

PREVENTING OVERSHOOT AND COLLAPSE: MANAGING THE EARTH'S RESOURCES

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Abstract: Population ecology of all species, including humans, teaches us that too much of e.g. human race may lead to its collapse. Many authors, over history and science, have been trying to make humans understand this natural law. The latter seems to be too complex for most to comprehend and obey. Thus, the modern humans' values are dangerous for humans' survival. The problems scientists identify can be made worse by the weaknesses in the political systems internationally and nationally, and the unmanaged globalized economy where speculation and corruption are out of control. Improving global environmental governance and our ability to manage the Earth's resources is thus a key part of any solution. Preventing overshoot and collapse is the challenge of our time.

Key words: population ecology, human, complexity, modern values, overshoot, collapse

Preprečitev čezmernosti in zloma: obvladovanje virov Zemlje

Povzetek: Ekologija populacije vseh vrst živih bitij, vključno z ljudmi, nas uči, da preveč na primer ljudi lahko vodi do zloma take populacije. Mnogi avtorji so v teku zgodovine in znanosti poskušali doseči, da bi ljudje razumeli ta naravni zakon. A slednji je videti za mnoge ljudi prezapleten, da bi ga razumeli in ubogali. Zato so sodobne vrednosti ljudi nevarne za preživetje ljudi. Problemi, ki jih identificirajo znanstveniki, lahko postanejo hujši zaradi šibkosti političnih sistemov, mednarodnih in narodnih, in zaradi neobvladanega globaliziranega gospodarstva, v katerem človeštvo ne obvladuje špekulacije in korupcije. Izboljšanje globalnega upravljanja naravnega okolja ljudi in svoje sposobnosti obvladovati vire Zemlje je tako ključen del katere koli rešitve. Preprečitev čezmernosti in zloma je izziv našega časa.

Ključne besede: ekologija populacij, ljudje, kompleksnost, sodobne vrednote, čezmernost, zlom

Introduction

In population ecology, overshoot and collapse is a well-studied phenomenon: a population that escapes from the natural control on its numbers continues to multiply until it destroys its food supply or some other vital resource, at which point its numbers collapse or it may disappear entirely. This may happen when a species is introduced to or invades a new ecosystem without its enemies and parasites.

There is no biological reason why humans should not be vulnerable to the same phenomenon.

Human-to-Environment Relation from Malthus to Club of Rome and Today

Ever since Thomas Malthus and his *Essay on the Principle of Population* (1798), there have been predictions of the exhaustion of resources and the collapse of the human population. In the early years of the environment movement, the report to the Club of Rome on *The Limits to Growth* used computer modelling of population and economic growth and resource consumption to predict what would happen to society in the 21st century as it reached planetary limits on resources. They predicted a collapse of the economy and the human population by mid-century if growth continued unabated.

However they did not anticipate the green revolution of the 1970s and 80s that increased food production, particularly in Asia, so the promised famines did not materialize. The same team updated their model and predictions at the time of the Rio Earth Summit in 1992, calling their book "*Beyond the Limits*" because they estimated that society was overshooting sustainable planetary limits and living off its capital, but that time lags in the response of natural systems meant that the effects would not be apparent for some decades.

A further 30-year update ([Meadows et al. 2004](#)) maintained the same conclusions that civilization would face major disruption in this century. While these studies have often been criticized and discounted, the recent concern about resource shortages and steep rises in prices, disregarding a speculative component, are closely following their predictions. The pessimistic and optimistic views of

resource depletion have been reviewed by Tietenberg (1996), and resource regimes by Vatn (2005). The relative contributions of countries to this problem are demonstrated in the ecological footprints of nations (WWF/ZSL/GFN, 2006).

Other well-informed scientists have explored more generally the stability and persistence of Western Civilization (Diamond 2005; Homer-Dixon 2006). Often making comparisons with the decline and fall of civilizations in the past, they draw disturbing parallels with our present situation, and question the common assumption that our science and technology will find a solution for every problem. For example, James Lovelock, originator of the Gaia Hypothesis about the evolution of the planetary life-support system, recently stated that he expected an 80% reduction in the world population in this century. At the other end of the political spectrum are those that deny that there is any threat of overshoot and collapse (Michaels 2004). A well-funded anti-science movement backed by the oil and tobacco industries and fundamentalist religious groups has filled the media with counter-arguments, making it difficult for decision-makers to find positions that are both scientifically valid and politically acceptable.

Research groups that prepare global scenarios for the United Nations and other organizations have also explored alternative possible futures across the political spectrum, from business as usual through a retreat to some fortress society to a transition to a sustainable future (see for example Hammond 1998). These scenarios tend to show the un-sustainability and vulnerability of our present forms of development, but they also demonstrate that a transition that avoids the worst of the problems is technically possible. Some take a positive view that the necessary transition is an opportunity to build a more sustainable civilization (Homer-Dixon 2006), and whole groups of researchers such as the Great Transitions Initiative have been working on how that could be done (<http://www.GTInitiative.org>).

Complexity of the Human – Nature relations

Part of the problem is in understanding the behaviour of such complex systems as human civilization and the planetary environment. Experts in one field or another (economics, political science, information technology, industry) tend to see probable solutions in their field and thus no need to worry. Biologists observing the rapid decline of natural systems tend to be more concerned; while those systems may be resilient in the long term, all the immediate trends are in the wrong direction. It is the specialists on complex systems who explore the interactions between many disparate factors who seem the most alarmed as they study the relationships of energy cost, climate change, water and food shortages, biodiversity loss, pollution impacts, the declining reserves of critical minerals and other constraints facing both a still-growing population and rapidly rising demand with economic success in some parts of the world. A recent cover story in the journal *New Scientist* focused on the possible collapse of civilization, highlighting the ease with which complex interlinked networks (like electricity transmission) can shut down and the vulnerability of human society to events like a virulent flu epidemic that could kill key technical personnel around the world (New Scientist, 2008).

Environmental and resource problems are of course intimately linked to the economic system. Those resources that are traded in the world market are subject to destabilizing price fluctuations. Two cases in point are fossil energy resources (Goldemberg 1996) and food (Evans 2008). On the other hand, the failure of the market to reflect the true costs of economic activities is what drives much environmental damage. Sir Nicholas Stern called climate change the greatest market failure in history (Stern 2006). As the economic implications of the world situation become clearer, it is not easy to see where the enormous requirements for investment capital and development assistance will come from. One journalist summed up the challenge very well: "On current trends, ...humanity will need twice as much energy as it uses today within 35 years.... Produce too little energy, say the economists, and there will be price hikes and a financial crash unlike any the world has ever known, with possible resource wars, depression and famine. Produce the wrong sort of energy, say the climate scientists, and we will have more droughts, floods, rising seas and worldwide economic disaster with runaway global warming." (Vidal, 2007)

Dangerous Basic Values of the modern Society

One consequence of this situation is the need to question the basic values on which modern society has been based, and particularly the "growth paradigm" in which success is measured by growth in the economy, in business and in politics, and any leader who does not bring growth in GDP, profits or power is quickly replaced. The growth paradigm has been a necessary response to a growing

population, an increased energy supply, and growing resource exploitation, on which technological advances have been built.

However the UN estimates that the world population will stabilize in mid-century, as it already has in many industrialized countries. The decline in fossil fuel reserves means the end of the cheap energy subsidy on which industrialization, trade and intensive agriculture have been based. In a heavily-exploited world, it is difficult to see where further significant growth in resources can come from. Avoiding overshoot and collapse means abandoning the growth paradigm for one based on balance, efficiency, equitable distribution, optimal sizes, renewable energy and closed materials systems. This implies a revolutionary change in economics, politics and society, one that will not come easily.

Conclusions

The problems scientists identify can be made worse by the weaknesses in the political systems internationally and nationally, and the unmanaged globalized economy where speculation and corruption are out of control. Improving global environmental governance and our ability to manage the Earth's resources is thus a key part of any solution. Preventing overshoot and collapse is the challenge of our time.

References:

Detailed data about references are available with the author.