

Working Paper

Outlook for Russian Forest Product Trade with People's Republic of China

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WP-96-72

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

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

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.

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

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 Suifenhe Timber 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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Seattle, Washington, USA & Laxenburg, Austria
July, 1996

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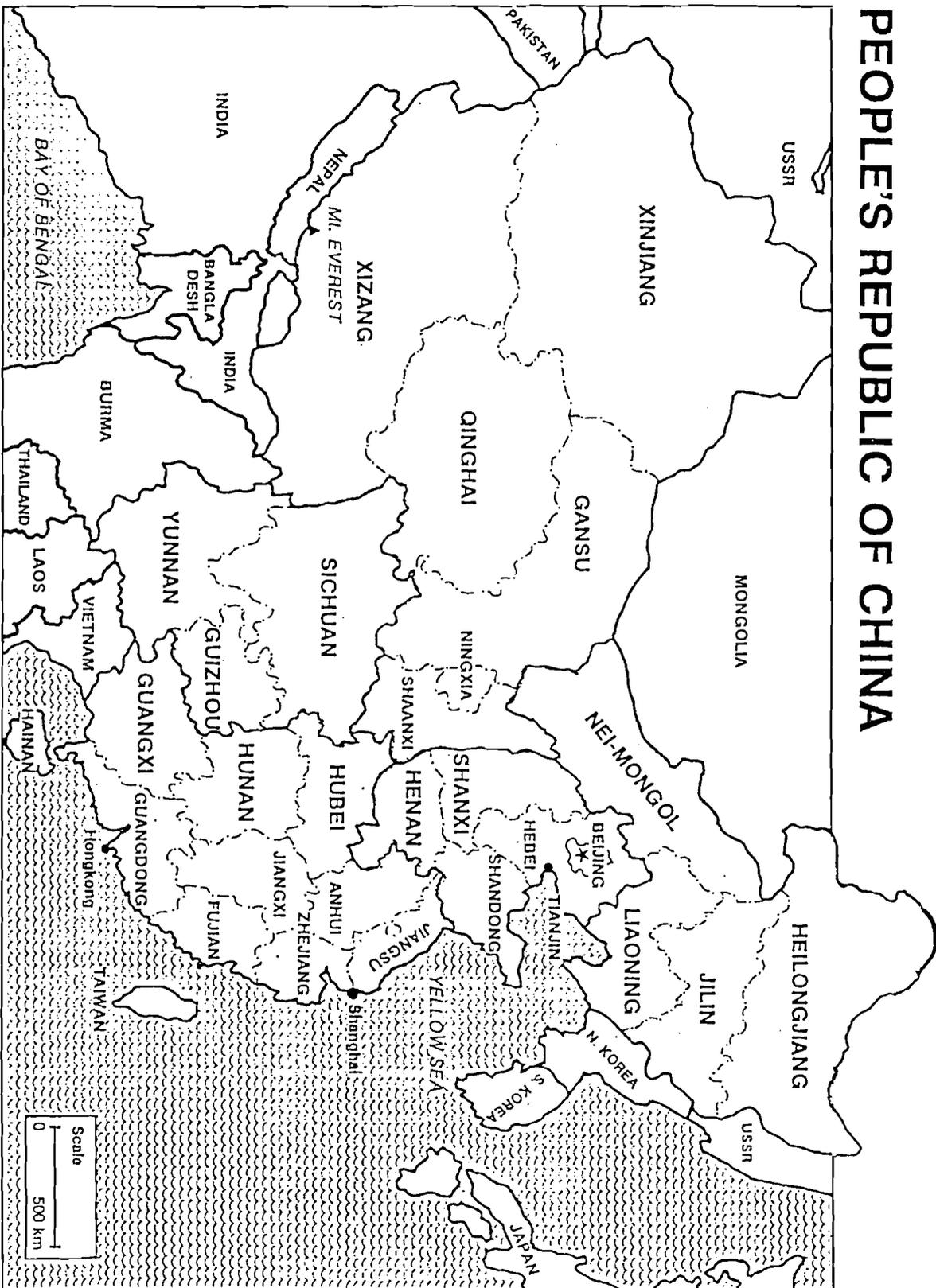
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PEOPLE'S REPUBLIC OF CHINA



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
Shrubbery	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%
Shrubbery	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							
Bamboo Area	100 ha	118,296	1,868	13,129	66,442	81,439	69%
	100 ha	10,491		1,702	8,545	10,247	98%
New Plantation							
Scattered Forests	100 ha	71,383	13,614	5,172	41,765	60,551	85%
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 is 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	Ten Southern Collective Forest Provinces			Major Region Subtotal	Three-Region % Share of Total
			Northeast and Inner Mongolia	Sichuan and Yunnan			
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.

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 its 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 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				TOTAL	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

	SAW/VEN LOGS	INDUSTRIAL ROUNDWOOD			TOTAL	FUELWOOD	TOTAL ROUNDWOOD
		PULPWOOD	OTHER	TOTAL			
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).

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

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	WOOD PULP	PAPER & BOARD
1976	10,608,000	6,295,000	16,903,000	750,000	3,343,000
1977	11,167,000	6,610,000	17,777,000	804,000	3,636,000
1978	11,725,000	6,941,000	18,666,000	938,000	4,139,000
1979	12,311,000	7,288,000	19,599,000	1,046,000	4,929,000
1980	12,927,000	7,652,000	20,579,000	1,108,000	5,346,000
1981	13,573,000	8,035,000	21,608,000	1,108,000	5,402,000
1982	14,252,000	8,437,000	22,689,000	1,108,000	5,890,000
1983	14,732,000	8,721,000	23,453,000	1,114,000	6,613,000
1984	16,474,000	8,870,000	25,344,000	1,195,000	7,560,000
1985	17,388,000	9,372,000	26,760,000	1,512,000	9,112,000
1986	16,928,000	9,122,000	26,050,000	1,610,000	10,004,000
1987	16,928,000	9,122,000	26,050,000	1,625,000	11,411,000
1988	16,888,000	9,100,000	25,988,000	1,695,000	12,645,000
1989	16,027,000	8,637,000	24,664,000	1,700,000	13,333,000
1990	14,788,000	7,965,000	22,753,000	1,693,000	13,989,000
1991	11,526,000	8,578,000	20,104,000	1,738,000	14,779,000
1992	11,180,000	7,720,000	18,900,000	1,829,000	16,196,000

*****cubic meters*****

*****metric tons*****

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

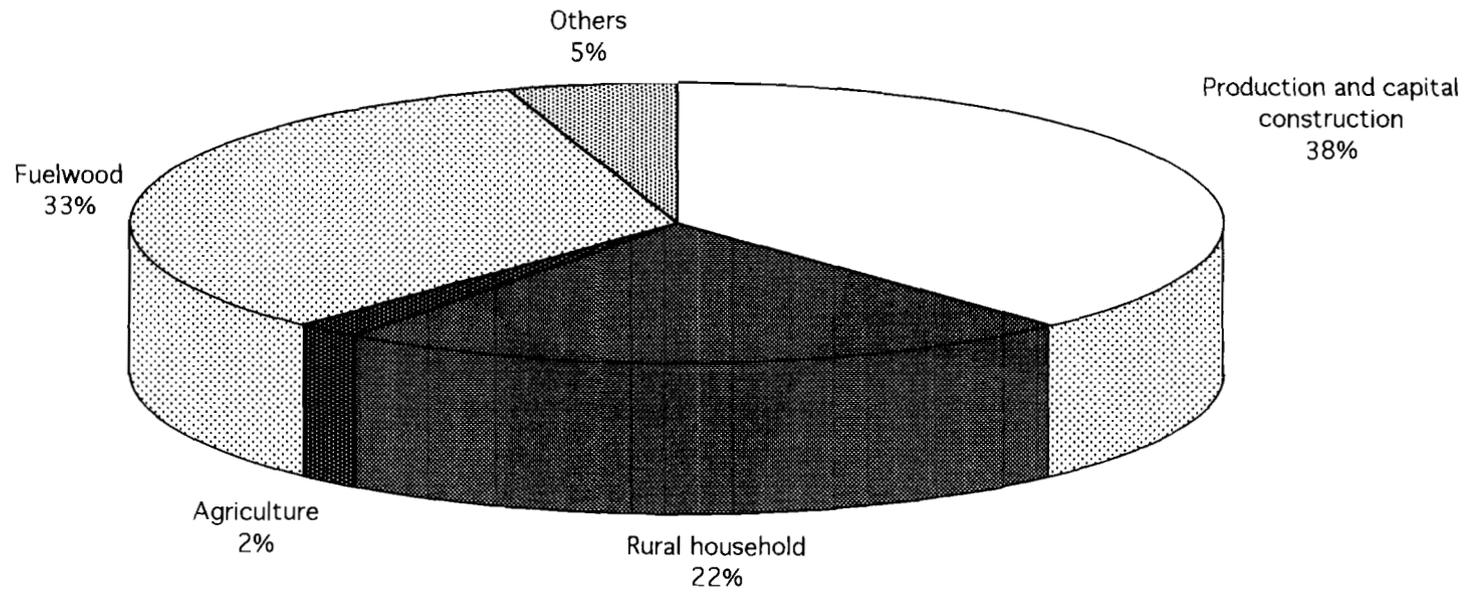
From: Gao, 1988, NFPA 1986

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.

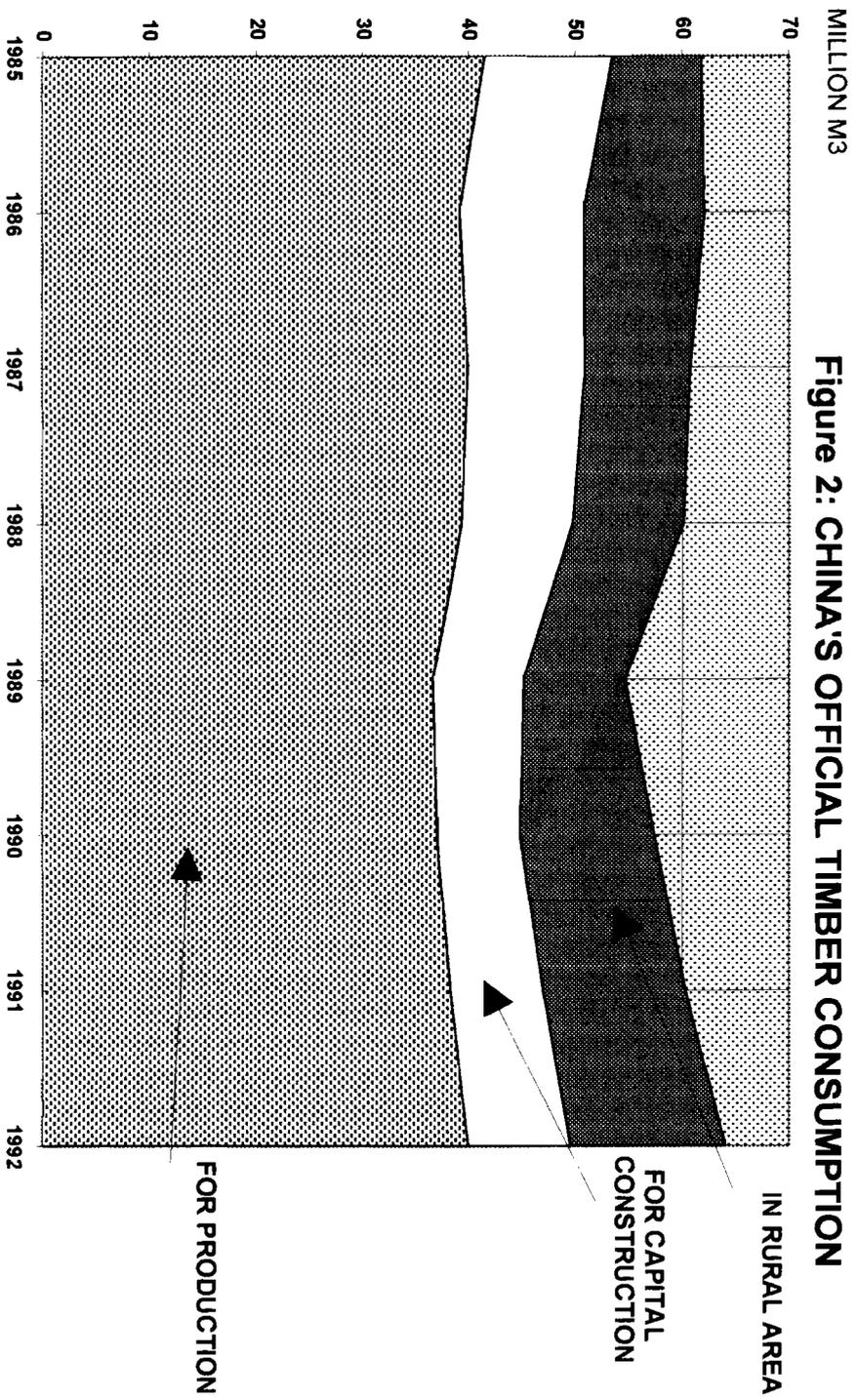
The official State Plan consumption for the three major uses is shown in Figure 2 for the period 1985-92. Official consumption has averaged about 60 million cubic meters. Combined production and capital construction use has averaged approximately 50 million cubic meters. The rural sector use has increased, 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

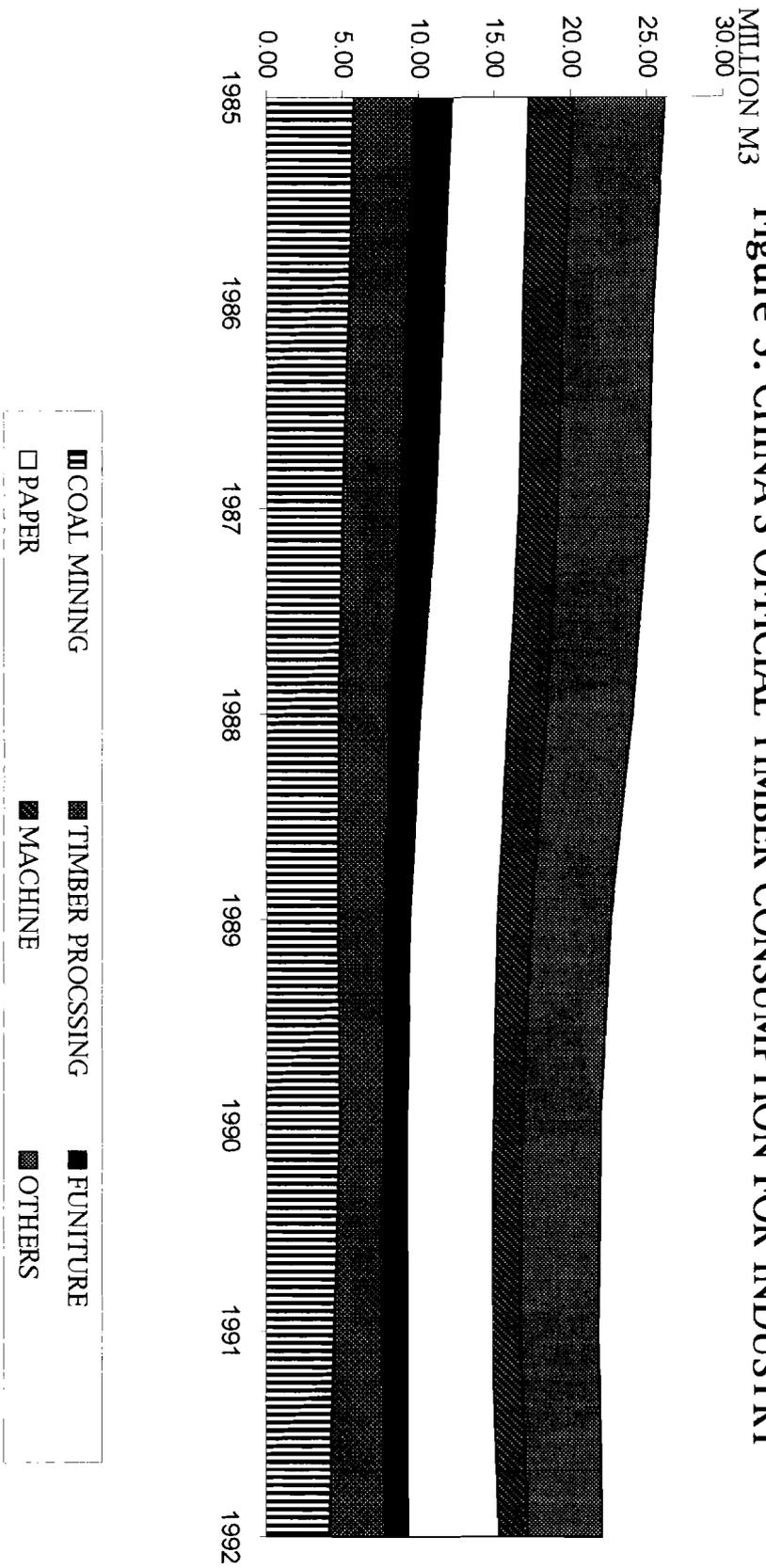


Source: Ministry of Forestry, China, 1993



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, particularly 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".

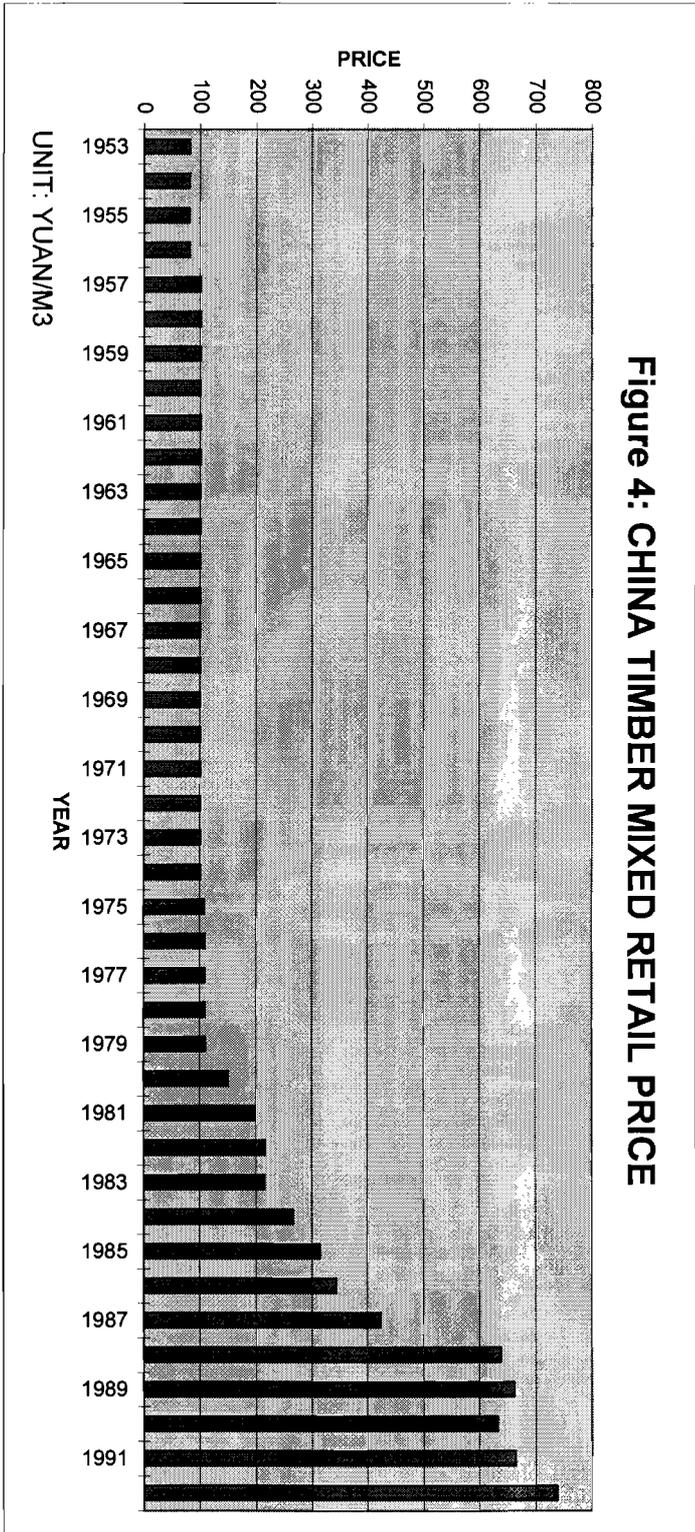


Figure 4: CHINA TIMBER MIXED RETAIL PRICE

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"	Potential Domestic 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 its 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 Commodities⁵ 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	4,038,732	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	5,635,780	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, Writing 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 Stationery	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). Complete 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	LALUAN	268,006	105,343	93,052	
4403.33	TEAK & OTHER				
4403.331	TEAK	27,333	47,336	24,149	
4403.332	OTHER	53,318	6,682	24,226	
4403.34	OKOUME ETC (TRDP)	225	68,692	213,137	
4403.35	TIAMA ETC (TROP)	128	2,752	9,490	
4403.91	OAK	6,507	1,782	1,332	
4403.92	BEECH	56	1,257	630	
4403.99	OTHER NON-CONIFER	1,801,274	1,544,393	1,597,906	
4403.995	PHOEBE	60	914	2,685	
4403.996	CAMPHOR	11,260	3,147	3,317	
4403.997	ROSEWOOD	127,384	58,965	56,524	
4403.998	KIRI	5,544	8	7	
4403.999	OTHER	1,867,026	1,481,359	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				
4407.211	TEAK	10,956	16,452	14,986	
4407.212	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				
4407.995	CAMPHOR	25,801	27,692	50,967	
4407.996	PAULOWNIA	266	1,354	3,927	
4407.999	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	MPREG 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	1,562,728	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				
4403.33E	TEAK	9,517	18,147	8,278	
4403.33E	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	
4403.95E	PHOEBE	12	176	253	
4403.95E	CAMPHOR	1,472	706	965	
4403.95E	ROSEWOOD	30,767	15,355	17,578	
4403.95E	KIRI	405	2	1	
4403.95E	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				
4407.95E	CAMPHOR	6,693	8,306	12,523	
4407.95E	PAULOWNIA	84	215	559	
4407.95E	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	42,038	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	11,628	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	8,210	
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/BDARD	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	11,615	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							
Z	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							
2511	Waste Paper, Paperboard, etc	kg		8,190,534	9,808,292	7,390,011	5,571,642	3,227,522
2512	Mechanical Wood Pulp	kg			360,557	447,754	231,625	
2516	Chem Wood Pulp, Dissolving	kg						18,126
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	1,132,468
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	LAJAN		92	110	
4403.33	TEAK & OTHER	0	0	3,233	
4403.33	TEAK				
4403.33	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	
4403.95	PHOEBE				
4403.95	CAMPHOR		918	1,057	
4403.95	ROSEWOOD				
4403.95	KIRI				
4403.95	OTHER		55,223	64,001	
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			
4407.95	CAMPHOR		75		
4407.95	PAULOWNIA				
4407.95	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	
44.13	OTHER WOOD PRODUCTS (Kg)	514,311	1,072,794	733,607	
44.14	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	
47.02	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	652,200	6,656,313	4,530,115	
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	
48.04	'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	1,131,680	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	43,767,438	58,135,283	35,092,000
44.01	FUELWOOD	105,645	16,694	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	LALUAN		7,429	8,725	
4403.33	TEAK & OTHER				
4403.331	TEAK				
4403.335	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				
4403.995	OTHER		4,226,053	8,316,715	
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				
4407.215	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		
4407.995	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	
44.13	OTHER WOOD PRODUCTS	118,104	232,067	146,332	
44.14	DENSIFIED WOOD	18,693	7,756		
44.15	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	2,838,736	7,852,471	10,001,235	48,885,000
47.01	MECH WOOD PULP	466,708	212,612	280	
47.02	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	738,819	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	
48.05	'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)		% of Total
		Total	Russia	
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

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

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

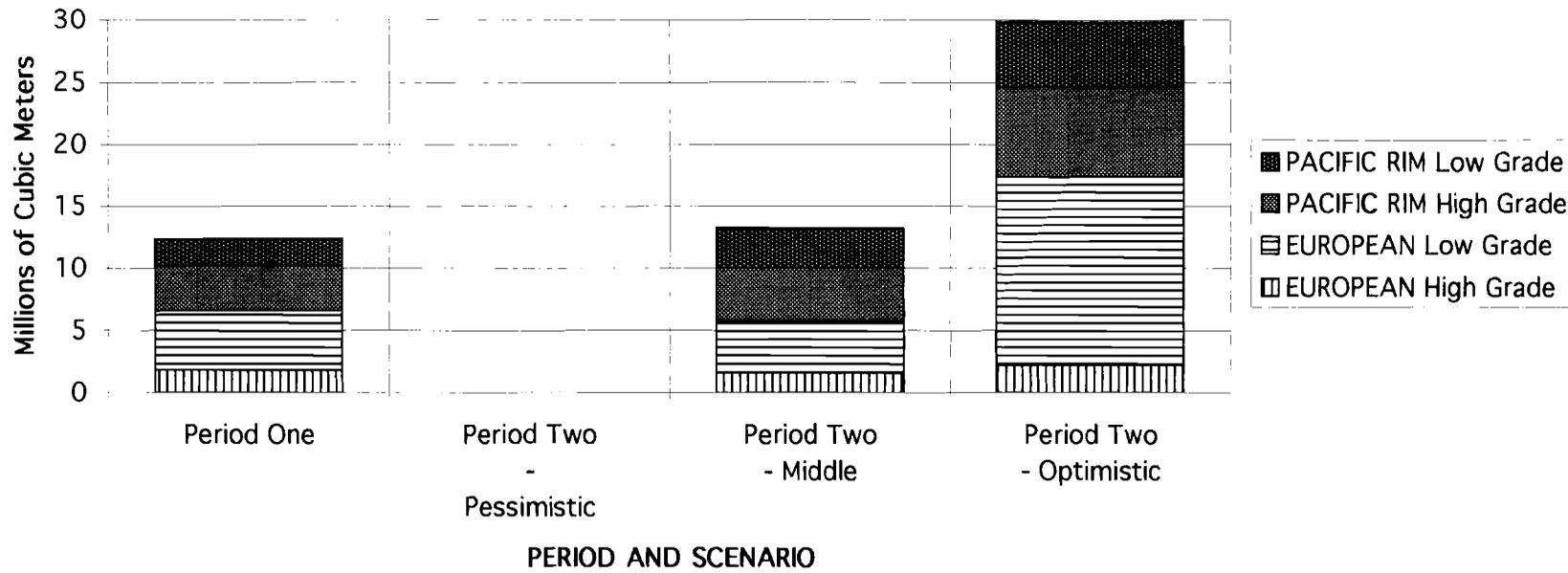
State subsidies are eliminated. Estimates of possible future trends in production and trade are reported by Backman and Waggener (1994) and Backman (1995, 1996). These estimates utilize the Russian Forest Sector Model developed by Backman (1993). The analysis integrates the dynamics of the near term 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 resource tied up in the potential fiber flow resource could by 2040 be exporting in the vicinity 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

	SAW/VEN. LOGS	INDUSTRIAL ROUNDWOOD		TOTAL	FUELWOOD	TOTAL
		PULPWOOD	OTHER			
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

	SAW/VEN. LOGS	INDUSTRIAL ROUNDWOOD		TOTAL	FUELWOOD	TOTAL
		PULPWOOD	OTHER			
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

	SAW/VEN. LOGS	INDUSTRIAL ROUNDWOOD		TOTAL	FUELWOOD	TOTAL
		PULPWOOD	OTHER			
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

	SAW/VEN. LOGS	INDUSTRIAL ROUNDWOOD		TOTAL	FUELWOOD	TOTAL
		PULPWOOD	OTHER			
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 Percent	Proposed
44 WOOD PRODUCTS			
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

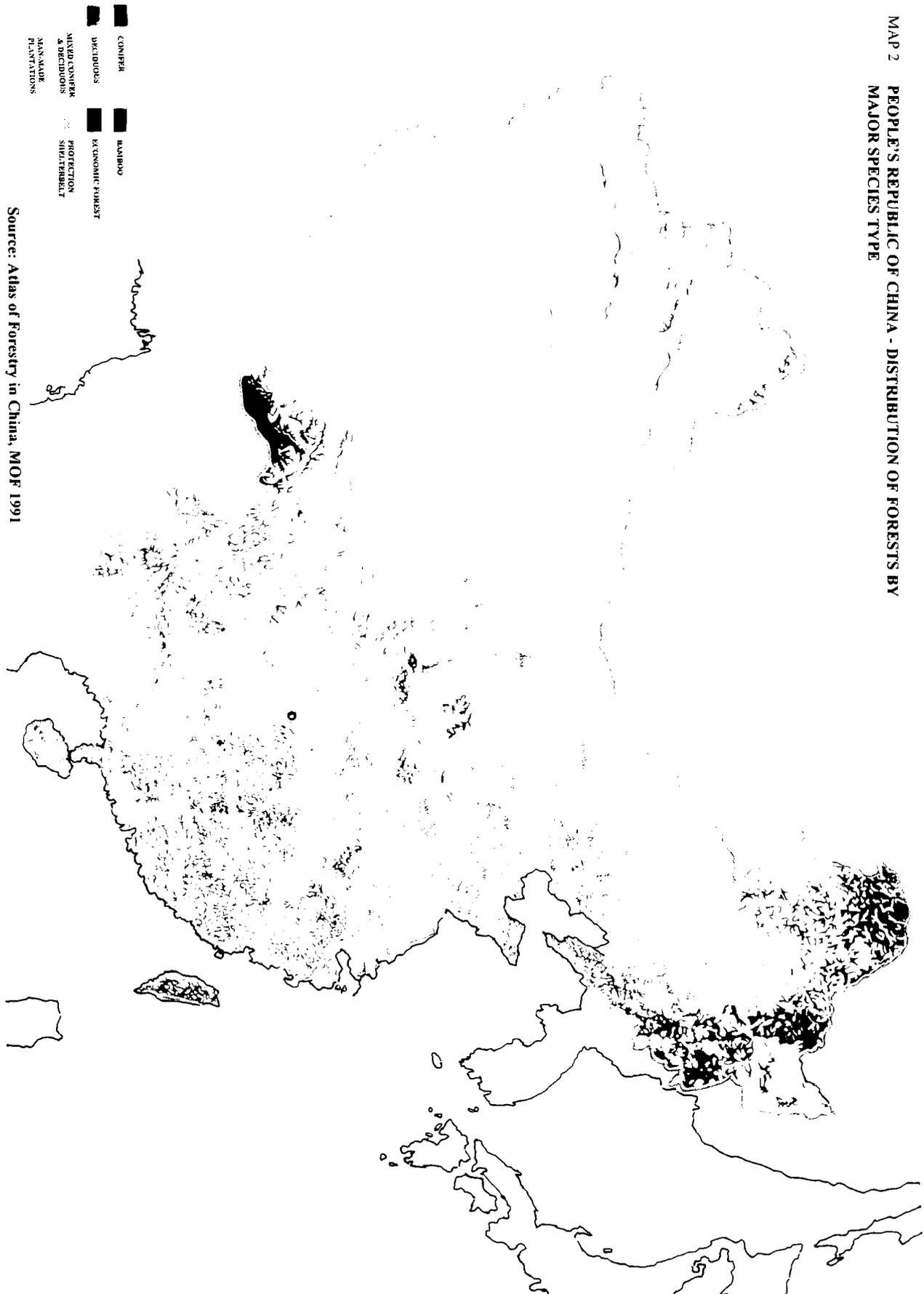
PEOPLE'S REPUBLIC OF CHINA - FOREST PRODUCTS TARIFF RATES (cont'd) *

CODE	COMMODITY	TARIFF	
		Current Percent	Proposed
	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

MAP 2: People's Republic of China - Distribution of Forest by Major Forest Type

MAP 2 PEOPLE'S REPUBLIC OF CHINA - DISTRIBUTION OF FORESTS BY MAJOR SPECIES TYPE



Source: Atlas of Forestry in China, MOF 1991

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