

# Pursuing Sustainability: Challenges and Opportunities

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[Mossavar-Rahmani Center for Business and Government](#)

*by*

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# Pursuing Sustainability: Six questions...

1. What's the **problem** of sustainable development?
2. What should be the **goal** of efforts to address the problem?
3. What must be **sustained** to achieve the goal?
4. What is most needed from **science and technology**?
5. *What is most needed from **management and governance**?*
6. *How can we better link **knowledge with action**?*

# 1) What's the *problem* of sustainable development?



“Environment is where we live;  
Development is what we all do  
in attempting to improve our  
lot within that abode.

The two are inseparable....”

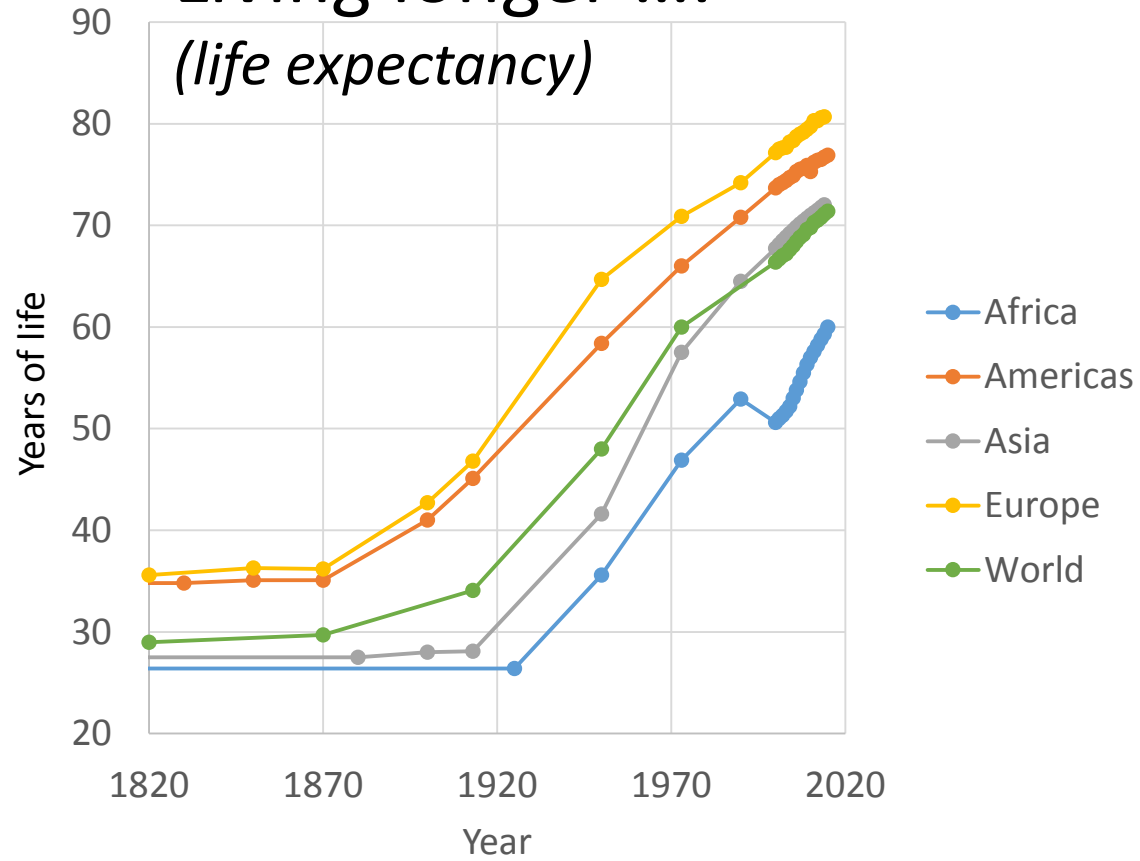
“Humanity has the *ability* to  
make development  
sustainable...”

(WCED, 1987)

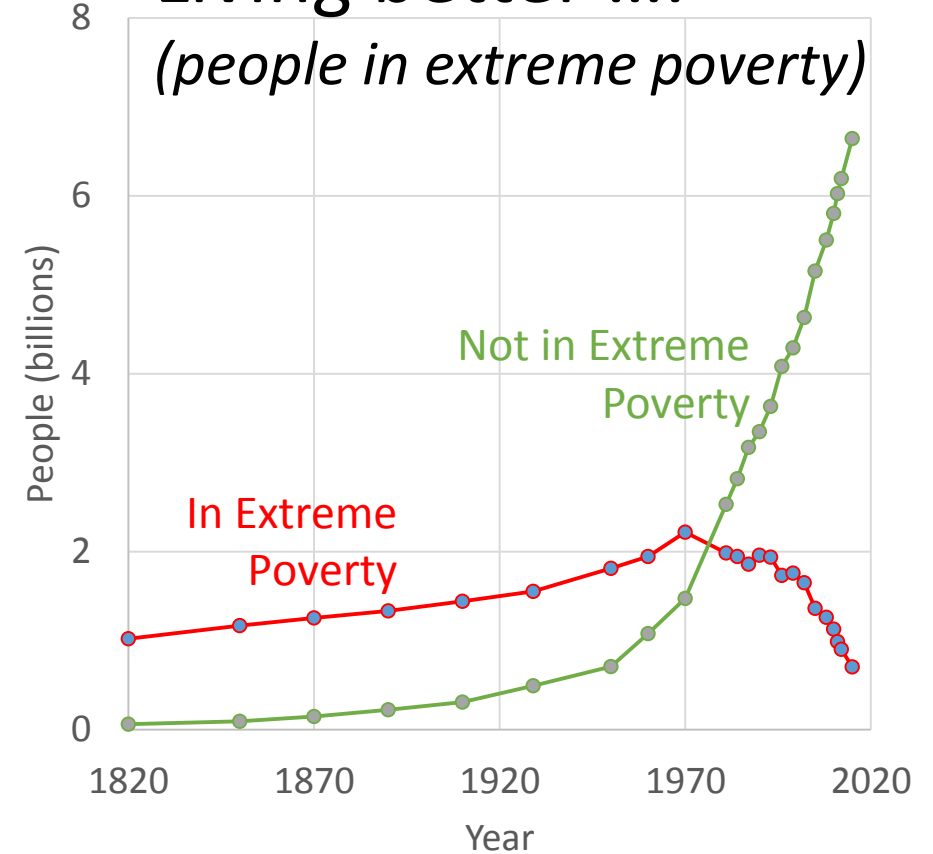
“The *ability* to make *development* ...?”

## The “Great Escape” (Deaton)

Living longer ....  
(life expectancy)

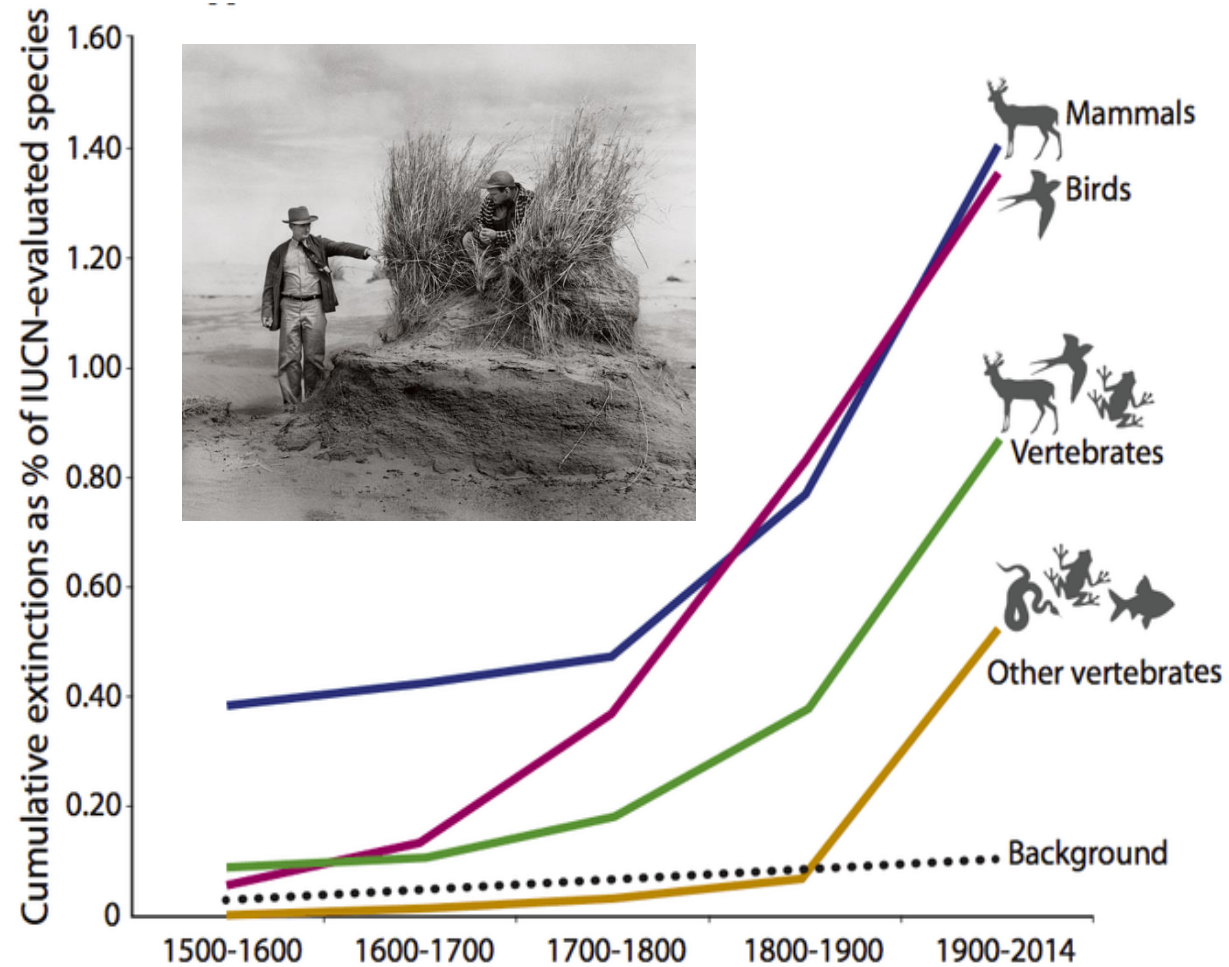


Living better ....

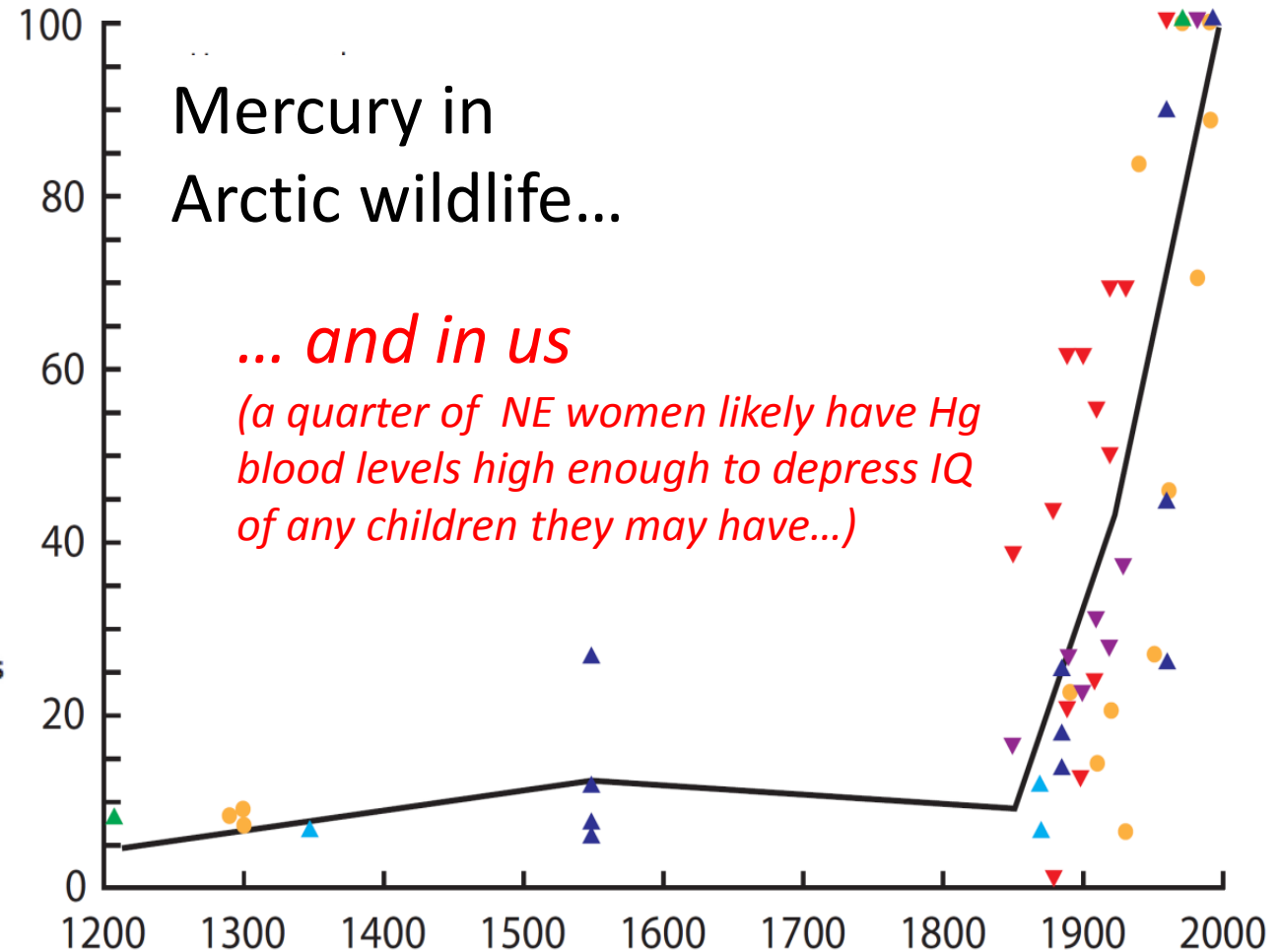


# “The *ability* to make development *sustainable*?”

## “The (6<sup>th</sup>) Great Extinction”

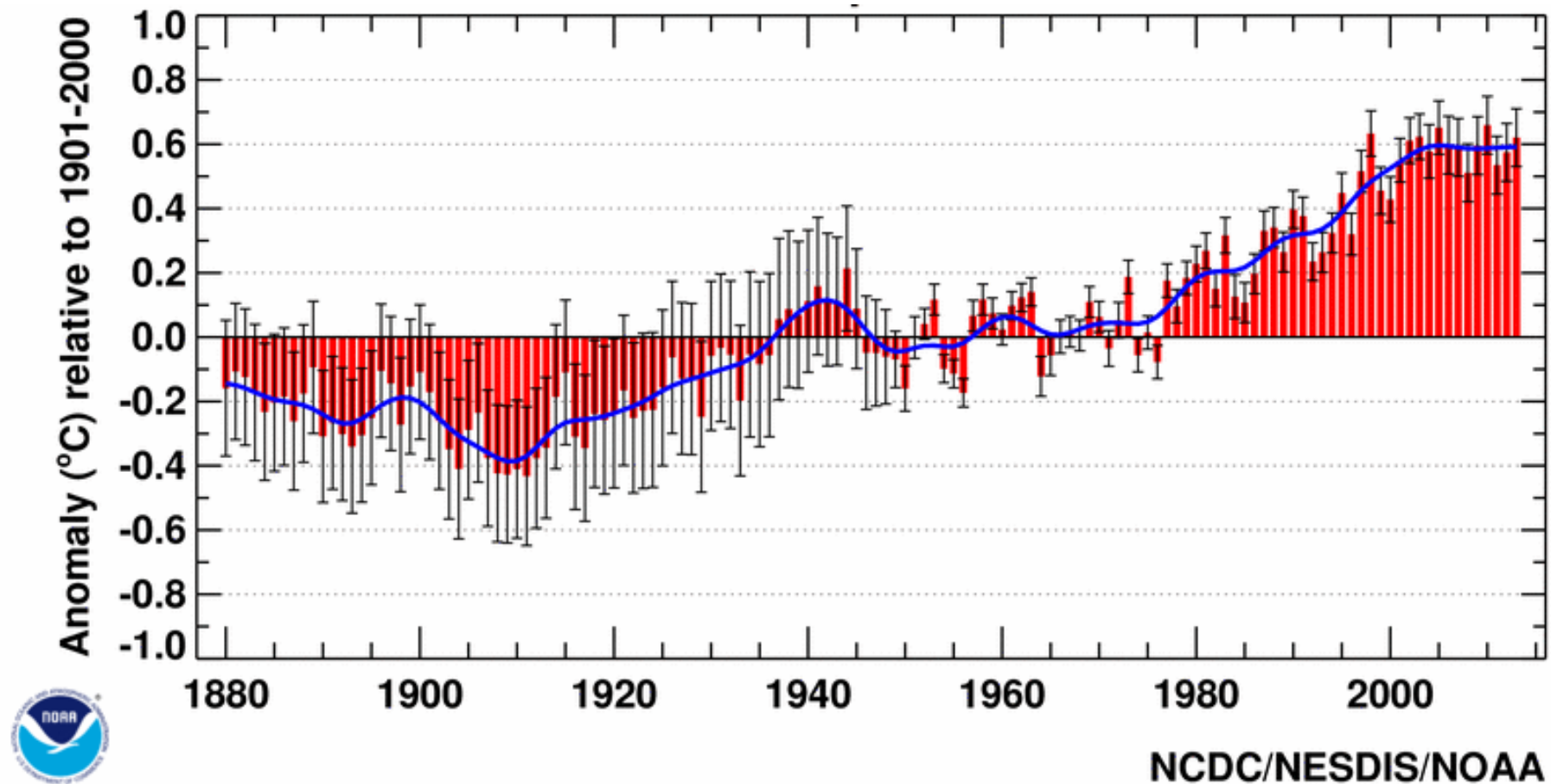


## “The Great Poisoning”



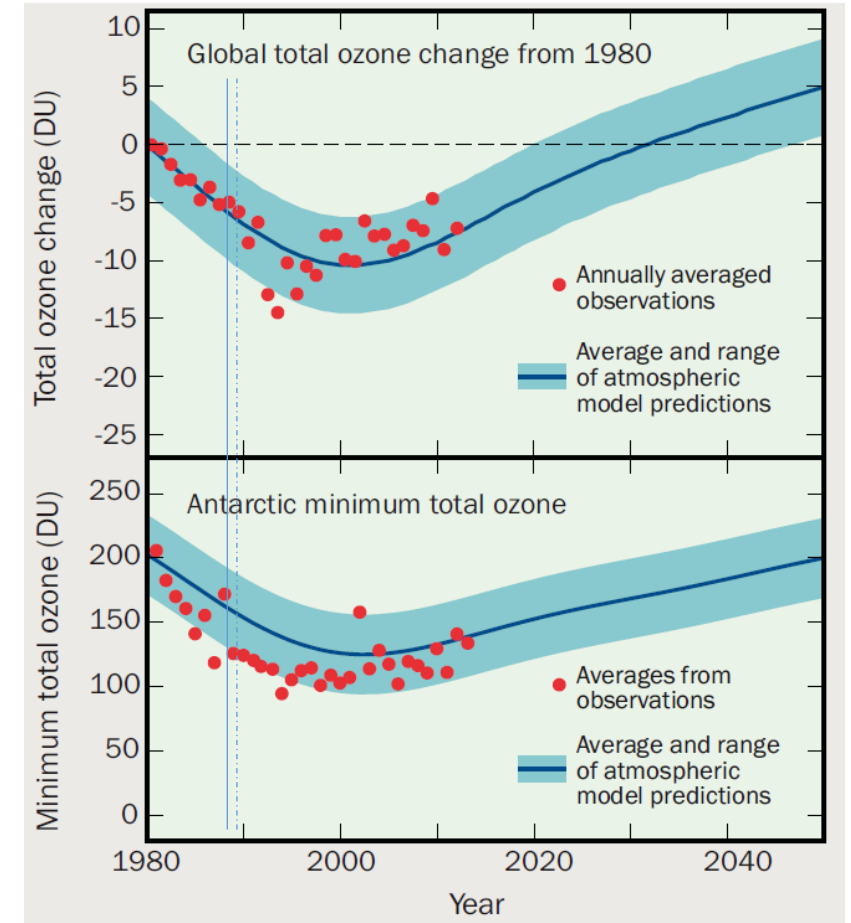
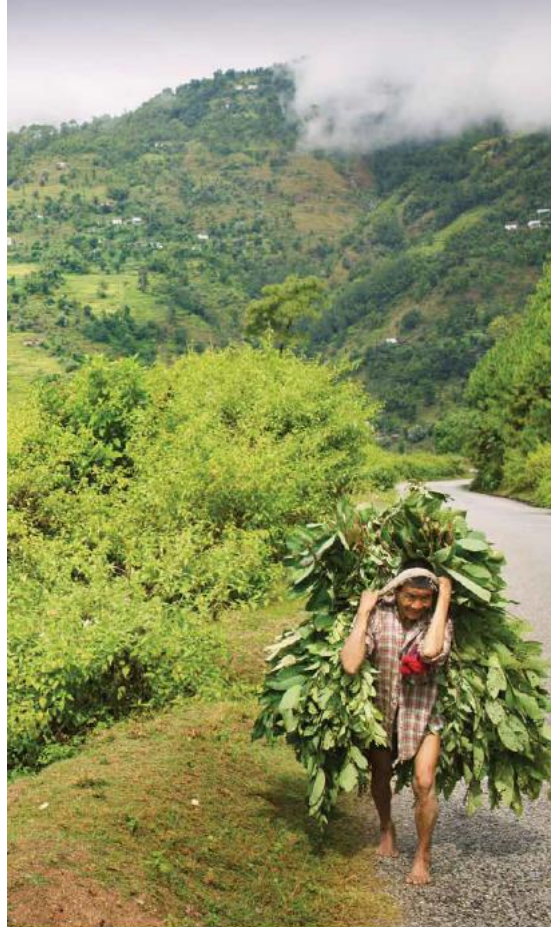
“The *ability* to make development *sustainable*?”

“The Great Warming/Acidifying/Drowning....”





# Progress on *parts* of sustainable development...



But challenges remain at the level of ***whole sectors...***



**global ENERGY demand  
2015 → 2050:**

**+40%**



But challenges remain at the level of ***whole sectors...***



**global FOOD demand  
2015 → 2050:**

**+50%**

But challenges remain at the level of *whole sectors*...



**global URBAN demand  
2015 → 2050:**

**+60%**

And *sectors* themselves are *interconnected*:  
Needs of 10B people heading toward “A Perfect Storm...”

**Water**  
+30%

**Food**  
+50%

**Climate**  
+1°C by 2030

**Energy**  
+50%

**Specific  
diseases**  
+50%



(Beddington, 2009)

**Water**

+30%

**Food**

+50%

**1) Problem of sustainable development?**

**Move beyond incrementalism on the “parts,”  
build *capacity for systems-level transformations* in  
how we “improve our lot within our planetary abode”**

**Energy**

+50%

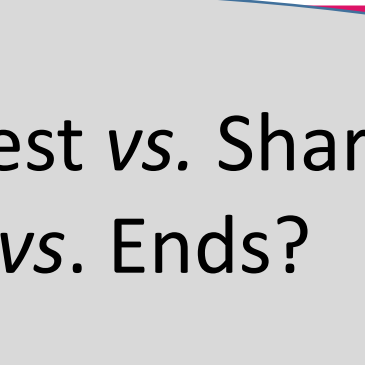
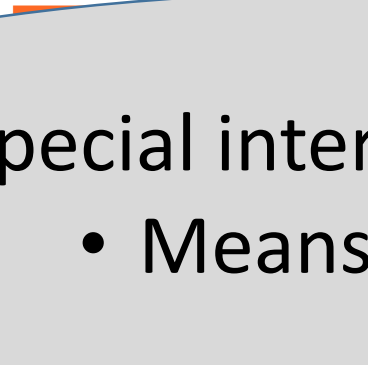
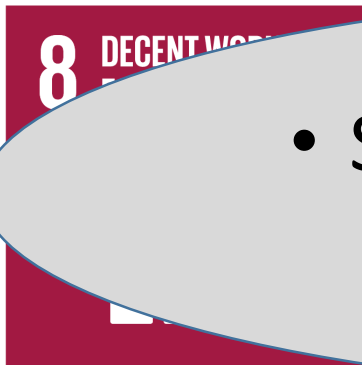
**Specific  
diseases**

+50%



## 2) What should be the *goal* of efforts to address the problem?





- Special interest vs. Shared?
- Means vs. Ends?

# Goals for a sustainability transition?

*Two major contenders...*



# Goals for a sustainability transition?



- Special interest vs. Shared?
  - Means vs. Ends?



# Goals for a sustainability transition?



- Sustainable development defined in terms of  
“human needs” → “human well-being”

*(ie material needs... + health, education, security, biophilia, community, ...)*

# Goals for a transition toward sustainability?



- *Human Well-being !*

But how to think about distribution (justice and equity)?



# Goals for a transition toward sustainability?

Human Well-being conceived

***Inclusively***

across all people

(here and there,

now and in the future)

But how to ensure justice and equity?





2) The goal of a transition toward sustainability?  
**Development pathways for which  
*inclusive human well-being does not decline*  
(This a radical redistribution re BAU!)**





### 3) What must be sustained to achieve this goal?

- Preoccupation with flows....
  - GNP growth rate
  - Population growth rate
  - Forest depletion rate
  - GHG reduction rate...
- Sustainability must be about stocks
  - Essential assets on which we draw to achieve our goals...
  - ... and whether those asset stocks are declining over the long run...
  - Resulting in reduced opportunities for future generations to reach own goals



# But which asset stocks?

Classical focus on:

- *Land* capital
- *Labor* capital
- (Manufactured) capital

More comprehensive view:

- Natural capital
- Human capital
- Manufactured cap
- Social capital
- Knowledge capital



Development is about creation, depletion, trade offs of asset stocks

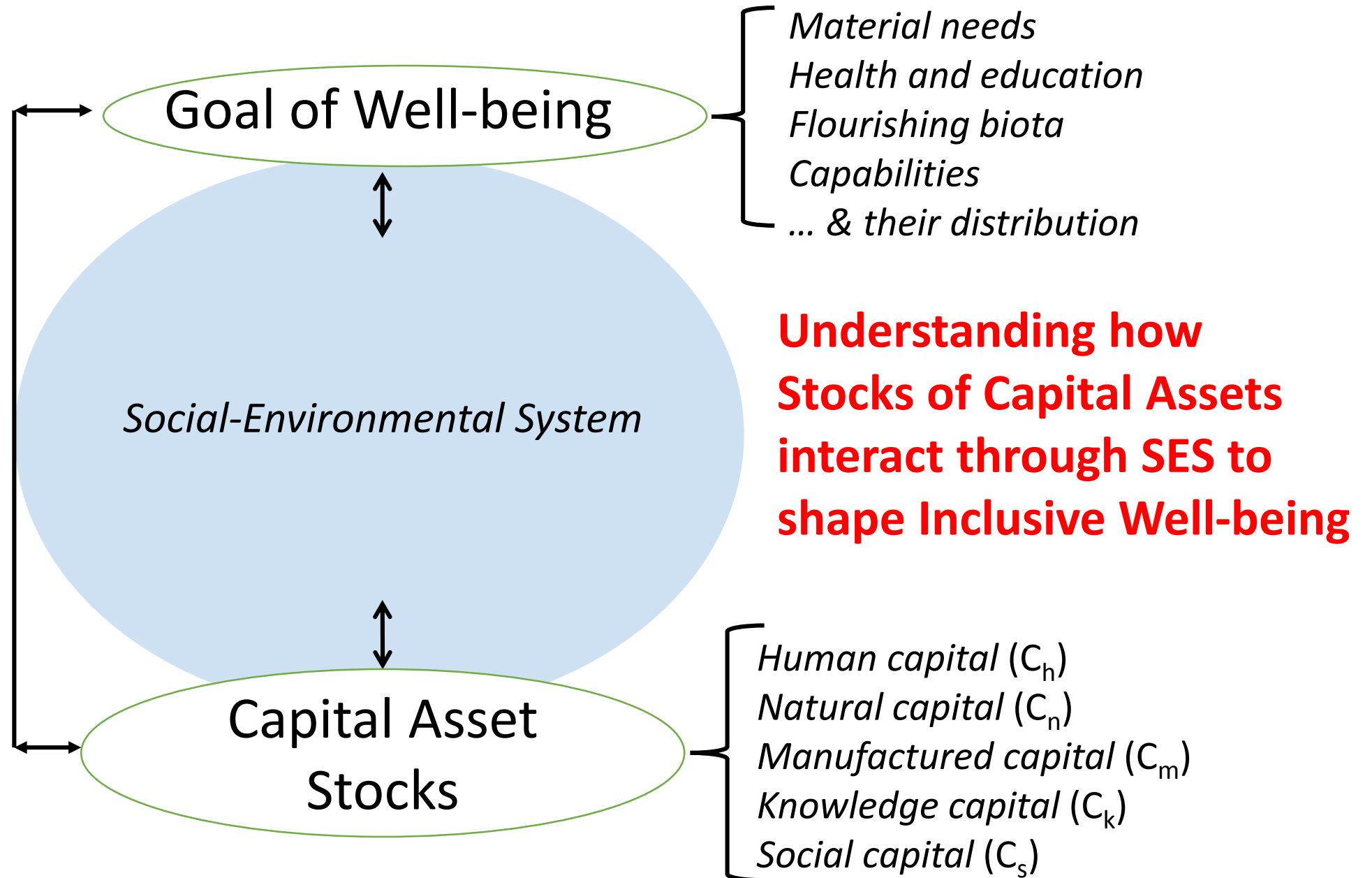
Development is *sustainable* when *capacity of the total stock of capital assets to support inclusive human wellbeing does not decline over the long run*



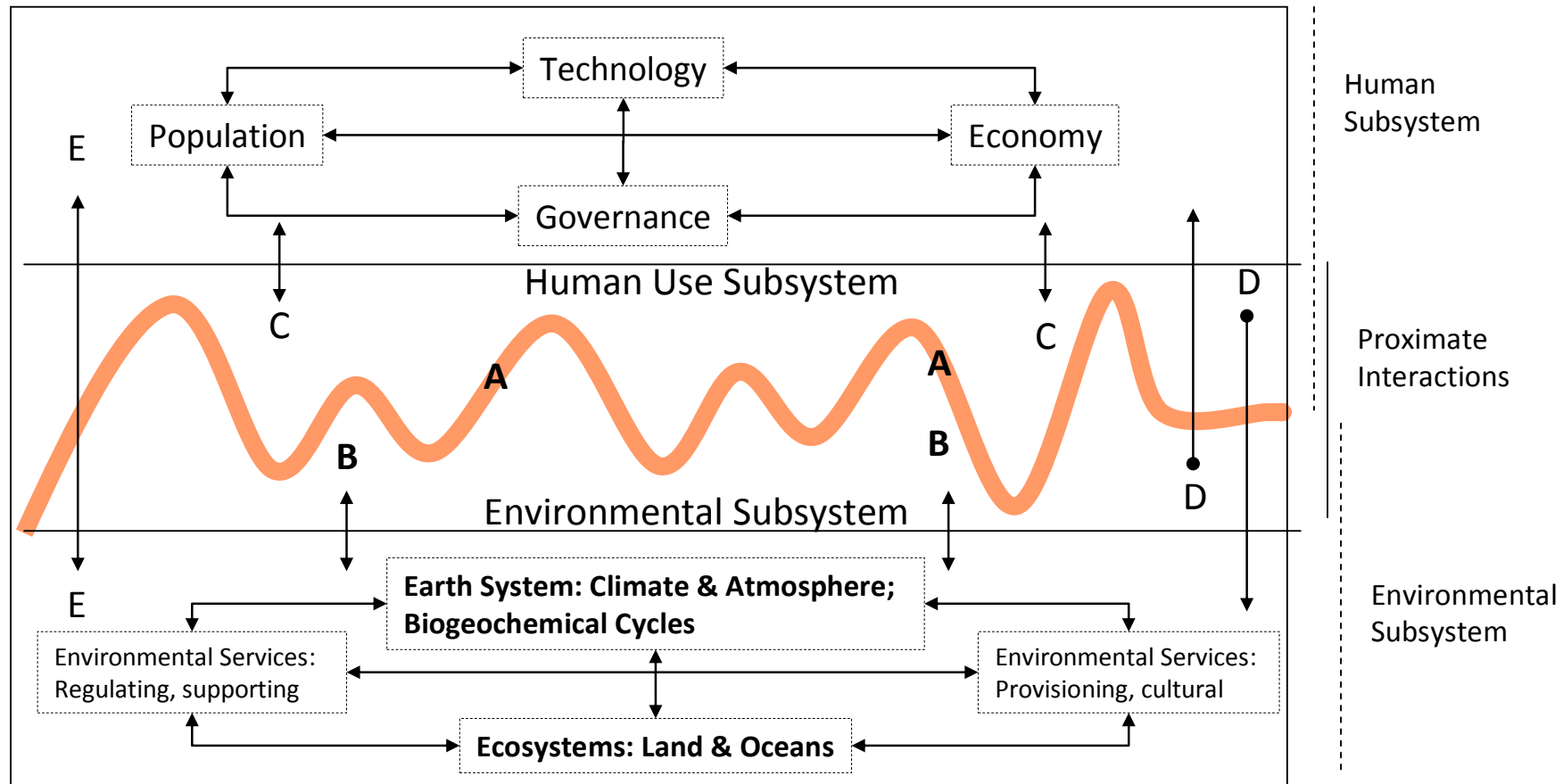
**4) What is most needed from science...?**



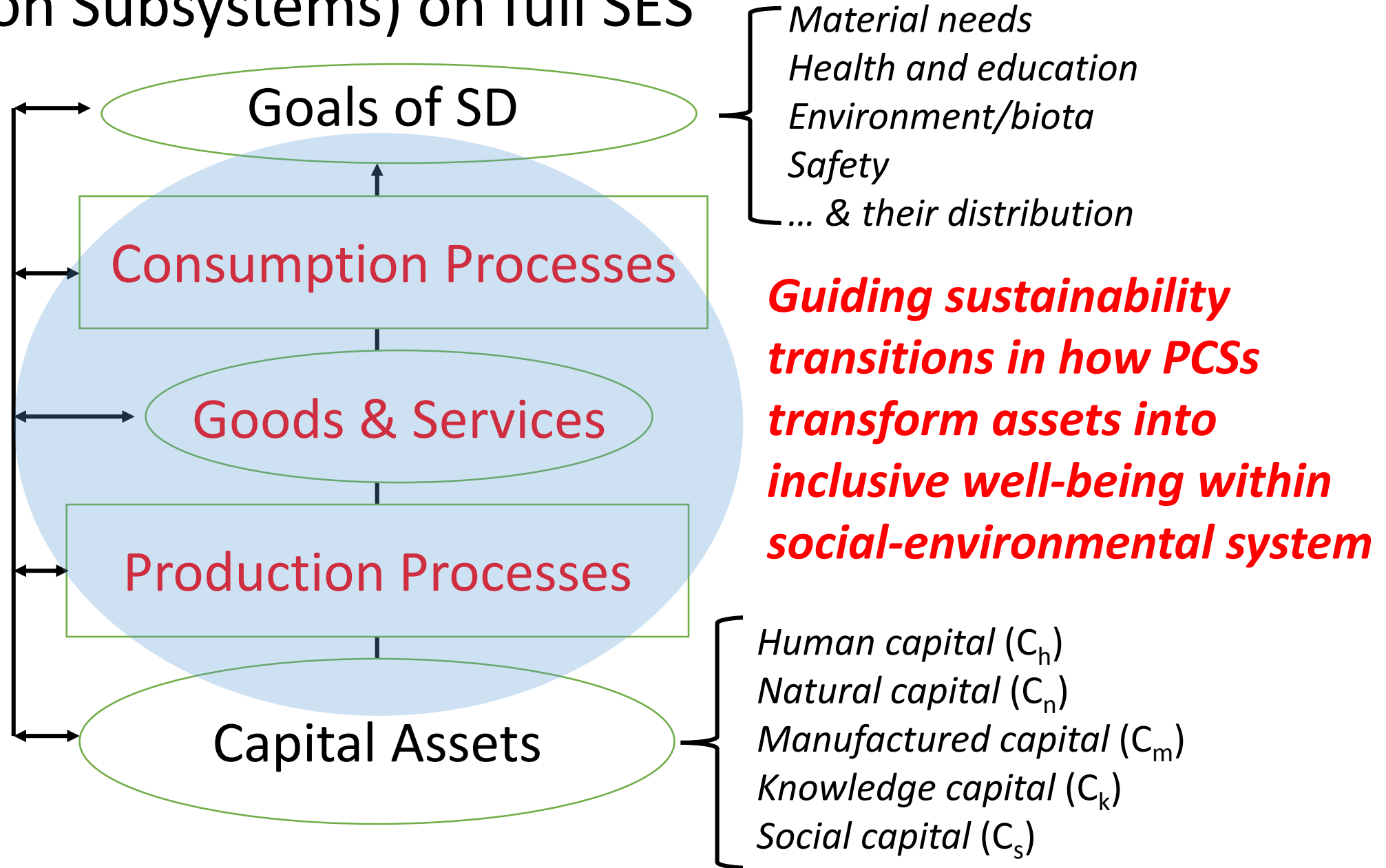
## 4) What is most needed from science...?



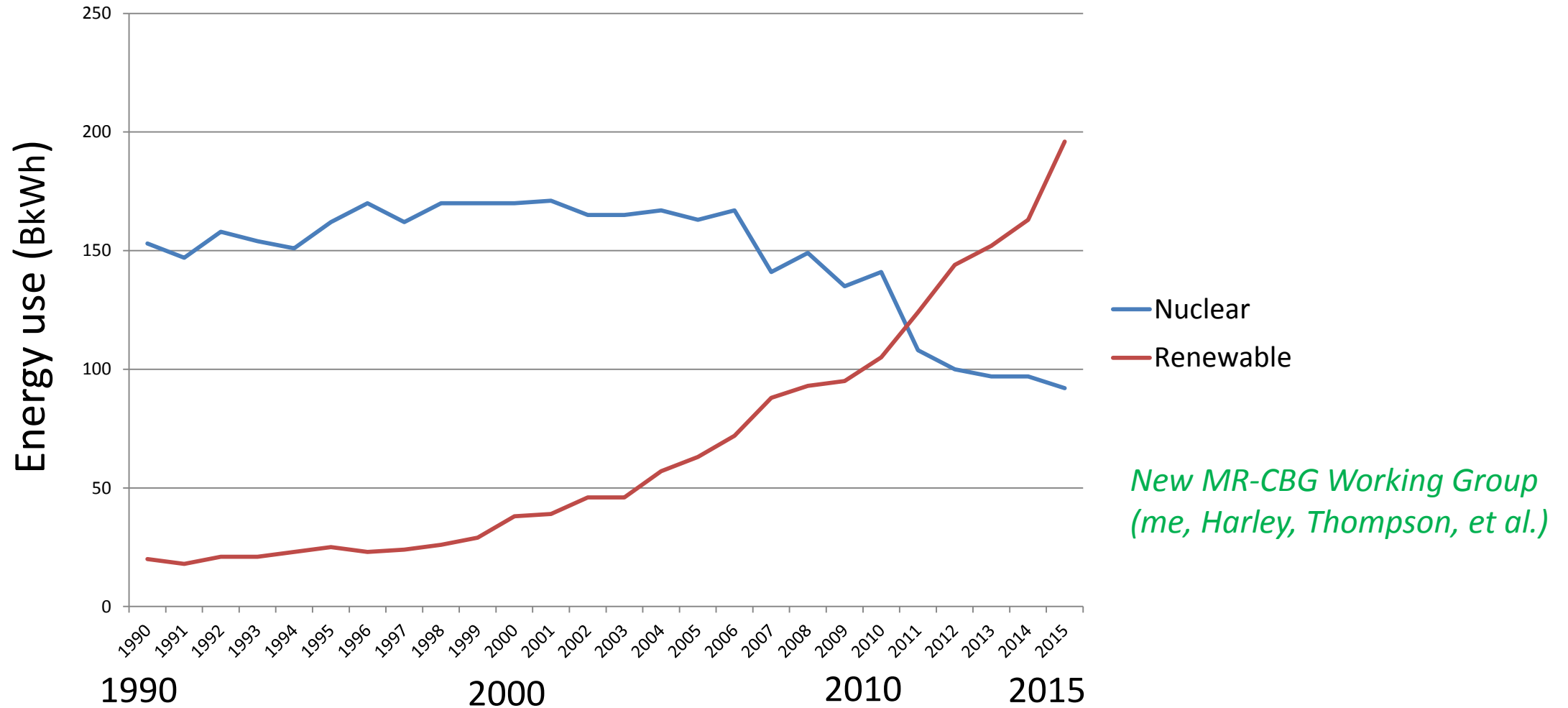
# *Basic Research* Foundations: Understanding Social-Environmental Systems (SES)



# ***Applied Research*** Simplification: PCS Lens (Production-Consumption Subsystems) on full SES

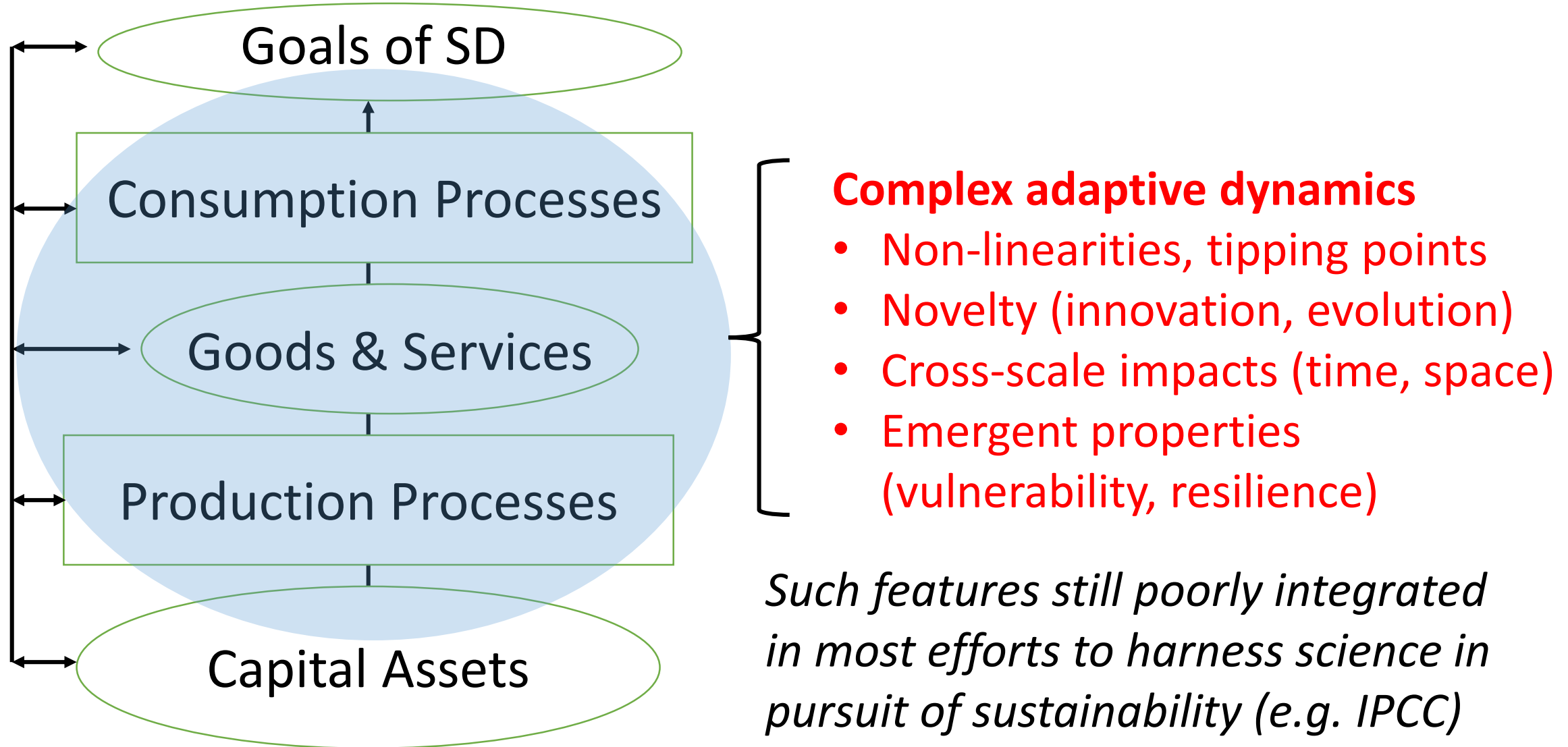


# Transforming a Production-Consumption System: Germany's *Energiewende*



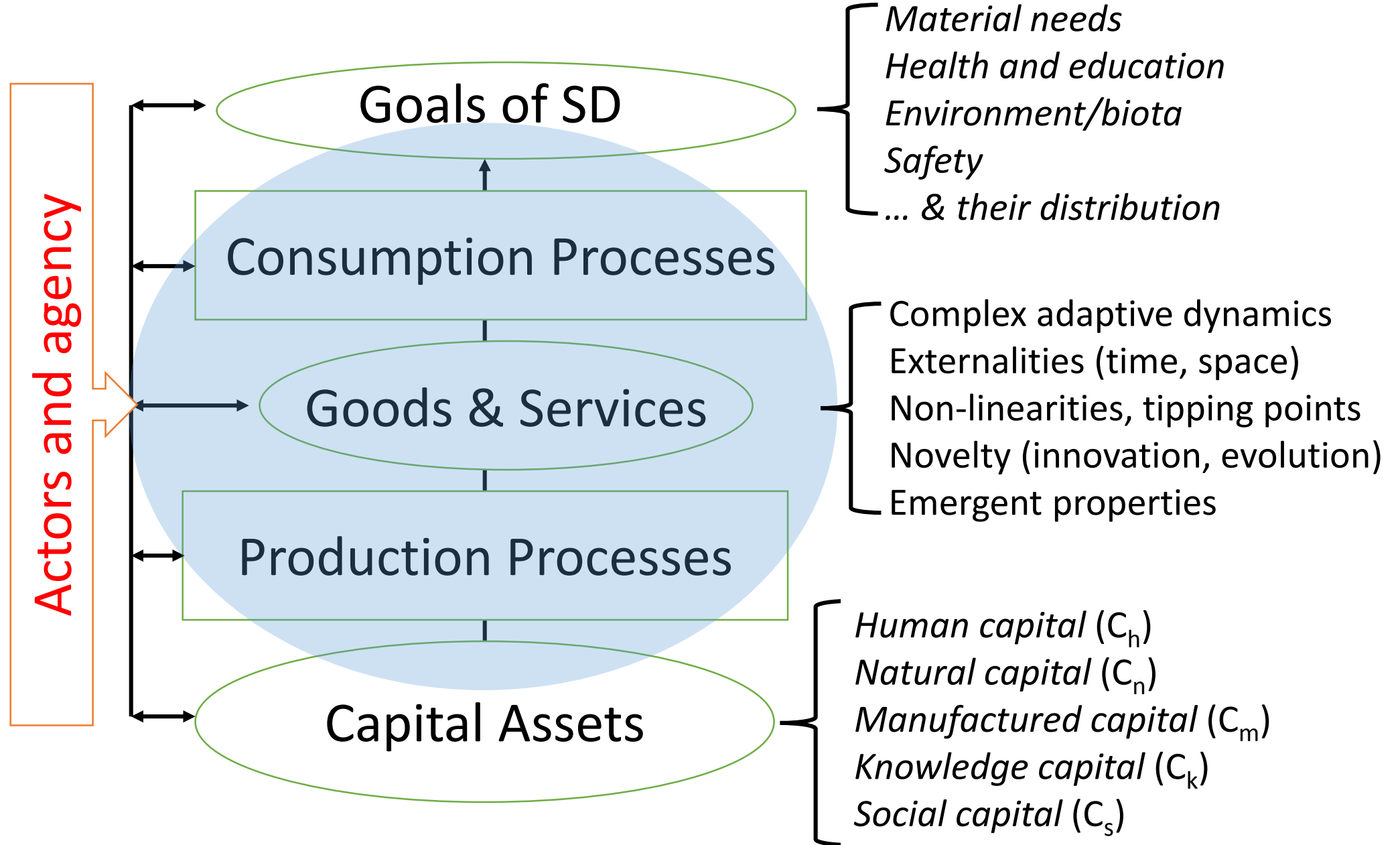


# Research challenges for guiding sustainability transitions in production-consumption subsystems of SES

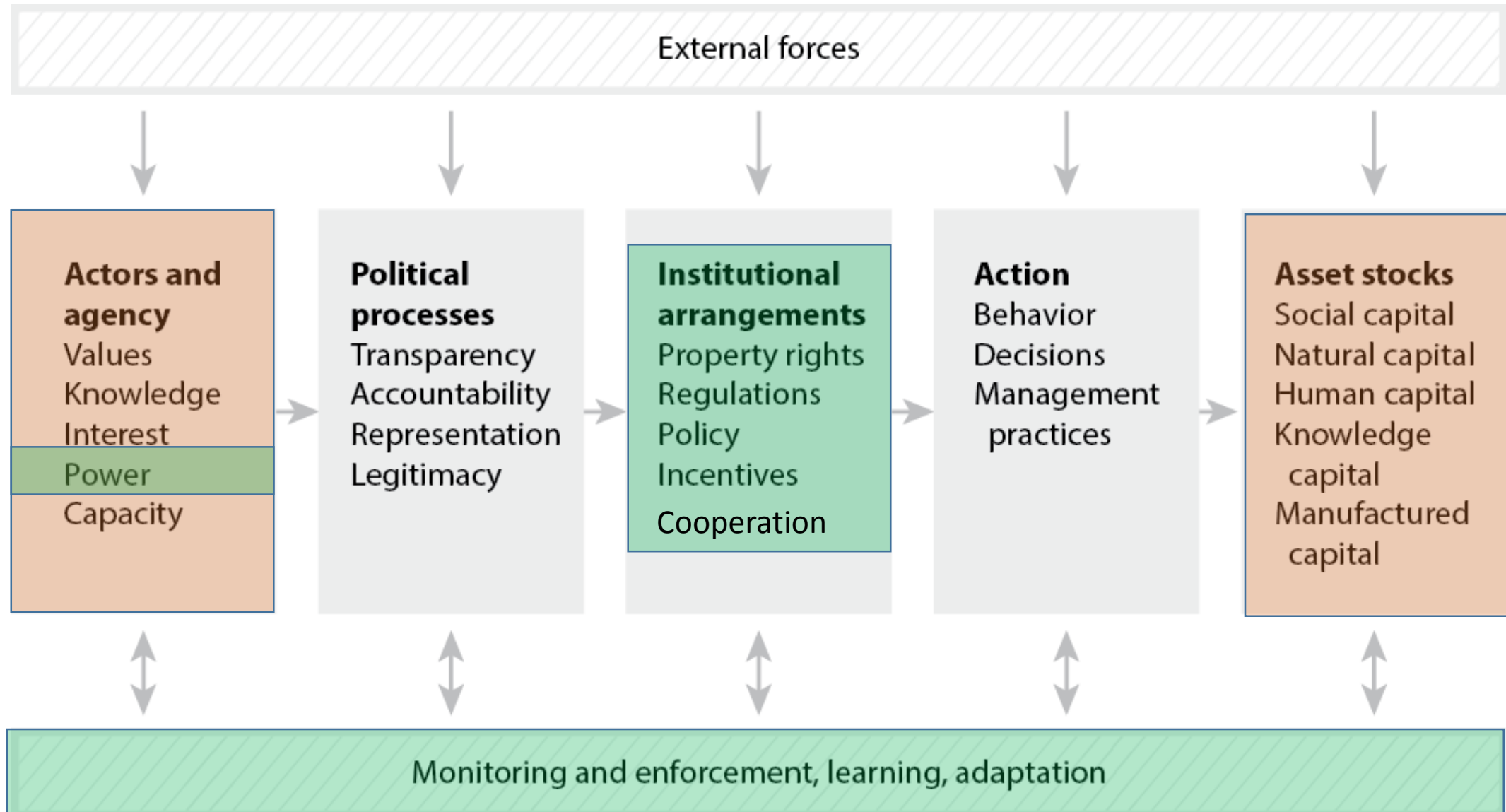


**5) What is most needed from management & governance?**

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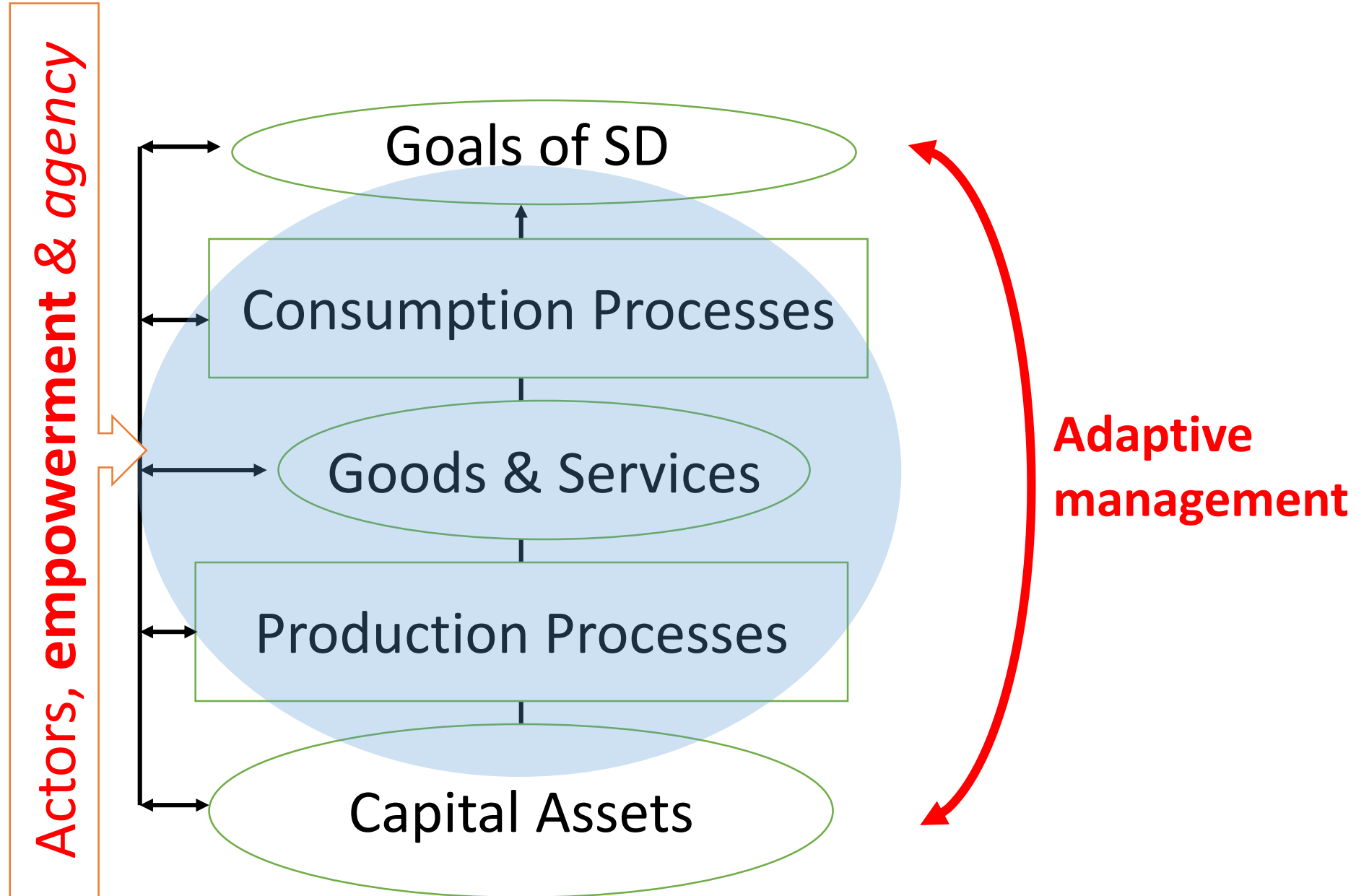


# Management & governance of Production-Consumption Sys.





## 5) What is most needed from management & governance?



**6) How can we better  
link knowledge with action?**

# To Know: Actionable knowledge and knowledgeable action are “*Coproduced*” ...

*New knowledge needed for sustainability transitions comes partly from theory, mostly from practice*

Innovation system

Complex system

*Because SES is complex, new knowledge will be incomplete, often leading to error, unexpected result*

*In a world full of snake-oil salesmen, coproduction requires building trust.....*

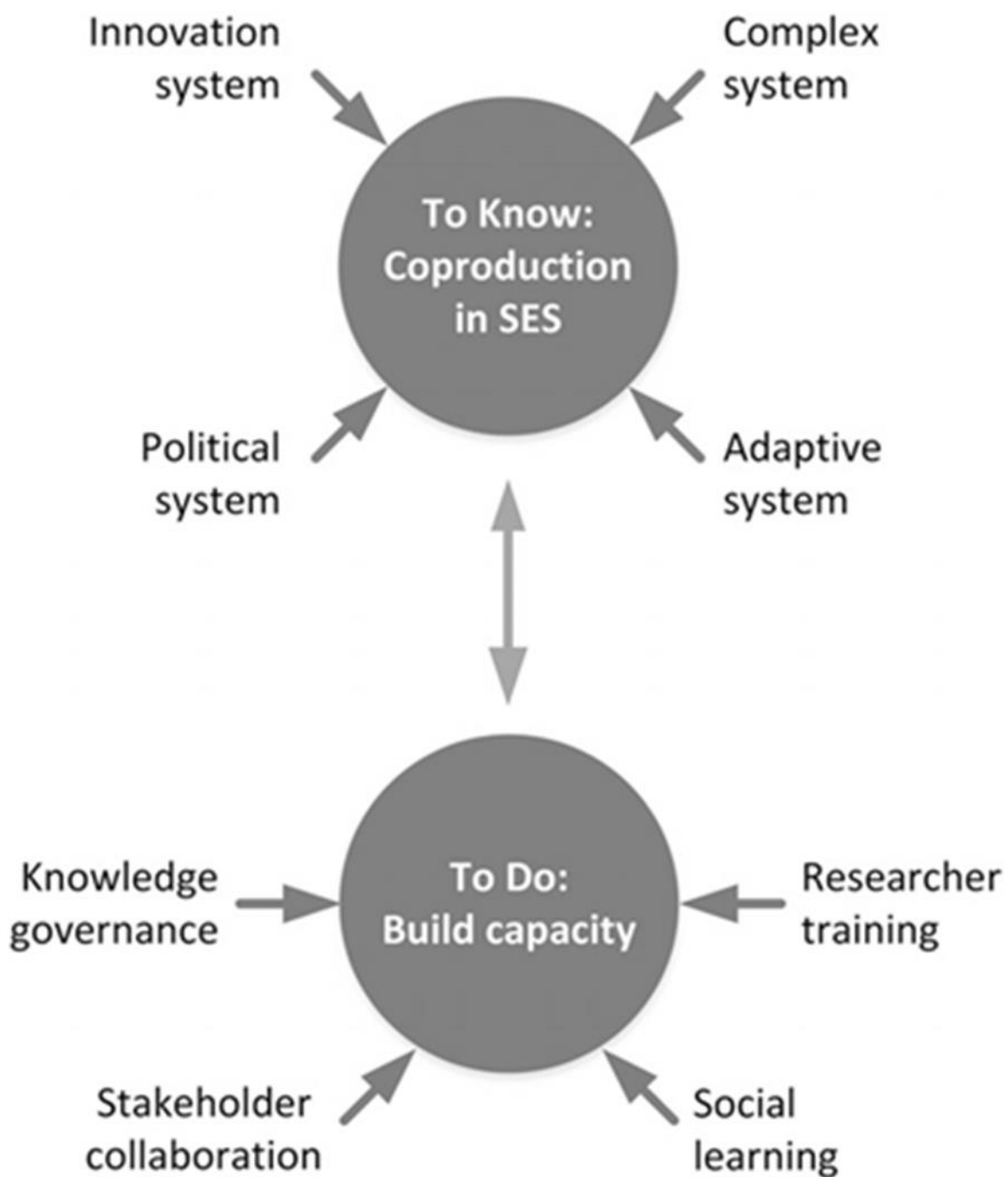
Political system

Adaptive system

*Researchers and DMs therefore need to be willing to acknowledge inevitability of surprise, adapt to it*



To Know:  
Coproduction  
in SES



## To Do: Build capacity for coproduction...

- *“next-gen universities... providing training and “safe spaces” to support:*
- *Stakeholder collaboration*
- *Open knowledge governance*
- *Social learning... →*
- *“Informed agitation” in pursuit of sustainability*



# Pursuing Sustainability: Six questions...

1. What's the problem of sustainable development?  
\* **growing capacity for systems-level transformations in how we use the environment**
2. What should be the goal of efforts to address the problem?  
\* **development pathways for which inclusive human well-being does not decline**
3. What must be sustained to achieve the goal?  
\* **capacity of total stock of capital assets to support inclusive human wellbeing**
4. What is most needed from science and technology?  
\* **understanding production-consumption systems as complex adaptive systems**
5. What is most needed from management and governance?  
\* **adaptive governance, empowerment of marginalized groups**
6. How can we link knowledge with action?  
\* **capacity for researcher/stakeholder collaborations leading to “informed agitation”**

# Pursuing Sustainability...

*A biased list of sources for further information*

- Sustainability Science Program @ Harvard (This presentation and related materials )
  - [www.hks.harvard.edu/centers/mrcbg/programs/sustsci](http://www.hks.harvard.edu/centers/mrcbg/programs/sustsci)
- *PNAS Sustainability Science* (current research)
  - <http://sustainability.pnas.org/>
- *Annual Review of Environment and Resources* (reviews of core topics in sustainability science)
  - <http://arjournals.annualreviews.org/loi/energy>
- *Pursuing sustainability: A guide to the science and practice* (new book by Pam Matson, Bill Clark, Krister Andersson; Princeton Univ. Press)
  - <http://pursuingsustainability.org>

