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Ministère d'État

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Sciences et Technologie Canada

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FEDERAL S&T EXPENDITURE DATA

An Overview of Collection and Availability

# internal report rapport

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#### FEDERAL S&T EXPENDITURE DATA

An Overview of

Collection and Availability

PRA Division Government Branch August 7, 1979

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#### FEDERAL S&T EXPENDITURE DATA

An Overview of Collection and Availability

- 1. The purpose of this document is to outline the current scope and availability of federal science statistics. Although federal science expenditures are the principal focus of this report, they are in fact complemented and supplemented by data collected by Statistics Canada for other sectors (Provincial, Industry, Non-profit, University) and on a Regional basis. Formal statistical data on the Federal inputs to science are supplemented by working data collected in the day-to-day activities of PRA from sources such as departmental submissions to TBS. In addition, data for other countries and groups of countries is consolidated and published for comparative purposes by agencies such as OECD and UNESCO. Figure 1 gives an overview.
- 2. There are three broad aspects to the Ministry's involvement in science statistics, involving collection and data management, the related complementary liaison and cooperation mechanisms together with arrangements made by the Branches for the analysis and use of data.

3. The collection of science expenditure data from the

financial administrations of departments and agencies is organized by the Ministry of State for Science and Technology (MOSST) in cooperation with the Treasury Board Secretariat and the Science Statistics Centre of Statistics Canada. Data are collected twice-yearly, by means of Science Addenda to the submissions by departments and agencies of their Program Forecast and Main Estimates to the Treasury Board.

- 4. Collection is undertaken to gather essential data describing the recent, current and proposed state of the federal resources allocated to science and is coordinated by the Program Review and Assessment (PRA) Division of MOSST, which works in close cooperation with the collecting agency, Statistics Canada, in editing, verification, and in adding to the data base which resides in the MOSST computer. (Federal totals and detailed tabulations are available from this source: Appendix A).
- 5. Within MOSST, PRA has responsibility to manage the federal science expenditures data base, for which computer services support is provided by the Research and Information Services (RIS) Division. Over and beyond this, RIS provides as a service the Secretariat of the Ministry's Data Management Committee, which is a coordinating tool to ensure both liaison between Branches on data management matters and overall access to the core data of continuing interest to the

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Ministry's Policy Branches.

- 6. Externally, PRA is the designated interface on expenditure data matters between the Ministry and Treasury Board Secretariat, as well as the Science Statistics Centre and the departments and agencies. The Interdepartmental Committee on Scientific Expenditures is the formal mechanism for liaison, and discussion of problems in the gathering of federal science expenditure data. It is Chaired by PRA which provides this Committee's Secretariat. PRA advises the Science Statistics Centre on its work plan, which also includes surveys for expenditures in the Industrial, Provincial and Municipal Government, and the University Sectors.
- 7. Federal expenditure data are analyzed and used by PRA in the development of advice to MOSST's Minister and the Treasury Board Secretariat, as well as by the Policy Branches for policy development purposes. The data are also used in monitoring the implementation of science policies. Statistics Canada maintains the historical expenditure series in natural and human (social) sciences, and has done since 1963; historical tabulations are available from this source (Appendix B).

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8. The basic reporting unit is the budgetary program of a department or agency and each budgetary program forms the subject of separate scientific expenditure reports for the natural and for the human science activities within it. A program or the activity within it may be scientific in whole or in part only. It is only expenditures on the scientific components of a program or an activity which are reported upon in the Main Estimates and the Program Forecast Science Addenda.

- 9. Data on the scientific components of expenditures on 100 programs of 60 departments and agencies covering three financial years are collected by means of the annual Main Estimates Science Addenda.(MESA). The focus of attention is on the upcoming financial year; also collected are historical data for the past year, as well as confirming data for the current financial year. Thus the MESA to be distributed in the Fall of 1979 requests data for 1978/79, 1979/80 and 1980/81.
- 10. In the MESA questionnaires, data on proposed and actual inputs of money and person years are collected by Budgetary Program under the major categories of Natural Sciences and Human Sciences. These program expenditures are then looked at from various viewpoints. The major headings of <u>Research and Development</u> (R&D) and <u>Related Scientific Activities</u> (RSA) are further sub-

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divided better to indicate the "what" of a department's scientific effort. Expenditures on the major categories of scientific activity (R&D, RSA) are subdivided into "current" . and "capital" segments. Current expenditures are additionally subdivided to show "by whom" and in which sector the activity is performed (e.g. federal in-house, in industry, in universities).

- J1. The industry sector data are further supplemented and expanded upon by means of the "Regional" Survey undertaken by the Science Statistics Centre, in conjunction with the Program Forecasts, in order to identify both the geographic (regional) distribution of R&D contracts to industry and the regional distribution of federal intramural science expenditures.
- 12. The "why" of the scientific activity is addressed in the MESA by asking departments to identify areas of expenditure application (e.g., oceans, energy), as well as to summarize the sector of performance (intramural or extramural). Furthermore, the human resources allocated to scientific activities are summarized in terms of the involved categories of personnel (executive, scientific and professional, etc.) and the principle focus of their efforts (R&D, RSA, AEP (administration of extramural programs)).

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13. When completed, checked for consistency with previous reports, entered into the data base and totalled along the various dimensions, these data provide annual snapshots of the federal resources allocated to science. The data support the work of central agencies, the analyses of submissions from departments and agencies requesting resources, and form the factual basis of the Ministry's Annual Science Publications.

14. These annual publications consist of an overview narrative with data highlights ("Federal Science Activities") and a statistical companion volume ("Federal Science Expenditures and Personnel") containing summary tabulations. Still greater detail can be found in the working hand book ("MESA Database Supplementary Tables") provided for internal use in PRA (See Appendix A).

15. The core data collected annually through the MESA is further supplemented by current data which comes to MOSST through various channels. Departments and agencies, in conjunction with their Program Forecast Submissions, identify the changes which have occurred since Main Estimates in their resources allocated to science. These include the impacts of such

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items as Supplementary Estimates, transfers in and out of programs, Cabinet decisions, X-Budget cuts and discontinued activities. Data for each program are kept "on line" by PRA to permit rapid access to current figures, e.g., S&T totals, R&D in natural sciences, etc.

Also important in tracking the current state of resources allocated to science are the week-to-week decisions of Treasury Board in response to departmental submissions. These are a major source of current information on departmental plans e.g., to implement Cabinet decisions or other initiatives. Summaries are kept by PRA for use in development of advice to TBS and to the Minister.

16. Furthermore, there are a number of data sources systematically compiled by departments or interdepartmental panels for their own specific purposes, such as A-Base reviews. As another example, some departments (Agriculture) maintain R&D project listings to facilitate internal management and control the use of resources in different tasks (e.g. Improvement of Animal Productivity, Plant Breeding, Waste Management). The R&D Panel on Energy maintains a project inventory as a means to monitor the spending on different R&D tasks coordinated by the panel. This kind of information is generally accessible to MOSST through PRA contacts.

- 17. Last but not least, there is the intelligence and the data gained in contacts between PRA officers and science managers, planners, or financial officers of departments and agencies. Such information is not treated systematically for access by others: it is more of a working tool for PRA officers in their day-to-day tasks.
- 18. Clearly, the present data collection mechanisms have evolved from a base of existing arrangements in order to meet various needs of statisticians, central agencies and departmental management. If the present budgetary arrangements and mechanisms undergo modification, then data collection arrangements will have to change in step with them. For example, identification of a need to measure science spending in terms of additional applications or objectives, such as economic development, will demand corresponding adjustments in data collection machinery.

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#### Fig. 1

#### OVERVIEW OF FEDERAL SCIENCE EXPENDITURES

AND RELATED INFORMATION

• Other - Countries - Sectors of Canada

-Federal:

.Historical (Main Estimates Science Expenditures Series) 1963 - 1979/80

- men and money

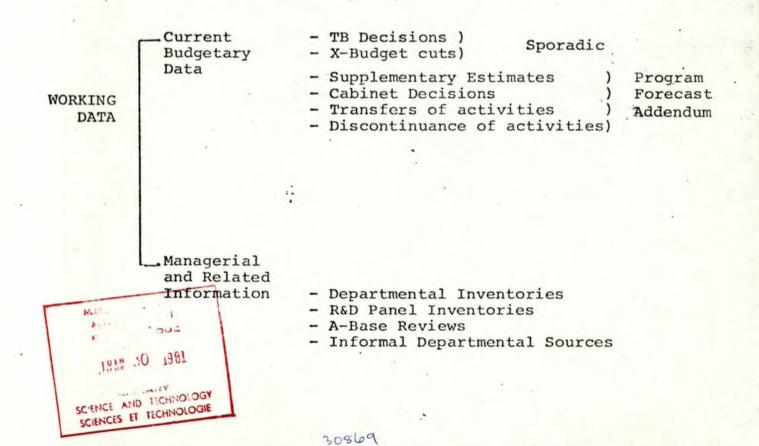
- activities, applications, performers

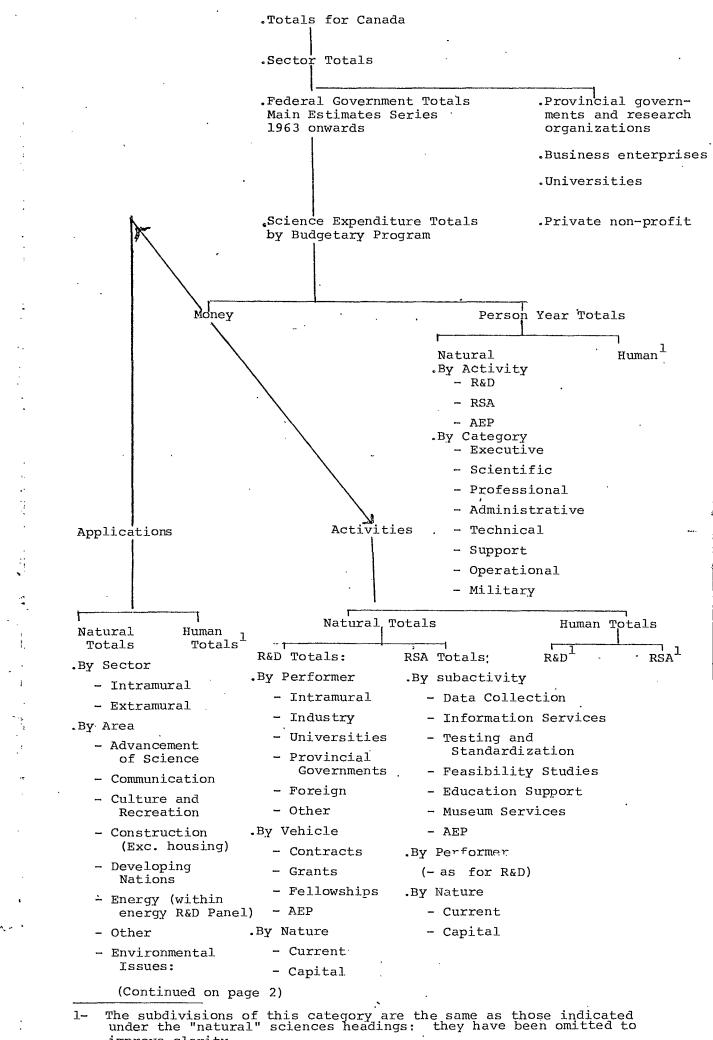
- natural and human sciences

CORE

- Regional spending - federal intramural - R&D contracts

\_\_\_\_Spending planned for 1980/81 (Fall 1979 Survey)





#### Applications

.By Area (cont.)

Air

Land

Water

Other

- Food - Agriculture Fisheries Others

- Health

- Housing and Urban Dev.
- Northern Dev.
- Ocean
- Official Languages
- Policy Department
- Resources
  - Forestry
  - Mineral
  - Water
  - Other

- Security

Domestic

Nat'l Defence

- Social Dev't & Welfare
- Space
- Transportation
- Other

Appendix A

Federal Science Expenditures Data Base: Current tabulations available

I. Published in "Federal Science Expenditures and Personnel 1977/78 - 1979/80"

II. Supplementary Tables

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1978/80 MESA Database (PRA Working Handbook)

#### FEDERAL SCIENCE EXPENDITURES

#### AND PERSONNEL

1977/78 - 1979/80

# MARCH 1979



Ministry of State

Science and Technology Canada .

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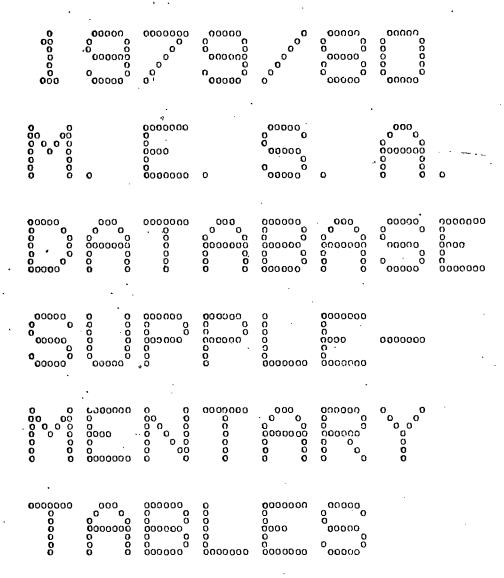
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	Tabulation	<u>Classification</u>	N&H	<u>N</u>	H
S&T	Totals	by department	10	-	-
	Totals	by performer	12	44	76
	Science activity	by performer	12	44	76
•.	Detailed activity	by performer	13	45	77
	Science activity	by department	14	46	78
• <u>.</u>	Performance sector	by department	16	48	80
·. ·	Intramural	by department	18	50	82
	Industry	by department	20	52	84
	University	by department	21	53	85
۰.	Non-profit	by department	22	54	86
	Provincial & municipal	by department	23	55.	87
	Foreign	by department	24	56	88
	Other	by department	25	57	.89
R&I	) Total	by performer	26	58	90
RSA	A Total	by performer	27	59	91
R&I	) Performance sector	by department	28	60	92
	Industry, type of payment	by department	30	62	94
	University plus non- profit, type of payment	by department	32	64	96
RSA	A Performance sector	by department	34	66	<b>9</b> 8
P!	Occupational category	by department	36	68	100
	Science activity	by category	42	74	106
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Prepared by J. Farrell, April, 1979

NOTE: These supplementary tables include applications data as well as additional expansions or variations of the tables contained in the report "Federal Science Expenditures and Personnel 1977/78-1979/80", Cat. No. ST 21-4/1980.

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	•
(includin Total.	nt Scientific Activities g A.E.P.): 
Note:	Total current scientific activities for extramural performers = total scientific activities for extramural performers.
. • Total.	nt R&D (excluding A.E.P.): 
Note:	Total current R&D for extramural performers = total R&D for extramural performers.
Total. Intran	nt RSA (excluding A.E.P.): 
Note:	Total current RSA for extramural performers = total RSA for extramural performers.
A.E.P R8	D (Intramural only)133
A.E.P RS	A (Intramural only)133
Capital R&D	(Intramural only)
<b>C</b> apital RSA	(Intramural only)
In-house R&	D (Intramural only)
Intram Univer Canadi Provin Foreig	its: 11 77 136   nural 12 77 136   sities 12 77 137   an Non-profit 13 78 137   cial & Municipal 13 78 137   n 14 78 138   15 79 138

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R&D Grants:	
Total	16 70 130
Universities	
Canadian Non-profit.	
Provincial & Municipal	
Foreign	18 81 1/0
Other.	10
U LITET	10,,
Research Fellowships:	
Total	19
Intramural	
Industry	
Universities	
Canadian Non-profit	
Provincial & Municipal	
Foreign.	
Other.	
Data Collection:	
Total	21
Intramural	
Industry	
Universities	
Canadian Non-profit	
Provincial & Municipal	
Foreign	
Other	
Information:	
• Total	26
Intramural	27
Industry	28
Universities	28
Canadian Non-profit	29
Provincial & Municipal	29
Foreign	29
Other	30
Testing and Standardization:	•
Total	
Intramural	
Industry	ν
Universities	.;
Universities. Canadian Non-profit	g
Provincial & Municipal. Foreign	~
Foreign	
Other	<sup>•</sup> •••••••••••••••••••••••••••••••••••
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Economic and Feasibility Studies:	
Total	
Intramural	
Industry	
Universities	
Canadian Non-profit	
Provincial & Municipal	<u> </u>
Foreign	···· a
Provincial & Municipal Foreign Other	
Forsthility Chuding	•
Feasibility Studies: Total	
10ldi	
Intramural Industry	
	······································
Universities	
Canadian Non-profit Provincial & Municipal Foreign Other	Z 00
foreign	···· • • ···· · · · · · · · · · · · · ·
Uther	
Operations and Policy Studies:	·
Total	152
IDtalessessessessessessessessessessessesses Intromunal	152
Intramural	ин на
Inuus li y i	······································
Canadian Non profit	
Drovincial & Municipal	т. Э., т
Fornian	U 100
Universities Canadian Non-profit Provincial & Municipal Foreign Other	····· 0 ······· ····· ···· ···· ···· ·
Education Support:	··.
Total	
Intramural	
Industry	
Universities	
Canadian Non-profit	
Provincial & Municipal	
Provincial & Municipal Foreign	31 94 157
Other	
Museum Services:	-
Total	
Intramural	
Industry	
Universities	
Canadian Non-profit	
Provincial & Municipal	
Foreign	
Other	

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#### Symbols

.. figures not available

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... figures not appropriate or not applicable

Ξ.,

- nil or zero

-- amount too small to be expressed

