

Consumption and its Externalities: Where Economy Meets Ecology

Thomas Princen

Environmental Improvement

Analytic and policy approaches to environmental problems can be roughly grouped into two categories. There are those that take current resource use practices as given and look for marginal improvements. And there are those that presume current practices are unsustainable, possibly catastrophic if pursued to their logical conclusions, and look for alternative forms of social organization. Research within the economic strands of social science disciplines such as political science, sociology, and anthropology has been preponderantly in the first category, what might be termed “environmental improvement.” Pollution control, environmental movements, and environmental organizations are common topics.

At the same time that social science has focused on environmental improvement, those who chart biophysical trends say marginal change is not enough. Every time a “state of the environment” report comes out, authors across the ideological spectrum call for a fundamental shift in how humans relate to the natural world. Some call for global citizenship, others for spiritual awakening. But nearly all call for a drastic overhaul of the economic system, a system that is inherently and uncontrollably expansionist, that depends on ever-increasing throughput of material and energy, and that risks life-support systems for humans and other species. Usually, these analysts are not students of human behavior, and the best prescriptions they offer are changes in taxes—classic marginal tinkering.

If the social sciences are going to make a contribution that is commensurate with the severity of biophysical trends, they must do better than analyze environmental improvement measures. Social scientists must develop analytic tools for the analyst (biophysical and social alike) and an effective vocabulary for the policy-maker and activist that allow, indeed encourage, an escape from well-worn prescriptions that result in marginal change at best.

The difficulty in conducting such a transformative research agenda, I submit, lies in two facts. One is the reluctance or inability of social scientists to ground their theorizing in the biophysical, a problem I only touch upon

here.¹ A second is the fact that the economic strands of the various disciplines focus on *production*. Economic sociology concerns itself with issues of labor and management, economic history with the rise of industrialism, economic anthropology with subsistence provisioning, and political economy with the political effects of increasing trade, finance, and development. *Consumption* is nearly invisible. These strands of research adopt the position of the dominant social discipline—economics—and accept consumption as a black box, as simply what people do at the end point of material provisioning, as the reason for all the “real stuff” of economic activity, that is, production. The economy produces goods and goods are good so more goods must be better. There is little reason to investigate consumption, except to estimate demand functions. Consumers, after all, will only purchase what is good for them, and producers, as a result, will only produce what consumers are willing to pay for.

When the prevailing social concern was insufficient production, shortages of food and shelter for a growing population, inadequate investment and risk-taking, this stress on production is understandable.² It is also understandable when natural resource abundance and unending waste sink capacity, at home or abroad, could be safely assumed. But today, such an ecologically “empty world” cannot be reasonably assumed. Humans are stressing ecosystem services and causing irreversible declines around the world, on land and water and in the atmosphere. In addition, the contemporary economic system is stressing societies at the individual, family, community, and national levels. The biophysical and social trends are unsustainable and cannot be corrected through more tinkering, that is, more environmental improvement.

Under these conditions, one must ask if the exclusive focus on production might itself contribute to abuse of resources, to the neglect of serious environmental change, especially change entailing irreversibilities and the diminution of ecosystem services, and to societal stress. One must at least ask if the predilection for *environmental improvement* might obscure, indeed, help drive, serious environmental change and do so by promoting *production*, since enhanced production, however implicit, is the overriding normative goal of the economic strands of the social sciences.

This article is an attempt to point in an alternative direction, what I term the *consumption angle*. The task is straightforward in the initial stages of conceptualizing: reject the production angle, adopt its polar opposite, the consumption angle, and play out its implications. The result is to show how the consumption angle raises questions outside the parameters of the production angle. The first step, however, is to play out the nature of the production angle and its associated “environmental improvement” approach and show how they neglect throughput and irreversibility issues.

1. Economics, curiously enough, is the only discipline that has spawned efforts (albeit well out of the mainstream discipline) at biophysical grounding. See, for example, Georgescu-Roegen 1993; Boulding 1993; and Daly 1993. For attempts within an institutionalist tradition, see Costanza, Low, Ostrom, and Wilson 2001; and Princen 1998.

2. Leach 1993, 510.

Before proceeding, however, it is worth noting that although such initial conceptualization is in many ways quite straightforward, the more operational it becomes the trickier it gets, as will be evident in the hypothetical example at the end of this article. This trickiness, I suspect, is not due so much to the difficulties of constructing an alternative logic—one grounded in the biophysical—as it is to the hegemony of the production angle. When the idea of production as the core of economic activity is pervasive, problems in the economy (e.g., ecosystem decline, community deterioration) are logically construed as production problems, problems to be solved with more or better production. If more, even better, production makes only marginal improvements, if it increases risk or material throughput,³ it only postpones the day of reckoning. Contradictions mount and risks proliferate. The challenge is to push beyond the production angle, to chart an analytic perspective that at once eschews the production orientation and raises difficult questions about excess resource use.

The Production Angle

The coincidence of a production angle on economic matters and an “improvement” perspective on environmental matters is not accidental. When economic activity or, most broadly, humans’ material provisioning, is preponderantly production oriented, then the only logical way to deal with problems of production—e.g., pollution or deforestation—is to “produce better.” If automobiles are polluting, manufacturers produce catalytic converters. If they are consuming too much gasoline, manufacturers produce more efficient engines. If traffic is congested, planners produce more roadway and traffic signals. If suburban growth exceeds population growth, then “smart growth” is pursued. If flooding destroys property, engineers build better levees. If aquifers are being drawn down, agriculturalists sink deeper wells. If a fish stock is being depleted, distributors develop markets for “trash species.” If slash piles left after a logging operation create visual blemishes or a fire hazard, processors make particle board out of the slash.

In all these examples, the operation is “improved,” made more efficient, or the impacts are softened. But the fundamental problem is skirted or displaced in time or space. Pollutants cannot exceed absorptive capacity. Suburban growth is still growth, that is, the conversion of farmland to residential and commercial use while previously used land is left abandoned and degraded. Aquifers are still “mined” unless their extraction rate is below their regeneration rate. Aquatic systems are still disrupted, possibly irreversibly, if one species after another is fished out. And so on.

What is more, the production angle pervades all sectors of modern industrial society, not just the industrial. Consider the position of a major environmental NGO in the US, the Natural Resources Defense Council, with respect to

3. Daly 1996, 253.

gas guzzling, private transportation trends and the National Petroleum Reserve in Alaska:

It is time to ask what kind of energy policy this country really needs. Sport-utility vehicles (SUVs) are getting as little as 12 miles to the gallon. By making small improvements in the fuel economy of SUVs and other light trucks, we could save ten to forty times the estimated oil holdings of the *entire* reserve.⁴

The prevalence of the production angle on economic and environmental issues and the inadequacy of this perspective for dealing with “full world,” ecologically constrained conditions, suggests the need for an alternative perspective. The tack taken here is to develop a perspective centered on production’s apparent flip side, consumption. This perspective maintains the focus on economic issues, that is, on the appropriation of resources for human benefit. To do so, I characterize two approaches. One is to retain the prevailing production-consumption, supply-demand dichotomy where consumption is largely wrapped up in the black box of consumer sovereignty and address consumption with both theoretical and empirical study. Certainly extensive study has been carried out on consumption within microeconomics (consumer theory), marketing and, in recent years, there are growing literatures in sociology, anthropology, and social history.⁵ What has been missing in these lines of work, though, is explicit analysis of the *externalities of consumption*. How do decisions of consumers, individually and collectively, contribute to the displacement of costs in space and time? How do personal lives change as expression, identity, and status shift to purchasing and display? How does the polity change as democracy is increasingly defined as a vote in the market place?⁶ In addition to the neglect of externalities, these literatures have largely ignored the role of power, whether it be the power some actors marshal over consumers or the power, potential or realized, consumers marshal to counter existing practices. Consumption all too often is treated as a passive process, indeed, merely a natural result of “real economics,” namely, production and its variants of growth, investment, trade, and innovation.

The second approach to developing the consumption angle is to flip the production angle entirely around, to stand it on its head and construe all economic activity as “consuming,” as “using up,” as degrading. This approach pushes the analytic gaze to the opposite extreme from that of the prevailing production angle where goods are good and more goods are better. As will be seen, this approach lends itself to an *ecological conception* of economic activity, where consideration of environmental impact is not just an add-on but is integral to the analysis.⁷

4. Adams 1999, 2.

5. Miller 1995, 341; Wilk 1998; and Leach 1993.

6. This neglect of the externalities of consumption does have its exceptions. Within economics, see Daly 1996; and Schor 1998. In anthropology, see the discussion by Rappoport 1994.

7. For an extended critique of the production perspective including that adopted by many environmentalists, as well as an explanation of why pursuing a research agenda on consumption and environment engenders resistance, see Princen 1999.

Consumption as Product Use

Consumption as the necessary complement to production is eating the apple, burning the log, wearing the socks. Research on consumption and its externalities must examine such decisions and influences for their biophysical impacts. A conventional starting point is the decision to purchase. From the prevailing production angle, especially that of retailing, whatever happens after purchase is of little concern unless the consumer's anticipation of subsequent decisions affects the purchase decision. But from an environmental impact perspective, the critical decision is a combination of purchase and product use decisions, where, in some cases, major purchases drive resource use⁸ and, in others, the patterns of use are most important.⁹

Disaggregating the relative impacts of purchase and use decisions is certainly critical to the consumption and environment agenda. But a more extensive approach would be to go beyond product to consider the non-purchase decision. That is, individuals consume to meet needs. Sometimes those needs can only be met with purchased items—say, grain, electric power and high technology equipment. But many other needs can be obtained through productive effort, individually or collectively. Fresh produce can be purchased at a grocery store or grown oneself. Personal transportation can be had by driving to work or walking (or at least walking part way). Community members can raise funds to purchase playground equipment and pay to have it installed or they can collect materials and build it themselves. If one has a need for musical experience, one can buy an album or call a few musician friends over for a jam session. In each of these examples, a priori, one cannot know for sure which activity has the least environmental impact. But an initial and plausible operating assumption is that the commercial, purchased choices are more a part of the current trends—*ever-increasing throughput*.

Little if any research has been done on peoples' choices *not* to purchase or to seek less consumptive, less material-intensive means of satisfying a need. The reason may be obvious: it is very hard to get an analytic or empirical handle on an act that entails not doing something. But my hunch (and it can only be a hunch given the state of knowledge on this kind of question) is that this gap exists in large part because the question is out of, or contrary to, the dominant belief system where value is presumed to inhere in market transactions. A consumption perspective that is more expansive, that recognizes that individuals actually meet their needs with non-commercial or relatively non-material means, makes *the non-purchase decision a critical focus of inquiry*.

Research that retains the consumption-production dichotomy, then, must address product use, not just purchase. What is more, both post-purchase decisions and non-purchase decisions must be included in the analysis. At least two empirical questions arise. One, under what conditions do individuals switch from purchasing a high environmental impact item to a relatively low impact

8. Stern, Dietz, Ruttan, Socolow, and Sweeney 1997.

9. Nordman 1995.

item, when impact is evaluated not just in production but in the use of the product itself? This question might fit existing research programs including that of energy use;¹⁰ household metabolism;¹¹ industrial ecology¹² and market research.¹³ Two, and this may well be the most difficult yet most important question, under what conditions do individuals opt for a *non-commercial or relatively non-material response to meet a need*? Research does exist on intrinsic satisfaction as it relates to conservation behavior,¹⁴ subjective well-being,¹⁵ and work and leisure.¹⁶ Much of this research could be extended to consumption patterns and their environmental impacts.

Conducting such research within the framework of the supply-demand, producer-consumer dichotomy is important, as noted, because production has been the dominant focus not only in economics but also in the economic strands of other disciplines. It may also be the safest research tack, given the hegemony of the economic belief system. Unpacking the demand function for environmental impacts can enrich existing research traditions and inform policy-making, and it can do so without challenging the underlying assumptions of those research traditions. But for those seeking a more transformative approach to environmental problems, an approach that goes beyond “environmental improvement,” the prevailing dichotomy is probably more of a hindrance than an aid. It tends to constrain the analysis to market functioning (and malfunctioning) where “the environment” is merely an externality.

A more radical approach, one that challenges this dichotomy and its propensity to relegate consumption to a black box or to the marginal status of emotion or personal values, is to treat all resource use as consuming and ask what risks are entailed in patterns of resource acquisition, processing, and distribution. This approach is more consistent with the ecological economics perspective where human economic activity is seen as an open subset of a finite and closed biophysical system.¹⁷ Consuming is that part of human activity that “uses up” material, energy, and other valued things.

Consumption as “Using Up”

A definition of consumption that transcends the supply-demand dichotomy would start with biophysical conditions and their intersection with human behavior. That intersection, following from systems theory, has many attributes but ecological feedback is an essential factor: signals from the biophysical system are picked up and reacted to by individuals and groups in the social sys-

10. Cleveland, Costanza, Hall, and Kaufman 1984; and Schipper, 1997.

11. Noorman and Uiterkamp 1998.

12. Keoleian and Menerey 1994; and Graedel and Allenby 1995.

13. Richins 1994; Ahuvia and Wong 1997; and Ger 1997.

14. De Young 1990–1991.

15. Inglehart and Abramson 1994; and Andrews and Withey 1976.

16. Scitovsky 1976/1992; and Schor 1998.

17. Costanza 1991; and Daly and Townsend 1993.

tem.¹⁸ At its most basic and general level, the human behavior that intersects with the biophysical realm can be termed *material provisioning*, that is, the appropriation of material and energy for survival and reproduction.

Material Provisioning

All human activity can be divided among overlapping sets of behavior that includes reproduction, defense, social interaction, identity formation, and material provisioning. Three broad categories of material provisioning are hunting/gathering, cultivating, and manufacturing. The question then is, what aspects of each category of material provisioning are best construed as consumption? Alternatively, what are the insights gained if hunting/gathering, cultivating, and manufacturing are all construed as consumption rather than as production? To answer this requires first a general definition of consumption itself.

Consumption, according to the American Heritage dictionary, is to expend or use up, to degrade or destroy. Thermodynamically, it is to increase entropy. Biologically, it is capturing useable material and energy to enhance survival and reproduction and, ultimately, to pass on one's genes. Socially, it is using up material and energy to enhance personal standing, group identity, and autonomy.

Hunting / Gathering

A defining characteristic of consuming behavior, therefore, is that it is that feature of material provisioning that permanently degrades material and energy and serves some purpose to the individual or to the group. Within hunting/gathering, consumption begins when the deer is shot or the apple is picked and ends when the user has fully expended the material and energy in that deer or apple. It is important to stress that, in hunting/gathering, the consumption act is only the appropriation *of the item* and its ingestion. The one deer and the one apple is permanently degraded, not the deer herd or species and not the apple tree or species. This level of consumption is the most fundamental biologically and, indeed, is integral to all life. When some argue that consumption is "natural," they are right—at this level.

Cultivation

In cultivation, one begins to see both the extension of consumption beyond single items and the external effects of consumption. Consumption in cultivation begins when a forest is cleared or a grassland plowed. It ends when the crop is harvested and the wood burned or the bread eaten. What is expended—used up or degraded—is not just the wood fiber or seed of individual plants. Rather, it is,

18. Kay 1991; Ulanowicz 1997; and Costanza et al. 2001.

first and foremost, the ecosystem that preceded the cultivation and, second, the cultivated plants that no longer function within integrated ecosystems. Cultivation may be conventionally thought of as production, that is, as adding value. But from the consumption angle, a perspective grounded in the biophysical, cultivation is a set of degrading behaviors—clearing, breeding, harvesting, and ingesting. I should note that characterizing cultivation as degrading is not to judge it as wrong. I use “degrade” primarily in the thermodynamic sense of increased entropy, but also in the ecological sense of decreased autonomous functioning over long periods of time. Thus, a cornfield may generate more calories than its grassland predecessor, but it does so only with continuous external inputs. It likely operates at a net energy loss and without the resilience of a less “productive” yet self-organizing system.

This treatment is not meant to suggest that there is no value in cultivation. The consumption angle on cultivation merely directs analytic attention to *degradation* and *irreversibility* in a way that the prevailing perspective—the production angle—does not; or if it does, it does so only as an add-on where value added is the focus and environmental impacts are unfortunate side effects that can be cleaned up if actors have the funds, the interest, and the political will.

Manufacturing

Whereas cultivation involves rearranging extant plants and animals, manufacturing, quite literally, is making things by hand. It is applying human labor and ingenuity to create wholly new substances. Ecologically, it draws on more than the available soil and water and associated ecosystems. In particular, manufacturing extends consumption beyond the direct use of individual organisms and ecosystems to the use of energy sources and waste sinks. Converting a log into lumber and then furniture entails an expenditure of low entropy fuel and the disposal of waste material and heat. From the production angle, this is value added. But from the consumption angle, it is using up secondary resources (energy and waste sink capacities) to amplify and accelerate the use of primary resources (forests, grasslands, fisheries, etc.). Consuming here may entail permanent and unavoidable depletion as with fossil fuels, or a temporary drawdown with the possibility of regeneration as with soil buffering.

Both cultivation and manufacturing risk permanent degeneration in ecosystem functioning. But manufacturing is generally more risky due to the separation of activity from primary resources. High technology and global finance are extreme examples where so-called “wealth creation” is far removed, some would argue completely removed, from a natural resource base. The consumption angle directs attention to the heightened risks of such distanced material provisioning.¹⁹

In sum, an ecologically grounded definition of consumption takes as a starting point human material provisioning and the draw on ecosystem services.

19. Daly and Townsend 1993; Dryzek 1987; and Princen forthcoming.

It is distinguished from those that begin with market behavior and ask what purchasers do in the aggregate and from those that start with social stratification and ask how consumption patterns establish hierarchy or identity. The potential of such an ecological definition is to escape the confines of both limits-to-growth and economic frameworks that tend to prescribe top-down, centralized correctives for errant (i.e., over-consuming) human behavior. An ecological approach to consumption directs attention to ecological risk and the myriad ways clever humans have of displacing the true costs of their material provisioning. The next step in conceptualizing the consumption-environment nexus is to specify what is excessive or maladaptive consumption. In particular, it is to ask how a given act of consumption (e.g., eating the apple, converting the forest, manufacturing the chair) can be interpreted or judged. I start with the broad biophysical context in which consuming behavior can be interpreted as “natural” or “background” and then consider both ecological and social definitions of degradative consumption, what I call “overconsumption” and “misconsumption.”

Excess Consumption: Three Interpretive Layers

A strictly ecological interpretation takes consumption as perfectly “natural.” To survive, all organisms must consume, that is, degrade resources. This interpretation of a given consumption act is *background consumption*. It refers to the normal, biological functioning of all organisms, humans included. Every act of background consumption by an individual alters the environment, the total environmental impact being a function of aggregate consumption of the population. Individuals consume to meet a variety of needs, physical and psychological, both of which contribute to the ability of the individual to survive and reproduce, and hence to its ability to pass on its genes.

From this limited, *asocial*, *nonethical* interpretation of consumption, all consumption patterns and consequences are natural, including population explosions and crashes and irreversibilities caused by the expansion of one species at the expense of other species. If, however, the interpretation is modified to include *human concern* for population crashes, species extinctions, permanent diminution of ecosystem functioning, diminished reproductive and developmental potential of individuals, and other irreversible effects, then “problematic consumption” becomes relevant. Two interpretive layers are *overconsumption* and *misconsumption*.

Overconsumption is that level or quality of consumption that undermines a species’ own life-support system and for which individuals and collectivities have choices in their consuming patterns. Overconsumption is an aggregate level concept. With instances of overconsumption, individual behavior may be perfectly sensible, conforming either to the evolutionary dictates of fitness or to the economically productive dictates of rational decision-making. Collective, social behavior may appear sensible, too, as when increased consumption is needed in an advanced industrial economy to stimulate productive capacity and

compete in international markets. But eventually the collective outcome from overconsuming is catastrophe for the population or the species. From a thermodynamic and ecological perspective, this is the problem of *excessive throughput*.²⁰ The population or species has commanded more of the regenerative capacity of natural resources and more of the assimilative capacity of waste sinks than the relevant ecosystems can support. And it is an *ethical* problem because it inheres only in those populations or species that can reflect on their collective existence. What is more, for humans it becomes a *political* problem when the trends are toward collapse, power differences influence impacts, and those impacts generate conflict.

The second interpretive layer within problematic consumption is *misconsumption*, which concerns individual behavior. The problem here is that the individual consumes in a way that undermines his or her own well-being even if there are no aggregate effects on the population or species. Put differently, the long-term effect of an individual's consumption pattern is either suboptimal or a net loss to that individual. It may or may not, however, undermine collective survival. Such consumption can occur along several dimensions.

Physiologically, humans misconsume when they eat too much in a sitting or over a lifetime or when they become addicted to a drug. The long-term burden overwhelms the immediate gratification. Psychologically, humans misconsume when, for example, they fall into the advertiser's trap of "perpetual dissatisfaction." They purchase an item that provides fleeting satisfaction resulting in yet another purchase. Economically, humans misconsume when they overwork, that is, engage in onerous work beyond what can be compensated with additional income. With more income and less time, they attempt to compensate by using the additional income, which is to say, by consuming.²¹

Ecologically, humans misconsume when an increment of increased resource use harms that resource or related resources and humans who depend on the resource. In the short term, if one builds a house on a steep, erosion-prone slope, the construction itself increases the likelihood of massive erosion and the destruction of one's consumption item, the house. In the longer term, if one uses leaded house paint, one's children or grandchildren are more likely to have developmental problems.

Misconsumption, then, refers to those individual resource-using acts that result in net losses for the individual. They are not "rational" or sensible in any of several senses—psychological, economic, or health-wise. And, once again, they may or may not add up to aggregate, ecological decline. The question that

20. Georgescu-Roegen 1993; Boulding 1993; and Daly 1993.

21. This is not to say that the marginal work effort is generally compensated by the additional income. Compensation takes many forms, both extrinsic (eg., monetary, public recognition) and intrinsic (eg., sense of competence, autonomy, achievement, well-being) and varies from case to case. It is to say, however, that humans occasionally work beyond what can be explained by additional monetary or psychic income. The reasons for this are complex but include a lack of flexible time in the work place. See Schor 1998.

critically defines the consumption and environment research agenda at the individual level is the following: what are the forms of individual misconsumption that lead to collective overconsumption? Put differently, when is overconsumption not simply a problem of excessive throughput—that is, a problem of too many people or too much economic activity—and when is it a question of the inability of individuals to meet their needs in a given social context? When, in other words, do individuals simultaneously wreak harm on themselves *and* on the environment through their consumption patterns?

These questions are important because they point toward potential interventions that make sense at both levels and without requiring evolutionarily novel human behavior such as global citizenship²² or authoritarian command structures.²³ These questions point toward win-win, “no-regrets” policies that simultaneously produce improved human welfare and reduced ecological risk to humans’ life-support system. A critical area of research, therefore, is the intersection of misconsumption and overconsumption where individuals and society together can potentially benefit from improved consumption patterns. This may offer the greatest, and certainly the easiest, opportunities for interventions. But a second area is at least as important, yet more vexing: consumption patterns that involve individually satisfying behavior with net benefits to the individual and, say, to that individual’s kin, yet net harms to others. This is unavoidably a distributional question and, hence, a moral and political issue. Below I explore part of this moral and political dimension by considering how producers must exercise restraint and resistance when demand is overwhelming.

A Simple Application

To suggest how a critique of the production angle and a preliminary ecological conceptualization of a consumption angle may be operationalized in a research and action agenda, imagine a resource is stressed, say, more timber is being harvested in a watershed than the forest ecosystem can regenerate. What is more, the primary reason is demand. Consumers want more of the timber than the ecosystem can bear and they can pay a sufficiently high price or marshal enough coercion to compel high production.²⁴ Imagine further that the forest users—that is, those who decide harvest rates and management techniques—are responding entirely to this demand, managing the forest and choosing harvest rates and practices that best fit that demand. As demand increases, they increase the harvest rate in the short term and, for the longer term, plant, say, fast-growing species. Their entire enterprise is production oriented and demand driven. More demand, expressed either through higher prices or increased orders or

22. Low and Heinen 1993.

23. De Young 1996.

24. This scenario, although highly simplified to make the argument, is not unlike that which occurred in the great cut-overs of North America (Cronon 1991, 148–206) or those that are occurring currently in South America and Southeast Asia (Peluso 1993, 46–70).

both, compels more production. The only question forest users and others ask is how demand can be anticipated and then met. Consequently, the timber owner tries to improve harvesting methods to get more useable logs off each acre and the mill owner tries to improve milling to get more sellable board feet out of each log. Builders and retailers develop new construction methods to get more square feet of building or more pieces of furniture out of a load of lumber. And all step up production with more labor and more hours of operation. To deal with the loss of the forest, government officials and activists might require replanting or mandate a set-aside to preserve a portion of the forest. They might require buffer strips along streams to reduce siltation and beauty strips along roadways to reduce aesthetic loss.

All of these production-oriented measures fall within the realm of “environmental improvement.” For a given level of harvest they generate more useable product or less environmental damage. But the harvest is, indeed, *given*—that is, given by demand, by some combination of human need and desire and agents to supply—or stoke—that demand. And all via a supply of money that exists completely outside of ecological carrying capacity. Such production-oriented measures may be able to accommodate more of the demand or ameliorate the environmental effects. But when demand continues to increase and then exceed supply (in an ecological sense), the real issue regarding overharvesting is, indeed, the demand, not the supply. Better forest management practices, less wood waste, more efficient milling, lower transportation costs, rehabilitation and set-asides will have little effect on the excessiveness of the demand.²⁵ Use of the forest may appear to be a production issue, but when overharvesting is the concern, it is really a consumption issue. For both analytic and behavior change reasons, it should be investigated from the consumption angle.

Before doing so, it is important to point out that the production angle starts with a set of conditions that, in contemporary industrial society, are taken as the baseline, the starting point from which all else progresses. What is more, this baseline is unecological. If policy-makers want to increase employment, the central banker stimulates demand through the money supply and interest rates. Financial signals start in the capital city, work their way through planners, designers, and builders to retailers and processors and, eventually, in this case, to the timber owner, who hires more workers and develops new technologies to cut more trees. The financial stimulus occurs as if ecological constraints are irrelevant. Indeed, the financial signal exists completely independent of signals from the ecosystems that must adjust.

Signals from elsewhere in the commodity chain operate similarly. If members of the wood products industry want to capture market share in rot resistant

25. More efficient use of a tree may appear to be a logical response to increasing demand. Certainly getting more useable wood per tree would, all else being equal, accommodate at least some of the excess demand. But, in general, such an efficiency always makes sense, regardless of demand. The issue raised here is what a producer must do outside of production efficiencies to deal with excess demand and still ensure long-term production from the resource.

timber, say, they convince municipalities to mandate pressure-treated lumber in outdoor applications. What were once trash species become highly marketable and demand rises. Production, once again, increases, and all as if there were no ecological constraint, as if ecosystems were mere *inputs* to the economy, not a *foundation* of the economy.²⁶

The production angle is, thus, inherently unecological. If countervailing biophysical signals happen to work their way from the forest to the timber owner to processors, distributors and retailers (let alone to money supply managers), they are overwhelmed by the presumption of net benefits from more production: producers produce goods, goods are good, more goods are better. Consumers benefit, as revealed by their willingness to pay. (Note how the notion of consumer sovereignty is integral to the production angle.) But as many have argued, economic growth, conventionally defined and measured, can be “uneconomic,” even on its own terms, let alone on ecological terms. It can lead to net harm, especially when ecosystem services, family and community integrity, and future generations are taken into account.²⁷

If the production angle is inherently unecological, if it naturally overwhelms feedback that would otherwise reveal long-term net harm, then the consumption angle, if it has analytic and policy utility, ought to do just the opposite. It should direct analytic attention to what is lost, and to what risks are incurred when, in this example, the harvest rate exceeds the regenerative rate of the forest ecosystem. Following the framework outlined above, I begin the consumption angle within the production-consumption, supply-demand dichotomy then shift to material activity up and down the chain of resource use decisions.

Within the production-consumption dichotomy, the first observation is that the production-oriented measures do not solve the problem of overharvesting. They mitigate the damage or extend the time until the forest is completely cut over. When resource use decisions are largely governed by agents and managers and consumers highly removed from the forest itself, then the problem is not inefficiencies or lack of political will or greed. The problem is not inefficient use of logs and lumber or the political difficulties of creating parks and buffer strips. Indeed, the problem is not the intricacies of meeting ever-increasing demand, satisfying customers, stockholders and workers. Rather, the problem is the demand itself, the array of signals and incentives coming from actors highly distanced from ecological constraint.²⁸

A consumption perspective therefore asks about the *nature of the demand*, what is otherwise forbidden territory in the production angle where consumers

26. Implicit in this hypothetical case is the option that many timber owners have of moving on to another forest or to monocrop plantations to procure supplies. In a frontier economy, one can so “consume” one resource after another without limit. In a sustainable economy, by contrast, one must come to grips with limits at the local and global level. See Princen forthcoming; and Princen 1998.

27. Ayres 1996; Daly 1996; Scitovsky 1976/1992; and Hirsh 1976/1995.

28. Princen forthcoming.

are sovereign. The consumption angle asks whether the increasing demand is simply a matter of a growing population in need, say, of shelter; whether the price paid by buyers reflect full costs, social and ecological (however measured); whether consumption is facilitated, maybe subsidized, by low-cost transportation infrastructure or easy credit;²⁹ whether the benefits of new products are highlighted while the drawbacks are shaded; whether retailers launched a new line of luxury furniture or builders doubled the average house size (yet again). It asks whether consumers have the option to choose less wood intensive means of meeting the same needs. What is more, the consumption angle raises questions of non-purchase. Is some segment of the population foregoing purchase of the product and, if so, is it because of income, availability, information, or alternative means of meeting the same needs? In other words, is non-purchase a meaningful option and, if so, does the increasing demand truly reflect a net social welfare gain, the implicit assumption in the production angle?³⁰

Shifting to consumption as “using up,” a comprehensive analysis would examine each decision node from initial extraction to ultimate use and disposal. Here I focus on processing and initial extraction. From the production angle, a mill owner “produces” lumber from logs. Equally logically, yet from the consumption angle, the mill owner *consumes* logs from the timber owner’s forest. That is, what is used up is a log and its alternative uses. The log is irretrievably converted to one item—lumber—never to be used for veneer or paper or larger dimension lumber.

Applying the same logic to the timber owner and the forest, what are used up, it would appear at first glance, are trees. Each tree cut is irreversibly removed, its ability to photosynthesize and provide habitat for other plants and animals, completely eliminated. But at some rate and extent of harvest, more than single trees’ capacity to put on cellulose is consumed. Each tree constitutes a node in a complex system. As some trees fall to the axe (or to wind or insects), the system, being adaptive and resilient, adjusts. But as more trees fall, a threshold is passed and the integrity of the system is compromised. At this level of harvest, the system itself and all the species it entails and ecosystem services it provides are, indeed, consumed, that is, used up. Efficient production, erosion control and preserves (unless at a system scale) do nothing to alter this ultimate effect of ever-increasing harvest. They may postpone the threshold or soften its impact, but the forest ecosystem is still consumed.

From this analytic perspective, all decision makers along the chain from extraction to end use are “consumers.” As such, they and policy-makers and citizens who condition their choices logically must ask what is “used up,” what services are put at risk, what features of the primary resource, the forest ecosystem (not the trees) are being eliminated. Moreover, to ask these questions is un-

29. For evidence of the role credit plays in creating excess demand for commodities, see Gale 1998, 72–73.

30. Many new technologies create their own dependencies. In the US, the highway system and segregation of residential and retailing areas make it nearly impossible to function without a car.

avoidably to ask about long-term effects. If the ecosystem is degraded, will there always be another? Do the benefits accrued by each actor along the material chain accumulate so as to unambiguously override the risk or loss of the ecosystem (especially if such a judgment is made in an open, well-informed, forum rather than in the market)? Are future generations likely to recognize and accept the value of the trade-off: more human capital (lumber and furniture and their associated technologies) for less natural capital?

These are questions of long-term sustainable resource use, not environmental improvement. They take high integrity ecosystems as given, indeed necessary, not the social organization for resource use and economic expansion that happens to be hegemonic at this historical juncture. But I should stress that these questions derive logically from the consumption angle, not from the arbitrary or ideologically derived positions of those who "value nature" or who profess concern for future generations. These questions come from turning the dominant perspective on its head and asking not what goods are produced (and presuming that all such goods consumed are "good"), but what services, *what forms of social and natural capital, are consumed*. Just as the production angle presumes goods are good and more goods are better, in the consumption angle, *life support systems are presumed fragile and critical irreversibilities possible*. "Cautious consuming" is not only prudent, but rational. In addition, not only do these questions derive logically from the consumption angle, whether emphasizing the demand side or viewing all economic activity as consuming, the perspective itself is at least as logical as the production angle. In fact, although the production angle may be the most logical in an "empty world," frontier economy, in a "full world," in an ecologically constrained economy, the consumption angle can be judged more logical. It does, after all, draw attention to ecosystem functioning as an integral part of the analysis, not as an add-on, not as an "externality," the prevailing approach in the production angle.

Finally, I should add that instances do exist where resource users eschew production-oriented measures. Under some conditions timber owners, fishers, and others will deliberately limit output.³¹ Such measures entail behaviors by producers that tend to be ignored, if not suppressed, when a production perspective is dominant. Two such behaviors that derive logically from the consumption angle are *restraint* and *resistance*.

If forest users have a strong interest in their own long-term economic security and if they depend on the forest, then it is sensible to avoid or modulate demand-driven harvest decisions. When demand is low, these forest users would harvest little and invest little. But they would also shift to different forest uses, from timber harvesting only, say, to hunting and fishing and tourism, as well as to non-forest means of making a living.³² A multiple use approach, therefore, is

31. McGoodwin 1990; Colchester and Lohman 1993; and Alcorn and Toledo 1995.

32. Some evidence does exist that extractors who attempt to maximize their long-term economic security rather than respond to extant demand pursue strategies of diversified production. When either demand or the resource declines, they shift to other pursuits. Fishermen in the

not just good public policy; it makes sense as a survival strategy and as a means of ensuring long-term economic security for the user. If demand were high, they would increase the harvest rates only to a point. Beyond that point, a point determined not by short-term economic opportunity but by a sense of ecological limits, by a risk-averse approach to complex natural systems and to the users' own economic security, they would logically *restrain* their harvests so as not to jeopardize future use and those other uses. What is more, if demand were so intrusive, so overwhelming via temptingly high prices or coercion (force or law), then a second behavior would logically be *resistance*. Users would develop organizational, legal, or, if necessary, coercive means of their own to resist the intrusion, limit their harvest, and thus maintain the resource over the long term.³³

Once again, the problem here may appear to be one of production—i.e., harvest rates. But it is really one of *consumption vis-à-vis* production. The foci of conventional production analysis—issues of investment, management, extraction, pricing, processing, distributing—tend not to ask questions about restraint and resistance among producers. Quite the contrary, the productive enterprise is precisely one of opening markets, lowering prices, gaining efficiencies, and capturing market share—in short, increasing production. It is a process that sees the *addition* of value, not the *subtraction* of value, not the *risks* to multiple uses or to residents' economic security or to the long-term viability of the supporting ecosystem.

In sum, this simple application suggests that a consumption angle on resource use problems—especially problems of ecological overuse—compels examination of decisions among extractors and processors that tend not to get asked from a conventional production perspective. Among these decisions are those associated with the general behaviors of restraint, that is, self-limiting behavior, and of resistance to destructive intrusions. Comparing cases where restraint and resistance are prominent with those in which they are not and applying indices of sustainable practice would be a useful research direction.

Conclusion

By making consumption more visible analytically, certain activities become more prominent. From a production angle, the simple living movement, home

Norwegian Arctic and many independent farmers follow this model (see Jentoft and Kristoffersen 1989; Clunies-Ross and Hildyard 1992; and McGoodwin 1990). To my knowledge, however, no systematic research has been done on such work strategies and their impact on natural resources.

33. Empirical support for restraint does exist, especially in the common property literature (see Bromley 1992; Ostrom 1990; and Acheson and Wilson 1996). Other instances in private property are beginning to develop. See, for example, the cases being developed by the MacArthur Foundation's Sustainable Forestry program. On resistance, see Gadgil and Guha 1992; Peluso 1993; and special sections of *The Ecologist*.

power and local currencies are trivial instances of protest; they are of little political or economic consequence. From a consumption angle, however, they are concrete expressions of concern and resistance and of the sense that too much of what is important in day-to-day life is lost through the lens of ever more production meeting the (presumably) insatiable desires of people as consumers. These three cases not only give meaning to consumption, but they give meaning to economic activity as being more than that which ascribes value only to what is produced and sold in the open market and that assigns people the role of consumer, but not producer and certainly not citizen. If simple living, home power and local currencies are trivial by conventional (read, production) measures, they are not trivial representations of the widespread discontent with consumerist society.

In short, the consumption angle is a means of “rethinking how humans relate to nature.” It is a way to, in effect, wipe the slate clean with respect to how analysts, policy-makers, and citizens understand social organization for resource use. It puts aside, or goes back to the origins of, the neoclassical economic model and asks what model would have been most useful *given* ecological constraint, *given* the lack of unending frontiers and infinite waste sinks, and *given* the inability to find a technical substitute for everything from petroleum to the ozone layer. The consumption angle not only allows for consideration of “full world,” ecologically constrained conditions, but places ecosystem functioning up front and central. It does so by generating questions that ask what is consumed, what is put at risk, what is lost. And it does so without restricting the questions to consumer products or even industrial inputs but by going all the way back up the decision chain to organisms and ecosystems and biogeochemical processes. It also does so by drawing attention to behaviors and movements that otherwise tend to escape those who hold sacrosanct the production angle: restraint and resistance with respect to ever-increasing demand, simple living, home power and local currencies with respect to lifestyle and economic life. Finally, the consumption angle lends itself to explicit assignment of responsibility for excess throughput. This stands in marked contrast to the production angle where actors routinely escape responsibility via distanced commerce and the black box of consumer sovereignty.

References

- Acheson, James M., and James A. Wilson. 1996. Order out of Chaos: The Case of Parametric Fisheries Management. *American Anthropologist* 98: 579–594.
- Adams, John H. 1999. Oilgate in the Arctic: Message from the President. *Amicus* 20: 2.
- Ahuvia, Aaron, and N. Wong. 1997. Three Types of Materialism: Their Relationship and Origin. Paper, University of Michigan Business School, Ann Arbor, Michigan, 1–20.
- Alcorn, J. B., and V.M. Toledo. 1995. The Role of Tenurial Shells in Ecological Sustainability: Property Rights and Natural Resource Management in Mexico. In *Property Rights in a Social and Ecological Context: Case Studies and Design Applications*,

- edited by Susan Hanna and Mohan Munasinghe, 123–140. Washington, DC: Beijer International Institute of Ecological Economics and the World Bank.
- Andrews, F.M., and S.B. Withey. 1976. *Social Indicators of Well-Being: American Perceptions of Life Quality*. New York: Plenum.
- Ayres, Robert U. 1996. Limits to the Growth Paradigm. *Ecological Economics* 19:117–134.
- Boulding, Kenneth E. 1993. The Economics of the Coming Spaceship Earth. In *Valuing the Earth: Economics, Ecology, Ethics*, edited by Herman E. Daly and Kenneth N. Townsend, 297–310. Cambridge, MA: MIT Press.
- Bromley, Daniel W., ed. 1992. *Making the Commons Work: Theory, Practice, and Policy*. San Francisco, Calif: Institute for Contemporary Studies Press.
- Cleveland, Cutler J., Robert Costanza, Charles A.S. Hall, and R. Kaufman. 1984. Energy and the U.S. Economy: A Biophysical Perspective. *Science* 225: 890–897.
- Clunies-Ross, T., and N. Hildyard. 1992. The Politics of Industrial Agriculture. *The Ecologist* 22: 65–71.
- Colchester, Marcus, and Larry Lohman, eds. 1993. *The Struggle for Land and the Fate of the Forests*. London: Zed Books.
- Costanza, Robert, ed. 1991. *Ecological Economics: The Science and Management of Sustainability*. New York: Columbia University Press.
- Costanza, Robert, Bobbi S. Low, Elinor Ostrom, and James Wilson, eds. 2001. *Institutions, Ecosystems, and Sustainability*. Boca Raton, FL: Lewis Publishers.
- Cronon, William. 1991. *Nature's Metropolis: Chicago and the Great West*. New York: Norton.
- Daly, Herman E. 1993. The Steady-State Economy. In *Valuing the Earth: Economics, Ecology, Ethics*, edited by Herman E. Daly and Kenneth N. Townsend, 325–364. Cambridge, MA: MIT Press.
- _____. 1996. *Beyond Growth: The Economics of Sustainable Development*. Boston: Beacon Press.
- Daly, Herman E., and Kenneth N. Townsend, eds. 1993. *Valuing the Earth: Economics, Ecology, Ethics*. Cambridge, MA: MIT Press.
- De Young, Raymond. 1990–1991. Some Psychological Aspects of Living Lightly: Desired Lifestyle Patterns and Conservation Behavior. *Journal of Environment Systems* 20: 215–227.
- _____. 1996. Some Psychological Aspects of a Reduced Consumption Lifestyle: The Role of Intrinsic Satisfaction and Competence. *Environment and Behavior* 28: 358–409.
- Dryzek, John S. 1987. *Rational Ecology: Environment and Political Economy*. New York: Basil Blackwell.
- Gadgil, Madhav, and Ramachandra Guha. 1992. *This Fissured Land: An Ecological History of India*. Berkeley, CA: University of California Press.
- Gale, Fred P. 1998. *The Tropical Timber Trade Regime*. New York: Palgrave.
- Georgescu-Roegen, Nicholas. 1993. Selections from “Energy and Economic Myths.” In *Valuing the Earth: Economics, Ecology, Ethics*, edited by Herman E. Daly and Kenneth N. Townsend, 89–112. Cambridge, MA: MIT Press.
- Ger, Guliz. 1997. Human Development and Humane Consumption: Well-Being Beyond the Good Life. *Journal of Public Policy and Marketing* 16: 110–125.
- Graedel, T.E., and B.R. Allenby. 1995. *Industrial Ecology*. Englewood Cliffs, NJ: Prentice-Hall.
- Hirsh, Fred. 1976/1995. *Social Limits to Growth*. Cambridge, MA: Harvard University Press.

- Inglehart, Ronald, and P.R. Abramson. 1994. Economic Security and Value Change. *American Political Science Review* 88: 336–354.
- Jentoft, S., and T. Kristoffersen. 1989. Fishermen's Co-management: The Case of the Lofoten Fishery. *Human Organization* 48: 355–365.
- Kay, James J. 1991. A Nonequilibrium Thermodynamic Framework for Discussing Ecosystem Integrity. *Environmental Management* 15: 483–495.
- Keoleian, Greg A., and D. Menerey. 1994. Sustainable Development by Design: Review of Life Cycle Design and Related Approaches. *Air and Waste* 44: 645–668.
- Leach, Robert. 1993. *Land of Desire: Merchants, Power, and the Rise of a New American Culture*. New York: Pantheon Books.
- Low, Bobbi S., and Joel T. Heinen. 1993. Population, Resources, and Environment: Implications of Human Behavioral Ecology for Conservation. *Population and Environment* 15: 7–41.
- McGoodwin, James R. 1990. *Crisis in the World's Fisheries: People, Problems, and Policies*. Stanford, CA: Stanford University Press.
- Miller, Daniel, ed. 1995. *Acknowledging Consumption: A Review of New Studies*. London: Routledge.
- Noorman, K.J., and T.S. Uiterkamp, eds. 1998. *Green Households? Domestic Consumers, Environment, and Sustainability*. London: Earthscan Publications.
- Nordman, Bruce. 1995. Celebrating Consumption. Paper, Lawrence Berkeley Laboratory, 90–4000, Berkeley, CA.
- Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge MA: Cambridge University Press.
- Peluso, Nancy. 1993. Coercing Conservation: The Politics of State Resource Control. In *The State and Social Power in Global Environmental Politics*, edited by Ronnie Lipshcutz and Ken Conca, 46–70. New York: Columbia University Press.
- Princen, Thomas. 1998. From Property Regime to International Regime: An Ecosystem Perspective. *Global Governance* 4: 395–413.
- _____. 1999. Consumption and Environment: Some Conceptual Issues. *Ecological Economics* 31: 347–363.
- _____. Forthcoming. Shading and Distancing: Consumption and the Severing of Feedback. In *Confronting Consumption*, edited by Thomas Princen, Michael Maniates and Ken Conca.
- Rappoport, Roy. 1994. Disorders of our Own: A Conclusion. In *Diagnosing America: Anthropology and Public Engagement*, edited by Shepard Forman, 235–294. Ann Arbor, Michigan: University of Michigan Press.
- Richins, Marsha L. 1994. Valuing Things: The Public and Private Meanings of Possessions. *Journal of Consumer Research* 21: 504–521.
- Schipper, L.J. 1997. Carbon Emissions from Travel in the OECD countries. In *Environmentally Significant Consumption: Research Directions*, edited by Paul C. Stern, Thomas Dietz and Vernon W. Ruttan, 50–62. Washington, D.C.: National Academy Press.
- Schor, Juliet. 1991. *The Overworked American: The Unexpected Decline of Leisure*. New York: Basic Books.
- _____. 1998. A New Economic Critique of Consumer Society. In *Ethics of Consumption: The Good Life, Justice, and Global Stewardship*, edited by David A. Crocker and Toby Linden, 131–138. Lanham, Maryland: Rowman & Littlefield Publishers.
- Scitovsky, Tibor. 1976/1992. *The Joyless Economy: The Psychology of Human Satisfaction*. Oxford: Oxford University Press.

- Stern, Paul C., Thomas Dietz, Vernon W. Ruttan, Robert Socolow, and J. Sweeney, eds. 1997. *Environmentally Significant Consumption: Research Directions*. Washington, D.C.: National Academy Press.
- Ulanowicz, Robert E. 1997. *Ecology: The Ascendent Perspective*. New York: Columbia University Press.
- Wilk, Richard. 1998. Emulation, Imitation, and Global Consumerism. *Organization and Environment* 11: 314–333.