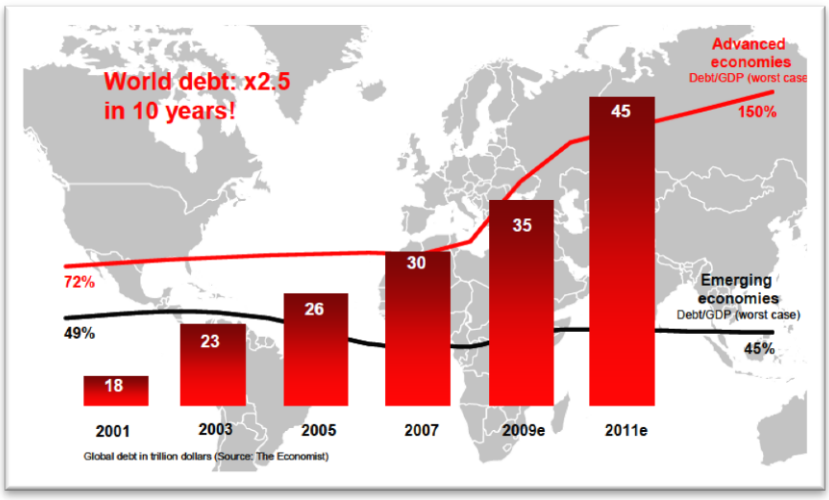
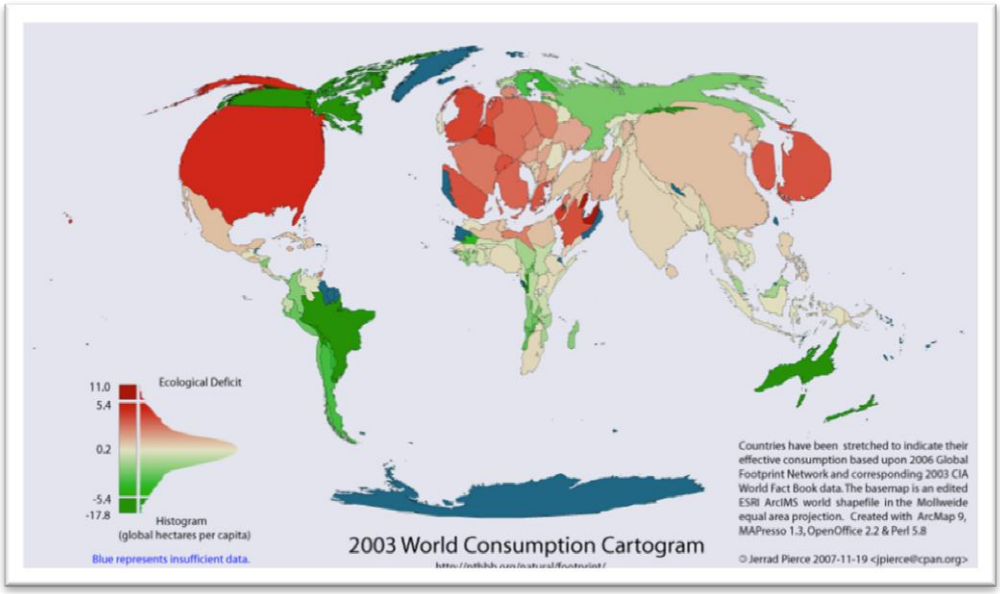
A world of limits

Perhaps one of the most important lessons that emerged from the 2008 economic crash was the realization that our global society was now confronting a series of limits or cliffs. While prediction of exactly what might happen is always fraught with difficulty, the cumulative effect of these is hard to deny. They can perhaps be summed up as **economic limits, energy limits and environmental limits**. Each in its own way **will trigger a rethink in what we do and how we behave**.

Economic limits

Our **economic behavior has been based on the idea of continuous growth, increased consumption and access to credit**. Now we are faced with a future where government incomes will grow only slowly, consumption is flat lining or even decreasing and many are focused on retiring debt.



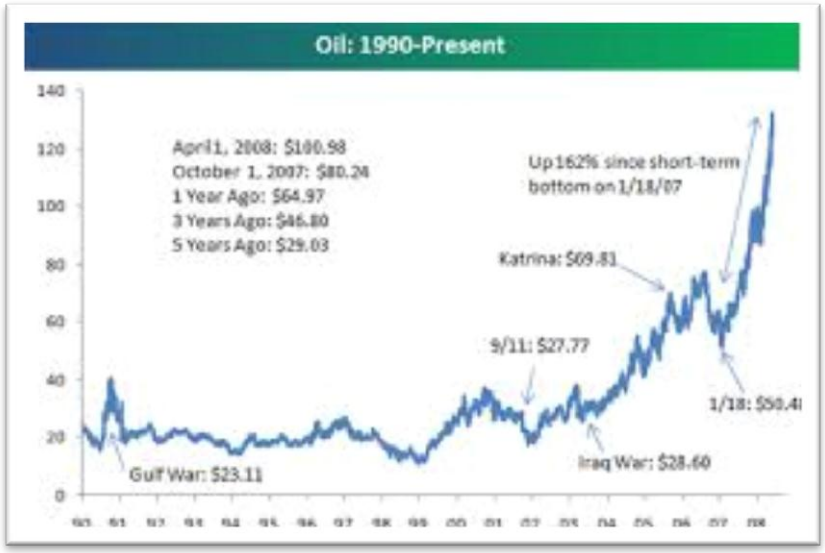


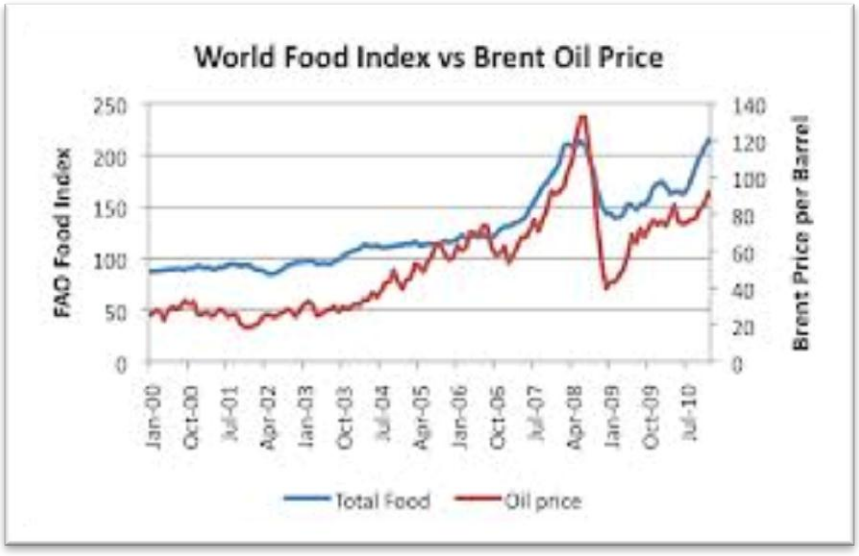
Energy limits

Our world has been built upon cheap oil. Now oil is no longer cheap and the International Energy Agency is on record as saying;

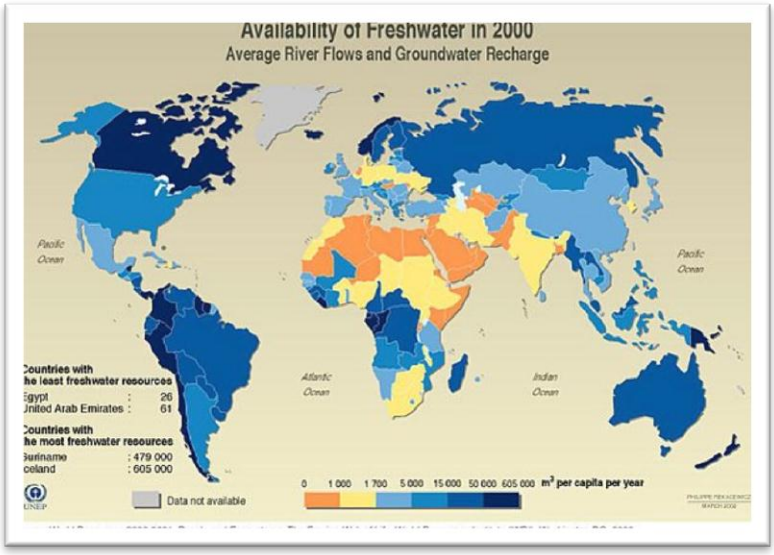
> *The International Energy Agency released its annual flagship publication, the World Energy Outlook in November 2012. The IEA made an historic statement in the executive summary. It said, "**No more than one-third of proven reserves of fossil fuels can be consumed prior to 2050 if the world is to achieve the 2°C goal**", the internationally recognized limit to average global warming in order to prevent catastrophic climate change.*

What this means in common language is that **two-thirds of today's proven reserves of fossil fuels need to still be in the ground in 2050 in order to prevent catastrophic levels of climate change.**



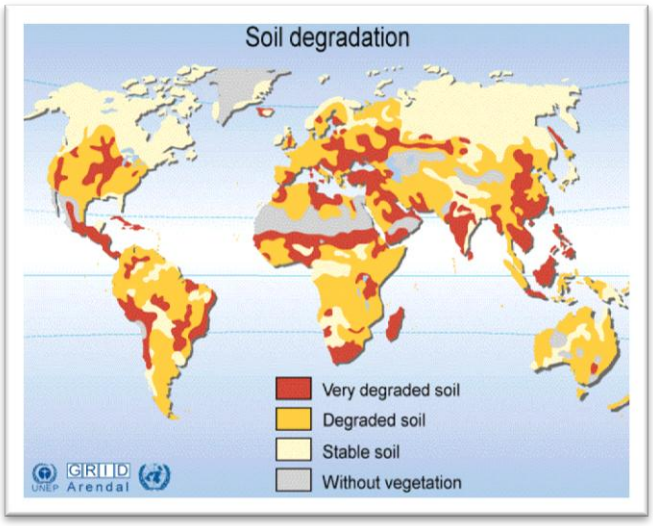


Environmental limits



Many of the **world's environmental systems are either severely stressed or beyond limits that they were designed for**. These include diminishing global fresh water systems, rapidly disappearing topsoils, ocean acidification, rapid biodiversity loss (especially wild flora and fauna that have been used for food or energy), loss of stratosphere ozone, the loss of arctic sea ice in summer, thawing permafrost in the Siberian and Canadian tundra and increases in temperature which are outside the 2^0 limit that is generally accepted as comfortable for human existence.

There are two major concerns with the current state of affairs. The first is that these



large systems will begin to impact upon each other in adverse ways thus accelerating the effects. The second is that these **large systems will only repair over long periods of time**. What this means for practical purposes is that whatever environmental damage we have caused we will need to live and adapt to it for at least the next 20 years. Given we always put economy before the environment we also need to consider in a thoughtful way what kind of legacy we are creating for our grandchildren.

Our failure to address environmental limits in any meaningful way caused the World Bank to comment recently:

> *"A 4 degree warmer world can, and must be, avoided – we need to hold warming below 2 degrees,"* said **World Bank Group President Jim Yong Kim.** *"Lack of action on climate change threatens to make the world our children inherit a*

completely different world than we are living in today. ***Climate change is one of the single biggest challenges facing development, and we need to assume the moral responsibility to take action on behalf of future generations, especially the poorest****."*

The report says that the 4°C scenarios are potentially devastating: the inundation of coastal cities; increasing risks for food production potentially leading to higher under and malnutrition rates; many dry regions becoming dryer, wet regions wetter; unprecedented heat waves in many regions, especially in the tropics; substantially exacerbated water scarcity in many regions; increased intensity of tropical cyclones; and irreversible loss of biodiversity, including coral reef systems.

"*The Earth system's responses to climate change appear to be non-linear*," points out PIK Director, **John Schellnhuber.** *"If we venture far beyond the 2 degrees guardrail, towards the 4 degrees line, the* ***risk of crossing tipping points*** *rises sharply.* ***The only way to avoid this is to break the business-as-usual pattern of production and consumption****."*