

Consumption and the Sustainability Equation

by
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Introduction

Environmental concerns have led to doubts about whether the full scope of human activity can be sustained over the long term. Growing population and consumption have accentuated these doubts. Consequently, discussion about how human activity might be modified in order to halt or reverse negative impacts on the world's natural systems permeates current environmental literature. The term "sustainability" is often used to describe the topic of such discussion.

While consumption has long been identified as a key determinant of environmental impact, there has been surprisingly little attention focused on consumption per se within western nations. Particularly notable has been the almost total absence of consumption from the discussion agenda in either politics or leading environmental organizations within the world's greatest consuming nation – the United States.

This paper briefly examines U.S. consumption, considers potential mechanisms for reducing consumption on the part of individual consumers, and outlines a variety of ways in which impacts of consumption are being and could be reduced.

Sustainability

Much has been written about the topic of sustainability over the past decade, with a myriad of definitions for the term proposed by various authors. A common thread in much of the discourse regarding sustainability is wording from the groundbreaking 1987 report of the World Commission on Environment and Development (the Brundtland Commission); this report defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs."

Simpler language is found in the American Heritage Dictionary which defines *sustain* as "to keep in existence; maintain."

Whether the existence and vitality of the world's natural systems can be maintained in the face of an expanding population and growing consumption is questioned by increasing numbers of people. Discussion of what to do inevitably returns to concepts advanced by the Brundtland Commission and in the 1991 joint report of the World Conservation Union (IUCN), the United Nations Environment Program (UNEP), and the World Wide Fund for Nature (WWF) – *Caring for the Earth. A Strategy for Sustainable Living*.

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Prominent among the recommended actions of both commissions are a reduction of per capita consumption on the part of developed nations and diversion of developing nations from development and consumption patterns followed by the wealthiest of the developed nations.

Consumption

Environmental Impacts of Consumption

Biologists Ehrlich and Holdren spotlighted consumption as a principal driver of environmental impact with publication of the $I = PAT$ formula in 1974. Population, affluence (a proxy for consumption), and technology were identified as the factors that together determine the magnitude of environmental impact. Although the role of technology remains controversial, the IPAT formula struck a chord with those who perceived a growing environmental threat from expanding human activity. Also hitting home domestically was the well publicized finding that an average child born in the United States would consume 30 to 50 times more resources in his or her lifetime and have a similarly greater impact on the global environment than a child born in a developing country (Gore 1993; UNDP 1998). Publicity surrounding the export of toxic waste from the U.S. to developing nations also briefly stirred the public conscience (Lewis and Chepesiuk 1994).

Although attention-getting, the revelation that high consumption is associated with large and adverse environmental impacts must have seemed incongruous to much of the population of the U.S. and other developed nations. Indeed, it is a bit ironic that leading consuming nations are also generally the most environmentally pristine. The U.S. is a prime example of this. Only recently has American society begun to acknowledge that what appears to be an anomaly is, in fact, due in part to the well-established practice of shifting basic industrial activity needed to support U.S. consumption to locations outside the United States based largely on domestic environmental concerns. Pulitzer-prize-winning journalist Tom Knutson of the Sacramento Bee has recently spotlighted the large and growing international environmental impact of U.S. consumption with the recent series *California – the State of Denial* (Knutson 2003).

Reducing Consumption

Should Society Reduce Consumption?

Consumption within some of the developing nations is rising rapidly. China is a prime example of such a nation. There, GDP has risen at an average annual rate of 8 to 9 percent over the past decade (compared to 2 to 3 percent in the developed nations) and consumption of a wide array of goods is rising accordingly. This pattern is not likely to change any time soon and chances of government action to slow consumption growth within China are zero or less. A similar situation exists in other developing nations

where populations are just beginning to experience improvements in living standards after generations of near subsistence living. In short, consumption is rising rather than falling in most of the developing nations, and absent a global economic collapse this is not likely to change.

In spite of realities vis-à-vis the developing countries, it is worth considering whether developed countries – where approximately 20 percent of the world's population account for 86 percent of private consumption globally (UNFPA 2001) – should reduce their consumption or assume greater responsibility for their own consumption. Should the U.S. in particular seek to reduce its consumption and/or take actions to supply a greater portion of basic resource needs? What makes sense in this regard from an environmental perspective; from an ethical perspective; from an economic perspective?

With regard to questions about whether developed nations should reduce consumption, a provocative examination of consumption in the context of the writings of Aldo Leopold provides food for thought (MacCleery 2000). MacCleery critically examines U.S. environmental policy and suggests that a land ethic without an accompanying consumption ethic lacks a moral foundation. The authors of the UNEP publication *Global Environmental Outlook – 2000* take a strong position on developed nation consumption; UNEP called for a tenfold reduction in resource consumption in the industrialized countries, arguing that this was necessary if adequate resources were to be released to supply the needs of the developing countries (Clarke 2000). This is not, however, a perspective that is universally shared. Within the United States, for example, participation in international trade is widely viewed as the most effective means through which developing countries can improve their economies and living standards (Anonymous 2003, Bush 2002, Koretz 2001). The prevailing view is that the consumption of developed nations and U.S. consumers provides critically needed markets to enable developing nations to grow economically – the first step in a demographic transition that ultimately focuses more attention on education, public health, and environmental problems. Thus, a healthy U.S. economy, fueled by domestic U.S. consumption, is viewed by many as the engine that is driving global progress on a number of fronts; a reduction in U.S. consumption would, according to this view, negatively impact both the economies and environments of countries around the world. This argument can be extended to consumption of developed countries in general.

So, should developed nations reduce their consumption? It turns out that this is not a question with a clear yes/no answer. Some of the ramifications of reduced consumption are clearly positive:

- A reduction in direct environmental impacts within the U.S. and other developed countries.
- A reduction in direct environmental impacts within current raw material exporting nations.
- Reduced rates of non-renewable resource depletion globally.

- Reduced global competition for raw materials.
- Reduced balance of payments deficits within the U.S. and other developed nations

However, assuming that the demographic transition remains a valid concept today, reduced domestic consumption on the part of the U.S. and other developed countries would likely include negative environmental impacts as well:

- Reduced monetary flows to developing countries from developed countries (and thus a loss of employment within the developing countries).
- Slower progress toward industrialization within developing countries.
- Reduced attention in developing countries to public health, education, environment and other factors stemming from loss of international trade and associated income.
- Slowing of the rate of population growth reduction within developing countries.
- Moderate to severe economic repercussions within the developed countries (with resulting negative environmental impacts within the developed countries).

How Might Society Reduce Consumption?

General Observations

The factors listed above notwithstanding, how might the U.S. or any other nation bring about a reduction in consumption? This topic has been addressed by a number of authors over a period of many years. One recent U.S. initiative to identify ways in which consumption might be reduced domestically was the establishment of a Responsible Consumption Task Force by the former U.S. Forest Service Chief Mike Dombeck. The effort involved people representing environmental and religious groups, forest industry, individual forest landowners, state and federal governments, and universities. What began as a focus on how to reduce consumption of wood quickly became a broader examination of how to reduce consumption in general after it was recognized that focusing on reduced consumption of a single material would almost certainly lead to large and unintended environmental consequences. The final report contains a number of suggestions for approaching the consumption issue including various approaches to promoting voluntary reduction of consumption, encouraging manufacturing process efficiency improvements, taxing consumption, and taking greater responsibility for individual consumption (Strigel and Meine 2001). Several of these approaches are highlighted in the remarks that follow.

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Encouraging Manufacturing Process Efficiency Improvements

It is important to realize that reduced consumption per unit of goods produced is a daily fact of life, inspired by competition and profit motivation within a free economy. In industry after industry, including forest products, the efficiency of raw material use has increased steadily, such that consumption of raw materials per unit of Gross Domestic Product has fallen markedly over the past century and recent decades, as a continuation of a trend that began long before regulatory pressures and governmental mandates. Thus, over time, consumption of raw materials per unit of consumption is trending downward even in the face of high per capita consumption of goods.

In recent years the U.S. government has initiated a number of programs in an attempt to accelerate the rate of process improvement innovation focused on increasing the efficiency of raw material use and reducing the environmental impacts of production. The USDOE/AF&PA Industries of the Future program under the Agenda 2020 initiative is an example of this kind of program (US Dept. of Energy 2003).

Taxing Consumption

It is worth noting that no society has ever voluntarily reduced its standard of living (i.e. its consumption), suggesting that reducing societal consumption per se might be extremely difficult to achieve. One mechanism that could bring about a change in consumer behavior is the consumption tax. Promoted quietly today by some prominent members of the U.S. Congress (Archer 1998, Collins 1997, Schaefer 1996), this tax is favored not for the impact it might have upon consumption, but because it could be used to replace the income tax. For example, it has been calculated that a federal consumption tax of 17 to 30 percent on every sale would allow a total elimination of federal income taxes. It is argued that such a shift would allow elimination of the hated (in some circles) Internal Revenue Service and would promote savings rates in all income brackets. Proponents suggest that across-the-board tax rebates equivalent to the sales tax on the first \$20,000 or so of purchases could be used to allow those in very low income brackets to completely avoid the federal tax burden. Although none of those promoting the consumption tax are pointing to the effect that such a tax might have upon individual consumption the prospects are interesting. In effect implementation of a consumption tax would set up a designer system whereby each taxpayer could determine the level of tax paid simply by modifying his or her behavior: If you think you are paying too much tax you can simply reduce your consumption!

A variation of the consumption tax is a targeted tax implemented on those things that society would like to see less of. A tax might be imposed, for example, on carbon emissions (the often-discussed carbon tax), on use of non-renewable resources, on non-recyclable products, and so on. A carbon tax alone would tend to stimulate development of alternative (non-fossil fuel based) forms of energy, encourage use of more fuel efficient vehicles and development of mass transit systems, increase interest in more energy-efficient and smaller homes, discourage long commutes and associated urban

sprawl, stimulate development of less energy intensive products in general, and greatly reduce national balance of payments deficits.

Whether the consumption tax will ever see the light of day in the U.S. remains to be seen. Ultimately the implementation of any such tax in the U.S. or other democratic countries would, of course, have to be endorsed by the voting public.

Incorporating Consumption into Environmental Planning

Environmental planning in the U.S. very seldom includes any consideration of the reality of consumption or of the accompanying need for raw materials. Consequently, decision after decision is made wholly on the basis of esthetics or biology, with no thought given to possible unintended consequences of such decisions. As a result, environmentally-based decision making in the U.S. has fostered increasing raw material importation along with a transfer of associated environmental impacts as discussed earlier. Two actions of the Clinton/Gore administration provide examples of this kind of decision making: 1) the spotted owl recovery plan, and 2) designation of the Grand Staircase-Escalante National Monument.

Development of the spotted owl recovery plan, a process that is undoubtedly well known to Oregon State University students, is as remarkable for what wasn't considered as for what was. A team of biologists crafted the recovery plan, and not surprisingly a host of questions related to economics and consumption were simply not considered. Among the questions that were not addressed are the following: If harvesting levels within the national forests of the PNW are reduced by 4 billion board feet annually, where might replacement wood come from? Is there any plan in place for reducing U.S. consumption of wood by 4 billion board feet annually? What would be the environmental impact if consumers switched from use of wood to use of steel, aluminum, concrete, and/or plastic? What are the environmental implications of producing 4 billion board feet annually in the likely new producing region? Are there rare or endangered species in the likely new producing region and will they be negatively impacted by increased harvest activity? What are the likely environmental impacts of shipping 4 billion board feet annually from the new producing region to regional and national markets? What are the risks of importing exotic pests as a result of increasing softwood imports? Not only were these questions not addressed, but they weren't even on the table for discussion. How is it possible that what has been described as the most comprehensive environmental planning process in history failed to consider such questions?

Within only several years of plan implementation net softwood imports into the U.S. increased sharply, Brazil replaced the U.S. as the largest supplier of softwood plywood to the European Union, softwood harvests in the U.S. Southeast exceeded harvests for the first time in over six decades, steel gained 4 to 6 percent of the U.S. house framing market (up from 0 in 1990), and net iron and steel imports increased from 9.6 million to 26.3 million tons. Although a direct link between these developments and the spotted

owl recovery plan cannot be proven, it is likely that the initiative played a role in most or all of them.

Without a doubt the solution arrived at by the environmental planning team would have been different had a wider range of backgrounds been reflected in the team and had a wider range of issues been considered. Without a doubt the global environment and the regional economy would have fared better had critical issues in addition to biology been included in deliberations.

The Grand Staircase-Escalante region has attracted the attention of geologists since the late 1940s. A part of the 1.9 million acre area had been found to contain some of the richest mineral deposits ever discovered and plans were being made to establish mining operations over a portion of the land surface. However, groups of environmentalists were following these developments and in 1995 they began soliciting help from the Clinton administration to stop development. President Clinton responded in the fall of 1996 by designating the entire region as a national monument where all commercial activity is prohibited. The designation was hailed as a victory for the environment by many. However, what was hailed as an environmental victory may turn out to be anything but that. Why? Because the area set aside without discussion or debate happened to contain an estimated 62 billion tons of coal, 3 million tons of zirconium/titanium (57%), 2.5 billion tons of phosphorous (1%), and abundant deposits of silver (52%), copper (37%), lead (24%), zinc (71%), gypsum (22%), molybdenum, and gold; numbers in parenthesis are the percent of U.S. domestic consumption supplied by net imports in the year 2000). Mr. Clinton in announcing the national monument declaration made no mention of ongoing massive importation of the minerals involved or of any plan for reducing consumption of these minerals, or of any examination of what the environmental impact might be in the regions that would be instead tapped to obtain the needed minerals. Again, planning that included serious consideration of consumption issues would undoubtedly have led to a different, and better, solution.

To ensure that such planning takes place in the future changes are needed in the way that land areas are designated as parks, preserves, reserves, and other set-aside areas. Similar to the environmental impact statement that today is required of firms seeking permission for expansion of commercial activity, any proposal for land redesignation should include a comprehensive evaluation of the probable impact of such a redesignation on regional and global raw materials flows as well as associated global environmental impacts.

Taking Greater Responsibility for Consumption

As noted earlier, there is growing evidence that consumption within the U.S. and other developed countries is causing major negative environmental impacts all over the globe. Impacts are traceable not only to raw material extraction and to basic processing of these raw materials, but to waste disposal as well. Consider for a moment the 1986 saga of the *Khian Sea*, a vessel that sailed from Philadelphia with a load of 13,000 tons of toxic incinerator ash bound for Haiti. After the government there denied permission to offload,

the vessel sailed (minus 3,000 tons of ash that was left on the Haitian beach) for 27 months in search of a country that would accept its cargo. Ultimately the ship docked in Shanghai absent its unwanted cargo; it was never determined where the waste wound up (Lewis and Chepesiuk 1994). This incident focused attention on the common practice of hazardous waste export from developed to developing countries, a practice that continues today (Markoff 2002). Several years after the Khian Sea incident, Lawrence Summers, then the chief economist of the World Bank, argued in an internal memo that international trade of toxic wastes was a good thing since it provided a mechanism for removal of unwanted wastes from countries with high environmental standards and provided countries with low wages and low population densities with jobs and income. He noted, moreover, that low income countries tended to place a low economic value on human life and health and thus possessed a higher tolerance for environmental hazard. When the leaked memo was published in the Economist magazine in 1992, a firestorm of negative public opinion resulted in the U.S. and globally and such thinking was abandoned (at least publicly).

But if such thinking as espoused by Mr. Summers is clearly unacceptable, then what about massive importation of raw materials that result in jobs and income to other countries but also substantial long or short-term environmental degradation and perhaps significant resource depletion within those countries? These kinds of arrangements appear to be far less controversial than exporting of garbage or hazardous wastes as evidenced by the fact that they are made on a daily basis with virtually no reaction or even notice on the part of citizens or governments of importing countries.

In view of the global negative environmental impacts of high consumption in the U.S. and other developed countries and recognizing that much of the impact is traceable to raw material importation it is worth considering whether developed countries should accept more of the responsibility for their own consumption. Again there are positive and negative aspects to such a change, but in this case there is less justification for arguing that developed countries should not change behavior in this regard.

Were the U.S. and other developed countries to take greater responsibility for their domestic consumption (i.e. were they to obtain a greater portion of their raw materials domestically rather than as imports) impacts might include:

- Reduced environmental impact and resource depletion in nations outside the U.S. and other developed nations.
- Increased environmental impact and resource depletion within U.S. borders and the borders of other developed nations.
- Increased awareness of environmental impacts of high consumption on the part of residents of the U.S. and other developed nations.
- Greater attention to consumption issues and impact-reducing strategies on the part of developing nations.

- Reduction of balance of payments deficits (assuming no increase in cost of goods for export).
- Reversal of downward trend in domestic jobs related to basic industries.

Again it can be argued that reduced procurement of raw materials within developing nations would tend to reduce transfer payments to those nations, with negative implications regarding demographic transition issues. However, it is difficult to convincingly argue that raw material importation and basic processing of raw materials is part of a strategy to assist developing nations grow economically since a potentially more effective and far less invasive policy would be to focus on a transfer of clean industry and service jobs to the developing nations.

An important aspect of greater domestic extraction and processing of raw materials would be heightened awareness on the part of U.S. and developed nation residents of environmental impacts of high consumption. In my view, as long as impacts of consumption remain out of sight and out of mind it is highly unlikely that any groundswell of public opinion against unrestrained consumption will develop. Conversely, if the public is forced to deal to a greater extent than currently with issues related to resource extraction, processing, and waste disposal, then it is far more likely that serious discussion about consumption will reach the public and political agenda.

Changing How Society Consumes

Use Product Labels

Aside from the quantity of goods consumed and the source of raw materials used to support that consumption, how society consumes and makes consumption decisions are important determinants of the impacts of consumption. For instance, consumers who pay attention to environmental attributes of product alternatives and who systematically select those products having the lowest environmental burden can reduce the impacts of consumption while helping to send market signals that over time can result in a greater selection of low impact products. For such consumers it is important that readily available, credible, accurate, easy-to-understand, and up-to-date information be available regarding environmental attributes of consumer goods.

The information needs as outlined above provide an indication of the role of environmentally-oriented product labels. Such labels are used today on a wide range of products to convey information about single product attributes (lawnmower noise rating, vehicle mileage estimates, appliance energy efficiency ratings, recyclability symbol), raw material sources (recycled content paper, certified wood products, organically grown vegetables, free-range chickens), or manufacturing process information (chlorine-free, BST-free, fair trade, care and fair). Not yet in common use in any country are labels that reflect information pertaining to a wide range of attributes over the full life cycle of a

product. As explained below, such a labeling program may be assist North American consumers within the relatively near future.

Make Process Performance Information Available

Any manufacturer who is motivated to minimize the environmental impacts of his or her product or manufacturing process needs tools that allow identification of the various environmental burdens associated with product manufacture, use, and disposal, and rapid, cost effective evaluation of changes in product or process design. Reliable and readily available industry-wide benchmarking data is also needed. Today, information about environmental burdens is largely obtained through process monitoring driven by environmental compliance requirements. Such information is mostly gathered by individual firms, by regulators and consultants who collect and maintain general emissions statistics pertaining to a particular manufacturing sector, and by university, government, or independent research organizations. As in the case of consumer product information there is today no readily accessible source of industry-wide information within the United States regarding environmental burdens that is based on systematic assessment of a wide range of attributes over the life cycle of a product; such information is currently available through government or quasi-government sources in Canada and several European Countries, and to a few progressive U.S. firms that have developed internal expertise in life cycle inventory and/or broader-scope life cycle analysis techniques. A new program initiative of the U.S. government, the U.S. Database Project (described in the following section), will provide a wealth of information that can be used to improve environmental performance.

Apply Life Cycle Analysis More Broadly

General Observations

Developed in Europe in the early 1970s, life cycle analysis (LCA) is an accounting system for tracking flows of raw materials (including energy), products and co-products, and emissions and wastes through the life of a product and for assessing the environmental impacts of these flows. A central part of a life cycle analysis is the life cycle inventory (LCI) that involves accounting for all measurable flows associated with a product or process. An LCI is conducted after defining a system boundary that may encompass all phases of a product's life from raw material extraction, through product manufacturing, use, maintenance, and disposal, or may be restricted to a smaller subset of the product life cycle. The analysis phase of a life cycle inventory builds upon the life cycle inventory and seeks to assign values to factors that are not precisely measurable such as impacts on human health, landscapes, flora, fauna, and air and water quality.

Interest in the use of life cycle analysis techniques has grown substantially in recent decades, with involvement today by the research community in a number of countries, by a few groups working within environmentally-oriented regulatory branches of

governments, and by practitioners working mostly within the larger, most progressive industrial firms of the developed countries. As the field has grown and attracted interest from greater numbers, the tools of LCA have become more sophisticated. Currently a number of international protocols are in place governing how an LCA is conducted and results are reported.

The LCA is useful in systematically identifying environmental burdens associated with a product or process; in evaluating the probable impacts of a change in product or process design, product durability, or product life; in informing designers, architects, engineers, and others who specify materials used in construction and other applications and who have interest in minimizing environmental impacts; and in gauging the potential impacts of government policies such as those that favor or disfavor certain products or materials in government purchasing or in government-financed projects.

CORRIM

A current research effort within North America that is focused on LCI is that of the Consortium for Research on Renewable Industrial Materials (CORRIM), a research entity involving ten universities, the U.S. Forest Products Laboratory, FORINTEK – the forest products laboratory of Canada, and APA-the Engineered Wood Association as well as a number of cooperators including the Athena Sustainable Materials Institute (Bowyer et.al 2001). Oregon State University is a prominent player within CORRIM.

CORRIM is focused on development of LCI data for a wide range of wood-based products manufactured in various regions of the U.S. that are used in the construction of residential homes. The primary intent is to develop information that can be used by the U.S. wood products industry to improve environmental performance. The research is also comparing impacts associated with the use of construction materials made of steel, aluminum, concrete, plastics, and emerging composites.

The findings of CORRIM, as well as those of other research groups around the world, show that the choice of materials used in product manufacture or building construction has a major influence on the level of environmental impact. The use of renewable materials such as wood generally results in substantially lower environmental impacts than when using non-renewable materials such as steel, aluminum, concrete, or plastics.

LCA-Based Product Labels

Data from CORRIM will be used as one part of an emerging U.S. LCI database under development by the Environmental Protection Agency and the National Renewable Energy Laboratory of the Department of Energy. Termed the U.S. Database Project, the intent is to provide readily accessible, transparent, continually updated benchmark data across a broad spectrum of U.S. industry that will promote and allow substantial environmental performance improvement, and perhaps provide the foundation for a

national product labeling program focused on environmental attributes of products. Development of an LCA-based product labeling program would be significant in that none of the product labeling programs used in the world today are subject to the rigorous scientific standards or comprehensiveness of LCA. Tomorrow's consumer is likely to have much more information than is available today on which to make informed purchasing decisions. The availability of such information should focus attention of producers and consumers alike on reducing the environmental impacts of consumption.

Summary

Consumption on the part of residents of the world's developed countries far exceeds the combined consumption of all of the developing countries that account for 80 percent of world population. Moreover, the high consumption of developed countries is increasingly linked to substantial and negative environmental impacts outside of the borders of these countries. With consumption now rising rapidly within many of the developing countries, increasing numbers of people are questioning whether unrestrained consumption will allow the existence and vitality of the world's natural systems to be sustained over the long term.

While some are calling for a reduction of consumption within developed nations, others point to the positive impact of such consumption on the economies of developing countries and related, though indirect, positive impacts on human health, education, and environmental quality in these countries. Whether the influence of high consumption is on balance positive or otherwise, it is clear that environmental impacts linked to consumption on the part of developed nations are inequitably distributed around the globe. The developed nations, including the United States, are ethically obliged to take steps to accept greater responsibility for the impacts of their consumption; such action would likely bring greater attention to the environmental impacts of consumption to citizens of developed nations and stimulate efforts to reduce the level of consumption and/or the negative impacts of it.

Approaches that might be used to reduce the level or the environmental impact of consumption include implementation of broad-based or targeted consumption taxes, using governmental incentives to accelerate efficiency of materials use, ensuring that consumption and raw materials needs issues are incorporated into environmental planning processes at every level, halting the practice of shifting environmental impacts of production and consumption to other regions and other countries, requiring that processes for redesignating land use classifications be more rigorous, and providing a means for environmentally concerned citizens to make informed choices in purchasing.

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