Linking Knowledge with Action for Sustainable Development

Presented by

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Synthesis of Scholarly Research from

TWAS, US National Academies, Sustainability Science Program

The Problem

- 'Knowledge' is a key determinant of human well-being, with its contributions integrally linked to a society's system of capital assets & institutions:

$$W = f(C_n, C_m, C_h), P, I, K$$

- Needed knowledge remains under-produced, and unevenly distributed…
- Even knowledge that does exist is seldom integrated into systems supporting decision
- We are making gratifying progress…
  - but its too too little, too late…

Linking Knowledge with Action for Sustainable Development as if we were in crisis…

What can research tell us about the key impediments…

and ways for overcoming them, NOW?

The Focus: “Knowledge Systems”

- Networks of people, organizations doing a variety of knowledge-related functions that can ultimately link knowledge with action.
- Included are human capital, institutions, incentives, financial resources, that provide
  - *capacity* to do the work
  - *intention* to focus on particular problems
- Examples of knowledge systems
  - Agriculture (CGIAR commodity programs)
  - Health (WHO malaria campaigns)
  - Environment (ENSO application programs)
  - Defense (US smart weapon systems)

The Findings

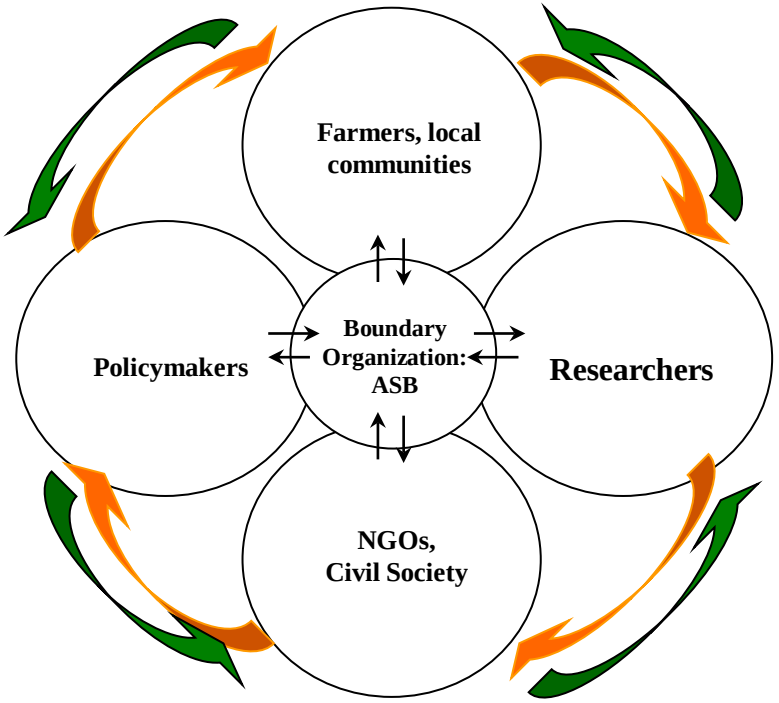
- Many different barriers inhibit effective mobilization of knowledge to support sustainable development…
- Three, however, are ubiquitous:
  1. Mutual incomprehension between scientists and decision makers (farmers or ministers)
  2. Fragmentation of the knowledge system
  3. Inflexibility in a world of uncertainty, surprise

1) Mutual Incomprehension

- Diagnosis (Why is there a problem?)
  - Scientists, practitioners have different perceptions of problems, solutions, reliable knowledge
  - New knowledge must be *trusted* by practitioners before they allow it to influence beliefs, behaviors
  - Trusted knowledge is perceived by practitioners to be not only *credible*, but also *salient* and *legitimate*.
- Process prescription (What needs to change?)
  - Reject pipe-line models of knowledge transfer
  - Promote *collaborative production* of trusted knowledge by stakeholders involved in its creation
- Institutional implementation (How to do it?)
  - Foster *boundary-spanning* capacity …

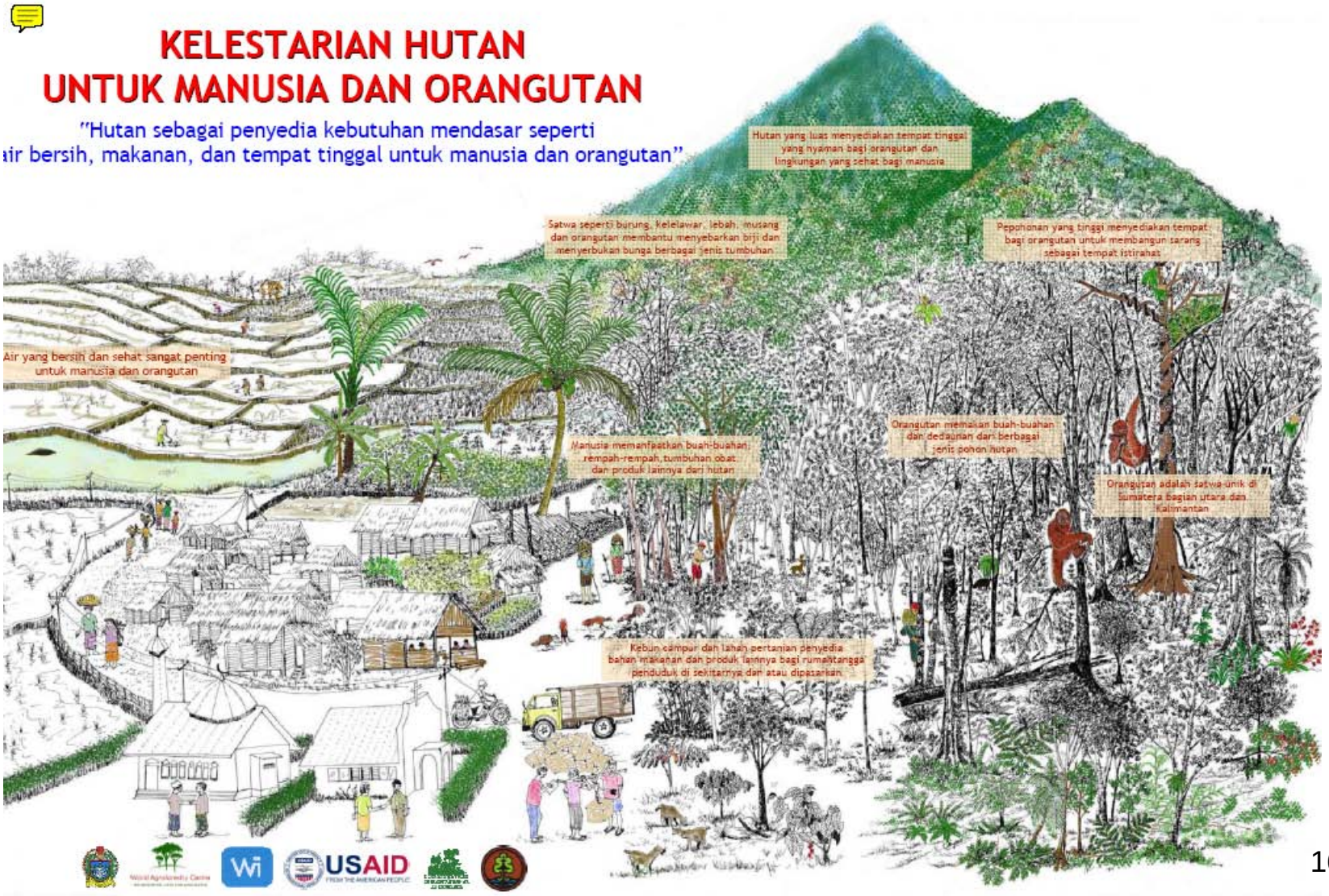
Foster “boundary-spanning” capabilities?

- Individuals, organizations that facilitate communication, translation, and negotiation across a variety of “cultural” boundaries (scientist-farmer; scientist-ministry; scientist-farmer-ministry).
  - IIASA / RAINS decision support models for acid rain negotiations*;*
  - *Heinz Center ‘State of the Nation’s Ecosystems’*
  - *USDA Extension, GCIAR / ASB*



- Avoiding capture via shared accountability to all parties …
- Facilitated by use of shared “boundary objects”…

A Boundary-spanning Object…

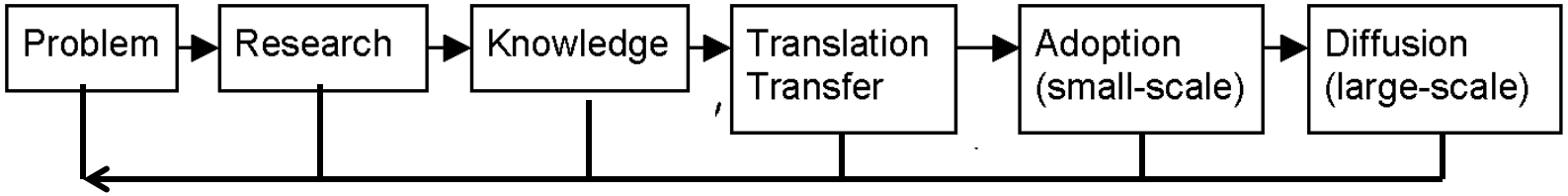


Contextual dependence of Boundary Work

Boundary Work		**USE of knowledge to support….**		
		Enlightenment (U_0)	**Decision (U_1)**	**Negotiation (U_m)**
SOURCE of knowledge…	**Single community of expertise (S_1)**	$S_1 \leftrightarrow U_o$ *Demarcation*	$S_i \leftrightarrow U_j$ *Expert advice*	U_k $S_i \leftrightarrow\updownarrow$ U_ℓ *Assessment*
	Multiple communities of expertise (S_n)	S_i $\updownarrow \leftrightarrow U_o$ S_j *Integrative R&D*	S_i $\updownarrow \leftrightarrow U_j$ S_j *Participatory R&D*	S_i U_k $\updownarrow \leftrightarrow\updownarrow$ S_j U_ℓ *Political bargaining*

2) Fragmentation (system less than sum of its parts)

- Diagnosis (Why is there a problem?)
  - Different organizations charged with different parts of the knowledge-action "supply chain…"

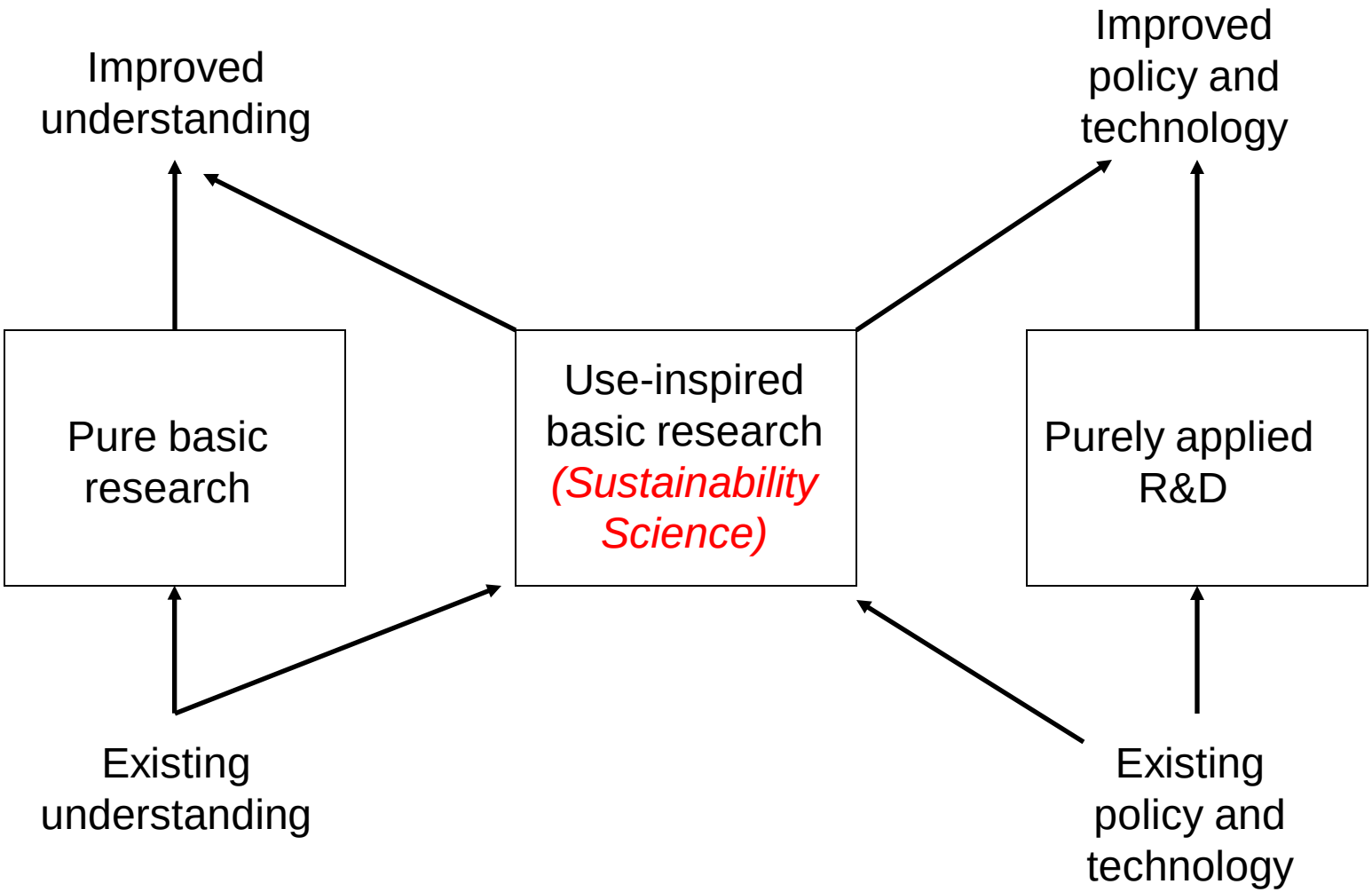


  - But sustainability often a public good, with weak incentives to complete the chain from basic research to large-scale adoption and back
  - Persistent mythology of "basic" versus "applied" research exacerbates fragmentation

2) Fragmentation (system less than sum of its parts)

- Diagnosis (Why is there a problem?)
  - Sustainability often a public good (weak market tests)
  - Mythology of “basic” vs. “applied” research…
- Process prescription (What needs to change?)
  - Systems integration to identify missing nodes, links; construct incentives to complete them
  - More realistic understanding of the central role and reality of “use-inspired basic research”…

Knowledge System for Linking Research with Action



(redrawn from Stokes, 1997)

2) Fragmentation (system less than sum of its parts)

- Diagnosis (Why is there a problem?)
  - Sustainability often a public good (weak market tests)
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- Process prescription (What needs to change?)
  - Systems integration to identify missing nodes, links; construct incentives to complete them
- Institutional implementation (How to do it?)
  - Adopting *supply chain* perspective to get all the parts
  - *Project-oriented management* accountable for results
    - eg. IRI’s efforts to make ENSO forecasts useful to farmers…
  - Central role of partnerships among universities, NGOs and business to provide complementary strengths

3) Inflexibility (static systems, dynamic challenges)

- Diagnosis (Why is there a problem?)
  - Absence of forums to learn from others' experience
  - Incentives to hide failures rather than learn from them
  - Willful ignorance and motives to block learning
- Process prescription (What needs to change?)
  - From knowledge systems to *learning systems*
- Institutional implementation (How to do it?)
  - *Polycentric governance* institutions, with capacity for
    - adaptive management, closely attuned to local realities
    - reflection (evaluations and metrics that reward improvement)
    - creating "safe spaces" …

3) Inflexibility: "Safe spaces" for experimentation

- Need for knowledge systems to create, and donors to support, "safe spaces" where
  - politically sensitive questions, experiments can be pursued
  - innovative scientists are protected from hostile takeovers
  - evaluation is practiced not as a tracking mechanism for checking off completion of safe projects, but rather as a learning device for linking knowledge with action.
- Key roles played by universities, international research centers in fostering collaborative learning with governments, industry;
  - *eg. ICRAF work on forest cover and hydrology*

Summary research findings and their implications for us…

- Mutual incomprehension between scientists and decision makers (farmers, ministers, etc.)
  - *Collaborative production* of *trusted* (SCL) knowledge, facilitated by *boundary work*
- Fragmentation of the knowledge system
  - Systems integration via *supply chain* perspective and *project-orientation,* facilitated by *P-P partnerships*
- Inflexibility in a world of ignorance & surprise
  - *From knowledge systems to learning systems,* facilitated via *polycentric institutions*, *adaptive management* and *safe spaces*