

THE EVOLUTION OF PAPER

Exploring the history of papermaking, amount of paper produced and consumed world wide, and exploring the process in which paper is produced.

A BRIEF HISTORY

The first paper-like substance was invented by the Egyptians over 6,000 years ago. Papyrus, which is the root of our English word paper, was made by weaving reeds or other fibrous plants together and pounding them into a flat sheet. The Greeks and the Romans also used this technique, although some Ancient Greek paper makers were the first to create a kind of parchment paper made out of animal skins. Chances are, Aristotle, Socrates and other Greek philosophers originally wrote their books on the skins of dead cows.

But paper as we know it wasn't made until 105 AD, when a Chinese court official named Ts'ai Lun mixed mulberry bark and hemp with water and scraps of cotton and linen cloth (i.e. rags). This concoction was mashed into a pulp and pressed into mats that were left in the sun to dry.

Rags were the basis for paper for the next 1700 years. Bamboo Paper Modern paper was invented in 105 AD by the Chinese when they used tree parts to make it. Some of the fine paper was made from bamboo fiber, such as the example pictured here. (Franklin Institute).

As the Chinese culture flourished and expanded to the edges of the Asian continent, paper went along with it. First to Korea and Japan and then to the Arab world which included Egypt and Morocco. Yet, it wasn't until 1009 AD that Papermaking reached Europe by way of Spain, where the first European paper mill was set up by Arabs in Xativa, near the Mediterranean port city of Valencia.

After that, the Italians and the French became notable paper makers and dominated the paper industry in Europe from 1250

to 1470 AD. After the invention of the moveable type printing press in 1453 by the German inventor Johannes Gutenberg and the subsequent boom in literacy rates in the 16th century, paper for books grew in demand. Paper mills began opening all over the European continent and eventually reached the new world where the first American paper mill opened in Philadelphia in 1690. That increase in demand and the upsurge in papermaking began to tax the raw materials used to make paper (which was still largely made with rags) and manufacturers began searching for alternatives. It wasn't until 1843 that ground-wood (or pulp) harvested from trees became the papermakers material of choice.



FACTS & STATS

North Americans still consume more paper per capita, upwards of **500 LBS.** annually, than anyone else on earth.

40% of the world's industrial logging goes into making paper, and this is expected to reach **50%** in the near future.

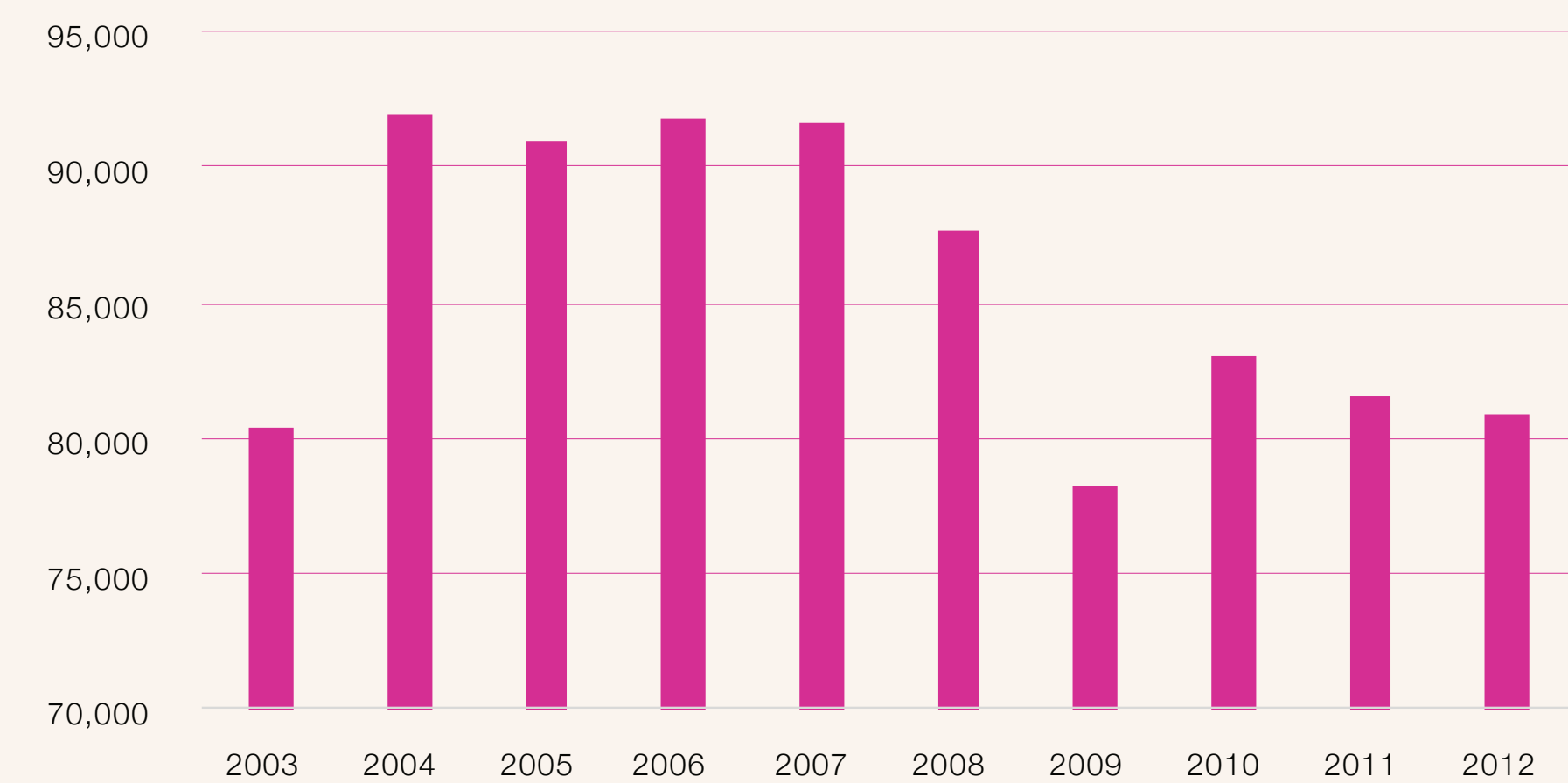
Paper production is the third most energy-intensive of all manufacturing industries, using over 12% of all energy in the industrial sector. The paper and pulp industry is also the fourth largest emitter of greenhouse gases in the manufacturing sector. Though paper recovery rates in the US have

increased in recent years, paper still represents one of the biggest components of solid waste in landfills - 26 million tons (or 16% of landfill solid waste) in 2009. When paper decomposes in a landfill, it releases methane, a greenhouse gas 23 times more potent than carbon dioxide.

World consumption of paper has grown 400% in the last 40 years. Now nearly **4 billion trees** or 35% of the total trees cut around the world are used in paper industries on every continent, each year.



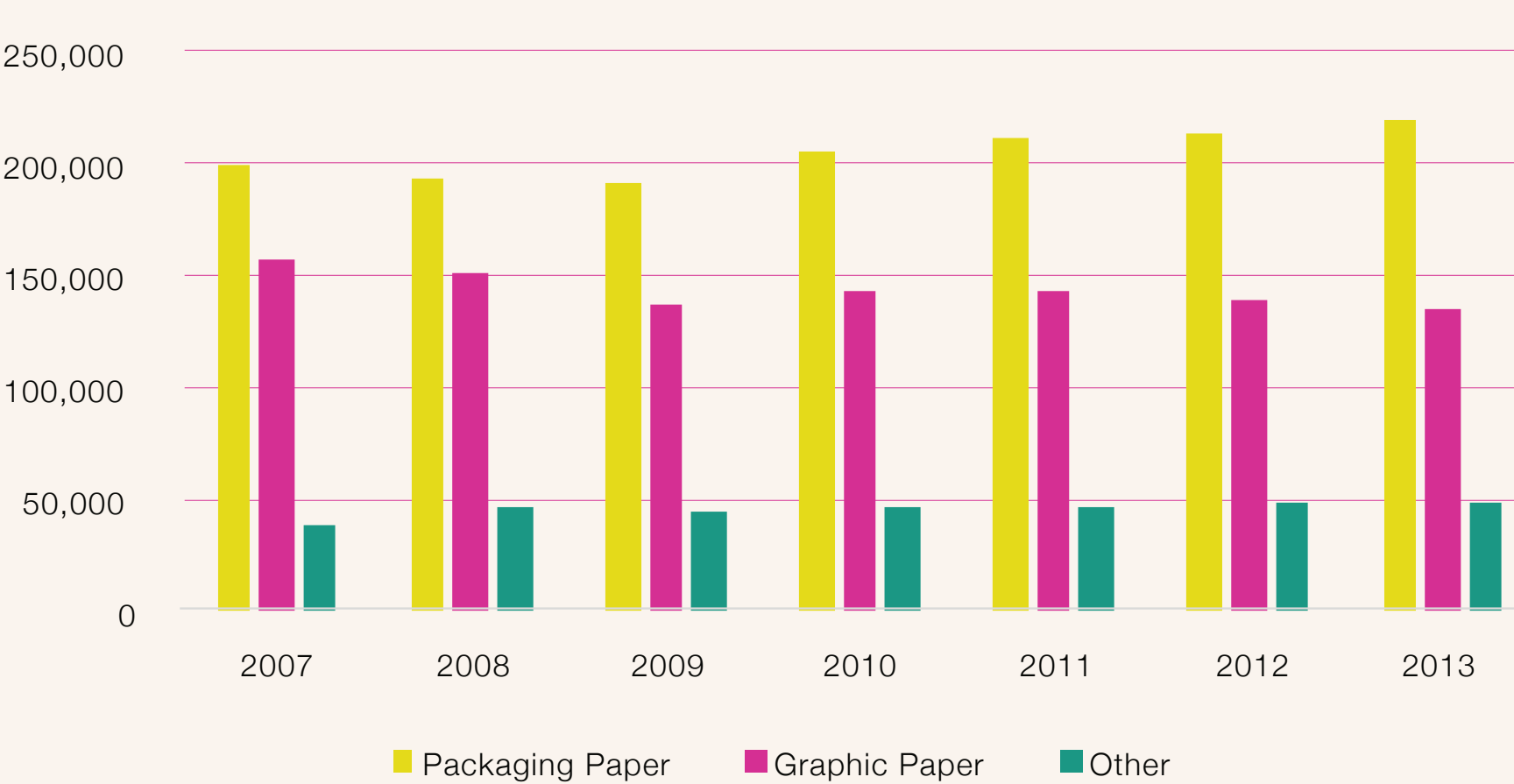
TOTAL U.S. PRODUCTION OF PAPER AND BOARD FROM 2003 TO 2012 (IN 1,000 TONS)*



This statistic depicts the total production of paper and board in the United States from 2003 to 2012. In 2011, the total U.S. production of paper and board amounted to some 81.52 million tons.

* Excludes hardboard. Includes wet machine board and construction grades.

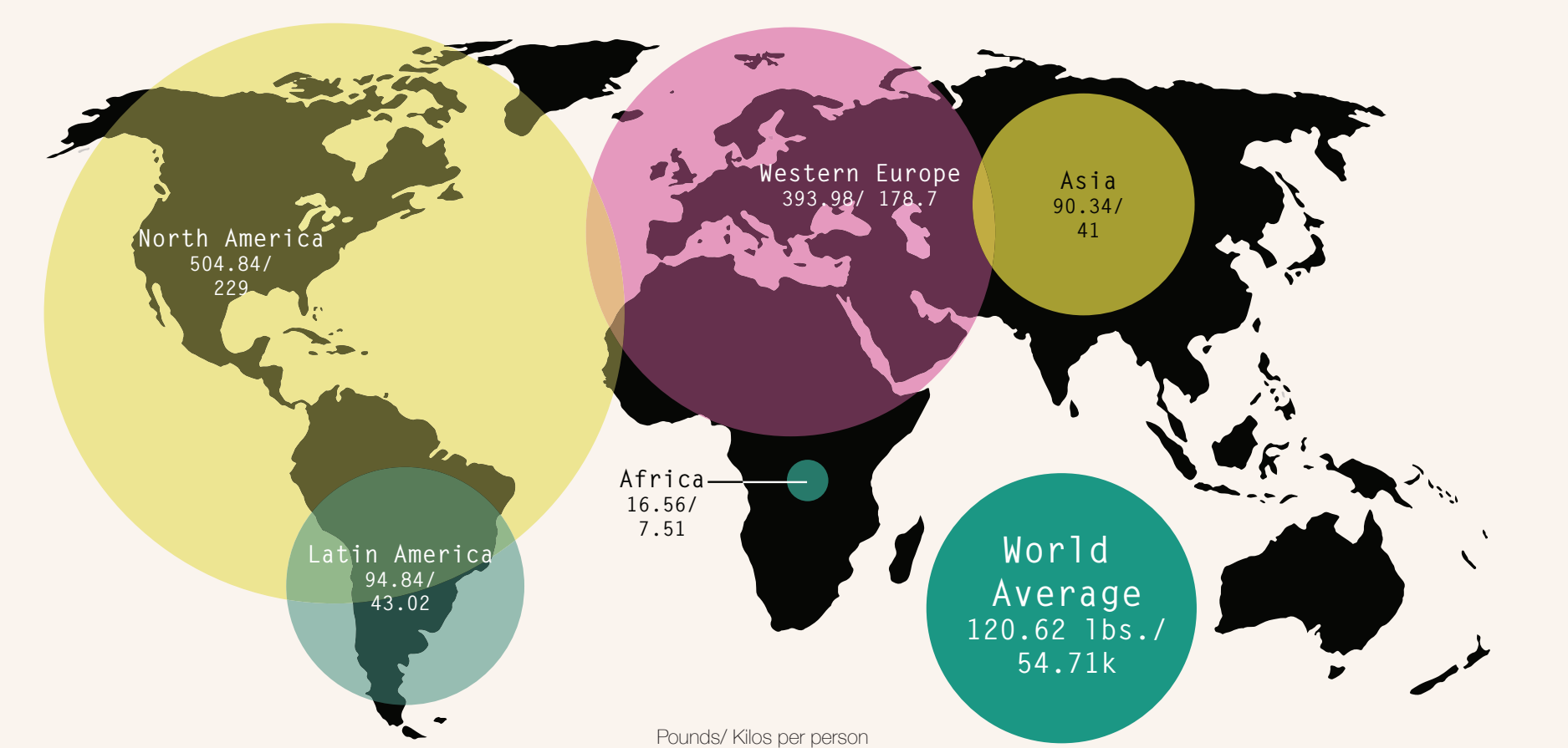
GLOBAL PAPER PRODUCTION VOLUME FROM 2007 TO 2013, BYTYPE (IN 1,000 METRIC TONS)



This statistic shows the amount of paper produced worldwide, by paper type, from 2007 to 2013. In 2008, some 151.5 million metric tons of graphic paper were produced around the globe. Until 2013, this production decreased to under 135 million metric tons.

This statistic was assembled from several editions of this report. VDP stands for "Verband Deutscher Papierfabriken" (Association of German Paper Factories).

ANNUAL PAPER CONSUMPTION PER CAPITA

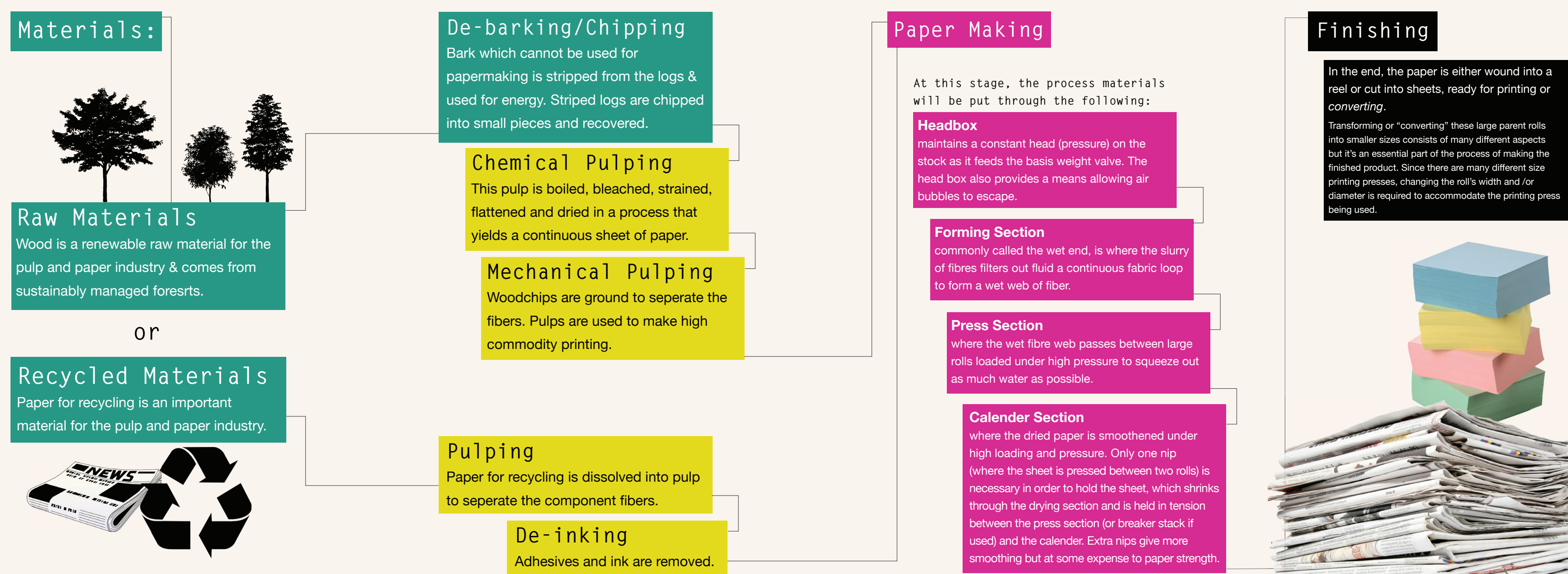


This map is demonstrating how widely paper usage varies from continent to continent.

Sources: RISI, US Census Bureau, United Nations, Statistics Canada, Infograph @ Environmental Paper Network

THE PRODUCTION OF PAPER

BELOW IS A DIAGRAM OF THE PAPERMAKING PROCESS ACCORDING TO PAPERONLINE.COM



PAPER SAMPLES

BELOW ARE DIFFERENT TYPES OF PAPER USED IN PROFESSIONAL DESIGN PROJECTS

Vellum Bristol Popular colors: White and Color Popular weights: 57, 67, 100, 120 lb, 200 lb. Uses: Makers, Posters, Advertising	Ledger Popular colors: White, Buff, Green/Ink Popular weights: 24, 28, 32, 36 lb, 100, 130 lb Uses: Business Forms, File Tabs, Records, Etc.	Cover Popular colors: White and Color Popular weights: 50, 60, 65, 80, 90, 100, 130 lb Uses: Booklet Covers, Makers, Manuals, Posters	Index Popular colors: White and Color Popular weights: 90, 100, 140, 170, 200 lb Uses: Record Cards, Tab Folders, Booklets
Newsprint Popular colors: White Popular weights: 90, 100, 140, 170, 200 lb. Uses: Record Cards, Tab Folders, Booklets	Laser Bond Popular colors: White Popular weights: 20, 24 lb. Uses: Laser printed Forms, Makers, Stationery	Offset Popular colors: White, Ivory, Cream Popular weights: 50, 60, 70, 80, 100 lb. Uses: Business Forms, Flyers, Books, Makers	Digital Imaging Popular colors: White, Bright White Popular weights: 20, 24, 28, 32, 50, 60, and 70 lb. Uses: Brochures, Newsletters, Reports, Manuals, Magazines, Folders, Cards