

China's forest sector markets: policy issues and recommendations

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SUMMARY

Based on the papers contributed to this Special Issue and other studies an effort is made to identify the major policy issues facing the Chinese forest sector. The policy analysis is organized around the so-called 'supply chain' (from stump to final products' markets). The discussion of policy issues and implications centers on the identified large and growing gap in the demand/supply balance of forest products. A major problem to carry out the policy analysis is the identified lack of consistent and transparent data for the different components of the 'supply chain'. This is a situation which must be substantially improved in order to undertake relevant policy setting for the Chinese forest sector.

Keywords: forest sector, policy analysis, data, supply chain, forest resources

INTRODUCTION

China's forest market has quickly become a dominant, if not the dominant, driver of investment and industry transition, affecting both forests and forest-dependent livelihoods globally. The future of the Chinese forest sector and its implications for the world is directly dependent on the future economic growth in China and its commitment to developing its domestic supply and manufacturing. China's gross domestic product (GDP) already accounts for 13 % of the world's output (at purchasing-power-parity), in 2004 China is probably the world's third largest exporter, it is the largest recipient of foreign direct investments, and its imports have grown by 40 % (Economist 2004). However, there are questions whether China will be able to maintain current economic growth. The fragile banks have increased lending too rapidly and helped fuel a property bubble as well as pushed the inflation above 5 %. In addition there remains a lack of transparent institutions, evidence of corruption, dramatic income inequalities, inefficient state owned enterprises and severe environmental pollution (Economist 2004).

If China's economy slows down sharply in the next couple of years, the long-term outlook on strong economic growth is bright. China's growth is not only based on a large cheap labor force but it has extensive infrastructure upgrades underway, an educated work-

force, a high investment savings rate and an extremely open economy.

Thus, if the economic structural reforms continue there are good reasons to believe that strong economic growth can be maintained. Usually, economic growth slows down when incomes approach the levels of developed countries but China's GDP per capita is far below countries such as Japan and South Korea. The Economist (2004) concludes that China should be able to sustain an annual economic growth of 7-8 % for at least another decade.

In the context of growth, the analysis carried out in other papers in this Special Issue assumes that economic growth will continue to be substantial in the next decade and cause a significant gap in the Chinese forest products demand/supply balance. This gap will not only cause difficulties with the supply of forest wood products but also create conflicts with respect to Chinese non-wood forest ecosystem services and future land-uses in the country. In addition, the identified demand/supply gap will put severe pressures on the utilization of forest resources surrounding China and in other parts of the world.

The gap measured in 2002 between consumption and domestically produced forest products is 106 million m³ expressed in roundwood equivalents (RWE) as presented by Sun *et al.* (2004) in this volume. The likely future gap at around 2010, based on the analysis in Bull and Nilsson (2004), He and Barr (2004), Sun *et*

al. (2004), and Sun (2004) in this volume, may be in the magnitude of 150-175 million m³ RWE.

This discussion of policy issues and implications centers on this large and growing gap in the demand/supply balance of forest products and is organized around the so-called 'supply chain' which begins with the so-called 'wood balance'. The supply chain follows the wood raw material from the forest resources through the industry to the market and it takes into account the side effects that the products produced are having on other functions, services and sectors inside and outside China.

A wood balance is a method to control the consistency of data and can be described in a simplified way as aggregated equations:

$$\text{domestic production of wood raw material} + \text{domestic production of other fibres used in the forest sector} + \text{import of wood raw material and other fibres} - \text{export of wood raw material and other fibres} = \text{domestic production of forest products in the industry expressed in RWE}$$

$$\text{domestic forest industrial products in RWE} + \text{imports of forest industrial products (RWE)} - \text{exports of forest industrial products (RWE)} = \text{domestic consumption of forest industrial products (RWE)}$$

After a thorough review of the existing literature and statistics, we can conclude that we are not able to accurately close the 'Wood Balance'. Nonetheless, we have a partial understanding of the current structure of the Chinese forest sector and on this basis we will concentrate on the issues that are in alignment with the evidence presented in the other papers in this Special Issue in order to give a consistent set of recommendations.

FOREST RESOURCES AND FIBRE SUPPLY

The analysis by Bull and Nilsson (2004) shows that the Chinese forest sector is facing a major challenge in meeting the future demands on forest resources to provide material for industrial, non-industrial and conservation uses. But the size of the challenge cannot accurately be assessed given the incomplete, non-transparent and conflicting data. For example, there is no satisfactory assessment of forest areas available for wood supply, there is conflicting information on the productivity and areas of plantations, there is no satisfactory assessment of current and future growth as well as on stocking quality, there are discrepancies in the information on growing stock in different forest categories and age classes, and there are major discrepancies in the removal statistics that indicate substantial illegal logging or over-harvesting.

A key issue for setting any policies for the future of the Chinese forest sector is to have the domestic supply options correctly identified. In order to do this the Chinese Government should consider:

- *Establishing a new and transparent forest inventory in order to make the needed supply assessments. The inventory should include areas, growing stock, growth, quality, non-wood functions and services for all forest categories.*
- *Carrying out transparent assessment of future possible supply of different services from the forest resources in order to identify the conflicting demands and possible solutions to these conflicts.*

The aggressive Chinese Government plantation program, which is closely linked to the assessments of the future forest resource base, has a target of establishing 13.4 million ha of new plantations during the period 2001-2015. The program is focusing on the development of the domestic industry, especially the pulp industry as discussed in the analysis by Barr and Cossalter (2004). In that study the authors conclude that these plantations will not be cost competitive with plantations in many other producing countries due to frequent cases of shallow and nutrient poor soils, water shortage, locations far from industrial sites, etc. Jaakko Pöyry (2001) arrived at similar conclusions.

The plantations are also bound to generate land-use conflicts and the land that the government hopes to allocate to plantations might not be available. As indicated by West *et al.* (2004) the majority of forest land in China is owned by collectives and they are increasingly asserting their property rights to choose the uses of their lands. In many regions the prime plantation land has already been planted and in many cases the land targeted by the government for plantations could be used for the production of crops with substantially higher economic returns in comparison with pulp fibres (Barr and Cossalter 2004, Jaakko Pöyry 2001). There is also the question of how many sites are available for new greenfield mills for pulp production in China due to constraints in water supply (Roberts 2004), environmental impacts, and transportation infrastructure (Jaakko Pöyry 2001, Roberts 2004). It is not at all clear that the produced wood in the planned pulpwood plantations (5.9 million ha) can be used domestically in China. It may be that China would be much better off both economically and environmentally to import the needed pulp. Therefore, the Chinese Government should consider:

- *Revisiting the planned plantation program and evaluate whether this is the most efficient economically, socially, and environmentally sound way for satisfying the future demand of pulp in China.*

The re-examination should include evaluations of the potential impacts of proposed sites for greenfield pulp mills on local water supplies and quality and the broader environment, taking into account local people's perspectives and concerns. It should also identify the most suitable locations of plantations in the vicinity of the existing identified sites for pulp production. In all cases, evaluations should begin with an as-

assessment of the perspectives and interests of the property owners to commit their land, and possibly labor, to industrial plantations. Potential investors should also carefully evaluate the productivity, water, land-use, and environmental dimensions of the proposed plantations. At the same time, steps should be taken to include in the analysis the feasibility to increase productivity and lower production costs for each of the areas where the government aspires to encourage plantations.

The current plantation program is divided into plantations for pulpwood (5.9 million ha), logs for panels (5.0 million ha) and large timber (2.5 million ha). This division makes limited sense from an economic point of view. It also makes limited sense from a property rights and incentives point of view. It is one thing to plan for the establishment of plantations on public land. It is another to propose that private property owners adopt technologies to achieve a government target. This latter situation, which dominates potential plantation areas, requires much more careful use of financial and regulatory instruments of the government. In addition, new plantations should be designed in such a way that there is flexibility in the type of fibre produced, whether for pulp or veneer, for example. In the end, the use of the yield of plantations will be determined by the market therefore the Chinese Government should consider:

- *Revisiting the overall goals of the current plantation program and setting separate objectives and strategies for the public and collective lands, including steps to ensure that the plantations will generate flexibility in the type of product produced.*
- *Revisiting the current policy of shifting production from natural to plantation forests, and develop plans to boost the sustainable production of natural forests - particularly in regions where forestry can contribute significantly to rural incomes and broader development.*

There is also the issue of fuelwood, which will have some influence on the future availability of industrial fibres. Bull and Nilsson (2004) in this volume have identified that there are huge uncertainties with respect to the utilization of fuelwood. Based on this analysis as well as analysis by Leiwen and O'Neill (2003), it seems like the consumption is currently in the magnitude of 150 million m³ per year but, according to some Chinese sources, the consumption could be substantially higher. Leiwen and O'Neill (2003) conclude that this demand will increase in the foreseeable future. One significant question is: What kind of forests will provide for this fuelwood consumption? We know that some of the fuelwood is coming from four-sided forests, fuelwood forests, protection forests, etc., but we also know that an unknown quantity of the fuelwood is coming from the so-called timber forests. It is important that the Chinese Government consider:

- *Assessing the future fuelwood demand in China and determining which forest resources will supply the material required in the future and how policies should be reformed to better encourage sustainable production of fuelwood - without adversely competing with industrial fibre. The analyses will have to consider the overall energy policies in China.*

The analysis of the available and non-transparent statistics on the current harvest or removals by Bull and Nilsson (2004) in this volume leads to the conclusion that China is severely over-harvesting the existing domestic forest resources and that substantial illegal logging is taking place in China. The analysis also suggests that the logging ban introduced in 1998 and 1999 is, in reality, not being fully enforced. This finding points to the fundamental weakness of such 'bans' in China, or in other countries, where the vast majority of rural people remain reliant on fuelwood, timber for household use, and where many communities have depended on commercial harvesting for their livelihoods and where the capacity to enforce the law is weak. Therefore, the Chinese Government should consider:

- *Removing the logging ban and reforming broader forest regulatory framework, taking into particular account how they affect the rights and incentives of collective forest owners, and then once a sound framework is in place, introducing strong measures against over-harvesting and illegal logging.*

If over-harvesting and illegal logging are not brought to a halt, and if simultaneously, steps are not taken to ensure incentives to invest and manage new forests, the long-term supply/demand balance will be even more severe and dramatic than that presented earlier in this section.

In the future, the difficult demand/supply balance situation for wood fibres in China also means that non-wood fibres will play an important role. As demonstrated by He and Barr (2004) in this volume the total demand on fibres in 2003 for the Chinese pulp sector was about 40 million tons and some 12 million tons were supplied from agricultural residues and nearly 20 million tons from recovered paper (about 50 % of the total fibres consumed). The He and Barr (2004) assessment indicates that the importance of the non-wood pulp fibres will decline over time due to quality requirements on the different paper grades in the future and due to environmental problems with the usage of non-wood fibres. But recovered paper could play an even more important role in the future and constitute some 60 % of the fibre mix in the pulp sector. This increased demand could be met by doubling (+9 million tons) the domestically recovered paper and increasing imports by 7-8 million tons. Thus, the domestically recovered paper will play an important role in the future of the Chinese forest sector. For this scenario to materialize it is important

that the Chinese Government consider:

- *Establishing, together with private sector actors, efficient collection systems for recovered paper.*

From the discussion above it is also obvious that the Chinese statistical system reporting on the forest resources, other fibres and their utilization needs substantial strengthening. Therefore, the Chinese Government should consider:

- *Implementing a new, transparent, statistical system covering all relevant aspects of the forest resources, other fibres and their utilization (This is also valid for industrial production, consumption and trade, which will be discussed in succeeding sections).*

Without an efficient and transparent statistical system for the Chinese forest sector there will be significant difficulties in setting new policies for the sector and doing the much needed evaluation of any policy measures taken. Thus, this is a key issue in maintaining an efficient policy process.

INDUSTRIAL PRODUCTION

From the analysis carried out in this volume it is obvious that the Chinese Government has begun to restructure the domestic forest industry and aims to dramatically increase production and exports over time.

The He and Barr (2004) analysis presented in this volume provide us with a satisfactory understanding of the pulp and paper sector structure. This study indicates that domestic pulp production will increase by some 4 million tons of wood pulp by 2010, which means establishing 5-8 new greenfield mills. We have already raised the issue of the availability of suitable sites of this magnitude. We have also raised the need for new investment procedures and criteria, as well as the independent investigation of suitable sites for greenfield pulp mills.

There are also other concerns about the future of the Chinese wood pulp sector. Wright (2004) claims that China's wood pulp production is unlikely to be competitive with imported wood pulp until the current plantation program will start to produce substantial yields. This means that China will continue to depend on imported wood pulp for at least 20 years.

The paper and paperboard industry is also very fragmented and growing quickly. There are some 4000 mills but only about 115 mills have the capacity of exceeding 10 000 tons per year. Currently, the committed and proposed capacity additions in the paper and paperboard sector are growing faster than the growth demand, risking the development of overcapacity in the industry. This seems to be at least partly driven by very aggressive set of subsidies provided to the sector from the Chinese Government, exceeding several billion US\$ between 1998 and 2002 alone (AFPA 2004). Given the structure of the industry and the cost profile for production there are questions on

how competitive the domestic paper and paper production will be in comparison to imported paper products produced in integrated mills (Wright 2004).

He and Barr (2004) in this volume also predict the increase to be some 20-25 million tons in the domestic paper and paperboard production by 2010. Some of this production increase can be achieved by expanding the capacities of existing mills but it is likely that a number of greenfield mills are also required. Therefore, there is a need to instill new rigor into the investment process, requiring independent investigation of the financial costs and benefits of proposed mills taking water conditions, the costs of local fibre supply, infrastructure and market trends into account. Given the real need for greater supply of pulp and paper and the real risk of overcapacity and misuse of limited government funds, it is of importance for the Chinese Government to consider:

- *Reassessing the justification for public subsidies for industrial investments, developing new investment criteria and procedures for public banks, and more carefully analyzing the possibilities for expanding the pulp and paper sector.*

Earlier we discussed the important role of recovered paper and highlighted the need for a policy of developing efficient systems for the collection of recovered paper. There is another aspect to the domestic recovered paper in China; it is of low quality because it contains a high amount of fibre from agricultural residues. Low quality recovered paper cannot be used in quality grades of paper, which will be in greater demand in the future. In order to use the domestically collected paper in the most industrially efficient way the collection of recovered paper must be based on strict quality grading.

Pigments and chemicals can be as high as 50 % in the fibre furnish of quality papers (Jaakko Pöyry 2001). Therefore, the Chinese Government should consider:

- *Establishing a program for increased use of domestic pigments and chemicals in the Chinese paper process since China has good raw materials for production of these pigments and chemicals.*

There are other dimensions of the dependence of a high rate of recovered paper. Häggblom (2004) predicts that the global demand for recovered paper will increase by 63-65 million tons per year in 2010. Roberts (2004) concludes that only the USA can increase the export of recovered paper within a short time frame but it is limited to 5-10 million tons. Given this situation the prices for all key grades of waste paper are likely to increase substantially in real terms. Therefore, there are reasons for the Chinese Government to consider:

- *Revisiting the current strategy of a strong dependence on imported recovered paper for the Chinese paper and paperboard production.*

The accessibility of recovered paper may be difficult in the future and the prices may become too high to suit the Chinese production structure. If that is the case, a different industrial pulp and paper strategy is needed in comparison to what we see today.

We do not think at this stage that we have a clear view of the current structure of and production by the wood products industry, especially the saw milling and plywood industries. In particular, no one seems to have a clear understanding of the role of the many small mills that, as demonstrated by West *et al.* (2004), continue to play a critical role in rural employment.

The declining supply of domestic raw material is a major constraint for the development of the saw milling and plywood industries. As demonstrated by Bull and Nilsson (2004) in this volume the domestic supply of large and quality logs has declined dramatically in recent years and will continue to do so in the future. This is accelerating these industries dependence on imported logs as well as encouraging greater use of bamboo and other substitutes for lumber.

In order to develop solid policies for forest industrial development the Chinese Government should consider:

- *Carrying out an investigation of the Chinese solid wood products industry with respect to capacities, technologies, location, production, wood utilization, ownership structure, and contributions to local employment and public revenue.*

This sector is the biggest consumer of the domestic industrial forest raw material and without a clear understanding of the current structure of this industry there will be large difficulties in planning for the future.

Based on the above measures we think there is a need for the Chinese Government to:

- *Develop a united strategy/vision on the future structure of the total forest industry over time in China. The strategy must build on financial and economic analysis on China's future competitive position in the global forest sector as well as the potential for the forest industry to contribute to rural employment and development. The new structure should take into account how the current policy framework and infrastructure inhibits the flow of fibre to the industry due to transportation constraints.*

The appropriate structure should also be created with a market-driven approach and not be based on domestic financial solutions/constructions as is currently the case.

CONSUMPTION

With the analysis carried out in this volume we feel it is possible to compose a reasonable view of future pulp and paper consumption in China (He and Barr

2004). But for other industrial forest products the picture is much less clear. Given the statistics discussed in the paper of Sun (2004) the current consumption of lumber could be somewhere between 55 and 105 million m³/year (the upper boundary does not seem possible due to the wood available). Jaakko Pöyry (2004) claims that the total consumption of lumber, plywood and boards was 44 million m³ in 1999 and predicts it to be 56 million m³ in 2010. Based on Sun (2004) and Sun *et al.* (2004) in this volume the consumption of plywood and boards in 2002/2003 is some 43 million m³. Earlier we also highlighted the difficulties with the consumption figures on fuelwood. With this range of consumption statistics there are huge difficulties in setting relevant policies for the future. Therefore, the Chinese Government should consider:

- *Establishing a new system to calculate the end-use of the different forest products consumed by the Chinese society in order to get reliable consumption estimates. This analysis should account for end-use pattern changing over time with increased economic development. The latter information is important in forecasting the future consumption of forest products.*

MARKETS

The huge gap between demand and supply is driving urgent policy issues both at the international and the domestic levels.

From Katsigris *et al.*'s (2004) analysis in this volume it can be seen that many of the countries supplying China today with forest primary and secondary industrial forest products are not operating in a sustainable manner. Over-harvesting, unsustainable practices and illegal logging are prevalent, and are not only destroying local livelihoods for many people today, but diminishing the potential for forestry's contribution to sustained rural development tomorrow. The potential for continued, and even expanded, negative impacts will increase substantially with the widening gap between domestic supply and demand in the future forecasted by Bull and Nilsson (2004) in this volume. The Katsigris *et al.* (2004) report also reveals the important and increasing role of Chinese companies and investment into some supplying countries, most notably Myanmar and Russia. While China in no way can be responsible for ensuring the enforcement of policies and laws in other countries it can adopt policies at home that discourage or prohibit Chinese investment into illegal and unsustainable operations as well as prohibit imports from questionable sources. Other countries have begun to move in this direction, either by requiring proof of legal sources or outright bans against imports from particular countries. The Forest Law Enforcement and Governance forums, underway in Asia and under construction

in the Eurasian region are important fora for inter-governmental dialogue and actions on these topics. For these reasons the Chinese Government should consider:

- *Prohibiting Chinese public and private investments into forest operations in countries where the illegality and unsustainable forest practice is prevalent, such as Myanmar, and develop new criteria and procedures for encouraging investment into forestry operations that are independently certified to be legal and sustainable.*
- *Establishing a moratorium on imports from countries where over-harvesting, illegal logging, and unsustainable practices and/or the abuse of indigenous and other traditional rights are prevalent, and simultaneously engage those supplying country governments in steps to put their country forest operations on sustainable footing, including measures to require the independent certification of sustainable practice and legality.*

These are critical steps for the Chinese forest sector in order to be taken as credible contributors towards advancing the sustainable management of the world's forest resources. At the same time, it is critical that the international community support China in adopting more responsible procurement and investment policies, by simultaneously adopting similar policies.

There is also another policy issue coming out of Katsigris *et al.* (2004) analysis. It is concluded that most of the countries currently supplying China with forest raw material in the Asia Pacific region will in the future, at best be able to maintain current export levels to China'. By analyzing the future supply conditions in these countries it can be concluded that this is probably an over-estimate and the supply possibilities will decrease in a majority of these countries within the next 10-15 years, with the exception of Russia. Katsigris *et al.* (2004) conclude that, only Russia is presenting the potential of significantly increased supply of logs to China'. This leads to the conclusion that the Chinese Government should consider:

- *Developing a strategy and policy on how to secure the needed increased import of forest raw material (and forest industrial products) in the future.*

Without a clear import strategy there is a high risk that China will fail to get the demanded raw material.

In this strategy, as identified by Katsigris *et al.* (2004), Russia is crucial. We have assessed the potential for increased export from Russia in the future. Our assessment is that Russia, under current conditions, can sustain a harvest of industrial wood of the magnitude of 250 million m³ per year and the current harvest is assessed to be in the magnitude of 175 million m³ of industrial wood. This means that the potential for increased export from Russia is in the size of 75 million m³ of industrial wood. There will be substantial competition for this potential increased volu-

me from other rapidly growing developing economies, particularly India. At the same time, the Katsigris *et al.* (2004) report and the Russian analyses from which this report draws clearly identifies the extensive problems of illegal and unsustainable logging in Russia. Because the Chinese market is becoming increasingly dependent upon Russian supply the Chinese Government should consider:

- *Developing a strategy to both advance sustainable and legal production in Russia and secure sufficient import potential of forest raw material (and forest industrial products).*

Given the assessed difficult future demand/supply situation it is of utmost importance that the domestic market with respect to wood supply is functioning efficiently. West *et al.* (2004) in this volume have investigated the domestic forest resources and property rights. It can be concluded that the collective forests are the most important from a wood supply point of view but that there are difficulties with respect to property rights in order to have an efficient market for the wood supply (West *et al.* 2004). The physical assets rights do not correspond with the economic rights and some collective forests are limited by having obligations to deliver only to the state owned industrial companies. In order to stimulate the forest management and bring in economic incentives into the collective forest system and the markets, the Chinese Government should consider:

- *Working towards clarifying and strengthening joint property and economic rights in forest areas, including strengthening respect for collective and individual properties.*

There are also other hindrances for an efficient market with respect to the domestic wood supply. The tax, fee and charge system being in place with respect to the utilization of the forests is a major bottleneck for the establishment of an efficient market. It is not reasonable that the charge system often exceeds half of the gross revenue from the utilization of the collective forests (West *et al.* 2004). The present system currently acts as a disincentive for investments and utilization of the forests (West *et al.* 2004). The Chinese government has begun reforming the rural tax code, but this has not yet reached into many forested areas or yet led to the reduction of forest taxes in many areas. Therefore, the Chinese Government should consider:

- *Accelerating reforms of the current charge system to become an efficient tool for investments in forestry, for efficient utilization of the forests and contribute to a sound development of the domestic markets for wood supply.*

This measure will also improve the livelihood conditions for the rural people living in forested regions as well as the ecological conditions.

Sun (2004) in this volume describes Chinese 995 formal Timber Markets to serve the industry with the supply of wood raw material. It is our view that these timber markets contribute to both efficiency and economic losses in the fibre supply chain. Therefore, we recommend the Chinese Government:

- *Deregulate the timber markets' and restructure the wood supply market based on pure market principles.*

The policy implications relating to the widening gap in supply/demand of forest products in China discussed in this paper do not claim to be a complete set of required policy or strategy changes. But we suggest that these are the major policy implications to be dealt with now and that the set of policies/strategies proposed are internally consistent.

REFERENCES

- AFPA 2004. China's Fibre Resources and Forestry Industry Development. AFPA, Washington D. C., USA.
- BARR, C. and COSSALTER, C. 2004. China's Development of a Plantation Based Wood Pulp Industry: Government Policies, Finance Incentives, and Investment Trends.
- BULL, G. and NILSSON, S. 2004. An Assessment of China's Forest Resources.
- ECONOMIST 2004. The Dragon and the Eagle. *The Economist* 2 October, London, UK.
- HÄGGBLUM, R. 2004. Global Forest Trends. Paper presented at the World Bank Seminar 'Business Opportunities in the Forest Sector', Helsinki, 7 May, Jaakko Pöyry, Finland.
- HE, D. and BARR, C. 2004. China's Pulp and Paper Sector: Supply-Demand Trends and Medium Term Projections.
- KATSIGRIS, E. *et al.* 2004. The China Forest Products Trade: Asia Pacific Supplying Countries.
- JAAKKO PÖYRY 2001. China Forest Industries. Opportunities and Challenges, Volumes 1-3, Multi-Client Study, Jaakko Pöyry Consulting, Singapore and Shanghai.
- LEIWEN, J. and O'NEILL, B. 2003. The Energy Transition in Rural China. Interim Report IR-03-070. International Institute for Applied Systems Analysis, Laxenburg, Austria.
- ROBERTS, D. 2004. China and the Global Paper and Forest Products Industry: A Focus on Fibre. CIBC, Ottawa, Canada.
- SUN, X. 2004. A Brief Overview of China's Wood Market System.
- SUN, X., KATSIGRIS, E. and WHITE, A. 2004. Meeting China's Demand for Forest Products: An Overview of Import Trends, Ports of Entry, and Supplying Countries with Emphasis on the Asia Pacific Region.
- WEST, A. *et al.* 2004. Chinese Collective Forests: How Property Rights and Policy Affect the Sector.
- WRIGHT, R. 2004. Defining the China Market for Pulp, Paper and Board. Paper presented at Forest Trends seminar in Beijing, China 23 September 2004. Forest Trends, Washington, D. C., USA.