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# OUTLOOK FOR RUSSIAN FOREST PRODUCT TRADE WITH THE PEOPLE'S REPUBLIC OF CHINA

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**July 1996**

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## SUMMARY

Both China and Russia are and have gone through unprecedented change as both of their societies adjust away from the centrally planned approach and begin to adopt a mixed system incorporating facets characteristic of both private and public sectors. However, while Russia's economy has collapsed following the demise of the centrally planned system, GDP falling nearly 40 percent between 1990 and 1994 (25 percent between 1990 and 1993), China's economy has grown with GDP rising by 55 percent (40 percent by 1993). While the activity of the forest sector in Russia has fallen more steeply to a level of only 45 percent that existing in 1990 (63 percent in 1993), being somewhat lower in Siberia and the Russian Far East, China's forest sector has expanded though it is facing constraints imposed by the forest resource (27 percent between 1990 and 1993).

Ongoing growth linked to evolution of the Chinese system will translate into higher demand for forest products than can be met in the short to medium term by domestic sources. The looming shortages present emerging opportunities for regions rich in forest resources which must seek export opportunities abroad. Nowhere does this opportunity beckon more than in the relatively less developed forests of Siberia and the Far East.

By the year 2025 under a low growth assumption, China could face a deficit in industrial wood of some 200 million cubic meters annually, equal to slightly more than two times the domestic production of industrial roundwood in 1992. Outside of Siberia and the Russian Far East, very few regions have the ability to service this looming deficit. Furthermore, even the Russian region will seemingly be able to meet only up to one-half of the short fall and only under conditions which promote capital investment in the Russian forest sector and development of the forest resource which is available subject to development of the infrastructure.

While on the surface conditions seem to be emerging which will favor increased trade activity between Russia and China in forest products beyond current levels of nearly one million cubic meters annually, much uncertainty remains regarding the longer-term outcome of reform and restructuring in both countries. Future China trade in forest products with Russia will depend on many factors on both sides - many of which are political in nature or speculative regarding future course of economic and market reforms. There is no doubt that in the near term China will experience increasing demand for all forest products and that the domestic supply will be insufficient to satisfy consumption at prevailing prices. Increased trade, including trade with Russia, is one of the several policy tools available to China to deal with this reality. Whether this will be selected as a major or significant element of overall timber strategies remains to be seen. Russia, the potential trading partner, will almost

certainly seek new and expanded markets for timber from Eastern Russia (East Siberia and the Far East regions). The future status of economic reform and transition to markets will dictate outcomes with respect to Russian forests and potential for trade. International markets will grow in importance as traditional markets in European Russia and former Soviet Republics become increasingly economically inaccessible.

What is certain, however, that the People's Republic of China will increasingly play a major role in Asia and the Pacific Rim forestry, both as a producer and consumer market. Likewise, it is certain that Russia, particularly Siberia and the Far East, will impact the overall equation for forest products trade in the Pacific region, with important linkages to China. It is certain that China will need to compete with other Pacific Rim consumer countries in order to obtain timber. It is unlikely that Russia will offer substantial concessions in order to sell to China. Barter trade may persist (currently denominated in Swiss francs) but will be more difficult given competition from hard currency buyers for the available timber from Russia. The willingness to pay international prices for specific species and quality of timber will largely determine the competitiveness of China. Japan, as the major log importer in the Pacific Rim, is increasing seeking timber supplies worldwide, including from the Russian Far East, to offset declines from traditional sources including the West Coast of North America.

It is also certain that Russia will seek expanded international market outlets for timber and forest products. The level and mix of timber for export will in turn depend critically on development strategies for the forests in East Siberia and the Far East. The lack of capital for investment in new and modern capacity and technology will slow the development of competitive processing, largely indicating future trade will continue to emphasize unprocessed roundwood in the near term. The near term outlook for unprocessed roundwood exports from Russia is not materially affected by the import tariff structure imposed by China, though there appear to be inconsistencies in how tariffs are applied to Russia.

China has historically had preferential tariff structures favoring the import of unprocessed timber with increasingly higher tariff rates for semi-processed and finished products, thus favoring domestic manufacture of the wood raw resource. Although 'special arrangements' can often prevail for trade with Russia, importers of Russian timber in the Northeast of China complain that they must pay full duties on wood imported even under barter arrangements or from labor-export agreements. Government officials indicated that this could be 'resolved' in the case of trade with Russia, although no clear policy appears to exist dealing with such issues. China's future policies with regard to timber substitution and regulations to enforce limitations on timber in many end uses (including construction) will be important with regard to meeting pressures for

increased consumption as well as the future role of trade and import of timber from Russia or elsewhere.

The role of finance and credit arrangements will perhaps be most significant for China's importers. Russian enterprises have virtually no working capital and little possibility of credit. In many cases, supplies must be paid for in advance, in some cases including timber. Production is impossible without adequate credit or advance payment from buyers of timber products. Given the financial situation of many forest products enterprises within China, it is unlikely that advance payment for imported timber can be feasible any time soon. Greater roles for banking institutions, including letters of credit and foreign exchange accounts will be required if timber trade with Russia is to expand. Improved infrastructure, including rail, port and other transportation services for Russian trade remain critical, and although agreements in principle have been announced for cooperation on infrastructure development much remains to be accomplished.

From the perspective of China, timber from Russia has both advantages and disadvantages. Advantages for trade with Russia include the possibility of 'trade deals' as both countries seek to minimize the use of scarce foreign exchange in trade. Border trade, including barter trade, expanded between China and Russia from 1990-93 following some 20 years of closed borders. Various agreements were negotiated for the import of goods from Russia by China, including timber. In exchange China offered consumer goods, textiles, electronic goods, and a variety of other light industrial and agricultural products. Border trade declined during 1993-95, due to many perceived problems on both sides. The changing nature of policies and regulations in both countries contributed to charges of "difficulty" in reaching agreements that could be honored and enforced. In 1993, China also tightened credit in its efforts to control inflation, resulting in a drop in demand for imported products including timber. Tax regulations, trade policies including quotas and licenses, and foreign exchange restrictions also impacted trade. The 'political situation" in Russia was frequently mentioned as causing many difficulties for Chinese importers. This was noted particularly with regard to 'labor contracts' whereby China has sought to use Chinese labor to supplement Russian workers in exchange for both wages and timber which can be brought back to China.

Closeness to Russian timber is a considerable advantage for China importers. Access by rail or water is relatively low cost considering alternative timber supply sources, including North America. Trade with Russia also has the advantage of species familiarity. The common forests of NE China and the Russian Far East reinforce the dominant role of China's NE as a supplier of timber throughout China. Enterprises and users of timber are generally quite familiar with the attributes and characteristics of the Russian timbers and can

easily substitute supply sources. Siberian larch, Korean (red) pine, spruce, and "white pines" (whitewoods) are all acceptable in the China market. Larch, a relatively abundant species in Eastern Russia, is commonly used for railroad ties, construction, vehicle floor boards, etc. and can substitute for Douglas-fir and hemlock in these and other lower-valued markets such as packaging. Internal river ports and coastal shipping compliment rail connections directly linking China and Russia or passing through Mongolia. Improved infrastructure in the Far East and in China ease the problems of transportation and distribution. Although rail connections still require changing of rail car wheels, plans have been put forward to eliminate this difficulty in the near future. Coastal shipments (up to 40 percent of Russian timber imports) are by comparatively small ships, handling about 5,000 cubic meters. Most China buyers do not need (or cannot finance) larger shipload purchases, hence favor smaller and faster transport by smaller vessels. Shipments to Shanghai, Jiangsu, and Shejiang have increased as wholesale markets have evolved, allowing brokerage of relatively small volumes to individual enterprises and other purchasers.

While having some advantages over competitors brought on by proximity and familiarity with species, China buyers and processing enterprises prefer North American timber to Russian timber. While technical characteristics are noted (for example strength), log size is the most common difference identified as leading to this preference. Russian timber is generally smaller diameter, normally less than 25-30 cm, and often 12-16 cm. China prefers larger timber, preferably over 30 cm diameter at a minimum. China importers also complain that Russian timber is 'old', having spent considerable time in storage or transit following harvesting, resulting in considerable drying and cracking, thus degrading product yields.

China importers also feel that Russia trade is not 'dependable' in terms of quality per orders, timely delivery, and other details of trade agreements. Contract disputes are difficult to resolve, as are questions of financing and credit. Quality of timber had declined, according to China importers, and comparisons were made to radiata pine from New Zealand which was considered much better and quite suitable for pulping.

## FOREWORD

Siberia's forest sector is a topic which recently has gained considerable international interest.

IIASA, the Russian Academy of Sciences, and the Russian Federal Forest Service, in agreement with the Russian Ministry of the Environment and Natural Resources, signed agreements in 1992 and 1994 to carry out a large scale study on the Siberian forest sector. The overall objective of the study is to focus on policy options that would encourage sustainable development of the sector. The goals are to assess Siberia's forest resources, forest industries, and infrastructure; to examine the forests' economic, social, and biospheric functions; with these functions in mind, to identify possible pathways for their sustainable development; and to translate these pathways into policy options for Russian and international agencies.

The first phase of the study concentrated on the generation of extensive and consistent databases of the total forest sector of Siberia and Russia.

The study is now in its second phase which encompasses assessment studies of the greenhouse gas balances, forest resource and forest utilization, biodiversity and landscapes, non-wood products and functions, environmental status, transportation infrastructure, forest industry and markets, and socio-economics. This report, carried out by Drs. Thomas Waggener and Charles Backman, is a contribution to the analyses of the topic of forest industry and markets.

## PREFACE

Interest in forestry sector development, and international trade linkages between countries surrounding the Pacific Ocean have emerged as a continuing research interest for most organizations engaged in the analysis and research related to the global forest economy. This research was undertaken as a collaboration between three of these organizations. The Center for International Trade in Forest Products (CINTRAFOR) was first established at the College of Forest Resources, University of Washington with the goal of expanding the understanding of the globalization of forest products trade, with respect to major developments in production, consumption and internationalization of markets. This work has included a significant focus on the Pacific Rim, including China and Russia. The International Institute of Applied Systems Analysis (IIASA), Laxenburg, Austria has had a long history of active involvement in the study of global forests linking production and utilization to broader environmental and policy issues. Prior work has included both Eastern and Western Europe and the European Region of the former Soviet Union. Currently, IIASA is engaged in a major review of the Siberian forest region of Russia through the joint IIASA-Russia study under the Siberian Forest Project. The US Forest Service, through the International Trade Project of the Pacific Northwest Research Station has actively pursued the analysis of linkages between the US forest sector and major international developments, primarily focussed on the markets and resource potential in the Asian-Pacific region. Together, these organizations sought to establish a clearer understanding of the forestry linkages between the significant markets of the People's Republic of China and the potentially enormous international role of the Russian-Siberian conifer forest resources.

The Siberian Forest Project at IIASA has included an examination of the potential for greater international participation of Russia in the Asian-Pacific markets. Prior analysis has investigated linkages with both Japan and Korea. It is recognized that China has also been a major trading partner with the former Soviet Union and now with the Russian Federation. Due to the more restricted knowledge of the nature of this trade relationship under the former closed planned economies of both countries, and the dramatic economic reforms now being implemented, it was felt desirable to undertake a more intensive investigation of the recent and near-term outlook for this traditional linkage between China and Russia.

The Siberian Forest Project at IIASA had established linkages with the Far Eastern Institute for Market Economy in Khabarovsk, Russia through the Marketing and Industrial Development component of that study. However, a project of this nature could not be undertaken without additional important cooperation with key forestry organizations within China. The investigators were able to establish that cooperation through the working relationships established by CINTRAFOR. The Office of International Cooperation of the Ministry of Forestry, Beijing, PRC agreed to assist in arranging for in-country investigations. Working cooperation with the Research Center for Forestry Economic Development in Beijing, and the College of Management and Economics, Northeast Forestry University (NEFU), Harbin, Heilongjiang Province, was established and proved essential to the successful development of this study. Key staff of these units gave significant assistance in coordinating arrangements for the principal investigators, providing access to current

information, and accompanying the investigators to many related meetings and discussions. Staff of the NEFU accompanied the investigators throughout Heilongjiang Province, the major forested province of China which borders Siberia and Russian Far East.

Additional cooperation and assistance in China was provided by the staff of the United States and Canadian Embassies in Beijing. Background information and station reports related to general trade development and forest sector activities were provided. Detailed statistics on forest products trade were provided by the Agricultural Affairs Office, US Embassy.

The investigators would like to acknowledge especially the professional cooperation and support provided by Mr. Li Lukang and Mr. Zhou Guolin (Office of International Cooperation, Ministry of Forestry), Mr. Jin Xi Shu, Mr. Wang Huan Lioug, Ms. Ma Quang, Mr. Zhu Jian Ping, and Ms. Guan Jinfeu (Research Center of Economy Development, MOF), Mr. Lin Fengming and Mr. Lu Wenming (Center of Scientific and Technological Information, Institute of Scientific and Technological Information, Chinese Academy of Forestry), ) Prof. Liu Guo Cheng, Mr. Jiang Minyuan, Ms. Huo Shu Yan, Mr. Yufu Zhang, Mr. Chin Khuan, and Mr Su Jinbao (College of Economics and Management, Northeast Forestry University), and Mr. Wang Chang Fu (General Bureau of Forest Industry, Heilongjiang Province). Many additional representatives of forestry organizations, forest bureaus, and forest industry enterprises participated in intensive discussions and are thanked for their contributions. The Mudanjiang Forestry Administration, the Suifenhe Forestry Bureau, the Committee of Foreign Economic Trade of Suifenhe City, the Sui Yang Forestry Section, Economy & Trade Company, the SuifenheTimber Bureau Log Yard, the Mudanjiang Comprehensive Wood Processing Plant, the China State-Operated Zhengyanghe Lumber Processing Factor, and the China Heilongjiang Native Produce & Animal By-Products I/E Corporation all provided significant assistance. Ms. Teresa Howes and Ms. Wang Jine (US Embassy) and Mr. Jacques Castonguay (Canadian Embassy) likewise enriched the work of the study investigators. Sincere appreciation is especially acknowledged to Mr. Jin Xi Zhu, Sr. Research Fellow and Deputy Director General, the Research Center of Economy Development in Beijing, and Prof. Liu Guo Cheng, Professor and Dean, College of Economics and Management, Northeast Forestry University, Harbin, who willingly served as the Principal Cooperators on behalf of their respective organizations.

While every effort has been made to properly interpret the detailed information provided by our Chinese cooperators, responsibility for the content and accuracy of this report remains with the principal investigators from CINTRAFOR and IIASA. The financial support provided by the US Forest Service, and the technical and information contributions of Dr. Donald Flora, Senior Research Scientist (International Trade) is gratefully acknowledged.

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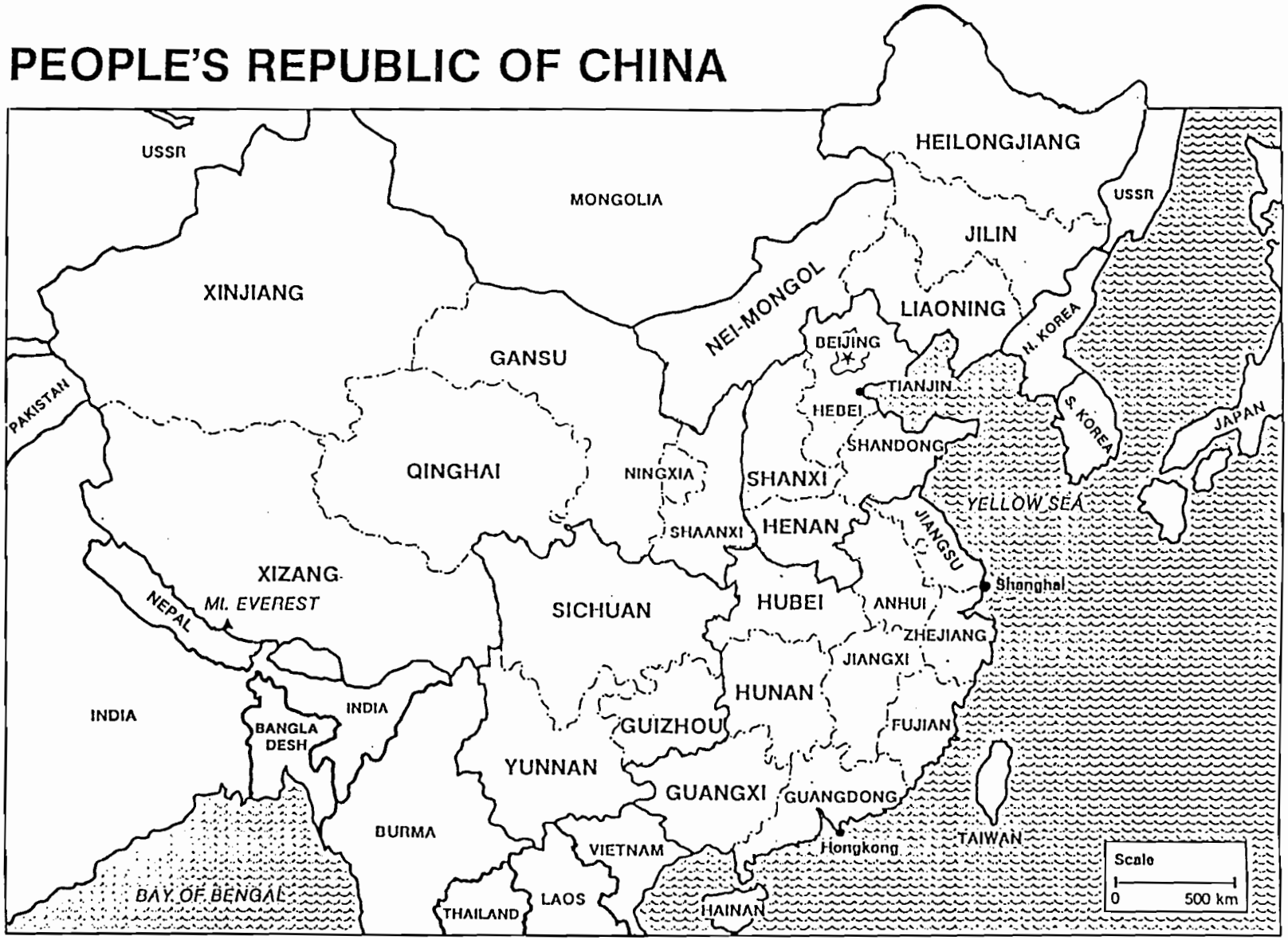
# PEOPLE'S REPUBLIC OF CHINA




Map 1

## INTRODUCTION

While much attention has focussed on forestry in the Pacific Rim over the past decade, and the related international trade activities, there has been an overall lack of understanding in the West of the specific roles of both China and Russia. Research available in the West has been limited to a relatively few reports and documents published in English outside of China and Russia. Since the late 1980's, however, change has been dramatic in both countries. Economic reforms and changes to market-like structures have been significant, although the final outcome of such change is yet in the future. Nevertheless, a fuller understanding of the significance of these events is timely. The forestry sector in China, while large by any measure, is increasingly under pressure to meet the growing needs of a rapidly expanding economy. The present forest capacity is being stretched to maximum sustainable capacity - and in some cases, beyond. While seeking to expand the forest resource base and timber supply, China has also embarked on major policies to discourage wood use in many applications and thus reduce demand. In spite of such efforts, China is a net importer of timber and forest products, and will likely remain so for years to come.

Russia's forest sector is also confronting significant change. Nowhere is this change having greater impact than in the relatively less developed forests of Siberia and the Far East. Because of past isolation, the lack of infrastructure, a low population base and local consumption, and lack of capital investment, the forestry sector has not developed to the extent as the industry in the European (western) region of Russia. This is both a problem and opportunity as Russia seeks to develop the forests of Siberia and the Far East. In addition to the traditional dependence on orders for timber from the Center (Moscow), Siberia and the Far East have looked to the Pacific for markets. While primarily dealing with trade in unprocessed logs with Japan and more recently Korea, eastern Russia has also engaged in trade with the People's Republic of China. This trade has reflected both economic and political realities, rising and declining as the situation dictated under the dual centrally-planned structures guiding bilateral relationships more broadly.

The forests of eastern Russia can potentially provide expanded harvests which can serve multiple Pacific Rim markets - including China. The People's Republic of China, on the other hand, potentially needs a growing volume of timber and forest products to help meet growing consumption as economic growth expands demands for all products. The reality of this potential will be driven by both economic and political considerations on the part of both Russia and China. Old structures have given way to new policies and incentives. Yet central authority is and will undoubtedly continue to exercise influence on bilateral relations well into the next century. Much uncertainty remains regarding the longer-term outcome of reform and restructuring in both countries. What is certain, however, that the People's Republic of China will increasingly play a major role in Asia and the Pacific Rim forestry, both as a producer and consumer market. Likewise, it is certain that Russia, particularly Siberia and the Far East, will impact the overall equation for forest products trade in the Pacific region, with important linkages to China.

# I. CHINA'S FORESTRY SECTOR - TRENDS AND RECENT DEVELOPMENTS

China, by any measure, is a large and important country relative to the forestry sector. Forests play a significant role within the Chinese economy. Forests are a major land use, in terms of providing wood-based resources for the growing economy, as recognized environmental resources contributing to both national and global sustainability, and as the source of employment and incomes for a large number of rural communities and territories thus supporting an important share of China's rural resource-based economy.

## Forest Resources

China is a huge country, encompassing approximately 9.6 million square kilometers, or over 960 million hectares (ha.). The scope extends from the harsh frozen tundra in the north, bordering the Russian republic, to tropical in the south, and from the Pacific Ocean on the east to central Asia and the Indian Subcontinent to the west. At the founding of the PRC in 1949, it is estimated that forests accounted for about 83 million ha., or 8.6 percent of the land base. The forest inventory completed in 1991 estimated forests at approximately 115.2 million ha, or 12 percent of land area, a significant increase in just over 40 years.

Data from the most recent forest inventory, covering the period 1989-93, is summarized in the following tables. As shown in Table 1, the total "forest" land is calculated as almost 263 million ha., while "forested" land was 133.7 million ha., equaling 13.9 percent of land area. This forested area included an estimated forest growing stock volume of 10,136.7 million cubic meters. In turn, the "forested area" was estimated to include 113.7 million ha. of timber forest stands with an average stocking of 89 cubic meters per ha. In addition, China reported an additional 16 million ha. of "economic forests" and almost 4 million ha. of bamboo forests. Economic forests are primarily horticultural and fruit orchards, primarily on collective or State farms in the southern and coastal provinces.

Table 1 also indicates the general characteristics of the forest stands by type. Approximately 57 million ha. of conifer forests hold an estimated growing stock volume of 5.7 billion cubic meters, or an average of about 100 cubic meters per ha. Broadleaf (Deciduous) forests encompass some 56.6 million ha. with a growing stock volume of 4.4 billion cubic meters. The broadleaf forest stands average 78 cubic meters per ha.

The total forest area, including unstocked land, is presently 27.4 percent of China's total land. Stocked forest lands, however, are only a little over half of this total (13.9 percent). Although large in absolute size, the forests are very limited given the size of the country and the population of over 1.2 billion. Forest coverage per capita is presently estimated at only 0.11 ha./person, or about one-sixth of the worldwide average.

TABLE 1: PRC - Forest Resources (National Total) 1989-1993 (incl. Taiwan)

| | Units | Amount |
|---|---|---|
| Total area | 100 ha | 9,602,716 |
| Forest land area | 100 ha | 2,628,885 |
| Total Volume of Stumpage | 100 c.m. | 117,852,393 |
| Forested Area | | |
| Area | 100 ha | 1,337,035 |
| Volume | 100 c.m. | 101,367,532 |
| Stand Area | | |
| Total Area | 100 ha | 1,137,000 |
| Total Volume | 100 c.m. | 101,367,532 |
| Volume per Ha. | c.m./ha | 89 |
| Conifer Area | 100 ha | 570,963 |
| Conifer Volume | 100 c.m. | 57,006,091 |
| Conifer Volume per Ha. | c.m./ha | 100 |
| Broadleaf Area | 100 ha | 566,037 |
| Broadleaf Volume | 100 c.m. | 44,361,441 |
| Broadleaf Volume per Ha. | c.m./ha | 78 |
| Economic Forest Area | 100 ha | 160,988 |
| Bamboo Area | 100 ha | 39,047 |
| | | |
| Forest Coverage | % | 14 |
| Forest Land/Total Land | % | 27 |
| Forested Area/Total Forest Land | % | 51 |
| Forested Area Per Capita | ha | 0 |
| Volume on Forested Area Per Capita | c.m. | 9 |

Source: PRC, Min. Forestry, "Statistics & Analysis of National Forest Resources (89-93), Beijing, 1994

The distribution of forests in China is far from uniform. Map 2 shows the distribution of forests by the major forest types, including bamboo, economic (horticultural) plantations, shelterbelts and timber plantations. As is readily observed, the forests are primarily concentrated in three principal regions: the Northeast, the Southwest, and the Southern ten province region.

The primary regional distribution of China's forest is given in Table 2. The national totals shown in Table 2 differ slightly from the inventory data summarized in Table 1, yet reveal the concentration of forests in the three principal regions.

The Northeast region, consisting of the three provinces of Heilongjiang, Jilin and Liaoning together with Inner Mongolia, These three regions account for over 76 percent of the total forest area and over 81 percent of the total forested area. Some 82 percent of the "Timber Stand Area" is in these three regions, including 73.865 million ha. of the total 84.9 million ha. of 'commercial' forest area (87 percent). While the forests of the Northeast and Southwest are largely remaining natural forest stands, much of the forest in the South region is man-made (plantation) forests scattered in smaller blocks throughout the ten province area.

Table 2 also provides summary information regarding other components of the total forested area, including shelterwood forests, firewood forests, special-use forests, economic forests, and bamboo forests. The pattern for non-forested areas is also provided, including 'wildlands', harvested areas, burned (fire) areas, and sandy wildlands. With the exception of Nursery area, the three dominant regions account for 70 percent or more for all the forest key indicator statistics.

China has aggressively pursued a program of forest plantations, particularly since the start of the 8th Five Year plan. China's forests have been heavily utilized in the past, without adequate reforestation or protection, with the resultant trend towards decline and reduction in both the area and productivity of the remaining natural forest stands. China has established an estimated 34.25 million ha. of plantations as of the completion of the last forest inventory in 1993. Some 21.4 million ha. of plantations are considered as 'timber" plantations, while 11.8 million ha. are "economic" (horticultural) plantations, with about 1 million ha. of bamboo plantation area. (Table 3). New plantations reported in the 1989-93 inventory period totaled 7.1 million ha.

The largest majority of plantations are in the Southern Ten Provinces region in contrast to the natural forest regions of the Northeast and Southwest. As indicated in Table 3, the Southern region accounts for 18.3 million ha. of plantations, or over 53 percent of the national total. Over one-half of the Timber plantations and almost 53 percent of the plantation timber growing stock volume are in the Southern region. Much of the Economic forest plantation area and most of the bamboo plantations are also in the Southern region.

TABLE 2: PRC - Forest Lands by Type (National Total & Major Forest Regions) 1989-1993.

| Title | Units | National Total | Northeast and Inner Mongolia | Sichuan and Yunnan |
|---|---|---|---|---|
| Total Forest Area | 100 ha | 2,567,740 | 622,918 | 510,817 |
| Total Forested Area | 100 ha | 1,285,278 | 365,746 | 209,360 |
| Timber Stand Area | 100 ha | 1,086,382 | 356,128 | 189,492 |
| Commercial Timber Area | 100 ha | 849,286 | 321,017 | 124,282 |
| Shelterwood Timber Stand Area | 100 ha | 160,729 | 16,531 | 52,633 |
| Firewood Stand Area | 100 ha | 42,886 | 3,242 | 4,639 |
| Special-Use Timber Stand Area | 100 ha | 33,481 | 15,338 | 7,938 |
| Economic Forest Stand Area | 100 ha | 160,988 | 9,618 | 15,164 |
| Bamboo Area | 100 ha | 37,908 | | 4,704 |
| Thin-Stocked Forest Area | 100 ha | 180,257 | 27,441 | 59,020 |
| Shrubberry | 100 ha | 297,063 | 23,135 | 119,734 |
| Young Plantation (pre-forest) | 100 ha | 71,383 | 13,614 | 5,172 |
| Nursery | 100 ha | 1,149 | 272 | 65 |
| Non-Forested Area - Total | 100 ha | 732,610 | 192,708 | 117,466 |
| Wildlands | 100 ha | 630,253 | 138,087 | 113,632 |
| Harvested Area | 100 ha | 27,568 | 12,780 | 2,927 |
| Fired Area | 100 ha | 9,128 | 5,401 | 586 |
| Sandy Wildlands | 100 ha | 65,661 | 36,440 | 321 |

Source: PRC - MOF, Statistics & Analysis of National Forest Resources (1989-93), Beijing, 1994

TABLE 2 (cont'd)

| Title | Units | Ten Southern Collective Forest Provinces | Major Region Subtotal | Three-Region % Share of Total |
|---|---|---|---|---|
| Total Forest Area | 100 ha | 818,428 | 1,952,163 | 76% |
| Total Forested Area | 100 ha | 466,432 | 1,041,538 | 81% |
| Timber Stand Area | 100 ha | 347,434 | 893,054 | 82% |
| Commercial Timber Area | 100 ha | 293,351 | 738,650 | 87% |
| Shelterwood Timber Stand Area | 100 ha | 27,824 | 96,988 | 60% |
| Firewood Stand Area | 100 ha | 22,488 | 30,369 | 71% |
| Special-Use Timber Stand Area | 100 ha | 3,771 | 27,047 | 81% |
| Economic Forest Stand Area | 100 ha | 86,622 | 111,404 | 69% |
| Bamboo Area | 100 ha | 32,376 | 37,080 | 98% |
| Thin-Stocked Forest Area | 100 ha | 57,392 | 143,853 | 80% |
| Shrubberry | 100 ha | 48,199 | 191,068 | 64% |
| Young Plantation (pre-forest) | 100 ha | 41,765 | 60,551 | 85% |
| Nursery | 100 ha | 89 | 426 | 37% |
| Non-Forested Area - Total | 100 ha | 204,569 | 514,743 | 70% |
| Wildlands | 100 ha | 190,392 | 442,111 | 70% |
| Harvested Area | 100 ha | 9,402 | 25,109 | 91% |
| Fired Area | 100 ha | 2,903 | 8,890 | 97% |
| Sandy Wildlands | 100 ha | 1,872 | 38,633 | 59% |

TABLE 3: PRC - Plantation Area and Volume (National Total & Major Forest Regions) 1989-1993.

| | Units | Amount | Northeast and Inner Mongolia | Sichuan and Yunnan | Ten Southern Collective Forest Provinces | Major Region Subtotal | Three-Region % Share of Total |
|---|---|---|---|---|---|---|---|
| Total Plantation & Newly Planted | | | | | | | |
| Area | 100 ha | 413,899 | 53,701 | 42,376 | 224,814 | 320,891 | 78% |
| Volume | 100 c.m. | 7,119,803 | 1,259,504 | 607,411 | 3,743,321 | 5,610,236 | 79% |
| Plantations | | | | | | | |
| Area | 100 ha | 342,516 | 40,087 | 37,204 | 183,049 | 260,340 | 76% |
| Timber Stands | | | | | | | |
| Area | 100 ha | 213,729 | 38,219 | 22,373 | 108,062 | 168,654 | 79% |
| Volume | 100 c.m. | 7,119,803 | 1,259,504 | 607,411 | 3,743,321 | 5,610,236 | 79% |
| Volume/Ha. | c.m./ha | 39 | 33 | 27 | 35 | 33 | |
| Economic Forest Stands | 100 ha | 118,296 | 1,868 | 13,129 | 66,442 | 81,439 | 69% |
| Bamboo Area | 100 ha | 10,491 | | 1,702 | 8,545 | 10,247 | 98% |
| New Plantation | 100 ha | 71,383 | 13,614 | 5,172 | 41,765 | 60,551 | 85% |
| Scattered Forests | | | | | | | |
| Area | 100 ha | 29,688 | 2,866 | 5,549 | 10,937 | 19,352 | 65% |
| Volume | 100 c.m. | 343,336 | 24,307 | 56,166 | 157,211 | 237,684 | 69% |

Source: PRC-MOF, Statistics & Analysis of National Forest Resources (1989-93), Beijing, 1994

Data for the "Timber Forests" of China are summarized in Table 4. As noted above, these areas cover approximately 108.6 million ha. with 82 percent being located in the three major forested regions. Of the total stumpage (growing stock) volume of 10.7 billion cubic meters, over 9 billion cubic meters is contained in these timber forests, with the three major regions holding almost 6.9 billion cubic meters. The Northeast region (including Inner Mongolia) contain over 3 billion cubic meters, and the Southern region about 1.45 billion cubic meters. Sichuan and Yunnan, in the southwest, contain 2.4 billion cubic meters of timber growing stock on almost 19 million ha. of timber forest stands. In addition to the "Timber" forest stands, some 545 million cubic meters of growing stock in held on the "Thinly" Stocked forests and 771 million cubic meters occur on the "Scattered" Forest Areas. Trees planted under the "Four-Side" program in rural areas are estimated at 332 million cubic meters of growing stock, with about 37 percent being in the three major forest regions, whereas the majority of such plantings are widely distributed in other rural agricultural areas of China.

**Forest Management**

The majority of natural forests in China are under the administration of the Ministry of Forestry and the related provincial Forestry Bureaus. In addition, China has established State Forest Farms and Collective Forest Farms. As of 1993, there were 136 State Forestry Bureaus (primarily in the Northeast), some 4,256 State Forest Farms with approximately 24.6 million ha. of forests (19.8 percent), and over 110,000 Collective Forest Farms, with 8.7 million ha. (7 percent).

Forest planting statistics for 1993 are summarized in Table 5. Total planted area was 5.9 million ha., including 579 thousand ha. planted by the State, with the remainder planted by collective farms, individual farmers, and provincial or county level forestry organizations. Approximately 2.8 million ha. of the planted area is commercial or 'timber' forest, 1.56 million ha. is economic forest, with 1.3 million ha. of shelterwood forest. Less than 200 thousand ha. of planting was for firewood and 21 thousand ha. of 'special use' forest.

Recent trends in planting and silvicultural forest management activities are summarized in Table 6 for the period 1991-93. Annual planted area has been at 5.5 million to 6.0 million ha. per year during this recent period. Aerial seeding has become more common, with a peak of 947 thousand ha. so seeded in 1992. Natural seeding is the predominant method of regeneration, but such aerial seeding and/or seedling plantings have increased in recent years. Area planted by the State remains under 600 thousand ha. annually, while reforestation or planting projects have been over 2.2 million ha. annually. Technical assistance by the World Bank has provided the major emphasis on such planting projects. These projects have included plantations of high yield, fast growing species, particularly in the ten Southern province region.

Silvicultural practices have been increasingly used on both young stands (10 million ha. in 1993) and older mature stands (4.9 million ha. in 1993). Restoration of understocked or poorly stocked (low productivity) stands has also increased, reaching 780 thousand ha. in 1993. Four-side plantings around

TABLE 4: PRC - Forest Area and Volume (National Total & Major Forest Regions) 1989-1993

| | Units | Amount | Northeast and Inner Mongolia | Sichuan and Yunnan | Ten Southern Collective Forest Provinces | Major Region Subtotal | Three-Region % Share of Total |
|---|---|---|---|---|---|---|---|
| Total Stumpage Volume | 100 c.m. | 107,356,532 | 34,764,732 | 28,228,439 | 18,266,227 | 81,259,398 | 76% |
| Forest Stands | | | | | | | |
| Area | 100 ha | 1,086,382 | 356,128 | 189,492 | 347,434 | 893,054 | 82% |
| Volume | 100 c.m. | 90,871,671 | 30,028,896 | 24,105,927 | 14,576,952 | 68,711,775 | 76% |
| Thinly Stocked Forest | | | | | | | |
| Area | 100 ha | 180,257 | 27,441 | 59,020 | 57,392 | 143,853 | 80% |
| Volume | 100 c.m. | 5,449,017 | 980,242 | 2,274,913 | 1,009,956 | 4,265,111 | 78% |
| Scattered Forest Areas | | | | | | | |
| Volume | 100 c.m. | 7,714,424 | 3,581,877 | 1,392,675 | 2,091,707 | 7,066,259 | 92% |
| Four-Side Plantings | | | | | | | |
| Number Trees | 1000 units | 2,538,793 | 39,613 | 274,977 | 1,715,731 | 2,030,321 | 80% |
| Volume | 100 c.m. | 3,321,420 | 175,715 | 454,924 | 587,612 | 1,218,251 | 37% |
| Dead Timber Volume | 100 c.m. | 2,757,797 | 1,396,624 | 712,894 | 331,442 | 2,440,960 | 89% |

Source: PRC - MOF, Statistics & Analysis of National Forest Resources Beijing, PRC, 1994

TABLE 5: PRC - Forest Sector Statistics 1993

| National Total: Planted Area by Grade | Units | 1993 |
|---|---|---|
| Total Planting Area | 1000 ha | 5,903 |
| including: Planted by State | 1000 ha | 579 |
| Commercial Area | 1000 ha | 2,813 |
| Economic forest | 1000 ha | 1,564 |
| Shelterwood | 1000 ha | 1,315 |
| Firewood | 1000 ha | 191 |
| Special-use Forest | 1000 ha | 22 |

Source: PRC Agricultural Yearbook 1992-94

TABLE 6: PRC - Forest Sector Statistics - Forest Practices & Silviculture

| | Units | 1993 | 1992 | 1991 |
|---|---|---|---|---|
| Forest Practices & Silviculture | | | | |
| Total area planted annually | 1000 ha | 5,903 | 6,030 | 5,595 |
| including: air-seedling | 1000 ha | 859 | 947 | 843 |
| Planted by State | 1000 ha | 579 | 555 | 534 |
| Area of Planting Projects | 1000 ha | 2,259 | 2,536 | 2,264 |
| including: fast-growing plantations | 1000 ha | 505 | 622 | 560 |
| Regeneration | 1000 ha | 739 | 674 | 664 |
| Silvicultural Practice on Young Growth | 1000 ha | 10,021 | 9,678 | 9,072 |
| Silvicultural Practice on Mature Stands | 1000 ha | 4,878 | 4,508 | 4,435 |
| Reformation on Low Productivity Stands | 1000 ha | 781 | 576 | 503 |
| Four-Side Planting | 10000 | 341,465 | 346,940 | 362,036 |
| Seedling Area | 1000 ha | 262 | 250 | 228 |
| Seed collected | ton | 51,812 | 34,744 | 33,538 |
| Forest Protection by End of Year | 1000 ha | 30,872 | 31,637 | 29,304 |

Source: PRC Agricultural Yearbook 1992-94

rural residences, along highways, railroads, and canals, and other scattered areas has been actively promoted, as had seed collection supporting the aerial seeding programs. Forest protection programs have been expanded, and have averaged about 31 million ha. during 1991-93.

General statistics for the reforestation or plantation projects is summarized in Table 7. As noted, these projects encompassed some 2.2 million ha. in 1993, including 505 thousand ha. of timber forest. Total regeneration was accomplished on almost 740 thousand ha. within these projects, with almost all accomplished manually. Of the 31 million ha. under forest protection plans, some 4.8 million ha. were treated during 1993. Seedling area was 262 thousand ha. during the year.

**Forest Planning and Policies**

Recent forest inventory statistics indicate an encouraging reversal of forest decline and an improvement in the forestry situation overall. However, it is estimated that for the period 1981-88 that the commercial timber area declined by some 2.8 million ha., with a corresponding decline in mature inventory of about 7.7 percent. Recent reports provide estimates indicating that the gross removal of timber (total consumption) is approximately in balance with gross forest growth. Previously, for the period 1977-81 it had been estimated that the 'gap' between gross consumption (commercial removals, losses to fire, pest and disease, and illegal harvesting) and total growth was 18.7 million cubic meters per year. This fell to about 15 million cubic meters per year for the period 1984-88. It was reported that growth exceeded gross consumption by 39 million cubic meters in 1988-90. As would be expected, however, harvest continues to be primarily from older, mature natural forests while new growth is accomplished in the younger forest stands and plantations, indicating a significant change in forest stand composition and geographic location (Waggener, 1992).

China has been aware of the past trends contributing to decline in forest resources and timber use, and has had a long standing objective of increasing forest coverage to a target of 16 percent by the end of this century. This would approximate 160 million ha. in contrast to the 133.7 million ha. estimated in the recent forest inventory. A long term target of 20 percent forest coverage (192 million ha.) has been established.

A comprehensive forest policy and planning process was established for forestry development in China by the Ministry of Forestry through the 8th Five-Year Plan (1991-95) and a companion 10 Year Forestry Development Plan. This plan established goals for the forestry sector and program means to carry out the intended plan.

The plan envisioned five development 'themes' including:

1. Development of Expanded Forest Cover
2. Improved Protection of Forest Resources to avoid Losses
3. Enhanced Management of Forests to Increase Productivity
4. Improved Comprehensive Utilization of Resources
5. Improved Science, Technology and Education for Improved Forest Management and Administration

A large number of specific strategies and programs were developed to implement the 10 Year Forestry Plan, many of which are ongoing at the present time.[1] In order to expand the forest base, China is pursuing a program of establishing fast growing plantations for both production and protection purposes. The "1-4-1" program includes 'one' fast growing timber base, 'four' environmental protection programs (Three North Project, Soil and Water Conservation Forest in the Middle & Upper Yangtze River, Coastal Shelterbelts, and Plains Afforestation) and reforestation of previously cut-over areas. A desertification protection for sand control through afforestation and grass covers some 10 million ha. through the year 2000.

The "One Timber Base" envisions some 4.7 million ha. of fast growing plantations by the year 2000. Selection of species reflects site and environmental conditions, and included Chinese fir, Masson Pine, Larch, and Slash and Loblolly Pines. Primary broadleaved species include poplar, eucalyptus and Paulownia.

The second theme for development (forest protection) recognized that without adequate protection, China's progress in expanding the forest resource base would be substantially reduced and less likely to contribute to development of the sector. Protection includes programs for forest fire control, forest insect and disease management, and the establishment of natural reserves and wildlife protection. Reduction of unauthorized forest encroachment is also being carried out.

Improved planning and management is being promoted by improved inventory and resource monitoring systems. The lack of timely and complete information of basic forest growth and yield, and determination of long term sustainable yields is required for systematic forest planning. Changes in the land base are also critical to assessment of forest potential. For example, the major timber bureaus in Heilongjiang province experienced a reduction of authorized cut in 1990 of almost 11 million cubic meters from the previous approved (1987-90) 'ceilings', representing a reduction of almost one-third due to better information regarding the status and declining mature inventory on this province's remaining natural forests.

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[1] See Waggener (1992). A Forestry Sector Strategy was formulated by MOF with the assistance of UNDP/FAO under the current technical assistance programme "Enhancement of Forestry" (CPR/91/150).

TABLE 7: PRC National Total: Forests in Various Types 1993

| | Units | 1993 |
|---|---|---|
| Forest area of Plantation Projects | 1000 ha | 2,259 |
| Timber Forest | 1000 ha | 505 |
| Regeneration, Total | 1000 ha | 739 |
| Manual Regeneration | 1000 ha | 609 |
| Area of Forest Protection, Total | 1000 ha | 30,872 |
| Area of forest protection in 1993 | 1000 ha | 4,796 |
| Seedling Area | 1000 ha | 262 |

Source: PRC Agricultural Yearbook 1992-94

Improved management is also stressing expanded capacity for improved seeds and seedlings for plantation establishment. Sustainable harvest and enhanced utilization together target efforts to make better and complete use of a smaller yield of timber in the near term until greater harvest is possible from recently established fast growing plantations. Future harvest of plantation timber will also be qualitatively different, and smaller size, than the traditional harvest from older natural forests. The plantation forests also imply a shift from extensive management of natural forests to intensive management on shorter cycles the expanding fast growing timber base plantations. Multiple use of forests, and environmental protection purposes are also being integrated into more intensive forest management planning.

China has also initiated efforts to encourage more direct responsibility for the forest at the lower levels of administration, including collective forest farms and individual contract tenure arrangements. Often such forest management is associated with agricultural pursuits. Experience with such management schemes is rapidly growing, and have become a recognized component of forest policy in rural agricultural areas.

The fourth area of emphasis is greatly improved utilization of the timber already available within China. Improved comprehensive utilization can yield new and better quality products, and extend the recovery volumes from existing production. Sawlog utilization is reported at about 0.58 conversion efficiency, indicating the physical potential for added utilization of wasted products and residues. The changing emphasis towards fast growing, high yield plantations is also changing the nature of utilization and technology. Technologies aimed at increased capability for wood-based panel and increased utilization of wood-based fiber for pulp and paper products are emphasized. Chemical processing of forest products, and related environmental concerns, are receiving greater attention.

The fifth area of priority is the improved administration of forestry through science, technology and education. Forestry responsibility is now shared at the National, provincial, township, county, and rural collective/individual levels under a hierarchical planning and management system. The Ministry of Forestry is primarily responsible for guidance for forest protection, management and supervision of activities to be implemented at the Provincial, Prefecture, County and Collective levels. Improved information systems, monitoring, and professional and technical capacity are still required at all levels. China is aggressively pursuing the individual "Responsibility System" for forestry. The State Forest Farms and Collective Forest Farms are increasing delegated authority and responsibility for forestry matters. Starting in 1987, villages and individual farmers could also obtain long term tenure rights to small scale forests under the "Contract System" arrangements. It was estimated that some 50 million farmers had participated in this effort, utilizing some 60 million ha. of mostly hilly, barren lands by 1992. However, under present policies the land (and forest) will remain State property, with efforts under way to 'register' property rights granted by the State (Ding, 1995). Nevertheless, the household contract system is widely seen as the critical

element in the success of China's future forestry development efforts (Liu, 1995).

**Harvest and Production**

Information regarding the harvest of timber in China and the related production of forest products is made more difficult by the structure of the forest sector combining the centrally planned State Plan allocations, the role of the Ministry of Forestry and it's linkages to the major Timber Bureaus, and the growing importance of State Forest Farms and Collective Farms. In the past, the major focus for statistical data gathering has been placed on the centrally-directed authorities - the Forest Bureaus and linked enterprises under the Ministry of Forestry. By this means, production targets were set and the allocation of timber by quota to various ministries and departments was controlled according to plans. This system has given way to greater flexibility in the control and authority for harvesting and production, reducing the role of the Central Plan allocations.

A further complication to understanding timber production and allocation in China is the relatively undocumented harvest of timber in rural areas outside of the State Plan. A large amount of timber is consumed annually for rural (household) construction and related activities and as fuelwood. Only broad estimates of such use are typically available. Finally, there is reportedly relatively large volumes of 'illegal' or unauthorized harvest. This includes timber entering the rural sectors and, increasingly, timber finding its way into the free market channels which are rapidly growing in China. Taken together, this combination of factors makes detailed reporting of harvest and production difficult. Nevertheless, it is evident that harvest and production have increased, adding to the pressures on the limited forest base and the remaining mature natural timber stands.

Data is provided by Chinese authorities to the Food and Agricultural Organization (FAO) of the United Nations, as part of the international cooperation in documenting trends and developments in forestry worldwide. Unpublished data from FAO permits the disaggregation of "China" information into components for the People's Republic of China and Taiwan. A summary of production trends based on FAO sources is provided in Table 8. The percentage composition of total Roundwood Production is given in Table 9. Detailed information for conifer and non-conifer production is contained in Appendix I.

Total harvest (roundwood production) is estimated to be almost 295 million cubic meters as of 1992. This production is comprised of 140.7 million cubic meters of coniferous species and 154 million cubic meters of non-conifer (deciduous) species. Total roundwood production has increased steadily from an estimated 210 million cubic meters in 1976. Conifer production has increased from 100.3 million cubic meters in 1976, or by just over 40 percent. Non-conifer production increased from 110.1 million cubic meters, or by almost 40 percent.

TABLE 8: PRC - TOTAL Roundwood Production 1976-92 (cub. m.)

| | INDUSTRIAL ROUNDWOOD | | | | FUELWOOD | TOTAL |
|---|---|---|---|---|---|---|
| | SAW/VEN. LOGS | PULPWOOD | OTHER | TOTAL | | |
| TOTAL (Coniferous + Non-coniferous) | | | | | | |
| 1976 | 42,000,000 | 3,892,000 | 21,718,000 | 67,610,000 | 142,800,000 | 210,410,000 |
| 1977 | 43,000,008 | 4,087,000 | 22,804,000 | 69,891,008 | 145,655,008 | 215,546,016 |
| 1978 | 44,160,016 | 4,292,000 | 23,944,000 | 72,396,016 | 148,568,000 | 220,964,016 |
| 1979 | 46,850,000 | 4,505,000 | 25,141,000 | 76,496,000 | 151,535,008 | 228,031,008 |
| 1980 | 46,690,016 | 4,490,000 | 26,397,000 | 77,577,016 | 154,565,008 | 232,142,024 |
| 1981 | 42,490,000 | 4,086,000 | 27,716,008 | 74,292,008 | 157,656,016 | 231,948,024 |
| 1982 | 43,350,016 | 4,168,000 | 29,101,008 | 76,619,024 | 160,809,008 | 237,428,032 |
| 1983 | 44,810,016 | 4,309,000 | 30,557,000 | 79,676,016 | 164,026,016 | 243,702,032 |
| 1984 | 52,310,016 | 5,030,000 | 32,085,008 | 89,425,024 | 167,307,008 | 256,732,032 |
| 1985 | 53,410,000 | 5,640,000 | 33,690,008 | 92,740,008 | 170,653,008 | 263,393,016 |
| 1986 | 54,094,000 | 5,667,000 | 35,374,008 | 95,135,008 | 174,065,008 | 269,200,016 |
| 1987 | 54,094,000 | 5,810,000 | 37,143,008 | 97,047,008 | 177,546,016 | 274,593,024 |
| 1988 | 53,347,008 | 6,100,000 | 37,143,008 | 96,590,016 | 181,097,008 | 277,687,024 |
| 1989 | 51,614,000 | 6,362,000 | 37,143,008 | 95,119,008 | 184,719,008 | 279,838,016 |
| 1990 | 45,614,992 | 6,919,000 | 37,143,008 | 89,677,000 | 188,413,008 | 278,090,008 |
| 1991 | 44,880,000 | 6,809,000 | 36,548,992 | 88,237,992 | 192,171,008 | 280,409,000 |
| 1992 | 47,573,008 | 6,809,000 | 36,548,992 | 90,931,000 | 203,701,008 | 294,632,008 |

Source: FAO (Unpublished)

TABLE 9: PRC - Percent of Total Roundwood by Component

| | INDUSTRIAL ROUNDWOOD | | | | FUELWOOD | TOTAL |
|---|---|---|---|---|---|---|
| | SAW/VEN LOGS | PULPWOOD | OTHER | TOTAL | | ROUNDWOOD |
| 1976 | 20.0 | 1.8 | 10.3 | 32.1 | 67.9 | 100.0 |
| 1977 | 19.9 | 1.9 | 10.6 | 32.4 | 67.6 | 100.0 |
| 1978 | 20.0 | 1.9 | 10.8 | 32.8 | 67.2 | 100.0 |
| 1979 | 20.5 | 2.0 | 11.0 | 33.5 | 66.5 | 100.0 |
| 1980 | 20.1 | 1.9 | 11.4 | 33.4 | 66.6 | 100.0 |
| 1981 | 18.3 | 1.8 | 11.9 | 32.0 | 68.0 | 100.0 |
| 1982 | 18.3 | 1.8 | 12.3 | 32.3 | 67.7 | 100.0 |
| 1983 | 18.4 | 1.8 | 12.5 | 32.7 | 67.3 | 100.0 |
| 1984 | 20.4 | 2.0 | 12.5 | 34.8 | 65.2 | 100.0 |
| 1985 | 20.3 | 2.1 | 12.8 | 35.2 | 64.8 | 100.0 |
| 1986 | 20.1 | 2.1 | 13.1 | 35.3 | 64.7 | 100.0 |
| 1987 | 19.7 | 2.1 | 13.5 | 35.3 | 64.7 | 100.0 |
| 1988 | 19.2 | 2.2 | 13.4 | 34.8 | 65.2 | 100.0 |
| 1989 | 18.4 | 2.3 | 13.3 | 34.0 | 66.0 | 100.0 |
| 1990 | 16.4 | 2.5 | 13.4 | 32.2 | 67.8 | 100.0 |
| 1991 | 16.0 | 2.4 | 13.0 | 31.5 | 68.5 | 100.0 |
| 1992 | 16.1 | 2.3 | 12.4 | 30.9 | 69.1 | 100.0 |

Source: FAO (Unpublished data)

Total roundwood is composed of two major components: industrial roundwood and fuelwood. In total, industrial roundwood increased from 67.6 million cubic meters in 1976 to almost 91 million cubic meters in 1992, an increase of 34.5 percent. At the same time, total fuelwood is estimated to have increased from 142.8 million cubic meters to about 203.7 million cubic meters, or by 42.6 percent. In 1992, conifer species accounted for 58.2 million cubic meters of the industrial roundwood (64 percent) while deciduous species totaled 32.8 million cubic meters (36 percent). For fuelwood, conifers accounted for 82.5 million cubic meters (40.5 percent) and deciduous species 121.2 million cubic meters (59.5 percent).

Industrial roundwood is identified as either Sawlog-Veneer Logs, Pulpwood, or "Other". Sawlog and Veneer Logs provide the basic raw material for a wide variety of solid wood products. Sawnwood (lumber) and veneer sheets for plywood are the major component uses for these industrial logs. Over the period 1976-92, Sawlog-Veneer Log production increased from 42 million cubic meters to 47.6 million cubic meters. Estimated production, however, peaked at 54.9 million cubic meters in 1986-87 (a period of inflationary economic growth in China) and was above 50 million cubic meters for the period 1984-1989. Conifer Sawlog-Veneer Log production increased from 25.9 million cubic meters to 30.1 million cubic meters, peaking at 33.1 million cubic meters in 1986-87. Conifer species accounted for 63 percent of Sawlog-Veneer Log production in 1992, a relatively constant share over the 1976-92 period.

Pulpwood production has increased in total from 3.9 million cubic meters in 1976 to 6.8 million cubic meters in 1992. Conifer roundwood has constituted about 70 percent of pulpwood production. Non-conifer pulpwood production increased from 1.2 million cubic meters to just over 2 million cubic meters in 1992.[2]

"Other" industrial roundwood is comprised of a wide variety of products, including mining pit-props, railroad ties (sleepers) and predominantly wood for rural construction and agriculture used primarily as small pole timber. Such types of timber were approximately 36.5 million cubic meters in 1992, consisting of 23.3 million cubic meters of conifer species and 13.2 million cubic meters of non-conifer species. Total 'other' roundwood production increased from 21.7 million cubic meters in 1976 to 36.5 million cubic meters in 1992, or by 68 percent.

During the period 1976-92, fuelwood increased in importance as a share of total roundwood production, increasing from 67.9 percent to 69.1 percent, with a corresponding decline in the share for total industrial roundwood. During this period, Sawlog-Veneer Log production declined from 20 percent of total roundwood to 16.1 percent. At the same time, shares for pulpwood and 'other' roundwood increased slightly. (Table 9).

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[2] It should be noted that wood fiber provides only a small portion of all raw material for pulp and paper in China. Agricultural by-products are the major component of pulping materials.

As reported by the China Agricultural Yearbooks for 1992-94, total timber production (industrial roundwood) was as shown in Table 10. Total production in 1991 was recorded at 58.073 million cubic meters, increasing to 63.922 million cubic meters for 1993. Of this reported total, production by the "Forest Sector" was 36.478 million cubic meters in 1991, and 35.695 million cubic meters in 1993. This would be production 'inside' the State Plan. Of these totals, the majority was commercial log production, being 33.887 million cubic meters or 95 percent of the total under the forestry sector. Table 10 also reports output for other primary manufactured products, to be discussed below.

The U.S. Department of Agriculture (1995) reports estimates for 1994 timber output. The estimated total annual timber removal capacity was 60 million cubic meters. Based on planned reductions in annual allowable cut below potential, however, the estimated 1994 allowable cut was 50-55 million cubic meters, with an estimated 1994 removal of 48 million cubic meters.[3] Removals were estimated by FAS4 at 50 million cubic meters in 1993.

As with information regarding harvest of timber in China, it is difficult to determine consistent estimates of production. From FAO sources, the estimated production of primary forest products is as shown in Table 11 for the period 1976-1992.

As is evident in Table 11, the primary use of industrial roundwood in China is for the production of sawnwood (lumber). Total sawnwood production ranged from 16.9 million cubic meters in 1971 to a high of 26.8 million cubic meters in 1985. While production was above 20 million cubic meters for 1980-1991, production for 1992 was estimated at 18.9 million cubic meters.

The majority of sawnwood production is from conifer species, estimated at 11.2 million cubic meters in 1992 (59.2 percent of total) in contrast to peak production of conifer sawnwood at 17.4 million cubic meters in 1985. Non-conifer sawnwood was estimated at 7.7 million cubic meters in 1992 (40.8 percent of total). Non-conifer sawnwood reached a period high of 9.4 million cubic meters in 1985.

In comparison, production of plywood is comparatively small in China, yet production has increased significantly over the 1976-92 period. While only 184 thousand cubic meters in 1976, production increased rapidly reaching 1.6 million cubic meters in 1992, or an increase of almost ten-fold. Similarly, the production of particleboard has increased dramatically as China has sought to make more complete utilization of existing timber resources. While only 27

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[3] FAS reports that the AAC is presently set at an estimated 70% of potential to allow for improving the stocking of forests - that is, allowing current growth to accumulate. The AAC is reportedly set at the county level based on local forest conditions.

4 FAS - Foreign Agricultural Service

TABLE 10: PRC - National Forest Production (Forestry System)

| | Units | 1993 | 1992 | 1991 |
|---|---|---|---|---|
| Total Production of Timber | 10,000 cub. m. | 6,392 | 6,174 | 5,807 |
| Total Production of Panels | 10,000 cub. m. | 580 | 429 | 296 |
| Plywood | 10,000 cub. m. | 212 | 156 | 105 |
| Fiberboard | 10,000 cub. m. | 181 | 144 | 117 |
| Shaving Board | 10,000 cub. m. | 157 | 116 | 61 |
| Total Production of Bamboo | 10,000 units | 43,356 | 40,430 | 29,173 |
| Total Sawnwood Production | 10,000 cub. m. | 1,401 | 1,119 | 1,142 |
| | | | | |
| Forestry Sector: | | | | |
| Timber Production by Forest Sector | 10,000 cub. m. | 3,570 | 3,475 | 3,648 |
| Including: Logs | 10,000 cub. m. | 3,389 | 3,277 | 3,394 |
| Firewood | 10,000 cub. m. | 181 | 198 | 254 |
| Panel Production by Forest Sector | 10,000 cub. m. | 232 | 176 | 125 |
| Including: Plywood | 10,000 cub. m. | 74 | 56 | 41 |
| Fiberboard | 10,000 cub. m. | 80 | 64 | 51 |
| Shaving board | 10,000 cub. m. | 75 | 54 | 31 |
| Bamboo Production by Forest Sector | 10,000 units | 1,083 | 2,234 | 1,536 |
| Sawnwood Production by Forest Sector | 10,000 cub. m. | 264 | 327 | 461 |

Source: PRC Agricultural Yearbook 1992-94

TABLE 11: PRC - Production of Primary Forest Products 1976-1992

| | WOOD PRODUCTS PRODUCTION | | | | | PULP & PAPER PRODUCTION | |
|---|---|---|---|---|---|---|---|
| | CONIFER | SAWNWOOD NON-CONIFER | TOTAL | PLYWOOD | PARTICLE BOARD | WOOD PULP | PAPER & BOARD |
| | ********** cubic meters ********** | | | | | ******* metric tons ******* | |
| 1976 | 10,608,000 | 6,295,000 | 16,903,000 | 184,000 | 27,000 | 750,000 | 3,343,000 |
| 1977 | 11,167,000 | 6,610,000 | 17,777,000 | 209,000 | 29,000 | 804,000 | 3,636,000 |
| 1978 | 11,725,000 | 6,941,000 | 18,666,000 | 252,000 | 44,000 | 938,000 | 4,139,000 |
| 1979 | 12,311,000 | 7,288,000 | 19,599,000 | 292,000 | 53,000 | 1,046,000 | 4,929,000 |
| 1980 | 12,927,000 | 7,652,000 | 20,579,000 | 330,000 | 78,000 | 1,108,000 | 5,346,000 |
| 1981 | 13,573,000 | 8,035,000 | 21,608,000 | 351,000 | 77,000 | 1,108,000 | 5,402,000 |
| 1982 | 14,252,000 | 8,437,000 | 22,689,000 | 394,000 | 103,000 | 1,108,000 | 5,890,000 |
| 1983 | 14,732,000 | 8,721,000 | 23,453,000 | 455,000 | 127,000 | 1,114,000 | 6,613,000 |
| 1984 | 16,474,000 | 8,870,000 | 25,344,000 | 490,000 | 165,000 | 1,195,000 | 7,560,000 |
| 1985 | 17,388,000 | 9,372,000 | 26,760,000 | 539,000 | 182,000 | 1,512,000 | 9,112,000 |
| 1986 | 16,928,000 | 9,122,000 | 26,050,000 | 611,000 | 210,000 | 1,610,000 | 10,004,000 |
| 1987 | 16,928,000 | 9,122,000 | 26,050,000 | 776,000 | 378,000 | 1,625,000 | 11,411,000 |
| 1988 | 16,888,000 | 9,100,000 | 25,988,000 | 827,000 | 483,000 | 1,695,000 | 12,645,000 |
| 1989 | 16,027,000 | 8,637,000 | 24,664,000 | 728,000 | 442,000 | 1,700,000 | 13,333,000 |
| 1990 | 14,788,000 | 7,965,000 | 22,753,000 | 759,000 | 428,000 | 1,693,000 | 13,989,000 |
| 1991 | 11,526,000 | 8,578,000 | 20,104,000 | 1,054,000 | 614,000 | 1,738,000 | 14,779,000 |
| 1992 | 11,180,000 | 7,720,000 | 18,900,000 | 1,565,000 | 1,159,000 | 1,829,000 | 16,196,000 |

Source: FAO (Unpublished)

thousand cubic meters in 1976, production exceeded 100 thousand cubic meters by 1981 and was 1,159 thousand cubic meters in 1992.

Production of wood pulp remains modest in China, where the sector relies primarily on non-wood fiber sources. Production in 1976 was estimated at 750 thousand metric tons, increasing steadily to 1,829 thousand metric tons in 1992, or an increase of 2.4 times. Production has exceeded 1.5 million metric tons since 1985. Production of paper and board products is significantly greater, reflecting use of both wood and non-wood fibers. Production was estimated at 3.34 million metric tons in 1976, rising to 16.2 million metric tons in 1992. This represents an increase of 4.8 times.

The US Dept. Of Agriculture (FAS, 1995) has estimated China's sawnwood production at 10.2 million cubic meters for 1994, consisting of 7.2 million cubic meters of conifer sawnwood, 2.5 million cubic meters from temperate hardwoods, and 0.5 million cubic meters from tropical hardwoods. Other production estimates for 1994 are:

| | | |
|---|---|---|
| Medium Density Fiberboard | 1.50 | million Cubic Meters |
| Plywood | 1.60 | " " " |
| Particleboard | 1.45 | " " " |
| Fiberboard | 0.90 | " " " |
| Veneer Panels | 3.00 | " Square Meters |
| Wood Chips | 4.00 | " Metric Tons |

Kuang (1995) has recently indicated that China's total pulp and paper production was 17.25 million metric tons in 1992 and 20.2 million metric tons in 1993. Production is concentrated in six provinces:

| Province | 1993 Pulp and Paper Output |
|---|---|
| Henan | 2.50 mill. MT |
| Shandong | 1.60 |
| Guangdong | 1.34 |
| Hebei | 1.33 |
| Zhejiang | 0.81 |
| Sichuan | 0.92 |

Kuang indicates that at 1994 approximately 26 percent of pulping materials consisted on wood-based fibers.

As indicated relative to current forest resources, Northeast China, and particularly Heilongjiang province has been the traditional 'center' for forest-based production. This region is still primarily administered by the Ministry of Forestry under the Heilongjiang Forestry Bureaus and related organizations and enterprises. This region borders on Siberia and the Russian Far East, and has much in common with respect to timber types. The US Department of Agriculture (FAS 1995) has recently reported on the status of forestry under the Heilongjiang Forestry Department, the DaXing'AnLing Forestry Bureau and

the Heilongjiang Forestry Industry Bureau. Relative production for these three forestry administrative organizations were:

| | |
|---|---|
| Heilongjiang Forestry Industry Bureau | 6.95 million cubic meters |
| Heilongjiang Forestry Department | 1.57 " " " |
| DaXing 'AnLing Forestry Bureau (MOF) | 3.8 " " " |

The Heilongjiang Forest Industry Sales Bureau, under the Forestry Industry Bureau, reported the following (FAS 1995):

| | | |
|---|---|---|
| Total Annual Roundwood Cut: | | 6.95 million cubic meters |
| Fuelwood | | 1.01 " " " |
| Logs (18 cm+) | | 4.38 " " " |
| Softwood | 1.81 | " " " |
| Hardwood | 2.57 | " " " |
| Logs (8-18 cm) | | 1.46 mill. cubic meters |

Logs (18cm+) sold under the State Plan totaled 1.78 million cubic meters. This was an estimated one-third of the 4.68 million cubic meters allocated centrally under the State Plan.

Forest enterprises in Heilongjiang were reported as generating the following production for 1994:

| | |
|---|---|
| Lumber | 320 Thousand Cubic Meters |
| Sold under State Plan | 180 " " " |
| Plywood | 113 " " " |
| Particleboard | 169 " " " |
| Med Density Fiberboard | 50 " " " |
| Fiberboard | 59.8 Thousand Metric Tons |
| Wood Chips | 2.5 Million Cubic Meters |
| Paper | 1.0 Million Metric Tons |

Total log consumption was estimated at 1.42 million cubic meters. In addition, the Bureau sold 4.06 million cubic meters of logs outside the State Plan in addition to providing 1.78 million cubic meters inside the State Plan.

Fujian Province is the second leading timber producer. Primarily mountainous, this province is a major producer of tea and tropical fruits in addition to timber (FAS, 1995). The province includes 6.14 million ha of commercial forests including almost 4 million ha of plantations. The 1990-95 annual allowable cut for the province was 22 million cubic meters, with annual growth estimated at 30.9 million cubic meters. Roundwood production was an estimated 6.4 million cubic meters, with 9.0 million cubic meters of fuelwood and 'cuttings'. Waste is estimated at 6.6 million cubic meters. Based on estimated yields from maturing plantations, the roundwood harvest levels from 1993 are reported at:

| | | | | |
|---|---|---|---|---|
| 1993 | 5.58 million cubic meters | | | |
| 1994 | 5.73 | " | " | " |
| 1995 (est) | 6.00 | " | " | " |
| 1996-2000 (Plan) | 8.00 | " | " | " |

Roundwood under the State Plan in 1994 was 1.46 million cubic meters, primarily for pulp and paper production. Forest products output for Fujian Province for 1994 was reported at:

| | | | | |
|---|---|---|---|---|
| Med Density Fiberboard | 70 | Thousand Cubic Meters | | |
| Plywood | 25 | " | " | " |
| Particleboard | 80 | " | " | " |
| Fiberboard | 90 | " | " | " |
| Lumber | 630 | " | " | " |
| Veneer Panels | 2 | Million Square Meters | | |
| Plastic Board | 4.0 | " | " | " |

It was also reported that about one-half of the log output and 80 percent of lumber produced in Fujian Province was shipped to other Provinces. Fujian does not have production quotas under the State Plan Total provincial processing capacity is estimated at 1.2 million cubic meters, including capacity of 900 thousand cubic meters for lumber.

## Consumption of Forest Products

As indicated for the harvest and production of timber in China, information regarding consumption by product type or end user is often incomplete or conflicting. Consumption is frequently used to identify gross 'removals' from the forest, including estimates for natural losses (eg. Insect, disease, fire losses), losses in harvesting and transportation, and less frequently illegal removals. Thus reconciling information about specific products (eg. Lumber) or end market (eg. Construction) is difficult.

Previously, the control of the allocation and distribution of forest products in China was much more centrally administered under State quota systems. As economic reforms have been implemented in recent years, greater flexibility has been evident in both timber markets as well as in the production and distribution of products. Timber allocated under the State plan has been reduced in volume and as a share of the total market.

Although one of the largest countries in terms of forests and production, China has one of the lowest per-capita timber consumption levels, estimated at approximately 0.058 cubic meters per capita in the late 1980's (Richardson, 1986). It was estimated that approximately 40 percent of timber was allocated and distributed under the State Plan in 1985, subject to State regulated and subsidized prices (Cardellichio, 1992). This controlled allocation had dropped to approximately 25 percent of the total by 1992. As reported by FAS (1995), the State sector share has dropped further, to approximately 10 percent. At

present, the domestic marketing system is described at a three-tiered system: 1) a State forest land system managed at the provincial level, with mixture of market pricing and quotas, 2) the collective system with management and pricing at the local (Provincial and sub-Provincial) level, and 3) an emerging 'market" structure at the wholesale level with market-determined pricing. While the State system still imposes controlled prices at below-market levels, enterprises and forest units are generally permitted to sell timber on the wholesale market after quotas have been met. The first organized wholesale markets were established in 1992 in Jilin, Hubei and Fujian provinces, with expansion into Heilongjiang, Sichuan, Henan and Guangdong in 1993. A major wholesale market was planned for implementation in Beijing by the end of 1995 .

The evolving market and timber distribution system has been described by FAS (1995) as a three-tiered regional system. First, the Northern "Tier" is still largely subject to State influence under the dominance of the State Forestry Bureaus and related subsidiary forest organizations and enterprises. The "Shanghai Tier" is made up of the several East-Coastal provinces, and which is active throughout the country and which 'brokers' timber for other provinces. Last, the "Southern Tier" includes the southern provinces which deal more extensively with importer trade, has much less State involvement, and which is responsible with most timber trade which is linked with Hong Kong. The Shanghai Tier is described as the most diversified, with participation by importers, brokers, and agents purchasing for local end users as well as for projects throughout the country. For the Southern Tier, most importers are at the local or municipal levels. In the Northern Tier, most agents purchase or sell on behalf of the provincial governments or State administered enterprises.

Increasingly, "local" timber from the Northeast is being brokered to other provinces, often at great distances, when prices exceed local prices. As State quotas are reduced, a greater volume of timber from the Northeast region potentially becomes available to the national wholesale markets.

Consumption under the State Plan is more easily identified than is the utilization of timber 'outside' the plan. Almost all firewood use falls outside the plan, and is perhaps the most difficult element of consumption to accurately measure. Fuelwood is estimated at about 90 percent of 'non-production' timber use, with the balance primarily related to farm use and rural housing. Together, these 'non-production' uses are estimated to account for 36 to 54 percent of total timber use, almost exclusively outside the State plan.

Total 'production consumption', that is wood used for conversion to specific forest products, was estimated to be as much as 200 million cubic meters for 1988, with 62 million cubic meters being under the central State plan, a similar amount under the Provincial and local government plans, and approximately 71 million cubic meters directly utilized by farmers and rural households for production purposes (MOF, 1989).

The general market for construction activities is the most important market in China - both for domestic and imported timber. The approximate allocation of

timber by major market segment in 1986 was estimated by Gao (Gao, J.P. 1988) as follows:

Use of Wood in China - 1986

| Market Segment | Percent of total timber Use | |
|---|---|---|
| | Domestic | Imported |
| Construction | 20.2 | 45.0 |
| Mining | 13.6 | |
| Packaging | 10.1 | 5.0 |
| Fuelwood | 8.1 | |
| Pulp & Paper | 7.6 | 9.0 |
| Furniture | 4.7 | 5.0 |
| Other | 25.7 | 8.0 |
| Market Sales | | 10.0 |
| Defense | | 8.0 |
| Railroad | | 4.0 |
| Plywood | | 6.0 |

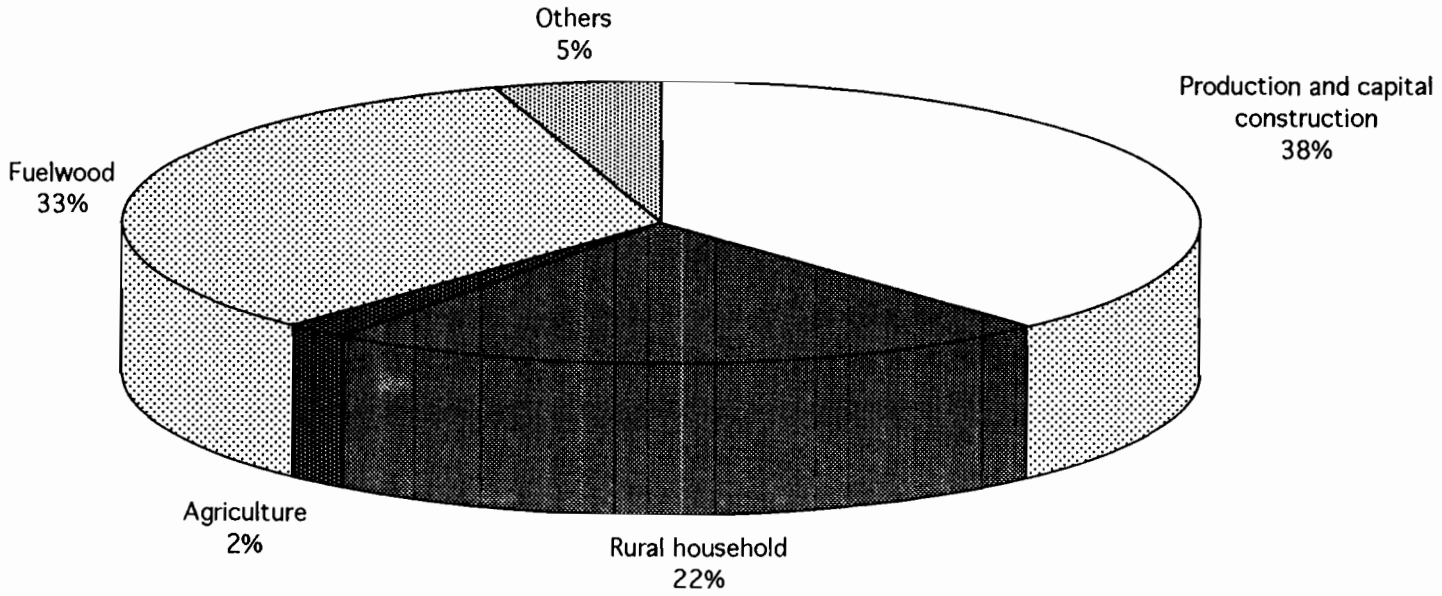
From: Gao, 1988, NFPA 1986

The estimated pattern of consumption of timber in China for 1990 is shown in Figure 1. The 'production and capital construction' segment accounted for 112.86 million cubic meters, or approximately 38 percent of timber consumption, followed by rural household use at 22 percent. Approximately half (57.36 million cubic meters) of the total production and capital construction use was under the State Plan. Fuelwood was estimated at one-third of total use, followed by 'other' and agricultural uses. Total consumption for 1990 was estimated at 297 million cubic meters. Timber use in 'capital construction' was estimated at about 50 percent for doors and windows, 45 percent for concrete forming, and 5 percent for scaffolding. Relatively little timber is used in structural applications, including housing, outside the rural areas.

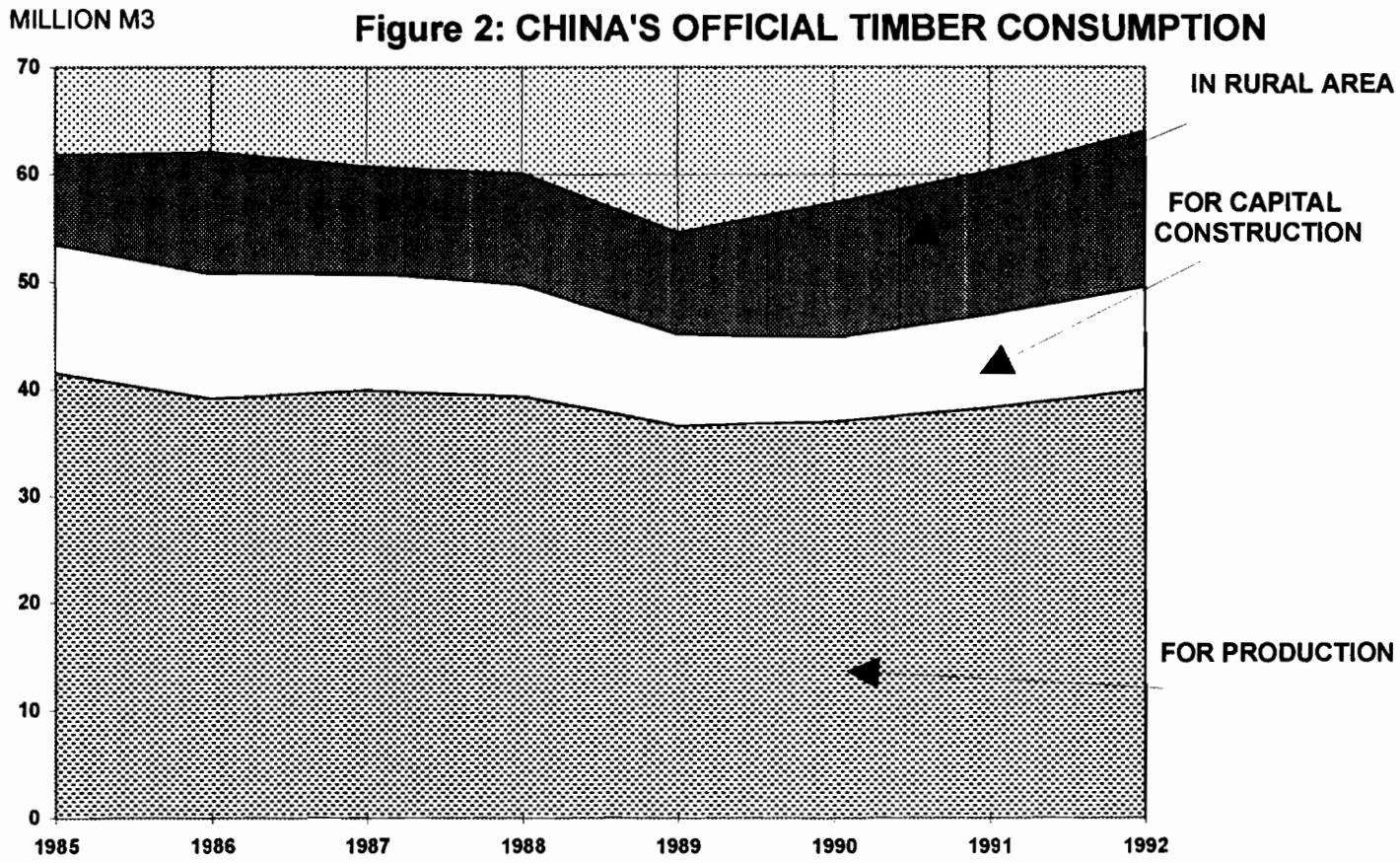
The official State Plan consumption for the three major uses is shown in Figure 2 for the period 1985-92. Official consumption has averaged about 60 million cubic meters. Combined production and capital construction use has averaged approximately 50 million cubic meters. The rural sector use has increased, since 1989, to approximately 15 million cubic meters. For 1992, 62 percent of the official consumption was for production, 15 percent for capital construction, and 23 percent for rural use. Industrial utilization accounts for the most significant component of all production use (95%), with small amounts going to agriculture, transportation, postal, telecommunications, and other miscellaneous production uses. Industrial uses are shown in figure 3 for the period 1985-92. Mining uses have declined to just under 20 percent, with timber processing falling from 15 percent to about 12 percent. Paper production has increased from about 19 percent to just over 27 percent of the total.

## Figure 1: Structure of China Timber Consumption 1990

Total Consumption: 297 million m3

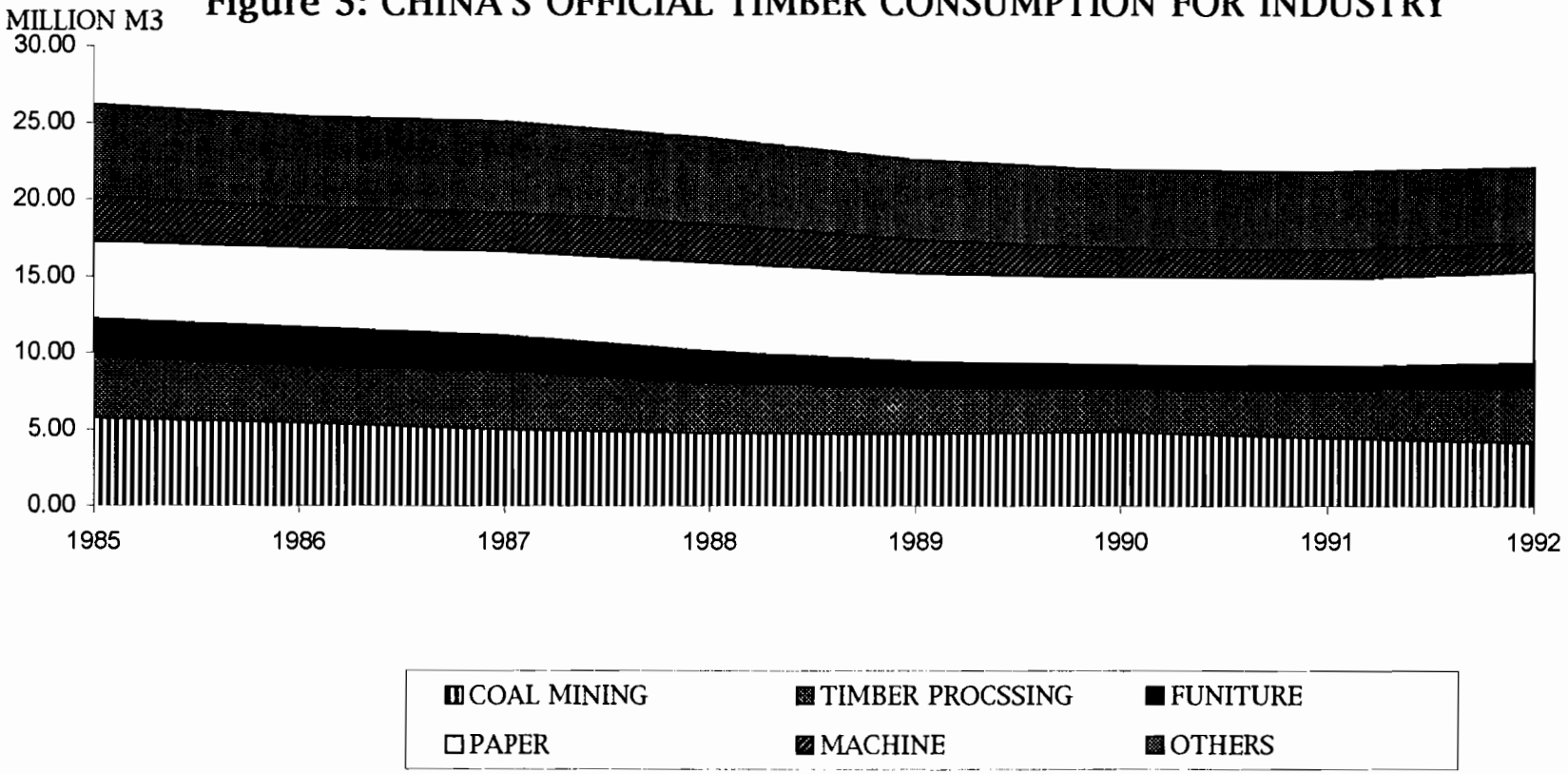



**Source:** Ministry of Forestry, China, 1993




**Source:** China Statistic Year Book, 1993

## Figure 3: CHINA'S OFFICIAL TIMBER CONSUMPTION FOR INDUSTRY




**Source:** China Statistic Year Book, 1993

## Balancing Timber Requirements - Policies and Strategy

Beginning in early 1983, China imposed "Regulations for Economical and Rational Applications of Wood and Wood Substitutes" as a means of limiting demand for timber in the face of declining harvests from the remaining natural forests and the parallel decline in mature timber stands, particularity for the State timber bureaus in the Northeast (Waggener, 1989, FAS 1995). At the same time, efforts were initiated in forest management under the 10 Year Forestry Plan to stimulate the domestic production of timber, primarily through the establishment of the "one timber base" centered on faster growing, high yield plantations as an alternate to prior reliance on the diminishing capacity of the natural forests of the Northeast and Southwest regions. The rapid development of plantations has been noted, although these plantations are still largely immature and have yet to contribute substantially to overall timber supply. As will be discussed in detail below, China has also strategically imported timber in order to supplement domestic supply, although under specific quota and foreign currency controls, with periodic decentralization and greater flexibility in the context of overall national macroeconomic policy.

China has also sought to make more complete and efficient use of the available timber supply by increasing the level of comprehensive utilization. This has been in the form of both reducing waste in logging and processing as well as the greater use of by-products and residues for wood based panel production. Extending the level and range of products without additional harvest remains a central element of the comprehensive forest policy of China.

Demand management continues to supplement efforts to stimulate the domestic timber capacity. Although indications have been evident that the wood substitution regulations of 1983 were to be relaxed or discontinued for imported timber, and that joint ventures will be allowed to import timber for their own use, FAS (1995) reports that timber is still included in the "Interim Method of Quota Management of Imports of General Products" issued by MOFTEC in January of 1994, the most recently published regulations governing timber.

## Market Transition and Economic Reforms

The forestry and forest products sector continue to be influenced by the evolution of economic reforms and transition to more economic market-based distribution and consumption decision-making. As noted, timber distribution under the central and provincial Plans has declined, with greater reliance on market-based wholesale distribution centers. Further, after state quotas are met under central and provincial plans, forest and collective farms, state bureaus, and other forest organizations are increasingly able to sell timber and forest products on the growing uncontrolled markets. In the Northeast region, it was reported in the present investigation that timber was being sold to many other provinces by Heilongjiang forest bureaus at prevailing prices greater than those that local bureau enterprises could afford to pay and produce profitably. Timber is thus being increasingly allocated to national markets in response to market prices rather than local enterprise demand or production capacity.

The greater flexibility in marketing of domestic timber is matched by greater accountability for the profitable operation of enterprises. Except where State quotas are still in effect, provision of financial and capital subsidy through central budgeting has been greatly reduced, forcing enterprises to account for costs and revenues. With the majority of timber and product prices being set in open markets, structural shifts in the economic feasibility of production have arisen where past capacity reflected State planning over economic feasibility. Unprofitable enterprises continue to be a major problem, particularly in the Northeast where State dominance remains the strongest (Cardellichio, 1992). At the same time, there is a growing problem of 'oversupply' of smaller diameter wood from the emerging plantations in the Southern and coastal regions, and the implicit controls of the price of larger diameter industrial wood, leading to early harvests.

Capacity utilization of the older, centrally planned industrial capacity remains a difficulty under the economic reforms and movement towards economic accountability. Cardellichio (1992) provided the following capacity utilization estimates for 1990:

| Sector | Capacity Utilization |
|---|---|
| Sawnwood | 49 percent |
| Plywood | 52 " |
| Fiberboard | 82 " |
| Particleboard | 36 " |
| Wood pulp | 77 " |

Sawnwood capacity utilization ranged from a high of 87 percent in Jiangxi province and 85 percent in Henan province (both relatively small producers) to a low of 12 percent in Anhui province, 9 percent in Liaoning province, and 7 percent in Hunan province. Utilization was unfortunately unavailable for Heilongjiang, Jilin and Inner Mongolia in the Northeast region, which accounted for approximately 43 percent of lumber production. Plywood capacity utilization ranged from 97 percent in Sichuan province and 98 percent in Jiangxi province to only 16 percent in Hubei province and 13 percent in Anhui province.

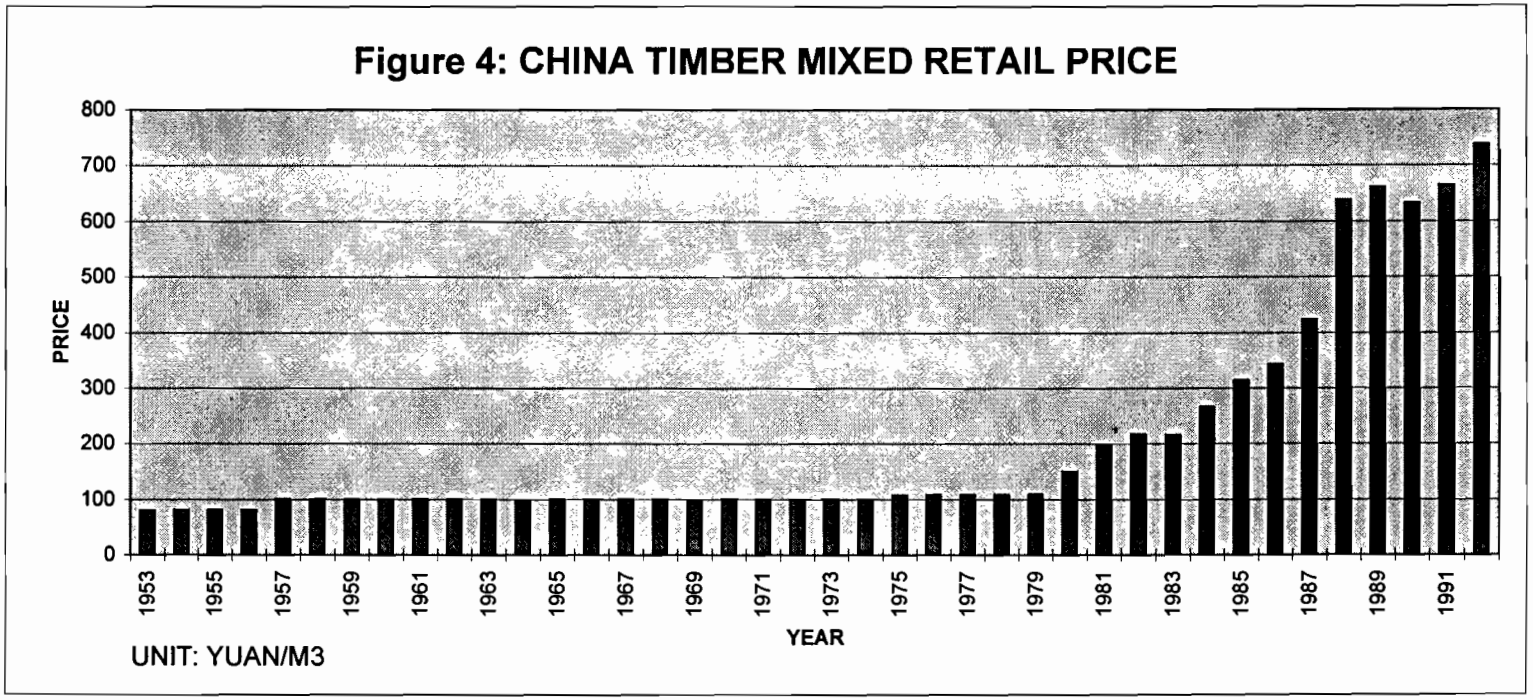
Transportation costs have also been restructured, impacting the feasibility of timber sales throughout China under the emerging wholesale market structures. Previously, timber was largely distributed by rail, often over distances of 1000 km or greater, under State allocation plans with little apparent consideration of true economic cost. Rising transportation rates now become a significant consideration in the wholesale distribution of timber. FAS (1995) reported that at mid-1995 that comparative transportation rates for timber from Fuzhou (Fujian province) to Shanghai was approximately 70 rmb/cum ($8.38/cm) for water shipment and 120 rmb/cum ($14.37/cm) for rail. Shipments from Jilin province in the Northeast to Xiamin (southern Fujian province) is estimated to take 5 days by rail and up to 20 days by boat if partial loads are included or 10 days for full loads. Dependent upon urgency and handling-storage facilities, consumers may choose the more expensive rail distribution due to the longer time for water shipment.

Perhaps the most important economic reform impacting forestry and timber markets is the relaxing of pricing and the emergence of flexible wholesale markets. It is reported that a comprehensive price reporting system is being implemented, and that a national publication "China Forestry Products Information" is available with regular price quotations, although at late 1995 circulation of this report is considered confidential and not generally available. It is estimated that up to 90 percent of timber and product prices are now set by such independent markets. The lack of timely and accurate pricing information, however, will continue to restrict the functioning of these markets to the extent that potential buyers and sellers, including brokers, do not have full access to market data. The World Bank reported (Cardellichio, 1992) that approximately 55.7 million cubic meters was produced under the State plan in 1990, with 12.8 million cubic meters sold at fixed prices, or 23 percent of the total. The fixed prices were estimated at 50 percent of the level of the market-determined prices.

Weighted or 'mixed' prices for timber for the period 1953-1992 are shown in Figure 4. Prices are shown as yuan/cum at retail levels. The era of controlled prices extended through 1979 when some authority for a three-tiered pricing structure emerged (fixed, guidance prices, and market prices). Thereafter, prices increased rapidly from the fixed level of 100 yuan/cum to over 700 yuan/cum by 1992.

Credit and financial market reforms remain critical to the forest products sector. Without assured State investments and budgets for operational activities, the lack of investment capital and credit for transactions remains a significant constraint on forestry sector restructuring and modernization. Together with the absence of a fully functioning market information system, critical decisions regarding production and distribution remain difficult, and to some degree, inefficient. Information regarding product standards, various governmental regulations which are poorly coordinated and disseminated, import and foreign exchange requirements, and tax and tariff policies contribute to problems in operational planning and marketing.

Comparative financial data for "independently accounting enterprises" under the forestry system for 1993 are summarized in Table 12. These enterprises are those that, according to new State regulations, must account for operations independently. Total 'commercial processing income' is reported at 177.8 million yuan (rmb) for 1993 based on total industry output of 24.5 billion yuan. Over half of the reported output was for logging enterprises (13.4 billion yuan) followed by processing enterprises (4.4 billion yuan) and forest chemical enterprises and equipment manufacturing and repair enterprises (1.4 billion yuan each). Inputs of 11.3 billion yuan included 7.2 billion yuan in inputs "bought from the market".




**Source:** China Statistic Year Book, 1993

TABLE 12: Increased Value in Independently Accounting Enterprises of Forestry System (according to production law and present price) 1993 (10,000 yuan)

| | Total | Logging enterprises | Processing enterprises | Forest chemical enterprises | Mechanic manufacture and repair enterprises | Construction materials enterprises | Electricity industrial enterprises | Other industrial enterprises |
|---|---|---|---|---|---|---|---|---|
| Industry Value Added | 1,018,838 | 790,177 | 125,189 | 37,984 | 36,549 | 3,396 | 9,977 | 15,566 |
| Industry Total Output | 2,451,519 | 1,337,956 | 442,976 | 138,108 | 138,682 | 8,840 | 28,519 | 56,438 |
| Final Value of Finished Product Output | 2,113,680 | 1,325,098 | 435,228 | 137,292 | 130,205 | 8,406 | 25,698 | 51,753 |
| Commercial Processing Income | 17,780 | 5,042 | 3,390 | 477 | 5,235 | 12 | 2,821 | 803 |
| Self-made Semi-finished Products | 11,131 | 2,895 | 2,266 | 99 | 2,420 | 422 | - | 3,029 |
| Difference Between Ending and Beginning Value for Goods in Process | 8,928 | 4,921 | 2,092 | 240 | 822 | - | - | 853 |
| Industry Inputs | 1,132,681 | 547,779 | 317,787 | 100,124 | 102,133 | 5,444 | 18,542 | 40,872 |
| Materials Bought from the Market | 724,001 | 272,307 | 242,112 | 85,945 | 88,808 | 2,735 | 3,597 | 28,497 |
| Fuel Purchased | 117,904 | 70,841 | 22,011 | 4,057 | 2,415 | 779 | 13,747 | 4,054 |
| Power Consumed | 61,984 | 31,848 | 20,636 | 2,187 | 2,391 | 895 | 423 | 3,604 |
| Interest Expense | 53,398 | 28,733 | 14,775 | 3,168 | 3,298 | 313 | 607 | 2,504 |
| Service Fee Expense | 175,394 | 144,050 | 18,253 | 4,767 | 5,221 | 722 | 168 | 2,213 |

Source: PRC Ministry of Forestry, Forestry Statistical Yearbook 1993

## Near-term Outlook for Production and Consumption

According to the latest forest inventory for China (1989-93), total timber growth now equals total consumption (including mortality). This balance was achieved in 1992 when much of the growth was generated on plantations with smaller, but faster growing species. Nevertheless, there is a generally acknowledged problem of rapidly declining inventory of mature and over-mature timber from natural forests, and the premature harvesting of immature timber and lack of middle-aged timber stands. A implicit 'quota' of total consumption of 246.6 million cubic meters was established, which for the first time included formal consideration of both 'inside plan' and non-state consumption. Of this, a target of 99.9 million cubic meters of 'commercially useable' timber was set which included about 60-65 million cubic meters directly under the State plan.

China is confronting potentially major restructuring of the State forest enterprise system in the Northeast region, where the majority of the 131 comprehensive forest bureaus are located (together with State forest enterprises). Many enterprises are losing money under new accountability rules, and receive only limited assistance from within the local bureaus. The inability to 'purchase' timber at prices permitting economically feasible operation has resulted in enterprises operating well below capacity while a considerable volume of timber is transshipped to other, more distant provinces at higher wholesale prices. In Heilongjiang, harvestable timber reserves have decreased by some 81 percent (Song, 1995). It is reported that 40 percent of the Forest Industry Bureau's enterprises and branches are currently generating losses. This bureau has an estimated 800,000 employees, increasing the concern regarding the long term viability of the present industry structure.

China is increasing aware of environmental and other non-commercial aspects of forest use, including soil and water protection, wildlife, and natural environments and biodiversity. While substantial progress under market reforms has been made, incomplete restructuring and information gaps still contribute to distorted production and allocation of resources. Administrative regulations continue to influence market consumption decisions. Accounting reforms have increasingly highlighted inefficiencies, forcing some major adjustments which potentially impact regional distribution of productive activities and related employment in both harvesting and processing.

The distinction of timber activities 'inside' the State planned economy and the use of timber and forest products 'outside' the plan will remain a potentially distortion of markets and consumption. As noted, much of the 'outside plan' utilization is in the rural housing and agricultural sectors and for fuelwood. These forms of consumption can be expected to grow significantly as economic development flows to the rural regions yet energy and fuel shortages persist. Further, industrial uses, including construction markets, can be expected to expand under the pressures of economic development which falls in the 10-12 percent range (6.9 percent real growth) as anticipated by the World Bank (1996) and other international development organizations. Population growth, lengthened life expectancy, and growing total and per capita incomes will

contribute to greater timber consumption in spite of efforts to controlled wood use.

Real economic growth was 9.9 percent in 1995 and is currently projected at 10.5 percent for 1996 (Far East Economic Review, March 7, 1996). China continues to experience double-digit inflation, currently at approximately 10.1 percent annually. Projections are for more conservative growth during the new 9th Plan directives, with an emphasis on more planned and gradual growth, and greater self-reliance under State oversight. Strategic sectors targeted during the 9th Plan include agriculture and manufacturing, science, technology and investment (Anon. 1995e, 1995f). These sectors will, if planned policies are successful, stimulate the growth in demand for forest products at the time when domestic supply will be under greater pressure and the growing emphasis to balance annual harvest and removals below net growth as a means of building up growing stock and future harvest potentials. Likewise, continuing economic reforms and decentralization can be expected to moderate the role that central demand regulation can effectively play in forcing reduced timber consumption via the planned use of substitutes. The critical need for a growing pulp and paper consumption level consistent with economic development will pressure the emerging capacity of plantations of short rotation, fast growing species to supply an increased share of wood-based fiber for pulping.

Reforms in the economy have stimulated a tremendous concern regarding housing - both the quantity of housing and the adequacy in terms of both space and quality. There is an acknowledged shortage, and many of China's population live in cramped and shared facilities. Housing rents are increasing, and more housing is being sold to resident's in moves to improve housing capacity and to reduce the large demands on central and municipal budgets. Yet improved housing is still beyond the reach of the majority of Chinese (Tefft, 1996). Government policies are seeking to slow or halt 'luxury' developments and to refocus on lower-middle income city dweller housing. Targets for 1991-95 were for 750 million square meters of new or improved residential construction, with an increase to 900 million square meters for 1996-2000 (FAS, 1995c). A target of increasing the living space per person from about 4 square meters to 8 square meters for urban areas by 2000 was adopted. China's urban population of about 220 million is expected to swell to over 400 million by that date (Asian Timber, 1993).

Quantitative projections of China's wood consumption are not readily available. However, an approximate order of magnitude of potential demand can be summarized from the analysis of China's forestry sector and markets carried out by Richardson (1986). Richardson utilized economic projections of national gross domestic product, population growth, and changes in per capita wood consumption based on global relationships between economic growth and consumption in order to project both rural and urban timber demand. These projections are summarized in Table 13. Richardson used a baseline of 1982 industrial wood consumption levels, which were reported at 58.2 million cubic meters. At that time, per capita consumption was estimated at 0.058 cubic meters. Projections were made for the years 2000, 2025, and 2040. A range of projections reflected differing assumptions about per capita consumption rates, which in turn reflect alternate rates of economic growth and population. In

addition to total population, Richardson projected rural and urban trends separately.

At 'low' rates of growth, Richardson projects total industrial timber consumption at 136.9 million cubic meters by 2000, at 291.1 million cubic meters by 2025, and almost 388 million cubic meters by 2040. As noted previously, total consumption for 'production and capital construction' had reached 112.9 million cubic meters by 1990 (Xu, 1995). Projected industrial wood consumption would increase significantly under both 'medium' and 'high' rates of economic development and per-capita consumption. Under the highest rates assumed by Richardson, total consumption would reach 1.163 billion cubic meters by 2040 - a ten-fold increase over 1990, and obviously an unrealistic level based on both China's forest capacity as well as potential global resources. Such projections do, however, provide an awareness of the magnitude of market adjustments that may be expected, and the need for deliberate consideration of both the domestic timber capacity and the future realistic role for international trade in forest products.

Richardson also sought to provide a perspective between recent timber production in China and the levels of projections under the "low" conditions. These comparisons are provided in Table 14. Estimated production of industrial wood in 1984 is shown by province, with the national domestic total at 64.139 million cubic meters. Combining the rural and urban projections for the year 2025 for each province and the three major municipal regions, Richardson then computed the 'supply gap' potentially confronting China. Under these stated conditions, China's domestic demand for industrial timber would exceed 1984 production by almost 227 million cubic meters. Such a gap could only be closed, of course, by a combination of increased domestic production, increased supply through imports, and/or reduced consumption. It is shown in Table 14 that only Heilongjiang province, with substantial forest resources and proportionately small population and hence consumption, would have a positive balance based on 1984 estimated production. However, declining forest capacity and mature inventory may actually reverse this situation.

The main variable not explicitly considered by Richardson was the level of real prices, and the corresponding impact of rising real prices on consumption. It is evident that rising prices would dampen demand, and over a longer period, stimulate domestic production. At some point, however, with rising real prices it is likely that China's government would take steps to intervene in timber markets and perhaps reimpose more strict controls on utilization and allocation of timber.

TABLE 13: Peoples Republic of China: Industrial Wood Consumption Projections 2000-2040 ('000 cub. m.)

| Year | | Rural Provinces Per Capita | Total | Urban Provinces Per Capita | Total | Total Consumption |
|---|---|---|---|---|---|---|
| 1982 | | 0.06 | 47,148 | 0.06 | 11,081 | 58,228 |
| 2000 | Low | 0.10 | 110,810 | 0.10 | 26,042 | 136,852 |
| | High | 0.20 | 221,620 | 0.20 | 52,084 | 273,704 |
| 2025 | Low | 0.16 | 235,137 | 0.20 | 55,977 | 291,113 |
| | Medium | 0.30 | 440,882 | 0.30 | 104,956 | 545,838 |
| | High | 0.50 | 734,803 | 0.50 | 174,927 | 909,730 |
| 2040 | Low | 0.20 | 312,048 | 0.20 | 75,705 | 387,753 |
| | Medium | 0.40 | 624,096 | 0.40 | 151,410 | 775,505 |
| | High | 0.60 | 936,144 | 0.60 | 227,114 | 1,163,258 |

S.D. Richardson, "The Cotchell Report" 1986

TABLE 14: People's Republic of China: Production & Demand Projections of Industrial Wood by Province ('000,000 cub. m.)

| Province | Ind. Wood Production 1984 | Projected Consumption 2025 "Low growth" | PotentialDomestic Supply Balance |
|---|---|---|---|
| Hebei | 0.1 | 15.3 | -15.2 |
| Shanxi | 0.1 | 7.3 | -7.2 |
| Nei Monggol | 4.8 | 5.6 | -0.9 |
| Liaoning | 0.7 | 10.5 | -9.8 |
| Jilin | 6.3 | 6.6 | -0.3 |
| Heilongjiang | 16.7 | 9.6 | 7.1 |
| Jiangsu | 0.4 | 17.5 | -17.2 |
| Zhejiang | 2.0 | 11.4 | -9.4 |
| Anhui | 0.5 | 14.4 | -13.9 |
| Fujian | 7.3 | 7.5 | -0.2 |
| Jiangxi | 3.7 | 9.6 | -5.9 |
| Shangdong | 0.1 | 21.5 | -21.4 |
| Henan | 0.1 | 21.5 | -21.4 |
| Hubei | 0.7 | 13.8 | -13.1 |
| Hunan | 3.8 | 15.6 | -11.9 |
| Guangdong | 4.5 | 17.2 | -12.6 |
| Guangxi | 2.0 | 10.5 | -8.5 |
| Sichuan | 4.6 | 28.8 | -24.3 |
| Guizhou | 0.8 | 8.3 | -7.4 |
| Yunnan | 3.1 | 9.4 | -6.4 |
| Xizang | 0.2 | 0.5 | -0.3 |
| Shaanxi | 0.5 | 8.4 | -7.9 |
| Gansu | 0.5 | 5.7 | -5.1 |
| Qinghai | 0.1 | 1.1 | -1.1 |
| Ningxia | 0.0 | 1.1 | -1.1 |
| Xinjiang | 0.5 | 3.8 | -3.4 |
| Beijing | | 2.7 | -2.7 |
| Tianjin | | 2.3 | -2.3 |
| Shanghai | | 3.5 | -3.5 |
| Total PRC | 64.1 | 291.1 | -227.0 |

Derived from S.D. Richardson,
"The Cotchell Report" 1986 Table 15 & Appendix III

## II. TRADE IN FOREST PRODUCTS

### Background to Forest Products Trade

For most of it's history since the founding of the People's Republic of China in 1949, China has been a relatively closed economy in terms of external trade. Trade was largely based on political decisions, both with respect to commodities traded and trade partners. Central policies were formulated, based on strategic needs, prioritization of scarce foreign earnings, political considerations of international relationships, and other considerations largely external to normal economic markets and comparative advantage. These considerations have clearly impacted China's overall trade position with regard to forest products, and the bilateral relationship with the former Soviet Union and more recently the Russian Republic.

Lovett and Goetzl (1988) summarized the general considerations influencing China's trade policies for forest products in terms of four principles:

1. To make up for the domestic shortage of wood,
2. To obtain large size and high quality wood,
3. To balance the available species, and
4. To supply improved exporting enterprises.

Importation of timber has been traditionally regulated by the State, under the State Planning Commission. Various regulations have governed the trade in timber with regard to import quotas and/or necessary licenses, use of foreign exchange, duties and tariff rates, preferential treatment of State enterprises, barter trade, and almost all other aspects of trade relations. Due to foreign currency considerations, and a relatively low priority placed on timber and wood products, barter arrangements have influenced China's decisions regarding imports. When cash payment is required, China has been a selective buyer, choosing to purchase primarily logs for processing within China and avoiding payment of the quality premiums associated with other Asian markets (primarily Japan).

At present, there is still a great deal of uncertainty regarding market accessibility for importing timber, including requirements for import licensing, the role of trading companies, and related regulatory issues. China announced on May 16, 1995 that all import quotas and licensing requirements on logs, lumber (excluding Paulownia), veneers and plywood would be removed effective June 30, 1995 (FAS, 1995). However, trading was to be restricted to trade organizations designated by the State with the expectation that there would be approximately 2 such designations per province. A total of about 70 such organizations nationally were expected. These organizations would have authority to exercise some control over setting prices and to control the trade, distribution and consumption of imported timber. Joint ventures engaged in forest products activities, including potential re-export of value added products, would apparently be exempted for such controls. Other organizations, including MOFTEC and the Ministry of Railroads, would be permitted to import and handle timber products.

During field investigations for the present analysis, there was evident confusion and conflicting interpretations of the status of this policy change, the mechanism for securing import authority, and the issues of quotas or limitations on import volumes. China maintains separate regulations regarding import under barter trade agreements, 'special' considerations for Centrally Planned Commodities[5] and regulations for Special Economic Zones. Preferential policies for these special zones are currently under review and the subject of debate, especially since the 9th Plan seeks to more equally balance growth between the coastal regions and the interior provinces (China Daily, Oct. 24, 1995).

Although China exports small volumes of forest products, it is traditionally a large net importer in almost all categories of forest products. China's imports by major product category are summarized in Tables 15 (Volume) and 16 (Value) for the years 1986-91. Imports expanded steadily through 1988, when China imposed strict economic controls to cool the economy and inflation. Such policies hit construction activities severely, including the linked demand for forest products.

Conifer sawlogs have traditionally been the leading import item, reaching a peak of 9.476 million cubic meters in 1988, thereafter declining to 2.491 million cubic meters in 1991. Non-conifer sawlogs and veneer logs reached 1.198 million cubic meters in 1988, and also subsequently declined, to 1.605 million cubic meters in 1991.

Trade in sawnwood, while important, has been much smaller. Imports of conifer lumber reached a maximum of 278.8 thousand cubic meters in 1988 and 214.8 thousand cubic meters in 1991. As with logs, non-conifer lumber imports have been lower, reaching 181.6 thousand cubic meters in 1988. Imports of non-conifer lumber slumped after 1988, regaining a volume of 139.1 thousand cubic meters in 1991.

Trade in combined pulp and waste paper has been substantial, reaching 1,178 million kg in 1988, then declining but increasing again to over 1,291 million kg in 1991. The major component of this trade was waste paper and paperboard, followed by sulphate wood pulp (in terms of volume).

Import of other solid wood products has been quite limited with the exception of plywood. Although not differentiated in the China customs statistics, the largest share of plywood imported has been tropical hardwood veneers and panels. Panel imports were 950.1 million kg in 1991, over twice the level of 1986.

[5] At the end of 1995, it remains unclear whether timber will remain subject to such regulations.

TABLE 15: PRC TOTAL WOOD PRODUCTS IMPORTS BY VOLUME 1986-91

| Code | Commodity | Volume Units | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|---|
| I | PRIMARY PRODUCTS | | | | | | | |
| 2 | Crude materials | | | | | | | |
| 24 | Cork and Wood | | | | | | | |
| 2440 | Cork, natural, raw, waste | kg | 596,357 | 459,655 | 475,247 | 523,749 | 185,435 | 342,356 |
| 2450 | Fuel Wood nes, Charcoal | kg | 1,664,495 | 2,923,500 | 7,271,702 | 8,864,345 | 5,791,045 | 18,421,535 |
| 2460 | Pulpwood, Chips, Wastewood | kg | 432,416,046 | 463,144,749 | 445,956,924 | 283,941,774 | 138,627,491 | 138,561,521 |
| 2471 | Saw-, Veneer-Logs, Conifer | cum | 6,891,450 | 5,683,462 | 9,476,176 | 5,647,149 | 3,473,455 | 2,491,061 |
| 2472 | Saw-, Veneer-Logs, Non-Conifer | cum | 424,264 | 876,494 | 1,198,457 | 405,319 | 719,035 | 1,605,447 |
| 2479 | Pitprops, poles, piling, etc | kg | 1,395,557 | 3,527,986 | 7,191,715 | 450,186 | 1,049,857 | 940,140 |
| 2481 | Railway Sleepers, Ties | number | 214,183 | 421,493 | 340,371 | 151,444 | 303,840 | 133,443 |
| 2482 | Lumber, Shaped - Conifer | cum | 62,979 | 84,237 | 278,854 | 110,848 | 127,158 | 214,782 |
| 2483 | Lumber, Shaped - Non-Conifer | cum | 102,694 | 80,084 | 181,651 | 46,296 | 194,989 | 139,144 |
| 25 | Pulp and waste paper | kg | 737,132,377 | 979,145,284 | 1,178,630,964 | 924,471,834 | 764,970,631 | 1,291,077,497 |
| 2511 | Waste Paper, Paperboard, etc | kg | 213,776,820 | 295,721,794 | 383,514,194 | 448,423,503 | 423,219,897 | 619,016,431 |
| 2512 | Mechanical Wood Pulp | kg | 33,073,829 | 26,007,014 | 41,327,027 | 24,383,766 | 6,390,951 | 40,567,574 |
| 2516 | Chem Wood Pulp, Dissolving | kg | 31,826,407 | 24,357,121 | 20,985,336 | 30,446,127 | 20,669,995 | 32,721,803 |
| 2517 | Soda, Sulphate Wood Pulp | kg | 398,887,824 | 499,624,725 | 598,517,952 | 293,711,609 | 271,240,408 | 464,947,633 |
| 2518 | Sulphite Wood Pulp | kg | 51,310,742 | 114,118,463 | 126,005,802 | 112,779,750 | 35,445,165 | 118,815,142 |
| 2519 | Other Cellulosic Pulps | kg | 8,256,755 | 19,316,167 | 8,280,653 | 14,727,079 | 8,004,215 | 15,008,914 |
| II | MANUFACTURES | | | | | | | |
| 6 | Manufactured goods classified by materials | | | | | | | |
| 63 | Cork and Wood manufactures (excluding furniture) | | | | | | | |
| 6301 | Misc & Trifling Goods of 63 | - | | | | | | |
| 6330 | Cork Manufactures | kg | 89,304 | 46,992 | - | - | | |
| 6341 | Veneer Sheets etc | kg | 681,651 | 22,724,484 | 18,468,764 | 10,128,690 | 4,348,439 | 20,997,672 |
| 6342 | Plywood of Wood Sheets | kg | 404,239,015 | 913,057,656 | 878,096,526 | 696,551,844 | 894,243,963 | 950,142,351 |
| 6343 | Improved, Reconstituted Wood | kg | 680,604 | 1,171,658 | 1,650,998 | 2,097,762 | 3,778,923 | 5,552,583 |
| 6344 | Wood-Based Panels nes | kg | 2,173,404 | 2,841,484 | 1,395,845 | 2,121,890 | 3,418,437 | 8,995,523 |
| 6349 | Wood Simply Shaped | kg | 5,390,908 | 9,111,457 | 14,045,101 | 7,062,169 | 4,098,732 | 8,163,648 |
| 6351 | Boxes, Cases, Crates, etc | - | | | | | | |
| 6352 | Cooperage Prod, inc staves | - | | | | | | |
| 6353 | Builders Woodwork, Prefabs | - | | | | | | |
| 6354 | Wood Mfrs Domestic etc | - | | | | | | |
| 6359 | Other Wood Manufactures | - | | | | | | |
| 64 | Paper, paperboard and articles of paper pulp, of paper or of paperboard | | | | | | | |
| 6411 | Newsprint | kg | 110,545,214 | 141,880,624 | 102,083,787 | 101,408,707 | 16,221,178 | 21,095,340 |
| 6412 | Printing, Writing Papers nes | kg | 89,658,589 | 78,954,847 | 81,403,223 | 71,768,477 | 129,404,776 | 223,273,522 |
| 6413 | Kraft Paper, Paperboard | kg | 344,053,946 | 609,951,828 | 298,358,852 | 310,392,305 | 340,375,314 | 523,975,757 |
| 6415 | Paper, Paperboard nes | kg | 256,823,608 | 274,298,012 | 226,880,375 | 267,807,022 | 380,240,560 | 473,359,700 |
| 6416 | Fibre Building Board | kg | 4,011,305 | 110,367 | 1,121,485 | 4,520,597 | 10,174,646 | 13,565,209 |
| 6417 | Corrugated Paper etc, blk | kg | 277,983,694 | 216,766,501 | 125,829,550 | 94,147,141 | 65,482,952 | 55,311,308 |
| 6418 | Coated etc Paper nes, blk | kg | 11,438,453 | 10,975,126 | 12,393,913 | 8,679,138 | 15,665,777 | 22,459,353 |
| 6419 | Converted Paper etc, nes | kg | 4,764,990 | 3,063,922 | 3,588,989 | 3,480,602 | 4,430,921 | 6,070,967 |
| 6421 | Paper, etc Containers | - | | | | | | |
| 6422 | Correspondence Stationry | - | | | | | | |
| 6423 | Exercise Books, etc | - | | | | | | |
| 6424 | Paper etc cut to Size, nes | - | | | | | | |
| 6428 | Paper etc Articles nes | - | | | | | | |

Sources: PRC, China Customs Statistics: Summary Surveys of China's Customs Statistics 1986-89; Yearbook of Chinese Customs Statistics 1990-91.

TABLE 16: PRC TOTAL WOOD PRODUCTS IMPORTS BY VALUE 1986-91 ($US)

| Code | Commodity | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|
| I | PRIMARY PRODUCTS | | | | | | |
| 2 | Crude materials | 3,143,425,000 | 3,320,362,000 | 5,089,599,000 | 4,834,600,000 | | |
| 24 | Cork and Wood | 665,997,000 | 582,011,000 | 1,155,395,000 | 635,806,000 | 508,531,000 | 509,500,000 |
| 2440 | Cork, natural, raw, waste | 1,336,780 | 1,146,524 | 1,310,254 | 1,094,682 | 1,109,000 | 2,107,000 |
| 2450 | Fuel Wood nes, Charcoal | 25,046 | 46,759 | 263,172 | 282,023 | 235,000 | 574,000 |
| 2460 | Pulpwood, Chips, Wastewood | 13,374,280 | 12,664,737 | 11,593,203 | 10,854,016 | 5,367,000 | 4,057,000 |
| 2471 | Saw-, Veneer-Logs, Conifer | 568,694,560 | 425,857,737 | 915,550,385 | 537,981,149 | 366,677,000 | 266,769,000 |
| 2472 | Saw-, Veneer-Logs, Non-Conifer | 55,056,580 | 111,543,310 | 159,551,004 | 63,876,531 | 99,610,000 | 203,264,000 |
| 2479 | Pitprops, poles, piling, etc | 543,323 | 270,626 | 745,821 | 43,253 | 68,000 | 189,000 |
| 2481 | Railway Sleepers, Ties | 4,279,765 | 7,948,621 | 10,298,728 | 832,085 | 3,750,000 | 847,000 |
| 2482 | Lumber, Shaped - Conifer | 9,242,545 | 11,100,890 | 29,542,281 | 11,192,122 | 12,796,000 | 9,038,000 |
| 2483 | Lumber, Shaped - Non-Conifer | 13,444,044 | 11,432,045 | 26,540,262 | 9,649,974 | 18,919,000 | 22,655,000 |
| 25 | Pulp and waste paper | 221,220,000 | 403,636,000 | 580,630,000 | 424,475,000 | 286,533,000 | 453,231,000 |
| 2511 | Waste Paper, Paperboard, etc | 19,011,711 | 33,447,008 | 50,679,247 | 57,466,091 | 50,249,000 | 79,098,000 |
| 2512 | Mechanical Wood Pulp | 10,091,775 | 10,055,088 | 18,226,377 | 11,482,542 | 2,903,000 | 18,708,000 |
| 2516 | Chem Wood Pulp, Dissolving | 14,147,810 | 13,332,390 | 14,560,850 | 26,445,479 | 15,914,000 | 21,999,000 |
| 2517 | Soda, Sulphate Wood Pulp | 153,519,182 | 272,734,343 | 405,345,643 | 228,839,155 | 188,818,000 | 259,172,000 |
| 2518 | Sulphite Wood Pulp | 21,744,407 | 64,338,470 | 86,031,750 | 89,832,379 | 22,546,000 | 64,705,000 |
| 2519 | Other Cellulosic Pulps | 2,704,976 | 9,728,362 | 5,786,510 | 10,409,748 | 6,103,000 | 9,549,000 |
| II | MANUFACTURES | | | | | | |
| 6 | Manufactured goods classified by materials | 11,191,942,000 | 9,729,645,000 | 10,409,712,000 | 12,335,262,000 | | |
| 63 | Cork and Wood manufactures (excluding furniture) | 202,700,000 | 544,309,000 | 618,426,000 | 466,921,000 | 564,190,000 | 624,832,000 |
| 6301 | Misc & Trifling Goods of 63 | | 121,570 | 321,937 | 123,632 | 312,000 | |
| 6330 | Cork Manufactures | 477,846 | 571,703 | 877,439 | 1,000,102 | 1,843,000 | 1,315,000 |
| 6341 | Veneer Sheets etc | 1,494,091 | 11,679,534 | 11,250,005 | 6,578,029 | 2,782,000 | 12,293,000 |
| 6342 | Plywood of Wood Sheets | 175,928,837 | 505,781,950 | 572,306,326 | 420,488,850 | 524,750,000 | 560,993,000 |
| 6343 | Improved, Reconstituted Wood | 290,552 | 612,422 | 1,187,359 | 1,248,019 | 2,812,000 | 2,562,000 |
| 6344 | Wood-Based Panels nes | 1,488,512 | 2,589,310 | 1,236,942 | 1,298,692 | 3,368,000 | 7,128,000 |
| 6349 | Wood Simply Shaped | 2,828,706 | 3,707,531 | 5,635,760 | 3,653,466 | 2,960,000 | 5,807,000 |
| 6351 | Boxes, Cases, Crates, etc | 155,037 | 158,753 | 208,287 | 199,464 | 105,000 | 1,078,000 |
| 6352 | Cooperage Prod, inc staves | 738,954 | 149,279 | 322,962 | 58,636 | 30,000 | 185,000 |
| 6353 | Builders Woodwork, Prefabs | 16,539,313 | 14,580,072 | 20,281,784 | 24,937,611 | 15,555,000 | 21,410,000 |
| 6354 | Wood Mfrs Domestic etc | 307,080 | 987,568 | 952,045 | 1,500,961 | 1,724,000 | 2,315,000 |
| 6359 | Other Wood Manufactures | 2,450,846 | 3,369,265 | 3,844,796 | 5,833,929 | 7,949,000 | 9,672,000 |
| 64 | Paper, paperboard and articles of paper pulp | 554,180,000 | 727,123,000 | 609,573,000 | 634,307,000 | 744,781,000 | 968,474,000 |
| 6411 | Newsprint | 39,745,105 | 67,854,294 | 67,844,838 | 58,986,784 | 8,694,000 | 11,745,000 |
| 6412 | Printing, Wnting Papers nes | 74,341,212 | 70,281,790 | 81,632,618 | 81,996,261 | 134,288,000 | 197,867,000 |
| 6413 | Kraft Paper, Paperboard | 124,651,865 | 268,136,224 | 144,572,702 | 150,861,121 | 157,776,000 | 233,596,000 |
| 6415 | Paper, Paperboard nes | 152,485,081 | 148,262,642 | 137,367,627 | 158,373,574 | 211,205,000 | 266,706,000 |
| 6416 | Fibre Building Board | 2,242,351 | 69,476 | 842,305 | 3,535,585 | 10,780,000 | 11,204,000 |
| 6417 | Corrugated Paper etc, blk | 94,805,351 | 80,691,229 | 50,405,832 | 37,596,878 | 23,748,000 | 21,259,000 |
| 6418 | Coated etc Paper nes, blk | 23,408,495 | 26,597,714 | 21,964,152 | 23,413,998 | 33,292,000 | 48,587,000 |
| 6419 | Converted Paper etc, nes | 10,611,843 | 10,871,244 | 13,340,933 | 13,943,448 | 12,374,000 | 13,682,000 |
| 6421 | Paper, etc Containers | 9,163,055 | 19,195,712 | 35,780,780 | 43,938,011 | 51,432,000 | 60,658,000 |
| 6422 | Correspondence Stationry | 924,006 | 635,802 | 890,155 | 1,227,785 | 2,038,000 | 2,524,000 |
| 6423 | Exercise Books, etc | 1,278,850 | 934,081 | 966,684 | 1,444,885 | 2,174,000 | 2,954,000 |
| 6424 | Paper etc cut to Size, nes | 17,271,572 | 29,329,304 | 45,794,901 | 52,722,677 | 84,693,000 | 83,219,000 |
| 6428 | Paper etc Articles nes | 3,251,710 | 4,263,029 | 8,269,137 | 6,266,108 | 12,287,000 | 14,473,000 |

Sources: PRC, China Customs Statistics: Summary Surveys of China's Customs Statistics 1986-89; Yearbook of Chinese Customs Statistics 1990-91.

China has also imported a significant amount of paper and paperboard products. By volume, the greatest import has been for Kraft paper and paperboard other paper and paperboard, and printing and writing papers. Kraft paper imports in 1991 were 523.9 million kg, with 473.4 million kg of other paper and paperboard. Both categories have increased over the 1986-91 period, although kraft paper imports peaked at 610 million kg in 1987.

By value, China's main wood imports were of paper and paperboard in 1991, reaching $968.5 million. Cork and wood manufactured products totaled $624.8 million, lead by plywood sheets at $561 million. Cork and wood raw materials (including lumber) totaled $509.5 million. Conifer logs accounted for $266.8 million, while non-conifer logs totaled $203.3 million. Non-conifer lumber imports were $22.7 million, while conifer lumber imports were $9.0 million. In all cases, these values for 1991 were below the peaks reached in 1988 prior to imposition of economic measures to control the expanding China economy.

In 1992, China adopted the international Harmonized System (HS) for trade classification, making direct comparison with earlier years difficult. Forest products trade for the period 1992-1994 under the HS system is summarized in Table 17 by Volume. Aggregate totals are also shown for groups 44.03 (Wood in the Rough), 44.07 (Sawnwood) and 44.12 (Plywood). Compete information for trade in 1995 was unavailable at the time of preparation of this report.

Total imports of "wood in the rough" declined over the 1992-95 period, from 4.7 million cubic meters to 2.58 million cubic meters. By volume, almost all of such imports have been conifer and non-conifer logs. Conifer log imports declined from 2.22 million cubic meters in 1992 to 1.2 million cubic meters in 1994. Non-conifer logs also declined, from 2.38 million cubic meters to 2.0 million cubic meters. Almost all the non-conifer imports were for tropical timbers rather than temperate hardwoods.

Sawnwood imports reached 1.2 million cubic meters in 1993 before dropping to only 851 thousand cubic meters in 1995. Conifer sawnwood imports dropped sharply, from 370 thousand cubic meters in 1992 to only 198.5 thousand cubic meters in 1994. Tropical, non-conifer sawnwood imports, on the other hand, increased, from only 85 thousand cubic meters in 1992 to 224.7 thousand cubic meters in 1993 before declining to 138 thousand cubic meters in 1994. Plywood imports also declined, from 2.5 million cubic meters (1992) to 1.38 million cubic meters (1995). Veneer, particleboard, and fiberboard imports, however, all increased significantly. Likewise, builder's joinery (44.18) increased significantly, reaching 344 million kg in 1994.

Pulp imports reached 1,520 million kg in 1994, with over one-third comprised of soda or sulphate pulp. Sulphite pulp was the second leading pulp commodity, closely followed by dissolving pulps and mechanical wood pulps. Waste-scrap papers, however, dominated the pulp category, exceeding 711 thousand kg in 1994.

TABLE 17: PRC: Total Forest Products Imports by Volume 1992-95

| CODE | COMMODITY | 1992 | 1993 | 1994 | 1995 |
|---|---|---|---|---|---|
| 44 | WOOD PRODUCTS | | - | - | |
| 44.01 | FUELWOOD (Kg) | 122,577,698 | 79,967,500 | 66,645,750 | |
| 44.02 | WOOD CHARCOAL (Kg) | 2,897,807 | 582,078 | 147,673 | |
| 44.03 | WOOD IN ROUGH (CUM) | 4,659,942 | 3,458,815 | 3,334,577 | 2,580,000 |
| 4403.1 | TREATED WOOD | 53,607 | 60,379 | 110,682 | |
| 4403.2 | CONIFER | 2,224,519 | 1,512,135 | 1,191,632 | |
| 4403.3 | NON-CONIFER | 2,381,816 | 1,886,301 | 2,032,263 | |
| 4403.31 | MERANTI | 224,969 | 108,084 | 68,341 | |
| 4403.32 | LAUAN | 268,006 | 105,343 | 93,052 | |
| 4403.33 | TEAK & OTHER | | | | |
| 4403.33 | TEAK | 27,333 | 47,336 | 24,149 | |
| 4403.33 | OTHER | 53,318 | 6,682 | 24,226 | |
| 4403.34 | OKOUME ETC (TROP) | 225 | 68,692 | 213,137 | |
| 4403.35 | TIAMA ETC (TROP) | 128 | 2,752 | 9,490 | |
| 4403.91 | OAK | 6,507 | 1,762 | 1,332 | |
| 4403.92 | BEECH | 56 | 1,257 | 630 | |
| 4403.99 | OTHER NON-CONIFER | 1,801,274 | 1,544,393 | 1,597,906 | |
| 4403.99 | PHOEBE | 60 | 914 | 2,685 | |
| 4403.99 | CAMPHOR | 11,260 | 3,147 | 3,317 | |
| 4403.99 | ROSEWOOD | 127,384 | 58,965 | 56,524 | |
| 4403.99 | KIRI | 5,544 | 8 | 7 | |
| 4403.99 | OTHER | 1,667,026 | 1,481,350 | 1,535,373 | |
| 44.07 | SAWNWOOD (CUM) | 924,549 | 1,208,235 | 896,163 | 851,029 |
| 4407.1 | CONIFER | 370,268 | 367,708 | 198,505 | |
| 4407.2 | NON-CONIFER (TROP) | 85,897 | 224,695 | 137,980 | |
| 4407.21 | TEAK & RELATED | | | | |
| 4407.21 | TEAK | 10,956 | 16,452 | 14,986 | |
| 4407.21 | OTHER | 71,639 | 198,792 | 97,854 | |
| 4407.22 | OKOUME ETC | 2,222 | 8,616 | 21,533 | |
| 4407.23 | BABOEN, MAHOGANY ETC | 1,080 | 835 | 3,607 | |
| 4407.9 | NON-CONIFER (TEMPERATE) | 468,384 | 615,832 | 559,678 | |
| 4407.91 | OAK | 152 | 2,263 | 1,468 | |
| 4407.92 | BEECH | 2,102 | 3,652 | 546 | |
| 4407.99 | OTHER | | | | |
| 4407.99 | CAMPHOR | 25,801 | 27,692 | 50,967 | |
| 4407.99 | PAULOWNIA | 266 | 1,354 | 3,927 | |
| 4407.99 | OTHER | 440,063 | 580,871 | 502,770 | |
| 44.08 | VENEER (Kg) | 240,920 | 349,979 | 174,615,357 | |
| 44.09 | WOOD - SHAPED (Kg) | 14,462,038 | 13,869,505 | 14,854,069 | |
| 44.10 | PARTICLEBOARD (Kg) | 9,150,667 | 55,582,678 | 36,177,303 | |
| 44.11 | FIBERBOARD (Kg) | 56,925,764 | 119,234,160 | 165,852,417 | |
| 44.12 | PLYWOOD (CUM) | 2,517,173 | 2,228,628 | 2,108,870 | 1,380,000 |
| | OTHER' WOOD PRODUCTS (Kg) | | | | |
| 44.13 | DENSIFIED WOOD | 2,061,237 | 2,660,040 | 10,019,632 | |
| 44.14 | WOODEN FRAMES | 202,051 | 536,738 | 831,954 | |
| 44.15 | PACKING CASES & BOXES | 2,323,909 | 1,168,141 | 3,038,364 | |
| 44.16 | CASKS, BARRELS ETC | 220,859 | 225,656 | 280,716 | |
| 44.17 | TOOLS | 1,154,404 | 736,839 | 733,486 | |
| 44.18 | BUILDERS' JOINERY | 15,298,272 | 21,981,011 | 344,099,911 | |
| 44.19 | TABLE/KITCHENWARE | 803,089 | 2,748,858 | 8,125,944 | |
| 44.20 | MARQUETRY/INLAID WOOD | 1,783,942 | - | 548,733 | |
| 44.21 | OTHER | 8,794,743 | 11,879,749 | 13,845,802 | |
| 47 | PULP (Kg) | 1,392,545,078 | 1,120,429,168 | 1,520,763,157 | |
| 47.01 | MECH WOOD PULP | 35,604,620 | 39,339,856 | 57,003,039 | |
| | CHEM WOOD PULP | | | | |
| 47.02 | DISSOLVING | 51,387,707 | 24,327,583 | 65,908,852 | |
| 47.03 | SODA OR SULPHATE | 420,446,178 | 359,480,659 | 558,165,801 | |
| 47.04 | SULPHITE | 65,783,879 | 29,300,135 | 87,940,294 | |
| 47.05 | SEMI-CHEM WOOD PULP | 5,167,622 | 19,193,788 | 19,929,477 | |
| 47.06 | PULP -OTH FIBER MATER | 24,174,334 | 44,716,052 | 20,478,204 | |
| 47.07 | WASTE-SCRAP PAPER | 789,980,738 | 604,071,095 | 711,337,490 | |
| 48 | PAPER & PAPERBOARD (Kg) | 2,874,034,883 | 2,881,520,580 | 3,721,625,964 | |
| 48.01 | NEWSPRINT | 59,666,064 | 117,522,436 | 92,057,607 | |
| 48.02 | UNCOATED WRITING & PRINT | 80,820,968 | 125,842,112 | 168,062,232 | |
| 48.03 | SANITARY PAPERS | 4,664,210 | 4,726,380 | 7,285,798 | |
| 48.04 | UNCOATED KRAFT PAPER & BD | 718,454,776 | 707,743,173 | 882,668,606 | |
| | 'OTHER' PAPER & PAPERBOARD | | | | |
| 48.05 | OTHER UNCOATED PAPER/BD | 778,228,287 | 724,357,970 | 914,237,538 | |
| 48.06 | VEGETABLE PARCHMENT | 3,771,642 | 3,625,579 | 1,735,277 | |
| 48.07 | COMPOSITE PAPER/BOARD | 21,087,004 | 27,439,216 | 34,089,084 | |
| 48.08 | CORRUGATED PAPER/BD | 71,745,074 | 134,403,117 | 182,360,722 | |
| 48.09 | CARBON PAPER ETC | 3,147,924 | 3,988,349 | 2,642,734 | |
| 48.10 | COATED PAPER & PAPERBD | 432,849,998 | 412,667,184 | 739,063,245 | |
| 48.11 | IMPREG PAPER/PAPERBD | 170,021,497 | 131,158,460 | 144,922,123 | |
| 48.12 | FILTER BLOCKS | 291,806 | 640,914 | 807,102 | |
| 48.13 | CIGARETTE PAPER | 14,259,719 | 8,379,628 | 7,146,609 | |
| 48.14 | WALLPAPER ETC | 3,527,441 | 3,333,269 | 4,388,231 | |
| 48.15 | FLOOR COVERINGS | 73,575 | 1,184,085 | 10,031 | |
| 48.16 | OTHER CARBON PAPERS | 5,035,296 | 5,713,252 | 2,951,243 | |
| 48.17 | ENVELOPES, LETTER | 6,209,702 | 6,330,053 | 6,420,468 | |
| 48.18 | TOILET PAPER ETC | 4,407,916 | 5,179,081 | 4,462,721 | |
| 48.19 | CARTONS, BOXES, BAGS | 135,262,959 | 133,590,576 | 169,225,375 | |
| 48.20 | REGISTERS, NOTEBOOKS | 4,127,612 | 5,028,157 | 7,110,981 | |
| 48.21 | LABELS ETC | 217,232,044 | 100,859,638 | 101,833,587 | |
| 48.22 | BOBBINS & SPOOLS | 1,805,465 | 1,179,053 | 2,259,938 | |
| 48.23 | OTHER PAPER & PAPERBD | 137,343,904 | 216,628,899 | 245,884,712 | |

Sources: PRC China Customs Statistics Yearbook (1992-94; China Statistics Monthly Series 76 (Dec. 1995)

Paper and Paperboard imports have also increased in volume, totaling 3,721.6 million kg in 1994. Uncoated kraft paper accounted for 882.7 million kg, while uncoated 'other' paper and paperboard totaled 914.2 million cubic meters. Coated papers and paperboards accounted for the largest share of remaining imports in this group, being 739 million kg in 1994. In contrast to import of logs and lumber, almost all classifications of pulp and paper commodities increased in volume during 1992-94.

Import trends for 1992-95 by value are shown in Table 18. Import of all wood products (HS 44) increased from $1.4 billion in 1992 to $1.63 billion in 1994 before declining slightly to $1.56 billion in 1995. Wood in the Rough (44.03) accounted for $368.4 million, or 23.6 percent of wood imports. In 1994, non-conifer logs accounted for the largest share of wood in the rough imports (73.7 percent) by value. Sawnwood imports were $148.4 million in 1995, with temperate hardwoods accounting for the majority (67.2 percent). Plywood imports reached $816.2 million in 1994 but declined to $556.6 million in 1995.

Pulp imports were $844.5 million in 1995, up significantly from $494.4 million in 1994. Paper and Paperboard import value was also up but more modestly, from $2,046.8 million to $2,321.7 million.

**Trade with the Former Soviet Union/Russian Federation**

Trade in forest products between the People's Republic of China and the former Soviet Union/Russian Republic as had a twisted record. Since it's founding in 1949, trade has ebbed and flowed, primarily in response to political relations and economic necessity. Recent trade between the two nations resumed in 1972, including forest products (Eitemiller, 1987).

Trade in forest products between China-Russia as reported in Chinese customs reports is summarized in Table 19 by volume for the period 1986-91 and in Table 20 for 1992-94. Table 19 is classified by the former Chinese customs codes, while Table 20 utilizes the international Harmonized System (HS) for trade classification.

Trade as of 1986 consisted of conifer sawlogs (2.872 million cubic meters), a small volume (14 thousand cubic meters) of non-conifer sawlogs, and a moderate volume of pulpwood, chips and wastewood materials (421 million kg). Trade expanded slightly in 1987, to include 225 thousand cubic meters of pitprops and poles (but no non-conifer sawlogs), and the introduction of trade in pulp and waste paper totaling 8.2 million kg of sulphate wood pulp. Trade further expanded in 1989 to include fuelwood and charcoal, waste paper, and small volumes of sulphite and other cellulosic pulps. Trade also developed in kraft paper other paper and paperboard products (697.5 thousand kg) and other coated papers (509.2 thousand kg). This was the year of peak China trade in forest products, prior to the era of economic restraints and restrictions which were imposed in late 1988 to slow the economy and inflation.

TABLE 18: PRC - Total Forest Products Imports by Value 1992-95

| CODE | COMMODITY ($US1000) | 1992 | 1993 | 1994 | 1995 |
|---|---|---|---|---|---|
| 44 | WOOD PRODUCTS | 1,399,656 | 1,582,728 | 1,629,797 | 1,563,737 |
| 44.01 | FUELWOOD | 11,348 | 5,037 | 2,620 | |
| 44.02 | WOOD CHARCOAL | 736 | 197 | 79 | |
| 44.03 | WOOD IN ROUGH | 495,070 | 459,041 | 430,371 | 368,372 |
| 4403.1 | TREATED WOOD | 5,929 | 8,938 | 15,969 | |
| 4403.2 | CONIFER | 193,292 | 166,240 | 97,266 | |
| 4403.3 | NON-CONIFER | 295,849 | 283,864 | 317,137 | |
| 4403.31 | MERANTI | 28,571 | 17,867 | 12,001 | |
| 4403.32 | LAUAN | 33,172 | 12,257 | 11,626 | |
| 4403.33 | TEAK & OTHER | | | | |
| 4403.3 | TEAK | 9,517 | 18,147 | 8,278 | |
| 4403.3 | OTHER | 5,337 | 890 | 2,945 | |
| 4403.34 | OKOUME ETC (TROP) | 166 | 13,938 | 46,186 | |
| 4403.35 | TIAMA ETC (TROP) | 8 | 690 | 2,075 | |
| 4403.91 | OAK | 869 | 949 | 764 | |
| 4403.92 | BEECH | 22 | 315 | 311 | |
| 4403.99 | OTHER NON-CONIFER | 218,187 | 218,811 | 232,951 | |
| 4403.9 | PHOEBE | 12 | 176 | 253 | |
| 4403.9 | CAMPHOR | 1,472 | 706 | 965 | |
| 4403.9 | ROSEWOOD | 30,767 | 15,355 | 17,578 | |
| 4403.9 | KIRI | 405 | 2 | 1 | |
| 4403.9 | OTHER | 185,531 | 202,572 | 214,154 | |
| 44.07 | SAWNWOOD | 90,898 | 151,660 | 143,246 | 148,373 |
| 4407.1 | CONIFER | 17,876 | 28,980 | 18,615 | |
| 4407.2 | NON-CONIFER (TROP) | 13,139 | 33,725 | 28,334 | |
| 4407.21 | TEAK & RELATED | | | | |
| 4407.21 | TEAK | 2,849 | 5,441 | 5,560 | |
| 4407.21 | OTHER | 9,017 | 25,508 | 16,380 | |
| 4407.22 | OKOUME ETC | 830 | 2,413 | 5,125 | |
| 4407.23 | BABOEN, MAHOGANY ETC | 443 | 363 | 1,269 | |
| 4407.9 | NON-CONIFER (TEMPERATE) | 59,883 | 88,955 | 96,296 | |
| 4407.91 | OAK | 51 | 455 | 235 | |
| 4407.92 | BEECH | 565 | 461 | 239 | |
| 4407.99 | OTHER | | | | |
| 4407.9 | CAMPHOR | 6,693 | 8,306 | 12,523 | |
| 4407.9 | PAULOWNIA | 84 | 215 | 559 | |
| 4407.9 | OTHER | 52,490 | 79,518 | 82,740 | |
| 44.08 | VENEER | 55,463 | 75,401 | 67,677 | |
| 44.09 | WOOD - SHAPED | 13,680 | 13,958 | 14,283 | |
| 44.10 | PARTICLEBOARD | 3,760 | 13,345 | 9,777 | |
| 44.11 | FIBERBOARD | 24,885 | 42,033 | 54,046 | |
| 44.12 | PLYWOOD | 660,511 | 762,163 | 816,257 | 556,645 |
| | OTHER' WOOD PRODUCTS | | | | |
| 44.13 | DENSIFIED WOOD | 1,811 | 3,485 | 10,298 | |
| 44.14 | WOODEN FRAMES | 1,830 | 1,542 | 1,078 | |
| 44.15 | PACKING CASES & BOXES | 2,152 | 1,789 | 2,614 | |
| 44.16 | CASKS, BARRELS ETC | 648 | 366 | 292 | |
| 44.17 | TOOLS | 3,230 | 1,785 | 1,911 | |
| 44.18 | BUILDERS' JOINERY | 17,531 | 26,417 | 34,431 | |
| 44.19 | TABLE/KITCHENWARE | 1,212 | 2,495 | 9,180 | |
| 44.20 | MARQUETRY/INLAID WOOD | 2,628 | 1,743 | 1,516 | |
| 44.21 | OTHER | 12,263 | 12,503 | 17,626 | |
| 47 | PULP | 308,218 | 294,053 | 494,431 | 844,521 |
| 47.01 | MECH WOOD PULP | 16,730 | 16,437 | 23,834 | |
| | CHEM WOOD PULP | | | | |
| 47.02 | DISSOLVING | 28,764 | 11,828 | 42,706 | |
| 47.03 | SODA OR SULPHATE | 212,709 | 152,220 | 270,753 | |
| 47.04 | SULPHITE | 33,385 | 14,250 | 46,242 | |
| 47.05 | SEMI-CHEM WOOD PULP | 3,338 | 6,289 | 8,423 | |
| 47.06 | PULP -OTH FIBER MATER | 13,292 | 18,475 | 8,914 | |
| 47.07 | WASTE-SCRAP PAPER | 105,250 | 74,756 | 93,559 | |
| 48 | PAPER & PAPERBOARD | 1,652,651 | 1,620,395 | 2,046,847 | 2,321,679 |
| 48.01 | NEWSPRINT | 26,843 | 44,616 | 37,828 | |
| 48.02 | UNCOATED WRITING & PRINT | 54,631 | 76,097 | 89,687 | |
| 48.03 | SANITARY PAPERS | 4,763 | 5,069 | 6,210 | |
| 48.04 | UNCOATED KRAFT PAPER & BD | 310,042 | 290,346 | 349,455 | 342,119 |
| | 'OTHER' PAPER & PAPERBOARD | | | | |
| 48.05 | OTHER UNCOATED PAPER/BD | 326,668 | 296,343 | 365,640 | |
| 48.06 | VEGETABLE PARCHMENT | 7,349 | 3,954 | 3,117 | |
| 48.07 | COMPOSITE PAPER/BOARD | 19,136 | 25,281 | 29,725 | |
| 48.08 | CORRUGATED PAPER/BD | 25,964 | 46,313 | 62,149 | |
| 48.09 | CARBON PAPER ETC | 4,686 | 4,788 | 3,637 | |
| 48.10 | COATED PAPER & PAPERBD | 293,217 | 251,570 | 459,057 | |
| 48.11 | IMPREG PAPER/PAPERBD | 145,452 | 123,835 | 130,009 | |
| 48.12 | FILTER BLOCKS | 1,228 | 2,113 | 1,417 | |
| 48.13 | CIGARETTE PAPER | 19,389 | 11,815 | 9,772 | |
| 48.14 | WALLPAPER ETC | 8,397 | 9,461 | 12,518 | |
| 48.15 | FLOOR COVERINGS | 159 | 511 | 34 | |
| 48.16 | OTHER CARBON PAPERS | 5,799 | 7,139 | 4,941 | |
| 48.17 | ENVELOPES, LETTER | 7,110 | 8,206 | 7,301 | |
| 48.18 | TOILET PAPER ETC | 7,557 | 7,994 | 8,158 | |
| 48.19 | CARTONS, BOXES, BAGS | 125,222 | 127,169 | 146,953 | |
| 48.20 | REGISTERS, NOTEBOOKS | 5,644 | 9,378 | 11,663 | |
| 48.21 | LABELS ETC | 112,248 | 107,532 | 124,551 | |
| 48.22 | BOBBINS & SPOOLS | 2,417 | 2,454 | 3,238 | |
| 48.23 | OTHER PAPER & PAPERBD | 138,730 | 158,608 | 177,788 | |

Sources: PRC China Customs Statistics Yearbook (1992-94; China Statistics Monthly Series 76 (Dec. 1995)

TABLE 19: PRC Wood Products Imports from USSR/Russiaq by Volume 1986-91

| Code | Commodity | Volume Units | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|---|
| I | PRIMARY PRODUCTS | | | | | | | |
| 2 | Crude materials | | | | | | | |
| 24 | Cork and Wood | | | | | | | |
| 2440 | Cork, natural, raw, waste | kg | | | | | | |
| 2450 | Fuel Wood nes, Charcoal | kg | | | 3,374,562 | 4,412,280 | 2,066,950 | 14,522,504 |
| 2460 | Pulpwood, Chips, Wastewood | kg | 421,054,979 | 420,231,103 | 358,874,764 | 201,660,169 | 112,506,052 | 19,312,024 |
| 2471 | Saw-, Veneer-Logs, Conifer | cum | 2,872,786 | 2,400,136 | 2,464,744 | 2,579,929 | 1,320,069 | 247,808 |
| 2472 | Saw-, Veneer-Logs, Non-Conifer | cum | 13,912 | | 6,693 | 10,583 | 2,099 | 4,542 |
| 2479 | Pitprops, poles, piling, etc | kg | | 225,000 | 334,000 | | 54,939 | |
| 2481 | Railway Sleepers, Ties | number | | | | 15,737 | 14,216 | 5,646 |
| 2482 | Lumber, Shaped - Conifer | cum | | | | | | |
| 2483 | Lumber, Shaped - Non-Conifer | cum | | | | | 7 | |
| 25 | Pulp and waste paper | | | 8,190,534 | 9,808,292 | 7,390,011 | 5,571,642 | 3,227,522 |
| 2511 | Waste Paper, Paperboard, etc | kg | | | 360,557 | 447,754 | 231,625 | |
| 2512 | Mechanical Wood Pulp | kg | | | | | | 18,126 |
| 2516 | Chem Wood Pulp, Dissolving | kg | | | | | | |
| 2517 | Soda, Sulphate Wood Pulp | kg | | 8,190,534 | 9,083,144 | 1,761,388 | | 28,503 |
| 2518 | Sulphite Wood Pulp | kg | | | 189,000 | 1,182,977 | 4,589,670 | 1,053,353 |
| 2519 | Other Cellulosic Pulps | kg | | | 175,591 | 3,997,892 | 750,347 | 2,127,540 |
| II | MANUFACTURES | | | | | | | |
| 6 | Manufactured goods classified by materials | | | | | | | |
| 63 | Cork and Wood manufactures (excluding furniture) | | | | | | | |
| 6301 | Misc & Trifling Goods of 63 | - | | | | | | |
| 6330 | Cork Manufactures | - | | | | | | |
| 6341 | Veneer Sheets etc | kg | | | | | | |
| 6342 | Plywood of Wood Sheets | kg | | | | 30,000 | 1,200 | |
| 6343 | Improved, Reconstituted Wood | kg | | | | 264,000 | 33,311 | |
| 6344 | Wood-Based Panels nes | kg | | | | 30,000 | | |
| 6349 | Wood Simply Shaped | kg | | | 6,810 | 30,000 | 99,090 | |
| 6351 | Boxes, Cases, Crates, etc | - | | | | | | |
| 6352 | Cooperage Prod, inc staves | - | | | | | | |
| 6353 | Builders Woodwork, Prefabs | - | | | | | | |
| 6354 | Wood Mfrs Domestic etc | - | | | | | | |
| 6359 | Other Wood Manufactures | - | | | | | | |
| 64 | Paper, paperboard and articles of paper pulp, of paper or of paperboard | | | | | | | |
| 6411 | Newsprint | kg | | | | | | |
| 6412 | Printing, Writing Papers nes | kg | | | 50 | 25,654 | 25,000 | |
| 6413 | Kraft Paper, Paperboard | kg | | | 151,481 | 112,923 | 386,452 | 52,500 |
| 6415 | Paper, Paperboard nes | kg | | | 697,539 | 309,248 | 2,008,963 | 1,132,488 |
| 6416 | Fibre Building Board | kg | | | | 820,000 | | |
| 6417 | Corrugated Paper etc, blk | kg | | | | | 815,407 | 33,862 |
| 6418 | Coated etc Paper nes, blk | kg | | | 509,200 | 669,928 | 1,388,472 | 413,317 |
| 6419 | Converted Paper etc, nes | kg | | | | | | |
| 6421 | Paper, etc Containers | - | | | | | | |
| 6422 | Correspondence Stationry | - | | | | | | |
| 6423 | Exercise Books, etc | - | | | | | | |
| 6424 | Paper etc cut to Size, nes | - | | | | | | |
| 6428 | Paper etc Articles nes | - | | | | | | |

Sources: PRC, China Customs Statistics: Summary Surveys of China's Customs Statistics 1986-89; Yearbook of Chinese Customs Statistics 1990-91.

TABLE 20: PRC - Import of Forest Products from Russia by Volume 1992-94

| CODE | COMMODITY | 1992 | 1993 | 1994 | 1995 |
|---|---|---|---|---|---|
| **44** | **WOOD PRODUCTS** | | | | |
| 44.01 | FUELWOOD (Kg) | 3,688,656 | 168,436 | 131,393 | |
| 44.02 | WOOD CHARCOAL (Kg) | | | | |
| 44.03 | WOOD IN ROUGH (CUM) | 621,615 | 391,881 | 603,123 | |
| 4403.1 | TREATED WOOD | 228 | 159 | 272 | |
| 4403.2 | CONIFER | 548,238 | 335,424 | 504,360 | |
| 4403.3 | NON-CONIFER | 73,149 | 56,298 | 98,491 | |
| 4403.31 | MERANTI | | 65 | | |
| 4403.32 | LAUAN | | 92 | 110 | |
| 4403.33 | TEAK & OTHER | 0 | 0 | 3,233 | |
| 4403.3[illegible] | TEAK | | | | |
| 4403.3[illegible] | OTHER | | | 3,233 | |
| 4403.34 | OKOUME ETC (TROP) | | | | |
| 4403.35 | TIAMA ETC (TROP) | | | | |
| 4403.91 | OAK | | | | |
| 4403.92 | BEECH | | | | |
| 4403.99 | OTHER NON-CONIFER | 73,149 | 56,141 | 95,148 | |
| 4403.9[illegible] | PHOEBE | | | | |
| 4403.9[illegible] | CAMPHOR | | 918 | 1,057 | |
| 4403.9[illegible] | ROSEWOOD | | | | |
| 4403.9[illegible] | KIRI | | | | |
| 4403.9[illegible] | OTHER | | 55,223 | 94,091 | |
| 44.07 | SAWNWOOD (CUM) | 18,457 | 51,627 | 57,524 | |
| 4407.1 | CONIFER | 17,463 | 50,804 | 57,327 | |
| 4407.2 | NON-CONIFER (TROP) | 16 | 144 | 0 | |
| 4407.21 | TEAK & RELATED | 16 | | 0 | |
| 4407.21 | TEAK | | | | |
| 4407.21 | OTHER | | 144 | | |
| 4407.22 | OKOUME ETC | | | | |
| 4407.23 | BABOEN, MAHOGANY ETC | | | | |
| 4407.9 | NON-CONIFER (TEMPERATE) | 978 | 679 | 197 | |
| 4407.91 | OAK | | | | |
| 4407.92 | BEECH | | | | |
| 4407.99 | OTHER | 978 | | | |
| 4407.9[illegible] | CAMPHOR | | 75 | | |
| 4407.9[illegible] | PAULOWNIA | | | | |
| 4407.9[illegible] | OTHER | | 604 | 197 | |
| 44.08 | VENEER (Kg) | 478 | 1,202 | 228,780 | |
| 44.09 | WOOD - SHAPED (Kg) | 14,728 | 19,700 | 41,136 | |
| 44.10 | PARTICLEBOARD (Kg) | 1,192,532 | 15,944,195 | 8,850,093 | |
| 44.11 | FIBERBOARD (Kg) | 525,379 | 3,867,319 | 2,262,387 | |
| 44.12 | PLYWOOD (CUM) | 953 | 7,398 | 6,957 | |
| | OTHER WOOD PRODUCTS (Kg) | 514,311 | 1,072,794 | 733,607 | |
| 44.13 | DENSIFIED WOOD | 180,000 | 35,000 | | |
| 44.14 | WOODEN FRAMES | | | | |
| 44.15 | PACKING CASES & BOXES | 30,963 | 293,684 | | |
| 44.16 | CASKS, BARRELS ETC | 795 | | | |
| 44.17 | TOOLS | | | | |
| 44.18 | BUILDERS' JOINERY | 95,000 | 198,848 | 73,867 | |
| 44.19 | TABLE/KITCHENWARE | | 491,792 | 112,300 | |
| 44.20 | MARQUETRY/INLAID WOOD | | | | |
| 44.21 | OTHER | 207,553 | 53,470 | 547,440 | |
| 47 | PULP (Kg) | 8,009,151 | 29,486,734 | 31,682,520 | |
| 47.01 | MECH WOOD PULP | 800,418 | 841,671 | 1,000 | |
| | CHEM WOOD PULP | | | | |
| 47.02 | DISSOLVING | 768,700 | 694,661 | 692,032 | |
| 47.03 | SODA OR SULPHATE | 4,599,341 | 13,929,466 | 14,546,912 | |
| 47.04 | SULPHITE | | 3,864,460 | 4,995,743 | |
| 47.05 | SEMI-CHEM WOOD PULP | | | | |
| 47.06 | PULP -OTH FIBER MATER | 988,492 | 1,300,163 | 6,916,718 | |
| 47.07 | WASTE-SCRAP PAPER | 852,200 | 8,856,313 | 4,530,113 | |
| **48** | **PAPER & PAPERBOARD (Kg)** | 3,590,743 | 47,383,284 | 20,772,059 | |
| 48.01 | NEWSPRINT | | 39,551,135 | 13,056,839 | |
| 48.02 | UNCOATED WRITING & PRINT | 82,000 | | 29,916 | |
| 48.03 | SANITARY PAPERS | 12,000 | | | |
| 48.04 | UNCOATED KRAFT PAPER & BD | 531,655 | 1,852,350 | 4,428,169 | |
| | 'OTHER' PAPER & PAPERBOARD | | | | |
| 48.05 | OTHER UNCOATED PAPER/BD | 3,737 | 2,164,841 | 2,146,719 | |
| 48.06 | VEGETABLE PARCHMENT | | | 89,040 | |
| 48.07 | COMPOSITE PAPER/BOARD | 1,131,880 | 1,654,481 | 180,120 | |
| 48.08 | CORRUGATED PAPER/BD | | 3,880 | 402,441 | |
| 48.09 | CARBON PAPER ETC | | | 100,031 | |
| 48.10 | COATED PAPER & PAPERBD | | | 75,000 | |
| 48.11 | IMPREG PAPER/PAPERBD | 1,379,940 | 1,817,720 | 179,114 | |
| 48.12 | FILTER BLOCKS | | 18 | | |
| 48.13 | CIGARETTE PAPER | | | | |
| 48.14 | WALLPAPER ETC | | 200 | | |
| 48.15 | FLOOR COVERINGS | | | | |
| 48.16 | OTHER CARBON PAPERS | | | | |
| 48.17 | ENVELOPES, LETTER | | | | |
| 48.18 | TOILET PAPER ETC | | 17,460 | | |
| 48.19 | CARTONS, BOXES, BAGS | 2,118 | | 32,973 | |
| 48.20 | REGISTERS, NOTEBOOKS | 250 | 155,700 | 51,697 | |
| 48.21 | LABELS ETC | | | | |
| 48.22 | BOBBINS & SPOOLS | 34,920 | | | |
| 48.23 | OTHER PAPER & PAPERBD | 412,443 | 165,499 | | |

Sources: PRC China Customs Statistics Yearbook (1992-94; China Statistics Monthly Series 76 (Dec. 1995)

Trade in forest products with Russia also declined in 1989, with modest changes in the product composition. Fuelwood imports increased while pulpwood and chip import volume declined by almost 44 percent. Pulp and wastepaper imports also declined, with a small increase in waste papers but a sharp decline in sulfate pulp (almost 80 percent) with a partial offset by increases in sulphite pulp and other cellulosic pulps. Trade in paper and paperboard products also increased, with a decline in paper and paperboard but a large (820 thousand kg) but temporary volume of fiber building boards. Modest volumes of other solid wood products (veneer, plywood, reconstituted wood, and other wood based panels) were reported for 1989 but were temporary items in the import mix.

The composition of trade continued to change in 1990-91, with an increase in fuel wood, a major decline in pulpwood and chips (to 19.3 mill kg) and for conifer sawlogs - to only 247.8 thousand cubic meters, down from the peak of 2.87 million cubic meters in 1986. Pulp imports from Russia also continued to decline, to a total of 3.2 million kg in 1991 in contrast to 9.8 million kg for 1988. Sulphite pulp imports, which had largely displaced sulphate wood pulp, fell to 1.1 million kg in 1991 after surging to almost 4.6 million kg in 1990. Paper and paperboard imports also declined significantly, with 1991 volume of 1.13 million kg comparing to 2.0 million kg the prior year. Coated paper imports declined to 413 thousand kg, the lowest level since this commodity was first reported in 1988.

Trade between China and Russia in the post-reform period 1992-94 is summarized by volume in Table 20. This Table is based on the Harmonized System implemented by China in 1992. Trade in conifer logs recovered in 1992 to 548.2 thousand cubic meters, up from 247 thousand in 1991 but well below the peak of 2.9 million cubic meters achieved in 1986.

Trade in non-conifer sawlogs has increased, reaching 98.5 thousand cubic meters in 1994. Total sawnwood trade has also increased, growing from 18.5 thousand cubic meters in 1992 to 57.5 thousand cubic meters in 1994, essentially all conifer sawnwood. Plywood imports from Russia grew from 953 cubic meters in 1992 to 7.3 thousand cubic meters in 1993 before declining slightly to 7.0 thousand cubic meters in 1994. Trade in both particleboard and fiberboard have both increased significantly, with particleboard volume reaching 15.9 million kg in 1993, with fiberboard volume at 3.9 million kg. Volumes for both products declined in 1994, however, to 8.9 million kg for particleboard and 2.3 million kg for fiberboard.

Import by China of Pulp products (Group 47) from Russia have increased from 8 mill kg in 1992 to 31.7 million kg in 1994, consisting primarily of sulphate pulps. Sulphite pulp, other pulp fiber materials, and waste-scrap papers are also important, although waste-scrap paper volume fell by almost half from 1993 to 1994. Paper and Paperboard import volume (Group 48) first increased sharply from 1992 to 1993, reaching 47.3 million kg, but then fell to 20.8 million kg in 1994. Although many commodities were involved, China reported the first import of newsprint, at 39.6 million kg, in 1993, but with a decline to 13 million kg in 1994. The majority of other paper products peaked in 1993 with declines in 1994 as well.

A summary of China's trade with Russia for 1986-94 by value is provided in Tables 21 (1986-1991) and Table 22 ( (1992-1994). As evident by the discussion of trade volumes, trade declined sharply in value terms following 1988-89 as China embarked on a period of economic controls and the former Soviet Union confronted the political uncertainty and restructuring of 1990-91.[6] Total trade in basic wood products (Group 24) was $21 million in 1991 in comparison with $266.7 million in 1986 and $228.2 million in 1989 just prior to the start of political restructuring and economic reforms in Russia. The majority of this value was generated by the trade in conifer sawlogs which accounted for $17.8 million in 1991, a sharp drop from $252.9 million in 1986 and $217.7 million in 1989. Conifer lumber trade was also down sharply, from $3.2 million in 1990 to only $1.8 million in 1991.

By value, trade in pulp and waste paper (Group 25) also fell, from over $3.6 million in 1988 to $2.1 million in 1991. Trade in manufactured wood products, excluding lumber (Group 63) all but ceased, totaling only $42 thousand in 1991. Finally, trade in paper and paperboard products had fallen to $390 thousand in 1991 from over $1.4 million in 1990.

Corresponding China imports from Russia by value for 1992-94 are summarized in Table 22. Total wood products value (Group 44) peaked at $58.1 million in 1994, declining to $35.1 million in 1995. As with volume of imports, conifer sawlogs comprised the majority of value for timber in the rough, accounting for $40.2 million (82.1 percent) of the total group import value, with non-conifer logs ($8.7 million, 17.9 percent) making up most of the balance. Sawnwood value was considerably less, totaling $5.8 million in 1994, with almost all (99.6 percent) being conifer sawnwood. Plywood ($1.8 million) and particleboard ($1.1 million) comprised the majority of other solid wood imports from Russia. Total pulp imports (Group 47) were $49.9 million in 1995, with paper and paperboard imports (Group 48) at $2.5 million. While pulp imports increased substantially, paper and paperboard imports declined from a total of $12.7 million in 1993. As noted relative to volume of imports, the major contributing factor was the rapid change in newsprint imports which declined by almost $6.8 million from 1993 to 1994.

Table 23 summarizes the relationship between total imports of forest products and imports from Russia by value for 1995. For major Group IX (Wood and Articles of Wood) Russia provided $35.1 million to China, or 2.23 percent of the total import value of $1,576.1 million. For Group 24 (Wood Products) the share was 2.24 percent, with almost all Russian exports to China being in this group. Group 45 (Cork) and Group 46 (Manufactures of straw etc) are relatively minor in terms of China imports and are not significant in terms of imports from Russia.

[6] It should be noted that essentially all trade with the former Soviet Union originated with the Russian Republic

TABLE 21: PRC - Import of Forest Products from Russia by Value

| Code | Commodity | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|
| I | PRIMARY PRODUCTS | | | | | | |
| 2 | Crude materials | | | | | | |
| 24 | Cork and Wood | 266,692,229 | 177,454,938 | 193,356,445 | 228,183,553 | 119,263,000 | 21,029,000 |
| 2440 | Cork, natural, raw, waste | | | | | | |
| 2450 | Fuel Wood nes, Charcoal | | | 51,474 | 80,970 | 37,000 | 289,000 |
| 2460 | Pulpwood, Chips, Wastewood | 12,933,437 | 11,365,598 | 9,176,725 | 7,257,250 | 4,306,000 | 665,000 |
| 2471 | Saw-, Veneer-Logs, Conifer | 252,853,061 | 166,086,835 | 183,402,458 | 217,662,462 | 111,429,000 | 17,756,000 |
| 2472 | Saw-, Veneer-Logs, Non-Conifer | 905,731 | | 576,930 | 1,033,512 | 113,000 | 374,000 |
| 2479 | Pitprops, poles, piling, etc | | 2,505 | 3,678 | | 3,000 | |
| 2481 | Railway Sleepers, Ties | | | | 233,890 | 221,000 | 153,000 |
| 2482 | Lumber, Shaped - Conifer | | | 145,180 | 1,913,681 | 3,153,000 | 1,792,000 |
| 2483 | Lumber, Shaped - Non-Conifer | | | | 1,788 | 1,000 | |
| 25 | Pulp and waste paper | | 2,949,462 | 6,332,956 | 3,667,323 | 3,502,000 | 2,102,000 |
| 2511 | Waste Paper, Paperboard, etc | | | 18,144 | 19,929 | 42,000 | |
| 2512 | Mechanical Wood Pulp | | | | | | 9,000 |
| 2516 | Chem Wood Pulp, Dissolving | | | | | | |
| 2517 | Soda, Sulphate Wood Pulp | | 2,949,462 | 6,045,892 | 806,022 | | 11,000 |
| 2518 | Sulphite Wood Pulp | | | 197,867 | 674,297 | 2,931,000 | 795,000 |
| 2519 | Other Cellulosic Pulps | | | 71,053 | 2,167,075 | 529,000 | 1,287,000 |
| II | MANUFACTURES | | | | | | |
| 6 | Manufactured goods classified by materials | | | | | | |
| 63 | Cork and Wood manufactures (excluding furniture) | | | 1,376 | 133,282 | 43,000 | 42,000 |
| 6301 | Misc & Trifling Goods of 63 | | | | | | |
| 6330 | Cork Manufactures | | | | | | |
| 6341 | Veneer Sheets etc | | | | | | |
| 6342 | Plywood of Wood Sheets | | | | 13,200 | 1,000 | |
| 6343 | Improved, Reconstituted Wood | | | | 43,029 | 7,000 | |
| 6344 | Wood-Based Panels nes | | | | 26,420 | | |
| 6349 | Wood Simply Shaped | | | 442 | 21,413 | 12,000 | |
| 6351 | Boxes, Cases, Crates, etc | | | | 7 | | |
| 6352 | Cooperage Prod, inc staves | | | | | | |
| 6353 | Builders Woodwork, Prefabs | | | | 27,150 | 17,000 | 35,000 |
| 6354 | Wood Mfrs Domestic etc | | | | 350 | 1,000 | |
| 6359 | Other Wood Manufactures | | | 934 | 1,713 | 5,000 | 7,000 |
| 64 | Paper, paperboard and articles of paper pulp, of paper or of paperboard | | | 546,001 | 557,811 | 1,407,000 | 390,000 |
| 6411 | Newsprint | | | | | | |
| 6412 | Printing, Writing Papers nes | | | 26 | 21,632 | 8,000 | |
| 6413 | Kraft Paper, Paperboard | | | 96,422 | 58,607 | 175,000 | 14,000 |
| 6415 | Paper, Paperboard nes | | | 334,786 | 123,848 | 784,000 | 317,000 |
| 6416 | Fibre Building Board | | | | 181,786 | | |
| 6417 | Corrugated Paper etc, blk | | | | | 148,000 | 6,000 |
| 6418 | Coated etc Paper nes, blk | | | 114,687 | 167,230 | 290,000 | 52,000 |
| 6419 | Converted Paper etc, nes | | | | | | |
| 6421 | Paper, etc Containers | | | | | | |
| 6422 | Correspondence Stationry | | | | 749 | | |
| 6423 | Exercise Books, etc | | | 80 | 3,375 | 1,000 | 1,000 |
| 6424 | Paper etc cut to Size, nes | | | | 584 | 1,000 | |
| 6428 | Paper etc Articles nes | | | | | | |

Sources: PRC, China Customs Statistics: Summary Surveys of China's Customs Statistics 1986-89; Yearbook of Chinese Customs Statistics 1990-91.

TABLE 22: PRC - Import of Forest Products from Russia by Value 1992-95

| CODE | COMMODITY ($US) | 1992 | 1993 | 1994 | 1995 |
|---|---|---|---|---|---|
| **44** | **WOOD PRODUCTS** | **24,111,021** | **43,767,439** | **58,135,293** | **35,092,000** |
| 44.01 | FUELWOOD | 105,645 | 16,894 | 9,596 | |
| 44.02 | WOOD CHARCOAL | | | | |
| 44.03 | WOOD IN ROUGH | 21,690,225 | 33,738,493 | 48,911,492 | |
| 4403.1 | TREATED WOOD | 16,925 | 15,389 | 16,871 | |
| 4403.2 | CONIFER | 20,433,530 | 29,397,307 | 40,155,629 | |
| 4403.3 | NON-CONIFER | 1,239,770 | 4,325,797 | 8,738,992 | |
| 4403.31 | MERANTI | | 5,804 | | |
| 4403.32 | LAUAN | | 7,429 | 8,725 | |
| 4403.33 | TEAK & OTHER | | | | |
| 4403.331 | TEAK | | | | |
| 4403.339 | OTHER | | | 331,381 | |
| 4403.34 | OKOUME ETC (TROP) | | | | |
| 4403.35 | TIAMA ETC (TROP) | | | | |
| 4403.91 | OAK | | | | |
| 4403.92 | BEECH | | | | |
| 4403.99 | OTHER NON-CONIFER | 1,239,770 | 4,312,564 | 8,398,886 | |
| 4403.991 | PHOEBE | | | | |
| 4403.992 | CAMPHOR | | 86,511 | 80,171 | |
| 4403.993 | ROSEWOOD | | | | |
| 4403.994 | KIRI | | | | |
| 4403.999 | OTHER | | 4,226,053 | 8,318,715 | |
| 44.07 | SAWNWOOD | 1,841,150 | 5,714,535 | 5,811,919 | |
| 4407.1 | CONIFER | 1,762,853 | 5,451,790 | 5,790,233 | |
| 4407.2 | NON-CONIFER (TROP) | 1,825 | 12,135 | 0 | |
| 4407.21 | TEAK & RELATED | 1,825 | | | |
| 4407.211 | TEAK | | | | |
| 4407.219 | OTHER | | 12,135 | | |
| 4407.22 | OKOUME ETC | | | | |
| 4407.23 | BABOEN, MAHOGANY ETC | | | | |
| 4407.9 | NON-CONIFER (TEMPERATE) | 76,472 | 250,610 | 21,686 | |
| 4407.91 | OAK | | | | |
| 4407.92 | BEECH | | | | |
| 4407.99 | OTHER | 76,472 | | | |
| 4407.991 | CAMPHOR | | 8,841 | | |
| 4407.992 | PAULOWNIA | | 241,769 | | |
| 4407.999 | OTHER | | | 21,686 | |
| 44.08 | VENEER | 67,458 | 150,174 | 33,596 | |
| 44.09 | WOOD - SHAPED | 4,147 | 1,342 | 4,221 | |
| 44.10 | PARTICLEBOARD | 66,821 | 1,915,435 | 1,124,927 | |
| 44.11 | FIBERBOARD | 122,932 | 498,556 | 314,629 | |
| 44.12 | PLYWOOD | 94,539 | 1,499,943 | 1,778,581 | |
| | OTHER' WOOD PRODUCTS | 118,104 | 232,067 | 146,332 | |
| 44.13 | DENSIFIED WOOD | 18,693 | 7,756 | | |
| 44.14 | WOODEN FRAMES | | | | |
| 44.15 | PACKING CASES & BOXES | 27,743 | 56,325 | | |
| 44.16 | CASKS, BARRELS ETC | 3,959 | | | |
| 44.17 | TOOLS | | | | |
| 44.18 | BUILDERS' JOINERY | 13,196 | 41,833 | 22,193 | |
| 44.19 | TABLE/KITCHENWARE | | 121,613 | 19,245 | |
| 44.20 | MARQUETRY/INLAID WOOD | | | | |
| 44.21 | OTHER | 54,513 | 4,540 | 104,894 | |
| **47** | **PULP** | **2,836,736** | **7,652,471** | **10,001,235** | **48,885,000** |
| 47.01 | MECH WOOD PULP | 466,708 | 212,612 | 280 | |
| | CHEM WOOD PULP | | | | |
| 47.02 | DISSOLVING | 356,190 | 319,544 | 346,894 | |
| 47.03 | SODA OR SULPHATE | 1,388,076 | 2,995,409 | 4,908,412 | |
| 47.04 | SULPHITE | | 1,074,936 | 1,503,777 | |
| 47.05 | SEMI-CHEM WOOD PULP | | | | |
| 47.06 | PULP -OTH FIBER MATER | 516,785 | 485,394 | 2,101,008 | |
| 47.07 | WASTE-SCRAP PAPER | 108,977 | 2,564,576 | 1,140,864 | |
| **48** | **PAPER & PAPERBOARD** | **736,819** | **12,738,363** | **5,585,741** | **2,462,000** |
| 48.01 | NEWSPRINT | | 10,285,515 | 3,494,666 | |
| 48.02 | UNCOATED WRITING & PRINT | 60,224 | | 16,881 | |
| 48.03 | SANITARY PAPERS | 975 | | | |
| 48.04 | UNCOATED KRAFT PAPER & BD | 100,656 | 706,951 | 1,302,981 | |
| | 'OTHER' PAPER & PAPERBOARD | | | | |
| 48.05 | OTHER UNCOATED PAPER/BD | 819 | 677,498 | 552,674 | |
| 48.06 | VEGETABLE PARCHMENT | | | 16,598 | |
| 48.07 | COMPOSITE PAPER/BOARD | 182,121 | 318,055 | 9,671 | |
| 48.08 | CORRUGATED PAPER/BD | | 453 | 63,312 | |
| 48.09 | CARBON PAPER ETC | | | 49,554 | |
| 48.10 | COATED PAPER & PAPERBD | | | 38,820 | |
| 48.11 | IMPREG PAPER/PAPERBD | 252,743 | 652,327 | 13,048 | |
| 48.12 | FILTER BLOCKS | | 46 | | |
| 48.13 | CIGARETTE PAPER | | | | |
| 48.14 | WALLPAPER ETC | | 1,037 | | |
| 48.15 | FLOOR COVERINGS | | | | |
| 48.16 | OTHER CARBON PAPERS | | | | |
| 48.17 | ENVELOPES, LETTER | | | | |
| 48.18 | TOILET PAPER ETC | | 4,097 | | |
| 48.19 | CARTONS, BOXES, BAGS | 2,351 | | 17,563 | |
| 48.20 | REGISTERS, NOTEBOOKS | 120 | 29,800 | 9,973 | |
| 48.21 | LABELS ETC | | | | |
| 48.22 | BOBBINS & SPOOLS | 13,571 | | | |
| 48.23 | OTHER PAPER & PAPERBD | 123,039 | 63,584 | | |

Sources: PRC China Customs Statistics Yearbook (1992-94; China Statistics Monthly Series 76 (Dec. 1995)

TABLE 23: PRC - Import of Wood Products by Value and share from Russia

| Code | Commodity | Value of Imports ($1,000) Total | Russia | % of Total |
|---|---|---|---|---|
| IX | WOOD AND ARTICLES OF WOOD; WOOD CHARCOAL; CORK AND ARTICLES OF CORK; MANUFACTURES OF STRAW, OF ESPARTO OR OF OTHER PLAITING MATERIALS; BASKETWARE AND WICKERWORK | 1,576,082 | 35,098 | 0.02 |
| 44 | Wood and articles of wood; wood charcoal | 1,563,737 | 35,092 | 0.02 |
| 45 | Cork and articles of cork | 7,100 | 6 | 0.00 |
| 46 | Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork | 5,245 | 0 | 0.00 |
| X | PULP OF WOOD OR OF OTHER FIBROUS CELLULOSIC MATERIAL; WASTE AND SCRAP OF PAPER OR OF PAPERBOARD; PAPER AND PAPERBOARD AND ARTICLES THEREOF | 3,343,055 | 54,359 | 0.02 |
| 47 | Pulp of wood or of other fibrous cellulosic material ; waste and scrap of paper or paperboard | 844,521 | 49,885 | 0.06 |
| 48 | Paper, paperboard and articles of paper pulp, of paper or of paperboard | 2,321,679 | 2,462 | 0.00 |
| 49 | Printed books, newspapers, pictures and other products of the printing industry: manuscripts, typescripts and plans | 176,855 | 2,011 | 0.01 |

Source: PRC China Customs Statistics Monthly Series 76, Dec. 1995

TABLE 24: PRC Import Volumes of Conifer Industrial Logs and Sawnwood 1986-94 ('000 cub. m.)

| YEAR | CONIFER LOGS | | | CONIFER SAWNWOOD | | |
|---|---|---|---|---|---|---|
| | TOTAL | RUSSIA | SHARE | TOTAL | RUSSIA | SHARE |
| 1986 | 6,892 | 2,873 | 42% | 63 | - | |
| 1987 | 5,684 | 2,400 | 42% | 84 | - | |
| 1988 | 9,476 | 2,465 | 26% | 279 | - | |
| 1989 | 5,647 | 2,580 | 46% | 111 | - | |
| 1990 | 3,474 | 1,320 | 38% | 127 | - | |
| 1991 | 2,491 | 248 | 10% | 215 | - | |
| 1992 | 2,225 | 548 | 25% | 370 | 17.5 | 5% |
| 1993 | 1,512 | 335 | 22% | 368 | 50.8 | 14% |
| 1994 | 1,192 | 504 | 42% | 199 | 57.3 | 29% |

Source: China Customs Statistics

Major Group X covers the import of Pulp of Wood or other Fibrous Cellulosic materials, Waste and Scrap Paper or Paperboard, and Paper and Paperboard Articles. For this broad group, Russia provided materials valued at $54.4 million, or 1.63 percent of the group total of $3,343 million. Pulp imports (Group 47) from Russia were $49.9 million, or 1.63 percent of total China imports in this category. Paper and Paperboard (group 48) imports from Russia were $2.462 million, accounting for 0.11 percent of China's total paper and paperboard imports of $2,321.7 million. Although not normally considered a primary forest product, the import of printed books, newspapers and similar materials (Group 49) from Russia accounted for $2.0 million, or 1.14 percent of this group's total imports by China.

Based on the official Chinese Customs statistics presented here for total timber imports and the related imports from the former Soviet Union-Russia, it is evident that Russia has played a major role with respect to only conifer sawlogs and conifer sawnwood. Russia's share of imports by China has varied over the 1986-94 period in response to dynamic conditions in both China and Russia. Table 24 provides a summary of the trend in market share held by Russia in China with respect to both conifer logs and conifer sawnwood.

During the 1986-89 period, Russia held a market share of about 40 percent, having dropped to 26 percent in 1988 (when imports from the USA were particularly strong) and reaching 45.7 percent in 1989, after the imposition of economic controls in China, causing imports from the USA to drop sharply. Thus the dynamics of market share were primarily caused by variations in China's total conifer sawlog import volume, whereas Russia's exports to China remained relatively constant at about 2.5 million cubic meters after declining from 2.9 million cubic meters in 1986. During the period 1990-94, China's imports of conifer sawlogs declined by almost two-thirds, from 3.5 million cubic meters in 1990 to 1.2 million cubic meters in 1994. Imports from Russia, however, responded to the general decline of economic activity as the country faced economic and political changes. Imports from Russia declined by almost half between 1989 and 1990, and then reached a low of only 247.8 thousand cubic meters in 1991, or about one-tenth the average for 1986-89. Import volume from Russia recovered during 1992-94 as the Russian economy has stabilized, but reached only 504.4 thousand cubic meters in 1994 or only one-fifth of the 1986-89 average. As a consequence of the overall decline in China's conifer log imports together with the instability in Russia, market share dropped to only 9.9 percent in 1991 before recovering to 24.6 percent in 1992 and to 42.3 percent in 1994. The market share in 1994 closely approximates the average for the 1986-89 period, in spite of the major decline in volume.

Table 24 also provides information regarding the Russian market share for China's import of conifer sawnwood. According to China Customs statistics, no conifer sawnwood imports from the former Soviet Union/Russia were reported prior to 1992. Imports of 17.5 thousand cubic meters in 1992 represented just 4.7 percent of China's total conifer sawnwood import volume of 370.3 thousand cubic meters. Imports from Russia increased to 50.8 thousand cubic meters in 1993 and 57.3 thousand cubic meters in 1994, representing an increase in market share to 28.9 percent for 1994. During the

1992-94 period, imports from Russia of conifer sawnwood were increasing while China's total imports of conifer sawnwood were declining by 46.4 percent. This trend reflects both the general strengthening of the forest sector within Russia after the substantial disruptions of 1990-91 and the general improvement in political and economic relations between China and Russia.

It should be noted that the statistics reported by China for imports from Russia differ considerably from information obtained from Russian sources. For example, the US Foreign Agricultural Service (FAS 1995e) reported in 1995 that exports of all roundwood ("wood in the rough") under Harmonized System Group 4403 to China were 218 thousand cubic meters in 1992, 129 thousand cubic meters in 1993, and 370 thousand cubic meters in 1994, all below the volumes shown in Table 24. Likewise, FAS reports no Russian exports of sawnwood (HS 44.07) to China for 1992-94 although it is possible that small volumes would be included in the aggregation of "Other" importing countries with value below $17.5 million.[7]

Information provided by Zausaev (1995) related to the current analysis of China-Russia trade highlights the role played by the Russian Far East in bilateral trade in forest products. Trade between Russia and China is summarized below for 1989-1990 and 1992-1993. Total roundwood trade consists of both sawlogs and pulpwood.

Timber Exports from the USSR/Russia to China

| Year | Item | Volume (000 CUM) | Volume (Tons) |
|---|---|---|---|
| 1989 | Sawlogs | 2,294 | |
| | Pulpwood | 255 | |
| 1990 | Sawlogs | 1,078 | |
| | Pulpwood | 120 | |
| 1992 | Sawlogs | 220 | |
| | Sawn timber | na | |
| | Cellulose | | 1,548 |
| 1993 | Sawlogs | 234 | |
| | Sawnwood | - | |
| | Cellulose | | - |
| | Newsprint | | 32,000 |
| | Uncoated Paper & Uncoated Cardboard | | 24,000 |

[7] Importing countries are listed in order of declining value for 1994. Exports to Uzbekistan were $17.4 million, the smallest individual country reported with the exception of very small ($1.5 million) exported to the USA.

Zausaev (1995) Personal Correspondence. Data is derived from "Foreign Economic Relations of the USSR" (1990-91) and "Foreign Economic Relations of the Russian Federation" (1992-93).

The combined totals given by Zausaev from central government sources for sawlogs and pulpwood are relatively comparable to the conifer volumes reported in Table 24 from China Customs sources. The absence of reported sawnwood for 1993, however, differs from the reported volume of 50.8 thousand cubic meters reported by China sources.

Table 25 summarizes trade in logs exported by the Russian Far East to China for 1975, 1980 and the period 1985-93. Log volumes as reported by Zausaev from Russian exporters is shown separately as 'sawlogs' or 'pulpwood' after 1985. Combined volumes are approximately half (or less) than the corresponding volumes of Russian imports as reported in Table 24 from China Customs sources.[8] The reported Russian export of conifer sawlogs exceeded 1 million cubic meters for 1985-86, before declining to 844 thousand cubic meters in 1988. Following the implementation of political and economic changes, exports of conifer sawlogs declined to only 121.9 thousand cubic meters in 1992 with a slight upturn to 149.7 thousand cubic meters for 1993. No deciduous sawlog exports to China are reported prior to 1992, when volume was only 3.3 thousand cubic meters, increasing to only 10.7 thousand cubic meters in 1993.

Reported pulpwood log exports to China are almost entirely conifer, with deciduous exports reported only beginning in 1988. Total pulpwood conifer exports reached a maximum of 508.3 thousand cubic meters in 1986, falling sharply thereafter to only 8.3 thousand cubic meters in 1992 and 35.0 thousand cubic meters in 1993. Deciduous pulpwood exports were a maximum of 19.8 thousand cubic meters in 1988, declining to only 0.2 thousand cubic meters in 1993.

As shown in Table 25, the greatest share of both sawlog and pulpwood conifer exports to China are composed of Larch species. From two-thirds or more of pulpwood exports are made up of Larch, while approximately three-fourths of sawlog exports are Larch. Preferred exports of Spruce, pine, and whitewoods from the Russian Far East, which dominate trade with Japan and other Pacific Rim countries, would provide the balance of the trade with China in much smaller volumes.

Table 26, provided by Zausaev, reports comparative trade volumes for 1992 and 1993 for additional categories of forest products trade with China. Reported volume for "Sawlogs" is the combination of 'sawlogs' and 'pulpwood' as reported in Table 25. Sawnwood exports from the Far East are small, and primarily conifer sawnwood. Total sawnwood volume in 1993 was 15.4 thousand cubic meters, with conifer exports of 13.4 thousand cubic meters, very close to the volume reported in Table 24 from China Customs

[8] Unconfirmed information would indicate the possibility that the volume of barter trade is unreported in the Russian sources, potentially accounting for a portion of the apparent differences.

sources. Total sawlog volume of 196.1 thousand cubic meters compares with a volume of 335.4 thousand cubic meters reported in Table 24 for all Russian imports, indicating the potential for under-reporting of barter trade in Russian statistics as well as the possibility of volumes entering China from East Siberia by rail through Mongolia. No detailed export data for East Siberia is presently available to supplement the information from the Russian Far East region.

Reported exports from the Far East to China also included 22.7 thousand cubic meters of particleboard, 11.6 thousand square meters of fiberboard, and 3 thousand cubic meters of plywood. For pulp and paper exports, only 2.4 thousand tons of pulp (cellulose) was reported in 1993, with 6.7 thousand tons of cardboard, reflecting the relatively small pulp and paper capacity in the Far East region.

TABLE 25: Export of sawlogs from the Russian Far East to China (thousands cub. m.)

| Assortment | 1975 | 1980 | 1985 | 1986 | 1987 | 1988 | 1990 | 1992 | 1993 |
|---|---|---|---|---|---|---|---|---|---|
| Sawlogs, total | 47 | 59 | 1,060 | 1,068 | 774 | 844 | 498 | 125 | 160 |
| coniferous | 464 | 58 | 1,060 | 1,058 | 774 | 844 | 498 | 122 | 150 |
| larch | 20 | 58 | 766 | 748 | 563 | 701 | 371 | * | * |
| deciduous | | | | | | | | 3 | 11 |
| Pulpwood, total | | | 191 | 508 | 441 | 341 | 124 | 21 | 36 |
| coniferous | | | 190 | 508 | 441 | 321 | 110 | 8 | 35 |
| larch | | | 157 | 382 | 328 | 238 | * | * | * |
| deciduous | | | | | | 20 | 14 | 12 | 0 |

Source: Reports of the exporters provided by Zausaev.

TABLE 26: Export of timber from the Russia Far East to China

| Items | | 1992 | 1993 |
|---|---|---|---|
| Sawlogs | 000 cub. m. | 145.9 | 196.1 |
| Sawn timber | 000 cub. m. | 0.5 | 15.4 |
| | | 0.3 | 13.4 |
| | | 0.2 | 2.0 |
| Particleboard | 000 cub. m. | 4.0 | 22.7 |
| Fiberboard | 000 sq. m. | | 11.6 |
| Plywood | 000 cub.m. | | 3.0 |
| Cardboard | 000,000 m.t. | 4.5 | 6.7 |
| Chemical pulp | 000,000 m.t. | 0.6 | 2.4 |

Source: Reports of the exporters provided by Zausaev.

## III. RUSSIA AS A FUTURE SUPPLIER OF FOREST PRODUCTS

The forest resource capacity of Russia is substantial in terms of the physical and biological potential. However, the future economic potential is less certain, both from the perspective of production and in terms of international trade. The trends and potential for the Russian forestry sector has been recently reviewed by Backman and Waggener (1994). Backman (1995) updated earlier work related to production, consumption and exports from the Russian republic, and Backman and Waggener (1996, forthcoming) review the status of Russian forests and potential trade with an emphasis on the Russian Far East and East Siberia as linked to the Pacific Rim. Backman (1996) reviewed the potential markets for Russian forest products among the republics belonging to the former USSR.

The economic and political disruptions of 1990-91 had a severe impact on the forestry sector as harvest levels collapsed well below historic levels. Economic domestic demand fell as the national economy failed to sustain output at pre-reform levels. The output of almost all sectors of the forest industry fell, and traditional trade patterns were broken as trade with former communist-bloc partners was abruptly changed from 'soft' ruble-based accounting and barter trade to hard currency transactions. Trade with other traditional partners, including China, was as much determined by political considerations as on economic conditions. Although the decline in industrial output has now slowed, the lack of longer term data regarding the performance of the forestry sector under emerging market conditions makes it difficult to predict the future with certainty. The likely direction which production, consumption and trade in forest products will take will be shaped by the new conditions , both externally and internally, which undoubtedly will differ significantly from the prior centrally-planned Soviet economy and trade relations.

The desire for hard currency will undoubtedly support a continuing desire to maintain and expand export levels to hard currency trade partners. Furthermore, the existence of quotas and other controls to limit the volume of exports will remain as much political and economic decisions, and will be based at least in part on the need to support minimal desired levels of domestic consumption within Russia in spite of potential for export. Policies will seek to insulate the Russian population from harsh consequences of adjustment during the on-going transition to a market economy.

The transition from a centrally planned economy has been very painful for the country as a whole and equally so for the forest sector. The declines in forest sector performance, first evident in 1990, have continued largely unabated into early 1996. The disruptions of this sector have affected both production and trade. By 1992, Russian production of roundwood had declined to 238 million cubic meters, some thirty percent below the level attained in the pre-reform year of 1989. The Russian harvest was reported at 174 million cubic meters in 1993. Conifer sawlog and veneer log harvest for 1993 was 52.7 million cubic meters, down from 69.8 million cubic meters in 1992 and a high of 142.8 million cubic meters in 1987 (Backman and Waggener, 1996).

The production of forest products reflects the trend in harvesting. Lumber output suffered steep reductions, falling to 53 million cubic meters by 1992, or approximately two-thirds of the production of 1990, and some 30 million cubic meters below 1989 levels. Conifer sawnwood was just 32.8 million cubic meters in 1993, down from 43.7 million cubic meters in 1992. Similar declines in other branches of the forest products sector were also evident by 1992. Wood based panel production was 6.4 million cubic meters in 1993, off from 7.4 million cubic meters in 1992 and 13.1 million cubic meters in 1989. Production of wood pulp declined from an estimated 11.1 million cubic meters in 1989 to 6.5 million cubic meters in 1992 and 5.1 million cubic meters in 1993.

The Russian Far East produced approximately 8 percent of the timber industry output of Russia prior to the wave of economic and political changes implemented in 1990. Total roundwood harvest was 42 million cubic meters in 1989, declined to 30 million cubic meters in 1992, and further to 24 million cubic meters by 1993. By 1993, available commercial roundwood supply had declined to an estimated 11.7 million cubic meters. Lumber and plywood production declined to approximately 1.2 million cubic meters by 1992. Other wood based panel production declined to 0.7 million cubic meters, pulp production declined to 240 thousand metric tons, and paper-paperboard production dropped to 300 thousand metric tons.

East Siberia harvested approximately 93 million cubic meters in 1989. This declined to 69 million cubic meters by 1992. Commercial timber supply amounted to 63.8 million cubic meters in 1989, but fell to 42.1 million cubic meters in 1992 and to an estimated 29.1 million cubic meters in 1993. Lumber production in the East Siberian region dropped from an estimated 19 million cubic meters in 1989 to only 8 million cubic meters in 1993. Wood based panels declined to 550 thousand cubic meters in 1993 from about 1.1 million cubic meters in 1989. Pulp production declined from almost 2 million metric tons (1989) to only 1.2 million metric tons by 1993.

The initial post-reform developments in the Russian forest sector have impacted foreign trade as well. In 1993, total industrial log exports amounted to 11.5 million cubic meters, down from 18.7 million cubic meters in 1989. Softwood lumber exports dropped just as precipitously, falling to almost 5.5 million cubic meters, down from 7.7 million cubic meters in 1989. Paper exports also suffered, with 1993 exports of paper and paperboard of only 482 thousand metric tons compared to 1,020 thousand metric tons in 1993. Trade in forest products from European Russia are primarily softwood lumber, plywood, and pulp and paper products, with relatively less trade in roundwood. Primary roundwood exports are mainly pulpwood exports to the Scandinavian countries. In contrast, trade from the Eastern regions of Russia are primarily unprocessed roundwood with significantly smaller volumes of lumber or other processed materials.

While the Russian forest sector has suffered in recent years, the future outlook depends upon longer term development and economic policies directed towards this sector - particularly economic restructuring and capital investments required to update the sector in terms of international competitiveness as the traditional

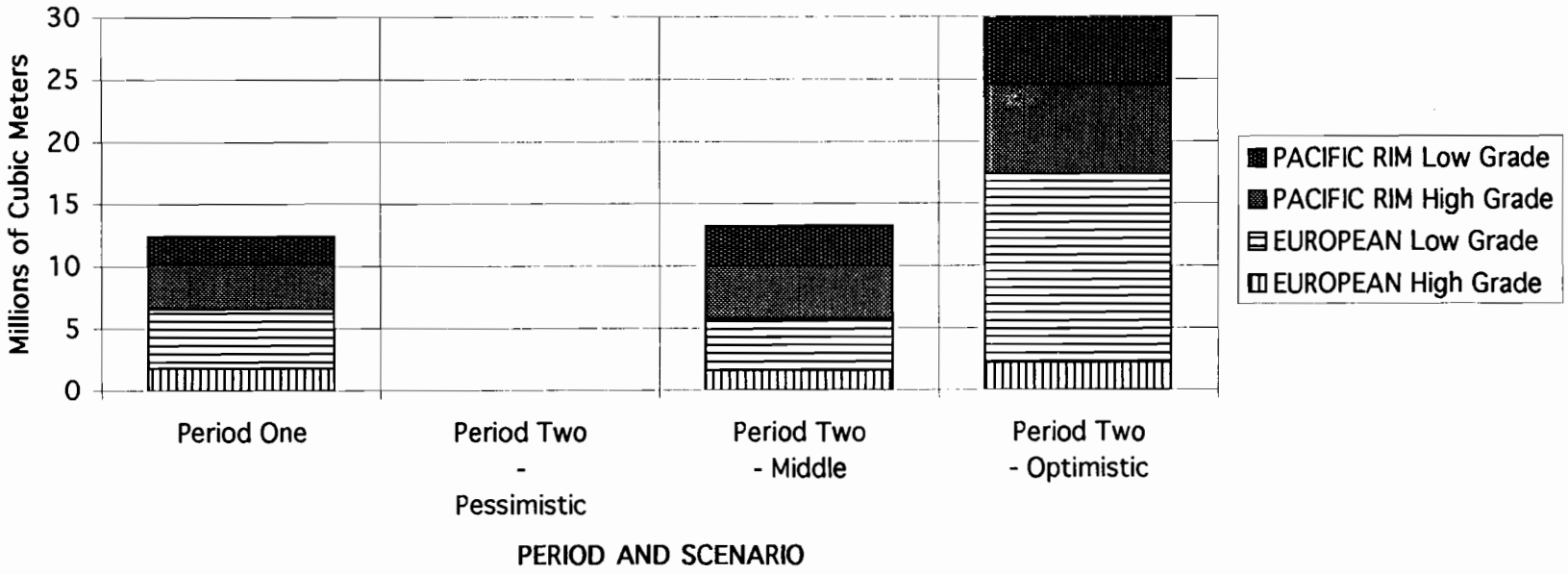
State subsidies are eliminated. Estimates of possible future trends in production and trade are reported by Backman and Waggener (1994) and Backman (1995, 1996). These estimates utilize the Russian Forest Sector Model developed by Backman (1993). The analysis integrates the dynamics of the near term forest land base and inventory, the current and expected industry structure and productive capacity, and the relative consumption of forest products within Russia and the former Republics of the former USSR and the probable implications of the continuing economic reforms and change towards a market economy. The potential for timber exports was projected relative to the competitive nature of export markets which Russia might serve as well as the nature of internal domestic demand.

Projected trade to hard currency markets for Europe and the Pacific Rim are summarized in Figure 5. Average annual exports for Period 1 (1990-95) were estimated at 13 million cubic meters, consisting of 6 million cubic meters of high grade materials (primarily sawlogs) and 7 million cubic meters of low grade timber and fiber (primarily pulpwood and chips). Exports to European markets were estimated at 7 million cubic meters, including only 2 million cubic meters of high grade timber but 5 million cubic meters of lower grade logs and chips. This reflects the existing pattern of export of processed wood (lumber and wood panels) to Europe in addition to the lower grade pulpwood.

In contrast, exports to Pacific Rim markets were estimated at 6 million cubic meters, consisting of 4 million cubic meters of higher grade sawlogs and 2 million cubic meters of lower grade materials. As noted, Pacific Rim exports are primarily unprocessed timber rather than processed forest products. Almost all Pacific Rim exports would originate in the Far East with smaller volumes coming from East Siberia.

For Period 2 (1996-2000), three levels of projections were made. The "middle" baseline projected exports under most likely conditions. Total European exports would remain at 7 million cubic meters annually and Pacific Rim exports at 6 million cubic meters. This baseline represents the same level of trade as projected for the 1990-95 period, under the assumption that fundamental economic and policy factors would remain unchanged and that there would not be substantial capital investment in the forestry sector. European low grade exports would decline only slightly, while Pacific Rim low grade exports would increase. Under more pessimistic conditions, exports could fall to near-zero, since the delivered harvest would be below the politically constrained levels required to sustain minimum domestic consumption linked to a declining gross domestic product. In reality, exports would not disappear since the need for foreign exchange would weigh against domestic consumption. An optimistic projection indicates that a substantial increase in hard currency exports could take place, growing to a Russian total of near 30 million cubic meters. The greatest growth in exports would be to the European markets for lower grade materials. Pacific Rim exports would also increase, for both high grade and lower grade materials. Lower grade (pulpwood and chips)

FIGURE 5: RUSSIA and REGIONS - Projected Export of Wood Fiber to European and Pacific Rim Markets




**Source:** Backman 1993

exports would increase to just over 5 million cubic meters to Pacific Rim markets. Sawlog exports would also increase, to about 8 million cubic meters, equaling the pre-reform levels.

In addition to projected trade in low grade pulpwood and higher grade sawlogs, Russia can also be expected to engage in the export of processed wood materials, including lumber, plywood, other wood based panels, wood chips and residues suitable for pulping, market pulp, and processed paper and paperboard products. Estimated exports during 1990-95 were projected to average about 4.5 million cubic meters, with the majority (4.1 million cubic meters) being from the European region of Russia with only 400 thousand cubic meters originating in Eastern Russia. All of the eastern exports would be to Pacific Rim markets, including China. During the second period (1996-2000) lumber exports would be only 3.2 million cubic meters, falling slightly over period one as economic conditions hold more of the declining lumber output for domestic consumption. Under pessimistic conditions, however, domestic use of lumber would drop as gross national product declines further, and an estimated total of 5.1 million cubic meters would potentially be exported, including 4.9 million cubic meters to European markets and only 0.2 million cubic meters to Pacific Rim markets. Alternatively, an optimistic outlook would see lumber exports increasing to an estimated annual level of 5.7 million cubic meters, with 5.5 million originating in European Russia and only 0.2 million cubic meters from the Eastern Russian region. Pacific Rim exports would therefore remain at 200 thousand cubic meters under all projected conditions due to the deteriorating capacity of the industry and the quality limitations of the existing sawmill sector in East Siberia and the Far East. Increased exports will require substantial capital investment which does not seem likely before the year 2000.

Most exports of wood-based panels, including plywood, originate in the European Russia region and are destined for European hard currency markets. It is also possible for Russia to export either market pulp, processed paper, or paperboard products. However, expected exports from Siberia or the Far East are limited due to high costs, lack of capital for modernization, and capacity limitations. Estimated production in the Far East was a combined total of only 710 thousand tons in 1992. The combined Far East and East Siberian capacity probably did not exceed 2.4 million tons.

Backman (1996) identified likely volumes of commercial wood fiber surplus to domestic demand in Russia for the next half century. Shown in Table 27, Russia East remains a net exporter for the next two decades, and depending on the ability of the forest sector in Russia to attract capital beyond that necessary to replace existing capacity and develop the forest resoruce tied up in the potential fiber flow resource could by 2040 be exporting in the vacinity of 180 million cubic meters annually. Not all of this volume of course would be available for consumption in China as Russia West would face deficits ranging from 55 million c.m. to 336 million c.m., European Republics of the former USSR deficits of between 58 million c.m. and 85 million c.m., Central Asian (including Kazakhstan) republics deficits of between 28 million c.m. and 31 million c.m. Surplus in 2025 would amount up to some 100 million c.m. though the capital necessary to support this level of forest sector activity in

Russia East alone would amount to some 40 billion dollars invested in the 5 year period including 2025.

Presently, the forestry sector in Russia, including East Siberia and the Far East, has substantial potential for development. Resources are relatively abundant and utilization is presently limited by lack of access and appropriate technology. Substantial capital investment will be required to transform the existing industry to standards of technology and product quality to become truly competitive in major markets of the Pacific Rim. Present political and economic conditions are not yet conducive to large scale foreign participation in the sector's development, but investment should ultimately increase as conditions stabilize and become more favorable. By the turn of the century, deteriorated industry capacity will increasingly fail to be competitive in the absence of capital investment. Domestic demand for timber will increase with economic improvement. While transport distances and costs will limit access to major Russian markets and the European region, Eastern Russian forests should find growing domestic demand. Exports of timber and wood in the near term will remain attractive as domestic prices continue to adjust to international levels. Potential trade with China will take place within this context, with China seeking to secure some fraction of the exported timber in competition with other Pacific Rim consumers. However, in the long-term, there are limits to which Russia in general and Russia East in particular can be expected to meet the rising demand in China, even assuming that all surplus fiber is directed solely to China and capital requirements which are met.

**Table 27: REGIONS - Distribution of annual net exports for modified high growth scenario and all sources of fiber for different investment strategies (million c.m. r.e.)**

| | 1989 | P(1) | P(2) | P(3) | P(4) | P(5) | P(6) | P(7) | P(8) | P(9) | P(10) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RUSSIA WEST | | | | | | | | | | | |
| Mod. high - base | -52.8 | -18.0 | -5.3 | 38.8 | 86.9 | 161.5 | 218.2 | 244.8 | 270.7 | 300.4 | 335.9 |
| investment - 10 | -52.8 | -18.0 | -12.6 | 23.7 | 63.4 | 123.5 | 168.7 | 183.1 | 195.7 | 211.3 | 231.6 |
| investment - 25 | -52.8 | -18.0 | -23.5 | -1.1 | 21.3 | 57.9 | 71.7 | 49.4 | 32.8 | 33.7 | 54.8 |
| investment - 50 | -52.8 | -18.0 | -41.7 | -37.2 | -15.7 | 22.3 | 28.8 | 32.6 | 32.8 | 33.7 | 54.8 |
| RUSSIA EAST | | | | | | | | | | | |
| Mod. high - base | -37.4 | -26.2 | -24.7 | -17.0 | -8.5 | 4.0 | 13.9 | 19.3 | 25.5 | 32.7 | 38.9 |
| investment - 10 | -37.4 | -26.2 | -27.9 | -23.8 | -18.9 | -11.3 | -6.0 | -5.6 | -4.8 | -3.3 | -3.3 |
| investment - 25 | -37.4 | -26.2 | -32.8 | -34.8 | -37.7 | -39.7 | -47.0 | -61.9 | -79.8 | -101.2 | -129.3 |
| investment - 50 | -37.4 | -26.2 | -40.9 | -55.7 | -71.8 | -71.7 | -101.2 | -127.2 | -155.0 | -184.6 | -181.4 |
| RUSSIA | | | | | | | | | | | |
| Mod. high - base | -90.2 | -44.3 | -29.9 | 21.7 | 78.5 | 165.5 | 232.1 | 264.1 | 296.2 | 333.1 | 374.9 |
| investment - 10 | -90.2 | -44.3 | -40.4 | -0.1 | 44.4 | 112.1 | 162.7 | 177.4 | 190.9 | 208.0 | 228.4 |
| investment - 25 | -90.2 | -44.3 | -56.2 | -35.9 | -16.5 | 18.1 | 24.6 | -12.4 | -47.0 | -67.6 | -74.5 |
| investment - 50 | -90.2 | -44.3 | -82.6 | -92.9 | -87.5 | -49.4 | -72.4 | -94.6 | -122.2 | -150.9 | -126.6 |
| EUROPEAN REPUBLICS | | | | | | | | | | | |
| Mod. high - base | 34.2 | -2.0 | -1.1 | 10.5 | 21.6 | 33.6 | 43.6 | 51.9 | 61.6 | 72.7 | 85.5 |
| investment - 10 | 34.2 | -2.0 | -2.3 | 7.8 | 17.1 | 27.2 | 35.0 | 41.0 | 48.7 | 58.1 | 69.1 |
| investment - 25 | 34.2 | -2.0 | -2.6 | 6.1 | 13.8 | 21.8 | 27.1 | 33.3 | 40.7 | 49.3 | 59.2 |
| investment - 50 | 34.2 | -2.0 | -2.9 | 5.6 | 13.2 | 20.6 | 25.4 | 31.4 | 38.9 | 47.5 | 57.6 |
| CENTRAL ASIAN REPUBLICS + KAZAKHSTAN | | | | | | | | | | | |
| Mod. high - base | 12.9 | 2.5 | 2.6 | 4.6 | 7.3 | 11.2 | 15.0 | 18.0 | 21.5 | 25.8 | 31.0 |
| investment - 10 | 12.9 | 2.5 | 2.6 | 4.5 | 7.1 | 10.9 | 14.5 | 17.3 | 20.7 | 24.8 | 29.8 |
| investment - 25 | 12.9 | 2.5 | 2.6 | 4.4 | 6.8 | 10.4 | 13.7 | 16.1 | 19.3 | 23.2 | 28.1 |
| investment - 50 | 12.9 | 2.5 | 2.6 | 4.4 | 6.7 | 10.3 | 13.4 | 16.1 | 19.3 | 23.1 | 28.0 |

Abbreviations and explanations: million - '000,000; c.m. - cubic meter; r.e. - roundwood equivalents; gr. - growth; excl. - excluding; pot. - potential forest resource; P(1) - period one with each period having five years

Source: Backman 1996

## IV. NEAR TERM ASSESSMENT FOR CHINA-RUSSIA TRADE

Future China trade in forest products with Russia will depend on many factors on both sides - many of which are political in nature or speculative regarding future course of economic and market reforms. There is no doubt that in the near term China will experience increasing demand for all forest products and that the domestic supply will be insufficient to satisfy consumption at prevailing prices. Increased trade, including trade with Russia, is one of the several policy tools available to China to deal with this reality. Whether this will be selected as a major or significant element of overall timber strategies remains to be seen. Russia, the potential trading partner, will almost certainly seek new and expanded markets for timber from Eastern Russia (East Siberia and the Far East regions). The future status of economic reform and transition to markets will dictate outcomes with respect to Russian forests and potential for trade. International markets will grow in importance as traditional markets in European Russia and former Soviet Republics become increasingly economically inaccessible.

It is certain that China will need to compete with other Pacific Rim consumer countries in order to obtain timber. It is unlikely that Russia will offer substantial concessions in order to sell to China. Barter trade may persist (currently denominated in Swiss francs) but will be more difficult given competition from hard currency buyers for the available timber from Russia.9 The willingness to pay international prices for specific species and quality of timber will largely determine the competitiveness of China. For example, Russian timber exports to Japan regained a level of 5 million cubic meters in 1995 after a decline in 1992-94. Most of this timber was commercial conifer logs (4.7 million cubic meters) including whitewoods, larch, red pine, and Cedar-pine. Japan, as the major log importer in the Pacific Rim, is increasing seeking timber supplies worldwide to offset declines from traditional sources including the West Coast of North America.

It is also certain that Russia will seek expanded international market outlets for timber and forest products. The level and mix of timber for export will in turn depend critically on development strategies for the forests in East Siberia and the Far East. The lack of capital for investment in new and modern capacity and technology will slow the development of competitive processing, largely indicating future trade will continue to emphasize unprocessed roundwood in the near term.

From the perspective of China, timber from Russia has both advantages and disadvantages. These have been summarized by Eitemiller (1987). Advantages for trade with Russia include the possibility of 'trade deals' as both countries seek to minimize the use of scarce foreign exchange in trade. Border trade, including barter trade, expanded between China and Russia from 1990-93 following some 20 years of closed borders (China Daily, Sept. 4, 1989). Various agreements were negotiated for the import of goods from Russia by

9 In order to provide an indication of the "value" of goods and services which comprise the "barter trade", the unit of account employed is the Swiss franc. Goods and services with more or less equal valuation are exchanged thus obviating the need to transfer hard currency.

China, including timber. In exchange China offered consumer goods, textiles, electronic goods, and a variety of other light industrial and agricultural products. Border trade declined during 1993-95, due to many perceived problems on both sides. The changing nature of policies and regulations in both countries contributed to charges of "difficulty" in reaching agreements that could be honored and enforced. In 1993, China also tightened credit in its efforts to control inflation, resulting in a drop in demand for imported products including timber. Tax regulations, trade policies including quotas and licenses, and foreign exchange restrictions also impacted trade (Song, 1995). The 'political situation" in Russia was frequently mentioned in the current research as causing many difficulties for Chinese importers. This was noted particularly with regard to 'labor contracts' whereby China has sought to use Chinese labor to supplement Russian workers in exchange for both wages and timber which can be brought back to China. China 'enjoys' a surplus of forest and forest products labor (especially in NE China). China has had approximately 60 projects involving labor to Russia, with about half involved in forest cutting and various forest farming or management activities. At a peak, it is estimated that some 2,000 forest workers were in the Far East under contract, but this had declined to 'several hundred' by mid 1995.

Closeness to Russian timber is a considerable advantage for China importers. Access by rail or water is relatively low cost considering alternative timber supply sources, including North America. Trade with Russia also has the advantage of species familiarity. The common forests of NE China and the Russian Far East reinforce the dominant role of China's NE as a supplier of timber throughout China. Enterprises and users of timber are generally quite familiar with the attributes and characteristics of the Russian timbers and can easily substitute supply sources. Siberian larch, Korean (red) pine, spruce, and "white pines" (whitewoods) are all acceptable in the China market. Larch, a relatively abundant species in Eastern Russia, is commonly used for railroad ties, construction, vehicle floor boards, etc. and can substitute for Douglas-fir and hemlock in these and other lower-valued markets such as packaging. Internal river ports and coastal shipping compliment rail connections directly linking China and Russia or passing through Mongolia. Improved infrastructure in the Far East and in China ease the problems of transportation and distribution. Although rail connections still require changing of rail car wheels, plans have been put forward to eliminate this difficulty in the near future. Coastal shipments (up to 40 percent of Russian timber imports) are by comparatively small ships, handling about 5,000 cubic meters. Most China buyers do not need (or cannot finance) larger shipload purchases, hence favor smaller and faster transport by smaller vessels. Shipments to Shanghai, Jiangsu, and Shejiang have increased as wholesale markets have evolved, allowing brokerage of relatively small volumes to individual enterprises and other purchasers.

Eitemiller (1987) also commented on a number of disadvantages. He generally acknowledges that China buyers and processing enterprises prefer North American timber to Russian timber. While technical characteristics are noted (for example strength), log size is the most common difference identified as leading to this preference. Russian timber is generally smaller diameter, normally less than 25-30 cm, and often 12-16 cm. As estimated for 1986,

Eitemiller states that only 15 percent of Russian imported timber was greater than 40 cm in diameter with the largest about 60 cm. Eighty percent of volume was in the 20-40 cm range, with 5 percent being 12-20 cm in diameter. Log lengths range from 2 meters (pulpwood) to 12 meters, with the majority (80 percent) being 8-12 meters. China prefers larger timber, preferably over 30 cm diameter at a minimum. China importers also complain that Russian timber is 'old', having spent considerable time in storage or transit following harvesting, resulting in considerable drying and cracking, thus degrading product yields.

China importers also feel that Russia trade is not 'dependable' in terms of quality per orders, timely delivery, and other details of trade agreements. Contract disputes are difficult to resolve, as are questions of financing and credit. Quality of timber had declined, according to China importers, and comparisons were made to radiata pine from New Zealand which was considered much better and quite suitable for pulping.

China has historically had preferential tariff structures favoring the import of unprocessed timber with increasingly higher tariff rates for semi-processed and finished products. At the November 1995 meeting of APEC in Osaka, China announced its intention to greatly reduce tariff rates. Reductions of at least 30 percent were proposed for more than 4,000 specific items. Preliminary proposed rate reductions were published in late January 1996, including some (but not all) product classifications for forest products under the Harmonized System. A preliminary comparison of the proposed rates to the existing rates are included in Appendix 2. While rates on unprocessed timber were generally low, the higher rates of processed timber were initially higher and were proposed for reductions which were much more modest. For example, new rates for veneer, shaped wood, particleboard, and fiberboard would remain above 20 percent. Tariffs on many 'other' manufactured wood products would remain in the 25-50 percent range. Although 'special arrangements' can often prevail for trade with Russia, importers in the Northeast complain that they must pay full duties on wood imported even under barter arrangements or from labor-export agreements. Government officials indicated that this could be 'resolved' in the case of trade with Russia, although no clear policy appears to exist dealing with such issues.

China's future policies with regard to timber substitution and regulations to enforce limitations on timber in many end uses (including construction) will be important with regard to meeting pressures for increased consumption as well as the future role of trade and import of timber from Russia or elsewhere. As noted, wood was still covered under MOFTEC regulations issued in January 1994. Timber was considered as a "Class 1 Commodity" of 'strategic' national importance. The application of these regulations to potential Joint Ventures engaged in wood processing and possibly re-export of value added products will also influence investment and production decisions. Clarifications of licensing of importers, quotas, and 'fees' associated with import permission are likewise needed. Statements regarding removing logs, lumber, veneer, and plywood from existing licensing and quota restrictions need to be clearly implemented in order to facilitate trade planning. The role of designated (licensed) trading enterprises likewise needs greater clarity.

The role of finance and credit arrangements will perhaps be most significant for China's importers. Russian enterprises have virtually no working capital and little possibility of credit. In many cases, supplies must be paid for in advance, in some cases including timber. Production is impossible without adequate credit or advance payment from buyers of timber products. Given the financial situation of many forest products enterprises within China, it is unlikely that advance payment for imported timber can be feasible any time soon. Greater roles for banking institutions, including letters of credit and foreign exchange accounts will be required if timber trade with Russia is to expand. Improved infrastructure, including rail, port and other transportation services for Russian trade remain critical, and although agreements in principle have been announced for cooperation on infrastructure development much remains to be accomplished.

Heilongjiang Province is the major province dealing directly with Russian timber interests. Road and water access through this province is a gateway to the rest of China. However, much trade in forest products is bypassing Heilongjiang's traditional trade centers. Timber entering Heilongjiang is largely bypassing processing within the province. Local enterprises have a high preference for Chinese timber, which is perceived as abundant. Local enterprises expressed the strong view that 'there is more than enough' wood available, but not at prices that they can afford to pay and compete profitability under new accounting requirements. Hence processing capacity is increasingly idle while both domestic timber and imported Russian timber flows south towards other China provinces. Only specialized timber needs, such as ash for decorative applications, are presently met by imports from Russia. Little interest was evident regarding Heilongjiang timber organizations serving as brokers or trade intermediaries for servicing import demand for other parts of China. Coastal trade is, therefore, expected to grow in lieu of land based trade directly entering China at the border. China's productive capacity is also expected to shift increasing to the South as timber supply constraints in the Northeast become more severe and increased comprehensive processing takes hold based on the newly established plantations in the more productive Southern provinces.

Russia will intensify its search for export markets in the Pacific Rim. China will likely regain some of the earlier preferential trading advantages but serious barriers will remain and must be resolved before Russia can be expected to supply significant volumes of timber to China. As noted, projected near-term exports from Eastern Russia (East Siberia and Far East) will in all likelihood remain in the range of 5-10 million cubic meters, primarily as unprocessed timber. China is not as demanding in quality, nor will China pay the premium prices paid by Japan and other emerging Pacific Rim buyers. On the other hand, timber supplies are tightening around the Pacific Rim, particularly from North America which has been a favored supplier to China. Russian timber can be expected to be increasingly attractive, particularly if China's senior leadership places a greater priority on timber as a desired raw material and relations with Russia move towards greater cooperation. If imports of timber, and perhaps sawnwood, becomes a greater priority as China confronts a growing gap between domestic production and rising pressures for consumption, Russian log shipments could rise once again to the one million cubic meter levels

previously seen. Limited export supply from Eastern Russia, and competition from other Pacific Rim markets able to pay in hard currencies, however, will realistically restrain shipments to China and will dictate trade in the lower valued species (primarily Larch) as a substitute for reduced export capacity for roundwood in North America. Greatest competition can perhaps be expected from New Zealand where export of radiata pine can be anticipated as intensively managed plantations continue to mature. Higher grade pruned logs will likely go to Japan and Korean markets, but middle and lower grade sawlogs and perhaps even pulpwood grade logs will be increasingly attractive to China.

Increased China imports of sawnwood from Russia are more questionable. Russia will have limited capacity in East Siberia and the Far East due to the existing constraints on production and technology. Lack of capital investment will weigh against any substantial increase in production capacity and improvements in quality towards international standards until substantial foreign capital can be attracted. This will require greater economic and political stability. Even should this occur, other markets will surely compete with China for the modest volumes of sawnwood that might be available. Finally, growing domestic consumption in Eastern Russia will result as economic reforms take place and the region confronts huge demands for construction and improved housing - a situation not unlike China. More of the sawnwood which is produced will likely stay within the Eastern russian region to meet such domestic demands.

Increased trade in panel products is somewhat unlikely, given the limited production capacity in Eastern Russia and the preference for tropical hardwood panels in China. A major unknown is the likely increased use of panels for concrete forming in construction in China, a factor that could contribute to increased demand for conifer panels. Should capital investment become available the integrated production of conifer plywood could expand trade modestly in the near term. China's emphasis on the rapid expansion of MDF, other particleboard and fiberboard products, and wood-based overlaid panels as a component of more comprehensive utilization of byproducts and waste (harvesting and manufacturing) will likely limit the import of such products from Russia until such time that substantial expansion of capacity in Eastern Russia evolves.

China is facing severe shortages of both wood-based pulps as well as a broad range of paper and paperboard products. Limited imports of newsprint and cardboard stock from Russia indicates that such trade is potentially feasible. Growing consumption within Russia and limited production capacity in Eastern Russia will, however, continue to constrain trade in pulp and paper products. Increased competition from hard currency markets, and even from European Russia, will stretch capacity in Eastern Russia until substantial capital investment in modernization and expansion is realized.

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# APPENDIX

Appendix I. Statistical Data - People's Republic of China

1. PRC - Conifer Roundwood Production 1976-1992
2. PRC - Non-Conifer Roundwood Production 1976-1992
3. PRC - Conifer Roundwood - Percent by Type 1976-1992
4. PRC - Non-Conifer Roundwood - Percent by Type 1976-92

Appendix II. China Wood Product Tariff Rates (Current & Proposed)

APPENDIX I: TABLE 1: PRC -Conifer Roundwood Production (cub.m.)1976-92

| | INDUSTRIAL ROUNDWOOD | | | | FUELWOOD | TOTAL |
|---|---|---|---|---|---|---|
| | SAW/VEN. LOGS | PULPWOOD | OTHER | TOTAL | | |
| TOTAL (Coniferous) | | | | | | |
| 1976 | 25,900,000 | 2,737,000 | 13,860,000 | 42,497,000 | 57,834,000 | 100,331,000 |
| 1977 | 26,517,008 | 2,874,000 | 14,553,000 | 43,944,008 | 58,990,000 | 102,934,008 |
| 1978 | 27,233,008 | 3,018,000 | 15,280,000 | 45,531,008 | 60,170,000 | 105,701,008 |
| 1979 | 28,904,000 | 3,168,000 | 16,044,000 | 48,116,000 | 61,370,000 | 109,486,000 |
| 1980 | 28,989,008 | 3,143,000 | 16,846,000 | 48,978,008 | 62,597,008 | 111,575,016 |
| 1981 | 25,952,000 | 2,860,000 | 17,687,008 | 46,499,008 | 63,849,008 | 110,348,016 |
| 1982 | 26,505,008 | 2,918,000 | 18,571,008 | 47,994,016 | 65,126,000 | 113,120,016 |
| 1983 | 27,397,008 | 3,016,000 | 19,500,000 | 49,913,008 | 66,429,008 | 116,342,016 |
| 1984 | 31,983,008 | 3,521,000 | 20,475,008 | 55,979,016 | 67,758,000 | 123,737,016 |
| 1985 | 32,656,000 | 3,948,000 | 21,499,008 | 58,103,008 | 69,113,008 | 127,216,016 |
| 1986 | 33,074,000 | 3,967,000 | 22,574,008 | 59,615,008 | 70,495,008 | 130,110,016 |
| 1987 | 33,074,000 | 4,067,000 | 23,703,008 | 60,844,008 | 71,905,008 | 132,749,016 |
| 1988 | 32,617,000 | 4,270,000 | 23,703,008 | 60,590,008 | 73,343,008 | 133,933,016 |
| 1989 | 30,138,000 | 4,453,000 | 23,703,008 | 58,294,008 | 74,810,000 | 133,104,008 |
| 1990 | 28,842,000 | 4,843,000 | 23,703,008 | 57,388,008 | 76,306,000 | 133,694,008 |
| 1991 | 28,380,000 | 4,766,000 | 23,324,000 | 56,470,000 | 77,832,000 | 134,302,000 |
| 1992 | 30,083,008 | 4,766,000 | 23,324,000 | 58,173,008 | 82,502,000 | 140,675,008 |

Source: FAO (Unpublished)

APPENDIX I: TABLE 2: PRC -Non-conifer Roundwood Production (cub.m.)1976-92

| | INDUSTRIAL ROUNDWOOD | | | | FUELWOOD | TOTAL |
|---|---|---|---|---|---|---|
| | SAW/VEN. LOGS | PULPWOOD | OTHER | TOTAL | | |
| TOTAL (Non-coniferous) | | | | | | |
| 1976 | 16,100,000 | 1,155,000 | 7,858,000 | 25,113,000 | 84,966,000 | 110,079,000 |
| 1977 | 16,483,000 | 1,213,000 | 8,251,000 | 25,947,000 | 86,665,008 | 112,612,008 |
| 1978 | 16,927,008 | 1,274,000 | 8,664,000 | 26,865,008 | 88,398,000 | 115,263,008 |
| 1979 | 17,946,000 | 1,337,000 | 9,097,000 | 28,380,000 | 90,165,008 | 118,545,008 |
| 1980 | 17,701,008 | 1,347,000 | 9,551,000 | 28,599,008 | 91,968,000 | 120,567,008 |
| 1981 | 16,538,000 | 1,226,000 | 10,029,000 | 27,793,000 | 93,807,008 | 121,600,008 |
| 1982 | 16,845,008 | 1,250,000 | 10,530,000 | 28,625,008 | 95,683,008 | 124,308,016 |
| 1983 | 17,413,008 | 1,293,000 | 11,057,000 | 29,763,008 | 97,597,008 | 127,360,016 |
| 1984 | 20,327,008 | 1,509,000 | 11,610,000 | 33,446,008 | 99,549,008 | 132,995,016 |
| 1985 | 20,754,000 | 1,692,000 | 12,191,000 | 34,637,000 | 101,540,000 | 136,177,000 |
| 1986 | 21,020,000 | 1,700,000 | 12,800,000 | 35,520,000 | 103,570,000 | 139,090,000 |
| 1987 | 21,020,000 | 1,743,000 | 13,440,000 | 36,203,000 | 105,641,008 | 141,844,008 |
| 1988 | 20,730,000 | 1,830,000 | 13,440,000 | 36,000,000 | 107,754,000 | 143,754,000 |
| 1989 | 21,476,000 | 1,909,000 | 13,440,000 | 36,825,000 | 109,909,008 | 146,734,008 |
| 1990 | 16,773,000 | 2,076,000 | 13,440,000 | 32,289,000 | 112,107,008 | 144,396,008 |
| 1991 | 16,500,000 | 2,043,000 | 13,225,000 | 31,768,000 | 114,339,008 | 146,107,008 |
| 1992 | 17,490,000 | 2,043,000 | 13,225,000 | 32,758,000 | 121,199,008 | 153,957,008 |

Source: FAO (Unpublished)

APPENDIX I: TABLE 3: PRC - Conifer Roundwood Production (percent by type)1976-92

| | INDUSTRIAL ROUNDWOOD | | | | FUELWOOD | TOTAL |
|---|---|---|---|---|---|---|
| | SAW/VEN. LOGS | PULPWOOD | OTHER | TOTAL | | |
| TOTAL (Coniferous) | | | | | | |
| 1976 | 26 | 3 | 14 | 42 | 58 | 100 |
| 1977 | 26 | 3 | 14 | 43 | 57 | 100 |
| 1978 | 26 | 3 | 14 | 43 | 57 | 100 |
| 1979 | 26 | 3 | 15 | 44 | 56 | 100 |
| 1980 | 26 | 3 | 15 | 44 | 56 | 100 |
| 1981 | 24 | 3 | 16 | 42 | 58 | 100 |
| 1982 | 23 | 3 | 16 | 42 | 58 | 100 |
| 1983 | 24 | 3 | 17 | 43 | 57 | 100 |
| 1984 | 26 | 3 | 17 | 45 | 55 | 100 |
| 1985 | 26 | 3 | 17 | 46 | 54 | 100 |
| 1986 | 25 | 3 | 17 | 46 | 54 | 100 |
| 1987 | 25 | 3 | 18 | 46 | 54 | 100 |
| 1988 | 24 | 3 | 18 | 45 | 55 | 100 |
| 1989 | 23 | 3 | 18 | 44 | 56 | 100 |
| 1990 | 22 | 4 | 18 | 43 | 57 | 100 |
| 1991 | 21 | 4 | 17 | 42 | 58 | 100 |
| 1992 | 21 | 3 | 17 | 41 | 59 | 100 |

Source: FAO (Unpublished)

APPENDIX I: TABLE 4: PRC - Non-conifer Roundwood Production (percent by type)1976-92

| | INDUSTRIAL ROUNDWOOD | | | | FUELWOOD | TOTAL |
|---|---|---|---|---|---|---|
| | SAW/VEN. LOGS | PULPWOOD | OTHER | TOTAL | | |
| TOTAL (Non-coniferous) | | | | | | |
| 1976 | 15 | 1 | 7 | 23 | 77 | 100 |
| 1977 | 15 | 1 | 7 | 23 | 77 | 100 |
| 1978 | 15 | 1 | 8 | 23 | 77 | 100 |
| 1979 | 15 | 1 | 8 | 24 | 76 | 100 |
| 1980 | 15 | 1 | 8 | 24 | 76 | 100 |
| 1981 | 14 | 1 | 8 | 23 | 77 | 100 |
| 1982 | 14 | 1 | 8 | 23 | 77 | 100 |
| 1983 | 14 | 1 | 9 | 23 | 77 | 100 |
| 1984 | 15 | 1 | 9 | 25 | 75 | 100 |
| 1985 | 15 | 1 | 9 | 25 | 75 | 100 |
| 1986 | 15 | 1 | 9 | 26 | 74 | 100 |
| 1987 | 15 | 1 | 9 | 26 | 74 | 100 |
| 1988 | 14 | 1 | 9 | 25 | 75 | 100 |
| 1989 | 15 | 1 | 9 | 25 | 75 | 100 |
| 1990 | 12 | 1 | 9 | 22 | 78 | 100 |
| 1991 | 11 | 1 | 9 | 22 | 78 | 100 |
| 1992 | 11 | 1 | 9 | 21 | 79 | 100 |

Source: FAO (Unpublished)

PEOPLE'S REPUBLIC OF CHINA - FOREST PRODUCTS TARIFF RATES*

| CODE | COMMODITY | TARIFF Current | Proposed |
|---|---|---|---|
| | 44 WOOD PRODUCTS | Percent | |
| 44.01 | FUELWOOD | 30 | 9 |
| 44.02 | WOOD CHARCOAL | 30 | 9 |
| 44.03 | WOOD IN ROUGH | | |
| 4403.1 | TREATED WOOD | | |
| 4403.2 | CONIFER | 2 | |
| 4403.3 | NON-CONIFER | | |
| 4403.31 | MERANTI | 15 | |
| 4403.32 | LAUAN | 15 | |
| 4403.33 | TEAK & OTHER | | |
| 4403.331 | TEAK | 15 | |
| 4403.339 | OTHER | 2 | |
| 4403.34 | OKOUME ETC (TROP) | 2 | |
| 4403.35 | TIAMA ETC (TROP) | 2 | |
| 4403.91 | OAK | 2 | |
| 4403.92 | BEECH | 2 | |
| 4403.99 | OTHER NON-CONIFER | | |
| 4403.991 | PHOEBE | 15 | 6 |
| 4403.992 | CAMPHOR | 15 | 6 |
| 4403.993 | ROSEWOOD | 15 | 6 |
| 4403.994 | KIRI | | |
| 4403.999 | OTHER | | |
| 44.07 | SAWNWOOD | | |
| 4407.1 | CONIFER | 6 | 3 |
| 4407.2 | NON-CONIFER (TROP) | | |
| 4407.21 | TEAK & RELATED | | |
| 4407.211 | TEAK | 20 | |
| 4407.219 | OTHER | 6 | |
| 4407.22 | OKOUME ETC | 6 | |
| 4407.23 | BABOEN, MAHOGANY ETC | 6 | |
| 4407.9 | NON-CONIFER (TEMPERATE) | | |
| 4407.91 | OAK | 6 | 3 |
| 4407.92 | BEECH | 6 | 3 |
| 4407.99 | OTHER | | |
| 4407.991 | CAMPHOR | 20 | 9 |
| 4407.992 | PAULOWNIA | 6 | 3 |
| 4407.999 | OTHER | 6 | 3 |
| 44.08 | VENEER | 9-25 | 12 |
| 44.09 | WOOD - SHAPED | 35 | 20 |
| 44.10 | PARTICLEBOARD | 25 | 22 |
| 44.11 | FIBERBOARD | 25 | 22 |
| 44.12 | PLYWOOD | | |
| | OTHER' WOOD PRODUCTS | | |
| 44.13 | DENSIFIED WOOD | | |
| 44.14 | WOODEN FRAMES | 70 | 50 |
| 44.15 | PACKING CASES & BOXES | 40 | 30 |
| 44.16 | CASKS, BARRELS ETC | 40 | 25 |
| 44.17 | TOOLS | 40 | 25 |
| 44.18 | BUILDERS' JOINERY | 40 | 30 |
| 44.19 | TABLE/KITCHENWARE | 70 | 50 |
| 44.20 | MARQUETRY/INLAID WOOD | 70 | 40 |
| 44.21 | OTHER | 20-60 | 40 |

PEOPLE'S REPUBLIC OF CHINA - FOREST PRODUCTS TARIFF RATES (cont'd) *

| CODE | COMMODITY | TARIFF Current Percent | TARIFF Proposed Percent |
|---|---|---|---|
| 47 | PULP | | |
| 47.01 | MECH WOOD PULP | | |
| | CHEM WOOD PULP | | |
| 47.02 | DISSOLVING | | |
| 47.03 | SODA OR SULPHATE | | |
| 47.04 | SULPHITE | | |
| 47.05 | SEMI-CHEM WOOD PULP | | |
| 47.06 | PULP -OTH FIBER MATER | | |
| 47.07 | WASTE-SCRAP PAPER | | |
| 48 | PAPER & PAPERBOARD | | |
| 48.01 | NEWSPRINT | 20 | 15 |
| 48.02 | UNCOATED WRITING & PRINT | 20 | 15 |
| 48.03 | SANITARY PAPERS | | |
| 48.04 | UNCOATED KRAFT PAPER & BD | 20 | 15 |
| | 'OTHER' PAPER & PAPERBOARD | | |
| 48.05 | OTHER UNCOATED PAPER/BD | 20 | 15 |
| 48.06 | VEGETABLE PARCHMENT | 20 | 12 |
| 48.07 | COMPOSITE PAPER/BOARD | 20 | 15 |
| 48.08 | CORRUGATED PAPER/BD | 20 | 15 |
| 48.09 | CARBON PAPER ETC | 30 | 25 |
| 48.10 | COATED PAPER & PAPERBD | 25 | 20 |
| 48.11 | IMPREG PAPER/PAPERBD | 20 | 15 |
| 48.12 | FILTER BLOCKS | 20 | 12 |
| 48.13 | CIGARETTE PAPER | 70 | 60 |
| 48.14 | WALLPAPER ETC | | |
| 48.15 | FLOOR COVERINGS | 50 | 35 |
| 48.16 | OTHER CARBON PAPERS | 40 | 30 |
| 48.17 | ENVELOPES, LETTER | 50 | 40 |
| 48.18 | TOILET PAPER ETC | | |
| 48.19 | CARTONS, BOXES, BAGS | 50 | 35-40 |
| 48.20 | REGISTERS, NOTEBOOKS | 50 | 40 |
| 48.21 | LABELS ETC | | |
| 48.22 | BOBBINS & SPOOLS | 20-40 | 12-30 |
| 48.23 | OTHER PAPER & PAPERBD | 20-150 | 15-50 |

Revised rates as announced November 1995, Scheduled for Implementation by April 1, 1996