Public Goods and University-Industry Relationships in Agricultural Biotechnology:

Roles of Academic Scientists, University Administrators & Industry Partners

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Disclaimer

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Genesis and Motivation

- NRC and other scholarly studies found inadequate science to manage the environmental effects of some crop biotech.
- Intellectual property issues raising concern in academic science.
- Some felt that university relationships with the biotech industry focused academic resources too heavily on commercial uses.
- Little evidence to understand the effects of university-industry relationships (UIRs).

Study Components

1. University case studies of Cornell, UC Davis, North Carolina State, Texas A&M, Stanford and U.Wisconsin (150 interviews)
2. Industry partners (63 interviews)
3. National survey of academic bioscientists (1440 responses)

Intellectual Property in Academe

"Academic Capitalism" defines the role of universities in the new knowledge economy. The knowledge economy refers to the set of intellectual property policies and practices that convert advanced knowledge into the raw material for commercialized products and services (Slaughter and Rhoades, 2004).

University Roles

- Shift toward a ‘competitiveness agenda’ in which universities are seen as ‘engines of growth’ as opposed to ‘creators of public knowledge’ (Busch)
- Because much of the advanced knowledge in the U.S. is in research universities, a central component in constructing the knowledge economy has been to integrate these universities into the intellectual property process (e.g., Bayh-Dole).

Univ. Administrators on UIRs

- Tended to be the most positive group
- Interpreted university's 'public goods' mission as consistent with UIRs & commercialization
- Rationale emerges within context of justifying state budgets
- UIRs leverage additional scientists through wider network
- Also provide research funds and materials
- Raised concerns about potential impact on university scientists.

Industry Partners on UIRs

- Overwhelming praise for UIRs in principle:
  - Leverage research money
  - Division of labor: basic/applied research
  - Facilitate regulatory approval
- Raised concerns that division of labor between public/private sector is fading.
- Concerned that universities must continue to play a neutral role, e.g., conducting credible biosafety tests.

Academic Bioscientists and UIRs

- Central Question – Does industry support lead to more applied and excludable research, diminishing basic and publicly accessible knowledge?
- Basicness = % of scientist's research identified as basic (versus applied)
- Excludability = % of discoveries that may legally be withheld from public use

Findings re Scientists' Roles

- Industry funding leads to more applied research than does NSF or NIH funding.
- Other Federal and State funding do as well, but only at one third the rate as industry funding.
- Industry funding in concert with other factors has a modest effect on more research excludability.
- Scientists' professional norms affect research excludability more strongly than do funding sources.

Major Point 1

- UIRs touch all phases of academic science.
  - Research design in the laboratory directed primarily by the scientists.
  - Research program management governed by university administrators in conjunction with funders and scientists.
  - Technology transfer process directed by university officials working with scientists and industry.

Major Point 2

- Industry funding leads to more applied crop biotech research for additional funding than does any other source.
  - This emphasis on commercial outcomes is to be expected.
  - Innovations in UIRs that foster crop biotech advances for public goods issues are needed.

Major Point 3

- Scientists' professional norms exert stronger effects on research excludability than do funding sources.
  - Nurturing 'open science' norms in an era of academic capitalism is important to address public goods issues, e.g., environmental spillovers.
  - Points to the importance of faculty selection to build public science culture.

Major Point 4

- Strong public funding of academic research on crop biotechnology is needed for a balanced research agenda.
  - Both academe and industry benefit from a robust public science base.
  - If public support remains stagnant or declines, less basic and public goods research should be expected.

Major Point 5

- University administrators perceive pressure to work with industry to aid economic development in their regions.
  - This strategy may bring short-run benefits to the region and university.
  - However, it may jeopardize the long-term science base to address public goods issues, for which markets and commercial incentives are weak.

Publications

- Ervin. 2006. “University-Industry Relationships in Agricultural Biotechnology Research.” Issue Report Seven, Chicago: Farm Foundation.
- Welsh and Glenna. 2006. "Considering the Role of the University In Conducting Research on Agri-biotechnologies." *Social Studies of Science* 36(6): 929-942.
- Glenna, Lacy, Welsh, and Biscotti. 2007. “University Administrators, Agricultural Biotechnology, and Academic Capitalism” *The Sociological Quarterly*. 48(1): 141-163.

Publications cont'd

- Glenna, Welsh, Lacy, and Biscotti. 2007. "Industry Perceptions of University-Industry Relationships Related to Agricultural Biotechnology Research." *Rural Sociology* 72(4): 608-631.
- Buccola, Ervin and Yang. "Research Choice and Finance in University Bioscience" *Southern Economic Journal* (revise and resubmit)
- Ervin, Buccola and Yang. "Academic Bioscience, Money Sources, and Professional Norms" *Research Policy* (in review)