Science Policy and Social Justice

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Science is a Principal Driver of Change

Social change
- Internet

Health and Medical change
- Biotechnology

Environmental change
- Climate

Science-based economy

National security change
- Weapons of mass destruction
## Foundations of Science Policy

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<thead>
<tr>
<th>Current</th>
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<td>Republic of Science</td>
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Current (Linear) Approach to Science Policy

Input-driven process assumes:
- All societal outcomes will be positive
- Linear model of innovation and societal benefit
Linking Scientific Research and Science Policy to Societal Outcomes

Genetically-Modified Organisms (GMOs)
Perspectives

- How does the science that we do affect the social choices we make?
- How do the S&T programs we implement affect the distribution and equity of outcomes?
Global Climate Change and Societal Outcomes
How does the science that we do affect the social choices we make?
Components of Environmental Science

Geophysical Systems Research

Social Systems Research

Biological Systems Research

Technological Systems Research
Standard (Linear) Model of Science for Decision Making

Fundamental Research → Predictive Models → Policy Decisions → Societal Benefits
Local land use affects climate at every scale

Source: C. Ziegler, NOAA
> 100 killed
> 1% of population affected
> 1% nat’l GDP

Source: OFDA/CRED International Disaster Data Base
Hurricane Mitch, October 22 - November 5, 1998

**Human Impacts**

Deaths       >10,000
People affected  1.7 million

Source: NOAA/OGP

**Economic Impacts**

<table>
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<tr>
<th>Country</th>
<th>Losses</th>
<th>% of GDP</th>
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<tr>
<td>Nicaragua</td>
<td>US$2 billion</td>
<td>50%</td>
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<tr>
<td>Honduras</td>
<td>US$4 billion</td>
<td>100%</td>
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Source: The Economist 11/14/98; slide courtesy of R. Pielke Jr.
Sensitivity Analysis of 2XCO2 Worldwide Global Tropical Cyclone Loss Estimates for 2050

Not Control But Navigation

Because the pathway to sustainability cannot be charted in advance, it will have to be navigated through trial and error and conscious experimentation.

National Research Council, 2000 *Our Common Journey*
How does the science that we do affect the social choices we make?
Science and Technology Policy in the States: Economic Development for Whom?
How do the S&T programs we implement affect the distribution and equity of outcomes?
New “Laboratories of Democracy”

- University-Industry “Centers of Excellence”
- Research Parks
- Business Incubators
- Technology Development Centers
- Manufacturing Assistance Programs
The Linear Theory of Innovation: State Government Version

Stimulate science and technology → Build new businesses → Create wealth in the state → Societal Benefits

Income transfer from middle income taxpayer to the wealthy
Why are problems of employment and distribution of income S&T Issues?

- S&T and social issues critically interdependent
- Technology strategy drives government spending and its social outcomes
- Linear thinking in technology policy is linear thinking in social outcomes
A Case Study: Georgia

- Top five in spending for S&T Programs
- FY2000: $51 million
- Universities highly effective technology transfer sites
- Strong Hi-Tech base in Metro Atlanta
- But...Booming and Busting at the Same Time
The Georgia Economy is Hot

- Unemployment rate below 5% since 1995
- State revenues doubled between 1990 and 1999
- New corporations per month doubled between 1985 and 1999
- 15,000 jobs unfilled right now
But...Booming AND Busting

- Median income for:
  - Whites in Metro Atlanta: $51,000
  - African-Americans: $18,000
  - Rural Georgia families: $27,000
- Atlanta among leaders in creating new millionaires and in percentages of children below poverty level
- Average SAT’s:
  - Georgia Tech: 1319
  - Georgia high schools: 874
Georgia has the worst high school graduation rate in the nation
Is Georgia S&T Policy a “Success”?

- Yes: Creates jobs, creates wealth, does a lot with a little
- No: Exacerbates wage gaps, promotes uneven development, contributes to suburban rim sprawl
Running in Place, Running Ahead:

The median wage earner has advanced only 8% in income growth during past two decades.
The Challenge: to develop science and technology policy that reaches the significant proportion of each state’s working poor who have been bypassed by the economic boom...
How do the S&T programs we implement affect the distribution and equity of outcomes?
Science Policy Research Needs

- New science policy indicators
- New tools of evaluation
- New vision for what science can bring to our future
- Education of scientists and politicians
- Replace Cold War paradigm as outmoded
A New Science Policy Framework: Outcome-Driven

- Integrated
- Informed
- Self-correcting
- Recognizes and responds to the inextricable links between science and technology and societal evolution
Linking Scientific Research to Societal Outcomes: New Models

**Societal Outcomes**
- New social structures
- New institutions

**Economic Outcomes**
- New industries

**S&T Outcomes**
- Partnerships
- Knowledge transfer

**Conduct of Science**
- Tech transfer

**Education**
- New skills

**Policy**
- New industries
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Morality and Science

What is the collective good that we want inquiry to promote?

Philip Kitcher, Professor of Philosophy in Science, Truth and Democracy, to be published, 2001