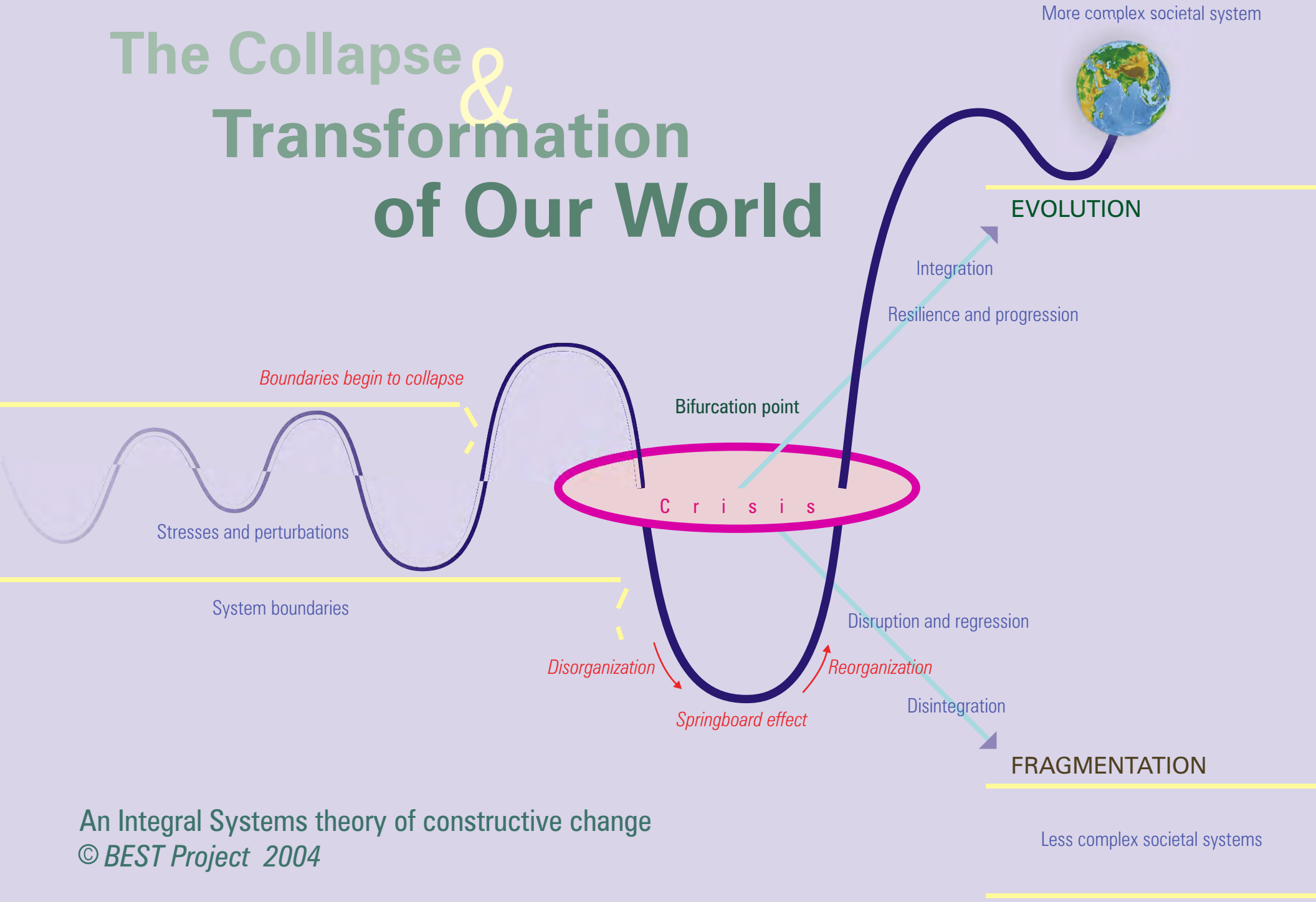
The Collapse & Transformation of Our World



An Integral Systems theory of constructive change

Introduction

This presentation is designed to demonstrate that the world as we know it is about to be transformed.

Children standing in clearcut rainforest

Why?

Because an economic system based on unlimited material growth is unsustainable on a planet with finite resources.

Introduction

Over the next few decades the collapse of major ecosystems will accelerate, negatively affecting the human economies that depend on them.

If the industrial system with its expansionist consumer culture continues to degrade the biosphere, at some point civilization as we know it will end.

Green building design by Renzo Piano

However, positive outcomes are also possible.

Emerging values, theories, technologies and social organizations are networking and beginning to develop post-industrial societal structures and economic processes.

Humanity has the ability to transform the existing unsustainable system into a sustainable societal system.

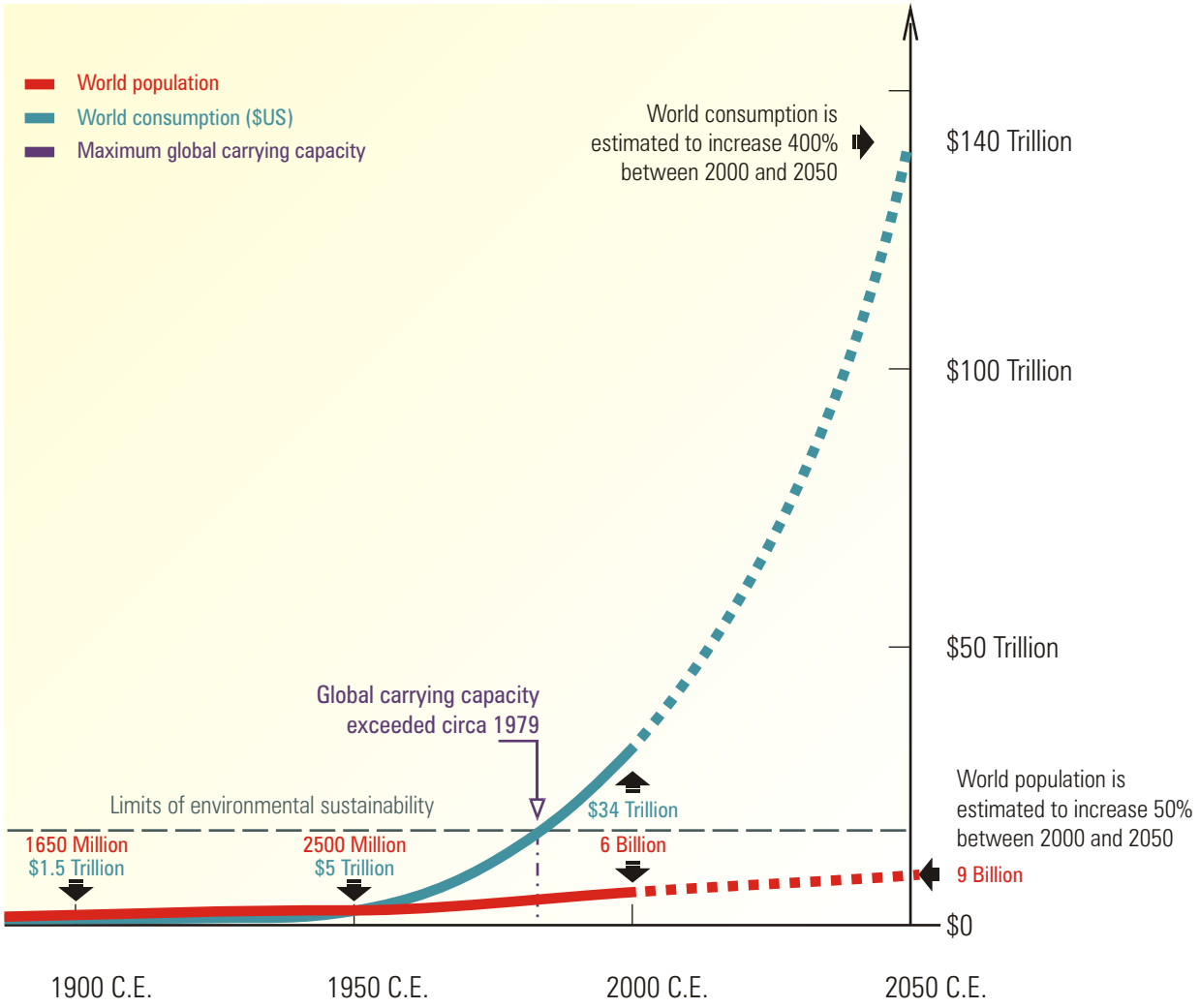
This presentation will describe these processes and our options.

Growth of Consumption Relative to Population

There is a growing tension between the increasing demand for energy and resources and the decreasing capacity of the planet to produce resources and recycle waste.

The carrying capacity of the planet was exceeded circa 1979.

Since then the global economy has been increasing its annual environmental deficit.



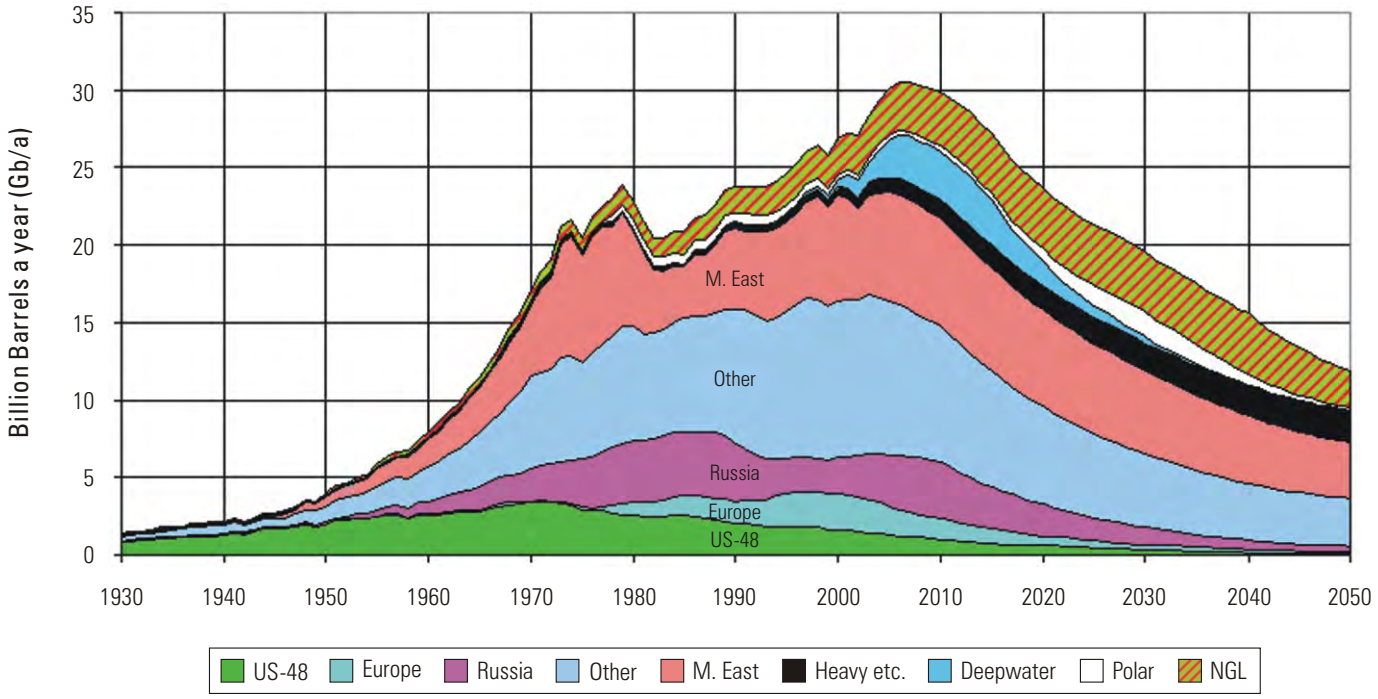
World consumption of private and public goods and services is estimated. Based on UNDP *Human Development Report 1998* and World Bank *World Development Report 2003*. World populations are estimated. Based on data from U.S. Bureau of the Census (2003). Environmental sustainability is estimated. Based on WWF *Living Planet Report 2002*.

Energy Shortages

Among many emerging global crises, some of the most serious are the interrelated problems of water, food and energy shortages, and climate change and species extinction.

Without adequate supplies of energy it is difficult for people to meet their basic economic, health and educational needs. One component of future energy shortages is declining oil and gas production.

In 2001 the world economy derived 56% of its total energy from oil and natural gas. Although demand is steadily growing, new oil and gas fields are not being discovered as quickly as old fields are being depleted. Some leading experts predict that peak production will take place in 2008, after which supplies will decline. The result will be rapidly rising energy costs with major negative implications for the global economy.



Global Production of Oil and Gas Liquids, 2004 Scenario

From: The Association for the Study of Peak Oil, 2004

Food Shortages

834 million malnourished people need to eat more now. Food will also need to be produced for three billion more people by 2050. However, the capacity of our planet to produce food is steadily being reduced by aquifer depletion, topsoil erosion, pollution, deforestation, desertification, overfishing, and the loss of arable land to roads and housing. These problems are complicated by the uneven global distribution of fresh water, arable land, and people.

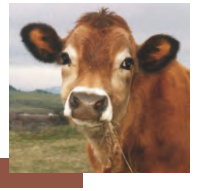
An example of a growing problem is grain production. One-half of humanity's food calories come (directly or indirectly) from grains. Although global production has been growing, it has not been increasing as quickly as consumption, as developing countries copy North American meat-based diets. As a result, world grain reserves have been falling since 2000.

Over 1,000 tons of water is needed to produce one ton of grain. Aquifers are shrinking in all major grain-growing regions in the world. What will happen to food production when these aquifers can no longer be used for irrigating crops?

70% of the grain in China is grown on irrigated land

5% of the grain harvest is fed to animals in India

60% of the grain harvest is fed to animals in the United States



The resources do not exist for the world's population to copy meat-based Western diets

Data from: Earth Policy Institute (2004), *Eco-Economy Indicators: Twelve Trends to Track* and V. Smil (2001), *Feeding the World*, Cambridge: MA, MIT Press.

Climate Change

Burning fossil fuels for energy and cutting and burning forests causes global warming. As the 'greenhouse' gases (such as carbon dioxide) in the atmosphere increase, global temperatures rise. The International Panel on Climate Change estimates that average temperatures will rise 1.4 - 5.8°C by 2100 if greenhouse gas emissions are not significantly reduced.

Climate change will increase both global precipitation and extreme weather. Climate zones will shift, disrupting and fragmenting ecosystems. An international study predicts that climate change will result in the extinction of up to 25% of all animal and plant species by 2050.

Rising temperatures will have different impacts on different areas. Growing seasons will be extended in temperate regions, while high temperatures may damage crops in tropical regions. Melting ice will raise sea levels 9 - 88 cm by 2100, inundating many islands, coastal areas and cities.

The summer Arctic ice cap in 1979.

By 2003 the Arctic ice cap had shrunk by 40%.

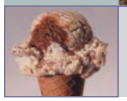
Information from: UNFCC (2004) and *Nature* 427 (2004), pp. 145-148.
Photos from NASA.

Luxury Expenditures

Compared with funding needed for basic needs

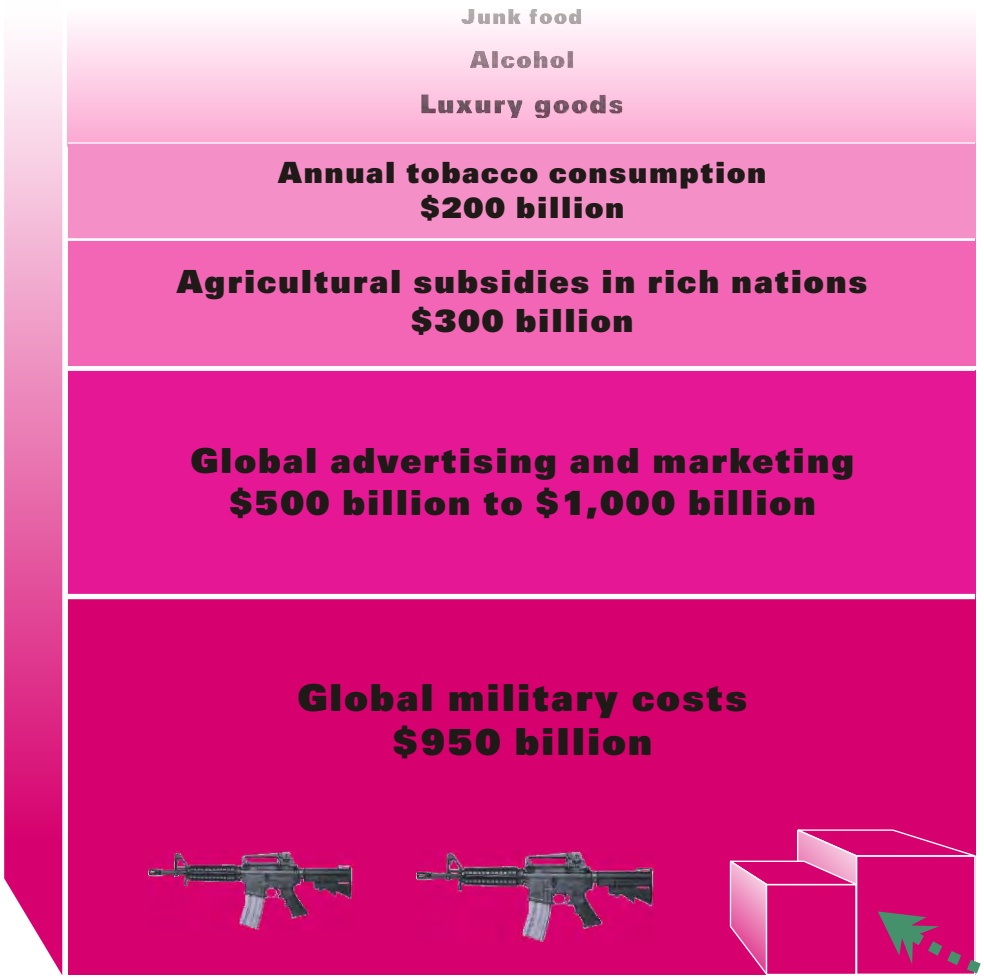
Consumer society creates the illusion of scarcity in the rich world, where people try to satisfy their emotional and spiritual needs through consuming things, and real scarcity in the poor world, where the resources do not exist to meet basic human needs for food, shelter, health and education.

The global consumer culture creates false greeds instead of meeting real needs. Although sufficient resources exist to solve the world's problems, they are not being used constructively because private and public priorities are distorted and dysfunctional.

	Product	Annual Expenditure	Social or Economic Goal	Additional Annual Investment Needed
	Makeup	$18 billion	*Reproductive health care for all women*	*$12 billion*
	Pet food in Europe and United States	$17 billion	*Elimination of hunger and malnutrition*	*$19 billion*
	Perfumes	$15 billion	*Universal literacy*	*$5 billion*
	Ocean cruises	$14 billion	*Clean drinking water for all*	*$10 billion*
	Ice cream in Europe	$11 billion	*Immunizing every child*	*$1.3 billion*

Adapted from: The Worldwatch Institute *State of the World 2004*

Discretionary and Essential Expenditures



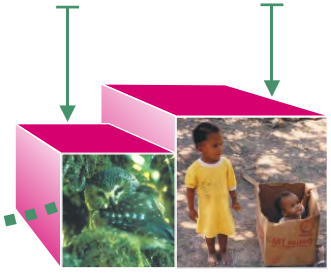
Examples of annual global discretionary expenditures

Trillions **are spent annually for dysfunctional or questionable reasons**

Only *billions* are needed to meet essential human and environmental needs

A single investment of ***$30 billion*** could preserve much of the key habitat of 70% of plant and animal species

Basic human needs could be met by a doubling of annual official development assistance to ***$60 billion***



Environmental needs

Human needs

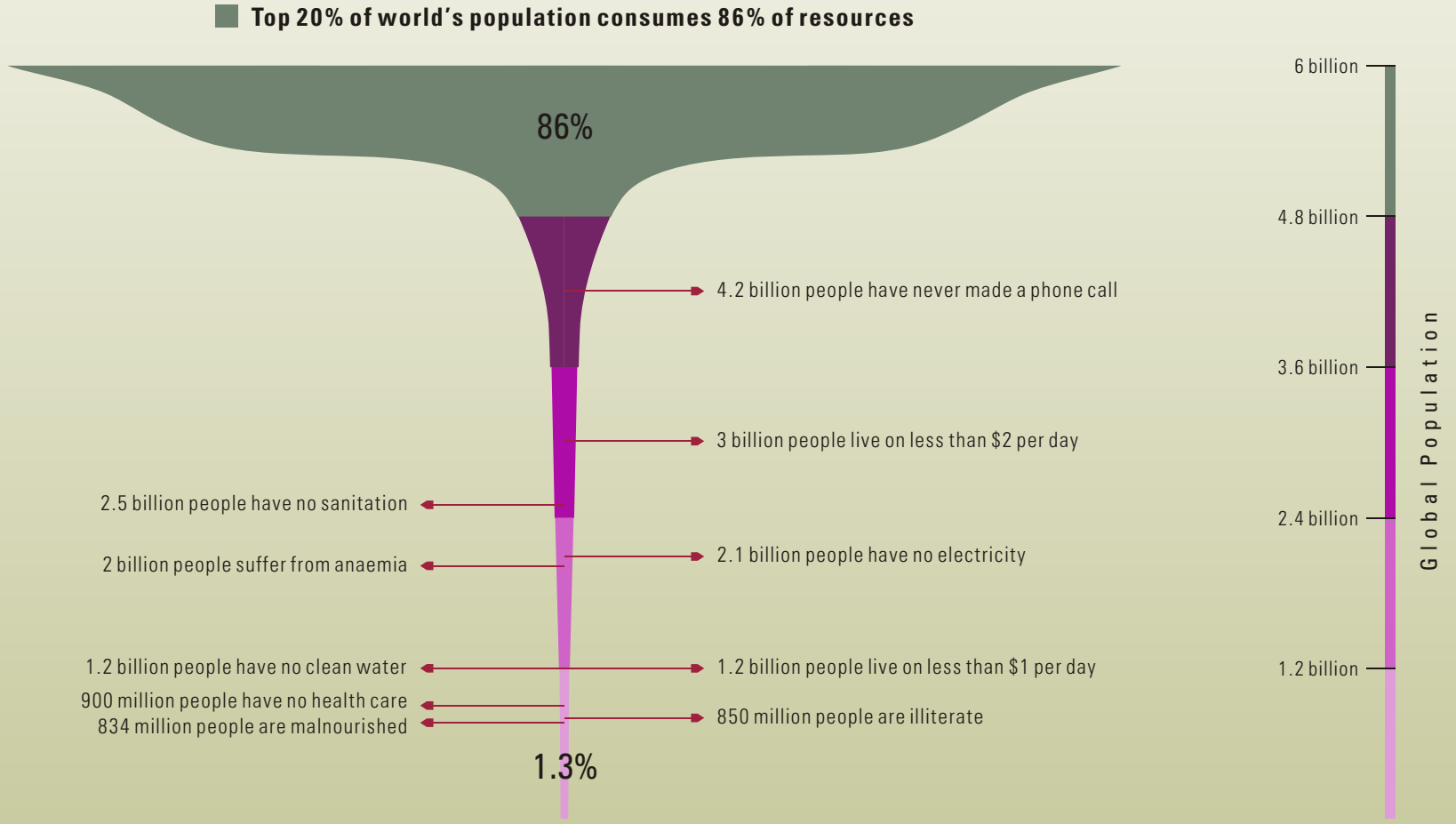
Diagram not to scale

Data from UNDP Human Development Report 2002, UN estimates for 2004, and E.O. Wilson (2002) *The Future of Life*

Distribution of Private Consumption

Inequality between countries and within countries is increasing. The richest 5% of the world's population now have incomes 114 times those of the poorest 5%.

Although living standards rose for much of the world's population during the 1990s, 3 billion people still live on less than $2 per day.



Data from *UNDP Human Development Reports 1998, 2002*

Diagram not to scale

The World's Only Super-ower

The United States is a superpower for three main reasons: it has the largest economy, it has the strongest military, and most international banking and trade is conducted in US dollars. Its wealth and power give it cheap access to raw materials: although Americans are 5% of the world's population, they consume approximately 30% of the world's resources.

The US is not only the world's only superpower, it is also the world's only super-ower. Americans have an unsustainable economy: they import $50 billion of goods more per month than they export. The US dollar is stable only because Asian central banks buy US treasury bills. Through undervaluing their own currencies China, Japan and other countries are able to capture increasing shares of the US market.

China now produces almost half of the world's manufactured goods. Expanding Asian economies are competing for limited global resources. The rising costs of resources will worsen US trade deficits. When foreign banks lose faith in the dollar and withdraw their investments, the dollar's value will drop, inflation will rise and the US economy will contract. This may trigger a global depression.

US global supremacy >>>>> *will be challenged by* >>>>> Chinese economic power

Each year China and other countries buy hundreds of billions of dollars of US government bonds. US military power depends on these loans.

Developing shortages of oil, lead, copper, zinc and other resources will raise prices, destabilize the dollar and increase competition between China and the US.

Data from: Bank for International Settlements, *Annual Report, June 2004.*
International Institute for Environment and Development (2004), *Breaking New Ground.*

Violent Cultures

Conflict develops when people believe that they have incompatible objectives. Although conflict is a normal part of everyone's experience, violent conflict is not inevitable. Some cultures are more violent than others: the US murder rate is 10 times that of Britain.

Both objective and subjective factors contribute to conflicts. Violence is less likely to occur when people's real needs are being met. Cultural factors that contribute towards violence include: feelings of superiority; the devaluation of others; authoritarian traditions; a monolithic culture; a strong either/or ideology; and a history of responding aggressively to conflict.

Cultural factors that contribute towards peace include: diversity, tolerance, equality, democracy, the rule of law and a history of peacefully resolving conflicts. Europeans have reduced the likelihood of wars between their countries through promoting tolerance, democracy, and pluralism.

Ecological crises (overpopulation and resource shortages), economic crises (hunger and inequality) and political crises (civil war) combined with a history of interethnic violence to produce genocide in Rwanda. Violence occurred in regions where food energy per person per day was less than 1,500 calories, while no violence occurred in regions where consumption was over 1,500 calories.

Information from: M. Deutch (1973), *The Resolution of Conflict*, London, UK: Yale University Press, and E. Staub (1989), *The Roots of Evil*, Cambridge, UK: Cambridge University Press. Data on Rwanda from: *World Watch*, September/October 2002.

Unsustainable Values

The consumer society is socially unsustainable because it promotes greeds instead of needs and increases inequality, poverty and conflict. It is morally unsustainable because it encourages getting instead of giving and destroys healthy relationships by discouraging caring and sharing.

The industrial system has improved living standards for much of the world's population, but at the cost of ruined cultures, communities and ecosystems. We now have more but belong less. Many people feel alienated from their families, from their work, from nature and spirituality. Individual dis-eases such as addictions, depressions, divorces, and obesity are increasing, as are social dis-eases such as ecocide, poverty, crime and war.

Consumer society manipulates and markets our deepest feelings and values. We feel overwhelmed and grow numb to our own needs and to the sufferings of others. We cannot heal our sick planet without healthier morals and a higher common purpose. A sustainable world will need sustainable values: integrity, respect for all life, fairness, equality, and peaceful co-operation.

Child soldier

Homeless person

Child prostitute

Trafficking in endangered species

New Technologies

Economic optimists believe that new technologies will overcome problems caused by increasing demand and declining resources.

Wind turbines at sunrise

However, while technological advances will improve efficiencies and reduce waste, they will not change the societal values and structures that promote limitless consumption and growing inequality.

Although technological advances can postpone environmental collapse, only social advances can transform an unsustainable consumer society into a sustainable creative society.

Technological fixes alone can not solve social problems.

Sustainable Development

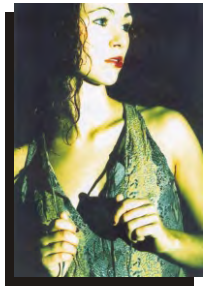
is meeting human and biophysical needs

Sustainable development is "improving the quality of human life while living within the carrying capacity of supporting ecosystems".
(IUCN, UNEP and WWF, *Caring for the Earth*, 1991)

and

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (U.N. Brundtland Report, 1987)




Will future generations be able to meet their needs?

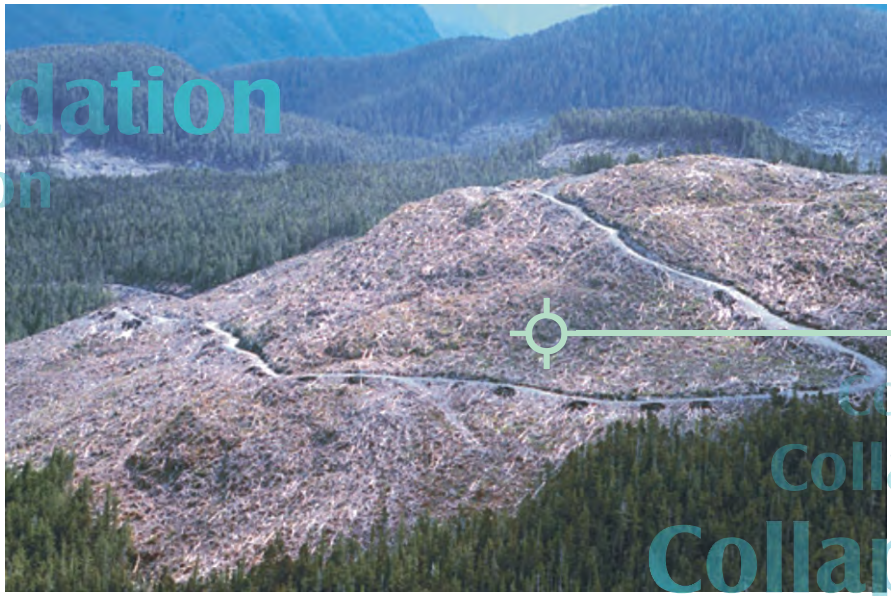
What Are Biophysical Needs?

Biophysical systems are made up of many interacting and interdependent components. Because ecosystems continually process energy and information from their surrounding environments they must constantly adjust (equilibrate) to changing conditions.

The ability of a system to absorb shocks and adapt to changes is called resilience. If the existence of an entire system is dependent on the health of a few species, it may easily collapse when stressed. For this reason larger and more complex ecosystems are more resilient than smaller and simpler systems.

Ecosystems need to maintain wholeness and health if they are to survive. Human-induced stresses are threatening to degrade ecosystems beyond threshold points—the points at which additional degradation will trigger irreversible collapse.

Clearcut forest in British Columbia



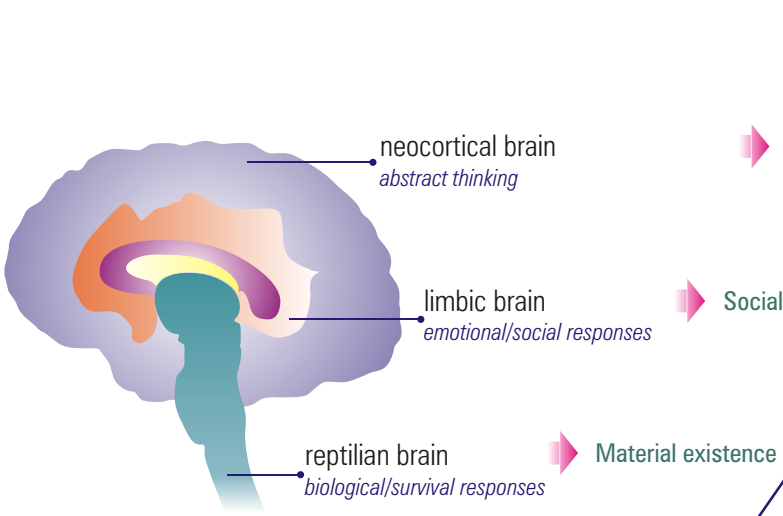
Without wholeness and health ecosystems can be irreversibly damaged

What Are Human Needs?

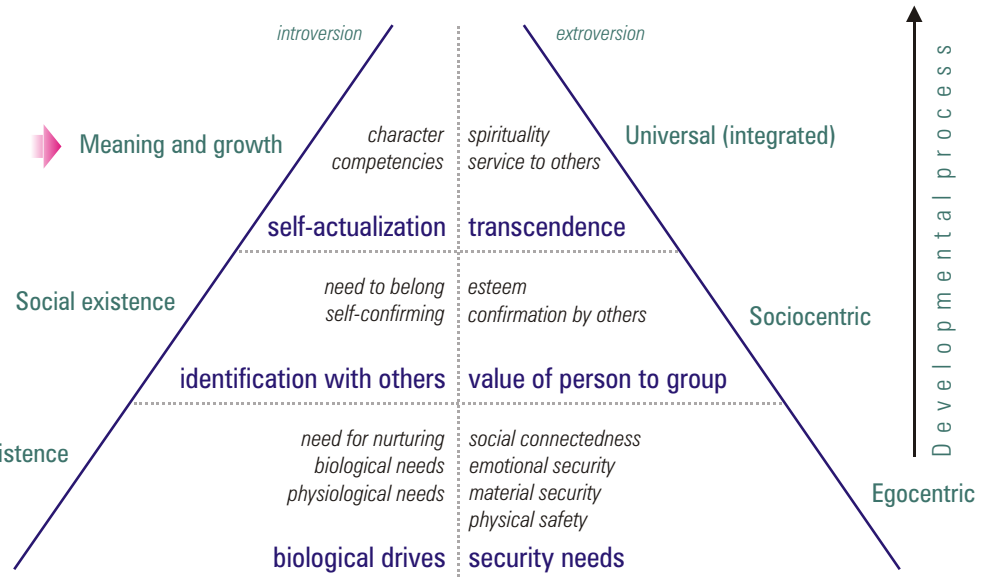
Humans are the only species who use abstract symbols to interpret their environments. We live in societal systems because we cannot survive without learning to use symbols and tools.

Language, culture and social institutions co-evolved with the human brain. Our triune brains represent three levels of evolution: the reptilian brain enables physiological responses; the limbic or mammalian brain enables emotional responses; and the large neocortex enables abstract thinking. All parts of the brain are interdependent.

Humans have three corresponding levels of needs: material existence needs; social existence needs; and needs for meaning and growth. These needs are also interdependent and interactive.



Triune brain



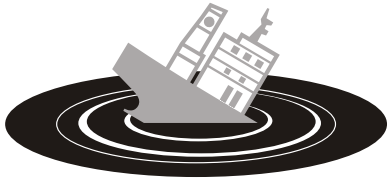
Human needs hierarchy

Brain illustration adapted from T. Lewis, F. Amini and R. Lannon (2000), *A General Theory of Love, New York, NY: Vintage Books.*
Hierarchy adapted from W.G. Huitt's reorganization of Maslow's and Alderfer's hierarchies in *Educational Psychology Interactive 2004.*

Genuine Progress Indicators

Our economic system is based on false and incomplete accounting. Economic transactions generated by destructive or non-productive activities such as wars, addictions or speculation are considered to add value, while unpaid productive activities such as parenting, housework or volunteer work are not valued at all.

With GDP accounting:



= +

The economic activity created by accidents adds value

= 0

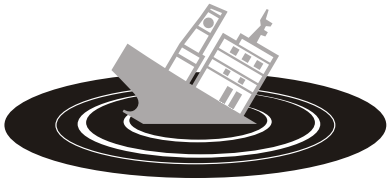
Parenting and unpaid agricultural work have no value

A sustainable global system must be able to accurately determine the real costs and benefits of human and biophysical activities. Accounting must be based on Genuine Progress Indicators (GPI) instead of Gross Domestic Product (GDP). While GDP only tracks monetary activities, GPI also accounts for social and environmental costs in order to evaluate personal and public well-being.

With GPI accounting:

= +

All productive work adds value



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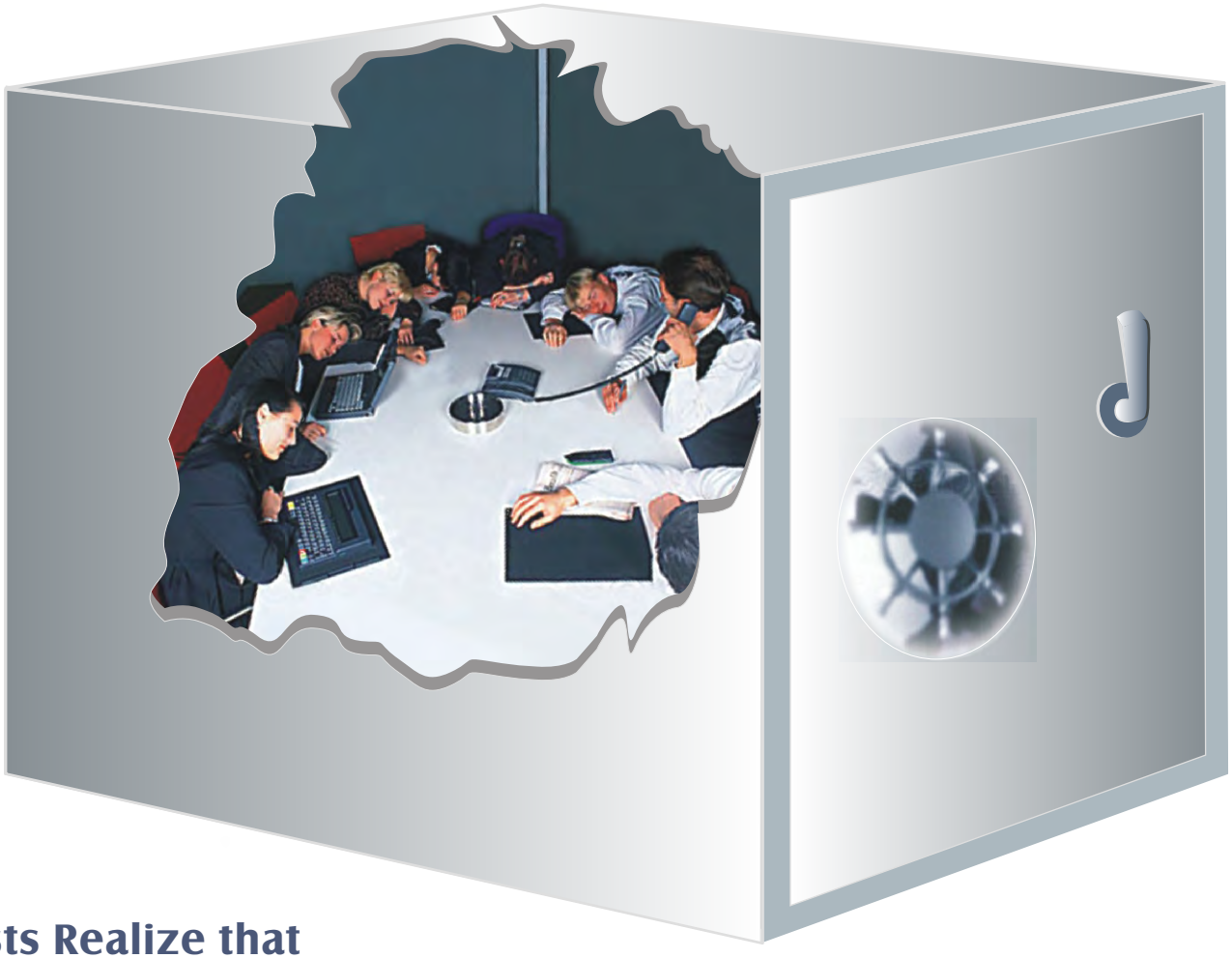
Pollution and accidents reduce value

The Real Bottom Line

Orthodox economics dismisses social and environmental costs as “externalities”. This means that values such as health and well-being are not included in economic modelling, planning or accounting.



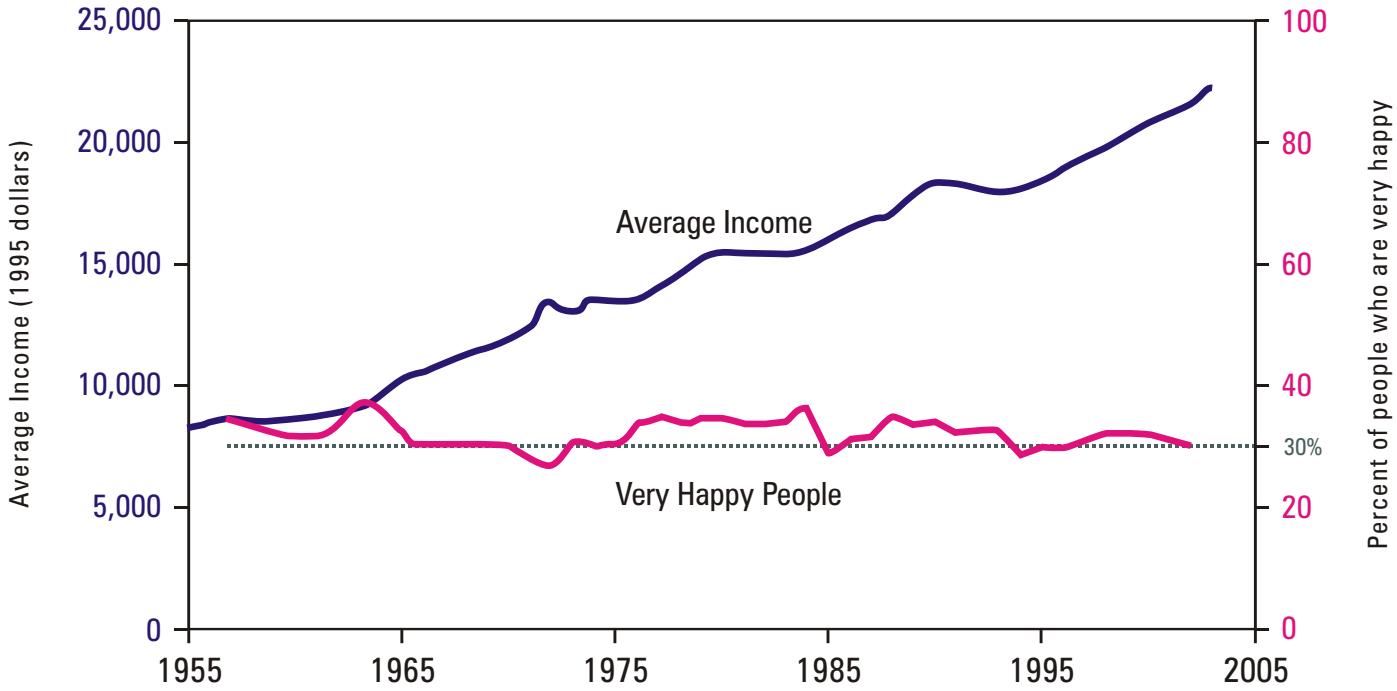
Will Economists Realize that Fresh Air and Water Have Value?

Money is not the real bottom line.

Meeting Real Needs, Not False Greeds

Global sustainability can be achieved if the world economy is redesigned to meet real needs instead of false greeds. This can be done through taking into account qualitative as well as quantitative factors.

International surveys indicate that rising incomes increase happiness only in poor countries. Increased income has little influence on happiness once basic needs are satisfied (for food, shelter, healthcare, education, etc.). After real material needs are met, it is easier to increase happiness by improving the quality of lives than by increasing the quantity of goods.



Average Income and Happiness in the United States, 1957-2002

Chart from D.G. Meyers (2004), in *Psychology,* 7th Ed., New York, NY: Worth Publishers

The Need for a New Model

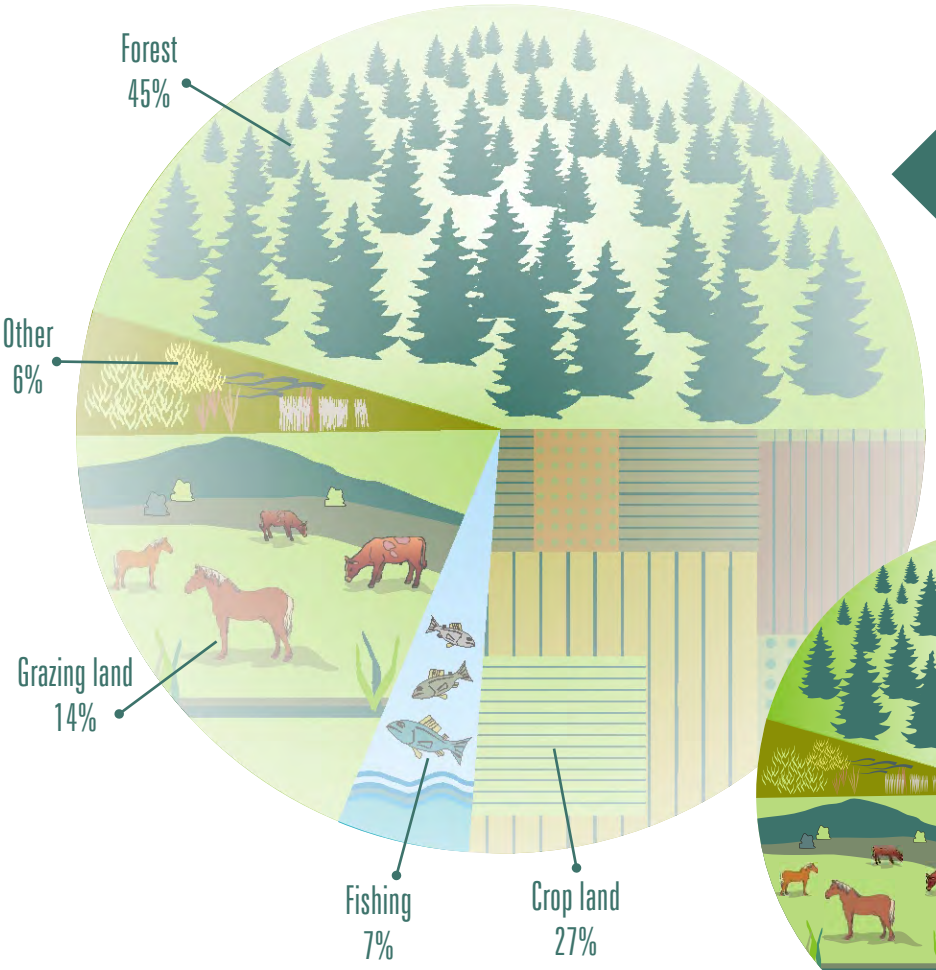
Industrial civilization is no longer sustainable: the industrial model is no longer relevant.

Our political and economic system is organized around the obsolete expansionist worldview of the industrial age.

The current economic model fails to understand that the viability of human social systems is utterly dependent on the viability of biophysical systems.

Global Natural Capital and Income

The carrying capacity of our planet equals the biosphere's total annual production of goods and services. This is the global annual natural income.



Natural Capital (Principal)

- Natural capital is the stock of natural assets that yields a flow of valuable goods and services into the future.

Natural Income (Interest)

- Natural income is the sustainable flow of goods and services from the stock of natural capital.

(From Rees, 1995)

- The global natural capital is equivalent to approximately 11.4 billion hectares of biologically productive land and sea.

(From: The Earth Council, *Ecological Footprints of Nations,* 1997)

Diagrams not to scale

Per Capita Ecological Footprints

The Per Capita Ecological Footprint is a tool for measuring and analyzing the average annual natural resource consumption and waste output of individuals.

= 1.9 ha.

Each person's fair ecological footprint (**earthshare**) in 1999. (The average amount of biologically productive land and sea available for each person on earth.)

= 6.48 ha.

Each person's average footprint in **high income** countries. (906 million people in 1999.)

= 1.99 ha.

Each person's average footprint in **middle income** countries. (2,941 million people in 1999.)

= 0.83 ha.

Each person's average footprint in **low income** countries. (2,114 million people in 1999.)

Estimates based on 1999 data. From: WWF *Living Planet Report 2002*

The Average American Ecological Footprint

= 1.9 ha.

Each person's fair **earthshare** in 1999.

= 9.7 ha.

The average footprint of **U.S. citizens** in 1999.

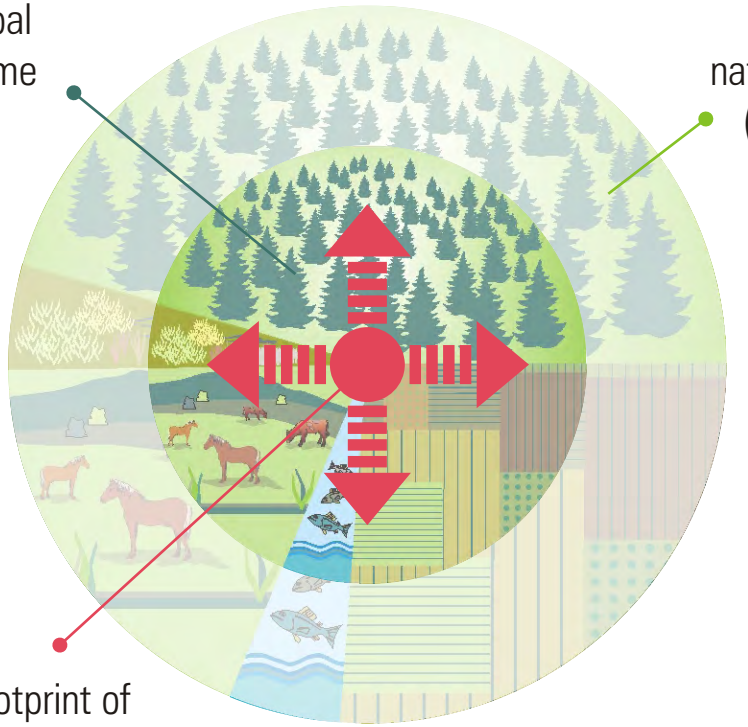
Human economies will only survive over the long-term if they are able to function within the carrying capacity of planet Earth.

The resources of 3 more planets would be needed for everyone in the world to live like Americans. The globalization of the American consumer society is not possible.

Estimates based on 1999 data. From: WWF *Living Planet Report 2002.*

Expansionist Worldview

relevant in1750 C.E.



Our expansionist economic model was developed at a time when there were unexplored frontiers. Natural resources seemed limitless.

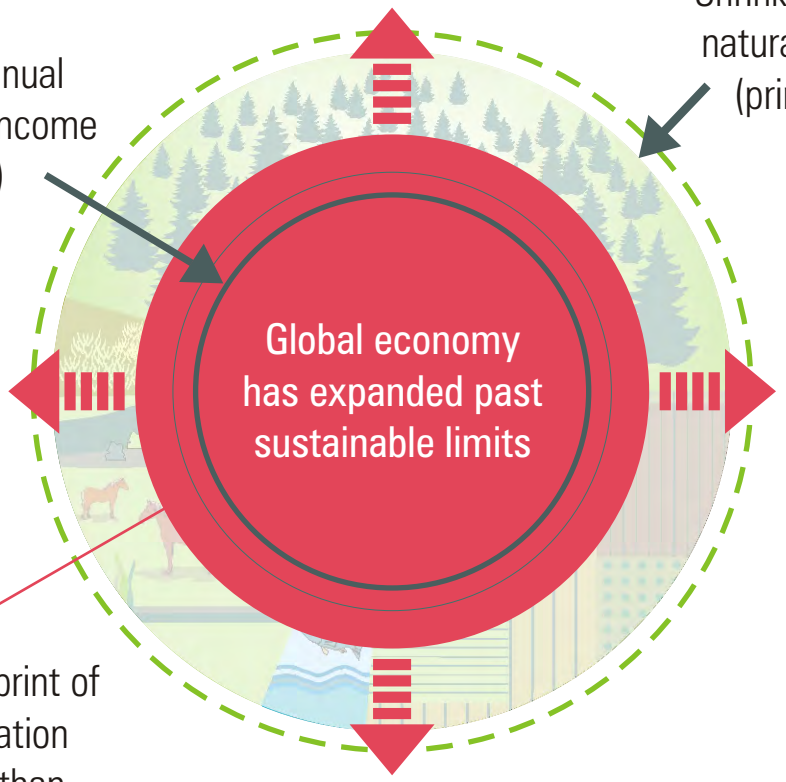
1750 C.E.

World population approx. 800 million
Agrarian civilizations still dominant
Beginning of Industrial Age

Diagram not to scale

Expansionist Worldview

not viable in 2000 C.E.



Globalization marks the end of unexplored terrestrial frontiers. An economic system based on limitless growth is no longer viable.

2000 C.E.

World population approx. 6 billion
Global industrial economy
Consumer culture

Diagram not to scale

Include and Transcend

The global economy must become environmentally sustainable.

PESSIMIST

New technologies can help make the transition to a sustainable economy.

EXPANSIONIST

Global resources must be shared more fairly and reallocated to meet real needs.

DISTRIBUTIONIST

INTEGRAL

We need to include and transcend current views. A global system must have a global perspective and values.