP growth and annual growth rate

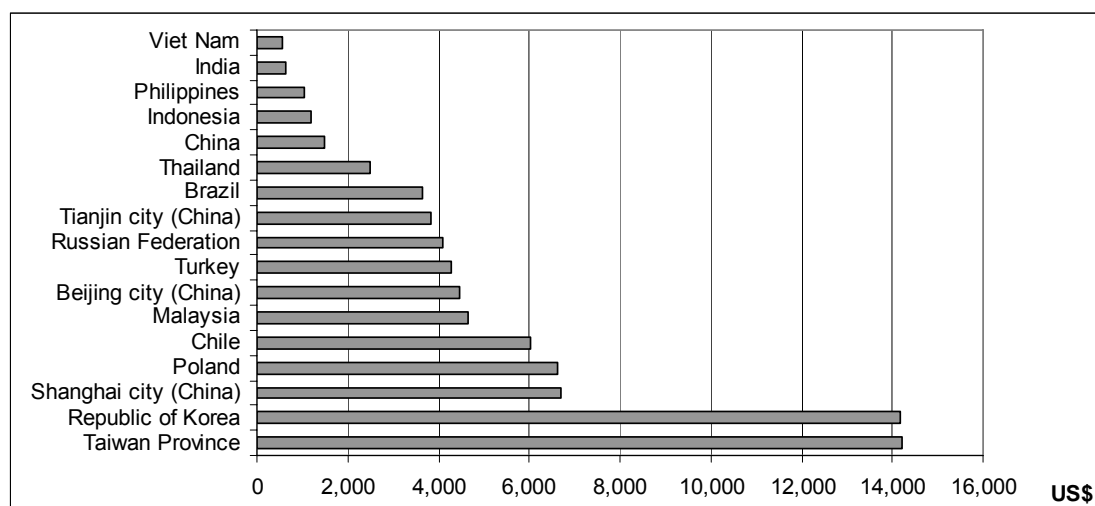


Sources: National Bureau of Statistics of China, 2006; World Bank, 2006.

China's per capita GDP reached US\$1 700 in 2005, surpassing those of the Philippines and Indonesia, but still below those of Thailand and Brazil. Per capita GDP in large cities such as Beijing, Shanghai and Tianjin is already as high as those of Malaysia, the Russian Federation and Turkey, as illustrated in Figure 2.

<sup>1</sup> Middle income countries are those classified in lower middle income and upper middle income groups in the World Development Indicator of the World Bank.

**Figure 2. Per capita GDP of selected countries, 2005**



Source: IMF, 2006.

### Population growth

China's population reached 1.3 billion in 2005 (National Bureau of Statistics of China, 2006). During the 1990s, the population increased by more than 1 percent a year. Recently this rate has declined to an annual increase of about 0.6 percent.

The Government of China forecast that the population will reach 1.37 billion in 2010 and 1.46 billion in 2020, at an annual increase rate of 0.4 percent. China's population is forecast to reach its highest – 1.5 billion – in 2033, before decreasing (Table 1). In the long term, the downward trend will affect the consumption of wood products (National Bureau of Statistics of China, 2006), but the government has policy options to loosen population control should it face drastic population decrease in the future.

Demographic trends and consumer preference will influence the housing sector. As family planning is implemented, the recent population increase is partly owing to longer life expectancy in the country, which indicates that society is ageing. As the population grows older, savings in the banking sector will decrease because more people will be consuming without producing. This may eventually affect the amount of savings in the banking sector that can be invested in the construction and housing sectors. In addition, the younger generation tends to consume more than its parents' generation, and this too will encourage a shift from saving to consumption.

**TABLE 1**  
**Predicted population trends**

Year	Population (billion people)
2005	1.30
2010	1.36
2020	1.46
2033	1.50

Source: National Bureau of Statistics of China, 2006.

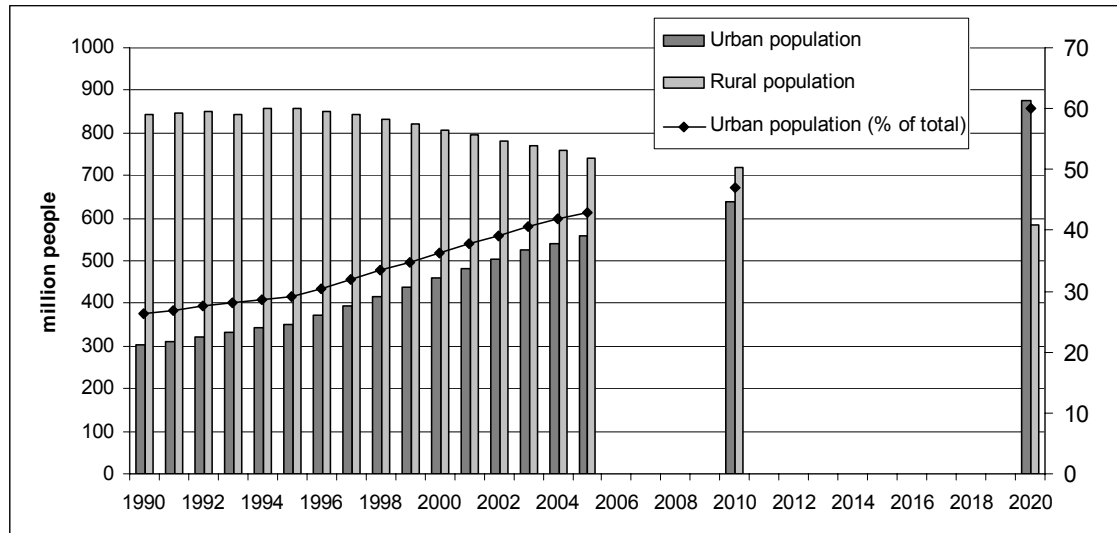
### Urbanization

Progressing urbanization is another important factor that affects the demand for wood products. Along with economic growth, urbanization has been progressing at a rapid rate, averaging 1 percent a year over the past ten years. In 2004, 760 million people (58 percent of the population) were living in villages, and 540 million (42 percent) in cities (Figure 3). Over

the past ten years, the urban population has increased by 190 million, while the rural population has decreased by 100 million.

It is anticipated that the next two decades will continue to witness rapid urbanization in China. The urban population rose from 26 percent in 1990 to 43 percent in 2005, at an annual growth rate of more than 1 percent. This trend is expected to continue until 2020. Urban population is expected to reach 620 million (45 percent of the total population) in 2010, and between 800 million and 900 million (58 to 60 percent of the total) in 2020 (MOC, 2005a). The progress of urbanization will continue to affect new housing construction in urban areas, driving the demand for wood products.

**Figure 3. Urbanization trends**



Source: MOC, 2005a.

China used to restrict the inflow of workers into large cities. Recently, however, the government has called for cancelling these restrictions to allow more flexible labour movement. The Security Ministry intends to reform the registered permanent residence system, and is exploring a new resident registration system. As of 2005, 11 provinces – including Liaoning, Fujian and Shandong – had abolished the rural and urban permanent residence system and started to register residents as provincial residents. The new registration system will loosen the movement of people within provinces and promote the influx of workers into large and medium-sized cities (*Legal Daily*, 2005).

Due to continuing depopulation, the demand for housing in rural areas could decrease. On the other hand, investment in infrastructure development by the public sector will shift to the areas left behind. Both trends will affect the demand for wood products.

Recently, the government has started to promote infrastructure and market development at sub-county levels. This will enhance the pace of urbanization in what are at present rural areas (TDBOHK, 2005). Growing sub-county areas will provide further opportunities for construction development.

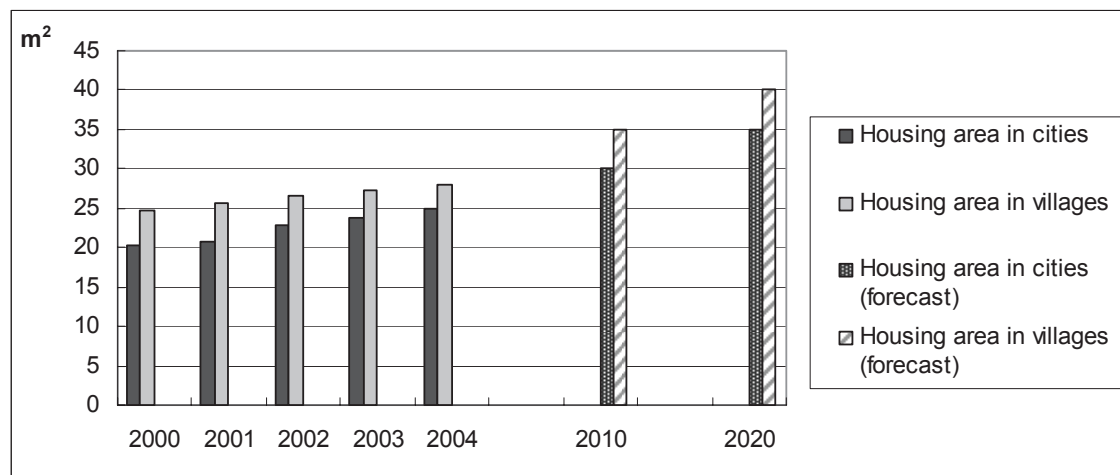
### Housing construction

In China, the quality of housing has been improving alongside the rise in income. Urban per capita floor space increased from 20.3 m<sup>2</sup> in 2000 to 25 m<sup>2</sup> in 2004, at an average increase of 1 m<sup>2</sup> a year. Rural housing also increased, from 25 to 28 m<sup>2</sup>, over the same period. The total annual increase of housing floor space in urban areas was about 700 million m<sup>2</sup> in 2002. In 2002, total expenditure for housing was US\$97 billion (800 billion yuan).

The Policy Research Centre of the Ministry of Construction predicts that per capita floor space in urban areas will reach 30 m<sup>2</sup> in 2010, and 35 m<sup>2</sup> in 2020 (MOC, 2005b). In rural

areas it will reach 35 and 40 m<sup>2</sup>, respectively, in the same years. This trend implies that the recent increase rate will continue until 2010, followed by a slightly lower rate until 2020. Experience in other countries indicates that housing demand grows until the floor area per capita has reached 30 to 35 m<sup>2</sup>.

**Figure 4. Housing areas per capita in cities and villages**



Source: MOC, 2005b.

China's housing and construction decoration sector (interior decoration for both public construction and housing) has grown extremely rapidly in recent years. This is mainly owing to the progress of urbanization, expanding investments in the housing sector and improving living standards of urban residents. While growing at an average annual rate of 19.9 percent from 2000 to 2004, with housing decoration growing at 25.5 percent a year and public construction decoration at 11.6 percent, the production value of the housing and construction decoration sector rose from US\$52 billion (430 billion yuan) in 2000 to US\$106 (880 billion yuan) in 2004 (Association of Construction Decoration, 2006). Of the sector's total output value, 50 percent is estimated to be material expenses, of which wood products account for a substantial share (TDBOHK, 2005).

The China Economic Research Committee on Construction Materials Industry estimated that growth of China's housing and construction decoration sector will be 3 to 4 percent higher than that of national GDP. As residence expenses account for less than 10 percent of people's incomes, housing-related consumption still has a promising future. In 2002, the total area of urban residences was more than 5 billion m<sup>2</sup>, and more than 900 million suites needed renovation (*People's Daily*, 2005). Decoration of newly built residences will keep increasing, with that of renovated houses growing even faster. As wood is one of the main decoration materials, the growth of the housing and construction decoration sector will raise the demand for major wood products such as sawnwood and wood-based panels.

## GOVERNMENT POLICIES

### Challenges for balanced growth

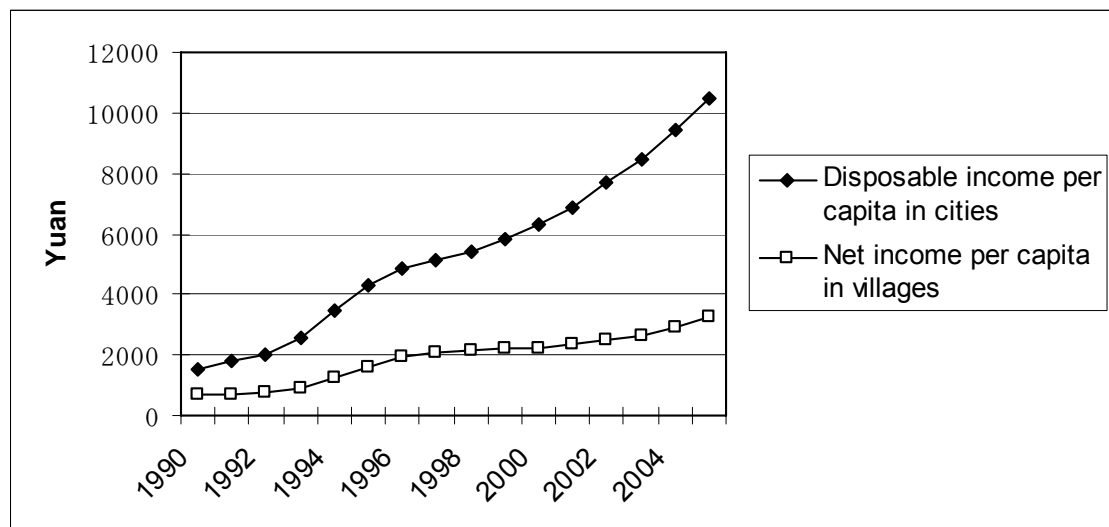
Over the past two decades, government policies have promoted economic growth and reduced poverty, but China still faces several challenges for its sustainable and balanced development. These include reform of State-owned enterprises, improved law enforcement in the economic sphere, the introduction of flexible exchange rates for its currency, and reform of the banking sector, the pension system and taxation. Other challenges include the restructuring of public expenditure, addressing the expanding disparity between urban and rural incomes, and alleviating the imbalance between economic growth and the environment (OECD, 2006b). The Government of China has started to tackle these challenges. Policy changes will

influence some industry sectors and may have impacts on the demand for wood products, as described in the following subsections.

### Disparity between urban and rural areas

As a result of sharp income rises in urban areas, economic disparity between urban and rural areas has amplified. Figure 5 indicates the increases in per capita income in both areas. In 2005, urban per capita disposable income reached US\$1 294 (10 493 yuan), and rural per capita net income US\$397 (3 255 yuan). The figures indicate growth of 695 and 454 percent, respectively, over the last fifteen years. Urban income has increased more rapidly than rural income.

**Figure 4. Income increases in cities and villages**



Source: National Bureau of Statistics of China, 2006.

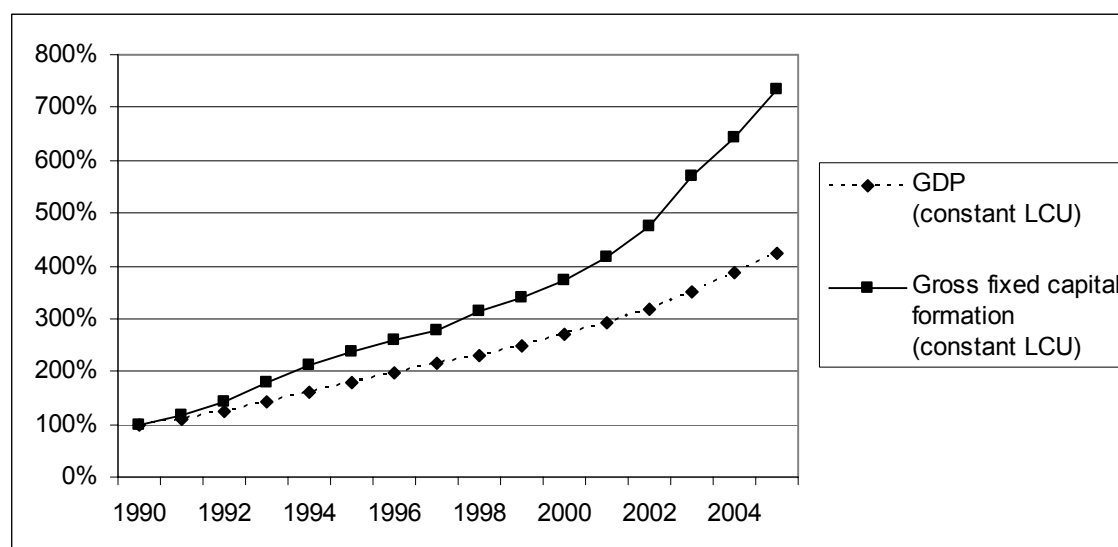
Under these circumstances, tackling the increasing disparity between rural and urban areas has become one of the priority policy targets for achieving sustainable and balanced development in China. The government has taken measures to increase rural incomes, and provides direct subsidies to rural areas, particularly for farmers. Growing consumption by the rural population was included in the policy indicators. Policy changes will increase the demand for wood products in rural markets. In line with this, some of China's major timber markets have started to move into rural areas.

### Fixed capital formation and government policies

Recent rapid growth of the construction sector has had a significant impact on the consumption of wood products in China. Investments in fixed capital formation provide an indicator of the development of construction as a whole. Recently, fixed capital investment has increased twice as rapidly as GDP (Figure 6). Gross fixed capital formation surpassed 40 percent of China's GDP in 2005 (World Bank, 2006). This proportion is much higher than the average for Organisation for Economic Co-operation and Development (OECD) countries, which is about 20 percent (OECD, 2006a).

The public sector and State-owned industries account for a large share of investments in construction. Government capital spending was about 10 percent of GDP in 2002, which was more than double the OECD average. The share of capital spending in government expenditure has more than doubled since 1998 (OECD, 2006a). Implementation of key government projects has greatly increased capital spending and the demand for wood products. These projects include the Three Gorges Project on the Yangtze River, the transport of natural gas from the west to the east, the South-to-North Water Diversion Programme, and the Olympic Games stadium project.

**Figure 5. Trends in fixed capital formation**



Source: World Bank, 2006.

A booming construction sector has resulted in the emergence of large construction and housing sectors. Vast savings in the banking sector, which have been transferred from the huge trade surplus, have contributed to this trend. The lending policies of the banking sector may therefore have influenced the increase in investment in fixed capital formation.

In this context, the ongoing reform of the banking sector and State-owned enterprises will have significant impacts on the future demand for wood products. The introduction of stricter lending policies into the banking sector will eventually reduce the availability of finance for fixed capital investments. Improved financial management and investment strategies in State-owned enterprises will have similar effects on capital investments. These policy changes will curb the heating of investment in the construction sector, and consequently ease the soaring demand for wood products.

**Box 1. Wood demand for housing and industry in Shanghai**

The Yangtze River Delta is one of the Chinese regions undergoing the fastest economic growth. Shanghai provides the momentum that drives economic development in this area. Over the past two decades, the development of areas along the banks of Huangpu River, the launch of the central ring road project and the World Expo programme, the construction of Lujiazui finance and trade zone and Huaihaizhong Road commercial district, and the development of Songjiang, Haigang and Jiading new towns, have resulted in the rapid increase of Shanghai's demand for timber, influenced by real estate development.

Shanghai's demand for timber falls into two categories. One is the demand for local construction materials and the decoration industry. According to statistics, 30 to 35 million m<sup>2</sup> of floor space for commercial residences and other new housing are being built every year in Shanghai, equivalent to 300 000 to 350 000 new apartments, while about 100 000 existing apartments are being decorated. This has created a demand for timber, plywood and other wood products that is equivalent to 3 million m<sup>3</sup> of logs. The second category of timber demand is for the manufacturing industry. The timber industry in Shanghai comprises mainly floorboard and furniture producers, which demand about 2 million m<sup>3</sup> of logs a year. An additional 1 million m<sup>3</sup> of timber is used for construction mould board, piano making and handicrafts every year. In total, Shanghai's demand for timber is about 6 million m<sup>3</sup> a year.

### 3. Production, consumption and trade in wood products

With the growth in domestic demand, successful entrance into global markets and increasing investments, the wood processing industry has developed dramatically in China. This chapter describes recent trends in the development of wood processing industries, focusing on production, consumption and trade in major wood and paper products.

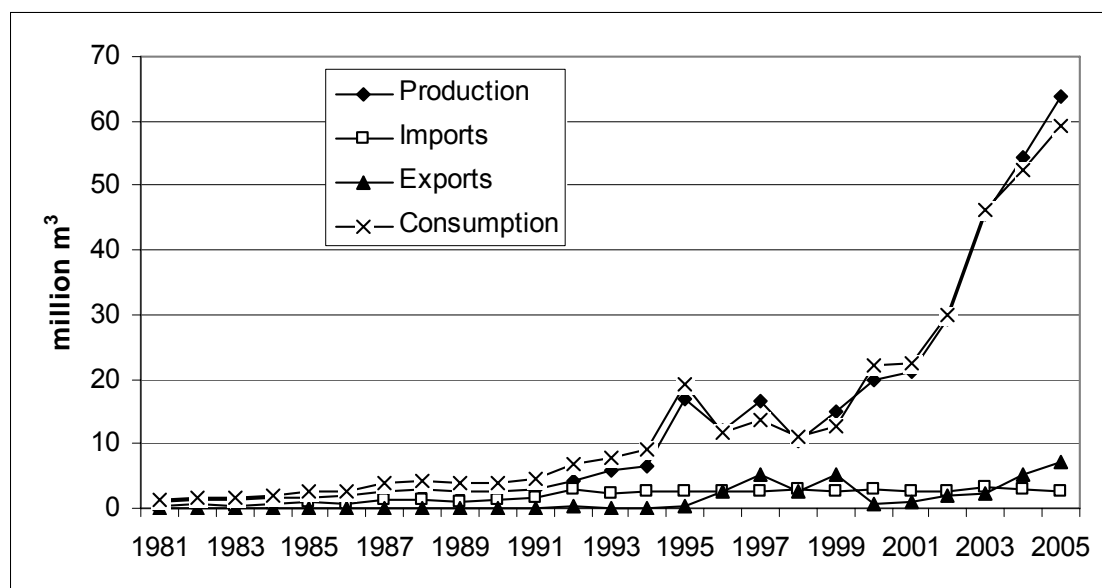
#### WOOD-BASED PANELS

##### Production and consumption

The recent development of domestic real estate, construction, interior decoration, furniture production and standards of living have all facilitated rapid development of the wood-based panel industry (Chen, 2005). The expansion of public construction projects has also led to an unprecedented increase in the demand for wood-based panels.

Figure 6 shows the production, consumption and trade in wood-based panels. Production has tripled over the past five years, reaching 64 million m<sup>3</sup> in 2005 (SFA, 2006). China surpassed the United States in the production of wood-based panels in 2004. Some 90 percent of production was consumed domestically. These figures include wood-based panels for producing wooden furniture, some of which is exported (see the following section on Wooden furniture).

**Figure 6. Production, trade and consumption of wood-based panels**

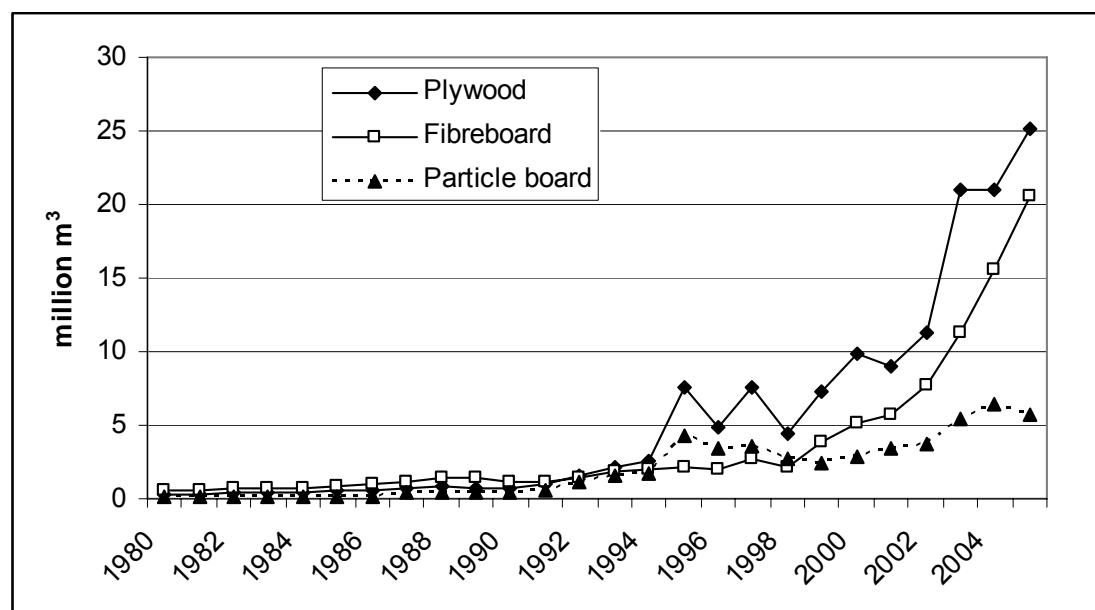


Source: SFA, 2006.

Among wood-based panels, the production of plywood reached 25.1 million m<sup>3</sup> in 2005, accounting for 39 percent of total wood-based panel production. Fibreboard production was 20.1 million m<sup>3</sup>, most of which was middle-density fibreboard (MDF), and accounted for 32 percent of the total. Production of particle board was 5.8 million m<sup>3</sup>, accounting for 9 percent of the total. As illustrated in Figure 7, production of plywood and MDF has increased dramatically.



**Figure 7. Production of three major types of wood-based panel**



Source: SFA, 2006.

Owing to the convenience of importing wood raw materials, particularly tropical timber, and the preferential treatment that local governments accord to wood-based panel manufacturing, at present most wood-based panel mills are located in eastern provinces, where forest resources are deficient (Tian, Zhai and Liu, 2002). Recently, however, more and more domestic poplar wood (*Populus tomentosa*) from plantations has been used as a core for plywood, with tropical wood used for surfaces. The top three provinces for wood-based panel manufacturing in 2004 were Shandong, Jiangsu and Hebei, which yielded about 30 million m<sup>3</sup> in total and accounted for 54 percent of the country's total production.

The total production capacity of China's fibreboard and particle board factories has been expanding, which will affect the markets for wood-based panels. For example, the annual production capacity of the MDF industry reached 26.3 million m<sup>3</sup> in 2006, which was much larger than the actual production of 2005 (CAF/ITTO, 2006a). With the expected increase in investments for new factories, MDF production will continue to increase. Investments in large-scale particle board production, including in the largest particle board production line in Asia, are also rising (CAF/ITTO, 2006b).

## Trade

China has changed from being a net-importer of wood-based panels to an exporter. With its expanding domestic production capacity, China's imports of plywood went down to 0.6 million m<sup>3</sup> in 2005, compared with more than 2 million m<sup>3</sup> a year in the early 1990s. Trade in fibreboard indicates a similar trend. At the same time, exports of wood-based panel have increased, and surpassed imports in 2004. More than 7 million m<sup>3</sup> – nearly US\$2.4 billion – of wood-based panels were exported from China in 2005, of which 5.6 million m<sup>3</sup> was plywood. China's exports of plywood have overtaken those of Indonesia, which used to be the largest supplier in Asia.

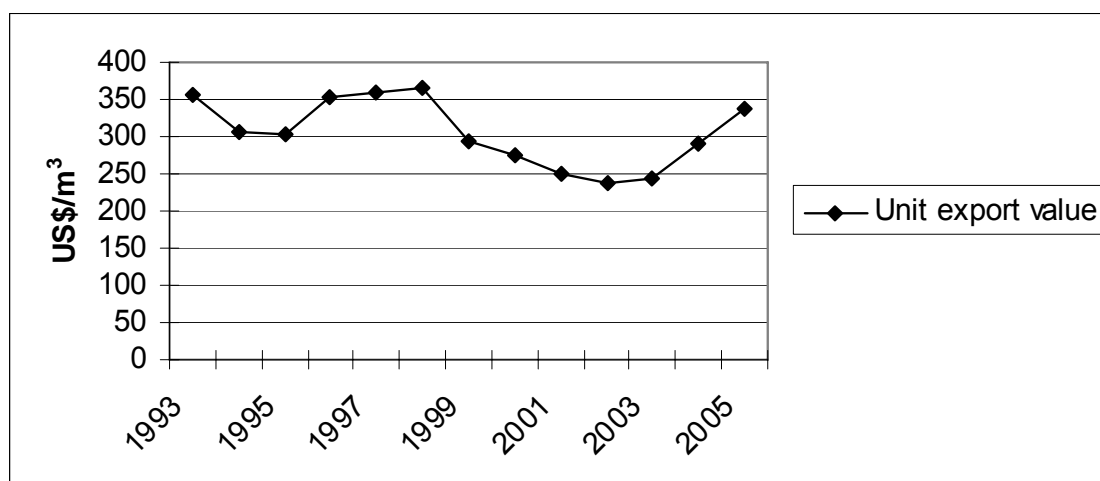
Plywood export value grew to US\$1.9 billion in 2005. Major importers of Chinese wood-based panels are the United States, Japan and the Republic of Korea. Recently, exports to Saudi Arabia have rapidly increased. Figure 9 shows trends in the unit export value of Chinese plywood. The recent rise in unit value is mainly due to the strong demand in importing countries and the improved quality of Chinese plywood.

The competitiveness of China's plywood in global markets rests not only on low labour costs, but also on low wood material costs, owing to the growth of domestic wood

availability, especially of poplar (*Populus tomentosa*) for core board. Based on analyses of domestic demand, raw material availability, input costs, product quality and increased production efficiency, it is predicted that the export of plywood still has prospects for growth in global markets (Shen and Chen, 2002).

However, the increase of low-priced plywood exports from China has provoked import restrictions in Europe. Imports of Chinese plywood accounted for 10 percent of European Union (EU) plywood consumption in 2005. In 2004, faced with significant impacts on the market, the European Commission imposed anti-dumping measures, including a 64 percent import tariff for Chinese okoume plywood (UNECE and FAO, 2006).

**Figure 8. Unit export values of Chinese plywood**



Source: SFA, 2006.

### Box 2. Plywood industry in Jiashan, Zhejiang province

Located in the northeast of Hangjia Lake plain, Jiashan county is less than 100 km from Shanghai. Under the guidance of different levels of government and the competent departments, plywood manufacturing in Jiashan – where previously no wood was produced – has been booming in recent years, and is the county's pillar industry. Jiashan has become the largest plywood production base in East China, and has been named the Land of Plywood of Zhejiang by the Provincial Forestry Department. More than 320 plywood mills and processing and accessory enterprises form a complete industrial chain from log to end-product, with a total annual output value of 8.5 billion yuan, which accounts for one-third of the domestic market share. Currently, nine wood enterprises have won independent export entitlements, allowing high-quality plywood and furniture to enter the markets of more than ten countries and regions, including the United States, Japan and Southeast Asia. The export value in 2004 reached US\$113 million, 7.5 times that of 1999.

## WOODEN FURNITURE

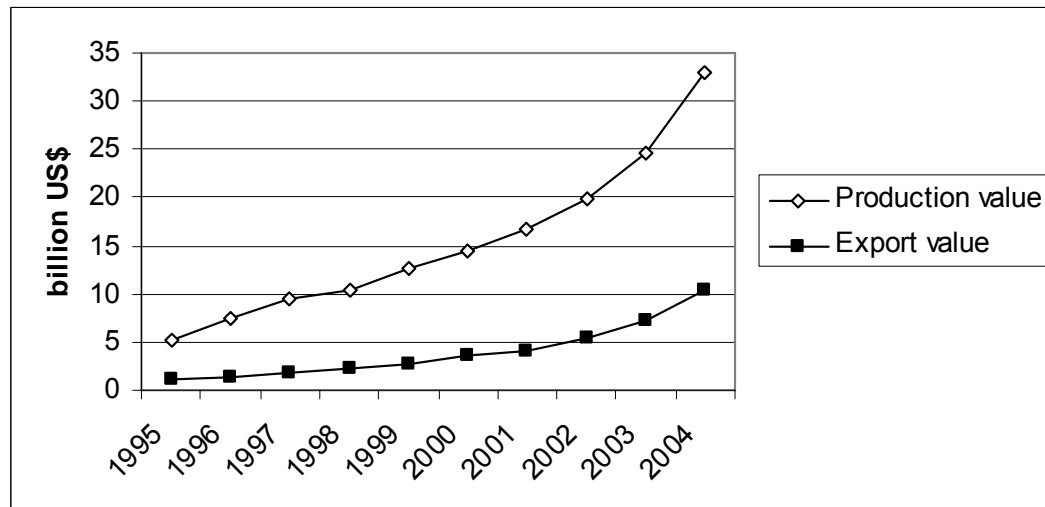
### Production and consumption

With economic development and increased incomes, Chinese consumer preferences have been changing, particularly in urban areas, from goods for basic needs to diversified products of higher quality. Recently, more and more people choose to use natural products such as wood, which are of better quality for housing interiors. Wooden furniture sales have been increasing steadily. The total output of wooden furniture increased from 48 million sets in 2000 to 428 million in 2004 (SFA, 2005a).

The total production value of the furniture industry (including wooden furniture) increased from US\$1 billion (2.9 billion yuan) in 1985, to US\$5.3 billion (44.6 billion yuan) in 1995

and US\$33 billion (273 billion yuan) in 2004 – an average growth of 15 percent a year (National Bureau of Statistics of China, 2006). As shown in Figure 9, the export value of furniture also rose, from US\$1.1 billion in 1995 to US\$10.4 billion in 2005.

**Figure 9. Furniture production and export values**



Sources: SFA, 2006; National Bureau of Statistics of China, 2006.

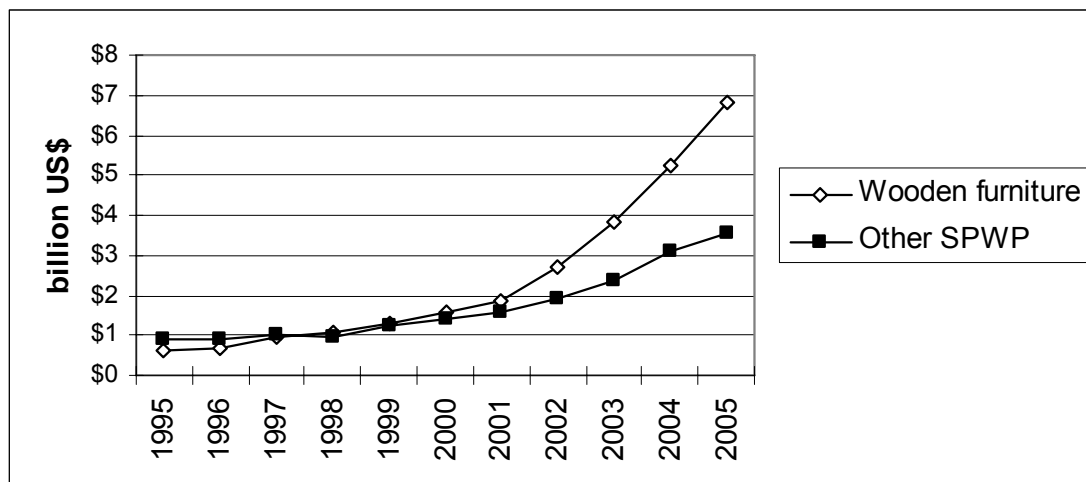
The wood material used for domestic furniture in 2004 was estimated at 27.8 million m<sup>3</sup> in roundwood equivalent volume (RWE) (SFA, 2005a). Sawnwood for wooden furniture production was estimated at 11.0 million m<sup>3</sup> (RWE) (Li, 2006). These figures are based on the production value of wooden furniture, estimation of the wood material value used in production and the prices of wood materials for production.

Since the 1980s, furniture production has developed rapidly from a traditional handicraft to a modern mechanical industry. Furniture has become a market-oriented industry dominated by non-State-owned enterprises; State-owned enterprises have almost disappeared from this industry. There are more than 50 000 furniture manufacturers in China, with more than 5 million employees. Most of these are medium- and small-scale enterprises, accounting for about 90 percent of the industry's output value. The largest market share is in the hands of domestic private enterprises and three types of foreign-investment enterprises or ventures: Chinese and foreign joint ventures, cooperative businesses, and exclusively foreign-owned enterprises. After nearly 20 years of competition, major production bases have been developed in the Pearl River Delta at Shenzhen, Dongguan, Shunde, Guangzhou and Zhongshan; the Yangtze River Delta in Jiangsu, Shanghai and Zhejiang provinces, including Shanghai, Suzhou, Changzhou, Hangzhou, Wenzhou, Yuhuan and Anji; the Bohai Sea area at Beijing, Tianjin, Hebei, Shandong and Liaoning; Sichuan and Shaanxi provinces centred on Chengdu and Xi'an; and Heilongjiang and Fujian. Some 81 percent of furniture manufacturers are in China's southeastern provinces (Xu and Xu, 2000).

## Trade

China's exports of wooden furniture soared from 91 million pieces at a value of US\$1.7 billion in 2000 to 176 million pieces at a value of US\$5.2 billion in 2004, reaching US\$6.8 billion in 2005. China overtook Italy as the world's largest wooden furniture exporter. Figure 10 indicates trends in the export values of both wooden furniture and other types of secondary processed wood products (SPWPs), such as builders' woodwork and mouldings. In addition to wooden furniture, China has also become the world's largest exporter of SPWPs, the total export value of which reached US\$10.4 billion in 2005. As with plywood, low production costs, high-quality products and favourable exchange rates have made Chinese wooden furniture more competitive in global markets.

**Figure 10. Export values of wooden furniture and other SPWPs**



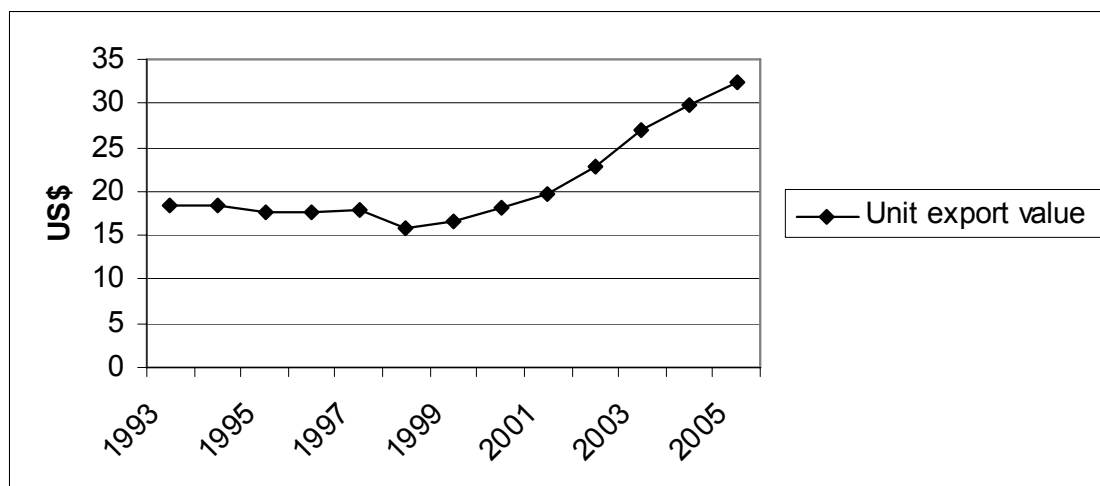
Source: UN, 2006.

Figure 11 shows the trends in Chinese furniture exports. Both export values and unit prices of exported furniture have increased substantially over the past five years. This trend indicates that China is becoming an exporter of value-added wooden furniture, supported by advanced production techniques.

The major destinations for Chinese furniture exports remained constant between 2001 and 2005, with the top four being the United States, Hong Kong Special Administrative Region (SAR), Japan and the United Kingdom. The United States alone accounts for half of China's furniture exports.

In 2004, facing soaring furniture imports from China, the United States Department of Commerce imposed anti-dumping duties ranging from 2.32 to 198 percent on Chinese bedroom furniture (UNECE/FAO, 2006).

**Figure 11. Trends in wooden furniture export prices**



Source: SFA, 2006.

### **Box 3. The furniture industry in Dongguan**

The output value of furniture from Guangdong province accounts for one-third of China's total. Many investors choose to invest in Dongguan City because of the excellent location, favourable policies for introducing investment, convenient transportation, low land prices, ample availability of land and labour resources, and government support in terms of taxation, cargo clearance and border control. After more than ten years of development, Dongguan has rapidly become a furniture manufacturing base. In 2004, there were nearly 3 000 furniture enterprises, with a total output value of more than 30 billion yuan, accounting for about one-quarter of China's total and making it the main city for furniture exports and the largest furniture manufacture and export base in the Asia-Pacific region. Dongguan and its furniture industry can best be described by the saying "China's furniture industry relies on Guangdong, and Guangdong's furniture industry relies on Dongguan".

### **Box 4. Changes in the furniture industry in Guangdong**

Most of the furniture production and export in Guangdong province is concentrated in the areas of Shenzhen, Dongguan and Shunde. At present, China's average furniture consumption capacity is a relatively low US\$8.6 per capita per year. Furniture consumption depends on the construction of urban housing, the per capita income and the education level. Sales of furniture in Guangdong market over the last four years show that the market for low-grade furniture in medium-sized and large cities has reached saturation point, which means that the supply is exceeding the demand. It has been estimated that every year since 1998, furniture worth tens of million of yuan remains unsold; this oversupply is all of low-grade furniture. This has caused such a fierce price war that a suite of five pieces of bedroom furniture is now sold for 2 800 yuan, which is only slightly more than the raw materials cost. At the same time, prices of raw and auxiliary materials for furniture have been increasing over the past few years: timber prices have risen by at least 50 percent, and the prices of paint, glue and hardware fittings are also on the rise. The costs of rent, transportation and labour also keep growing. Under such conditions, interest in furniture enterprises is declining, and many unsuccessful enterprises are closing down. According to statistics, as many as 1 000 furniture manufacturers in the Peal River Delta closed during 2000 and 2001.

Although the low-grade furniture market is saturated, medium- and high-grade furniture still has much market potential. Results of an investigation in Guangdong show that the demand for medium- and high-grade furniture has increased by about 80 percent. There is strong demand for this grade of furniture in developed countries, and it has been suggested that furniture manufacturers in Guangdong should devote themselves to creating innovative products, instead of struggling with the price wars for low-grade furniture.

## **SAWNWOOD**

### **Production and consumption**

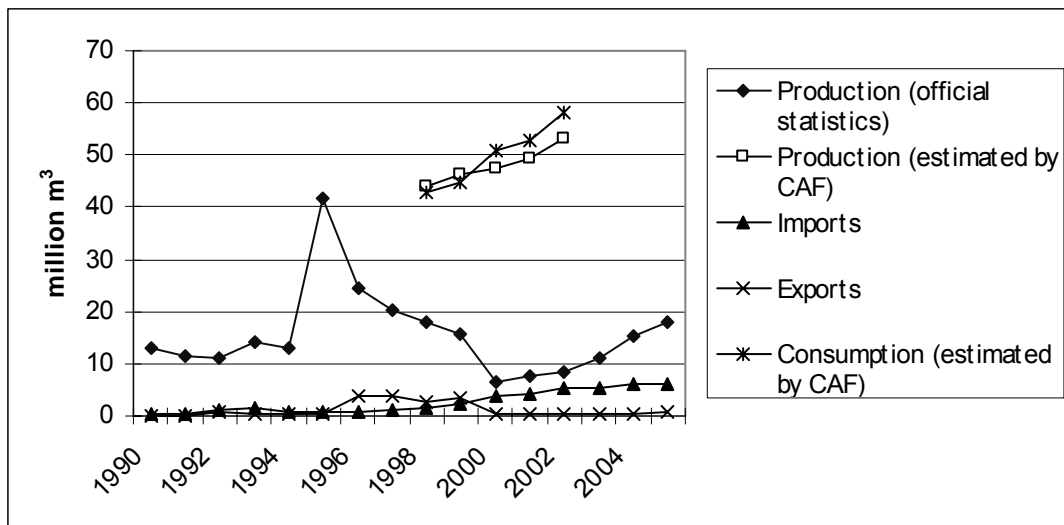
Figure 12 shows trends in the production, trade and consumption of sawnwood. Both production and imports have increased remarkably since 2000 because of the rapid growth in the construction, housing and furniture sectors. According to Chinese official statistics, sawnwood production was 18.0 million m<sup>3</sup> in 2005, but these figures do not entirely capture the production from small-scale producers, which account for a large part of the country's total.

One recent study estimated that sawnwood consumption in 2002 was about 58.0 million m<sup>3</sup> – about three times greater than the official statistics. This estimate was based on the assumption that 70 percent of total domestic industrial roundwood production, 90 percent of imported soft roundwood and 50 percent of imported hardwood roundwood were consumed in sawnwood production between 1998 and 2002 (CAF, 2004).

Another study estimated the consumption of sawnwood at about 64.6 million m<sup>3</sup> RWE in 2004 (Li, 2006). This figure is derived from the market demand rather than production.

Assuming a log-to-sawnwood conversion rate of 0.7, and subtracting the volume imported, the domestic production of sawnwood was estimated to be about 40 million m<sup>3</sup>.

**Figure 12. Production, trade and consumption of sawnwood**



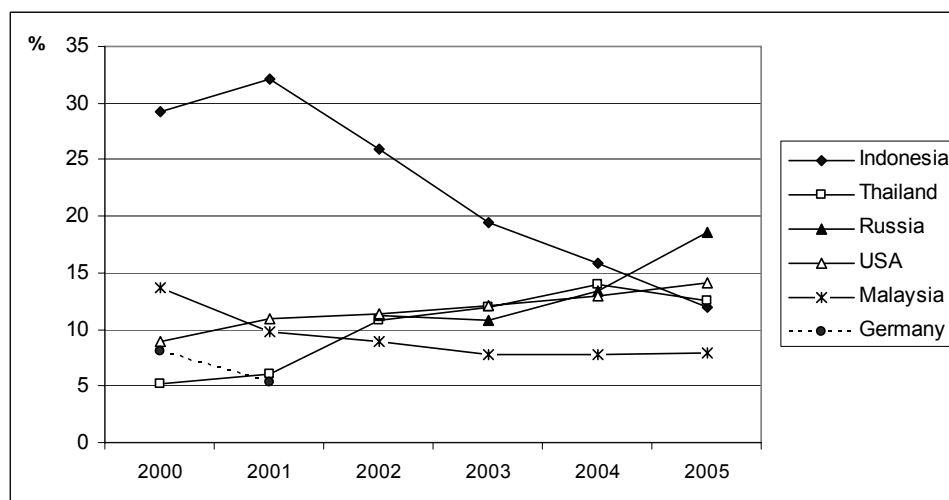
Sources: SFA, 2006; CAF, 2004.

Although the official statistics shown in Figure 12 do not present production and consumption volume accurately, they do reflect the recent upward trends in sawnwood production and consumption by covering the trends among large-scale producers.

### Trade

In 2005, China's imports of sawnwood totalled 6.0 million m<sup>3</sup> at an import value of US\$1.5 billion. Of this total, imports of soft sawnwood were 1.9 million m<sup>3</sup> at a value of US\$317 million, and imports of hard sawnwood were 4.1 million m<sup>3</sup> (US\$1.2 billion). China is importing increasing quantities of expensive hard sawnwood as material for furniture and housing interiors. Indonesia used to be the largest exporter of sawnwood to China, but recently the Russian Federation, the United States and Thailand have become the three main exporters. Figure 13 shows the steady increase in China's imports of sawnwood from the Russian Federation, which in 2005 exceeded 1 million m<sup>3</sup> and accounted for 18 percent of total sawnwood imports.

**Figure 13. Imports of sawnwood**



Source: SFA, 2006.

## PAPER AND PAPERBOARD

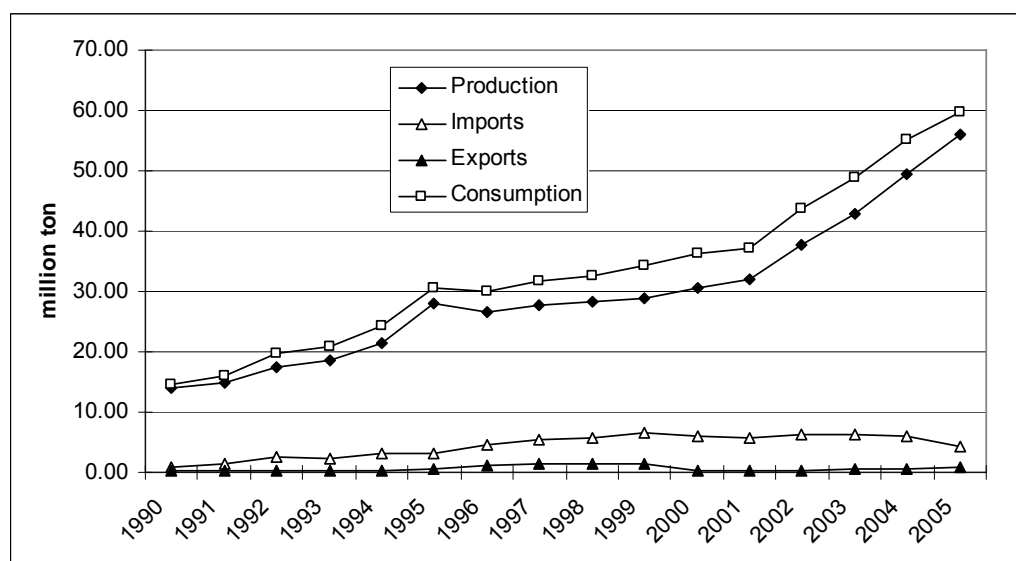
### Production and consumption

Alongside improved standards of living and industry development, the consumption of paper and paper products has risen dramatically. Figure 14 illustrates the production, trade and consumption of paper and paperboard. From 1990 to 2005, production increased from 13.9 million tonnes to 56.9 million tonnes, at an average annual increment of 10 percent. In the same period, consumption rose from 14.6 million tonnes to 59.6 million tonnes, ranking China second in the world after the United States. China has become one of the world's leading countries for paper production, consumption and imports (China Technical Association of Paper Industry, 2005; SFA, 2005a).

Figure 15 presents production, trade and consumption figures for paper and paperboard in China in 2004. Paperboard and cardboard accounted for half of total consumption, and newsprint for only 6 percent. These characteristics are explained by rapid growth in industrial sectors that consume large amounts of paperboard and cardboard, and the country's low per capita income.

In 2005, there were more than 6 500 paper mills in China. Recently, many large-scale paper factories have been established, some of which produce more than 1 million tonnes of products a year. In 2003, 20 factories were producing more than 200 000 tonnes of paper products a year. Most of these factories are in China's eastern provinces, which produce more than 70 percent of the country's total paper and paperboard production (Chuan, 2005).

**Figure 14. Production, trade and consumption of paper and paperboard**



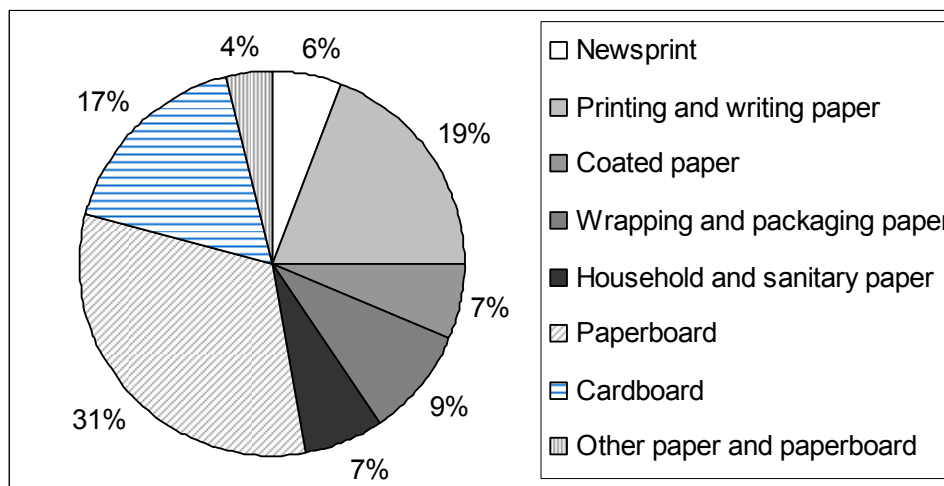
Source: SFA, 2006.

In spite of remarkable growth, China's paper industry still lags behind that of developed countries. First, the proportion of wood pulp is low, with wood fibre accounting for only 22 percent of total pulp for paper production in 2004. Second, domestic production does not meet domestic demand. In 2004, China imported 7.2 million tonnes of commercial wood pulp and 5.1 million tonnes of paper and paper products, spending more than US\$7 billion. Third, most paper mills are small. In 2002, the average annual production of China's wood pulp and paper factories were respectively 60 000 and 12 000 tonnes, compared with world averages of 180 000 and 80 000 tonnes. Fourth, China lags behind in technology and equipment; almost all large-scale pulp and paper production equipment is imported. Fifth, pulp and paper factories consume large quantities of water and cause serious environmental pollution. The discharge of wastewater from pulp and paper factories was 3

billion tonnes in 2001, accounting for 15 percent of China's total industrial wastewater discharge. Emissions of chemical oxygen demand (COD) from the paper industry accounted for 33 percent of the total from China's industrial sectors, with COD emissions from straw pulp production accounting for 60 percent of total emissions from the pulp and paper industry (NDRC, 2003).

Under these circumstances, the government has taken action to close large numbers of heavily polluting non-wood pulp factories, especially straw pulp factories.

**Figure 15. Consumption of paper and paperboard, 2004**



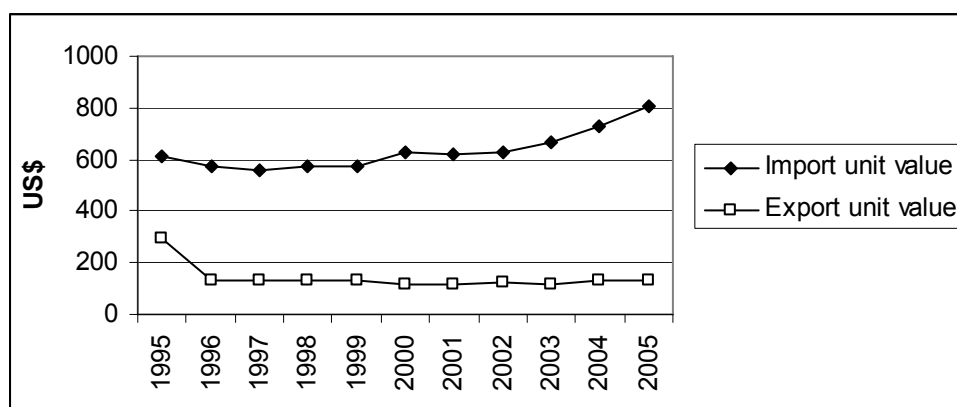
Source: China Technical Association of Paper Industry, 2005.

## Trade

China's imports of paper and paperboard decreased from 6.4 million tonnes in 2002 to 4.4 million tonnes in 2005. Over the same period, however, exports of paper and paperboard increased from 0.3 million tonnes to 0.8 million tonnes. These trends imply that the recent establishment of large-scale factories is making China's paper producers competitive in both domestic and international markets

Mainly because of technical constraints, however, Chinese markets still rely on imported products for some high-grade paper products to meet domestic demand (SFA, 2005a). Paperboard and printing and writing paper are major import and export paper products for China. As illustrated in Figure 16, the unit value of imported products has been increasing alongside rising incomes. China's paper industry focuses mainly on the production of low- and medium-grade products for export, but the production capacity of paper products has increased rapidly.

**Figure 16. Unit values of traded paper products**



Source: SFA, 2006.



In 2005, the top three exporters of paper products to China were Taiwan Province of China, the United States and the Republic of Korea; in 2004, Japan and the United States ranked first and second, respectively. Regarding China's imports of recovered paper, the United States, Japan and Hong Kong SAR remained the top three exporters from 2000 to 2004, while Hong Kong SAR, the United States and Japan were the top three destinations for Chinese exports of paper and paper products.

#### **Box 5. APP pulp and paper mill in Hainan**

The Sina Mas Group is one of the ten largest papermaking enterprises and the largest pulp and paper industry group in Asia (excluding Japan). Currently, the group owns more than 20 pulp and paper mills and more than 1 million ha of fast-growing plantations for distribution to Indonesia and China, at a total asset value of more than US\$10 billion.

The Jinhai Pulp and Paper Company Ltd occupies more than 5.3 million ha of land in the Yangpu economic development zone of Hainan province. It is the 13th of the super-large-scale pulp and paper mills that Asia Pulp and Paper (APP) of the Sina Mas Group built in mainland China to integrate forestry, pulp and papermaking. It is planned that 1 million tonnes of chemical bleached wood pulp a year will be produced during the first phase of the programme, which started on 28 March 2005 with a total investment of 10.2 billion yuan. Production for the programme's second phase, approved by China's National Development and Reform Committee (NDRC) on 20 December 2005, is planned to be 1.6 million tonnes of paper a year. The pulp production line for the Jinhai Pulp and Paper Company's first phase is the largest and most advanced single pulp production line in the world. Jinhai has been running well since it started. Monthly output volume for October 2005 exceeded 90 000 tonnes, which balanced production and marketing.

## **PULP FOR PAPER**

### **Production and consumption**

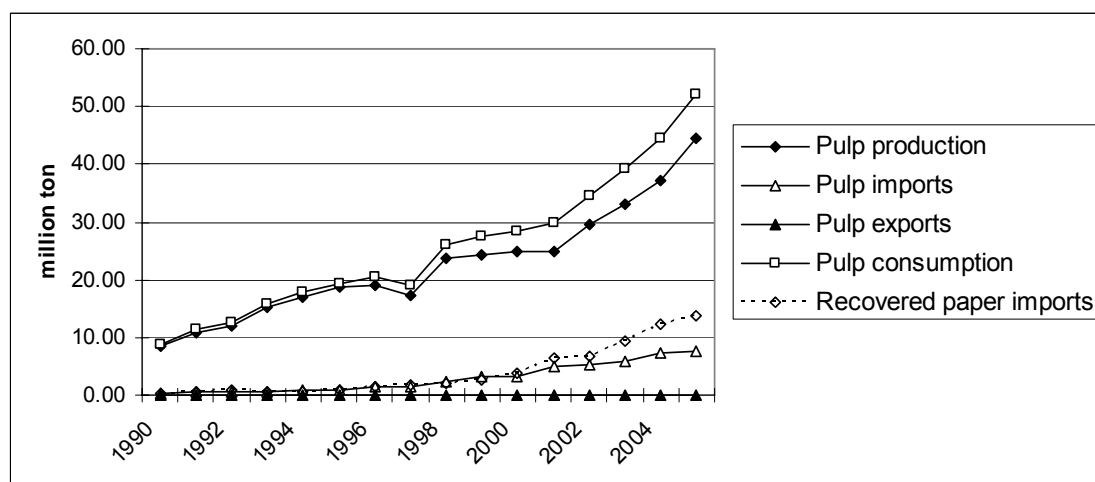
Production and consumption of pulp for paper have indicated sharp increases since 2001, similar to those for paper products. Figure 17 shows recent trends in these products. From 2000 to 2005, production increased from 25.0 million tonnes to 44.5 million tonnes, with an average annual increment of 18 percent. Consumption increased from 28.3 million tonnes to 52.0 million tonnes over the same period. These figures include wood pulp, non-wood pulp and pulp made from recovered paper.

Figure 18 illustrates the composition of pulps used for paper production in 2003. It is worth noting some characteristics of China's pulp production and consumption. First, at 39 million tonnes, recovered paper accounted for about half of total pulp consumption in 2003. Pulp from domestic recovered paper accounted for more than a quarter of total consumption of pulp for paper. Second, non-wood pulp accounted for about 30 percent of total pulp consumption. Most non-wood pulps are produced from straw. Third, non-wood pulp producers are small-scale, use low technology and are less efficient in production; they cause serious water pollution. Fourth, domestic wood pulp accounted for only 6 percent of total pulp consumption in 2003 (Chuan, 2005).

Recently, the Government of China has taken measures to promote a shift from non-wood pulp to wood pulp for paper production, to alleviate water pollution and enhance production efficiency. Many small non-wood pulp mills have been closed. The government has also taken action to increase domestic wood supplies for pulp production, through establishing forest plantations of fast-growing species. Table 2 shows recent changes in the composition of pulp for paper production. From 2000 to 2004, the production of pulp from recovered paper doubled, and accounted for more than half the total production of pulp for paper. Wood pulp production increased by 80 percent. At the same time, the proportion of non-wood pulp fell from 40 percent to 26 percent, although the amounts produced did not show conspicuous change (CAF/ITTO, 2006c). Promoting the development of large-scale wood pulp mills is

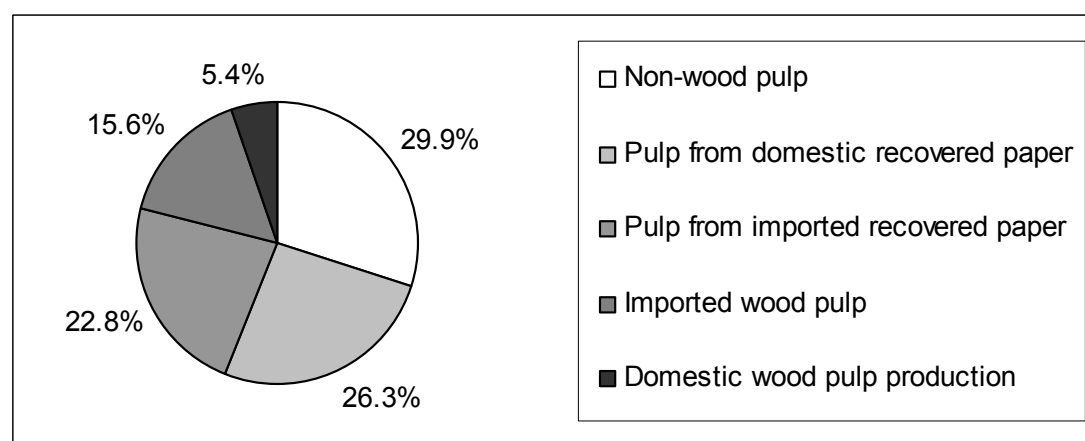
thought necessary for achieving the economies of scale needed to support an internationally competitive paper industry in China (Barr and Cossalter, 2004)

**Figure 17. Production, consumption and trade of pulp for paper**



Source: SFA, 2006.

**Figure 18. Composition of pulp for paper, 2003**



Source: Chuan, 2005.

**TABLE 2**  
**Composition of pulp for paper (thousand tonnes)**

Category	2000	2001	2002	2003	2004
Recovered paper pulp production	11 400	13 100	16 200	19 200	23 050
Proportion (%)	(40.9)	(44.0)	(46.7)	(49.0)	(52.0)
Non-wood pulp production	11 150	9 800	11 100	11 700	11 800
Proportion (%)	(40.0)	(32.9)	(32.0)	(30.0)	(26.0)
Wood pulp production	5 350	6 900	7 400	8 200	9 700
Proportion (%)	(19.1)	(23.1)	(21.3)	(21.0)	(22.0)
<b>Total pulp for paper consumption</b>	<b>27 900</b>	<b>29 800</b>	<b>34 700</b>	<b>39 100</b>	<b>44 550</b>

Figures include domestic and imported pulp and recovered paper.  
Source: CAF/ITTO, 2006c.

## Trade

Over the past decade, imports of wood pulp and recovered paper have increased nine- and 15-fold respectively, reaching 7.5 million tonnes and 13.6 million tonnes in 2005. The import value of wood pulp was US\$3.7 billion in 2005, surpassing that of industrial roundwood in the same year. Canada, Indonesia, the Russian Federation, Chile and the United States are major exporters to China. The import value of recovered paper was about US\$2.0 billion in 2005. The United States, Japan, Hong Kong SAR, the Netherlands and Ireland are major exporters to China.

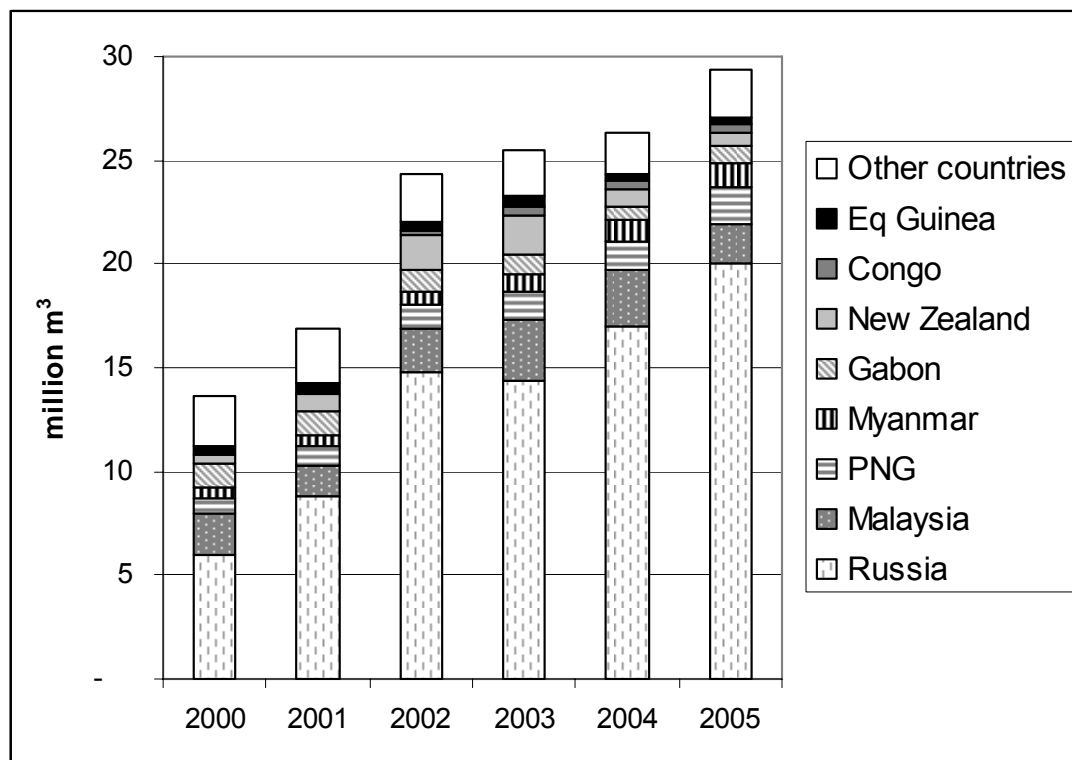
As China is the world's largest importer of recovered paper, importing nearly 40 percent of the global traded volume, its imports have significant impacts on international markets. Over the past five years, the unit prices of exported recovered paper have risen in Asia and the United States. In global markets, this has led to increased interest in using wood chip as an alternative material for paper production, and may affect the demand and price of wood chip.

## IMPORTS OF INDUSTRIAL ROUNDWOOD

Along with the rising demand for wood raw materials, and partly owing to domestic harvest restrictions (see Chapter 5), China's imports of industrial roundwood have increased remarkably. The import volume tripled between 2000 and 2005, reaching nearly 30 million m<sup>3</sup>. China has become the world's largest importer of industrial roundwood, importing about 22 percent of world trade.

Figure 19 illustrates the major exporters of industrial roundwood to China. Imports from the Russian Federation surpassed 20 million m<sup>3</sup> in 2005, accounting for 68 percent of China's total industrial roundwood imports. China is becoming more and more dependent on imports of Russian roundwood, mainly because of a severe shortage of timber supplies in northeastern regions. Major species imported from the Russian Federation include Korean pine (*Pinus koraiensis*), southwestern white pine (*P. strobiformis*) and Dahurian larch (*Larix gmelinii*). Imports of broadleaf timber have also been rising. Since the logging restriction was imposed in northeastern regions, China has had to import longleaf oak (*Xylosma longifolium*) from the Russia Federation. Large quantities of this wood are needed for export furniture and wooden floorboards.

**Figure 19. Major exporters of industrial roundwood to China**



Source: UN, 2006.

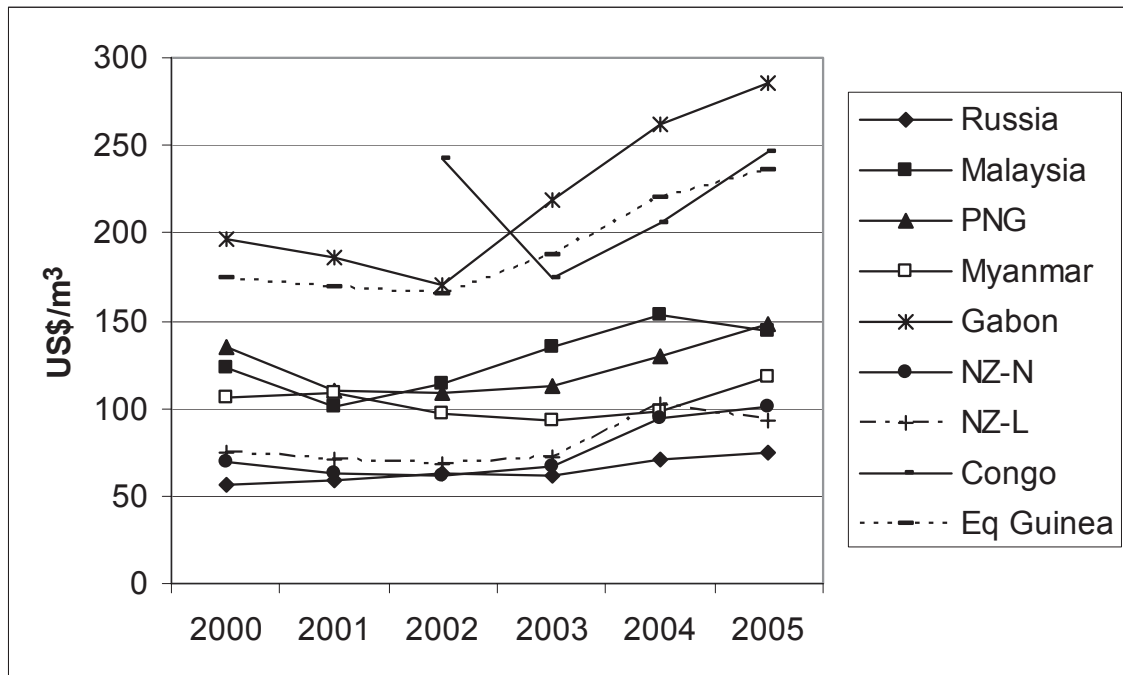
According to official statistics, nearly 15 percent of the industrial roundwood produced in the Russian Federation in 2005 was exported to China. However, the Russian Federation has adjusted its timber export policies to increase exports of value-added products, including processed wood products (China Wood Production, 2006).

China imports tropical roundwood from several countries. Recently, imports from Papua New Guinea, Myanmar and the Congo have been increasing. The import value of industrial roundwood has doubled since 2000, reaching US\$32 billion in 2005.

Reflecting intensified competition among importing countries, the import prices of industrial roundwood have been increasing recently.

Figure 20 shows the import unit values of industrial roundwood in China. This trend has multiple causes, including resource scarcity in the accessible areas of exporting countries, restrictions on timber production or exports, and increasing transportation costs. Between January and October 2006, the average price of China's log imports rose by 26 percent, from US\$104.6 to \$132.0 per cubic metre. For example, prices for Russian logs rose by 10.6 percent and those for logs from Myanmar by 186.5 percent (CAF/ITTO, 2006d). In Japan, the average import price for Russian logs rose by 27 percent in 2006 (Mokuzaijohou, 2007).

**Figure 20. Import prices for industrial roundwood from major exporters**



Source: UN, 2006.

Table 3 shows China's shares of roundwood exports from the major exporting countries. Nearly half of Russian coniferous roundwood is exported to China. China's share of exports from the major tropical wood exporting countries has increased, and now accounts for about 70 percent of the total. The sharp increase in Chinese imports of industrial roundwood has caused concern about the conservation of tropical and Russian forests (Chunquan, Taylor and Guoqiang, 2004).

TABLE 3

**Shares of exports from major roundwood exporting countries**

Russian Federation: coniferous roundwood (2005)		Russian Federation: hardwood roundwood (2005)		Malaysia: tropical timber (2005)		Papua New Guinea (2004)		Myanmar (2004)		Gabon (2004)	
	%		%		%		%		%		%
China	47.5	Finland	55.1	China	49.5	China	66.4	China	72.8	China	76.7
Finland	20.3	China	21.0	Japan	24.6	Korea, Rep.	8.3	Thailand	9.2	India	10.0
Japan	13.3	Sweden	14.3	India	15.8	India	5.2	India	8.3	Morocco	4.6
Korea, Rep.	5.1	Estonia	2.8	Korea, Rep.	3.0	Japan	4.1	Japan	7.3	Japan	2.2
Estonia	3.7	Latvia	2.2	Thailand	1.2	Morocco	2.4		0.0	Italy	1.3
Other	10.1	Other	4.5	Other	6.0	Other	13.7	Other	2.4	Other	5.2

Sources: UN, 2006; FAO, 2006a.

**China's investments in other countries**

In order to ensure the supply of timber, China is seeking opportunities to explore forest resources abroad. Forestry enterprises start by investing overseas, and aim to grow into multinational enterprises. In 2005, Chinese enterprises were investing in about 50 forestry projects abroad, for a total investment of about US\$300 million. These include logging, wood processing, horticulture, forest machinery repair and replacement, labour export and contract engineering projects in Brazil, Canada, the Gabon, Germany, Guyana, Malaysia, New Zealand and the Russian Federation (SFA, 2005a; ITTO, 2006). The Export and Import Bank of China provides low-interest loans to enterprises that invest in other countries to secure supplies of raw materials.

Chinese enterprises have also recently started to establish forest plantations in other countries to secure wood material resources both for China and for domestic use in the other countries. Forest plantations are established mainly on barren hills and land, slopes and desert areas that the counties are incapable of developing themselves. The Chinese Government encourages such activities by the private sector as long as they are implemented in line with the principles of conserving biodiversity, helping host countries rehabilitate vegetation sustainably, and improving local ecological environments. Enterprises are encouraged to set up mills for timber processing and wood biomass energy production when necessary, thereby not only providing employment opportunities in local areas, but also promoting the economic and community development of these areas.

China and the Russian Federation have established an amicable trade relationship, which has laid solid foundations for cooperation. The two countries cooperate in a variety of forestry activities, including forest resource exploration and utilization. Since 1995, the governments of both countries have signed several documents, including the Programme for Implementing the Chinese-Russian Treaty on Good Neighbourliness and Friendly Cooperation (2005 to 2008), which indicates that the two parties have decided to take active measures to promote cooperation in forestry and wood industry (Lu and Yamane, 2001). The premiers of China and the Russian Federation met on 24 September 2003 and agreed to the joint development of high- and new-technology industries (such as machinery, electronics and communications), along with investment cooperation in resource development, forest industry and timber processing in the Russian Federation. They also agreed that joint venture enterprises should be founded. The Russian Federation welcomed China's participation in exploitation of Siberia and the Federation's far eastern regions. The two leaders held their tenth fixing meeting in Beijing in November 2005, when they agreed that the exploitation and utilization of forest resources in the Russian Federation would be strengthened further.

#### **Box 6. The popularity of Russian timber in the timber market of Shandong**

In recent years, Russian timber (also known as Beiyang timber) has accounted for a large market share in Shandong. It sells well and its prices are growing. For example, a high-quality Mongolian Scotch pine (*Pinus sylvestris* var. *mongolica*) timber log produced in the current year, 4 m in length and more than 35 cm in diameter sells for about 1 000 yuan/m<sup>3</sup>, with logs exceeding 6 m in length selling for even more. Russian timber of high quality and price sells well, especially in coastal areas and economically developed regions such as the cities of Qingdao, Jinan and Yantai. There are several reasons for the popularity of Russian timber in Shandong market. First, Shandong is one of the most economically developed provinces in northern China. Over the past two years, with improved industrial and agricultural productivity, accelerated construction of key engineering projects and increased urbanization, real estate is prospering, and numerous infrastructure projects related to livelihoods, such as restaurants, hotels, office buildings and stadiums, are under construction. This combination of factors prompts growth in the timber market. Second, production of the homegrown northeastern timber that used to supply Shandong's timber market, such as Korean pine (*Pinus koraiensis*), southwestern white pine (*P. strobiformis*) and Dahurian larch (*Larix gmelinii*), has decreased as a result of implementation of the Natural Forest Protection Programme (NFPP). This has increased the gap between supply and demand for timber in Shandong. Russian timber, which is close to northeastern Chinese timber in terms of species but of higher quality and lower price, fills this gap. Third, Shandong faces the sea to the east, so has many harbours; railway and highway transport from Shandong is very convenient for reaching the centre of mainland China, and the timber distribution centre is in Shandong.

Experts forecast that the current selling power of Russian timber in Shandong market will continue, promoting further upgrading and development of the timber processing industry in Shandong.



## 4. Policy to promote wood industry development

Since the 1980s, the Chinese Government has been implementing a policy of “opening to the world” to attract foreign investment. Industries have been supported by numerous preferential policies, such as tax holidays, tax deductions and trade policies that encourage imports of raw materials and exports of value-added products. Central government has prepared more than 100 policies to encourage industrial development in China (Jia *et al.*, 2005). These policies have had substantial impacts on development of the wood processing industries, by increasing export revenues and job opportunities. On the other hand, the tax deduction policies are estimated to have reduced China’s national income by US\$10.9 billion (90.1 billion yuan) in 2002 (excluding tariff and agriculture tax), of which tax deductions for foreign companies were US\$4.3 billion (35.7 billion yuan) (Zhou, Zhang and Chen, 2003). This chapter describes key policies that have had impacts on development of the wood processing industries.

### FOREST-PAPER INTEGRATED PROGRAMME

The Government of China started the Forest-Paper Integrated Programme in 2004. As discussed in Chapter 3, China’s paper industry has been facing several challenges: shortages of wood resources, inefficient production, and environmental pollution. Forest management and paper production have been influenced by government policies affecting only one or other of the two sectors for a long time. In addition, the two sectors have not been efficiently coordinated in the private sector, owing to China’s lack of integrated large-scale enterprises. The major purpose of the new programme is to develop large-scale paper enterprises that have their own supplies of forest resources and use advanced technology and equipment to save water and reduce pollution, by integrating sector development policies between the forestry and paper production sectors (NDRC, 2003).

Table 4 shows the programme’s targets for 2005 and 2010. The programme is expected to establish forests that will produce an annual 56 million m<sup>3</sup> of wood for pulp for paper production after 2010.

TABLE 4  
Targets of the Forest-Paper Integrated Programme

	<b>Increase in paper production forests</b>	<b>Estimated annual paper consumption</b>	<b>Percentage of wood pulp in paper production</b>	<b>Percentage of domestic wood pulp in paper production</b>
2005	2 million ha during the 10th Five-Year Plan	50 million tonnes	25%	10%
2010	3 million ha during the 11th Five-Year Plan	70 million tonnes	32%	15%

Source: NDRC, 2003.

US\$30 billion of investment is expected for the full implementation of this programme, including investments in afforestation and the establishment of pulp and paper factories. The government expects investments from both foreign enterprises and domestic investors.

To promote implementation of the programme, the government supports initial investments and provides subsidies for loan interest payments to projects that are registered as part of the programme. It also grants value-added tax (VAT) exemption for the installation of equipment that meets certain criteria. For example, the production lines of new chemical wood pulp projects seeking the government subsidy must each produce more than 500 000 tonnes of wood pulp a year. Chemical bamboo pulp and chemi-mechanical wood pulp projects must produce at



least 100 000 tonnes a year per production line. Using these measures, the government has promoted the importation of advanced pulp and papermaking equipment, which contributes to water saving and pollution control. Enterprises that establish their own fast-growing forest resources for the supply of wood raw materials are also exempt from VAT. As a standard VAT rate is 17 percent in China, these subsidies provide a substantial incentive to enterprises.

As a measure to integrate forestry and paper production, this programme refunds the silviculture fund to pulp and paper producers when they completely reforest the areas they have harvested. The silviculture fund is a government charge collected on sales of commercial timber. The refund aims to encourage pulp and paper producers to reforest.

While providing incentives to large-scale producers, the government has taken action to close small-scale straw pulp producers that produce less than 17 000 tonnes a year (see the section on Paper and paperboard in Chapter 3).

In 2004, 72 enterprises, including some foreign investors, were involved in this programme, and the area afforested was 1.1 million ha. Although its targets seem overambitious, the programme is expected to increase the timber supply from fast-growing forest plantations considerably. It will also promote the production of high-quality paper products, a large proportion of which are currently imported from other countries to meet the increasing domestic demand.

## **TAX SYSTEM**

### **VAT exemption on the use of wood residues and small-diameter logs**

In 2001, the government granted VAT exemption until 2008 on purchases of products made from certain woods. The wood materials concerned are the “three wastes”: wood residues from harvesting, production and processing; small-diameter logs of less than 8 cm; and low-value logs, i.e., logs with many bends, knots and holes, logs of less than 2 m in length and fuelwood (MOF and SAT, 2001a). This policy strengthened enterprises’ competitiveness, through the use of low-cost wood residues, and played a critical role in the efficient utilization and saving of wood resources (Cossalter and Barr, 2005). Many fibreboard factories and wood-based pulp factories have taken advantage of the policy. VAT exemption has also been applied to sales of seeds and seedlings and imports of wild flora.

### **Income tax deductions for afforestation**

Pulp and paper enterprises that use wood as a raw material and carry out afforestation can receive income tax deductions of US\$1.2 to \$2.4 (10 to 20 yuan) per cubic metre of wood consumed for the purpose of establishing forest plantations. This policy has increased enterprises’ interest in developing their own forest resource bases (NDRC, MOF and SFA, 2001; NDRC, 2003).

### **Income tax deductions for technology development**

To encourage the renovation and technological development of leading agricultural and forestry enterprises, since 2000, the government has refunded the research costs of developing new products, technologies and skills by deducting the amounts spent from the enterprises’ income taxes.

### **Other income tax exemption for afforestation**

Since 2001, the government has specified that all companies and organizations that plant trees, deal with tree seeds and seedlings, and process primary forest products can be exempt from income tax (MOF and SAT, 2001b). State-owned forest farms located on borders and facing severe financial constraints can also be exempt from income tax (MOF and SAT, 1997).

### Property tax exemption for afforestation

From 2004 to 2010, the government is exempting enterprises and organizations from house property tax, urban land-use tax and transportation tool tax on properties that are used for Natural Forest Protection Programme (NFPP) (see the section on Policies and programmes to promote afforestation in Chapter 6) in specific regions: the upper branches of the Yangtze River, the middle and upper branches of the Yellow River, northeast China, and inner-Mongolian State-owned forest regions (MOF and SFA, 2004).

## TRADE POLICY

### Import tariffs

Owing to the scarcity of wood raw materials, particularly high-grade wood, and the rapid development of wood processing industries, China decreased the import tariff rates for wood raw materials earlier than those for processed products. The tariff rates for industrial roundwood, sawnwood and wood pulp were reduced to zero in 1999.

Since China entered the World Trade Organization (WTO), the Chinese Government has reduced import tariffs on 249 forest products, in fulfilment of its WTO commitments, and is eliminating non-tariff restrictions step by step (Ye, 2002). Table 5 shows the import tariff rates for major wood products, the average of which was reduced to 5.39 percent in 2005, although wood-based panels maintain higher rates. The tariff rate for paper and paperboard was reduced to 5.39 percent in the same year. The average tariff rates for furniture and toys were reduced to 1.07 and zero percent, respectively. For all other forest products, the tariff rate was decreased to final obligation level in 2004, i.e., to an average of 8.31 percent. These tariff rates are lower than China's average for commodity products, which was 9.9 in 2005 (Dai, 2005).

TABLE 5  
Tariff rates of wood products (percent)

Tariff item (HS code)	Tariff term	Most-favoured nation level		
		2004	2005	2006
44.03	Roundwood	0	0	0
44.07	Sawnwood	0	0	0
44.10	Particle board	4-7.5	4-7.5	4-7.5
44.11	Fibreboard	4-7.5	4-7.5	4-7.5
44.12	Plywood	4-12	4-12	4-12
47.01-47.07	Wood pulp	0	0	0
48.01	Newsprint	8.5	7.5	7.5
48.02	Uncoated paper and paperboard	5-7.5	5-7.5	5

Sources: Office of Customs Tariff Commission of the State Council *et al.*, 2004, 2005 and 2006.

### VAT rebates on exported products

China has taken measures to promote exports of industrial products. Until recently, the government provided VAT rebates to enterprises producing wood products for export. As China's standard VAT is 17 percent, this policy has had a significant influence on markets. Owing to the increasing demand from domestic producers resulting from the wood resource scarcity, however, the government has eliminated the VAT rebate for exported wood raw materials and primary processed wood products such as logs and wood chip (MOF and SAT, 2003). This adjustment aims to provide domestic industries with wood raw materials by discouraging exports. Exporters of wooden furniture, plywood and value-added paper products are still entitled to the VAT rebate.

## TAX AND TARIFF POLICIES TO ATTRACT FOREIGN INVESTMENT

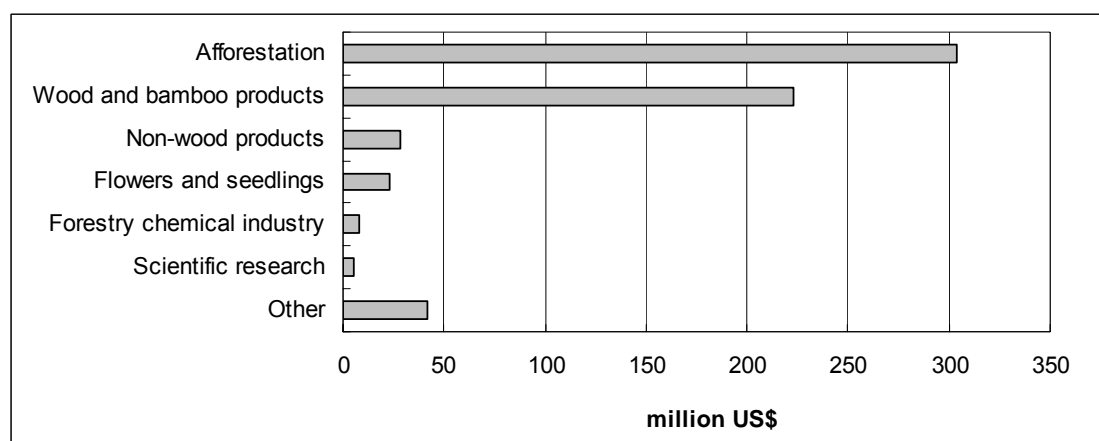
The Chinese Government has implemented preferential tax policies to attract foreign direct investments. Foreign-invested enterprises are entitled to receive two years of tax holiday and to pay only half the normal income tax rate for up to three years from the year they start to make profits (National Congress of China, 1991). This is known as the “Two-Free, Three-Half” policy. As the standard rate of corporate income tax is 33 percent in China, this policy has had a significant influence on attracting foreign investment. In addition to these central government preferential policies, local governments have also introduced their own preferential policies to attract foreign investments to their regions.

During the 1990s, to promote the introduction of high-technology equipment and to attract foreign investments, including for infrastructure development, the Chinese Government exempted foreign enterprises that exported all their products from the tariffs on imported equipment for production. This policy was adjusted in 2002, and now tariffs are levied on imported equipment, but the government gradually refunds the tariffs to the enterprises, at 20 percent a year for five years, as long as the enterprises verify that all their products have been exported (MOF *et al.*, 2002). These policies have contributed substantially to improving the quality of Chinese products through the introduction of advanced equipment for production, and have consequently enhanced the competitiveness of Chinese producers in international markets.

Figure 21 indicates the amounts of foreign investment in the forestry sector in 2004. Half of foreign investment was used for establishing fast-growing high-yielding (FGHY) timber plantations. Foreign investments in the forestry sector in China continue to increase; in 2005, 472 foreign-invested forestry projects started, with a total investment of US\$633 million, which is 1.7 times the total for 2003. Of this amount, US\$357 million – or 56.4 percent – was invested directly by foreign investors.

Foreign investments are concentrated in the eastern provinces. Nine provinces and autonomous regions have received more than US\$10 million of foreign investment a year: Fujian, Hubei, Hunan, Jiangsu, Jiangxi, Guangxi, Shaanxi, Ningxia and Anhui. These provinces accounted for 90 percent of the country’s total foreign investments in forestry, with the US\$432 million received by Fujian and Hubei accounting for 68.2 percent of the national total.

**Figure 21. Foreign investments in the forestry sector**



Source: SFA, 2005a.

### Tax reform and foreign investments

The tax reform now under way in China will have impacts on the consumption of wood products. China is committed to providing equal treatment – the so-called “national treatment” – to both domestic enterprises and foreign-invested enterprises, and the tax reform will be carried out in line with this direction. Income tax rate is expected to be decreased to

between 25 and 28 percent. If this reform is completed, foreign enterprises and domestic enterprises will be on equal terms for competition, which will benefit domestic enterprises.

However, it is anticipated that even if the national treatment policy is implemented, foreign enterprises that currently benefit from preferential treatment will be given a transition period before the new policy is adopted in full. In addition, in some provinces, new preferential financial policies may be introduced to attract new foreign enterprises and investors (Jia *et al.*, 2005).

On the whole, tax reform will not substantially affect the amounts of foreign investment (although there might be a slight decrease). This is mainly because most recent foreign investors have been attracted to China by the huge potential domestic demand and low costs of producing export products. Preferential tax policies may not therefore be indispensable for attracting foreign investors.

#### **Box 7. Investment in furniture manufacture in the Yangtze River Delta**

Furniture manufacture was one of the first sectors to be opened to foreign enterprises in China. Because the price of labour in the Yangtze River Delta is relatively low, and the quality relatively high, and because of the area's convenient transportation conditions, favourable investment environment and large market capacity, many furniture manufacturing tycoons from all over the world have invested there, making the delta a melting pot for global furniture manufacturing capital. Ever since its opening, the Pudong area of Shanghai has undergone prosperous development to become one of the regions of highest economic development and strongest overall economic power in China. It is estimated that more than 200 foreign enterprises invested in furniture manufacture in Shanghai in the three years from 2001 to 2003, with a total investment of US\$1 billion, twice the total for the 1990s. Nearly ten enterprises in Shanghai have more than US\$10 million of investments from United States furniture manufacturers. Haimen in Jiangsu, which is very close to Shanghai, is becoming the world's largest international furniture purchasing centre. It is predicted that over the next few years, furniture manufacturers from the United States, Germany, Italy, the Republic of Korea, Malaysia and Hong Kong SAR will transfer their production bases to this area.

#### **Box 8. APP's investment in papermaking in China**

In recent years, many multinational wood giants have come to China to "enclose" land suitable for afforestation in Guangxi, Guangdong, Hainan, Hunan, Yunnan, Jiangxi, Jiangsu and Fujian, and to use joint ventures or direct investment to create production chains in China. For example, since 1993, the Sina Mas Group (APP), the tenth largest papermaker in the world, has set up advanced large-scale pulp and paper mills at Jindong, Zhonghua (Ningbo), Jinhusheng, Jinhongye and Jinhai (Hainan), and large-scale, modern fast-growing plantations – jointly with local enterprises – in Ningbo, Suzhou, Zhenjiang, Qingyuan, Hainan and Guangxi. This huge investment is centred on the Yangtze and Pearl river deltas. APP's goal is to set up an integrated industrial chain, comprising 600 000 ha of forest land, pulp mills with an annual capacity of 1.2 million tonnes and paper mills with an annual capacity of 2 million tonnes. It has set up 12 modern large-scale paper mills, more than 20 afforestation enterprises and one pulp mill, forming a papermaking group with a capacity of 2.5 million tonnes. Zhenjiang Jindong Paper and Ningbo Zhonghua Paper are the backbone enterprises, employing more than 20 000 people.



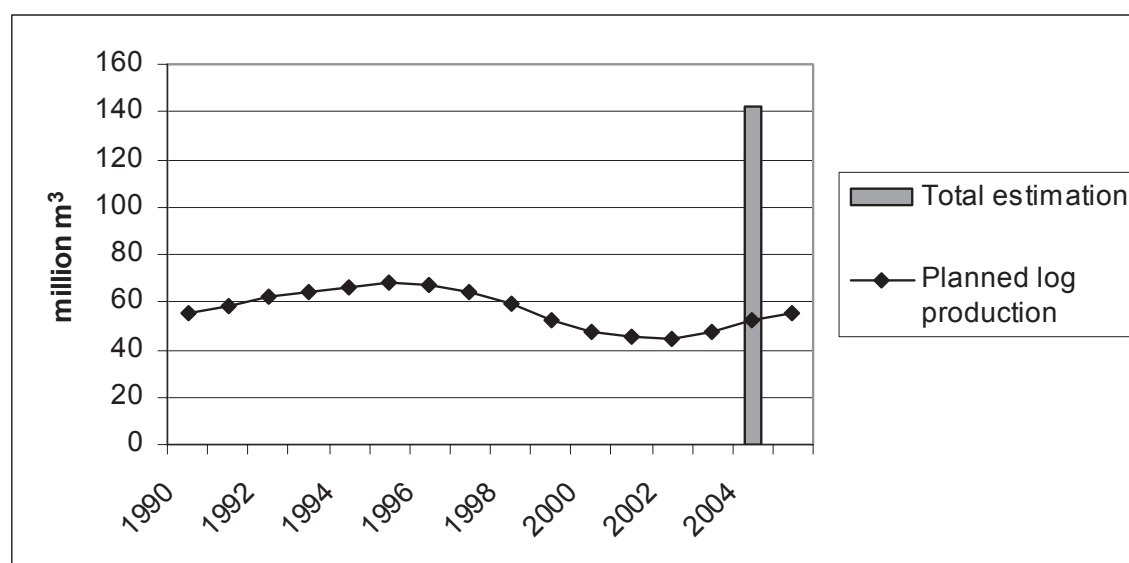
## 5. Supply of wood raw materials from domestic forests

### PRODUCTION OF INDUSTRIAL ROUNDWOOD

There are no accurate official statistics on the production of industrial roundwood in China. This is mainly because small-scale harvests are not fully reported and recorded as government statistics. Official government statistics indicate the volume of “planned log production”, which is the designated production volume by the State Forest Administration (SFA) under the harvest quota system (HQS - see following section on Policies and regulations for wood production). In 2004, planned log production was 52 million m<sup>3</sup>. Meanwhile SFA’s thematic study on the 11th Five-Year Plan estimated the total production of commercial timber at about 142 million m<sup>3</sup> in 2004, not including timber for farmers’ private use and fuelwood. This figure is based on the assumption that the harvest of industrial roundwood accounted for 60 percent of China’s total wood harvest from forests (Li, 2006) (see Annex). Figure 22 illustrates the differences between the government’s planned log production and estimates from the SFA thematic study.

Since implementation of NFPP in 1998 (see the section on Policies and programmes to promote afforestation in Chapter 6), the production of industrial roundwood in natural forest regions has declined. For example, the volume of planned log production decreased from 63.9 million m<sup>3</sup> in 1997 to 44.4 million m<sup>3</sup> in 2002, but has increased since 2003. This is probably because of changes in HQS policies and procedures by the government, and the increase of forest plantation resources (see following section).

**Figure 22. Production of industrial roundwood**



Source: SFA, 2006.

Production of industrial roundwood has been shifting from the northern cool temperature regions to the mid-southern regions. In 2005, the production of six provinces in the mid-southern regions accounted for 50 percent of total national production, while production from the northern cool temperate regions accounted for 27 percent. This trend indicates that production has also been shifting from natural forest regions to forest plantation regions (CAF/ITTO, 2006c).

Owing to the recent increased demand for wood raw materials, the prices for domestic logs have risen substantially. In Hebei Shijiazhuang City timber market, the price for Korean

pine logs rose from US\$107 (890 yuan) in 2003 to US\$209 (1 650 yuan) in 2006. The price for Mongolian Scotch pine rose from US\$95 (790 yuan) in 2003 to US\$154 (1 220 yuan) in 2006 (CAF/ITTO, 2003; 2006a).

## **POLICIES AND REGULATIONS FOR WOOD PRODUCTION**

### **Harvest Quota System (HQS)**

Since 1987, timber harvest has been regulated by the annual HQS, which was authorized in the Forest Law and the Regulations for the Implementation of the Forestry Law of China (RFIFL). In this system, a harvest licence must be approved by the forestry authority before timber can be harvested, except for harvests in rural residents' private wood plots and yards. SFA sets the national harvest volume (quota) every five years, in accordance with the condition of provincial forest resources and the number of applications for harvest licences. Licences are also required for the transportation and processing of logs.<sup>2</sup>

During the 10th Five-Year Plan (2001 to 2005), the country's total annual Harvest Quota (HQ) was 223 million m<sup>3</sup>, of which 137 million m<sup>3</sup> was from natural forests, and 86 million m<sup>3</sup> from forest plantations. The annual harvest volume of planned log production was 50 million m<sup>3</sup> (SFA, 2005a).

Although the HQS has played an important role in conserving natural forests, the restrictions on logging and production it imposes have hindered forest plantations from responding to market demand, resulting in long delays in bringing products to market, and thus in lost sales (AF&PA, 2004). The HQS does not allow forest owners to set their own rotation periods and to harvest in a timely manner for maximizing the economic benefits of forest resources. Even when forest owners seek to shorten the harvest rotation of their forests by enhancing annual growth, they may be prevented from harvesting (Hu, 1995). This uncertainty has discouraged forest owners from carrying out intensive forest management. Forest owners also often misuse the HQ by cutting only large-diameter trees or precious tree species, to maximize their short-term profits. This reduces the long-term value of the forest (Zhang and Zhang, 2004).

### **Relaxed Harvest Quota in the 11th Five-Year Plan**

Since the outset of the 11th Five-Year Plan (2006 to 2010), the annual HQ has been increased to 248 million m<sup>3</sup>, of which 91 million m<sup>3</sup> is from natural forests and 157 million m<sup>3</sup> from forest plantations. Compared with the previous Five-Year Plan, the annual HQ has been increased by 25 million m<sup>3</sup>: an increase of 71 million m<sup>3</sup> from forest plantations and a decrease of 46 million m<sup>3</sup> from natural forests. The annual HQ for commercial timber was increased by 42 million m<sup>3</sup>, while that for non-commercial timber, such as in Natural Forest Protection Programme (NFPP) regions, was reduced by 17 million m<sup>3</sup> (SFA, 2005a). This change reflects the increased availability of forest plantation resources for timber production.

Another important change to the harvest regulations is that, since the outset of the 11th Five-Year Plan, flexible annual harvest volumes can be applied within the fixed total harvest volume of the five-year planning period. Until the 10th Five-Year Plan, a single annual harvest volume – equal to one-fifth of the total volume for the five-year period – was applied throughout the planning period for every forest management unit.

In 2002, the government decentralized decision-making on the felling age of timber forests to provincial forestry bureaus (SFA, 2002). The new ruling allows forest owners to decide the felling ages of forest plantations planted after 2000. In 2003, the government allowed forest owners managing more than a set minimum of forest to estimate the annual HQ for their commercial forest plantations (SFA, 2003). These relaxations of the regulations have made it possible for forest owners to enhance the economic returns from their forests. Tending felling and the felling of trees of less than 10 cm in diameter are excluded from the HQS volumes.

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<sup>2</sup> China's harvest policy is described in detail, in terms of history, calculation models, the practice and results of HQS, issues and future trends, in Zhang *et al.*, 2004.

Timber harvesting under the Forest-Paper Integrated Programme (see Chapter 4) was exempt from the need to obtain authorization under the HQS. Forest owners do not need the additional authorization of local authorities if they are implementing harvesting as specified in the forest management plans that have been authorized and registered under the Forest-Paper Integrated Programme.

These relaxations of the HQS in timber forests have enhanced flexibility for forest owners' management strategies, especially in privately owned commercial forests. This change will help increase the timber supply and profits from these forests.

### **Natural Forest Protection Programme (NFPP) and logging bans**

The Government of China started NFPP in 1998, to protect natural forests by implementing a logging ban in ecological forests in the middle and upper branches of the Yangtze and Yellow Rivers, and by reducing timber harvests in State-owned forest regions of northeast China and Inner-Mongolia. NFPP covers 68.2 million ha of forested land, of which natural forests cover 56.4 million ha. These areas account for 53 percent of the total natural forest in China.

Although a logging ban is a necessary measure to protect and improve ecological conditions in degraded areas, the logging ban currently imposed under NFPP also applies to forest plantations that are suitable for timber production and have been established by private and collective forest owners. This has restricted forest owners' land-use rights and discouraged investors (FGTF/CCICED, 2002). To improve the situation, a detailed logging ban that is consistent with management needs must be elaborated.

## **DISINCENTIVES FOR TIMBER PRODUCTION AND FORESTRY**

### **Tax on timber production**

A variety of taxes have been imposed on timber sales in China. In addition to central government taxes, provinces have also introduced their own charges. Central government taxes include the farm tax, VAT, the municipal construction tax and the school tax. Additional fees required by central and local governments include the forestry fund, forest maintenance fees, forest construction and protection fees, and quarantine fees. Table 6 lists some of these.

These taxes, charges and fees on timber sales often exceed 50 percent of the value of the products (AF&PA, 2004). In some provinces, local charges account for up to 70 percent of the total tax burden (Lu *et al.*, 2002). Heavy taxes and fees on forestry reduce forest owners' incomes, reduce the value of forest land assets, undermine incentives for private investment and induce underreporting of harvested volume. These taxes have discouraged forest owners from harvesting timber resources, lessened the competitiveness of domestic forestry and, consequently, led to increased imports of industrial roundwood.

To alleviate the tax burden, the Government of China has recently abolished several taxes and fees. It has also required local governments to abolish all charges except for government funds (taxes) on timber production and operation. This policy change will increase the interest of forest owners and investors in forest management, and consequently promote domestic timber production.



TABLE 6  
**Taxes on timber production**

Number	Name	Management organization
12	Silviculture fund	Central and local government
12.1	Silviculture fund and maintenance fund (collective forest)	Local government
12.2	Silviculture fund and rebuilding fund (State-owned forest)	Local government
12.3	Maintenance fee	Local government
12.4	Forestry maintenance fee	Local government
13	Forestry fund (Shanxi province )	Local government
14	Recovery fee for forest vegetation	Central and local government

Source: MOF, [www.yfzs.gov.cn/](http://www.yfzs.gov.cn/).

### **Silviculture fund**

The silviculture fund is a tax imposed by both the central and local governments to support afforestation by forest owners. State forestry enterprises are charged 26 percent of their timber sales income in the north-eastern State forest region, and 21 percent in other State forest regions. Sixty percent of the collected silviculture fund is meant to be returned to the enterprises, and the rest transferred to the provincial administration responsible for forestry enterprises. In collective forest regions in the south, forest owners are charged 12 percent of their first timber sales income as the silviculture fund, and 8 percent as a maintenance fee. In these forest regions, at least 70 percent of the silviculture fund is supposed to be returned to the forest owners.

The silviculture fund played an important and long-term role in the recovery of China's forest vegetation, especially during the 1960s when the country needed to cultivate forest resources under poor financial conditions for the government. However, market incentives can also be used to encourage reforestation after trees have been felled, without the need to collect a tax for this purpose. The tax reduces forest owners' economic returns and discourages them from managing their forests. In addition, the tax is difficult to implement; once the silviculture fund has been collected, it is rarely returned to forest owners. An investigation of this issue revealed that less than 10 percent of the charge was returned to forest owners (Wang *et al.*, 2005).

Recently, efforts have been made to improve implementation of the silviculture fund. In some provinces, such as Hainan, Jiangsu, Hebei and Shandong, the local authorities charge only 5 percent of timber sales income as the silviculture fund. The abolition or reduction of the fund will benefit forest owners.

### **Cropland protection**

In accordance with the Agricultural Law, the government has prescribed that at least 80 percent of the total arable land in each province is protected as basic cropland (MOA, 1998). When farmers or investors plant trees on farmland that has been designated as basic cropland, it is difficult to complete the procedures required for harvesting the trees. This regulation restricts the expansion of forest land, even when forestry is more profitable than crop cultivation. In addition, as most fertile land has been designated as basic cropland, little productive land is left for forestry. At present, the government prohibits the issue of forest right certificates on basic cropland, in spite of the rising interest in investing in forestry on that land.

### **Policies to encourage crop planting**

Recent statistics indicate that more and more farmers, rural households and private enterprises – including those from other countries – have participated in afforestation (SFA, 2005a). This is mainly because of the rising economic returns from forest management. However, the government continues to provide subsidies for farmers who plant crops, which makes agriculture more profitable than other land-use options. Agricultural subsidies discourage landowners' interest in forest management, although forestry is also subsidized to some extent.

Another view on this issue argues that if agricultural subsidies increase the productivity of cropland, the pressure on marginal lands may be reduced, allowing farmers to grow tree plantations and non-timber forest products (Zhang, Uusivuori and Kuuluvainen, 2000).

### **Wildlife, wetland and environment protection**

In recent years, more and more nature and wetland reserves have been established for protecting purposes. As the economy develops, people are becoming more aware of the country's environmental and ecological conditions, and protected areas and wetland reserves will definitely expand in the future. This trend will increase the pressure on commercial forest development. More technology and more intensive management measures will be required to manage limited commercial forests in order to meet the growing market demand for wood products and wood fibre.



## 6. Afforestation programme

### FOREST RESOURCES IN CHINA

#### Area and stocking volume

In 2005, SFA released the sixth National Forest Inventory (NFI), for 1999 to 2003. The report concluded that the forest area covered 175 million ha at a stocking volume of 12 456 million m<sup>3</sup>. Since the fifth NFI report in 1998, the forest cover had increased by 16 million ha, and the forest stocking volume by 1 189 million m<sup>3</sup> (SFA, 2005b). The increases in forest area and volume are mainly due to the expansion of forest plantations.

Of the total forest area, natural forest covered 115.8 million ha, with a stocking volume of 10 593 million m<sup>3</sup>, and forest plantation 53.3 million ha, with a stocking volume of 1 505 million m<sup>3</sup>. These figures include fruit trees and bamboo forests. Forest plantations accounted for 30 percent of forest area, but only 12 percent of forest stocking volume since many of the forest plantations are still immature. The average timber volume was 84.7 m<sup>3</sup>/ha: that of natural forest 95.9 m<sup>3</sup>/ha and that of forest plantation 46.6 m<sup>3</sup>/ha. Most forest plantations did not have sufficient stocking volume for commercial timber production.

#### Ownership

China's forests belong to the State, collectives and individuals. State-owned forest covers 72.9 million ha (42 percent of total forest area), most of which is in the northeast of the country. Collective-owned forest covers 64.8 million ha (38 percent), mainly in the southeast. Individual-owned forest has expanded recently, although it still covers only 35.1 million ha (20 percent) (SFA, 2005b). Owing to harvest restrictions in many State-owned natural forests, the role of collective- and individual-owned forest plantations in commercial timber production has become increasingly important.

#### Regional distribution of forests

China's forests are classified into five major regions, as indicated in Table 7. The southeast low mountain and hilly forest region accounts for more than half of the country's forest area, and includes a large part of China's forest plantations. Forest plantations account for nearly half of this region's forest area, so the forest stocking volume per hectare is low. Natural forest regions, such as in the northeast Inner Mongolia and southwest mountain forest regions, have higher forest stocking volumes per hectare. Although the stocking volume in the southeast region is still small, the region is becoming increasingly important for commercial timber production because of the increase of large-scale forest plantations.

TABLE 7

#### Regional distribution of forest area

Region	Forest area (million ha)	Stocking volume (million m <sup>3</sup> )	Stocking volume (m <sup>3</sup> /ha)
Northeast Inner Mongolia forest region	37.8	3 156	83
Southwest mountains forest region	39.1	4 913	126
Southeast low mountain and hilly forest region	53.6	2,103	39
Northwest mountainous forest region	4.8	490	102
Tropics forest region	10.3	903	88
<b>Total</b>	<b>145.6</b>	<b>11 565</b>	<b>79</b>

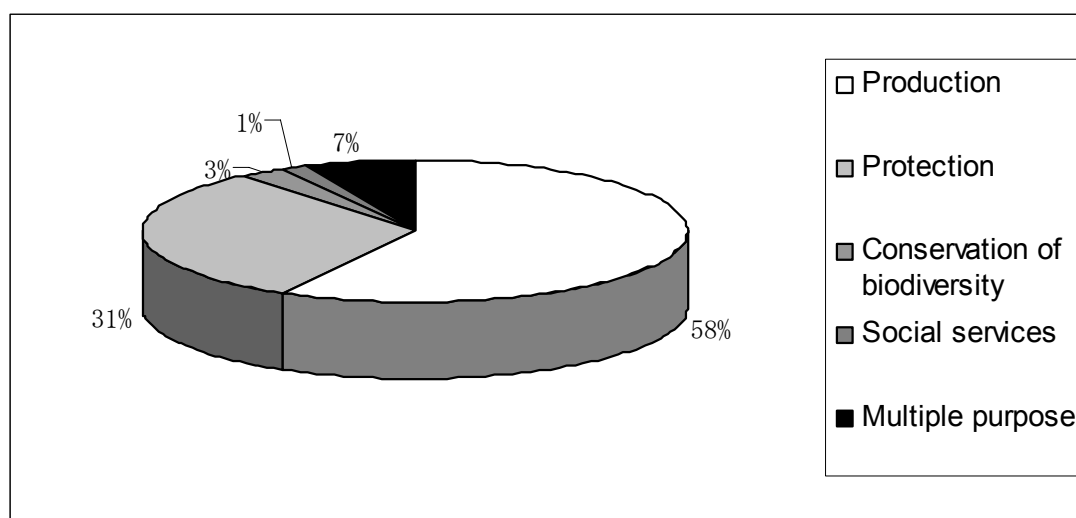
Source: SFA, 2005b.

### Functions of forests

Information provided by China to FAO's *Global Forest Resources Assessment (FRA)* for 2005 classified China's forests according to their designated functions, as illustrated in Figure 23. The total forest area in China as of 2005 is estimated to be 197 million ha, of which 58 percent is managed for productive purposes as the primary function and 31 percent for forest protection (FAO, 2004). However, as most forest has more than one function in China, the total area of forest designated for productive purposes amounts to 190 million ha and that designated for protection of soil and water resources amount to 186 million ha. These figures indicate that most of forests in China can be harvested for wood or non-wood forest products.

Restrictions on timber harvest in protection forests are not strict in most areas of China, so many of these forests can be harvested to support local people's livelihoods and for commercial purposes, to some extent.

**Figure 23. Designated functions of forest**



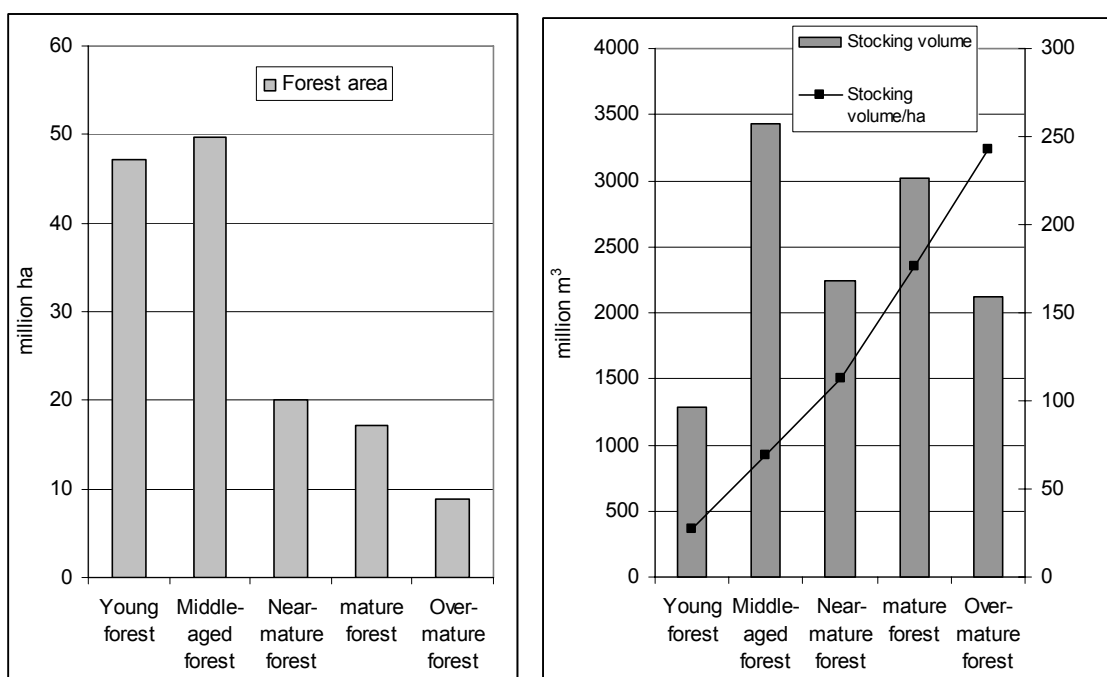
Source: FAO, 2004.

### Age class distribution

Although natural forests account for a large part of the total forest area, China's forests are relatively young. Young and middle-aged forest cover 47.2 million ha and 49.6 million ha, respectively (33 and 35 percent of the total forest area), as shown in Figure 24 (SFA, 2005b). In this analysis, forest age was classified according to species characteristics. For example, to become mature forest, *Cunninghamia lanceolata* takes at least 25 years, and *Populus L.* and *Eucalyptus* spp. take 20 years (FAO, 2006b).

In terms of forest stocking volume, mature and overmature forest accounted for 3.0 billion m<sup>3</sup> (25 percent) and 2.1 billion m<sup>3</sup> (18 percent), respectively, of the total forest stock. It should be noted that a large part of these forests are natural forests, about half of which is under NFPP logging restrictions. It is also noteworthy that the stocking volume per hectare is not high for commercial forests in China, even for mature and overmature forest; the average for mature forest is 176 m<sup>3</sup>/ha, and for overmature forest it is 242 m<sup>3</sup>/ha.

**Figure 24. Age class distribution of forest area and stocking volume**



Source: SFA, 2005b.

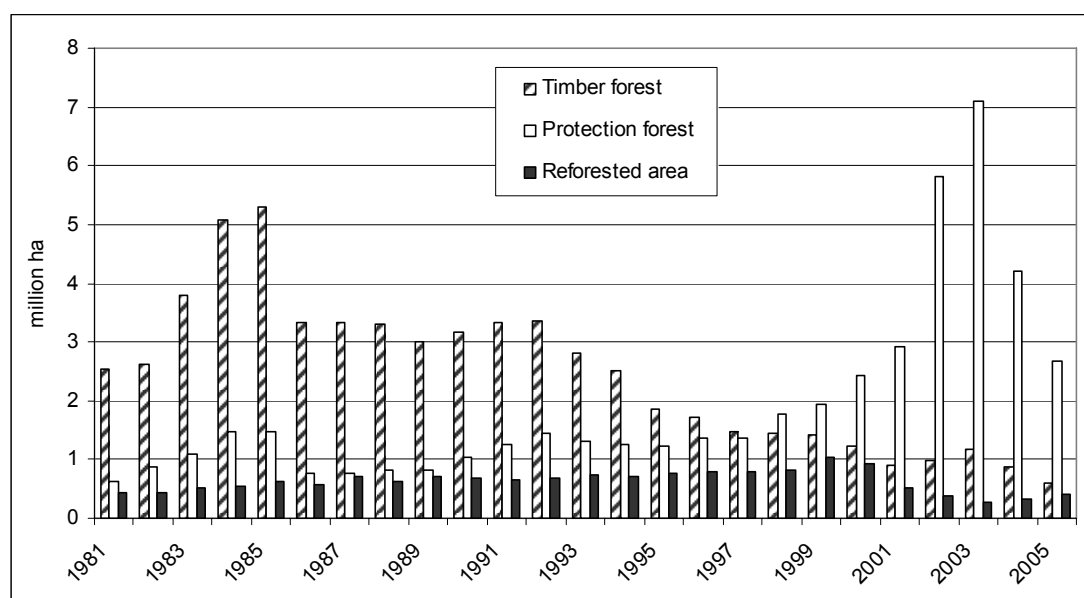
### Afforestation and forest area increase

China's forest area has increased dramatically since 1980. In the years between the second (1977 to 1981) and the sixth (1999 to 2003) NFI periods, the forest area increased by 60 million ha. This was because of large-scale intensive afforestation since 1980. According to official statistics (derived from SFA, 2004; 2005c) the afforestation carried out over this period totalled about 100 million ha (an annual average of about 5 million ha), excluding reforestation of harvested land. The difference between these two figures illustrates the difficulty in afforestating successfully and the existence of deforestation, which was more than compensated for by the larger-scale of afforestation.

The purpose of afforestation has shifted from timber production to protection, as illustrated in Figure 25. Until the mid-1990s, most afforestation occurred in timber forests; since then, and particularly since 2000, most has been implemented for protection purposes (SFA, 2006).

These changing characteristics of forest plantations in China imply that future timber supply from these forests will not necessarily increase in proportion to the scale of afforestation; the increase in available commercial timber will probably be much smaller than the annual afforestation rate.

**Figure 25. Afforestation areas per year**



Source: SFA, 2006.

## **POLICIES AND PROGRAMMES TO PROMOTE AFFORESTATION**

### **Guiding principles**

The Communist Party of China (CPC) Central Committee and the State Council issued the first Resolution on Protecting Forest and Developing Forestry (RPFDF) in 1981, which greatly accelerated forestry development in China, especially the planting of trees. Since then, forest plantation has increased dramatically, reaching 466.7 million ha in 2003. In 2003, the Government of China issued a Resolution on Accelerating Forest Development by the CPC Central Committee and the State Council (RAFD), which provides the fundamental guiding principles for reforming and developing forestry in China. The RAFD makes ecological construction one of the key concepts of forestry development strategy (Zhou, 2005). It provides targets regarding the enlargement of China's forest areas, which are expected to cover more than 19 percent of the total land area by 2010, more than 23 percent by 2020 and more than 26 percent by 2050 (CPC Central Committee and State Council, 2003).

In line with these targets, the Government of China has provided the following objectives for forestry development in the new era:

- Increase forest cover to more than 19 percent of total land area by 2010; alleviate soil and water erosion in major river basins, and desertification in main desert areas; bring the overall deteriorating conditions nationwide under control; and rationalize the structure of forest industries.
- Increase forest cover to more than 23 percent of total land area by 2020 – i.e., to at least 220 million ha – and the forest stocking volume to 14.5 billion m<sup>3</sup>; improve 19 million ha of low-quality forest; establish 13.33 million ha of FGHY timber plantations; recover and enhance the overall functions of the forest ecosystem; reduce the consumption of natural forest by 680 million m<sup>3</sup>; increase the supply from commercial plantations to about 70 percent of the total forest supply; and mitigate the conflict between supply and demand for timber and other forest products.
- Raise and maintain forest cover at more than 26 percent by 2050; increase the area of nature reserves to 172.8 million ha; protect typical ecosystem types effectively; bring desert land suitable for control under basic control; increase the tree cover to 45 percent

in 70 percent of cities; build picturesque landscape; and bring ecological conditions into a favourable cycle (SFA, 2005a).

### Six Key Forestry Programmes

In the late 1990s, China started the Six Key Forestry Programmes (SKFP) to promote afforestation. The six programmes are the National Forest Protection Programme (NFPP); the Conversion of Cropland to Forest and Grass Programme (CCTF); the Combating Sandification around Beijing and Tianjin Programme (CSPABT); the Key Regions' Shelter Forest Programme (SFP), which is the fourth stage of the Three North Shelter Forests (TNSF) and the SFP along the Yangtze and other Key Rivers (SFAKR); the Wildlife Protection and Nature Reserves Programme (WPNRP); and the Programme for Fast-Growing and High-Yielding Forest in Key Areas (FGHYFP). The six programmes were started one by one since 1998, and were reorganized into SKFP during the 10th Five-Year Plan. Although the initial purposes of SKFP, with the exception of FGHYFP, were to protect natural forests, solve water and soil erosion problems, and protect wildlife and endangered species, all the programmes used afforestation as an important measure for achieving results and provided a variety of incentive policies to promote afforestation.

Table 8 shows the target afforestation areas of SKFP, the afforestation achieved by the end of 2005, and the budgets spent until that year. The total afforested area was 58 million ha in 2005, including areas of both planted trees and natural regenerated forest.

At the end of 2005, about US\$22 billion had been spent for SKFP. The government tripled this expenditure between 2000 and 2005, to reach US\$3.9 billion (32.1 billion yuan) in 2005. This accounted for about 90 percent of total government expenditure for forestry fixed assets. Between 2001 and 2004, afforestation carried out under SKFP accounted for 95 percent of total government afforestation (SFA, 2005c).

TABLE 8  
SKFP targets and achievements

Programme	Period	Target afforested area (million ha)	Afforested area at end 2005 (million ha)	Budget spent at end-2005 (US\$ billion)
FGHYFP	2002–2015	13.33	1.78	1.60
		(new forests)		
NFPP	2000–2010	86.67	4.75	6.24
CCTF	2002–2010	32.00	17.74	10.06
CSPABT	2000–2010	7.57	2.88	1.47
TNSF	1978–2050	35.08	29.33	1.51
SFPs	2001–		1.44	1.10
<b>Total</b>			<b>57.92</b>	<b>21.98</b>

Source: SFA, 2006.

Government expenditure on forestry in 2005 was US\$5 billion (41.5 billion yuan), which was 2.05 percent of the total government expenditure of US\$247 billion (2 024 billion yuan) and 14.0 percent of the total agricultural expenditure of US\$24.1 billion (197.5 billion yuan) (Central People's Government of the People's Republic of China, 2006). Over the past ten years, forestry expenditure has risen far more rapidly than total agricultural and government expenditures. Although it is difficult to find comparable data from other countries, these figures show that the Government of China has been making serious efforts to develop forestry in recent years. These efforts have been supported by the rapid increase in government revenue arising from strong economic growth. The increase in government expenditure for forestry is probably the highest increase of any government expenditure, but strong economic growth will allow the government to increase its total national expenditure in



the future. The amount of expenditure that the government can allocate to afforestation will therefore largely depend on the country's economic growth.

Given the high taxes on forest owners' sale of harvested timber (see section on Disincentives to timber production and forestry in Chapter 5) and the large government subsidies for afforestation, it would be desirable to aim at increasing the financial sustainability and independence of forestry development by introducing market incentives. These could be realized by reducing the taxes on timber sales, to enhance investors' interest in forestry, while reducing the subsidies for afforestation, to alleviate the burden on national budgets. Increasing demand for wood and recent high stumpage prices have already provided a strong incentive to tree planting in many parts of China.

The rest of this section describes the programmes in SKFP.

***Programme for Fast-Growing and High-Yielding Forest in Key Areas (FGHYFP):*** In 2002, NDRC approved the FGHYFP in key regions of 18 southern and eastern provinces. The purpose of the programme is to plant 13.3 million ha of FGHY forest plantation by 2015. Once this has been achieved, an annual supply of 133 million m<sup>3</sup> of timber is expected. This will support the production of 13.9 million tonnes of wood pulp and 21.5 million m<sup>3</sup> of wood-based panels, and provide 15.8 million m<sup>3</sup> of large-diameter timber. The programme aims to supply 40 percent of the anticipated domestic timber demand for these industries.

At the end of 2005, a total of 3.7 million ha of FGHY forests had been planted. Of this forested area, 34.7 percent was for paper and pulp, 43.1 percent for wood-based panel, 8.8 percent for large-diameter timber, 4.3 percent for bamboo, 2.0 percent for precious tree species and special timber, and 7.2 percent for other industrial raw materials (SFA, 2006).

Foreign investment is expected to become a major force in promoting plantation. The total planned investment in FGHYFP is about US\$8.8 billion (71.8 billion yuan). From 2002 to 2005, a total of US\$1.8 billion (15 billion yuan) had been invested. In 2005, foreign investment accounted for 10.3 percent of the total for finished FGHY forests (Wang, 2005). In 2004, it totalled US\$633 million and accounted for 1.7 times the percentage for 2003 (SFA, 2005a). Most financial support from SFA is used for specialized purposes such as fire prevention, disease and pest control, and the study and divulgence of improved varieties of tree species.

To encourage private sector investments, new policy instruments have been developed. SFA has issued policies on the harvest of commercial plantations and on mortgage loans that use timber as a guarantee. Provinces such as Liaoning, Fujian, Guangxi and Hunan have promulgated their own preferential policies, including mortgages, to attract investment in FGHYFP. The National Implementing Plan of the 10th Five-Year Plan and the Forest-Paper Integrated Programme, which is run jointly by NDRC, SFA and the Light Industrial Association (see the section on the Forest-Paper Integrated Programme in Chapter 4), both include elements to encourage investment in FGHYFP. Farmers, households and foreign investors have become the main actors in creating FGHY forests.

The availability of land is another important factor for the success of FGHYFP. There are diverse views about this. One argument holds that the land targeted for FGHY could be used for crops with higher economic returns (Nilsson and Bull, 2004; Barr and Cossalter, 2004; Jaakko Poyry, 2000). On the other hand, according to a feasibility analysis, the planned FGHY area includes between 7 million and 8 million ha of barren land. An additional 7.5 million ha of middle-aged and young timber forest will be suitable for FGHY forest when tending has been completed. The total land feasible for FGHY forest therefore reaches an estimated 14 million to 15 million ha, which is enough to meet the 13.3 million ha FGHYFP target.

***Tax reform to promote FGHYFP:*** The silviculture fund and the maintenance and construction fee (M&CF) are among the administration charges related to forest plantations imposed by the government of China. Forest owners pay these charges to local forestry authorities when they obtain their first timber sales income. After the authorities have examined the regeneration and reforestation of the harvested land, a percentage of the charges

is returned to the owners.<sup>3</sup> To attract investors', in 2002, the government abolished the silviculture fund and the M&CF on new FGHY forests. This policy change is estimated to have increased forest owners' economic returns by about 9 percent. Along with abolition of the special agricultural products tax and the gradual cancellation of other agricultural taxes, this tax policy change will attract investors to FGHYFP.

*Subsidy programme:* The mining and paper industries can deduct a certain amount of their sales income from the sum subject to income tax, because their investments in forest regeneration and afforestation are regarded as production costs. This preferential treatment has enhanced the industries' interest in establishing their own forest bases. Since the outset of this policy in the 1980s, the total area afforested by coal mining industries had reached 40 000 ha in 2000 (Dai, 2000).

***National Forest Protection Programme (NFPP):*** The initial purpose of NFPP was to protect natural forests by implementing a logging ban in ecological forests of the middle and upper branches of the Yangtze and Yellow rivers, and by reducing the timber harvest in State-owned forest regions in northeast China and Inner Mongolia. These measures have reduced the timber supply from domestic forests. The programme also requires State-owned forest enterprises and farms to cultivate commercial forests intensively, establish industrial forests, and cultivate precious species and large-diameter timber forests in order to maintain the timber supply. From 2000 to 2010, a planned US\$2.2 billion (18 billion yuan) will be spent on activities such as closure of forests for natural regeneration, aero-seeding, construction of seedling bases, and fire prevention. NFPP will contribute to future timber supply because it covers most of the two major timber supplying areas in China: the State-owned forest regions in northeast and southwest China.

*Subsidy programme:* Forest owners or managers can receive a subsidy of US\$125 (1 050 yuan) per hectare for closing mountains for natural regeneration for five years. Other subsidies for planting trees are US\$92 (750 yuan) per hectare for aero-seeding; US\$366 (3 000 yuan) per hectare for planting trees in the upper branches of the Yangtze River; and US\$550 (4 500 yuan) per hectare for planting trees in the middle and upper branches of the Yellow River (SFA, 2000). Currently, these subsidies are provided to State-owned forest enterprises and farms only, and not to communities and forest farmers.

***Conversion of Cropland to Forest and Grass Programme (CCTF):*** The main aim of CCTF is to alleviate water erosion, soil erosion and desertification by converting croplands steeper than 25° to forest and grassland and by closing mountains to allow natural regeneration. The programme's target is to afforest 14.7 million ha of cropland and 17.3 million ha of barren land and hills. Since 1998, 17.3 million ha of land has been afforested. In 2002, CCTF was being carried out in 25 provinces, including 1 897 counties. Most of these areas were in western and central China; the aim is to improve the ecological environment and enhance local people's timber supply in the long term. Ecological forest accounts for 80 percent of conversion lands.

The long-term sustainability of CCTF and its potential to prevent soil erosion and restore forests remains uncertain, however (Chunquan, Taylor and Guoqiang, 2004). The programme has been implemented in different ways by different provinces, counties and townships, according to their own natural, economic and political conditions. For example, local governments and farmers appreciate the programme in counties where central government subsidies are higher than the potential land yield; whereas interest in CCTF is declining in counties where potential land yields surpass the government subsidies. In some places, many

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<sup>3</sup> Local governments charge 20 percent of the timber sales income from collective forests as the silviculture fund and the M&CF. About 80 percent of this charge should be returned to forest owners after regeneration and reforestation of their land has been verified, but the amounts returned differ from place to place, depending on local policies. For State-owned forests, the silviculture fund charges 21 percent of timber sales income – 26 percent in the northeastern forest region. The lowest percentage of sales income paid to the silviculture fund and the M&CF is 15 percent, and the lowest percentage returned after regeneration is 60 percent.

farmers who participated in the programme have not receive subsidies because more land has been converted to forest than originally planned (Xu and White, 2002).

*Subsidy programme:* The government provides grain and cash subsidies to implement the programme on private contracted land. By 2004, 97 million farmers had benefited from CCTF. The average annual subsidy per farmer is US\$4.9 (40 yuan), plus 247 kg of grain. Every year, 2 250 kg/ha of grain is provided to farmers in the upper branches of the Yangtze River, and 1 500 kg/ha to those in the middle and upper branches of the Yellow River. Grain is provided for eight years for conversion to ecological forest, and five years for conversion to commercial forest (MOF *et al.*, 2000). The cash subsidy, of US\$36 (300 yuan) per hectare, is provided for eight years for conversion to ecological forest, five years for conversion to commercial forest, and two years for conversion to grassland (MOF, 2002). In addition to these subsidies, a seedling subsidy of about US\$92 (750 yuan) per hectare is provided for afforestation on conversion land, barren land and barren mountains.

In 2004, to continue implementing the programme, the government proposed abolishing the grain subsidy and replacing it with a new cash subsidy calculated as US\$0.17 (1.4 yuan) per kilogram of grain (State Council, 2004). Provincial governments have the final decision about adopting this change.

***Combating Sandification around Beijing and Tianjin Programme (CSPABT):*** CSPABT covers 75 counties in five provinces (autonomous regions and municipal cities). The total task area is almost 148.2 million ha, requiring inputs of about US\$6.8 billion (55.8 billion yuan). After completion of CSPABT, 7.6 million ha of land is expected to be afforested, including 2.6 million ha on conversion cropland.

***Three North Shelter Forests (TNSF) and the Shelter Forest Programme (SFP) along the Yangtze and other Key Rivers (SFAKR):*** From 1978 to 2005, nearly 30 million ha was afforested. In 2004, the total afforestation implemented by SFAKR had reached 448 300 ha, of which 438 300 ha is forest plantation and 10 000 ha for aero-seeding (SFA, 2005a). The input to SFAKR was US\$300 million (2.7 billion yuan), of which US\$112 million (918 million yuan) came from the government (SFA, 2005a).

There are three main kinds of forest in TNSF; protection, fuelwood and economic. About 910 000 ha of fuelwood forest has been planted, meeting the fuelwood needs of 6 million rural households.

Diverse forestry industries have been developed through TNSF. Farmers' incomes have also greatly increased (SFA, 2001). Most species planted in TNSF are FGHY tree species, such as Poplars. As coal and natural gas start to substitute local people's fuelwood use, more forests are being left for timber and fibre production, which will increase the future supply of wood for these products in rural areas.

## LEGAL SECURITY OF LAND-USE RIGHTS

### Forest use right and afforestation

With the current strong timber prices, securing forest use rights greatly enhances forest owners' interest in investing in forestry, particularly in commercial forest plantations. Recently, China has started to reform the allocation of forest use rights to local individuals, mainly local farmers. Reforms are advancing, particularly in southeastern provinces, where collective ownership accounts for a large proportion of forests. For example, in 2003, reforms were introduced in Fujian province, on China's southeast coast, where collective forests account for 88 percent of the total. The registration and issue of forest use right certificates under these reforms have greatly promoted local households' participation in afforestation, with the proportion of non-public afforestation rising from less than 20 percent in 1998 to more than 60 percent in 2004. In Yongan City, the proportion of non-public plantations reached 94 percent of total new afforestation in 2004. Farmers with forest use rights are investing more and more labour and capital in forestry in these regions. Capital investments in

forestry in Fujian province rose by 180 percent from 2003 to 2004, reaching US\$27.4 million (227 million yuan).

However, constraints and inconsistency in implementation of this policy have been reported in some provinces. These weaknesses include logging quota systems that hinder timber production and sales, weak coordination between government policies to promote reforestation and forest owners' rights over forests, and insufficient monitoring and evaluation for implementation of the policies (Zheng, 2006).

### **Government regulations to secure land and forest tenure**

The following government rules and regulations have been introduced recently to improve forest and land-use rights:

- The certification of forest rights, land-use rights and afforestation contracts ensures ownership and use rights over forests and forest land. Relevant rules are provided in the Forest Law of China, the Regulations for the Implementation of the Forestry Law of China (RFIFL), the Agriculture Law, the Rural Land Contracting Law and the Land Management Law.
- The Forest Law of China stipulates that forest rights certificates provide legal evidence confirming the ownership of forests and trees. The Rural Land Contracting Law of China provides that the certificates also provide legal evidence confirming contracted management rights in woodlands.
- The Law of Desertification Prevention and Governing of China of 2002 requires the issuing of land-use right certificates to protect contractors' rights and benefits, and landowners' rights. Contract terms are limited to less than 70 years for contracts on collective desert land.
- For example, RFIFL provides that the State shall protect the ownership of forest trees and the interests of entitled afforestation contractors.
- The Rules of Ownership Registration and Management of Forest Trees and Forest Land of 2000 further clarify the application, procedures and necessary documents for registering and managing ownership.

Progress has been made in securing contractors' legal rights to promote forestry through contracting with third parties. The Rural Land Contract Law of China (2003) endows forestry contractors (mainly farmers) with long-term management rights for 30 to 70 years. These include the rights to transfer land management rights and to produce and carry out transactions in forest products. The cancellation or changing of land contracts during their contract periods is forbidden, unless both parties agree; no entity or individual can prevent or restrict farmers' rights over their contracted land. Contractors have also been given the legal right to compensation for certain losses, and are entitled to ask for arbitration or to lodge accusations in cases of violation of their rights and interests (Miao, Zhang and Goa, 2004).

### **Box 9. The mortgaging of forest assets for credit**

SFA issued the (trial) Rules on Registration of Mortgage by Forest Resource Assets on 25 May 2004. This policy aims to use forest resources to secure mortgages in order to broaden the financial base for forestry. Under the policy, forests, trees and use rights of commercial forest land can be used as mortgage guarantees, while the ownership of the forest does not change. Recently, pilot trials of this practice have been started in southern provinces, where reform of the forest property system is advanced.

There are constraints to the policy's full implementation, however, because of the special characteristics of forest resources. First, as forests and trees are living things, there are high risks of devaluation by disease, insects and fire after they have been registered for mortgages. Second, the economic valuation of forest assets is still being developed in China, so it is not easy to estimate the economic value of forests. As of 2006, the trials had not led to financial organizations accepting forests and forest resources as mortgage guarantees.

### **Box 10. Investment in forestry by the Xin Gaochao Group, Shanghai**

Shanghai's Xin Gaochao Group is a comprehensive enterprise that manufactures wood products and manages real estate and hotels. It has total capital of more than 7 billion yuan and a staff of more than 20 000 people. Currently, 20 enterprises are affiliated to the group, ten of which are large-scale wood product manufacturers supplying Shanghai and Jiangsu. The group owns 750 000 m<sup>2</sup> of factory and living space, and has 128 branch factories and production lines to produce and process 250 000 m<sup>2</sup> logs a month. It produces more than 100 kinds of products in nine categories, mainly environmentally friendly medium-/high-density fibreboard, grainy board, carpentry veneers, plywood, decorated panels, block board, multi-block board, fire-proof board, and wooden floorboards. Its products are sold across China, Japan, the Republic of Korea, India and Singapore, with sales of up to 5.5 billion yuan a year. The group has been the top private enterprise in Shanghai for six consecutive years.

The group is not only a major wood product manufacturer, but also a large timber consumer, with an annual consumption of more than 3 million m<sup>3</sup> of logs. Owing to China's deficiency of natural forest resources, more than 95 percent of the timber the group consumes comes from imports. Worldwide deterioration of the bio-environment and the resulting decline of forest resources are encouraging all countries to set restrictions on log exports, however. Facing a severe shortage of raw materials for its forest industry, the group has decided to invest in afforestation enterprise programmes in key areas of mainland China and in the Shanghai hinterland.

Cooperating with Shanghai Ya'er Science and Technology Co. Ltd, the group has made large investments in introducing fast-growing poplar (*Populus tomentosa*) seedlings of high quality, and advanced techniques and experience in culturing, breeding, afforestation and management. It has also invested in the Chinese plantation industry, setting up a 3-ha factorized breeding base, a 0.45-ha greenhouse, and a 670-ha nursery and genebank. It plans to plant 13 000 ha of forest a year. So far, it has completed more than 133 000 ha of plantation in Shanghai, Inner Mongolia, Shaanxi, Jiangxi, Hunan, Hubei, Fujian, Chingqing, Anhui, Shandong and Guangxi.

# 7. Outlook for demand and supply of wood products

## DEMAND FOR WOOD PRODUCTS

The expected growth of China's economy will continue to be a strong driving force of the demand for wood products.

### Industrial roundwood

The SFA thematic study for the 11th Five-Year Plan estimated that between 241.6 million and 246.6 million m<sup>3</sup> of industrial roundwood was consumed in 2004 (Li, 2006). This figure includes wood used for paper and paperboard, but not for recycled paper, timber for private use and fuelwood for farmers. The study forecast that the future demand for industrial roundwood will reach 325.0 million to 352.0 million m<sup>3</sup> in 2010 and 457.0 million to 477.0 million m<sup>3</sup> in 2020 (see Annex).

### Wood-based panels

The SFA study forecast that the demand for wood-based panels will reach 75 million m<sup>3</sup> in 2010 and 120 million m<sup>3</sup> in 2020 (Table 9). This forecast is based on the expected future increase of GDP.

It should be noted that the consumption of plywood is forecast to decrease between 2010 and 2020. This is because of the decreasing availability of tropical timber, particularly large trees. On the other hand, consumption of fibreboard and particle board is forecast to increase and to surpass that of plywood, because of the increasing availability of small logs and wood residues from forest plantations. Advances in the efficient use of wood residues and recovered wood products in wood-based panel production is also expected.

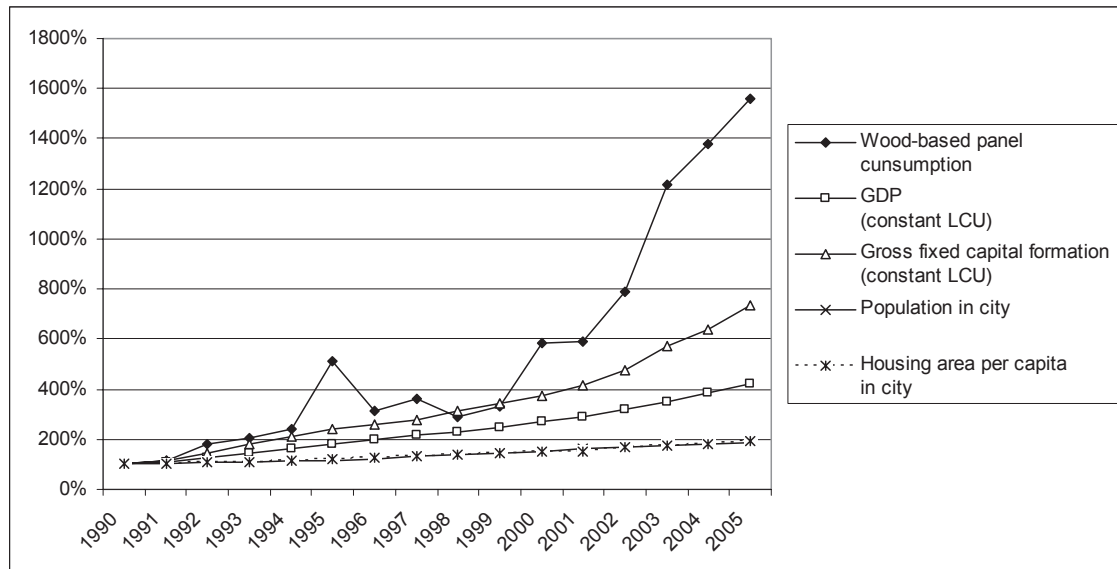
TABLE 9  
Outlook for wood-based panels demand (million m<sup>3</sup>)

Product	2004	2010	2020
Plywood	21.0	27.0	20.0
Fibreboard	15.6	21.0	35.0
Particle board	6.4	9.0	35.0
Other wood-based panels	11.4	18.0	30.0
<b>Total</b>	<b>54.5</b>	<b>75.0</b>	<b>120.0</b>

Source: Li, 2006.

Wood-based panels are used mainly for forming concrete in building construction, housing interiors and furniture. When forecasting the demand for wood-based panels, it is therefore important to take into account a variety of factors relevant to consumption, such as GDP, trends in fixed capital investment, urbanization, per capita housing area and replacement of sawnwood by wood-based panels. Figure 26 indicates that wood-based panel consumption has increased far more rapidly than the relevant socio-economic factors have. Among these factors, gross fixed capital formation has indicated an unprecedented sharp increase since 2000, doubling between 2000 and 2005. This trend reflects the recent steep increase in housing and public construction projects. From these trends it seems reasonable to conclude that government policies relevant to fixed capital formation in the future will have a significant influence on the demand for wood-based panels in China.

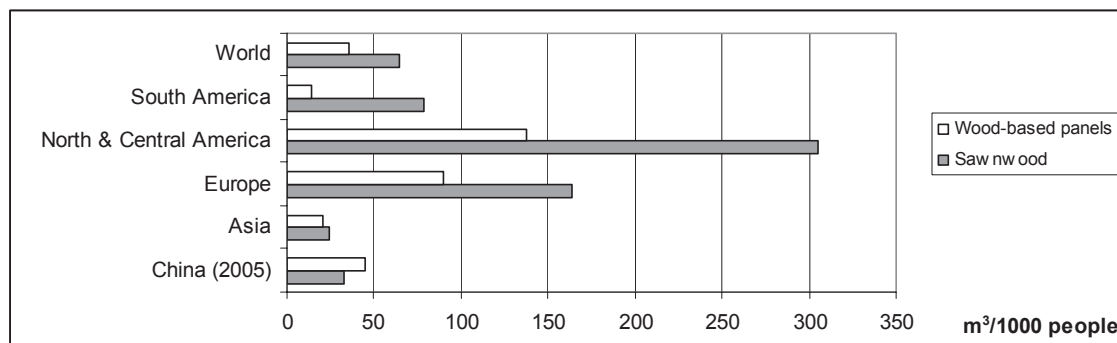
**Figure 26. Economic factors and wood-based panel consumption**



Sources: SFA, 2006; Ministry of Construction China, 2006; World Bank, 2006.

China's per capita consumption of wood-based panels is already high compared with the averages for Asia and the world. Figure 27 compares the consumption of solid wood products in China with that in other regions of the world. Consumption per thousand people was 45 m<sup>3</sup> in China in 2005. The comparable figures for Asia and the world were 21 m<sup>3</sup> and 36 m<sup>3</sup>, respectively, in 2004, and that for upper-middle-income countries was 50 m<sup>3</sup> in the same year. From these statistics, it can be inferred that even if China's economy maintains its current growth rate in the future, the consumption of wood-based panels may not increase as sharply as it has done over the past five years. The consumption of wood-based panels depends largely on the factors that drive economic growth, such as whether or not the country depends on fixed capital formation for its economic growth.

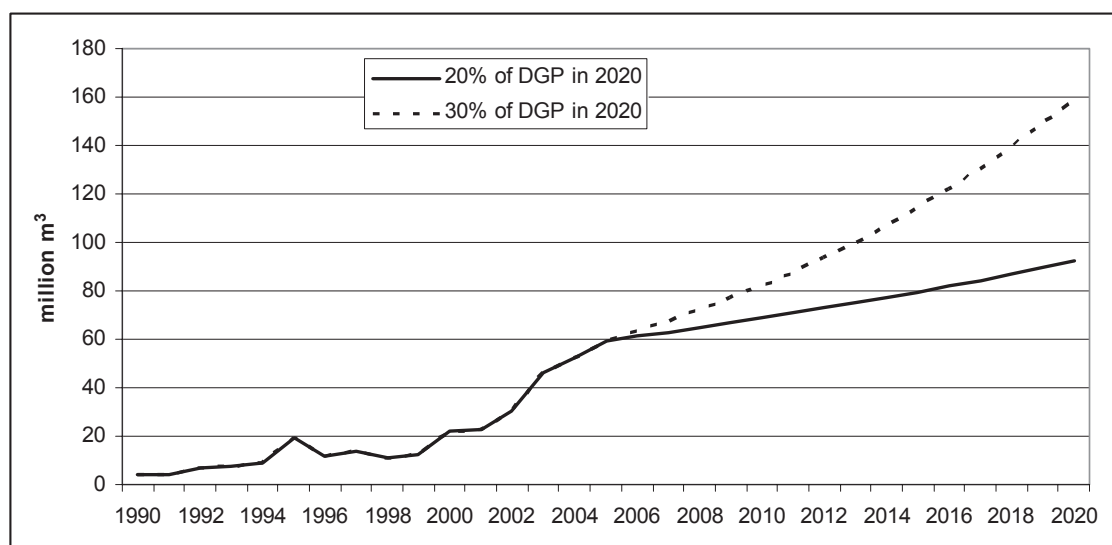
**Figure 27. Per capita consumption of solid wood products, 2004**



Sources: FAO, 2006a; SFA, 2006.

At present, gross fixed capital formation accounts for more than 40 percent of China's GDP (see the section on Government policies in Chapter 2). As there is a close relationship between fixed capital formation and the consumption of wood-based panels, two scenarios concerning the future consumption of wood-based panels can be projected. In one scenario, fixed capital formation will decline to 20 percent of GDP in 2020, owing to government policies to cool capital investments. In the other scenario, fixed capital formation will decline to 30 percent of GDP in 2020. As shown in Figure 28, in the second scenario the consumption of wood-based panels reaches 160 million m<sup>3</sup>, which is far higher than the forecast of the SFA thematic study (120 million m<sup>3</sup>) (Table 9).

**Figure 28. Forecast wood-based panel consumption based on fixed capital formation**



Sources: Derived from FAO, 2006a; SFA, 2006; World Bank, 2006.

### Sawnwood

Although official statistics for sawnwood production indicate increasing trends, no practical statistics cover all of China's domestic sawnwood production (see section on Sawnwood in Chapter 3). Under these circumstances, an alternative method for identifying demand is to estimate the sawnwood volume consumed on the market. Using this approach, the SFA thematic study estimated that the total consumption of sawnwood in 2004 was 53.6 million m<sup>3</sup> roundwood equivalent volume (RWE). This estimate includes consumption for: new housing and public construction; and decoration of housing and public construction. Table 10 shows the consumption estimates from the SFA thematic study.

In 2004, sawnwood consumption for new housing and public construction was estimated to be 34.6 million m<sup>3</sup> RWE; consumption for housing and public construction decoration was estimated at 13.4 million m<sup>3</sup>, with an RWE of 19.0 million m<sup>3</sup>, using 0.7 as the conversion rate for industrial roundwood to sawnwood. The consumption of sawnwood for wooden furniture was estimated to be 11.0 million m<sup>3</sup> RWE in the same year (see section on Wooden furniture in Chapter 3).

The SFA study forecast that consumption for new housing and public construction will increase to between 41.0 million and 43.0 million m<sup>3</sup> RWE in 2010, and will then decrease to between 32.0 million and 34.0 million m<sup>3</sup> RWE in 2020. This decrease is mainly because of population movements from rural areas, where much wood is consumed for housing, to urban areas.

On the other hand, sawnwood consumption for the decoration of housing and public construction is expected to grow to between 34.0 million and 36.0 million m<sup>3</sup> in 2010, and to continue going up to reach 40.0 million to 42.0 million m<sup>3</sup> by 2020, mainly owing to the increase in average incomes. The demand for wood for furniture production is also expected to increase, to between 20.0 million and 22.0 million m<sup>3</sup> in 2010 and between 35.0 million and 37.0 million m<sup>3</sup> in 2020.



TABLE 10

**Outlook for sawnwood demand** (million m<sup>3</sup>)

Use	2004	2010	2020
New housing and public construction	34.6	41.0–43.0	32.0–34.0
Decoration of housing and public construction	19.0	34.0–36.0	40.0–42.0
Wooden furniture	11.0	20.0–22.0	35.0–37.0

Source: Li, 2006.

These figures include exports of wooden furniture. In 2004, wooden furniture exports accounted for nearly one-third of the total production value of wooden furniture. The wood used for these exports is estimated to be 3.5 million m<sup>3</sup>, assuming that exported wooden furniture has similar characteristics to domestically consumed furniture in terms of prices and wood use.

**Roundwood used for construction**

The SFA thematic study estimated that the consumption of roundwood for construction, including sleepers and log supports for mining, was 30.0 million m<sup>3</sup> in 2004. Future consumption is forecast to be between 29.0 million and 31.0 million m<sup>3</sup> in 2010, and between 34.0 million and 36.0 million m<sup>3</sup> in 2020.

**Paper and pulp**

Table 11 shows the outlook for paper and paperboard demand, according to the SFA thematic study. The demand for paper and paperboard is expected to double from 71.3 million tonnes in 2010 to 137.8 million tonnes in 2020. The demand for wood materials for wood pulp production will reach 66.0 million m<sup>3</sup> in 2010 and 144.5 million m<sup>3</sup> in 2020.

These forecasts are based on the expected growth of GDP and wood pulp consumption, and the expected decrease in straw pulp consumption, in accordance with government policy. The ratio of wood pulp to total pulp for paper consumption is expected to go up from 22 percent in 2004, to 26 percent in 2010 and 30 percent in 2020. This means that even in 2020, a large proportion of pulp for paper will still be produced from recovered paper and non-wood pulp, implying that China will continue to have an affect on global markets for recovered paper.

TABLE 11

**Outlook for paper and paperboard demand** (million tonnes)

Category	2004	2010	2020
Paper and paperboard consumption	54.4	71.3	137.8
Pulp consumption	44.5	56.4	107.0
Wood pulp consumption	9.7	14.6	32.1
Demand for wood for wood pulp	44.0	66.0	144.5

Source: Derived from Li, 2006.

Although the consumption of paper may increase dramatically, in 2020 per capita consumption will be still be smaller than that of developed countries today. Table 12 presents the consumption of paper products per thousand people. From these forecasts, China will consume 94 tonnes of paper products per thousand people in 2020, which is still less than European and North American consumption in 2005. Experience in other countries indicates that China's paper consumption will continue to rise in proportion to its economic growth.

Recently, large-scale investments have been made in both the paper and the wood-based panel industries, resulting in the rapid expansion of production capacities. Consequently, competition between the two industries for wood raw materials, such as wood chip, will be intensified. This trend will affect the market prices of wood chip.

TABLE 12  
**Consumption of paper and paperboard, 2005** (tonnes per thousand people)

Category	Consumption (tonnes per 1 000 people)
China	45
Asia	32
Europe	129
North and Central America	213
World	55

Source: FAO, 2006a.

Table 13 shows the composition of paper and paperboard in 2005. Wrapping and packaging paper and paperboard account for about 58 percent of paper products consumption in China. This proportion is much higher than the world average, and can be attributed to the rapid development of industry sectors in China. On the other hand, China consumes less newsprint and printing and writing paper than the rest of the world. These account for about 6 and 26 percent respectively of the country's total paper products consumption. This is probably because of the low average incomes of the population. As developed countries account for most of the world's paper consumption, it is predicted that China will consume more newsprint and printing and writing paper as its economic growth progresses.

TABLE 13  
**Composition of paper and paperboard consumption, 2005** (percent)

Category	China	World
Wrapping and packaging paper and paperboard	57.8	46.9
Printing and writing paper	25.8	29.3
Newsprint	5.7	10.8
Household and sanitary paper	6.6	6.9
Other paper and paperboard	4.0	6.0

Sources: FAO 2006a; China Technical Association of Paper Industry, 2005.

## SUPPLY OF INDUSTRIAL ROUNDWOOD

### Outlook according to SFA

The SFA thematic study for the 11th Five-Year Plan estimated that industrial roundwood production from domestic forests was 142.4 million m<sup>3</sup> in 2004. This figure is based on the assumption that 60 percent of the 365 million m<sup>3</sup> of wood harvested was for commercial use. Of this 60 percent, 65 percent was utilized as industrial roundwood (Annex 1).

Table 14 shows the expected supply of industrial roundwood from domestic forests. Assuming that 9.2 million ha of FGHY forest is established by 2010, industrial roundwood supply from domestic forest plantations is expected to reach 110.0 million m<sup>3</sup> in that year. Production from natural forests is expected to be 73.0 million m<sup>3</sup>. Total annual production is forecast to reach 241.5 million m<sup>3</sup> in 2010. These figures are within the annual Harvest Quota (HQ) of the 11th Five-Year Plan (157.0 million m<sup>3</sup> from plantations, and 91.0 million m<sup>3</sup>

from natural forest). Given the current pace of FGHY plantation establishment, however, it seems unlikely that this target will be attained.

In 2020, industrial roundwood production from forest plantations is expected to reach 213.0 million m<sup>3</sup> and that from natural forests 91.0 million m<sup>3</sup>; total production is therefore expected to reach 304.0 million m<sup>3</sup>. This is based on the assumption that the FGHY base will expand to 13.3 million ha by 2020. It must be noted, however, that the forecast roundwood production from forest plantations in 2020 – which is almost double that for 2010 – is much higher than the annual HQ of the 11th Five-Year Plan. It is also worth noting that industrial roundwood production from natural forest is expected to increase by 18.0 million m<sup>3</sup> from 2010. Ongoing efforts to improve resources in natural forests seem to have been incorporated in this forecast.

TABLE 14  
**Outlook for industrial roundwood supply** (in thousand m<sup>3</sup>)

<b>Product</b>	<b>2004</b>	<b>2010</b>	<b>2020</b>
Domestic roundwood production	142 350	183 000	304 000
From forest plantations		110 000	213 000
From natural forests		73 000	91 000
Imported wood products	99 109		
<b>Total</b>	<b>241 460</b>		

All the data are given in RWE.  
Source: Li, 2006.

### **Outlook based on planted forest information**

Because of growing awareness of the importance of conserving natural forests, the role of Forest plantations in timber production will become increasingly important. China has already established large areas of forest plantations: SFA reported 53.3 million ha in 2005 (SFA, 2005b). A recent report related to FRA 2005 revealed that planted forests in China had reached 71 million ha in 2005 (FAO, 2006b). Table 15 shows the components of planted forests in China. In the report, planted forests include semi-natural forest and forest plantations established for both production and protection purposes, but not primary forest and modified natural forest. As restrictions on timber harvest are not strict in most protective forest, these forests will be able to provide substantial amounts of timber in the future.

Figure 29 illustrates the age class distribution of planted forests in China. Of the 71 million ha of planted forest, an estimated 6 million ha is already mature or overmature. The total stocking volume of mature and overmature forest is estimated to be 1 200 million m<sup>3</sup>, based on the per hectare stocking volumes of these forests given in the section on Forest resources in China in Chapter 6 (176m<sup>3</sup>/ha and 242m<sup>3</sup>/ha, respectively). Of the planted forest in Figure 30, productive plantation is estimated to account for about 10.4 million ha in middle-aged forest and about 3.8 million ha in sub-mature forest.

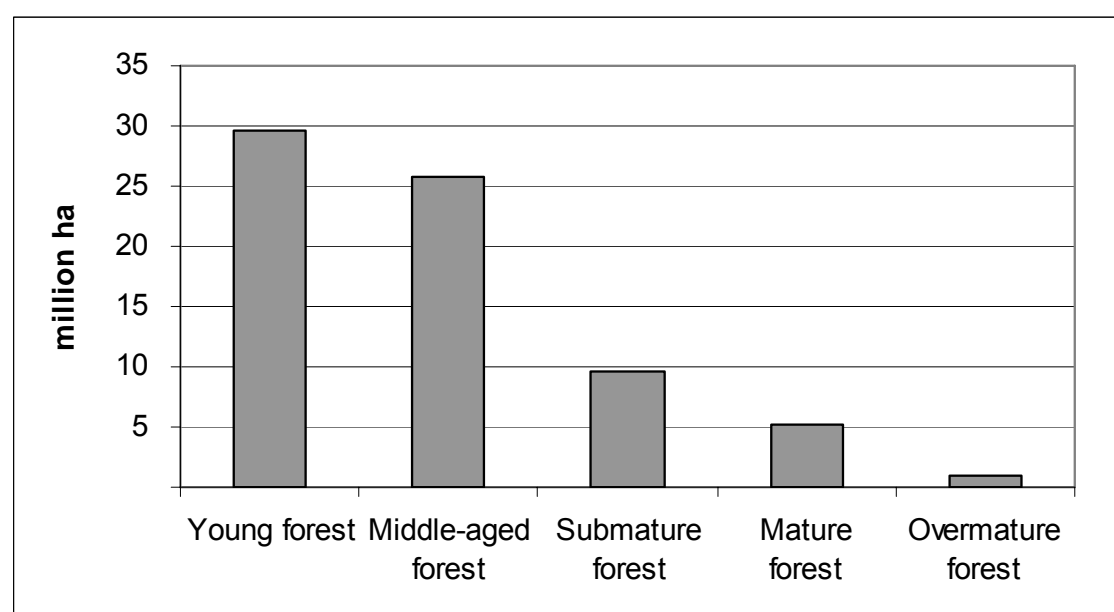
Forecasts based on the data in Figure 29 indicate that the stocking volume of forest plantations will increase substantially in the near future. Given the short rotation period for major species in productive forest plantation, most sub-mature forest is expected to become mature within ten years and most middle-aged forest to become mature within 20 years. As shown in Table 16, in productive forest plantations, it is forecast that an average of 0.38 million ha of sub-mature forest will become mature every year between 2006 and 2015. The growing stock of these newly mature forests is estimated to be 66.9 million m<sup>3</sup> a year. Similarly, it is forecast that between 2016 and 2025, 1.04 million ha of productive forest plantation will become mature every year. The growing stock of these newly mature forests will equal an estimated 183 million m<sup>3</sup> a year.

TABLE 15  
**Planted forests in China** (million ha)

Category	Planted forest area
Semi-natural, productive	25.6
Semi-natural, protective	14.4
Plantation, productive	28.5
Plantation, protective	2.8
<b>Total</b>	<b>71.3</b>

Source: Derived from FAO, 2006b.

Figure 29. Age class distribution of planted forests



Source: Estimated from FAO, 2006b.

TABLE 16  
**Forecast timber supply from productive forest plantations**

Period	Newly mature forest	Growing stock of newly mature forest
2006–2015	0.38 million ha per year	67 million m <sup>3</sup> per year
2016–2025	1.04 million ha per year	183 million m <sup>3</sup> per year

Source: Estimated from FAO, 2006b.

Whether or not these planted trees are used for commercial timber production depends on the existence of nearby timber markets and the prices of wood products. In fact, in many provinces, forest plantations have been established with no regard for the costs and benefits of their sites. At the same time, the paper and wood-based panel industries, which are the major buyers of plantation timber, are located in places that are convenient for imported timber. The producers of domestic plantation timber therefore need to compete with timber imports, as well as among themselves.

A survey of Guangxi province, carried out by the Center for International Forestry Research (CIFOR) and the World Bank, found that some of the forest plantations in the province are more competitive than imported wood from Thailand, Viet Nam, Malaysia and Australia, which are the major exporters of wood chip to China. Some factories use wood that has been transported from adjacent provinces. Nevertheless, the survey also found that some

domestic forest plantations in slope areas of Guangxi are not competitive compared with imported wood chip (Cossalter and Barr, 2005).

Similarly, in southeastern provinces, where large-scale wood processing industries have been established, a large part of the forest plantations will be used by wood and paper industries, but factories in these provinces can obtain imported wood at lower cost. For accurate estimation of the profitability of using domestic timber, more detailed analyses of costs and benefits, which reflect the location of factories and forests, are necessary.

## **IMPORTS OF WOOD PRODUCTS**

### **Imports of industrial roundwood**

As discussed in the previous section, although timber production from domestic forests is expected to increase in the future, it will not meet the growing domestic demand for wood products. Based on the information provided by the SFA thematic study, it is forecast that China will need to import between 142.0 million and 169.0 million m<sup>3</sup> RWE of wood products to meet domestic market demand in 2010, and between 153.0 million and 173.0 million m<sup>3</sup> RWE in 2020. Industrial roundwood, sawnwood and wood pulp will be major imported wood products. China will need to import industrial roundwood, especially large-diameter and high-quality hardwood timber, because these woods are deficit in domestic forests.

Under these conditions, the Russian Federation's new policy to impose high export taxes on logs will have a significant impact on Chinese wood markets because Russian logs account for nearly 70 percent of China's industrial roundwood imports. The Government of the Russian Federation has published a resolution to raise the duties on log exports from July 2007. Export duties on softwood logs will be increased to 25 percent, or not less than €15/m<sup>3</sup> in April 2008, and to 80 percent, or not less than €50/m<sup>3</sup>, in January 2009. This move is intended to boost the Russian Federation's domestic wood processing industry (ITTO, 2007). If this duty is imposed, imports of Russian roundwood will decline substantially, while those of Russian sawnwood will increase dramatically. Chinese industries have already started to invest in establishing sawmills in the Russian Federation to secure wood resources, and exports of sawnwood from the Russian Federation to China have started to rise. This trend will become clearer in the future.

Another important factor that affects China's log markets is the condition of tropical forests and timber. Anticipated scarcities of forest resources in Southeast Asia will affect China's wood-based panel production. Shortages of large-size tropical wood will make Chinese plywood less competitive in the markets. In the future, fibreboard production will surpass that of plywood, because small logs and wood chip can be used for fibreboard production.

China needs to seek diversified exporters of tropical timber. Although current major exporting countries such as Malaysia, Myanmar and Papua New Guinea will remain major exporters of tropical timber, the quantities of exports from these countries will decrease, mainly because of forest resource constraints. Increasing investments by Chinese enterprises in alternative exporting countries will help to ensure new timber resources for imports, particularly plantation timber of fast-growing species.

Increasing investments from China will bring significant changes to the financial conditions of some developing countries, where forests have not yet been exploited owing to insufficient funding of the forestry sector. Large investments in the forestry sector may lead to the rapid depletion of natural forests in these countries. In this respect, the enforcement of laws and regulations for sustainable management by these new exporting countries will become increasingly important.

## Imports of pulp and paper products

The shift from non-wood pulp to wood pulp for paper production will progress as the government continues to promote the use of wood pulp to improve production efficiency and alleviate the contamination of water resources. In line with this policy, the production of wood pulp from domestic forest plantations is expected to increase. Nevertheless, China's imports of wood pulp and recovered paper will continue to increase, because domestic timber production will not meet the domestic demand.

China's increasing demand will lead to higher prices for wood raw materials for paper production, such as recovered paper, wood pulp and wood chip. China's huge demand for recovered paper has increased paper producers' interest in the use of wood chip, and this trend may lead to increased demand for wood chip in international markets.

As well as imports of raw materials for paper production, imports of high-quality paper products will also keep growing as the incomes of Chinese citizens continue to rise.

## EXPORTS OF WOOD PRODUCTS

### Competitiveness and exports of wood and paper products

The production capacities of China's wood-based panels, wooden furniture and paper industries have increased dramatically over the past decade. Production capacity has expanded more rapidly than domestic demand in these sectors. This trend will continue to increase China's exports of these products. Much of the recent investment in new factories for these industries has been aimed at export production.

The competitive advantages of production in China have largely been in its low-cost and skilled labour force. Table 17 compares value-added in the production of wood-based panels and builder's carpentry and joinery of selected exporting countries. Although value-added per employee in China is lower than in other countries, value-added per wage costs is competitive with other countries, owing to China's low labour costs (UNIDO, 2007).

A study in Guangxi Zhuang autonomous region reported that labour costs accounted for less than 8 percent of production costs for medium- and high-density fibreboard. In plywood production, labour costs accounted for 8 to 10 percent and wood material costs for 65 to 70 percent of total production costs (Cossalter and Barr, 2005). Their low production costs have made Chinese plywood producers competitive in both the sale of products and the purchase of roundwood in international markets.

TABLE 17

### Value-added per employee and wage costs in selected exporting countries

Country	Value-added per employee	Wage costs per employee	Value-added per wage costs
China	3.4	1.3	2.6
Brazil	8.1	3.0	2.7
Canada	46.6	21.5	2.2
Germany	48.1	28.4	1.7
Indonesia	3.0	0.9	3.3
Italy	42.5	19.8	2.1
Malaysia	8.3	3.5	2.4
Poland	10.0	4.5	2.2
Russian Fed.	6.2	2.1	3.0

Data used are for 2002 and 2003.

Sources: UNIDO, 2007; ILO, 2003.

Rising incomes and restrictions on labour mobility have affected labour conditions in China. Recently, labour shortages in the production sectors and wage rises have been observed in large cities. Although this trend will continue, Chinese wood and paper industries will maintain their competitiveness in the foreseeable future. First, at the current exchange rate for the yuan, wages in the Chinese manufacturing sector are far lower than in competitor countries, except for Indonesia,

as shown in Table 17. Second, Chinese producers have recently improved production efficiency and product quality by introducing new technology, as discussed in Chapter 3. Third, for the wood-based panels and paper products industries, China's forest plantation resources are expected to supply wood raw materials at lower cost in the future; the competitive advantage of Chinese products is therefore based on more than its low labour costs. Although inefficient factories will go out of business, competitive producers will expand further to provide wood and paper products that are appreciated in international markets.

With development of the forest product industries and constant increases in foreign investments, exports of high value-added products such as paper and furniture will gradually increase.

Chinese exports of wood products may be required to verify the legality of their production and trading methods in several importing countries, in both the private and public sectors. The recent development of forest certification and public procurement policies relating to wood products require such verification.

Competition with products from other countries on international markets will become tougher, and profits from the production process will tend to shrink (Digital Information Service, 2006). An example of this is the emergence of Viet Nam as a competitor in wooden furniture production.

### **Trade disputes and the currency exchange rate**

In China's manufacturing sector, emphasis is put on investing in export-oriented, capital-intensive activities, including through government assistance and public investment. As a result, manufacturing – especially export-oriented manufacturing – has developed more rapidly than other sectors (WTO, 2006).

With the increasing trade surplus, China has been facing severe trade disputes with major importing countries. Anti-dumping measures have been taken in Europe for Chinese plywood and wooden furniture, and in the United States for Chinese wooden furniture (see Chapter 3). China acceded to WTO five years ago, and many Chinese policies that promoted the export of industrial products will attract more attention from importing countries and will be examined more strictly in the light of WTO rules. These policies include the preferential tax treatments and subsidies applied only to enterprises that specialize in the export of certain products. Recently, the government has started to revise these policies. Trade disputes and the government's new policy direction may have significant influence on future exports of wood products.

Chinese import tariffs on wood raw materials, such as logs, were reduced during the 1990s. After accession to WTO, China reduced import tariffs on major wood products to the internationally committed levels. Consequently, the average tariff rates on wood products currently applied to WTO member countries are not very high. Any future tariff reductions on wood products will therefore have limited impact on domestic markets for most wood products.

On the other hand, the exchange rate of the Chinese yuan, which is now almost pegged to the United States dollar, has been influential in international trade by maintaining the price competitiveness of Chinese wood products. Recently, China's wooden furniture and plywood industries have taken advantage of this competitiveness to earn huge export profits (see Chapter 3).

As a result, China has been under pressure to move to a more flexible exchange rate system. In 2005, the Government of China introduced a managed floating exchange rate system with respect to a basket of currencies, but slight changes to the exchange rate have occurred since then. China is expected to introduce a more flexible exchange rate system, which would lead to appreciation of the Chinese yuan and influence trade and the economy on many fronts. First, higher-value Chinese currency would encourage imports of production materials, such as roundwood. Second, a higher yuan would raise the real incomes of domestic consumers and expedite the shift from export-oriented growth to service sector-oriented growth, which depends more on domestic demand.

Appreciation of the yuan would also reduce the profits of export industries, however, and damage less competitive industry sectors, particularly agriculture. This would have a serious impact on the country's social stability, as the economic disparity between urban and rural areas has been expanding. Under these circumstances, it is not conceivable that the government will move to a floating exchange rate system in the short term, although it may allow the system a little flexibility.

# Annex 1

## Forecast timber demand for 2010 and 2020

Demand	2004 (10 000 m <sup>3</sup> )	2010 <sup>e</sup> (10 000 m <sup>3</sup> )	2020 <sup>e</sup> (10 000 m <sup>3</sup> )
Wood demand for housing and construction	83 600	104 000–110 000	106 000–112 000
Sawnwood for housing	34 600	41 000–43 000	32 000–34 000
Sawnwood for housing decoration	19 000	34 000–36 000	40 000–42 000
Logs for construction	30 000	29 000–31 000	34 000–36 000
Sawnwood for furniture	11 000	20 000–22 000	35 000–37 000
Wood for paper and paperboard	44 000	66 000–70 000	140 000–145 000
Wood for wood-based panels	83 000	110 000–120 000	141 000–143 000
Other wood use	20 000–25 000	25 000–30 000	35 000–40 000
<b>Total demand for wood<sup>a</sup></b>	<b>241 600–246 600</b>	<b>325 000–352 000</b>	<b>457 000–477 000</b>

Domestic wood production	142 350	183 000	304 000
Plantation wood		110 000	213 000
Natural forest wood		73 000	91 000
Imported wood	99 109		
<b>Total supply<sup>b,c,d</sup></b>	<b>241 460</b>		

Notes:

<sup>a</sup> All data in this table are from Li Yucai, 2006: 98–113.

<sup>b</sup> Data do not include wastepaper.

<sup>c</sup> Data apply to merchantable timber only, and do not include wood for private use and fuelwood for farmers.

<sup>d</sup> Data are given in log equivalent.

<sup>e</sup> Forecasts for 2010 and 2020 are according to the GDP before 20 December 2005.





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