Why and How Should the Government Support Basic Research on the Human Dimensions of the Environment?

Daniel H. Newlon
Economics Program Director
National Science Foundation

Introduction – a good time for this workshop

- Dynamics of Coupled Natural and Human Systems Program (07-598)
- Environmental Research supported by Human and Social Dynamics Initiative – what will follow now that HSD has ended?
- SBE participation in the Long-Term Ecological Network and NSF Observatories
- Proposed Future Foundation-wide Initiative

Why?

- Provides a Public Good
- Falls in Pasteur's Quadrant – User Defined Public Good
- Nexus of Two Market Failures

Increment to Knowledge Benefits Many Users

- Coase Theorem: Competitive markets efficient under certain conditions
- Many Beneficiaries/ No Dominant User
- Benefits Difficult to Measure (Scientific Publications, Number of Scientists, Production Function)
- Difficult to Enforce Property Rights
- Enforcement Counterproductive

Pasteur’s Quadrant

- Bohr’s Quadrant – conventional fundamental research
- Edison’s Quadrant – conventional applied research
- Pasteur’s Quadrant – user inspired basic science
- Donald Stokes’ “new” paradigm anticipated by NSF over twenty years before his book published

Two Market Failures

- Protecting the Environment
- Innovation and Diffusion of Technologies
- Complements rather than Substitutes
- Portfolio of Flexible Incentive-Oriented Policies
- Experimentation and Evaluation

How?

- Grants for Scientific Research
- Prizes for Past Accomplishments
- Research within the Government
- Subsidies, Taxes, Regulations
- Patents, Copyrights

Competition for Grants or Prizes

- Scope
- Budget
- Review
- Evaluation of Performance
- Newlon’s proposal

Scope

- Define what research falls within the scope of the program (broad enough to include exciting research but narrow enough to send clear signals about the goals of the program to the relevant research communities)
- Overlap with Existing Programs, Joint Review, Interdisciplinary, Centers, Minimum Award Size
- Initiative as repackaging and highlighting basic research that would have been supported by existing programs
- Partnerships with Other Government Agencies, Non-Profits and Private Sector
- Staff Rotator, Permanent, Temporary Assignment from other part of NSF

Budget

- New Money – Favorable Visibility within and outside NSF, Persuasive Arguments, Politics
- What is the counterfactual? What if the overall NSF budget increase would be approximately the same regardless of new initiatives and new programs.
- Measures of Opportunity Cost – Existing Budgets, Compelling Proposals, Small is Beautiful, Interdisciplinary is Good, Success Rates, Award Size
- Discretionary Reserves, Matching, Decline Competition
- Negotiating Individual Awards – Trade-offs

Review

- Intellectual Merit
- Broader Impacts (Pascal's Quadrant Revisited)
- NSF grants as prizes (ABRs, Creativity Extensions, CAREER, PECASE, Indirect Costs)
- Variety is our strength (Panel, Ad Hoc, Mix, staff review only)
- Does peer review discourage creativity (SGER, EAGER, RAPID)
- Letters of Intent, Pre-proposals, and other means of screening Concern about burden on scientific community

Evaluation

- Annual Reports, Final Project Reports
- Oversight Boards, Commissioned studies
- Renewals
- Committee of Visitors, Advisory Committees
- Systematic Program Evaluations
- Assessments can be hazardous to your program

If it were my call…

- Incentives for existing programs to support research on the human dimensions of the environment (base contribution, matching from special reserve, oversight provided by interdisciplinary committee, encourage co-funding by existing programs)
- Special reserve for awards that do not fit existing programs based on review by interdisciplinary committee
- Annual assessment of base funding by programs. Reallocation of money based on these assessments.