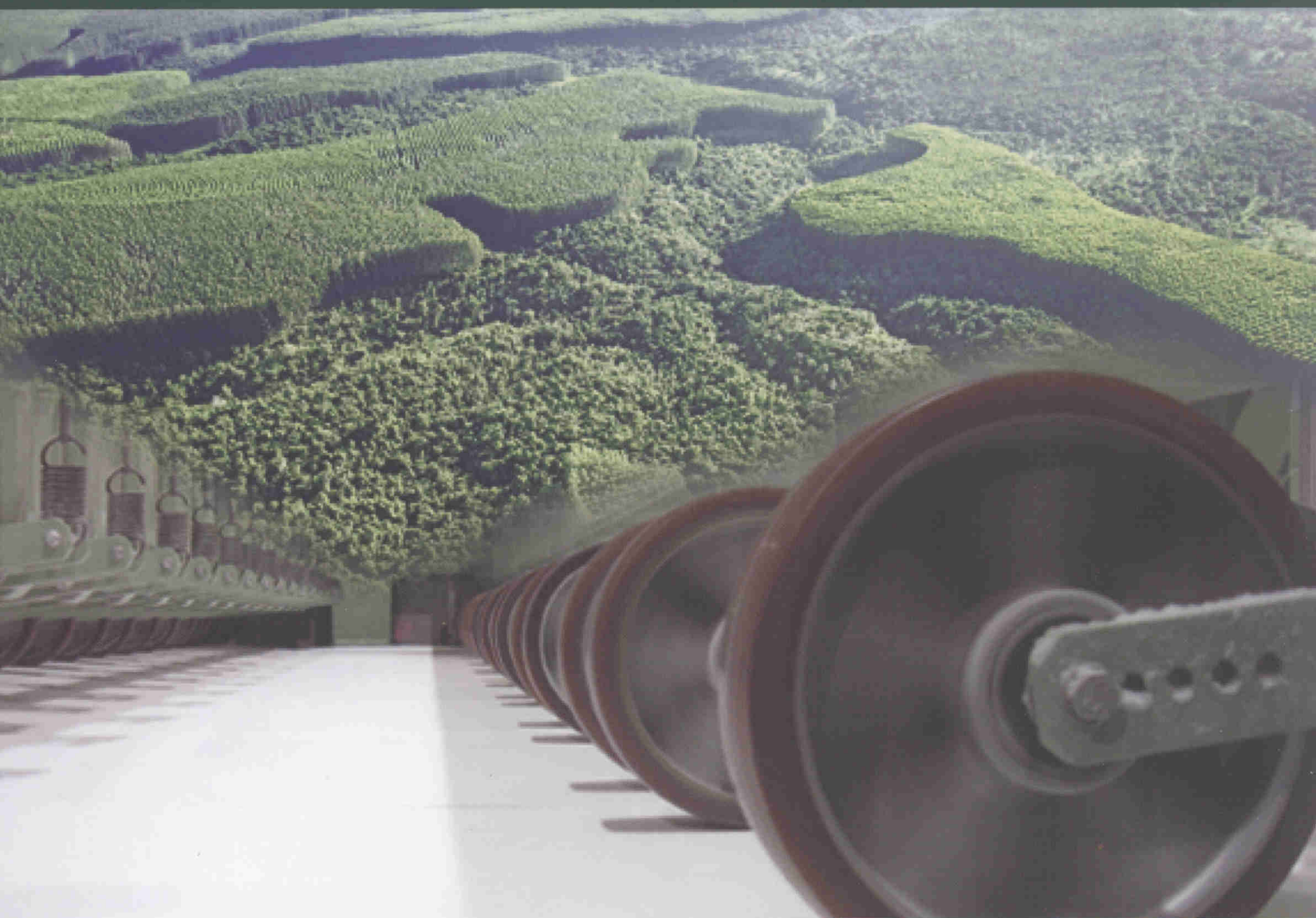


Impact of the global forest industry on atmospheric greenhouse gases



Impact of the global forest industry on atmospheric greenhouse gases

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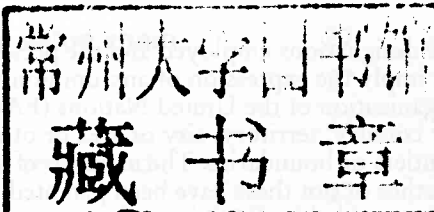
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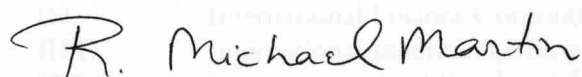
Natural and planted forest (Veracel/N. Souza); paper industry (Bahia Specialty Cellulose)

Foreword

FAO and the International Council of Forest and Paper Associations (ICFPA) commissioned this study at the request of the forty-ninth session of the Advisory Committee on Pulp and Wood Products (ACPWP), held in Backubung, South Africa in June 2008. It outlines the global roundwood production, pulp and paper, and wood processing industry's contribution to climate change mitigation and aims to raise the industry's profile in international negotiations on global warming.

Over the years, climate change has become a priority issue for the global environment. Recently, the focus of the global climate change agenda has started to shift from carbon sequestration to low carbon emission products and technologies, in which forest industries should play a crucial role. Stable demand for forest products is one of the most important factors in avoiding forest land-use change and maintaining stable forest cover to withstand global warming.

FAO does not necessarily share or support all of the statements in this report. However, we think it is an important attempt to present the climate profile of modern forest management and industries impartially, based on solid facts and figures. We hope that the report will open avenues for further clarification, discussion, findings and solutions.



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- the Confederation of European Paper Industries (CEPI);
- the International Council of Forest and Paper Associations (ICFPA);
- the National Council for Air and Stream Improvement (NCASI).

Acronyms and abbreviations

ACEEE	American Council for an Energy-Efficient Economy
ACPWP	Advisory Committee on Pulp and Wood Products
BSI	British Standards Institution
CEPI	Confederation of European Paper Industries
CHP	combined heat and power
CO₂	carbon dioxide
CoC	chain-of-custody certificate
EJ	exajoule
EU	European Union
FICAT	Forest Industry Carbon Assessment Tool
FSC	Forest Stewardship Council
GDP	gross domestic product
Gha	gigahectare
GJ	gigajoule
Gt	gigatonne
GW	gigawatt
HWP	harvested wood product
ICFPA	International Council of Forest and Paper Associations
IEA	International Energy Agency
IFC	International Finance Corporation
IIED	International Institute for Environment and Development
IPCC	Intergovernmental Panel on Climate Change
ICFPA	International Council of Forest and Paper Associations
LHV	lower heating value
MCF	methane correction factor
MW	megawatt
NCASI	National Council for Air and Stream Improvement
OECD	Organisation for Economic Co-operation and Development
PAS	Publicly Available Specification
PEFC	Programme for the Endorsement of Forest Certification schemes
PPP	purchasing power parity
UNFCCC	United Nations Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

Summary

This book examines the influence of the forest products (roundwood, processed wood products and pulp and paper) value chain on atmospheric greenhouse gases. Forests managed for natural conservation, for protection of soil and water resources or for non-wood forest products may also have a considerable role in the global carbon balance, but these are beyond the scope of this publication.

Many forest owners and forest product companies engage in practices that will increase forest ecosystem carbon stocks or help avoid their decline, chiefly the establishment of planted forests on areas that were not previously forested, adherence to sustainable management practices in production forests and, increasingly, participation in chain-of-custody programmes.

Experiences in North America and the European Union (EU) suggest the effectiveness of sustainable management of production forests. These regions contain most of the world's certified forests, and their forest carbon stocks are generally stable or increasing, even though these areas also account for 69 percent of global industrial roundwood production. National-level statistics do not necessarily reflect the carbon stocks on land used for wood production, but some countries can provide information specific to production forests. In the United States of America, for instance, government statistics demonstrate that carbon stocks are stable on industrial timberland, the areas most likely to be used for wood production.

Total greenhouse gas emissions from the forest products value chain are estimated to be 890 million tonnes of carbon dioxide (CO₂) equivalent per year, not counting the sequestration accomplished in the value chain. However, the forest products value chain also accomplishes large net removals of CO₂ from the atmosphere, because a portion of the CO₂ it removes from the atmosphere is stored as carbon for long periods in forests, products in use and products in landfills. In 2007, the net sequestration of CO₂ from the atmosphere into the forest products industry value chain was 424 million tonnes of CO₂ equivalent, enough to offset 86 percent of the greenhouse gas emissions associated with manufacturing forest products, and almost half of the value chain's total emissions. When sequestration is taken into account, net greenhouse gas emissions from the forest products value chain decline to 467 million tonnes of CO₂ equivalent per year.

Between 2002 and 2007, the direct emissions intensity (direct greenhouse gas emissions per tonne of product) of pulp and paper mills declined by 13 percent, while that from wood product facilities fell by 16 percent. The methods used to characterize other aspects of the global profile were too different from earlier methods to allow similar comparisons over time.

The pulp and paper sector and wood products sector are closely connected through wood flows, ownership of facilities and land, and economics. As a result, their carbon footprints are intimately connected, and attempts to influence one sector will likely have an impact on the other. When looked at separately, however, the pulp and paper sector is generally characterized by higher emissions and less sequestration than the wood products sector.

Several aspects of the forest industry's activities are not adequately captured by looking at only the emissions and sequestration accomplished in the value chain. For example, the use of wood-based building materials avoids emissions of 483 million tonnes of CO₂ equivalent a year, via substitution effects. In addition, by displacing fossil fuels, the burning of used products at the end of the life cycle avoids the emission of more than 25 million tonnes of CO₂ equivalent per year, which could be increased to

135 million tonnes per year by diverting material from landfills. The Intergovernmental Panel on Climate Change (IPCC) estimates that forest biomass-derived energy could reduce global emissions by between 400 million and 4.4 billion tonnes of CO₂ equivalent per year, a goal that the forest products industry can help society to reach through its forest biotechnology research and forest biomass infrastructure. The market for wood encourages landowners to keep land under forest, helping to avoid large-scale losses of carbon to the atmosphere via land-use change.

IPCC has stated that "In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the largest sustained mitigation benefit." The analysis contained in the present report gives strong support to IPCC's assertion that sustainable management of production forests represents an important mitigation option over the long term.

Forest products

Forest products are derived from the forest and include timber, wood, wood products, and non-wood products. The forest products industry is a major contributor to the global economy, providing a wide range of goods and services. The industry is also a significant source of employment, particularly in rural areas. The forest products industry is a complex and diverse sector, with a wide range of products and services. The industry is also a significant source of employment, particularly in rural areas. The forest products industry is a complex and diverse sector, with a wide range of products and services. The industry is also a significant source of employment, particularly in rural areas.



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1. Introduction

OVERVIEW OF THE GLOBAL FOREST PRODUCTS INDUSTRY

Economic importance

In 2006, the forest industry – in this book taken to include roundwood production, pulp and paper, and wood processing – contributed approximately US\$468 billion to the global economy, or 1 percent of the total (Figure 1). Although between 1990 and 2006 the industry's contribution to the global economy grew by about 10 percent in absolute terms, it became relatively less important owing to the much faster growth of other sectors over the same period. The industry's economic contribution varies among regions and nations. In Latin America, for instance, it represents about 2 percent of the economy, twice the global average (FAO, 2009).

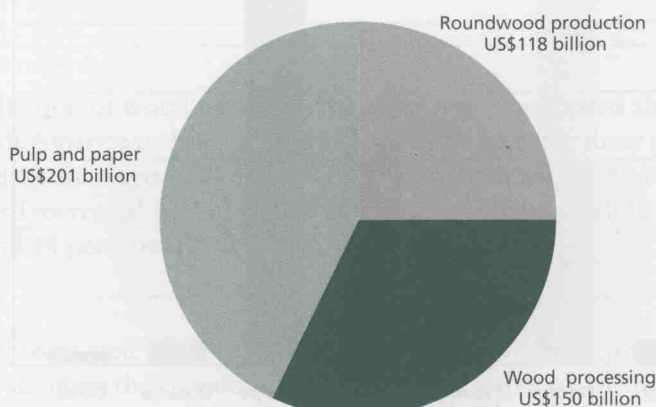
In 2006, the forest products sector was estimated to employ 13.7 million people, divided among roundwood production (almost 3.9 million), pulp and paper manufacturing (4.4 million) and wood processing (5.5 million) (FAO, 2009).

Forest products

In 2007, approximately 3.6 billion cubic metres of roundwood (wood in its natural state as felled, with or without bark [FAO, 2008]) was removed from the world's forests, of which 1.7 billion cubic metres was industrial roundwood and the rest fuelwood (FAO, 2007). Most of this wood is converted into products or burned for energy in industrial boilers, and the forest industry is becoming increasingly efficient at using it. The combined output of sawnwood, wood-based panels and paper and paperboard increased by 30 percent between 1990 and 2005, while industrial roundwood production remained essentially unchanged (Figure 2).

The industry's products serve a wide range of society's needs. Sawnwood and engineered wood products are used in structures that provide shelter and comfort (e.g. housing and furniture), facilitate transportation (e.g. railroad sleepers), and serve a broad range of other functions. Paper and paperboard products transmit written material, protect packaged goods, and fulfil a range of personal hygiene needs. Wood-

FIGURE 1
Economic impact of the global forest products industry (2006)



Note: Data are subject to rounding.
Source: FAO, 2009.

derived materials can be found in products as diverse as liquid crystal display (LCD) computer screens and ice cream.

The industry's products are often divided into three major groups: sawnwood, wood panels, and paper and paperboard. Most sawnwood production is in North America and Europe, although the fastest growth is in Asia and South America (Figure 3). Between 2000 and 2007, sawnwood production grew by 27 percent in South America and by 32 percent in Asia, compared with 12 percent globally (FAO, 2007).

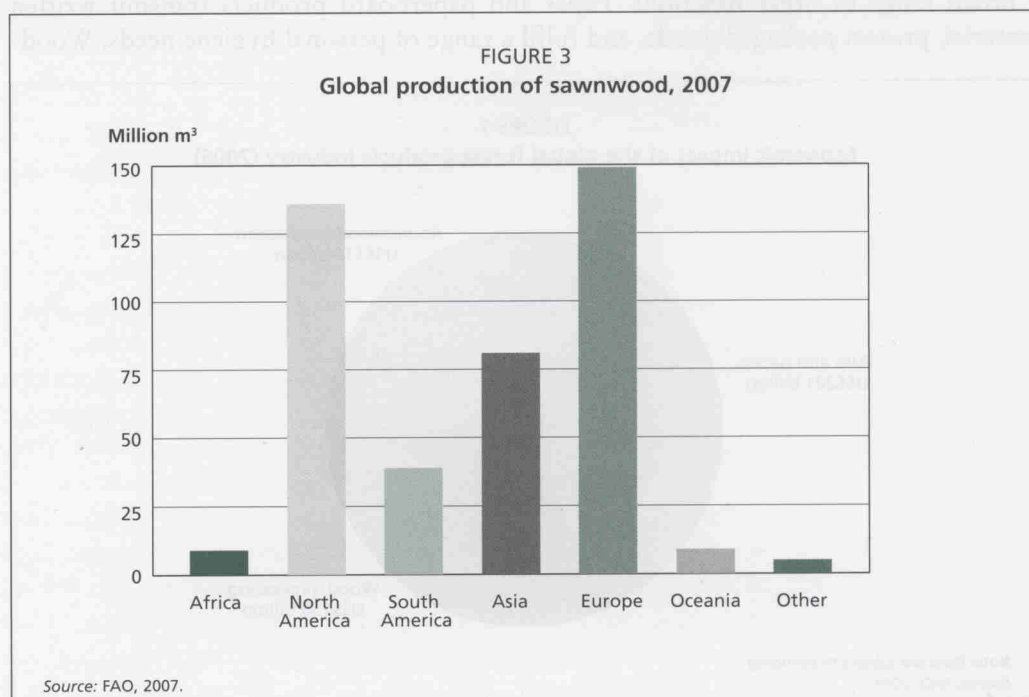
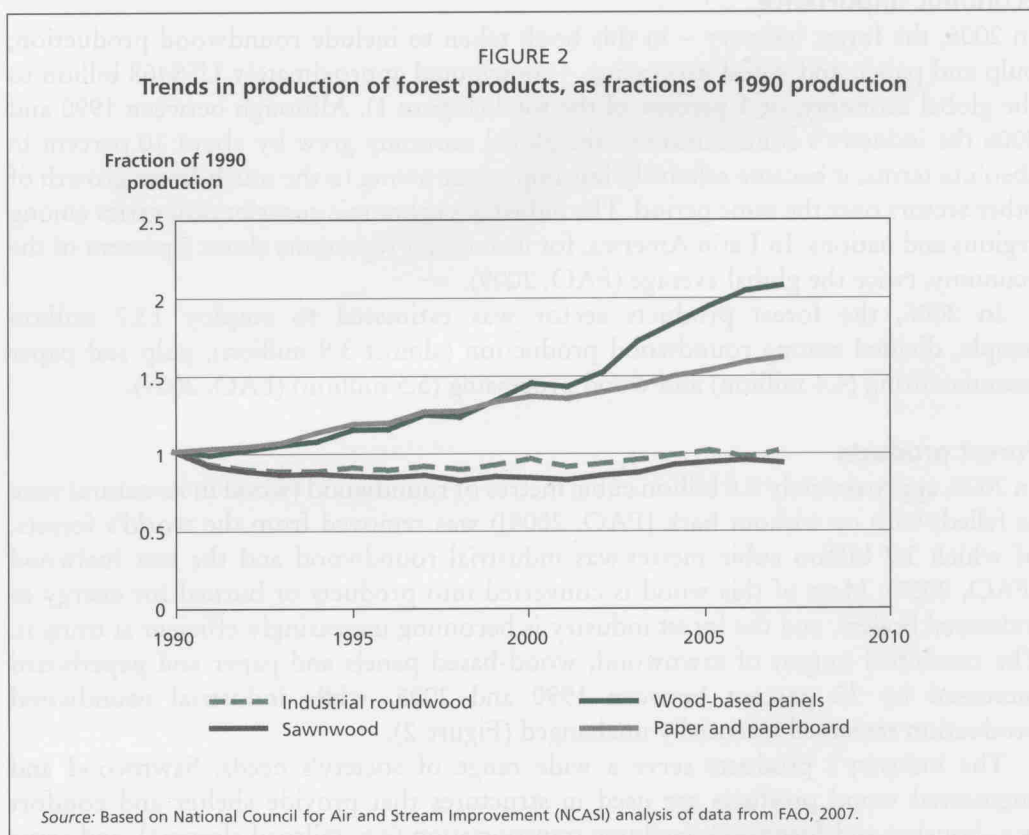
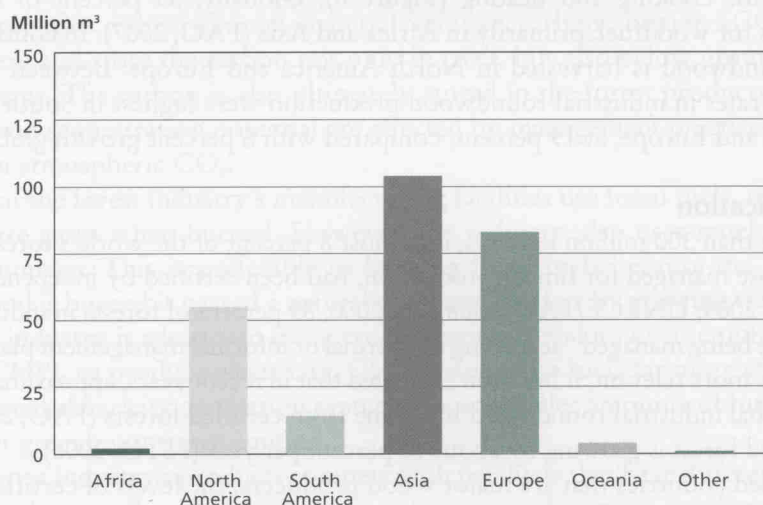
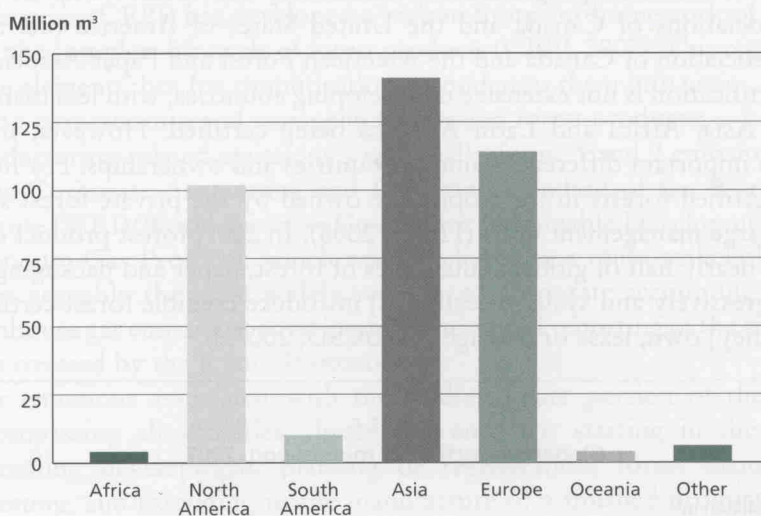


FIGURE 4
Global production of wood-based panels, 2007



Source: FAO, 2007.

FIGURE 5
Global production of paper and paperboard, 2007



Source: FAO, 2007.

Asian production of wood panels and of paper and paperboard already exceeds that of either North America or Europe, as do the growth rates for these product categories (Figures 4 and 5). Between 2000 and 2007, Asian production of wood panels and pulp and paperboard increased by 115 and 50 percent, respectively, while global production grew by 44 and 18 percent (FAO, 2007).

Fibre supply

Globally, the recovered fibre utilization rate in 2007 was just over 50 percent (calculated by dividing the consumption of recovered paper by the production of paper and paperboard, using data from FAO, 2007). The remaining fibre needed for paper and paperboard production is primarily harvested from forests. The fibre used in wood products is essentially all harvested from forests.

Removals of roundwood from forests are fairly evenly distributed among the world's regions, but removals in Africa and Asia are dominated by non-industrial uses, mainly as woodfuel for cooking and heating (Figure 6). Globally, 53 percent of harvested roundwood is for woodfuel, primarily in Africa and Asia (FAO, 2007). In contrast, most industrial roundwood is harvested in North America and Europe. Between 2000 and 2007, growth rates in industrial roundwood production were highest in South America, at 18 percent, and Europe, at 19 percent, compared with 6 percent growth globally.

Forest certification

In 2008, more than 300 million hectares, or almost 8 percent of the world's forests and 13 percent of those managed for timber production, had been certified by independent third parties (FAO, 2009; UNECE/FAO, 2008). By 2000, 89 percent of forests in industrialized countries were being managed "according to a formal or informal management plan" (FAO, 2001). Perhaps more relevant, it has been estimated that in recent years, approximately one-quarter of global industrial roundwood has come from certified forests (FAO, 2009). The area of certified forest is growing by about 10 percent per year (ITTO, 2008).

In developed countries that are major wood producers, the levels of certification are very high, and 90 percent of certified forests are located in North America and Europe (ITTO, 2008). In Europe, 86 percent of forests owned by companies are certified, while 87 percent of pulp production and 63 percent of paper and paperboard production are chain-of-custody-certified (CEPI, 2008). In North America, 36 percent of all forests (public and private) are certified (ITTO, 2008), and participation in sustainable forest management certification programmes is mandatory for membership in the major industry associations of Canada and the United States of America (i.e. the Forest Products Association of Canada and the American Forest and Paper Association).

Forest certification is not extensive in developing countries, with less than 2 percent of forest in Asia, Africa and Latin America being certified. However, this overall figure covers important differences among countries and ownerships. For instance, 82 percent of certified forests in the tropics are owned by the private forest sector, and most are in large management units (ITTO, 2008). In 2007, forest product companies representing nearly half of global annual sales of forest, paper and packaging products agreed "progressively and systematically [to] introduce credible forest certification in the forests [they] own, lease or manage" (WBCSD, 2007a).

