

The Federal Science and Technology Budget



Observations on the Impact of
Changes in Mission Agency
Budgets on Key Fields

Allocating Federal Funds for Science and Technology ("The Press Report", 1995)



- Make the allocation process more coherent, systematic, and comprehensive.
- Determine total federal spending for federal science and technology.
- Allocate funds to the best projects and people.
- Ensure that sound scientific and technical advice guides allocation decisions.
- Improve federal management of R&D activities.

Key Concept:

The Federal Science and Technology Budget



The FS&T budget reflects the real federal investment in the creation of new knowledge and technologies and excludes activities such as the testing and evaluation of new weapons systems.

For example, in FY1999:

Total Federal R&D Budget: \$77.7 B

Total Federal FS&T Budget: \$47.1 B

Role of COSEPUP

(Committee on Science, Engineering, and Public Policy)



- Provide an impact assessment of aggregate FS&T trends each spring (with AAAS)
- To seek guidance from both the research community and policy makers about key issues of concern.
- To analyze in more detail such issues in mid-year reports.

Analysis of FS&T Budget



- Spring Report: Observations on the President's Budget
- Fall Report: Examine Issue Area of Concern to S&T community
- Both released in cooperation with AAAS.
- Guidance Group Overseeing this Activity: Jim Duderstadt (chair), Millie Dresselhaus, Guy Stever, Marye Anne Fox, Phillip Griffiths

Observations on President's FY1999 FS&T Budget



- President's FY1999 budget proposed an increase in the FS&T budget of 1.3% (in constant dollars), bringing FS&T support to within 1.8% of the FY1994 level (constant dollars).
- The only federal agencies receiving increased FS&T investment since 1994 are NIH (+21.3%) and NSF (14.3%).

Observations on President's FY1999 FS&T Budget



- The FS&T budgets of other agencies that support reesearch and graduate education and have important influence on key fields (such as physical sciences, engineering, computer science, and mathematics) have declined since FY1994 by **11.0%** as a group.
- The President's budget request did take a step toward the FS&T budget concept by proposing a Research Fund for America (but without including defense-related FS&T).

Impact of Changes in Mission Agency Budgets on Key Fields



- Major increase in NIH budget (51%); minor increase in NSF budget (18%)
- Decreases in DOD, DOE, NASA, and USDA FS&T Budgets
- Concern: The impact that projected decreases in the FS&T budgets of mission agencies could have on selected fields

Fields with Majority of Support from Mission Agencies



- DOE: Physics (46%)
- DOD: Computer Science (60%), Electrical and Mechanical Engineering (69%), Biological and Social Aspects of Psychology(66%), (also Mathematics (27%) and Materials Science and Engineering (38%))
- NASA: Astronomy (68%), Aeronautical and Astronautical Engineering (40%)
- USDA: Agriculture (99%)

Questions to be Addressed



- Is Funding for these Fields Declining as a Result of a Decrease in Overall Research Funding at these Agencies?
- Are Researchers Beginning to Obtain Funding Elsewhere--from NSF, NIH, or Industry?
- What is the Impact on the Nature of Research Being Conducted Relative to the Funding Source?

Questions to be Addressed

(continued)



- Are Changes in Funding Affecting the Number of S&E Graduate Students Supported?
- How are Changes in Funding Affecting Who Performs the Research?
- How Can Data be Improved in the Future to Answer These Questions?

Is mission agency funding for academic research in select fields declining as a result of a decrease in overall funding of research at these agencies?



Yes, for some fields (1997-1997)

DOE: Physics (- 2.2%)

DOD: Computer Science (- 0.4%)

Mathematics (-9.2%)

NASA: Aeronautical Engineering (-6.9%)

USDA: Agriculture (-3.6%)

Is mission agency funding for academic research in select fields declining as a result of a decrease in overall funding of research at these agencies?



However there has also been growth in some fields:

DOD: Electrical Engineering (+ 0.4%)

Mechanical Engineerign (+ 3.7%)

Materials (+ 4.1%)

NASA: Astronomy (+ 6.9%)

Are researchers able to obtaining funding elsewhere (NSF, NIH, industry)?



No, this does not appear to be the case.

NSF funding decisions do not generally take into account the funding from other agencies (and is relatively small in some of these fields such as high energy physics).

Industrial support of academic research is also relatively small (6.5% of all academic research).

What is the impact on the conduct and nature of the research being conducted relative to the funding source?



Although there is a tendency for industrially funded research to be somewhat more applied in nature, this is a small element of academic FS&T expenditures.

Hence we are unable to conclude there has been a substantive shift in the nature of campus based research associated with the decline in mission agency support.

Are changes in funding affecting the number of science and engineering graduate students supported?



The available data show that support for graduate science and engineering research assistantships is declining in all agencies including NSF and NIH, e.g.,

DOD: Mechanical Engineering (-1.4%)

Mathematics (-9.8%)

DOE: Physics (-24.7%)

NASA: Astronomy (-8.5%)

USDA: Agriculture (-4.8%)

Conclusions



Key problem: Lack of awareness of impact on specific fields of shifting nature of FS&T support from various federal agencies.

Causes:

- 1) absence of adequate data*
- 2) absence of federal coordination*

Key Recommendation



The White House Office of Science and Technology Policy should play the lead role in developing a coherent picture of FS&T support for various fields, requesting the data and analysis necessary to support this activity from the various federal agencies.

Status of Report



- Report is Currently in External Review
- Release Date: late-October/early-November