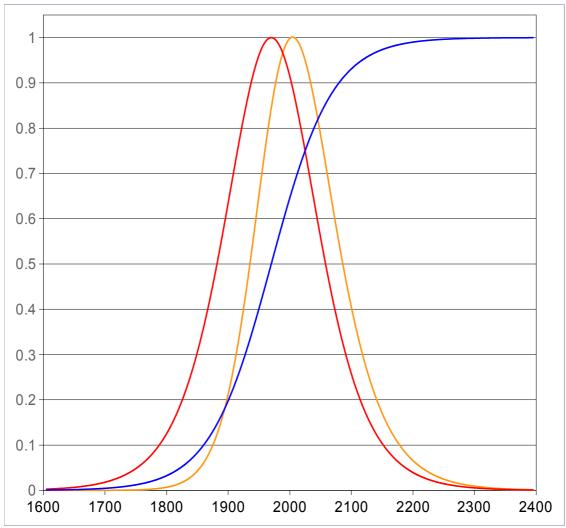# Economic Growth

(optimistic estimate, normalized to per capita maximum)

consumption, growth and growth weighted with consumption

Four economic periods: **E**mergence, **G**rowth, **S**tagnation, **S**aturation
- until 1850: survival economy, growth limited by restricted access to resources
- from 1850 to 2000: growth economy powered by efficient access to resources and virtually unrestricted entropy production
- from 2000 to 2250: stagnation economy, still good access to resources, but noticeable limits to entropy export
- after 2250: survival economy, growth limited by scarce resources and limited entropy export until major change occurs

Growth history of the world per capita GDP: A temporary exception
- 1000-1820: 0.05%/year (1.5%/30years)
- 1820-1870: 0.53%/year (17%/30years)
- 1870-1913: 1.3%/year (47%/30years)
- 1913-1950: 0.91%/year (31%/30years)
- 1950-1973: 2.93%/year (138%/30years)
- 1973-1998: 1.33%/year (47%/30years)
Source: Agnus Maddison, *The World Economy*, 2002

Take the logistic function (blue) as a possible middle line of our road. The derivative (red) shows that there could be growth for ever, but what kind of growth? The weighted growth (orange) shows, that stagnation on high level still is stagnation.

We are not simple lab bacteria in a simple lab biosphere. We could try to move the middle line or the whole road. Does more growth lead to more happiness or at least to less suffering?

Bacteria don't think. People think that finding and consuming more energy leads to a better life. However, growth is limited by the maximum possible entropy export. Bacteria do not know that. Most people do not know that. The curves just could depict a theoretical best case scenario.

Goetz Kluge, 2009-03-07