Positive Consumer Perception – Leveraging Green

Opportunities for renewable, non-wood packaging as part of a sustainable consumer market.

(Eco Packaging for Fun and Profit)

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Forward

What began as a simple search for additional packaging options for my clients, turned not only into a review of the packaging and paper industries, but a look into forestry practices world wide, development tactics for Third World economies, as well as a deeper look into the workings of today's consumer economy.

Having just completed a class at the University of St. Thomas (St. Paul, MN) in packaging processes with Professor Edward Rzepecki, I approached Professor Rzepecki about doing a possible independent study project on the topic of tree-free fibers for packaging.

"Why would you want to do that?" was his first reaction. "Wood fibers are superior to all others, or we wouldn't use them exclusively for packaging here in the US" he went on. After reviewing my initial research though, he held quite a different view, "In my 40 odd years in packaging, I never considered a need for an alternative to wood pulp. But the annual yield/acre [of annual fiber crops] coupled with the variety of structural properties annual fiber crops offer, we as an industry would be foolish not to investigate and capitalize on a wide variety of fiber sources." As we talked about non-wood fibers, possible applications, and what to do next for my study he seemed perfectly giddy. He was very anxious to get busy on fabricating samples of corrugated made from tree-free paper, and testing the structural properties of non-wood fiber products currently on the market.

Unfortunately, Professor Rzepecki passed away before we could get rolling. And yet, his contribution to this paper has been invaluable. To win the enthusiastic support of a total dyed in the wool, mainstream packaging engineer has been the fuel that fired this study.

This paper is dedicated to the memory of a spirit that refused to stand still.

Wendy Jedlicka

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Overview

Packaging Today

From transport packaging (the shipper box used to get the products to store or online consumer) to primary packaging (what the consumer sees on the shelf), to labels, hang tags, and user inserts, paper and paperboard packaging accounts for the greatest share of all packaging dollars spent. Paper and paperboard production has continued to rise steadily, with accelerating rates of consumption in OECD (Organization for Economic Co-operation and Development) countries.

In 1993, use of paper and paperboard in developing countries was only 32 percent of the level in developed countries, since that time things have changed. In addition to economic growth for all world markets (predicted in spite of today's flat growth figures), factors like increasing literacy rates in developing countries and global computer use increases (personal computers are currently estimated to consume 115 billion sheets of paper annually) all have contributed to increased demand for both paper and paperboard.[1]

The paper industry accounts for about 2.5% of the world's industrial production and 2% of world trade.[2] Given this industry's heavy reliance on slow to harvest, though highly renewable resource (trees), developing and expanding alternative pulp resources would seem to be a simple and desirable way of supplementing pulp shortfalls quickly, or as an as-needed way of offsetting losses when wood producing areas suffer harvest setbacks due to extended drought or fire. History though has shown, that a few well entrenched players can stifle development of alternatives purely for their own profit to the detriment of players further down the production chain, consumers in general, and ultimately the environment.

Listening to the Market

A recent RPA-100% national survey of more than 200 primary shoppers confirmed that preference and demand for 100% recycled paperboard products has reached an extremely high level. 92% believe they are doing something for the environment when they buy it, 84% feel better about companies that use it as packaging material, and 73% are more inclined to buy products from companies that use it.[3]

With such high consumer support for forest-free (100% recycled) or even virgin pulp reduced (partially recycled packaging), the opportunities are ripe for companies looking to integrate the positive consumer perception advantages found in tree-free products. The fact that no trees were used at all, is a simple idea the consumer can easily get their arms around. In this time of transition, with companies issuing varied and confusing eco-marketing claims, companies that find simple ways of connecting with the consumer are best positioned to profit the most in an ever greening market.

Seems simple enough. And yet the drive to incorporate tree-free fibers as part of a general greening of industry, seems to be getting tied up in issues far beyond aesthetic or budget choices.

As much as 70% of purchase decisions are made at the store.

This shopper prefers to shop green. Are you interested in positive consumer perception, or being part of the background noise? How much are you willing to pay to get his attention? Cost per 1000 impressions: Packaging (printed 4 sides) $.05, Newspaper Ad (full page) $3.10, Magazine ad (full page) $3.40, Radio (30, 30 second spots) $5.00, Television (30, 30 second spots) $15.00, Direct Mail (11x17 piece) $47.00.[4]

Background

Historical Perspective

“You don’t know where you’re going until you know where you’ve been.” *Author unknown.*

Though it seems to be such an integral part of our lives, having been around as long as anyone can remember, packaging and paper made of wood pulp is actually a relatively new thing. From the days of the earliest cave dwellers using containers made from animal bladders and skins or folded leaves, man has found ways of containing goods for transport, storage, or trade. Here is a review of the elements and driving forces that shaped today’s package:[5]

Mesolithic Era (12,000 to 4,000 BC) – Some of the first clay pots as well as animal skin/bladder containers are discovered in burial sites.

4,000 BC – Ancient Egyptians invented the first paper, papyrus. Papyrus is a woven mat of reeds pounded together to form a thin pliable sheet. The word "paper" stems from the word "papyrus.” Ancient Greeks later used a kind of parchment made from animal skins for the same purpose (velum).

50 BC – The glass blowpipe invented in Imperial Rome. Glass packaging is born. About this time too, wooden barrels (the workhorse of transport packaging for centuries to come) begin to appear in Alpine Europe.

105 AD – China: Paper from pulp invented by Chinese court official Ts'ai Lun. Ts'ai mixed mulberry bark, hemp, and rags with water, mashed it into a pulp, pressed out the liquid and hung the thin mat to dry in the sun. Paper Mache (molded pulp) craft came about as a way to reuse this valuable material after it had served its original purpose. Used for centuries after it’s invention to make decorative objects and elegant lacquered gift boxes, molded pulp will become more commonly known for the more humble, gray disposable egg carton, showing up on store shelves in the 1800’s.

610 – Japan: Buddhist monks gradually spread the art to Japan. Papermaking became an essential part of Japanese culture and was used for writing material, fans, garments, dolls, folded paper packaging, and as an important component of houses. The Japanese were also the first to use the technique of block printing.

751 – Samarkland: Chinese and Arab armies clash after decades of peaceful trading. The Chinese are defeated and many are taken prisoner. Among the prisoners are papermakers who attempt to bargain for their freedom by teaching the Arabs the secrets of papermaking.

1009 – Europe: It took about 400 years for paper to traverse the Arab world to Europe. The first paper mill in Europe was built by the Arabs in Spain.

1045 – China: Moveable clay type blocks developed to speed up the printing processes.

1250 – Italians vigorously produced paper and exported large amounts of it, dominating the European market for many years.

1338-1470 – French monks begin producing paper for holy texts. France quickly adopts this new technology and becomes a self-sufficient and competitive paper producer.

1411 – The first paper mill in Germany is converted from a flourmill with assistance from the Italians. Germany greatly improved the craft and made the finest papers available. In 1453 Johann Gutenberg invents the forerunner of today's printing press. The printing press was the next stage in the communication revolution. With the availability of books, literacy increased. As literacy increased, the demand for books – and paper increased as well.

1550 – The first 'Throw Away" package in the Western World attributed to German paper makers who used inferior paper labels, printed with various designs to wrap their better paper products. At around the same time the first pictorial labels were introduced by a Venetian cloth manufacturer to distinguish bales of cloth.

1588 – England begins to make its own paper.

1680 – The first paper mill in the New World is established by the Spanish in Culhuacan, near the capital of Mexico.

1690 – A German immigrant named William Rittenhouse founded the first paper mill in America near Philadelphia. The first American papermakers are trained.

1719 – Rene Antoine Ferchault de Reaumur suggests that paper could be made from wood in response to a critical shortage of paper making materials (Paper was made from old clothes and rags. Due to population increases demand for both cloth and paper was outstripping supply).

1798 – Nicholas Robert develops hand-cranked device to make paper on a continuous revolving screen. Hearing of Robert's invention from a mutual acquaintance, the Fourdrinier (a name still associated with paper making today) brothers of England create their own papermaking machine.

1800 (circa) – First paperboard packages begin to appear.

1809 – France: First metal can appears in response to offer by Napoleon of 12,000 FFR for method of preserving food to maintain French Army.

1840/50 – Products move from bulk distribution to prepackaged goods. Retailers welcome the shift in responsibility for hygiene, weight accuracy, and quality, from them back to the original manufacturer.

1841 – United States: John Goffe Rand produces first extruded metal tube from tin.

1850 – Germany: Though of poor quality, Friedrich Gottlob Keller devises a method of making paper from wood pulp.

1852 – England: Hugh Burgess perfects the use of wood for paper pulp through new chemical process.

1855 – A technique is patented for the production of cellulose nitrate (nitrocellulose) fibers, the first artificial fibers.

1856 – England: First corrugated boxes appear. US patents for this technology granted in 1871.

1860 (circa) – Alexander Parkes produces the first known synthetic plastic (Parkesine, or xylonite) from cellulose nitrate, vegetable oils, and camphor; it is the forerunner of celluloid. Today over 30% of all plastics manufactured in US are used for packaging.

1860 (circa) – United States: John Wesley Hyatt creates a substitute for ivory used to make billiard balls, successfully fabricating the first semi-synthetic material, Celluloid.

1867 – United States: C.B. Tilghman improves new chemical wood pulping process by using sulfites.

1879 – Sweden: C.F. Dahl further develops 'sulfate' process. This technology spreads quickly, reaching the US around 1907.

1879 – First machines to cut and score paperboard boxes begin to appear. First major user of this technology is the National Biscuit Company (Nabisco).

1883 – United States: Charles Stillwell invents brown paper bag making machine.

1884 – Milk bottle developed. Supplier serviced consumer reusable packaging system is born.

1889-1900 – Economical, mass produced paper becomes widely available. Paper production doubled to about 2.5 million tons per year. Newspapers, books, and magazines flourished. Paper found its way into schools, replacing the writing slate.

1900 (4500BC – Early 20th Century) – The majority of all twine, rope, ship sails, rigging and nets up to the late 19th Century were made from hemp fiber. Hemp widely used for papermaking. Other non-wood fibers used world wide along side hemp included kenaf, bamboo, flax, and cotton.

1900 (circa) – "Sanitary-style" open- top metal can introduced. New container can be machine produced and filled.

1903 – United States: The corrugated box finally gets official acceptance as freight grade shipping container. Over the next 40 years, corrugated boxes replace wooden crates as primary shipping container.

1909 – The first totally synthetic plastic (Bakelite, a phenolic resin) is produced by Leo Baekeland. Phenolic closures for bottles are still produced today.

1911 – Machine developed to produce continuous cellulose film.

1912 – I. Ostromislensky patents the use of plasticizers, which render plastics moldable.

1913 – First use of foil for wrapping Lifesavers, candy bars, and chewing gum.

1927 – United States: DuPont perfects cellulose casting process and produces ‘cellophane,’ and dominates the clear film market until the invention of polyethylene. The commercial production of polyacrylic polymers begins.

1930 (circa) – United States: Industrial hemp, and anything that remotely looks like marijuana, in spite of centuries of valued commercial use, becomes entangled in “Reefer Madness” propaganda. Legislation passes in 1937 that essentially bans industrial hemp production by imposing huge bureaucratic hurdles.

1933 – United Kingdom: Imperial Chemical Industries invents polyethylene.

1937 – Extrusion blow molder for plastics invented by Enoch T. Ferngren and William Kopitke. Wallace Carothers invents nylon. Polyurethanes are first produced.

1938 – Nylon introduced by DuPont, used in packaging to make film and molded parts in aerosol valves.

1942 – United States: Hemp ban lifted to encourage farmers to grow this valuable fiber crop for war effort. Research into developing other annual non-wood fiber crops like kenaf and agripulp moves forward.

1945 – United States: Hemp ban reinstated at the end of WWII.

1947 – Continental Can Company produces first commercial aerosol cans.

1953 – The German chemist Karl Zeigler produces high-density polyethylene.

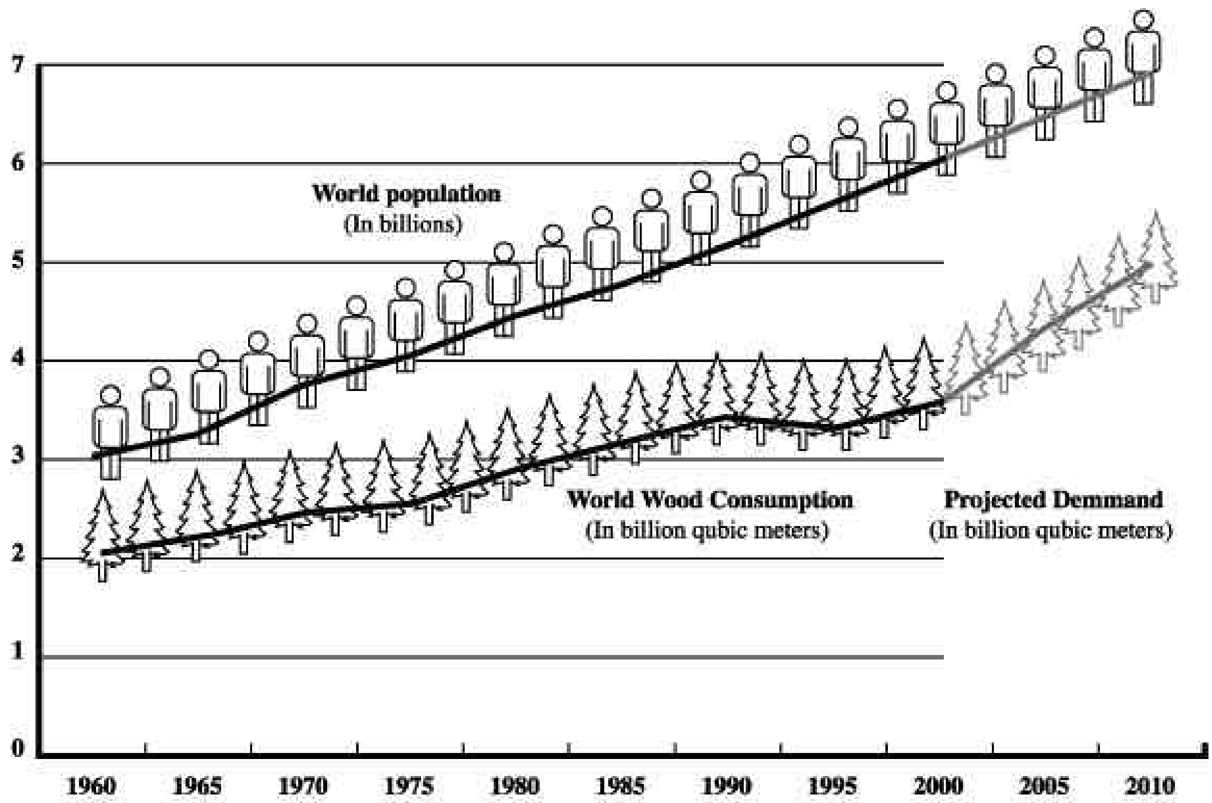
1959 – Shrink film for packaging introduced.

1970 – United States: Hemp criminalized along with marijuana.

1972 – United States: Oregon becomes first State to restrict packaging by banning use of non-returnable bottles for soft drinks.

1993/94 – UK, Australia, and Canada lift bans on industrial hemp.

Population and Consumption



People vs. Trees[6]

Developing countries account for 90% of the world's fuelwood use, while developed countries meet their energy needs with fossil fuels and other energy sources. Wood in developed countries is used primarily for lumber, paper/paperboard, and building products.[7]

"To understand how the three main factors affect the flow of forest products and measure their leverage for reducing the area harvested, we use an identity to isolate each factor's role for individual products.

(Consumers) Population x GDP/Person x (Millers) Wood/Paper x (Foresters) Forest Area Disturbed/Wood = Forest Area Disturbed"[8]

According to the Food and Agriculture Organization of the United Nations (FAO), since 1988 wood use per person has been declining from about 0.64 m3/person/year to about 0.55 m3/person/year. This is about a 14% reduction in wood consumption per person over 10 years. Even though worldwide consumption of wood is down, most of this decrease can be attributed to the near complete deforestation of countries where wood was the primary fuel source.[9] Wood product consumption in developed countries however, is steadily climbing, and is directly connected to increases in consumer spending and population growth. Countries that successfully make the transition from developing to a developed economy, would again see an increase in wood consumption. Though figures vary, it is widely held, that given current population projections and economic trends of developing countries, demand for pulp will easily outstrip supply by the year 2010.[10]

Future Pulp Demands

Seeing the Forest for the Trees:

– 85% of the world's wood supply is sourced from native forest.[11]

– The international trade in wood is $130 Billion/year, making it the 3rd largest commodity.[12]

– 75% of Australia's Tazmanian Forest has been harvested to supply the Japanese paper industry.[13]

– Every ton of paper that's recycled saves 17 trees. The amount of wood and paper we throw away is enough to heat 50 million homes for 20 years.

– Only about 30% of the Earth's surface is land, of that about half to a third can support anything more than the most meager life supporting eco system. Of the habitable land area, most is used for growing food, the rest is forest. Remaining forest coverage by continent: North America 18.7%, South America 21.4%, Africa 16.5%, Europe 3.8%, Former USSR 22.9%, Asia 12.9%, Australia 3.8%[14]

– In prehistoric times, 60% of the Earth's land surface was covered by forests.[15] Only one-fifth of the world's original forest cover remains as large tracts of undisturbed forest.[16]

The heart of sustainability is to look for opportunities found in the limits of a consumer-based society. Renewables are its life-blood. If pulp shortfall predictions are true, the only ones who stand to benefit from stifling development of alternative fiber sources are a handful of wood pulp producers. Paper mills (though some of the biggest wood pulp producers, are starting to promote alternative fibers), printers, converters, their clients, and eventually the consumer will share the bill for an increase in pulp prices a short fall will produce. The biggest looser of all will be the environment. As pulp producers push fragile, and slow growing eco systems ever harder to turn more profits and meet growing demand, the benefits of at least temporary habitat and watershed management wood fiber plantations provide, will be pushed aside. In addition, greater pressure will be placed on old growth forests, threatening the few remaining wild places, and sources for biodiversity left on Earth. In fact the process has already begun.[17] Though the concept of harvest and plant is widely accepted both by the forestry industry and the public in general, it only works in partnership with a well managed system of forest maintenance that includes scrupulous post-replanting follow-up.

Reforestation Failure

Ten Year Old Clearcut, Routt National Forest, Colorado[18]

Photo: Steve Holmer

Alternative fiber crops obviously can't make harvesting practices more responsible. But what they can do is reduce the appeal of clear cutting, the most destructive forestry practice, in favor of selective culling as pressure is relieved for low end pulp needs filled by alternative fibers. A whole large tree will simply have more value. Small trees will be left to become large trees, and eco systems are left in better condition to support a more healthy and sustainable wood producing area.

The proposal of cooperation between wood pulp producers and non-wood fiber growers is a tough one to take at the moment, as pulp prices are very low. America's paper firms have delivered average annual returns of only about 12%, lagging the S&P 500 index by five points. European paper firms, whose returns on capital have not exceeded 10% in recent years, have also done badly.[19] However, competition from outside sources aren't to blame, global over capacity is.

Requiring a very long lead time and high investment, paper producers tend to run their plants to full capacity no matter what the market for their goods, in the of hope of squeezing an extra buck out of their plants. Building and feeding wood pulp mills is a very expensive proposition. Yet here too, well placed mini-mills could provide the flexibility needed to react to market trends the pulp industry has lacked.

In an effort to better adapt to market changes, and to position themselves early, many of the major players have already begun incorporating alternative and PCW fiber papers (Fox River, Domtar, Gilbert, and Crane) into their product offerings. Maybe it's time for the industry as a whole to reexamine the way it does things. Ironically while pulp prices were plummeting, whole board lumber prices were reaching new highs throughout the 1990's. A rise only slowing now due to overproduction.[20]

Emotional and Economic Issues

Our Jobs are Our Life!

"Forest Guardians and SWAN have been less successful in pushing their agenda than loggers seem to believe. The recent declines in federal timber sales, he says, don't reflect any wholesale change in regulatory policy: "I wish we could take credit for it, but I think it has more to do with the fact that the large valuable trees are gone." City Pages 1999[21]

"Protecting the last remaining roadless areas on a state's national forest is good for that state's economy according to The Wilderness Society. Following up on "Economic Values of Protecting Roadless Areas," a study prepared by John B. Loomis, Ph D., Professor of Agriculture and Resource Economics at Colorado State University, and released earlier this summer, 14 state-specific economic profiles point to distinct patterns in income and job growth that make it clear that forests products manufacturing and other resource extractive jobs are a minor, and in most cases, declining part of the economy in states with national forest land. The fourteen states include: California, Colorado, Florida, Georgia, Michigan, Minnesota, North Carolina, New Hampshire, New Mexico, Pennsylvania, South Dakota, Tennessee, Washington, and Wisconsin."[22]

Statistics show that of the 501 million cubic meters of timber harvested in the US (1993), only 167 million tons ended up as paper products. The bulk remained as whole wood. The argument that shifts in pulp supply from wood to recycled/annual crops will somehow collapse the logging industry as a whole, is reactionary at best.[23] In fact, much of the perceived drop in current demand for new harvests has come from within the timber industry itself. In addition to the current effects felt from years of over harvesting, new efficiencies have been developed by the Mills that initially process logs. Mills are creating alternative products from waste wood, as well as better figuring cut patterns for each log. Everyone but those cutting the logs seems to recognize it's more profitable not to cut more trees, but cut trees smarter.

Each shift in economic focus brings with it a hailstorm of objections from players well established in a given market. 'My father was a logger, my grandfather was a logger, and my son will be a logger too!' is a typical reaction to any sort of change in logging practices. Whaling communities shouted these same arguments as governments banned commercial whaling. The fact that generations of harvesting, had pushed the whales to near extinction, didn't seem to matter to the people living from whale hunting. Even as they watched the harvest dwindle to sub-livable figures, they still clung to the old ways. Today these communities still celebrate their whaling heritage, but instead of making money from dead whales, live whales are the base of a thriving eco-tourism trade.[24] At what point will *logging* communities step back and say, 'Hmmm, maybe the old way isn't working'?

It's these very people, people who live from renewable natural resources, that new and renewed sustainable Forest Stewardship practices promise to benefit the most. By shifting low end paper making to annual crops, relieving the pressure on slow growing forests, in the end delivers better quality wood from healthier forest systems with higher economic returns. From proven increases in tourist revenues revealed in several independent as well as US Forest Service studies, to higher per log return for better quality wood products, annual fiber crops offer forest managers in partnership with pulp producers a practical mix of options.

Even the fastest growing trees used specifically for paper pulp take 3-10 years before they're ready to harvest. Annual fiber crops on the other hand, provide 4-6 times the fiber when calculated as tons per acre per year. The only possible reason then for not developing and supporting alternative pulp crops would be to directly and decisively drive up the price of paper pulp to favor existing technologies, as demand outstrips supply, while providing no long-term plan for relieving pressure on forests. Of course the pulp industry isn't so united as to orchestrate such a move. Just as cumulative short sighted self-interest has led to overproduction and soft prices today, the cumulative effect of that same self-interest, unwillingness to change, and a lack of cohesive policy governing pulp sourcing, will have much the same effect on driving pulp prices up tomorrow as demand outstrips supply.

Sustainable Foresters and traditional Loggers are battling it out right now within the wood products industry. The idea that a forest can be diverse, healthy and profitable is a new idea with a centuries old history of success. Yet even with overwhelming evidence to support change, it's only with direct legislative intervention, that any real change in the industry as a whole likely happen. With campaign contributions from mainstream forest industry players at over $24 million,[25] it will take direct pressure from the consumer to make a difference in a more timely fashion.

Is this Sustainable Forestry, or take the money and run?

Private land clear-cutting on Olympic Peninsula, Washington.[26]

Photo: Steve Holmer

Informal poll:[27]

Do you feel toilet paper made from recycled paper is less sanitary or some how inferior to toilet paper made from virgin wood pulp?

92% No it's great, I buy recycled now!

8% It's okay.

Farmer Brown the Lumber Jack

For years the plight of the family farmer has been at the forefront of social issues. Low maintenance fiber crops are one way to help. Annual fiber crops like hemp and kenaf, produce more fiber per acre annually, are naturally pest resistant, maintain the condition of the topsoil (soil lost to wind erosion in a dormant year crop rotation schedule), and require a fraction of the process bleaching and processing to produce paper grade pulp, than their wood counterparts. Agripulp, the waste from most fibrous crops like wheat, sugar cane, corn and rice, turns material that was formerly a liability into a revenue stream.[28]

Even pro-wood studies recognize the need for developing and promoting non-wood fibers as a way to not only maximize economic potential in a developed economy but to help developing countries take greater control of their own needs.

"Non-wood fibres are used to produce a variety of grades of paper and paperboard and account for over half the virgin pulp production in developing countries. Approximately 90% of all non-wood pulp is produced in Asia… non-wood fibres are important to the paper industry in developing countries and there may be social and employment benefits to be gained by maintaining and even expanding paper production from this fibre source …In areas with a surplus of agricultural residues, or where there is local interest in growing fibre crops, industry could support local initiatives by investigating the installation of a non-wood pulping line alongside existing wood-pulping lines."[29]

Using existing technologies, processing non-wood fibers has been both costly (transport of the voluminous pre-processed materials) and unattractive from an eco standpoint. Enter the new generation of Mini-Mills.[30] By situating small, clean running, efficient pulp mills in the areas where the annual pulp crops are produced, transport costs are brought in line, more jobs are created in rural areas, and farmers are given more options on how to best manage their land and ultimately the health of the local environment and economy.[31]

Sustainability and the Real World

"I decided to look at the term "sustainability." That term was not used much in the 70's. The use of this term [today] has skyrocketed…" David South – *Resource Sustainability and Population Growth*[32]

At a time of increased globalization, players that can successfully manage sustainable resources will reap the greatest economic gain. Companies (and in the broader picture, Countries) that put production without consideration for the social, economic, and natural environments, could find themselves out of business. From an article in the September 11, 1999 Economist "Companies with an eye on their "triple bottom-line" - economic, environmental and social sustainability - outperformed their less fastidious peers on the stock market, according to a new index from Dow Jones and Sustainable Asset Management."

"States with the highest environmental standards also boast the best economic performance, finds Gold & Green 2000, a new report from the Institute for Southern Studies."[33]

In the next 50 years the world population is expected to increase from today's 6.1 billion[34] to 9.36 billion (UN projection). Virtually all of this population growth will be in developing countries where the demand for industrial wood is low and the demand for fuel wood is high. As their economies expand though, so too will this dynamic change. Affordable, renewable, and especially eco-friendly technologies to replace wood for fuel and allow for reforestation to supply building materials and improve local environmental health, need to be made available and included in any economic development plan. Sustainable practices of Forest Management vs. wholesale harvesting must also be incorporated.

In the struggle to escape the economic depression gripping developing and stagnated economies, greater emphasis must be put on maximizing what the region can produce itself. Rather than trying to copy development paths used by developed countries with completely different eco systems and population densities, developing countries need to customize their path to development to best fit their eco-system. Some of the biggest mistakes made both by developing countries and outside organizations assisting them, comes from trying to apply Western models of development that rely on materials not locally producible. One of the cornerstones of sustainability is to make the most of what you have, or can produce yourself.

"The use of paper is generally regarded as essential for modern living. Indeed, in the developing countries there is an urgent need for significantly increased consumption of paper products to meet health, education, information, hygiene and other needs. But the consumption of paper is linked by policymakers and the public with environmental impacts at other stages of the cycle, notably, forest management, pollution during manufacture and end of life waste."[35]

In his lecture series "Fundamentals of Packaging," Walter Soroka mentions a UN finding he came across some years ago. The report states, that part of the problems faced by developing countries is not the inability to produce enough food or produce exportable products to earn desperately needed hard currency, but a simple lack of packaging. In most developing countries, roads are often barely passable and warehousing is unreliable, goods rot before reaching market or arrive hopelessly damaged. Packaging of goods (such as it is) tends to be in bulk.

One solution is to locate a mini-mill in production areas. This small expansion of local production abilities, could turn a simple farming community, selling only a fraction of what they could produce, into a self contained economic center, capable of exporting goods regardless of transport or warehousing reliability. Failures of infrastructure, a point that's held many developing countries back for too long, could be bypassed. Rural areas could be better developed, and hard currency would be earned to improve infrastructure, further improving developing economies. (See also: Reis, Mauro S. – *Resource Development for Non-Wood Forest Products* and Kelsey, Robert – *Packaging in Today's Society, Third Edition*)[36]

Soroka in his book, Fundamentals of Packaging Technology, goes on to point out that though developed countries are criticized for overpackaging (which certainly is a problem), North Americans spend very little for their food. Food costs in North America consume only 11-14% of a family's income while European's pay 20%, and people in developing countries spend up to 95% of their income on food.[37]

An added illustration for the power of packaging to be a positive player in the fight against World hunger is that as the amount of packaging increases worldwide, the amount of food waste goes down.[38]

No discussion of sustainability would be complete without a look at wastestream issues. In 1995 the US Environmental Protection Agency (EPA) identified paper and wood packaging as 17.3% of the total materials mix composing the municipal solid waste in the US (metal packaging 2%, glass packaging 5.7%, and plastic 4.1%), accounting for nearly 60% of all discarded packaging.[39]

As more than a renewable resource, paper is derived from a living thing that takes years to mature. Celebrated with holidays in many nations, the subject of poetry and song, and incorporated into significant moments in people's lives (birth of a child, a living memorial), trees hold a special place in our lives. Annual crops on the other hand are hard to warm up to. You plant them, you harvest and use them. What better to make packaging from, a thing at best, people consider a necessary evil, future trash. As important as packaging is to our economy, no one ever got weepy over someone taking a chainsaw to a hemp plant. Developing annual crops specifically for short and once use products like packaging and office papers, not only offers developing countries the opportunity of meeting their own pulp needs, and is fully compatible with paper recycling systems, but provides an instant connection to the consumer. As today's paperboard industry has yet to settle on an eco-labeling scheme, a *tree-free* statement provides the height of clarity. Put simply, no trees were killed to make this package. A concept appreciated in all cultures.

You Can Sleep While I Drive

The Consumer's at the Wheel

A recent RPA-100% national survey of primary shoppers confirmed that preference and demand for 100% recycled paperboard products has reached an extremely high level. 92% believe they are doing something for the environment when they buy it, 84% feel better about companies that use it as packaging material, and 73% are more inclined to buy products from companies that use it.[40]

In another study outlined by sociologist Paul Ray in the February 1997 issue of American Demographics, a segment of consumers identified as "Cultural Creatives" has been quietly growing and now represents about a quarter of all US adults. This group is at the forefront of sustainability concerns, is strongly motivated, and their purchasing and investing decisions reflect these values.[41]

Consumer pressure is an interesting thing. Until a few years ago, curbside recycling was available in only a handful of US markets, now over 50% (and growing) of American Households recycle. In Europe, a consumer revolt at the check-out line (consumers brought reusable containers from home, and repacked items purchased, leaving the manufacturers' packages at the end of the check-out line for the store to deal with) forced a major rework of the manufacturer responsibility laws. The overall impact of which was an expansion of recycled material use to keep original materials and disposal costs down (selling waste for recycling turns it into a profit center rather than a disposal liability), and a reduction in overall packaging. In general people like to think they're doing something good, as long as it's not too hard to do. Recycling and purchasing decisions are two issues the consumer has no problem getting involved with.

Consumer pressure in action: Of the 10 plain white bond papers offered at the Office Max in Roseville Minnesota, over 50% have some recycled content. "Customers ask for it" said the clerk stocking the shelves. It's this simple application of market forces that can steer even the most immobile industry to move in a new and positive direction.

Education on eco issues has been the biggest key to expanding eco-responsibility. Consumers like the idea of recycling. Offering products made from the resources they helped generate through their recycling efforts, completes that good feeling. Using eco-responsibility as a tool for building a positive consumer perception is no longer limited to Hippie culture companies like Ben and Jerry’s or something you’d find on the shelves of the local Co-op. 3M, DuPont, Clairol, Proctor and Gamble, and General Mills (to name only a few), all go to great lengths to make the consumer aware of their commitment to the environment.

Informal poll:[42]

Would you suggest a more eco choice to a friend you saw using a less than eco product?

64% Yes, Always!

36% Most of the time

Touching (and Banking) Intangibles

Whatever a manufacturers’ eco stance may be when you ask them in person, the store shelves tell the consumer what the manufacturer’s view of their impact on the world is, and what the manufacturer thinks of the consumer. If a manufacturer sells a product in un-eco packaging they’re not only saying "We don’t care," but also "Buy this because you don’t care either."

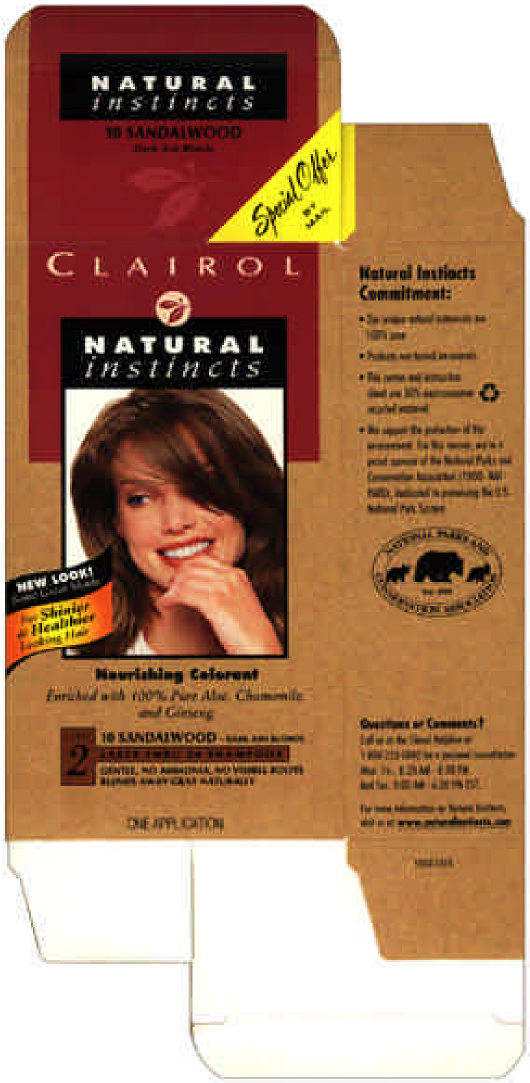
In the 1997 Cone/Roper Cause-Related Marketing Trends Report, Americans are significantly more receptive to cause-related marketing than ever before, 76 percent believe it's acceptable for companies to engage in cause-related marketing. That's up from 66 percent in 1993. The report says consumer cynicism toward cause-related marketing is down, only 21 percent of those surveyed questioned the motives of companies that help good causes. Additionally, according to a recent US survey of primary shoppers conducted by Leflein Associates, there's a strong link between consumer packaging preferences and positive feelings toward packaged goods companies and retailers that care about the environment.

An overwhelming 96% of women surveyed said they believed it was important for companies to do something good for the environment. In addition, 84% said they felt better about companies using 100% recycled paperboard as a packaging material, with more than 90% maintaining that 100% recycled paperboard packaging will make a better future for their children. Most importantly, almost three-quarters of the women said they were more inclined to buy products from companies using 100% recycled paperboard. Women surveyed also expressed a desire for clearly labeled packages that would help them identify recycled packaged products quickly and easily.

Companies that ignore changing social attitudes see marked reduction in their market share over time. After 100 years, changes in race attitudes forced Quaker Oats and Mars Corporation to change their Aunt Jemima and Uncle Ben logo personalities. Moving from stereotyped images considered racist, to a look that conveys the image of a modern culinary professional, who also happens to be of African heritage. General Mills recognized too that their spokescharacter, Betty Crocker, as a white Anglo-Saxon Protestant, no longer represented the face of America. After nearly 80 years, Betty now has a tan.

"Why bother? What we've done in the past has served us for years" is what manufacturers say most often. But though they'll recognize the need to change a logo or image that could be perceived as racist, they can't seem to recognize the total image their packaging choices (and/or product) conveys to the consumer. But whether they recognize it or not, consumer attitudes towards eco impact are changing.

The beauty products industry is already experiencing this ramping up of eco expectancy by the consumer. Firms like Aveda and the Body Shop over the past few years have been carving large hunks of market share (out of the established players' customer base?), with the promise of natural purity and respect for the earth throughout the production process. Suddenly big companies were finding themselves on a whole new playing field in the quest for the consumers' confidence. In response, or a timely coincidence, companies like Clairol started to change their image. Not only did they start using recycled



content pulp for their paperboard and user inserts, but they reworked their packaging to better convey, to even a casual observer, an eco look and product position. In addition they began an open campaign of corporate sponsorship of environmental causes. Unlike much corporate giving which happens almost in the background, Clairol printed their efforts right on the package, encouraging the consumer to get involved too.

Leveraging greenness is becoming an invaluable tool in highly competitive markets. Kinko's (using recycled paper for their default paper), Home Depot (featuring lumber from Certified Sustainable sources), and Apple Computer (using sustainability principles in all aspects of production) are only a few examples of mainstream corporations using green opportunities to give them a competitive advantage or extra point of difference in a crowded market.

Informal poll:[43]

In general would you pay more for a product in packaging you knew to be more eco-friendly than a comparable and cheaper product in a non (or not so) eco package?

64% Yes, always!

34% Not always / Depends how much more.

Applications

Tree-free – Annual Fibers

Tree-free papers and cover stocks can be used in any place where wood pulp paper of the same weight is used. The only limit is the imagination of the designer. User inserts, manuals, labels, hang-tags, and neck labels are just a few suggestions. Tree-free fiber papers come in a wide variety of colors from brilliant white to a rainbow of colors.

Deep Green: Products using high PCW Boards, Tree-free Paper (printed with soy inks), Biodegradable Cellobags, Certified Sustainable Forestry Wood, and Organic Cotton.[44]

In many cases, right now tree-free papers run a bit higher than their dead-wood cousins. But as we illustrated throughout this paper, the use of tree-free papers isn't a per unit consideration, it's part of a whole eco-marketing strategy. In time, as tree-frees become more mainstream, the price will drop across the board (many of the more common grades are already competitive with wood pulp papers).

Ever notice some soda cans say “Please Recycle” in tiny letters. They do that because the can wasn’t necessarily made from recycled materials, but still they want to cash in on eco sentiments. The can still is very recycle *able*. When you choose to use tree-free materials, make a big deal out of it. Use the direct to the heart connection with the consumer and make your paper choices very obvious. Talk about those choices on your website and give the consumer opportunities to get involved.

While alternative pulps are used for packaging grade boards throughout Asia, with China currently producing 77% of the world's non-wood pulp[45] (put simply, no trees left), at the moment in the US, tree-free paper products are only available in text, writing, and cover weights. This is just a taste of what could be done. The opportunities for development are great, annual fiber producers say it’s not only time to relook at how pulp is used, but time for a pulp paradigm shift.[46]

Though many common annual pulp crops have shorter fiber length than wood, these fibers are considerably fatter than wood fibers, making them far more resistant to breakage. This stoutness allows annual fibers to remain useful through many more recycling courses than wood fibers, delivering even more useful pulp per ton, system wide. Long fiber annual crops like cotton, offer transport packaging engineers additional moisture resistance benefits. Shippers made of cotton pulp boards are naturally strong when wet, where wood pulp begins to breakdown under he same conditions. A common problem faced in transoceanic shipping.[47]

Transport Packaging

Plastic Lumber

One of the biggest uses of whole wood in packaging comes from the manufacture of shipping pallets. Susceptible to infestation from exotic pests,[48] moisture degradation, and a host of other problems associated with raw wood, the use of wooden pallets as part of a transport packaging and warehousing system needs to be reexamined. Enter Plastic Lumber. Molded, or fabricated like wood, plastic lumber (end of recycle life and mixed type plastic) is showing up in places traditionally held by wood. Park benches that never need painting, shipping pallets impervious to insects and requiring no pesticides, and round-trip shipping containers are only a few uses.

"As our primary mission, we can recycle over 65,000,000 pounds of post-consumer and post-industrial scrap plastic from land fill, enough to build a ski hill. Because our pallets and totes can return through the process continuously as raw material and based on the fact that, on average, a tree can produce 4 pallets, we can reduce the harvesting of 350,000 trees each year."[49] say's one pallet producer.

Dole Fresh Vegetables, Inc. purchases over 1.2 million pallets per year for use in shipping various commodities.[50] Though Dole recycles more than 100,000 wooden pallets anally, think of how many trees could have been saved, in addition to the tons of plastic that would not have ended up in a land fill (or incinerated) if they would have used plastic pallets. Now multiply that by the millions of companies worldwide that use wooden pallets.

Kenaf Crates

One of the biggest problems with using organic matter for transport packaging is its appeal to pests. The mechanisms that nature put in place to allow wood to be broken down and its nutrients returned to the earth, can be catastrophic, when activated before its time. The biggest pest draw, are the sugars present in all fibrous plants. In China, where wood is scarce, kenaf cores, the lower grade section of the plant, are processed to remove the sugars, then bundled tightly to form a rigid board, perfect for making shipping crates. Comparable to wood in many applications, and recyclable as part of any composite wood recycling scheme, these pressed kenaf board crates have the added feature of being nearly invisible to wood eating pests. Current wood crates and pallets require intensive fumigation in order to be used for shipping into the US and other countries looking to control problems caused by exotic pests like the voracious and destructive Asian Longhorn Beetle.[51]

On the Horizon

As consumer attitudes green, package designers and marketers are looking for new ways of connecting to the consumer. Understanding consumers (and manufacturers) view, that packaging is future trash, is an important step in the greening process. Next will be admitting the products themselves are future trash as well. Slowly gaining a space in the sun, annual crops are not only looking to fill demand previously the exclusive domain of forest product producers, so too are annual crops looking to share shelf space with petroleum based product producers.

We read in the history section the World’s first plastic, cellophane (made from wood and cotton cellulose), used for products like cellophane bags, films and tapes, are already commonly available products. And have been for over a hundred years. Cellulose film used to make these products, though usually made from wood pulp, can be manufactured from any number of fibrous plants, many of which are annual crops.

Only a fraction of the plastics that *can* be recycled are being recycled. Recycling figures for plastics, made from a non renewable resource, irritatingly run far below the levels of paper, a substance we can *replace*. One day this may no longer be a problem.

Developments in bioplastics, using corn or soybeans, are only a few years from commercial production. Targeting packaging applications where clear plastics are currently used (bottled soft drinks for example), early samples have proved to be as attractive, robust, and cost effective to produce as the petroleum based containers they hope to replace. The biggest benefit, bioplastics are compostable. Trash littered by the roadside or left to wash-up on a beach, sitting for generations as fresh as the day they were casually discarded, and entire forests harvested for one time use applications like packaging, may soon be a thing of the past.

Conclusion

Up until a few years ago, getting paperboard and corrugated boards at a competitive price to virgin pulps, was nearly impossible. Today, you have to specially request virgin stocks for many board grades, as converters and their clients have moved decidedly towards recycled stock to take advantage of positive consumer perception, and less altruistically, conform to tougher packaging and wastestream laws.

Opening the opportunity for economic self-sufficiency in developing countries, reducing dependency on crude oil, and easing the strain on the World's forests (which will help reduce global warming) is a tall order. But the future of annual crops to meet our pulp, commercial fiber, and polymer needs is a good one. One whose time has come.

Many people have already taken stock of what their responsibilities are, and what opportunities that new view opens up for them. For some it's as simple as recycling and buying recycled goods, completing the loop. For others it's deciding it's more profitable to be an eco-innovator, banking on the idea that positive consumer perception, though an intangible, is worth more than gold.

When lawmakers, manufacturers and even some consumers say 'Well, I'm not sure, all this talk of global warming and such seems pretty extreme. Things have gone pretty well so far. Let's not rush and change anything', I have to ask "Why not?"

From skyrocketing levels of greenhouse gasses changing eco-systems wholesale, to piles of radioactive waste, to mounds of trash taller than the Great Pyramid of Cheops (Great Pyramid = 450ft; Fresh Kills Landfill on Staten Island = 450ft),[52] even school children can see, we've not been acting in the most responsible manner possible. Why not simply assume *all* of our actions have a major environmental impact and act accordingly. What's the worst thing that could happen? Rushing headlong, blindly making as little impact on the environment as possible, we'd accidentally cause a catastrophic act of irreversible global health? I think we could live with that. Reexamining our use of packaging, and finding ways to, not only clean up our act, but profit as well, is a positive step in the right direction.

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Comprehensive source for currently available tree-free and recycled papers. Includes sections on Marketing, Wastestream Information, Eco-Examples, Government Resources, and much, much more. http://www.indes.net/idnref.html

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