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# HOW MUCH IS ENOUGH?

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*The Consumer Society  
and the Future of the Earth*

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*The Worldwatch Environmental Alert Series  
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## The Environmental Costs of Consumption

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Economists use the word consume to mean “utilize economic goods,” but the *Shorter Oxford Dictionary*’s definition is more appropriate to ecologists: “To make away with or destroy; to waste or squander; to use up.” The economies that cater to the global consumer society are responsible for the lion’s share of the damage that humans have inflicted on common global resources.<sup>1</sup>

The consumer class’s use of fossil fuels, for example, causes an estimated two thirds of the emissions of carbon dioxide from this source. (Carbon dioxide is the principal greenhouse gas.) The poor typically are responsible for the release of a tenth of a ton of carbon apiece each year through burning fossil fuels; the middle-income class, half a ton; and the consumers, 3.5 tons. In the extreme case, the richest tenth of Americans

pump 11 tons into the atmosphere annually.<sup>2</sup>

Parallel class-by-class evidence for other ecological hazards is hard to come by, but comparing industrial countries, home to most of the consumers, with developing countries, home to most of the middle-income and poor, gives a sense of the orders of magnitude. Industrial countries, with one fourth of the globe's people, consume 40-86 percent of the earth's various natural resources. (See Table 4-1.)<sup>3</sup>

From the crust of the earth, we take minerals; from the forests, timber; from the farms, grain and meat; from the oceans, fish; and from the rivers, lakes, and aquifers,

TABLE 4-1. *Consumption of Selected Goods, Industrial and Developing Countries, Late Eighties*

Good	Industrial Countries' Share of World Consumption	Consumption Gap Between Industrial and Developing Countries
	(percent)	(ratio of per capita consumption rates)
Aluminum	86	19
Chemicals	86	18
Paper	81	14
Iron and steel	80	13
Timber	76	10
Energy	75	10
Meat	61	6
Fertilizers	60	5
Cement	52	3
Fish	49	3
Grain	48	3
Fresh water	42	3

SOURCE: See endnote 3.

fresh water. The average resident of an industrial country consumes 3 times as much fresh water, 10 times as much energy, and 19 times as much aluminum as someone in a developing country. The ecological impacts of our consumption even reach into the local environments of the poor. Our appetite for wood and minerals, for example, motivates the road builders who open tropical rain forests to poor settlers, resulting in the slash-and-burn forest clearing that is condemning countless species to extinction.

High consumption translates into huge impacts. In industrial countries, the fuels burned release perhaps three fourths of the sulfur and nitrogen oxides that cause acid rain. Industrial countries' factories generate most of the world's hazardous chemical wastes. Their military facilities have built more than 99 percent of the world's nuclear warheads. Their atomic power plants have generated more than 96 percent of the world's radioactive waste. And their air conditioners, aerosol sprays, and factories release almost 90 percent of the chlorofluorocarbons that destroy the earth's protective ozone layer.<sup>4</sup>

As people climb from the middle-income to the consumer class, their impact on the environment makes a quantum leap—not so much because they consume more of the same things but because they consume different things. For example, South African blacks, most of them in the middle-income class, spend their limited budgets largely on basic food and clothing, things that are produced with relatively little damage to the environment. Meanwhile, South Africa's consumer-class whites spend most of their larger budgets on housing, electricity, fuel, and transportation—all more damaging to the environment.<sup>5</sup>

Jyoti Parikh and his colleagues at the Indira Gandhi

Institute for Development Research in Bombay used U.N. data to compare consumption patterns in more than 100 countries. Ranking them by gross national product per person, they noticed that as income rises, consumption of ecologically less damaging products such as grains rises slowly. In contrast, purchases of cars, gasoline, iron, steel, coal, and electricity, all ecologically more damaging to produce, multiply rapidly.<sup>6</sup>

The furnishings of our consumer life-style—things like automobiles, throwaway goods and packaging, a high-fat diet, and air conditioning—can only be provided at great environmental cost. Our way of life depends on enormous and continuous inputs of the very commodities that are most damaging to the earth to produce: energy, chemicals, metals, and paper. In the United States, those four industries are all in the top five of separate industry-by-industry rankings for energy intensity and toxic emissions, and similarly dominate the most-wanted lists for polluting the air with sulfur and nitrogen oxides, particulates, and volatile organic compounds.<sup>7</sup>

In particular, the fossil fuels that power the consumer society are its most ruinous input. Wrestring coal, oil, and natural gas from the earth permanently disrupts countless habitats; burning them causes an overwhelming share of the world's air pollution; and refining them generates huge quantities of toxic wastes. Estimating from the rough measure of national averages, the consumer class depends on energy supplies equal to at least 2,000 kilograms per capita of average-grade coal a year. The poor use energy equal to less than 400 kilograms per person, and the middle-income class falls in between. (See Table 4-2.)<sup>8</sup>

Fortunately, once people join the consumer class,

TABLE 4-2. *Per Capita Consumption of Energy, Selected Countries, 1989*

Country	Energy
	(kilograms of coal equivalent)
United States	10,127
Soviet Union	6,546
West Germany	5,377
Japan	4,032
Mexico	1,689
Turkey	958
China	810
Brazil	798
India	307
Indonesia	274
Nigeria	192
Bangladesh	69

SOURCE: See endnote 8.

their impact ceases to grow as quickly because their attention tends to switch to high-value, low-resource goods and services. Eric Larson of Princeton University studies the use of chemicals, energy, metals, and paper in both industrial and developing countries. He has found that per capita consumption of most of these things has been stable in industrial countries since the mid-seventies, after surging upward in preceding decades.<sup>9</sup>

Larson attributes some of the change to higher energy prices, but argues that a more fundamental transition lies behind it. In the places that best exemplify the global consumer society, he believes, markets for bulky products such as automobiles and appliances and for infrastructure-building raw materials such as cement are

largely saturated. We consumers are spending our extra earnings on high-tech goods and services, from computers and compact disk players to health insurance and fitness club memberships, all of which are gentler to the environment than were earlier generations of consumer goods.<sup>10</sup>

That per capita resource use in the consumer class reaches a plateau is a hopeful sign, yet the plateau is far too high for all the world's people to attain without devastating the planet. Already, the natural systems that sustain our societies are fraying badly, demonstrating that our global economy is getting too big for the global biosphere. If all the world's people were responsible for carbon dioxide concentrations on a par with the consumer class, global emissions of this greenhouse gas would multiply threefold. If everyone in the world used as much metal, lumber, and paper as we consumers do, mining and logging—rather than tapering off as ecological health necessitates—would jump more than threefold.<sup>11</sup>

The influence of the consumer class is felt strongly in regions populated mostly by the middle-income and poor classes. By drawing on resources far and near, we consumers cast an ecological shadow over wide regions of the earth. Every piece of merchandise in the retail districts of the consumer society creates its own ecological wake. A blouse in a Japanese boutique may come from Indonesian oil wells by way of petrochemical plants and textile mills in Singapore, and assembly industries in Bangladesh. Likewise, an automobile in a German showroom that bears the logo of an American-owned corporation typically contains parts manufactured in a dozen or more countries, and raw materials that originated in a dozen others.<sup>12</sup>

A strawberry in a Chicago supermarket in February is likely to have come from Mexico, where it might have been grown with the help of pesticides made in the Rhine Valley of Germany and a tractor made in Japan. The tractor, perhaps constructed with Korean steel cast from iron ingots dug from the territory of tribal peoples in Papua New Guinea, was likely fueled with diesel pumped from the earth in southern Mexico. At harvest time, the strawberry may have been packed in a box made of cardboard from Canadian softwood pulp, wrapped in plastic manufactured in New Jersey, and loaded on a truck made in Italy with German, Japanese, and American parts. The ecological wakes of the blouse, car, and strawberry—like the production lines themselves—span the globe.

Sadly, hard-pressed developing nations sell their ecological souls all too often in the attempt to make ends meet. Cynically playing one nation against another, manufacturing industries have segmented their production lines into dozens of countries in search of low wages, cheap resources, and lax regulations. The Philippine government, more blatant than most, ran an advertisement in *Fortune* in 1975 for the little-regulated Bataan export processing zone: "To attract companies . . . like yours . . . we have felled mountains, razed jungles, filled swamps, moved rivers, relocated towns . . . all to make it easier for you and your business to do business here."<sup>13</sup>

Brazil provides a vivid illustration of what transpires at the tail end of these global production lines. Burdened with an international debt exceeding \$100 billion, the government has subsidized and promoted export industries. As a result, the nation has become a major exporter of aluminum, copper, gold, steel, appli-

ances, beef, chicken, soybeans, and shoes. The consumer class gets cheaper products because Brazil is in the export business, but Brazil—most of whose citizens are middle-income—gets stuck with the tab of pollution, land degradation, and forest destruction. As of 1988, for example, 18 percent of the electricity used by all Brazilian industries went to plants producing aluminum and steel for export to industrial countries. Most of that electricity came from gargantuan hydroelectric dams that flooded tropical forests and displaced native peoples from their ancestral domain.<sup>14</sup>

The global consumer society casts a particularly long shadow over forests and soils. El Salvador and Costa Rica, for example, grow export crops such as bananas, coffee, and sugar on more than one fifth of their cropland. Export cattle ranches in Latin America and southern Africa have replaced rain forest and wildlife range. At the consumer end of the production line, Japan imports 70 percent of its corn, wheat, and barley, 95 percent of its soybeans, and more than 50 percent of its wood, much of it from the rapidly vanishing rain forests of Borneo.<sup>15</sup>

The Netherlands imports the agricultural output of three times as much land in developing countries as it has within its borders. Many of those agricultural imports flow to the nation's mammoth factory farms. There, millions of pigs and cows are fattened on palm-kernel cake from deforested lands in Malaysia, cassava from deforested regions of Thailand, and soybeans from pesticide-doused expanses in the south of Brazil in order to provide European consumers with their high-fat diet of meat and milk.<sup>16</sup>

In 1989, the European Community, Japan, and North America between them imported \$136 billion

worth of “primary commodities”—crops and natural resources—in excess of what they exported. Developing regions, meanwhile, are net exporters of these goods; in the few cases in which they import a particular commodity, much of it goes to their own world-class consumers. About three fourths of developing-country imports of grains—excluding rice—feed livestock, the meat of which largely goes to urban elites.<sup>17</sup>

For decades, shifting tastes among the consumer class have fueled commodity booms in the tropics. Sugar, tea, coffee, rubber, palm, coconut, ivory, gold, silver, gems—each has transformed natural environments and shaped the lives of legions of workers. Today, the tastes of the consumer class retain that influence, as the wildlife trade and illegal drug production illustrate.

Each year, smugglers take millions of tropical birds, fish, plants, animal pelts, and other novelties from impoverished to wealthy lands. They take Olive Ridley and hawksbill sea turtle shells by the thousands, and pelts of jaguars and other spotted cats by the ton. Although habitat destruction is the world’s leading cause of species extinction, *biologists believe that more than a third of the vertebrates on the endangered species list are there primarily because of hunting for trade. That hunting is fueled by the demand of affluent consumers. Worldwide, sales of exotic wildlife exceed \$5 billion a year, according to the World Wildlife Fund in Washington, D.C.*<sup>18</sup>

High prices and fast-changing fashions can swiftly drive species to the brink of survival. Peruvian butterflies sell for as much as \$3,000 on the black market, and to some Asian consumers, the allegedly aphrodisiac musk from Himalayan deer is worth four times its weight in gold. Bangladesh, India, and Indonesia send

250 million Asian bullfrogs each year to Europe, where restaurants serve their legs as a delicacy. Back in Asia, the mosquitos that frogs eat have proliferated, increasing deaths from malaria, which mosquitos carry.<sup>19</sup>

Another token of consumer-class influence is scrolled out across 200,000 hectares of what used to be the untouched cloud forest of the Peruvian Amazon. The area, once home to a unique highland ecosystem roamed by jaguars and spectacled bears, now boasts the herbicide-poisoned heartland of the world's cocaine industry. In the upper Huallaga Valley, peasants fleeing from poverty in their mountain villages grow coca to feed the cocaine habit of urbanites in the United States and Europe. Coca growers, like farmers of any high-value export crop, spare no expense in its cultivation, plowing up steep slopes and lacing the soil with chemical herbicides to maximize harvests.<sup>20</sup>

Processing the coca leaves compounds the ecological ruin. In 1987, Peruvian forester Marc Dourojeanni estimated that secret cocaine laboratories in the jungle spilled millions of gallons of kerosene, sulphuric acid, acetone, and toluene into the valley's watershed. And the valley's streams have since proved deadly to many types of fish, amphibians, and reptiles. Finally, the rule of drug traffickers and allied guerrilla movements has created a lawless state in which profiteering gangs log, hunt, and fish the region to its destruction.<sup>21</sup>

Thus from global warming to species extinction, we consumers bear a huge burden of responsibility for the ills of the earth. Yet our consumption too seldom receives the attention of those concerned about the fate of the planet, who focus on other contributors to environmental decline. Consumption is the neglected variable in the global environmental equation. In simplified

terms, an economy's total burden on the ecological systems that undergird it is a function of three variables: the size of the population, average consumption, and the broad set of technologies—everything from dinner plates to communications satellites—the economy uses to provide goods and services. Generally, environmentalists work on regulating and changing technologies, and family planning advocates concentrate on slowing population growth.

There are good reasons for emphasizing technology and population. Technologies are easier to replace than cultural attitudes. Family planning has enormous human and social benefits aside from its environmental pluses. Yet the magnitude of global ecological challenges requires progress on all three fronts. Environmental economist Herman Daly of the World Bank points out, for example, that simply stopping the growth in rates of global pollution, ecological degradation, and habitat destruction—not reducing those rates, as is clearly necessary—would require within four decades a twentyfold improvement in the environmental performance of current technology. And that assumes both that industrial countries immediately halt the growth of their per-capita resource consumption, allowing the developing countries to begin catching up, and that world population no more than doubles in that period.<sup>22</sup>

Changing technologies and methods in agriculture, transportation, urban planning, energy, and the like could radically reduce the environmental damage caused by current systems, but a twentyfold advance is farfetched. Autos that go three or four times as far on a tank of fuel are feasible; ones that go 20 times as far would defy the laws of thermodynamics. Bicycles, buses, and trains are the only vehicles that can reduce

the environmental costs of traveling that much, and to most in the consumer class they represent a lower standard of living. Clothes dryers, too, might run on half as much energy as the most efficient current models, but the only way to dry clothes with one twentieth the energy is to use a clothesline—another retrogressive step, in the eyes of the consumer society.

So technological change and population stabilization cannot suffice to save the planet without their complement in the reduction of material wants. José Goldemberg of the University of São Paulo and an international team of researchers conducted a careful study of the potential to cut fossil fuel consumption through maximizing efficiency and making full use of renewable energy. The entire world population, they concluded, could live at roughly the level of West Europeans in the mid-seventies—with things like modest but comfortable homes, refrigeration for food, clothes washers, a moderate amount of hot water, and ready access to public transit, augmented by limited auto use.<sup>23</sup>

The study's implicit conclusion, however, is that the entire world could not live in the style of Americans, with their larger homes, more numerous electrical gadgets, and auto-centered transportation. Goldemberg's scenario, furthermore, may be too generous. It would not reduce global carbon emissions by anything like the 60–80 percent that the Intergovernmental Panel on Climate Change believes necessary to stabilize the world's climate.<sup>24</sup>

Even assuming rapid progress in stabilizing human numbers and great strides in employing clean and efficient technologies, human wants will overrun the biosphere unless they shift from material to nonmaterial ends. The ability of the earth to support billions of

human beings depends on whether we continue to equate consumption with fulfillment.

Some guidance is thus needed on what combination of technical changes and value changes would make a comfortable—if nonconsumer—life-style possible for all without endangering the biosphere. From a purely ecological perspective, the crucial categories are energy, materials, and ecosystems, but such categories are abstract. For a more tangible approach, the next section focuses on three aspects of daily life: what we eat and drink (Chapter 5), how we get around (Chapter 6), and the things we buy and use (Chapter 7). In each case, the world's people are distributed unevenly over a vast range, with those at the bottom consuming too little for their own good—and those at the top consuming too much for the earth's good.