Sustainable Procurement of **Wood** and Paper-based Products

Guide and resource kit

World Business Council for Sustainable Development

WORLD RESOURCES INSTITUTE

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Sourcing and legality aspects

Origin
Where do the products come from?

Information accuracy
Is information about the products credible?

Legality
Have the products been legally produced?

Environmental aspects

Sustainability
Have forests been sustainably managed?

Special places
Have special places, including sensitive ecosystems, been protected?

Climate change
Have climate issues been addressed?

Environmental protection
Have appropriate environmental controls been applied?

Recycled fiber
Has recycled fiber been used appropriately?

Other resources
Have other resources been used appropriately?

Social aspects

Local communities and indigenous peoples
Have the needs of local communities or indigenous peoples been addressed?

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Bank of America

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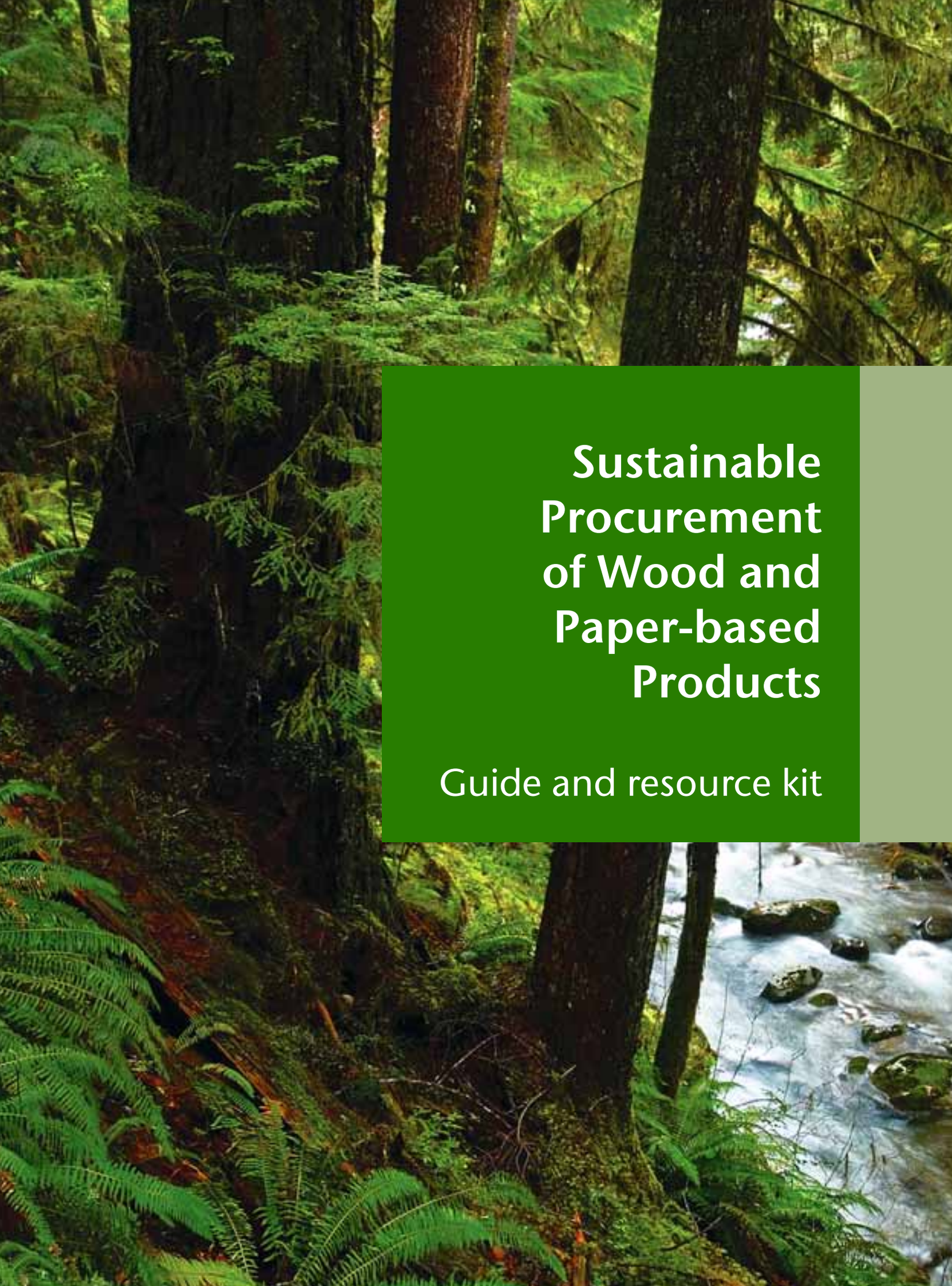
All information contained in this guide, and more, is available at *www.SustainableForestProds.org*.



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Foreword

Decisions regarding the purchase and use of wood and paper-based products can have far reaching, long-term impacts. Consumers, retailers, investors, and communities are taking an increased interest in how their buying decisions affect the environment. Will their purchase today help or hurt the availability of similar products or important natural resources for future generations? These decisions are also expanding rapidly as forests are being recognized as important renewable resources for addressing global warming and for renewable energy.

A variety of tools, initiatives, and labels has been developed to guide consumers of wood and paper based-products. But many organizations that want to implement a sustainable procurement policy may not have the necessary resources and familiarity with the issues to efficiently sort through the myriad choices available. The purpose of this publication is to help them.

This report was created to help procurement managers make informed choices. Specifically it:

- Identifies and explains the central issues around sustainable procurement of wood and paper-based products;
- Provides an overview of the key tools, initiatives, programs and labels currently available – a "Guide to the Guides"; and
- Surveys the maze of slang, jargon and "techno-speak" that often stands in the way of effective understanding and communication.

For the reader who wants more information, a companion website is available at *www.SustainableForestProds.org*. This website contains additional information about the resources available to procurement managers that are described within this report. The website will be continuously updated to reflect the latest developments in this rapidly changing field.

For the reader who would rather have less information, a brief introductory report is available: *Sustainable Procurement of Wood and Paper-based Products: An introduction*.

We believe that these resources will stimulate and help organizations of all sizes and types to find their place in the critical process of sustainable procurement. It is important that those decisions be based on the best available information.

We welcome your comments, questions and opinions.

Sincerely,

Jonathan Lash
President
WRI

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President
WBCSD

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Introduction

Almost half of the Earth's original forest cover has been converted to other land uses (Bryant et al., 1997). Although estimated rates of net loss seem to indicate a slowdown, the total forest area continues to decrease; today forests extend over an estimated 30% of the total land area (FAO, 2006).

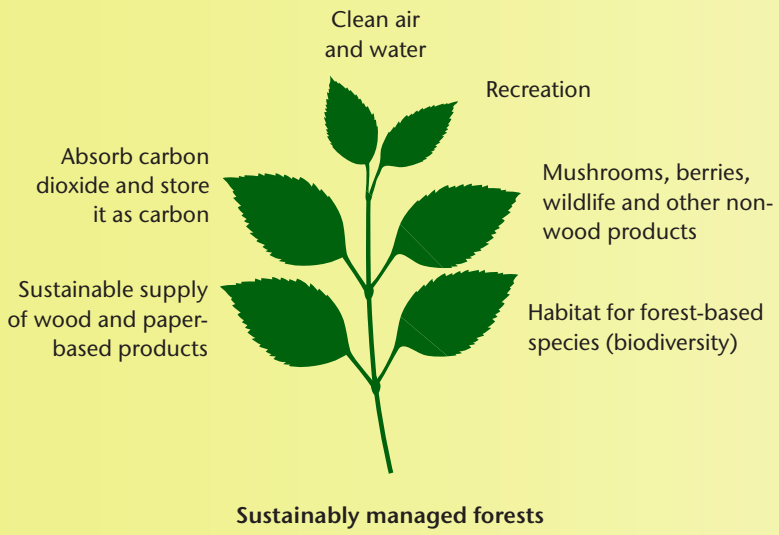
Interest in procurement of wood and paper-based goods produced in a sustainable manner is growing. Concerned consumers, retailers, investors, communities, governments, and other groups increasingly want to know that in buying and consuming these products they are making positive social and environmental contributions.

In what is often described as "sustainable procurement", organizations are looking beyond price, quality, availability and functionality to consider other factors in their procurement decisions including environmental (the effects that the products and/or services have on the environment) and social aspects (labor conditions, indigenous peoples' and workers' rights, etc.) (Environmentally and Socially Responsible Procurement Working Group, 2007).

Sustainable procurement can help maintain a company's social license to operate (Kemp, 2001). It can help reduce reputation risks and, ultimately, help secure sustainable supplies (Kennard, 2006). Sustainable procurement can also be used to align companies with their stakeholders' values and make organizations along the supply chain (from forest owners and producers to retailers) more resilient to changing business conditions.

The growing demand for sustainably produced wood and paper-based goods can lead to improved forest management. Sustainably managed forests are a renewable source of raw materials; these forests also provide services such as clean air and water, wildlife habitat, and sometimes recreation opportunities (Figure 1).

Figure 1. Ecosystem goods and services of sustainably managed forests



Sustainably managed forests produce much more than wood. Sustainable management reduces the risk of the forests being converted to other land use, thereby also sustaining various goods and services.

Sustainably produced wood and paper-based goods can be a wise choice compared to other materials, because:

- They come from a renewable resource – trees, the product of sunlight, soil nutrients and water.
- They capture carbon – through photosynthesis, most trees take carbon dioxide out of the atmosphere and replace it with oxygen, mitigating greenhouse gas emissions. In sustainably managed forests, the carbon released through harvesting is offset by that which is taken up through regeneration and re-growth, making these forests carbon neutral.
- They store carbon over the long term – solid wood and paper-based products can effectively store carbon for decades or even centuries.
- They are recyclable – they can be reused, or converted into other products, extending their useful life and adding to the available resource pool of wood fiber.

PURPOSE AND SCOPE OF THIS GUIDE

The purpose of this *Guide and resource kit* is to assist sustainability officers and business procurement managers, especially major purchasers of wood and paper-based products[1] that do not have "in house" forest and forestry expertise. It identifies and reviews central issues, and highlights tools that can be used to assist sustainable procurement. It should be noted that not all aspects of potential concern and risk apply to all forested regions of the world.

The guide will help purchasers to define requirements for their procurement policies, engage in dialogue with stakeholders, seek resources to meet procurement policy requirements, and assess suppliers.

The past few years have seen a proliferation of tools – projects, initiatives, publications and labels – to aid sustainable procurement of wood and paper-based products. To help those who are new to the subject, a selected number of these tools are highlighted and characterized for the first time (Table 1).

This guide is a companion to the report: *Sustainable Procurement of Wood and Paper-based Products: An introduction.* To obtain a copy of the introductory guide please visit www.sustainableforestprods.org.

More information, commonly cited instruments, tools and processes, and updates, are also available at *www.sustainableforestprods.org*

[1] Wood and paper-based products include solid wood (lumber, building materials and furniture), engineered wood (plywood, oriented strand board and fiberboard) and paper-based products (containerboard packaging and various types of paper such as newsprint, copy and tissue paper).

Table 1. Tools highlighted in this guide

The resources highlighted in this guide can roughly be divided into two categories: requirements for sustainable procurement, and resources to assess requirements.

PROCUREMENT REQUIREMENTS

Private sector initiatives

- Confederation of European Paper Industries' (CEPI) Legal Logging Code of Conduct *(www.cepiprint.ch/environment)*
- Timber Trade Federation Responsible Purchasing Policy *(www.ttfrpp.co.uk)*

Public sector

- Danish Government Procurement Policy for Tropical Forests *(www.2.skovognatur.dk/udgivelser/2003/tropical/)*
- German Government Procurement Policy *(www.bmelv.de)*
- Japanese Government Procurement Policy *(www.env.go.jp/en/)*

Rating systems

- Green Building Initiative's Green Globes Rating System *(www.thegbi.org)*
- Leadership in Energy and Environmental Design (LEED)® Green Building Rating System *(www.wsgbc.org/leed/)*

Certification systems

- Forest Stewardship Council (FSC) Controlled-Wood Standard *(www.fsc.org)*.
- Programme for the Endorsement of Forest Certification (PEFC) Guide for the avoidance of controversial timber *(www.pefc.org)*
- Sustainable Forestry Initiative (SFI) Procurement Objective *(www.sfiprogram.org)*

RESOURCES TO ASSESS REQUIREMENTS

Private sector initiatives

- CEPI Certification Matrix *(www.forestrycertification.info)*
- Paper Profile *(www.paperprofile.com)*
- The report: Public procurement policies for forest products and their impacts *(www.fao.org/forestry/site/trade/en/)*

Public sector

- Central Point of Expertise on Timber Procurement (CPET) *(www.proforest.net/cpet)*. CPET is an initiative of the UK central government to assist in the implementation of its procurement policy

Rating systems

- Environmental Paper Assessment Tool® (EPAT) *(www.epat.org)*
- WWF Paper Scorecard *(www.panda.org)*
- WWF Tissue Scoring *(www.panda.org)*

NGO/Other initiatives

- Forest Certification Assessment Guide (FCAG) *(www.worldwildlife.org/alliance)*
- Global Forest and Trade Network (GFTN) *(www.panda.org/forestandtrade)*
- Green Purchasing Network (GPN) *(www.gpn.jp)*
- Tropical Forest Trust's guide: Good Wood. Good Business *(www.tropicalforesttrust.com)*
- wood for good campaign *(www.woodforgood.com)*
- WWF's Guide to buying paper (companion to WWF's Paper Scorecard)

Key sources of information on these tools are available in the references section. These selected resources represent significant efforts by different actors. FSC's Controlled-Wood Standard and PEFC's guide for controversial sources are recent efforts addressing concerns related to unwanted sources. Different components of the FSC and PEFC sustainable forest management (SFM) certification standard are covered in other sections of this guide.

STRUCTURE OF THE GUIDE

The information in this publication is organized in five main sections:

- Ten key issues and their associated overview – the list can be used as a checklist and as a tool for structuring discussions with stakeholders, while each overview discusses what it is, why it matters, and typical terminology and provides a general sense of how the highlighted resources address each issue and factors for company consideration;
- An overview of the selected tools highlighted in the guide;
- Sources of additional information

Factors to consider

- **A natural first step in developing and implementing sustainable procurement of wood and paper-based forest products is to consider internal company policies or systems that may already exist for the procurement of other products. Another step is to establish dialogue with suppliers, technical experts, non-governmental organizations (NGOs), and owner associations, as these actors can be familiar with specific issues in local circumstances. Trade associations and national and regional government representatives may also have relevant information and advice to offer.**
- **The leverage of a company to influence change depends on its position along the supply chain; large buying companies purchasing from a variety of sources often have more influence.**
- **A commitment to sustainable procurement to protect forests may go beyond forest products. For instance, a company policy to avoid wood from land being converted to agriculture may also want to consider avoiding agricultural products or biofuels from similarly converted lands.**

10 things you should know

10 things you should know

This guide focuses on 10 key issues, formulated as essential questions, central to the sustainable procurement of wood and paper-based products.

Wood and paper-based products can be an environmentally and socially sound purchasing option.

The essence of sustainable procurement is to select these products with acceptable and even beneficial environmental and social impacts. While sustainable procurement is an investment in a better world, it is also an investment in a better bottom line.

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www.sustainableforestprods.org

1. Where do the products come from?

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1. Where do the products come from?

Traceability is the ability to track sources of wood from final products through the supply chain to – as close as is practical – their origins. A clear sense of all the links in the products' supply chain will be useful for the procurement manager to assess:

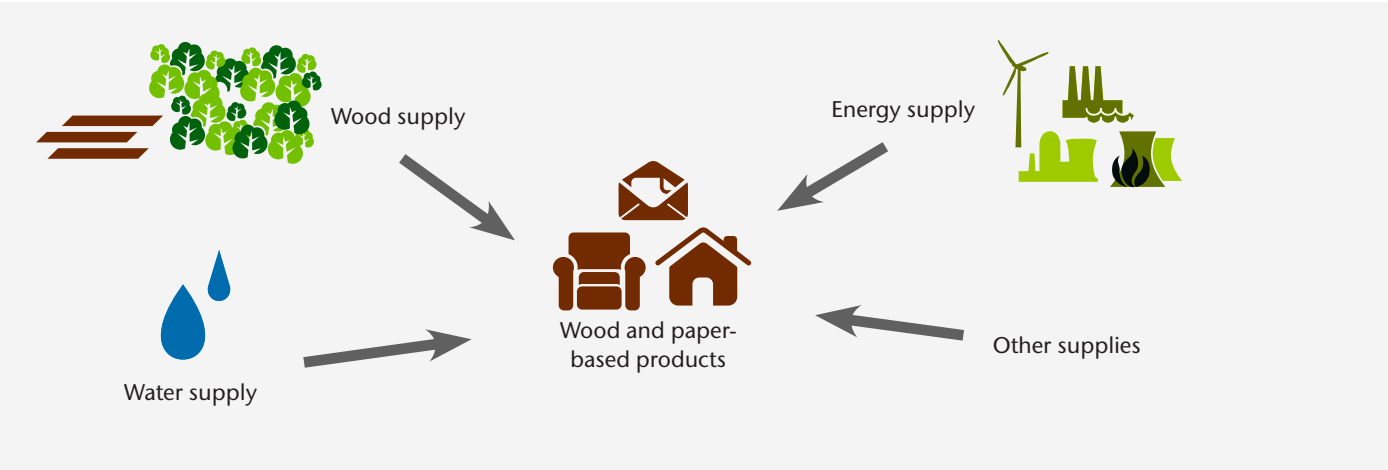
- Whether the sources of wood can be accurately identified.
- Whether the products have the properties they are claimed to have. For instance, whether:
  - The wood was harvested and processed in compliance with relevant laws
  - The wood comes from sustainably managed forests
  - The unique ecological and cultural features of the forest where the wood was sourced have been maintained
  - The products were manufactured with environmental controls in place
  - Harvesting and manufacturing processes complied with social standards.

Tracing the origin of wood and paper-based products is not always straightforward. Supply chains can sometimes link many wood producers and dealers across several countries, and procurement portfolios can be complex, with multiple supply chains (Figures 2 and 3).

It may be easier to establish traceability for solid wood products than for paper-based products. Paper products are manufactured in pulp mills that typically draw wood from many sources. In the most complex cases, a network of dealers buying wood from many different loggers, landowners and sawmills may supply a pulp mill (Box 1). In a sawmill, logs usually lose their link to individual landowners in a sorting yard in the same way an agricultural business would combine grain from individual farmers in a common silo. The wood collected from sawmills – often chips that are by-products of solid-wood products manufacturing – further lose their individual identity during the paper making process.

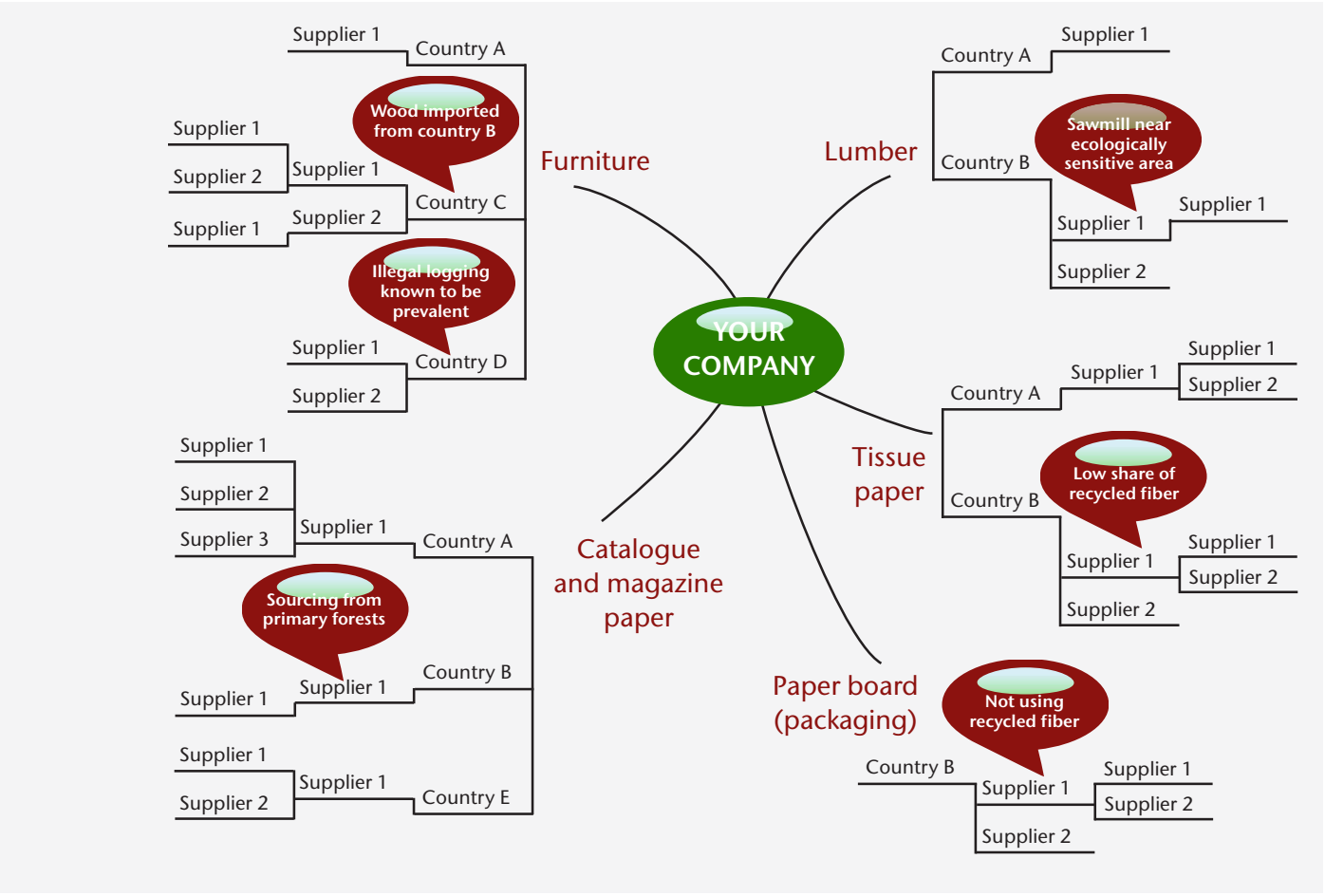
Understanding the position of a company in the supply chain can help identify priorities and key areas of influence. Also, depending on the location and/or complexity of the supply chain, the need for due diligence is greater in some places than in others.

Figure 2. Wood and paper-based products have many inputs



Wood and paper-based products have many inputs. The inputs can be very different for different products, both in terms of the amount used and the characteristics of the supply chain.

Figure 3. Example of a company's portfolio of wood or paper-based products



The supply chain associated with each product varies depending on the product, the location of the purchaser in the supply chain, and the context of the procurement. This figure shows an example of how a company may engage in a number of different supply chains, each with its own challenges and opportunities.

Requesting documentation from suppliers is a common method of tracing the origin of raw materials. A supply chain can be regarded as a chain of legally binding contractual relationships; purchasers can trace the supply chain through contracts, and require that their suppliers commit to providing raw materials that were harvested in compliance with the law, or meet other customer specifications.[2] In places where the law – both background law and contract law – is strong and properly enforced, sales contracts can be a good compliance mechanism.

In addition to sales contracts, other documents for tracing the origin of raw materials include:

- Licensing permit(s) from the relevant authorities giving permission to harvest
- Certificate of a sustainable forest management standard
- Certificate of origin
- Chain-of-custody (CoC) certificate
- Certificate of legality
- Harvesting/management plans
- Phytosanitary certificates – issued by state/local authorities regarding the plant health requirements for the import of non-processed products
- Bill of lading – a receipt for cargo and contract of transportation between a shipper and a carrier that describes the goods being transported and is issued when the shipment is received in good order.
- Export documents
- Transportation certificates

[2] In some cases competition laws may limit the amount of information that customer and supplier may exchange. In the US, for instance, a pulp mill owned by a company may buy chips from sawmills owned by one or more companies. All these companies may compete against each other to buy logs from landowners, and the information about their respective suppliers may be highly proprietary business information; sharing this information directly or through a common customer may be improper and perceived as anti-competitive.

All of these documents should carry appropriate stamps and seals from the relevant governmental agencies. However, false documentation can be common in certain countries and additional systems to trace the raw materials back to – within the limits of feasibility – their origins (Question 1) may be needed in some cases.
Working with those directly involved in the supply chain will help develop a better understanding of the challenges, costs and other impacts associated with implementing additional tracking systems. Forest managers, forest owners, government agencies and certification bodies active in the area can provide useful information.

A high degree of vertical integration makes traceability simpler. However, in some countries such as in the United States, companies are becoming less integrated, selling off their forest lands and thereby externalizing traceability.

Factors to consider regarding traceability

- **Purchase contracts can be useful to trace the origin of the wood. They can also be used as safeguards to require that raw materials be harvested and products be manufactured in compliance with the law, where laws are properly enforced.**
- **Tracing wood through the supply chain back to the regions of origin is becoming common in many parts of the world, and new technologies are emerging to aid this practice. Forest certification schemes are often able to track certified and recycled content as well as uncertified content in the product line. For the uncertified content certification schemes are increasingly placing requirements and safeguards to avoid supply from unwanted/controversial sources.**
- **Different levels of detail may be needed depending on the risk of encountering unacceptable practices. More information and verification is typically needed for high-risk areas than for low-risk areas (Box 2). In areas where illegal activity may be occurring, for instance, detailed information on the specific location of harvesting may be needed while for other areas knowing the general origin of the wood may suffice.**
- **Chain-of-custody systems have been established by different stakeholders to document the wood flow between various steps of the supply chain. Most forest certification schemes include a chain-of-custody standard that reaches from the forests up to certain processes in manufacturing. Not all chain-of-custody systems cover 100% of the certified product, and all systems allow mixing of certified and non-certified materials. In some cases it may be pragmatic for the end user to ensure that its suppliers maintain proper records and make them available upon request, subject to appropriate confidentiality agreements.**

SELECTED RESOURCES: TRACEABILITY

Procurement requirements

Danish Government Procurement Policy for Tropical Forests (under review)	Draft criteria include requirements to track products throughout the supply chain and verification through the certification process.
German Government Procurement Policy	Accepts FSC and PEFC certificates although the systems can be excluded if the complete traceability of the product cannot be guaranteed.
Japanese Government Procurement Policy	Requires that relevant documentation and evidence (e.g., invoices, contract sales, logging notification, etc.) be preserved during definite terms.
CEPI Legal Logging Code of Conduct	Members commit to set up and use reliable verification/tracking systems and use third-party certification chain-of-custody to document the wood flow.
Timber Trade Federation Responsible Purchasing Policy	Provides assistance to members to evaluate the supply chain of their products, the levels of risk of their suppliers and country of origin for their products.
FSC Controlled-Wood Standard	Includes specifications to ensure the tracking of wood to the country and district level.
PEFC Guide for Avoidance of Controversial Timber	Provides specifications to ensure traceability in chain-of-custody standard.
LEED	Promotes the use of locally manufactured materials.
Green Globes	Promotes the use of locally manufactured materials.
SFI Procurement Objective	In the US and Canada, requires an auditable system to characterize the lands from where raw materials are procured and improve rates of compliance with best management practices. For sources outside North America, it requires participants to assess and address risk of acquiring materials from unwanted sources.

Resources to assess requirements

CPET	Provides advice to evaluate supply chains, including contractual requirements. CPET's framework to assess compatibility of forest certification systems with UK government procurement policy covers chain-of-custody standards.
Paper Profile	Provides information on how the origin of wood fiber is documented and whether the mill receives wood from certified forests.
FCAG	Includes considerations about explicit performance requirements including chain-of-custody. FCAG assesses certification systems' provisions for the control of chain-of-custody from the forest of origin to the final product.
GFTN	Provides guidance on gathering information and assessing supplier data regarding the origin of wood products. Provides sample questionnaires and advice on setting up supplier databases (White and Sarshar, 2006).
Good Wood. Good Business guide	Provides advice for companies to identify the sources of their wood (e.g., sending questionnaires, interviewing suppliers, etc). Provides an overview of options for wood tracking, chains-of-custody, and potential issues.
EPAT®	Rates percentage of new fiber input that can be traced back to its origin to the forest management unit. Upcoming EPAT® upgrade allows members to compare and assess different supplies along the supply chain.
WWF Tissue Scoring	Rates the implementation of transparent process(es) for the systematic tracking of materials in order to compile evidence to ensure that the origin of commodities traded and/or processed is known.
WWF Paper Scorecard	Rates percentage of fiber from certified sources.
WWF Guide to buying paper	Promotes the use of Environmental Management Systems (EMS) and third-party verification; showcases a company tracking supply chain.

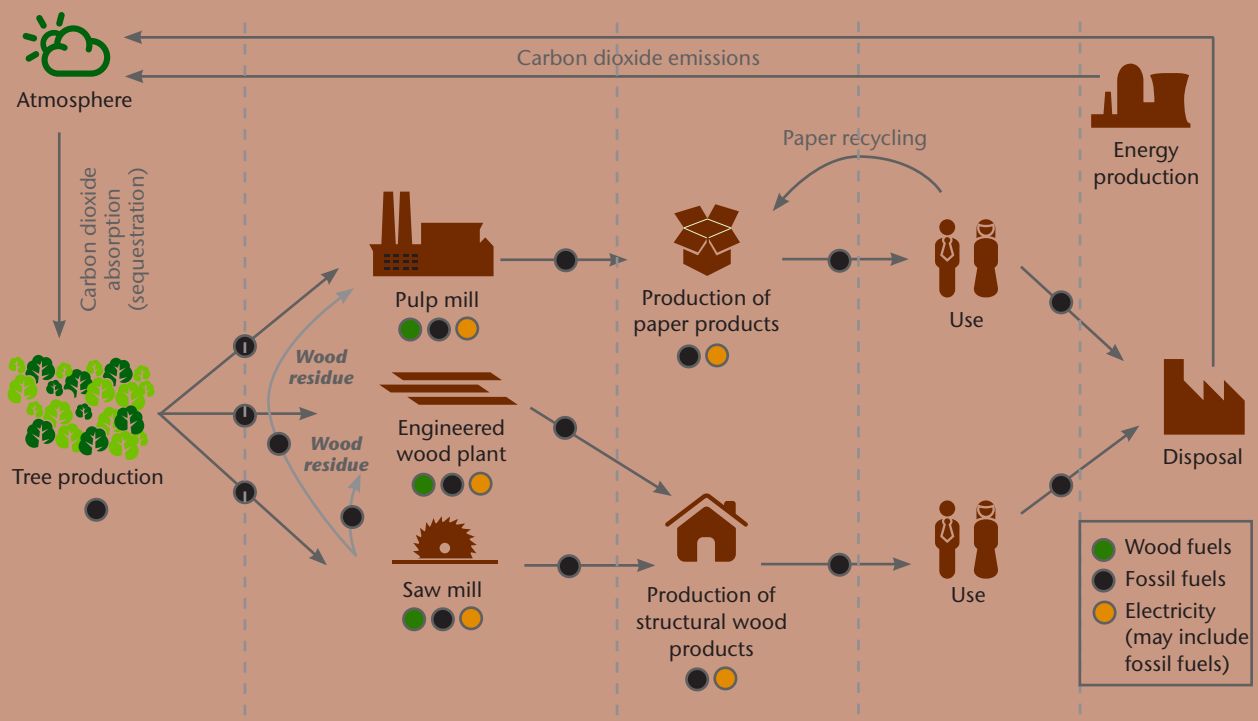
Box 1. The wood supply chain

There is no single standard supply chain for wood and paper-based products and all supply chains are different. There are, however, common elements that can be useful to clarify the connections among various manufacturing points, the product flows, and the environmental and social issues associated (figure below).

Solid wood, engineered wood, and paper-based products are manufactured using different technologies, but they may all come from the same forest or even the same tree. Some forest-based industries often use all parts of the tree for different products in a system of integrated processing facilities. In other instances, only the most valuable portions of the best trees are used. Raw tropical hardwoods are often produced under these circumstances.

There is great variability in supply chains depending on the country, region, or local circumstances. In the most complicated cases, a sawmill, pulp mill and engineered wood plant are fed by a network of product flows and business relationships. Mills frequently incorporate wood from various sources involving a large number of actors. For instance, a pulp mill in the Eastern United States that produces 860,000 tons (Mt) of paperboard per year uses 2,720,000 tons of wood chips. The mill procures these chips directly from 60-70 landowners, some 600 suppliers, 120 sawmills and 10 shipping operations (MeadWestvaco estimates for 2006). Tracking these wood flows can be challenging, but it is possible to do it to a degree that is satisfactory for sustainable procurement (e.g., district level; see traceability discussion).

Generic supply chain and related environmental and social issues



Environmental and social issues throughout the supply system

Primary Sector

- SFM; special places, conversion
- Climate effects
- Harvesting in traditional and community lands without proper permission
- Logging in sites important for traditional & local populations
- Worker's health & safety
- Fair wages

Secondary Sector

- Efficiency
- Pollution
- Climate effects
- Source reduction
- Worker's health & safety
- Fair wages

Tertiary Sector

- Efficiency
- Pollution
- Climate effects
- Recycling
- Worker's health & safety
- Fair wages

Use

- Recycling
- Climate effects
- Efficiency
- Source reduction

Disposal

- Efficiency
- Pollution
- Climate effects
- Recycling
- Worker's health & safety
- Fair wages

Dots representing energy inputs do not quantify amounts of energy used in processing or transportation.

Box 2. Areas of high and low risk of encountering unacceptable practices

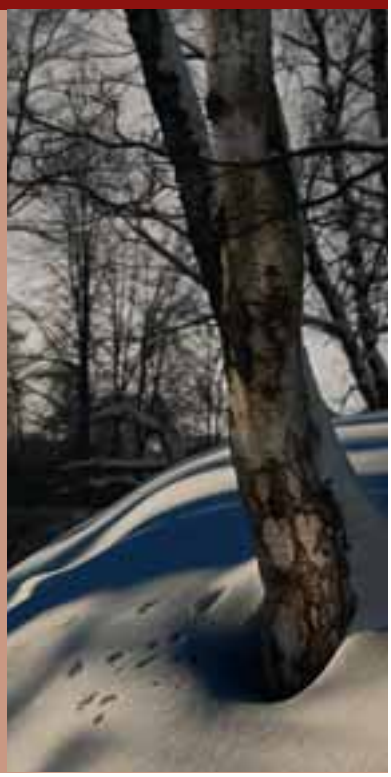
Areas with higher risk of encountering unacceptable practices require more due diligence and more detailed information than areas with lower risk.

High-risk source areas may include:

- **Areas that have unique ecological and socio-cultural features (special places) (addressed in Question 5, protected areas.**
- **Areas of political and social conflict.**
- **Areas where avoidance and violations of workers and/or indigenous rights are known to be high.**
- **Areas where the incidence of forestry-related illegal activity is known to be high.**

Low-risk source areas may include:

- **Sites that have been independently certified to appropriate credible standards. Not all certification labels are perceived by all stakeholders to offer the same level of protection against the risk of sourcing from controversial and unwanted sources.**
- **Sites where there are no ownership disputes or clear processes to resolve them fairly, and where illegal activity in the forestry sector does not typically occur.**
- **Areas known to have low corruption and where law enforcement exists.**



2. Is information about the products credible?

Sourcing and legality aspects

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Where do the products come from?

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2. Is information about the products credible?

Knowing the context and conditions surrounding the harvesting of the raw materials and the manufacturing processes of the products is important. A knowledgeable buyer will be in a better position to properly assess the social and environmental claims of a product (e.g., wood was harvested under a Sustainable Forest Management (SFM) regime, etc.).

When information to support the claims of the product is not complete, accurate, or enough for the buyer to properly assess these claims, monitoring and verification are used to add credibility to the process. In some cases information may come from long and well-established business relationships. In other cases the buyer may wish to consult outside sources for additional information.

Monitoring and verification can take three forms:

1. **Self verification** – a producer monitors and reports about its own harvesting and manufacturing processes. Typical outputs include sustainability reports, emissions reports, reports on social indicators, resource usage reports, recycling reports, etc.
2. **Second party verification** – a buyer verifies that a supplier and/or the products of that supplier conform to a certain standard.
3. **Third party verification** – an independent party verifies that a supplier and/or its products conform to a certain standard. Independent, third-party verification is generally considered to provide more assurance.

Monitoring and verification systems tend to be designed differently depending on which part or aspect of the supply chain (**production in the forest** or **manufacturing processes**) they address:

- **Production in the forest** – the classical monitoring system – forest authorities enforcing relevant laws – can be a reliable system where governance is strong, but it may not be adequate where governance is weak (Question 3. Concerned business, environmental groups and labor and trade organizations, generally agree that independent, third-party verification of forestry operations is desirable, particularly in areas of high risk (Box 2). Forest certification systems are intended to provide an alternative in this part of the supply chain.

Voluntary **forest certification** schemes have been developed to guide the marketplace. These systems allow interested producers to be independently assessed against a locally appropriate standard and to be recognized in the marketplace through a label that certifies compliance. The appropriateness of the standard includes having the right content for the right place, but also entails the process by which the standard was defined and implemented.

Forest certification

There are two major international systems for forest certification: the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Certification Systems (PEFC). Both are used by community and family-owned forests and large landowners and/or industrial operations.[3] These systems have similarities, but they also have differences that are considered important by their respective constituencies. Environmental organizations tend to prefer the FSC, while landowners and tenure holders tend to prefer PEFC. The choice of systems varies by geography, and many forest companies are certified to both systems depending on the location of their operations.

Table 2 provides an overview of the general characteristics of these two systems. Table 2 is NOT meant to be an exhaustive comparison. A proper comparison should include more detail of aspects such as compliance with international standards, system governance, accreditation, certification, criteria used as basis for the systems, performance on the ground, and others (Nussbaum and Simula, 2005). A list of comparisons can be found in Section III of this guide. Some of these comparisons represent the interests of specific stakeholder groups that claim there are significant differences between the certification systems.

[3] Although PEFC was established by the forest industry and trade and by forest owners' organizations, a considerable amount of areas certified by member schemes are industrial operations.

- **Manufacturing processes** – once raw materials leave the forests and reach mills and factories, they may no longer differ significantly from those of other industries if processing facilities are located in developed areas. However, when mills and factories are in less developed areas there may not be enough government enforcement of environmental and social standards. Self- and third-party verification systems can be useful to report and verify status and progress in relation to general standards and organizational commitments (e.g., to reduce emissions or increase recycled content).

Environmental Management Systems (EMS) and Social Management Systems (SMS) can be useful in the manufacturing process. An EMS is generally defined as a series of processes and practices seeking to assess and reduce the environmental impact of an organization, while an SMS encompasses the management of interactions between an organization and its social environment. In general, EMS and SMS have four major elements (EPE, 2007; SMS, 2007):

- **Assessment and planning** – identification of environmental and social aspects of interest, establishment of goals, targets, strategy and infrastructure for implementation.
- **Implementation** – execution of the plan, which may include investment in training and improved technology.
- **Review** – monitoring and evaluation of the implementation process, identification of issues.
- **Adaptive management and verification** – review of progress and adjustments for continual improvement. Different EMS/SMS have various degrees of third-party verification.

The presence or absence of viable EMS and SMS programs can be useful in assessing a supplier's efforts to improve environmental and social performance and enhance compliance with pre-determined standards (EPE, 2007). Third-party verification systems, including chain-of-custody certification (Table 2) and some ecolabels (Box 3) can also be of help.

Factors to consider regarding monitoring and verification

- **Many have compared certification standards, although comparisons are a complex task because of the many factors and elements that need to be considered. Section IV of this resource kit includes a list of resources about comparisons.**
- **Different stakeholders have different perspectives; certification standards are backed by different constituencies, reflecting their different interests, concerns, and values. Environmental organizations tend to prefer the FSC while industry and tenure holders tend to prefer PEFC.**
- **The choice of systems varies by geography, and many forest companies are certified to both systems depending on the location of their operations.**
- **Approximately 7% of the world's total forest area is currently certified. The area under certification is growing rapidly and so is the supply of certified products; however, there may be cases when it can be difficult to meet the demand of certified products. Most certified areas are in developed countries.**
- **In some regions small landowners have not embraced third-party certification.**
- **The need for independent monitoring and verification varies for different forest areas. A buyer with many supply chains might want to prioritize focusing on monitoring and verification efforts based on the perceived risks associated with sourcing from areas where information may be incomplete or misleading.**

SELECTED RESOURCES: MONITORING AND VERIFICATION

Procurement requirements

Danish Government Procurement Policy for Tropical Forests (under review)	Requirements for monitoring and verification are covered through the certification process.
German Government Procurement Policy	Accepts FSC and PEFC as guarantee that wood and wood products certified under these systems come from verifiable legal origin and are produced under SFM.
Japanese Government Procurement Policy	Requires verification of legality and sustainability through various instruments and procedures such as wood industry associations' codes of conduct, self-verification mechanisms and forest certification systems. Certification systems that are recognized to meet monitoring and verification requirements include Japan's Sustainable Green Ecosystem Council, the Canadian Standards Association (CSA), the Indonesian Lembaga Ekolabel (LEI), the Malaysian Timber Certification Council (MTCC), PEFC, and SFI.
Public procurement policies for forest products and their impacts	Reviews verification requirements issued by public timber procurement policies in Belgium, Denmark, France, Japan, Netherlands, New Zealand and the UK.
CEPI Legal Logging Code of Conduct	Members commit to set up and use reliable verification systems, apply third-party certification of the chain-of-custody, and EMS.
Timber Trade Federation Responsible Purchasing Policy	Provides assistance and guidance to its members to verify compliance with the Federation's purchasing policy, as well as with UK central government sustainability and legality procurement requirements. Members are expected to complete annual management reports, which are evaluated by an independent auditor to assess compliance with the Federation's responsible purchasing policy.
FSC Controlled-Wood Standard	Standard is subject to third-party verification.
PEFC Guide for the avoidance of controversial timber	Standard is subject to third-party verification.
SFI Procurement Objective	For the US and Canada, requires participants to have an auditable system characterizing the lands where raw material is procured in compliance with best management practices. As needed, participants implement either individually, cooperatively or third-party evaluations of on-the-ground compliance.

Resources to assess requirements

CPET	Provides advice on obtaining evidence of compliance and means of verification. CPET's framework to assess compliance of certification systems with UK central government procurement requirements includes elements of certification and accreditation.
CEPI Certification Matrix	Compares the compatibility of certification systems with ISO guidelines for the accreditation of chain-of-custody standards.
Paper Profile	Provides information on whether or not a mill receives wood from certified forests and the certification systems used. It also includes a description of certified environmental management systems.
FCAG	Includes criteria to assess the absence of conflicts of interest in a certification scheme's decision-making process. It also includes criteria and requirements to assess the independence of the evaluation and verification of performance in forest management and the chain-of-custody standard. Criteria and requirements to assess the use of monitoring systems to evaluate overall management, and the social and environmental impacts are also included.
GFTN	Provides advice on setting up internal monitoring and tracking systems. Promotes credibly, third-party, certified products.
GPN	Prefers suppliers that implement EMS to monitor and improve performance, as well as suppliers that proactively disclose environmental information.
Good Wood. Good Business guide	Provides advice about third-party verification systems, as well as potential issues.
EPAT®	Rates degree of verification. It also rates whether a company has EMS, monitoring programs, and procedures to manage negative impacts on communities.
WWF Tissue Scoring	Rates the systematic tracking of paper-based materials, as well as whether tracking is monitored and independently verified. Rates companies' commitments to implement an EMS and making such commitments publicly available. Progress towards environmental and social policies should be reported through an annual corporate/environmental responsibility report.
WWF Paper Scorecard	Rates fiber from certified operations as well as manufacturing operations that implement EMS.
WWF Guide to buying paper	Promotes the use of EMS and third-party verification.

Box 3. Ecolabels (other than forest certification systems)

A company may want to inform consumers about the environmental claims of a specific product or service through the use of ecolabels.

Ecolabeling is a voluntary certification and verification process. The International Organization for Standardization (ISO) classifies three broad types of ecolabels (Global Ecolabeling Network, 2007):

- Type I: a voluntary, multiple-criteria-based third-party program that authorizes the use of environmental labels on products indicating overall preference of a product within a particular category based on life cycle considerations. Examples include the EU Flower and the Canadian Environmental Choice Program.
- Type II: a program involving self-declared environmental claims by parties likely to benefit from such claims. These programs often involve single attributes. An example is the Paper Profile.
- Type III: a program involving a declaration that provides quantified environmental life cycle product information provided by the supplier, based on independent verification, and systematic data presented as a set of categories of a parameter.

There are many ecolabels in the world. In addition to FSC and PEFC, other important ecolabels for wood and paper-based products include:

- Blue Angel (www.blauer-engel.de) – the oldest environmental ecolabel; initiated by the German Ministry of the Interior, it is now administered by the Federal Environmental Agency. Wood and paper-based products covered include building materials, different types of paper and cardboard, packaging materials, and furniture.
- Bra Miljöval (snf.se/bmv/english.cfm) (Good Environmental Choice) – the ecolabel from the Swedish Society for Nature Conservation started in 1988. Wood-based products covered include various types of paper.
- Environmental Choice Program (www.environmentalchoice.com) – owned by the Canadian government and administered by TerraChoice Environmental Marketing. Wood and paper-based materials covered include building raw materials, flooring, office furniture and various types of paper.
- Eco Mark (www.ecomark.jp/english/nintei.html) – administered by the Japan Environment Association, it covers various types of paper, board wood, and furniture and packaging materials.
- Environmental Choice (www.enviro-choice.org.nz) – a voluntary, multiple specifications labeling program endorsed by the New Zealand government and managed by the New Zealand Ecolabelling Trust. Wood-based products covered include various types of paper, furniture and flooring products.
- EU Flower (ec.europa.eu/environment/ecolabel/index_en.htm) – started in 1992 under the European Union Eco-labeling board. The EU Flower is active throughout the European Union and also in Norway, Liechtenstein and Iceland. Wood-based products covered include various types of paper and building materials.
- Green Seal (www.greenseal.org/certification/environmental.cfm) – developed by Green Seal Inc., an independent non-profit organization. Wood-based products covered include various types of paper, furniture, particleboard and fiberboard, and food packaging materials.
- Greenguard (greenguard.org) – products certified meet requirements of the US Environmental Protection Agency, the US Green Building Council, and Germany's Blue Angel ecolabel.
- Good Environmental Choice Australia (www.aela.org.au/standardsregister.htm) – designed by Good Environmental Choice Australia Ltd. Wood and paper-based products covered include various types of paper, flooring products, packaging materials, furniture and recycled and reclaimed timber.
- The Swan (www.svanen.nu/Eng/) – the official Nordic ecolabel introduced by the Nordic Council of Ministers. Certifies some paper products. It also certifies that durable wood products do not incorporate heavy metals or biocides and are produced from sustainably managed forests.

There may be products bearing ecolabels that do not actually meet the label's environmental standards. The International Organization for Standardization (ISO) and other institutions provide guidance on general labeling standards to help in selecting ecolabels:

- International Organization for Standardization (www.iso.org) – Standards 14020 through 14025 provide guidelines for ecolabels for first and third party verification.
- US Federal Trade Commission (www.ftc.gov/bcp/grnrule/guides980427.htm) – provides guidance on the use of ecolabels and the use of environmental marketing claims.
- Consumer Reports Eco-labels (www.greenerchoices.org/eco-lablels/eco-homecfm) – provides guidance, scorecards and comparisons of ecolabels in the US.
- The Global Ecolabeling Network (www.gen.gr.jp/eco.html) – provides background information, links to national members, and so on.
- The UK Government's Green Claims Code (www.defra.gov.uk/environment/consumerprod/gcc/pdf/gcc.pdf) – provides guidance on statements, symbols, descriptions and verification.

Sources: Global Ecolabeling Network, 2007.

Table 2. General characteristics of the two major systems for forest certification

Developed by	Forest Stewardship Council (FSC)	
	GENERAL	
Established	Established in 1993 at the initiative of environmental organizations.	
Basic principle	FSC is a system of national and regional standards consistent with ten principles of SFM that cover the following issues: 1- Compliance with laws and FSC principles 2- Tenure and use rights and responsibilities 3- Indigenous peoples' rights 4- Community relations and workers' rights 5- Benefits from the forests 6- Environmental impact 7- Management plans 8- Monitoring and assessment 9- Special sites – high conservation value forests (HCVF) 10- Plantations	These principles were developed by a global partnership of stakeholders convened by FSC. The principles apply to all tropical, temperate and boreal forests and are to be considered as a whole. All national and regional standards are derived in-country from the ten principles. The principles are expected to be used in conjunction with national and international laws and regulations, and in compatibility with international principles and criteria relevant at the national and sub-national level (FSC Policy and Standards; principles and criteria of forest stewardship) (FSC, 1996). There is variation in regional standards and in interim standards adopted by auditing bodies.
Components, members	All component standards carry the FSC brand. National initiatives currently exist in Argentina, Australia, Belgium, Bolivia, Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, China, Colombia, Croatia, Czech Republic, Cote d'Ivoire, Denmark, Democratic Republic of Congo, Ethiopia, Ecuador, Estonia, Finland, Gabon, Germany, Ghana, Hungary, Ireland, Italy, Japan, Mexico, Mozambique, Netherlands,	Papua New Guinea, Peru, Poland, Romania, Russia, Slovakia, South Africa, Spain, Sweden, Switzerland, United Kingdom, United States, Vietnam, and Zambia (FSC website).
Stakeholder scope	FSC is a multi-stakeholder owned system; national standards are set by a consultative process in which economic, social, and environmental interests have equal weight (FSC website).	
Reach and extent	More than 93 million ha have been certified under FSC (as of November 2007) (FSC,2007).	
	MONITORING AND VERIFICATION	
Chain-of-custody (CoC)	• The CoC standard is evaluated by a third-party body that is accredited by FSC and compliant with international standards. • CoC standard includes procedures for tracking wood origin. • CoC standard includes specifications for the physical separation of certified and non-certified wood, and for the percentage of mixed content (certified and non-certified) of products.	• CoC certificates state the geographical location of the producer and the standards against which the process was evaluated. Certificates also state the starting and finishing point of the CoC. (FSC policy on percentage-based claims, and various FSC guidelines for certification bodies)
Inclusion of wood from non-certified sources	FSC's Controlled Wood Standard seeks to avoid: (a) Illegally harvested wood (b) Wood harvested in violation of traditional and civil rights (c) Wood harvested in forests where high conservation values are threatened by management activities (d) Wood harvested in forests being converted to plantations or non-forest use	(e) Wood from forests in which genetically modified trees are planted All certification holders are required to fully implement requirements by 1 January 2008. (FSC, 2004C) (Botriel, 2007).
Verification	Requires third-party verification.	

This table provides an overview of the general characteristics of these two systems. This table is NOT meant to be an exhaustive comparison. A list of references to more detailed comparisons can be found in Section IV – Additional resources. (Additional sources: FSC, 2004A, 2004B, and 2006; Cashore et al., 2004)

Programme for the Endorsement of Forest Certification Schemes (PEFC)

GENERAL

Founded in 1999 in Europe, at the initiative of forest landowners as a certification system. PEFC later became an endorsement mechanism system. Many member certification systems predate PEFC.

PEFC is a mutual recognition mechanism for national and regional certification systems. Endorsed certification systems are to be consistent with internationally agreed environmental, social and economic requirements such as the Pan-European Operational Level Guidelines (PEOLG), the African Timber Organization (ATO) and International Tropical Timber Organization's (ITTO) Guidelines, as well as intergovernmental processes on criteria and indicators for SFM. The elements of SFM covered by these requirements may vary to fit the circumstances of the areas for which they were developed. For instance, the Pan-European Operational Level Guidelines cover the following:

1- Maintenance and enhancements of forest resources and their contribution to global carbon cycles
2- Maintenance and enhancement of forest ecosystem health and vitality
3- Maintenance of productive functions of forests
4- Maintenance, conservation and enhancement of biodiversity
5- Maintenance and enhancement of protective functions in forest management
6- Maintenance of socioeconomic functions and conditions

Endorsed certification systems are expected to be consistent with international agreements such as ILO core conventions, as well as conventions relevant to forest management and ratified by the countries such as the Convention on Biological Diversity (CBD), CITES and others.

There is variation among member certification standards with some standards exceeding PEFC requirements (PEFC, 2006A).

Component standards carry their own brand names, such as SFI in the US and the CSA in Canada. Recognized (endorsed) member country/systems include Australia, Austria, Belgium, Brazil (Cerflor), Canada (CSA), Chile (Certfor), Czech Republic, Denmark, Finland, France, Germany, Italy, Latvia, Luxembourg, Norway, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and United States (the American Tree Farm System (ATFS) and SFI). PEFC endorses certification systems once they have successfully gone through the external assessment process using independent assessors (PEFC website). Other members include schemes from Belarus, Cameroon, Estonia, Gabon, Ireland, Lithuania, Malaysia, Poland, Russia, and Uruguay.

Multi-stakeholder participation is required in the governance of national schemes as well as in the standard-setting process (PEFC, 2006C).

More than 197 million ha have been certified under the PEFC standards (as of November 2007) (PEFC website).

MONITORING AND VERIFICATION

CoC certificates are issued based on: (i) compliance with Annex 4 and with Appendix 1 of the TD, or alternative appendices approved by the PEFC council; (ii) member scheme's definition of origin that is compatible with Appendix 4 and Appendix 1 or alternative appendices; and (iii) member scheme's CoC standard that is compatible with Annex 4 and Appendix 1 or alternative appendices.

- Only accredited certification bodies can undertake certification.
- CoC requirements include specifications for physical separation of wood and percentage-based methods for products with mixed content.

CoC certificates state the geographical location of the certificate holder; the standard against which the certificate was issued; and, identify the scope, product(s) or product(s) group(s) covered (PEFC, 2006A, 2006C, D and F).

PEFC's mandatory Guide for the avoidance of wood from controversial sources seeks to avoid wood from illegal or unauthorized harvesting.

Illegal harvesting includes harvesting in areas which are either protected by law or where a plan for strict protection has been officially published by the relevant government authorities, unless permission to harvest has been granted. This also implies issues such as workers rights, health and safety, indigenous peoples' rights as protected by legislation (PEFC, 2006G).

Requires third-party verification.

3. Have the products been legally produced?

Sourcing and legality aspects

Origin
Where do the products come from?

Information accuracy
Is information about the products credible?

Legality
Have the products been legally produced?

Environmental aspects

Sustainability
Have forests been sustainably managed?

Special places
Have special places, including sensitive ecosystems, been protected?

Climate change
Have climate issues been addressed?

Environmental protection
Have appropriate environmental controls been applied?

Recycled fiber
Has recycled fiber been used appropriately?

Other resources
Have other resources been used appropriately?

Social aspects

Local communities and indigenous peoples
Have the needs of local communities or indigenous peoples been addressed?

3. Have the products been legally produced?

There is no universally accepted definition of illegal logging and trade. Strictly speaking, illegality is anything that occurs in violation of the legal framework of a country. It is generally acknowledged that legality is not a synonym for Sustainable Forest Management, and that what is sustainable may not always be legal (World Bank, 2006; Contreras-Hermosilla et al., 2007). Some examples of what have been considered illegal forestry activities are given in Box 4.

Illegal logging is a fundamental problem in certain nations suffering from corruption or weak governance. International trade is one of the few sources of influence sufficient to create the political will to make improvements. Several international processes[4] have taken up this issue, and national efforts have started to appear as a result. During the last five to 10 years, illegal logging and illegal trade have risen to the top of the international forestry agenda.

Illegal logging of wood and paper-based products entails a complex set of legal, political, social, and economic issues. Poverty, lack of education, financial issues, population growth, and weak governance are all enabling factors for illegal activity. Illegal activity has many drivers that make it challenging to address this issue. These drivers are often associated with a range of items from short-term economic gain to local and national actors including communities and governments:

- Local (and often national) governments may receive higher revenues as a result of illegal land conversion and increased timber production.
- Because illegally logged wood can be sold at lower prices, it depresses the profitability of legally harvested wood while improving the competitiveness of industries that use illegal wood.
- Many people may derive an income from illegal forest activities.

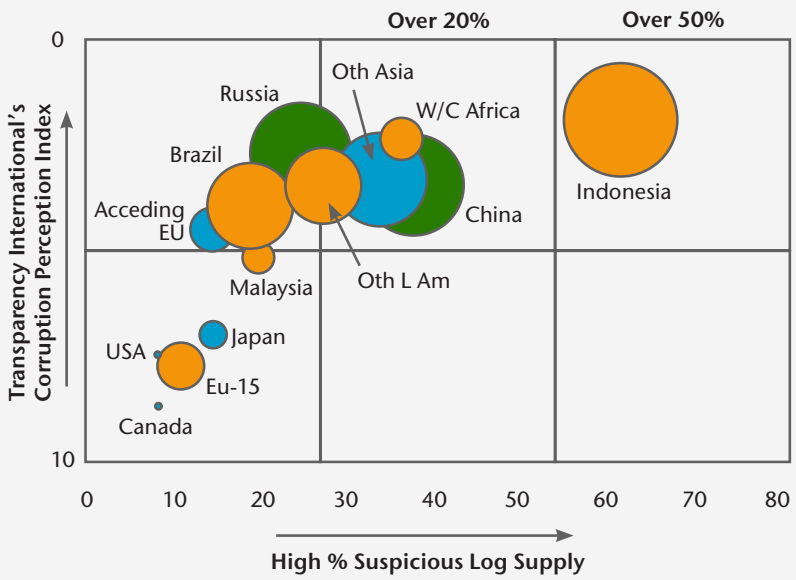
Illegal logging and illegal trade can create serious problems:

- **Government revenue losses** – the World Bank estimates that governments lose revenue equivalent to about US$ 5 billion per year (World Bank, 2002A).
- **Unfair competition** – market distortion and reduction of profitability for legal goods; the World Bank puts this cost at more than US$ 10 billion per year (World Bank, 2002A).
- **Increased poverty** – occurs indirectly when governments lose revenues.
- **Support and funding of national and regional conflicts.**
- **Unplanned, uncontrolled and unsustainable forest management.**
- **Destruction** – areas important for biological conservation, ecosystem services, and local livelihoods.

Between 8-10% of global wood production is estimated to be illegally produced, although the great uncertainty of these estimates is also acknowledged; most of this illegally produced wood is used domestically, although a significant portion enters the international trade either as finished products or raw materials (Seneca Creek and Wood Resources International, 2004). Estimates of illegal logging in specific countries and regions vary depending on the nature of the activity and the variability of laws and regulations (Figure 4).

[4] Prominent international initiatives include the G8 Forestry Action Programme, agreed by G8 foreign ministers in 1998, and the Gleneagles Declaration in 2005. The European Union in 2003 adopted an Action Plan on Forest Law Enforcement, Governance and Trade (EU FLEGT). The US launched the President's Initiative against Illegal Logging, also in 2003. Regional intergovernmental processes on Forest Law Enforcement and Governance (FLEG) have been established in Southeast Asia, Central Africa, and Europe and Northern Asia, each on the basis of a Ministerial Declaration.

Figure 4. Corruption and illegal logging activity (2004)



In a widely accepted, in-depth multi-country study, Seneca Creek Associates and Wood Resources International compared corruption and illegal logging activity. In the above graph, the y-axis displays Transparency International's Corruption Perception Index (CPI), where corruption tends to be higher (i.e., having lower CPI) in countries with lower per capita incomes. The x-axis displays the proportion of the total supply of suspicious logs, while the size of a bubble shows the absolute volume of suspicious logs that reach the market in a country or region, including imported logs.

EU-15 refers to the 15 countries in the European Union before May 2004: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Republic of Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom. EU countries include EU-15 countries plus Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, and Slovenia.

Source: Seneca Creek Associates and Wood Resources International (2004).

Factors to consider regarding legality

- Legality is not an issue in every country. A pragmatic approach may be to begin by identifying regions/countries at higher risk, and then focusing efforts on aspects of concern within those areas (e.g., corruption, lack of law enforcement, social conflict, etc). A number of resources are available to assist in this process (below).
- Legality is not always better than illegality in terms of SFM. Lack of compliance with minor administrative regulations may not have a significant impact on sustainability. It is desirable, but difficult, to focus on significant infractions.
- There are also cases when the law is not seen by everyone as equitable or fair (e.g., people with traditional claims to the land), or where laws protecting customary rights are not enforced or ignored.
- Verification of compliance with all national laws can be challenging. A pragmatic way to address this is to establish whether violations are merely oversights or form a pattern of major violations with serious impacts on sustainability.
- It is difficult to prove legality beyond good title because legal systems document non-compliance (i.e., citations, fines), not compliance. Transfer of title, however, is commonly documented through bills of lading and other negotiable instruments. Even for title, however, the risk of forged documents can be significant in some places. At a minimum, documents should carry all appropriate stamps and seals from the relevant governmental agencies.
- Consider actively supporting government action to address illegal logging and international trade in illegally-produced wood-based products.

SELECTED RESOURCES: LEGALITY

Procurement requirements

Danish Government Procurement Policy for Tropical Forests (under review)	Legality requirements in draft criteria are similar to UK central government criteria for legal timber. Requires that the forest owner/ manager hold legal use rights, compliance with all relevant laws related to forest management, environment, labor and welfare, health and safety and other parties' tenure and use rights. Draft criteria also require payment for all relevant royalties and taxes, as well as compliance with CITES requirements. Accepts CSA, FSC, MTCC, PEFC and SFI as schemes that provide adequate documentation of legality.
German Government Procurement Policy	Requires that wood come from verifiable legal forest management, initially as verified by FSC and PEFC.
Japanese Government Procurement Policy	Requires that timber be harvested in a legal manner consistent with procedures in the forest laws of timber-producing countries. Legality is a priority for the Japanese government.
Public procurement policies for forest products and their impacts	Reviews how public procurement policies define or address legality (e.g., through certification, providing specific guidance on selected aspects, deferring to third-party definitions, etc). It provides selected definitions of legality and compares different definitions and approaches. The report also analyzes the impact of public procurement policies on legality.
CEPI Legal Logging Code of Conduct	Members commit to full compliance with all applicable laws related to logging and purchasing wood. Members commit to implement procurement procedures that comply with laws corresponding to the underlying principles of the EMS. The legality of purchased wood is to be appropriately documented; support and cooperation with governments in their action to halt illegal logging is expected.
Timber Trade Federation Responsible Purchasing Policy	Provides guidance and assistance to members to evaluate levels of law compliance in various countries of the world.
FSC Controlled-Wood Standard	Requires wood harvesting to comply with all applicable harvesting laws in the jurisdiction.
PEFC Guide for the avoidance of controversial timber	Introduces safeguard mechanisms against procuring illegally logged wood.
SFI Procurement Objective	Requires program participants to comply with the law in their own operations, to assess and address the risk of procuring from illegal logging and support efforts to halt illegal logging.

Resources to assess requirements

CPET	Provides advice and guidance for compliance with UK central government procurement requirements for the legality of wood products. Accepts CSA, FSC, MTCC, PEFC, and SFI certification as evidence of legality.
CEPI Certification Matrix	Compares certification systems' law compliance requirements.
FCAG	Includes criteria and requirements for assessing compliance with relevant national and international laws, treaties and agreements.
GFTN	Provides advice for keeping illegally harvested wood out of the supply chain. Advice includes providing definitions of legal wood, addressing bad or unfair laws, examples of procurement policies, list of CITES listed species, and lists of legal documentation for various countries. (See Miller et al., 2006).
GPN	Promotes the use of raw materials that have been produced in compliance with the laws and the rules of the regions where they were harvested.
Good Wood. Good Business guide	Provides overview definitions of illegal and legal wood, as well as guidance to exclude illegal wood from the supply chain.
EPAT®	Rates compliance of the paper-making facility with international labor, human, and health conventions, as well as certified and non-certified fiber content. For non-certified fiber content, EPAT rates the percentage of fiber subject to FSC's Controlled-Wood Standard and SFI's procurement policy.
WWF Tissue Scoring	Scoring criteria include clear policies aimed at eliminating all raw materials from illegal and controversial sources.
WWF Paper Scorecard	Rates percentage of fibers that are certified to avoid the potential inclusion of fiber from unwanted sources.
WWF Guide to buying paper	Promotes the avoidance of illegal and other unacceptable sources. Promotes forest certification as means to avoid sourcing raw materials harvested through illegal practices.

Box 4. Examples of illegal forestry activities

Illegal activities can generally fall into two broad categories: illegal origin (ownership, title or origin), and lack of compliance in harvesting, processing, and trade. The following are examples of activities that have been identified and/or included in some definitions of illegal logging (Contreras-Hermosilla, 2002; Miller et al., 2006; GFTN, 2005).

Illegal origin (ownership, title, or origin)

- Harvesting of wood in protected areas without proper permission (e.g., in national parks and preserves). This may include instances where authorities allocate harvesting rights without properly compensating local people.
- Logging protected species.
- Logging in prohibited areas such as steep slopes, riverbanks and water catchments.
- Harvesting wood volumes below or above the limits of the concession permit as well as before or after the logging period stated in the harvesting license.
- Harvesting wood of a size or species not covered by the concession permit.
- Trespass or theft, i.e., logging in forests without the legal right to do so.
- Violations, bribes and deception in the bidding process to acquire rights to a forest concession.
- Illegal documentation (including trade documents).

Lack of compliance throughout the supply chain (harvesting, manufacturing, and trade)

- Violations of workers' rights (e.g., illegal labor, underpaying workers, etc.), labor laws and international standards, and violation of traditional rights of local populations and indigenous groups.
- Violation of international human rights treaties.
- Wood transported or processed in defiance of local and national laws.
- Violations of international trade agreements (e.g., CITES species – Box 5).
- Failure to pay legally prescribed taxes, fees and royalties.
- Illegal transfer pricing (e.g., when it is to avoid duties and taxes), timber theft, smuggling.
- Money laundering.
- Failure to fully report volumes harvested or reporting different species for tax evasion purposes.

Different definitions of illegal logging can lead to different estimates, which makes addressing the problem more difficult (Contreras-Hermosilla et al., 2007; Rosembaum, 2004). Defining illegal logging is not only a technical issue, but one with potentially far-reaching political implications (Contreras-Hermosilla et al., 2007).

Box 5. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was established to limit and regulate the trade of endangered species.

CITES is an international, legally binding agreement to ensure that international trade of certain animals and plants (including wood from certain tree species) does not threaten their survival.

CITES establishes controls for the international trade of selected species. All import, export, and introduction of species covered by the convention must be authorized through a licensing system established by member countries. Each country designates one or more Management Authorities that administers the licensing system advised by one or more Scientific Authorities.

Based on the degree of protection needed, species covered by CITES are listed in three appendices:

- Appendix I – species threatened with extinction; trade is permitted but under very restricted circumstances
- Appendix II – trade of these species is controlled and regulated to ensure their survival
- Appendix III – species subject to special management within a country.

Sources: Cites website (www.cites.org), and UNEP/WCMC's Tree Conservation Information Service website (www.unep-wcmc.org/trees/trade/cites.htm).

The Bali Mynah is one of the world's most critically endangered birds. Native to the island of Bali in Indonesia, there are less than twenty remaining in the wild.

4. Have forests been sustainably managed?

Sourcing and legality aspects

Origin
Where do the products come from?

Information accuracy
Is information about the products credible?

Legality
Have the products been legally produced?

Environmental aspects

Sustainability
Have forests been sustainably managed?

Special places
Have special places, including sensitive ecosystems, been protected?

Climate change
Have climate issues been addressed?

Environmental protection
Have appropriate environmental controls been applied?

Recycled fiber
Has recycled fiber been used appropriately?

Other resources
Have other resources been used appropriately?

Social aspects

Local communities and indigenous peoples
Have the needs of local communities or indigenous peoples been addressed?

4. Have forests been sustainably managed?

The movement for sustainable procurement of wood and paper-based products is driven to a large extent by the concern for how forests are affected by wood production. This concern has two major aspects:

- **Sustainability** – the balance of economic, social and environmental demands on the forest landscape. The maximization of wood production and minimization of cost should not upset the environmental and social balance of the landscape, either by removing trees at a quicker rate than they grow back or by paying insufficient attention to environmental or social concerns.
- **Forest conversion and land-use change** – the forest can change drastically after logging. It may be redesigned for tree production in a way that is significantly different from the forests that would naturally occur, or the forest can be converted to some other purpose that prevents trees from growing back.

Sustainable forestry

Sustainable Forest Management (SFM) is a management regime that integrates and balances social, economic, ecological, cultural, and spiritual needs of present and future generations (United Nations, 1992). Essential aspects of SFM include the following:

- **Economic** – the capacity of the forests to attract investment and support economically viable forest uses in the present and the future is undiminished. The forest is not used beyond its long-term capacity for production of wood, and non-wood forest products.
- **Social** – include a variety of aspects such as:
  - The rights of indigenous peoples and local communities are respected and protected
  - Forest workers are healthy, safe, and their rights are protected (e.g., freedom of association, right to bargain, child labor, forced labor, equal remuneration and non-discrimination)
  - Local communities, including indigenous peoples, benefit economically from forest management
  - Sites of religious, spiritual, archaeological, historic, as well as of aesthetic and recreational value are preserved.
- **Environmental** – forest use protects biodiversity (ecosystems, species, genes and ecological processes) and the capacity to maintain ecosystem processes and services such as watershed protection, pollination, protection against mudslides, aesthetic beauty, carbon storage, etc.

The result of different ways to balance these trade-offs is illustrated in Figure 5.

There are various approaches, positions, standards, and definitions of what SFM means and what specific management measures it requires. There are also various methods to measure progress towards SFM. Depending on the way their authors understand the concept and the management objectives, SFM standards for the same forest can be different. Regional standards for SFM can legitimately be somewhat different from one another, reflecting differences in forest types, legal frameworks, social conditions, and other factors. Mainstream standards for SFM differ on the following issues:

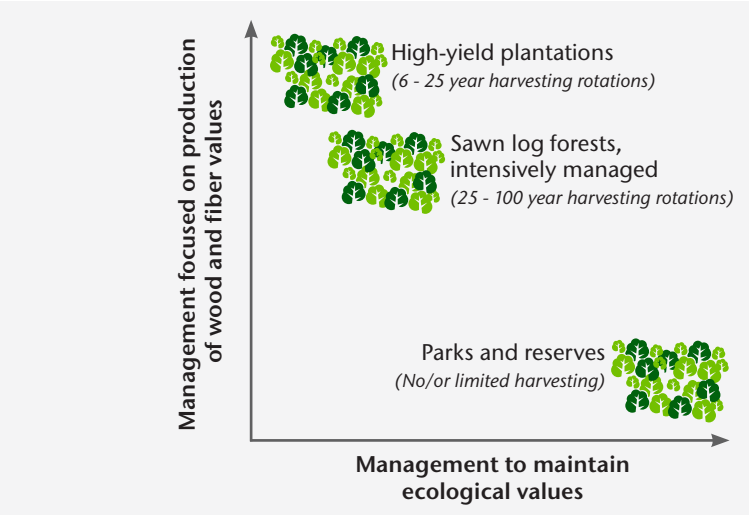
- **Clearcutting** – SFM standards, including CSA, FSC, PEFC and SFI, recognize clearcutting as consistent with SFM in the right forest ecosystems. Clearcutting can accomplish the following:
  - It mimics some of the natural disturbance dynamics of the forests (e.g., fire, wind blow downs, insects)
  - In some ecosystems, it allows regeneration and rapid growth of certain tree species
  - It costs less, making forestry more economically viable
  - It provides safer working conditions for loggers.

However, all SFM standards also recognize there is no single harvesting method suitable for all forest ecosystems.

- **Plantations** – plantations can focus production on smaller but more intensively managed areas. All SFM standards recognize plantations as being consistent with SFM under certain conditions; conditions may include considerations based on the ecological systems of the place, and the availability of land free from conflicts with other users.
- **Chemicals** – most standards allow controlled and appropriate use of chemicals (pesticides and fertilizers). Some standards prohibit the use of chemicals.
- **Genetically Modified Organisms (GMOs)** – some standards strictly prohibit the use of GMOs, while others will allow the use if and when legally available. At least 24 tree species have been known to have been the subject of transgenic research (for a list of species see WWF, 1999). In North America, however, no GM trees have been deregulated for commercial use.

Forest certification schemes define SFM through their respective standards (Table 3). All types of forests can be sustainably managed, from primary or natural forests to intensively managed forest plantations (Box 6).

Figure 5. Conceptual trade-offs between economic and ecological values



Areas managed intensively and exclusively for wood or fiber production (y-axis) will generally have fewer ecological values; forest areas managed exclusively for their ecological values (x-axis) will provide less economic value. Graphic based on Dyck (2003).

Factors to consider about SFM

- **Forest land can be sustainably managed without being certified by a forest certification system. Producers may not pursue forest certification if they perceive the costs of the process as outweighing the price premium offered for certified products.**
- **"Legally harvested" does not necessarily mean "sustainably produced" or "sustainably managed" because laws are sometimes insufficient to guarantee SFM, or are inadequately enforced.**

Both major certification schemes are developing methods to assess the risk that wood from non-certified sources has been produced in an unacceptable way, see the section on inclusion of non-certified wood in Table 1.

Table 3. How major international certification schemes address selected aspects of SFM

	Forest Stewardship Council (FSC)	Programme for the Endorsement of Forest Certification Schemes (PEFC)
Social issues	Four principles of the FSC system include various social concerns: tenure and use rights and responsibilities, indigenous people's rights, community relations, and workers' rights. Principle related to high conservation value forests (HCVF) also addresses social aspects for areas of archaeological, historical or cultural value. Standard-setting processes at the national and sub-national level are conducted in a transparent way and involve all interested parties.	Requires compliance with ILO core conventions. Pan-European Operational Level Guidelines (PEOLG) criteria and indicators address issues of occupational safety and health as well as accessibility to recreation and maintenance of sites with cultural or spiritual values. ATO/ITTO criteria and indicators for SFM require that legal and customary rights of local populations with respect to ownership, use and tenure are clearly defined, acknowledged and respected, as well as engagement with informed stakeholders (PEOLG, ATO/ITTO Principles, criteria and indicators for SFM of African natural tropical forests).
Special places	Principle 9 addresses high conservation value forests (HCVF), which are areas to be managed in such a way that these values are maintained or enhanced. HCVF include: • Forests that contain globally, regionally, or nationally significant concentrations of biodiversity values • Globally, regionally, or nationally significant large landscape level forests • Rare, threatened or endangered ecosystems • Forest areas providing basic services of nature in critical situations • Forest areas fundamental to meeting basic needs of local communities • Forest areas critical to local communities' traditional cultural identity	Forest management should maintain or enhance biodiversity, and protect soil and water. Sites of historical or spiritual significance should be respected and protected as specified by international guidelines and standards (PEFC, 2006 D). Different requirements specified by international standards, criteria and indicators and requirements for SFM, for instance: PEOLG Criterion 4.2i – special key biotopes in the forest such as water sources, wetlands, rocky outcrops and ravines should be protected or, where appropriate, restored when damaged by forest practices.
Forest plantations	Principles 6 and 10 of the FSC principles address forest plantations. Certified forest plantations should meet a set of requirements concerning: (i) representation on landscape; (ii) time of establishment; and, (iii) design of the management blocks (i.e., blocks promote biodiversity). Forest conversion to plantations or non-forest land uses should not occur except in circumstances where conversion entails a very limited portion of the forest management unit, does not occur in high conservation value areas, and will deliver long-term conservation benefits.	Management standards for forest plantations are to be compliant with the International Tropical Timber Organization and the PEOLG (PEFC, 2006D).
Chemicals	Principle 6 of FSC addresses chemicals. Chemicals should be minimized. Integrated Pest Management (IPM) is the preferred approach, i.e., to minimize chemical use through the use of alternative prevention and biological control techniques. Documentation, monitoring, and control are required, and certain chemicals are banned.	Use of pesticides and herbicides should be minimized, used in controlled manner, and take into account appropriate silvicultural alternatives and other biological means. Compliance with PEOLG, ATO/ITTO criteria and indicators for SFM, as well as various ITTO guidelines for SFM (PEFC, 2007).
Clearcuts	Principle 6 of FSC addresses clearcuts. Restrictions on size and location vary among national/regional standards as long as ecological functions and values are maintained intact, enhanced or restored.	Management plans – including clearcutting – should be based on legislation as well as existing land-use plans and adequately cover forest resources. Regeneration, tending, and harvesting should be carried out in time and manner that do not reduce the productive capacity of the site (MCPFE, 1998).
GMOs	Use of GMOs is prohibited; addressed in Principle 6 of FSC.	GMOs can not be considered as part of certified material (PEFC Council General Assembly held on October 2005).
Exotic species	Addressed in Principle 6. Exotic species are permitted, but not promoted. Careful monitoring is required to avoid adverse environmental impacts.	As required by PEOLG, native species and local provenances should be preferred where appropriate. Introduced species, provenances or varieties producing negative impacts on ecosystems and on the genetic integrity of native species and natural provenances should be avoided or minimized as should those not thoroughly evaluated (MCPFE, 1998).

Source for FSC information is FSC (1996). This table provides an overview of the general characteristics of these two systems. This table is NOT meant to be an exhaustive comparison. A list of references to more detailed comparisons can be found in the section on additional resources.

Box 6. Plantations

The increasing demand for wood and paper-based products will likely be met, at least in part, through the establishment of new forest plantations. The area of forest plantations worldwide has been increasing to reach 140 million ha in 2005. Slightly less than half of the world's plantations are in Asia while exceptionally fast increases were experienced in North America, Central America, Oceania and South America between 1990 and 2000 (FAO, 2006). This trend is expected to continue, especially in developing countries. Forest plantations currently make up 5% of world's forest cover, but account for 35% of total global industrial wood production. There are advantages and disadvantages that need to be considered when sourcing from forest plantations.

Planted forests (plantations) may not provide the same ecosystem services natural forests provide, but they can play a positive role in other regards:

- By producing wood more efficiently, they may allow other natural forests to be managed for other forest values.
- When established on previously degraded sites they may recover some ecosystem functions and services. Increased recovery of degraded lands will play an important role in meeting future demand for wood and paper-based products and services including carbon sequestration and/or crops for fuels.

However, when forest plantations reduce the production costs for timber, products from natural forests may be at a disadvantage. If natural forests become less economically viable, it could cause owners to convert their lands to other more financially attractive land uses.

Advantages and disadvantages of plantations

Advantages	Disadvantages
Forest plantations can return degraded or worn out lands to productive use and protect soil from erosion.	There is often limited biodiversity if the forest is managed in single species plantations, resulting in reduced wildlife habitat and ecosystem value.
The rapid growth of forest plantations can produce more wood, faster, requiring less land to produce a specified amount of wood.	Diseases and pests which target a particular tree species can have devastating impacts in single species plantations.
Forest plantations enable landowners to take advantage of the newest forest technology and genetics. This results in greater yields and better prices, strong incentives for private landowners to continue to practice forestry on their lands.	Forest plantations often receive higher levels of inputs such as fertilizer and chemicals to control vegetative competition. Run-off, overspray and groundwater contamination can be issues if these practices are not carried out correctly.
Wood harvested from forest plantations is often very uniform in terms of species and size, thereby improving processing and manufacturing efficiency.	Some forest plantations are established using non-native species. These plantations may not provide suitable habitat for local wildlife. Trees replacing grazing land may also adversely affect groundwater levels. If allowed to escape off-site, some non-native species may out-compete local tree species for available resources, and become a "weed" or invasive species.
Focusing wood production in fast-growing forest plantations can allow other native/natural forests to be managed for other uses such as biodiversity, non-wood forest products, and aesthetics.	Rights of local communities and indigenous peoples may be ignored. Forest plantations often take over large areas of land that become unavailable to other users (e.g., fuel-wood collection, non-wood forest products) and can distort income distribution in households and communities.
Greater economic value of plantations can keep forest land in forest use, where a natural forest may not be economically sustainable.	Clearance of natural forests to establish plantations.

The two principal concerns about forest plantations are:

1. They may replace natural forest areas or areas in the forest landscape with unique qualities.
2. They may not be established in compliance with local laws regarding land occupation, and with authorization of local and indigenous peoples.

Sources: Boyer, 2006; FAO, 2007B; Nair, 2001.

LAND-USE CHANGE AND FOREST CONVERSION

Forests are naturally dynamic ecosystems. Natural processes (e.g., fire, flood, wind, earthquakes, mortality caused by insects, outbreaks of diseases, and the simple aging of trees) affect the composition and structure of all forests. Anthropogenic influences also change forest ecosystems, often in more dramatic and permanent ways. It is important to distinguish two different types of significant forest change, which are sometimes confused:

- Land-use change
- Forest conversion.

Land-use change, i.e., deforestation, reduces the area under forest. The United Nation's Food and Agriculture Organization (FAO) defines deforestation as "The conversion of forest to another land use or the long-term reduction of the tree canopy cover below the minimum 10 percent threshold" (FAO, 2001). Deforestation occurs when forest areas are transformed to other land uses such as:

- **Agriculture:** this includes shifting cultivation (traditional and colonist shifting cultivation), permanent cultivation (subsistence or commercial cultivation), and cattle ranching (small and large-scale cattle ranching). Agricultural expansion can replace native forests with pasturelands and crops. Palm oil, soy crops, and likely fuel crops in the near future, are considered the leading proximate cause for forest land use change in the tropics.
- **Human settlement:** urban development, colonization, transmigration and resettlement (spontaneous transmigration, estate settlement, industrial settlement, urban settlements).
- **Infrastructure:** transport infrastructure, market infrastructure (mills, food markets, storage, etc.), public services (water, sanitation), hydropower, energy and mining infrastructure.

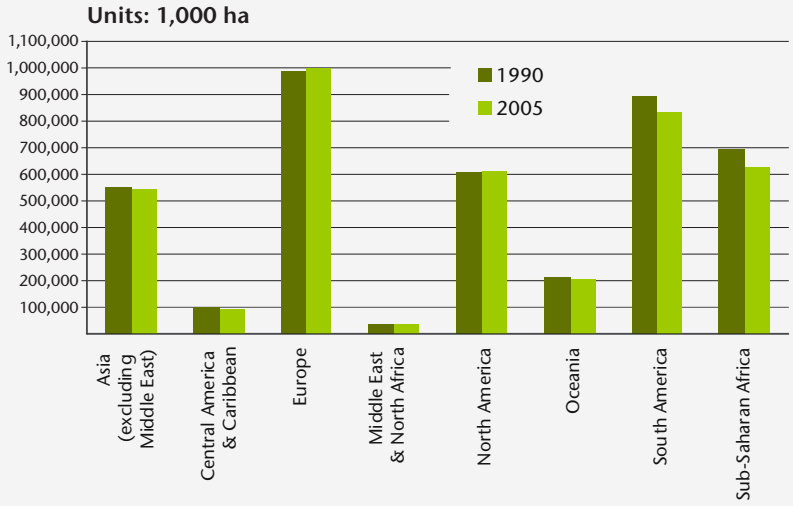
Forest conversion happens when a natural forest is transformed into a highly cultivated forest, often with introduced tree species and control of the hydrological and nutrient regime with a focus on wood production.

FAO's definition of deforestation specifically excludes areas where the forest is expected to regenerate naturally or with the aid of forest management measures following harvesting.

Over time, a significant amount of the world's forest lands have been converted to other land uses. In the northern latitudes most of this change in land use occurred in the past. In some cases natural forests have reestablished themselves in these areas; in others forests have been planted. The managed forests we see today are often influenced by historical land uses, such as grazing or agriculture.

In the tropics, a major concern is the high rate of continued conversion of forests to other uses (Figure 6).

Figure 6. Forest extent in 1990 and 2005



Source: Earth Trends Query (www.earthtrends.org). Forest coverage in South America has declined by almost 60 million ha in 15 years. In North America and Europe forest cover increased by almost 4 and 12 million ha respectively in the same time-period.

The causes of forest land use change vary by region, and even within a region. It is often a complex combination of intertwined factors and circumstances involving more than a single industry. Table 4 presents a general summary of some of the causes, drivers, and factors associated with forest land use change.

Commercial extraction of wood-based products, in combination with other factors and economic activities, has been linked to forest land use change. For instance:

- In Asia, logging concessions are often harvested and converted to plantations (mostly oil palm) because this change in use is usually less expensive than the selective logging needed to maintain the native forest. Under current economic and political incentives, there are faster and more profitable investment returns in palm oil plantations, and there is poor law enforcement and planning.
- In Central Africa and South America, logging companies open roads to extract/transport timber. These roads open the way for encroachment. An opening in the forest, combined with lack of enforcement and pressure from human populations, can result in change in use to subsistence farming or other agricultural operation.

Converting a forest into a forest plantation affects the balance of ecosystem services (e.g., it may eliminate species, affect erosion control and/or water supplies while increasing the production of wood), but converting forests to non-forest uses such as urban settlements completely eliminates the forest ecosystem. Forests deliver a variety of ecosystem services and benefits, but many of these are not recognized under the current economic and political situation and do not generate any revenue to the forest owner. Often the value of an intact natural forest or a standing forest or a forest plantation can be greater to society than the value of a converted forest area.

Table 4. Factors underlying forest land-use change and conversion in the tropics

Factors	Underlying causes
Economic	Market growth and commercialization: rapid market growth of the export-oriented sector, increased market accessibility, growth of industries, lucrative foreign exchange earnings, growth of demand for goods and services. Economic structures: large individual speculative gains, poverty and related factors, economic downturn, crisis conditions. Urbanization and industrialization: growth of urban markets, rapid build-up of new forest-based (or related) industries. Special economic parameters: comparative advantages due to cheap, abundant production, factors in resource extraction and use, and price.
Policy and institutional	Policies: taxation, credits, subsidies, licenses, concessions, economic development, population (migration), and land ownership policies. Institutional factors: corruption, poor performance, mismanagement, etc. Property rights regime: insecure ownership, rush to establish property rights, titling, consolidation, open access conditions, etc.
Technological	Agro-technological changes, technological applications in the wood sector, and other production factors in agriculture.
Social and cultural	Social unrest and disorder (war, civil war, etc.), health and economic conditions, government policy failures. Cultural factors include concern (or lack of) towards forest protection and sustainable use.
Demographic	Population growth and increasing demand for products, food, space, etc.
Other	Soil quality, water availability, and slope, topography, and vegetation types.

(Based on Geist and Lambin, 2001).

Factors to consider regarding land-use change and forest conversion

In procuring wood and paper-based products from forest areas that are being legally converted to another land use (e.g., as part of governmental land zoning policies), it is advisable to fully understand the circumstances as the risk of corruption, illegalities, violations of indigenous people's rights, and other issues may be high.

It is advisable to ensure that those involved in such a change process do it in a way that is transparent, mindful of the needs and perspectives of different local stakeholders, well planned and informed, and with safeguards and measures to remedy negative impacts. Some of the aspects described under Questions 1 and 2, and the tools presented there may be useful and applicable to these situations.

SELECTED RESOURCES: SFM, LAND-USE CHANGE AND FOREST CONVERSION

Procurement requirements

Danish Government Procurement Policy for Tropical Forests (under review)	Draft criteria address seven thematic elements for SFM, including protection and productive functions of forest resources and forest health and vitality. Previous guidelines considered FSC to provide adequate guarantees for sustainably produced tropical wood.
German Government Procurement Policy	Requires that wood-based products be harvested from verifiable legal and sustainably managed forest operations. Certificates issued from FSC and PEFC are recognized as guarantees of SFM but the systems can be excluded if sustainable management cannot be guaranteed.
Japanese Government Procurement Policy	Requires that timber be harvested under a sustainable management regime, and verified through various instruments such as forest certification systems (CSA, FSC, Japan's Sustainable Green Ecosystem Council, LEI, MTCC, PEFC and SFI), codes of conduct of wood industry associations, and self-verification mechanisms.
Public procurement policies for forest products and their impacts	Reviews how different public procurement policies define or address sustainability (e.g., through certification systems, providing definitions and guidance, adopting third-party definitions, etc). Provides an analysis of the impacts of public procurement policies on the forests and forest certification.
Timber Trade Federation Responsible Purchasing Policy	Provides guidance and advice to its members to evaluate compliance with sustainability requirements of the UK central government procurement policy. Members must not trade wood from forests being converted to plantations or non-forest land uses.
LEED	Promotes SFM through the use of FSC certification.
Green Globes	Scores whether wood-based products originate from operations that are certified by the American Tree Farm System, CSA, FSC and SFI.
SFI Procurement Objective	Program participants' procurement programs are expected to promote SFM principles.

Resources to assess requirements

CPET	Provides advice and guidance to comply with UK central government requirements for sustainability, including a framework to assess compatibility of certification systems and other types of evidence. Recognizes CSA, FSC, PEFC, and SFI certification as evidence of sustainability.
CEPI Certification Matrix	Compares certification systems' conformance with international governmental and non-governmental forestry principles.
Paper Profile	Provides information on whether or not the mill receives wood from certified forests, and under which certification systems.
FCAG	Includes criteria and requirements to assess compatibility with globally applicable SFM principles and continued improvement of forest management. Assesses whether or not certification systems' provisions for forest plantations ensure that plantations do not lead to the conversion of critical natural habitats.
GPN	Prefers products using sustainably produced renewable natural resources, including certified products.
Good Wood. Good Business guide	Promotes sourcing from verifiable sustainably managed forests. Provides an overview of international initiatives to develop criteria and indicators for assessing, monitoring and reporting on SFM, as well as certification systems. Definition of unwanted wood includes wood from forest conversion projects, dam clearance projects and others.
wood for good	Promotes forest certification (CSA, FSC, PEFC, and SFI).
EPAT®	Rates fiber from operations certified under CSA, FSC, PEFC, SFI, and other national and international certification systems.
WWF GFTN	Promotes credible certification as a tool for improving forest management. Provides advice on options for addressing land-use change issues.
WWF Tissue Scoring	Rates companies' commitment to eliminate all sourcing of materials from the conversion of natural forests. Gives preference for buying wood from FSC-certified plantations and companies committed to improvement of management that enhances biodiversity in plantations and in the adjacent areas. Scoring criteria also considers whether or not companies have a commitment to make stepwise progress towards certification.
WWF Paper Scorecard	Rates percentage of FSC-certified fiber.
WWF Guide to buying paper	Provides background information about SFM and links to additional resources; promotes forest certification as means to avoid sourcing raw materials from areas that have been converted; showcases company sourcing certified materials.

5. Have special places, including sensitive ecosystems, been protected?

Sourcing and legality aspects

Origin
Where do the products come from?

Information accuracy
Is information about the products credible?

Legality
Have the products been legally produced?

Environmental aspects

Sustainability
Have forests been sustainably managed?

Special places
Have special places, including sensitive ecosystems, been protected?

Climate change
Have climate issues been addressed?

Environmental protection
Have appropriate environmental controls been applied?

Recycled fiber
Has recycled fiber been used appropriately?

Other resources
Have other resources been used appropriately?

Social aspects

Local communities and indigenous peoples
Have the needs of local communities or indigenous peoples been addressed?

5. Have special places, including sensitive ecosystems, been protected?

For the purposes of this guide, the term "special places" is used as a generic term for areas with unique qualities within the forest landscape (Box 7). They typically need special attention and treatment. Depending on their features and significance, these places can be identified at different scales (e.g., global, regional, local scale). Some global, course-scale maps of special places exist, and they can be used to identify areas where a site-specific evaluation should be performed.

Some special places are legally protected, but this is not always the case. There can be several reasons for the lack of legal protection:

- The uniqueness of a site may not have been identified, either because of insufficient inventory efforts or because the science of conservation biology has improved since the last inventory was made.
- The political and administrative process to secure protection can be cumbersome and slow. Another possibility is that the law does not contain provisions for protecting special places of this particular type.
- The site may be private property or otherwise of important economic value to a community. Incentives to gain support for special designation may be lacking.
- An assessment process may have concluded that the area is not sufficiently special to warrant protection.
- Stakeholders may differ in their opinion of what qualifies as a special place.

While there is general agreement that forest management should respect legally protected areas, the situation can be unclear and complex when a legally unprotected area is claimed as a special place. There are several possibilities:

- The area may have been identified as special and an official government-led initiative is underway to protect it. In this case voluntary protection efforts are needed to maintain the special values of the area until it gets official protection. These can include protection measures by land managers. There may also be marketplace pressures to reject wood products harvested from the area, regardless of its legal status. This may or may not contribute to protection, depending on community reaction, and its effect on government decision-makers.
- The area may not be slated for official protection. A stakeholder conflict may then ensue, with some environmental and/or indigenous groups trying to enforce "market protection" of the site pending a change of minds by the authorities. In some cases, such conflict has led land managers to agree to a logging moratorium, pending government consideration. In others it has had no effect or led to disinvestment or land sales.

In either case land ownership or tenure is significant. A public or large owner may have a greater capacity to absorb a reduction of the productive land base than a small private landowner, but also may be more affected by perceived instability. Cooperation among small private landowners such as pursuing group certification may effectively take care of the special place. Boycott campaigns do not always have local support and can create a political backlash against the customer and other stakeholders.

Different stakeholders, including mainstream certification standards, have coined different definitions of special places (Table 5). With few exceptions, the areas that correspond to these definitions have not been mapped, making it difficult to analyze the extent to which they overlap. Along with the definition, stakeholders have recommended management regimes for these special places, including:

- **Precautionary management** – ensuring that special values are identified and protected before management plans are developed.
- **Sustainable Forest Management (SFM)** – integrating and balancing environmental, social and economic aspects across the landscape. Small-scale adaptations of management to promote conservation that do not significantly reduce the economic potential of the land, e.g., through protection of so-called key woodland habitats, are usually considered an inherent part of good forest management.
- **Conservation management** – managing to retain or enhance the ecological and biological values, which may or may not include limited timber harvesting.
- **No management** at all (i.e., leaving the forest by itself).
- **A combination of all of these across the larger landscape.**

The diversity of definitions of special places and definitions of forest in general is a major concern. International organizations such as FAO, International Union of Forest Research Organizations (IUFRO), Center for International Forestry Research (CIFOR) and UNEP have compiled forest definitions (FAO, 2002A) but do not offer any generally accepted definition for special places. The lack of a universally agreed upon definition of special places is a major concern, and the stakeholder support for each definition varies.

Factors to consider regarding special places

- **Some special places are yet to be located. Investment in time and resources is needed to identify them across the landscape.**
- **An initial inventory and analysis of the landscape as a whole will generally make it easier to find solutions that satisfy the needs and ambitions of all stakeholders. However, some aspects require special consideration:**
  - **There might be many small players involved (e.g., small landowners) who need to be considered and consulted because they may be affected out of proportion to their size**
  - **If the demand for forest products is removed from an area, the landowner is likely to find other ways to generate revenue from the land, e.g., through land-use change to development (urban sprawl) or for production of agricultural crops.**

Some forestry companies have used the following steps to overcome potential issues around special places:

- **Engagement with stakeholders to develop a common platform of definitions and a common process for mapping of conservation values and/or field inventory.**
- **Reference to, or engagement with, third-parties to define and map special places.**
- **Pursuit of legal opportunities to protect special places by encouraging land transfers to conservation organizations or establishing conservation easements.**

Box 7. What constitutes a special place?

There is no universally agreed upon definition of special places. Existing definitions combine scientific and political dimensions through different features, but they often do not prioritize the features that take precedence. In general, stakeholders deem a forest "special" if it includes one or more of the following characteristics:

- Biological, ecological and landscape features
  - Species richness: number of species within a given area
  - Species endemism: number of species found exclusively in that location
  - Rarity: species and/or ecosystems that are naturally rare
  - Representation: a site that represents all of the different ecosystems in the area of concern
  - Significant or outstanding ecological or evolutionary processes, such as key breeding areas, migration routes, unique species assemblages, and so on
  - Special species or taxa: presence of an umbrella, keystone, indicator, or flagship species. Site is habitat of a taxa of interest; for instance, wide-ranging species of waterfowl
- Conservation features
  - Threatened species: species that have been identified as threatened or endangered
  - Species decline: species whose populations have undergone significant decline in recent years
  - Habitat loss: areas that have lost a significant percentage of their primary habitat or vegetation
  - Fragmentation: areas that have lost connectivity and have been fragmented into smaller pieces
  - Large intact areas: areas within a certain minimum size with no or minimal human influence
  - Level of threat: areas facing high or low pressure from human populations or development
  - Places considered to have rare and exceptional scenic and aesthetic features
- Ecosystem services
  - Ability to supply basic and/or critical services such as watershed protection, erosion control, and fire/flood control among others
- Cultural, livelihood, historical and spiritual features
  - High value to the people who live within or around the site (e.g., for reasons of religion, history, cultural identity, or dependency for livelihoods); these include religious, historical and archaeological sites
  - Critical significance to the traditional cultural identity of a local community
  - Critical to maintaining local peoples' livelihoods

The most critical and controversial issues around identifying special places have been:

- What process is used to define, identify and map special places?
- What, and how fair and effective, is the process to make and implement the decision?
- Who bears the cost?
- What is the effectiveness of existing special places protection?
- The criteria, or, how special is special enough?

Governmental action to identify special places (through zoning and land-use planning processes) provides due process for those affected and may provide compensation or spread the costs equitably. If government actions are perceived as insufficient, however, this can give way to individual and private actions.

Sources: IUCN, 2006; UNEP/WCMC's Tree Conservation Information Service (www.unep-wcmc.org/trees/trade/40_species_in_trade.htm); Gordon et al., 2005.

Table 5. Definitions related to special places

A variety of definitions for special places have been proposed by different stakeholders in different places.

Developed by	Definition	Characteristics
Alliance for Zero Extinction (AZE)	AZE sites (AZE, 2007)	Focus on sites in most urgent need of conservation to prevent species extinctions. Priority sites must meet the three following requirements: • Endangerment – at least one endangered or critically endangered species listed by IUCN. • Irreplaceability – the area contains the overwhelmingly significant known resident population of the endangered or critically endangered species, or it contains the overwhelmingly significant known population for one life history segment of the species. • Discreteness – the area has a definable boundary within which the habitats, biological communities, and/or management issues have more in common with each other than they do with those adjacent areas.
American Tree Farm System (ATFS)	Special sites (AFF, 2004)	Sites of special interest because of their recreational, historical, biological, archaeological and geological features.
Conservation International	Biodiversity hotspots (Conservation International, 2007)	Hotspots are priority global areas for conservation. Hotspots are characterized by exceptional levels of plant endemism (at least 1,500 species of vascular plants) and by serious levels of habitat loss (lost at least 70% of its original habitat). Worldwide, 34 biodiversity hotspots have been identified. Collectively, these hotspots are estimated to house high levels of biodiversity, including at least 150,000 plant species as endemics and 77% of the world's total terrestrial vertebrate species.
Conservation International	Major tropical wilderness areas (Mittermeier et al., 2001)	A complementary concept to the biodiversity hotspots, the major tropical wilderness areas have high diversity and endemism, low human population density, and remain largely intact.
Birdlife International, Conservation International, and Plantlife International	Key biodiversity areas (Eken et al., 2004)	Building on the concept of hotspots, Conservation International is leading an effort to map and identify key biodiversity areas. These are globally important sites that are large enough or sufficiently interconnected to support viable populations of the species for which they are important. The definition is based on four criteria: • Globally threatened species • Restricted-range species • Congregations of species that concentrate at particular sites during some stage in their life cycle • Biome-restricted species assemblages The first criterion addresses vulnerability of species, while the other three cover different aspects of irreplaceability. Key biodiversity areas can be within biodiversity hotspots.
Finnish Forest Certification System	Key biotopes (Mikkelä et al., 2001; FFCS, 1999)	• Sites designed for protection under the Finnish Nature Conservation Act such as wild woods rich in broad-leafed deciduous species, hazel woods, Juniper and wooded meadows. • Habitats recognized as especially valuable under the Finnish Forest Act, such as the surroundings of springs and streams, hardwood spruce swamps, and heath land forest islets on undrained wetlands. • Additional habitats such as old-growth conifer forests, mixed forests and broad-leaved forests, and forest meadows in traditional landscapes. • Small water biotopes listed in the Finnish Water Act.
ForestEthics, Natural Resources Defense Council, Rainforest Action Network, Greenpeace	Endangered forests (Forest Ethics et al., 2006)	Forests that require protection from intensive industrial use in order to maintain their outstanding ecological values. Endangered forests include: forests that maintain landscape integrity; rare forest types; forests with high species richness; forests with a high concentration of rare, endangered and endemic species; forests that provide core habitat for focal species; and forests that exhibit rare ecological and evolutionary phenomena. Endangered forests are identified as: • Wilderness forests and intact forest landscapes • Remnant forests and forests with restoration values • Forests ecologically critical for the protection of biological diversity, such as naturally rare forest types, high endemism, or the habitat of focal conservation species
FSC	High conservation value forests (HCVF) (FSC, 1996)	• Forests that contain globally, regionally, or nationally significant concentrations of biodiversity values • Globally, regionally, or nationally significant large landscape-level forests • Rare, threatened or endangered ecosystems • Forest areas providing basic services of nature in critical situations • Forest areas fundamental to meeting basic needs of local communities • Forest areas critical to local communities' traditional cultural identity
Greenpeace/WRI	Intact Forest Landscapes (IFLs) (Greenpeace, 2006)	Intact Forest Landscapes are landscapes larger than 500 km^2 that are not fragmented by infrastructure, such as roads, settlements, waterways, pipelines, power lines, etc. These tracts are located within the forest vegetation zone and are mostly forested but also contain swamps and other non-forested ecosystems that are without significant visible signs of human impact such as logging, burning or other forms of forest clearing.
Natura Networking Programme	Natura 2000 Sites (Natura Networking Programme, 2007; European Commission, 2003)	A network of Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) in the European Union. SPAs are for the protection and management of areas important for rare and vulnerable birds as specified by the EU Parliament Birds Directive while SACs are areas established for the protection and management of rare and vulnerable animal and plant species, and habitats, as specified by the EU Parliament Habitats Directive. Among other things, the Birds Directive seeks to conserve, maintain or restore the biotopes and habitats of all bird species naturally living in the wild in the European Union (European Union, 2006). The Habitats. Directive includes: • Natural habitats in danger of disappearance in their natural range • Those having small natural range following their regression or by reason of their intrinsically restricted area • Those presenting outstanding examples of typical characteristics of more of the following biogeographical regions: Alpine, Atlantic, Continental, Macronesian and Mediterranean (European Union, 2007)
SFI	Forests with exceptional conservation value (FECV) (SFB, 2004)	Globally threatened or rare forests, with high levels of endemism, or that have little human intervention; forests containing high biodiversity value, unique or rare forest communities, viable populations of rare individual plant and animal species.
Wildlife Conservation Society	Last of the wild (Sanderson et al., 2002)	The largest, least influenced areas around the world where the full range of nature may still exist with a minimum of conflict with existing human structures. The last of the wild were identified based on an assessment of the human footprint, which compiles the following types of data as proxies for human influence: population density, land transformation, accessibility, and electrical power infrastructure.
World Bank	Critical forests (World Bank, 2002B)	Critical forest areas are the subset of natural forest lands that cover: • Existing protected areas and areas officially proposed by governments as protected areas, areas initially recognized as protected by traditional local communities, and sites that maintain conditions vital for the viability of these protected areas. • Sites identified as recognized by traditional local communities; areas with known high suitability for biodiversity conservation; and sites that are critical for rare, vulnerable, migratory, or endangered species.
WRI	Frontier forests (Bryant et al., 1997)	Relatively undisturbed large tracts of forests are capable of sustaining viable populations of all native species.
WWF	Global 200 (WWF, 2007)	Outstanding and representative eco-regions of each major habitat type in the world based on their biodiversity patterns and degree of threat. Global 200 harbor globally important biodiversity and ecological processes and represent the world's most outstanding examples within each major habitat type.

	Management preferences outlined	Notes
	Management for conservation.	A global joint initiative of 52 biodiversity conservation organizations. Alliance members include BirdLife International, Conservation International, Wildlife Conservation Society, and World Wildlife Fund US. 595 sites around the world have been identified to protect 794 species of mammals, birds, reptiles, amphibians and conifers.
	To the extent practicable, management practices should protect these sites.	Special sites can be identified directly on the ground by landowner and an ATFS inspection forester.
	Conservation can be carried out through a variety of approaches including the establishment of protected areas and the implementation of economic alternatives.	Conservation outcomes identified for individual hotspots are defined through regional-scale planning processes; maps of biodiversity hotspots and species databases are available at *www.biodiversityhotspots.org.*
	Conservation can be carried out through large-scale conservation set-asides.	Include the Guyana Shield region (Suriname, Guyana, French Guiana, Venezuela and adjacent parts of Brazil), the upper Amazonian (Brazil, Colombia, Ecuador, Peru and Bolivia); a substantial portion of the Congolese forests block/Congo River Basin in Central Africa; and most of the island of New Guinea and adjacent smaller Melanesian islands (Solomon Islands, New Britain, New Ireland and Vanuatu).
	Conservation of the sites to reduce global biodiversity loss.	Groups identifying these areas include: Birldlife International (Europe, Middle East, Africa); Plantlife International and Dutch Dragonfly Conservation (Europe); IUCN and Alliance for Zero Extinction (global); and Conservation International (Andes and Africa). More details at *www.plantlife.org.uk*
	Key biotopes are to be left in their natural state and only subject to gentle management operations.	Guidelines for assessing and protecting key biotopes have been produced (Korpela, 2004); key biotopes have been identified by different stakeholders.
	No intensive industrial activities or extraction. "No-go" zones. Endangered forests are defined as a subset of HCVFs due to their outstanding ecological values.	ForestEthics and its partners are working to define and map endangered forests of the world. The definition is meant to compliment certification of logging operations under FSC *(www.forestethics.org).*
	Management to maintain or enhance features of these forests.	A variety of tools have been developed to assist identifying these sites including: • a toolkit *(www.proforest.net)* • a resource network *(www.hcvf.org)* • a sourcebook *(www.proforest.net)* There are various efforts to identify HCVFs in Indonesia, Russia, Romania and other countries.
	Management for conservation of biological diversity.	Maps of Intact Forest Landscapes for northern forests are available *(globalforestwatch.org)*, as well as draft maps for other forest biomes *(intactforests.org).*
	Appropriate economic activity to maintain or improve the conservation status of Natura 2000 Sites is allowed. Member states identify and propose a list of sites for their territory and are in charge of managing these sites. Management can include strictly protection and sustainable management.	Natura 2000 Sites are identified and proposed by countries. For each site, national governments submit standard information describing the site and its ecology, this information is to be validated by the European Topic Centre for Nature Conservation. A complete GIS database of Nature 2000 Sites will be built after compilation and validation. Detailed information and maps can be obtained directly from the national governments. Links to governmental institutions with information can be found at *www.ec.europa.eu/environment/nature*
	Managed in a way that protects their unique qualities and promotes conservation of biodiversity.	FECVs are identified with assistance from information provided by NatureServe in the US and Canada. Outside North America, these areas can be identified in base of biodiversity hotspots and other important areas in the tropics.
	These areas are a guide to opportunities for effective conservation.	569 places have been identified. Maps are available at *www.ciesin.columbia.edu/wild_areas/*
	Definition is for internal purposes. The Bank would not finance projects that would involve significant conversion or degradation of critical forest areas.	Critical forests are identified by the Bank or an authoritative source determined by the regional environment sector unit.
	No management preferences outlined.	Maps available at *www.globalforestwach.org*
	Primary objective is to promote their conservation.	Maps available at *www.worldwildlife.org.* WWF also uses the HCVF concept to define special places at a more local scale.

SELECTED RESOURCES: SPECIAL PLACES

Procurement requirements

Danish Government Procurement Policy for Tropical Forests (under review)	Draft criteria includes seven thematic elements against which SFM should be addressed; one of these elements is the protection and maintenance of biodiversity, conservation/set aside of key ecosystems or habitats and protection of features and species of outstanding or exceptional value.
Timber Trade Federation Responsible Purchasing Policy	Members must not trade wood from forests where high conservation value is threatened by management activities.
FSC Controlled-Wood Standard	Requires that wood harvesting not threaten high conservation value forests. Evidence of compliance is required.
PEFC Guide for the avoidance of controversial timber	Requires that wood harvesting not occur in forest areas protected by law. Wood harvesting is also prohibited in forest areas designated by government authorities for future legal protection.
SFI Procurement Objective	For the US and Canada, requires that participants' procurement policies promote conservation of biological diversity, critical wildlife habitat, threatened, endangered, imperiled, and critically imperiled species. Outside North America, procurement policies are expected to promote the conservation of biodiversity hotspots and major tropical wilderness areas.

Resources to assess requirements

CPET	Addresses issues of special places to the degree they are incorporated in requirements of certification standards for sustainability.
FCAG	Includes provisions regarding the establishment of plantations, the conversion or loss of critical natural habitats, the mitigation of environmental impacts to conserve biological diversity and other ecosystem services, and the maintenance of critical forest areas and other critical natural habitats.
Good Wood. Good Business guide	Provides an overview of unwanted wood, includes wood from high conservation value forests, endangered forests, and others.
EPAT®	Includes special places to the degree they are addressed by FSC, SFI, Canadian Standard Association for SFM, PEFC, and other national and international certification systems. Upcoming EPAT upgrade adds a scale to assess the extent to which suppliers are identifying and managing sensitive forest fiber. Sensitive forest fiber takes into account ecological and cultural values such as biodiversity aspects, ecosystem services, subsistence and cultural values.
WWF GFTN	Provides overview information about high conservation value forests, and advice on options to address sourcing from these areas.
WWF Tissue Scoring	Rates whether companies have a policy to eliminate all raw materials from controversial sources including forests of high biodiversity value.
WWF Paper Scorecard	Provides safeguards to avoid potential inclusion of unwanted sources of fiber, in line with FSC Controlled-Wood Standard.
WWF Guide to buying paper	Promotes the avoidance of illegal and other unacceptable sources. Promotes forest certification as a means to avoid sourcing raw materials harvested from high conservation value forests.

6. Have climate issues been addressed?

Sourcing and legality aspects

Origin
Where do the products come from?

Information accuracy
Is information about the products credible?

Legality
Have the products been legally produced?

Environmental aspects

Sustainability
Have forests been sustainably managed?

Special places
Have special places, including sensitive ecosystems, been protected?

Climate change
Have climate issues been addressed?

Environmental protection
Have appropriate environmental controls been applied?

Recycled fiber
Has recycled fiber been used appropriately?

Other resources
Have other resources been used appropriately?

Social aspects

Local communities and indigenous peoples
Have the needs of local communities or indigenous peoples been addressed?

6. Have climate issues been addressed?

Climate and forests are intrinsically linked. As a result of climate change, forests are stressed through higher mean annual temperatures, altered precipitation patterns and more frequent and extreme weather events. At the same time, forests play a dual role in climate change. Forests mitigate climate change through uptake of carbon and, when sustainably produced, wood-based biofuels to replace fossil fuels. Land-use conversion and forest degradation, however, cause carbon emissions that contribute to climate change.

MITIGATION OF CLIMATE CHANGE

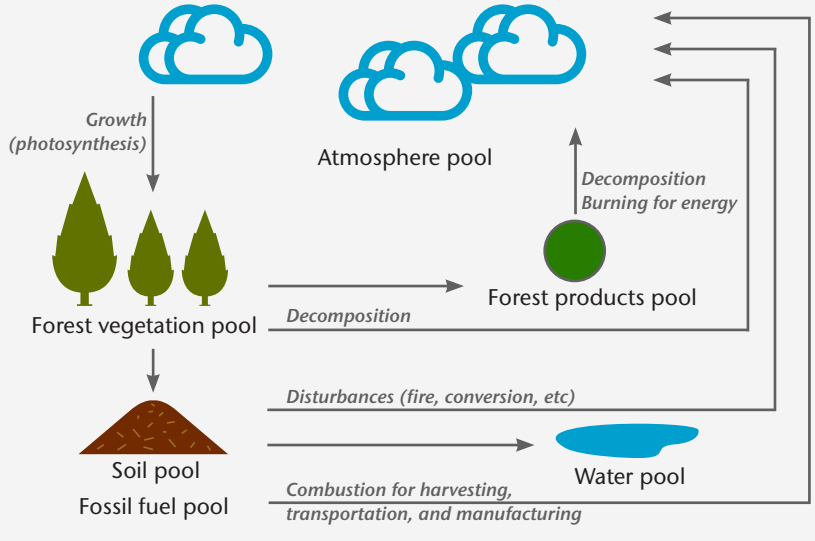
Forests remove carbon from the atmosphere (carbon sequestration) and store it as the biomass (wood and peat) that they produce and accumulate (Figure 7). Some carbon also remains stored in wood products through their lifetime, though this varies significantly between product types (on average, solid wood products last longer than paper-based products). The amount of carbon stored in products is estimated to be increasing by about 540 million tons of CO_2 per year (NCASI, 2007). Carbon in both forests and products is released back to the atmosphere either through decomposition (slowly), or burning (quickly). Establishing new forests on open land and replanting formerly forested areas can store additional carbon.

Wood-based biofuels recycle to the atmosphere carbon captured through tree growth. Burning wood-based biofuels results in no net effect on atmospheric CO_2. Compared to fossil fuels, which transfer carbon from geologic reserves into the atmosphere, wood-based biomass fuels are considered "carbon neutral" when the forests from which the fuels were taken remain as forested areas. There is increasing interest in the use of biomass fuels from forests; however, if carried to the extreme, demand for wood-based fuels could result in negative effects:

- Unsustainable harvesting for biomass
- Reduced carbon sequestration
- Distortion of markets for limited wood supplies.

Wood-based fuels can substitute for fossil fuels; and when they do, they reduce the amount of carbon that reaches the atmosphere as long as the areas from where they originate remain forested or trees are planted elsewhere to compensate. There has been an increasing interest in using biofuels from the forest to reduce fossil emissions, especially from the transportation sector.

Figure 7. Carbon pools and exchanges between pools



The burning of forest products substitutes for the use of fossil fuels.

CONTRIBUTIONS TO CLIMATE CHANGE

When forests are logged, destroyed or burned at a faster rate than they grow back, they contribute to climate change. In a sustainably managed forest, logging is balanced by re-growth, but when forest land is converted to other uses there can be a significant net contribution to greenhouse gas emissions (Figure 8). An estimated 24% of global carbon dioxide emissions are attributable to land-use changes and forestry activities (Baumert et al., 2005).

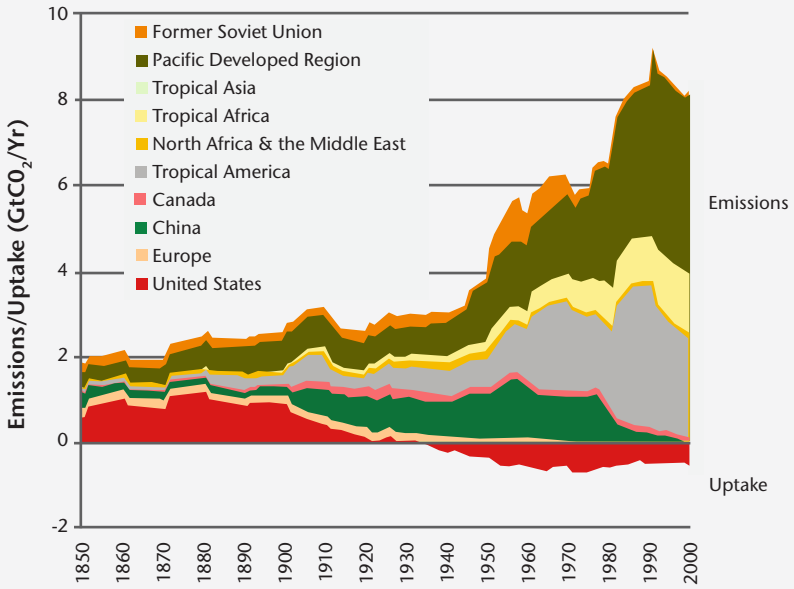
Clearing of forests for agriculture is the leading cause of deforestation. In Africa this is typically small-scale subsistence farming, while in South America it is large-scale cattle ranching and agricultural production. In Asia the production of palm oil, coffee and timber are the primary drivers of land-use change. Deforestation generally does not occur in northern forests, apart from forest loss due to urban sprawl.

Logging of tropical hardwoods can sometimes be the critical first step causing the deforestation process by providing other users with access roads. However, deforestation is generally not driven by the demand for forest products. Logging, if carried out under a sustainable forest management regime, does not contribute to deforestation.

Sustainably managed forests are approximately carbon neutral. They form a mosaic across the landscape in which the growth of trees over a large area will compensate for the carbon lost through annual logging of a much smaller area. On the other hand, a forest landscape subjected to land-use change or over-harvesting will release more carbon than it takes up. The rate of recapture of atmospheric carbon depends on several factors:

- A young stand with small trees will absorb carbon as the trees grow, but the amount of carbon stored is initially small because of the small size of the trees and the more rapid decomposition of organic matter under an open canopy.
- An old stand with big trees is the result of a long period of biomass accumulation. Although the science is still inconclusive, it is generally true that old stands with big trees store large amounts of carbon, but as their growth stagnates they may no longer take up as much carbon as they release.

Figure 8. Uptake and emissions from land-use change between 1850 and 2000



The negative emissions, (uptake) post-1940 are largely due to increasing forest area in the US and Europe. The peak emissions in 1990 are linked to forest fires in Indonesia.

Source: Stern, 2007.

- Some people have suggested that stable old-growth forests should be replaced with stands of young, vigorously growing trees as a way to increase carbon uptake. This would reduce the amount of carbon stored on the land, however, and it would take decades, or even centuries, for the newer stands to recapture it.

Compared with other products, those produced from sustainably managed forests generally are considered carbon neutral, because the wood contains recycled carbon, i.e., carbon that was taken from the atmosphere (rather than from fossil deposits in the ground). The bottom line is to have more carbon stored and less removal (that will capture more carbon), not less storage and more removals.

When the full supply-chain impacts of wood products are measured, significant sources of carbon dioxide can be identified similar to those associated with production of competing products. Emission sources associated with forest products include:

- **Logging operations** – machinery and equipment that use fossil fuels for logging.
- **Transportation** – use of fossil fuels.
- **Manufacturing** – some manufacturing can be considered carbon neutral if the process uses biofuels or some other renewable non-fossil fuel alternatives – that have not been produced in previously forested areas – for energy. However, mechanical pulping (used for newsprint and catalogue papers) does not result in burnable process residuals, so external energy is usually required.
- **Disposal** – emissions may result when products decompose in the landfill. On the other hand, paper products properly disposed of in a modern landfill can sequester carbon long-term.

Factors to consider regarding climate change

- **The forest industry is a major user of wood-based fuels. Sawmills and pulp mills both burn those parts of the tree that they cannot convert into merchantable products, co-generation of heat and electricity is common, and some mills even export electricity to the grid.**
- **In terms of energy and climate change, biofuels are generally considered positive; however, there are real concerns about conversion of forest land to unsustainable biofuel crops (e.g., corn or sugar cane), or an expansion of the agricultural frontier that will result in increased pressure for land-use change of forests.**

SELECTED RESOURCES: CLIMATE CHANGE

Note: because this is an evolving issue, procurement requirements highlighted currently do cover aspects related to climate:

Resources to assess requirements

Paper Profile	Provides information about the total amount of energy procured, possible energy surplus and the CO_2 emissions from burning fossil fuels and peat.
wood for good	Promotes the use of wood to address climate change; greater use of wood stimulates the expansion of forests, greater storage of carbon in trees and products, recovery of stored energy by burning wood as a substitute for fossil fuels, and reduction of greenhouse emissions.
EPAT®	Rates the total CO_2 emitted to the air per unit of product as well as efforts to reduce CO_2 emissions.
WWF **GFTN**	Supports efficient use of energy to minimize direct/indirect impacts on climate change, management to improve levels of carbon sequestration.
WWF Tissue Score	Rates whether or not a company has set a vision and targets for maximizing the use of biomass and other renewable energy, reducing CO_2 emissions, and ongoing research and development of cleaner production and transportation technologies.
WWF Paper Scorecard	Rates fossil fuels' contributions to climate change and global warming through emissions of CO_2.
WWF Guide to buying paper	Provides background information; promotes reduction of CO_2 emissions and showcases companies reducing CO_2 emissions.

7. Have appropriate environmental controls been applied?

Sourcing and legality aspects

Origin
Where do the products come from?

Information accuracy
Is information about the products credible?

Legality
Have the products been legally produced?

Environmental aspects

Sustainability
Have forests been sustainably managed?

Special places
Have special places, including sensitive ecosystems, been protected?

Climate change
Have climate issues been addressed?

Environmental protection
Have appropriate environmental controls been applied?

Recycled fiber
Has recycled fiber been used appropriately?

Other resources
Have other resources been used appropriately?

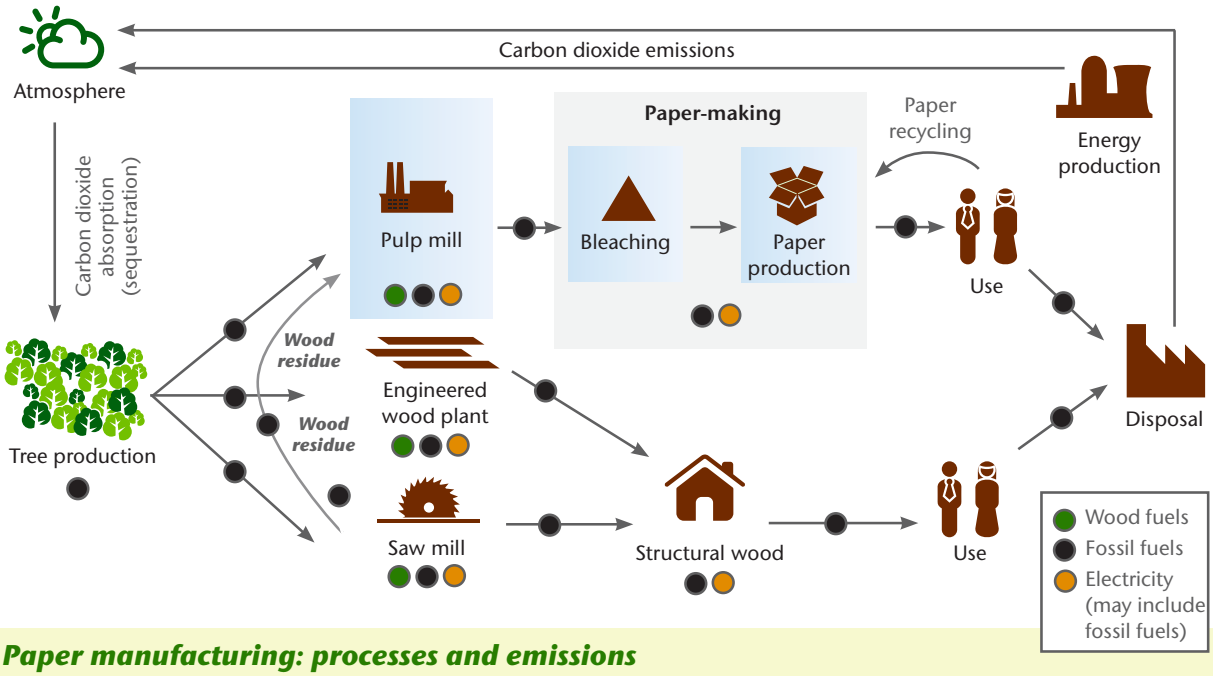
Social aspects

Local communities and indigenous peoples
Have the needs of local communities or indigenous peoples been addressed?

7. Have appropriate environmental controls been applied?

Different types of pollution can occur in many different places along the supply chain for wood and paper-based products (Figures 9 and 10). The amount and intensity of emissions depend on the type, condition and capacity of the equipment causing pollution and the location of the discharge points. The degree of deviation (i.e., lack of compliance) from legally established emission thresholds is also an important factor and the opportunity for continuous improvement exists.

Figure 9. Examples of emissions in paper-based products



Paper manufacturing: processes and emissions

Fiber production: separates fibers from other compounds through mechanical and chemical processes.

Mechanical: energy-intensive processes that apply physical pressure to convert wood into pulp. Result in high pulp yields; fibers provide smooth printing surface but they are not strong.

Chemical processes: chemicals dissolve other compounds to extract and bond fibers. Fibers are more flexible and stronger than those from mechanical processes.

Emissions: mostly water-borne emissions including sulfur compounds, BOD, suspended solids, COD, AOX, and VOCs. Most input chemicals (e.g., sulfur and sodium compounds) can be recovered for reuse.

Bleaching: eliminates remaining compounds from the pulp, increases brightness and increases absorbency. Fibers used for printing and writing papers, tissue paper or top of board papers undergo bleaching.

Bleaching substances that can be used:

- Chlorine-based compounds
- Sodium or calcium hypochlorite as well as sodium hydroxide
- Oxygen, ozone
- Hydrogen peroxide

Emissions: potential pollutants released to the air and water include chlorinated organic and inorganic compounds, AOX, and VOCs.

Paper-making: produces a continuous and uniform thread of paper. Process involves:

- Pulp is diluted in water and sprayed into a fast-moving, continuous screen.
- Water is drained by gravity and pumps, and the pulp forms a fiber mat.
- The fiber mat passes through a series of rollers and cylinders to extract water, compress and reduce thickness and produce a smooth surface.

Emissions: chemicals are used to create special properties (gloss, color, water resistance, etc.) and to facilitate the paper-making process. Emissions include particulate waste, organic and inorganic compounds, COD, and acetone.

Recycling: involves two major steps:

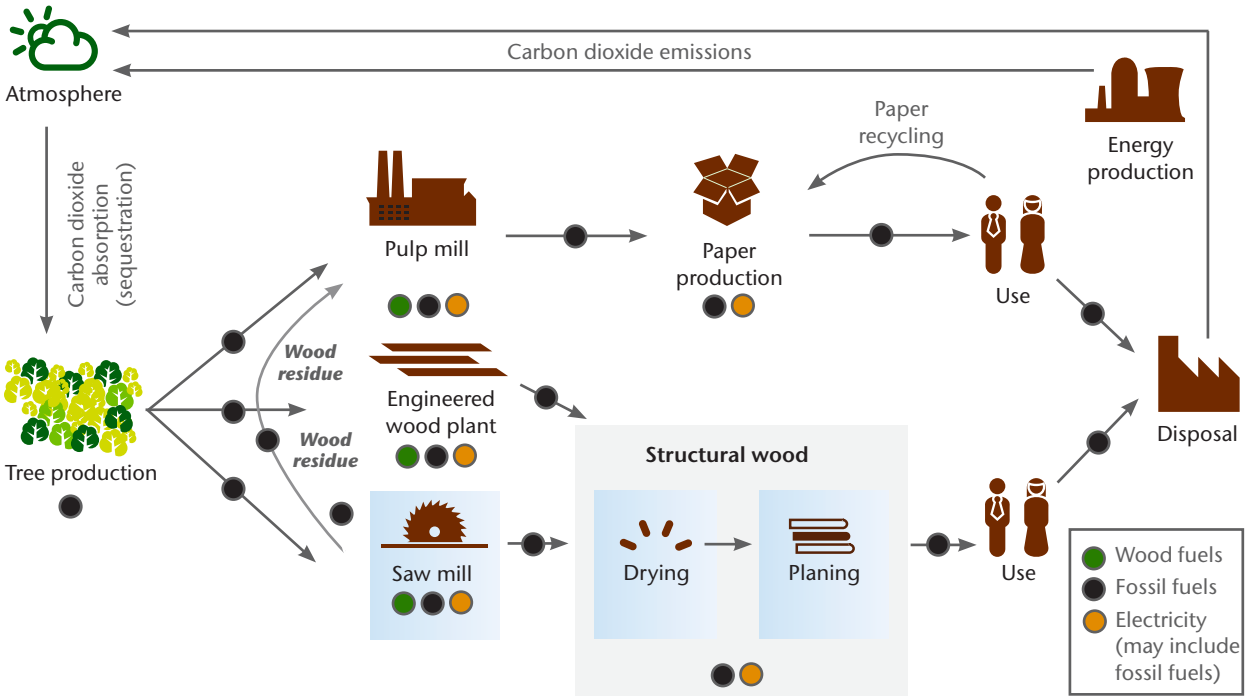
- Re-pulping: separating fibers from other substances (i.e., dirt, plastic, wax in specialty paper) and from each other. Sulfur, formaldehyde, naphthalene and sodium compounds are used to facilitate the process.
- De-inking: removing the ink from the paper and from the pulp mix by washing, flotation, or a combination of both. Chemicals used include sodium compounds, hydrogen peroxide, calcium chloride, soaps and fatty acids.

Recovered fibers can also be bleached separately or during re-pulping.

Emissions: mostly water-based including printing inks, adhesive components, fats, resins and AOX.

Examples of different emissions from different processes in paper-making. Dots representing energy do not quantify amount or proportion of energy inputs. Based on Holik, 2006; EPA, 2002; Paper Task Force, 1995.

Figure 10. Example of emissions in solid wood products



Sources: Milota, et al., 2005. The study was for production of dimension lumber in the Western and Southern U.S.

Dimensional lumber manufacturing: processes and emissions

Sawing: log storage and breakdown of raw logs into rough green lumber.

Water is used to wet the logs when they are sorted prior to being sawn.

Water-based chemicals such as paints, anti-stain treatments and others are used although their volumes are not considered highly toxic or hazardous.

Emissions: dust, VOC, Acetaldehyde, Formaldehyde and methanol can be emitted to the air. Solid emissions such as sawdust, bark, chips, and rough green lumber are considered co-products and are often burned for energy production or sold/used for other industrial processes such as paper-making.

Drying: the removal of water and moist content. Drying enhances performance, minimizes changes in the dimension (contraction or expansion), improves strength, reduces weight, facilitates processing and treatment, and reduces decay.

Because changes in water content result in strain and stress, wood must be dried under controlled circumstances to avoid bending, crackling or twisting. Chemicals can be used to treat lumber depending on the end-product including fire retardants, paints and finishes.

Emissions: common emissions include organic lubricants, solid particles, dust, and VOCs. Because of their volume, emissions of inorganic compounds are not considered highly toxic or hazardous.

Planing: the removal of excess wood to produce lumber with pre-determined dimensions and relatively smooth surfaces using planers, conveyers and other equipment.

Plastic film, cardboard corners and steel strapping are used to package the product. Use of other materials such as paints (for end sealing) is minor.

Emissions: coarse dust, VOCs, wood-shavings and chips.

Example of different emissions in the manufacturing of dimensional lumber. Dots representing energy do not quantify amount or proportion of energy inputs. Based on Milota et al., 2005. See box 8 for description of pollutants.

Types of pollution include:

- **Emissions to air**
  - **Energy-related emissions** resulting from the combustion of wood and fossil fuels to generate power
  - **Processing emissions** resulting from processes such as pulping, bleaching, pressing, evaporating, and the chemical recovery systems.
- **Solid emissions**
  - Sludge from wastewater treatment plants
  - Ash from boilers
  - Miscellaneous solid waste, including wood, bark, non-recyclable paper, and rejects from recycling processes.
- **Emissions to water** – large amounts of water are needed to carry the fibers through each manufacturing step in making paper products.
- **Noise** – a concern in the immediate vicinity of a mill. Its impact depends on the proximity of human settlements and the mitigation measures taken.

More information on pollutants commonly associated with manufacturing of wood and paper-based products can be found in Box 8.

Bleaching can be a potentially major source of pollution (Box 9). Most of the global paper industry has phased out the use of Elemental Chlorine (EC) as a bleaching agent; however, some facilities still use it. The prevailing bleaching systems are Elemental Chlorine Free (ECF) and Enhanced Elemental Chlorine Free (EECF). Totally Chlorine Free (TCF) bleaching may be an option for certain products although it tends to use more fiber and produce a lower quality product.

The law is the formal reference for what constitutes an acceptable level of emissions in a country. No international agreement on acceptable levels of emissions exists, but some multilateral and bilateral lending institutions have established policies based on Environmental Impact Assessments (EIA).

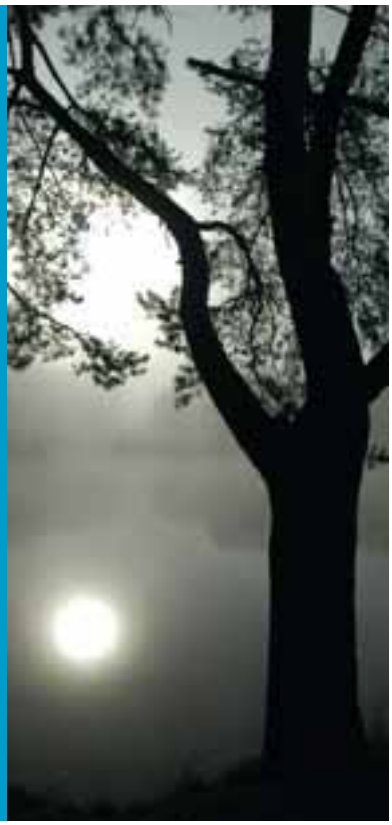
Box 8. Pollutants

Pollutants of interest include:

- **Volatile Organic Compounds (VOCs): include a variety of organic chemicals including paints, lacquers, glues and adhesives, by-products of the processing wood, and others. VOCs are precursors of ground-level ozone.**
- **Nitrogen Oxides (NOx): NOx are also precursors of ground-level ozone.**
- **Formaldehyde: in the atmosphere formaldehyde is rapidly broken down in atmospheric ions; formaldehyde is a component of acid rain.**
- **Methanol: methanol reacts in the air to produce formaldehyde and other chemicals that are washed out by rain. Methanol is the most common VOC found in the production of wood and paper-based products.**
- **Sulfur Compounds: in the atmosphere sulfuric acid contributes to acid rain, and it can be transported large distances from the point of release.**
- **Volume and Quality of the waste water including:**
  - **Biochemical Oxygen Demand (BOD) in the water discharge; BOD is the amount of oxygen that micro-organisms consume to degrade the organic material in the water. High levels of BOD can result in the reduction of dissolved oxygen in the water. This may adversely affect aquatic organisms. BOD is usually measured in kilograms per metric ton of pulp.**
  - **Chemical Oxygen Demand (COD) in the water discharge; COD is the amount of oxidizable organic matter and it can be used as an indicator of the quantity of organic matter in the water. COD is measured in kilograms per metric ton of pulp.**
  - **Total Suspended Solids (TSS); measured in kilograms per metric ton.**
  - **Absorbable Organic Halogens (AOX), including chlorine; there has been heavy pressure to stop using elemental chlorine in the bleaching processes because chlorine compounds can react with organics and generate chlorinated compounds (dioxins). Dioxins are persistent substances that have been considered a probable human carcinogen. AOX can be used as an indirect indicator of the quantity of chlorinated organic compound in the effluent. Reductions in the amounts of AOX can be used as indicator of continued technological improvement. However, AOX from ECF-bleached pulp do not contain highly chlorinated compounds.**

Factors to consider regarding pollution

- **Engaging in dialogue with landowners, trade associations and NGOs can be useful as they are often familiar with specific issues and local circumstances.**
- **The emission of pollutants is often specific to the country and the site. Some countries are more stringent in their regulation of emissions. Continuous improvement should be the goal; although compliance may not always be enough (e.g., in cases where requirements are not stringent) therefore holistic environmental impact reductions are also a goal. Adherence to the relevant and local regulations and/or international lending standards can be used as a proxy to assess a company's procurement policy requirements.**
- **Best management practices in the forest industry to deal with pollution include:**
  - **Minimizing the generation of effluents, air emissions and solid waste through better technology**
  - **Increasing reuse and recycling of waste materials**
  - **Increasing rates of chemical recovery from pulping and bleaching processes**
  - **Use of high-efficiency washing and bleaching equipment**
  - **Elimination of uncontrolled discharges of wastewater and solid waste due to equipment lack or failure, human error, or maintenance procedures**
  - **Usage of ECF, TCF, and EECF bleaching systems**
  - **Time-bound plans and management systems to minimize impacts from specific toxic pollutants.**



SELECTED RESOURCES: ENVIRONMENTAL CONTROLS

Procurement requirements

LEED	Promotes the reduction of waste.
Green Globes	Prefers materials with low environmental impact.
Japanese Government Procurement Policy	Includes specifications for pollutant emissions in the processing of procured raw materials.
SFI Procurement Objective	Requires the establishment of an auditable system for compliance with environmental best management practices.

Resources to assess requirements

Paper Profile	Provides a summary of air, water and solid emissions in pulp and paper production including: chemical oxygen demand, absorbable organic halogens, nitrogen, phosphorous, sulfur dioxide, nitrogen oxides as well as solid waste.
GPN	Prefers paper bleached without chlorine.
wood for good	Measures wood against other construction materials (steel and concrete) through comparisons of environmental impacts in manufacturing processes.
EPAT®	Rates the minimization of environmental impacts on water, air, earth and climate; per unit of finished product rates released to the environment of sulfur dioxide, nitrogen oxides, total particulate matter, mercury, absorbable organic halogens, total suspended solids, carbon dioxide, as well as solid waste, total suspended solids and oxygen demand.
WWF GFTN	Supports procedures for minimizing pollution and improving the acquisition, transportation, storage and management of toxic substances. Promotes non-use/production of toxic chemicals and compliance with local and international conventions regarding emissions, effluents and wastes.
WWF Tissue Scoring	Rates whether a company has a vision and targets for the production process with specific commitments to reduce/eliminate emissions of various substances including carbon dioxide, nitrogen oxides, sulfur compounds, total suspended solids, phosphorous, nitrogen, biological and chemical oxygen demand, and absorbable organic halogens, as well as the reduction of solid and hazardous waste to landfill. It also rates commitments to ongoing research and development into cleaner production and transportation technologies.
WWF Paper Scorecard	Rates pollution from organic waste and from absorbable chlorinated compounds. Promotes unbleached or totally chlorine free products.
WWF Guide to buying paper	Provides background information about pollution and most notable pollutants. Promotes the use of EMS by forest-products producing companies to improve environmental performance, and promotes the use of TCF paper.

Box 9. Bleaching of wood pulp

Wood is a composite material made of cellulose fibers, bonded and made rigid by lignin. To make paper, mechanical and chemical processes are used to separate the cellulose fibers from lignin and other compounds. Wood pulp intended for white paper products undergoes an additional bleaching process to remove residual lignin. Bleaching increases the performance and the brightness of the fibers, increasing their absorbency and turning them from brown to white. In addition, bleaching disintegrates contaminating particles, such as bark, and reduces the tendency of pulp to turn yellow (an important feature for archiving of information).

Elemental Chlorine (EC), combined with small amounts of chlorine dioxide, was the historical bleaching agent of the paper industry. However, EC has been determined to be the source of highly chlorinated organic compounds (dioxins), which are toxic to animal and human health, and are considered a probable human carcinogen. Almost all of the global paper industry has stopped using EC and turned to alternative processes, including:

- **Elemental Chlorine Free (ECF) – chlorine dioxide is substituted for EC in the bleaching process; some processes also use additional bleaching agents such as oxygen and hydrogen peroxide.**
- **Enhanced Elemental Chlorine Free (EECF) – removes more lignin and other contaminants before bleaching process through oxygen-based chemicals or prolonged delignification processes.**
- **Totally Chlorine Free (TCF) – uses oxygen-based chemicals such as ozone and hydrogen peroxide instead of chlorine-based compounds.**

TCF bleaching reduces the formation of pollutants but it can also use a greater amount of wood and energy per unit of product; TCF fibers may not entirely satisfy the performance needs of certain products.

Sources: Paper Task Force, 1995; Markets Initiative website (www.marketsinitiative.org) (5/09/07).

Renewable eucalyptus plantations grown in Brazil for the leading global producer of bleached eucalyptus pulp

Traditional bleach

8. Has recycled fiber been used appropriately?

Sourcing and legality aspects

Origin
Where do the products come from?

Information accuracy
Is information about the products credible?

Legality
Have the products been legally produced?

Environmental aspects

Sustainability
Have forests been sustainably managed?

Special places
Have special places, including sensitive ecosystems, been protected?

Climate change
Have climate issues been addressed?

Environmental protection
Have appropriate environmental controls been applied?

Recycled fiber
Has recycled fiber been used appropriately?

Other resources
Have other resources been used appropriately?

Social aspects

Local communities and indigenous peoples
Have the needs of local communities or indigenous peoples been addressed?

8. Has recycled fiber been used appropriately?

Recycling is common to the paper-making industry. The main raw material for paper used to be recycled clothes, until scarcity of clothes, rising demand and technological improvements allowed the use of wood fibers (Holik, 2006). Today, a significant amount of wood by-products from industrial processes are used, including trees that are too small or crooked to be cut into lumber, sawmill residue, and residue from the making of wood pulp (bark and non-cellulose parts of the wood).

The use of recycled fiber is exclusive to paper-based products. Recycling has increased significantly in many countries (Table 6) and one reason for the growth in demand for recycled fiber is that some governments and institutions have established requirements for recycled content. However, in some regions the availability of recycled fibers may not be sufficient to meet the demand and fiber collection can be a major bottleneck. In addition to the paper industry, collecting fibers to be recycled involves many actors such as city governments, municipalities, and waste management facilities and in some cases the recycled fiber is not enough to meet the demand.

Table 6. Recovered paper in the world

Region/Year	1990	1995	2000	2005	Recovery rate (Putz, 2006)
Africa	734,970	909,800	1,166,700	1,515,700	N/A
Asia	24,322,100	33,493,771	44,076,152	52,077,715	57%
Europe	24,088,000	33,641,000	43,991,709	54,774,990	55%*
North and Central America	28,788,008	33,246,500	45,945,000	47,806,928	38%**
South America	2,417,000	2,665,000	4,455,000	4,867,700	N/A

Production is in metric tons (Mt). Trends show an increase in production of recovered paper. Recovered paper includes paper and paperboard that has been used for its original purposes and residues from paper conversion. This includes waste and scrap collected for reuse as a raw material for the manufacture of paper and related products. Sources: Putz, 2006; FAO Faostat website (faostat.fao.org); CEPI, 2006.

**** EU Countries plus Czech Republic, Hungary, Norway, the Slovak Republic and Switzerland. Recovery rate is 62.6% if including European recovered paper recycled in third countries.***

***** North America only.***

A constant flow of virgin fiber into the fiber network is needed because wood fibers cannot be recycled indefinitely. Depending on the origin of the virgin fiber and the type of products, fiber is typically degraded and unusable after five to seven cycles. Thus, virgin fiber is constantly added to the fiber network to compensate for the retirement of degraded fiber, archival storage of paper, and loss of fiber through normal use and disposal of certain paper products such as personal care and tissue products. A recent study suggests that the paper supply in Canada and the United States would develop serious problems in a matter of days if the input of fresh fiber was eliminated (Metafore, 2006).[5]

In addition to recycled fibers, non-wood crops such as bamboo, kenaf and bagasse can also be used to produce paper (Box 9).

Factors to consider regarding recycled content

- **Use of recycled content is generally considered positive and can be an environmentally preferable source of fiber. Many consumers would like to see an increase in recycled content.**
- **The optimum percentage of recycled content depends on a combination of commercial, technical and political factors and is not necessarily the same as the maximum percentage. To determine targets for recycled content close contacts with suppliers is important, but engagement of other stakeholders in a transparent dialogue is a useful supplementary strategy.**
- **The optimum percentage of recycled content is not the same for all types of paper products; some end-products are more suitable for high recycled content than others. Differences in technical constraints and market sensitivity to product performance play significant roles.**
- **Consider the holistic environmental impacts of recycled content versus sustainable sourced fiber. The benefits of increased recycled fiber may be offset by non-fiber inputs such as chemicals or energy. For instance, depending on the processing, recycling of fibers may require additional inputs of fossil fuels because waste byproducts used to produce energy are not as available as when processing virgin fibers.**
- **Recycling involves investments at various steps of the process and it is not completely free from environmental impacts (Box 10).**
- **Responsible burning of wastepaper may be better for the environment than collection in remote areas of low supply density. Attempts to reach a 100% collection rate would not only be fruitless but also produce unintended negative effects, such as increased carbon emissions associated with the additional transportation needed to collect fiber. However, this relationship may change depending on changing prices for oil and fiber.**
- **Recycling can be part of a sustainable procurement policy in several ways. Apart from purchasing specifications for recycled content, a company may also set targets for increasing the proportion of recycled content in its products and support measures for helping local governments to collect recycled fibers in sufficient amounts to meet demand. The costs for upgrading fiber quality rise rapidly when recycling rates become high.**

[5] The same study examined production of newsprint in Canada and the US. The result suggests that production of newsprint would have to cease after three and a half months if only recovered fiber were used.

SELECTED RESOURCES: RECYCLED CONTENT

Procurement requirements

LEED	Rates the proportion of materials that contain recycled content and the proportion of used materials (e.g., in renovation projects) being recycled including paper, wood, flooring, cardboard, etc.
Green Globes	Rates proportion of construction materials that contain recycled post-consumer content.
Japanese Government Procurement Policy	Requires specific percentages of recycled content for various solid and pulp-based products.

Resources to assess requirements

Paper Profile	Includes a summary of recycled content.
GPN	Prefers products that are easily recycled and contain high percentages of recycled content.
wood for good	Promotes recycling of wood products.
EPAT®	Rates the percentage of use of pre- and post-consumer fiber, as well as the total fiber input in the product.
WWF GFTN	Provides advice on defining levels of recycled content and systems to certify recycled materials.
WWF Tissue Scoring	Rates companies' specific commitments to maximize the use of post-consumer recycled content and optimize the use of virgin fiber.
WWF Paper Scorecard	Rates and promotes the use of post-consumer recycled fiber.
WWF Guide to buying paper	Provides background information and advice about increasing use of recycled fiber. Showcases examples of companies using recycled fiber.

Box 10. Alternative fibers

Non-wood fibers, or other agricultural residues, used in paper-making include flax, kenaf, hemp, bamboo, rye, wheat straw and fiber from sugar cane (bagasse). Alternative fibers and agricultural residues have some advantages for paper-making:

- The demand for wood fibers from unsustainable sources is reduced, as is the pressure on forests for fiber production.
- Rural economies and employment can benefit. In India and China, in particular, non-wood fibers play an important role in some rural economies.

However, alternative fibers have failed to attract a strong interest from major industrial paper makers for several reasons:

- Poor availability and logistical difficulties – certain alternative fibers are not available throughout the year and storage capacity would be needed to feed mills year-round; production of alternative fibers may involve a large number of suppliers.
- Scale, supply and markets – the supply system and customer base for wood fiber are well established, whereas a supply system for alternative fibers would have to be designed and constructed, and offers less predictability and control.
- The need for intensive management – non-wood fibers would have to be grown as intensively-managed crops on large areas in order to sustain a large-scale manufacturing operation. The environmental side effects of this may be greater than those of SFM.
- Technical properties – some alternative fibers may not meet the performance requirements for certain products (e.g., rice straw for making newsprint). There are still some processing problems due to high silica content in some alternative fibers (e.g., straw).

Some key questions to consider when requesting paper made from alternative fibers:

1. Does it remove incentives to keep the landscape forested?
2. Do the environmental advantages persist when the production expands to the necessary scale, or does it result in more negative environmental impacts? (consider water use, chemical inputs, energy requirements, climate effects, etc).
3. What is the risk that forest land will be converted to agriculture?
4. What effects, both positive and negative, would this have on local communities and indigenous peoples?

Flax bush on Tiritiri Matangi Island, New Zealand

Bamboo plantation

Box 11. Recycling and environmental impacts

Wood and paper-based products have environmental implications at every stage of their life cycle. Recycling is better in general because it can reduce the demand on virgin fiber to a certain degree. From a life cycle assessment (LCA) perspective, the environmental impacts of fiber recycling and reuse need to be considered. Enhancing one aspect of fiber recycling could offset the benefits and increase the negative impacts in another stage of the life cycle of the product. There are disagreements among stakeholders about the benefits and negative environmental impacts of recycled fiber.

	VIRGIN FIBER PRODUCT	RECYCLED FIBER PRODUCT
Raw material acquisition	**Trees grown, harvested, transported and chipped.**	**Used products collected, transported, and sorted. There might be cases, where paper with high content of recycled fiber generates more fossil fuel-based CO_2 emissions because of transportation.**
Raw material processing	**Water, energy, and chemicals used to extract fibers from wood chips.**	**Water, energy, and chemicals used to clean and re-pulp used products, remove fillers, and de-ink fibers.**
Processing by-products	**Air emissions, water effluent, non-hazardous waste (wastewater treatment residuals). Some solid waste used as soil nutrients.**	**Fewer air emissions, similar water effluent, significantly more wastewater treatment residuals.**
Product manufacturing	**Water and energy used to make paper from pulp.**	**Water and energy used to make paper from pulp. Recycled fibers can increase the amount of energy (including fossil fuel energy) needed in paper-making because they dry less efficiently. Fibers that shorten/break during recycling process can end up as solid waste.**
Product use	**The amount of fiber or product needed to perform a given task (i.e., make 100 copies, absorb 2 grams of fluid).**	**Recycling process breaks and stiffens fibers, resulting in reduced performance in some types of products. More fiber per sheet may be needed or more product used to adjust for poorer performance.**
Product disposal	**Paper products typically recycled or disposed as solid waste or in wastewater. When products are no longer recyclable they can be burned to generate energy.**	**Similar disposal routes for products made from recycled fibers. When products are no longer recyclable they can be burned to generate energy.**

9. Have other resources been used appropriately?

Sourcing and legality aspects

Origin
Where do the products come from?

Information accuracy
Is information about the products credible?

Legality
Have the products been legally produced?

Environmental aspects

Sustainability
Have forests been sustainably managed?

Special places
Have special places, including sensitive ecosystems, been protected?

Climate change
Have climate issues been addressed?

Environmental protection
Have appropriate environmental controls been applied?

Recycled fiber
Has recycled fiber been used appropriately?

Other resources
Have other resources been used appropriately?

Social aspects

Local communities and indigenous peoples
Have the needs of local communities or indigenous peoples been addressed?

9. Have other resources been used appropriately?

Efficiency in the use of water, raw materials and energy, paired with demand reduction, is another aspect of sustainable procurement.

SOURCE REDUCTION

Source reduction is an important strategy for reducing the consumption of raw materials while maintaining efficiency and usability of the products. Source reduction goes beyond recycling by attempting to reduce negative environmental impacts throughout the entire life cycle of the product. Design, manufacturing, usage, sales (including packaging), and final disposal are all part of source reduction (Box 11).

Benefits of source reduction include:

- Decreasing environmental impacts including a decrease in pollution and toxicity and decrease in the use of non-renewable resources.
- Lower costs, and increased economic benefits throughout the production process:
  - Harvesting operations (more efficient and targeted harvesting)
  - Manufacturing (less raw materials to process)
  - Product management (collection, transportation, packaging and storage).

The benefits of source reduction should be considered in light of consequences for performance and usability. A lower-performing paper using fewer resources per unit of product may create a false sense of economy of resources if it requires more units of the product to accomplish the task. This is particularly true for some products that undergo specialized treatment and processing to enhance performance and usability (e.g., tissue with additives to soothe skin, stronger and more durable paper, and so on).

EFFICIENCY

Besides wood, energy remains the most expensive part of the manufacturing process for the pulp and paper industry. While energy efficiency has improved dramatically in the last few decades, the manufacturing processes of many products still consume considerable amounts of energy. Energy reduction is of strong interest to the forest products industry.

There are pulp mills that burn residual biomass to both meet their own energy needs, and to sell surplus energy to the grid. Most mills do not, however, either because they have not been equipped with sufficiently modern technology or because the production process does not generate biomass residue as a by-product (such as mechanical pulping).

DEMAND REDUCTION

Demand reduction can be a positive and important element of a sustainable procurement strategy. Reusing the back side of paper, using double-sided printing, using lighter products, etc. are all ways to reduce wasteful consumption.

Factors to consider regarding efficiency, source and demand reduction

When it comes to transportation, energy consumption depends on the distance, location, and even condition of the facilities and transportation routes. It is advisable that a company first identify the areas of priority where it has more leverage and can have a positive impact without compromising the quality of the products.

Wood transportation vehicle in Germany

SELECTED RESOURCES: SOURCE REDUCTION

Procurement requirements

LEED	Rates the proportion of building materials that are reused.
Green Globes	Rates the proportion of building materials that are reused.
Japanese Government Procurement Policy	Requires simple packaging.

Resources to assess requirements

Paper Profile	Provides a summary of the electricity procured for both the pulp and paper mills in relation to the amount of pulp used in the paper.
GPN	Prompts user to assess whether or not the product is needed before purchasing. GPN also prefers products where the manufacturing and distribution processes minimize the use of resources and energy.
EPAT®	Rates the recyclability and compostability of other materials (wax, plastic and metal), as well as the amount of water and energy used throughout the manufacturing process.
WWF Tissue Scoring	Rates whether companies have set a vision and targets for the production process to minimize the use of non-wood inputs (water, energy and additives), and maximize the use of biomass and other renewable energy.
WWF Guide to buying paper	Provides background information and advice to reduce paper consumption.

Box 12. Life cycle assessment

A life cycle assessment (LCA) is a tool to objectively evaluate the overall environmental impacts associated with a product. LCA assesses the product and the inputs (energy, raw materials, water, etc.) and outputs (pollution to soil, water, oil, etc.) in a product's life cycle from raw material extraction to final disposal.

LCA is not a risk assessment tool because it stops at quantifying emissions without assessing their impacts. Additionally, LCA is a data-intensive methodology and data limitations (out-of-date, lack of data, or omissions) are common.

LCA is a useful tool to identify, prioritize and target actions to minimize negative environmental impact. LCAs can also be used to compare the environmental impact of alternative raw materials.

A number of LCAs have been completed for various wood-based products including:

- **Wood as a building material**
- **Wooden furniture**
- **Comparison between single-use diapers with absorbent gels, commercially laundered cloth diapers, and home-laundered cloth diapers**
- **Comparison of wood, concrete, and steel as building materials**
- **Comparison between using wood, aluminum and plastic to build a video/TV unit**
- **Comparison between solid wood, linoleum and vinyl as raw materials for flooring**
- **Comparison between wood, PVC and aluminum as raw materials to build window frames.**

Some of the drawbacks of LCAs include:

- **They account for environmental factors but not economic and social aspects**
- **LCAs do not address the renewable aspect of wood**
- **LCAs are undertaken on a case-by-case basis and thus, limited by the boundaries of the assessment.**

A list of resources on LCA can be found in Section III.

10. Have the needs of local communities or indigenous peoples been addressed?

Sourcing and legality aspects

Origin
Where do the products come from?

Information accuracy
Is information about the products credible?

Legality
Have the products been legally produced?

Environmental aspects

Sustainability
Have forests been sustainably managed?

Special places
Have special places, including sensitive ecosystems, been protected?

Climate change
Have climate issues been addressed?

Environmental protection
Have appropriate environmental controls been applied?

Recycled fiber
Has recycled fiber been used appropriately?

Other resources
Have other resources been used appropriately?

Social aspects

Local communities and indigenous peoples
Have the needs of local communities or indigenous peoples been addressed?

10. Have the needs of local communities or indigenous peoples been addressed?

Protection of indigenous and workers' rights in the forest, as well as in manufacturing facilities, is an important part of sustainable procurement. Forests and forest-products manufacturing facilities are potentially dangerous work environments. Initial processing of the wood often occurs in remote and sparsely populated areas where job opportunities, social support systems, government supervision and adequate infrastructure may be limited. Forces and conditions beyond the control of government authorities can sometimes be found in forest areas.

The forest sector employs millions of workers throughout the various steps of the value chain (Box 13). Forest companies sometimes make up for governmental voids and take a leadership role in addressing social and governance issues. Values such as fair pay, employment benefits, training, health and safety, and interaction with local communities are a part the "social contract" between employers and the communities in which they operate. Violations of workers' rights can lead to unsafe work conditions, reduction of local benefits, discriminatory behavior, low wages, and an increase in migrant and informal work.

A number of international conventions, treaties and processes, including the International Labour Organization's core labor standards, incorporate considerations about social aspects of forest-based industries (Table 7). In some instances compliance with the law can be sufficient to meet the demands of individuals and communities, but land tenure issues can present cases where legality does not equate with fairness.

Some of the most pressing social issues related to sustainable procurement include:

- **Violation of property rights, and the rights of local peoples (including indigenous groups).** Forestry operations (logging and processing) should consider, and be compatible with, the local land tenure rights regime, which may include community-based forest management systems. Subsistence use of the forest should be respected. Violations of the rights of local peoples may include bribery and access to large concessions through gifts to certain members of the community without the consent of the full community.

Factors to consider regarding social issues

- **Logging concessions may have been granted in areas where local and indigenous people claim property rights. This is a potential concern in many post-colonial countries.**
- **Worker safety may be lacking or underage labor may be used.**
- **Logging operations may be run by the military and proceeds used to finance war-like activities.**
- **The issues above can arise in both natural forests and intensively managed forest plantations.**
- **Extremely low salaries and communities not receiving economic benefits they deserve from forest resources.**
- **Illegal labor may be used.**

As in other aspects of sustainable procurement of wood-based products, tracing the production chain back to its beginning will help assess the risk and opportunities associated with social issues. In some areas monitoring and verification have important roles to play.

- **Participation and consultation.** Forest operations should include the meaningful participation of and consultation with local communities and indigenous peoples appropriate to the nature and scale of the operation, the type of ownership (public vs. private), and local legal regimes and customs. Engagement that is based on information, inclusiveness, dialogue, legal recognition, monitoring and evaluation and capacity building can benefit communities and businesses alike. Especially where land tenure and traditional rights are uncertain, the appropriate degree of consultation and consent can be controversial. The principles of "free, prior and informed consent" (FPIC) are evolving through international debate to help define and require appropriate consultation and consent. ILO Convention 186 (ILO, 1998) defines FPIC as the right of communities "to exercise control, to the extent possible, over their own economic, social and cultural development". A full discussion of FPIC can be found in Herz et al., 2007.
- **Capacity building.** Building the capacity of local peoples (including indigenous groups) to work in the industry sector, and understand, negotiate and participate in agreements regarding the management of their resources.
- **Recognition and support of cultural identity.** This includes maintenance, use and promotion of traditional knowledge and practices of local communities and indigenous peoples.

The differences in social performance between and within countries and regions are significant. It is important to know where the wood is coming from. Areas of concern include the following:

- Areas associated with armed conflict (in some cases logging and trade in wood-based products have been used to sponsor armed conflict).
- Areas known to have flagrant violations and avoidance of workers' and human rights.

SELECTED RESOURCES: SOCIAL ISSUES

Procurement requirements

Danish Government Procurement Policy for Tropical Forests (under review)	Draft criteria include seven thematic elements, including maintenance of socioeconomic functions, legality of property and tenure rights, respect for customary and traditional rights, and health and workers' rights.
Public procurement policies for forest products and their impacts	Reviews how public procurement policies include, exclude or address social aspects (socioeconomic, cultural and spiritual), compliance with fundamental rights, equality, non-discrimination, and others.
Timber Trade Federation Responsible Purchasing Policy	Provides guidance and assistance to members to evaluate compliance with legality requirements of the UK central government procurement policy, including compliance with social standards and laws. Members must not trade wood harvested in violation of traditional and civil rights.
FSC Controlled-Wood Standard	Requires that wood not be harvested in violation of traditional and civil rights, and in compliance with ILO labor rights declaration.
PEFC Guide for the avoidance of controversial timber	Provides safeguards seeking to prevent sourcing from illegal harvesting, which covers social issues such as workers, indigenous and human rights.
SFI Procurement Objective	Requires the establishment of an auditable system for compliance with socially sound management practices. In countries without effective laws and law enforcement, participants must assess and address issues related to workers' health and safety, fair labor practices, indigenous peoples' rights, anti-discrimination and anti-harassment measures, prevailing wages and workers' right to organize.

Resources to assess requirements

CPET	Addresses social issues to the degree they are incorporated in requirements of certification standards for sustainability and legality.
FCAG	Includes criteria and requirements for assessing compatibility with globally applicable social principles including: respect for human, indigenous and worker's rights; meaningful and equitable participation of all major stakeholder groups; and transparency in decision-making and public reporting.
Good Wood. Good Business guide	Provides an overview of unwanted wood, which includes: material from places where harvesting is associated with human rights violations, wood used to underwrite armed conflicts, or wood that breaks UN trade sanctions.
EPAT®	Rates mill systems for ensuring worker safety and health, engagement with stakeholders, and public disclosure of indicators covered by EPAT.
WWF GFTN	Provides information on social issues related to wood and paper purchasing, as well as information on areas where these issues are most relevant (see White and Sarshar, 2006). Requires compliance with ILO convention on indigenous and tribal peoples, and the UN declaration of human rights. Endorses good labor practices through compliance with local and international labor laws.
WWF Tissue Scoring	Rates whether a company has a clear policy to eliminate all raw materials from controversial sources including sourcing from forests where the rights of local communities and indigenous peoples are compromised.
WWF Paper Scorecard	Rates safeguards to avoid potential inclusion of unwanted sources of fiber, aligned with the FSC Controlled-Wood Standard.
WWF Guide to buying paper	Promotes the avoidance of illegal and other unacceptable sources. Promotes forest certification as means to avoid sourcing raw materials harvested in violation of customary rights.

Table 7. Key International commitments and standards on social issues and forests

ISSUES	AGREEMENTS					
	Agenda 21 – UN plan for sustainable development (UN, 2005)	Forest Principles – international, non-binding, consensus on the management, conservation and SFM of the forests	IPF/IFF proposal for action – international non-binding proposals to address a variety of forest issues (Commonwealth of Australia, 2000)	Human rights instruments – International Covenant on Civil and Political Rights, International Covenant on Economic, Social and Cultural Rights	Convention on Biological Diversity – international convention to promote sustainable development focusing on biodiversity (CBD, 2007A)	International Labour Organization – core conventions and Convention 169, to recognize, promote and protect indigenous and tribal peoples' rights (ILO, 2003)
Ensure the participation of local communities and indigenous peoples and other major groups in the formulation, planning and implementation of national forest policies.	✓	✓	✓		✓	
Recognize and support the cultural identity, culture and rights of indigenous peoples and other forest-dependent people.	✓	✓	✓	✓	✓	✓
Recognize multiple functions, values and uses of forests, including traditional uses, and development and implementation of strategies for the full protection of forest values including cultural, social and spiritual.		✓			✓	✓
Formulate policies and laws aiming at securing land tenure of indigenous peoples and local communities.	✓	✓	✓	✓		✓
Ensure that external trade policies take into account community rights.				✓		
Recognize and support community-based forest management			✓		✓	
Development of regimes for protection, use and maintenance of traditional knowledge and customary use.	✓				✓	✓
Capacity building of indigenous peoples and other forest-dependent people who possess resources to participate in agreements that apply SFM.					✓	
Protection of workers' rights including freedom of association, right to bargain, prevention of child and forced labor, equal remuneration, and protection against discrimination.	✓			✓		✓
Involvement of unions and workers in all processes for forest planning.	✓					

(Adapted from Forests Peoples Programme. 2004. *www.forestpeoples.org/documents/forest_issues/summary_stds_forests_dec04_eng. shtml*) (11/07/06). Over the past decade, a number of international agreements and commitments have been made to address some of the most pressing social issues around forests.

Box 13. Forests and people

Forests are home to an estimated 800 million people around the world. To varying degrees more than 1.6 billion people depend on forests for their livelihoods (e.g., fuel wood, medicinal plants and forest foods). About 60 million indigenous people are dependent on forests, and in developing countries about 1.2 billion people rely directly on agroforestry farming systems that help sustain agricultural productivity and generate income.

An estimated 13 million people were formally employed in the forestry sector worldwide in the year 2000. This represents about 0.4% of the total labor force, but is likely an underestimation as it includes only the "visible" and "formal" activities. The International Labour Organization estimates that for every formal job in the forestry sector there are one or two informal jobs. The forestry sector could potentially contribute to an estimated 1.5% of global employment.

The gross value-added in the forestry sector in 2003 was US$ 353 billion, while the global trade in wood products amounted to US$ 150 billion.

Sources: FAO, 2007B, 2002B. Facts and figures are online at (www.fao.org/forestry/site/28821/en) (11/20/06).

Child from the forest tribe of Kurebahal Village, Orissa, India

Selected tools

Selected tools

A number of tools – projects, initiatives, labels and publications – exist to support sustainable procurement of wood and paper-based products. Various tools have different things to offer. They differ in their geographical and thematic scope, in their focus within the wood chain, in the reasons for why they exist, in the constituency backing them, in their level of depth and detail, in their user-friendliness, etc. It is difficult to characterize them or place them in any kind of unified system.

This section presents the characteristics of 23 tools by placing them in two overview tables (Tables 8 and 9). The selected tools are grouped into three categories, depending on their relevance and focus:

- Solid wood products
- Paper-based products
- Wood-based products in general

Within a category, the tools are further defined by their focus in the supply chain and by their geographic area of relevance. Each tool's primary issues of concern are noted, as well as the contact information.

Note – more complete information about each of these tools is available at *www.sustainableforestprods.org.*

Factors to consider regarding the selection of a tool

- **Does the program/organization fit with the corporate procurement strategy? Is it credible?**
- **Does the tool align with the company's supply chain and geographic area of operations?**
- **Are the goals and mission of the tool consistent with the company's business strategy and long-term vision?**
- **Will the company be able to provide input into future decisions about the tool and its use?**
- **Is it a holistic approach? Does it cover a sufficiently broad array of issues?**

Table 8. Summary list of tools exclusively for either wood or paper-based products

SCOPE	Focus in supply chain				Geographic areas of interest	Main issues of concern					
	Forest production	Processing/ Manufacturing	Retail/Use	Trade		Traceability	Monitoring and verification	Legality	SFM	Special places	
SOLID WOOD											
German Government Procurement Policy	✓			✓	Global	✓	✓	✓	✓		
The Green Building Initiative's Green Globes™ Rating System	✓		✓		US	✓			✓		
The Leadership in Energy and Environmental Design (LEED)® Green Building Rating System	✓		✓		US	✓			✓		
Timber Trade Federation Responsible Purchasing Policy	✓	✓		✓	Global	✓	✓	✓	✓	✓	
Tropical Forest Trust's *Good Wood, Good Business* guide	✓		✓	✓	Global/ Tropics	✓	✓	✓	✓	✓	
wood for good campaign	✓		✓	✓	Global				✓		
PULP AND PAPER-BASED											
Environmental Paper Assessment Tool®	✓	✓	✓		Global but primarily used in the US and Canada	✓	✓	✓	✓	✓	
Paper Profile	✓	✓			Europe/ Global	✓	✓		✓		
WWF Guide to buying paper	✓	✓	✓	✓	Global	✓	✓	✓	✓	✓	
WWF Paper Scorecard	✓	✓		✓	Global	✓	✓	✓	✓	✓	
WWF Tissue Scoring	✓	✓	✓		Europe	✓	✓	✓	✓	✓	

	Forest conversion	Social issues	Pollution	Recycled content	Climate	Source reduction	Brief characterization	Contact details
							Procurement policy for wood and wood products only from verifiably legal and SFM.	German Federal Ministry of Consumer Protection, Food and Agriculture Phone: +49 (030) 200 60 *www.bmelv.de*
			✓	✓		✓	Rating standards for commercial buildings.	The Green Building Initiative; Phone: +1 877-GBI-GBI; E-mail: info@thegbi.org; *www.thegbi.org*
			✓	✓		✓	Rating standards for various types of buildings.	Green Building Council Phone: +1 800 795 1747 or +1 202 828 5110; E-mail: info@usgbc.org *www.usgbc.org*
	✓	✓					Management system compliant with UK central government requirements for legality and sustainability.	Timber Trade Federation Phone: +44 (0) 20 7839 1891 E-mail: ttf@ttf.co.uk; *www.ttf.co.uk*
	✓	✓					Practical guidance to develop and implement sustainable procurement.	Tropical Forest Trust Phone: +41(0)22-367 94 40 or +44 (0) 1329 833888 E-mail: tft@tropicalforesttrust.com *www.tropicalforesttrust.com*
			✓	✓	✓		Brochures, fact sheets, education materials.	wood for good Phone: +44 (0) 800 279 0016 E-mail: contact@woodforgood.com *www.woodforgood.com*
		✓	✓	✓	✓	✓	Comprehensive, state-of-the-art decision-support tool to facilitate dialogue between producers and buyers on various issues.	Metafore Phone: +1 503 224 2205 E-mail: info@metafore.org *www.metafore.org*
			✓	✓		✓	Voluntary system to provide information to the consumer about various environmental parameters of specific paper products.	Finnish Paper Engineer's Association Phone: +358 (9) 132-6688 E-mail: info@papereng.fi *www.papereng.fi*
	✓		✓	✓	✓	✓	Companion to WWF Paper Scorecard. Provides guidance on various issues and showcases examples of companies taking action on issues covered.	WWF International Phone: +41 (0)22 364 91 11 *www.panda.org/paper/toolbox*
	✓	✓	✓	✓	✓		Scoring system for paper.	WWF International Phone: +41 (0)22 364 91 11 *www.panda.org/paper/toolbox*
	✓	✓	✓	✓		✓	Rating system to assess tissue paper sourcing.	WWF International Phone: +41 (0) 22 364 91 11

Table 9. Summary list of tools for both wood and paper-based products

SCOPE	Focus in supply chain				Geographic areas of interest	Main issues of concern					
	Forest production	Processing/ Manufacturing	Retail/Use	Trade		Traceability	Monitoring and verification	Legality	SFM	Special places	
WOOD & PAPER-BASED PRODUCTS											
CEPI Certification Matrix	✓				Global		✓	✓	✓		
CEPI Legal Logging Code of Conduct	✓			✓	Europe	✓	✓	✓			
Danish Government Procurement Policy for Tropical Forests	✓	✓		✓	Global	✓	✓	✓	✓		
Forest Certification Assessment Guide	✓				Global	✓	✓	✓	✓	✓	
FSC's Controlled-Wood Standard	✓	✓		✓	Global	✓	✓	✓		✓	
Global Forest and Trade Network	✓	✓	✓	✓	Global	✓	✓	✓	✓	✓	
Green Purchasing Network		✓	✓		Japan		✓	✓	✓		
Japanese Government Procurement Policy	✓	✓			Japan/ Global	✓		✓	✓		
PEFC Guide for the avoidance of controversial timber	✓	✓		✓	Global	✓	✓	✓		✓	
Public Procurement Policies for Forest Products and Their Impacts	✓			✓	Europe, New Zealand, Japan		✓	✓	✓		
Sustainable Forestry Initiative Procurement Objective	✓	✓		✓	US and Canada	✓	✓	✓	✓	✓	
UK Government Central Point of Expertise on Timber Procurement	✓	✓		✓	Global	✓	✓	✓	✓	✓	

	Forest conversion	Social issues	Pollution	Recycled content	Climate	Source reduction	Brief characterization	Contact details
							Online comparison of certification systems based on compatibility with ISO standards, legality and conformance with internationally recognized SFM principles.	Confederation of European Paper Industries (CEPI) Phone: +32 (2) 627 4927 E-mail: mail@cepi.org www.cepi.org
							States CEPI member companies' commitments to address illegal logging.	Confederation of European Paper Industries (CEPI) Phone: +32 (2) 627 4927 E-mail: mail@cepi.org; www.cepi.org
		✓					Guidelines for purchasing of tropical timber. Guidelines are currently under review.	Danish Ministry of the Environment Phone: +45 (72) 54 20 00 E-mail: sns@sns.dk; www.sns.dk
	✓	✓	✓				Framework for the evaluation of certification systems to assess compliance with World Bank and WWF policies.	World Bank/WWF International Phone +41 (0) 22 364 91 11 Phone +1 202 473 10 00 www.forest-alliance.org
	✓	✓					Within the FSC system, a standard to avoid trading of illegal and environmentally and socially damaging wood.	Forest Stewardship Council Phone: +49 (228) 367 6626 E-mail: fsc@ fsc.org www.fsc.org
	✓	✓		✓	✓	✓	Promotes responsible forest management and trade trough a step-wise approach toward credible certification.	WWF International Phone : +41 22 364 9111 www.gftn.panda.org
			✓	✓	✓	✓	Guidance for green purchasing, including various types of paper products and furniture.	Green Purchasing Network Phone: + 81 (3) 3406-5155 E-mail: gpn@net.email.ne.jp www.gpn.jp
			✓	✓	✓	✓	Guidelines for verification of legality and sustainability of wood and wood products.	Forestry Agency, Ministry of Agri-culture, Forestry and Fisheries of Japan www.maff.go.jp/eindex.html
		✓					CoC requirements to prevent trading of timber harvested illegally.	PEFC Council ASBL Phone: +352 26 25 90 59; E-mail: info@pefc.org; www.pefc.org
		✓					Synthesis and comparative review of public timber procurement policies around the world.	Ardot Phone: +358 (0) 9 44 88 61 E-mail: ardot@ardot.fi www.ardot.fi
		✓			✓		Purchasing requirements for wood and fiber under SFI certification standard.	Sustainable Forestry Initiative Phone: +1 703 875 9500; www.sfiprogram.org
		✓					Guidance for compliance with UK central government purchasing requirements for sustainability and legality.	ProForest Phone: +44 (0) 1865 243 766 E-mail: cpet@proforest.net www.proforest.net

Additional resources

Additional resources

CITES

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- UNEP/WCMC. Tree Conservation Information Service website – www.unep-wcmc.org/trees/trade/cites.htm (11/7/07).
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Social issues

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- International Labour Organization – www.ilo.rg
- ISO's Standard on social responsibility (upcoming) – more information at isotc.iso.org
- Rights and Resources Program– www.rightsandresources.org
- The Forest Dialogue – Forest and poverty reduction – research.yale.edu/gisf/tfd/
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- US Department of Energy – Industrial assessment centers – iac.rutgers.edu

Special places

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- FSC's High Conservation Value Forests – www.fsc.org.
- Global Forest Watch's maps of Intact Forest Landscapes for Russia, Canada and Alaska – www.globalforestwatch.org
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- TNC Ecorregional Planning website – gis.tnc.org/gisattnc.php#Eco.
- World Heritage Sites – whc.unesco.org/
- WWF Ecorregions – www.worldwildlife.org/science/ecoregions/landscapes.cfm#2

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Traceability

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Terminology

Terminology

ACRONYMS

AFF	American Forest Foundation
AOX	Absorbable Organic Halogens
ATFS	American Tree Farm System
ATO	African Timber Organization
AZE	Alliance for Zero Extinction
BOD	Biological Oxygen Demand
CBD	Convention on Biological Diversity
CEPI	Confederation of European Paper Industries
CIFOR	Center for International Forestry Research
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CO_2	Carbon Dioxide
CoC	Chain-of-Custody
COD	Chemical Oxygen Demand
CPET	Central Point of Expertise on Timber Procurement (UK)
CPI	Corruption Perception Index
CSA	Canadian Standards Association
ECF	Elemental Chlorine Free
EECF	Enhanced Elemental Chlorine Free
EMS	Environmental Management System
EPAT®	Environmental Paper Assessment Tool
EPE	European Partners for the Environment
FAO	Food and Agriculture Organization
FCAG	Forest Certification Assessment Guide
FECV	Forests with Exceptional Conservation Value
FLEG	Forest Law Enforcement and Governance
FLEGT	Forest Law Enforcement, Governance and Trade
FPIC	Free Prior and Informed Consent
FSC	Forest Stewardship Council
GBI	The Green Building Initiative
GFTN	Global Forest and Trade Network
GMOs	Genetically Modified Organisms (also Genetically Modified – GM)
GPN	Green Purchasing Network
HCVF	High Conservation Value Forests
IGPN	International Green Purchasing Network
IPF/IFF	Intergovernmental Panel on Forests/ Intergovernmental Forum on Forests
IPM	Integrated Pest Management
ISO	International Organization for Standardization
ITTO	International Tropical Timber Organization
IUCN	World Conservation Union, formerly International Union for Conservation of Nature and Natural Resources
IUFRO	International Union of Forest Research Organizations
LCA	Life Cycle Assessment
LEED	Leadership in Energy and Environmental Design
LEI	Lembaga Ekolabel Indonesia (Indonesian Ecolabeling Institute)
MTCC	Malaysian Timber Certification Council
NGO	Non-Governmental Organization
PEFC	Programme for the Endorsement of Forest Certification schemes
PEOLG	Pan-European Operational Level Guidelines
QACC	Questionnaire for Assessing the Comprehensiveness of Certification Schemes
SFI, Inc.	Sustainable Forestry Initiative, Inc.
SFM	Sustainable Forest Management
SMS	Social Management System
TCF	Totally Chlorine Free
TFT	Tropical Forest Trust
TI	Transparency International
TTF	Timber Trade Federation
UNEP	United Nations Environment Programme
VOCs	Volatile Organic Compounds
WB	World Bank
WBCSD	World Business Council for Sustainable Development
WCMC	World Conservation Monitoring Centre
WRI	World Resources Institute
WWF	World Wide Fund for Nature

GLOSSARY

bill of lading
A document establishing the terms of contract between a shipper and a transportation company to move freight from one point to another for a specific charge. The shipper often prepares the bill of lading on forms issued by the carrier (GFTN, 2005).

biodiversity
Also, biological diversity. The variety of living organisms from all sources including terrestrial, marine and other aquatic ecosystems, as well as the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems (CBD, 2007B).

carbon sequestration
The different processes through which carbon is removed from the atmosphere and stored in soil, biomass, geological formations and oceans.

chain-of-custody (CoC)
The systematic tracking of wood-based products from their origin in the forest to their end-use.

clearcutting
A timber harvesting method that involves the removal of standing trees in a given area (ACF, 2006).

critical forests
See Table 3.

critically endangered species
Species considered to be facing an extremely high risk of extinction in the wild (IUCN, 2006).

endangered forests
See Table 3.

endangered species
Any species facing a very high risk of extinction in the wild. Examples of endangered commercial tree species include Cerjeira or roble del país (*Amburana cearensis*), Palissandre (*Dalbergia davidii*), and Australian hickory (Flindersia ifflaiana) (IUCN, 2006).

endemic species
Species that live exclusively in certain areas and do not exist anywhere else (IUCN, 2006)

engineered wood
Also known as composite woods, engineered woods are manufactured by binding wood particles or fibers with adhesives to meet specific design requirements. Uses of engineered woods are often similar to those of solid wood (Composite Panel Association, 2007). Engineered wood products include plywood, oriented strand board and fiberboard.

environmental management systems (EMS)
A set of processes and practices that enables an organization to reduce its environmental impacts and increase operational efficiency (EPA, 2007).

exotic species
A species that exists in the free state in an area but is not native to that area. (IUCN, 2007A).

fiberboard
An engineered wood made of wood fibers or particles bonded together with wax and adhesives. Fiberboards include particle board, medium-density fiberboard, high-density fiberboard and hardboard depending on the density of the particles.

flagship species
A species that can be used to anchor a conservation campaign because it arouses public interest and sympathy (Simberloff, 1998).

forest concession
Generally speaking, a forest concession is a contract between a forest owner and another party allowing the management and harvesting of wood resources from a given area (Gray, 2002).

forest conversion
When natural forests are converted to highly cultivated forests typically with an increased focus on wood production, and decreased environmental benefits.

forest land-use change
Also called Deforestation – where forests are being converted from natural forests to other land uses (agriculture, cattle ranching, urbanization, etc). Such land-use change may or may not be legal and can result in forested areas that do not have the prospect of being sustainably managed.

forests with exceptional conservation value (FECV)
See Table 3.

free prior informed consent (FPIC)
ILO's Convention 186 (ILO, 1998), defines FPIC as the right of communities "to exercise control, to the extent possible, over their own economic, social and cultural development." The principles FPIC are evolving through international debate to help define and require appropriate consultation and consent. A full discussion can be found in Herz et al., 2007.

frontier forests
See Table 3.

genetically modified organisms (GMOs)
An organism that, through human intervention in a laboratory, has had its genetic code deliberately altered. Genetic modification may be used to alter any of a wide range of traits (Alberta Forest Genetic Resources Council, 2007).

high conservation value forests (HCVF)
See Table 3.

indicator species
Species that define a characteristic of trait of the environment. Indicator species are used to assess the condition of an environment because they are often more sensitive than other species to environmental changes.

intact forest landscapes (IFL)
See Table 3.

integrated pest management (IPM)
An approach to enhancing crop and livestock production based on an understanding of ecological principles. Chemical pesticides are used only when biological and cultural control methods and available technologies fail to keep pests below acceptable levels and when assessment of associated risks and benefits indicates that the benefits of the use of chemicals outweigh the costs (SPIPM, 2007).

invasive species
Species which are non-native to the ecosystem under consideration, and whose introduction is likely to cause economic, environmental, or human health harms (NISIC, 2007).

kenaf
A plant related to cotton and okra that can be used as alternative fiber for paper-making (Vision Paper, 2007).

key biotopes
See Table 3.

keystone species
Species whose activity governs the well-being of many other species (Simberloff, 1998).

life cycle assessment (LCA)
A tool to objectively evaluate the overall environmental impacts associated with a product.

major tropical wilderness areas
See Table 3.

non-wood forest products (NTFP)
All forest products except timber. Non-wood forest products include other materials obtained from trees such as resins and leaves, as well as other plant and animal products such as mushrooms, berries, medicinal herbs, game, etc. (FAO, 2007A).

old growth forests
A forest that has originated through natural succession and maintains significant portions of dead wood and old tress. A multi-layered structure is often present and the forest may be at climax (mature) stage (Lund, 2007).

oriented strand board
An engineered wood made from strands of wood in specific orientations bonded together with wax and adhesives. Oriented strand board has similar properties to plywood but is less expensive.

paper-based products
Include cardboard and various types of paper such as newsprint, copy paper, tissue paper, and construction paper.

phytosanitary certificate
A document often required by governments for the import

of non-processed plant products. Depending on the state or country, export products should meet certain sanitary standards related to storage pests, plant diseases, chemical treatment and weeds (GFTN, 2005).

plywood
An engineered wood made of thin slices of wood bonded together with adhesives. Plywood is used for many purposes because of its strength, resistance to twisting, cracking, and shrinkage.

protected areas
IUCN defines a protected area as an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means (IUCN, 2007B).

pulp mill
Manufacturing facility to reduce wood into cellulose fibers for paper-making.

sawmill
Manufacturing facility to cut logs into boards.

social management system (SMS)
A management system to encompass the conscious management of interactions between an organization and its social environment (Social Management Systems, 2007).

solid wood products
Include lumber or timber products for building materials and furniture.

special places
For the purpose of this guide, the term special places is used as a generic term to mean areas in the forest landscape that have unique qualities and need special attention and treatment.

species richness
The number of different species found in a specific area. Species richness is used as a measure of biodiversity.

supply chain (also supply system)
The different steps through which wood and paper-based products go from being harvested to an end product.

threatened species
Threatened species is a group of three categories: critically endangered species, endangered species, and vulnerable species. Endangered species are considered to be facing a very high risk of extinction in the wild while vulnerable species are considered to be facing a high risk of extinction in the wild (IUCN, 2007A).

traceability
The ability to track wood between two subsequent points of the chain-of-custody.

umbrella species
Species that, if protected, protect many other species because of their large-size habitat requirements (Simberloff, 1998).

unwanted sources
In addition to illegal logging, a number of controversial sources of wood including: protected areas or forests that have been proposed for national parks but have not yet been formally protected; forests deemed to be special places; forests where there are serious tenure disputes, particularly where these involve the failure to respect the customary rights of indigenous or local people; forests that are inappropriate converted to other land uses (Nussbaum and Simula, 2005).

vulnerable species
When a species is facing a high risk of extinction in the wild. Commercial vulnerable tree species include Afzelia (*Afzelia bipindensis*), Merbau (*Intsia bijuga*), and Tule (*Milicia excelsa*) (IUCN, 2006).

water effluent
Waterborne waste.

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