EarthTrends: Featured Topic

Title: **No End to Paperwork**
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More than a decade ago, we heralded computers, e-mail, and the Internet as a means to reduce consumption of paper for printing and writing, newsprint, packaging, and other uses. But today, more than ever, paper remains the dominant and essential vehicle of modern communications. Far from ushering in a "paperless office," for example, computers, e-commerce, fax machines, and other information technologies have fueled paper demand, creating more "information consumers" who routinely print web pages, e-mails, and other verifications of electronic information (von Ungern-Sternberg and von Ungern-Sternberg 1999:230).

More Paper, Not Less

The world's paper renaissance extends to both new and traditional uses. Inexpensive computer printers, for example, have encouraged home paper use. By one estimate, personal computers in the early 1990s accounted for 115 billion sheets of paper per year worldwide; today Hewlett-Packard estimates that laser printers in North America alone are churning out 1.2 trillion pages annually (Anzovin 1993 cited in Young 1993:42; Brooke 2001). Offices continue to rely on paper for files and records; just 10 percent of office documentation was in digital form as of the mid-1990s (von Ungern-Sternberg and von Ungern-Sternberg 1999:230).

Paper still dominates the publishing industry, with electronic publications accounting for only 5-15 percent of the world's publishing market. Although newspaper circulation in industrialized countries was declining even before the advent of the Internet, worldwide demand for newsprint is still expected to grow an average of 2 percent a year for the next 10 years, driven by increases in Asian newspaper readership (von Ungern Sternberg and von Ungern-Sternberg 1999:231; Salonen 2000).

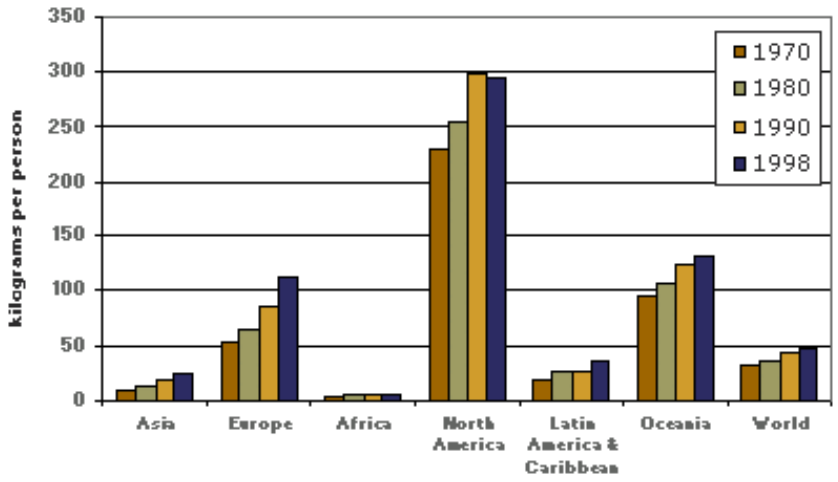
In addition to such traditional print products as books, newspapers, and stationery, new markets for mail order catalogues and marketing and promotional materials are keeping paper consumption buoyant. In the United States, the number of pieces of mail delivered each year has increased by 25 billion over the last 5 years to 210 billion (PaperCom Alliance 2000:5; U.S. Postal Service 2000:4). Communications, however, make up less than half of the world's paper use; a bigger share is now taken by the booming packaging industry (IIED 1996:16). Global production of paper for wrapping, packaging, corrugated boxes and other containers increased 75 percent over the last 5 years to 140 million metric tons in 1999 (FAO 2001).

Paper and Economic Growth

Unlike consumption trends in other mature commodity sectors, paper consumption shows little sign of decoupling from economic growth. Globally, paper consumption has increased by a factor of 20 this century and has more than tripled over the past 30 years (Robins and Roberts 1997:3) (see Figure 1a). Per capita paper consumption has grown to about 190 kg per year in Western Europe and more than 300 kg in North America (WRI 2000:294; see also Data Tables and Searchable Database in EarthTrends). Indeed, in many Western countries, high paper consumption has come to be regarded as a symbol of

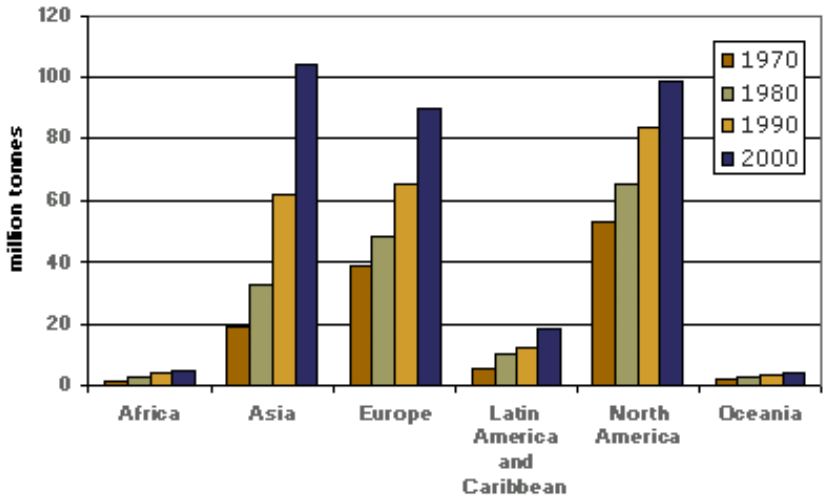
Paper Use is Growing Worldwide

Figure 1a: Annual Per Capita Paper and Paperboard Consumption by Region, 1970 to 1998



Sources: FAOSTAT and the UN Population Division.

Figure 1b: Global Consumption of Paper and Paperboard, 1970-2000



Source: FAOSTAT

overconsumption and of the wastefulness of modern society.

In the developing world, paper consumption is growing rapidly, too, but average per capita consumption is still just 17.5 kg/year (WRI 2000:295) (see Figure 1b). This is well below the 30-40 kg of paper per capita per year considered the minimum level necessary to meet basic needs for communication and literacy.

However, total paper and paperboard consumption in Asia already exceeds that in Europe and is projected to grow 3-4 percent per year until 2010 as incomes and population increase. Such a rate of increase would eventually make the region the biggest paper consumer in the world (FAO 1997:78; FAO 1998b:183).

Paper consumption worldwide is projected to grow about 50 percent by 2010 (FAO 1997:78). The critical question is how and from where future demands for paper will be met. North America and Europe are expected to be able to maintain their current balance between demand and supply. Asia, despite having the world's fastest increases in local wood production, could experience shortfalls in the supply of all wood products, but especially pulp and paper (FAO 1997:80-81). In theory, however, Asia could meet its entire pulp need through greater use of recovered paper and wood processing residues (FAO 1999:50). Currently Asia relies on imports of 10 million tons of recycled paper annually to help meet its paper demands (FAO 2001).

The use of paper is generally considered essential for modern living, and the current paper consumption pattern cannot be considered adequate while per capita paper use in developing nations remains at today's low levels. The Food and Agriculture

Organization of the United Nations suggests that no immediate crisis exists in terms of meeting near-term demand for pulp and paper worldwide. Over the longer term, however, anticipated growth in demand for wood products of all types will probably necessitate changes in forest management practices, such as greater reliance on plantations, and an increased use of wood processing residues and recycled fibers (FAO 1997:6,74; FAO 1999:56).

The Paper Cycle

Every stage of the paper production and consumption cycle is associated with a range of potential environmental problems. Most wood fiber, from which pulp and paper are made, comes from natural forests managed for timber production in North America, Europe, and Asia and from plantations around the world. Only 2 percent of wood fiber comes from tropical rainforests and virgin temperate hardwood forests (IIED 1996:33-34).

As demand rises, pressure on unmanaged forests is likely to increase, especially on the largely untouched boreal forests of the former Soviet Union. Plantations, which in 1993 supplied 29 percent of global wood pulp, may offer one way to alleviate that pressure (IIED 1996:34; Sedjo and Botkin 1997). In theory, the world's current total demand for wood fiber for pulp could be supplied from high-yielding industrial plantations totaling about 40 million hectares (roughly the size of Sweden or Paraguay)—an area equivalent to about 1.5 percent of the world's closed forest area (IIED 1996:36). However, intensively managed plantations often involve environmental, social, or aesthetic trade-offs compared with natural forests.

Pulp- and papermaking can be a highly polluting process. Liquid effluents from mills include a range of organic, toxic, and chlorinated organic matter that adversely affects water quality and can be lethal to fish. While large-scale paper producers in some industrialized countries have succeeded in achieving closed-cycle bleaching, in which no effluent is discharged, serious pollution problems are still common in small pulp and paper mills in developing countries (IIED 1996:117-124).

Pollution could actually be worsened by a physical or economic scarcity of wood fiber in the future, particularly in developing countries. Shortages could encourage greater use of nonwood fibers for papermaking, like straw, bagasse, and bamboo. Nonwood fibers are already a significant raw material in China and India, but only about 8 percent of the world's papermaking capacity is nonwood based (FAO 1998a:46).

Nonwood fibers from crops like kenaf or from the leftovers of sugarcane pressing, however, are not a perfect substitute for wood pulp. The process of growing agricultural products often requires the use of more fertilizers and pesticides, which can then lead to more pollution. In fact, pollution from nonwood fiber mills can be as much as 20 times greater than that from nonwood pulp mills (Matthews and Hammond 1998:43); pollution problems have led China to close its smallest nonwood fiber pulp mills (FAO 1998b:186). Use of nonwood fibers also hampers the recovery of the chemicals used in papermaking because of the plants' high silica component, although new technologies are making the process more efficient (FAO 1999:57). In addition, nonwood fibers are bulky, expensive to transport, and tend to be available only seasonally (FAO 1997:75; Sedjo and Botkin 1997:16, 20).

More Recycling and Plantations, Less Pollution

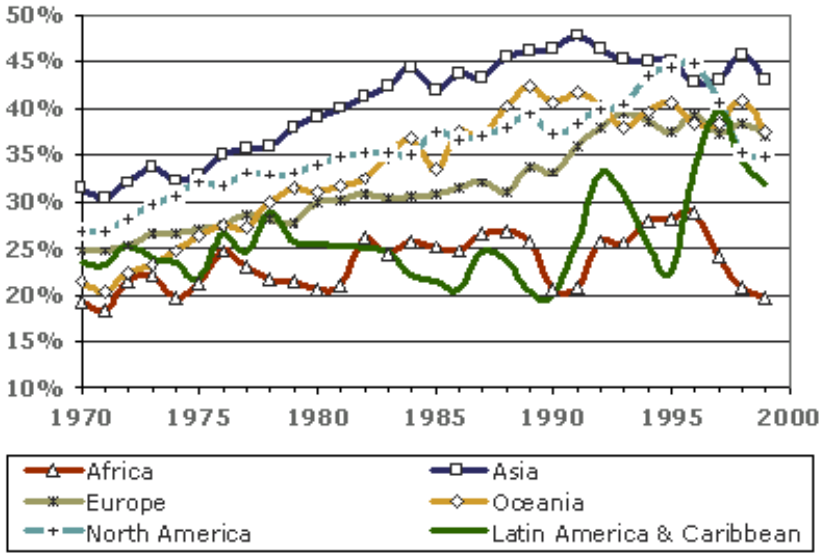
In industrialized countries, concern has focused on the ever-increasing volumes of wastepaper being created. In the United States, paper accounts for nearly 40 percent of municipal solid waste (U.S. EPA 1998:4). Disposal of paper products in landfill sites leads to emissions of the greenhouse gas methane, and incinerating chlorine-bleached paper at landfills may release dioxins into the atmosphere. In

fact, establishing new disposal facilities of any kind is increasingly difficult because of their unpopularity as neighbors.

These problems, together with the perception of wasteful paper use and excessive packaging, have led to numerous government, private-sector, and voluntary initiatives to increase recycling rates. The efficiency of de-inking systems has also improved, making it possible to reuse more paper (FAO 1999:57). Between 1970 and 1994, worldwide paper recovery rates rose from 23 percent to 37 percent, and many countries have achieved considerably higher rates (IIED 1996:186-210) (see Figure 2). The United States, Japan, and Western Europe all have paper recovery rates close to or in excess of 50 percent (AF&PA 2001; CEPI 2000:16; FAO 1998b:61). The FAO predicts further growth in waste paper and paperboard recovery. However, over the longer term measures such as mandated recycling targets, certification or labeling schemes to promote the use of sustainably produced paper products, and financial incentives for paper recovery will probably be necessary to secure greater efficiency in current patterns of paper consumption in developed nations.

Paper Recycling: Rising Volume, Growing Importance

Figure 2: Paper Recovery as a Percentage of Paper and Paperboard Production



Source: FAOSTAT.

Improved operations in pulp and paper mills is also an urgent need, for both environmental and health reasons. Conservative estimates suggest that bringing all mills worldwide up to a uniform "good" environmental standard could require an investment of about US$20 billion, plus annual operating costs of more than US$8 billion (IIED 1996:126-127). Unfortunately, paper plant pollution is worst and growth in paper consumption greatest precisely in those developing regions where financial resources for mill cleanup are most limited.

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