

WE WITNESS UNSUSTAINABLE HUMAN-ECOSYSTEM INTERACTIONS

- How could people make such serious mistakes in the past and why does society continue to repeat such mistakes today?



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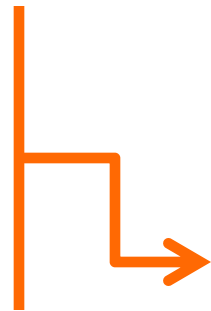
- How could people make such serious mistakes in the past and why does society continue to repeat such mistakes today?
- Is it inevitable that the environment must be degraded to satisfy human needs?



DRIVERS OF UNSUSTAINABILITY

○ HUMAN POPULATION INCREASE

- Agriculture
- Shelter
- Mobility
- Stuff



Use
Energy and
Material Resources

causes

- Land use change
- Habitat loss
- Deforestation
- Alter biogeochemical cycles

Climate Change
Eutrophication
Acid precipitation
Ozone Depletion
Smog

...



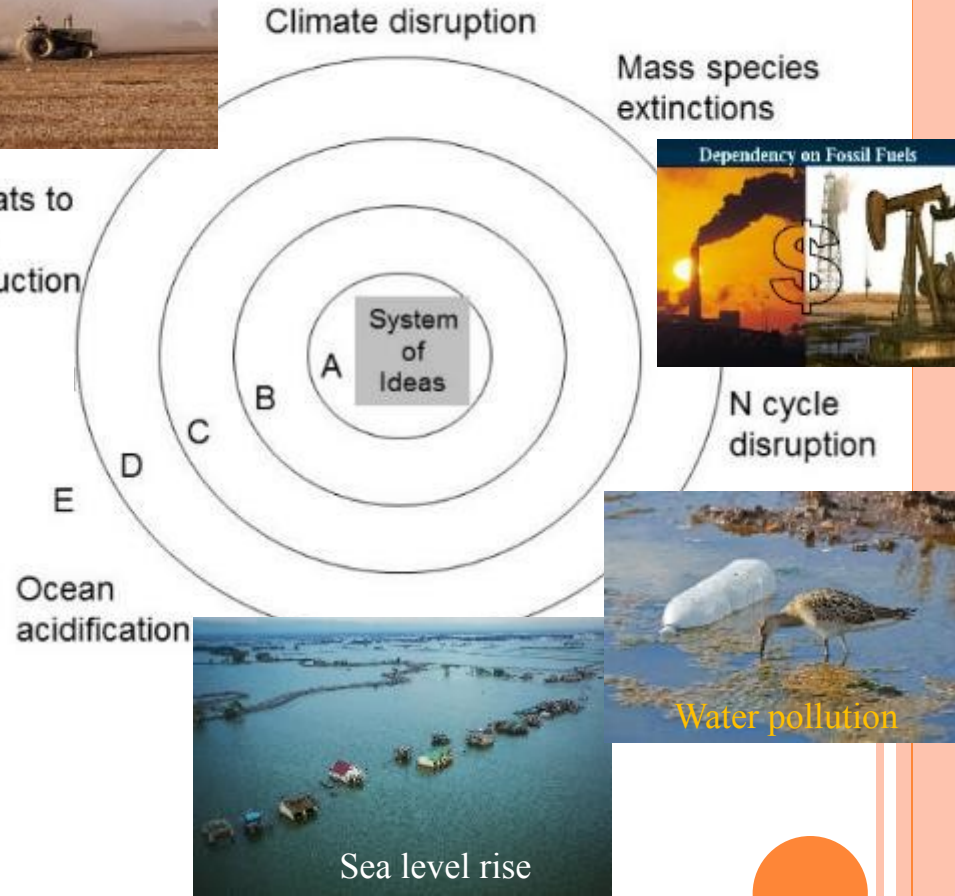
Leads to



ENVIRONMENTAL (AND SOCIAL) PROBLEMS ARE SYMPTOMS OF DEEPER FAILURES

Are mostly symptoms of a deeper flawed relationship with nature and ourselves

Today's problems were yesterday's solutions



WHY ENVIRONMENTAL RESOURCES HAVE BEEN POORLY CONSERVED IN THE PAST?

1. *Nature's rate of return of ecosystem services leads us to over exploitation*
 - Living off the flow is too slow, for how we want to grow
 - Poor understanding of growth, exponential growth
2. *Externalities – distort the prices and price signals*
 - Indirect cost not paid for by producer and consumer as part of a transaction
 - When a decision (for example, to pollute the atmosphere) causes costs or benefits to individuals or groups other than the person making the decision
3. *Pressure for resource consumption*
 - Economic and institutional growth paradigm
 - Victor Lebow (1955): our enormously productive economy demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfactions, our ego satisfactions, in consumption
 - Marketing



1. “LOW” GROWTH RATE LEADS TO OVER EXPLOITATION

- Nature provides constant production of new goods and resources (through ecosystem services such as primary production).
- If this rate of production is lower than desired, we
 - Over exploit the resources (fisheries, forests, soils)
 - push the system to increase production – adding nutrients, water, protect from pests, etc.
- Hardly occurs to us to manage our needs within this available production
 - living off the flows, not the capital



UNSUSTAINABILITY - SOME DRIVERS

○ Human migration

- Fitting in to a new area with varied ecological constraints
 - U.S. Prairies: perennial grasses, windy, polyculture substituted annual crops, monoculture

○ New technologies

- Unknown environmental consequences
- Social systems do not have the institutions on environmentally sustainable use
- Culture may not have evolved a conservation ethic if it was unnecessary in the past (what may have worked then doesn't work now)



UNSUSTAINABILITY - SOME DRIVERS

- Portable capital in a free market economy
 - Because the growth rate of the world economy is greater than the biological growth rate of most renewable natural resources, there are powerful economic incentives not to use renewable resources on a sustainable basis (Marten 2001, p.143).
- Tragedy of the Commons
 - Garret Hardin (1968)
 - Benefit to the individual is greater than the loss which is shared by all





Within carrying capacity

Above carrying capacity



division of costs and benefits to herders is unequal:
individual herder gains all of the advantage,
disadvantage is shared among all herders using the pasture



It's a tragedy because under the current economic paradigm, the "right" choice for the individual degrades the environment



Use of the commons is below the carrying capacity of the land. All users benefit.



If one or more users increase the use of the commons beyond its carrying capacity, the commons becomes degraded. The cost of the degradation is incurred by all users.



Unless environmental costs are accounted for and addressed in land use practices, eventually the land will be unable to support the activity.



RESPONSE TO TRAGEDY OF COMMONS

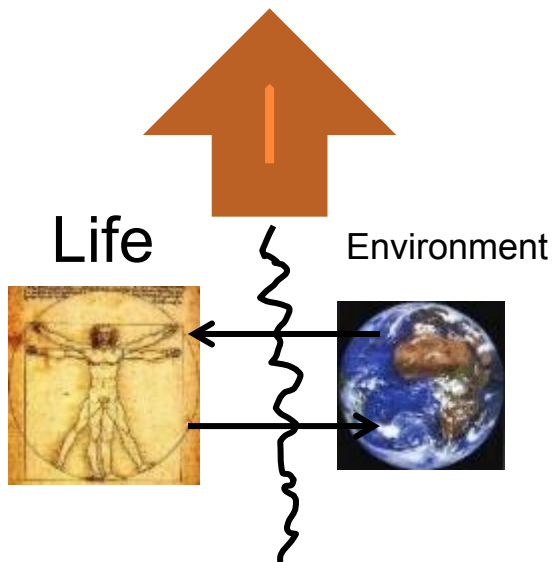
- Environmental Ethics that protects nature and the common goods
- Privatize resources so risk and reward are coupled (doesn't address off-site impacts, downstream, in airshed, etc.)
 - Some resources are not able to be privatized (oceans, air, groundwater, etc.)
- Hardin proposed: “Mutual coercion, mutually agreed upon” – meaning democratically imposed (top-down) limitations
- Ostrom proposed bottom-up community “collective actions” could effectively manage commons



SOCIO-ECOLOGICAL FRAGMENTATION

REAL IMPACTS OF CHOICE OF SYSTEM BOUNDARIES

Tragedy of the Commons
Humans win, environment degrades



Bounty of the Commons
Humans win, environment improves



Figures by Dan Fiscus



LARGE INPUTS TO AGRICULTURAL AND URBAN ECOSYSTEMS

- There is an important relationship between inputs and sustainability
- {Systems} are less sustainable over the long term if large quantities of human inputs are required to keep them functioning.
- Creates dependencies, “control loops”
- It is difficult to ensure that large inputs can be provided on a reliable basis
- Most energy comes from fossil fuels

(Marten, 2001, p. 145)



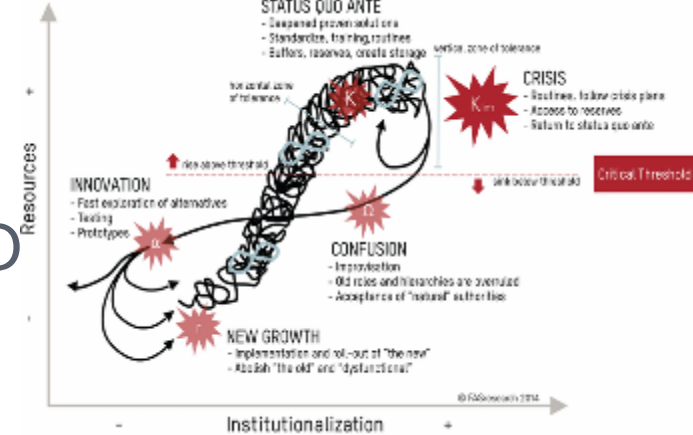
URBANIZATION AND ALIENATION FROM NATURE

- Inborn human need to learn about nature
- Biophilia – the emotional need for nature
- Access to nature during childhood is important



THE RISE AND FALL OF COMPLEX SO

- Complexity characterized by extensive differentiation and specialization
- Growth and complexity form a **positive feedback** loop that makes them increase exponentially
- When complexity is greater than the optimum more complexity can lead to less productivity
- Dissolution begins
- Downward positive feedback loops may eventually cause the system to be abandoned
- Migration to new areas with new opportunities (reorganization)



The Collapse of Complex Societies

JOSEPH A. TAINTER



Collapse of Complex Societies (Tainter 1988)

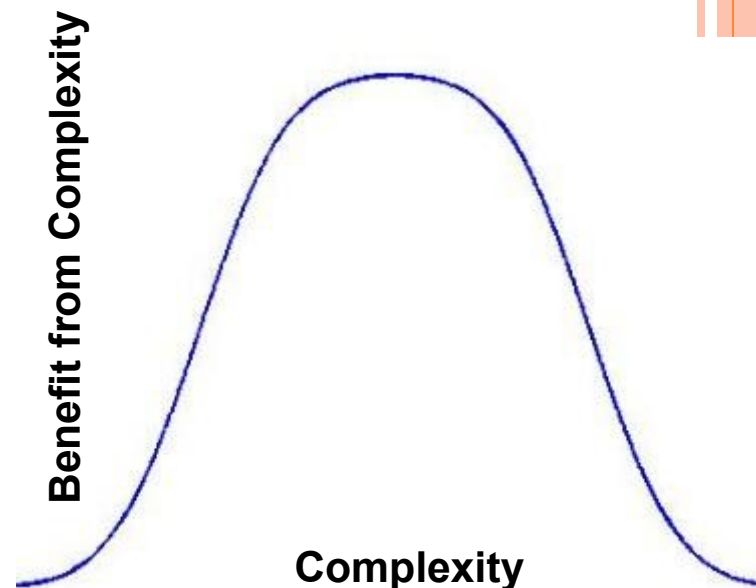
Complexification is limited as a problem solving strategy.

“More complex societies are more costly to maintain than simpler ones... as societies increase in complexity, more networks are created among individuals, more hierarchical controls are created to regulate these networks, more information is processed ...

increasing need to support specialists
not directly involved in resource
production, and the like”

(Tainter 1988, p. 91).

“Collapse is the appropriate response of
the system”



PRECAUTIONARY PRINCIPLE

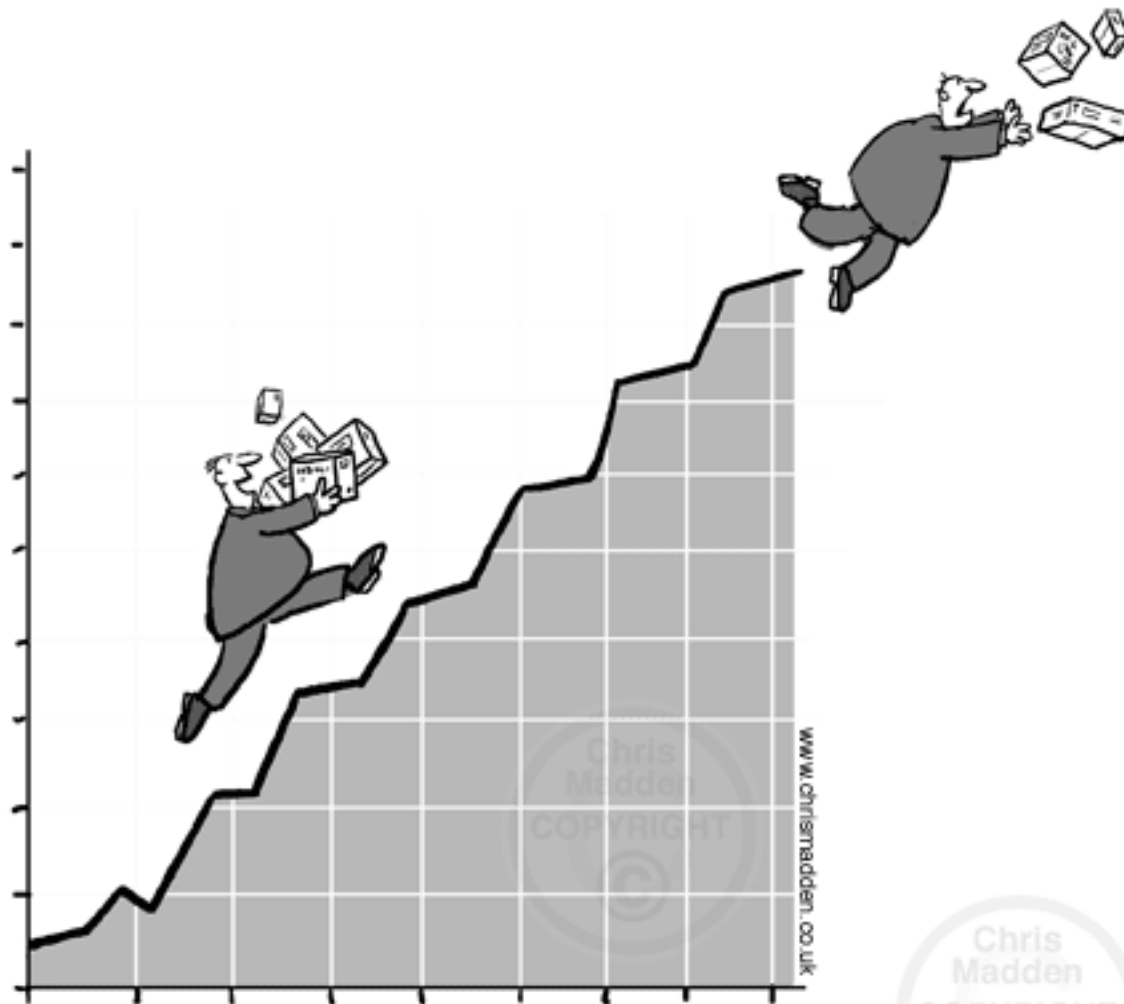
- Burden of proof on the doer not the receiver
- If in doubt, then use less than the apparent maximum
- However, this is counter to the prevailing ethos of the modern global economy, which rewards entrepreneurial boldness and portrays confidence in economic growth as an ultimate virtue (Marten, 2001, p 154).



3. *PRESSURE FOR RESOURCE CONSUMPTION*

- Consumerism is a cultural pattern that leads people to find meaning, contentment and acceptance primarily through consumption of goods and services.
- Equates high consumption with well-being and success
- Defining success and happiness through how much a person consumes is not sustainable.





THE RISE OF CONSUMERISM

Chris Madden
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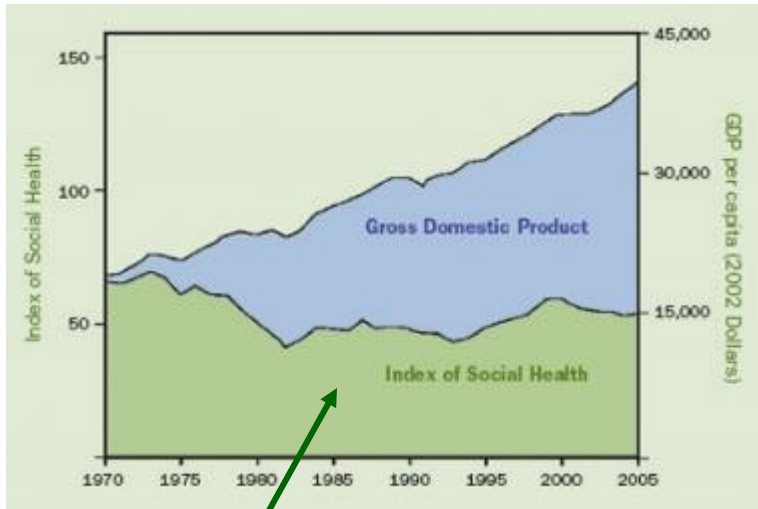
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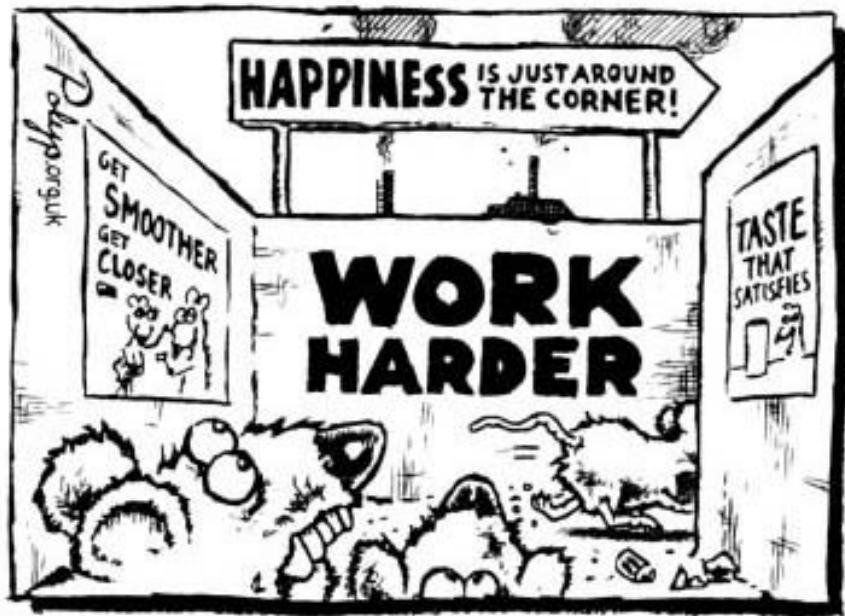


What is the purpose of growth?

We know that bigger does not always mean better, nor more happiness



Alternative well-being indicators tell a different story



'RAT RACE'

Cultural orientation did not just appear as a byproduct of growing incomes but was engineered over several centuries:

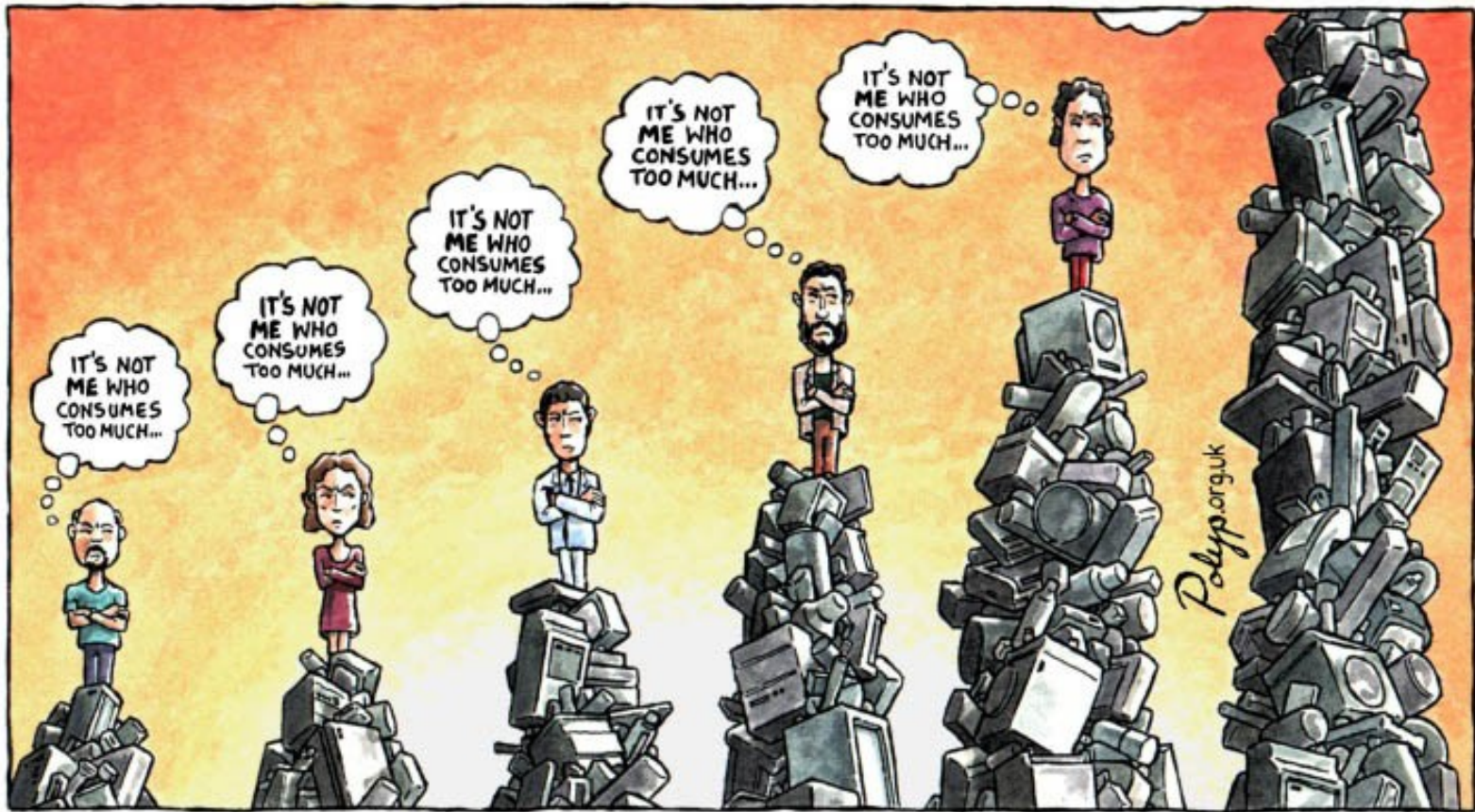
POSITIVE FEEDBACK – consumption – production cycle

Reinforced through exposure to cultural symbols



Memetic rivalries: Rene Girard

Our wants are socially constructed in competition (for status) with others.
We measure in terms of others, not absolutes



'IT'S NOT ME'

The challenge is “To live undestructively in an economy that is overwhelmingly destructive...” p. 20

“The responsible consumer slips out of the consumer category altogether.” P. 27

Wendell Berry, *The Unsettling of America* 1977





We help the environment by consuming less

We help the environment by consuming lots of environmentally safe products



Business practices to entice consumerism:

Increase in consumer credit

Advertisement – particularly to youth

BABY WALKER





Early social customs actually blocked consumerism

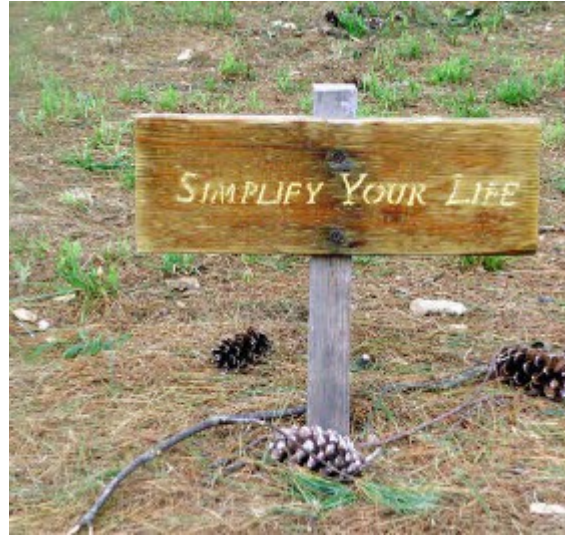
Religion

Fasting

(Lent, Ramadan)

Poverty

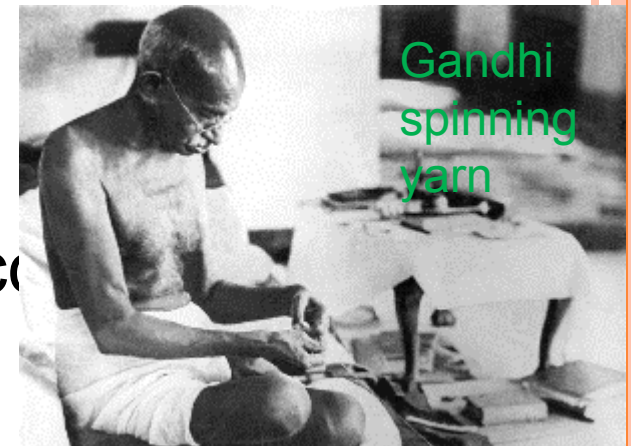
Simple living



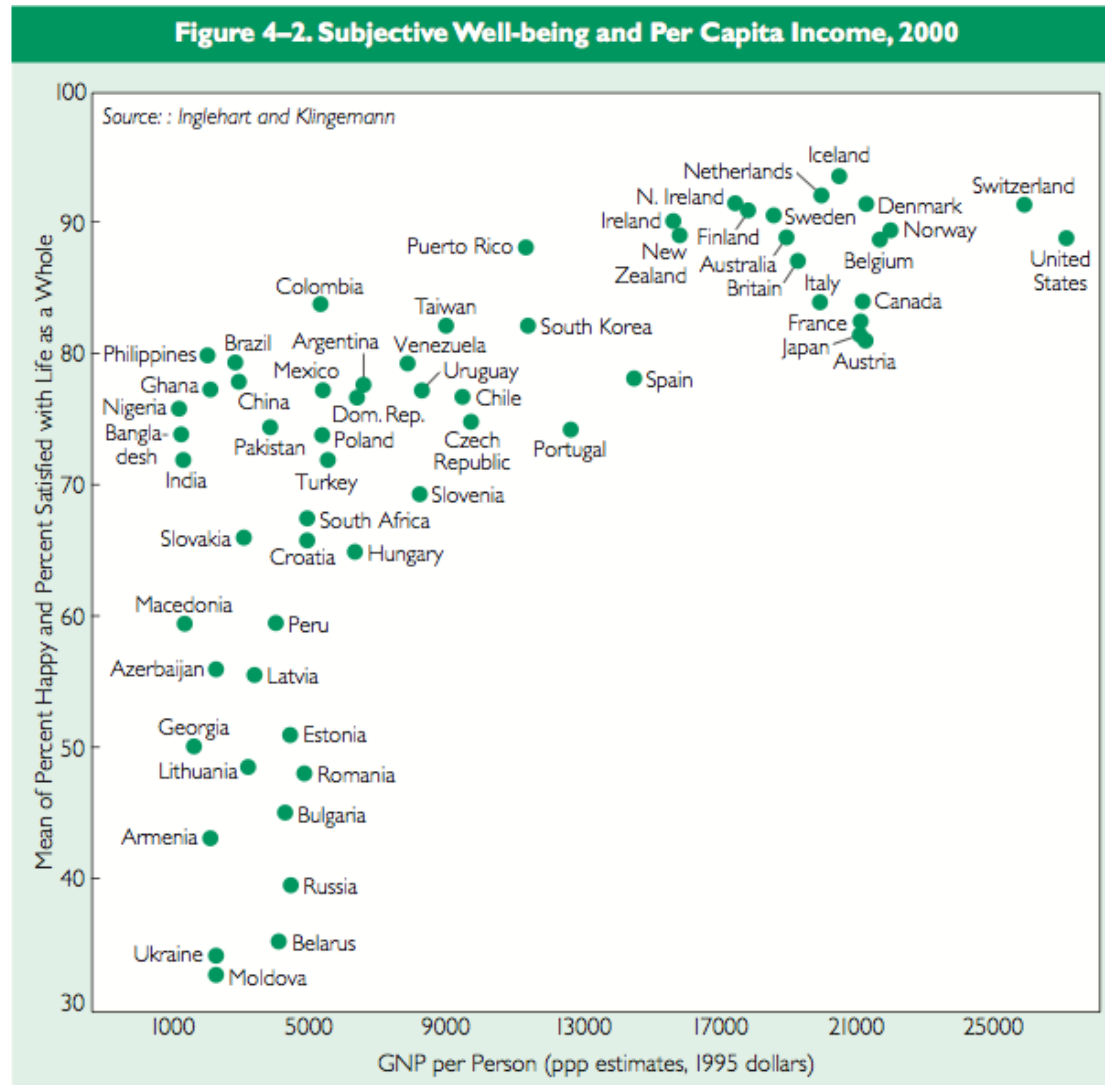
Limited credit

Preference for leisure time

How can we regain control over co



Why focus on GNP?



“The gross national product does not allow for the health of our children, the quality of their education or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of public officials. It measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country, it measures everything, in short, except that which makes life worthwhile.”

Robert F. Kennedy, 1968

STEPS FORWARD

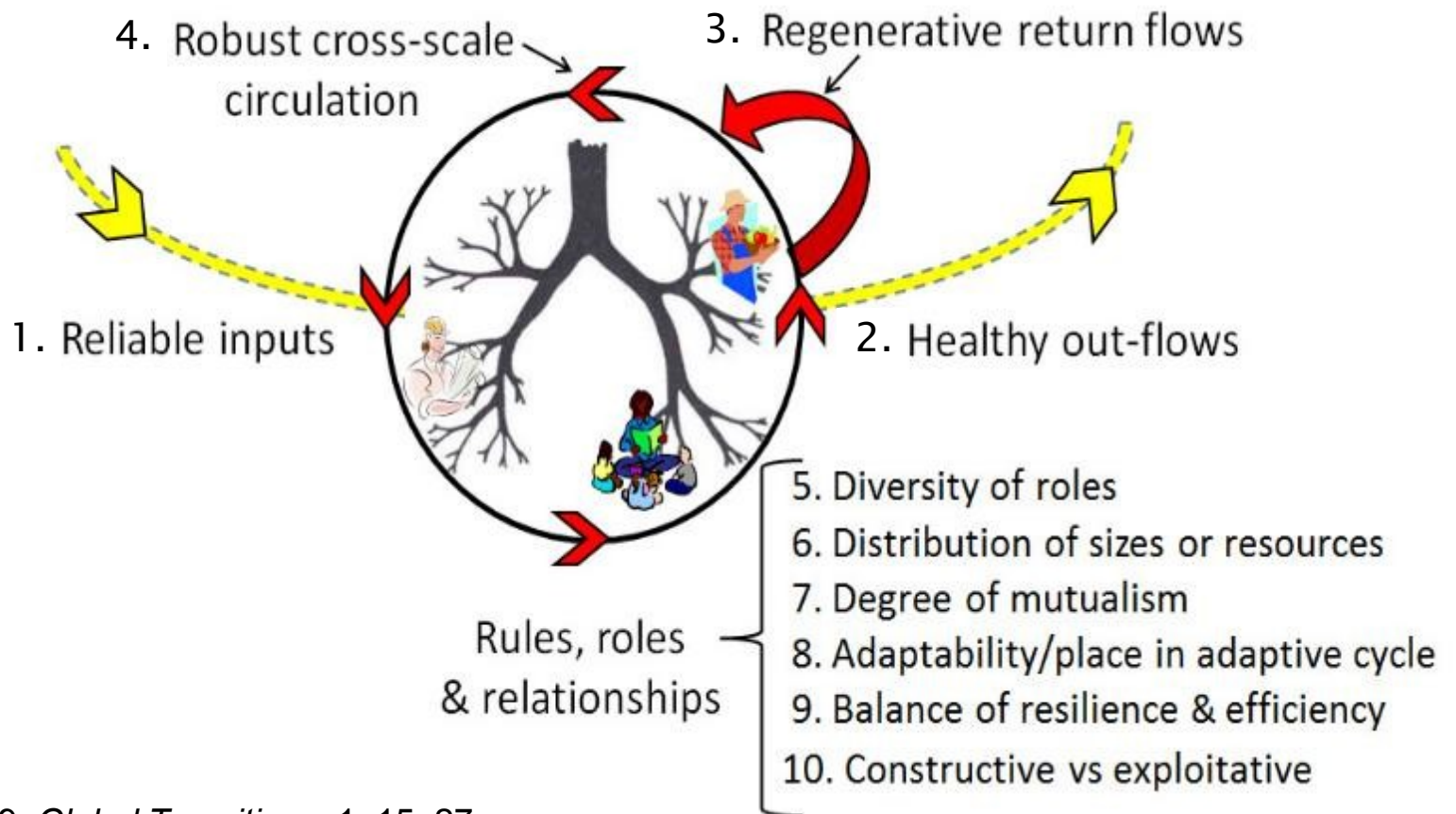
- Market corrections for externalities
- Ecosystem Services now guiding policy decisions
- Consider other “quality of life indicators”
 - Genuine Progress Index
 - Index of Sustainable Economic Welfare
 - Human Development Index
 - Gross Happiness Index

- But the mindset of unlimited growth is deeply embedded – and flawed



SIMILAR TO AN ECOSYSTEM REGENERATIVE ECONOMY

Input, Output, and System Dynamics







PLAN VON BRÜNN 1749
— von Koller —

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**THANK YOU FOR
YOUR ATTENTION**