

FLUSHING FORESTS

The pursuit of hygienic elimination is eliminating a lot of forest.

by Noelle Robbins



Over the ages human beings have employed various methods of personal cleansing following urination and defecation, including leaves, rags, seaweed, straw, grass, snow, sand, corncobs, coconut shells, newspapers, and catalog pages. Those with means enjoyed relative comfort and luxury; French royalty used lace, while hemp served upper class needs in many cultures and rosewater-infused wool was prized in ancient Rome. Defecating in running bodies of water was considered an efficient method of washing, and disposing of waste, and still is in some developing areas.

But increasingly the method of choice for many individuals worldwide is toilet paper. There is virtually nowhere on the planet where toilet paper is not used, at least occasionally. In 2005, according to the marketing analysis firm RISI, world per-capita consumption of toilet paper was 3.8 kilograms. But the range is wide—North American per-capita consumption was highest at 23 kilograms; the lowest reported was Africa, at 0.4 kilograms—and consumption growth could be closing the gap. In 2008, China and Western Europe saw toilet tissue growth rates of 5 percent, followed by Eastern Europe at 4 percent growth and Japan and Africa at 3 percent. North American consumption remained stable.

Many factors are driving the increased use of toilet paper: growing populations, adoption of Western lifestyles, and sanitation improvements in developing countries. And despite the economic downturn, global consumption is projected to hold steady or grow.

But what about the impacts? Worldwide, the equivalent of almost 270,000 trees is either flushed or dumped in landfills every day, according to Claude Martin of the World Wildlife Fund. Roughly 10 percent of that total is attributable to toilet paper. The result is that forests in both the global North and South are under assault by paper companies competing to fill what they insist is an inexhaustible consumer demand for, among other paper products, soft, fluffy toilet paper. The expanding global demand for toilet paper and the accompanying environmental effects of raw material sourcing and manufacturing are intensifying the focus on the source and production of tissue: virgin pulp or recycled? Tree plantations or office wastebaskets? Luxury triple ply? Or, perhaps, no toilet paper at all?

GROWING NEEDS AND IMPACTS

China's experience, as with so many problematic economic trends, illustrates many of the dilemmas. In China, rates of toilet paper use indicate a robust consumer economy, expanding manufacturing sector, and increasing share of the international market. Between 1990 and 2003, Chinese consumption of toilet paper grew by 11 percent. The Chinese Institute of Paper predicts that within the next 10 years China will become the fastest-growing consumer of all paper products, including toilet paper, and will lead the world in toilet paper production as well.

China, partly in an effort to promote its "green" credentials

(or environmental policies), and partly in response to the rising demand for paper products with corresponding raw material requirements, has embarked on a vast reforestation project. In 1978, China launched the Great Green Wall initiative, scheduled for completion in 2050. The goal is tree coverage of about 42 percent of China's landmass.

Those trees will demand a lot of water in a country where water issues are already troublesome. Last year, *Guardian* Asian correspondent Jonathan Watts discussed one of the key problems with China's tree-planting endeavor: stresses on water supplies. With emphasis on planting saplings of fast growing trees such as poplar, larch, and eucalyptus in plantations, the impact is significant. "Although tree coverage has increased from 12 percent to 18 percent of the nation's land area, many saplings are planted in semi-desert areas where they deplete water supplies," Watts says. Expansion of tree cover may assure Chinese toilet tissue manufacturers a steady source of wood fiber to feed an industry hungry for global market conquest, but at a cost.

More than market share is at stake, however. China also correlates increased use of toilet paper with advancements in sanitation and improved health outcomes. Other developing countries make this connection as well. South Africa, for example, is undergoing an entrepreneurial revolution in public toilet management and sanitation. Trevor Mulaudzi runs The Clean Shop and identifies himself as a toilet activist, educator, revolutionary, and businessman. The Clean Shop is particularly focused on the availability of clean toilets for schoolchildren. In the absence of toilet paper, children use newspapers and articles of clothing, or rags, which clog toilets and jeopardize the cleanliness of the facilities. Mulaudzi insists children bring toilet paper from home, an "admission ticket" to school restrooms.

Steadily increasing demand for toilet paper in developing countries is a critical factor in the impact toilet paper manufacturers have on forests around the world. As a PricewaterhouseCoopers report on the forestry, pulp, and paper sector notes, continued (if slow) growth in the large traditional markets of North America, Western Europe, and Japan, coupled with substantial growth in emerging markets in Asia (primarily China), Latin America, and Russia, will offer opportunity for industry expansion. And with the emphasis on the use of virgin wood pulp fiber to meet market demand, and the

Stephan Schwarz



Eucalyptus plantation near Belo Horizonte, Brazil.

increasing pressure to reduce and discontinue use of old-growth forests as sources, the move is on to tree plantations.

But is this cure worse than the disease? Certainly the concerns about native forests are serious. In 2005 the Food and Agriculture Organization (FAO) of the United Nations, which monitors the state of the world's forests every few years, reported that 13 million hectares of global forests are lost annually, including 6 million hectares of what are described as primary forests—some of the most biologically diverse ecological systems in the world. And although ongoing depletion of forests in the Amazon is a focus of environmental alarm, a 2009 report published in *Trends in Ecology and Evolution* detailed the escalating threat to boreal forests in Russia, Alaska, Canada, and Scandinavia. According to the online magazine *World Science*, "the boreal, or northern forest, comprises about one-third of the world's forested area and one-third of the world's stored carbon." The U.S. and Canadian NGO ForestEthics reports that "Canada's boreal forest (alone) stores 23 percent of the planet's terrestrial carbon—more carbon per acre than any other ecosystem on earth, including tropical forests. However, Canada's old growth and intact forests are logged at a rate of five acres a minute, 24 hours a day."

Hence the interest in plantations. But according to the National Resources Defense Council (NRDC), "one of the most insidious threats to forests comes from industrial tree plantations. The current obsession with all things carbon, coupled with the UN's failure to differentiate between forests



Finnish birch trees, chipped and ready to be turned into paper.

and plantations, provides the biggest ever incentive to clear forests and replace them with plantations.” Plantation development perfectly suits the needs of the paper industry, as the virgin fibers of the fast-growing trees frequently planted (eucalyptus and pine) result in the ideal texture for high-grade toilet paper. Monoculture plantations are increasingly incorporated in tree planting projects, such as those in China, and the paper industry often touts plantations as the solution to creating an ongoing supply of virgin pulp and fiber.

The trouble is, a forest is far more than just a bunch of closely planted trees. Although the Food and Agriculture Organization of the United Nations (FAO) considers plantations the environmental equivalent of native forest, the World Rainforest Movement asks, “How can a biodiverse tropical forest be equated with a monoculture alien tree plantation?” The monocultures created in eucalyptus plantations, for example, displace indigenous plant and animal life, require tremendous amounts of chemical pesticides and fertilizers, and soak up such huge quantities of water that they have been planted to drain swamps.

Deforestation is one of the major contributing factors to global climate change. NRDC says that while toilet tissue only accounts for 15 percent of deforestation, any industry focused on virgin wood products—whether from boreal forests or plantations—is culpable. “Virgin fiber is not the optimal fiber source for disposable tissue products,” says Allen Hershkowitz

of NRDC. “Instead, disposable tissue products should be made from recycled fibers, which avoids forestry impacts entirely.”

ANOTHER JOB FOR RECYCLING?

While some paper companies focus their energy on improving virgin pulp toilet tissue quality and desirability through advances in tree agriculture, chemical treatments, and manufacturing techniques, tons of already used paper fill landfills. The case for recycling much or most of that paper—which can be made into perfectly acceptable toilet paper—is compelling, on several grounds. Various estimates place the quantity of waste paper tossed into U.S. dumps and landfills at 35–40 percent of total landfilled mass. According to the University of Colorado’s Environmental Center, “in this decade Americans will throw away over four and one-half million tons of office paper and nearly 10 million tons of newspaper...almost all of which could be

recycled.” Moreover, according to the Center, one ton of recycled paper (909 kilograms) saves 3,700 pounds (1,682 kilograms) of lumber and 24,000 gallons (90,849 liters) of water; uses 64 percent less energy and 50 percent less water to produce; creates 74 percent less air pollution; saves 17 trees; and creates five times more jobs than one ton of paper products from virgin wood pulp.

So if recycling paper to make toilet tissue—the only paper product that cannot be recycled after use—makes so much sense, why is it not happening more often, in either U.S. or other global markets? Looking at the corporation dominating the global toilet paper market provides some answers.

Kimberly-Clark, headquartered in Texas, is the largest tissue maker in the world. Kimberly-Clark (K-C) products are sold in 150 countries, and the company estimates that 1.3 billion people use its tissues every day. K-C maintains a position of either first or second in market share in at least 80 countries. According to K-C’s 2007 *Sustainability Report*, North America ranks the lowest for use of recycled fiber at about 20 percent for all K-C tissue products. By comparison, Europe’s recycled-content tissue product use is about 36 percent and Latin America’s is 67 percent.

Kimberly-Clark says consumer preferences drive product quality. And on its company website K-C offers an in-depth Life Cycle Analysis (LCA) of tissue, which raises questions about the true environmental impact of virgin-

sourced versus recycled toilet paper products. According to the LCA, “the products selected are made in different parts of the world, under differing conditions, using different mixes of energy sources and raw materials.” A colorful graphic illustrates the flow of materials from the environment, including air, land, and water impacts. The “energy supply system” is shown as an input to the chain of tissue production. On one side is the manufacturing process of virgin pulp tissue, starting with forestry, harvesting, and transport to the virgin pulp mill. The flow chart continues through retail sale, consumption, and waste management, i.e., down the toilet or into the latrine. On the other side of the chart is tissue made of recycled-only waste paper. This side demonstrates, accurately,

the need to de-ink waste paper prior to tissue production. However, the forestry, harvesting, and initial production of the original paper product are included in the recycled tissue equation. In short, the company dings recycled tissue twice in its analysis—once for virgin pulp tissue production and again for recycled tissue manufacturing.

The LCA studied three impacts: air pollution and influence on global warming; water pollution and consumption; and availability of virgin versus waste materials for production. K-C succinctly concluded “that neither recycled nor virgin fiber is environmentally preferable.”

To be clear, K-C is not the only company debating the environmental consequences of using virgin fiber for toilet paper. But it is the international industry giant driving the market—a global market it claims is clamoring for the softest, most absorbent, thickest toilet paper, which can only be manufactured from virgin fiber. And while it is true that the source of fiber for many tissue products is wood waste created in other segments of the wood industry, the fact remains that there is no strong movement among many toilet tissue companies to shift consumer preferences to more environmentally friendly products—although, it is interesting to note, these same consumers regularly use recycled-content toilet paper on the road, at sporting events, and at work.

Tim Spring, CEO of Marcal, a U.S. company that has been making recycled toilet paper (using nothing but recov-

Tim Meijer



“Good, clean, white paper” baled for recycling in Australia.

ered fiber) for over 50 years, agrees that consumers want quality and comfort in their tissue products. He vehemently argues, however, that you can give the market what it wants using recycled materials. “Sixty percent of all paper manufactured ends up in landfills, only 40 percent is recaptured for further use. We throw away enough paper to make toilet paper for a lifetime,” he says. “Most paper products can go through four cycles of recycling, with each cycle resulting in shorter fibers. Various grades of recycled fiber can be blended in the toilet paper.”

Marcal relies on office waste—what Spring describes as “good, clean, white paper”—magazines, and the paper deposited in residential recycling bins from local towns and cities. Located in New Jersey, Marcal utilizes the recoverable paper from over 600 municipalities in New Jersey, New York, Pennsylvania, and New England. Thus the source of materials is not only previously used paper, it is local.

Using colored or printed recycled paper requires a de-inking process, which Spring describes as a soapy, watery bath for the ground-up magazines. “The water does the work, with the inks floating to the top of the tank, and clay residue sinking to the bottom. The top and bottom of the tank are skimmed,” he says. “The water is recycled, too. It ends up as drinking water, which is cleaner than the local water sources. Nothing is lost, it is a closed cycle.” The clay and ink residue is used as layering material in landfills, or in road construc-



Dry culture: So many choices, so little recycled.

tion. So, in contrast to K-C, Spring concludes that producing recycled toilet tissue is the most logical response to consumer need for a one-time-use item: relying on local sources of recovered fiber, using less energy in manufacturing, cutting costs and fuel consumption, polluting less. The result is a desirable product for the marketplace and reusable byproducts as well.

Global paper recycling efforts are growing. For instance, Brazil's largest recycling company, Klabin, handles 325,000 tons of waste paper annually. The Paper Recycling Association of South Africa projects that over 1 million tons of paper will be recovered in the calendar year 2010. Meanwhile, in 2004 the *Guardian* (U.K.) reported on government figures suggesting that exports to China of waste paper collected in Britain "are running at...500,000 tonnes of paper and cardboard a year."

Marcal's Spring raises a concise and thought-provoking idea when he asks consumers to ask themselves, "Do I really need to kill trees, to get the job done?" According to Marcal's website, the use of their company's products alone has saved over 22 million trees since 2000.

OPTIONS

The United Nations declared 2008 the International Year of Sanitation, estimating that 42,000 people die every week in part from diseases related to the absence of adequate sanitation. About 1.5 million children die from diarrhea each year before reaching the age of five, and illness triggered by poor sanitation

contributes to the loss of at least 500 million school days annually around the world. There are organizations that correlate the use of toilet paper with access to improved sanitation in developing countries. It appears that the consumption of toilet paper will be a continuing global need as population growth adds to the over 2 billion people currently estimated to be lacking access to sanitation.

Can recycled toilet paper meet the needs of communities in developing countries focused on expanding access to improved sanitation facilities? Trevor Mulaudzi of The Clean Shop voices some doubts: "The problem with recycled toilet paper in Africa is quality, not availability." There are companies producing recycled toilet paper in South Africa, but worldwide,

virgin toilet paper manufactured by companies with the financial resources to invest in production and marketing continues to be associated with better cleaning and comfort.

There are materials available, however, to produce virgin pulp toilet paper, without trees. The three largest toilet paper producers in Japan, for example, use recycled wood pulp and "washi" as a paper additive. Washi is made from a variety of sources, including rice, hemp, bamboo, and wheat. In Mendocino County in northern California, a small but ambitious effort spearheaded by the NGO Earth Pulp and Paper promotes the production of paper from hemp stalks, flax, kenaf, and agricultural waste. Fast-growing fiber crops, such as hemp, and abundant agricultural and industrial byproducts ranging from wheat straw to garment scraps, sunflower stalks, and rags are logical sources of tree-free pulp for the manufacture of paper. The organization contends there are new methods under development that can transform pulp production, lowering costs, pollution, energy consumption, and water use—a closed system adaptable to a wide range of source materials. It may be some time before such technology can be used at the scale required to meet global toilet paper needs.

Pulp Mill Watch, a website sponsored by the German nonprofit Urgewald, projects that by 2012 the pulp industry will be expanding production by over 25 million tons, fed by monoculture plantations established in Uruguay, Brazil, Indonesia, Australia, China, South Africa, Thailand, and Russia primarily to feed the market demand for virgin

toilet paper in North America and Europe.

As Marcal's Tim Spring notes, it takes 3.5 tons of raw fiber to produce 2 tons of toilet paper. Monoculture plantations or agri-tree operations, established in response to limits placed on old-growth forest logging and growing consumer demand, endanger local environments with heavy use of chemicals, reduce biological diversity, demand large quantities of water to support fast-growing tree species, and displace indigenous populations and their farming cultures. Converting virgin pulp to toilet paper requires more water than producing toilet paper from recycled paper. Manufacturers of virgin-pulp toilet paper are increasingly utilizing high-energy drying techniques to maximize softness and fluffiness, and their chlorine-based bleaching processes pollute local water sources.

Regardless of arguments favoring the use of recycled toilet tissue, are there other options for healthy, effective personal cleansing?

According to Rose George, author of *The Big Necessity: The Unmentionable World of Human Waste And Why It Matters*, there is no fixed norm for hygiene; cultural differences define hygienic standards. "Wet" cultures (those using water for cleansing) can achieve health standards every bit as high as "dry" cultures relying on toilet paper. "Sanitation improvement tied to toilet paper use assumes a flush toilet paradigm," she contends. "A decrease in fecal-oriented disease in developing countries is a much better indicator of improved hygiene and sanitation, particularly in 'wet' cultures. It is illogical to use something dry to clean the dirtiest part of our body when we use water to clean everything else."

Rather than selling the world on using toilet paper, a better option might be to explore the possibilities offered by promoting personal washing, an alternative that may improve hygiene and reduce consumption of natural resources, even water. Water-based personal cleansing runs the gamut, starting with Japan's high tech and decidedly high-end Washlet, which incorporates a blow-drying system. Bill Worrell, manager of the San Luis Obispo County Integrated Waste Management Authority in California, returned from a trip to Japan so impressed with the efficiency and superiority of the Washlet that he installed the system in the IWMA offices as a research model. Worrell discovered that consumption of paper products could be reduced by 50 to 90 percent. "This may not seem significant until we realize that Americans use more than 3.2 million tons of toilet paper annually, cutting down 54 million trees in the process," he says. "The production of each roll requires an average of 37 gallons [140 liters] of water. The average American uses 57 sheets of toilet paper per day, about 3.7 gallons of water per day figured for just for the manufacturing process. This compares to about 0.03 gallons [0.01 liter] per use of the Washlet."

At the other end of the spectrum is Tjebok Health Care's portable plastic bottle washer, the Tjebbi. "Tjebok means, in Malay, cleaning your lower body with water," explains Dirk de Roos, director of the Netherlands-headquartered com-

pany. He claims that the hand-held bidet is "environmentally friendly, since there is no water waste, no toilet paper waste, and no batteries or other power sources required." De Roos sees the Tjebbi as contributing to the achievement of the UN's Millennium Development Goals for accessible sanitation.

TotoWashlets.com



Wet culture: The Japanese-designed Washlet being demonstrated.

tion, and he notes that "a typical toilet visit using a can, bottle, or cup uses a minimum of 500 milliliters of water. The Tjebbi uses only 200 milliliters, and can be used twice a toilet visit, saving water."

Toilet tissue, whether manufactured from virgin pulp or recycled-paper, will continue to be an important part of daily life for people in Western nations, and in developing countries emphasis on improving sanitation conditions to mitigate health concerns will expose new markets to the message of local and multinational toilet paper businesses. The environmental impacts inherent in harvesting wood, either from sustainably managed forests or plantations, for a single-use personal item must continue to be explored and documented. Education of consumers; improvements in quality, pricing, and marketing of recycled products; and willingness to consider toilet paper alternatives such as water for cleansing must be pursued to meet the needs of a growing global population.

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