



MIT - USGS

SCIENCE IMPACT COLLABORATIVE (MUSIC)

Testing Collaborative Approaches to Environmental Decisionmaking
and Training Science Impact Coordinators

Solving Wicked Environmental Problems— Harmonizing the Built Environment with the Natural

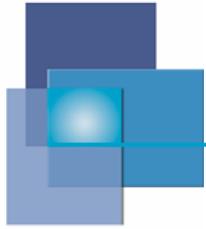
Herman Karl
Co-Director of MUSIC

U.S. Geological Survey

Massachusetts Institute of Technology

International Delta Roundtable 2007

November 29, 2007



Premise

Use of science and engineering technology in policy making can lead to better natural resource management decisions and more effective environmental policy;

And help avoid or mitigate the consequences of human-induced stressors on the environment and reduce the risk of impacts of natural hazards on the built environment.



If the premise is true, then...

Why then do we continue to witness disasters on the scale of Hurricane Katrina?



Relationships and Behavior...

...human dynamics and institutional behavior can either enhance or impede the benefits to society of our research achievements....

Alarms Bells Should Help Us Refocus, Neal Lane, Science, v. 312, 2006



Unintended consequences...

“But this magnificent rodeo, starring the Army Corps of Engineers as the wranglers of an untamed river, has been plagued from the start by *unintended consequences* [emphasis added].”

Thornburgh, 2005, Time



Unintended consequences...

“Our parish was not only destroyed by nature. *It was destroyed by man* [emphasis added].”

Rouselle, Plaquemines Parish president cited in Thornburgh, 2005, Time



Unintended consequences...

“...in world put at risk by the *unintended consequences* of scientific progress, *participatory procedures* involving scientists, stakeholders, advocates, active citizens, and users of knowledge *are critically needed* [emphasis added].”

Kates et al, 2002, Science



Some reasons...

Conflict
Complexity
Uncertainty
Communication



Adversarial Processes

Do not recognize other
interests as legitimate
Increase conflict
Thrive on uncertainty
Exclusive (divisive)
Opaque and closed



Adversarial Processes

Dueling Scientists
Expert/lay conflict
Mistrust
Litigation



Collaborative Processes

Recognize legitimacy of
other interests

Reduce conflict

Explain uncertainty

Inclusive (holistic)

Transparent and open



Collaborative Processes

Address values and
interests

Jointly gather science
and technical
information

Level the playing field



Collaborative Processes

Shared learning

Trust

Creative problem solving

Shared ownership



Science Is Not A Panacea

Decisions are based on **Values**

Science can provide a **Context**



Problem Definition

Defining the Problem(s)

Asking the Question(s)





What Is Joint Fact Finding?

Joint Fact Finding (JFF) is a collaborative procedure for involving those affected by policy decisions in the continual process of generating and analyzing the scientific and technical information used to inform those decisions. JFF can take several forms; often it is a step embedded in a consensus seeking process.



Wicked Problems Sound Alarms

...The successful application of new knowledge and breakthrough technologies, which are likely to occur with ever-increasing frequency, will require an entirely **new interdisciplinary approach to policy-making**: one that operates in an **agile problem-solving environment** and works effectively **at the interface where science and technology meet business and public policy**. It must be rooted in a **vastly improved understanding of people, organizations, cultures, and nations** and be implemented by innovative strategies and new methods and communication. All of this can occur only by **engaging the nation's top social scientists, including policy experts, to work in collaboration with scientists and engineers from many fields and diverse institutions** on multidisciplinary research efforts that address large but well-defined national and global problems. **This will not be easy. It will require qualitative changes in research cultures and the way federal agencies consider research funding.**

Alarm Bells Should Help Us Refocus, Neal Lane, Science, v. 312, 2006

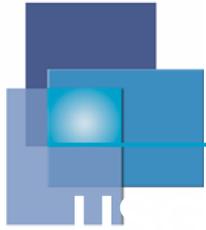


Wisdom

Different Ways of Knowing

- ✓ Local Knowledge
- ✓ Indigenous Knowledge
- ✓ Traditional Knowledge
- ✓ Oral History
- ✓ Scientific Knowledge
- ✓ Technical Knowledge

Wisdom?



A Way of Viewing the World

Science, social science, engineering and humanistic perspectives are viewed as reinforcing each other not as contradictory, while cross-cultural perspectives are woven into everything we do.

Environmental Policy and Planning
Department of Urban Studies and Planning
School of Architecture and Planning
Massachusetts Institute of Technology