



“Summary of article by Frank Ackerman: Material Use and Sustainable Affluence” in Frontier Issues in Economic Thought, Volume 6: A Survey of Sustainable Development. Island Press: Washington DC, 2001. pp. 202-205

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What would sustainable patterns of material use look like? Will those who live in a sustainable future society feel affluent, or will they be constantly struggling to conserve resources? What is the role of the present-day practice of recycling in creating a sustainable future? These and related questions are the subject of the chapter summarized here, the conclusion to a recent book on the economic and environmental meaning of recycling.

Play It Again, and Again

A sustainable economy must include patterns of production and consumption which can be repeated, generation after generation, without cumulative or worsening environmental damage. Current consumption patterns in the developed countries rely heavily on nonrenewable resources, particularly fossil fuels and metals. Worldwide demands for these resources will intensify as incomes rise in developing countries. While exhaustion of nonrenewable resources is not a short-run problem, it is inescapable in the long run. No nonrenewable resource can be used forever; even the best recycling systems never recover 100% of any material, due to losses in collection and processing.

Therefore, the post-oil, post-metal world of the future will have to rely on the renewable products of the land: wood, plant and animal fibers, paper – and plant-based plastics. The first plastics were made from plants; celluloid was based on cellulose, derived from cotton. In general, the hydrocarbon chemicals found in plants are similar to those found in fossil fuels, the current feedstock for plastic production. The vast and growing technological sophistication of the modern plastics industry could, in theory, be redirected to making the same materials from plants on a sustainable basis.

Let a Hundred Fibers Bloom

Although it is technologically possible to rebuild the material world with plant-based products, there is no guarantee that it is economically possible. The use of land to grow industrial materials will be in competition with production of food and fuel, expansion of areas of human settlement, and the desire for recreational and wilderness land. Will there be enough land and other resources to provide a comfortable material existence for all? The answer depends on three factors: the volume of total consumption; the productivity of agriculture and industry; and the rate of recycling and recovery of used materials.

The first factor, total consumption, depends on both population and per capita consumption. Demographic forecasts suggest that the world's population may level off during the twenty-first century. While per capita consumption is still growing, it is difficult to imagine this continuing indefinitely. Sustainability clearly requires that both population and per capita consumption of materials eventually be stabilize.

The second factor, the productivity of resource use, has been an area of rapid innovation. New technologies will be required to develop a sustainable plant-based economy, often regionally differentiated to make optimum use of successful local crops. China's extensive production of paper from non-wood fibers and Brazil's production of ethanol fuel from sugar cane illustrate the potential for innovative plant-based industry (although neither example is free of problems). The ongoing tendency toward "dematerialization," i.e. reduction of the material required to create a product or end-use service, holds out hope for achieving sustainability with fixed resource inputs.

The third factor, recycling of used materials, plays an essential role in stretching our finite resource base. Recycling of metals, a mature technology, conserves energy and increases the time available for the transition to an all-renewable economy. Recycling of paper, though widespread, has ample room for improvement; and recycling of plastics remains quite limited and technologically underdeveloped. Further progress in this area will greatly ease the transition to sustainability.

Affluence, Abundance, and Scarcity

In the short run, however, low and declining prices for energy and materials are taken by many free-market advocates as signs of abundance. New resource discoveries and improvements in extractive technologies are said to be increasing the availability of materials, ushering in a new era of unprecedented affluence. This is not entirely wrong as a description of the past, but there is no reason to think that it can continue indefinitely. Eventually, all the available resources will be discovered, and extraction of the remaining ores and fuels will become more and more expensive.

However unsustainable, the image of free-market abundance is an alluring one. It poses a crucial question: will a sustainable society feel affluent, or will there be constant pressure to scrimp and struggle to conserve materials? When materials are expensive and labor is cheap, market forces push people into undesirable roles such as landfill scavenging. A less extreme but still troubling image is the painstaking recovery, repair and reuse of ordinary material goods that consumed so much of the effort of nineteenth-century American housewives.

In contrast, affluence consists in large part of being able to act as though materials are cheap. The time required for the average urban worker to earn the price of several common materials is less than one-tenth of what it was in the 1830s. Economic theory might suggest that the failure to recycle is a natural response to the current relative prices of materials and labor. If and when materials become scarce again, greater levels of recycling and conservation will become cost-effective, and will be implemented by market forces.

What's Wrong With This Picture?

From this perspective, contemporary recycling is an anomaly. Modern recycling programs are designed for people in a hurry who believe their own time is scarce. Yet despite the hurry, they evidently believe that materials are scarce as well. People who recycle are acting as if materials (or landfill space) were expensive, despite the absence of market signals telling them to do so. The commitment to recycling is not confined to small numbers of activists and advocates; rather, recycling is one of the most widespread and popular environmental initiatives.

Is there a role for this anomalous institution? Does recycling materials “before we have to” play a part in moving toward sustainability? There are two quite distinct answers, one involving technology and the other involving human behavior and motivation.

The celebration of free-market material abundance rests on simple economic theories in which there is no need to worry about choice of technologies: price signals automatically guide producers toward use of the most efficient techniques. However, in reality many industries experience increasing returns to scale and learning-curve effects, meaning that the more that a technology is used, the more efficient its users become.

The result is the phenomenon of “path dependence.” An initial head start for one technology may lead to snowballing advantages of accumulated engineering knowledge, production skills, and consumer acceptance. The choice of technologies, therefore, is not made automatically by the market, but depends on small events that give one or another technology the crucial initial boost.

In this context, recycling pushes industry toward the adoption of technologies to process and use recycled materials. In a path-dependent world, waiting for the market to recognize that materials are scarce runs the risk of allowing further development of virgin material-based technologies. By acting as if materials are more valuable than the market now thinks they are, recycling helps select which learning curves industry will slide down next.

Frugality and Participation

The popularity of recycling also provides a hopeful counter to the standard economic theories of consumer behavior. *Homo economicus*, the acquisitive individualist who inhabits economics texts, would never participate in recycling programs unless given a market incentive. However, contemporary recycling largely cannot be interpreted as a response to market signals; it is, rather, encouraging evidence that people are motivated by social and environmental concerns. A study of one municipal program found that recycling was correlated with desires for frugality and public participation, motivations that have a vital role to play in the creation of a sustainable society.

The practice of recycling pushes us in the right direction, toward the development of the technologies of sustainable material use, and toward the creation of less materialistic, more socially and environmentally engaged ways of living. There is no greater hope in any other direction. Indeed, in the long run there is nowhere else to go. [187]