



8. Have fresh and recycled fibers 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?



Unique forest values

Have unique forest values been protected?



Climate change

Have climate issues been addressed?



Environmental protection

Have appropriate environmental controls been applied?



Fresh and recycled fiber

Have fresh and recycled fibers been used appropriately?



Other resources

Have other resources been used appropriately?

Social aspects



Local communities, indigenous peoples, and workers

Have the needs of local communities, indigenous peoples, and workers been addressed?



8. Have fresh and recycled fibers been used appropriately?

The paper industry uses both fresh and recovered fibers as raw materials. Fresh fibers, or wood, are sourced from natural forests and tree plantations. Fresh material is broken down into wood chips and converted to pulp in mechanical or chemical processes. Fiber can also be recovered as by-products in industrial processes or after consumer use. By-products, known as post-industrial, pre-consumer materials, include sawmill residue, residue from the making of wood pulp, and trees that are too small or crooked to be cut into lumber. Post-consumer materials are collected from end consumers after paper-based products are discarded. For an overview of terms and concepts used in this chapter, see also Box 17.

THE RECOVERY AND RECYCLING PROCESS

Paper recycling rates are increasing significantly in many countries (Figure 12). This increase reflects growing demand for recycled fiber as governments and other organizations continue to establish recycled content requirements, and greater consumer demand for recycled products.

However, while certain types of pre-consumer materials can be recovered efficiently, recovering post-consumer material for use in recycled paper products is more complex. A wide range of actors are involved in the post-consumer paper recovery and recycling process: the paper industry, local government institutions in charge of solid waste and wastewater effluent, third-party waste management companies, as well as private and industry consumers. In some regions, demand for recovered fibers exceeds the amount that can be collected.

Because wood fibers cannot be recycled indefinitely, a constant flow of fresh fiber into the fiber network is needed. Depending on the origin of the fresh fiber and the type of products, fiber is typically degraded and unusable after five to seven cycles. Thus, fresh fiber is constantly needed to compensate for the retirement of degraded fiber, archival storage of paper, and loss of fiber through

Box 17. Fibers: terms and definitions

Recovery: The collection, separation, and sorting of paper from industrial, commercial, institutional, and household sources so that the fibers can be reused.

Recycling: The use of recovered fiber in paper and paperboard products.

Recovered paper: Paper collected for reuse from any source.

Pre-consumer material: Fibers from industrial by-products or waste (i.e. waste paper from newspaper or catalogue production).

Post-consumer material: Fibers from paper products recovered after consumer use (i.e. newspapers, magazines recovered from consumers after use).

Recycled fiber: Fibers that have been recovered from pre- or post-consumer paper or paper-board products, sorted, re-pulped, and are available for use in paper products with recycled content.

Fresh Fiber (also known as virgin fiber): Fibers extracted from wood, extracted through mechanical or chemical pulping processes.

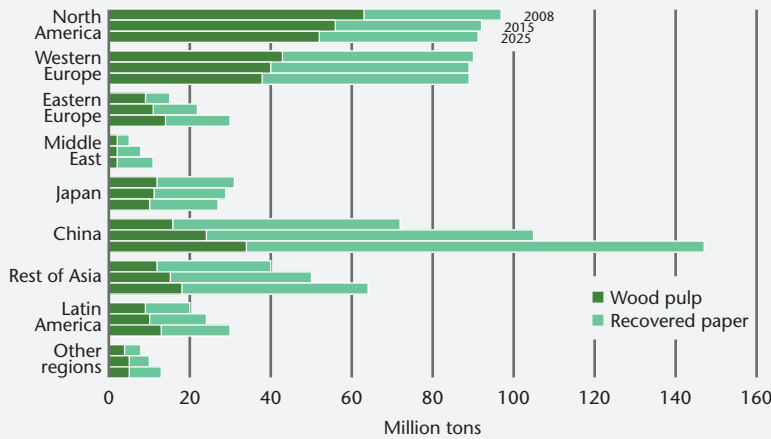
Recycled content: The amount of recycled fibre used in a product (from pre- or post-consumer content, or from both).

Sources: Adapted from WBCSD 2014

normal use and disposal of certain non-recyclable paper products, such as personal care and tissue products.

In addition, varying amounts of fresh fibers are required to make certain products, and for some products, recycled fiber cannot be used at all. The amount of recycled fiber used depends on economic factors (cost and availability of recovered fiber, cost of fresh fiber, and cost of processing) as well as quality considerations in the final product. For instance, newsprint and cardboard can contain a much higher amount of recycled fiber than archival paper (WBCSD 2014).

Figure 12. Past and projected demand for fresh wood pulp and recovered fiber by region



Source: WBCSD 2012 Future from Fibre, data from Poyry.

Note: Trends in regional and country demand for recovered fiber, with demand rising for both fresh and recovered content in Asia, particularly China, and demand for fresh wood pulp decreasing in Europe and North America as demand for recovered fiber increases.

ENVIRONMENTAL FACTORS

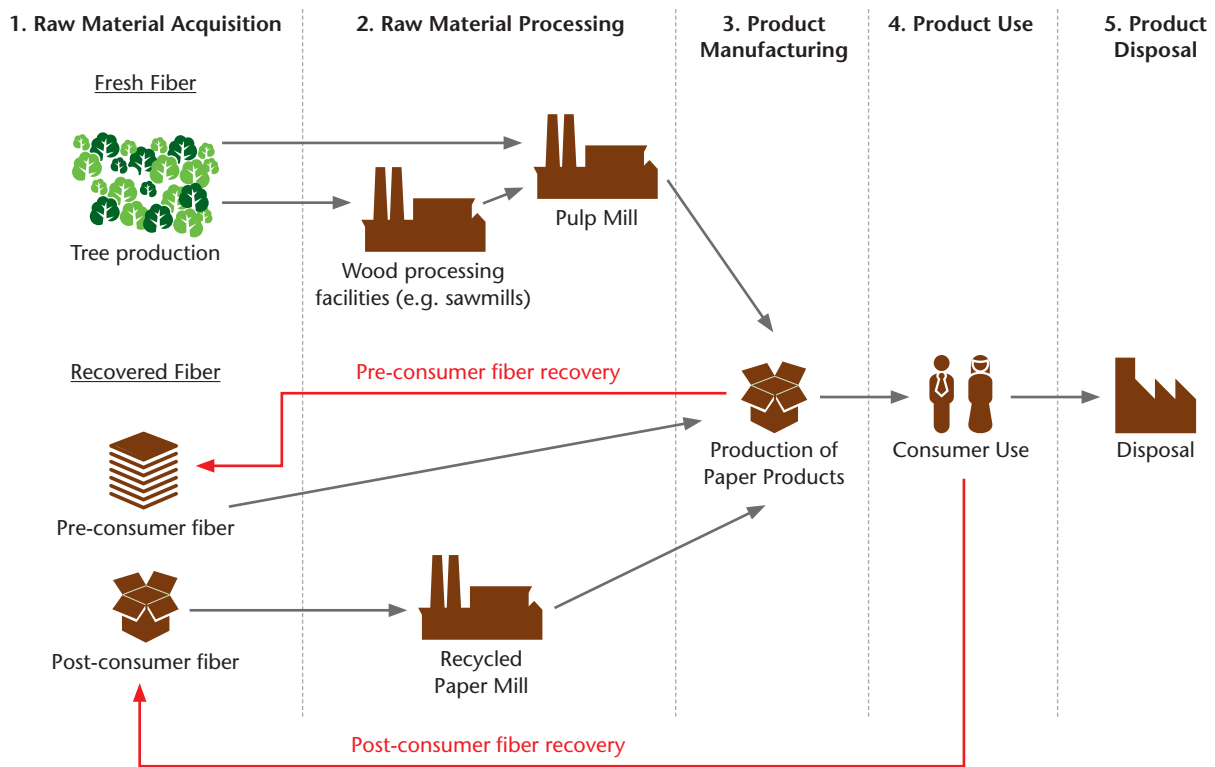
Using recycled fibers to produce paper reduces the need for fresh content per unit of paper. However, the recovery and recycling process is resource and energy intensive. The decision about whether to use recovered fibers and what percentage to use should be made after analyzing the kind of fibers needed for the end product, the availability of fresh and recycled fibers, and the environmental implications of both types of fiber for a specific product supply chain.

Additionally, it is important to consider not only fiber sources, but the holistic environmental impact of both fresh and recycled fibers. Wood and paper-based products have environmental impacts at every stage of their life cycle. Therefore, the environmental impacts of fiber recovery, recycling and reuse should be considered from a life cycle assessment (LCA) perspective, taking into account energy and resource use, and by-products such as solid waste and wastewater effluent.

It is difficult to directly compare energy consumed by using recycled fibers with energy consumed by using new fibers. The energy input depends on many factors, such as distance between fiber source and processing facility, condition of the recovered paper, and the characteristics of the end product. Indirect impacts may also be relevant. For instance, recycling reduces the demand for fresh fiber, which may reduce harvesting pressure on forest areas. In some circumstances, reduced harvesting could also increase pressures to convert the land to a different use.

Figure 13 highlights potential positive and negative impacts of using fresh fibers and recycled fibers. However, the specific impact of using fresh or recycled fibers should be considered on a case-by-case basis. The underlying assumptions and the relative importance assigned to the range of inputs and outputs also significantly influence the outcome of the LCA. The resources recommended at the end of this chapter provide more information about how to analyze the environmental impacts of recycling.

Figure 13. Recycling and environmental impacts in the fiber cycle



Environmental issues in using fresh and recovered fiber

1. Raw Material Acquisition

Depending on where fibers are sourced, raw material made from fresh fiber can generate fossil fuel-based carbon dioxide emissions because of transportation to the mill. Environmental impacts of harvesting can include forest cover loss, threats to biodiversity, habitat loss, erosion and soil compaction, and reduction of water quality in adjacent areas.

Collection, sorting, and transportation of recovered fiber also generate fossil fuel-based carbon dioxide emissions, depending on where fibers are sourced. For products that cannot be made with 100% recovered fiber, input of a component of fresh fiber is needed to replace the fraction of fiber that breaks down during recycling. The potential for carbon emissions and harvesting impact from these fresh fibers should be included in the calculations.

2. Raw Material Processing

Fresh fibers are extracted from wood chips by a chemical or mechanical pulping process, which requires water, energy, and chemicals. Recovered fiber is cleaned, re-pulped and de-inked, before the pulp can be used for recycled fibers. This process requires water, energy, and chemicals for cleaning and removing fillers, and de-inking fibers.

3. Product Manufacturing

Creating paper from both fresh fibers and recovered fibers creates air emissions, wastewater effluent, wastewater treatment residuals, and uses water and energy.

4. Product Use

The recycling process breaks and stiffens fibers, resulting in reduced performance in some types of products. The technical specifications for the end product will in part determine how much fiber will be needed to make one unit of the product (i.e. one sheet of paper, or one roll of toilet paper).

5. Product Disposal

Paper products made from both fresh and recycled fibers are typically composted, recycled, or disposed as solid waste. When products are no longer recyclable, they can be composted or burned to generate energy, while also creating air pollution and carbon dioxide emissions.

Source: Based on Franklin Associates 2012, WBCSD 2014

Note: This graph shows the fiber cycle, with inputs of both fresh and recovered fiber. The graph highlights some of the potential environmental impact of using fresh and recovered fibers.

USE OF ALTERNATIVE FIBERS

In addition to fresh and recycled wood fibers, non-wood fibers or agricultural residues can be used in paper-making. These alternative fibers include flax, kenaf, hemp, bamboo, rye, wheat straw, and fiber from sugar cane (bagasse).

Alternative fibers and agricultural residues hold some advantages for paper-making:

- Using alternative fibers may help avoid the risks of sourcing wood fibers from unsustainable and illegal sources or high-risk forest areas.
- Rural economies and employment can benefit. In India and China, for instance, non-wood fibers play an important role for livelihoods in some areas.

However, alternative fibers have so far failed to attract a strong interest from major industrial paper makers for at least four reasons:

- Certain alternative fibers are not available throughout the year, meaning storage capacity would be needed to feed mills year-round.
- The supply system for wood fibers is well established, whereas a supply system for alternative fibers must be designed and constructed, and offers less predictability and control.
- Some alternative fibers may not meet the performance requirements for certain products (e.g., rice straw for making newsprint).
- The high silica content in some alternative fibers (e.g., straw) continues to cause processing problems.

Key questions to consider when requesting paper made from alternative fibers include:

1. Will the use of alternative fibers allow forests to be conserved because fiber can be sourced from faster-growing alternative crops?

2. Will environmental advantages that may be present with small-scale alternative fiber growth and use for paper production persist when the production is scaled up, or does it result in more negative environmental impacts?
(Consider water use, chemical inputs, energy requirements, climate effects, reduced biodiversity etc.).
3. Is there a risk that existing forest land will be converted to agriculture to increase supply of alternative fibers?
4. What effects, both positive and negative, would switching to alternative fibers have on local communities, indigenous peoples, and workers?

Factors to consider regarding use of fresh and recycled fiber:

- For most products, there is a maximum amount of recycled fiber that can be used without compromising product quality. The optimal amount of recycled content is not necessarily the same as the maximum amount that could be used. The optimal amount of recycled fiber is determined by product specifications, consumer preference, availability and cost of recovered fibers of the quality needed, and government or industry standards. Decisions about the optimal recycled fiber content should take into account the views and interests of consumers, company management, local and national government and regulatory authorities, and recovered fiber suppliers.
- Fiber characteristics depend on the type of tree and the growing conditions (Paper on Web 2014). When fibers from recovered paper are mechanically re-pulped, the structure and texture of the end product are affected.
- Objectives related to recycling or the use of recovered fibers can be included in a sustainable procurement policy based on a supply chain analysis of environmental benefits. A procurement policy may also incorporate supportive measures for helping local governments to collect recycled fibers in sufficient amounts to meet demand.

SELECTED RESOURCES: FRESH AND RECYCLED FIBER

See “Guide to the Guides” chapter for more information on each resource.

Procurement requirements

European Community Green Purchasing Policy	Japanese Government Procurement Policy	Mexican Federal Government Procurement Policy
Green Globes	LEED	

Resources to assess requirements

Environmental Footprint Comparison Tool	New Zealand Government Paper Buyers guidance	WWF GFTN
Environmental Paper Network	Paper Profile	WWF Guide to Buying Paper
EPAT®	PREPS	WWF Paper Scorecard
FICAT	Sustainable Forest Finance Toolkit	WWF Tissue Scoring
FPAC: A Buyers’ Guide to Canada’s Sustainable Forest Products (the report)	The Forest Trust	
	Two Sides	
GPN	wood for good	