Sustainable Development Forum

Royal Society, Wellington, 12 March 2004

# Sustainability – A Scientific (and Policy) Dilemma

John Peet

Research & Policy Working Group

# SO … what is to be sustained in ***sustainable development?***

*Two very different answers to this question:*

*(Daly, 2003)*

1. ***Utility*** should be sustained. In practice, surrogates such as Consumption are used, normally expressed as dollars per capita spent on goods and services.
2. ***Physical throughput*** should be sustained, so that the throughput of resources available to future generations is no less than at present, i.e. Natural Capital must be kept intact.

# Why these differences? What do the main disciplines think "sustainability" means? (Common, 1996)

- **Economics** - maintaining a constant (or, preferably, growing) level of per capita aggregate consumption (as a surrogate for Utility) for ever.
- **Ecology** - maintaining the resilience, or functional integrity, of ecosystems (by limiting Throughput to that which can be supplied and/or assimilated sustainably).

# So what *is* the problem?

- ***If*** Utility depends upon Consumption of goods and services, ***and if***
- Consumption presupposes Production of those goods and services, ***and if***
- Production requires Transformation of Resources taken from the Environment, (i.e. that to which value is added), ***then***
- *The relationship between resource use and transformation processes is central to the possibility of achieving SD.*

# The IPAT equation

Total Social Impact

= Population x Affluence x Technology Impact

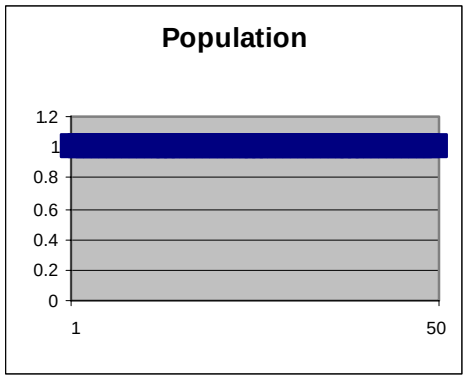
or I = P x A x T

Where P = people

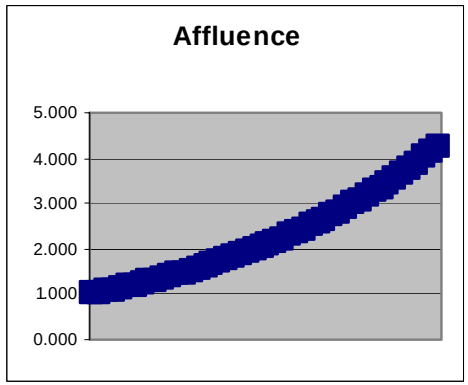
A = GDP/people

T = Resource use/GDP

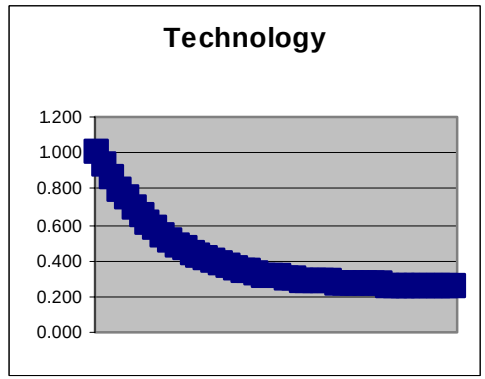
# A simple example




X




X

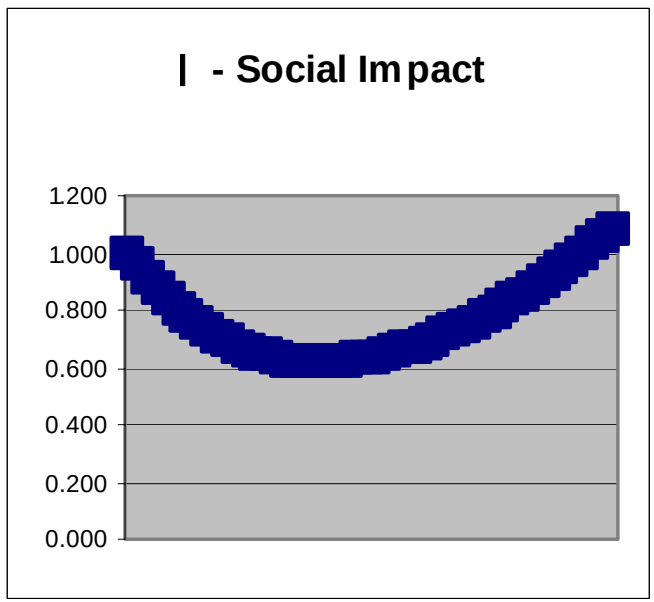



P - Constant

A - 3% per annum

T - 10% dv to 1/4

=

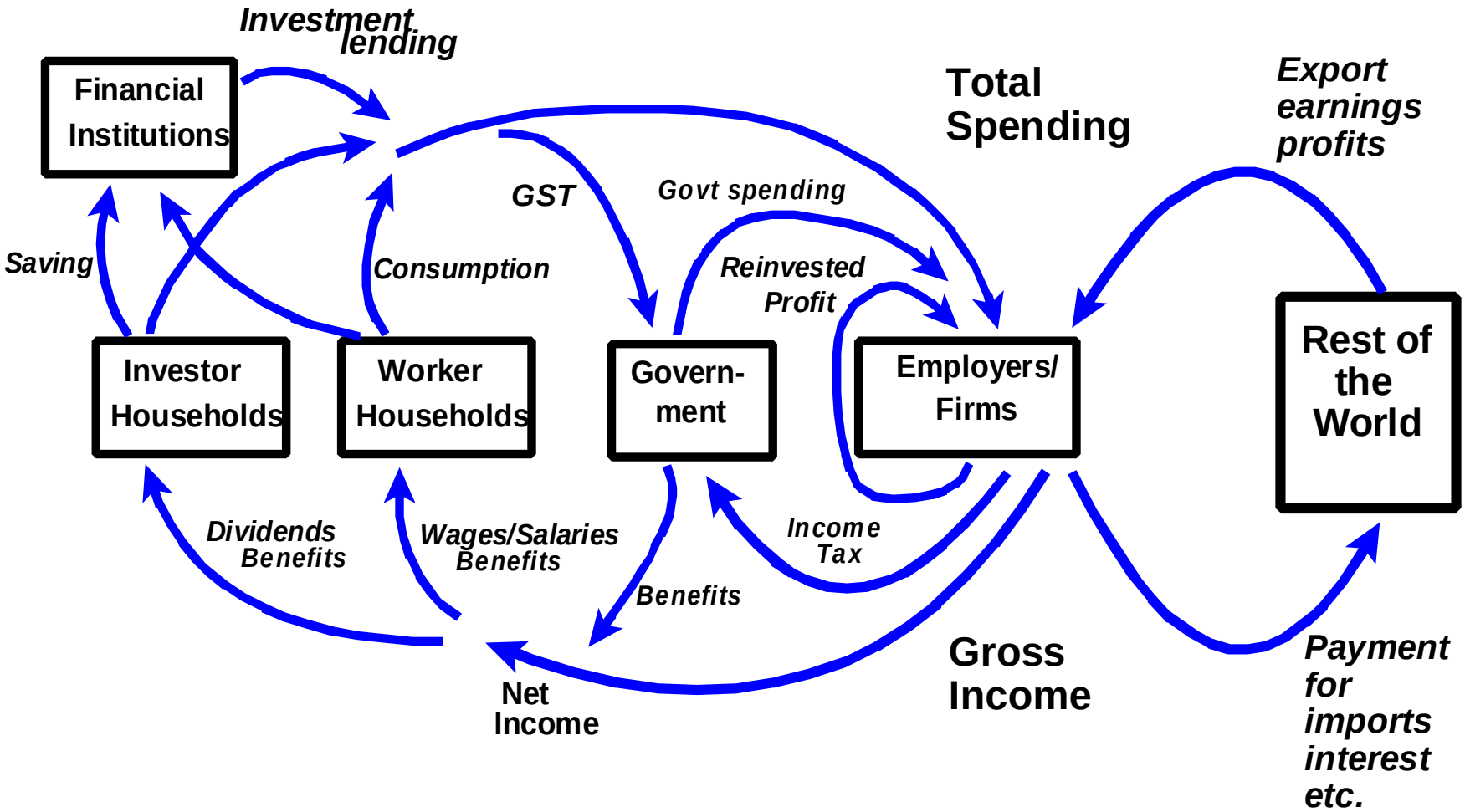



Time span
50 years

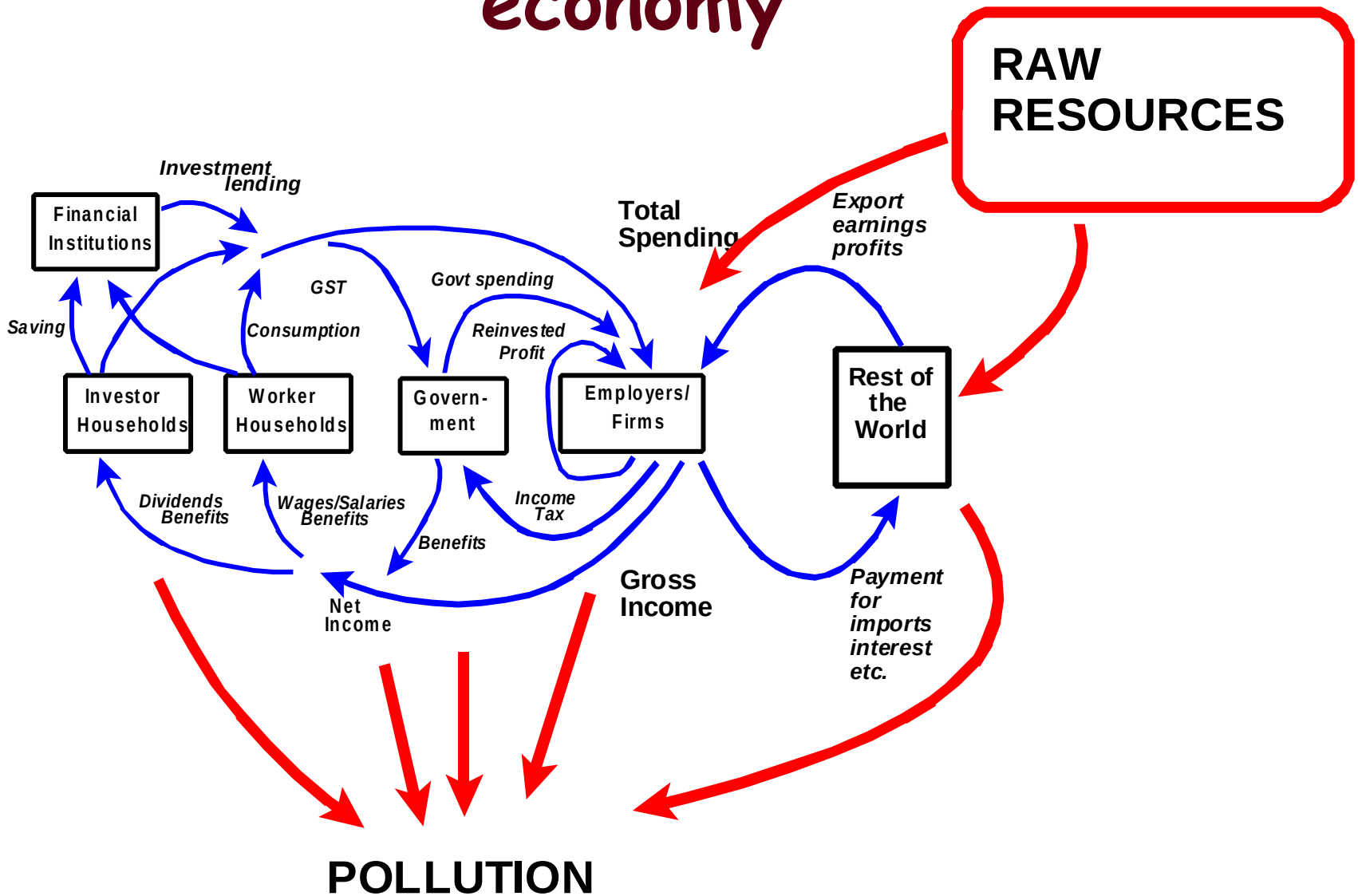
# We need to examine resource use in the production of Goods and Services in more detail

We look first at the mainstream macroeconomic model of production and consumption, and then extend it progressively, using different scientific perspectives.

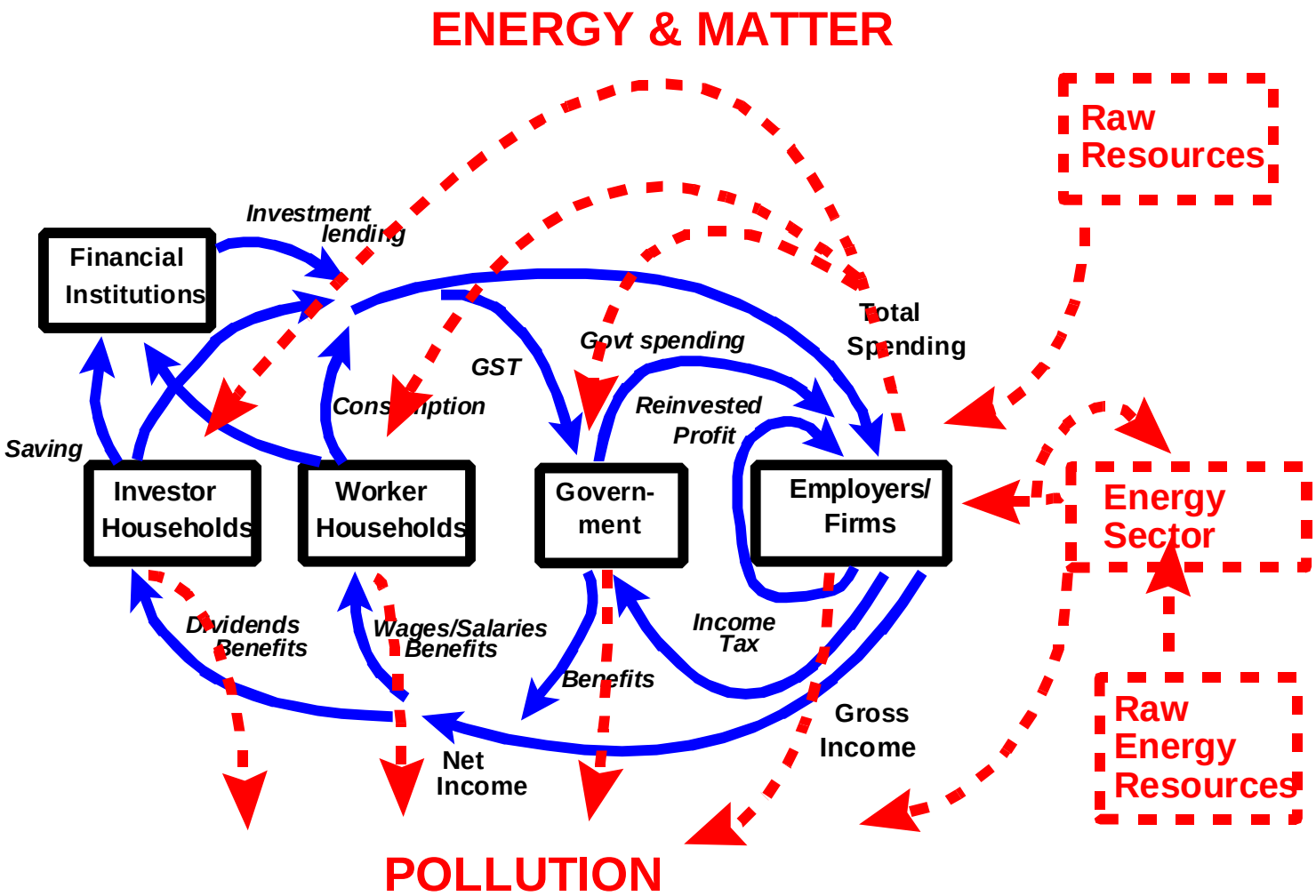
# Circular flow model of the NZ economy



# Environmental model of the economy



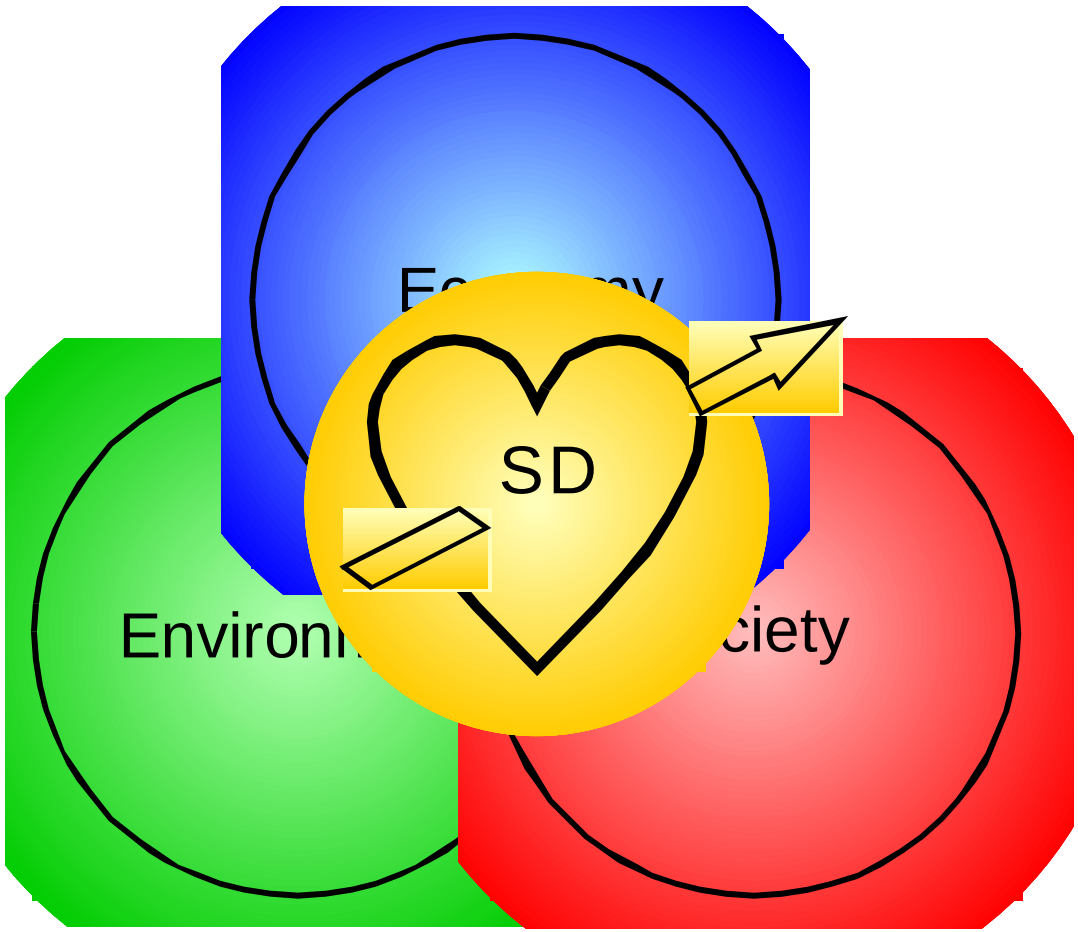
# Thermophysical model of the economy



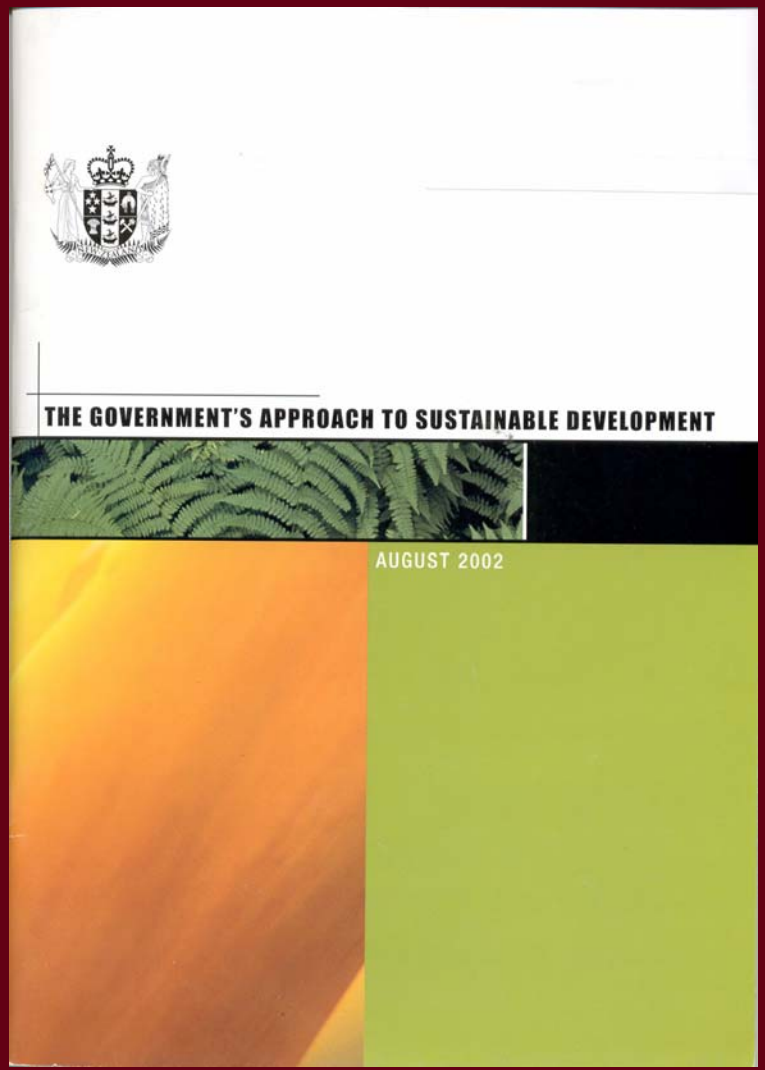
# Limitations of even these expanded perspectives:

- Markets create the linear throughput flow of resources but do not take account of the results (the Scale problem)
- Money controls the flow of resources (those without money don't have access - the Justice problem)
- Money and energy/material units are not commensurable

# The usual Weak Sustainability model put before us (e.g. Triple Bottom Line)



# The NZ Government's Sustainable Development policy:



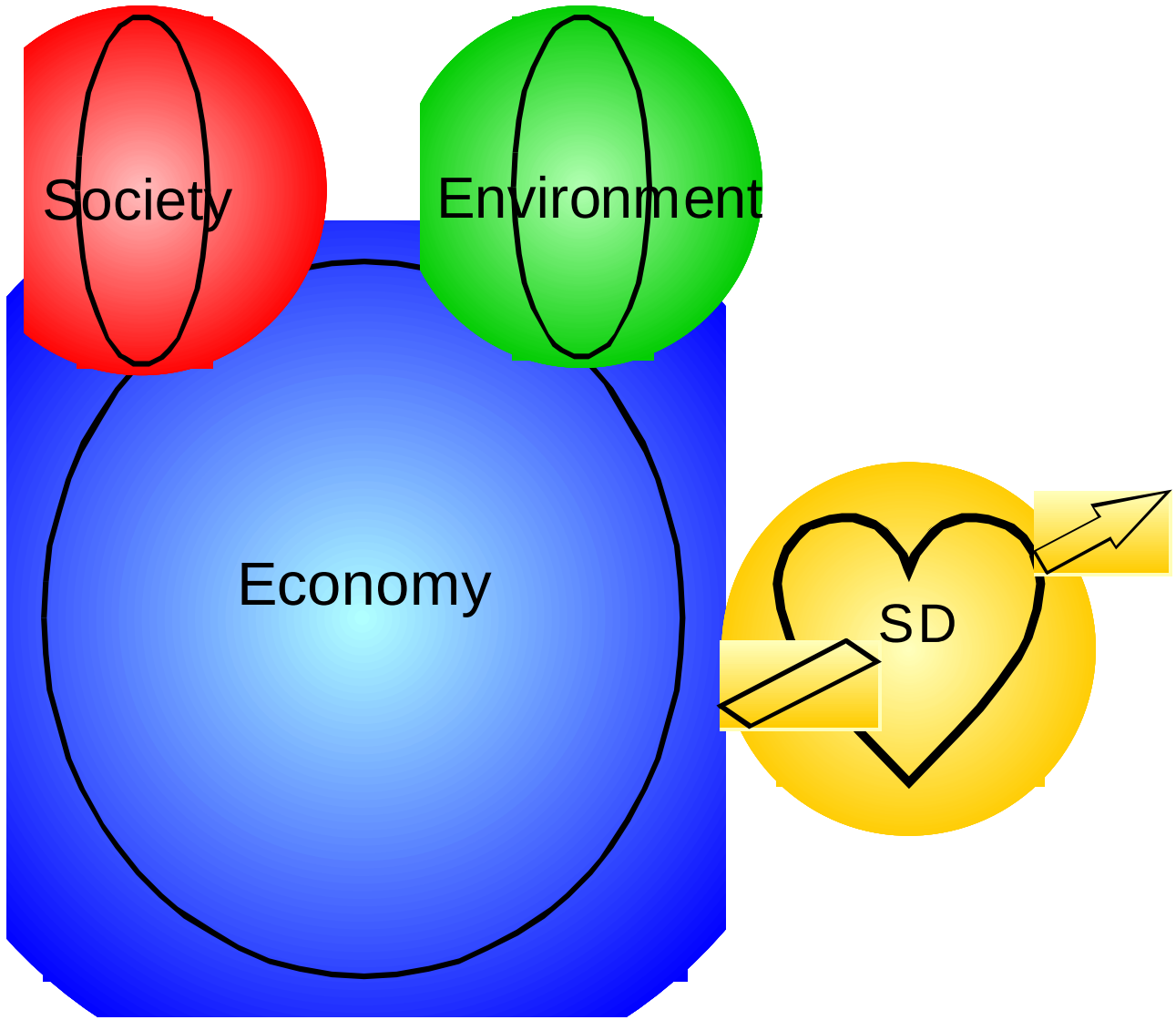

Prime Minister:

*"The central issue is how we achieve sustainable economic growth in a manner which enables us to improve the wellbeing of all our peoples without compromising the quality of the environment."*

Minister for the Environment:

*"... priorities ... such as economic growth, the implications of international population change for New Zealand, decoupling of economic growth from environmental harm, governance for sustainable development ...."*

# The real situation?



- There appears to be a clear conceptual gulf between the economic, the ecological and the technological meanings of sustainability itself, and hence of the meaning of sustainable development
- *This gulf must be bridged, as a matter of urgency*
- *Few - if any - governments have a clue how to make the transition to "true" sustainability*

In the mainstream (neoclassical) economic approach, a primary purpose of the economy is to achieve (Pareto-efficient) optimal allocation of resources with its corresponding optimal set of prices. As Daly (2003) suggests, however, the [real] economic problem may be rather more complex:

- *"A good **allocation** of resources is **efficient** (Pareto optimal);*
- *a good **distribution** of income or wealth is **just** (a limited range of acceptable inequality);*
- *a good **scale** does not generate "bads" faster than goods and is ecologically **sustainable**."*

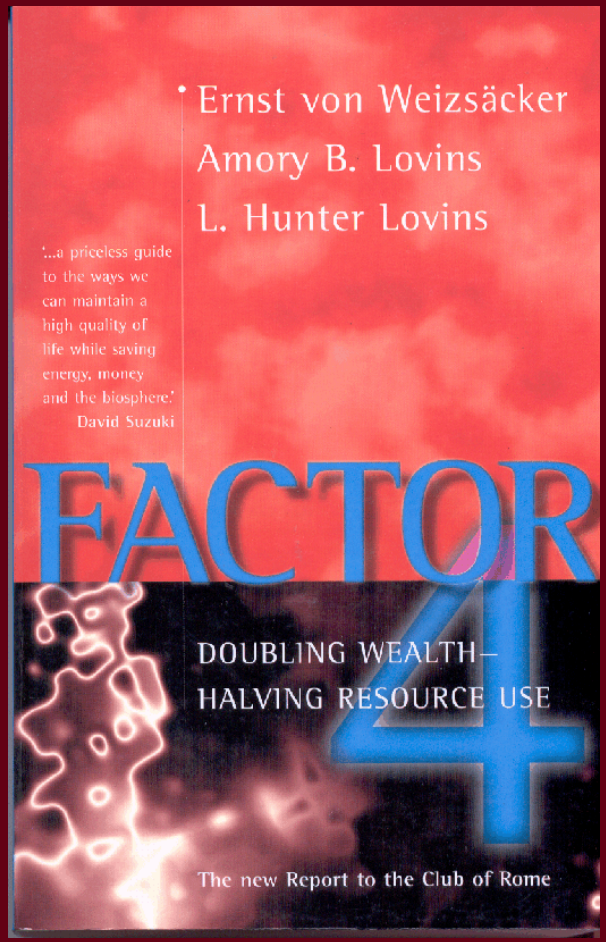
# Limits to Eco-efficiency and Green Processing?

- Continuing growth in GDP remains the central preoccupation of governments
- Material and energy inputs per dollar of output (*relative*) have in many cases been reduced – **not** decoupled
- ***BUT*** – in most cases, *absolute* amounts of resources consumed continue to increase
- ***The global environment is affected by absolute amounts***

*De*materialisation of industrial production is not possible; *reduced* materialisation is the best we can hope for.

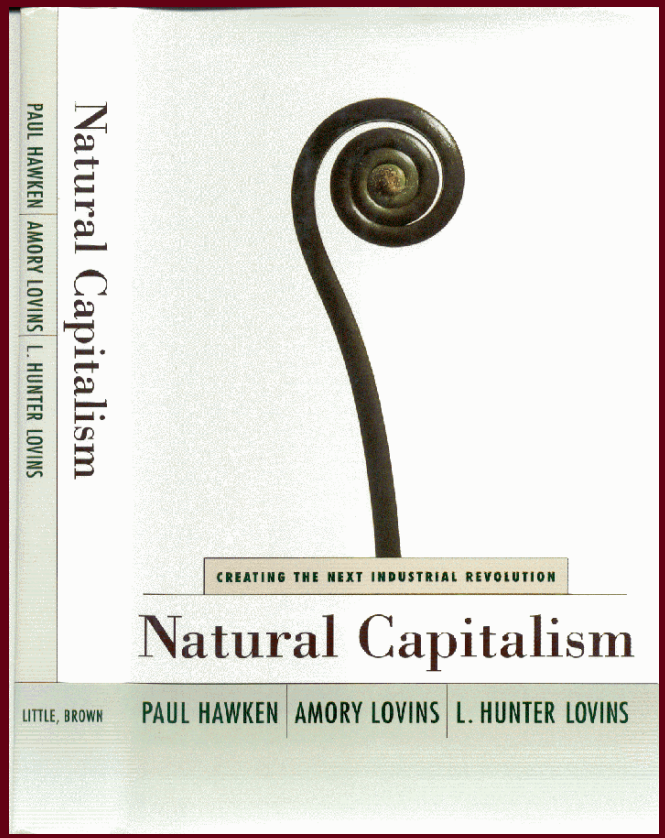
***SO……***

- *That to which value is added* must be reduced substantially, ***and***
- *The expectation of perpetual growth in consumption* (as a surrogate for utility) must be changed.
  - HDI? ISEW/GPI? ……others?



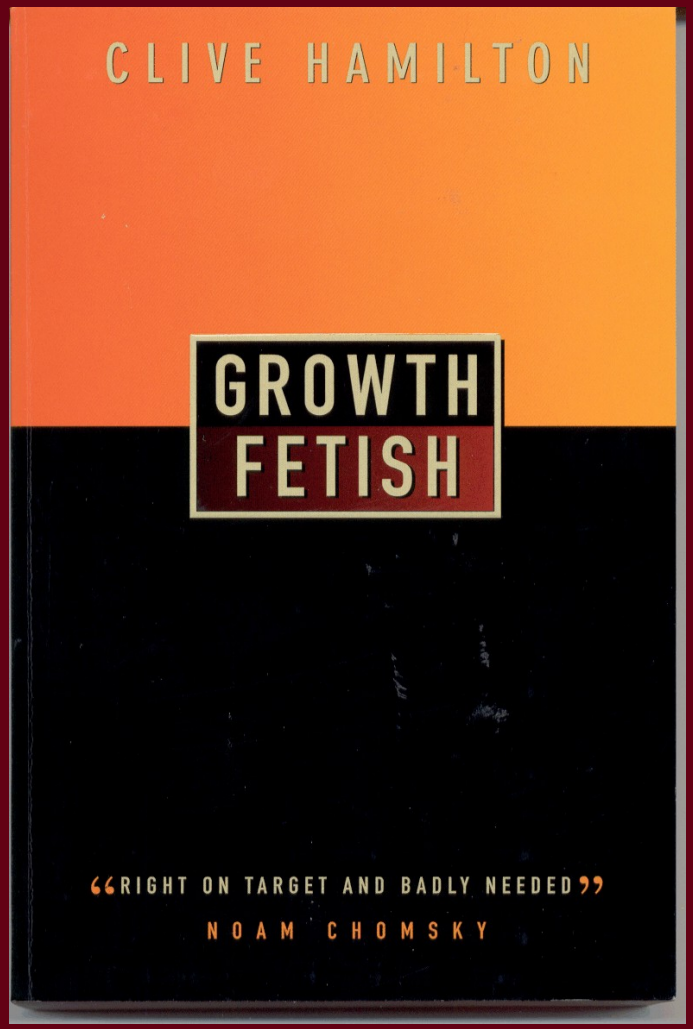

*"They are right in saying that efficiency won't be enough. If exponential growth goes on at a rate of 5 per cent per annum, the entire Factor Four efficiency revolution would be eaten up within less than 30 years!"*

*Weizsacker, Lovins & Lovins, Factor 4*




*"Without a fundamental rethinking of the structure and the reward system of commerce, narrowly focused eco-efficiency could be a disaster for the environment by overwhelming resource savings with even larger growth in the production of the wrong products, produced by the wrong processes, from the wrong materials, in the wrong place, at the wrong scale, and delivered using the wrong business models. With so many wrongs outweighing one right, more efficient production by itself could become not the servant but the enemy of a durable economy."*

*Hawken, Lovins & Lovins, Natural Capitalism*



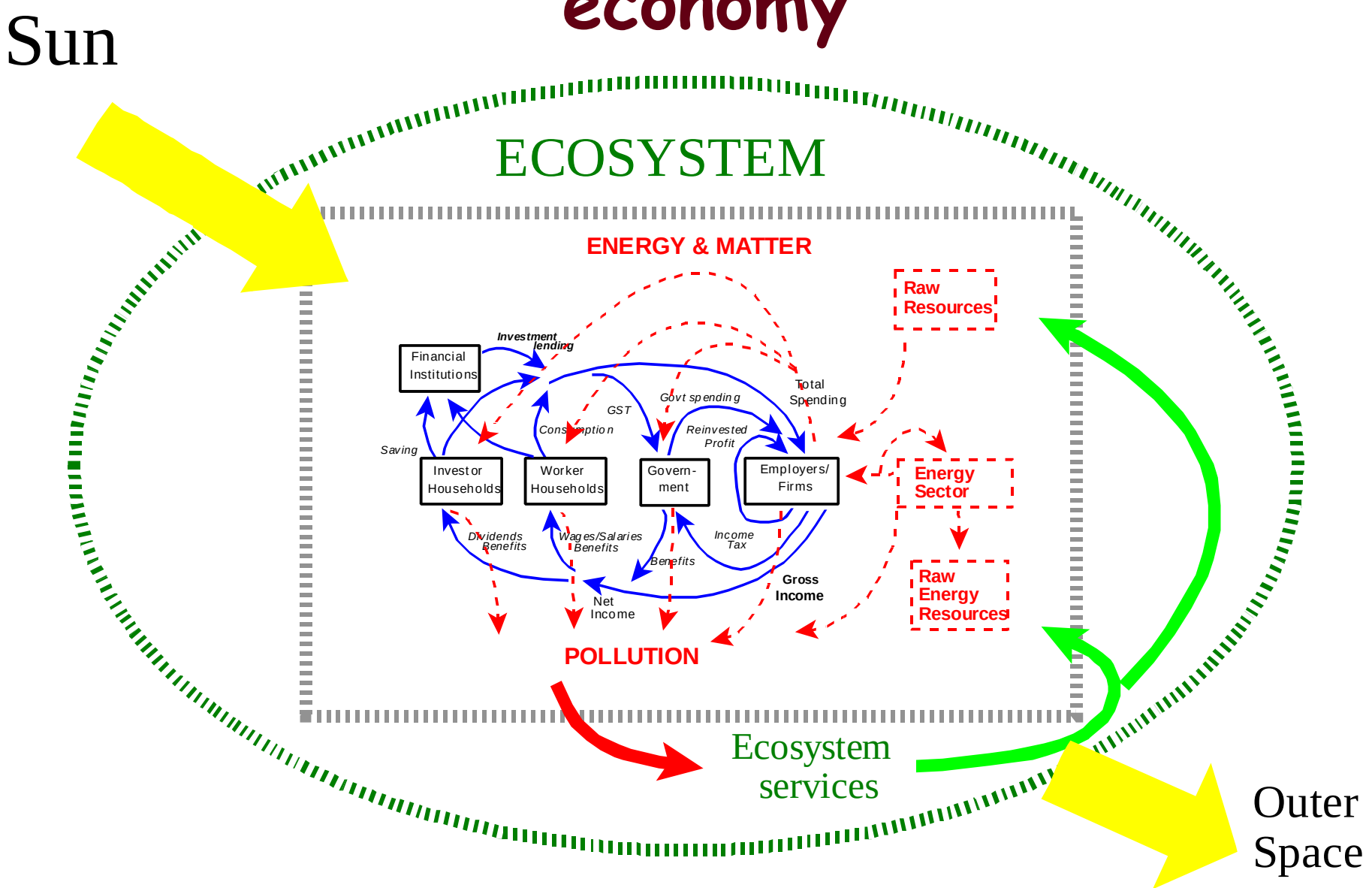

*"But, in the face of the fabulous promises of economic growth, at the beginning of the 21st century we are confronted by an awful fact. Despite high and sustained levels of economic growth in the West over a period of 50 years – growth that has seen average real incomes increase several times over – the mass of people are no more satisfied with their lives than they were then. If growth is intended to give us better lives, and there can be no other purpose, it has failed."*

*Clive Hamilton, Growth Fetish*

# The big hard policy problem

Unless the full spectrum of human welfare needs worldwide can be satisfied without overloading the global ecosystem's capacity both to supply resources and receive wastes, into the indefinite future, SD will remain a dream rather than a realistic policy option.

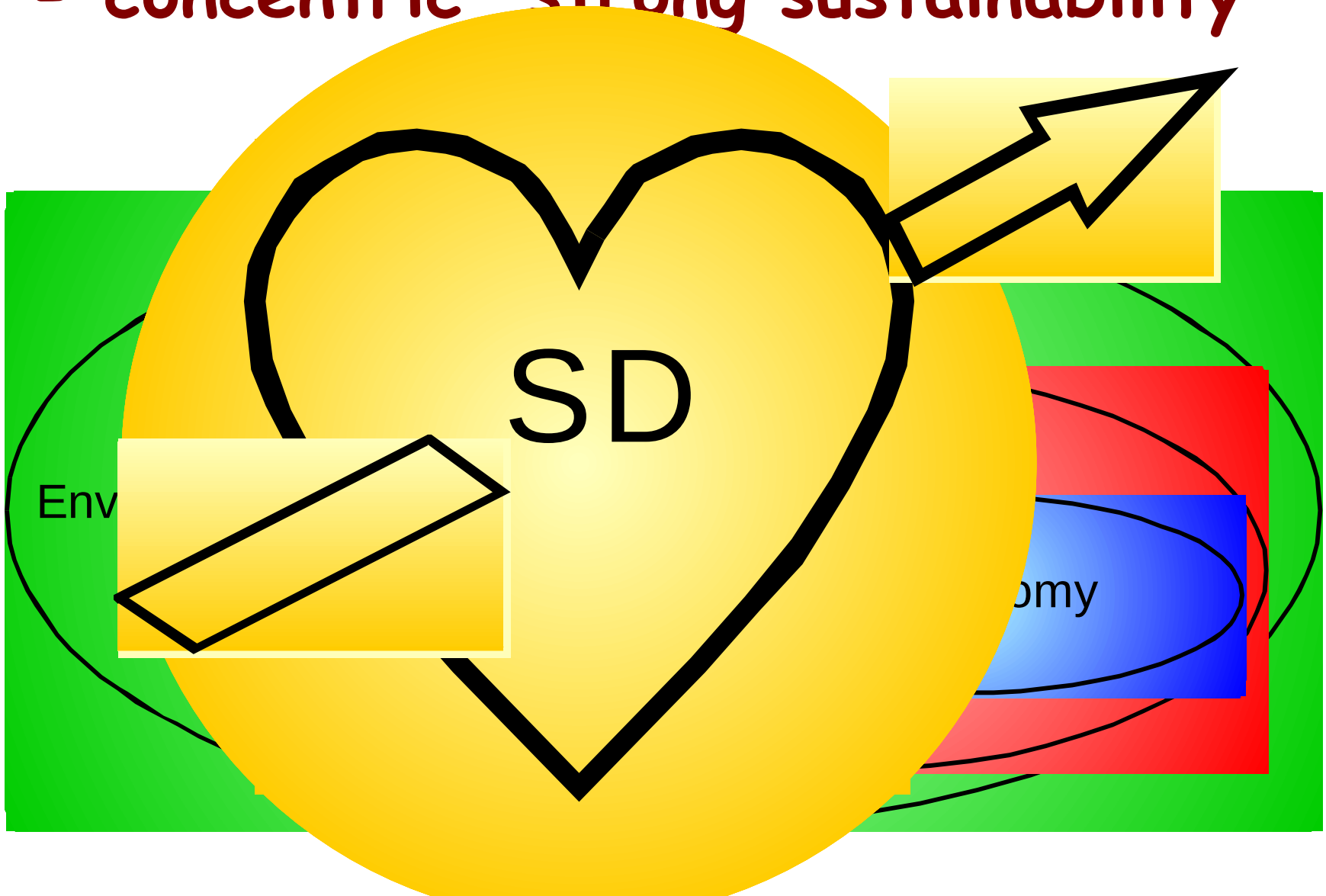
# Thermo-biophysical view of the economy



# Points relevant to Mindset Shifting

- Eco-efficiency is useful but not enough
- Decoupling of economic growth from environmental harm has limited potential
- Growth expectations cannot be sustained for much longer, if at all
- *It is time to examine the relationship between economic growth and social wellbeing*

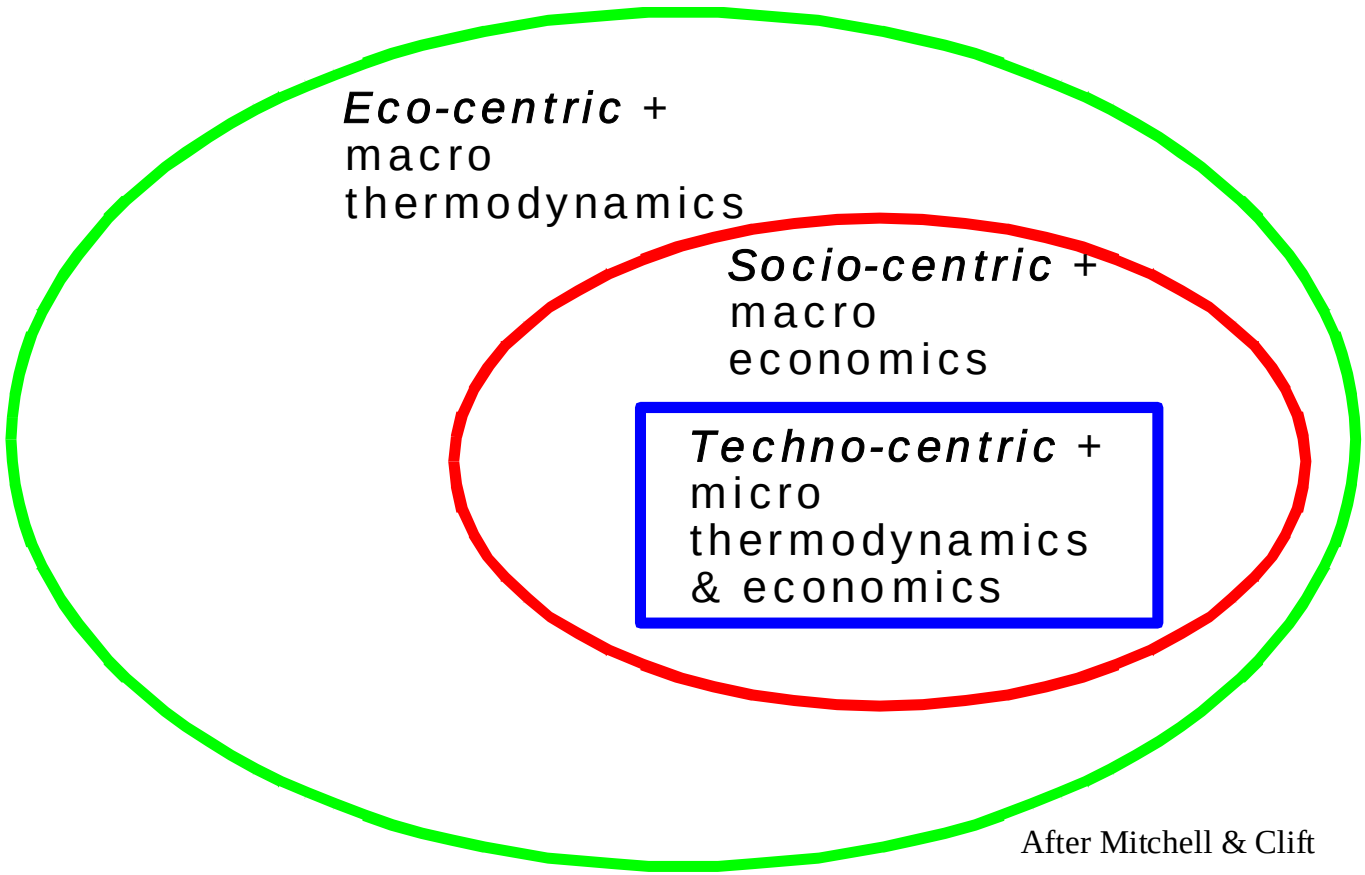
# The Worldview context
# - concentric "strong sustainability"



# How to choose between the Utility and Throughput models?

- **One does not have to choose, if one accepts the Strong Sustainability approach!**
- In Weak Sustainability (the Rabbit model), there is a ***Dominator hierarchy*** controlled by the Economy
- In Strong Sustainability (the Concentric model), there is an ***Actualisation hierarchy***, where each part is important, and viability of the whole is dependent upon maintenance of stable relationships between the parts

# Central professional disciplines involved in SD policy analysis




After Mitchell & Clift

# The Big Hard Mindset Change:

- SD is not about economics,  science or technology
- SD is at base a moral issue, where humans have a vital part to play in helping to ensure sustainability of the total system – including themselves
- Only if we have an overarching moral position, expressed in a practical working ethic, can we make an Actualisation hierarchy work.

# A sustainability ethic for a new Mindset:

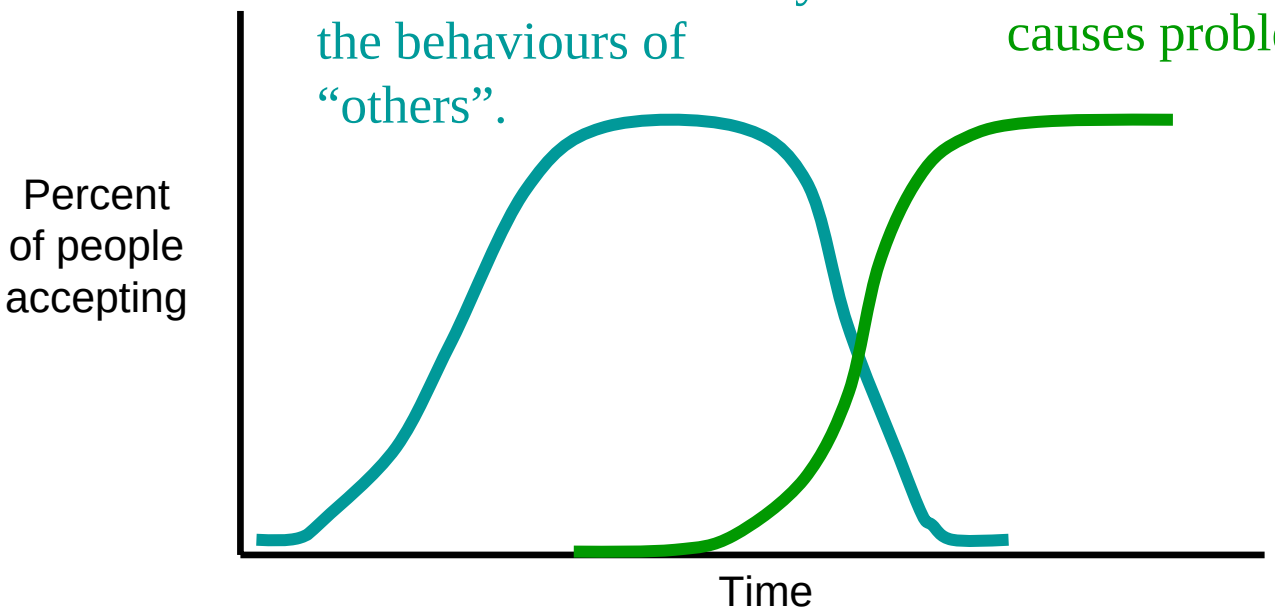
*"All people have their basic needs satisfied, so they can live in dignity, in healthy communities, while having the minimum adverse impact on natural systems, now and in the future."*

*Peet and Peet, 1999*

# Shifting Mindsets

- Growth is always good.
- Markets alone can solve all problems.
- We are separate from nature.
- Problems are caused by the behaviours of "others".

- We exist in a world of limits.
- Markets don't measure everything that is important.
- We are an integral part of nature.
- Often the structure of systems causes problems.




**Dominant Mindset** **Emerging Mindset**



Sustainability Institute

Kia ora tatou!