

# Science

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*"Science affects the way we think together."*

Lewis Thomas

## SUPPLY AND DEMAND FOR WOOD: A WORLDWIDE PERSPECTIVE?



**A** Fuelwood gathering is a universal sight in developing countries. Efforts to reduce consumption by designing more efficient cooking stoves has produced more than 900 designs.

**T**he simplest of statistics suggest we have a problem. In the last four decades, global consumption of wood—both industrial roundwood and fuelwood—has hovered around 0.6 cubic meters per person. But in the same four decades, the number of consumers in the world has doubled.

Cities and deserts are expanding, per capita income is generally increasing, and the continuing encroachment of people, agriculture, and development on forested lands is well documented. Furthermore, forests are now recognized for their value as habitat and providers of environmental services. But despite an avowedly grim impression of the direction we are headed, there does not seem to be a "fiber supply crisis," according to David Brooks, research forester and science team leader with the Pacific Northwest Research Station.

"Demand for wood will increase, but there is no evidence of a crisis at the world scale," he says. "However, I want to emphasize strongly that the absence of crisis does not imply there is no need for new policies, or no need to discuss and debate the surrounding issues." He notes that opportunities to increase wood production are limited, and tradeoffs among competing uses of forests will be required.

Brooks was the sole U.S. participant in a study of the long-term trends and prospects in world supply and demand for wood that grew out of the 1992 United Nations Conference on Environment and Development (UNCED). The study was published under the aegis of UNCED's ad hoc Intergovernmental Panel on Forests (IPF) in 1996 by the European Forest Institute.

### IN SUMMARY

*In a unique effort to compare and contrast differing views on future supply and demand for wood, a study found that demand for wood will increase, but there is no evidence of a crisis at the world scale. Opportunities to increase wood production, however, are limited and trade-offs among competing uses of forests are inevitable. A complex of factors determine supply and demand including population growth, increasing income, prices of wood raw material, technological change, institutions and policies, and the nature of ownership and rights to use land.*

*The study displayed the future under many types of assumptions. In doing so, it became clear that the greatest uncertainty was projected demand for fuelwood, and sources of supply for fuelwood. This is particularly important because more than half of the global wood harvest is for fuelwood.*

*"The outlook for industrial wood-based products is uncertain, but we do know that demands on forests are increasing," says David Brooks, research forester. The rate of increase will remain moderate because increases in income and consumption will be relatively slow in developed countries. In developing countries, a combination of slow income growth and increasing prices could encourage constant or declining consumption of industrial round wood.*

*The long-term outlook is for steadily increasing demand for wood and the many other services of forests, and a declining area for their production. The study found that increasing and competing demands for land and resources requires that the forest sector not be viewed as independent from other land uses such as agriculture, and it is not separate from industry and trade. The study also highlights the importance of forestry policies that consider environmental consequences.*

*"We are just statistics,  
born to consume resources."*

Horace 65-8 BC.

## WHO CAN SEE THE FUTURE?

The IPF study attempted to comprehend the many views of the future presented in other recent outlook studies, inventorying supply and demand for both fuelwood and industrial roundwood. There is a spectrum of views, and Brooks cautions against simply searching for middle ground.

"We hear many different views, from impending catastrophe to dramatically low levels of concern, and our challenge was to bring together a coherent consideration of many outlook studies," he says. "Part of the reason for the variety is that people have different assumptions about the trajectory of such factors as income and supply. In the end, our approach was simply to display the future under many types of assumptions."

The greatest uncertainty, he says, surrounds projected demand for fuelwood, and sources of supply for fuelwood. Herein lies an issue that seems to require immediate policy action, for more than half of global wood harvest is for energy purposes. There already are areas of critical shortage where large populations rely on wood for domestic energy.

"A particular need is for better information on which to base a current assessment of the magnitude of fuelwood demand in developing countries," Brooks says. "What are the sources of supply, and What are the environmental consequences of fuelwood gathering?"

Such fuelwood data as are available aptly illustrate the connectivity of all supply and demand trends. Because fuelwood does not enter international trade, fuelwood concerns are predominantly regional and local in developing countries. Nonetheless, local and regional scarcity of wood fuel affects social and economic well-being and the process of development, with associated effects on international trade.

In turn, when urbanization and development do occur, they lead to the substitution of fossil fuels for wood fuel. Although this trend reduces demands on forests, it produces other, possibly significant global environmental consequences. The objectives of the study

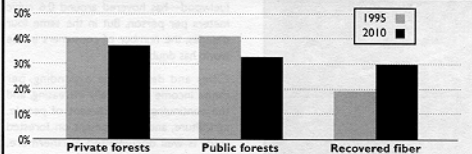


### KEY FINDINGS



- Demand for wood will increase steadily, but there is no evidence of a "fiber supply crisis" at the world scale. There is, however, a pressing need for policies addressing challenging issues around world supply and demand.
- Fuelwood is estimated to account for more than half of world wood consumption. This scarcity has predominantly local and regional environmental effects. These effects, however, can become global once urbanization and development encourage the substitution of fossil fuels for wood.
- Intensive management of private forests helps keep the "supply crisis" at bay; although private forests account for less than 10 percent of forest area, they produce nearly 40 percent of the world's industrial roundwood.
- Fast-growing plantations and recovered paper will increase in absolute and relative terms as sources of industrial fiber.

### CURRENT & PROJECTED SOURCES OF TIMBER & FIBER USED FOR INDUSTRIAL PRODUCTS, WORLDWIDE



Recovered fiber is projected to offer the largest percentage increase in sources of supply for industrial products worldwide. Private forests most likely will become a larger supplier than public forests.

were to describe the factors affecting current and future wood demand and supply to understand the world outlook, and to discuss implications for sustainable management of the world's forests. No similar effort to compare and contrast differing views of the future had been made on a global scale before, Brooks says.

### WRITER'S PROFILE

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## MULTIPLE FORCES ACT ON SUPPLY AND DEMAND

Clearly, population growth is not the only factor in the complicated puzzle that is world wood supply and demand, although it is probably the easiest vehicle for illustrating the obvious strain on resources. Other braking and accelerating factors abound, and taken together add up to an international policy challenge that is knotty in the extreme, chiefly because all the pieces interact.

Increasing income is directly linked to increasing demand for forest products, and its effect naturally differs broadly across boundaries of developing and developed countries. Notably, income growth reduces the demand for fuelwood as people come to afford fossil fuels. At the same time, it increases demand for industrial wood products and also for environmental services from forests.

Prices of wood raw material, of forest products and their substitutes, have immediate impact on short-term consumption. "Prices are equally important in the longer term as an indicator of investment opportunities, and are often the motivating factor in technological change," says Brooks. "They also indicate the possible need to develop and implement new policies."

Technological change has both reduced demand for wood and extended wood supplies, according to Brooks. There is increasing substitution of newly developed products for traditional products—

POLICY IMPLICATIONS	
• Sustainable forest management will require diverse management practices, especially at larger domestic and international scales. Uniform practices are not consistent with diversity in ownerships, objectives, and biophysical conditions.	
• The international context is increasingly important for U.S. domestic resource policies and management. Interdependence is already obvious through commodity trade, and international investment and agreements.	
• Increasing and competing demands for land and resources require intersectoral decisionmaking, in which links among forestry, agriculture, industry, and trade, for example, are clearly acknowledged.	
• Strong, effective institutions and a commitment to ongoing international cooperation are required to define policies and implement management decisions.	

oriented strand board replaces plywood, for example, and engineered wood products replace structural lumber. Other materials such as concrete and metal also can substitute for wood.

Technological change also has increased usage of wood supplies: increased processing efficiency, improved ability to use recovered fiber such as paper, and design for previously unusable sizes and species of material in manufacturing. "However, gains from technological change are neither free from external and unintended consequences nor are these gains unlimited," Brooks notes.

Institutions and policies affect supply and demand worldwide, and are perhaps the most individual and widely differing set of factors. The body of laws, customs, regula-

tions, standards, and the knowledge of how things are done can differ widely among countries, yet heavily affect such matters as investments in production and management of resources.

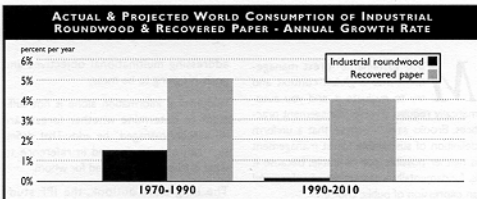
The nature of ownership and rights to use of land are also fundamental: uncertain tenure or questions about private land rights most often increase short-term production and consumption and can diminish long-term potential, according to Brooks. And of course, current conditions in forests directly affect future supply of forest products and services.

Superimpose onto this complex set of factors a collection of international agreements, both existing and proposed, and the view can get truly hazy.

## INDUSTRIAL ROUNDWOOD IN A NEW WORLD

The outlook for industrial wood and wood-based products also is uncertain, but we do know that demands on forests are increasing," Brooks says. The rate of increase, however, will most likely remain moderate for several reasons. First, increases in income and therefore in consumption of forest products will be relatively slower in developed countries, where most consumption currently occurs.

Second, Brooks says, in developing countries, a combination of relatively slow income growth and increasing prices could encourage a constant or even declining level of consumption for industrial roundwood. And third, worldwide changes in both manufacturing efficiency and the mix of products will help slow the demand.



World consumption of industrial roundwood is most likely to drop significantly over the next 20 years, whereas consumption of recovered paper will continue a steady annual rate of increase.

In addition, there remain several other factors helping stave off crisis, factors possi-

bly less predictable because they are newer on the world scene: the increasing use of

recycled fiber and the intensification of management, especially of privately owned forests.

"Fast-growing plantations in the tropics and recovered paper will increase in both absolute and relative terms as sources of industrial wood fiber," Brooks says. Already, recovered paper accounts for about 20 percent of all wood fiber used for industrial products, and best estimates suggest that by 2010, that percentage will be at least 35.

"Then there's the plantation-based forest industries such as you find in Chile and New Zealand with radiata pine," Brooks notes, "and this is also happening in different ways in tropical countries. In Brazil you now see steel mills fueled by charcoal produced locally from fast-growing plantations, expanding the term 'industrial wood' to mean wood for industrial energy." Likewise, there is a strong trend in many countries toward short-rotation crops, such



**A** In Chile, false beech is heavily harvested for domestic and international markets. Plantation farming will take some of the pressure off this native species.

as hybrid poplars, grown under agricultural conditions with drip irrigation, and

contributing increasing quantities of raw product to the pulp industry.

## MANAGEMENT: A TOOL TO MEET HIGHER DEMAND?

**D**espite all these developments, what still surprises people, Brooks says, is the central importance of private forests and how they are managed. "There is a tendency to focus on policies of governments towards public forests, but the fact is that private forests managed intensively and influenced by public policy are sources of about 40 percent of the world's production of industrial roundwood." This despite their representing only about 10 percent of the world's forests.

He adds, therefore, that we have a crucial need for better understanding the effects of

government policies on private forests and vice versa.

"Investments in forest management, especially intensive forest management, must be forthcoming, and this will require action on the part of both the public and the private sector," he says. "The outlook indicates that world forests are biologically capable of supplying the quantities and types of wood consistent with even the highest demand projections. But active management of forests is a likely and necessary development to assure the availability of both commodities and services."

Thus resource policies must take into account long-term and large-scale effects, seeking consistency between the objectives of policy and those of forest owners. As a further consequence, it will become increasingly important to recognize the need for tradeoffs and the potential for conflict. Although these issues have come into play on many domestic stages, their time on the world stage is now at hand.

And what on earth might be an acceptable standard for "active management"? What is sustainable, in a whole world context?

## SUSTAINABILITY: IN QUEST OF A DEFINITION

**M**ove sustainable forest management into a global context and try to evaluate it, and you automatically require diverse management practices, Brooks says. "I believe that a uniform definition of sustainable forest management is neither possible nor desirable, because it is, fundamentally, a statement of values and an expression of public choice."

Uniform practices are inconsistent with diversity in ownerships, objectives, and biophysical conditions, he adds, and you can already see how the world struggles with

addressing multinational objectives and goals. It's going to be messy.

"Biophysical information alone is not sufficient to determine whether forests are 'sustainably' managed," he adds. That definition can only be formed in reference to what is to be sustained and for whom.

The long-term outlook, the IPF study concludes, is for steadily increasing demand for wood and the many other services of forests, and a declining area for their production. Although a unified definition of sustainable forest management may not be

in the cards, Brooks says, it is clear we need increasingly effective institutions for resource management, land use, research, education, and extension.

What also emerged from the study is that increasing and competing demands for land and resources require intersectoral decisionmaking. In other words, the forest sector cannot be viewed as independent of other land uses such as agriculture, or from industry and trade. The connections within a country are obvious, and the links among countries are becoming clearer.

# Science FINDINGS

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