China’s Natural Forest Protection Program (NFPP):
Impact on Trade Policies Regarding Wood

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# Table of Contents

1 Introduction ................................................................................................................. 1

2 The NFPP and Related Programs ............................................................................... 5
   2.1 Background to NFPP .......................................................................................... 5
   2.2 The Scope and Scale of the NFPP ................................................................. 6
   2.3 Current Status of NFPP Implementation .................................................. 10
   2.4 Forest Resources ........................................................................................... 11
      2.4.1 Production of Timber and Other Forest Products ......................... 13
         2.4.1.1 Timber Production .......................................................................... 13
         2.4.1.2 Impacts of Logging Ban on Timber Production ....................... 14
         2.4.1.3 Impact of Ban on Timber Production in Major Production Areas .... 15
         2.4.1.4 Can Plantations Compensate For the Logging Ban in the Future? ... 16

3 Supply and Demand for Timber in China................................................................. 18
   3.1 Estimated timber consumption and uncertainty ........................................ 18
   3.2 Increasing Demand for Wood Products ....................................................... 19
      3.2.1 Construction .......................................................................................... 19
         3.2.1.1 Housing Reform ........................................................................... 20
         3.2.1.2 Wood Used in House Construction .............................................. 20
   3.3 Wood Demand and the Western Development Strategy .................................. 21
   3.4 Imports Fill Gap Between Demand and Domestic Supply ........................... 23
      3.4.1 Factors Affecting Wood Imports to China ........................................... 24
      3.4.2 Other Causes for Imports Increase ....................................................... 26
   3.5 World Timber Supply .................................................................................... 27

4 Logistics for Forest Product Trade and Transportation ........................................... 30
   4.1 Distribution for Wood Products .................................................................... 31
   4.2 Logistic of Imported Wood Products ............................................................ 32
   4.3 Transportation Systems .................................................................................. 33
      4.3.1 Railway ................................................................................................. 33
      4.3.2 Road and Highway ................................................................................ 35
China’s Natural Forest Protection Program (NFPP): Impact on Trade Policies Regarding Wood

WORKING PAPER DRAFT

4.3.3 Ports and Waterways ................................................................. 35
4.4 Summary of Infrastructure ............................................................ 36
5 Summary .......................................................................................... 37
6 Policy Recommendations ..................................................................... 39
6.1 Long Term .................................................................................... 41
7 Conclusion ....................................................................................... 43
8 Citations ........................................................................................... 44
Appendix 1 List of the Positions Held by Those Interviewed in the Study ........ 47

List of Tables

Table 1: China Timber Production* in 1997 and 1999 (million m³) ...................... 49
Table 2: Timber Production by Region in 1997-1999 (million m³) ......................... 50
Table 3: Forests Area Planted by Purpose, 1996-1999 (million ha) ....................... 51
Table 4: Wood Consumption Estimates by Major Wood Consuming Industries (million m³) ................................................................. 52
Table 5: Estimated Wood Consumption in China, 1995-1998 (thousand m³) ...... 53
Table 6: Floor Space of Building Construction in China, 1990-1999 ....................... 54
Table 7: Three Major Products Imports in Volume, 1992-1999 ............................ 55
Table 8: Top Ten Log Importing Countries into China, 1998 and 1999 (m³) ......... 56
Table 9: Top Ten Lumber Importing Countries in China, 1998 and 1999 (m³) ...... 57
Table 10: Tariff of Selected Wood Products in 1995-1999 ....................................... 58
Table 11: Total Standardized Volume by Region (in million m³) ............................ 59
Table 12: Potential Fiber Availability by Region 1996-2050 (in Million m³) ........ 60
Table 13: Proportion of Roundwood Exported to China in 1998 ............................ 61
Table 14: Length of Transportation by Region in 1999 ( km) ................................ 62
Table 15: Volume Handled in Major Coastal Ports by Type of Goods in 1999 (million tons) ................................................................. 63
1 Introduction

This report was initially developed as part of a larger project on China under the Public Policy Option Project (PPOP) financed by the Canadian International Development Agency (CIDA). It focuses on issues of wood supply and trade in Forest products that arose (or may arise) as a consequence of the Natural Forest Protection Program (NFPP).

The report is based on an extensive literature review, data collection by the Chinese team\(^1\) and interviews with policy makers and experts in China. The positions of those experts interviewed are provided in Appendix A. The opinions and analysis in this report, however, are solely those of the authors.

The object of the analysis is to provide an answer to the following questions:

(1) What has been the impact of the NFPP and related programs so far on wood supply in China, and what impacts can be anticipated in the future?

(2) What is, and what will the likely impact be, of the NFPP and related programs on the supply of Forest products in China?

The report explores both national and regional impacts and identifies policy options that may be adopted by China in order to minimize any adverse effects of the NFPP and related programs that may impact the production of wood.
The report starts with an account of the nature and history of the NFPP and its implementation to date. These scheduling details will determine the degree to which national and regional shortages of wood that may emerge in the short-run. China’s forest production of timber and the impacts that the loggings ban may have on the domestic supply of wood and the security of supply of Forest products is also examined. In particular, the role that alternative new sources of wood supply (e.g. plantations) may play in eliminating any shortfalls that the logging ban may cause.

Shortfalls are a function of changes in both supply and demand. We, therefore examine, in the subsequent section, timber consumption by major wood consuming industries. We investigate how anticipated changes in each consuming industry (and in final consumer demand) for forest products may affect the demand for wood. In particular, we focus on the impacts of housing reform and the Western Development Strategy on the consumption of forest products, and thus wood demand and supply.

Shortfalls in domestic supply due to the demand and supply analysis could be filled by imports. Hence, we examine the role that alternative foreign suppliers play in China, as well as anticipated future supply conditions from these sources. Institutional barriers on trade also affect imports. We examine the role that accession to WTO (and China’s changes to its import policies in anticipation of WTO membership) have or potentially may have on imports. We explore the sustainability of imports of wood as substitutes to

1 The Chinese team was led by Changjin Sun, Director of the Centre for Ecological and Environmental Economics at the Chinese Academy of Science
domestic supply by analyzing the long term forecast of global wood supply. We conclude that no global shortages are likely to arise and thus high prices of imports do not pose a threat on China’s ability to satisfy its demand for Forest products.

Analysis at a national level cannot detect regional shortages, however, when there are barriers (physical or institutional) to the flow of wood and other forest products between the regions. We therefore examine the logistic characteristics and the distribution system of forest products in China. We conclude that an inadequate infrastructure (both institutional and physical) may cause shortages in the West. Coastal regions benefiting from the emergence of efficient markets for timber and forest products and from a good physical infrastructure (e.g. port facilities) will not experience any shortage.

The above analyses provide the groundwork for the policy recommendations to ensure continued availability of wood supplies as a renewable resource. Our policy recommendations include some short term temporary measures to alleviate the immediate problems of regional wood and forest product supplies shortfalls through tax relief which will compensate for price increases caused by the need to use expensive and inefficient transportation systems. We recommend improvements in information collection, processing and provision of supply, demand and price statistics of forest products nationally and regionally. This will help planning by both enterprises and government agencies. We recommend an assessment of the technological and skill needs of the Industry that are required to maintain a competitive industry, in order to determine appropriate investment levels and training programs. This assessment will also indicate where rationalization of the industry is required (i.e. supporting the smooth
transformation of those enterprises with a strong potential to competitive enterprises that can function in a market system and facilitating the exit from the industry of those enterprises which have no economic potential). In the long run a market system and a modern physical infrastructure will do much to alleviate the problems of wood supply we have identified in Western China.
2 The NFPP and Related Programs

2.1 Background to NFPP

Several recent natural disasters have focused the attention of the Chinese central government on problems associated with deforestation. In 1998, for example, floods occurring in the three large river drainage areas (the Yangtze River, the Yellow River and the Shanghuajiang and Nenjiang Rivers) killed thousands of people and caused damages exceeding three hundred billion Yuen (~US$36 billion) [20]. In 2001, severe sand storms have covered Beijing reinforcing the determination of China’s leaders to fight deforestation and desertification. Recognition of the importance of the threat that deforestation in the Western region, the region containing the sources of China’s major rivers, poses to China’s water supplies has also grown and reinforced that determination.

A series of programs has been developed to protect China’s natural forests, with the objective of conserving bio-diversity, protecting water quality, preventing soil erosion and desertification, and reducing the likelihood of floods and other natural disasters associated with deforestation.

The first draft of the NFPP was published in October 1997. It was followed by the implementation of several experimental programs. It was revised several times until finally in December 2000 the implementation of the program was announced officially [28]. The NFPP covers 17 provinces representing over half of all provinces of China. The program has its roots in the 1950s when at the first national forest conference China adopted the guiding principle of “protecting the forest comprehensively, afforestation in
key areas, rational felling and rational utilization of timber” [4]. In 1962 after inspecting
the northeast forest region, Premier Zhou Enlai called for “keeping evergreen mountains
and, sustainable Forests”. In 1970s, the Ministry of Forests revised the Management
Measures of Felling and Regeneration to remove clear-cutting around the large reservoirs
and lakes and the banks of major rivers. Later in 1979, China promulgated the Forest
Law that brought forest protection into the legislation.

Despite official and legal sanctions forest protection efforts failed to stop over-cutting
and over-use of forestlands that seriously damaged China’s limited natural forests and
their sensitive ecologies. Land erosion reached 38% of the total. Sixteen percent of the
land area is undergoing desertification [20]. Disastrous floods are occurring more
frequently than before and a water shortage is threatening the population living along the
Yellow River. The degradation of the natural environment has become a major
government concern. The development and implementation of the NFPP reflect the
commitment of the government to deal with these concerns.

2.2 The Scope and Scale of the NFPP

Based on the fourth survey for national forest inventory2, China has 87.3 million hectares
of natural forest, representing 65% of the total forest area. [10] The natural forest is

2 China has recently released the results of the fifth survey of national forest inventory
and the total forest area is 158.9 million ha. and the natural forest area is 113 million
ha. In order to keep the consistency of the analysis, numbers in the fourth survey of
China national forest inventory are still used in this report.
composed of three categories. The first one is called "natural forests under protection". This includes 552 forest reserves, 874 forest parks, and the Tibet forest region. The total area of this first category is approximately 20 million ha, accounting for 23% of total natural forest area. The second category is the scattered natural forests with an area of 17.7 million ha, which accounts for 20% of the total natural forests. The third category is the natural forests requiring urgent protection. These forests constitute 57% of all natural forests [20] [29] The NFPP targets these forests because forests in this category are mainly located in the up-reaches of the major rivers.

The detailed information of the final version of NFPP has not been released yet. However, the general figures published in newspapers showed that the Chinese government will invest 96.2 billion Yuan (78.4 billion from central government and 17.8 billion from local governments) in a 10 year program that contains two major projects. The first one is to protect 61.1 million ha. of natural forest in the up-and-middle reaches of Yangtze and Yellow rivers by reducing by 12.4 million m³ commercial logging each year and by afforestation of 8.67 million ha. of forest area by the year 2010. This will increase the forest cover rate from 17.52% to 21.24% in this region. The second major project is to effectively control and protect the 33 million ha. of the state owned forests by reducing by 7.52 million m³ of the commercial logging each year. [28]

Since the first proposed outline, there have been six editions of program proposals or guidelines under the NFPP. The first two proposal outlines were launched on October 1997, a year before the big floods of 1998. The title of the first proposal was, *Forest Restoration Program in the Ecological Environment of the Yangtze and Yellow River*
China’s Natural Forest Protection Program (NFPP): Impact on Trade Policies Regarding Wood

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Watershed, and the major content of this proposal was afforestation for erosion control and combating desertification. The projected scope of this proposal covered 11 provinces in the Yangtze and Yellow River watershed. [20]

The second proposal, titled Natural Forest Resources Protection Program (NFRPP) in State-owned Forest Regions – Program Outline, focused on logging reduction in natural forests, the creation of timber plantation and alternative business development. The scope included 135 state-logging firms in eight provinces in Northeastern, Southwestern, and Northwestern. [20]

Two implementation plans for NFRPP were proposed in 1998 and 1999. Although the major content of these implementation plans was similar to the outline, the scope was modified. The changes can be found even in the titles, from the coverage of state-owned forest regions to key state-owned forest regions, and then to key forest regions. [20]

The implementation plan in August 1999 is a comprehensive and ambitious program with detailed and specific policies. These include classification of the areas of sub-protected regions or zones, the timber volume to be deducted from harvesting allocation by region, the areas to be planted for ecological or economic purposes by region, and the distribution of financial support for redundant and/or retired forest workers. This plan covers 135 state and 21 local key logging firms and eight provincial and 662 county-level forest bureaus in 19 provinces. The whole project is designed in two phases. Phase I, from 1998 – 2000, covers 135 state and 20 local state-owned logging firms in 13 provinces/autonomous regions/municipal cities, including Yunnan, Sichuan, Chongqing,
China’s Natural Forest Protection Program (NFPP): Impact on Trade Policies Regarding Wood

Guizhou, Tibet, Shannxi, Gansu, Qinghai, Xinjiang, Inner Mongolia (excluding the up-reach of the Yellow River), Jilin, Helongjiang, and Hainan. Phase II, from 2001 – 2010, covers one local state-owned forest bureau and eight provincial and 338 county local forest bureaus in six provinces/autonomous regions, including Hunan, Hubei, Jiangxi, Henan, Shanxi, Ningxia, and up-reach of Yellow River in Inner Mongolia. The overall objective is to reduce annual timber production by 16.3 million cubic meters (m³) in 19 provinces, autonomous regions and municipal cities. The first phase would result in a reduction of 12.6 million m³ of timber and the remainder would be reduced during Phase II. [20]

The budget is 204 billion Yuan for the entire program. The protected forest is expected to be 126.5 million ha, with 98 million hectares in ecological protection areas (77.4% of total protected area) and 28.6 million ha. as commercial forest (22.6% of total protected area). The ecological protected area was further divided into two zones: areas where logging is prohibited (47.9% of total protected area) and areas with restricted logging (27.4% of total protected area).

In December 1999 an updated version separated the NRFPP program into two programs. One kept the title of NFPP, but was restricted to the northeast region (Helongjiang, Jilin, Inner Mongolia excluding up-reach of Yellow River), plus Xinjiang and Hainan. The second program was called the Afforestation and Greening Program (AGP) for the upper reaches of the Yangtze River and the upper and middle reaches of Yellow River (UYUMY). This covered 13 provinces/autonomous regions (Yunnan, Sichuan, Guizhou, ...
Chongqing, Hubei, Tibet, Shanxi, Gansu, Qinghai, Ningxia, Up-reach of Yellow River in Inner Mongolia, Shanxi, and Henan). [20]

Economic pressures are believed to be the main factor for the latest change. [20] Other modifications include clarification of objectives, scope, zone classification, the number of phases for completion, and a reduction of allowable volume of timber production. However, the information provided by these two separate plans is not as detailed as the earlier unified edition. This created some significant uncertainties for the people implementing the program.

2.3 Current Status of NFPP Implementation

There is no doubt that the NFPP is one of the most important environmental and social programs China has had in its 50 year history, in term of scope, financial investment and impacts on the national economy and social stability. After three years of reported experimental implementation, the program has made some progress. The most salient implementation achievement is the enforcement of the logging ban. Reports indicate that it has been implemented properly in the northwest Sichuan and northeast Yunnan. Logging quota in the partial reduction region of northeast and Xinjiang has also been reduced from 18.53 million m³ in 1997 to 15.41 million m³ in 1999, a 17% reduction in two years. [8] There are some questions, however, regarding the reliability of these numbers. Experience shows that there is often at least one-third of over-quota-logging on top of the assigned quota. Some people believe that the volume of over-quota-logging could be double the assigned quota. [5]
There is a lack of a monitoring system or program for both the implementation of the policy and the distribution of funds. This leaves the system open to abuse through incomplete or faulty implementation and other misuses of funds. [20]

There have been few policies developed or implemented to mitigate the impact of the program on community livelihood, especially for the farmers who had been relying on logging for their livelihood. Because of the strong role of the State Forestry Administration in developing the NFPP, the scope of compensation is limited only to state-owned forest firms. This policy omits assistance to many farmers and non-state loggers that could decrease the effectiveness of the NFPP as well as contribute to illegal logging and a decline in social stability in rural regions and thus reduced support by local officials. [20]

While community issues are important the remainder of this report focuses on the impacts and potential impacts of the NFPP on the domestic supply of wood and the trade and economic policies that China could adopt to deal with any shortfalls in wood supply that may arise.

2.4 Forest Resources

China is a large country in terms of both population (1.25 billion in 1998) and area (9.6 million square kilometres). It is the fifth largest country in the world in terms of forested
China’s Natural Forest Protection Program (NFPP): Impact on Trade Policies Regarding Wood

WORKING PAPER DRAFT

area\(^3\). It has a forest area of approximately 159 million hectares and the growing stock is 12.5 billion cubic meters\(^4\). However, the forest covers only 16.5\% of the total land area and the forest area per capita is estimated at only 0.11 hectares/person. [10] This is approximately one-sixth of the worldwide average.

Neither economic development nor the forest resource is evenly distributed among the geographic regions in China. The GDP growth rates in the east and south coastal areas are much higher than in the west and north interior regions, while the forest inventory is mainly concentrated in the Northeastern and Southwestern regions. [17]

China can be geographically classified into six large regions, the Northeast, North, Northwest, East, South, and Southwest. In 1999, the average provincial GDP was 283 billion Yuan. The GDP of the East and South regions averaged 474 and 377 billion respectively while the Southwest and West regions averaged only 161 and 81 billion Yuan respectively. [8] The gap in income resulted from both location advantages in coastal regions and government policy which treated these regions in a preferential way. However, this gap in economic activity between the east and west will be gradually reduced as the new economic development strategy promoted by the Chinese government is implemented (see detailed discussion on the development strategy for the west in following sections).

\(^3\) Source: Food and Agriculture Organization (FAO), United Nations, database on forestry

China’s forest is primarily located in three main regions: the Northwest, the Southwest, and the Southern ten provinces. Based on the fifth survey of China's forest resources, these three regions account for 90% of total forested area and 96% of commercial timber area. China has pursued an extensive forest plantation program for both industrial production and environmental protection purposes. [5] [23] The major natural forest is concentrated in the northeast and southwest forest region, accounting for 52% of total national natural forest area, while the majority of plantation forests are in the southern 10 provinces, accounting for 52% of the total timber plantations in China. [23]

2.4.1 Production of Timber and Other Forest Products

2.4.1.1 Timber Production

China was the largest global producer of roundwood in 1999 followed by the United States. China was the second largest producer of industrial roundwood. However, the majority of harvested volumes (66%) are used for heating and cooking with only 34% used for industrial purposes. The share of industrial use in China is much lower than that of Canada or the United States, which used 97% and 86%, respectively, of their harvest timber for industrial purposes.

The actual production of timber in China is somewhat uncertain. The numbers we used are based on reports to the FAO. The reports from China are based largely on official quotas rather than a survey of what was actually harvested on the ground. [5]
Timber production increased significantly from 1975 to 1995 and peaked at 67.7 million m³ in 1995. Since then production has been gradually declining partially in response to the forest protection policies promoted by the Chinese government.

### 2.4.1.2 Impacts of Logging Ban on Timber Production

From 1997 to 1999 timber production declined from 64 million m³ to 52 million m³ according to the China Forest Industry Statistic Yearbooks. Table 1 shows the detailed information on production of timber and other forest products in 1997 and 1999. The production of high-grade logs decreased significantly (38.3%) from 1997 to 1999, while the production of regular-grade sawlogs declined only by 1.3%. While supply of high quality timber declined the demand for it increased. Indeed, with increases in the per capita income of the Chinese the demand for high quality logs rises. The demand is increasing largely because of a construction boom (the construction industry consumed 60% of total wood consumption in 1997) [3] [25]. Because of the time lags involved between planting and harvesting even an aggressive afforestation program cannot ease in the short run, the current shortage of high quality timber through domestic supply. [3]

<table>
<thead>
<tr>
<th>Year</th>
<th>Timber Production (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>64 million</td>
</tr>
<tr>
<td>1999</td>
<td>52 million</td>
</tr>
</tbody>
</table>

The shortage may not be as severe as indicated by the official statistics because of biases leading to under reporting of harvests and illegal logging. Some experts we interviewed indicated that the official statistics showed the production quotas, not the actual harvesting volumes. State owned logging companies record logging volumes based on their quota to please their superiors. There is however no practical incentive for state
owned forest enterprises to reduce logging volumes since many of them are already facing severe financial problems and the out of quota logging can generate revenues to help them survive. The possibility exists that official quota logging is declining but off quota, unofficial (illegal and unreported) logging is increasing.

Other informants indicated that there was little financial support to the non state owned logging sector to implement the logging ban and reduce harvests. In many situations, logging is the only source of income for these private firms. In such circumstances implementation of a logging ban is unlikely, especially since monitoring of harvesting is lax in most of the areas where logging was banned (Few resources were allocated to monitoring the ban). Again official logging data would not reflect continued illegal and unreported harvesting.

2.4.1.3 Impact of Ban on Timber Production in Major Production Areas

Chinese timber production is predominantly in three forest regions, the northeast, southwest and the southern ten provinces. The share in total production of these three regions is 90%. The northeast region accounted for 38% in 1997 and 1998, and its share increased by 1% in 1999. The proportion of timber production in the SW region decreased dramatically from 14% in 1997 to 6% in 1999. The southern 10 provinces’ share increased from 40% to 45% during 1997 to 1999 (Table 2).
South experienced a mild decline of 5%. The decline of production in the SW can be attributed directly to the complete ban on commercial logging in the up-and-middle reaches of Yangtze and Yellow Rivers. It is interesting to note that after the logging ban and logging restriction in SW and NE regions, the production volume in the South 10 forest region did not show an increase, but decreased 5%. The expectation that increased production in plantations in the South would compensate for declines in the SW and NE was not realized. Indeed, as production declines will continue in both NE and SW forest regions in the next 10 years, what happens in the South will determine the level of wood self-sufficiency in the face of growing demand in China.

There has been little impact of the NFPP on the forests in the South 10 provinces. Production is expected to either stay at the same level or to grow slightly in next few years. In these regions there is a wide range of plantation forests that are maturing and soon will be ready for commercial harvest. These plantations are part of those expected to replace the decline in domestic timber supply resulting from the logging ban.

2.4.1.4 Can Plantations Compensate For the Logging Ban in the Future?

Among some there is an expectation that increased harvesting from plantation forests will mitigate much of the impact of the logging ban. [4] [11] Plantation timber is believed to be lower in quality and smaller in size (diameter, length and volume) than natural grown timber. [4] This may make it unsuitable for structural or architectural use. There is also some concern whether plantations can provide sufficient volumes to replace those lost from natural forests due to the NFPP, at least in the short term. [3]
China has an aggressive and extensive afforestation program. In 1998, 4.8 million ha. was planted increasing the area of Chinese plantations to 46 million hectares. While plantation forests accounts for 30% of the total forest areas, the growing stock from the plantations forest accounts for only 10% of total forest stock volume. One reason for this apparent discrepancy is that not all plantation forests produce commercial timber. In China plantation forests are classified into four categories: (1) commercial timber plantations, (2) economic plantations, (3) ecological plantations, and (4) other types of plantations. The first three categories account for 95% of total plantation area, and slightly over half of all plantations are designated as commercial timber plantations according to the 1994-1998 Forest Resource Statistic of China. However, figures presented in the China Forest Statistical Yearbook of 1999 show that plantations established more recently have focused more and more on ecological objectives (Table 3). This trend reflects the trend towards natural resource utilization policies with more environmental consideration as exemplified by the NFPP.

< INSERT TABLE 3 >
3 Supply and Demand for Timber in China

3.1 Estimated timber consumption and uncertainty

Reliable information on annual wood consumption in China is not available. Therefore, wood consumption figures in this report come from diversified sources and are often derived from other data. Several estimates of timber consumption are presented below.

1) Total consumption is calculated by adding estimates of wood consumption as reported by major wood using industries (Table 4).

Using this method the estimated total wood consumption figures for 2000 and 2010 are 119 and 161 million m³ in the construction, furniture, plywood, mining and pulp and paper industries respectively.

Another method calculates total consumption by multiplying average consumption per capita by the population. With wood consumption per capita of 0.22 m³, total wood consumptions in 2000, 2005 and 2010 are estimated to be 128, 136, and 144 million m³ respectively. [3]

Information from other Chinese sources indicates that raw timber consumption in 1999 was approximately 70 million m³. [11] This represents an increase of 27% from the 55 million m³ reported in 1998. The shortage created by increasing demand and decreasing
domestic supply was satisfied by increased imports. Wood demand is estimated to have grown in 2000 to 102 million m³, a 46% increase from 1999. [11]

Wood consumption in 1998, estimated by the commonly used calculation (production plus imports minus exports), was 64.7 million m³. Table 5 shows the estimated wood consumption in 1995 to 1998 using Chinese Statistics.

< INSERT TABLE 5 >

There is a large spread in estimated wood consumption using different sources and methods. [3] [4] [5] [11] [18] [19] [27] [31] It would benefit analysis, policy development and planning if a system that provides accurate data on wood production and consumption is established. This will be essential for enterprise planning as forest products production shifts from state enterprises to private firms.

3.2 Increasing Demand for Wood Products

3.2.1 Construction

The construction industry, the major timber consumer, represented 6.6% of total GDP in 1999. The two main components of construction, infrastructure and housing construction are key drivers of demand for wood products. However, after a decade of rapid expansion the infrastructure boom has cooled due to more restrictive loan policies promoted by the Chinese central bank combined with reduced foreign investment caused by the Asia economic crisis. [19]
3.2.1.1 Housing Reform

Compensating for the slowing infrastructure construction has been an increase in the residential housing construction sector (Table 6). This growth has been stimulated by the National Housing Reform Program (NHRP) which seeks to transfer state-owned residential housing to private ownership to improve the people’s living standards. [24] Traditionally housing provided a welfare benefit to employees working in state owned enterprises or government institutions. As part of the transition to an open market economy, the government initiated reform of the old social housing system. Housing reforms have greatly increased residential housing construction by stimulating housing demand.

< INSERT TABLE 6 >

3.2.1.2 Wood Used in House Construction

Although wood is not the major structural material for housing construction, it still accounts for a significant portion of total wood consumption. Wood is used in housing construction in two main ways:

1) as a structural building material in construction for concrete forming as well as beams, rafters, and joists in rural housing, and

2) as interior decoration such as flooring, moulding, and wall panels as well as windows and doors in urban buildings.
The estimated wood used in housing construction is between 0.025 and 0.045 m³ per m² of floor area in urban residential building and 0.04-0.06 m³ per m² of floor area\(^5\) in rural areas [19]. The total wood consumption in residential housing construction in 1998 is estimated to be 44 million m³ (using 0.025 m³/m² for urban housing and 0.04 m³/m² for rural housing), based on published housing starts data for 1998. This excludes the wood used for interior decoration. [8]

Interior decoration is a newly developed industry and is becoming one of the major wood consuming industries in China. Because houses built in China have interiors that are barely finished, interior decoration is a must-do job for most house buyers. Spending on interior finishing has now reached 30-40% of total construction costs [11]. Average spending on interior decoration is estimated to be in the range of 400 to 500 Yuan per m². [11] Taking the interior decoration and furniture into account, one needs to add another 0.025 m³ of wood to the estimate of wood use for each m² of constructed floor area.

### 3.3 Wood Demand and the Western Development Strategy

Since 1980 when China started to open its economy, the focus of economic development has been on the southern and eastern coastal regions. During these 20 years, the coastal regions have enjoyed a favourable tax policy as well as other financial support from the Chinese central government. [17] Fast economic growth has enlarged the gap in the

\(^5\) ITTO report estimated the 0.045 m³/m² and 0.06 m³/m² in urban and rural, while other sources suggested 0.025 m³/m² and 0.04 m³/m² correspondingly. [3] The authors believe the more conservative estimates are more reasonable.
standard of living between coastal and interior communities. [17] In 2000, the
government shifted its development attention from the south and east to the west. The
Chinese government states that the “Western Region Development Strategy” is the
second step of the Chinese development plan following the success of the first step
(which was the development of the south and east regions). The second step aims to
narrow the economic disparity between the coastal and the interior western regions and
create a more regionally equitable national economy. [17] This will contribute to
speeding up China’s modernization.

It is believed that the Western Region Development Strategy will bring tremendous
opportunities to investors, both Chinese and foreigners. The western region includes
seven provinces (Shannxi, Gansu, Qinghai, Yunnan, Guizhou, and Sichuan), five
autonomous regions (Ningxia, Guangxi, Inner Mongolia, Xinjiang, and Tibet) and one
direct administered city (Chongqing). It covers 686 square kilometres of land area (70%
of China’s total) with a population of 358 million (28% of China’s total). [17] These
regions have less dense populations than most of China but are richer in natural resources
(minerals, forests, and water). Nine of these twelve provinces, the autonomous regions,
and the direct administered cities are impacted by the NFPP.

The Chinese government will invest significantly in the Western Development Program
which will stimulate the regional demand for wood products both for infrastructure and
housing. Concurrently the NFPP will decrease the supply of timber available in the
western and northern regions. The shortage of wood products will be most critical in the
western regions of China in next 10 to 20 years. This shift in government development
focus should also shift wood demand for structural wood products from the south to the west while demand for interior finish products should continue to grow in the south due to continued demand for new housing.

3.4 Imports Fill Gap Between Demand and Domestic Supply

Growing demand and falling domestic supply have led to a dramatic increase in timber imports that will most likely accelerate once the NFPP is fully implemented. In 1998, China was the fifth largest log importing country; the seventh largest lumber importer and the third largest importer of wood based panels in the world. [13] While China has been increasing imports of a variety of forest products the primary products for remanufacturing and construction (logs, lumber and plywood) have represented most of the import volumes. The total imports volume of these three products was approximately 14 million m³ in 1999, an increase of 71% from 1998. Imports of wood products have increased for the last 20 years. They reached a peak in 1992, when China opened several coastal areas as special economic zones. Since then the Chinese government has modified economic policies several times to control the overheated economy. A reduction in government infrastructure resulted in a decline in wood imports during 1992 to 1996. This decline ended in 1997. A continued growth trend has led to historical high volumes of imports in 1999. Table 7 shows the total imported volume of the three major wood products, logs, lumber and plywood, as well as the proportion of each product of the total volume and total value of imports in 1992-1999.

< INSERT TABLE 7 >
This table shows a dramatic increase from 1998 to 1999. Some experts attribute the
dramatic increase of imported wood products in 1999 to the decrease of domestic supply
resulting from the implementation of NFPP, while others credited it to the increase of
market demand stimulated by housing construction and municipal infrastructure
development in large cities in the coastal regions. Our analysis and the experts we
interviewed suggest that the increase in imports was largely demand driven and the
effects of lower tariffs and lower international prices.

The majority of those interviewed indicated that the impact of logging ban on the wood
products market was far less than expected, especially in the coastal regions. Officials
from the Shanghai housing administration indicated that wood products used in housing
construction in Shanghai are mainly imported, and the there was no sign showing
shortfalls of timber supply in the Shanghai market. A manager of a large timber market
near Shanghai confirmed that the products traded in his market were adequate and the
prices of all kinds of products have been stable.

3.4.1 Factors Affecting Wood Imports to China

The sources of wood imports have become more diverse particularly after the removal of
the requirement for importing licenses. [11] Thousands of importers in China are seeking
wood with higher quality and lower price from all over the world. Instant
communications and the rapid acceptance of global markets for wood products has
rapidly directed wood products from almost all exporting regions to fill the expected
shortfall in China. Russia has become one of the main sources of wood supply in China.
in recent years and was the largest log supplier in 1999 supplying 4.3 million m³, an
increase of 169% from 1998. [7] Log imports from Russia accounted for 43% of total log
imports in 1999, doubling their share of log imports from 20% in 1998. Logs imported
from Russia were mainly softwood (92%). Indonesia (22%), Malaysia (21%), and the
United States (12%) provided most of the remaining 2.7 million m³ lumber imports in
1999 (China Customs Statistics).

Most lumber imports were hardwood used for finishing houses. Top supplying regions
for logs and lumber are shown in Tables 8 and 9.

< INSERT TABLE 8 >

< INSERT TABLE 9 >

The majority of timber imported from Russia is transported through China's Northeast
border with Russia. Some of the logs are shipped directly out of the northeast region to
other parts of China by railway, and the remainder are manufactured into lumber in the
Chinese border regions and shipped as domestic products to other regions. Interviews
with officials from the Shanghai harbour confirmed that the lumbers shipped from Dalian
(the major northern harbour) to Shanghai were mixed with both Northeastern and Russian
species. Because of the similarity of the species of logs from Russia and northeast China,
it is hard to identify the proportion of lumber manufactured from Russian rather than
domestic logs.
3.4.2 Other Causes for Imports Increase

Changing trade policies have also promoted the increased use of imported wood in China. Tariffs for imported wood products have been reduced several times in last 10 years. Tariffs for forest products averaged 12.3% after the latest tariff reduction in January 1, 2001. [2] Tariffs are expected to continue to decline to compensate for decreased harvest volumes due to the NFPP and to ensure that China conforms to World Trade Organization policies (WTO) [22]

The tariffs for wood products shown in Table 10 are for nations that have signed bilateral trade agreements with China. Tariffs for the other nations are often 8-70% higher than the favoured tariff.

< INSERT TABLE 10 >

Besides tariffs, most imported goods attract additional taxes such as the value-added tax or the consumption tax, which is paid by the importers. Wood products are subject to a value-added tax that ranges from 13% for logs and lumber to 17% for other wood products. This means that although the tariffs for logs and lumber products are zero, the value-added tax will affect price competitiveness of imported wood products since the tax payable increases directly with increases in market price. It is possible that this tax now that China has joined the WTO. [22]

Removal of the Importing License requirement (since January 1999) has allowed all trading companies to directly import wood products from different sources. License
liberalisation reduces the burden of importing procedures and increases competition, thus lowering prices and increasing volumes.

### 3.5 World Timber Supply

Can imports be a sustainable source of wood supply to China and compensate for declines due to the NFPP and other necessary environmental laws?

World timber production in 1999 was estimated at 3.3 billion m³ (FAO statistics). The Global Fiber Supply Model (GFSM), developed by the FAO predicts an average annual increase of 1.3% in world supply of roundwood production, based on the analysis of historical data. [6] This study indicates that the current natural forest area in the world is approximate 3.2 billion ha. with one half of this area available for harvesting to produce commercial and subsistence wood supply. Ninety five percent of the total growing stock volume of 182 billion m³ are commercial species (see Table 11 for detailed growing stock volumes by region). It should be noted that growing stock volumes for regions in relative close geographic proximity to China (Asia, Oceania and Russia) would reach almost 85 billion cubic meters or 47% of the world's total (GFSM, page 37). This suggests sufficient volumes of timber in this region to supply all regional demand including that from China.

< INSERT TABLE 11 >

Future commercial fibre availability is shown in the Table 12. Volumes for Africa, Asia, Oceania, Central America and South America were estimated by the FAO’s Global Fiber Supply Model, while figures for North America (The United States and Canada), Europe,
and Russia were estimated by other models. The total fiber supply volume in 2010 will reach 3.3 billion cubic metres (cum)\(^6\). Of this 1.7 billion cum will come from regions that have convenient water or land transportation routes to China (Table 13). This represents a growth of 30% in regional fibre available for commercial use. Increased supplies from Russia and Oceania will more than compensate for declines in supply from Asia (including China) due to past over-harvesting and environmental constraints. It should be noted that the most conservative estimate of timber growth generated by the GFSM were used in this report. Other scenarios indicated an even larger increase in fibre supply.

< INSERT TABLE 12 >

Much of the fibre supply increases are due to changes in Russia which has the world’s largest growing stock of timber volume (Table 12). Russia contains the world largest potential usable forests and considerable proportion of it comes from the Russian Far East that includes the Siberian forest, a region which will become increasingly accessible through the development of infrastructure in that region. Russia has been the largest timber exporter to China for last five years\(^7\). In 1999, 10% of all roundwood exported by

\(^6\) Current harvests are 3.3 billion cubic metres but less than half of that volume is used for commercial or industrial purposes. Over half is used for subsistence use (mostly fuel wood). The 3.3 billion cubic metre estimate for 2010 is for industrial or commercial purposes only and represents more than a doubling of current harvests for this type of use.

\(^7\) The volumes are from official reported wood transfers and do not include any wood that is smuggled into China from Russia.
Russia went to China and this proportion is expected to grow (Table 13). Because of the improving relationship between the two the countries, the similarity of the timber species, and favourable trade policies that have reduced tariffs and value added tax by an additional 50%, Russia will continue to increase exports of roundwood to China. [27]. Much of the increased log volume has been diverted from previous exports to Japan. However, China is willing to accept a much more varied mix of quality and species than Japan but will demand and pay lower prices for this increased variability of quality. [12]

It is clear that sufficient volumes of roundwood exist to mitigate the impact of reduced harvests in China assuming adequate logistics and a globally competitive price. Reliance on markets and foreign supplies, however, may result in higher price volatility. Periods of high world demand will result in sharp increases of prices and provide incentives to Chinese (and other customers) to substitute wood products with other less expensive products.
4 Logistics for Forest Product Trade and Transportation

While as a nation China may not face a significant impact in meeting demands for forest products because of the decline in domestic wood supply, some regions within China may face shortages. The key is logistic constraints. China has one third of its land base covered by mountains. [8] Major mountain ranges and rivers divide the country into the different regions, and this fact is reflected by the names of several provinces, such as Shanxi and Shandong (translated as west of the mountain and east of mountain), Henan and Hebei (south of river and north of river), and Hunan and Hubei (south of lake and north of lake), etc. The special geographical characteristics of China cause difficulties in transportation and a high cost in developing transportation infrastructure that affects the spatial pattern of natural resource, availability and economic development. [16] Although the improvement of transportation and communication has led to intensified inter-regional economic interactions and regional integration, the construction of transportation systems have not yet been able to catch up with the rapid economic development in both coastal and interior regions. Currently the railway is the main transport vehicle for both goods and people, but the capacity is insufficient to meet growing demand. The short supply and the out-of-date technology result in higher costs of transportation, that further hinders the interflow of regional goods and integration of the national economy. [16]

Markets for wood products are very localized because of the uneven distribution of timber production and the inadequate transportation and communication systems. [16]
The distribution of wood products is very complex and the logistics is restricted within certain regional levels.

### 4.1 Distribution for Wood Products

Because the market system in China is currently being restructured new evolving distribution channels are not completely formed. [14] [23]

After the centrally planned wood distribution system was dismantled, wood products have become market goods. Products can be directly shipped from production areas to remanufacturers or to the retail wood markets through an array of wholesalers. There are thousands of wood wholesalers ranging from large state owned trading corporations to small privately owned companies. The ‘wood market’ in the physical sense is the actual gathering place for wholesalers and retailers of different wood products to exchange goods (very much like the furniture market in High Point, North Carolina USA). These markets are located in many cities across the country and they are very localized. While some imported wood can be found in many of these markets, the majority of products traded are domestic commodity products.

Channels of distribution for imported wood products depend very much on specific product categories. Logs, lumber, and different panels are commodity products and they are usually imported by state owned trading companies (SOTC) or by large private

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8 There are exceptions particularly in some coastal hubs such as Shanghai where imports dominate and the location facilitates a broader and more global marketplace.
companies through the SOTC. Small amounts of value-added products, such as doors, windows and kitchen cabinets can be imported directly by large interior decoration, or construction companies. The majority of imported wood products would not be shipped far from the coastal areas because of the high transportation costs resulting from the poor infrastructure previously discussed. [16]

4.2 Logistic of Imported Wood Products

Inadequate infrastructure has prohibited goods flowing around the country. Lower transportation capacity and higher costs have been the major impediments for raw materials shipments from inland to the coastal region and the shipments of manufactured products and imported goods in the opposite direction. As discussed previously local timber supply mainly came from the northeastern and southwestern regions. High shipping costs result in a higher market price for domestic timber in the coast than it is in interior. For the same reason the imported goods are more expensive in the interior than they are in coast. Because the imported good are more expensive than domestic ones in general, the price gap between the imported products and domestic products is larger in the interior and smaller in the coast. People living in undeveloped interior region are also less capable of affording the imported wood products than people living in coastal regions. People living in the coast are more likely to buy imported products since the price difference is not significant.

The majority of imported wood products arrive at the two major coastal ports, Shanghai and Guangzhou, and majority of them remain in the coastal region in close proximity to
these two ports. This fact has been verified with officials in the Shanghai port. They indicated in interviews that 99% of the timber imported to China through the Shanghai harbour was shipped no further than Jiangsu and Zhejiang provinces. Before 1995 when the trading regulations were changed to open up the ability to import timber, most timber importers were large trading companies, but this changed dramatically and manufacturers now import logs and lumber directly. Now there are few traders left. The majority of manufacturing buyers are large state owned enterprises or foreign joint venture companies that manufacture wood products such as flooring or plywood. Most imported timber is shipped to the buyers by trucks directly from the port, and only a small portion is shipped by boat along the Yangtze River.

4.3 Transportation Systems

4.3.1 Railway

The railway is the main system in China to transport goods and passengers from region to region. The major north-south routes move coal, oil, and grain, and the east-west routes transport raw material (west→east) and manufactured products (east→west). [16]

Although the railway system can reach most capital cities of the provinces, the system is far more developed in the east, south, north, and northeast than in the west and southwest regions. This is reflected by the shorter length of railways and less capacity of the rail vehicles in the west (Table 14). This is partly a result of the relatively low population density in the west as well as the difficult topographic features such as high mountains.
and large rivers, which increase the costs of maintaining and developing transportation infrastructure. [16]

\[\text{INSERT TABLE 14}\]

The national railways are linked with the transportation infrastructure of neighbouring countries. Fifteen official railway crossings connect northeast China with Russia and North Korea, southwest China with Myanmar, south China with Laos, Thailand and Vietnam, and northeast China with Kazakhstan. [16]

Since the economic reform towards a market economy there has been substantial efforts to upgrade the railway system. By the end of 1999, 36% of the railways had double tracking, compared to 16% in 1978; 24% were electrified, up from 2% in 1978; and diesel engine routes increased from 14% in 1978 to 64% in 1999. Despite this dramatic improvement, railway infrastructure in China cannot match the demand for transportation generated by the economic growth. Assuming an annual national GDP growth of 9%, the demand for railway capacity is estimated to increase by 60 million tons. There is insufficient capacity to meet this growing demand and several problems may prevent adequate rail infrastructure development. These problems include poor management, inefficient operations leading to long wait times and delayed delivery times, and inadequate financing from either domestic or foreign sources. [16] There is little likelihood that rail transportation improvements will facilitate the movement of large quantities of wood products to the regions where harvests are declining.
4.3.2 Road and Highway

Construction of highways has been one of the most important infrastructure projects planned by the Chinese government to speed up transportation of goods across the nation. Road construction has been part of a national campaign to reduce the poverty in rural areas and to promote exchanges between cities and villages. [16] However, despite improved road systems, during the nineties less than 5% of existing highways are able to handle 2,000 vehicles daily and highways are not a common system of transportation of goods between cities or regions. [16]

4.3.3 Ports and Waterways

There were 16 major coastal ports in China at the end of 1999. [8] Most ports handling foreign trade are along the east and south coast, such as Dalian, Tianjin, Qingdao, Shanghai and Guangzhou. Several inland river ports, mainly along the Yangtze River, also handle foreign cargoes. Total timber volume transferred in 1999 was 9 million tons, an increase of 13% from the previous year (Table 15).

The network of rivers, lakes and canals also plays an important role in China’s transportation system. Waterways transportation is mainly confined in the south and east coastal areas and they are connected to ocean ports. Inland waterways are mainly locally controlled and are responsible for nearly one quarter of the total water shipping volume. [16]
4.4 Summary of Infrastructure

It is clear that sufficient land and sea portals exist for additional wood products to enter China from exporting regions. However, additional infrastructure will be needed to transport goods from rail crossings, major regional cities, and ports to the rural locations which will be most impacted by the NFPP. Our interviews indicated that shortages of raw materials and processed forest products occurred in some interior regions affected by the NFPP. High transportation costs and lack of efficient distribution channels prevented inter-regional flows of goods from mitigating these local shortages.
5 Summary

The NFPP will have a major impact on the supply of wood in the north-eastern, southwestern, and northwestern provinces of China. Many of these regions have a much lower GDP per capita than other parts of China, particularly the south and the social and economic consequences of reduced harvests on both logging operations and farmers who rely on timber could be very disruptive. While the environmental objectives of the NFPP and reduced harvest levels should not be compromised, there should be some complementary social and economic policies to alleviate some of the unintended negative consequences of the NFPP. From a wood supply perspective, some of the unintended consequences of the NFPP include increased incentives for illegal logging to mitigate local shortages of forest products.

If the logging ban is enforced effectively, alternative wood supply sources will be needed to deal with regional and national shortfalls. Given a decline in timber supply in the regions most impacted by the NFPP, alternative supply either can come from domestic forests in other regions or imported from external sources. As discussed previously despite recent increases in plantations in China much of the growth is intended for non-commercial purposes. Furthermore, the geographic location of plantations and increasing demand for wood products in regions close to the plantations make this option unattractive. There are few reasons to transport high weight resources away from their origins for processing and then shipping finished goods back. Regional shortfalls can be dealt with through imports but at a cost. An improved infrastructure and the development
of a more modern market based distribution system will in the long run solve the problem. Government policies, however, need to be developed to deal with short run impacts.

Nationally, wood supplies imported from external sources offer a solution. The experience in the past several years strongly suggests that the free market segments of timber trade in China have adjusted quickly to declines in domestic supplies. Imports of major timber products have risen dramatically since 1997 with imported log and lumber volumes increasing by 127% and 108% respectively from 1997 to 1999. [7] Increasing imports reflected both the emergence in coastal regions of timber markets and a reduction in tariffs and non-tariff barriers.

Our analysis of global wood supply indicated that imports are a sustainable source to meet the increased demand for wood and declining domestic supplies of China. Timber supplies are growing globally as well as in regions in close shipping proximity to China. These regions include Asia, Russia and Oceania, regions within close proximity for land or ocean shipping to China at reasonable transportation costs. While a decline in wood supply is expected in Asia this will be more than compensated for by increasing supplies both from Russia and Oceania. Technologies that improve manufacturing recovery rates and increase substitution play a role in reducing demand and keeping a lid on prices.

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9 The impact of technology on timber values and future prices was covered in a presentation by Dr. Clark S. Binkley titled "What's Driving Timber Values" on November 13, 2000 at the 17th Annual Conference on International Forest Products Marketing" in Seattle organized by the Centre for International Trade in Forest Products,
However, the existence of sources of foreign supply may not necessarily solve regional shortages unless distribution and transportation systems can move these supplies to the effected area in a timely and cost efficient manner. China has both sea ports and rail crossings able to serve imported wood supplies. While the existing rail system can bring forest products to large cities in most provinces, the areas most impacted by the NFPP are the rural areas and are not served by the train system. In addition, there is a lack of infrastructure to take the finished wood products form areas impacted by the NFPP to the more populated areas in the south and the coastal regions. The Western Development Strategy should provide the opportunity to improve the infrastructure and facilitate the transport of both raw material imports to the affected regions and the finished wood products to both regional and distant urban centres. However a proactive set of policies will be needed to mitigate some of the unintended negative impacts of the NFPP policy.

6 Policy Recommendations

Short Term

1) The greatest impact of the NFPP is in the rural regions where harvesting is being curtailed. To mitigate the impacts of local wood supply shortages in these regions and

University of Washington. The dramatic growth in new wood products that require less raw material to produce knowledge based products to perform both structural and non-structural tasks was presented in A New Taxonomy of Wood Products written by Cohen, David H., Simon Ellis, Robert A. Kozak and Bill Wilson, 1996. FRDA Working Paper 96.05. Canadian Forest Service, Victoria BC 58 pages.
compensate for the increase cost of transportation in getting replacement imported
wood to these areas we recommend a policy to provide rebates of VAT on wood
products imported and remanufactured in these regions. This will not only help
compensate for the high costs of transportation but facilitate inter-regional and
international trade. This policy could be considered as an initial step in the long term
development of these regions.

2) There can be little industry to replace the wood products industry without the ability
to move goods in and out of the effected regions. A policy to improve the distribution
systems is necessary to facilitate the emergence of competitive suppliers of forest
products in the interior regimes. Without competition, rebates of VAT or any other
subsidies will be captured by sellers not consumers.

3) Implementing the NFPP was based on the need to stabilize soils and reverse the soil
and water degradation caused by unsustainable practices. Replacing the wood supply
with illegally logged material from other countries only exports the environmental
degradation rather than improve upon it. Anecdotal evidence indicates that
unsustainable illegal harvesting is increasing in Russia and Asia partly to offset the
reduced timber supplies from the implementation of the NFPP. Policies need to be
developed to ensure that the source for imported wood is known. It is not realistic or
necessarily desirable to insist on certified wood products given the proliferation of
schemes and the lack of adequate global supply. However knowing the true origin of
whatever timber is imported and that it was harvested legally is a major first step in
ensuring that the environmental degradation that instigated the NFPP is not exported to less developed regions.

6.1 Long Term

While short term policies are necessary to mitigate the obvious unintended consequences of the NFPP only long term policies can ensure the environmental benefits that are the objectives of the NFPP.

1) Target western infrastructure development to facilitate the flow of raw materials and products from ports, borders and other land crossings to connect large markets in the East and South with the interior regions most affected by NFPP. Ensure that rural saw mills (and other industries) are integrated to the main transportation lines (which now connect mainly urban centers in the Western regions). Low labour costs and proximity to transport-line from Russia may encourage the development of a forest products processing industry that can rely on both declining domestic supplies as well increasing volumes of Russian logs.

2) Support the development of efficient market based distribution systems. To facilitate the evolution of a national competitive distribution system, better market information is needed. We recommend the development of a comprehensive system for collecting market information concerning the production, transport and sale of wood products. Such a system will permit market participants (buyers and sellers) to identify key trends as the industry shifts from a planned to a market economy. Efficient resource allocation whether by private entrepreneurs or public sector planners, requires proper
data rather than reports of targets and quotas which may not accurately reflect realities.

3) Conduct a technology assessment to identify what manufacturing equipment and training would be most appropriate for the development of a wood processing sector in the northwest. Improved (see 1) infrastructure will encourage a shift to higher added value products produced for national and international markets. This will require different inputs of skilled labour and machinery
7 Conclusion

The development and implementation of the NFPP is arguably the largest environmental program undertaken in China. Reduced domestic timber supplies will be offset by increased imports. However to ensure that the unintended consequences of this admirable program do not cause negative environmental and social impacts new policies need to be implemented in both the short and long term.
8 Citations


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Appendix 1 List of the Positions Held by Those Interviewed in the Study

- Assistant Directors, The Canada Wood Bureau - A Collaboration of the Q-WEB and BC Specialities Group in China

- Assistant Manager, Shanghai Harbour Nanpu Stevedoring Company

- Associate Professor, Research Institute of Wood Industry, Chinese Academy of Forestry

- Chief Editor, <<Wood comprehensive Utilization News>>

- Deputy Director, Chinese Society of Wood Industry, <<China Timber Information>>

- Deputy Manager, China National Timber Corporation

- Director, China National Forest Products Industries Association

- Director, Housing Industrial Division, Shanghai Municipal Housing Development Bureau

- Director, Information Office of Shanghai Wood Industry Research Institute

- Director, Shanghai Jinjiang Timber Wholesale Market, Shanghai Market of National Timber Market

- Emeritus Professor of Forestry, National Taiwan University

- Engineer, Shanghai Wood Industry Research Institute

- Officers, Management Center of Natural Forest Conservation Project, State of Forestry Administration
China’s Natural Forest Protection Program (NFPP): Impact on Trade Policies Regarding Wood

WORKING PAPER DRAFT

- Professor, Institute of Forest Ecology, Environment and Protection, Chinese Academy of Forestry
- Professors, Institute of Science and Technological Information, Chinese Academy of Forestry
- Professors, Institute of Wood Processing & composites Technology, North-eastern Forestry University
- Professors, Research Center of Ecological and Environmental Economics, Chinese Academy of Social Science
- Professor, Research Center of Forestry Economics, Chinese Academy of Forestry
- Professors, Rural Development Institute of Chinese Academy of Social Science
- Secretary General, Committee of Shanghai Building Material Distribution Association
- Vice President, Shanghai Office, Jaakko Poyry Consulting (Asia-Pacific) Pte Ltd.
- Vice Secretary General, China Timber Distribution Association

Cohen, Lee and Vertinsky page 48
Table 1: China Timber Production* in 1997 and 1999 (million m³)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Volume</td>
<td>%</td>
<td>Volume</td>
<td>%</td>
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<tr>
<td>Timber</td>
<td>63.95</td>
<td>100.00</td>
<td>59.66</td>
<td>100.00</td>
</tr>
<tr>
<td>Logs**</td>
<td>59.35</td>
<td>93.00</td>
<td>55.56</td>
<td>93.12</td>
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<tr>
<td>Direct use logs</td>
<td>20.10</td>
<td>34.00</td>
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<td>1.41</td>
<td>0.68</td>
<td>0.96</td>
<td>1.72</td>
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<td>Regular-grade sawlogs</td>
<td>23.99</td>
<td>40.00</td>
<td>24.74</td>
<td>44.53</td>
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<tr>
<td>- conifer</td>
<td>16.50</td>
<td>69.00</td>
<td>17.57</td>
<td>71.00</td>
</tr>
<tr>
<td>- broadleaf</td>
<td>7.49</td>
<td>31.23</td>
<td>7.17</td>
<td>29.00</td>
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<td>Fir timber</td>
<td>3.32</td>
<td>5.60</td>
<td>4.09</td>
<td>7.36</td>
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<tr>
<td>Fuelwood***</td>
<td>4.59</td>
<td>7.18</td>
<td>4.10</td>
<td>6.88</td>
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</table>


* The total production includes the timber harvested from the state owned, collective owned and private owned forests that had been examined and met the national harvesting standards

** The timber above the national log standards

*** The timber below the national log standards, but not including the fuel branches or twigs
Table 2: Timber Production by Region in 1997-1999  (million m³)

<table>
<thead>
<tr>
<th></th>
<th>Total country</th>
<th>N.E. %</th>
<th>S.W. %</th>
<th>S. ten provinces</th>
<th>Total 3 regions %</th>
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<tr>
<td>1997</td>
<td>63.95</td>
<td>24.07</td>
<td>37.7</td>
<td>9.18</td>
<td>38.1</td>
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<tr>
<td>1998</td>
<td>59.66</td>
<td>22.59</td>
<td>37.9</td>
<td>6.77</td>
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<td>1999</td>
<td>52.37</td>
<td>20.56</td>
<td>39.3</td>
<td>3.25</td>
<td>44.1</td>
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<td>-14.60</td>
<td>1.61</td>
<td>-64.61</td>
<td>-5.17</td>
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<th>1999</th>
<th>Area Change</th>
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<td>Total</td>
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<td>100.0</td>
<td>4.36</td>
<td>100.0</td>
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<td>Commercial timber</td>
<td>1.71</td>
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<td>1.47</td>
<td>33.7</td>
<td>-16.96</td>
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<tr>
<td>Economic</td>
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<td>33.9</td>
<td>1.37</td>
<td>31.4</td>
<td>-16.18</td>
</tr>
<tr>
<td>Ecological</td>
<td>1.37</td>
<td>27.8</td>
<td>1.37</td>
<td>31.4</td>
<td>42.34</td>
</tr>
<tr>
<td>Fuelwood &amp; special use</td>
<td>0.17</td>
<td>3.5</td>
<td>0.15</td>
<td>3.4</td>
<td>-23.53</td>
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Table 4: Wood Consumption Estimates by Major Wood Consuming Industries (million m³)

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<td><strong>Construction</strong></td>
<td>57.24</td>
<td>64</td>
<td>63.39</td>
<td>62</td>
<td>68.24</td>
</tr>
<tr>
<td><strong>Plywood</strong></td>
<td>5.23</td>
<td>5.8</td>
<td>6.52</td>
<td>6.4</td>
<td>18.98</td>
</tr>
<tr>
<td><strong>Furniture</strong></td>
<td>7.55</td>
<td>8.4</td>
<td>12.19</td>
<td>12</td>
<td>15.25</td>
</tr>
<tr>
<td><strong>Pulp &amp; paper</strong></td>
<td>5.77</td>
<td>6.4</td>
<td>5.78</td>
<td>5.7</td>
<td>6.99</td>
</tr>
<tr>
<td><strong>Mining</strong></td>
<td>6.86</td>
<td>7.6</td>
<td>8.05</td>
<td>7.9</td>
<td>7.78</td>
</tr>
<tr>
<td><strong>Railway</strong></td>
<td>0.7</td>
<td>0.8</td>
<td>0.56</td>
<td>0.5</td>
<td>0.54</td>
</tr>
<tr>
<td><strong>Ship-building</strong></td>
<td>2.13</td>
<td>2.4</td>
<td>2.19</td>
<td>2.1</td>
<td>2.27</td>
</tr>
<tr>
<td><strong>Chemical</strong></td>
<td>1.08</td>
<td>1.2</td>
<td>1.11</td>
<td>1.1</td>
<td>1.16</td>
</tr>
<tr>
<td><strong>Stationary</strong></td>
<td>3.29</td>
<td>3.7</td>
<td>2.46</td>
<td>2.4</td>
<td>2.33</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>89.85</td>
<td>102.25</td>
<td>123.54</td>
<td>124.26</td>
<td>128.47</td>
</tr>
</tbody>
</table>

Source: Impact on Related Industries after Implementation of Natural Forest Protection Program and Solutions
Table 5: Estimated Wood Consumption in China, 1995-1998 (thousand m³)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>67,669</td>
<td>67,103</td>
<td>63,948</td>
<td>59,662</td>
</tr>
<tr>
<td>Imports*</td>
<td>6,593</td>
<td>7,105</td>
<td>8,766</td>
<td>10,068</td>
</tr>
<tr>
<td>Exports*</td>
<td>4,731</td>
<td>4,770</td>
<td>5,181</td>
<td>5,003</td>
</tr>
<tr>
<td>Consumption</td>
<td>69,531</td>
<td>69,438</td>
<td>67,533</td>
<td>64,727</td>
</tr>
</tbody>
</table>

* Volume was estimated by using the wood density of 650kg/m³ for the items measured by weight (kg) in statistics.
Table 6: Floor Space of Building Construction in China, 1990-1999

(billion square meters)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Under construction</td>
<td>0.38</td>
<td>0.41</td>
<td>0.52</td>
<td>0.65</td>
<td>0.78</td>
<td>0.90</td>
<td>1.29</td>
<td>1.29</td>
<td>1.38</td>
<td>1.47</td>
<td>288%</td>
</tr>
<tr>
<td>Complete</td>
<td>0.20</td>
<td>0.20</td>
<td>0.24</td>
<td>0.29</td>
<td>0.32</td>
<td>0.36</td>
<td>0.60</td>
<td>0.62</td>
<td>0.66</td>
<td>0.74</td>
<td>278%</td>
</tr>
</tbody>
</table>

Source: China Statistic Yearbook, 1999
### Table 7: Three Major Products Imports in Volume, 1992-1999

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (000 m³)</td>
<td>8,102</td>
<td>6,896</td>
<td>6,340</td>
<td>5,516</td>
<td>5,896</td>
<td>7,284</td>
<td>8,192</td>
<td>13,934</td>
<td>70%</td>
<td>1%</td>
<td>72%</td>
</tr>
<tr>
<td>Logs</td>
<td>4,660</td>
<td>3,459</td>
<td>3,335</td>
<td>2,583</td>
<td>3,186</td>
<td>4,471</td>
<td>4,823</td>
<td>10,136</td>
<td>110%</td>
<td>4%</td>
<td>118%</td>
</tr>
<tr>
<td>%</td>
<td>57%</td>
<td>50%</td>
<td>53%</td>
<td>47%</td>
<td>54%</td>
<td>61%</td>
<td>59%</td>
<td>73%</td>
<td>14%</td>
<td>2%</td>
<td>16%</td>
</tr>
<tr>
<td>Lumber</td>
<td>925</td>
<td>1,208</td>
<td>896</td>
<td>851</td>
<td>933</td>
<td>1,325</td>
<td>1,678</td>
<td>2,720</td>
<td>62%</td>
<td>81%</td>
<td>194%</td>
</tr>
<tr>
<td>%</td>
<td>11%</td>
<td>18%</td>
<td>14%</td>
<td>15%</td>
<td>16%</td>
<td>18%</td>
<td>21%</td>
<td>20%</td>
<td>-1%</td>
<td>10%</td>
<td>9%</td>
</tr>
<tr>
<td>Plywood</td>
<td>2,517</td>
<td>2,229</td>
<td>2,109</td>
<td>2,083</td>
<td>1,777</td>
<td>1,489</td>
<td>1,691</td>
<td>1,042</td>
<td>-38%</td>
<td>-33%</td>
<td>-59%</td>
</tr>
<tr>
<td>%</td>
<td>31%</td>
<td>32%</td>
<td>33%</td>
<td>38%</td>
<td>30%</td>
<td>20%</td>
<td>21%</td>
<td>7%</td>
<td>-14%</td>
<td>-10%</td>
<td>-24%</td>
</tr>
</tbody>
</table>

Source: China Customs Statistics Yearbook, 1992-1999
Table 8: Top Ten Log Importing Countries into China, 1998 and 1999 (m³)

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th></th>
<th>1999</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Country</td>
<td>Total*</td>
<td>Softwood</td>
<td>Hardwood</td>
</tr>
<tr>
<td>1</td>
<td>Russia</td>
<td>1,591,272</td>
<td>1,072,827</td>
<td>518,445</td>
</tr>
<tr>
<td>2</td>
<td>Malaysia</td>
<td>1,060,073</td>
<td>87,612</td>
<td>972,461</td>
</tr>
<tr>
<td>3</td>
<td>Gabon</td>
<td>592,979</td>
<td>0</td>
<td>592,979</td>
</tr>
<tr>
<td>4</td>
<td>Cameroon</td>
<td>233,915</td>
<td>17</td>
<td>233,898</td>
</tr>
<tr>
<td>5</td>
<td>North Korea</td>
<td>218,729</td>
<td>174,293</td>
<td>44,436</td>
</tr>
<tr>
<td>6</td>
<td>Guinea</td>
<td>201,942</td>
<td>0</td>
<td>201,942</td>
</tr>
<tr>
<td>7</td>
<td>Papua New Guinea</td>
<td>184,621</td>
<td>2,011</td>
<td>182,610</td>
</tr>
<tr>
<td>8</td>
<td>Myanmar</td>
<td>181,905</td>
<td>16,546</td>
<td>165,359</td>
</tr>
<tr>
<td>9</td>
<td>New Zealand</td>
<td>143,580</td>
<td>75,343</td>
<td>68,237</td>
</tr>
<tr>
<td>10</td>
<td>Indonesia</td>
<td>97,187</td>
<td>558</td>
<td>96,629</td>
</tr>
<tr>
<td></td>
<td>Canada (21)</td>
<td>2,602</td>
<td>1,567</td>
<td>1,035</td>
</tr>
</tbody>
</table>

Source: China Customs Statistics Yearbook, 1998 and 1999

* some unclassified volume are counted into the total, so the total volume is not equal to the volume of softwood and volume of hardwood
Table 9: Top Ten Lumber Importing Countries in China, 1998 and 1999 (m³)

<table>
<thead>
<tr>
<th>Country</th>
<th>Total</th>
<th>Softwood</th>
<th>Hardwood</th>
<th>Country</th>
<th>Total</th>
<th>Softwood</th>
<th>Hardwood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td>399,595</td>
<td>9,120</td>
<td>390,475</td>
<td>Indonesia</td>
<td>591,290</td>
<td>10,939</td>
<td>580,352</td>
</tr>
<tr>
<td>Indonesia</td>
<td>301,464</td>
<td>27</td>
<td>301,437</td>
<td>Malaysia</td>
<td>561,331</td>
<td>9,628</td>
<td>551,703</td>
</tr>
<tr>
<td>Mongolia</td>
<td>265,649</td>
<td>265,637</td>
<td>12</td>
<td>USA</td>
<td>336,471</td>
<td>18,137</td>
<td>318,334</td>
</tr>
<tr>
<td>USA</td>
<td>212,744</td>
<td>16,597</td>
<td>196,147</td>
<td>Germany</td>
<td>325,102</td>
<td>2,440</td>
<td>322,662</td>
</tr>
<tr>
<td>Germany</td>
<td>72,479</td>
<td>820</td>
<td>71,659</td>
<td>New Zealand</td>
<td>133,470</td>
<td>96,298</td>
<td>37,172</td>
</tr>
<tr>
<td>Thailand</td>
<td>71,027</td>
<td>1,255</td>
<td>69,772</td>
<td>Thailand</td>
<td>85,642</td>
<td>2,503</td>
<td>83,139</td>
</tr>
<tr>
<td>Myanmar</td>
<td>58,603</td>
<td>13,590</td>
<td>45,013</td>
<td>Russia</td>
<td>82,258</td>
<td>75,749</td>
<td>6,536</td>
</tr>
<tr>
<td>New Zealand</td>
<td>53,569</td>
<td>27,358</td>
<td>26,211</td>
<td>Myanmar</td>
<td>73,279</td>
<td>21,176</td>
<td>52,103</td>
</tr>
<tr>
<td>Taiwan</td>
<td>49,934</td>
<td>8,286</td>
<td>41,648</td>
<td>Canada</td>
<td>70,843</td>
<td>26,481</td>
<td>44,362</td>
</tr>
<tr>
<td>Canada</td>
<td>39,895</td>
<td>9,473</td>
<td>30,422</td>
<td>Italy</td>
<td>69,157</td>
<td>0</td>
<td>69,157</td>
</tr>
</tbody>
</table>

Source: China Customs Statistics Yearbook, 1998 and 1999
### Table 10: Tariff of Selected Wood Products in 1995-1999

<table>
<thead>
<tr>
<th>Code</th>
<th>Commodity</th>
<th>1995 (%)</th>
<th>1996 (%)</th>
<th>1998 (%)</th>
<th>1999 (%)</th>
<th>Value-added Tax (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4403</td>
<td>Wood in rough</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4403.1</td>
<td>Treated wood</td>
<td></td>
<td></td>
<td>2</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>4403.2</td>
<td>Conifer</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>4403.3</td>
<td>Non-conifer</td>
<td>2-15</td>
<td>2-15</td>
<td>2</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>4407</td>
<td>Sawnwood</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4407.1</td>
<td>Conifer</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>4407.2</td>
<td>Non-conifer (tropical)</td>
<td>6-20</td>
<td>3-9</td>
<td>3</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>44.08</td>
<td>Veneer</td>
<td>9-25</td>
<td>6-12</td>
<td>5-10</td>
<td>5-10</td>
<td>17</td>
</tr>
<tr>
<td>44.15</td>
<td>Packing cases &amp; boxes</td>
<td>40</td>
<td>30</td>
<td>18</td>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>44.18</td>
<td>Builders joinery</td>
<td>40</td>
<td>25-30</td>
<td>18-20</td>
<td>10-18</td>
<td>17</td>
</tr>
</tbody>
</table>

Source:  
- Forest Resources, Products, and Market Opportunities, Wood Technology, 1997  
- Outlook for Russian Forest Products Trade with the People’s Republic of China, CINTRAFOR, 1996
### Table 11: Total Standardized Volume by Region (in million m³)

<table>
<thead>
<tr>
<th>Region</th>
<th>Total growing stock**</th>
<th>Total commercial species growing stock**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa (26)*</td>
<td>26,796</td>
<td>11,927</td>
</tr>
<tr>
<td>Asia (22)</td>
<td>22,670</td>
<td>15,089</td>
</tr>
<tr>
<td>Oceania (6)</td>
<td>3,013</td>
<td>2,226</td>
</tr>
<tr>
<td>Europe (28)</td>
<td>17,029</td>
<td>17,029</td>
</tr>
<tr>
<td>Russia (1)</td>
<td>59,112</td>
<td>1,794</td>
</tr>
<tr>
<td>North America (2)</td>
<td>30,926</td>
<td>30,926</td>
</tr>
<tr>
<td>Central America (10)</td>
<td>2,339</td>
<td>2,339</td>
</tr>
<tr>
<td>South America (13)</td>
<td>20,120</td>
<td>14,518</td>
</tr>
<tr>
<td>Total</td>
<td>182,005</td>
<td>173,499</td>
</tr>
</tbody>
</table>

* number of countries included in database

** volume pertain to the forest available for supply, the reference diameter is 10 cm

Source: Global Fiber Supply Model, FAO
Table 12: Potential Fiber Availability by Region 1996-2050 (in Million m³)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>62.95</td>
<td>30.22</td>
<td>-</td>
<td>79.38</td>
<td>-</td>
<td>58.22</td>
</tr>
<tr>
<td>Asia</td>
<td>482.65</td>
<td>1,124.17</td>
<td>-</td>
<td>675.65</td>
<td>-</td>
<td>690.87</td>
</tr>
<tr>
<td>Oceania</td>
<td>66.81</td>
<td>51.05</td>
<td>-</td>
<td>78.18</td>
<td>-</td>
<td>76.18</td>
</tr>
<tr>
<td>Russia</td>
<td>676.51</td>
<td>111.00</td>
<td></td>
<td>928.07</td>
<td></td>
<td>1646.82</td>
</tr>
<tr>
<td>C. America</td>
<td>41.92</td>
<td>60.95</td>
<td>-</td>
<td>36.02</td>
<td>-</td>
<td>25.01</td>
</tr>
<tr>
<td>S. America</td>
<td>182.76</td>
<td>293.21</td>
<td>-</td>
<td>220.01</td>
<td>-</td>
<td>201.35</td>
</tr>
<tr>
<td>Partial Total</td>
<td>1,513.60</td>
<td>1,670.60</td>
<td>2,017.31</td>
<td></td>
<td>2,698.45</td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>-</td>
<td>393.67</td>
<td>422.22</td>
<td>452.29</td>
<td>479.90</td>
<td>-</td>
</tr>
<tr>
<td>USA</td>
<td>-</td>
<td>500.75</td>
<td>552.00</td>
<td>586.00</td>
<td>634.00</td>
<td>-</td>
</tr>
<tr>
<td>Canada**</td>
<td>-</td>
<td>185.66</td>
<td>194.00</td>
<td>213.00</td>
<td>227.0***</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>2750.68</td>
<td>3,268.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* real production volume

** volume showing only the industrial roundwood

*** volume predicted on year of 2015

Source: Global Fiber Supply Model, FAO, 199?
Table 13: Proportion of Roundwood Exported to China in 1998  
(top 10 roundwood sourcing countries + USA and Canada)

<table>
<thead>
<tr>
<th>Country</th>
<th>Total exports volume (m³)</th>
<th>Volume to China* (m³)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>19,701,726</td>
<td>2,011,132</td>
<td>10.21</td>
</tr>
<tr>
<td>Malaysia</td>
<td>8,319,246</td>
<td>3,273,989</td>
<td>39.35</td>
</tr>
<tr>
<td>Gabon</td>
<td>1,946,666</td>
<td>798,994</td>
<td>41.04</td>
</tr>
<tr>
<td>Cameroon</td>
<td>1,663,690</td>
<td>270,266</td>
<td>17.28</td>
</tr>
<tr>
<td>North Korea</td>
<td>219,000</td>
<td>216,126</td>
<td>98.69</td>
</tr>
<tr>
<td>Equatorial Guinea</td>
<td>339,029</td>
<td>204,321</td>
<td>60.27</td>
</tr>
<tr>
<td>PNG</td>
<td>2,894,420</td>
<td>383,863</td>
<td>13.26</td>
</tr>
<tr>
<td>Myanmar</td>
<td>868,868</td>
<td>212,100</td>
<td>24.44</td>
</tr>
<tr>
<td>New Zealand</td>
<td>4,611,459</td>
<td>203,743</td>
<td>4.42</td>
</tr>
<tr>
<td>Indonesia</td>
<td>282,058</td>
<td>102,508</td>
<td>36.34</td>
</tr>
<tr>
<td>USA</td>
<td>8,964,867</td>
<td>162,530</td>
<td>1.81</td>
</tr>
<tr>
<td>Canada</td>
<td>1,624,467</td>
<td>15,826</td>
<td>1.04</td>
</tr>
</tbody>
</table>

Source: FAO Statistics, FAO data on line, 2001

* data from FAO statistics, may not be same as the ones from Chinese Custom
Table 14: Length of Transportation by Region in 1999 (km)

<table>
<thead>
<tr>
<th></th>
<th>Length of railway</th>
<th>Extension length of trunk links</th>
<th>Length of navigable inland waterway</th>
<th>Expressway</th>
<th>Highway below class IV</th>
<th>Total length of highway</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>12,813</td>
<td>18,887</td>
<td>1,771</td>
<td>186,619</td>
<td>9,870</td>
<td>196,489</td>
</tr>
<tr>
<td>Northeast</td>
<td>12,047</td>
<td>15,518</td>
<td>2,601</td>
<td>126,591</td>
<td>2,873</td>
<td>129,464</td>
</tr>
<tr>
<td>East</td>
<td>9,044</td>
<td>14,095</td>
<td>53,782</td>
<td>239,555</td>
<td>28,515</td>
<td>268,070</td>
</tr>
<tr>
<td>South</td>
<td>9,696</td>
<td>15,065</td>
<td>35,229</td>
<td>277,532</td>
<td>62,724</td>
<td>340,256</td>
</tr>
<tr>
<td>Southwest</td>
<td>6,407</td>
<td>6,848</td>
<td>12,185</td>
<td>208,805</td>
<td>67,452</td>
<td>276,257</td>
</tr>
<tr>
<td>Northwest</td>
<td>7,916</td>
<td>10,099</td>
<td>3,072</td>
<td>117,643</td>
<td>23,548</td>
<td>141,191</td>
</tr>
<tr>
<td>National total</td>
<td>57,923</td>
<td>80,512</td>
<td>108,640</td>
<td>1,156,745</td>
<td>194,982</td>
<td>1,351,727</td>
</tr>
</tbody>
</table>

Source: China Statistical Yearbook, 2000
### Table 15: Volume Handled in Major Coastal Ports by Type of Goods in 1999 (million tons)

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th></th>
<th></th>
<th>1999</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Out-port</td>
<td>In-port</td>
<td>Total</td>
<td>Out-port</td>
<td>In-port</td>
</tr>
<tr>
<td>Total</td>
<td>922.38</td>
<td>455.71</td>
<td>466.67</td>
<td>1,051.62</td>
<td>514.15</td>
<td>537.47</td>
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<tr>
<td>Coal</td>
<td>241.88</td>
<td>153.53</td>
<td>88.35</td>
<td>263.19</td>
<td>167.30</td>
<td>95.89</td>
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<tr>
<td>Petroleum</td>
<td>160.37</td>
<td>78.47</td>
<td>81.90</td>
<td>187.73</td>
<td>83.47</td>
<td>104.26</td>
</tr>
<tr>
<td>Metal ores</td>
<td>99.82</td>
<td>27.42</td>
<td>72.40</td>
<td>104.10</td>
<td>27.84</td>
<td>76.26</td>
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<tr>
<td>Steel and iron</td>
<td>34.03</td>
<td>15.03</td>
<td>19.00</td>
<td>39.60</td>
<td>17.17</td>
<td>22.43</td>
</tr>
<tr>
<td>Mineral material</td>
<td>56.66</td>
<td>16.73</td>
<td>39.93</td>
<td>62.73</td>
<td>21.21</td>
<td>41.52</td>
</tr>
<tr>
<td>Cement</td>
<td>9.92</td>
<td>6.29</td>
<td>3.63</td>
<td>9.57</td>
<td>5.25</td>
<td>4.32</td>
</tr>
<tr>
<td><strong>Timber</strong></td>
<td><strong>7.97</strong></td>
<td><strong>3.79</strong></td>
<td><strong>4.18</strong></td>
<td><strong>9.02</strong></td>
<td><strong>3.72</strong></td>
<td><strong>5.30</strong></td>
</tr>
<tr>
<td>Nonmetal ores</td>
<td>21.72</td>
<td>14.56</td>
<td>7.16</td>
<td>21.00</td>
<td>13.93</td>
<td>7.07</td>
</tr>
<tr>
<td>Chemical,</td>
<td>18.77</td>
<td>4.77</td>
<td>14.00</td>
<td>17.53</td>
<td>4.29</td>
<td>13.24</td>
</tr>
<tr>
<td>fertilizer, and pesticides</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salt</td>
<td>4.53</td>
<td>2.25</td>
<td>2.28</td>
<td>4.23</td>
<td>2.00</td>
<td>2.23</td>
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<td>Grain</td>
<td>38.15</td>
<td>19.99</td>
<td>18.16</td>
<td>43.33</td>
<td>23.32</td>
<td>20.01</td>
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<tr>
<td>Others</td>
<td>228.55</td>
<td>112.87</td>
<td>115.68</td>
<td>289.60</td>
<td>144.67</td>
<td>144.93</td>
</tr>
</tbody>
</table>

Source: China Statistical Yearbook, 2000