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Forest Products and The People's Republic of China

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Thomas R. Waggener

CENTER FOR INTERNATIONAL TRADE IN FOREST PRODUCTS
UNIVERSITY OF WASHINGTON
COLLEGE OF FOREST RESOURCES AR-10
SEATTLE, WASHINGTON 98195

FOREST PRODUCTS

AND

THE PEOPLE'S REPUBLIC OF CHINA

CINTRAFOR WORKING PAPER 23

Thomas R. Waggener
Center for International Trade
in Forest Products
College of Forest Resources
University of Washington
Seattle, Washington 98195

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Preface

Forestry and forest products in the People's Republic of China is a large and complex subject - just as China itself is large. The contemporary ties between the forestry and forest products community in China and the College of Forest Resources at the University of Washington formally began in 1980 with the April 24th visit to Seattle by a senior PRC forestry delegation led by Luo Yuchuan, then Minister of Forestry. This delegation included twelve senior officials of the Ministry of Forestry, leading Chinese forestry educational and research institutions, and professional forestry organizations in the People's Republic of China.

The author of this report has been fortunate in terms of opportunities to intensively follow forestry, the forest products industry, international trade, and forestry education and research in the People's Republic of China since that opening in 1980. Five extended visits to the PRC, together with numerous return visits by foresters, educators, and officials to Washington State have contributed greatly to an understanding of the Chinese people and the forestry sector.

All information and interpretations presented in this report are of course the sole responsibility of the author. Appreciation is gratefully extended to those who have contributed to my current knowledge of forestry and forest products in China. China's forestry related organizations most directly contributing freely of their resources include the Ministry of Forestry (Foreign Affairs Department and Education Department), Beijing Forestry University, Nanjing Forestry University, Northeast Forestry University, the Chinese Society of Forestry, the Research Institute of Forestry Economy and the Research Institute of Wood Industry of the Chinese Academy of Forestry Sciences, the China National Forest Products Industry Corporation, and the State Investment Corporation of Forestry.

Within the US, the International Trade Council of the National Forest Products Association, Weyerhaeuser Company, and ITT Rayonier have given freely of their considerable knowledge of China. The Seattle-based representatives of the PRC timber trading organizations, SUNRY (Seattle) Inc and CITIFOR, have shared information and knowledge of trade in forest products with the U.S. Finally, the Washington State China Relations Council has provided important insights into doing business with the PRC.

Although individuals are too numerous to acknowledge, special appreciation is expressed for the cooperation and assistance extended by the China Ministry of Forestry through the efforts of Mr. Yuan Haiying, Official, Foreign Affairs Department. His assistance in arranging for my professional visits to China, his patience in explaining the Chinese culture and the workings of the forestry sector, and his good humor and friendship together exemplify the growing professional relationship between those in the US and China who seek a better mutual understanding.

The draft manuscript of this report was nearing completion when the tragic events of June 3-4, 1989 erupted in Tiananmen Square in Beijing. At this writing, it is still much too early to predict the future course of events that will ultimately determine the path of forestry in China and the important expanding role of forest products trade. The international forestry community can only hope that the collaboration and relationships so carefully constructed in the past decade endure, and will ultimately lead to a renewed and expanding commitment of cooperation.

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Seattle, Washington
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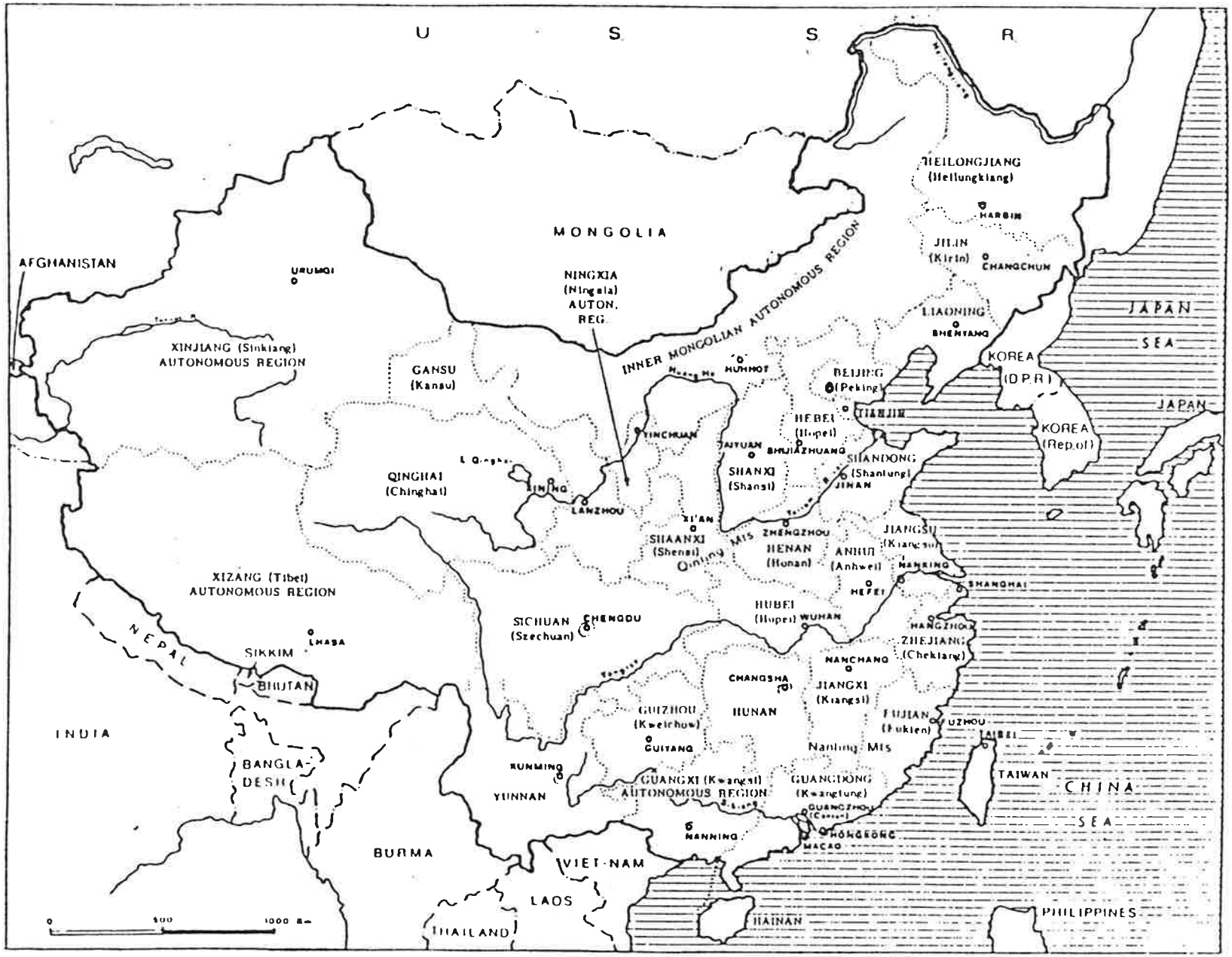

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FOREST PRODUCTS AND THE PEOPLE'S REPUBLIC OF CHINA

During the 1980's, the People's Republic of China (PRC) has emerged as the second leading trading nation with the United States in forest products. In 1987, total forest products exports from the U.S. to the PRC totalled over $343 million, and increased in 1988 to over $615 million, an increase of 81.3 percent in export value. Yet less is probably known about the forestry and forest products economy in the PRC than most other trading partners. The long period of isolation, together with the limited opening to the West since 1979, has restricted first-hand information about this huge and rapidly changing nation.

FOREST RESOURCES IN CHINA

The Forest Land Base

Official PRC government statistics place the forest land base for mainland China at 124.7 million hectares (approximately 308 million acres). This represents about 12.98 percent of the land area of china. An additional 27.7 million ha. are classified as shrub lands and 17.2 million ha. as "open forest" or areas of incomplete stocking. In total, 267.43 million ha. are considered as potential "land for forestry use".

China's long-standing forestry goal is to increase the commercial forest estate to 20 percent of the land base, or to approximately 192 million ha. of productive forest. Initially targeted for the year 2000, this is now expressed as a goal for 2020 or as soon as practical.

Forest land is unevenly distributed in China, with over 60 percent located in the northeast provinces of Heilongjiang and Jilin, and the Southwest provinces of Yunan, Guangdong, and Sichuan. China's major forest zones are shown in Figure 1.

As of 1987, it was reported that there were 4,185 State-administered Forest Farms with 25.75 million ha. of forested lands (gross area of 52 million ha.). The remaining forest is contracted to rural collectives for management.

Forest Inventory

The forests of China currently hold an estimated 9,141 million cubic meters of timber inventory. Commercial forests contain an inventory estimated at 6,160 million cubic meters. Commercial mature forests contain an inventory of 2,622 million cubic meters, with an additional 1,109 million cubic meters on open forest lands or lands with only scattered trees. Over 146 million cubic meters are on lands planted around houses and villages, or on roadsides and/or ditches (MOF, 1989).

Figure 1

Much of the timber inventory (1.1 to 1.2 million cubic meters) is remote and inaccessible for present commercial exploitation. It is estimated that nearly 1/2 of the mature inventory is presently inaccessible. Approximately 54.8 percent of the total inventory is softwood species, a drop from the 70 percent share held in 1965. Hardwoods account for 45.2 percent of inventory. For commercial forestlands, softwoods account for 65.4 percent and hardwoods 36.6 percent of growing stock inventory. Major softwood species are larch, Red Pine and firs, while Eucalypts, poplar and birch are the dominant hardwood species.

The distribution of major softwood species is summarized in Table 1 as of 1984 as compiled by NFPA.

State forest farms were estimated as containing an inventory of 1.713 million cubic meters as of 1987.

Timber Harvests

Estimates of China's timber harvest is largely a matter of speculation, partly due to the nature of the official timber distribution systems and partly due to the continuing rural use of timber for fuelwood. Total wood production in 1986 was estimated by FAO at 266.9 million cubic meters (Figure 2).

Table 1.

DISTRIBUTION OF CHINA'S PREFERRED SOFTWOOD SPECIES STANDS IN 1984

Species	Area		Timber Reserves		Distribution of Stands
	Million hectares	% total forest land	Million m^3	% total resources	
Korean Pine	.4	0.4	84	1.0	Jilin; Heilongjiang
China Fir (Shanmu)	6.1	6.1	237	2.7	Zhejiang, Fujian, Jiangxi, Hubei, Hunan, Guangxi, Sichuan, Guizhou, Shaanxi, Yunnan, Guangdong
Fir (Abies...)	2.7	2.7	812	9.2	Hubei, Sichuan, Yunnan Tibet
Spruce	4.1	4.2	1,175	13.3	HLJ, Shaanxi, Inner Mongolia (IM), Sichuan Tibet, Yunnan
China Larch	10.0	10.1	1,000	11.4	IM, Jilin, HLJ, Sichuan Yunnan, Shaanxi
China Pine	1.2	1.2	40	.4	Hubei, IM, Shaanxi, Liaoning
Masson's Pine (Pinus Massonia)	14.2	14.4	485	5.5	Fujian, Zhejiang, Jiangxi, Hubei, Hunan, Guangdong, Guangxi, Sichuan, Guizhou, Shaanxi
Yunnan Pine	5.8	5.8	432	4.9	Yunnan, Sichuan, Guizh
Cypress	1.3	1.4	45	0.5	Sichuan, Guizhou, Yunnan, Hubei, Shandong Hebei
Other, Mixed	6.4	6.5	761	8.7	Jilin, HLJ, Guangdong, IM, Tibet, Hubei, Sichuan, Yunnan
Total Softwoods	52.2	52.8	5071	57.6	

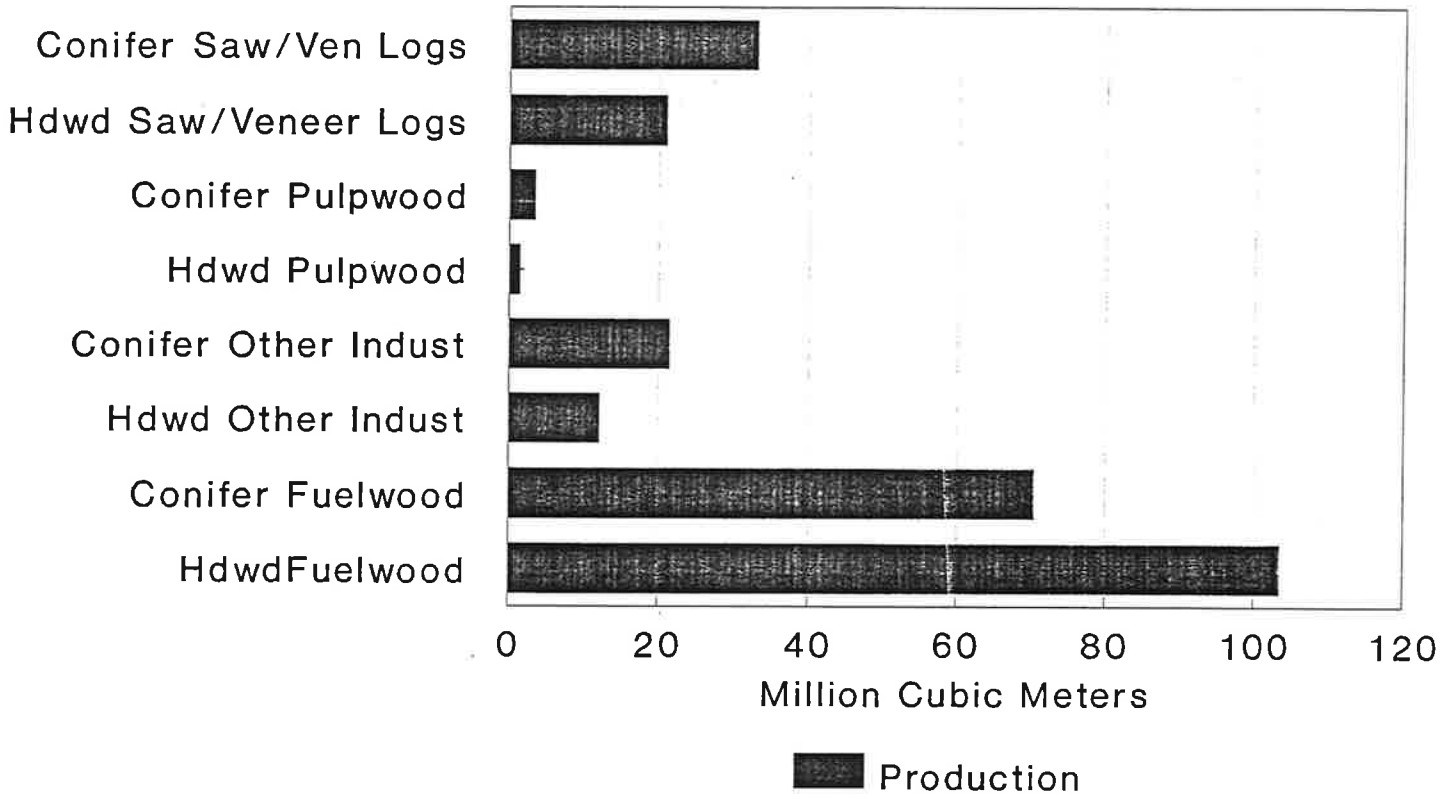
Source: Forestry Yearbook, Contemporary China's Forestry, 1985

Reproduced from NFPA (1986) p. 72

People's Republic of China

Wood Production 1986

Total 266.9 Million Cubic Meters



CINTRAFOR/FAO

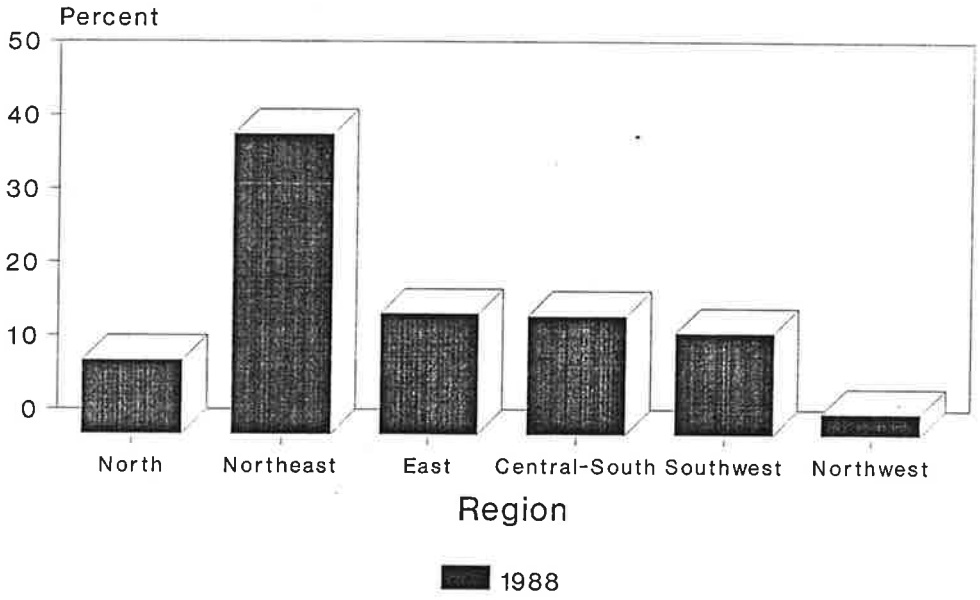
Figure 2.

Of this amount, over 174 million cubic meters was utilized as fuelwood. Sawlog/veneer log production was estimated as 54.1 million cubic meters, with an additional 39 million cubic meters of pulpwood and other industrial materials. The Chinese MOF estimated aggregate wood consumption for all purposes (including illegal cutting) at 390 million cubic meters (MOF, 1989).

Timber production by geographic region is shown in Figure 3, which clearly shows the dominant role of the Northeast and North (over 50 percent) and the Southwest and Central South (30 percent) in terms of harvest.

Figure 3.

Timber Production by Major Geographic Region, People's Republic of China



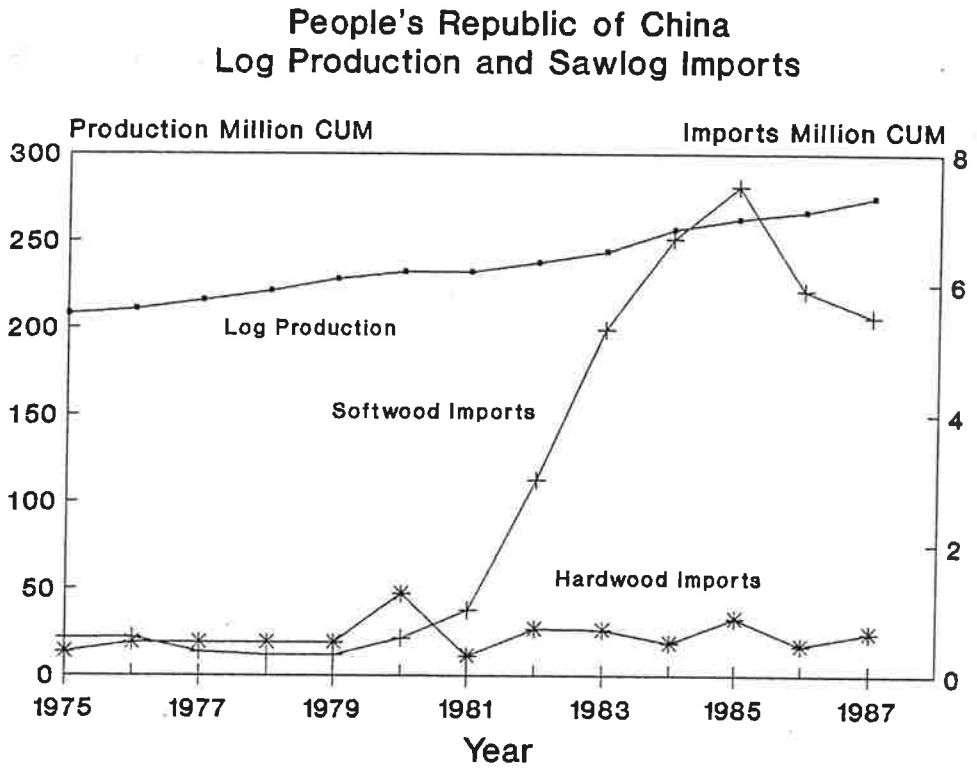
CINTRAFOR/China Daily

Official statistics released by the Ministry of Forestry indicate a total timber output of 64.1 million cubic meters for 1987, inclusive of 53.9 million cubic meters of logs. This harvest, however, represents only the official harvest under the state-administered harvest plan. For recent years, the official harvest has been kept at about 65-70 million cubic meters. It is widely estimated that at least an additional 75-200 million cubic meters of timber are harvested "outside" the state plan, representing both harvest from collective enterprises and illegal harvest for fuelwood and rural construction. Thus, total harvest is likely closer to 250-300 million cubic meters, which is very close to the FAO estimates

Recent MOF estimates place current harvest as high as 344 million cubic meters (MOF 1989).

The estimated trend in total harvest for all uses (both within the State plan and unauthorized harvest) is shown in Figure 4 for the period 1975-87. Also shown are trends for the import of both softwood and hardwood saw/veneer logs.

Figure 4.



Forest Destruction and Reforestation

It is estimated that China has lost 3.82 million hectares of forest land from 1984-88, or approximately 0.5 million ha. of forests per year through overcutting, illegal cutting, and clearing for agriculture, municipal expansion and transportation. A loss of 6.67 million ha. of productive forest was reported for the period 1975-1980. China has planted or seeded an estimated 31 million ha. since the founding of the PRC in 1949. Planting has been accelerated in the last twenty years under the "Green China" program. In 1987, over 3.3 million ha. of commercial forests were reported planted. In total, China reported planting of some 508 million trees in 1987. The 1987 commercial forest plantings are estimated to account for some 61 percent of the planted commercial forest area in China. Plantations (man-planted areas) now account for approximately 25 percent of the total

commercial forest area. However, recent reports indicate that only 26 million ha. of the replanted forest have survived to the extent that acceptable forest stands exist today. Overall, a net reduction in productive commercial forest is still occurring. The MOF reports a reduction from 82.4 million ha. in 1986 to 79.6 million ha. in 1988 (MOF, 1989).

Pressures to increase harvests have greatly reduced the inventory of mature timber. Of the 4000 state timber farms, it is estimated that fully one-half may have no mature timber to harvest by the year 2000. State Forest Farms are organized into 131 Forest Industry Bureaus, located mainly in the Northeast and Inner Mongolia. Some 25 timber bureaus are reported as having no mature timber. The inventory contained in the 131 bureaus has been reduced by almost one-half in the last five years (1984-88), from 1,450 million cubic meters to 740 million cubic meters (MOF, 1989)

China had established some 2,137 State-owned seed nurseries up to 1987 containing some 65,000 ha. State-run nurseries produced as estimated 13 percent of total seedlings planted in 1987.

In recent years, approximately 5 million ha. per year have also been seeded, with a reported 85 percent survival rate. Elsewhere, however, a "successful" reforestation rate of only 25 percent is reported, with an increase in reforested land of only 500,000 ha. per year. The MOF estimates an increase of 5.88 million acres from 1984-1988, or over 1.1 million ha. per year (MOF, 1989). When considered in light of a overall reported losses through illegal cutting and land conversion, expansion of the commercial forest is progressing at best only slowly.

Projections for man-made plantations, however, are encouraging with respect to yields. China estimates that average yields are approximately double that of natural forests. An afforested area of 31.01 million ha. was reported in 1988 as a result of the "high yield plantation" (HYP) program. In the 1985-90 planning period, some 1.67 million ha. of commercial HYP forest are anticipated to be planted. In 1987, plantings were 0.45 million ha. of HYP plantations. The balance was for "economic forests", "shelter forests" and other non-commercial purposes. Total HYP plantings of 6.7 million ha. are anticipated by 2000. Average survival rates of 85 percent are reported to date (MOF, 1989).

Total current growth is estimated as 1.5 percent on total mature inventory. Average yield is reported by the MOF at 77.1 cubic meters per ha at final harvest. Larch in the Northeast is estimated as yielding about 70 cubic meters per ha. from natural stands, with managed yields expected to be double this level. Red pine in the NE currently yields 100-120 cubic meters per ha. from natural old-growth stands.

Heilongjiang Province, in the Northeast, is a clear example of the changing nature of forests and timber in China. This major Province has an estimated 15 million ha. of forests, or almost 32 percent of land area, containing an inventory of 1.5 billion cubic meters. While well above the national averages, this situation is in stark contrast to earlier periods. About 1900, Heilongjiang Province had some 33 million ha. of forests with over 4 billion cubic meters, and in 1949 there was some 20 million ha. of forests with 2 billion cubic meters of inventory.

A very large forest fire occurred in 1987 in the Daxinganling Mountains in northern Heilongjiang Province. A total of 1.14 million ha. was burned, including an estimated 870,000 ha. (70 percent) which was forest. Essentially all trees were fire-killed on an estimated 440,000 ha. This represents approximately 7.5 percent of the forest in this major timbered province. An estimated 39.6 million cubic meters of standing timber was killed, or a volume equal to over half of the official State-planned harvest. On 1/3 of the burned area it was estimated that over 70 percent of trees were killed, and on another 1/2 of the area, between 10-20 percent of trees were killed. In addition, about 855,000 cubic meters of harvested timber and wood in log yards was burned.

Following the fire in Heilongjiang Province, a major international response was extended to assist in both timber salvage and reforestation of the damaged area. Major funding was provided by the World Bank, as well as through several bilateral agreements with individual nations. Total funding for this major effort to date is approximately $US 21 million.

Salvage plans call for removal of 14-15 million cubic meters of fire-damaged timber over a three year period, ending in April 1990. The target for 1988 was 4.5 million cubic meters, including 1.7 million cubic meters considered under the State plan. Offsetting this was a planned reduction of 2 million cubic meters of "normal" cutting.

By March 1989, some 4 million cubic meters of fire-killed or damaged timber had been harvested and accumulated in Heilongjiang Province storage yards due to a critical shortage of transport facilities, including rail cars. The Tahe Forest Farm, the second largest in the northeast, had cut an estimated 1 million cubic meters of fire-damaged timber, but had been able to ship only approximately 600,000 cubic meters due to a shortage of rail cars.

Balance of Consumption, Growth and Harvest

Estimates of actual wood consumption in the People's Republic of China vary widely, reflecting the official tendency

to report only official statistics related to timber allocated under the State plan. Differences also arise from reporting of harvest or roundwood removal estimates, on the one hand, and actual product consumption following conversion to primary products. A significant volume of roundwood is wasted both in harvest and conversion - a problem now being seriously addressed in forest policy discussions in the PRC.

All estimates recognize that total consumption of wood greatly exceeds current domestic production capacity that can be sustained in the near future. FAO statistics indicate a gross consumption of 273.4 million cubic meters in 1986, inclusive of industrial wood, pulpwood, and fuelwood. As noted above, domestic roundwood production was estimated at 266.9 million cubic meters, indicating a 1986 production deficit of 6.5 million cubic meters. As was indicated earlier, the MOF estimates 1988 total consumption at 344 million cubic meters.

More important than broad ranging estimates of consumption, however, is the inability of the forests of China to 1) sustain the level of cut currently obtained, 2) to allow progress in forest management and reforestation, and 3) to respond to China's rapidly growing demands resulting from economic growth and reforms which stimulate construction activity and overall wood use.

Official Ministry of Forestry production goals for timber from State Forest Farms under the State plan have been held at the 65-70 million cubic meter level in recent years. In 1987, the target was 60.5 million cubic meters. As approved by the State Council, total timber harvest in China for the period 1987-1990 should be held within a limit of 126.338 million cubic meters. This represents a change in the definition of harvest under the State plan to include all legal cuttings (except "local" firewood) and is designed to be consistent with the growth capacity of the commercial forest (Lin & Xue, 1989). This quota will be "adjusted" every five years according to new updated forest inventory information.

Consumption was estimated as increasing at an annual rate of about 3 percent for the period 1977-1987, with a more recent estimate of consumption growth of 7.7 percent in 1987-88. In large part, this growth in consumption is fueled by the rapid growth in rural housing construction outside the state plan. As acknowledged by FAS (1988): "China's peasants are building millions of homes each year with the aid of wood without official permission."

Table 2 indicates the range of recent estimates of total wood consumption together with estimates of forest growth.

Table 2.

PRC Timber Consumption and Growth

Source	Year	Consumption	Growth	Apparent Deficit
		(Million Cubic Meters)		
FAS	1986	200+	140	60
FAS	1987	269	213	56
FAS	1988	290	230	60
NFPA	1988	400	300	100
*MOF	1985	399	299	100

* Includes 44.45 million cubic meters "natural loss"

In spite of the variations in the estimates, it is apparent that current harvest and consumption exceeds likely forest growth by something approaching 60 million to 100 million cubic meters per year. In the past seven years, according to the MOF, the average overcutting for all uses (including illegal harvests) was 170 million cubic meters. (MOF, 1989).

The timber deficit, obviously, can be addressed in several ways: continue overcutting in the short term to increase domestic supply, increased net imports to expand supply, greater (more efficient utilization) of current gross roundwood volume available from domestic and import sources, and/or forced reductions in consumption through marketplace regulation. All four factors are relevant in the present timber situation. In the longer term, domestic supply can be enhanced through afforestation and reforestation efforts. Current projections indicate a "target" of 100 million cubic meters of output within the state plan by the year 2000, at which time consumption (State) is also projected at 156 million cubic meters, indicating the chronic long term problem of a substantial timber deficit.

Wood allocated under the State plan is largely processed in sawmills and facilities operated under the Ministry of Forestry (MOF) provincial and municipal timber supply corporations, and other ministries with raw material requirements. An estimated 155 sawmills are operated by the MOF, with another 500-700 mills operated by provincial and municipal timber supply bureaus and corporations. In 1986, total sawmill capacity was an estimated 25 million cubic meters (sawnwood) while production realized was only 15 million cubic meters. Although there are also a very large number of other enterprises and small mills processing wood, these are quite

small and the total wood consumed in these operations is minor in comparison. At present, pulp and paper facilities (largely under the Ministry of Light Industry) utilize relatively small volumes of wood-based fibers. Most wood fiber is obtained through the utilization of wastewood, residues, and small, "non-commercial" roundwood (Li, 1989). Total paper production in 1986 was approximately 10 million tons, with 6.6 million tons of pulp. Only 22 percent of pulp fiber was from wood-based sources.

DEMAND AND CONSUMPTION OF WOOD IN THE PRC

Economic reforms in the PRC, particularly since 1980, have lead to rapidly expanding demands for all basic commodities and materials, including wood products.

The composition of "planned" consumption under the State plan, as reported by FAS (1987) is shown in Table 3.

Table 3.

PRC Estimated End Use of Wood under State Plan

End Use	Volume (Million Cubic Meters)
Capital Construction	15.0
Mining Timber	9.1
Packaging	5.0
Firewood	5.4
Paper	5.4
Furniture	3.1
Agriculture	2.3
Vehicles	2.0
Plywood	1.0
Railroad Ties	0.7
Telephone Poles	0.7
Pilings/supports	0.5
Music, Sports, Shoes, etc	0.6
Other Misc.	13.0
TOTAL	64.1

Source: FAS, 1987

As noted, cutting outside the "plan" could be 250 million cubic meters or more. Based on MOF estimates, the cutting outside the State Plan in 1988 was 284 million cubic meters, including illegal cutting. Much of the wood cut outside the State plan goes to rural housing and fuelwood, although an increasing volume is finding its way into commercial markets in

response to the dual pricing system whereby the free market price is frequently double the state administered price. Rural peasant housing is estimated to total some 9 million units per year, with a floor space of 100 square meters/unit (almost double the urban average). For 1987, this use alone was estimated by FAS (1987) at 175-190 million cubic meters.

INTERNATIONAL TRADE

The imbalance between domestic timber production (harvest) and growing demand has, in part, been met through greater wood imports. The trend in the import of both softwood and hardwood sawlog and veneer logs was shown in Figure 4. Although China has sought to expand exports (including wood) in order to provide greater foreign exchange, wood exports to date have been minor. Rather, the clear picture is one of greater import of wood to meet the current and projected deficit in the domestic ability to satisfy demand.

Table 4 summarizes estimates of harvest and imports which have been compiled by FAS based on China's official state statistics.

Table 4.

PRC Harvest and Import of Wood 1987-89

Category	Volume (1000 Cubic Meters) Harvest	Import
Roundwood		
Total Roundwood		
1989 (proj)	70,000	10,000
1988	69,000	9,900
1987	68,430	6,496
Softwood Logs		
1989 (proj)	45,500	9,500
1988	45,500	9,000
1987	45,164	5,684
Hardwood Logs (Temp)		
1989 (proj)	23,500	85
1988	23,500	85
1987	23,266	79
Hardwood Logs (Trop)		
1989 (proj)	0	825
1988	0	825
1987	0	798

Source: FAS, 1988

The overall Role of Imports of Forest Products

As a consequence of both overcutting of domestic forests, and the rapid expansion of demand, the import of roundwood has grown to 10 million cubic meters. Over 90 percent of this volume is softwood species, heavily dominated by exports from the U.S. Pacific Northwest and the Soviet Union.

For 1987, the U.S. supplied 2.9 million cubic meters of softwood logs, while the USSR furnished over 2.4 million cubic meters. Smaller volumes were obtained from Canada, Chile, and Malaysia. Imports of hardwood logs in 1987 were mainly tropical species, primarily from Malaysia (676 thousand cubic meters), with smaller volumes from Canada, Indonesia, Laos, and Chile.

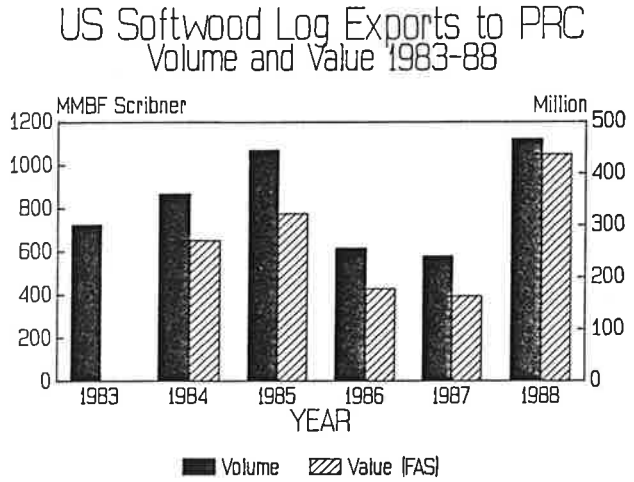
Figure 5 shows log exports from the U.S. to the PRC for the years 1983-88. Exports rose rapidly following the opening of China to the West. In 1986, exports declined sharply, reflecting (primarily) tightening of foreign credit in response to dropping reserves. Trade in logs, however, resumed a rapid increase in late 1987, with a continuation through 1988. Major China ports for importation of wood are Shanghai, Qinhuangdao (Hebei Province), and Lianyungang (Jiangsu Province). Major U.S. west coast shipments are from the Ports of Tacoma, Olympia, Aberdeen-Hoquiam, Longview, Pt. Angeles and Everett in Washington State and Coos Bay and Portland in Oregon State.

Increased border trade with the USSR has also impacted China's importation of wood. Largely through barter agreements (textiles and coal), the USSR has supplied China with increasing volumes from the Soviet Far East. Thawing relations between China and the USSR have led to a tenfold increase in trade since 1981. The increasing level of bilateral Sino-Soviet trade is mirrored in the increase in trade in forest products. Trade is primarily in roundwood.

For the period 1986-1990, agreements called for approximately 16 million cubic meters of Soviet wood to be delivered to China. In 1987, deliveries under barter agreements fell 35 percent short of targets. For 1988, planned deliveries were for 3.5 million cubic meters, although reported shipments again fell short (delivery of approximately 2.2 to 2.4 million cubic meters) due to labor shortages in the USSR and transportation and rail car shortages in both countries.

In 1986 China also negotiated boarder agreements with the USSR for the export of Chinese workers to help relieve the soviet shortage. Some 4,000 workers from Heilongjiang Province were reported working in the USSR in 1988 (construction, logging, farming, factory assembly) with the potential for an additional 5,000 workers in the near future. The arrangements for such additional forest workers is presently under negotiation.

Figure 5.



Summary estimates by FAS for major processed wood products are shown in Table 5 for the years 1987-89.

As revealed by Table 5, the PRC imports relatively little in processed wood products. Imports of softwood lumber in recent years has averaged 130 thousand cubic meters, almost all exported by Canada (British Columbia). Small volumes are reported from the Soviet Union, shipped via Mongolia. Tropical hardwood plywood is obtained in significant quantity from Malaysia (65 percent) and Indonesia (35 percent). No significant volumes of other processed wood products (excluding pulp and paper) have been imported by the PRC recently.

Overall, the PRC imported an estimated 10 million cubic meters of wood and wood products for 1988. Over 82 percent of this volume was imported directly by China Tushu or coordinated by this organization on behalf of other ministries, state and provincial governments or economic enterprises with foreign exchange earnings.

Volumes imported in 1988 by China Tushu are reported by source as shown below:

Source of Imports	Volume (Mill Cubic Meters)
North America	
US and Canada	4.7
E. Europe, USSR & Korea	2.7
Brazil & Chile	.3
Malaysia, New Zealand	.5
TOTAL (Tushu)	8.2

Table 5.

PRC Production and Import of Wood Products 1987-89

Category	Volume (1000 Cubic Meters) Production	Import
Sawnwood		
Total Sawnwood		
1989 (proj)	17,800	135
1988	17,500	130
1987	16,300	125
Softwood Lumber		
1989 (proj)	10,800	135
1988	10,500	130
1987	9,780	125
Hardwood Lumber (Temp)		
1989 (proj)	7,000	0
1988	7,000	0
1987	6,520	0
	(Volume Cubic Meters)	
Softwood Plywood		
1989 (proj)	650,000	0
1988	575,000	0
1987	506,000	0
Hardwood Plywood (Trop)		
1989 (proj)	0	275,000
1988	0	265,000
1987	0	255,000
Hardwood Plywood (Temp)		
1989 (proj)	150,000	0
1988	135,000	0
1987	126,600	0
Panel Products		
Medium Density Fiberboard		
1989 (proj)	1,450,000	0
1988	1,250,000	0
1987	1,087,000	0
Particleboard		
1989 (proj)	275,000	0
1988	250,000	0
1987	224,000	0

Source: FAS, 1987, 1988

Given the domestic timber situation with harvest and growth, together with economic growth and consumption projections it has been widely reported that the "economic need" for wood imports could potentially grow to as much as 50 million cubic meters per year towards the end of this century. It is uncertain, however, how China's political and economic policies towards trade will respond to the "needs"; it is unlikely that present economic conditions would permit policies favoring substantial increases in import volumes over the next decade or more.

Economic and Consumption Policies: Timber Substitution

The rapid push for economic reform and development in China has resulted in major supply problems for all construction materials including wood products. This pressure has led to the higher harvest levels imposed on the domestic forest resources of China, and the consequent problems of overcutting on many forest farms and timber bureaus managed within the State system by the Ministry of Forestry, rapid cutting on lands controlled by cooperative enterprises, and illegal cutting by peasants and others.

As reported by the China Daily in March 1989, overall timber demand in China has increased by 44 percent in the past six years, with "official" consumption rising from 52.5 million cubic meters in 1982 to over 75 million cubic meters in 1988.

Official government policy has been to discourage and/or prohibit the use of wood in many applications over the past six years. For most forms of capital construction and investment, non-wood materials including cement, brick and steel have been promoted as a means of conserving the scarce timber supply -both domestic and imported.

This element of "demand management" and product substitution has been pursued with only limited success, although actual results are exceedingly difficult to measure in practice. Demand for wood has continued to grow at rates equal to or above the rate of economic growth. At best, demand management policies have dampened the rate of growth for wood products demand rather than generating actual reductions in demand and/or consumption.

It is widely acknowledged that wood imports must and will play a growing role in meeting the domestic supply-consumption imbalance for at least the next four decades. As noted, import "requirement" projections of from 56 to 100 million cubic meters have appeared in the China press and in independent market appraisals in both the U.S. and Canada. The realization of such trade "requirements" will largely be determined by central economic policies imposed by the State, particularly those related to the allocation and use of foreign exchange. Actual imports will almost certainly exceed current levels but

will remain well below such unconstrained estimates.

During the 6th Five-Year planning period (1981-85), the PRC claimed to "save" 45 million cubic meters of wood consumption through substitution guidelines and restrictions. For the 7th Five-Year planning period (1986-1990), the targeted consumption savings was set at 66 million cubic meters, or about 20 percent of the anticipated allocation of timber under the State plan.

In 1987, the Chinese government implemented a strategically important shift in policy involving efforts to substantially improve the recovery and comprehensive utilization of the timber supply which is (and will be) available. Losses in current timber processing are estimated to total at least 18 million cubic meters per year. Thus, a renewed central effort is now directed to not only enhancing the gross timber supply, but to also extend the effective recovery from that volume in terms of end use products.

Estimates place natural losses in the forest (fire and disease) at levels of up to 100 million cubic meters annually. The MOF reports a loss of 44.45 million cubic meters for 1985. Losses in harvesting and primary processing have also been huge.

The current directives seek to reduce such losses and to rationalize log allocation and distribution to enhance recovery. Further, a major initiative was taken in 1987 to expand the production of wood based panels (fiberboard and particleboard as a means of extending the timber supply through recovery and use of residues and by-products from primary production.

In order to increase the utilization of waste woods and to improve wood-based panel production efficiency, China has renovated 169 panel mills. This reportedly increased the productive capacity of these mills by 555 thousand cubic meters per year. This restructuring included 115 fiberboard mills, 43 plywood mills, and 11 particleboard mills. In addition, five new particleboard mills were established, with an annual capacity of 56 thousand cubic meters, and two MDF mills with a capacity of 100 thousand cubic meters (MOF, 1989.

Future plans of the MOF also include improvements in the 25 small pulp and paper mills under the Ministry's authority.

In August 1988, the China government (Ministry of Forestry and State Planning Commission) announced new regulations restricting the use of wood in seven economic sectors. The use of wood was prohibited with limited exceptions for: electric power transmission poles, railroad ties and bridges, mine shaft and tunnel supports, road and water transportation, fuels, certain construction applications, and coffins.

In March 1989, China announced an "austerity policy" that would reduce timber imports by 40 percent for 1989 (from 1988 levels) as a result of economic policies to slow down capital investment and construction and the overall rate of economic growth and inflation. This would indicate a drop from approximately 10 million cubic meters to 6 million cubic meters to be imported.

In addition to the impacts on economic growth and inflation, the announced policy would also free up critical foreign reserves to be reallocated to higher priority needs -identified as "advanced technology and equipment."

In implementing this import reduction, the State Planning Commission has developed a quota system for allocating imports to provincial and municipal government end-users. It is expected that those users will be granted greater flexibility in specifying the species and quality requirements for wood to be obtained through imports.

The consequences of this policy are yet unclear. The rate of importation has slowed. However, the wide spread between state administered prices and free market prices for timber in China will likely result in more pressures on the domestic forests, including incentives for greater illegal cutting..

Tariffs and Trade Barriers

The tariff structure for wood products for China has remained virtually unchanged for the past five years, although a series of extra-tariff import taxes and fees have been utilized. A schedule of tariffs is shown in Table 6, reproduced from the NFPA 1986 study of China Markets.

The tariff schedule reflects the general tendency of developing countries to favor unprocessed and semi-processed wood products and to discriminate against processed or finished goods.

Tariffs on most conifer sawlogs and pulpwood is 3 percent, plus a 10 percent "consolidated industry and commercial" tax. Hardwood logs (exclusive of selected tropical species) are also subject to a 3 percent tariff and the 10 percent tax. Selected tropical hardwood logs (see Table footnote) are subject to a 25 percent tariff. Rough sawn conifer timber, squares and half squares are also subject to a 3 percent duty and 10 percent tax. However, sawn lumber over 5 mm in thickness is charged duties at 9 percent plus 10 percent tax. Finished lumber has a duty of 40 percent (plus tax). Duties on other items include: reconstituted wood (chips, residues) 30 percent; plywood and laminated wood 12 percent; veneer 30 percent; fiberboard 30 percent; railroad ties 5 percent; and inlaid wood products 35

Table 6.

CHINA'S IMPORT DUTIES ON FOREST PRODUCTS

Description of Goods	Tariff No.	Import Duty Rate Minimum (U.S. Rate)	Product Tax Rate	Total Tariff
Softwood logs	44.03-2	3%	10%	13%
Hardwood logs	44.03-3	3%*	10%	13 or 35%*
Roughly squared	44.04			
Softwood	44.04-1	3%	10%	13%
Hardwood	44.04-2	3%*	10%	13 or 35%*
Lumber, rough	44.05-1	9%	10%	19%
sawn over 5mm	44.05-2*	9%	10%	19%
Lumber planed grooved	44.13	40%	10%	50%
All plywood	44.15	12%	3%	15%
Veneers	44.14	30%	10% (?)	40%
Rail Ties	44.06/06	9%	5%	14%

* Certain hardwood species are taxed at a higher rate:teak, camphor, sandalwood, garoo-wood, red-wood, rosewood, and a few others. A minimum duty of 30% is imposed on rough sawn lumber of these species; logs and cants are 25%

Source: NFPA, 1986. p. 137

percent - with the standard 10 percent import tax added for all these commodities except plywood (3 percent tax) and railroad ties (5 percent).

In 1987, the U.S. National Forest Products Association (NFPA) sponsored a mission to China. The resulting report identifies what are considered by the U.S. forest products industry as important tariff and non-tariff barriers to the China market.

* Restrictions on the structural applications of wood
* High Tariff Rates on semi-processed and finished products
* Subsidized wood (competition) from the USSR through barter arrangements
* Government import trade and distribution monopoly (see following section)

* Lack of contact with end users and policies which do not allocate timber on basis of species/quality for specific end uses

* Inefficient processing and applications of wood, resulting in reputation of wood as inferior material

* Central policies for distribution of foreign exchange

The most significant recurring difficulties relate to the lack of available foreign exchange and the tightly structured channels for distribution and trade which limit direct understanding between exporter and end user.

DOMESTIC DISTRIBUTION AND ORGANIZATION OF TRADE

As a centrally-planned economy, China has evolved a highly complex and somewhat obscure timber procurement and distribution system. As previously noted, a large component of the industrial roundwood supply is allocated under an annual State plan. The U.S. National Forest Products Association (NFPA) estimated that for 1985 this central allocation system actually accounted for only 25 percent of actual wood consumption. An additional 23 percent was supplied and distributed outside the planned sector, largely through rural collective enterprises and (increasingly) transactions on the free market. Firewood accounted for an additional 17 percent of the consumption while illegal harvesting (and consumption) accounted for over 35 percent of total wood use -largely for unauthorized rural housing and fuel. Estimated total consumption (NFPA) is shown in Figure 6.

Timber Consumption and the State

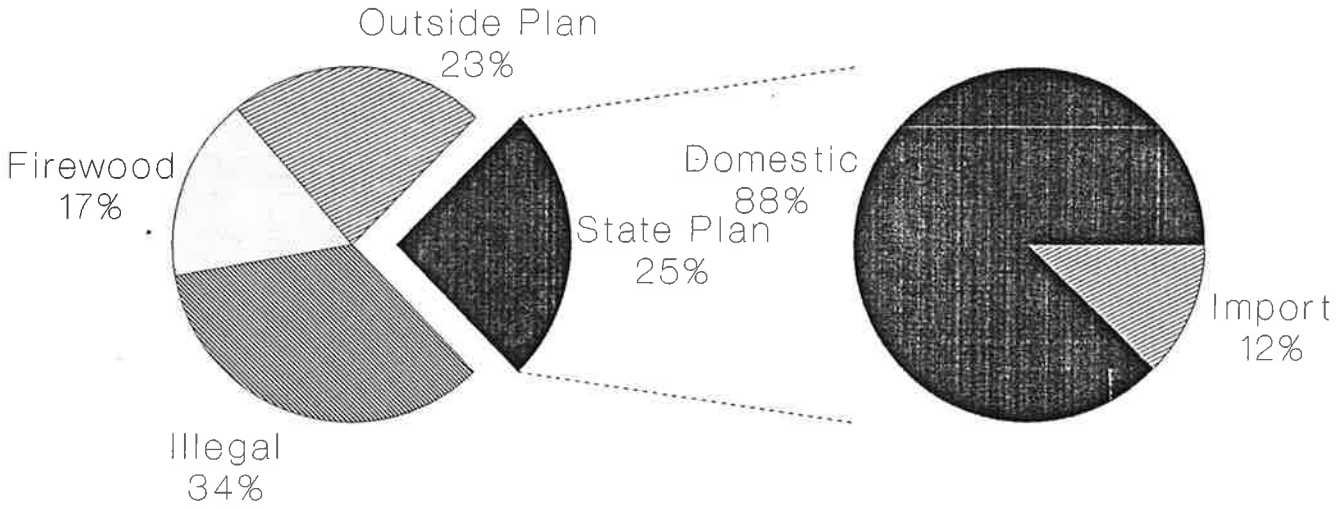
Timber allocation and distribution under the state planning process has been well described and documented by the US National Forest Products Association in its detailed study of the China timber markets (NFPA , Chapter VI, 1986).

The State planning process begins with the annual submission of requests from end users, city and county level timber processing and building organizations, and provincial governments. A complex series of reviews and allocation discussions are held which ultimately result in the approved annual timber plan for both supply and consumption. Consideration of imported wood and its distribution are also part of this planning exercise. The China Timber Corporation (CTC), under the China Ministry of Materials, is

Figure 6.

PRC Wood Consumption 1985

Domestic 290 Million CM
Imports 9 Million CM



Total Consumption
299 Million CM

State Plan
76 Million CM

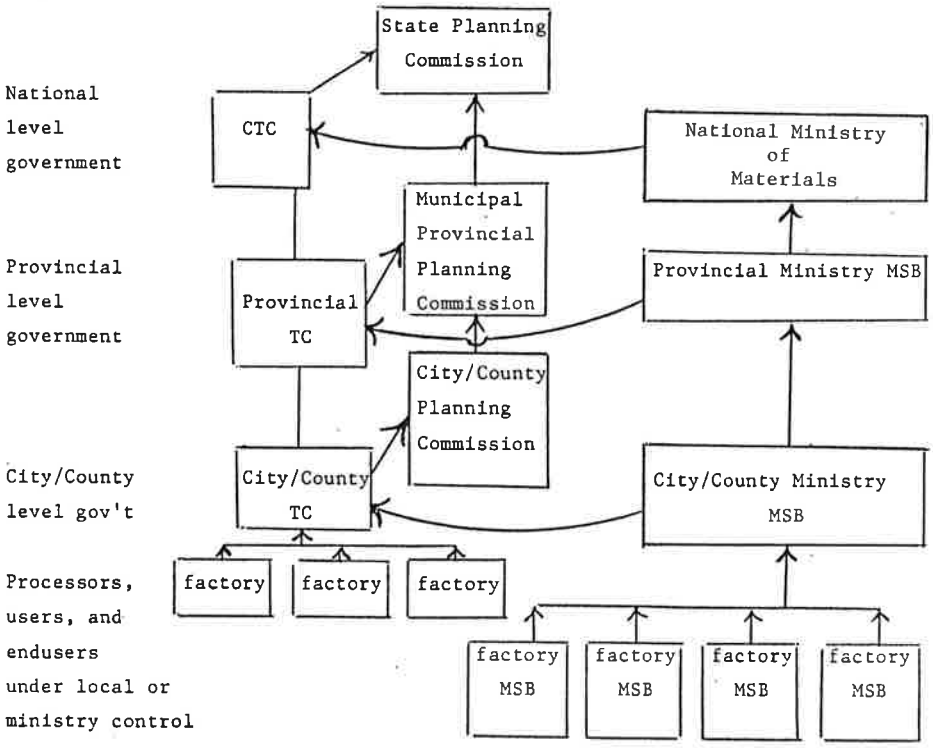
CINTRAFOR/NFPA

organization responsible for the domestic coordination and implementation of the supply-distribution system once the plan is approved by the State Council. Allocations are determined by the CTC semiannually. Local timber corporations, in close coordination with CTC, implement actual distribution of timber to processors and end users. The Ministry of Materials coordinates distribution within the individual users under other ministries.

The general structure of the timber request and planning system as reproduced from the NFPA study is shown in Figure 7.

Figure 7.

STRUCTURE OF CHINA'S REQUISITION, PLANNING, AND APPROVAL SYSTEM FOR THE SUPPLY AND DISTRIBUTION OF FOREST PRODUCTS



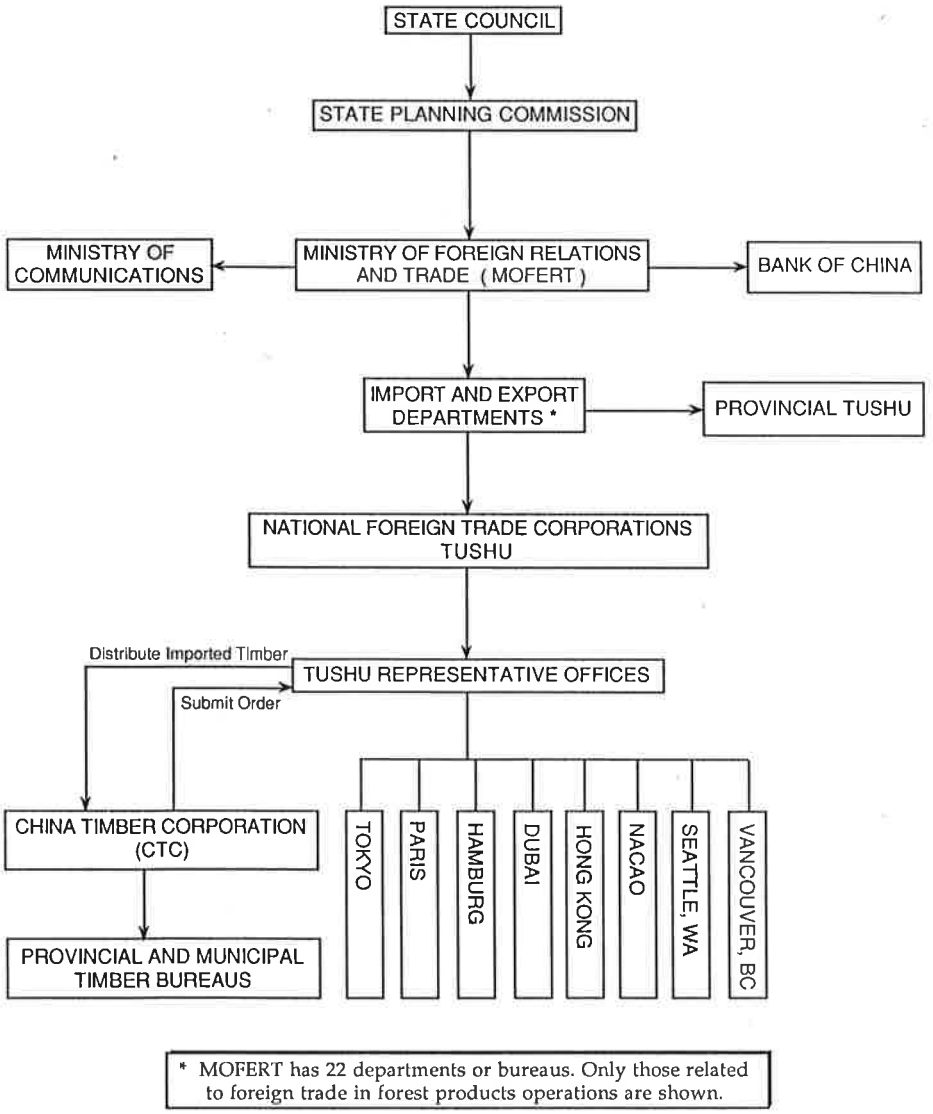
This system is applicable to all timber (domestic and imported) allocated under the State planning system. The China Timber Corporation is now administratively under the Ministry of Materials and Equipment, a move taken in 1987 that is designed to reduce overlap and coordination problems in the supply of industrial materials.

Import Channels

Import policy and coordination is under the Ministry of Foreign Economic Relations and Trade (MOFERT), which contains 15 National Foreign Trading Companies including the China Timber Import and Export Corporation (China TUSHU). Requests for imported U.S. wood imports are directed through TUSHU to the SUNRY (Subsidiary office) in Seattle, Washington. This office, together with the Vancouver, B.C. office of TUSHU, account for approximately 85 percent of the softwood log imports from North America, and work with 20 or more suppliers in the U.S. and Canada. (Figure 8). Purchases of imported wood by TUSHU are primarily coordinated through the China Timber Corporation for domestic distribution.

Figure 8.

ORGANIZATIONAL CHART OF KEY ORGANIZATIONS FOR CHINA TIMBER IMPORTS



SOURCE: Adapted from Li, 1987, "China Timber Consumption and Key Players in Its Import"

Additional imports of wood are conducted by the China International Trust and Investment Corporation (CITIC). Imports by CITIC are handled outside the China Timber Corporation distribution system. The Chinese military also has independent authority to directly import wood in addition to the volumes it obtains under the central allocation system. Finally, enterprises which earn their own foreign exchange can, under limited conditions, independently purchase timber on the import market. In the majority of cases, however, independent purchases of imports by CITIC, the military, or exchange-earning enterprises are coordinated and implemented by the China Timber Import and Export Company (Tushu). China Tushu plays a major role in advising on details of purchases by these independent organizations, including the provision of information on pricing and country of origin. As estimated by NFPA, the pattern of import purchases (circa 1985) was approximately as shown below.

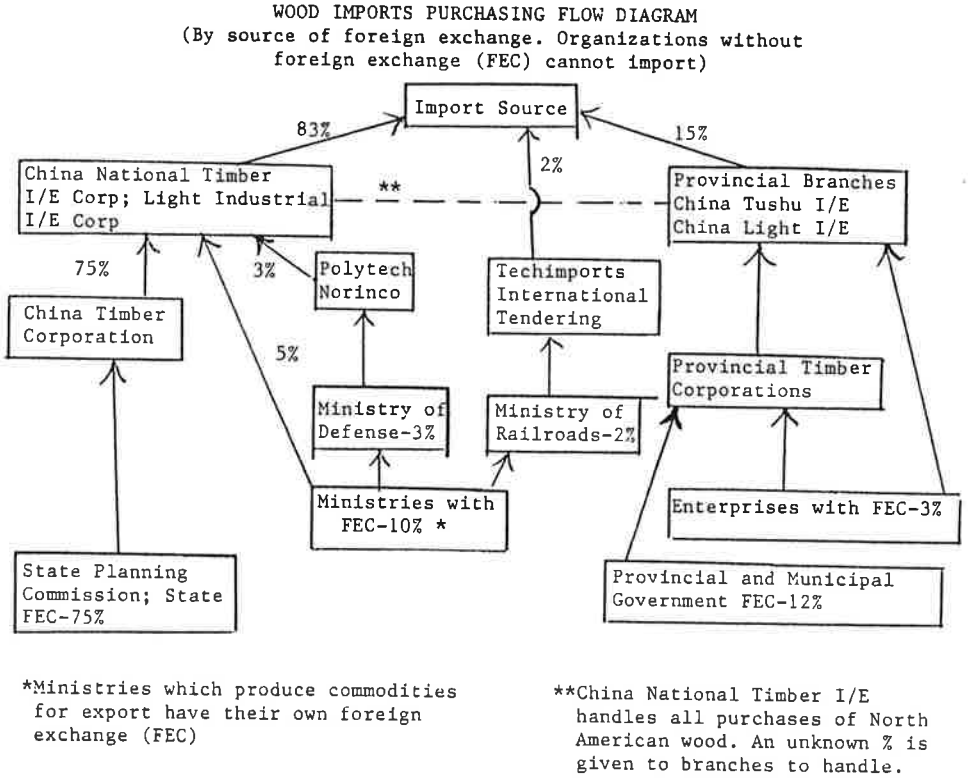
Import Responsibility	Share of Imports
China Tushu/CTC (Direct)	75 percent
Ministries with Foreign Exchange	10 percent
Provincial and Municipal Governments w/Foreign Exchange	12 percent
Enterprises with Foreign Exchange	3 percent

A simplified flow diagram for imported wood is shown in Figure 9. As is shown, the imports by China Tushu (China National Timber Import and Export Corporation) accounts for approximately 83 percent of all wood imports, with some 75 percent directly arising from purchases under the State planning allocation process and an additional 8 percent of purchases handled on behalf of other Ministries with independent sources of foreign exchange. Provincial timber corporations and enterprises with independent sources of foreign exchange account for approximately 15 percent of purchases which are coordinated through the Import-Export corporations (Tushu). Finally approximately 2 percent of imports are accounted for by purchases on behalf of the Ministry of Railroads handled directly (bypassing Tushu and the State allocation plan).

Import Substitution

An explicit policy of import substitution was contained in the 7th Five-Year plan for the Chinese economy. The report on the 7th plan stated in part: "we should make every effort to produce at home whatever we can" and, further "we should strive to expand production of import substitutes and to increase the proportion of goods produced at home."

Figure 9.



Programs and policies for reducing wood consumption and wood imports have been noted. A central program for "demand management" to reduce overall wood demand has been pursued for a period of ten years or more. This effort has been directed towards reducing the level of effective demand, both to relieve pressures on domestic timber harvest and to reduce imports. Import substitution has also been undertaken in an effort to conserve scarce foreign exchange, as evidenced by the sharp downturn in the purchase of North American timber in 1986 following record import volumes in 1985.

As noted previously, policy decisions announced in March 1989 currently seek to reduce China's import of wood by 40

percent during 1989. In this instance, the major objectives were to reduce the overall level of capital construction in order to control inflation, and to free up foreign exchange so that available funds could be reallocated to higher priority imports -in this instance "advanced technology and equipment." Claimed results, in terms of "wood savings" have been indicated above.

Pricing

Economic reforms within China have led to serious inflation, reflecting both efforts to reform the basic administered price structure and the "true" inflationary changes in prices in response to fiscal and monetary pressures accompanying rapid economic growth and supply shortages for many basic materials. Wood products have not escaped these pressures, with rapid increases in price a common experience in recent years.

Wood products in China are subject to a three-tiered pricing structure. First, a portion of the timber made available under the State plan is allocated to priority users at a predetermined fixed price. Secondly, the remainder of the timber under the State plan is allocated at negotiated prices which are higher and more flexible than the fixed price for priority users. Finally, timber outside the State plan is typically sold on the "free market" at prevailing prices. The major change occurred in January 1985 when authority was granted for the sale of timber through the "free market" from individually controlled plots and from collective enterprises.

A survey by the MOF indicated that in four key forest provinces 1987 log prices had increased significantly over 1986 levels. Fir log prices increased by 8.3-46 percent; pine log prices increased by 12-22 percent. Reported purchase price for users also increased significantly, by 19-39 percent for fir and 9-33 percent for pine. (MOF, 1989).

It was reported in March 1989 that free market sawnwood prices had increased by approximately 80 percent annually over the period 1985-88 due to domestic shortages. "Free market" prices have, in recent years, also reached a level approximately double the concurrent official State negotiated or fixed prices.

For example, the reported October 1986 price for red pine was 105 RMB per cubic meter (approximately US $28). By 1987, this price had increased to $214 RMB (US $58). In July 1988, red pine had reached a price level of $300 RMB (US $82) for timber allocated under the State plan. The free-market price in July 1988, however, was estimated at over $500 RMB per cubic meter (US $135).

Such distorted price signals influence both production and

consumption decisions. Where timber is made available at fixed or artifically low prices, consumption is both excessive and wasteful. As noted earlier, the much higher price available on the free market also encourages excessive (and illegal) harvesting outside the State plan. Price reform within the timber sector remains a major difficulty as is true for the Chinese economy as a whole. As will be noted, timber is one of the key commodity sectors exempted from more liberal price reforms under the perceived need to continue more rigid State administered prices for "critical" commodities.

Wood prices have also been impacted by generally higher world prices for wood imports, higher transportation costs, and the depreciation of the RMB against the U.S. dollar. This has resulted in "unsalable" timber at some import distribution centers where the resulting cost of the imported wood is greater than the prevailing free-market price. Hence such timber is often "withheld" from the market and frequently suffers notable degrade. Furthermore, the costs of holding such timber off the market (storage, capital costs and deterioration) do not seem to be reflected in subsequent marketing decisions.

THE CHINA ECONOMY UNDER ECONOMIC REFORM

The Chinese economy has undergone remarkable change within the last decade, following the opening to the West and a sustained period of emphasis on economic development and growth. Real economic growth (GNP) was approximately 12.2 percent in 1988, with projections of more moderate growth at 8-10 percent in 1989. Due to a population growth of 1.5 percent per year, growth in per capita GNP has been slightly lower, at a rate of approximately 8.4 percent in 1988.

Rapid growth has, in fact, contributed to many of the economic difficulties faced by China in recent years. Accelerating demand for capital construction, personal consumption, and imports have fueled chronic shortages of investment funds, rising prices, and inflation. The increasing need to expand imports, and the related need to raise foreign exchange through export earnings, have also pressured the domestic economy.

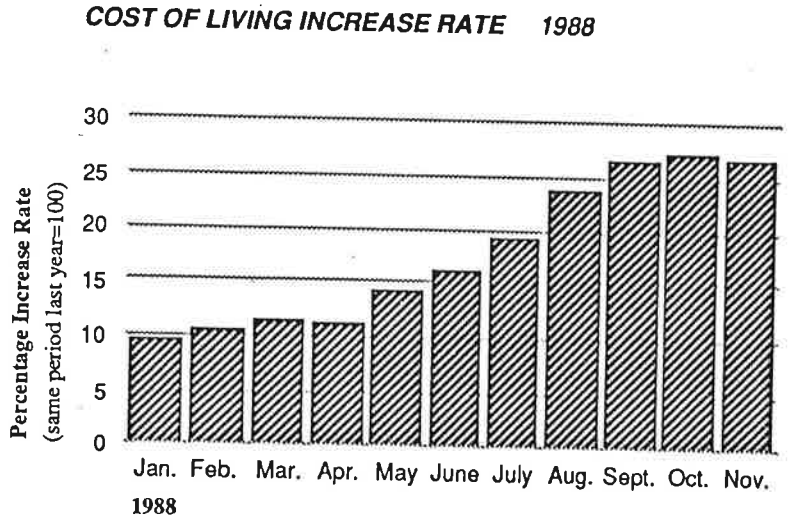
During the first quarter of 1989, China exported a total of $US 9.66 billion, while importing $US 11.55 billion, resulting in a trade imbalance of $US -1.89 billion. China had a trade imbalance of $US -9 billion for the year 1988. China's foreign debt was $US 31.2 billion at the end of 1988, with a debt service of $US 4 billion, equal to 8.8 percent of foreign exchange earnings through current exports.

China's foreign reserves stood at $US 18.28 billion in January 1989, an increase from $US 16.71 billion in January

1988. This improvement was accomplished by a sharp reduction of imports (21.2 percent) between 1988 and 1989 (first quarters) while exports actually increased by 9.3 percent over the corresponding period.

Consumer prices in January 1989 reached a level 27 percent above January 1988, reflecting the growing rate of inflation occasioned by a rapidly expanding money supply seeking to meet demands for capital investments (Fig 10).

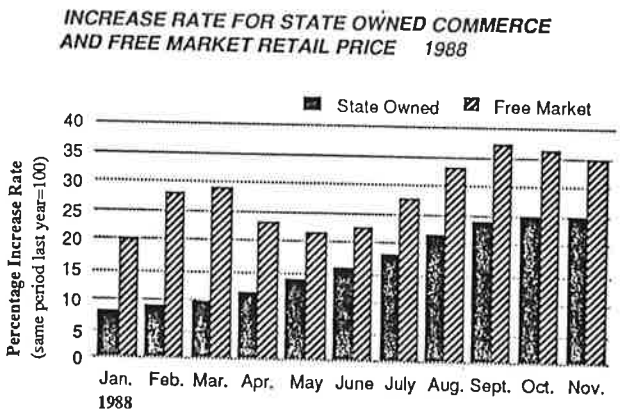
Figure 10.



Source: China Statistics Monthly, CSICSC Feb. 1989.

Prices for the first four months of 1989 were also reported up by 27 percent compared to the same period during 1988. Price increases for the "free markets" have increased at a rate greater than the administered price increases for state-owned enterprises. During the last quarter of 1988, free market prices increased at a rate of 35 percent over the previous year (Fig. 11). Evidence of consumer panic buying is reported in anticipation of continuing double-digit inflation. A thriving black market for consumer durable goods has developed in response to rising incomes and spiraling inflation.

Figure 11.



Source: China Statistics Monthly, CSICSC, Feb. 1989.

Rapid growth has also resulted in severe energy shortages, both for industrial and consumer users. Coal provides some 80 percent of power generation. A 17.7 percent growth in industrial production was reported for the first 11 months of 1988, yet China experienced a cumulative 20 percent idle capacity due to power shortages. Urban "brownouts" and temporary blackouts are increasingly common in large urban centers as power demands grow.

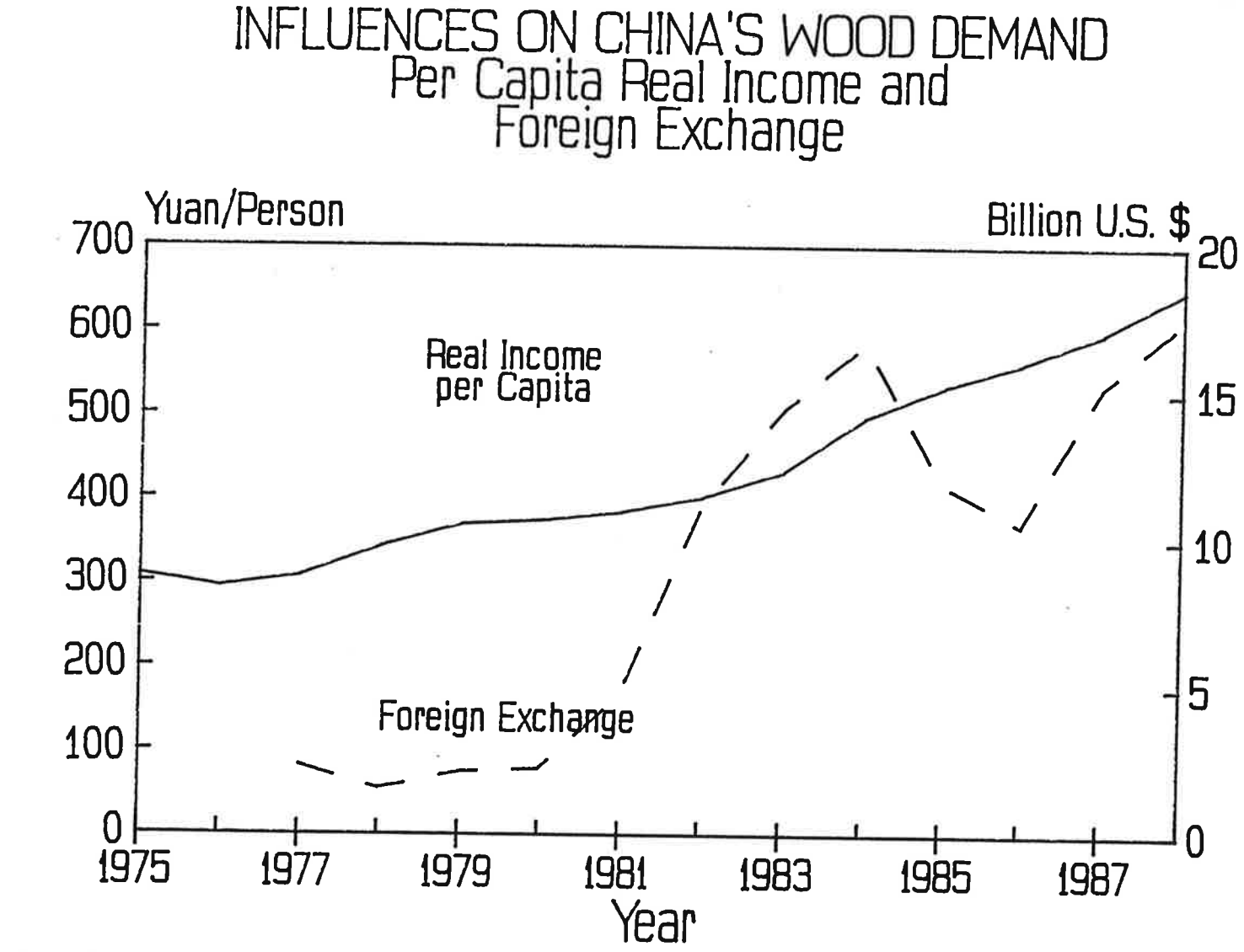
Personal Income, Foreign Exchange and Wood Demand

The trends in two of the major determinants of wood demand and wood imports are shown graphically in Figure 12. Real per-capita income has increased steadily since 1975, growing from approximately 300 Yuan (RMB) per person in 1975 to over 650 Yuan (RMB) per person in 1988, a doubling of real income in the space of 13 years or an annual compounded rate of 6.2 percent per year.

During the 6th Five-Year Planning period (1981-85), real per-capita income grew at an annual rate of 13.7 percent for rural residents and 6.9 percent for urban workers, indicating the relative growth in incomes for the rural population. This emphasis on rural development is particularly significant for housing development which is largely outside the planned economic sector as noted in later sections of this report. Rural incomes increased rapidly under the introduced "responsibility system" whereby households and individuals were provided economic incentives which linked incomes to productivity and output.

The private holding of foreign exchange is a relatively recent development in China. During the first quarter of 1989, personal foreign exchange deposits with the Bank of China were reported at $US 229 million, an increase of $US 24.2 million

Figure 12.


INFLUENCES ON CHINA'S WOOD DEMAND
Per Capita Real Income and
Foreign Exchange
Yuan/Person
Billion U.S. $
700
600
500
400
300
200
100
0
20
15
10
5
0
Real Income
per Capita
Foreign Exchange
1975
1977
1979
1981
1983
1985
1987
Year
USFS/CINTRAFOR

from 1988. This includes holdings for foreigners with individual accounts who are working in China, but represents a substantial holding by Chinese nationals.

The second major determinant of wood imports is the availability of foreign exchange. This reflects not only the total availability of foreign exchange in China, but also policies which determine the distribution of available foreign exchange to the many competing sectors of the economy. The import of wood products, therefore, is subject not only to central bank reserves, but the relative position of wood as a competitor for those reserves.

Figure 12 also shows the recent trend in foreign reserves held by the Bank of China. Reserves were modest prior to 1980 and the opening to the West. Reserves grew rapidly between 1980 and 1984 as China expanded exports and used the newly-generated earnings cautiously. In 1985, the decentralization of import authority, together with a booming capital construction sector, led to rapid growth in imports for both consumption and investment. Foreign exchange reserves fell sharply, declining from $US 16 billion at the end of 1984 to just over $US 10 billion at the end of 1985. Greater central governmental controls were implemented in early 1986, limiting the autonomous authority of provincial and municipal governments and cooperative enterprises to initiate independent import purchases. As noted, this change impacted the importation of wood significantly, with imports from North America dropping by some 40 percent.

Foreign exchange reserves subsequently increased in 1987 and 1988, reaching a level of $US 17 billion by the end of 1988. Continued economic growth and tight controls remain, however. As indicated, wood products have recently been "highlighted" as a target for reduced imports in 1989, with a shift of foreign exchange towards high technology and equipment imports, reflecting a conscious shift in priorities. Wood products are clearly of lesser priority for use of foreign exchange, a factor that will temper imports in the future. Nevertheless, the continuing surge in economic development and capital construction should press available domestic timber supplies and ultimately result in a strong and growing import requirement.

THE HOUSING SECTOR AND WOOD PRODUCTS

Housing needs in China are among the most pressing economic problems facing the government. Until recently, the housing stock has been strictly a State responsibility, even with the existence of a well developed rural housing sector which rests largely outside the State planning and economic

system. Housing, in turn, has a direct bearing on forest product markets. Efforts underway since 1979 have sought to address the housing shortage, both in terms of quality and space.

For the period 1979-85, an estimated 825 million square meters of residential construction was completed. This was over 60.8 percent of the total of 1.4 billion square meters of residential construction accomplished since the founding of the People's Republic of China in 1949.

Urban Housing Trends

The majority of centrally-planned housing programs are targeted on the urban housing needs, primarily within the larger urban centers. Elements of government policies have addressed investment and construction, allocation of housing units and rent controls, sale of housing units to individuals, and controls on the specification of building materials.

A survey of urban housing published in 1988 (China Quarterly, September 1988) reported that almost 27 percent of the urban population still lived in "inadequate" housing space, a level down considerably from a level of almost 36 percent in 1978. However, per-capita living space was still quite limited by Western standards, being only 3.6 square meters/person.

In 1984, total construction of some 340 million square meters was completed, including 100 million square meters of housing, involving an estimated use of 13 million cubic meters of wood. As reported by China Daily (5/18/89), the targeted cutbacks in government spending and investment would involve construction of only 80 million square meters of housing in 1989. This would result in some 1.6 million "flats" or commercial apartments of approximately 50 square meters each. Reportedly, this would be a reduction of 400 thousand flats from the 1988 level of 2 million. Forecasts are for a continuing restriction or slowdown on housing construction, with targets of 1.2 million flats for 1990 and only 1.0 million for 1991.

Construction of residential buildings for 1987-88 is summarized below:

Year	Residential Floor Space (1,000 sq. meters)	
	Under Construction	Completed
1987	120,574	64,965
1988	111,733	56,810

Source: China Statistics Monthly, Feb 1989

The distribution of housing floor space under construction and complete by major region in 1988 is summarized in Table 7.

Table 7.

Housing Floor Space Constructed 1988
State-Owned Units by Geographic Region

Region	Under Construction	Completed
Sichuan	9,691.2	5,379.1
Shanghai	8,256.1	2,485.9
Guangdong	7,846.3	3,132.7
Hubei	6,840.0	4,030.0
Liaoning	6,775.0	3,743.0
Beijing	6,120.0	2,170.0
Jiangsu	5,375.0	2,796.0
Henan	4,651.4	2,855.6
Shandong	4,280.0	2,619.0
Hunan	4,273.8	2,484.0
Shaanxi	4,085.5	1,705.3
All Other	43,538.7	23,409.2
National Total	111,733.0	56,809.8

Source: Compiled from China Statistics Monthly, Feb. 1989 Table T6.7

In contrast with this level of construction activity (under construction and completed), forecasts published in 1986 ranged from 86 to 184 million square meters per year for the period 1991-2000, reflecting alternative economic projections and growth assumptions (NFPA 1986, Appendix K). The Ministry of Construction "recommended" rate of construction for this period was for 167 million square meters per year, a level considerably above the level in 1988 and the outlook reported in the press noted previously.

Approximately 20 percent of the domestic wood allocated under the State plan is consumed in capital construction, including housing. Over one-half of this amount is used for doors and windows, with the majority of the balance going for concrete forming and a small amount for scaffolding. For imported timber, an estimated 45 percent of volume is consumed in construction, including housing.

Rural Incomes and Housing

Housing in the rural sector is accomplished largely outside the State plan - hence reliable statistics are very scarce. Nevertheless, it is widely acknowledged that rural

construction is significant and growing rapidly under the programs of economic reform and rising rural incomes (Gao, 1989).

In 1984, an estimated 9.93 million rural housing starts with a total floor area of 671 million square meters was reported, with some 54 percent using construction methods incorporating wood (NFPA, 1986). For the period 1979-1985, some 4 billion square meters of rural housing were completed, representing something over 200 million family living units.

The construction forecasts noted above also projected "rural construction" activity. For the projection period 1991-2000, a rural construction level of from 660 to 772 million square meters per year was estimated, with the Ministry of Construction recommending a level of 770 million square meters per year for planning purposes.

Housing Policies

Public policies towards the housing sector are in a period of rapid change. In part, this reflects the recognition of the current housing shortage and the investment/construction policies noted in the previous section. Additional policy issues have arisen relative to the State housing supply program as an outgrowth of the economic reforms undertaken in the last decade.

The current policy direction towards improved housing dates from December 1978 when Deng Xiaoping set forth the goal of 5 square meters of housing per person by 1985. By that date, actual housing conditions were reported at 6.36 square meters as a national average, with rural residents occupying 17.8 square meters or more than double the 8 square meter average for rural areas estimated in 1977.

The 7th Five-Year Plan (1986-90) recognized that the cost of construction for State projects, including housing, had increased rapidly, placing a heavy drain on State investment resources. The Plan acknowledged that construction costs (per square meter) had increased for housing over the period 1972-82 by almost 136 percent. In order to moderate the rapidly rising investment demand, it was concluded that

> "housing conditions should be steadily improved, but residential building standards should not be too high and rooms should not be too large."

Urban housing has traditionally been a State economic function, including the construction, allocation, maintenance, and rental by local government or work units. In 1982, the State initiated local experiments with relaxed control of housing, including the sale of units to individuals. The goal was "to recover construction costs, reduce the burden on the government

and ease housing shortages." Rents, which were set at very low levels, have been insufficient to cover maintenance costs, requiring additional State subsidies.

From 1964 to 1985, urban housing rental fees actually fell from 2.6 percent of family expenditures to 1.1 percent. Rent reform, with rentals more in line with actual construction costs and maintenance, and reflecting the quality and size of housing, remains a major economic issue confronting the Chinese planning system.

The State Council established a Housing System Reform Office with the goal to:

1. Change the Low-Rent system,
2. Commercialize all construction and allocation of urban houses
3. Allow people to own this own homes

The housing reforms were thus designed to encourage individuals to buy/build their own homes as a means of conserving investment capital and to avoid further rent subsidies. Indirectly, the program was also intended to alleviate some of the inequities in the administrative controls over housing allocation to individual families.

Along with reform of housing ownership, major efforts at rent reform have also been undertaken, with a general increase in rents designed to offset actual costs (including maintenance) and to reflect quality and space differences.

The China Housing Construction and Development Corporation was established in 1981 to build housing for rent or sale. In 1986, this organization constructed over 10 million square meters for this purpose, and was implementing construction with variable designs and quality, and subject to variable rent/sales prices.

Some 4.27 million square meters of State-owned housing was sold in 1986 at a total price of 996 million Yuan, which included over 48 thousand units of newly-built housing and 29.6 thousand older existing units with 1.13 million square meters. The sale of newly constructed units represented approximately 2.2 percent of all houses built in urban areas in 1986.

The China Daily (5/13/89) quotes Mr. Yin Zhenhu, an official of the State Statistical Bureau:

> "For a long time, we thought that in a Socialist country housing was not a commodity, but a welfare item. It is time that this concept to be abandoned (sic)."

He restated the housing goal of 8 square meters per

person, and stressed the desirability of charging higher rents for above-average sized units.

THE EVOLVING POLICY AGENDA

The previous sections clearly indicate that the forestry, forest products sector, international trade, and consumption policies are all undergoing rapid and continuous change as China seeks to revamp it's economy, to spur economic growth and development, and to join the world of nations as an open society. Thus it is impossible to report on forestry and forest products in China other than as a shapshot at a given period. Yet what is clear is a general pattern of policy development which will likely guide the forestry sector and forest products production, consumption and trade at least until the end of the current century. Broad dimensions of these policies are summarized below.

Integrating Forest Production, Consumption and Trade

As a centrally-planned economy, China has pursued National level planning for the forestry sector, wood consumption, and for foreign trade. However, this effort has been allocated to several ministries and without a great deal of recognition of the direct dependencies between these functions.

The Ministry of Forestry has primary responsibility for the management of forest lands, the harvesting of timber within the State plan, reforestation of forestlands and the planning of future production levels, and for a significant share of domestic solid wood processing. The Ministry of Forestry is, therefore, the primary unit of government responsible for the domestic supply of timber and solid wood production.

The consumption of wood products is largely planned and controlled through the State Council's planning initiatives, including the annual process of obtaining requests for state timber allocations through the China Ministry of Materials and the China Timber Corporation procedures noted earlier. Additionally, responsibilities for international trade and the import of timber products is under the Ministry of Foreign Economic Relations and Trade.

It is increasingly recognized by State planners in China that an integrated approach to the overall production, distribution, trade, and consumption of wood products sector is needed if adequate development of the forest resource base is to be accomplished together with meeting domestic economic development and growth plans. In the absence of a functioning open market economy to guide these decisions, a more formal

centrally-planned mechanism is critically needed.

This overall need within the Chinese economy was acknowledged in the report on the Seventh 5-Year Plan where it was concluded that one objective during this period was "...to insure better coordination between production and marketing, industry and foreign trade, and technology and foreign trade." Articles appearing in Wood Industry recently included discussions of the close relationship between forest management and the forest products industry (January 1988) and the need to better rationalize timber utilization in China (January 1989). This latter theme was also stressed in materials published in the China Economic News (August 1, 1988) where the protection and rebuilding of China's forest productive capacity was explicitly linked to rebuilding of the existing forest industry base and the more rational use of timber.

The 1988 moves towards relaxing the State monopoly over timber import decisions, with more flexibility for provincial and municipal requisitions for specific species and grades of timber has been encouraging, although such actions account for only a small part of the total imports. Likewise, the delegation of authority for enterprises with their own foreign exchange earnings to independently purchase and import timber (assuming this policy is effectively implemented) will likely result in better rationalization of timber imports to meet specific utilization needs. Renewed controls and quotas for local governmental units as announced by the State Planning Commission in March 1989 designed to reduce imports by 40 percent are, unfortunately, a signal of greater restrictions over imports.

International trade in forest products is increasingly seen as a critical piece of the policy agenda for both the forestry sector's success in rebuilding China's forest resources and the successful central planning for investment and material construction of infrastructure and housing as a central requirement of economic development. Further policy decisions of the Chinese government will significantly impact forest products trade in the next decade as China seeks to balance development and trade as a national economic priority.

Wood Substitution and Domestic Product Priorities

Because of the severe reductions in China's forest resource base and current inventory of mature timber available for harvest and domestic processing, China has aggressively sought to limit or "manage" demand as well as to cope with supply mechanisms (harvest, domestic processing, and imports). This policy for timber is part of a much broader national effort to use domestic means whenever possible to meet economic needs. As stated in the report on the Seventh 5-Year plan, China "..should make every effort to produce at home whatever we can.." and "..should strive to expand production of import

substitutes and to increase the proportion of goods produced at home." As noted earlier, significant claims for "timber savings" have been made, reflecting estimates of dampening of demand through various admonishments and actual policy restrictions on timber utilization.

Major policy directives towards the greater reliance on domestically available building materials as substitutes for both domestic and imported wood have stressed brick and concrete technologies. For timber used in capital construction, some 70 percent has gone for construction formwork, where steel is now being required as a substitute. Use of wood in doors and door frames, windows, scaffolds, and mine props are also subject to substitution by steel. Plastics and cardboard are urged as substitutes for sawnwood in packaging and crating. Cotton stems and other agricultural by-products are used for paper and packaging materials.

To a large extent, promotional and market development efforts by North American forest products industry (and backed by government programs) are in conflict with China's economic policies on wood substitution and use. Expanded demand and consumption of wood products is not encouraged, and given the limitations of domestic timber production, is seen as a direct stimulus to the importation of greater timber from abroad. This is, of course, also a prime motivation for such market development efforts by U.S. and Canadian forest products organizations. In order to ultimately be successful, such programs must be carefully tailored towards the improved use of wood in China, permitting more efficient utilization of both domestic and imported supplies. A higher priority for the import of timber will hinge on a greater awareness that such a move is consistent with and supportive of China's economic goals for development and trade. At present, the importation of wood is largely perceived as a net drain on the economy and foreign reserves except perhaps by those directly involved in the timber sector.

Increased Efficiency in Wood Use

One way for meeting the growing demand for wood products is to extend the effective supply by better utilization of the existing gross volume of timber entering the Chinese economic system. Substantial losses of wood volume occur at every stage of the production and utilization cycle, beginning in the forest itself. Mortality due to insect, disease, and fire are significant. Losses in harvesting and transport are likewise huge. Finally, falldown in useable volumes once timber is delivered to a mill for processing is great. Finally, degrade and losses due to inefficient distribution, storage, and end use application are effectively reducing the timber supply.

China has demonstrated a much greater awareness of these recovery and utilization bottlenecks, and the significant impact thus created on the timber supply. New policies designed to address these losses appear to be emerging, although no clear overall strategy has yet appeared.

The greater utilization of wood by-products for wood fiber and chip panels is actively promoted as a primary means of extending the timber supply in terms of greater recovery of end products. China has embarked on a major program to expand waste wood utilization and to improve the wood panel and fiberboard sector. In 1987, the production of plywood was 776.3 thousand cubic meters, fiberboard (hardboard) 1.2 million cubic meters, and particleboard 377.8 thousand cubic meters. In total, the production of almost 2.4 million cubic meters of wood-based panels was 27.2 percent above the 1986 level. Gains in particleboard production were by far the largest, with a year-on-year gain of almost 80 percent (MOF, 1989).

Efforts to integrate wood-based panel production with other timber processing in order to make by-product utilization more efficient have also been stressed. Current efforts are to expand this sector by fifteen percent, with both fiberboard and particleboard seen as preferable to plywood due to the significant difference in raw material requirements. China requires improved technology and equipment for this effort, and is actively encouraging joint ventures and other forms of assistance to make this effort successful. In contrast, USDA/FAS reports that there are no current plans to expand or upgrade sawmills in the coastal regions which process most of the imported logs. Rather, improved sawmill technology seems targeted to the domestic forest regions where greater recovery from China's own timber can be achieved.

Imports and Foreign Exchange

Since opening to the West, China has struggled with economic policies to stimulate exports and thus to generate the necessary foreign exchange earnings required to pay for rapidly expanding imports. The importance of foreign exchange reserves and earnings, together with recent trends, was noted earlier.

During the first calendar quarter of 1989, China had total exports of US $8.66 billion with imports at US $11.55 billion, or a trade deficit on current account of $1.89 billion. This was a substantial improvement over the 4th quarter of 1988 when the trade deficit was $4.19 billion, and the year earlier (1st Quarter 1988) deficit of $6.91 billion.

China has also experienced a growing need to borrow capital from abroad to sustain economic growth. This has led to a growing foreign debt, thus requiring an increasing share of export earnings (foreign exchange) to be devoted to debt

servicing - payment of both principal and interest. Foreign debt increased from US $24.5 billion in 1986 to over US $31.2 billion in 1988, with a corresponding increase in the debt service ratio from 7.8% to 8.8% of export earnings (the proportion of current foreign exchange earnings allocated to debt payments).

China has enjoyed relative strong foreign exchange reserves in recent years in comparison with many nations. However, in spite of improved foreign exchange reserves, China still experiences serious problems brought on by growing inflation and rising prices which discourage exports and encourage imports. Greater control over import decisions in order to ration and control foreign exchange expenditures have been imposed. Against this backdrop, China announced in March 1989 new import restrictions on wood products designed to reduce imports by an estimated 40 percent, or by some US $440 million for 1989. The stated purpose for this reduction in timber imports was to allow reallocation of foreign exchange to other priority needs, including the importation of "much needed" advanced technology and equipment.

National Priorities for Development

Continued controls on total imports will undoubtedly be needed as China seeks to control economic development and maintain a stable economy in terms of prices and inflation. Strong programs for export enhancement will also continue, allowing China to generate foreign earnings to pay for critical imports of goods and technology. Forest products will thus increasingly compete for much needed foreign exchange.

As noted earlier, imported timber is not perceived at present as a critical or high priority national need. In contrast, current policy is to control and limit the consumption of timber in order to conserve on domestic supplies and to reduce imports.

In spite of the adverse position of timber in the overall economic priorities for China's economic policies, the reality remains that there is a severe shortage of timber from domestic forests and that this situation will likely become worse in the next several decades. Demand will continue to grow in concert with an expanding economy and rising incomes and capital investment. Efforts to "manage" demand will undoubtedly continue but with limited and mixed success. At best, the increasing rate of demand growth may be dampened somewhat.

At the same time, recognition of the serious problems of overcutting of China's remaining domestic forests, and the inadequacy of reforestation to sustain future harvests will require serious consideration of current harvest levels. Continuing harvest outside the State Plan will also result in

growing pressures on domestic supply. The trends previously noted regarding the integrated consideration of forest management and harvest, production and consumption of forest products, and international trade may ultimately result in economic policies which will favor a higher priority for the import of wood products as a national need. Wood imports can be expected to play a growing role in balancing national domestic supply and consumption. This will require, however, a greater understanding of the ability of wood to serve national needs and improved efficiency in wood utilization and end-use performance.

For international suppliers desiring to enhance forest products trade with China the challenge is clear. They must match that desire to China's own perceptions of priority needs, and work much more closely with both the appropriate governmental organizations and end users to assure that the full economic and technical advantages of wood products is understood. China's efforts to rationalize the utilization of domestic timber supply and to improve the economic performance of wood products can ultimately lead to a substantial gain in the priorities assigned for timber imports.

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APPENDIX

Table A.1. CHINA'S TIMBER RESERVES AND FORESTED AREA BY PROVINCE

Province	Region	Timber Reserves billion m^3	%	rank	Forested Area million ha	%	rank	Fores Cover Rat %	ran
Heilongjiang	NE	1.44	16	1	15.3	13.3	1	34	3
Tibet	SW	1.40	16	2	6.3	5	6	5	22
Yunnan	SW	1.10	12	3	9.2	8	3	24	9
Sichuan	SW	1.05	12	4	6.8	6	5	12	15
Inner Mongolia	NE	.85	9	5	13.7	12	2	12	16
Jilin	NE	.66	7	6	6.1	5	7	32	6
Fujian	SE	.30	3	7	4.5	4	11	37	1
Shaanxi	Central	.25	3	8	4.5	4	12	22	11
Jiangxi	SE	.24	3	9	5.5	5	9	33	4
Guangxi	SW	.22	2	10	5.2	5	10	22	10
Other		1.52	17		37.9	33			
Total		9.03	100	--	115	100	--	12	--

Source: Agricultural Yearbook, 1985, Ministry of Forestry, published 1983, from survey in 1977-1981.

Reproduced from NFPA,(1986) p. 70

Table A.2. TOP TEN ROUNDWOOD PRODUCERS

Unit: 1000 meters^3

Area	1984 Roundwood Production	% National Total
Heilongjiang	16683	25.0
Fujian	7280	12.0
Jilin	6334	10.0
Inner Mongolia	4785	7.5
Sichuan	4570	7.4
Guangdong	4516	7.4
Hunan	3760	6.0
Jiangxi	3744	6.0
Yunnan	3066	4.8
Zhejiang	2037	3.0
Others	7073	10.9
Total	63848	100.00

Source: Ministry of Forestry

Reproduced from NFPA, (1986)

Table A.3. WOOD PROCESSING PROVINCES

Area	% of National Wood Processing
Heilongjiang	21.8
Jilin	8.3
Sichuan	5.6
Fujian	5.6
Inner Mongolia	5.3
Guangdong	5.3
Shanghai	5.3
Jiangxi	4.8
Beijing	3.9
Liaoning	3.3
Zhejiang	3.0
Shandong	3.0
Hunan	3.0
Jiangsu	2.9
Hubei	2.9
14 other provinces	16.0%
	100.0%

Source: State Statistical Bureau; MOF

Reproduced from NFPA, (1986)

Table A.4.

CHINA'S TIMBER OUTLOOK
CHANGING "PLANNED" HARVESTS

MAJOR TIMBER BUREAUS	1987-90 APPROVED CEILING	1989 STATE PLAN	ADJUSTED LIMIT
HEILONGJIANG FOR ENGR BUREAU	14.47	10.60	8.40
FOREST COMPANY GREATER XING'AN MOUNTAINS	5.78	6.00	4.41
JILIN PROVINCE	6.72	4.25	4.38
NEI MONGGOL	5.12	4.22	3.83
TOTAL	32.09	26.07	21.02

Volumes in Million Cubic Meters

CINTRAFOR/MOF

Table A. 5.

Log Production (1) (cart load of wood)
(million cubic meters)

Year	Log Production	Year	Log Production	Year	Log Production
1949	5.67	1962	23.75	1975	46.26
1950	6.64	1963	32.50	1976	48.73
1951	7.64	1964	38.00	1977	61.82
1952	11.20	1965	38.78	1978 (2)	51.60
1953	17.54	1966	41.92	1979 (3)	54.39
1954	22.21	1967	32.50	1980 (4)	53.39
1955	20.03	1968	27.91	1981 (5)	49.41
1956	20.84	1969	32.83	1982 (6)	50.00
1957	27.87	1970	37.82	1983 (7)	50.85
1958	35.79	1971	40.67	1984	--
1959	45.18	1972	42.53	1985 (8)	55.00
1960	41.29	1973	44.67		
1961	21.94	1974	46.07		

(1) China's Agricultural Yearbook 1980
(2), (3), (4), (5), SSB announcements
(6) Xinhua Dec 19,1982
(7) ibid (plan)
(8) Renmin Ribao, December 13, 1982

Table A.6.

CONSUMPTION OF STATE PLANNED DOMESTIC WOOD
BY MARKET SECTOR

Market Sector		Percentage	Unit: million m^3 Quantity 1981	1984	1985
1. Capital Construction		20.2	10.0	12.9	13.5
-doors and windows	(50%)				
-concrete forming	(45%)				
-scaffolding	(5%)				
2. Mining Props		13.6	6.7	8.7	9.1
3. Packaging		10.1	5.0	6.4	6.7
-export goods	(22%)				
-glass	(4%)				
-bicycles	(1%)				
-medicine	(1%)				
-machinery and equipment	(67%)				
-other	(05%)				
4. Fuelwood		8.1	4.0	5.2	5.4
5. Paper		7.6	3.7	4.8	5.1
6. Furniture		4.7	2.3	3.0	3.1
7. Agricultural uses		3.4	1.7	2.2	2.3
8. Rolling Stock		3.0	1.5	1.9	2.0
9. Plywood		1.5	0.7	1.0	1.0
10. Railroad Ties		1.1	0.5	0.7	0.7
11. Utility Poles		1.1	0.5	0.7	0.7
12. Posts		0.8	0.4	0.5	0.5
13. Geological Exploration		0.6	0.3	0.4	0.4
14. Matches		0.4	0.3	0.3	0.3
15. Shipbuilding		0.4	0.2	0.3	0.3
16. Freight Transport Uprights		0.3	0.2	0.2	0.2
17. Textiles		0.3	0.2	0.1	0.2
18. Shoe Manufacturing		0.1	0.1	0.1	0.1
19. Sports and Cultural		0.1	0.1	0.1	0.1
20. Musical Instruments and Toys		0.1	0.1	0.1	0.1
21. Thinning of Forests		6.2	2.9	4.0	4.2
22. Other*		16.3	8.0	10.2	11.0
Total		100.00%	49.4	63.8	67.0

Source: Ministry of Forestry, Forestry Economics Research Agency
Translated and compiled by DBC

*Much of this includes wood used for the military or additional wood in the above categories under local distribution for which no statistics are available. Important among these are retail markets and agricultural uses.

Reproduced from NFPA (1986) p. 170

Table A.7. CONSUMPTION OF IMPORTED WOOD BY MARKET SECTOR

Unit: million m^3

Market Sector	Quantity (million m^3) 1984	1985	Percentages Softwoods	Hardwoods	Total
1. Construction	3.7	4.2	45%	0%	45%
2. Paper	0.7	0.8	9%		9%
3. Market Sales (peasant home construction)	0.8	0.9	8%	2%	10%
4. Ordnance & Defense	0.7	0.7	7%	1%	8%
5. Packaging	0.4	0.5	5%		5%
6. Railroads	0.3	0.4	3%	1%	4%
7. Agricultural Industries	0.2	0.2	2%		2%
8. Shipbuilding	0.1	0.1	1%		1%
9. Furniture	0.4	0.5	1%	4%	5%
10. Plywood Manufacturing (logs to manufacture plywood)	0.5	0.6		6%	6%
11. Other	0.4	0.5	5%		5%
Transportation					
Post & telecommunication					
Textiles					
Aerospace					
Light Industry					
Support of other Countries					
Exports					
TOTAL	8.2	9.4	86%	14%	100%

Source: DBC Compilation
Reproduced from NFPA (1986) p. 171.

Table A.8. TOTAL PLANNED CONSUMPTION OF ALL WOOD (IMPORTS AND DOMESTIC) BY MAJOR MARKET SECTORS

Unit: million m^3

Market Sector	1984	1985
1. Construction	16.6	17.7
2. Packaging	6.8	7.2
3. Paper	5.5	5.9
4. Market Sales (peasant homes and rural collectives)	*	*
5. Ordnance and Defense	*	*
6. Furniture	3.4	3.6
7. Agricultural Industries	2.4	2.5
8. Plywood Manufacturing	1.5	1.6
9. Rail Ties	1.0	1.1
10. Shipbuilding	0.4	0.4
NO TOTALS POSSIBLE		

Source: DBC compilation

*This information is unavailable. Defense consumption is a classified State secret. Retail Markets are too new to have reliable statistics.

Reproduced from NFPA (1986) p. 171.

Table A-9 CONSUMPTION OF IMPORTED ROUNDWOOD BY PROVINCES, 1985

SOFTWOOD AND HARDWOOD

= less than 1% Unit = million m^3

Province	Rank	Amount	% National Total	Transportation Source
TOTAL	--	9.3	100%	89% ocean shipping; 11% from USSR by rail
Shanghai	1	1.5	16%	Port of Shanghai
Jiangsu	2	1.3	14%	Ports of Lianyungang, Nantong, Zhanjiajiang, Nanjing, Shanghai
Zhejiang	3	1.0	11%	Ports of Shanghai, Ningbo
Hubei	4	0.8	9%	Southeast Asian (SEAsian) from Huangpugang, Guandong, Ports of Shanghai, Nantong, Huangpu, up the Yangtze River from USSR by rail
Shandong	5	0.55	5%	Ports of Qingdao, Yantai, Qinghuangdao
Beijing	6	0.5	5%	Ports of Qinghuangdao, Xingoug By rail from USSR
Anhui	7	0.3	3%	By rail, from USSR, Ports of Shanghai, Nantong, Ningbo
Guangdong	7	0.3	3%	Port of Huangpugang
Tianjin	7	.3	3%	Ports of Xingang, Qinghuangdao
Shaanxi	8	.250	3%	Port of Lianyungang by Longhai Railline
Hebei	8	.250	3%	Port of Qinghuangdao, by rail from USSR
Shanxi	8	.250	3%	Longhai Railline, Port of Lianyungang, by rail from USSR
Henan	9	.200	2%	Longhai Railline, Port of Lianyungang, by rail from USSR
Hunan	10	.180	2%	Ports of Shanghai, Huangpu
Liaoning	11	.100	1%	Port of Dalian
Sichuan	11	.10	1%	Port of Lianyungang, Longhai Railline
Jiangxi	12	.08	1%	Ports of Ningbo, Shanghai, Huangsu
Fujian	13	.05		Port of Maweigang
Xiamen	13	.05		Port of Xiamen
Inner Mongolia (West)	13	.05		Port of Lianyungang, Longhai Railline
Qinghai	13	.05		Port of Lianyungang, Longhai Railline
Gansu	13	.05		Port of Lianyungang, Longhai Railline
Shenzhen	14	0.03		Port of Shenzhen
Other		1.06	11%	Used for defense and other industries, destination unknown

Source: Reproduced from NFPA, 1986, Table H, page 133.

Table A.10.

APPENDIX K

FORECAST OF CONSTRUCTION ACTIVITY BETWEEN 1986 and 2000

By the Ministry of Construction's Construction Technology Policy Group

Unit: million square meters

TYPE OF CONSTRUCTION	ESTIMATE NUMBER ONE (A)	(B)	(C)	ESTIMATE NUMBER TWO (A)	(B)	(C)	ESTIMATE NUMBER THREE (A)	(B)	(C)	ESTIMATE NUMBER FOUR (A)	(B)	(C)	ESTIMATE NUMBER FIVE (A)	(B)	(C)
INDUSTRIAL BUILDINGS	36	56	50	235	404	348	44	69	61	26	28	27	37	56	50
PUBLIC BUILDINGS	38	59	52	77	132	114	49	77	68	28	30	29	53	67	62
RESIDENTIAL BUILDINGS	108	169	149	112	180	157	118	184	162	69	86	80	131	167	155
TOTAL PLANNED CONSTRUCTION	182	284	251	424	716	619	211	330	291	123	144	136	221	290	267
RURAL CONSTRUCTION	600	660	640	749	772	764	---	---	---	---	---	---	770	770	770
GRAND TOTAL	780	944	891	1173	1488	1383							991	1060	1037

KEY: (A) Annual average for the period 1986 through 1990
(B) Annual average for the period 1991 through 2000
(C) Annual average for the period 1986 through 2000

Estimate Number One is based on reaching an average per capita living space of 8 square meters by the year 2000. T has been approved by the State Council. Other types of construction are derived based on the residential figu as per past data.
Estimate Number Two is based on rate of increase of national income as a percentage of fixed capital assets.
Estimate Number Three same as Number Two, but with a different proportion and rate of growth.
Estimate Number Four is based on an unstated statistical analysis.
Estimate Number Five is the Ministry of Construction's recommendation.

Source: In Construction Technology, February, 1986.

Table A.11.

PEASANT RESIDENTIAL CONSTRUCTION IN 1984

Province & Municipality	Housing Starts* (1000)	% of Total Households	Construction Area (million square meter)		Type of Construction	
			Total Area	Total of Which is Multistory	% Brick and wood	% Concrete Frame Brick
Shandong	1360	8	81	2	66	30
Henan	970	6	50	3	72	26
Jiangsu	888	7	63	20	60	40
Sichuan	830	4	53	4	14	38
Hebei	598	5	36		90	10
Hubei	570	7	51	7	72	20
Zhejiang	480	6	41	29	36	41
Guangdong	476	5	29	13	59	41
Hunan	453	4	50	10	66	34
Guangxi	437	7	31	9	58	24
Anhui	387		15	2		
Jiangxi	347	6	25	9	78	22
Gansu	300	8	18		18	14
Shaanxi	285	6	17	2	58	21
Shanxi	238	5	13	4	78	21
Yunnan	212	4	11	9	20	7
Liaoning	200	4	13		86	14
Fujian	160	3	20	18	53	23
Heilongjiang	122	3	8		45	21
Inner Mongolia	120	4	7		43	6
Jilin	110	3	7		82	8
Shanghai	109	8	13	10	21	79
Guizhou	100		8	3		
Tianjin	50	6	3		75	25
Beijing	44	4	3		84	16
Xinjiang	42		2		4	3
Ningxia	32	5	2			
Qinghai	10	2	1		3	1
Tibet						
TOTAL	9930	5	671	151	54	24

Source: 1985 Economic Yearbook. Translated by DBC.

*Households building new homes

Reproducted from NFPA, 1986 Table H, p. 309.

Table A. 12.

PEOPLE'S REPUBLIC OF CHINA: KEY ECONOMIC INDICATORS

	1986	1987	1988 Projection
Domestic Economy 1/			
Population (millions)	1,065	1,080	1,095
Natural Rate of Population Growth (%)	1.4	1.4	1.5
Official Unemployment (avg. % for year) 2/	2.0	2.0	2.0
GNP (billion yuan)	938	1,092	1,365
Real GNP Growth (%)	7.8	9.4	10
GNP Per Capita (yuan)	881	1011	1247
Real Per Capita GNP Growth (%)	6.3	7.9	8.4
National Income (billion yuan)	779	915	1144
Real National Income Growth (%)	7.4	9.3	10
Gross Value Indus. Output (billion yuan) 3/	1119	1378	1819
Real Growth GVIO (%)	11.4	16.5	17
Industrial Productivity Growth (%)	4.0	7.6	8
Gross Value Agric. Output (billion yuan) 3/	401	445	512
Real Growth GVAO (%)	3.4	4.7	5
Retail Sales (billion yuan)	495	582	728
Real Growth Retail Sales (%)	8.5	9.6	10
Total Fixed Asset Investment (billion yuan)	302	352	440
Real Growth Fixed Asset Investment (%)	12.9	9.2	10
Domestic Finance			
General Retail Price Index (CPI) (% change)	6.0	7.3	15
Market Price Index (% change)	8.1	16.1	25
Domestic M-2 Money Supply (billion yuan)	725	895	1120
M-2 Growth Over Prior Year-End (%)	29.0	23.4	25
Govt. Budget Surplus/Deficit as % of GNP	-1.8	-1.6	-2.3
Balance of Payments ($ billion)			
PRC Exports (FOB)	30.9	39.5	45.0
PRC Imports (CIF)	42.9	43.2	54.0
Trade Balance	-12.0	-3.7	-9.0
Current Account Balance	-8.2	-0.3	-5.0
Foreign Direct Investment (paid in)	1.9	1.9	2.2
Foreign debt, year end (estimated)	24.5	27.4	31.2
Debt Service Paid (estimated)	2.4	2.5	4.0
Debt Service Ratio (% of exports)	7.8	6.3	8.8
Foreign Exchange Reserves (year-end)	10.5	15.2	16.2
Average Exchange Rate for Year (yuan/$) 4/	3.46	3.71	3.71
U.S.-China Trade and Investment ($ million) 5/			
U.S. Exports to China (FAS)	3,106	3,497	5,250
U.S. Imports from China (CIF)	5,240	6,911	8,300
U.S.-China Trade Balance	-2,134	-3,413	-3,050
U.S. Share of Chinese Exports (%)	15.7	16.3	16.2
U.S. Share of Chinese Imports (%)	7.8	8.8	10.9
U.S. Investment (Cumulative, Approved)	2,700	3,040	3,950
U.S. Share of Total Foreign Investment (%)	14.1	13.8	14

Sources: State Statistical Bureau (SSB) Yearbook and Annual Statistical Communiques on Economic Performance, People's Bank of China Banking Data, Ministry of Finance Budget Reports, USG trade data, and Embassy estimates.

Notes:

1/ All yuan are current yuan. Growth rates are adjusted for inflation.

2/ 1987 is Embassy estimate. Official figure is not yet available.

3/ In accordance with the material product system (MPS) of national income accounting, GVIO and GVAO figures are calculated on a gross rather than a net basis. They are not directly comparable with GNP and national income figures which are calculated on a value added basis.

4/ Figures do not reflect the price of foreign exchange sold at domestic adjustment centers (swap markets), which currently is about 6.00 yuan/$.

5/ Except for projections, investment data are based on official Chinese sources. U.S.-China bilateral trade is based on U.S. Government data.

U.S. Department of Commerce. "Source: Foreign Economic Trends and their Implications for the United States--People's Republic of China". International Trade Admin. FTE 88-84, Aug 88.

US and Canadian Exports of Softwood Logs to
People's Republic of China 1980-88 (Volume MBF)

Table A.13

YEAR	U.S. Customs District: Seattle	Columbia-Snake	North. Calif.	Alaska	U.S. Pacific NW Total	British Columbia Total	W. North American Total
1980							
1stQtr	0	0	n/a	n/a	0	n/a	0
2ndQtr	3584	0	n/a	n/a	3584	n/a	3584
3rdQtr	10733	3624	n/a	n/a	14357	n/a	14357
4thQtr	28954	40890	n/a	n/a	69844	n/a	69844
Total	43271	44514	0	0	87785	0	87785
1981							
1stQtr	31378	12003	n/a	163	43544	n/a	43544
2ndQtr	21404	18757	n/a	65	40226	n/a	40226
3rdQtr	46885	11599	n/a	2977	61461	n/a	61461
4thQtr	71112	6099	n/a	0	77211	n/a	77211
Total	170779	48458	0	3205	222442	7838	230280
1982							
1stQtr	60090	19625	1466	0	81181	0	81181
2ndQtr	117366	86578	0	0	203944	9093	213037
3rdQtr	98120	45515	0	0	143635	6558	150193
4thQtr	83186	22622	7826	0	113634	22197	135831
Total	358762	174340	9292	0	542394	37848	580242
1983							
1stQtr	94305	10291	2	0	104598	33911	138509
2ndQtr	79999	26860	0	0	106859	18686	125545
3rdQtr	213563	66838	4500	7275	292176	4029	296205
4thQtr	147551	59833	3800	8316	219500	9669	229169
Total	535418	163822	8302	15591	723133	66295	789428
1984							
1stQtr	173563	42082	3500	0	219145	41440	260585
2ndQtr	135661	46776	0	0	182437	27897	210334
3rdQtr	101906	67902	3600	0	173408	28105	201513
4thQtr	178531	98767	6468	0	283766	74263	358029
Total	589661	255527	13568	0	858756	171705	1030461
1985							
1stQtr	108347	50825	4315	2113	165600	51427	217027
2ndQtr	241909	121925	14694	0	378528	8575	387103
3rdQtr	183044	122013	12696	0	317753	19914	337667
4thQtr	111070	90426	5600	0	207096	18357	225453

US and Canadian Exports of Softwood Logs to
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Table A.13.

YEAR	U.S. Customs District: Seattle	Columbia-Snake	North. Calif.	Alaska	U.S. Pacific NW Total	British Columbia Total	W. North American Total
Total	644370	385189	37305	2113	1068977	98273	1167250
1986							
1stQtr	162561	69994	3900	0	236455	19529	255984
2ndQtr	123487	49024	3197	0	175708	39899	215607
3rdQtr	66088	26224	0	0	92312	14473	106785
4thQtr	82549	28389	0	0	110938	6712	117650
Total	434685	173631	7097	0	615413	80613	696026
1987							
1stQtr	83690	31962	0	0	115652	10358	126010
2ndQtr	138543	36738	0	7567	182848	16146	198994
3rdQtr	119706	29066	0	4375	153147	16841	169988
4thQtr	93681	25293	0	7660	126634	19730	146364
Total	435620	123059	0	19602	578281	63075	641356
1988							
1stQtr	164489	90912	3417	0	258818	n/a	258818
2ndQtr	247239	121753	6391	0	375383	n/a	375383
3rdQtr	183543	101651	27463	4000	316657	n/a	316657
4thQtr	95673	47257	6442	5267	154639	n/a	154639
Total	690944	361573	43713	9267	1105497	0	1105497

Source: CINTRAFOR/Compiled from USDA, Production, Prices
Employment and Trade in NW Forest Industries,
USFS, PNB, (Var Issues) and Statistics Canada

Printed 6/20/89

US and Canadian Exports of Hardwood Logs to
People's Republic of China 1980-88 (Volume MBF)

Table A.14.

YEAR	U.S. Customs District: Seattle	Columbia-Snake	North. Calif.	Alaska	U.S. Pacific NW Total	British Columbia Total	W. North American Total
Hardwood Logs							
1980							
1stQtr	0	0	0	0	0	n/a	0
2ndQtr	6	0	0	0	6	n/a	6
3rdQtr	0	0	0	0	0	n/a	0
4thQtr	0	0	0	0	0	n/a	0
Total	6	0	0	0	6	0	6
1981							
1stQtr	0	0	0	0	0	n/a	0
2ndQtr	0	0	0	0	0	n/a	0
3rdQtr	0	0	0	0	0	n/a	0
4thQtr	0	0	0	0	0	n/a	0
Total	0	0	0	0	0	1362	1362
1982							
1stQtr	45	0	0	0	45	0	45
2ndQtr	0	0	0	0	0	0	0
3rdQtr	0	0	0	0	0	4472	4472
4thQtr	0	0	0	0	0	4439	4439
Total	45	0	0	0	45	8911	8956
1983							
1stQtr	0	0	0	0	0	9213	9213
2ndQtr	0	0	0	0	0	25534	25534
3rdQtr	0	0	0	0	0	4029	4029
4thQtr	0	0	0	0	0	9312	9312
Total	0	0	0	0	0	48088	48088
1984							
1stQtr	0	0	0	0	0	0	0
2ndQtr	0	0	0	0	0	0	0
3rdQtr	0	0	0	0	0	0	0
4thQtr	0	0	0	0	0	4102	4102
Total	0	0	0	0	0	4102	4102
1985							
1stQtr	0	0	0	0	0	6930	6930
2ndQtr	0	59	0	0	59	0	59
3rdQtr	0	0	0	0	0	427	427
4thQtr	0	0	0	0	0	0	0

US and Canadian Exports of Hardwood Logs to
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Table A.14.

YEAR	U.S. Customs District: Seattle	Columbia-Snake	North. Calif.	Alaska	U.S. Pacific NW Total	British Columbia Total	W. North American Total
Total	0	59	0	0	59	7357	7416
1986							
1stQtr	0	0	0	0	0	2836	2836
2ndQtr	0	0	0	0	0	12794	12794
3rdQtr	7	0	0	0	7	0	7
4thQtr	0	0	0	0	0	0	0
Total	7	0	0	0	7	15630	15637
1987							
1stQtr	0	0	0	0	0	6269	6269
2ndQtr	0	0	0	0	0	4843	4843
3rdQtr	0	0	0	0	0	11329	11329
4thQtr	0	1000	0	0	1000	3143	4143
Total	0	1000	0	0	1000	25584	26584
1988							
1stQtr	0	0	0	0	0	n/a	0
2ndQtr	0	0	0	0	0	n/a	0
3rdQtr	0	0	0	0	0	n/a	0
4thQTr	0	0	0	0	0	n/a	0
Total	0	0	0	0	0	0	0

Source: CINTRAFOR/Compiled from USDA, Production, Prices
Employment and Trade in NW Forest Industries,
USFS, PNB, (Var Issues) and Statistics Canada

Printed 6/20/89

US and Canadian Exports of Softwood Lumber to People's Republic of China 1980-88 (Volume MBF)

Table A.15.

YEAR	U.S. Customs District: Seattle	Columbia-Snake	North. Calif.	Alaska	U.S. Pacific NW Total	British Columbia Total	W. North American Total
1980							
1stQtr	n/a	n/a	n/a	n/a	0	n/a	0
2ndQtr	n/a	n/a	n/a	n/a	0	n/a	0
3rdQtr	n/a	n/a	n/a	n/a	0	n/a	0
4thQtr	n/a	n/a	n/a	n/a	0	n/a	0
Total	0	0	0	0	0	1280	1280
1981							
1stQtr	82	359	0	8721	9162	n/a	9162
2ndQtr	233	0	0	0	233	n/a	233
3rdQtr	20	0	13	9316	9349	n/a	9349
4thQtr	0	8347	80	9112	17539	n/a	17539
Total	335	8706	93	27149	36283	16792	53075
1982							
1stQtr	0	5	0	9479	9484	0	9484
2ndQtr	0	0	0	0	0	8663	8663
3rdQtr	0	2194	5	3674	5873	6290	12163
4thQtr	0	49	17	0	66	19025	19091
Total	0	2248	22	13153	15423	33978	49401
1983							
1stQtr	0	0	0	5976	5976	15108	21084
2ndQtr	0	1637	0	0	1637	27465	29102
3rdQtr	0	1619	0	6278	7897	35319	43216
4thQtr	0	4146	0	0	4146	55289	59435
Total	0	7402	0	12254	19656	133181	152837
1984							
1stQtr	0	0	0	0	0	48789	48789
2ndQtr	0	10665	0	0	10665	37426	48091
3rdQtr	0	12292	0	0	12292	10160	22452
4thQtr	0	20607	0	0	20607	10963	31570
Total	0	43564	0	0	43564	107338	150902
1985							
1stQtr	0	7345	0	0	7345	20601	27946
2ndQtr	0	10056	0	0	10056	25677	35733
3rdQtr	0	0	0	0	0	18487	18487
4thQtr	89	0	0	0	89	39516	39605

US and Canadian Exports of Softwood Lumber to
People's Republic of China 1980-88 (Volume MBF)

Table A.15.

YEAR	U.S. Customs District: Seattle	Columbia-Snake	North. Calif.	Alaska	U.S. Pacific NW Total	British Columbia Total	W. North American Total
Total	89	17401	0	0	17490	104281	121771
1986							
1stQtr	2178	3104	0	0	5282	16470	21752
2ndQtr	0	0	0	0	0	12850	12850
3rdQtr	0	0	0	0	0	5092	5092
4thQtr	0	0	0	0	0	5885	5885
Total	2178	3104	0	0	5282	40297	45579
1987							
1stQtr	0	0	0	0	0	5297	5297
2ndQtr	0	8636	0	0	8636	7150	15786
3rdQtr	119	0	0	0	119	9841	9960
4thQtr	512	0	0	0	512	9585	10097
Total	631	8636	0	0	9267	31873	41140
1988							
1stQtr	118	0	95	0	213	n/a	213
2ndQtr	0	0	0	0	0	n/a	0
3rdQtr	0	0	0	0	0	n/a	0
4thQtr	0	4823	0	0	4823	n/a	4823
Total	118	4823	95	0	5036	84465	89501

Source: CINTRAFOR/Compiled from USDA, Production, Prices
Employment and Trade in NW Forest Industries,
USFS, PNB, (Var Issues) and Statistics Canada

Printed 6/20/89

Figure A.1.

Chart II

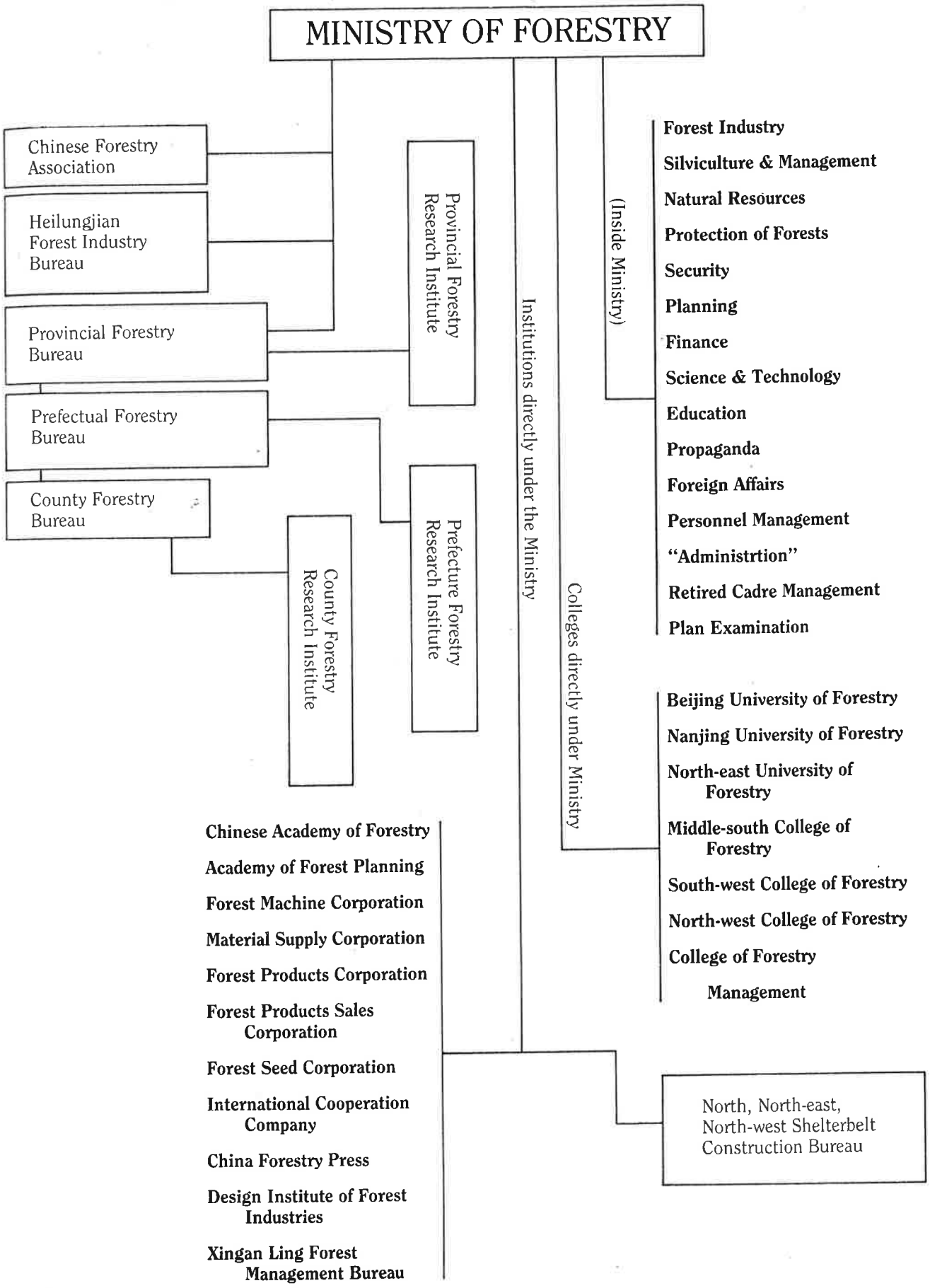

Figure A.2.

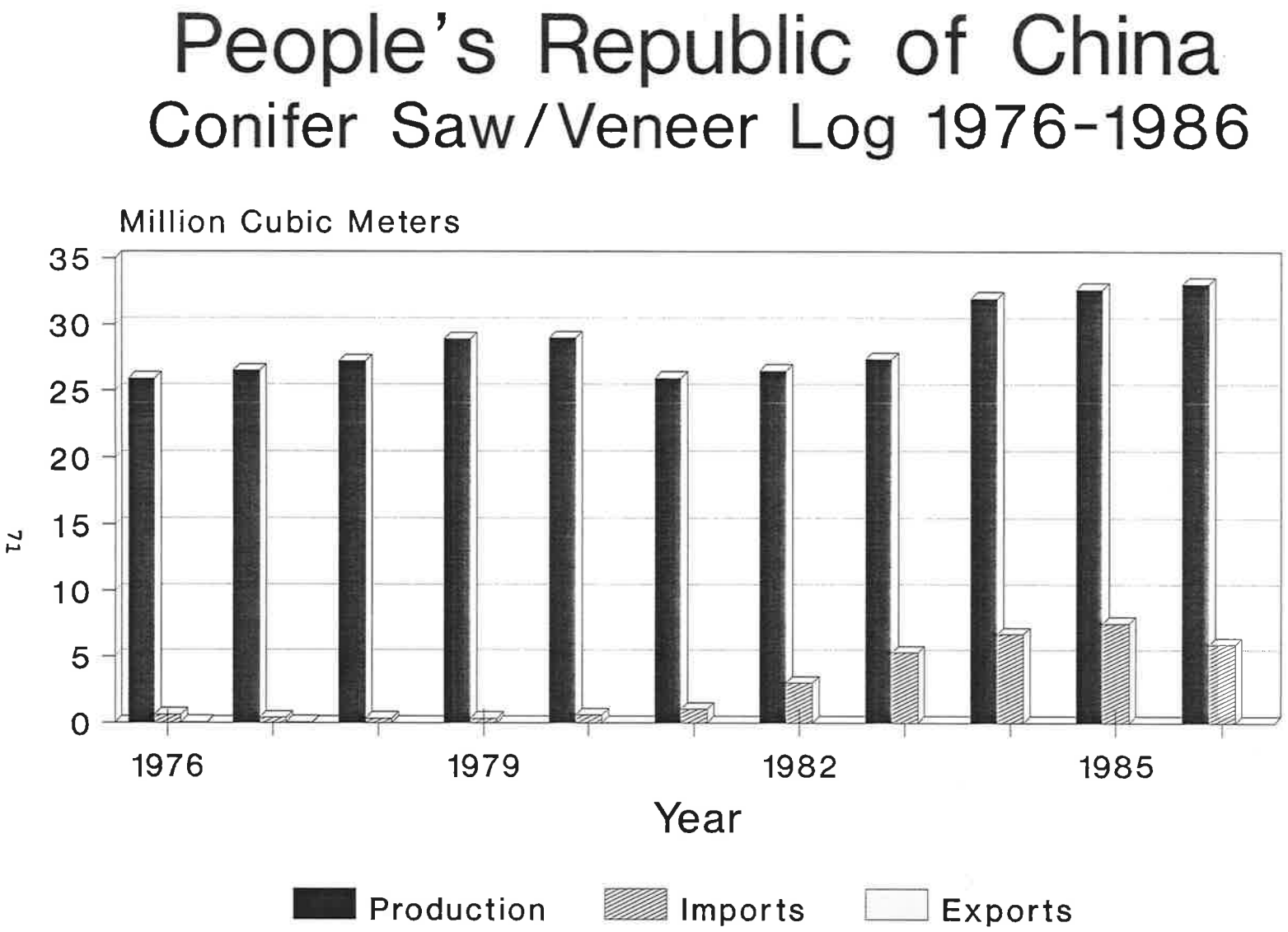
People's Republic of China
Conifer Saw/Veneer Log 1976-1986
Million Cubic Meters
35
30
25
20
15
10
5
0
1976
1979
1982
1985
Year
Production
Imports
Exports
CINTRAFOR/FAO

Figure A.3.

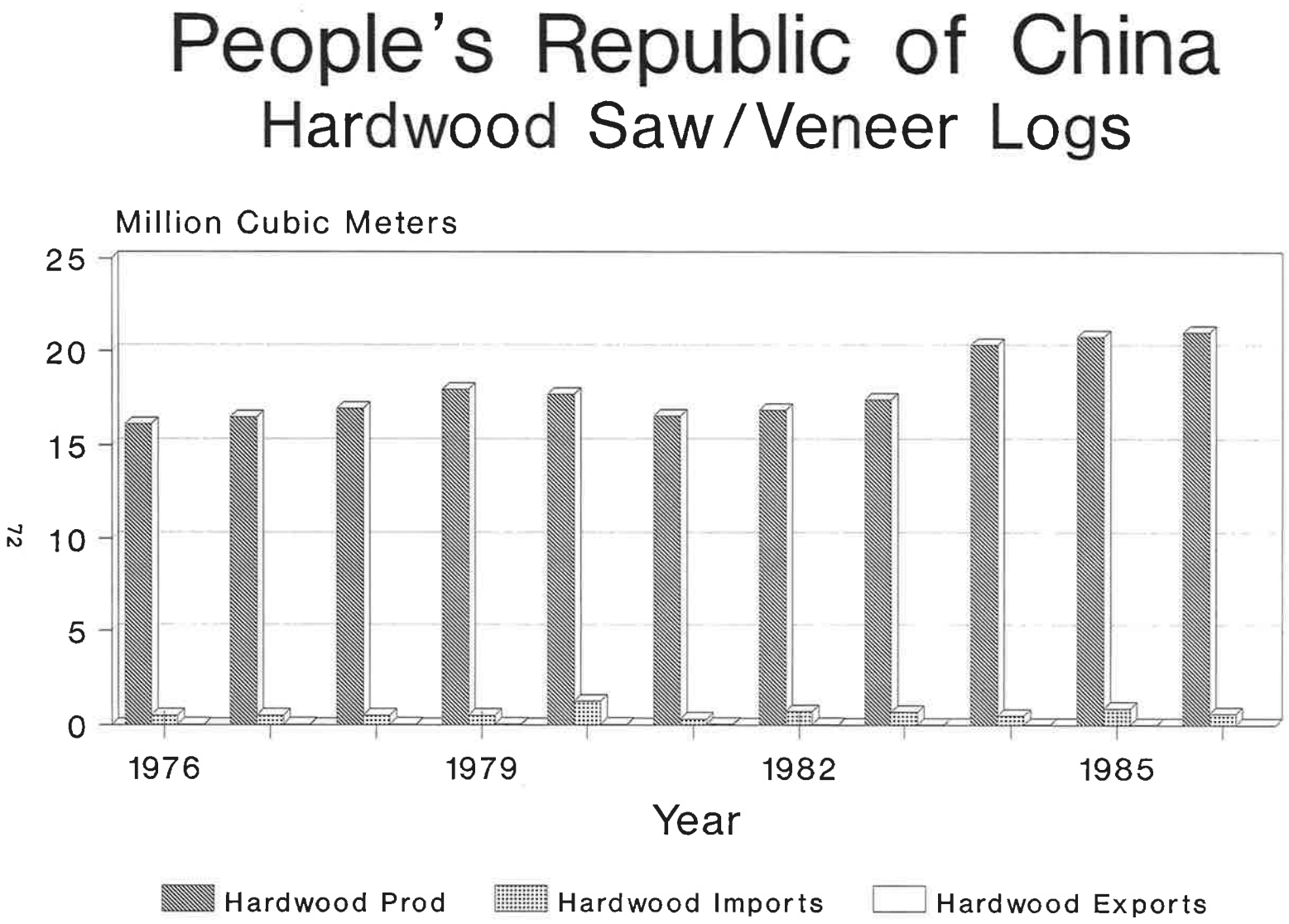

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Figure A.4.

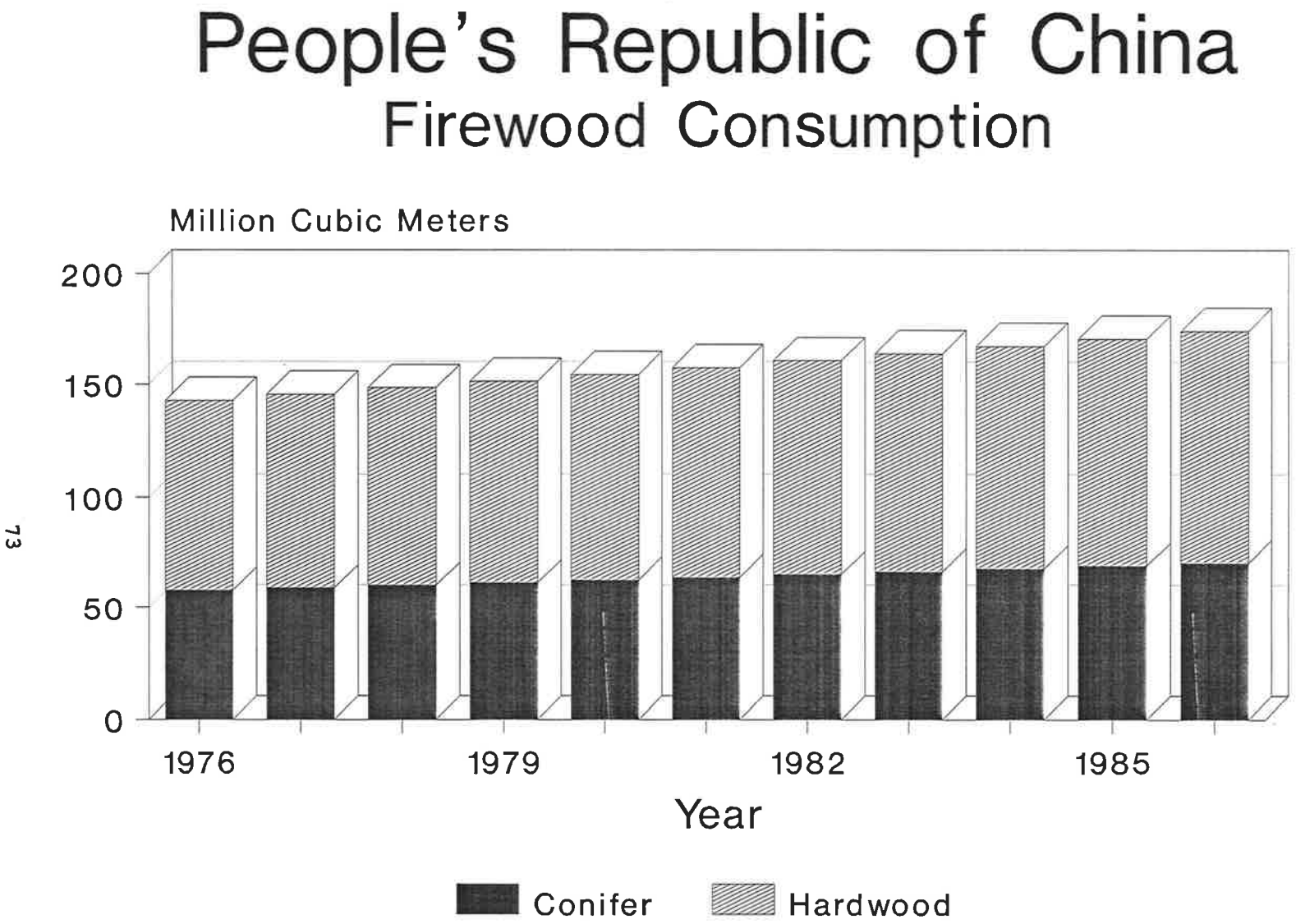
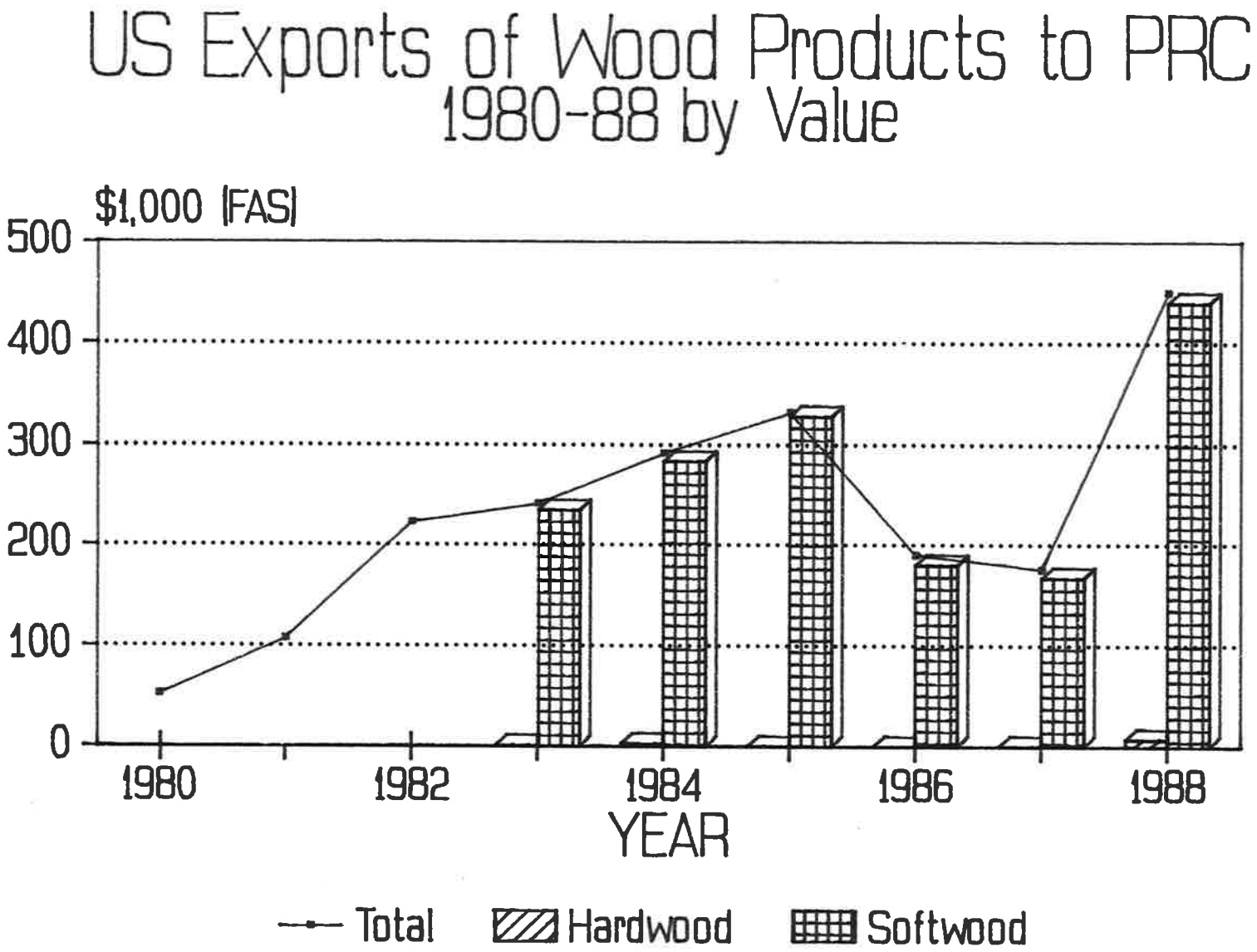

People's Republic of China
Firewood Consumption
Million Cubic Meters
200
150
100
50
0
1976
1979
1982
1985
Year
Conifer
Hardwood
CINTRAFOR/FAO

Figure A.5.



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