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## **Beyond Growth: A Journey through the Landscape of Sustainable Economics**

Growth is a story of success—until it isn't.

In most people's minds, "growth" is inevitably associated with biological development: food crops and babies grow. In those instances, growth is understood to be good—though we would be alarmed to see people continue significantly increasing their height and weight after they had reached adulthood, or to see individual tomato or cabbage plants the size of Jack's beanstalk. We intuitively understand that growth is desirable only within certain limits. Somehow, however, when the discussion turns to human population and consumption, many people's thoughts about growth become confused. Politicians and economists extol economic growth and fret if population isn't expanding, but they never address the questions, "What would be the optimum size for the economy?" or, "How many people can Earth support, long-term?"

During the last couple of centuries, humanity has dramatically grown its population, per capita energy usage, resource extraction, and waste dumping. Decades ago, nearly everyone assumed that the planet was so vast that there was nothing we puny humans could do to seriously damage it. Today, however, climate change, the spread of toxic chemicals, and the disappearance of wild nature attest to the reality that continuing growth is [killing the planet](#) and imperiling humanity's future.

In response, criticism of economic growth and the promotion of degrowth alternatives have emerged as essential subjects of research and discussion. In this article, we'll survey how various specialty disciplines (from archaeology to sociology) have contributed to our understanding of growth and its perils, and we'll recall the writers and thinkers who have proposed prosperous ways to downsize the human presence. This will be a brief tour of important ideas, authors, and books. There is a lot of intellectual territory to cover, so there will be many headings, and only brief entries under each one.

### **Indigenous Economics**

Indigenous societies did not cease evolving when the agricultural revolution occurred 10,000 years ago, or when Europeans began their global conquest in

the sixteenth century. Indeed, native societies in the Americas, Africa, Asia, and Oceania spent the last few thousand years experimenting with ways to [sculpt and manage](#) their ecosystems to make them more favorable for producing food and fiber, while also maintaining the ecological health of those landscapes. Growth in population or consumption sometimes occurred in times of surplus, but living in place for long periods led Indigenous societies to develop a keen appreciation for environmental limits; therefore, in many instances they actively discouraged growth by [constraining their own resource usage](#) and [population](#) size. As Ronald Trosper explains in his 2023 book *Indigenous Economics*, the goal of the circulation of essential goods was not profit maximization, but the maintenance of stable relationships with both other humans and the more-than-human world through reciprocity.

## The Philosophy of Sufficiency

Similar to Indigenous thinkers, some ancient Greco-Roman and Chinese philosophers understood the importance of limits. [Stoics](#) like Seneca and Epictetus (who both lived roughly 2,000 years ago) said things like, “You have power over your mind—not outside events. Realize this, and you will find strength.” In China, a few centuries earlier, [Taoist sages](#) proclaimed, “Nature does not hurry, yet everything is accomplished. Be content with what you have.” The message of these philosophers was: respect natural limits, curb your appetites, and aim for durable harmony in all your relations.

## Ecology and Systems Science

Ecology—the study of the relationship between organisms and their environment—was given its name by Ernst Haeckel in 1866. Sixty years later, Alfred Lotka studied predator-prey population dynamics, and was the first to state the [maximum power principle](#) (organisms survive and prosper by capturing and using energy more efficiently than their competitors). Lotka applied his insights to human society, and suggested that humanity’s shift from relying on wood, wind, and water wheels as energy sources to using depleting fossil fuels would make our species far more formidable, but would create major problems later on.

Population ecology, a field of study that arguably started with Thomas Malthus (more on him in the Economics section below), contributed the idea of [overshoot](#)—a word that William Catton used as the title of his influential [1982 book](#). Given sufficient food and other necessities, the population of any organism will increase; but once growth has gained momentum, it often continues until the organism’s population has exceeded its environment’s long-term [carrying capacity](#). The organism’s population is then considered to be in a state of overshoot. What comes next, typically, is a population die-off and a re-balancing of population size with available resources.

The field of [human ecology](#) applies insights from ecology to human societies. William Rees, an important human ecologist, together with his former graduate student, Mathis Wackernagel, created the [ecological footprint](#) in the mid-1990s as an ongoing way to measure the degree of humanity’s environmental overshoot.

In 1909, Nobel laureate [Karl Ferdinand Braun](#) used the term “feed-back” as a

noun to refer to coupling between components of an electronic circuit. Jay Forrester, who founded the field of systems dynamics, showed that feedback is also a phenomenon in economic and biological systems. Balancing or negative feedbacks are essential to keep systems functioning; in the biological realm, an example of a balancing feedback is the maintenance of human body temperature (if you start to heat up, your body sweats to cool itself down). Self-reinforcing or positive feedbacks are the opposite, and they usually create ever-greater systemic imbalances. Forrester identified economic growth as a self-reinforcing feedback loop—some growth begets more growth, such as what happens to money in a bank account that accrues compounding interest.

Building on Forrester’s work, a team of MIT systems scientists led by Donella and Dennis Meadows in 1972 sought to model economic growth via computer simulation. Most of the scenarios they produced showed a collapse of industrial society sometime during the 21<sup>st</sup> century. The study was published as the best-selling and controversial 1972 book, [\*The Limits to Growth\*](#).

Ecologists Howard T. Odum and Eugene Odum authored a landmark textbook on ecology ([\*Fundamentals of Ecology\*](#), 1953), in which they were among the first to discuss ecosystems and the role of energy in organizing them. H.T. Odum also pioneered general systems theory, and in his book *Environment, Power, and Society* (1971, [updated in 2007](#)) argued that agricultural ecosystems and industrial societies depend upon depleting fossil fuels as inputs, and, as a result, have limited capacity for growth. H.T. Odum and Elisabeth Odum’s [\*A Prosperous Way Down\*](#) (2001) laid out the ways that industrial societies could reduce energy and material throughput in orderly stages, while selecting and saving what is most important. Charles Hall, a former student of H.T. Odum, developed the concept of energy return on investment (EROI), which is the ratio of how much usable energy you get from a source compared to how much energy you had to spend in securing that source. Hall showed that it was partly the high EROI of fossil fuels that made them so important to spurring economic growth; he also showed that fossil fuel EROIs are beginning to decline due to the depletion of easily accessed resources. Hall has contributed to the development of biophysical economics and, with Kent Klitgaard, authored the 2018 textbook [\*Energy and the Wealth of Nations\*](#).

## Physics

Nobel prize-winning British radiochemist Frederick Soddy, in [four books](#) written between 1921 and 1934, carried on a “campaign for a radical restructuring of global monetary relationships,” insisting that economics should be rooted in physics—especially the laws of thermodynamics. Some of his proposals (to abandon the gold standard, let international exchange rates float, use federal surpluses and deficits as macroeconomic policy tools that could counter cyclical trends, and establish bureaus of economic statistics) were subsequently universally adopted, with Soddy receiving little credit. His critiques of fractional reserve banking (rules that allow banks to lend more money than they have on deposit) have been revived by others in the wake of major financial crises, such as that of 2008. Soddy observed that money and debt can grow exponentially at compound interest to any size, while the growth of the economy, which consists of real things in the real

world, is limited by the laws of physics and the finite stocks of fossil fuels. This criticism of economic growth led the majority of economists to dismiss Soddy as a crank.

In the early 1970s, Nicholas Georgescu-Roegen, a mathematician and statistician, researched and wrote about one of the most fundamental concepts of physics: entropy—the observation that, in any closed system, useful energy always turns into unusable heat energy. He applied this concept to economics, and [concluded](#) that the only truly sustainable economy would be one that is constantly shrinking its usage of energy and materials. Georgescu-Roegen pursued his reasoning rigorously, showing that standard economists’ assertions that increased efficiency, substitution of new energy resources, and technological innovation ultimately provided no escape from entropic physical limits. His 1971 book, [The Entropy Law and the Economic Process](#), was profoundly influential for the nascent fields of ecological economics and biophysical economics. Georgescu-Roegen was a mentor of Herman Daly (see below); further, in [“Farewell to Growth,”](#) the leader of the French degrowth movement, [Serge Latouche](#), called Georgescu-Roegen the “main theoretical source of degrowth,” an assessment echoed by Italian degrowth theorist [Mauro Bonaiuti](#).

Tom Murphy, an astrophysicist by training and profession, has recently employed his mathematical skills and scientific knowledge to [argue](#) that the entirety of modern industrial civilization is unsustainable, a conclusion he explains in his textbook, [Energy and Human Ambitions on a Finite Planet](#).

## Archaeology, Soil, and Energy

History is strewn with examples of societies that grew, but then collapsed. Why did they fail? Archaeologist Joseph Tainter, in his magnum opus, [The Collapse of Complex Societies](#) (1988), concluded that societies invest in complexity in order to solve problems, and their investments require energy. However, investments in complexity produce declining rates of return over time, leading to periods of crisis when problems accumulate and cannot be solved.

In 1953, the U.S. Department of Agriculture published a remarkable [booklet](#) by W.C. Lowdermilk, titled *Conquest of the Land Through 7,000 Years*. In it, the author argued that agricultural civilizations have routinely [degraded the soils](#) that provided the basis of their survival; they collapsed as a result. Soil scientist Daniel Hillel made essentially the same claim in his 1991 book, [Out of the Earth: Civilization and the Life of the Soil](#). David Montgomery updated the evidence and arguments in his 2007 book, [Dirt: The Erosion of Civilizations](#).

Fred Cottrell’s 1955 book [Energy and Society: The Relation Between Energy, Social Change, and Economic Development](#) detailed how energy revolutions—from the taming of fire to the advent of coal, oil, and natural gas—shaped and reshaped societies. Cottrell detailed how industrialized nations, global trade, economic growth, and modern warfare all flow from the qualities and characteristics of our currently abundant energy sources—coal, oil, and natural gas.

In 1998, petroleum geologists Colin Campbell and Jean Laherrère [argued](#) in

an influential article that the depletion of petroleum, the most economically important of the fossil fuels, would have monumental economic impacts in coming decades. Followers of Campbell, including the [current author](#), have pointed out that the modern era—characterized by population growth, economic expansion, and rapid technological change—came about due to the enormous energy subsidy provided by fossil fuels, and have suggested that energy substitutes will be [unable to maintain](#) growth and expansion.

## Cultural History: America and Growth

The United States saw the birth of the modern oil industry, and subsequently, for over a century, it led the world in technological innovation and manufacturing growth; it became a military and financial superpower. In his 2018 book [Oil, Power and War: A Dark History](#), French journalist Matthieu Auzanneau investigated the links between fossil fuels and geopolitics, showing how competition for access to energy sources helped spark two world wars and led to the emergence of a global American empire.

It was in the U.S. that growth first became institutionalized. Historian Stuart Ewen, in his [Captains of Consciousness: Advertising and the social roots of Consumer Culture](#) (1976), traced the beginnings of gross domestic product (GDP), the modern advertising industry, consumerism, and planned obsolescence; all emerged at roughly the same time, largely from ideas hatched by American bureaucrats and captains of industry. During the Great Depression, it became apparent that overproduction (enabled by cheap, abundant energy) had contributed to financial collapse; the solution, offered by industrialists and quickly adopted by politicians and economists, was a deliberate stimulation of demand. Subsequent generations of mainstream economists agreed: only through continual demand-led economic growth could the nation maintain full employment, as well as high profits and returns on investments.

## Economics

Thomas Malthus, in his 1798 book, [An Essay on the Principle of Population](#), observed that an increase in food production would lead to population growth, which would undermine any subsequent improvement in standard of living. Subsequent history appeared to prove Malthus wrong: world population has increased by over 800 percent since his book was published, while average living standards have improved (at least in the industrialized world). Of course, Malthus had little inkling of the capabilities of fossil fuels to boost agricultural production, resource extraction, manufacturing, and mechanization all at once. But our enormous one-time-only subsidy of geologically stored solar energy is depleting rapidly, and energy substitutes seem unlikely to pick up where coal, oil, and natural gas leave off. Although Malthus's ideas have been exceedingly unpopular during the last century, and the term “Malthusian” is used often by pro-growth advocates to discredit those who warn about environmental limits, a few scholars have [come to his defense](#).

John Stuart Mill, writing during the British Industrial Revolution, believed that economic growth was merely the prelude to a “stationary state” in which the goal of politics would be the maintenance of general happiness. In the section of Book IV of his [Principles of Political Economy](#) (1848) titled “Of



the Stationary State,” Mill asserted that “...the increase of wealth is not boundless; ...at the end of... the progressive state lies the stationary state, [and] all progress in wealth is but a postponement of this...”

William Stanley Jevons, in his book [The Coal Question](#) (1865), documented the rapid depletion of Britain’s coal supplies. He also observed that increases in energy production efficiency lead to more, not less, consumption. This phenomenon is known today as the [Jevons paradox](#), or the “rebound effect.”

Karl Marx was famous for his criticism of economic inequality and for identifying the flaws of capitalism. But, toward the end of his career, he became a sort of [ecological economist](#). Marx described the relationship between society and nature in metabolic terms, leading economist Ravi Bhandari to [describe](#) Marxism as “the first systems theory.”

Herman Daly criticized growthist economics and, echoing Mill, advocated what he called the “steady-state economy,” defined as one that fluctuates only mildly in size and does not exceed ecological limits. In his books, including [Steady-State Economics](#) (1977) and (with Joshua Farley) [Ecological Economics: Principles and Applications](#) (2004), he effectively spearheaded the emerging field of ecological economics, inspiring dozens of students and followers, including Robert Costanza, Brian Czech, Rob Dietz, Josh Farley, Neva Goodwin, Nate Hagens, Tim Jackson, Lisi Krall, Juliet Schor, and Peter Victor. The organization [CASSE](#) (the Center for the Advancement of the Steady State Economy) carries on his work. Although Daly was a follower of Georgescu-Roegen, the latter criticized the steady-state economy, arguing that only a contracting economy can be sustainable over the long run.

E.F. Schumacher, in his influential book [Small Is Beautiful: Economics as if People Mattered](#) (1973), criticized international “development” programs for undermining sustainable, traditional local cultures. Years earlier, he had traveled to Burma as an economic consultant; his experiences there persuaded him that “production from local resources for local needs is the most rational way of economic life.” Schumacher proposed a [Buddhist economics](#) and also advocated what is now called [appropriate technology](#)—user-friendly and ecologically suitable tools fit to the scale of the community. His legacy is carried on by the [Schumacher Center for a New Economics](#) and, until recently, [Schumacher College](#).

In his influential 1968 essay, “[The Tragedy of the Commons](#),” ecologist Garrett Hardin argued that natural resources that are collectively used will be over-exploited in the long term. Economist and political scientist Elinor Ostrom disproved this idea by conducting field studies on how people in small, local communities manage shared pastures, fishing waters and forests. [She showed](#) that when natural resources are jointly used, rules evolve for using them in ways that are both economically and ecologically sustainable. In 2009, Ostrom was awarded the Nobel Memorial Prize in Economic Sciences.

Kate Raworth’s 2017 book [Doughnut Economics: Seven Ways to think Like a 21<sup>st</sup> Century Economist](#) argues that economics should be reoriented around human needs and environmental stability and that economies should be designed to “thrive, not grow.” The book has received significant notice, with

the author appearing on national radio and television in several countries. Raworth has since gone on to launch the [Doughnut Economics Action Lab](#) to work with governments, businesses, and communities to shift policies on the ground.

Kohei Saito's 2023 book [Marx in the Anthropocene](#) has been prominently reviewed in the [New York Times](#) and elsewhere. According to Saito, Marx believed that nature and capitalism are fundamentally incompatible. He eagerly learned from pre-capitalist societies, and during his lifetime saw the consequences of industrialization. Saito argues for "degrowth communism," reinterpreting the goal of abundance to fit natural limits and the common good, rather than the attainment of luxury.

## Sociology and History

Has any historical society ever adopted degrowth policies to achieve sustainability? Philosopher Roman Krznaric, in his 2024 book [History for Tomorrow: Inspiration from the Past for the Future of Humanity](#), details the ways in which Japan minimized consumption during the Edo period (1603-1868). Having severed trade ties with the West so as to prevent colonization, the Japanese learned to live while producing minimal waste, recycling or reusing virtually everything. Bans on logging accompanied cash payments to farmers for planting trees. According to Krznaric, "The result was what may be the world's first large-scale ecological civilization."

Jason Hickel has extensively documented how wealth flows in growing economies: across national borders, it's nearly always from the Global South to the Global North; within countries, it's from workers to owners. Therefore, economic growth is tied to ever-greater inequality and exploitation. In his 2021 book [How Degrowth Will Save the World](#), Hickel writes, "We need to change how we see nature and our place in it, shifting from a philosophy of domination and extraction to one that's rooted in reciprocity and regeneration." He describes how a post-capitalist, post-growth society would provide work and pay for health care and education, while allowing societies to become more equal, and nature to heal and recover.

## Climate Science

Throughout recent decades, increasing global energy demand and usage, which are associated with economic production and consumption, have caused rising levels of greenhouse gas emissions. In a nutshell, economic growth is helping drive climate change.

While many "green growth" advocates claim that society will be able to maintain industrial expansion while shifting from relying on fossil fuels to using renewable energy technologies, [recent studies](#) have shown that this expectation is unrealistic. The transition itself (which would require manufacturing enormous numbers of solar panels, wind turbines, batteries, and alternative energy-using machines) needs a huge amount of energy, most of which would have to come from fossil fuels, thereby further increasing emissions. Also, obtaining the needed materials would entail vastly expanding mining operations, thereby contributing to further land degradation, which again contributes to climate change, and could exacerbate global inequality.

Therefore increasing numbers of climate experts, including [Kevin Anderson](#) of the Tyndall Centre for Climate Change Research, are advocating degrowth policies. Greta Thunberg, one of the world's foremost climate activists, in a pithy speech at the 2019 United Nations Climate Action Summit, [famously said](#), "We are in the beginning of mass extinction, and all you can talk about is money and fairy tales of *eternal economic growth*."

## Degrowth Home Economics

While much of the degrowth discussion centers on policies that could be enacted nationally or internationally, individuals, households, and small communities are already showing how life can be improved with reduced consumption. [Permaculture](#), which is often thought of merely as a set of sustainable gardening practices, is actually a comprehensive design philosophy (originating with the 1978 book, [Permaculture One: A Perennial Agricultural System for Human Settlements](#) by Bill Mollison and David Holmgren), that extends to all aspects of living, wherein the objective is to integrate land and people in mutually beneficial closed-loop systems with no waste. Duane Elgin's 1981 book [Voluntary Simplicity: Toward a Way of Life that Is Outwardly Simple, Inwardly Rich](#), helped spearhead a purposeful simplicity movement within the world's wealthiest, highest-consuming countries. The [ecovillage](#) movement arose at roughly the same time, encouraging and enabling groups of people to power down together. Vicki Robin and Joe Dominguez's 1992 bestseller [Your Money or Your Life](#) helped millions of readers rethink their finances so that they could spend less but enjoy a higher quality of life.

Although the simple living movement in Western industrial societies is recent, its roots extend back to pre-agricultural societies, via philosophers from the [early Christian ascetics](#) to [John Ruskin](#), [Leo Tolstoy](#), [Henry David Thoreau](#), and [Mohandas Gandhi](#). Today, many internet articles [advise](#) how to minimize climate change by eating less red meat, carpooling, trading disposable plastic bags for reusable cloth sacks, and buying used books and clothes. And devotees of [Marie Kondo](#) reduce their possessions to find clearer purpose and more peace of mind.

If we are to survive this century as organized societies, we will need both national degrowth policies and vastly expanded movements of individuals and communities aiming to live well with less. Fortunately, such policies and movements have a broad, diverse, and ancient lineage from which to draw inspiration.