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# **Public health in the Anthropocene: An eco-social approach to population health promotion in the 21<sup>st</sup> century**

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## **Abstract**

- **We are entering the Anthropocene, a new geological epoch in which humanity's impact on the Earth's natural systems is rivalling or exceeding natural processes. Since we depend upon these systems for the most fundamental determinants of our health, these human-induced changes present a profound threat to the health of the world's population in the 21<sup>st</sup> century.**
- **This calls for a public health response that adopts an eco-social approach, integrating the ecological and social determinants of health. At all levels from the local to the global, we need to transform our communities, our societies and our economic and social systems so that we can live equitably, sustainably and in good health within the limitations of our planetary home.**
- **Trevor Hancock will present the main features of the Anthropocene era, discuss its health impacts, define the eco-social approach and discuss what its application in public health means in practice.**

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## Outline

1. **The Anthropocene**
2. **The ecological determinants of health**
3. **Key ecological changes underway**
4. **Human driving forces**
5. **Health and human development impacts**
6. **Imagination and hope**
7. **The public health agenda**

## I. The Anthropocene

- **Our efforts to subdue nature have been so successful that the time in which we now live has been called the Anthropocene - it will show up in the geologic record**
- **Welcome to the Anthropocene!**

# • Welcome to the Anthropocene •



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GLOBAL IGBP CHANGE International Geosphere-Biosphere Programme  
WCRP World Climate Research Programme  
IHDP International Human Dimensions Programme on Global Environmental Change  
Earth System Science Partnership  
ICSU International Council for Science

Welcome to the Anthropocene website brought to you by

GLOBAL IGBP CHANGE International Geosphere-Biosphere Programme  
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IHDP International Human Dimensions Programme on Global Environmental Change  
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Earth System Science Partnership  
ICSU International Council for Science  
WCRP World Climate Research Programme

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# Global change and public health

## CPHA Project

- Document the potential health impacts of major global ecological changes
  - Climate and atmospheric change
  - Pollution and ecotoxicity
  - Resource depletion
  - Loss of species and biodiversity
- Identify the drivers of these changes
- Propose an action agenda for public health



Available at

<http://www.cpha.ca/uploads/policy/edh-brief.pdf>

[http://www.cpha.ca/uploads/policy/edh-discussion\\_e.pdf](http://www.cpha.ca/uploads/policy/edh-discussion_e.pdf)

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**The Rockefeller Foundation–Lancet Commission on planetary health**

**Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–Lancet Commission on planetary health**

*Sarah Whitmee, Andy Haines, Chris Beyrer, Frederick Boltz, Anthony G Capon, Bráulio Ferreira de Souza Dias, Alex Ezeh, Howard Frumkin, Peng Gong, Peter Head, Richard Horton, Georgina M Mace, Robert Marten, Samuel S Myers, Sania Nishtar, Steven A Osafsky, Subhrendu K Pattanayak, Montira J Pongsiri, Cristina Romanelli, Agnes Soucat, Jeanette Vega, Derek Yach*



It is time for a new discipline.



THE LANCET

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## 2. The ecological determinants of health

- **We have become so fixated on the social determinants of health that we have neglected the ecological determinants of health**
  - **Population health has been ecologically blind**



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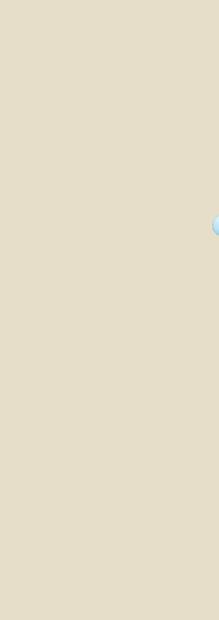
# The ecological determinants of health

We depend on ecosystems for the very stuff of life:

- Air
- Water
- Food
- Fuel and materials
- Protection from UV radiation
- Waste recycling and detoxification and
- A relatively stable and livable climate.

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## 3. Key ecological changes underway

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## Its more than climate change!

### Global ecological change includes

- Climate and atmospheric change
- Resource depletion
- Pollution and ecotoxicity
- Loss of species and biodiversity

## The state of the Earth's ecosystems

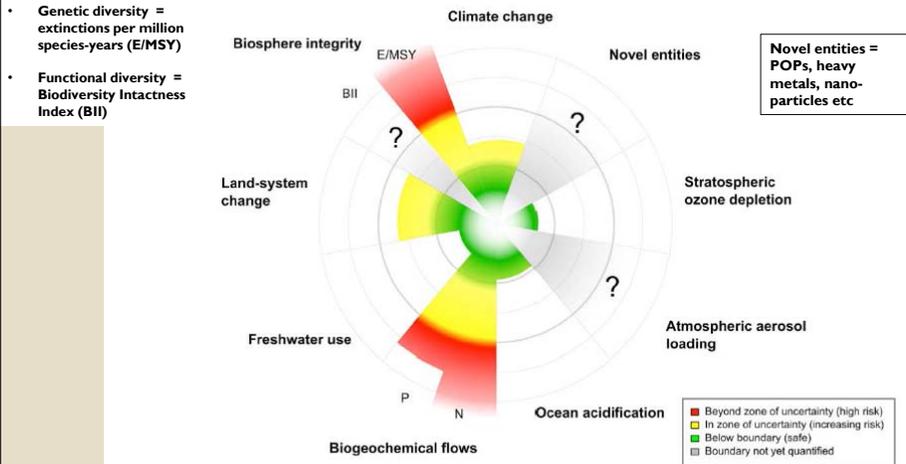
### Nine Earth System Processes:

(Steffen et al, 2015)

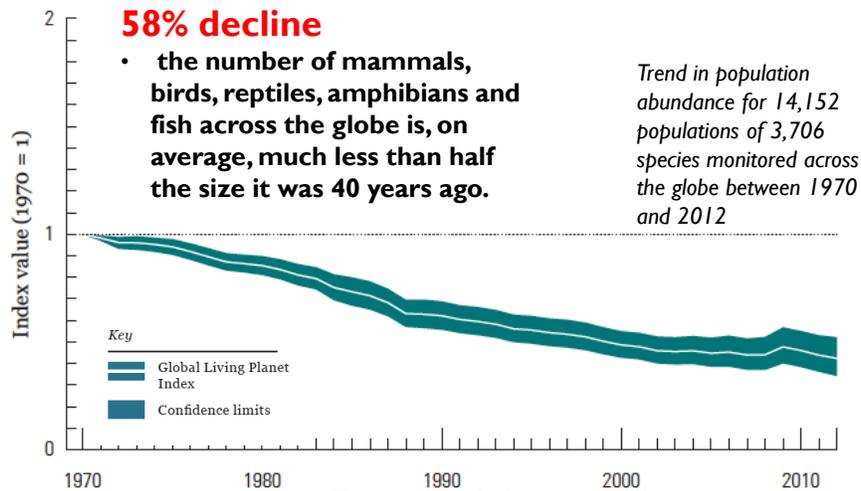
- Climate Change
- Loss of Biodiversity
- Nitrogen & Phosphorus Cycle
- Ozone Depletion
- Ocean acidification
- Global freshwater use
- Changes in land use
- Novel entities\*
- Atmospheric aerosol loading

\* new substances, new forms of existing substances and modified life-forms that have the potential for unwanted geophysical and/or biological effects e.g. POPs, heavy metals, nano-particles, genetically engineered organisms

# Crossing Planetary Boundaries



# Living Planet Index 1970 - 2012



Terrestrial down 38 percent  
 Marine down 36 percent  
 Freshwater down 81 percent

# 4. Human Driving Forces

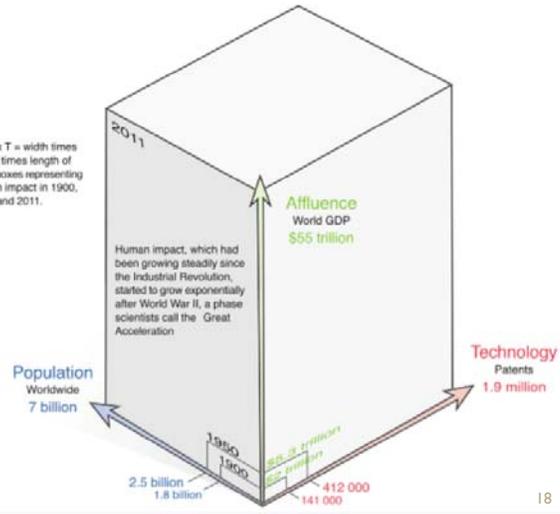
## The IPAT Equation: Impact = Population x Affluence x Technology

$$I = P \times A \times T$$

Human Impact = Population x Affluence x Technology

**Societal & human forces driving change, 1900 – 2011**

P x A x T = width times height times length of three boxes representing human impact in 1900, 1950 and 2011.



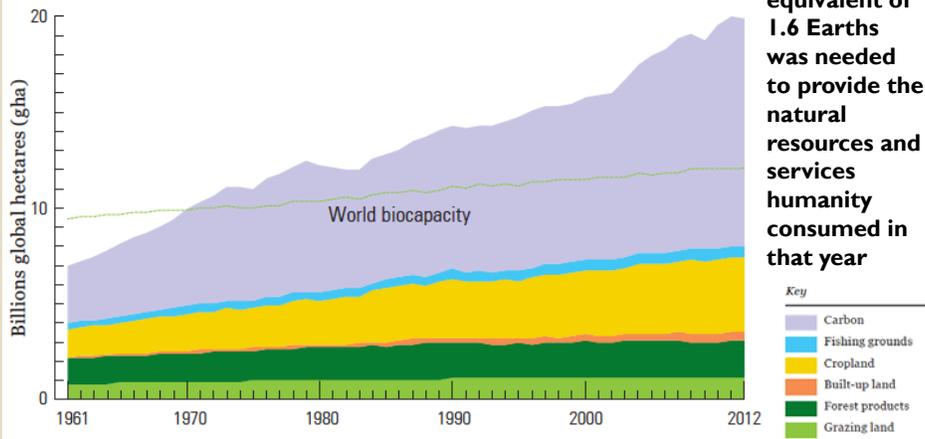
# Impact over an 80 year lifespan

- 1% annual growth in population = 2.2x
- 3% annual growth in real GDP = 10.6x
- **TOTAL OVER 80 YEARS = >23x**

**Even if our technology became 5 times more efficient, it is still >4x**



# Ecological footprint, 1961 - 2012



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Source: WWF Living Planet Report 2016 (p 75) / Global Footprint Network, 2016

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## It's the carbon, stupid!\*

- Carbon from burning fossil fuels has been the dominant component of humanity's Ecological Footprint for more than half a century, and remains on an upward trend.
- In 1961, carbon was 36 per cent of our total Footprint; by 2010, it comprised 53 per cent.

WWF Living Planet Report 2014

\* Based on Bill Clinton's famous slogan – "It's the economy, stupid!"

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## The Carbon Budget

- To have a two-thirds chance of keeping global warming below 2°C, we can add no more than 2,900 billion tonnes of carbon dioxide (Gt CO<sub>2</sub>) to the atmosphere - cumulative from 1870
  - By 2011 we had put out about 1,900 Gt CO<sub>2</sub>
  - At about 40 Gt CO<sub>2</sub> of emissions annually we pass the limit in about 2026

IPCC 2014

## No new fossil fuel extraction or infrastructure

- We can only emit about 800 Gt CO<sub>2</sub>
- CO<sub>2</sub> emissions from existing and under-construction global oil and gas fields and existing coal mines will be about 942 Gt CO<sub>2</sub>.
  - So there is already enough fossil fuel in production to take us past 2 degrees of warming.
- “No new fossil fuel extraction or transportation infrastructure should be built, and governments should grant no new permits for them”.

Oil Change International 2016

## There are Limits to Growth

“Troublingly, the original forecasts produced by the MIT group, which predicted a substantial collapse of the global ecosystem and economy during the mid-21st century period, appear to be on track forty years after they were generated.” (Turner, 2008)

\*\*\*\*\*

The BAU scenario “aligns well with historical data that has been updated in this paper” (Turner, 2014)

## 5. Health and Human Development Impacts

## A limited understanding

- **What we know about the health impacts of global ecological change is sketchy, preliminary, and often speculative**
- **But these changes often interact, multiplying adverse effects and affecting the whole system. Thus knowledge of the health impacts has to reflect comprehension of overall system change and its health impacts.**

## The Millennium Ecosystem Assessment, 2005

- **“At the heart of this assessment is a stark warning. Human activity is putting such strain on the natural functions of Earth that **the ability of the planet’s ecosystems to sustain future generations can no longer be taken for granted.**”**

## Mortgaging the health of future generations

**“we have been mortgaging the health of future generations to realise economic and development gains in the present. By unsustainably exploiting nature’s resources, human civilisation has flourished but now risks substantial health effects from the degradation of nature’s life support systems in the future.”**

## 6. Imagination and Hope

***“Hope is ... the commitment to positivity in the face of adversity”***

*Dutt and Brcic, 2014*

## Messages of hope

1. **The shift to a more ecologically sustainable society results in health gains from a healthier way of living.**
2. **We have successfully helped to create major societal shifts in favour of health before.**
3. **We are not alone; we have many potential partners.**

4. **For the most part we know what needs to be done, indeed we have known for a very long time**
5. **We have made some progress, there are in fact many examples of people, organisations, businesses, communities, cities, even entire nations, who are doing the right things and setting an example.**

## Health co-benefits

All of the following have direct health co-benefits

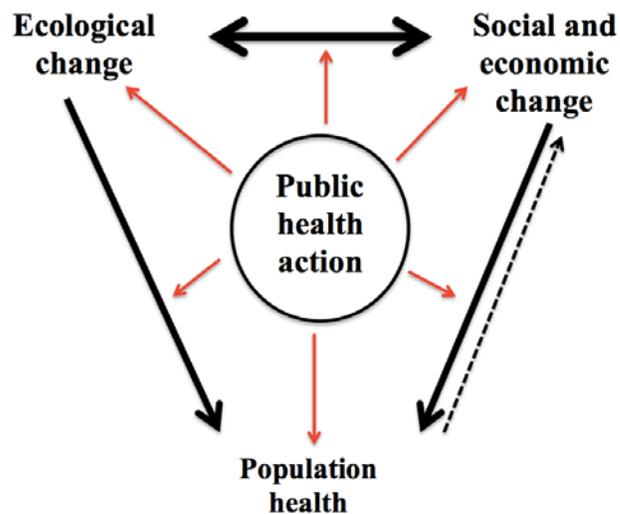
- **Energy efficiency**
  - Air quality up (beware IAQ issues!)
  - Physical activity up
  - GHG emissions down
- **Public transport**
  - Fewer injuries, more exercise, fewer emissions, more social connections
- **Low meat diet**
- **Local economies**
  - Social connections

## 7. The public health agenda

## Our ultimate message

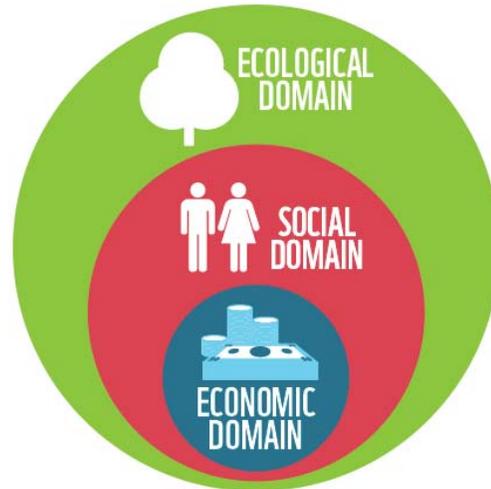
- The population health impacts of the ecological determinants of health are large, and comparable to the impact of the social determinants of health
- The two interact and must be considered as a whole – we cannot continue to be ecologically blind

## Ecosocial Model for Public Health Action



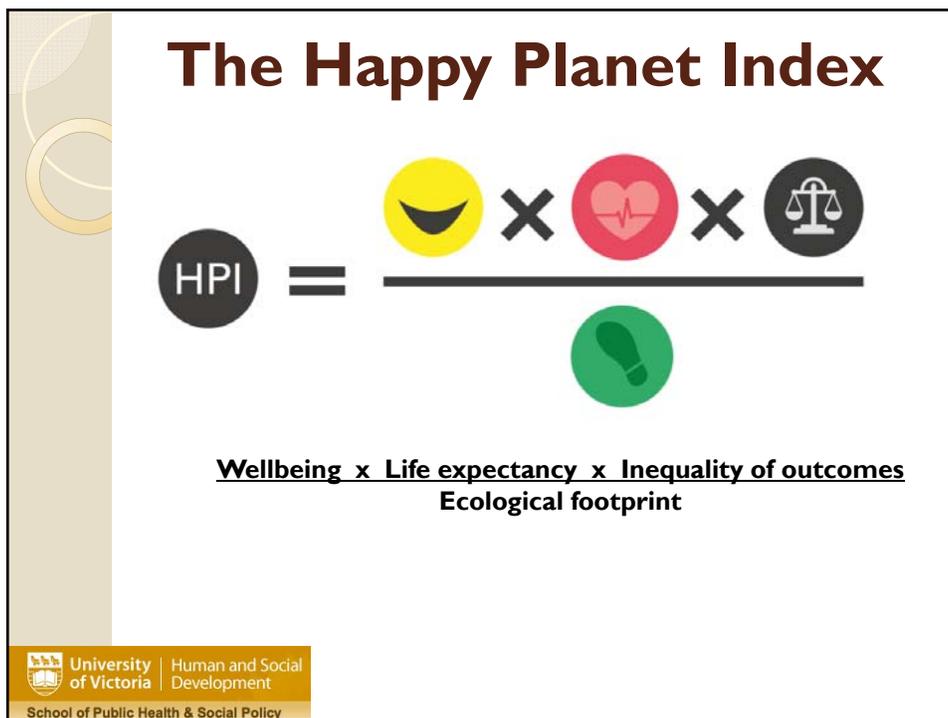
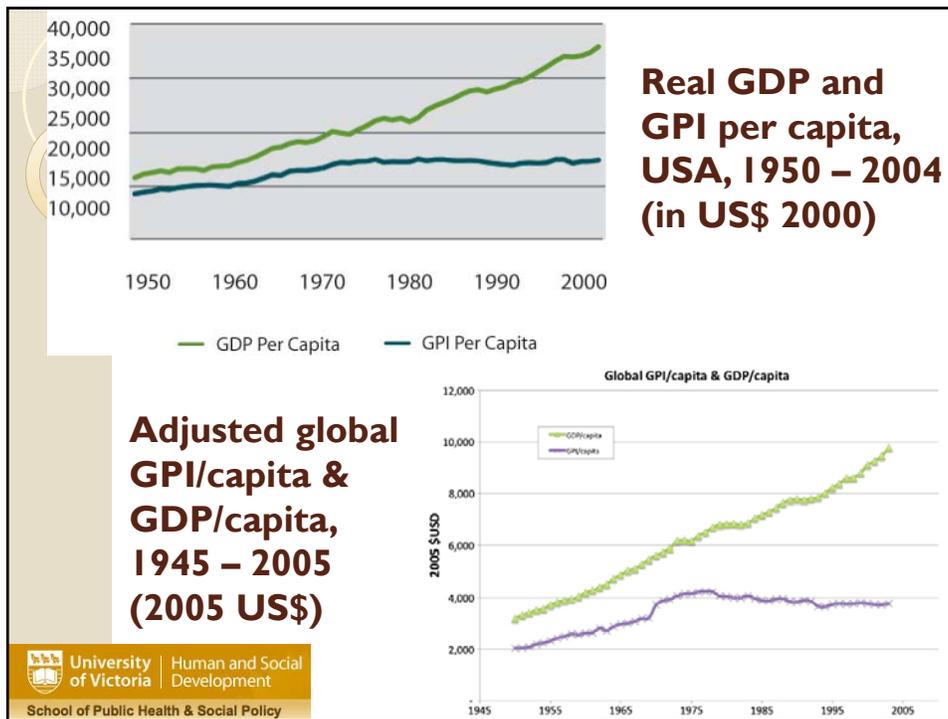
**“Ecosystems sustain societies that create economies. It does not work the other way round.”**

**WWF  
Living  
Planet  
Report  
2014**



**This challenges the very heart of our industrial economic system**

- **Growth in consumption is not the solution, it's the problem**
- **We need a new economic system that build all forms of capital at the same time**
- **We need new measures of progress**
  - **The Genuine Progress Indicator (GPI)**
  - **The Happy Planet Index (HPI)**





## **7a: Change and improve our thinking on population health**



## **A knowledge development and research strategy**

- **Integrate the EDH into our population health frameworks**
- **Educate public health professionals about the EDH**
- **Monitor, assess and report regularly on the EDH**
- **Fund and support research into the EDH**
- **Request the UN to establish a Commission on the Ecological Determinants of Health**



## 7b: Public health action

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## Change social norms and values

- **Change the focus of development and the way it is measured in both the public and private sectors, emphasizing human and social development and environmental sustainability as the new bottom line.**
- **Challenge corporate power where it harms ecosystems, societies, communities and the health of the population**
- **Change economic practices by supporting ethical purchasing and investment, boycotts and divestment.**

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## **Protect people and communities**

- **from social and economic policies and practices that harm health or widen health inequity**
  - **Seek ways to use public health legislation to investigate and report on the health threats of ecological change or those activities that contribute to it**
    - e.g. fossil fuel extraction

- **Protect people and communities from adverse impacts of global ecological change.**
  - **Explore in detail the dependence of the health care system upon - and vulnerability to failure of - essential infrastructure**
  - **Reduce vulnerability and protect the vulnerable**
  - **Increase resilience and adaptation**

- **Protect people and communities from adverse impacts of global ecological change.**
- ◦ **Reduce vulnerability in communities and protect the vulnerable**
- ◦ **Explore in detail the vulnerability of the health care system to failure of essential infrastructure**
- ◦ **Increase resilience and adaptation in communities and in the health care system**

## **Walk the talk: Environmentally responsible health care**

- **Expand our understanding of the ethical principle of *primum non nocere* – first, do no harm – embedded in the Hippocratic Oath**
- **include the obligation to do no harm to natural ecosystems and future generations**
  - **Healthcare Without Harm**
  - **Canadian Coalition for Green Health Care**

## Healthy communities

- **Establish policies and practices that create more ecologically sustainable and healthier societies and communities**
  - **Leadership Councils for intersectoral action**
  - **Community engagement**
  - **Healthy public policy and healthy urban planning**

## Towards a 'One Planet' region

- **What would our community be like, and what would our lives be like, if we reduced our EF**
  - **By 50%, and down to a 'One Planet' footprint**
  - **While retaining a high life expectancy and life satisfaction (HPI)**
- **Describe what this would mean and look like for people, and preferably model it.**
- **Use this as a community engagement initiative**

## 7c) A new system of economics

### The five forms of Community Capital

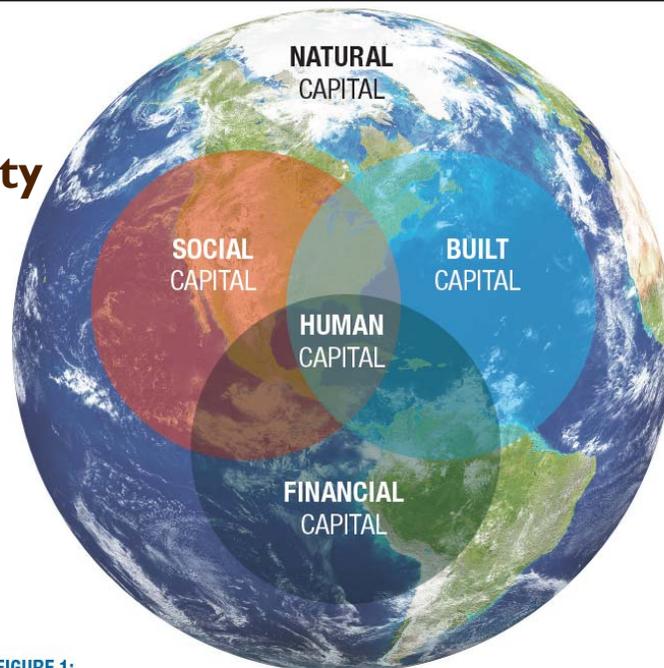


FIGURE 1:  
COMMUNITY CAPITAL

## Implications

**1. The health, wellbeing and level of human development of the individual is at the centre**

- This should be our real measure of progress as a community or society
- It is dependent upon the overlap between the social, financial and built forms of capital.

**2. All we do in our economic, social and human development occurs within the limits of the Earth's natural capital: there is only one Earth.**

## Implications - 2

**3. The inclusion of built capital as a separate form of capital is important because**

- **We have built a massive physical infrastructure all over the world — not just cities and buildings but energy, water, agricultural, transportation and other systems**
- **We are 80% urbanized and spend**
- **90% of our time indoors**

## Implications - 3

**Above all, the model shows that these forms of capital intersect and interact.**

- **Yet we often organize our society as if they are unrelated, and**
- **As if there were no limits to growth**

## Real capitalism

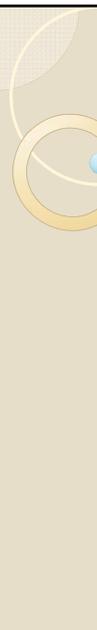
**Real capitalists do not build just one or two forms of capital – built and economic capital – by depleting the other three forms of capital. They build all five forms of capital simultaneously.**



## **A new capitalism for the 21<sup>st</sup> century**

**The new capitalism must simultaneously increase**

- **ecological capital**
- **social capital**
- **economic and built capital**
- **human capital**



## **7d) New approaches to governance - to manage what matters**

## **What business are we in? – as a society or a community?**

- **To grow the economy?**
- **To ‘grow’ people**

***“Human development and the achievement of human potential require a form of economic activity that is socially and environmentally sustainable in this and future generations.”***

**CPHA report on Human and Ecosystem Health,  
1992**

## **The challenge**

**Develop new systems and processes of governance that engage people and work with them, devising systems and solutions that**

- **Build all forms of community capital, while**
- **Maximizing human development that is**
- **Socially just and ecologically sustainable**

## Governance for people and the planet

### A 'whole of government' approach

- **The focus of the work of government must be a sustainable human development strategy**
  - **Sustainable human development in all policies**
    - **Healthy energy policy**
      - Keep carbon in the ground (the carbon budget)
    - **Healthy food policy**
      - Low-meat diet
      - UK study – reduces GHGs, improves health and LE
    - **Healthy transport policy**
      - Set up telecommute centres
      - Work from home 1 – 2 days/week
        - 20 – 40% reduction in personal commuting
        - Builds community and social cohesion
    - **Urban sprawl – Don't allow it**

- **Integrated/holistic impact assessments**
  - Include people, wellbeing, social equity
- **Tax what you don't want, don't tax what you want e.g.**
  - **Carbon taxes**
  - **End all fossil fuel subsidies, transfer to renewables**
  - **Tax consumption and waste, don't tax income**
- **A 'whole of society/community approach**
  - **Multi-sectoral Premier's/ Mayor's Councils on Sustainable Human Development**

## 7e) Interesting new legislation

- **Well-being of Future Generations Act - Wales**
- **Right to a Healthy Environment**
- **Safe Operating Space (SOS) Treaty**

## Well-being of Future Generations Act - Wales

Under the Well-being of Future Generations (Wales) Act 2015, Welsh Ministers must

- make a scheme ("the sustainable development scheme") setting out how they propose to promote sustainable development
- report each year on how the proposals set out in the scheme have been implemented; and
- publish a report assessing how effective they have been (through the scheme) in promoting sustainable development after every National Assembly for Wales election

## The right to a healthy environment

This right is

- explicitly included in the constitutions of 100 nations.
- incorporated in the national environmental laws of more than 100 countries.
- included in regional human rights treaties ratified by more than 120 nations spanning Europe, Africa, Central and South America, Asia and the Middle East.

Boyd, 2015

## ... but not in Canada

- All told, 181 of the UN's 193 member nations recognize that their citizens possess the right to live in a healthy environment.
- Canada is among the dozen holdouts, along with the United States, China, Japan, Myanmar, Afghanistan, Kuwait, Lebanon, Australia, New Zealand, Oman and North Korea.

Boyd, 2015

## ... although ...

- the right to a healthy environment is included in legislation in Quebec, Ontario and the three northern territories, the federal government and remaining provinces refuse to recognize this right.

**Boyd, 2015**

## Safe Operating Space (SOS) Treaty

- “the Earth is our home, our spaceship, a closed world with limited resources . . .”
- “it is now time to endow all citizens with responsibility for their spaceship”
- “Since 2014, the Earth has been recognized as a “client” by the European Court of Justice, and with the SOS Treaty, the environment won’t be silent any longer.”

**Meusy, 2015, in Preface to  
*The Safe Operating Space Treaty***



## **Res Communis Omnium (Things common to all – the global commons)**

**“The Earth System is available to all and cannot be appropriated by anyone, not even by a state. When this common property extends to all humankind, the goods come to be considered as *res omnium*. They are the common heritage of humankind so all human beings, both the present and future generations, have the right to access them in a favourable state. However, given its character as an exhaustible resource, it is necessary to create a legal framework for both the use and the benefits realized in the common good.”**