

**If our way of life is unsustainable and
if a transition to sustainability is unavoidable:
What will the transition and the future
look like?**

colloquium of the conCERNed club, July 9, 2012
Michael Dittmar

- **Headlines around Rio+20: 20 years of unsustainable development.**
- **How to define and quantify sustainable living?**
Our real footprint is much larger than the “ecological footprint”!
- **Without cheap unlimited energy: our way of life is unsustainable!**
Towards a realistic view of the energy overshoot problem:
Some numbers for Switzerland, the EU and the entire planet.
- **The unavoidable transition (end of today’s system) to a new sustainable system:** Theoretical possibilities and what real humans in a real world can hope for?
- **Our own (in)actions today shape tomorrows sustainable future.**
Ideas to optimize the conditions for a future life worth living.

Some headlines around the RIO+20 meeting

- **"Rio+20: Don't wait for disappointment from the bureaucrats:"**
"Today's technocratic politicians will only ever lead from behind, once a critical mass of people have already shown the way" (Guardian June 1, 2012)
- **"Brazilian leader Rousseff's pardon for illegal deforesters condemned"**
(Guardian June 1, 2012)
- **"Many treaties to save the earth, but where's the will to implement them?"**
(Guardian June 7, 2012)
- **"Return to Rio: Second chance for the planet"** (Nature, June 6, 2012)
- **"African land grabs hinder sustainable development"**
"Sales of forest land to corporations are dispossessing inhabitants and harming ecosystems." Nature, February 1, 2012
- **"After Rio, we know. Governments have given up on the planet"**
(Guardian June 25, 2012)

After 20 years of Mega-meetings (United Nations, G8, G20, EU etc) filled with "good intentions" and even more "good words":

Our policies of **"Sustainable DEVELOPMENT"** have made our way of life **LESS sustainable!**

20 (40) years of “Sustainable Development” (1)

UN meetings Stockholm (1972), Rio (1992) and Rio+20 (2012)

“World Remains on Unsustainable Track Despite Hundreds of Internationally Agreed Goals and Objectives”

Guardian Headline (June 12, 2012), about the new UNEP publication “Global Environmental Outlook” (June 6, 2012) at http://www.unep.org/geo/pdfs/geo5/GE05_report_full_en.pdf

Some details from the report:

- Population increased from 3.9 billion (1972) to 5.5 billion (1992) to 7 billion 2012; and (without “collapse”) 8-8.5 billion people want to live in 2032!
- Non renewable energy resource consumption almost doubled from 1972 to 2012.
- CO2 levels in the atmosphere: 330 ppm (1972) to 359 ppm (1992) to now 397 ppm.
- The world failed to reach the Millennium Development Goal (MDG) target of a significant reduction in the rate of biodiversity loss by 2010.
“The pressure on biodiversity continues to increase. Habitat loss and degradation from agriculture and infrastructure development, overexploitation, pollution and invasive alien species remain the predominant threats.”
- **Economic growth has come at the expense of natural resources and ecosystems.**
“Many terrestrial ecosystems are being seriously degraded because land-use decisions often fail to recognize non- economic ecosystem functions and biophysical limits to productivity.”

20 (40) years of “Sustainable Development” (2)

UN meetings Stockholm (1972), Rio (1992) and Rio+20 (2012)

Devastating results of “Sustainable development” policies!

More “quotes,details” from “Global Environmental Outlook”, UNEP, June 6, 2012
at http://www.unep.org/geo/pdfs/geo5/GE05_report_full_en.pdf

- Since 2000 alone, forests equivalent in size to the landmass of Germany have been lost;
- 80% of the world’s fish stocks are (close to collapse) fully or overexploited or have collapsed already.
- The Gobi desert is growing by roughly 10,000 square kilometres every year. Each year an additional 20 million hectares of agricultural land become too degraded for crop production, or are lost to urban sprawl (from a total of 1500 million hectares).
- **The world community** has missed all but 4 of its 90 most important environmental goals and **without a new path** of development and a change in consumption patterns, the pressure on ecosystems and poor communities is set to intensify as the global population is projected to rise from the current 7 billion to 9 billion by 2050.

“As human pressures within the Earth System increase, **several critical thresholds are approaching or have been exceeded**, beyond which abrupt and non-linear changes to the life-support functions of the planet could occur. This has significant implications for human well-being now and in the future.”

Today's way of life is unsustainable

The TINA principle (There Is No Alternative)

Our industrial civilization is like sitting
inside a TGV (first class) moving toward the cliff!

→ **Not knowing where we are and what is coming!**

If lost: apply the **STOP** principle!

from the scouts handbook <http://www.hikingdude.com/hiking-lost.php>

S for **Stop** (As soon as you realize you may be lost, stop, stay calm, stay put.)

T for **Think** (Go over in your mind how you got to where you are.)

O for **Observe** (Get out your compass and determine the directions from where you are currently sitting.)

P for **Plan** (Based on your thinking and observations, come up with some possible plans and then act on one of them.)

A quantifiable definition of sustainability (1)

Lacking a usable definition of “sustainable development”, we might try a method well known in science:

Quantify a problem by defining the “opposite”!

Examples for an unsustainable “way of life”:

- Use of non renewable energy resources (oil, gas, coal, uranium).
- Use of non renewable mineral resources (as long as recycling depends on unsustainable and cheap energy resources).
- Use of renewable energy resources (water, wood, solar, wind etc) is rarely sustainable! (e.g. the unsustainable destruction of old forests for (fire) wood use).
- Industrial agriculture destroys soils and clean water and depends on unsustainable cheap energy.
- Non compostable waste production with a long lifetime (plastics, chemical toxic waste, nuclear waste, CO₂) reduces/destroys remaining natural capital.

→ **“Development towards sustainability” can be quantified with a measurable (annual?) reduction of unsustainable practices and at any level of the society.**

The ecological footprint concept includes at best only the last three points. (proposed and developed 20 years ago by Rees and Wackernagel)

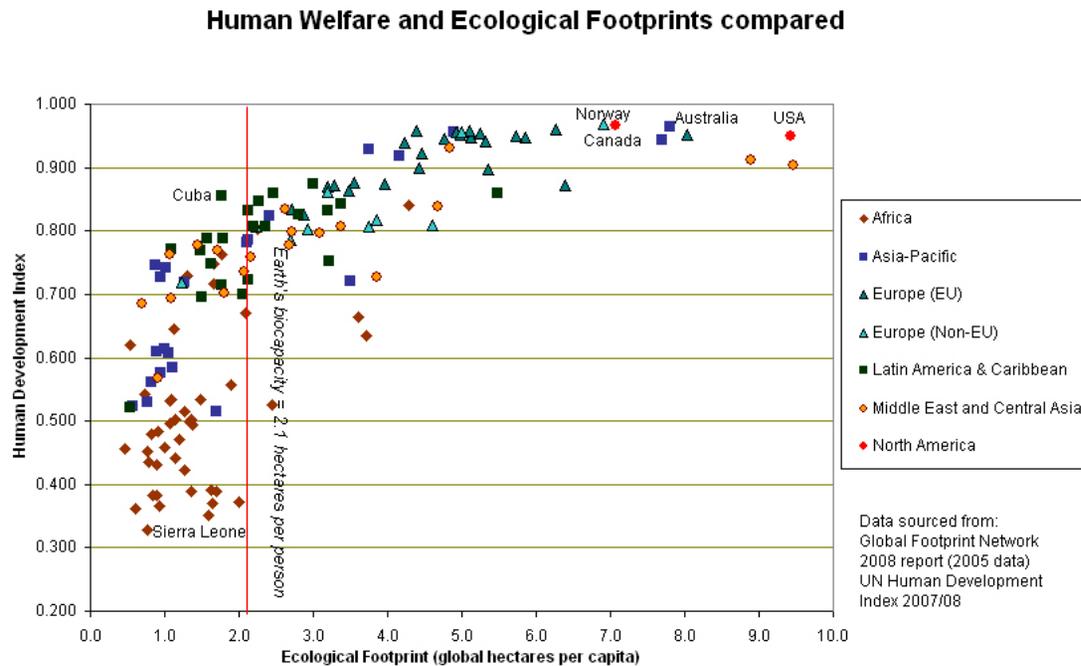
http://en.wikipedia.org/wiki/Ecological_footprint

A quantifiable definition of sustainability (2)

The failure of the “eco-footprint” concept

According to the “ecological footprint” concept, we in the rich countries, “consume” more than 4 times the annual bio-capacity of the planet and on average human activities decrease the natural capital by a factor of about 1.3 faster than nature can restore it.

The number carries little weight without knowing for how long this practice can continue: We need to know how much natural capital is left!



90% of our energy sources are nonrenewable and “renewable” energy sources can’t provide us with anywhere near as much net energy.

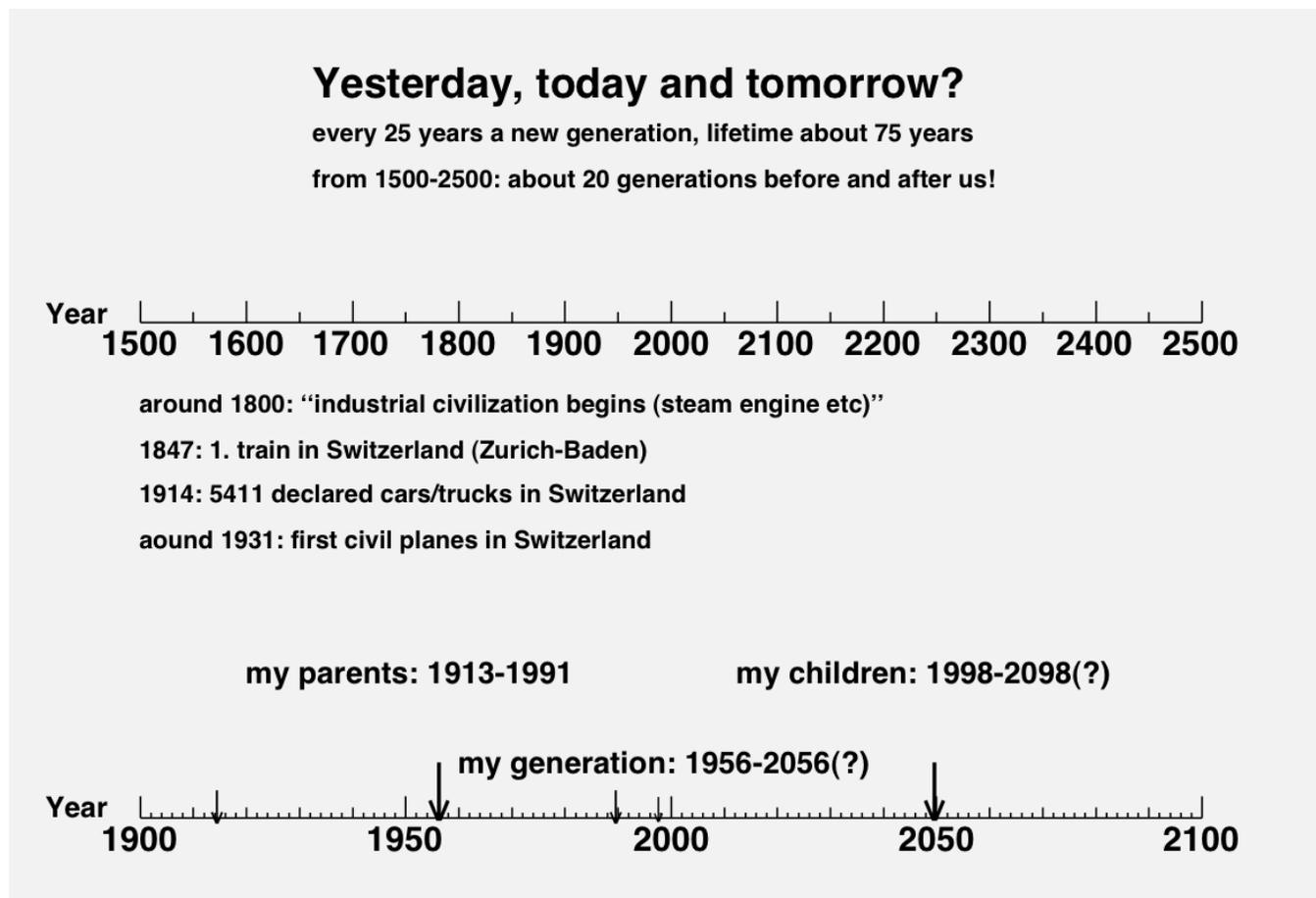
So our energy ghost-footprint is about 10 times larger than our eco-footprint. Which means our “real footprint” is about 10 times larger than what we like to believe!

Today's human impact is not sustainable; It must change! How much time is left? (1)

Following Liebig's principle: "A bridge will collapse at its weakest point":

How much natural capital is left after devastating overuse from at least 500 years of colonization and 200 years of the industrial revolution?

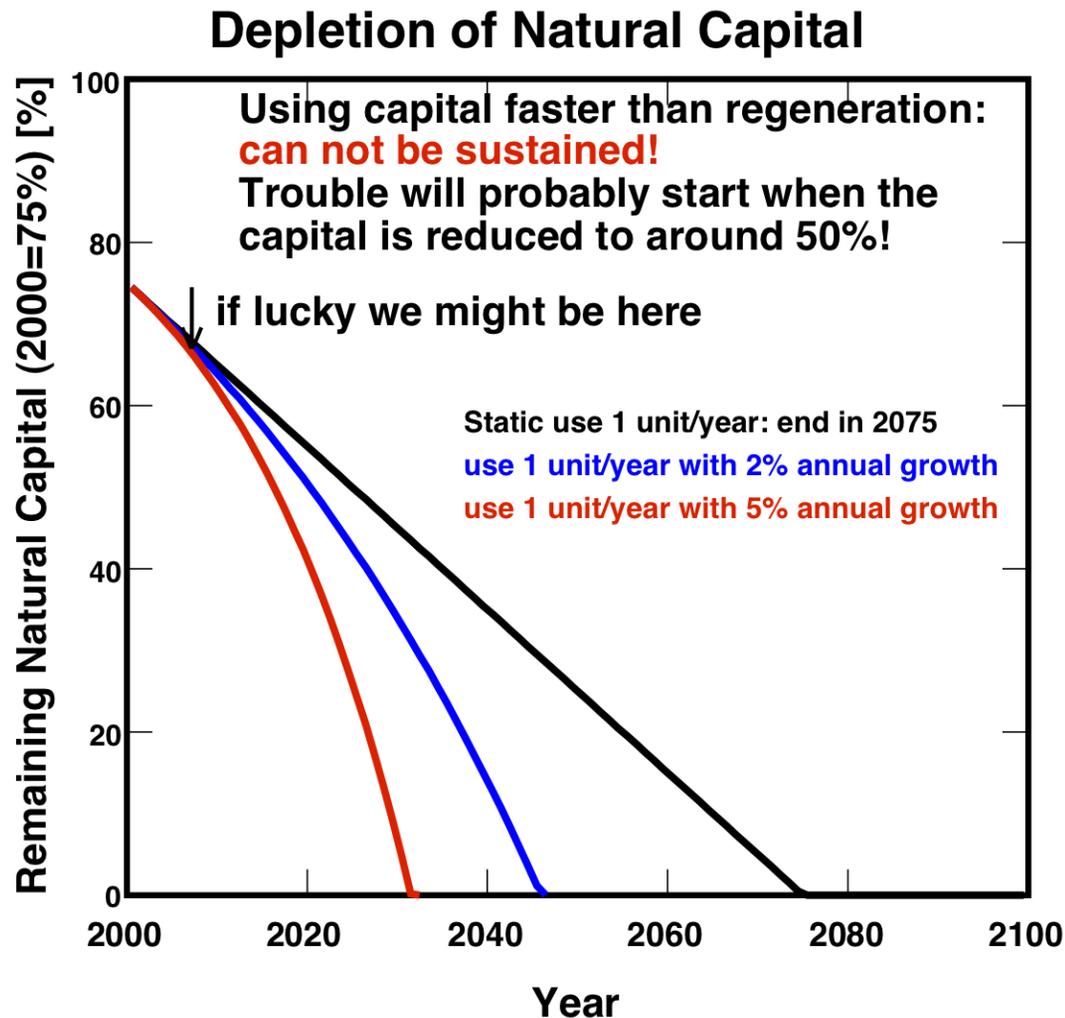
How much time is left before "mother nature" decides our fate with a "reset" ?



Today's human impact is not sustainable; It must change! How much time is left? (2a)

Following Liebig's principle: "A bridge will collapse at its weakest point":

How much natural capital remains before serious troubles begin?



Today's human impact is not sustainable; It must change! How much time is left? (2b)

Following Liebig's principle: **"A bridge will collapse at its weakest point":**

Example Forest cover in Switzerland:

<http://rainforests.mongabay.com/deforestation/2000/Switzerland.htm>

Switzerland 2000 years ago "="

Landscape with pristine forest at maximum "productivity": (soil building).
Used in a sustainable fashion by bears, wolves, bison, salmon .. and humans.

Switzerland today "="

31% is "forested", but only 1% is old pristine protected forest (40 000 ha).
Used by maximum number of humans and the biodiversity at lowest level ever.

Since 20 years: Forests are growing with 0.5%/year (5000 ha/year): At this (exp.) growth rate it takes about 200 years to restore the original pristine primary forest capital!

Difficult to continue this path when wood (energy) demand is growing:

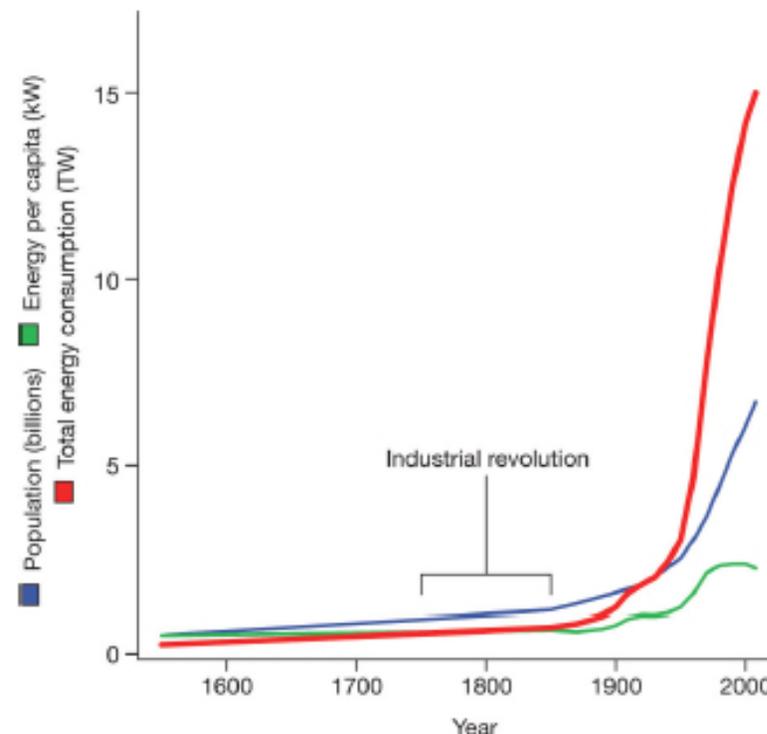
- (1) Today only 5% of Switzerland's "energy" demand satisfied with wood.
- (2) Current Swiss wood usage is "sustainable", but only in mountain regions and only if the "imbedded wood" in imports is not counted!

Today's human impact is not sustainable; It must change! How much time is left? (3)

Following Liebig's principle: **"Peak Energy/capita usage likely the weakest point!"**

- (1) Industrial civilization seems to function (well?) only during periods of economic growth.
- (2) Growth requires cheap/abundant energy (especially oil and electric energy!)
- (3) The decline following "peak energy" will start the decline of industrial civilizations!**

History of growth in world population and environmental impact of *Homo sapiens*, indicated by its surrogates, per capita and total human energy use.



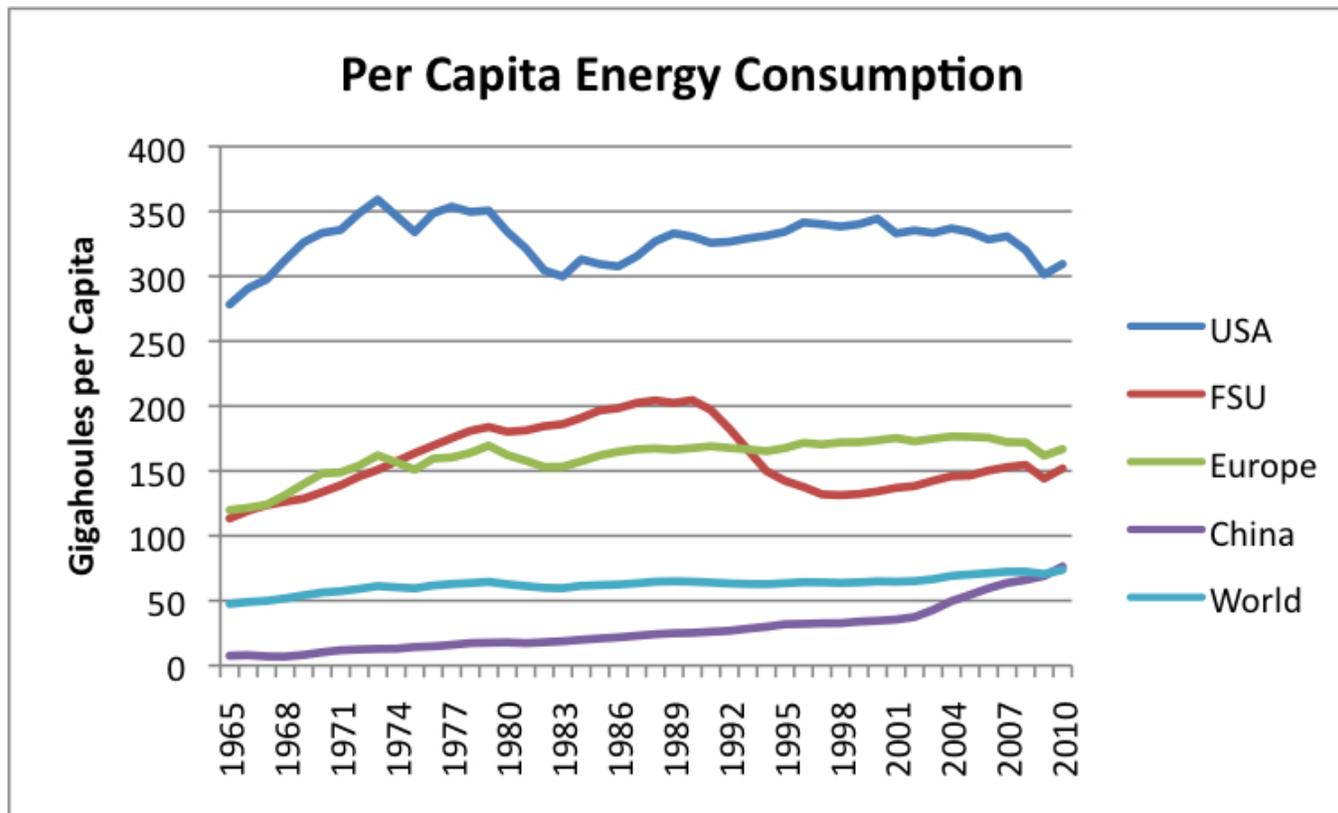
Today's human impact is not sustainable; It must change! How much time is left? (4)

Following Liebig's principle: **"Peak Energy/capita usage likely the weakest point!"**

Oil price reached record highs in Summer 2008 and the ongoing world economic crisis started in fall 2008.

Result: A reduction of almost 10% in USA energy consumption.

Just a coincidence (like the economic oil shocks in the '70)?



source: <http://ourfiniteworld.com/2012/03/12/world-energy-consumption-since-1820-in-charts/>
Energy per capita consumption stopped growing, are we near the final decline?

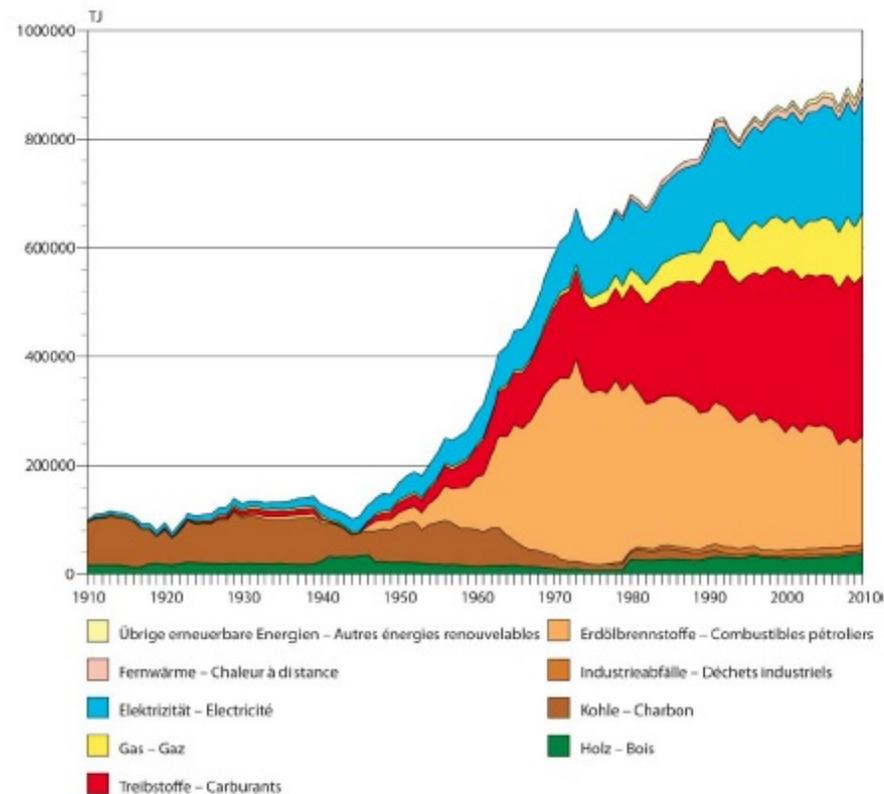
Today's human impact is not sustainable; It must change! How much time is left? (5)

Following Liebig's principle: **"Peak Energy/capita usage likely the weakest point!"**

Key numbers for Switzerland (similar for Europe and the Planet):
Industrial growth after World War II in coincidence with abundant cheap oil/energy!

About 60% of the Swiss energy sector/success based on oil!

Endenergieverbrauch 1910–2010 nach Energieträgern
Consommation finale 1910–2010 sel on les agents énergétiques

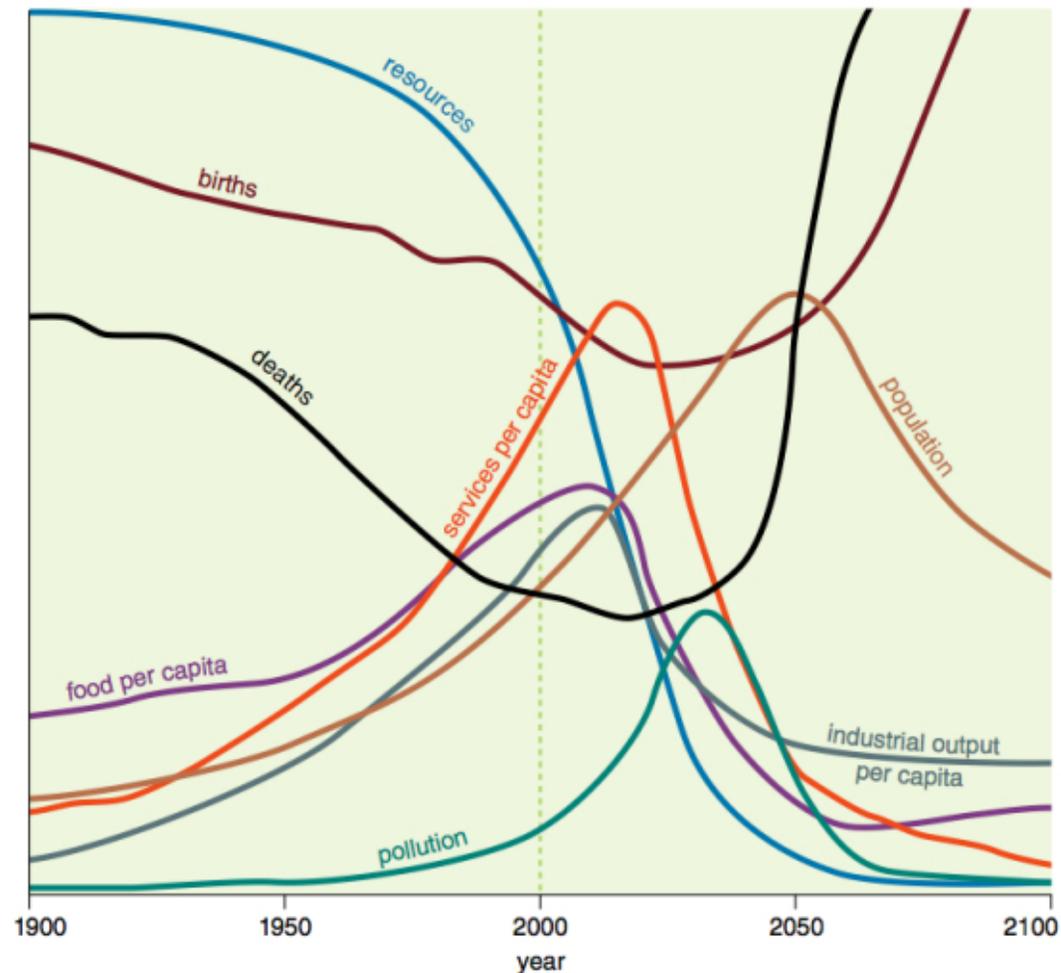


Quelle: BFE, Schweizerische Gesamtenergiestatistik 2010
Source: OFEN, Statistique globale suisse de l'énergie 2010

Today's human impact is not sustainable; It must change! How much time is left? (6)

Following Liebig's principle: "Peak Energy/capita usage likely the weakest point!"

(Energy) Resource constraints will determine this "century of decline"!
What can be expected for the coming years?



A guesstimate from 1972 (The limits of Growth, Meadows et al.)

Today's human impact is not sustainable; It must change! How much time is left? (7)

Following Liebig's principle: **“Peak Energy/capita usage likely the weakest point!**

Implication: The decline of oil/energy extraction must coincide with:
The terminal decline of the globalized industrial civilization!

Many regions are already on the slippery edge before the cliff!

As we all know: Even under free fall conditions:

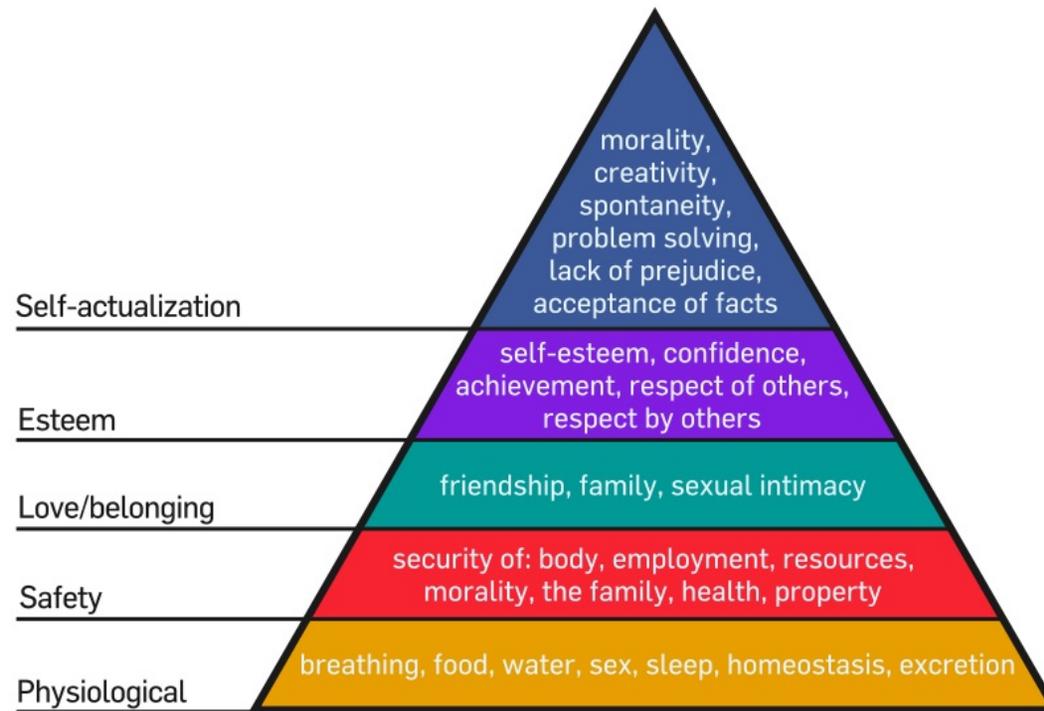
- Slow speed at the beginning of the falling and
- the depth of the canyon is unknown!

In theory: The fall doesn't have to be catastrophic, and safety measures can reduce the consequences of the fall but..

Living well and sustainably: Theoretical Ideas (1)

The minimum requirements for a sustainable and “good” life?

Maslow’s hierarchy of needs http://en.wikipedia.org/wiki/Maslow's_hierarchy_of_needs



Most points could theoretically easily be achieved in a well functioning society! But, even “water” and “shelter” and other basics are denied for significant number of people! (Significant fractions of child poverty and homeless people exist in all rich countries!)

“If I wouldn't be poor, you wouldn't be rich” B. Brecht

Living well and sustainably: Theoretical Ideas (2)

Perhaps the single most critical basic physiological need of human life:

- About 2500 Calories/day/person are required. Such a diet can be satisfied in many cultural/historcial variations and more or less healthy (vegetarian or not).
- Most “experts” think that “healthy food” requires large fractions and varieties of fruits and vegetables.

Sufficient healthy food production for how many people per km²?

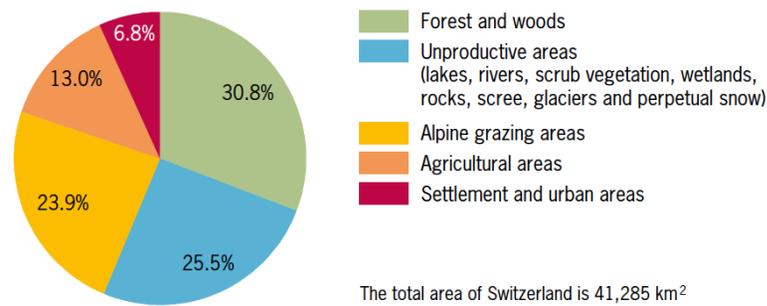
Example Switzerland: More than sufficient “food” is available for 8 million people.

The system feeds about 10 people/per hectare. But, the swiss food system is not sustainable:

- (1) about a factor of 10 calories from fossil fuels are “hidden” in every eatable calorie and
- (2) about 50% of the food is imported (corresponding to about 500 000 “ghost” hectares, often far away!)

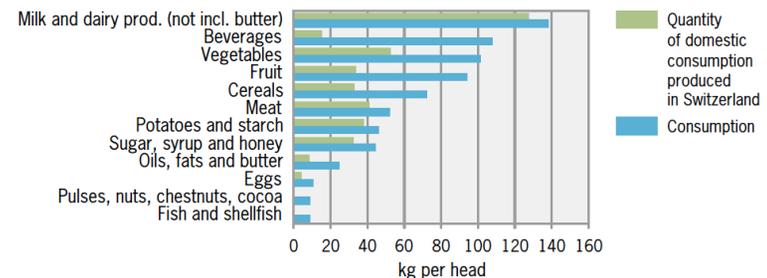
Land use

Areas surveyed between 1992 and 1997



© FSO

Food consumption¹, 2009



¹ Does not represent quantities actually consumed as losses (e.g. unsold or spoilt food) are not recorded completely.

Source: Swiss Farmers' Union

© FSO

Living well and sustainably: Theoretical Ideas (3)

The food situation in Switzerland: Some more details:

Swiss agriculture exploits currently about 400 000 ha (plus “700 000” ha “mountain” grazing land). http://www.swissworld.org/en/economy/farming/facts_and_figures/

To produce all grains/vegetables/fruits/ products **within Switzerland**, roughly 500 000 ha additional good agricultural land required.
(Or per capita: 1000 m²/year with current unsustainable agricultural methods)

In theory: With an established, sustainable bio-intense (manual labor!) local system:

A swiss like vegetable/fruit diet can be achieved with only 100 m²/person/year!
Another 300 m²/person/year are required for grains, vegetable oils and farm animals “cows, chicken etc”.

Who has the knowledge, time, access to land and in addition “the wish” to establish prototypes for sustainable and partially sufficient food production?

Living well and sustainably with real people (1)

Theoretical ideas taking human nature into account?

Real world real humans today live in large scale groups which are:

- Organized in top-down power/richness structures (often even at family level and with violent male dominance);
- Those on the top often have a slave owner mentality (possibly with mechanical energy slaves, but if not with real “slaves” !);
- A philosophical thought system has made most of humans to accept the top-down system as the natural system with god like humans at the top.
- Most of us assume (and want) to be members of a “middle class” and we believe in sharing resources within our clan / social group / country.
- Insane, evil and dangerous “monsters” are a minority (but, under unstable social conditions those can sometimes achieve extraordinary political power).

Hoping Einstein was not only correct about the neutrino speed but also here: “The world is a dangerous place to live; not because of the people who are evil, but because of the people who don’t do anything about it.”

Living well and sustainably with real people (2)

Theoretical ideas taking human nature into account?

Large scale human groups: Experience from past few 1000 years:

- From the day they begin to the day they end, empires depend on the exploitation of natural and human resources and they require expansion;
- Empires run into collision with other empires and the strongest survive;
- Today's industrialized globalized Empires are functioning because of abundant cheap energy resources, supposed to be without limits;
- As long as an empire is expanding, most people in the heart of the empire benefit from the empire's strength;
- But when its natural capital resource base becomes exhausted and expansion is no longer possible, an empire comes to an end, and those who have benefited in the past have a new reality to deal with.

The end of cheap oil/energy will force empires into their "final" battles. Can the usage of their final weapons of mass destruction be prohibited?

Living well and sustainably with real people (3)

Theoretical ideas taking human nature into account?

Large scale human groups: Historical quantum leaps?

Revolutions and revolutionary movements and their achievements?

- Stagnating empires are confronted by revolutionary movements from the “suppressed”.
- Sometimes, when the elite can’t (for some obscure reasons?) continue their way of ruling, mass movements start “suddenly” and system change is inevitable.
- Successful “local” uprisings often turned, after some time, into new top-down hierarchical structures, or were terminated by means of war into the larger surrounding ruling empires.

The end of cheap oil/energy will force empires to “final” local independence battles. Successful local independence movements will be confronted with little “know how” about how to live sustainably from the ruins of these battles!

Living well and sustainably with real people (4)

Theoretical ideas taking human nature into account?

Today's situation: Our Titanic moves full speed ahead. The views of the "remaining" political movements in the richer countries?

- "the Right" doesn't even recognize that we are speeding towards the iceberg. Some realize "Houston we have a problem", but believe in the "survival of the richest" (Not the "survival of the fittest")!
- Moderate central ("religious") parties: Keep on going and "hope for wonder solutions".
- "Left" political parties/movements (whatever that means) have perhaps ideas about "egalitarian principles" and want to continue economic growth sharing more equally within the country. Essentially no ideas remain about "global egalitarian principles and solidarity"!
- "Green" inspired? Some different ecological ideas are combined with hopes that an imaginary undefined green economy will make us eventually sustainable. Ignorance about the laws of nature and praying for technological wonders are widespread.
- Outside the system thinking groups (Antigrowth, Permaculture, Anarchist..): Minorities working on satisfying living under "island" lifeboat conditions. Often with interesting and sustainable approaches and solutions!

**A "movement" to stop the Titanic from inside is not imaginable!
What about "outside" movements (perhaps pirates can stop the boat)?**

Living well and sustainably with real people (5)

Theoretical ideas taking human nature into account?

Without a large number of miracles: The industrialized global society will collapse when the natural capital depletion reaches the critical point. Likely the energy per capita decline will be the trigger condition:

What needs to be done by those who realize?

- Create “lifeboat” conditions for your “clan”: Teach yourself how to live well, yet more and more sustainably! It can be done!
- Act against any further destruction of biodiversity (natural capital) rich regions. (Biodiversity is required to rebuild the natural capital after the crash)
- Start now to construct islands of sustainability, increase the biodiversity around you!
- Teach others about the unavoidable consequences of living unsustainably and teach them how to live well, yet more and more sustainably.
- **Perhaps the most important point: Act for a world without weapons of mass destruction now.**

Summary, some final thoughts: Living well and sustainably after the crash? (I)

Our unsustainable lifestyle will not be ended by a rational approach. There will be no global soft landing! The exact timing varies largely from region to region, but things are highly dependent in our globalized world.

During/after the collapse, basically two “way-of-life” options remain:

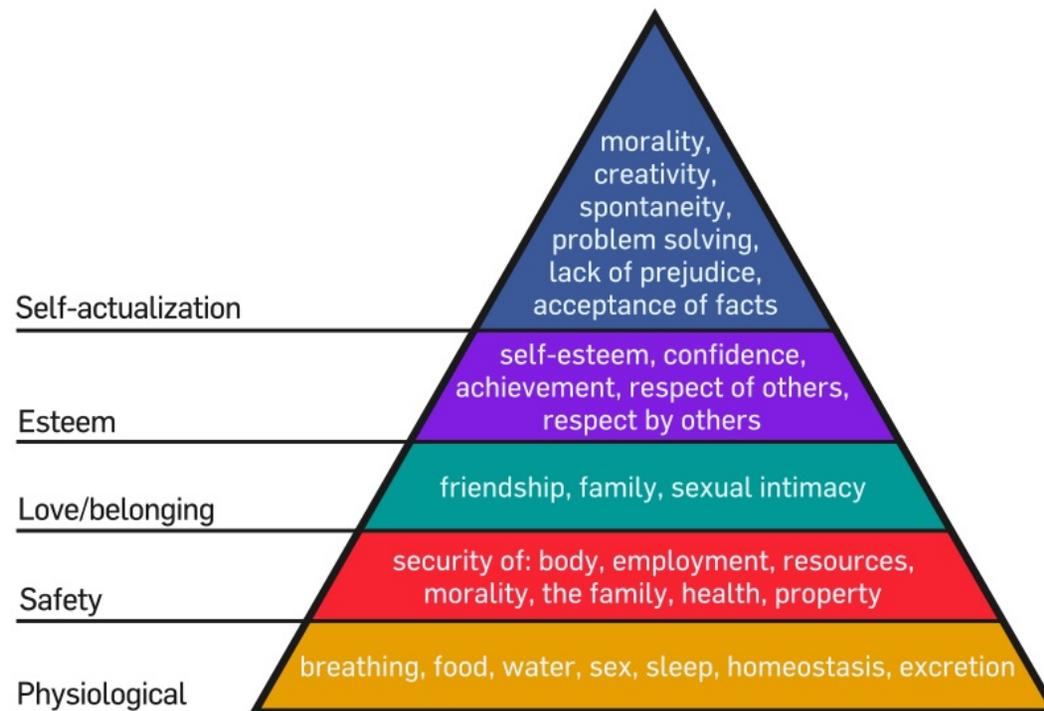
The nomadic hunter/gatherer sustainable lifestyle seems to be unachievable in most regions and with current population densities:
(a desert “Tuareg/Bushmen ...” way-of-life seems to be too “tough” to enjoy for most!)

- 1. Feudal-like/Mafia-like larger scale societies or “kingdoms” with unsustainable pseudo stable conditions.**
- 2. Small scale egalitarian societies, surrounded by a growing biological and cultural diversity.**

Summary, some final thoughts: Living well and sustainably after the crash? (II)

Option 2: “Small scale egalitarian societies surrounded by a large “diversity” provide theoretically the best conditions for a sustainable and “good life” (as outlined for example in Maslow’s hierarchy of needs)

Warning: Option 2 groups might be in considerable danger of attack by Option 1 Feudal-like/Mafia-like groups!



http://en.wikipedia.org/wiki/Maslow's_hierarchy_of_needs

Summary, some final thoughts: Living well and sustainably after the crash? (III)

For the “Development towards Sustainability” and for those who care today about achieving optimal conditions after the unavoidable crash:

- 1. Learn (and practice) how to live less and less unsustainably and how to enjoy this.**
- 2. Contribute to the defense, conservation and enlargement of the remaining biodiversity and small scale human cultures.**
- 3. Learn to create sustainable “permaculture islands” and contribute to their flowering.**
- 4. Contribute to development of small scale sustainable communities. A satisfactory and sustainable life for future generations can not be achieved in isolation!**

Different people have different talents and interests: Develop those within you that can facilitate the above transitions.

Good Luck