# Sustainable Development and the Wealth of Nations

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**Conference on the Green Economy**

Berlin
2 November 2016

The requirement that an object should be *sustained* over a period of time means that it should not diminish over the period. It's a weak requirement, and is different from the idea of an optimum development.

The Brundtland Commission Report of 1987 took the object of interest to be human needs. The Report defined sustainable development as "... development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

The definition suggests we should seek to sustain something like the *productive base* of the economy under review.

## Productive Base

## A. Capital Assets

1 Produced capital (roads, buildings, machinery and equipment)

2 Human capital

- (i) population (size and composition)
- (ii) knowledge and skills (education)
- (iii) health (enhancing the quality of life and extending life)

3 Natural capital (ecosystems, sub-soil resources)

## B. Enabling Assets

1 Institutions (property rights, firms, government, households)

2 Knowledge (natural laws, algorithms, theorems, cultural narratives)

Hint: we could measure capital assets in efficiency units

3 Social capital (the law, social norms, habitual practices)

4 Time (exogenous changes: technological change)

Call the social worth of all capital assets (using a mixture of market and shadow prices) the country's *wealth*. We then have the following proposition:

"Well-being across the generations, corrected for population, would not decline over time if and only if, relative to its population, the economy's wealth per capita was not to decline over time."

Estimates show that a country's wealth per capita can decline even as its GDP per head and HDI increase. By the same token, it can be that a country's wealth per capita increases even as its GDP per head and HDI decline.

As indicators of the long run performance of economies, GDP and HDI should now be rejected.

For wealth to increases it is necessary that there is positive *net investment*. Another way to state this is to say that *aggregate consumption should be less than net domestic product*. Measuring the depreciation of capital assets is the key exercise in sustainability analysis.

## Measuring Human Capital

Education and health are the two key components of a person's human capital.

(1) A useful summary statistic for *health* is life expectancy at birth. A straightforward method for measuring improvements in health is to estimate the value of a statistical life and use that as the shadow price of the increase in life expectancy over the period being studied.

(2) A useful way to measure the increase in *education* is to estimate the increase in the PDV of wages of the average person over the period in question.

*The Inclusive Wealth Report 2014* issued by UNEP/UNU-IHDP covered 140 countries and estimated changes in wealth per capita over the period 1990-2010. Their finding, in which carbon, agricultural land, sub-soil resources were included in natural capital, was that Germany enjoyed an average annual growth rate of 1.6 per cent. GDP per capita in contrast grew at 1.3 per cent and HDI at 0.7 per cent.