中国林产品贸易对亚太地区供给国的影响及意义

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【摘　要】

70%以上的中国木质林产品进口来自亚太地区国家，中国也是多数亚太地区国家的主要林产品市场，不可持续生产实践、非法采伐以及由此给社区生计带来的消极影响困扰着这些林产品生产国。亚太地区国家可以分成两类：一是继续大规模采伐和出口来自天然林的木材；二是结束了大规模采伐天然林，现转向对人工林的侵略性采伐和加工。若保持现有供给量，中国在亚太地区（俄罗斯除外）最大供应国的天然林资源不到20年将被耗尽，资源限制束缚了加工林产品对中国的出口扩张和长期供应。各国政府、市场决策者和国际组织应高度关注，并采取行动来应对这一消极影响，保证林产品供应的可持续性、合法性和公平性，解决中国林产品供应的长期来源问题。

【关键词】

中国；亚太地区；林产品出口；生计；政策问题

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封面照片由国际混农林业研究中心云南办公室的苏宇芳提供

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引　言

近年来，中国林产品进口显著增长，贸易量跃居世界前列。由于国内人均森林资源有限，制造业（通常是加工再出口）和国内消费的迅速扩张助长了林产品进口的上升[1]。中国增长的林产品需求影响到了世界范围内的供应国，对亚太地区国家的影响尤其显著，亚太地区的森林丰富国家的森林资源向中国的流量日益增加。许多情况下，贸易流量的增加会伴随着不可持续采伐、腐败和不能为依赖森林的社区提供满意的生计机会等问题。

当然，弄清过去存在的问题和将来的解决办法还需要更清楚地了解上述国家林业部门和林产品贸易的现状和发展趋势。在英国国际发展部（DfID）的大力支持下，森林趋势与国际林业研究中心（CIFOR）协同整个区域的合作伙伴于2003～2004年着手研究，填补信息空白，形成了对亚太地区林产品供给国森林工业和林产品出口贸易的基本认识。本文是多位作者针对单个供给国所做具体研究的综合成果[2]，具体的研究论文已在森林趋势网站（www.forest-trends.org）上发表。本文首先总结了林产品供给国林业部门的特点，进而分析了对中国的整体出口趋势和贸易状况，最后评述了这些国家与中国贸易的关键性问题。按照向中国出口林产品数量从大到小的顺序，本文研究的中国在亚太地区的林产品供给国包括：俄罗斯、印度尼西亚、马来西亚、泰国、巴布亚新几内亚（PNG）、缅甸、越南、柬埔寨和老挝[3]。

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[1] 阔叶材进口主要来自东南亚，拉丁美洲、非洲和美国，一般更多用于家具和室内装修。针叶材大多来自俄罗斯和新西兰，更多用作建材而完全供国内消费。

[2] 具体研究包括：Alexander Sheingauz，俄罗斯远东地区林业综述：生产、工业结构与非法采伐. 2004；Alexey Lankin，俄罗斯远东和东西伯利亚地区林产品出口中国的现状与趋势研究. 2004；Anatoly Lebedev，供应中国的西伯利亚和远东地区木材市场. 2004；Fredrich Kahrl，苏宇芳和 Horst Weyerhaeuser，跨越国界：中缅木材贸易分析. 2004；Yati Bun, Timothy King, Phil Shearman，中国木材进口对巴布亚新几内亚林业的影响. 2004；Keith Barney，柬埔寨的林业部门及其对中国的林产品供给. 2004；Keith Barney，泰国的林业部门及其对中国的林产品供给. 2004；Keith Barney, 越南的林业部门及其对中国的林产品供给. 2004。

[3] 分别进行了对俄罗斯、印度尼西亚、泰国、巴布亚新几内亚、缅甸、越南和柬埔寨的个别研究，其研究报告也主要针对这些国家。当然，这里的数据也包括马来西亚和老挝，作为对供给国排序依据的对中国林产品出口量数据来自中国海关，若包括非法贸易和转运，柬埔寨（甚至是老挝）的排序都有可能超过越南。

1 亚太地区林产品供给国的林业部门

中国的亚太地区林产品供给国的林业部门具有如下共同特征：缺乏有关森林面积和林业生产的可靠数据、林地国有、森林采伐主要以出让采伐权方式和大面积毁林趋势。尽管各国森林资源、采伐和加工与培育部门的发展等情况不尽相同，但这些国家可以大致归纳为两类：第一类国家很少考虑将来的林产品供给，大规模生产木材，经常以历史最高产量生产，对林产工业重视不足。俄罗斯、缅甸和巴布亚新几内亚可以归为此类。它们造林面积相当有限，发展替代木材资源的动力不足；由于可以依赖大量原木和锯材出口获得收入，它们通常很少有发达的加工部门。与之相反，其他供给国（如泰国、老挝、越南和柬埔寨）采伐天然林的高峰明显已经过去，开始追求（至少是探索）增强深加工能力或发展人工造林，以增强本国林业部门的供给能力。尽管有很强的工业原木生产能力，印度尼西亚逐渐减少了采伐量，发展了深加工工业，因此，也逐渐向后一类国家的发展方向靠拢。马来西亚原木生产能力虽然保持稳定，但不断增加的丰产人工林维持了较高产出，使得该国同样度过了天然林的采伐高峰。

森林资源

表1总结了中国林产品供给国（地区）森林资源的现状，提供了天然林面积、可采伐天然林面积、人工林面积、年工业原木产量和维持目前砍伐率的成熟天然林可采年限粗略估计等数据，这些数据具有许多不确定性，表1旨在描述这些国家森林资源基础的现状，预测将来持续供给中国林产品的潜力[1]。

因为有2.8亿ha天然林，仅俄罗斯远东地区的森林资源就超过了中国在亚太地区的任何其他供给国（远东和东南西伯利亚五省提供了中国进口俄罗斯木材的大部分，因此我们对俄罗斯森林工业和贸易的分析也集中于这些地区）。印度尼西亚有0.9～1亿ha天然林，位居第二。缅甸、巴布亚新几内亚和马来西亚在天然林面积和商品材供给方面排位居中，而泰国、越南、老挝和柬埔寨已过采伐高峰，来自天然林的木材供给极其有限。俄罗斯这一地区的天然林有望比所研究的其他任何供给国都具有长期的供给潜力，以现在的采伐率能维持20多年。中国的其他原木供给国中，巴布亚新几内亚的林地分配将在3～6年内完成，以现有采伐率，再有10年将基本耗尽其天然林资源；同样，业内人士估计，以现有采伐率，缅甸边境地区可供商业采伐的森林资源能维持10～15年的木材供应给中国。

[1] 不确定性主要是由于数据不全和定义范围问题，比如，计入“天然林面积”的森林资源最小郁闭度，或者对“可用木材供给”林地类型的定义。

表1　亚太地区供给国和地区的森林资源基础：最新估计

国家或地区	天然林面积	可采伐天然林面积	人工林面积	年工业原木产量	维持目前砍伐率的成熟天然林可采年限
	1×10^6 ha			1×10^6 m^3	年
俄罗斯远东地区	280.0	96.0	0.77	12.2	> 20
印度尼西亚	95.0	74.2	2.00	55.0	–
马来西亚	18.3	–	1.75	17.9	–
泰　国	12.0	0.0	2.80	7.8	–
巴布亚新几内亚	26.5	11.2	0.06	2.1	13～16
缅　甸	33.9	20.4	0.50	5.5	10～15 **
越　南	8.1	3.1	1.71	4.2	–
老　挝	12.4	5.7	0.09	0.4	–
柬埔寨	9.2	3.9	0.09	0.1	4～9

** 仅克钦地区供给中国

数据来源及说明：作者在2004年为森林趋势和国际林业研究中心撰写的国家报告（见参考文献）。亚太地区合作伙伴会议记录，2004.6。联合国粮农组织统计数据，2004。欧盟与联合国粮农组织合作纲要，2002。联合国粮农组织，2000年全球森林资源评估报告。世界银行，2001，2004。亚洲发展银行，2004。MIDAS农业经济有限公司等，2003。Gary Bull 等，1998。详细参考文献目录在本文的最后部分。工业原木产量是2002年数据，但越南和印度尼西亚除外，越南为2000年数据，印度尼西亚数据是作者的近期（2003年）估计。

在认识到本国工业原木供给下降的供应国或地区，人工林培育或此类计划已经引起高度重视，而那些还没有跨越天然林采伐高峰的国家在这方面的努力很少。然而，除泰国以外，各国的人工林资源还远远低于天然林；印度尼西亚（530万ha人工林地，但植树不到200万ha）和泰国（490万ha人工林地，280万ha是非橡胶“树木种植园”）是人工林发展领先的国家。在泰国，主要工业原木来源是小种植园主的桉树（*Eucalyptus* sp.）和橡胶树（*Hevea brasiliensis*）人工林。根据联合国粮农组织（FAO）的统计数据，马来西亚和越南各有170多万ha的人工林，柬埔寨（现仅有9万ha人工林）已有发展人工林的宏伟计划（Barney, 2004a）。因为有“采伐高峰”前雄厚的天然林资源基础，人工造林在俄罗斯、巴布亚新几内亚和缅甸（供给中国的部分地区）就很少有优先发展的机会。在俄罗斯远东地区，仅有0.5%的林地被考虑人工植树，巴布亚新几内亚的人工林面积仅为6.1万ha。虽然缅甸有50万ha人工林，1/3以上是柚木（*Tectona grandis*），但主要供给中国的地区人工林面积仍极其有限。

以下是有关各国森林资源状况的补充信息：

俄罗斯　虽然俄罗斯木材生产高峰出现在20世纪80年代中期，接下来产量的下降主要受经济因素影响，并非是资源耗尽，因此，我们把俄罗斯包括在还没跨越木材生产高峰的国家进行分析。和其他供应国相比，俄罗斯的采伐幅

度与资源基础的关系好像不很紧密，政府规定远东地区的采伐量是年可采伐量（AAC）的18.2%，然而，包括非法采伐，实际年可采伐量比例大约达到了25%（Sheingauz，2004）。

尽管总体上看远东地区的采伐没有超过年可采伐量，然而大面积的森林在退化。选择性采伐（仅采伐最好的木材和树种）是导致退化的一个重要因素。此外，允许间伐表面上是恢复森林的自身维护功能，但实际上间伐被滥用了，相当大一部分阔叶材产品，特别是那些禁止和限制砍伐的树种，是通过获得正式批准的“间伐”提供的（Sheingauz，2004）。

自然因素也会导致森林退化，毁灭性的森林火灾最近烧毁了相当于年采伐面积4倍的森林，森林火灾也因此被认为是过去5年来森林面积减少的主要原因，低劣的森林采伐操作增加了火灾发生的条件（Sheingauz，2004）。

印度尼西亚 尽管工业原木产量很高（从20世纪90年代中期保持在每年4700万～7500万m^3），但其中绝大多数都运往该国庞大的木材加工部门，我们把印度尼西亚归类为已跨越“采伐高峰”的国家。近年来，随着可采伐森林被迅速耗尽，该国在许多地区的采伐量也急剧下降。目前公认的事实是：以国内加工企业现有的加工能力，印度尼西亚的天然林资源不能维持多久，因此，为了保持现在的木材供给规模，需要非常重视加速工业人工林的发展。虽然对印度尼西亚毁林数据估计的差别很大，但一般认为每年至少16万ha，相当大一部分是因为把林地转作大规模农场和林木种植园。

泰国 泰国已明显跨越了天然林采伐高峰，过去20～30年里毁林非常迅速。由于环境意识的提高和政府的采伐禁令，现在毁林已经减少。由于天然林资源基础薄弱，加之相对发达的国内加工业的需求，泰国在发展人工林方面已付出巨大的努力，现有人工林（包括橡胶树）占全国森林覆盖面积的1/4左右，并制定了扩大植树造林面积的宏伟计划。但是，由于大部分农民参与植树造林计划并非是为了保护植被，因此，过去人工林发展遭遇了极低的成功率；此外，社会冲突也妨碍了人工林的扩展（Barney，2004b）。

巴布亚新几内亚 巴布亚新几内亚2650万ha的天然林目前产量较高（2002年200多万m^3），看来已接近产量高峰，全国大多数产量高、可采伐的森林都已出让给采伐权经营者来采伐。最近的卫星图显示，过去7年内的采伐强度超过了以往，由于在早期采伐迹地上重复采伐，连同这些地区大的火灾和旱灾，导致在很大程度上更新比预想得要困难的多（Bun等，2004）。

缅甸 缅甸约有3390万ha天然林，2002年工业原木产量达500多万m^3，森林资源丰富，现已成为中国在这一地区主要的木材来源。但毁林比较严重，专供中国木材的边境地区采伐量已达到最高峰（Kahrl等，2004）。

越南 同泰国一样，越南也曾是森林丰富国家，并已跨越了天然林采伐高峰。有分析人士认为，1980～1995年越南经历了严重的毁林，直到国内稳定后

才重视天然林下降问题。越南已经开始加强人工林发展，但目前为止人工林产量较低，未来发展的宏伟目标缺乏具体可行的计划（Barney，2004c）。

柬埔寨 与相邻的泰国和越南一样，柬埔寨似乎也在最近跨越了天然林采伐高峰。分析家指出，柬埔寨尚存的森林极少可供商业采伐，而现在维持的采伐率低于20世纪90年代中后期，那时非法采伐行为正值高峰，中国投资者的投资活动也早已在这一地区起到了相应的作用（Barney，2004a）。

天然林所有权与管理

供给中国林产品的国家的天然林主要为国家所有并管理，因此，与私人所有、社区共管的集体所有或本地团体所有的天然林相比，提供社区使用的机会较少。比如，在俄罗斯、印度尼西亚和缅甸，99%～100%的林地属公众拥有、政府管理（据官方数据）[1]。巴布亚新几内亚这个习惯上所有权集中的国家，97%的林地却归社区私人所有，是所研究国家中林地所有权国有的例外（White and Martin, 2002），但政府在对国家森林决定权的掌控方面还是比地方社区要发挥更重要的作用。

世界范围内拥有广袤森林资源的国家都是一样，最一般的管理机制是把大规模的采伐权出让给采伐公司，通过这种出让，就给了当地最终使用者接近森林的机会。在俄罗斯、印度尼西亚（58%的林地）、柬埔寨（64%的林地）、巴布亚新几内亚（政府起到促成采伐经营者和当地社区交易的作用）和缅甸供给中国林产品的地区，林地分配大多数通过出让采伐权的方式（White and Martin，2002）。

尽管以政府控制和采伐权采伐为主流，但还是出现了更广泛社区参与的迹象，只是规模有限。例如，在越南，大多数最高产的林地都分配给了国有企业，全国900多万ha低产林地中的143万ha于1999年分配给了个体家庭和合作经营者，2002年通过的新法规促进了对社区所有的进一步认识。印度尼西亚2000年制定了新的管理程序来确认社区所有权，该国现有60万ha森林保护区归社区管理。在老挝，一项把采伐权出让给当地社区（而非采运公司）的计划正在试点，已改善了森林管理。在俄罗斯，当地居民也开始获得了对国有森林的更多权利（White and Martin，2002）。

商品材生产者

亚太地区供给国的采运公司私有化水平不同，俄罗斯国有采运单位已经基本上实现了私有化，政府只持有少量股份，同时也出现了大量新的完全私有的

[1] 对于缅甸，“政府”一词在这里用得有些更宽泛，因为供应中国的主要林区更多由军队控制。

采运公司（Sheingauz，2004）。越南以国有采运公司为主，在全国6、7年的禁伐期内，只有国有采运公司才可以进行商业采伐（Barney，2004c）。在老挝，国防部下属的三个国有企业控制着森林采伐（世界银行，2001）。

在亚太地区一些国家，商品材生产企业由外商所拥有和经营是一个大趋势，巴布亚新几内亚和缅甸是最典型的例子。在巴布亚新几内亚，29例采伐经营只有一个不是由国外公司运作，其他全由马来西亚公司和国外工人掌控经营（Bun等，2004）[1]。在缅甸，绝大多数运往中国的木材由中国采运公司在军控区外采伐，这些公司雇佣中国公民为员工（Kahrl，2004）。俄罗斯的木材采伐主要由本国公司完成，但越来越多的中国公司加入其中。在柬埔寨，亚洲纸浆公司（APP）和其他区域内的外国公司对森林采运和人工林培育进行投资。

另外，各国商品材生产者的规模不同。比如，在俄罗斯远东地区，各个采伐公司的平均采伐量急剧下降，反映出了20世纪90年代木材采运公司的分化和整体生产能力的下降（Sheingauz，2004）[2]。相反，巴布亚新几内亚80%的原木出口仅由5家公司控制（Bun等，2004）。

木材加工

表2给出了关于中国的亚太地区林产品供给国的木材加工部门的数据，包括各国锯材、胶合板、单板、纤维板、木片与刨花板、木浆和纸张的生产数据。虽然实际数据可能有很大出入，表2中的数据还是足以给出对国家之间以及各国林产工业结构基本趋势的判断。

通过表2中的数据和表1中原木生产数据对比可以看出，没有跨越天然林采伐高峰的国家或地区（如俄罗斯远东地区、缅甸、巴布亚新几内亚）对木材加工重视较少，而那些已跨越采伐高峰的国家（如印度尼西亚、泰国、越南）则侧重提高原木的附加值。在亚太地区的供应国（或地区）中，印度尼西亚和马来西亚是两个最大的初级木材产品（包括锯材、板材和木片）生产国，而印度尼西亚和泰国是纸浆纸张的最大生产国。研究的所有国家或地区中（包括俄罗斯远东地区和东南西伯利亚地区，但不把俄罗斯作为一个整体），印度尼西亚拥有最大的木材加工部门，其锯材、胶合板和木浆生产能力最大；马来西亚是锯材和胶合板第二大生产国和单板（产量远超过其他国家）和纤维板的最大生产国；泰国和越南是所在地区居前列的木片生产国；印度尼西亚是木浆的首要生产国，其次是东南西伯利亚和泰国；印度尼西亚和泰国纸和纸板生产位居前列。

关于这一地区的木材加工部门状况按国别分的相关信息如下：

俄罗斯供应中国的部分地区 俄罗斯远东地区的木材加工水平明显较低，

[1] 常青集团，马来西亚一家公司，巴布亚新几内亚最大的原木生产商，也是俄罗斯远东原木的首要出口者。

[2] 如俄罗斯远东地区的滨海边疆区（Primorsky Krai），有代表性的采运公司2001年平均产量仅2.27万m^3（Sheingauz，2004）。

表2 亚太地区供应国初级木质林产品和纸浆纸张生产量最佳估计
（除另有说明，均为2002年数据）

国家/地区	锯材	胶合板	单板	纤维板	木片和木屑	木浆	纸张
	1×10^6 m³ RWE						
俄罗斯远东地区	1.19	0	–	–	–	0.02	0.09
东南西伯利亚	2.92	0.32	–	–	–	6.07	0.79
俄罗斯总计	27.51	4.55	0.200	1.880	5.76	24.42	16.74
印度尼西亚	20.00	16.22	0.110	0.770	0.81	21.73	19.59
马来西亚	6.56	10.85	1.790	2.200	0.73	0.49	2.38
泰国	0.42	0.30	0.008	0.440	3.74	3.68	6.83
巴布亚新几内亚	0.10	0.23	0.180	–	–	–	–
缅甸	0.54	0.05	0.003	–	–	–	0.12
越南	4.22	0.09	–	0.002	3.03	0.92	1.07
老挝	0.26	0.03	–	–	–	–	–

数据来源及说明：作者2004年为森林趋势和国际林业研究中心撰写的国家报告（见参考文献）。联合国粮农组织统计数据，2004。国际林业研究中心数据，2004。生产数据均为2002年，但以下除外：越南的全部数据（2000）；印度尼西亚胶合板和锯材数据（2003），纤维板和木片数据（2000）以及纸浆纸张数据（2001）；马来西亚纤维板和木片数据（2001）、纸浆纸张数据（2000）；泰国单板，纤维板，木片和纸浆纸张数据（2001）；巴布亚新几内亚胶合板数据（2000）；缅甸单板（2000）和纸张数据（2001）；老挝胶合板数据（2001）；柬埔寨全部数据（2001）。使用的换算系数($m^3 \rightarrow m^3$ RWE)：锯材1.43，胶合板2.5，单板2.5，木片1.8；($t \rightarrow m^3$ RWE)：机械木浆3，化学木浆4，半化学木浆3.3，纸和纸板2.8。注：由于缺少对俄罗斯远东和西伯利亚纸浆类型的明细分类，取一个加权平均的换算系数每吨折合3.8m^3 RWE，把俄罗斯纸浆类型混合作为整体使用这一换算系数。

2002年锯材产量不足工业原木产量的1/10，当年没有胶合板生产，纸浆产量不到5000吨。俄罗斯，尤其在远东地区，是所研究国家中的特殊情况，该国曾有过相当发达的加工部门，但此后产量持续下降，国内市场萎缩，产品质量难以在国际市场竞争中立足，高成本导致众多小厂倒闭，远东地区加工木材占全部林产品生产的份额从1990年的56%下降到了2000年的不足17%。东南西伯利亚的主要加工产品是锯材和纸浆，这一地区近来发展趋势值得肯定，表现在新锯材场的出现和纸浆和木片出口的增加（Sheingauz，2004）。

印度尼西亚 印度尼西亚庞大的木材加工部门表明该国已对作为原木出口国的早期角色进行了较大的转换，1979年，印度尼西亚热带原木出口占世界市场的40%以上。现在，该国林产品出口以深加工产品为主，但由于受资源限制，全国所有主要加工企业都在远低于生产能力的状况下运转。

印度尼西亚木材加工工业规模的扩大，部分得益于20世纪80年代初期政府对出口导向型木材加工企业的积极推动和1985年实施的原木出口禁令。尽管由于大径材原木日益稀缺而使过去10年的生产能力不断下降，直到20世纪90年代末，印度尼西亚仍提供了全球热带胶合板出口的70%左右。据说全国在产的

胶合板厂有110家，总生产能力达每年1130万m^3，但2003年仅生产650万m^3。

从20世纪90年代初，在投资150亿美元之后，印度尼西亚纸浆纸张生产增长非常迅速。尽管该国纸浆生产者不断投资于速生人工林，但大多数国内纸浆生产厂仍严重依赖来自天然林的“混合热带阔叶材”。

马来西亚 除了是所在地区最大的单板和纤维板生产国、第二大锯材和胶合板生产国以外，马来西亚还生产大量纸张（2000年产85.1万吨），但其国内纸浆生产能力比较落后（2000年产12.3万吨）。

泰国 与印度尼西亚和马来西亚一样，作为早已跨越天然林采伐高峰的国家，泰国延长了其林产品增值链，除木片、木浆和纸张等主产品外，泰国还具有200万m^3（300万m^3RWE）的刨花板生产能力。

越南 同上述国家相比，越南木材加工部门规模较小，通常附加值较低，以锯材和木片生产为主，木片产量不断上升。尽管短期内未能达到预期增长，但纸浆和纸的产量依然可观（2000年产量分别为24万吨和38.4万吨）。在成品木质林产品方面，越南已成为外向型木制家具生产中心（与中国竞争），并有希望取得进一步发展。与中国一样，越南家具生产使用的大量木材都不是来自本地（美国农业部海外局，2003）。

其他国家 余下的柬埔寨、巴布亚新几内亚和老挝等国木材加工能力较低。单板和胶合板是柬埔寨林业生产部门的主要产品，但由于受采伐限制，近期将无法提高其较低的生产能力。巴布亚新几内亚的木材加工工业极小，该国至今才有三家主要的木材加工厂：一个木片加工厂，一家锯材厂和一个单板厂；除此而外，还有一些小型和中等的锯材厂。虽然个体家庭生产轻木，但全国没有纸浆和纸的生产（Bun等，2004）。

缅甸的克钦邦和北掸邦是供给中国林产品的主要地区，那里的木材加工工业极其有限，反映出缅甸除首都仰光以外加工工业的缺乏。据报道，缅甸的军人政权主张由军队控制的克钦邦吸引国外投资来发展木材加工业，但是，因为缺乏稳定的政局和基础设施，作为潜在投资者的中国木材采运公司没有付诸行动。因此，虽然缅甸边境地区一些粗加工锯材厂已开始生产，但供应中国的主要地区内没有其他加工林产品生产（Kahrl等，2004）。

木材加工企业特点

虽然常常是少群大企业的产品质量能达到出口要求，但在所研究的几个国家和地区还是出现了大量小规模、私有的木材加工厂。俄罗斯、印度尼西亚、巴布亚新几内亚和中缅边界地区有很多这样的小型生产者。印度尼西亚被认为有2300～3500家在产的木材加工厂，其中大多规模较小且（或）无执照营业。仅俄罗斯远东地区的哈巴罗夫斯克边疆区，2002年官方统计数据显示就有104家此类加工企业，平均木材年产量仅为35 000m^3。在俄罗斯，主要的生产商既包

括现已私有化的大型加工企业和大型商业采伐公司的附属企业，也包括远东边界地区一些原始锯木厂，有时锯材加工完全是露天作业（Sheingauz，2004）。在巴布亚新几内亚，尽管采伐权获得者才拥有最大的加工设备，但是满足国内市场需求的木材加工厂大多是小型私有企业（Bun 等，2004）。此外，中缅边境地区有大量小规模工厂进行初级加工，例如，据报道腾冲（云南的一个县）有500 多家木材加工企业，仅有几家的规模较大（Kahrl 等，2004）。

在纸浆造纸行业，通常是少数大型企业供应出口市场，只有几个主要生产商控制着该部门少数的出口导向型工厂。由于最近的产业整合，泰国的纸浆造纸业很快被 Siam 和 Advanced Agro 两个主要的大型公司所掌控（Barney，2004b）[1]，两家公司还在寻求地区扩张[2]。印度尼西亚的少数大规模出口导向型纸浆造纸生产企业也由几个主要生产商控制，并主要集中在苏门答腊岛。虽然越南的造纸和纸浆业并不发达，越南纸业有限公司（Vinapimex）是国内仅有的生产商，它拥有 20 个附属工厂，但其中 3 个规模较大，占总产量的 50%（Barney，2004c）。

本地区内大多数国家的木材加工部门都吸引了大量的国外投资，尤其是近来中国的对外投资活动明显增加。与其采运部门一样，巴布亚新几内亚国内木材加工部门（尽管规模较小）是最典型由外资控制的实例之一。如前所述，小型企业面向国内市场，而少数国内大企业和出口导向生产企业由外资控制（Bun 等，2004）[3]。越南的木片生产主要为了出口，日本、韩国和中国台湾是其主要的资金来源，也是最主要的木片出口目的地（Barney，2004c）。

在俄罗斯、泰国、柬埔寨和印度尼西亚都可以见到中国的投资。中国大型企业投资于或计划投资于这些国家的林产品加工部门，同时中国许多小公司也都在俄罗斯边境建立了企业。据来自俄罗斯滨海边疆区（Primorskiy Krai）的报道，中国在该区的加工企业规模都比较小（被访企业员工 7～15 人不等），职员全部是中国人，所采购的木材主要来自于非法采伐（Lebedev，2004）。与此形成鲜明对照的是，中国三家大型企业——斯达造纸有限公司、珠海振戎公司和华诚国际，联合签署了一份向赤塔州的木材加工项目投资2.78亿美元的谅解备忘录，该项目最终要达到年加工原木 150 万 m^3，生产木质林产品 30 万 m^3 和纸浆 40 万吨（Lankin，2004）。

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[1] Siam 购买了 Thai Cane Paper（2004 年完全购买）和 Phoenix 的控股权（2002 年）。Phoenix 现已退出泰国证券交易所（SET），成为 Siam 的附属公司。

[2] Siam 购买了菲律宾联合纸业（United Pulp and Paper）的控股权（到 2003 年 7 月，股份升至 86%），正在寻找收购受问题困扰的印度尼西亚金光集团（APP）全部资产的机会。泰国顺和成集团下的 Advanced Agro 公司在中国开展营林造纸项目。

[3] 巴布亚新几内亚主要的木片工厂为日本几内亚木材公司（JANT）所有，该公司是日本 Hongshu Paper 的一个下属公司。马来西亚常青集团（Rimbunan Hijiau,简称 RH）是巴布亚新几内亚最大的木材采伐权受让者，拥有全国唯一的单板厂和最大的锯木厂，同时还有一些其他木材加工厂（Bun 等, 2004）。

同这一地区的其他人工造林和纸浆生产项目一样，计划和在建的同类中国投资项目都遇到了社区的抵制。柬埔寨正在建设中的Pheapimex-Fuchan纸浆项目是其国内最主要的纸浆加工企业，由柬埔寨最大采伐权获得者Pheapimex与中国国营农场集团联合投资；至少自2001年起，这一项目引发了当地社区的抗议，放慢了人工林发展（Barney，2004a）。最近，在一次600名抗议者试图阻止推土机的事件里，有几个人在手榴弹爆炸中受伤，推土机准备清理森林以便种植相思树人工林（美联社，2004）。在印度尼西亚加里曼丹的联合纤维系统（United Fiber System）纸浆企业项目也引起了争议，其投资主要来自一家中国公司。自1997年，泰国顺和成集团与中国一家企业就一项建立桉树人工林和纸浆造纸企业的提议不断进行高层磋商，据称该项目建成后可年产70万吨纸浆，其中大部分将出口中国。然而，此项目将面临林地资源缺乏、过大而不适合的建设规划带来的复杂性和高成本、以及可能引起的社会抗议等问题，很多人对其前途表示怀疑（Barney，2004b）。

2 出口走势

亚太地区供给国的出口走势与上述森林资源和林产品生产的趋势大致相同。也就是说，森林资源丰富国家仍在高强度采伐、出口和供给中国，尤其是供应大量原木；而大多数已跨越天然林采伐高峰的国家或主要供给中国加工林产品，或少量向中国出口林产品。结合现有剩余森林资源和出口趋势的分析表明，大多数亚太地区供给国最多在中期内（不到20年）维持目前对中国的出口规模，只有俄罗斯呈现出显著增加或者长期供给的潜力。

原木出口

把亚太地区供给国对中国的原木出口与其所有的原木出口以及本国总产量作一比较可以发现，中国在其原木出口贸易，以及很多情况下大多数主要供给国的整个原木市场中都起着关键作用（表3）。2001年中国超过日本成为俄罗斯远东地区最大的木材进口国，由于俄罗斯远东80%的木材生产用于出口，中国成为远东木材市场的主要力量（Lankin，2004）。2002年俄罗斯原木出口的40%和工业原木产量的12%出口中国。随着巴布亚新几内亚对中国的原木出口占其工业原木产量的比重从2000年的35%增长到2002年的58%，中国市场很快对这个小国家起到了决定性作用（Bun等，2004）。在亚太地区，马来西亚原木出口总量仅次于俄罗斯，该国原木出口的41%和工业原木产量的12%都运往中国。这一地区主要的原木生产国中，只有印度尼西亚重视提高产品附加值，仅出口小部分高档工业原木产品。官方数据显示，2002年印度尼西亚出口50万m^3原木，其中约一半运往中国，而向中国的原木出口量不到其国内工业

表3 中国在亚太地区供应国原木市场中的地位
（除另有说明，均为2002年数据）

国 家	工业原木产 量	原 木出口量	向中国出口原木量	出口中国占总出口的比例	出口中国占总产量的比例
	$1 \times 10^6 m^3$			%	
俄罗斯远东地区	12.20	10.3000	–	–	–
东南西伯利亚	15.10	–	–	–	–
俄罗斯全部	118.60	36.8000	14.8000	40	12.4
马来西亚	17.90	5.1800	2.1200	41	11.8
巴布亚新几内亚	2.00	1.8000	1.1500	64	57.5
缅 甸	5.54	0.8800	0.6100	69	11.0
印度尼西亚	55.00	0.5000	0.2500	50	0.5
越 南	4.18	–	0.0160	–	0.8
老 挝	0.39	0.0630	0.0110	17	2.8
泰 国	7.80	0.0031	0.0025	81	7.4
柬埔寨	0.12	0.0001	0	0	0

数据来源及说明：作者2004年为森林趋势和国际林业研究中心撰写的国家报告（见参考文献）；联合国粮农组织统计数据，2004；中国海关统计数据，2002。注：采用2002年数据，以下例外，越南工业原木产量（2000），印度尼西亚工业原木产量（作者估计：2003），柬埔寨原木出口（2000），老挝原木出口（2001）。

原木产量的3%。

对于缅甸、柬埔寨、老挝、越南和泰国，受缺乏准确的统计资料、走私以及转运等因素影响，对中国的贸易在其整个原木生产和出口中的地位不很明了。根据中国海关资料，这些国家中仅有缅甸是中国的一个主要原木供给国，而缅甸军人政权却报道了对中国极低的出口量。一般而言中国海关统计资料更可靠些，它包括了非军人政权控制地区的出口。

加工林产品出口

中国正在加强自身生产能力的发展，倾向于进口未经加工的林产品。较小规模的胶合板进口和大量的原木和锯材进口，以及停滞不前的纸张进口和迅速增长的纸浆进口，可以看出低附加值产品进口增长的趋势相当明显。

从地区供给角度对中国进口的分析（即估计中国进口在主要亚太地区生产国加工林产品出口中的份额）表明，在一些产品类别中中国的进口起着重要作用。中国在这一地区锯材和纸浆出口中作用显著，再次印证了其进口重点是低附加值产品。在地区前几位生产国的单板和纸张出口中，中国也有很重要的作用；然而，中国的胶合板进口在地区前几位胶合板出口国中的影响不明显。表4提供了按供给国和加工林产品分类，某国出口中国的数量、出口总量和总产量的比较，虽然有些总出口量和总产量的数据是粗略估计，但这些数据给出了

表4 亚太地区供应国加工林产品对中国出口量与其出口总量和生产总量的对比

（除另有说明，均为2002年数据）

国 家	锯 材	胶合板	单 板	纸 浆	纸 张
			$1 \times 10^6 m^3$ RWE		
俄罗斯					
出口中国	0.790	0.005	0.002	3.60	0.820
总出口	12.900	2.900	0.048	7.20	6.600
总产量	28.100	4.600	0.200	24.40	16.700
印度尼西亚					
出口中国	2.000	1.100	0.030	4.50	1.800
总出口	72.900	13.800	–	9.00	6.900
总产量	20.000	16.220	0.110	21.70	19.600
马来西亚					
出口中国	0.700	0.250	0.370	0.00	0.130
总出口	3.600	9.000	1.500	0.00	0.420
总产量	6.600	10.900	1.800	0.49	2.400
泰 国					
出口中国	0.850	0.007	0.005	0.36	0.700
总出口	2.200	0.095	0.005	0.76	2.200
总产量	–	0.300	0.008	3.70	6.800
巴布亚新几内亚					
出口中国	0.003	0.000	0.021	0.00	0.000
总出口	0.041	0.008	0.090	0.00	0.000
总产量	0.100	0.023	0.180	–	–
缅 甸					
出口中国	0.330	0.000	0.001	0.00	0.000
总出口	0.390	0.200	–	0.00	0.000
总产量	0.550	0.480	1.800	–	0.116
越 南					
出口中国	0.015	0.000	0.008	0.00	<0.001
总出口	0.022	0.017	0.019	0.00	0.005
总产量	4.200	0.093	–	0.92	1.100
柬埔寨					
出口中国	0.008	0.024	0.097	0.00	<0.001
总出口	–	0.035	–	0.00	–
总产量	–	0.035	–	–	–
老 挝					
出口中国	0.008	0.000	0.000	0.00	0.000
总出口	0.190	0.011	0.002	0.00	0.000
总产量	0.260	0.033	–	–	–

数据来源及说明：见表2数据来源及说明、换算系数的使用和生产数据注释。另外参见：中国海关统计数据，2002。未采用2002年数据的有：柬埔寨和老挝锯材、胶合板和单板出口（2001）；泰国和巴布亚新几内亚胶合板出口（2001）；马来西亚纸张出口（2001）；越南胶合板和泰国单板出口数据（2000）。

这一地区的趋势描述。这一趋势按产品分类总结如下：

锯材 本地区前几位锯材出口国包括：俄罗斯（2002年出口900万m^3），马来西亚（260万m^3），印度尼西亚（200万m^3）和泰国（160万m^3）。数据表明中国的进口对印度尼西亚的锯材生产和贸易起着相当重要的作用（占印度尼西亚锯材出口70%或锯材总产量22%），对泰国和马来西亚的作用次之。

胶合板 胶合板出口居本地区首位的国家包括印度尼西亚（2002年出口550万m^3）和马来西亚（360万m^3）。虽然两国出口国内生产的胶合板多于锯材，但是中国进口其胶合板却少于锯材，表明中国需要较少的加工林产品。从这些数据可以看出，中国进口胶合板只占印度尼西亚出口的8%，总生产量的6%和马来西亚出口的3%，总生产量的2%。

单板 迄今为止，马来西亚是这一地区最大的单板出口国（2002年出口60.1万m^3）。2002年，中国进口了马来西亚单板出口的25%或其单板总产量的22%。

纸浆 本地区前几位的纸浆出口国包括印度尼西亚（2002年出口220万吨）、俄罗斯（180万吨）和泰国（19.1万吨），在进口这一地区所出口的纸浆方面，中国的优势明显。现有数据显示，2002年，中国纸浆进口占印度尼西亚出口总量的50%（总产量的21%），俄罗斯出口总量的50%（总产量的15%），泰国出口总量的48%（总产量的10%）。

纸张 这一地区前几位纸张出口国有印度尼西亚（2002年出口250万吨）、俄罗斯（230万吨）和泰国（78.7万吨）。尽管不像在纸浆进口方面作用那么重要，但中国的纸张进口对这些国家纸张出口的作用仍然很大，也再次说明中国对初级林产品的需求相对较高。2002年，中国进口纸张占印度尼西亚总出口的27%，俄罗斯总出口的13%，泰国总出口的32%。

未来向中国出口原木和加工林产品的潜力

预测中国未来林产品消费，需要较好理解其需求动力和国内较低人均需求的影响，而分析亚太地区国家森林资源状况和近期出口走势能够明了这些国家在今后20年为中国提供原木的潜力。除马来西亚以外，其他（如越南、老挝、柬埔寨和泰国等）已跨越其天然林采伐高峰期的国家，不会向中国出口大量原木，而且未来20年也不可能拥有足够的森林资源出口中国。尽管印度尼西亚拥有大面积天然林和相当大的木材加工业（2003年向中国出口原木11.6万m^3），但该国已跨越天然林采伐高峰，且重点发展本国木材加工工业，未来几十年里也不可能大幅增加对中国的未加工原木出口。

这一地区最近供给中国原木数量最多的国家（俄罗斯、马来西亚、巴布亚新几内亚和缅甸）未来10年将继续保持该地区的主要原木供给国的地位。然而，根据专家对维持现有采伐率条件下各国森林资源耗尽的时间（巴布亚新几内亚

13～16年，中缅边境地区10～15年，俄罗斯20年以上）的粗略估计，只有俄罗斯才有希望成为今后20年内中国原木的来源。至于30年后，俄罗斯在现有采伐率下继续供给中国的能力，以及这一地区其他国家通过天然林资源恢复或充分发展人工林的供应潜力，很难有一个清楚的预测。短期内（未来几年），中国在亚太地区的主要供给国最多只能维持现有出口规模，只有俄罗斯具备供给显著增加的潜力。

该地区供给国加工林产品出口中国的未来潜力与前面谈到的原木供给和森林资源趋势紧密相关。由于中国已经消耗了这一地区出口的加工林产品的很大部分，问题是供给国能否再扩大他们的加工能力。由于原木资源有限，大多数已跨越天然林采伐高峰的国家扩大木材加工能力将会面临更多的困难，除非他们可以通过其他途径获取原木。例如，尽管未来几年纸浆和造纸业有望继续扩大，但是印度尼西亚的木材加工部门已经面临原材料短缺。虽然印度尼西亚和泰国在人工造林方面（目前两个供给国在该地区人工造林声势最大）都不是很成功，但大规模发展人工林是弥补这些国家天然林产量下降的一种可能途径。事实上，中国有望成为继日本之后在这一地区投资大规模发展人工林的国家。

目前，中国在这一地区的主要原木供给国（俄罗斯、马来西亚、巴布亚新几内亚和缅甸）有潜力扩大加工能力，为生产有附加值产品而保持更多未加工的原木，事实上这也是俄罗斯、巴布亚新几内亚和缅甸所提出的一项政策选择，然而，在多数情况下采用这种发展战略可能导致对中国原木出口的减少。尽管加工品的产地可能发生变化，但中国可得到的加工林产品总量也许不会改变。由于有丰富的天然林资源，只有俄罗斯有可能对中国增加制成品的出口，同时在未来20年对中国保持现有原木出口规模。

3 主要问题

中国的木材进口对亚太地区林产品工业和出口贸易有极大影响，并引发了许多政策问题。整个地区严重的生态问题与正在进行的不可持续采伐活动有关，而不可持续的采伐活动通常是非法采伐，具有消极的经济影响（表5）。同时，其他一些重要政策问题也应得到关注（表5）；特别是对每个供给国的生计方面产生的负面影响（表6），如居民丧失了利用资源的机会，收益向某一特定群体聚集。

不可持续生产实践

从生态学观点出发，由于不可持续的生产实践，那些仍采伐大量原木，维持当前对中国出口规模的林产品生产国令人担忧。然而，森林法规和计划中（如巴布亚新几内亚的国家森林计划）通常都不包含保护条款，而且已有的规定

表5　不可持续采伐行为，非法采伐和其他政策问题及例证

对保护重要森林计划或法规的重视不够
● 巴布亚新几内亚：国家森林计划
不可持续的采伐行为
● 巴布亚新几内亚： ◇ 年采伐面积和采伐强度逐年增加；在不适宜采伐的区域进行采伐 ◇ 没有遵循40年一个轮伐期的规定，平均出让采伐权经营时限为11年 ◇ 两次采伐间隔期仅10年 ● 缅甸： ◇ 采伐产生的生态冲击可能波及到接壤的中国边境地区（如害虫，疾病等） ◇ 年允许采伐量基于全国范围，却只能在中央政府控制区实施
同一采伐者常常同时参与合法和非法的采伐
● 柬埔寨：采伐权获得者既参与合法采伐也是非法采伐的主力军 ● 巴布亚新几内亚：合法采伐和非法采伐（包括当地军团）中的主要采伐者都是采伐权获得者 ● 俄罗斯： ◇ 长期从事采伐的公司也从事非法采伐活动 ◇ 海关检查员可能会将非法木材产品合法化 ◇ 森林护卫队人员通过对采伐中间环节的设卡来增加自己的工资收入，许多工作人员接收采伐者贿赂后就对非法采伐活动视而不见 ● 越南：在森林保护单位工作的个人经常从事商业性的非法采伐活动
非法采伐使国家收入损失
● 俄罗斯：在税收方面损失巨大
打击非法的/或不可持续的采伐活动的措施
● 印度尼西亚： ◇ 开展多边合作，包括与中国的谅解备忘录 ◇ 禁止原木出口（也用来促进国内加工工业的发展） ● 俄罗斯： ◇ 给固定检查站和巡逻队工作人员提供不错的薪水 ◇ 正在开发条形码系统（所有要采伐的树木将具有塑料制的条形码标志） ◇ 控制出口点并减少其数量（已见效） ● 柬埔寨： ◇ 附条件捐赠来促进森林部门的改革 ◇ 延期采伐补偿（2002） ● 泰国：1989年发布天然林采伐禁令（稳定了前20～30年的毁林趋势） ● 越南：局部采伐禁令和出口配额
推动木材加工业
● 俄罗斯：积极扩大向中国出口加工产品但未获成功 ◇ 中国的进口政策（包括进口关税，增值税等）更有利于原木的进口而非加工产品 ◇ 中国的劳动力价格低于俄罗斯的劳动力价格 ● 印度尼西亚：强制的政策推动发展林产品加工工业却导致能力过剩
海关方面的问题
● 缅甸：由于政府对供应中国地区缺乏控制，海关监管不力

（续）

• 俄罗斯： ◇ 俄罗斯和中国的海关之间缺乏沟通（如：统计数据和禁止物种种类等） ◇ 在中俄边境的俄方地区违反海关规定的情况不断增加 ◇ 海关检查员中的腐败使偷运大量非法林产品被允许
腐败蔓生
• 巴布亚新几内亚：政府最高层腐败明显，国外采伐权获得者为所支持的政党和个别政治家说话 • 柬埔寨：保护采伐权经营制度实际是在保护政府的最高层
采伐权获得者的不服从及采伐权管理的问题
• 巴布亚新几内亚：采伐权获得者不履行社会职责（例如，停止修建承诺完成的马路） • 柬埔寨：采伐权获得者未能遵守可持续的标准，不按规定纳税 • 俄罗斯：中国采运公司在加工原木 / 雇佣俄罗斯劳工方面并未按要求来做 • 缅甸：与中国公司的短期（5 年）采伐合同导致了管理不善

表6　生计方面的主要问题与实例

不可靠的土地使用权
• 泰国： ◇ 泰国农民缺乏完全的土地转让权，大面积土地被指定为保护区 ◇ 人工林的发展使农民失去了农田 ◇ 否认生活于山区的少数民族的土地所有权 • 老挝：农民失去使用临时农田的机会，土地和森林分配计划（方案）使山区农民更加贫困 • 柬埔寨：采伐引起的资源不可利用以及资源减少导致的冲突（如村民与人工林种植公司之间的冲突）
国内收益的分配不公
• 巴布亚新几内亚： ◇ 居民拥有土地（传统的土地使用期限），但是政府却不扶持本土居民发展森林资源 ◇ 不通过采伐而获得发展的可选择途径并没有包括在国家森林发展计划中 ◇ 没有文化的居民被当地精英欺骗 ◇ 当地社区与采伐权获得者磋商中应得的利益没有得到兑现 • 缅甸（供给中国林产品的地区） ◇ 大多数的收益用于军队的军费支出 ◇ 社区缺电，没有公路和其他基础设施，精英分子却是获益者 ◇ 采伐公司修建的公路不合格或不能满足社区需求
关系生计的收益向国外转移
• 俄罗斯：在与中国的原木贸易中俄罗斯收益较低，更多附加值在中国 • 巴布亚新几内亚：主要是由外国采伐权获得者控制，大多数使用外国雇员 • 缅甸（供给中国林产品的地区）：大都是中国的采伐公司操纵，且只雇佣中国人

通常也得不到很好地贯彻。例如，巴布亚新几内亚规定轮伐期为40年；而1993～2000年的平均采伐期限仅为11年，这表明砍伐速度远远超过了可持续砍伐的要求。在巴布亚新几内亚，年采伐面积和采伐强度都在不断上升，卫星图显示，一些地区在10年前第一次采伐后，现在正在经历第二次采伐，对生态的影响更具破坏性。考虑到巴布亚新几内亚绝大多数的原木都用于出口（中国为最主要的目的地），那么，目前的出口趋势预示了对该国森林可持续性和所支撑的重要国民经济部门的直接威胁（Bun 等，2004）。

在缅甸供应中国林产品的地区，不可持续的木材生产实践也反映出了生态影响和同中国的林产品贸易之间的直接联系。由于缅甸供给中国的原木采伐集中在距边界 50～150km 的范围内（有时是皆伐），过度采伐产生的生态影响极有可能会通过共享的生态系统传到中国云南省。作为关注地区野生动物和病虫害管理的部门，云南省科技局于 2003 年开始评估边界生态和社会经济的变化。中国采伐公司的合约期过短（1～5 年）导致了森林的退化，山林在采伐权易手之前就已经被很快地采伐了。另外，由于缅甸复杂的政治局面，林业部门没有足够的权力以监督和规范绝大多数供给中国的木材采伐，且已结束执行基于全国范围的年采伐许可制度，而仅对军人政权控制下的一部分地区执行（Kahrl 等，2004）。

尽管问题仍然存在，例如，印度尼西亚仍面临着毁林的问题，柬埔寨可能也有，已跨越天然林采伐高峰的国家制定了一些政策来应对不可持续的采伐行为。泰国的森林采伐已经下降到一定程度，可认为已经停止了毁林。因为采伐权获得者一直不能达到森林可持续的标准，柬埔寨政府于2002年1月暂停采伐。虽然柬埔寨附带条件的捐赠贷款可能是国家林业部门改革的最初力量，但改革的成效遭到了质疑（Barney，2004a）。批评家指出有条件的捐赠的失败在于助长了腐败，强化了有缺陷的采伐权制度，并呼吁分解和彻底检查采伐权制度。泰国、越南和印度尼西亚已经制定了采伐和原木出口禁令，而对于印度尼西亚，出口禁令的目的在于促进国内加工产业的发展。

非法采伐

非法采伐在绝大多数亚太地区供给国普遍存在，并且许多人都认为非法采伐与生态退化有关联。不过，合法采伐也可能产生消极影响，而且，在俄罗斯，并不能明显地看出非法采伐比合法采伐更具破坏性。在供给国，大规模的非法采伐往往涉及与合法商业采伐相关联的部门。例如，在俄罗斯，长期采伐公司也参与非法采伐；而且，海关检查员也牵扯到非法林产品的合法化中（Sheingauz， 2004）。在越南，非法采伐往往是一些从事森林保护的个体所为（Barney，2004c）。

在俄罗斯远东和东南西伯利亚地区，非法采伐尤其严重。据 Alexander

Sheingauz（2004）估计，远东地区38%的采伐属于非法采伐。非法行为的潜在动力之一就是森林防护人员可能通过间伐（实际上并不总是合法抚育）和来自于非法采伐者的贿赂来提高他们的低收入。然而，俄罗斯的非法采伐最可能和其国内社会经济问题有关。Sheingauz（2004）指出，出口越多的地区，非法采伐规模就越大；他进一步指出，走私非法产品的情况在与中国的贸易中更普遍，因为陆路口岸使用卡车而非船只作为交通工具，使非法贸易更便利。

Sheingauz（2004）还指出,由于合法采伐量远远低于年允许采伐量，大量的非法采伐并不一定意味着整个远东地区或任何一个省存在过度采伐，然而一些地区的采伐量比其他地区更接近于年允许采伐总量。从采伐现场来看，一般情况下非法采伐与合法采伐后果相同，但非法采伐可能会产生一些附带的影响。最关键的是，完全的非法采伐者会由于不考虑抚育要求（如择伐或再造林）而造成损害，而俄罗斯的大中型合法采伐公司是能遵守这些要求的。

出于对产业可持续性和税收大量流失的关注，俄罗斯政府，包括联邦一级的政府以及省级政府，已经采取了大量措施以防止非法采伐。一些省建立了固定的检查站，并为巡逻队提供较高工资。在联邦政府层面上，自然资源部正在开发一种条形码系统，每一株预定要砍伐的树木都会有一个含条形码的塑料标签（Sheingauz，2004）。

在其他供给国，因为这些国家的资源基础有限，非法采伐和环境破坏的关系更明显。在巴布亚新几内亚，主要的合法采伐者（即采伐权获得者）也要为大多数的非法采伐负责。尽管防止非法采伐的所有必需的法律和政策都很到位，但是仍缺乏行政上的决心和执行能力。事实上，政府官员可能就在支持非法采伐活动（见下面对腐败的讨论）；而且地方军团通常也卷入其中（Bun 等，2004）。与巴布亚新几内亚相同，在柬埔寨，非法采伐（也包括合法部分）被认为是由采伐权获得者控制。从20世纪90年代中期到90年代末，“环球见证”记录了从柬埔寨向泰国、老挝和越南的全部非法出口，但近期此类活动的情况就不太清楚了（Barney，2004a）。

印度尼西亚已经同许多国家开展了双边合作以打击非法采伐，特别是和中国签署了谅解备忘录，其宗旨是减少非法林产品贸易，分析家们指出这些协议正逐渐发挥其作用。

生计影响

森林工业和与中国的贸易对于亚太地区供给国人们的生计意义重大，并且和该地区森林工业的可持续性密切相关。不确定的土地使用权、各国国内利益分配的不公平、以及关系供给国国内生计的利益外溢是该地区与生计相关的主要趋势（表6），应引起政策制定者们的注意。虽然与中国的贸易对生计也有积极的影响，但受益者往往不是最贫困或者失去对资源传统使用机会的人们。当

然，生计影响，尤其对那些对中国的出口规模很小的国家而言，不能仅归因于中国市场的作用。因此，尽管在一些情况下中国的进口看起来可能是导致生计问题的源头，但供给国也应主动应对，中国木质林产品出口目的国也应该采取相应行动。

面对产业扩张，不确定的土地使用权已经引起农业用地的转移与流失、冲突和依赖森林生存的人们丧失利用资源的机会。这些所有权问题阻碍了产业的快速发展，而这些问题的解决是产业可持续的先决条件。泰国不确定的使用权及其对产业和当地居民的负面影响就是一个明显的例子，那里仅有一小部分农民拥有其土地的所有权。该国大面积的土地（陆地总面积的44.7%）被指定为森林保护区，虽然许多既没有森林覆盖也没有被占用。由于人工林发展造成的农业用地流失已经招致了非议和对进一步发展人工林的不断抵抗。泰国的林业政策对在保护区内临时耕作的山区少数民族采取了强硬的处理措施，这些少数民族中很多人没有泰国公民身份，且被剥夺了土地所有权（Barney，2004b）。

在老挝，土地和森林分配计划（LFAP）与一项旨在稳定“移耕”的政策一起推进，结果被认为是农村地区产生新贫困和食物匮乏的根源（老挝国家计划委员会，2001）。依据该计划，全国领土被划分为农村用地和国家用材林地或生物多样性保护用地；而且农村土地也划分出森林用地和农田用地。虽然该计划在促进农村土地所有权安全方面的目标值得赞扬，最终的效果却是过度剥夺农民利用对其至关重要的临时农田的机会，并使山区群体（尤其是少数民族）生活更加艰难和贫穷。

在柬埔寨，资源利用和使用权安全问题尤其突出，森林是该国大多数农村社区维持生计的关键资源。案例研究表明，柬埔寨的森林退化已经影响到生计，逼迫村民去更远的地区以满足其对林产品的需求（McKenny and Tola，2002）。农村与人工林种植公司之间的冲突变得越来越普遍。洪森总理甚至指出，土地问题可能会激发“农民革命”，并于2004年10月呼吁对土地特许权制度进行重新评价（美联社，2004）。随着亚洲纸浆公司（APP）以及该地区其他主要生产者投资于柬埔寨的森林采伐和人工林种植活动，这类动荡局面爆发的可能性也在不断上升。

原木贸易收益分配的不公平现象在该地区很普遍。贫困社区通常与失去的森林联系最紧密，也最依赖于失去的森林，但当地精英人物和关注该产业的人士汲取更多的收益。例如，根据传统的所有权制度，巴布亚新几内亚的土地属当地居民所有，而且对资源的任何重大开发都必须得到社区的同意，但这些一般都是文盲的人们常常被当地精英人物欺骗，他们把采伐公司带到该地区，并从中获得高于其应得的收益；另外，同采伐权获得者谈判获得的采伐收益一般不能兑现，而且通常留给当地居民的是没有完成的建筑物、公路和桥梁。另外，政府不支持当地土地所有者对他们拥有的森林资源进行开发。巴布亚新几内亚

国家森林计划没有设定非采伐森林的开发选择权；而且在当地居民的林地被指定为计划采伐林地前并不与所有者商量（Bun 等，2004）。

在缅甸，木材出口收益仅归一小部分人所有，而且通常都用于军费支出。拥有采伐权和毒品贸易一起在控制边境地区的军队中造就了一个精英阶层，然而克钦邦的一些地区仍缺乏电、公路和其他一些基础设施。由中国采伐公司修建的公路，虽称为公路，一般都不能满足当地居民运输的要求，因为这些公路比较分散，且支离破碎（Kahrl 等，2004）。

许多情况下，林产品贸易的直接收益或者流出生产国，或者流向当地的外来者，因此阻碍了支撑当地生计的可持续森林工业的发展。在缅甸，很少有当地人从事与中国的原木贸易，所有采伐工作都由中国公司执行，这些公司一般情况下只雇佣中国员工（Kahrl 等，2004）。在巴布亚新几内亚，主要的外资采伐权获得者往往主要雇佣外国员工。例如，研究者在巴布亚新几内亚发现，该国最大的采伐公司常青集团中，被保险员工有90%或者是马来西亚人，印度尼西亚人，中国人，或者是菲律宾人（Bun 等，2004）。在俄罗斯，人们认为与原木贸易连带产生的不成比例的生计机会更多地发生在中国一边，这主要是由于中国进口未加工原木并利用低成本劳动力进行加工。在俄罗斯一边，中国公司也积极从事林产品贸易；许多报告表明，为了规避对出口原木的砍伐许可要求，这些公司在俄罗斯进行最低程度的原木加工，不交任何税，并且只雇佣中国员工（Lebedev，2004）。

其他政策问题

在供给国中另外一些林业相关政策问题也值得关注，其中包括，在许多国家奋力争取加强木材加工部门的问题、海关监管问题、采伐权获得者不履行采伐经营职责问题和腐败蔓延问题等。虽然一些供给国已经制定了合意的林业政策，但执行往往是一个难题。另外，政府扶持的管理部门和保护天然林的组织缺乏资金也是一个重要的政策问题。

俄罗斯和印度尼西亚等国促进原木深加工以增加出口林产品附加价值的努力取得了不同程度的成效。俄罗斯努力争取扩大锯材和其他深加工产品对中国的出口，但没有显著的成果。中国的进口政策被认为是鼓励从俄罗斯进口未经加工的原木：中国对木制品征收2%～16%（2004年）的进口税和17%的增值税（VAT），但对进口的原木不征收进口税和13%的增值税（锯材进口关税为0，增值税为17%）。另外，由于中国劳动力成本低，俄罗斯锯材生产成本至少是中国的两倍。俄罗斯一直在讨论提高原木出口税以促进木材加工，又担心这一措施可能只会增多非法贸易活动（Lankin，2004）。相反，印度尼西亚已经通过强制政策实现了其发展加工工业的意愿，但也许政策有些过头，该国目前正遭受加工能力过剩的困扰，这被认为是过分的政府许可（没有定期的原材料供给认证）

以及隐性补贴造成的结果。

该地区林产品贸易中的海关监管问题大量存在，并且可能是解决非法产品贸易的关键所在。中国公布的林产品进口量与各供给国公布的出口量之间的出入很大，尤其是印度尼西亚与缅甸两国。缅甸政府要求出口的所有柚木和所有的木材加工产品必须经过首都仰光，但事实上，运往中国的大量阔叶材原木仅有一小部分通过这种迂回的路径（Kahrl 等，2004）。

Alexey Lankin（2004）指出，俄罗斯海关和中国海关一直没有就两国的海关统计和统一禁止出口物种种类进行沟通和协商。俄罗斯方面逃避关税现象随着对中国出口的增加而增加。尽管俄罗斯有复杂的检查系统和盖章系统，检查员中的腐败仍使大量的非法产品运送到中国。Lankin 指出，对于俄罗斯的防范措施而言，控制出口地点并缩减其数量最为有效。

采伐权获得者或租赁者不遵从规章或协议的现象在这一地区也很普遍。如上所述，巴布亚新几内亚的采伐权获得者通常不履行承诺的社会义务，全国到处都遗留着未完工的建筑物、公路和桥梁（Bun 等，2004）。柬埔寨采取了一项措施，中断未纳税采伐原木的运输来提高服从度（Barney，2004a）。在俄罗斯，从事采伐的中国公司被认为没有按照当地的要求投资于加工行业和雇佣俄罗斯员工。在缅甸发现了许多中国公司违反采伐权协议的案例，例如，中国公司打破协议，没有为当地社区提供电力和一些其他服务（环球见证，2004）。

非法采伐和其他林业部门的问题往往与政府腐败有关。大量证据表明，巴布亚新几内亚的政府高层，以及与外资采伐产业关联的政府机构里都存在腐败现象。外资采伐产业被看作是政党以及个别政客的主要资助来源；而国家级的采伐许可或执照的发放则被认为脱离了已经建立起的合法程序，采伐权或执照只发给那些愿意支付适当价格的公司（Bun 等，2004）。据“环球见证”分析，柬埔寨的采伐权系统也与高层的腐败相关（Barney，2004a）。

4 结　论

显然，中国林产品贸易对亚太地区供给国的森林、经济和人民有着深刻的影响。由于中国旺盛的市场需求和缺乏足够的国内供给，本文所描述的趋势还将持续一段时间。尽管要了解中国林产品的需求动力和较低人均木材消费的可能影响还需要大量的工作，除俄罗斯以外的亚太地区供应国已经没有能力保证中国整个原木和加工林产品需求的持续扩张，但中国的需求还有望在短期到中期内继续增长。因此，中国需要制定相应的策略确保获得更多俄罗斯林产品。考虑到俄罗斯的供给将不能满足中国的长期需求的可能性，从战略上考虑，中国应寻找其他潜在的木材来源；考虑到既需要针叶材，又要有足够的阔叶材供给，同时兼顾适应这一地区的保护政策，大力发展国内集体林可能是一个战略

选择；另外一个选择是鼓励在该地区供给国中对可持续天然林管理和人工林发展的私人投资。然而，中国在短期内可能继续充分利用目前供给国的林产品，因此，希望制定相应政策将对这些国家的生态和生计负效应降到最低。同时，大约一半的中国进口原木和其他木质林产品（按折合原木材积计算）以制成品（大多是家具和其他产成品）出口到了其他国家。因此，最终受益于中国的廉价制成品的各国也应该承担一定责任[1]，各供给国也可以制定相应政策以降低消极影响。例如，鼓励小规模生产者寻找其具有比较优势的市场，而不是与中国高效且资金雄厚的供给和产业链进行直接竞争。

政府部门、企业界、科研人员和地区内保护组织高度关注林产品贸易引发的消极影响，并积极努力寻找降低消极影响的途径。解决引发消极影响的潜在政策问题和制度问题需要各相关利益者共同努力，开展国际合作以及国内行动。前瞻性的思考和积极的解决措施是，利用对中国的贸易来激励对中国及其林产品供给国森林保护的投资，利用新的、不断扩大的市场，新的合作关系来提供资金，新的技术来降低可持续生产的成本，以及更好地组织和授权给当地生产者。这样的解决办法应该使森林更能够为改善该地区贫困人民（不论是中国的还是中国以外的其他国家）的生计做出更大的贡献。

[1] 2003年，中国林产品出口折合原木材积是其林产品进口的25%。木质林产品（即包括原木和实木产品，但不包括纸浆和纸张）出口2000万m^3 RWE，约为进口木质林产品（4030万m^3 RWE）的一半。

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The China Forest Products Trade: Overview of Asia-Pacific Supplying Countries, Impacts, and Implications

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【Summary】

Over 70 percent of China's timber product imports are supplied by countries in the Asia-Pacific region; and China is the dominant forest product market for many of these countries. Unsustainable harvesting practices, illegal logging, and negative impacts on community livelihoods plague many of these supplying countries. These countries may be divided into those still harvesting and exporting timber from natural forests on a large scale and those past their highest levels of natural forest timber harvesting and now more aggressively pursuing plantations and processing. Aside from Russia, China's top Asia-Pacific timber suppliers could at best maintain current supply, with natural forest resources being depleted in less than 20 years. Resource limits also constrain expansion and/or long-term continuation of processed product export to China. Greater attention and action on the part of governments, market leaders, and international organizations is needed to address negative impacts, shifting supply to a sustainable, legal, and equitable basis, and to determine from where China's long-term supply will come.

【Key words】

China, Asia-Pacific, forest product exports, livelihoods, policy issues

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INTRODUCTION

China's forest product imports have grown dramatically in recent years, catapulting the country to a top role in world trade in the sector. Rapid expansion of manufacturing (often for re-export) and domestic consumption, in a nation with very limited per capita forest resources, have fueled the rise in imports.[1] While China's increased forest product demand has affected supplying countries worldwide, impacts are particularly marked in the Asia-Pacific Region. Forest-rich Asia-Pacific countries are seeing increasing amounts of their resources head for China. In many cases, increasing trade flows are associated with issues such as unsustainable harvesting, corruption, and lack of satisfactory livelihood opportunities for forest-dependent communities.

Identification of priority issues and possible solutions, however, requires a clearer understanding of the status and trends of the forest sectors and forest product trade of these countries. In 2003 and 2004, Forest Trends and CIFOR, supported by the United Kingdom Department for International Development (DfID), worked with partners across the region to fill information gaps and build a knowledge base on the forest industry and export trade of China's Asia-Pacific supplying countries. This article is a synthesis of more detailed studies by co-authors focused on the particular supplying countries.[2] These more detailed papers have been published on the Forest Trends' website (www.forest-trends.org). This paper begins with a summary of the characteristics of supplying countries' forest sectors and then examines overall ex-

[1] Hardwood imports come largely from Southeast Asia, Latin America, Africa, and the US and are most commonly used in furniture and building interior applications. Softwoods, largely from Russia and New Zealand, are most commonly used as construction materials and therefore are more fully destined for domestic end use.

[2] These more detailed studies include: "Overview of the Forest Sector in the Russian Far East: Production, Industry, and Illegal Logging," Alexander Sheingauz, 2004; "Status and Trends in Forest Product Exports from the Russian Far East and Eastern Siberia to China," Alexey Lankin, 2004; "Siberian and Russian Far East Timber Market for China," Anatoly Lebedev, 2004; "Navigating the Border: An Analysis of the China-Myanmar Timber Trade," Fredrich Kahrl, Yufang Su, and Horst Weyerhaeuser, 2004; "China's Impact on PNG's Forestry Industry," Yati Bun, Timothy King, and Phil Shearman, 2004; "Cambodia's Forest Sector and Supply to China," Keith Barney, 2004; "Thailand's Forest Sector and Supply to China," Keith Barney, 2004; and "Vietnam's Forest Sector and Supply to China," Keith Barney, 2004.

port trends and trade with China. The paper ends with a review of key issues associed with the China trade. The Asia-Pacific supplying countries covered are, in order of decreasing volume of forest product exports to China, Russia, Indonesia, Malaysia, Thailand, Papua New Guinea (PNG), Myanmar, Vietnam, Cambodia, and Laos.[1]

[1] Individual studies were conducted for Russia, Indonesia, Thailand, PNG, Myanmar, Vietnam and Cambodia; and the paper thus focuses on these countries. Data is included, however, for Malaysia and Laos as well. Ranking of countries for volume of forest product exports to China is based on official data from China Customs. If the illegal sector and transshipments were included, Cambodia, and even possibly Laos, might move ahead of Vietnam in the rankings.

FOREST SECTORS OF ASIA-PACIFIC SUPPLYING COUNTRIES

Common characteristics of the forest sectors of China's Asia-Pacific supplying countries include uncertainties in forest area and forest sector production data, state ownership of forestlands, harvesting primarily through a concession model, and (often extensive) deforestation trends. Yet, the status of forest resources, harvesting, and development of the processing and plantation sectors varies substantially and suggests a clustering around two main polarities. In the first group are countries that, while generating some concern about future supply, are producing timber on a large scale, often at peak volumes in their history, and putting relatively little emphasis on processing. These countries (e.g. Russia, Myanmar, and PNG), tend to have fairly limited plantation area, having less motivation to develop alternative timber sources. They tend to have less developed processing sectors, as they can depend on high volumes of log and simple sawn wood exports for revenue. Other supplying countries (e.g. Thailand, Laos, Vietnam, and Cambodia), in contrast, have clearly passed peak harvesting periods in natural forests and are pursuing (or at least exploring) increased processing and/or plantation development to enhance their forest sectors. Indonesia, despite high industrial roundwood production, has experienced declining harvesting levels and has developed an extensive processing industry and thus trends towards this latter pole as well. Finally, while Malaysia's roundwood production continues to be substantial, the nation is similarly past its natural forest harvesting peak, with its increasingly productive plantations facilitating continued high yields.

Forest Resources

Table 1 summarizes the current status of the forest resource base in countries and regions supplying China, providing estimates of natural forest area, natural forest area available for wood supply, plantation area, annual industrial roundwood production, and rough estimates of years of natural forest resource remaining at current cutting rates. While a great deal of uncertainty is associated with these statistics, the table is meant to provide an indicative picture of the current status of these countries' resource bases and their potential for continuing to supply China in the future.[1]

[1] Uncertainties are due both to lack of data and definitional problems, such as the minimum density of resource to be included in "natural forest area" or the type of forestland to be defined as "available for wood supply."

Table 1 Resource Base in Asia-Pacific Supplying Countries and Regions: Current Best Estimates

Country or Region	Natural forest area	Natural forest area available for wood supply	Tree plantation area	Annual industrial roundwood production	Rough estimate of years of mature natural forest remaining at current cutting rates
	1×10^6 ha			1×10^6 m^3	Years
Russian Far East	280.0	96.0	0.77	12.2	> 20
Indonesia	95.0	74.2	2.00	55.0	NA
Malaysia	18.3	NA	1.75	17.9	NA
Thailand	12.0	0.0	2.80	7.8	NA
PNG	26.5	11.2	0.06	2.1	13 - 16
Myanmar	33.9	20.4	0.50	5.5	10 - 15 **
Vietnam	8.1	3.1	1.71	4.2	NA
Laos	12.4	5.7	0.09	0.4	NA
Cambodia	9.2	3.9	0.09	0.1	4 - 9

** in Kachin areas supplying China

Sources and notes : Country reports prepared by authors for Forest Trends and CIFOR in 2004 (see references). Proceedings of internal Asia-Pacific Partners meeting in June 2004. FAOSTAT data, 2004. EC-FAO Partnership Programme, 2002. FAO, Global Forest Resources Assessment 2000. World Bank, 2001,2004. Asian Development Bank, 2004. MIDAS Agronomics et al., 2003. Gary Bull et al., 1998. Industrial roundwood production figures are for 2002, except for Vietnam, for which data is from 2000, and Indonesia, for which the figure given is a current (2003) authors' estimate.

With 280 million ha of natural forest area, the forest resources of the Russian Far East (RFE) alone dwarf those of China's other Asia-Pacific supplying countries. (The RFE and the five provinces of Southeastern Siberia provide the bulk of China bound timber from Russia and are thus the focus of our analysis of Russia's forest industry and trade.) Indonesia, with 90 to 100 million ha of natural forest area, ranks second. Myanmar, PNG, and Malaysia make up a middle group in terms of natural forest area and that available for wood supply, while Thailand, Vietnam, Laos, and Cambodia make up a post-logging peak group with the most limited ability to supply wood from natural forests. With over 20 years of natural forest remaining at current cutting rates, areas of Russia supplying China are expected to have more long-term natural forest potential than any of the other supplying countries studied. Among China's other major log suppliers, for example, PNG is expected to have fully allocated its forestlands within 3 to 6 years and essentially exhausted its natural forest timber resources after another 10 years of harvesting at current rates. Similarly, industry insiders have estimated that, at current harvesting rates, the Myanmar border areas responsible for

supplying timber to China have between 10 and 15 years of economically accessible resource remaining.

Plantation development or plans for such have been most marked in supplying countries or regions recognizing a decline in their industrial roundwood supply, while those not yet "past-peak" in natural forest production have expended less effort in this area. Aside from the case of Thailand, however, plantations represent a much smaller resource base than natural forests in each country. Indonesia (with 5.3 million ha allocated to plantations, but less than 2.0 million ha planted) and Thailand (with 4.9 million ha of plantations, of which 2.8 million ha are non-rubberwood "tree plantations") lead the group in tree plantation development. In Thailand, the primary source of industrial roundwood is eucalyptus (*Eucalyptus* sp.) and rubberwood (*Hevea brasiliensis*) from small-holder plantations. According to FAO statistics, Malaysia and Vietnam each have over 1.7 million ha of tree plantations. Cambodia (with only 90 000 ha of plantations at present) has ambitious plans for plantation development (Barney, 2004a). Given the strong "pre-peak" status of their natural resource bases, forest plantations have been much less of a priority for Russia, PNG, and parts of Myanmar supplying China. In the RFE, only about 0.5 percent of forest area is considered plantation. Plantation area in PNG is only 61 000 ha. Finally, while Myanmar does have about 500 000 ha of plantations, over a third of which are teak (*Tectona grandis*), plantation area in the main regions supplying China is extremely limited.

Additional information on the status of forest resource bases is provided, by country, below:

Russia While Russia's timber production peaked in the mid-1980s, the subsequent drop in production was a result of economic factors rather than resource exhaustion, so that we include Russia among the countries of our analysis that are not yet "past peak." The extent of logging relative to resource base appears to be less in Russia than in other supplying countries. Official figures put harvesting in the RFE at 18.2 percent of the accessible annual allowable cut (AAC), while inclusion of illegal logging estimates raises this proportion of AAC actually logged to roughly 25 percent (Sheingauz, 2004).

While the AAC is not exceeded overall in the RFE, substantial forest degradation is occurring. High grading (the extraction of the best timber and best species only) is

a significant factor in this degradation. In addition, permits to conduct intermediate thinnings (ostensibly to restore forest maintenance functions) are commonly abused and officially sanctioned "thinnings" now supply a significant share of Russia's hardwood product, particularly of species for which cutting is either prohibited or limited (Sheingauz, 2004).

Natural factors are also leading to forest degradation. Catastrophic forest fires, which have recently consumed an area equivalent to about four times the area harvested annually, are considered the main cause in a reduction in forest area that has been occurring over the past five years. Poor forest harvesting and slash treatment practices have exacerbated fire conditions (Sheingauz, 2004).

Indonesia Despite its very high industrial roundwood production (ranging from 47 million to 75 million cubic meters per year since the mid-1990s), the vast majority of which is channeled to the nation's massive wood processing sector, we classify Indonesia as "past-peak." In recent years, logging in the nation has declined precipitously in many areas as the more accessible forests are rapidly being exhausted. It is now widely recognized that Indonesia's natural forests will not be able to sustain the country's wood processing sector at current capacity levels for much longer and that industrial plantation development will need to accelerate considerably in order to maintain current levels of wood supply. Although estimates vary, deforestation in Indonesia is generally believed to be occurring at a pace of at least 1.6 million ha annually, with a significant portion resulting from conversion to large-scale estate crops and timber plantations.

Thailand Thailand is clearly a country past its peak in natural forest production, with rapid deforestation having occurred over the previous 20 to 30 years. With increasing environmental awareness and government bans on logging, however, deforestation has now dropped off. Reflecting the weak status of its natural forests and demand of its relatively developed processing sectors, Thailand has made strong efforts to develop plantations, which (including rubber trees) now account for about a quarter of tree-covered area in the nation. Plans for expansion of planted areas remain ambitious; and there have been Chinese overtures towards investment in this sector. Yet, past initiatives in plantation development have met with low success rates, as a large portion of farmers involved in plantation programs have decided not to maintain plantings. Further, community conflict is stymieing current expansion efforts (Barney, 2004b).

PNG Production from PNG's 26.5 million ha of natural forests is currently high (over 2 million cubic meters in 2002) and appears to be peaking. The bulk of the country's high volume and accessible forest has already been allocated to concessionaires and harvested. Recent satellite imagery suggests that the intensity of logging over the past seven years has been greater than in the past. Repeated harvesting of previously logged areas combined with large fires and drought in such areas may be resulting in a much larger extent of non-regeneration than previously anticipated (Bun et al., 2004).

Myanmar Myanmar, with an estimated 33.9 million ha of natural forest area and an estimated 5 million cubic meters of industrial roundwood production (2002), is rich in forest resources and currently a major source of timber in the region. Deforestation is severe; and production in border areas serving China is thought to be peaking (Kahrl et al., 2004).

Vietnam Like Thailand, Vietnam also appears to be a formerly forest-rich country that has passed its natural forest logging peak. According to some analysts, serious deforestation trends occurring from 1980 to 1995 have since stabilized. Addressing the decline of its natural forests, Vietnam has begun to place an emphasis on plantation development, but productivity of plantations established to date has been poor; and ambitious targets for further development lack specificity and actionable plans (Barney, 2004c).

Cambodia As with its neighbors Thailand and Vietnam, Cambodia appears to have passed its natural forest logging peak, albeit somewhat more recently. Some analysts indicate that little of the remaining forest in Cambodia is commercially viable. While logging continues, the rate is thought to be much slower than in the mid- and late 1990s, when illegal activity was at its height. The nation hopes to develop a substantial plantation sector; and some Chinese investors have already become active in this area (Barney, 2004a).

Natural Forest Ownership and Management

Natural forests in supplying countries are predominantly state-owned and administered, thus offering weaker community access than in the case of either private ownership or public ownership with administration by community or indigenous groups. In Russia, Indonesia, and Myanmar, for example, 99 to 100 percent of forestlands are both publicly owned and (according to official data) administered

by the Government.[1] PNG, where customary ownership rights predominate and 97 percent of forestland is privately owned by communities, is the main exception to state ownership among the countries studied (White and Martin, 2002). The Government in PNG, however, still exerts much greater control in determining the fate of the nation's forests than do local communities.

As is common worldwide in countries with extensive forest resources, concession granting to harvesting companies for large-scale logging is the most common mechanism through which forest access is transferred to end users in the region. Logging concessions account for the majority of forestland allocated in Russia, Indonesia (58 percent of forestland), Cambodia (64 percent of forestland), PNG (where the government plays a role in brokering deals between concessionaires and local communities), and regions of Myanmar serving the China market (White and Martin, 2002).

Despite these trends of state control and the concession model, signs of a shift to greater community access, albeit on a limited scale, have emerged. For example, in Vietnam, while the majority of the most productive forestland is allocated to state-owned enterprises, 1.43 million of the nation's over 9 million ha under forest cover was allocated to households and cooperatives in 1999; and new regulations passed in 2002 facilitate further recognition of community ownership. In Indonesia, a new regulatory process through which community ownership can be recognized was established in 2000. The country currently has 600 000 ha of forest area reserved for community administration. In Laos, a pilot program granting concessions to local communities rather than logging firms is being tested and has improved forest management. Finally, in Russia, indigenous people are also beginning to gain greater rights to state-owned forests (White and Martin, 2002).

Commercial Timber Producers

Asia-Pacific supplying countries have reached different levels of logging company privatization. In Russia, state-owned logging units have been essentially privatized, though the state may retain some shares; and a great number of new completely private logging firms have emerged (Sheingauz, 2004). In Vietnam, state logging firms dominate, being the only harvesters allowed to commercially log during the nation's six to seven-year logging ban (Barney, 2004c). In Laos, three state-owned enterprises, all under the Ministry of Defense, dominate harvesting (World Bank, 2001).

[1] In the case of Myanmar, the term "government" here is applied somewhat broadly, with insurgent groups tending to control the main forest areas supplying China.

Foreign ownership and foreign workers are a trend associated with commercial timber producers in some Asia-Pacific supplying countries. PNG and Myanmar offer the most extreme cases. In PNG, all but one of 29 concessions are operated by foreign companies, with Malaysian ownership and foreign staff predominating (Bun et al., 2004).[1] In Myanmar, the vast majority of China-bound timber is harvested by Chinese logging companies staffed with Chinese citizens working in areas outside of the military regime's control (Kahrl, 2004). In Russia, logging is carried out mainly by Russian companies, but involvement of Chinese companies in harvesting is increasing. In Cambodia, Asia Pulp and Paper and other players in the region are making logging and plantation investments.

Finally, the scale of commercial timber producers varies from country to country. The average volume of harvesting operations in the RFE, for example, has dropped precipitously, reflecting proliferation of logging companies in the 1990s and a concurrent drop in overall production (Sheingauz, 2004).[2] In contrast, 80 percent of PNG's log exports are controlled by just five companies (Bun et al., 2004).

Wood Processing

Tables 2 provides data on Asia-Pacific supplying countries' wood processing sectors, including country production figures for each of sawnwood, plywood, veneer, fiberboard, wood chips and particles, wood pulp, and paper. Despite substantial uncertainties, the data overall is strong enough to facilitate identification of basic trends among countries and within each country's industrial structure.

Comparison of Table 2 data with roundwood production figures in Table 1 indicates that countries or regions that have not passed their natural forest harvesting peaks (e. g. RFE, Myanmar, and PNG) put relatively less emphasis on processing, while those past peak (e.g. Indonesia, Thailand, and Vietnam) add value to a much higher proportion of their logs. Within the group of Asia-Pacific supplying countries and regions, Indonesia and Malaysia are the top producers of primary timber products (defined to include sawnwood, panels, and chips), while Indonesia and Thailand are the top producers of pulp and paper. Indonesia, which has the largest processing sector of

[1] Rimbunan Hijiau, a Malaysian company, is the largest supplier of logs from PNG. It is also the top supplier of logs exported from the RFE (Bun et al., 2004).

[2] In the RFE's Primorsky Krai , for example, the average output of typical logging enterprises in 2001 was only 22 700 m^3 (Sheingauz, 2004).

Table 2 Primary Timber Product and Pulp and Paper Production in Asia-Pacific Supplying Countries: Best Estimates

2002 data unless otherwise noted

Country / Region	Sawnwood	Plywood	Veneer	Fiberboard	Wood chips and particles	Wood pulp	Paper
	1×10^6 m³ Roundwood Equivalence						
RFE	1.19	0	NA	NA	NA	0.02	0.09
SE Siberia	2.92	0.32	NA	NA	NA	6.07	0.79
Russia Total	27.51	4.55	0.200	1.880	5.76	24.42	16.74
Indonesia	20.00	16.22	0.110	0.770	0.81	21.73	19.59
Malaysia	6.56	10.85	1.790	2.200	0.73	0.49	2.38
Thailand	0.42	0.30	0.008	0.440	3.74	3.68	6.83
PNG	0.10	0.23	0.180	NA	NA	NA	NA
Myanmar	0.54	0.05	0.003	NA	NA	NA	0.12
Vietnam	4.22	0.09	NA	0.002	3.03	0.92	1.07
Laos	0.26	0.03	NA	NA	NA	NA	NA

Sources and notes : Country reports prepared by authors for Forest Trends and CIFOR in 2004 (see references). FAOSTAT data, 2004. CIFOR, 2004. Production data is for the year 2002, with the following exceptions: all Vietnam data (2000); Indonesia plywood and sawnwood data (2003), fiberboard and chips data (2000) and pulp and paper data (2001); Malaysia fiberboard and chips data (2001) and pulp and paper data (2000); Thailand veneer, fiberboard, chip, pulp and paper data (2001); PNG plywood data (2000); Myanmar veneer data (2000) and paper data (2001); Laos plywood data (2001); all Cambodia data (2001). Conversion factors used ($m^3 \rightarrow m^3$ RWE): sawnwood 1.43, plywood 2.5, veneer 2.5, chips 1.8; (metric tons $\rightarrow m^3$ RWE): mechanical wood pulp 3, chemical wood pulp 4, semi-chemical wood pulp 3.3, paper and paperboard 2.8. Note: Lacking breakdown on the type of pulp for RFE and Siberia, a weighted average conversion factor of 3.8 m^3 RWE per metric ton, derived from the pulp type mix of Russia as a whole, was used.

all the countries and regions studied (including the RFE and SE Siberia, but not Russia as a whole), also has the highest production of sawnwood, plywood, and wood pulp. Malaysia is the second largest producer of sawnwood and plywood and the top producer of veneer (for which it surpasses all other producers by far) and fiberboard. Thailand and Vietnam are the top wood chip producers in the region. Indonesia, followed by SE Siberia and Thailand, is the top wood pulp producer, while Indonesia and Thailand are the top paper producers (in both cases not including Russia as a whole).

Additional information on processing in the region is given by country below:

Russian Areas Supplying China The level of processing in the RFE is particularly low. Sawnwood production was less than 10 percent of industrial roundwood production in 2002. No plywood was produced in the RFE that year; and pulp pro-

duction was less than 5000 tons. Russia, particularly as reflected in the RFE, presents a special case among the nations studied of a country that once had a relatively advanced processing sector for which production has since dropped substantially. Domestic market shrinkage and difficulties competing internationally in quality and cost have resulted in numerous mill closures and in the share of processed wood in overall forest production in the RFE dropping from 56 percent in 1990 to less than 17 percent in 2000. Southeastern Siberia, with its main processed products being sawnwood and pulp, has experienced more positive trends recently, including the development of new sawmills and growth in exports of pulp and wood chips (Sheingauz, 2004).

Indonesia Indonesia's massive processing sector represents a major shift from its earlier role as a major log exporter, responsible for over 40 percent of the world market's tropical log exports in 1979. Processed products now play the dominant role in the nation's forest product exports. Due to resource constraints, however, all of Indonesia's major processing sectors are operating far under capacity.

The size of Indonesia's wood processing industry can be attributed in part to active government promotion of export-oriented wood processing since the early 1980s and introduction of a log export ban in 1985. Through the late-1990s, Indonesia supplied about 70 percent of the world's tropical plywood exports, though production has dropped substantially over the past decade as large-diameter logs have become increasingly scarce. The country reportedly has 110 operating plywood mills, with a total production capacity of 11.3 million cubic meters per year, but 2003 production of only 6.5 million cubic meters.

Since the early-1990s, Indonesia's pulp and paper production have grown very rapidly, following over US$ 15 billion of investment in the sector. Although the nation's pulp producers have made substantial investments in fast-growing plantation development, most of the country's pulp mills continue to rely heavily on "mixed tropical hardwoods" harvested from natural forests.

Malaysia In addition to its top role in veneer and fiberboard and second place standing in sawn wood and plywood produced in the region, Malaysia produces substantial paper (851 000 tons in 2000), though wood pulp (123 000 tons) production lags.

Thailand Like Indonesia and Malaysia, and as a country far past its natural forest logging peak, Thailand has progressed along the forest product value-added chain. In

addition to its main products of wood chips, wood pulp, and paper, Thailand also has about 2 million cubic meters (3 million cubic meters RWE) of particleboard capacity.

Vietnam While Vietnam has a smaller and generally lower value-added processing sector than the countries covered above, it does have significant production of sawnwood and wood chips/particles, with wood chip production on the rise. Pulp and paper production are also significant (240 000 and 384 000 tons, respectively, in 2000), though previously anticipated growth is not expected to materialize in the short term. In the area of finished wood products, Vietnam has become a center of outdoor wood furniture production (competing with China), with further growth likely. As in China, much of the wood used in furniture production is not locally sourced. (Foreign Agricultural Service, 2003).

Other countries The remaining countries of Cambodia, PNG, Myanmar, and Laos have very low processing capacities. Veneer and plywood are key products in Cambodia's forest product sector. Given restrictions on cutting, however, low capacities are unlikely to increase in the near future. PNG's wood processing industry is extremely small. At present, the country has just three major processing facilities, one wood chip mill, one sawmill, and one veneer mill. Aside from these, there are a number of small and medium sized sawmills. The country has no pulp and paper production, though individual households do produce balsa (Bun et al., 2004).

The main parts of Myanmar supplying China, Kachin State and Northern Shan State, have extremely limited processing industries, reflecting the dearth of processing facilities outside of Myanmar's capital, Yangon. Myanmar's military regime has reportedly suggested that the main insurgent group controlling Kachin State seek foreign investment in the processing sector, but potential investors, the Chinese logging companies, are deterred by the lack of political stability and basic power infrastructure. Thus, while some crude sawmilling work is done on the Myanmar side of the border, no other processed forest products are produced in the main areas supplying China (Kahrl et al., 2004).

Characteristics of Processing Enterprises

A trend of a large number of small, privately owned mills is found in several of the countries and regions studied, though it is often a smaller group of large mills that can attain the quality necessary for export. Russia, Indonesia, PNG, and Chinese-Myanmar border areas all have numerous small-scale processors.

Indonesia is believed to have between 2300 and 3500 operating sawmills, the vast majority of which are small-scale units and/or unlicensed operations. For the RFE's Khabarovsk Krai (a province) alone, official 2002 statistics indicate 104 wood processing enterprises, with annual average production per facility of only 35 000 cubic meters. In Russia, primary processors range from large-scale now-privatized processing factories and subsidiary mills of large commercial harvesters to primitive sawmills in RFE border areas, sometimes operating in open air (Sheingauz, 2004). In PNG, sawmills are predominantly small, privately owned entities serving the domestic market, though the largest processing facilities are owned by concessionaires (Bun et al., 2004). Finally, Chinese border areas near Myanmar have numerous small-scale mills handling preliminary processing. In Tengchong County, for example, there are reportedly over 500 timber processing companies, only several of which are of significant scale (Kahrl et al., 2004).

The trend of a smaller group of large mills serving export markets is particularly true in pulp and paper, with often just a few key players controlling a small number of large-scale export-oriented facilities in the sector. With recent industry consolidation, the Thai pulp and paper industry is quickly moving to domination by two major integrated firms, Siam and Advanced Agro (Barney, 2004b).[1] Both firms are also pursuing regional expansion.[2] Indonesia's small number of large-scale export-oriented pulp and paper mills, all concentrated geographically on the island of Sumatra, are also dominated by just a few key players. Finally, while the pulp and paper industry is less developed in Vietnam, the state-owned Vietnam Paper Corporation (Vinapimex) represents the only major industrial player. It has 20 subsidiaries, but three mills account for 50 percent of production (Barney, 2004c).

Most of the countries studied evidence a significant level of foreign investment in their processing sectors, with Chinese investment activity recently on the rise in several cases. As with its logging sector, PNG's processing sector, though much smaller, offers one of the most prominent cases of foreign control. While smaller mills, as mentioned, may serve the domestic market, the few large mills in the country and those that produce product for export, are foreign-controlled (Bun et al.,

[1] Siam has purchased Thai Cane Paper (full purchase completed in 2004) and a controlling stake in Phoenix (in 2002). Phoenix has now been de-listed from the Thai SET and may now be a full subsidiary of Siam.

[2] Siam has purchased a controlling share of United Pulp and Paper of the Philippines (raised to 86 percent in July of 2003) and is exploring opportunities to acquire the assets of troubled Indonesian pulp and paper firms. Advanced Agro, which is owned by the Soon Hua Seng Group, has pursued plantation projects in China.

2004).[1] Vietnam's wood chip operations, geared mainly towards export, involve investment from Japan, Korea, and Taiwan, also the top export destinations for wood chips (Barney, 2004c).

Russia, Thailand, Cambodia, and Indonesia evidence specifically Chinese investment. Large Chinese companies are investing or planning investments in the processing sectors of each of these countries; and numerous small Chinese firms have established ventures in border areas of Russia. Reports from Primorskiy Krai indicate that Chinese processing enterprises in the province are small (enterprises investigated range from 7 to 15 employees), staffed by fully Chinese labor, and purchase timber mainly from illegal loggers (Lebedev, 2004). At the other end of the spectrum, three Chinese companies, Star Paper, Zhuhai Zhenrong, and Huacheng International, have signed a memorandum of understanding to jointly invest US$ 278 million in a wood processing project in Chitinsk Oblast that is to eventually process 1.5 million cubic meters of logs annually and produce 300 000 cubic meters of timber products and 400 000 tons of pulp (Lankin, 2004).

Like other plantation and pulp projects in the region, planned and in-progress Chinese-invested projects in this sector have met with community resistance. The in-progress Pheapimex-Fuchan pulp project in Cambodia, to be the nation's first major pulp mill, is a joint venture between Cambodia's largest concession holder, Pheapimex, and the China Cooperative State Farm Group. The project has resulted in local community-level protest since at least 2001, slowing plantation development (Barney, 2004a). Recently, several individuals were injured in a grenade blast, as a group of 600 protesters attempted to block bulldozers that had begun clearing the forest for an acacia plantation. (Associated Press, 2004) In Indonesia, the United Fiber System pulp mill project in Kalimantan, with majority investment from a Chinese company, has also stirred controversy. In Thailand, Soon Hua Seng's Advanced Agro has held high-level discussions since 1997 with a Chinese company for a proposed eucalyptus and pulp/paper venture that would reportedly produce 700 000 tons of pulp annually, mostly for export to China. Many are doubtful, however, that this project will be realized due to the lack of land available for concessions, the complexity and cost of establishing out-grower schemes, and the social protest likely to develop (Barney, 2004b).

[1] PNG's main wood chip mill is owned by Japan and Niugini Timbers (JANT), a subsidiary of Hongshu Paper in Japan. Rimbunan Hijiau of Malaysia, the country's largest timber concessionaire, owns the nation's only veneer factory and its largest sawmill, as well as a number of other sawmills (Bun et al., 2004).

EXPORT TRENDS

Export trends of Asia-Pacific supplying countries are generally congruent with the findings on forest resources and production outlined above. That is, forest rich countries, still harvesting at high levels, export and provide China, in particular, with a large amount of logs, while most countries past their natural forest logging peaks either supply China mainly with processed product or have a low level of forest product exports to China. Analysis of remaining forest resources in conjunction with export trends suggests that most Asia-Pacific supplying countries will at best maintain current export levels to China for the medium term (less than 20 years), with only Russia presenting the potential of significantly increased and/or longer-term supply to China.

Log Exports

Comparison of log exports to China with overall log exports and domestic production of Asia-Pacific supplying countries shows that China is playing a critical role in the log export trade and, in many cases, overall log markets of most of the major producers (see Table 3). China, surpassing Japan in 2001, is the top export destination for RFE timber and, given that 80 percent of RFE timber production is exported, a major force in the RFE timber market overall (Lankin, 2004). China accounts for 40 percent of all Russian log exports and 12 percent of the nation's industrial roundwood production (2002). The China market is rapidly coming to have a decisive influence on the small country of PNG, with China exports growing from 35 percent of PNG's industrial roundwood production in 2000 to 58 percent in 2002 (Bun et al., 2004). Malaysia, second in the region only to Russia in total log exports, ships 41 percent of its log exports or 12 percent of its industrial roundwood production to China. Of the major log producers in the region, only Indonesia, congruent with its emphasis on value added, exports just a small proportion of its very high industrial roundwood production. While about half of its official 500 000 cubic meters in log exports (2002) went to China, log exports to China represented less than 3 percent of the nation's industrial roundwood production.

For Myanmar, Cambodia, Laos, Vietnam, and Thailand, the role of the China trade in overall log production and exports is clouded by lack of accurate statistics, smuggling, and/or transshipments. Based on China Customs data, only Myanmar

Table 3 Role of China in Asia Pacific Supplying Country Log Markets

2002 data, unless otherwise noted

Country	Industrial Roudwood Production	Log Exports	Log Exports to China	Percent of Log Exports to China	Percent of Log Production to China
	1×10^6 m^3			%	
RFE	12.20	10.3000	NA	-	-
SE Siberia	15.10	NA	NA	-	-
Russia Total	118.60	36.8000	14.8000	40	12.4
Malaysia	17.90	5.1800	2.1200	41	11.8
PNG	2.00	1.8000	1.1500	64	57.5
Myanmar	5.54	0.8800	0.6100	69	11.0
Indonesia	55.00	0.5000	0.2500	50	0.5
Vietnam	4.18	NA	0.0160	-	0.8
Laos	0.39	0.0630	0.0110	17	2.8
Thailand	7.80	0.0031	0.0025	81	7.4
Cambodia	0.12	0.0001	0	0	0

Sources and notes : Sources: Country reports prepared by authors for Forest Trends and CIFOR in 2004 (see references); FAOSTAT data, 2004; China Customs data for 2002. Notes: Data for the year 2002, except for Vietnam industrial roundwood production (2000), Indonesia industrial roundwood production (authors' estimate: 2003), Cambodia log exports (2000), and Laos log exports (2001).

among these countries is a major log supplier to China. While Myanmar's military regime reports extremely low exports to China, Chinese customs statistics are generally more dependable and include exports from regions not controlled by the regime.

Processed Forest Product Exports

China is shifting towards importing unprocessed forest products as it moves forward in developing its own manufacturing capacity. The trend of lower value-added imports is particularly apparent in comparison the low levels of plywood imports to high levels of log and sawnwood imports and in comparison of stagnant paper imports to growing pulp imports.

Analysis of China's imports from a regional supply perspective (namely, assessing the proportion of key Asia-Pacific producers' processed forest product exports purchased by China) indicates that exports to China play a dominant role in several product segments. China is particularly dominant in absorbing the sawnwood and pulp exported in the region, again confirming its emphasis on lower value-added imports. China also plays a very significant role, however, in the proportion of top

Table 4 Processed Product Exports to China and Comparison to Overall Exports and Overall Production of Asia-Pacific Supplying Countries

2002 data unless otherwise noted

Country	Sawnwood	Plywood	Veneer	Pulp	Paper
			1×10^6 m^3 Roundwood Equivalence		
Russia					
Exports to China	0.790	0.005	0.002	3.60	0.820
Total exports	12.900	2.900	0.048	7.20	6.600
Total production	28.100	4.600	0.200	24.40	16.700
Indonesia					
Exports to China	2.000	1.100	0.030	4.50	1.800
Total exports	72.900	13.800	NA	9.00	6.900
Total production	20.000	16.220	0.110	21.70	19.600
Malaysia					
Exports to China	0.700	0.250	0.370	0.00	0.130
Total exports	3.600	9.000	1.500	0.00	0.420
Total production	6.600	10.900	1.800	0.49	2.400
Thailand					
Exports to China	0.850	0.007	0.005	0.36	0.700
Total exports	2.200	0.095	0.005	0.76	2.200
Total production	NA	0.300	0.008	3.70	6.800
PNG					
Exports to China	0.003	0.000	0.021	0.00	0.000
Total exports	0.041	0.008	0.090	0.00	0.000
Total production	0.100	0.023	0.180	NA	NA
Myanmar					
Exports to China	0.330	0.000	0.001	0.00	0.000
Total exports	0.390	0.200	NA	0.00	0.000
Total production	0.550	0.480	1.800	NA	0.116
Vietnam					
Exports to China	0.015	0.000	0.008	0.00	<0.001
Total exports	0.022	0.017	0.019	0.00	0.005
Total production	4.200	0.093	NA	0.92	1.100
Cambodia					
Exports to China	0.008	0.024	0.097	0.00	<0.001
Total exports	NA	0.035	NA	0.00	NA
Total production	NA	0.035	NA	NA	NA
Laos					
Exports to China	0.008	0.000	0.000	0.00	0.000
Total exports	0.190	0.011	0.002	0.00	0.000
Total production	0.260	0.033	NA	NA	NA

Sources and Notes : See sources and notes to Table 2 for references, conversion factors used, and notes on production data. Additional reference: China Customs Data, 2002. Additional exceptions to use of 2002 data are: use of 2001 data for Cambodia and Laos sawnwood, plywood, and veneer exports, for Thailand and PNG plywood exports, and for Malaysia paper exports; use of 2000 data for Vietnam plywood and Thailand veneer exports.

regional producers' veneer and paper exports that it purchases. China's role in purchasing plywood from the region's top plywood exporters is much weaker. Table 4 offers a comparison, by supplying country and processed product, of exports to China, total exports, and total production. While figures for total exports and production are rough estimates in some cases, the data offers insight on trends in the region. These trends are also summarized, by product segment, below.

Sawnwood Top sawnwood exporters in the region include Russia (9.0 million cubic meters exported in 2002), Malaysia (2.6 million cubic meters), Indonesia (2.0 million cubic meters), and Thailand (1.6 million cubic meters). The data indicates that China plays a particularly significant role in the case of Indonesia (importing 70 percent of Indonesian sawnwood exports or 22 percent of total sawnwood production) and substantial roles in the cases of Thailand and Malaysia.

Plywood The top exporters of plywood in the region are Indonesia (5.5 million cubic meters exported in 2002) and Malaysia (3.6 million cubic meters). Although both of these nations export a much higher proportion of the plywood they produce than of the sawnwood they produce, China purchases a lower proportion of these countries' plywood production than of their sawnwood, reflecting China's demand for less processed products. According to the data, China imported only 8 percent of Indonesia's plywood exports (6 percent of production) and 3 percent of Malaysia's (2 percent of production).

Veneer Malaysia is by far the top exporter of veneer in the region (601 000 cubic meters exported in 2002). China imported 25 percent of Malaysia's veneer exports in 2002, or 22 percent of its total veneer production.

Pulp Top exporters of pulp in the region are Indonesia (2.2 million tons exported in 2002), Russia (1.8 million tons), and Thailand (191 000 tons). China is clearly dominant in importing pulp exported from within the region. Based on available data, China imported 50 percent of Indonesia's pulp exports (21 percent of total production), 50 percent of Russia's (15 percent of production), and 48 percent of Thailand's (10 percent of production) in 2002.

Paper Top exporters of paper in the region are Indonesia (2.5 million tons exported in 2002), Russia (2.3 million tons), and Thailand (787 000 tons). China's role in importing paper exported in the region is substantial, though not as dominant as for pulp, again showing China's relatively higher demand for less processed products.

In 2002, China imported 27 percent of Indonesia's paper exports, 13 percent of Russia's, and 32 percent of Thailand's.

Potential for Future Export of Logs and Processed Product to China

While projections of China's future forest product consumption will require a better understanding of demand drivers and implications of the nation's low per capita demand, analysis of Asia-Pacific country forest resource bases and recent export trends offers insight on the potential for these countries to supply China with log exports over the next two decades. Aside from Malaysia, countries past their natural forest logging peaks, such as Vietnam, Laos, Cambodia, and Thailand, do not export large volumes of logs to China and are unlikely to have the resources to do so in the upcoming two decades. Despite its large natural forest area and sizable timber harvest, Indonesia, which exported 116 000 cubic meters of logs to China in 2003, is also past its logging peak and, focusing on its own domestic processing industry, is not likely to substantially increase its raw log exports to China over the next few decades.

Instead, those countries from the region currently supplying China with the most substantial amount of logs (Russia, Malaysia, PNG, and Myanmar) should continue to be its main regional log suppliers in the coming ten years. Given rough estimates by experts on time to resource exhaustion at current cutting rates (13 to 16 years for PNG, 10 to 15 years for Myanmar in areas bordering China, and over 20 years for Russia), however, it appears that only Russia will be a promising source of logs for China 20 years from the present. For projections 30 years out, Russia's ability to continue to supply China at current rates or the potential of other countries in the region to have either recovered their natural forest base or substantially expanded plantation area is less clear. In the shorter term (over the next several years), China's main Asia-Pacific log suppliers will at best maintain current export levels to China, with only Russia presenting the potential of significantly increased supply.

Future potential for processed forest products exports to China from the region's supplying countries is closely linked to the log supply and forest resource trends discussed above. Given that China is already consuming a large proportion of the processed products exported from within the region, the question becomes whether supplying countries might expand their processing capacities. Given limits in log resources, most countries past their natural forest logging peaks would face substantial difficulties in expanding processing capacity unless they were able to secure logs from other sources. Indonesia's processing sector, for example, already has a

shortage of raw materials, though continued expansion of its pulp and paper industry is expected in coming years. Large-scale plantation development presents a possible means of offsetting declines in natural forest production in such countries, though plantation efforts in both Indonesia and Thailand (the two supplying countries in the region with the greatest plantation activity to date) have met with limited success. Indeed, China is expected to soon follow Japan's lead in investing in large-scale plantation development in the region.

China's major log suppliers from the region at present (Russia, Malaysia, PNG, and Myanmar) could potentially expand processing capacity, keeping more raw logs in country for value-added production. Indeed, this is a policy option that has been raised in Russia, PNG, and Myanmar. Adoption of this strategy, however, would reduce logs available for China in most cases. While the location of processing would shift, then, the total amount of processed product available to China might not change. Again, it is probably only Russia, given its strong natural forest resource base, that could increase export of processed product to China, while maintaining current levels of log exports to China over the next couple of decades.

KEY ISSUES

The forest products industry and export trade in the Asia-Pacific Region have enormous impacts on supplying countries, raising a host of policy issues. Serious ecological impacts across the region are linked with on-going unsustainable logging practices and, often, illegal logging, which also has negative economic impacts (see Table 5). At the same time, other key policy issues merit attention (see Table 5); and negative livelihood impacts (see Table 6) occur in practically every supplying country, as people lose access to resources and as benefits accrue to some groups and not to others.

Unsustainable Practices

In those producer countries still harvesting large volumes of logs, continuation of current export levels to China is worrisome from an ecological standpoint, due to unsustainable logging practices. Unfortunately, forest codes and plans, such as PNG's National Forest Plan, often do not contain conservation clauses. Further, rules that exist are often not well implemented. For example, the required 40-year cutting cycle in PNG is generally not respected; and average concession life from 1993-

Table 5 Unsustainable Practices, Illegal Logging, and Other Policy Issues, with Examples

Lack of Attention to Conservation in Main Forest Plans or Codes
• PNG: National Forest Plan
Unsustainable Logging Practices
• PNG: ◇ Annual logged area and intensity of logging rising; logging in unsuitable areas ◇ 40-year cutting cycle not respected/ average concession lifetime of 11 years ◇ Second time harvesting as little as 10 years after initial logging event • Myanmar: ◇ Ecological impacts of logging may spread to Chinese side of border (e.g. pests, disease, etc.) ◇ Annual allowable cut based on full area of country, but applied to area under central control
Legal and Illegal Players Often the Same
• Cambodia: concessionaires main players in both legal and illegal logging • PNG: concessionaires main players in both legal and (with local cohorts) illegal logging • Russia: ◇ Long-term harvesting companies also involved in illegal logging ◇ Customs inspectors may "legalize" illegal product ◇ Forest Guard staff enhance low salaries through "intermediate cutting"; many accept bribes to turn a "blind eye" to illegal logging • Vietnam: Individuals working for forest protection units often carry out commercial illegal logging
Loss of Revenue from Illegal Logging
• Russia: huge losses in tax revenues
Measures Adopted to Combat Illegal and/or Unsustainable Logging
• Indonesia: ◇ Bilateral cooperation, including memorandum of understanding with China ◇ Log export ban (also used to promote domestic processing industry) • Russia: ◇ Fixed checkpoints and patrolling brigade with decent salaries ◇ Barcode system under development (all trees to be harvested would bear plastic barcode label) ◇ Control of export sites and reduction in their number (has been effective) • Cambodia: ◇ Donor conditionality to promote forest sector reform ◇ Logging moratorium (2002) • Thailand: 1989 natural forest logging ban (has stabilized deforestation of previous 20 to 30 years) • Vietnam: partial logging ban and export quotas

The Push for Processing
• Russia: push to expand processed product exports to China not successful ◇ China import policies (import tariffs, previous VAT) favor log imports over processed product ◇ Chinese labor cheaper than Russian labor • Indonesia: aggressive policies to develop processing industry have led to overcapacity
Customs Issues
• Myanmar: low customs compliance due to regime's lack of control over areas serving China • Russia: ◇ Lack of coordination between Russia and China customs (re: statistics, forbidden species, etc.) ◇ Customs violations increasing on Russia side of China-Russia border ◇ Corruption among customs inspectors allows large flow of illegal product
Rampant Corruption
• PNG: Evidence of corruption at highest levels of government; foreign concessionaires said to support political parties and individual politicians • Cambodia: Patronage of concession system said to lead to highest levels of government
Non-Compliance of Concessionaires and Issues of Concession Management
• PNG: Concessionaires do not meet social obligations (e.g. leave promised roads unfinished, etc.) • Cambodia: Concessionaires have failed to meet sustainability criteria and pay royalties due • Russia: Chinese harvesting companies do not meet requirements to process wood/ hire Russians • Myanmar: short (5 year) logging contracts with Chinese companies promote poor management

2000 was only eleven years, indicating cutting rates far in excess of sustainable harvesting. The annual logged area and intensity of logging have been on the rise in PNG, with satellite imagery indicating that some areas are being harvested for the second time, as little as ten years after initial logging and with much more destructive ecological impacts. Given that most of PNG's logs are exported (with China as the top destination), then, current export trends imply a direct threat to the sustainability of the nation's forests and the critical sector of the economy that they support (Bun et al., 2004).

Unsustainable practices in parts of Myanmar serving China also suggest a direct link between ecological impacts and trade in forest products with China. Given that

Table 6 Key Livelihood Issues, with Examples

Insecure Land Tenure
• Thailand:
◇ Thai farmers lack full deed to land/vast areas of occupied land designated as forest reserve
◇ Loss of farmland from plantation development
◇ Upland minorities denied land rights/ lack citizenship
• Laos:
◇ Villager access to swidden farmland lost and upland groups impoverished through Land and Forest Allocation Program
• Cambodia:
◇ Conflict due to denied access and reduction in resources caused by logging (e.g. villager-plantation company conflicts)
Inequitable Distribution of Benefits within Country
• PNG:
◇ People own land (traditional tenure), but government does not support development of forest resources by local people
◇ Non-logging development alternatives not included in National Forest Plan
◇ Illiterate people cheated by local elites
◇ Benefits for local communities as negotiated with concessionaires not realized
• Myanmar (areas serving China):
◇ Much of benefit used for military spending of insurgent groups
◇ Elites benefit, while communities lack electricity, roads, and other basic infrastructure
◇ Roads built by logging companies are fragmented/ do not meet needs of communities
Transfer of Livelihood Benefits Outside of Country
• Russia:
◇ Low benefits to Russian side in China log trade/ most value-add in China
• PNG:
◇ Predominantly foreign concessionaires/ mostly foreign staff
• Myanmar (areas serving China):
◇ Logging companies Chinese/ staffed by Chinese only

most of the logging in Myanmar serving China has been concentrated within a (sometimes now fully clearcut) 50 to 150 kilometers radius from the border, ecological effects of over-logging in Myanmar are expected to spill over into China's Yunnan Province through shared ecosystems. Concerned about impacts in areas such as wildlife, pest, and disease management, Yunnan's Science and Technology Bureau began to assess ecological and socioeconomic change along the border in 2003. The short duration (1 to 5 years) of contracts awarded to Chinese logging companies leads to forest degradation, as hills are logged quickly before concessions change

hands. Finally, given Myanmar's complex political situation, forestry departments do not have the authority needed to monitor and regulate most of the logging serving China and also end up applying an annual allowable cut based on the country's full area to only that fraction under the military regime's control (Kahrl et al., 2004).

Countries past their logging peaks have adopted some policies to counter high levels of unsustainable harvesting, though problems remain, with Indonesia and, likely, Cambodia, for example, continuing to face ongoing deforestation problems. Logging in Thailand, however, has declined to such an extent that deforestation is thought to have stabilized. The Cambodian Government put a moratorium on logging in January 2002, because of concessionaires' continued failure to meet forest sustainability criteria. While conditions put on donor loans to Cambodia have likely been the primary force in the nation's forest sector reform, the effectiveness of reforms has been questioned (Barney, 2004a). Critics point to the failure of donor conditionalities to address corruption and the flawed concession system and call for its dismantling and overhaul. Logging and log export bans have also been instituted in Thailand, Vietnam, and Indonesia, though export bans may also aim at promoting domestic processing industries, as in the case of Indonesia.

Illegal Logging

Illegal logging is extensive in most Asia-Pacific supplying countries and thought by many to be linked with ecological deterioration. "Legal" logging, however, may also create negative impacts; and, in the case of Russia, it is not obvious that illegal practices are more damaging than legal ones. Illegal logging of commercial scale in supplying countries often involves parties linked with legal commercial logging. In Russia, for example, long-term harvesting companies are involved in illegal logging; and customs inspectors may also be involved in the "legalization" of illegal product (Sheingauz, 2004). In Vietnam, illegal logging is often carried out by individuals who work for forest protection units (Barney, 2004c).

In the RFE and Southeastern Siberia, illegal logging is particularly severe. Alexander Sheingauz (2004) has estimated that 38 percent of all logging in the RFE is illegal. One driving force in illegality is the potential for Forest Guard staff to enhance their low salaries through intermediate cuttings (which, as a result, may not always have a legitimate silvicultural basis) and bribes from illegal loggers. While illegal logging in Russia is probably linked most closely to domestic social and economic ills, Sheingauz (2004) indicates that areas with stronger exports have a higher level

of illegal logging. He further notes that smuggling of illegal product is probably most common in the case of China, given that the land border facilitates export of contraband by truck, rather than ship.

Sheingauz (2004) also suggests that the substantial magnitude of illegal logging does not necessarily imply over-harvesting of the RFE as a whole or of any of its provinces, given that legal logging falls so short of the annual allowable cut. In some areas, however, the cut volume is closer to the full annual allowable cut. At the site level, illegal logging generally has the same consequences as legal logging, but may have some additional impacts. Most significantly, fully illegal loggers create damage through disregard of silvicultural requirements (i.e. selective cutting or reforestation), while large and medium size (legal) logging firms in Russia tend to comply.

Reflecting concern for the sustainability of the industry and the huge losses in tax revenues, governments at both the federal and provincial levels in Russia have taken a number of measures to prevent illegal logging. Some provinces have set up fixed checkpoints as well as patrolling brigades provided with decent salaries. At the federal level, the Ministry of Natural Resources is developing a barcode system, whereby every tree destined for harvesting would have a plastic label with barcode (Sheingauz, 2004).

The link between illegal logging and environmental damage is more obvious in other supplying countries, given their more limited resource bases. In PNG, the main players in legal logging, the concessionaires, are also responsible for the bulk of illegal logging. While all the necessary laws and policies to prevent illegal logging are in place, there is a lack of political will and enforcement capacity. Government officials may in fact support these activities (see discussion of corruption below); and local cohorts are usually involved as well (Bun et al, 2004). In Cambodia, as in PNG, the illegal (as well as the legal) sector is thought to be controlled by the concessionaires. In the mid to late 1990s, extensive illegal exports from Cambodia to Thailand, Laos, and Vietnam were documented by Global Witness, though the current status of such activities is less clear (Barney, 2004a).

Indonesia has developed bilateral cooperation with a number of countries to combat illegal logging. In particular, the nation has signed a memorandum of understanding with China that is targeted at reducing the trade in illegal forest product. Analysts report, however, that these agreements have yet to make an impact.

Livelihood Implications

The livelihood implications of the forest industries and China trade for the people in Asia-Pacific supplying countries are immense and critically linked to the sustainability of the forest industry in the region. Insecure land tenure, inequitable distribution of benefits within each country, and the transfer of livelihood benefits outside of the supplying country are key livelihood-related trends occurring across the region (see Table 6) and demanding the attention of policy makers. While positive livelihood impacts also occur, beneficiaries are generally not the neediest or those that are losing traditional access to resources. Livelihood impacts, of course, are not due solely to the role of the China market, particularly for countries whose export levels to China are low. Thus, while the China trade may in many cases present an entry point for addressing livelihood issues, national-level initiatives in supplying countries will clearly be needed as well; and action in countries to which China ships finished forest products may also be relevant.

Insecure land tenure, in the face of industry expansion, has led to displacement, loss of farming land, conflict, and loss of access to resources by forest-dependent peoples. Such property issues impede the sound development of the industry; and their resolution is a prerequisite to sustainability. Insecure tenure and its negative impact on the industry and local peoples is a particularly evident in Thailand, where only a small proportion of farmers hold full deed to their land. Vast areas of the nation (44.7 percent of total land area) are designated as forest reserve, though much is neither forested nor unoccupied. Loss of farmland through plantation development has resulted in scandals and successful resistance to further plantation development. Finally, Thailand's forest policy has resulted in hard line treatment of upland minorities practicing swidden agriculture in protected areas. Many of these minorities lack Thai citizenship and are denied land rights (Barney, 2004b).

In Laos, implementation of the Land and Forest Allocation Program (LFAP), promoted in combination with a policy aimed at "stabilizing" shifting cultivation, has been identified as a primary source of new poverty creation and food insecurity in the countryside (Lao Government State Planning Commission, 2001). Under the program, national territory is demarcated into village land and state production forestry or biodiversity conservation land; and village territories are also internally zoned into forest and agricultural land use areas. While the overall goals of the program are commendable in terms of promoting village tenure security, the end effect has been

to unduly squeeze villagers' access to crucial swidden farmland and to create severe hardships and impoverishment for upland groups, particularly ethnic minorities.

In Cambodia, issues of access to resources and tenure security are particularly acute, as forests represent crucial sources of livelihoods for most of the nation's rural communities. Case studies have indicated that forest degradation in Cambodia has impacted livelihoods, forcing villagers to meet their forest product needs from areas farther away. (McKenny and Tola, 2002) Conflicts between villages and plantation companies are becoming more and more common. Prime Minister Hun Sen has even indicated that land issues could spark a "peasant revolution" and, in October 2004, called for a review of land concessions. (Associated Press, 2004) The potential for such unrest is rising as Asia Pulp and Paper and other major players in the region make investments in logging and plantations in Cambodia.

Inequity in the distribution of benefits of the logging trade is common in the region. Often, poor communities most closely tied and dependent upon forestlands lose out, as local elites and/or industrial concerns absorb most of the benefits. For example, while land in PNG belongs to local people through traditional tenure and local communities must consent to any major development of their resources, these often illiterate people are frequently cheated by local elites, who benefit disproportionately from bringing logging companies into the area. In addition, negotiated benefits from concessionaire harvesting are generally not realized; and local people are often left with unfinished buildings, roads, and bridges. Finally, the government does not support local landowners in the development of their own forest resources. PNG's National Forest Plan does not address non-logging forest development alternatives; and local peoples were not consulted before the plan designated their land for logging (Bun et al., 2004).

In Myanmar, the benefits of timber exports accrue to only a small segment of the population and are often used for military spending. Concessionary logging combined with the drug trade has created an elite class among insurgent groups controlling border areas, while many parts of Kachin State still lack electricity, roads, and other basic infrastructure. Roads built by Chinese logging companies, despite claims, do not generally support the transport needs of local people, as such roads are scattered and fragmentary (Kahrl et al., 2004).

In many cases, the direct benefits of the forest product trade are seen either to be leaving the producer country or to be accruing to foreigners in residence, impeding

the potential for developing a sustainable forest industry that bolsters local livelihoods. In Myanmar, few local people are involved in the China log trade. All logging for this trade is carried out by Chinese companies, which are generally staffed exclusively by Chinese employees (Kahrl et al., 2004). In PNG, predominantly foreign-owned concessionaires often employ mostly foreign staff. Researchers in PNG have found, for example, that 90 percent of the insured workforce at Rimbunan Hijiau, the nation's largest logging company, are either Malaysian, Indonesian, Chinese, or Filipino (Bun et al., 2004). In the case of Russia, disproportionate livelihood opportunities associated with the log trade are thought to be accruing to the Chinese side of the border, particularly because of the emphasis on raw log imports and processing by low-cost labor in China. Chinese companies are also becoming active in the forest product trade on the Russian side of the border. Some reports indicate that such companies process logs minimally in Russia to avoid the requirement of a harvesting permit to export logs, do not pay any taxes, and employ only Chinese staff (Lebedev, 2004).

Other Policy Issues

Other forestry-related policy issues in supplying countries meriting attention include a push for increased processing in a number of countries, customs issues, noncompliance of concessionaires, and rampant corruption problems. Some desirable forest-related policies have been identified in supplying countries, but implementation is often a problem. Finally, lack of funding for government-supported organizations associated with management of the sector and natural forest protection is another important policy issue.

Efforts in countries such as Russia and Indonesia to promote greater processing of logs to increase the value-added of exports have met with varying levels of success. Russia's push to expand lumber and other processed exports to China has not borne significant results. China's import policies are thought to encourage the import of raw logs from Russia: China institutes import duties ranging from 2 percent to 16 percent (as of 2004) and value-added tax (VAT) of 17 percent on processed wood products, but has zero import duty and VAT of only 13 percent on logs imported. In addition, given inexpensive labor in China, Russian sawn wood production costs are at least twice those in China. The raising of Russian duties on log exports to promote processing is still under discussion, though it is feared such a measure might merely increase illegal activity (Lankin, 2004). Indonesia, in contrast, has met its process-

ing ambitions through aggressive policies, but perhaps has taken these too far and is now suffering from excess processing capacity, thought to have resulted from excessive Government licensing (without periodic confirmation of raw material availability) and hidden subsidies.

Customs issues in the regional forest trade are substantial and represent a possible leverage point for addressing trade in illegal product. Gaps between forest product imports reported by China and exports reported by supplying countries are high, particularly for Indonesia and Myanmar. Myanmar's Government requires that all teak logs and all processed hardwood product bound for export pass through the capital, Yangon, but, in practice, only a small proportion of the substantial amount of hardwood lumber bound for China takes this indirect route (Kahrl et al., 2004).

Alexey Lankin (2004) has indicated that there is still no contact between Russian customs and Chinese customs for harmonizing national customs statistics and coordinating on species forbidden for export. Customs violations on the Russian side have gone up with increasing exports to China. Despite Russia's complex system of checking, stamping, etc., corruption among inspectors allows large amounts of illegal product to pass into China. Lankin notes that, of the counter-measures Russia has implemented, control of export sites and reduction of their number have been the most effective.

Noncompliance of concessionaires or leasing parties with regulations or agreements is common in the region. As mentioned, concessionaires in PNG often do not fulfill agreed upon social obligations, leaving unfinished buildings, roads, and bridges across the country (Bun et al., 2004). In Cambodia, a halt in transport of concession logs for which royalties have not been paid is being adopted to increase compliance (Barney, 2004a). In Russia, Chinese companies involved in harvesting are said to have failed to meet provincial requirements of investment in processing and hiring of Russian employees. Several instances of Chinese companies violating concession agreements have been noted in Myanmar, as well, with examples including broken agreements by Chinese companies to provide electricity and various other services to rural communities (Global Witness, 2004).

Illegal logging and other forest sector problems are often linked to government corruption. In PNG, there is strong evidence that corruption exists at the highest levels of Government and throughout the bureaucracy in association with the foreign-owned logging industry. The industry is thought to be a major source of funds

for both political parties and individual politicians; and national-level permits or licenses for logging concessions are said to be issued outside of the established legal process to the company that is willing to pay the right price (Bun et al., 2004). In Cambodia, according to Global Witness, the concession system is also linked to a high degree of corruption, with patronage leading directly to the highest levels of state (Barney, 2004a).

CONCLUSION

The China forest product trade is clearly having a dramatic impact on the forests, economies, and peoples of supplying countries in the Asia-Pacific Region. With strong and growing demand in China and lack of adequate domestic supply, it is likely that the trends identified in this paper will continue for some time. Indeed, while further work is needed on demand drivers and the implications of low per capita wood consumption in China, growth in Chinese demand is expected in the short to medium-term, despite the inability of Asia-Pacific supplying countries, aside from Russia, to expand overall supply of logs and processed products sustainably. As such, China may be faced with the need of developing strategy to secure greater access to Russian product. Given the possibility that even Russian supply may not meet its needs in the longer term, China's strategy may need to encompass other potential sources. Options might include stronger development of collective forests at home, with attention to the supply of not only softwood, but also hardwood species, and more innovative and flexible application of conservation policies in these areas. Another alternative, is encouraging private investment in sustainable natural forest management and plantation development in supplying countries in the region. In the shorter term, however, China will likely continue to make use of forest products from current suppliers as much as possible, and thus may wish to formulate policies to minimize negative ecological and livelihood impacts in these countries. At the same time, given that China's timber product exports (most in the form of furniture and other finished wood products) are 50 percent by RWE volume of the logs and other timber product it imports, final destination countries benefiting from China's low-cost manufacturing may have a role to play.[1] Supplying countries may also wish to develop policies minimizing

[1] In 2003, China's forest product exports by RWE volume were 25 percent of its forest product imports. Timber product (i.e. including logs and solid wood products, but excluding pulp and paper) exports that year, however, at 20.0 million cubic meters RWE were about half of timber product imports (40.3 million cubic meters RWE).

negative impacts. Initiatives might emphasize, for example, the gravitation of small-scale producers toward niche markets where they can find comparative advantage, rather than direct competition with China's highly efficient and well-financed supply and manufacturing chains.

The negative impacts associated with this trade merit the focused attention and dedicated energy of governments, industry, researchers, and conservation groups around the region. The combined efforts of all of these stakeholders, through both international cooperation on shared problems and domestic initiatives, will be needed to address the underlying policy and institutional problems generating the negative impacts. Forward-thinking and proactive solutions should utilize the China trade to create incentives for investment in and the protection of forests, both in China and in supplying countries, by taking advantage of new and growing markets, new partnerships to supply capital, new technologies to lower cost of sustainable production, and better organization and empowerment of local producers. Such solutions should further enable forestry to make stronger contributions to the economic development of the region's poor people both within and outside of China.