Pursuing sustainability (P Matson, WC Clark, K Andersson - 2016 by Princeton University Press)

HOW?

MAP 2 ◀ MAP 3 ◀ * Understand dynamics * Understand governance ➔ Knowledge ➔ Action ➤ MAP 4

Action ↓ Mindsets of sustainability leaders ➤ BOX

Contributing to a sustainability transition →

WHAT?

Goals Determinants ➤ MAP 1

Sustainability is not something to be achieved but is instead something to be worked toward

MAP 1 - Goals & Determinants of sustainability

GOALS
Inclusive social wellbeing

SOCIAL-ENVIRONMENTAL SYSTEMS
Goods & Services

DETERMINANTS
Capital assets

more than just sum of individuals' wellbeing

Development is sustainable if inclusive social wellbeing does not decline over multiple generations

equity within & between generations

> factors that make life not just livable but good: access to
- health — most universal component of wellbeing
- education — > 1 in 5 women worldwide remain illiterate
- nature — > millions of children still not in school
- community
- opportunity — Inequality = major barrier to opportunity
  - > across countries: richest {1% have 50% of global wealth; 10% have 90%}
  - > within countries: gap between wealthiest & poorest is widening

> capacity to meet basic needs:
- food
- water
- shelter
- energy
- physical security

Goods & Services
How they are produced
What kind and quantity are consumed
> huge influence on sustainability transition

WHY?

The way production and consumption processes are determined by and in turn shape the capital assets, is the crux of sustainable development (SD). Many improvements in social wellbeing have been made at the particular cost of natural capital.
↘
risk of being short term because natural capital costs are too high ➡ integration of capital assets for inclusive wellbeing

Social capital
↘ essential for sustainability as so many of the challenges facing SD require people working together
> one metric = trust

Natural capital
↘ goods & services paid for (like fuels, construction materials, food)
> valued
↘ "free" social value (like ozone layer, crop pollination, clean air)
> unnoticed or undercounted

Human capital
↘ optimal when people are:
- healthy
- well-educated
- skilled

Manufactured capital
↘ full costs not visible in developed regions:
less developed areas ⇄ (goods & services / negative impacts) more developed areas

Knowledge capital
↘ inevitably incomplete and fallible in the face of the complex realities of SD
> adaptive innovation
> broad access to inventions

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MAP 2 - Dynamics of social-environmental systems

↘ Here decisions are being made > integrated understanding is needed to prevent unintended and negative consequences

Limitations of production-consumption systems?
> production & consumption processes are seldom distinct, they interact
> obscure competing demands (food & energy systems competing for same water)
> downplays nature's dynamics

A system = a bounded area with a set of interconnected & interacting elements

In space and time > decisions made in one place or time can have **consequences** in places and times far distant

↙ **Invisible**
> discussed as "externalities" by economists & decision analysts
> invisibilities abound in social-environmental systems

↘ **Visible**
known, understood & believed
↓
wellbeing of all can be assured

Role of science:
making those externalities visible to decision makers & concerned citizens
> governance possible

3 sorts of invisibilities:
> ignorance (f.ex. coal and GHGs, CFCs and ozone)
> literally invisible (decision in one place, effect somplace else)
> future generations (f.ex. GHGs, soil and water depletion)

Making the invisible visible is an essential task in the pursuit of sustainability

Spatial & temporal changes in systems

Social-environmental systems exposed to many different kinds of perturbations & external forces
(change in temperature, policies, new technologies, ...)
↓
3 possible results:
> system absorbs perturbation
> system collapses
> system transforms shock into opportunity
↓
What determines outcome?
↙ Vulnerability — ↘ Resilience
of the system

likelihood of suffering harm	ability to continue its function or even extract benefits from the disturbances

↓
even when overall system is coping well, vulnerability perspective helps to identify who or what is most likely to suffer damage
↓
assure inclusive wellbeing

Determinants of vulnerability:
> exposure to stress
> access to capital assets

Determinants of resilience:
> diversity
> redundancy
> connectivity

The capacity to learn, needs to be viewed as one of society's most important assets

➤ Our best sources of reliable knowledge to manage for sustainability: science + real-world experience

Spatial & temporal changes in systems can be understood by measuring stocks
> stocks in social-environmental systems:

(MAP 3)
- social
- natural
- human
- manufactured
- knowledge

5 capital assets

> flows into and out of these stocks are controlled by:
>> natural processes
>> society's processes of production & consumption

The ability to understand the consequences of different production and consumption decisions for the state of the asset base seems essential for the informed pursuit of sustainability

complete understanding seldom within reach

WHY? Social-environmental systems = complex adaptive systems
↙ multiple interconnected components
↘ self-organization & emergent behavior
↘ ↙
all consequences of new policies or technologies, in pursuit of sustainability, cannot be predicted with confidence

➤ Better science can help but it needs to be imbued with humility

The pursuit of sustainability in complex social-environmental systems needs to be an adaptive process
↓
Even a careful adaptive approach with excellent monitoring has its limitations:

Social-environmental systems characterized by non-linearities & tresholds
↓ even small perturbations
regime shifts
= large, persistent and abrupt changes in the state & functioning of systems

> key to understanding social aspects of systems

F.ex. **Poverty traps**:
people need certain combinations of assets before their own hard work can help them get ahead > critical asset tresholds must be crossed to escape poverty

Natural capital deficits and degradation play a central role in many of today's deepest poverty traps

Evaluating complex systems
> analytical models (f.ex. Ecosystem Services models, Life Cycle Assessments): provides decision makers with information about trade-offs & co-benefits
→ helps to make more informed choices, does not simplify decisions
> accounting & indicator systems (f.ex. Gross External Damages, Inclusive Wealth Index): helps communities, corporations, governments and ngo's
→ track their success in managing social wellbeing

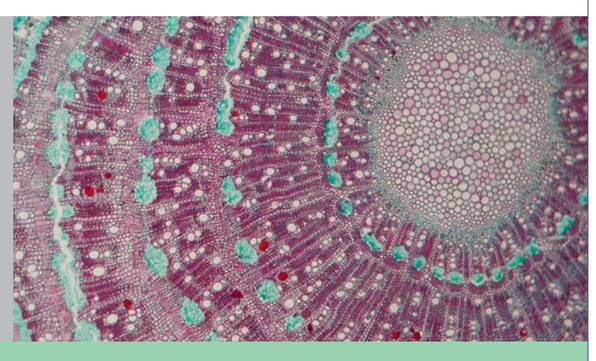
The development trajectory for the world overall is (barely) increasing its inclusive wealth per capita and thus is (barely) sustainable

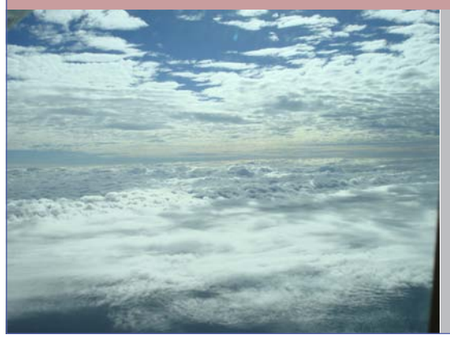
CFCs ChloroFluoroCarbons
GHGs Green House Gasses
↝ uncertainties

B. Russell - The conquest of happiness (1930)

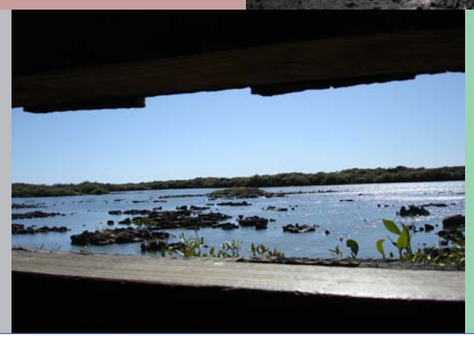
All our separate tastes and desires have to fit into the general framework of life, if they are not to become a source of misery.
If they are to be a source of happiness they must be compatible with health, with the affection of those whom we love, and with the respect of the society in which we live.

Embrace complexity





Think broad and recognize the limits of your view



It is better to do nothing than to do harm.
Half the useful work in the world consists of combating the harmful work.
A little time spent in learning to appreciate facts is not time wasted,
and the work that will be done afterwards is far less likely to be harmful
than the work done by those who need a continual inflation of their ego
as a stimulant to their energy. Nothing is more fatiguing nor, in the long run,
more exasperating than the daily effort to believe things which daily become more incredible.
To be done with this effort is an indispensable condition of secure and lasting happiness.

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MAP 3 - Governance in social-environmental systems

WHAT?

Decision-making process that creates rules about what people may, must and must not do in interactions with one another and with the rest of the social-environmental system

Governance = important part of society's assets of social capital (MAP 2)

Can help overcome collective-action problems by steering actors' behavior to be consistent with long-term goals for society as a whole

> common in all efforts to make changes in society
> externalities
> tragedy of the commons

Understanding which particular collective-action problems are threatening human wellbeing provides the basis for devising more effective governance strategies

LESSONS FOR GOVERNANCE IN SOCIAL-ENVIRONMENTAL SYSTEMS

➤ Diagnose collective-action problems

> mobilization of collective action faces 3 groups of challenges:
>> weak individual motivation
>> asymmetries of power
>> informational problems

Understanding what the problem is, is the most important goal of any governance analysis

➤ Figure out what makes people tick (MAP 4)

> people respond to mix of extrinsic & intrinsic sources of motivation

Use of cash payments can sometimes weaken people's motivation to do what is best for society

> acknowledge autonomy & problem solving capabilities of people

Government intervention can have opposite effect

> effectiveness of incentives depends on social norms, beliefs, values

Social punishments can produce more compliance than the relatively small cash fines

➤ Consider interventions as experiments to learn from

> large number of uncertainties in social-environmental systems
→ mistakes in design & implementation of policy responses is inevitable

➤ Explore multiple government responses

> question traditionally dominant role of national government in governance processes

> question ability of local users always to produce effective homegrown responses

> multilevel problems require contributions from actors operating at all those levels

➤ Recognize that knowledge is power (MAP 4)

> sharing of knowledge = counterweight to existing power asymmetries in society (MAP 4)

⚠ Sometimes governance itself is the problem:

Actors most influential in shaping existing governance processes rarely hold the same goals.
Some of the actors benefit enormously from unsustainable practices.

There is no 1 right answer: The real challenge is to determine which particular approaches to governance will work in specific contexts and situations

Challenge:
how reshape existing governance processes so that they are more conducive to achieving inclusive social wellbeing?

GOVERNANCE ANALYSIS

1. identify main actors, their characteristics and how these affect their degree of agency → interests, values, power, knowledge

actors interact through a political process in which collective decisions are made

2. how appropriate are political processes for addressing particular problems?
→ degree of: transparency, accountability, representation, legitimacy

one of essential outcomes of political processes is institutional arrangements

3. What are the specific characteristics of the rules introduced and how they are enforced (if at all)?
→ determine effectiveness of human responses to a problem about: > managing & using a resource
> monitoring & enforcing rule compliance

rules affect human action if they are known & enforced

4. Do the rules affect human action? → behavior, decisions, day-to-day practices

5. How do the different capital asset stocks respond to introduction or modification of a particular rule?
(MAP 1)

* condition of capital assets is unlikely to improve unless critical mass of actors work together to change rules about how asset base is accessed & used

Feedback loops to monitor & enforce the governance process, to learn & adapt

External forces beyond control of actors, also shape governance at all levels

= uncertainties

BOX - Mindsets of sustainability leaders

Description of characteristics of leaders, who can catalyze progress towards sustainability goals, whether corporate, educational, non-governmental or governmental and whether on a local or global stage

⚠ Science and technology are important but by focusing too much on the potential benefits of more knowledge and innovation we run the risk of becoming complicit in the continued depletion of our assets

Personal actions are also critical.
Scientific analysis should also lead the way to much broader exchanges, deliberations and **informed agitations**

➤ System thinkers

> open minds
> multi-disciplinary perspectives
> inclusive
→ recognize all they don't know and respect other's different ways of knowing & learning

➤ Deeply reflective & adaptive thinkers

> they recognize that their own ways of thinking are unlikely to be how the world really works
→ they cocreate with their communities

➤ Self-aware

> deep empathy & compassion for wellbeing of others, around the world and over time

➤ Creative & innovative for change at scale

> transform social-environmental systems through a process of change that can cascade across generations & across the globe
→ make a difference not just for themselves
→ pursue those changes with patience

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MAP 4 - Linking knowledge with action

The pursuit of sustainability requires more and better knowledge. But that knowledge needs to be targeted and produced in ways that make it useful.

Successful efforts that link knowledge with action are:

➤ TRUST BUILDING

Potential users more likely to trust new knowledge if it sounds:

1. relevant to them → saliency
2. credible/true → credibility
3. fair/unbiased → legitimacy

3 dimensions of trust

1. Users have no reason to listen to producers of knowledge unless conversation begins with the recognition of users' greatest hopes, fears and goals

2. Credibility is about perceptions of truth:
   > academic: seeing paper published in reputable journal
   > farmer: proof of potential in a neighbor's field

3. Scientists like to think of themselves as unbiased but there is bias in the selection of problems

Reorienting knowledge production efforts to encompass immediate & long term concerns of potential users, even if it doesn't involve cutting-edge work publishable in scholarly journals, increases likelihood of actions towards sustainability

→ may be very different from producers' assumptions about users' needs!

Local inventions with a real potential for contributing to sustainable development may be shunted aside by the powers that be for being "unscientific"

→ research tends to shed uneven light

➤ COLLABORATIVE EFFORTS

⛔ Mutual incomprehension of producers & users

⬆ Producers & users work together to:
> identify needs
> design possible solutions
> evaluate against mutually agreed upon criteria

challenge power dynamics!

(MAP 3) sharing of knowledge

⚠ Mutual incomprehension goes unrecognized in "pipeline" or "**technology transfer**" approaches, where everything is specified by knowledge producers

➤ ADAPTIVE EFFORTS

⛔ Knowledge producers too often aim for one-size-fits-all, static solutions ↔ heterogeneous & dynamic world

⬆ Successful adaptation requires:
> admission of error
> understanding how risky & uncertain SD is

How promote active error-embracing attitude essential for SD?
> create "safe spaces" (support rather than punish failure)
> develop metrics & evaluation procedures rewarding learning rather than success

➤ SYSTEM EFFORTS

⛔ Fragmentation of knowledge production enterprise

⬆ Complement:
> efforts that begin with discovery, with efforts anchored in the problem
> deep expertise with recognition of how different disciplines intersect and interact

If research is not disinterested, it can't be good

→ embrace idea that research can be important to society and admit that we care how it all turns out!

→ it's possible, indeed essential, to do committed research and excellent research at the same time

➤ POLITICAL EFFORTS

⛔ Tendency of researchers to see central challenge in technical terms when it is inherently political

⬆ Knowledge producers & users should become more aware of and more explicitly reflective about the inescapably political character of their collaborations

Figure out what makes people tick ➤ MAP 3

When knowledge is salient to interests of actors in society, then knowledge becomes power ← Recognize that knowledge is power (MAP 3)

➤ EMBRACING BOUNDARY WORK

Tensions arise at the interface between actors with different views of what is trusted knowledge;
those tensions must be managed effectively if potential benefits of knowledge are to be realized by society

Determinants of successful boundary work:
> all relevant stakeholders are accountable for the results
> boundary organizations or persons are able to tap into the knowledge, know-how & experiences of all stakeholders
> collaborative production of knowledge and boundary objects is encouraged

→ A **sustainability transition** requires ongoing connection between research community and the world of action & policy making (BOX)

Knowledge alone is seldom sufficient to achieve goals.
It is how knowledge is used that matters

SD Sustainable development

uncertainties

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