State Expenditure on Science and Technology 1999

Forfás

State Expenditure on Science & Technology, 1999

Financial allocations by Government for 1999 to institutions engaged in any activity related to science and technology - the Science and Technology Budget for 1999.

Summary Document

THE NATIONAL

POLICY AND

ADVISORY BOARD

FOR ENTERPRISE,

TRADE, SCIENCE,

TECHNOLOGY AND

INNOVATION

Is é Forfás an bord náisiúnta um polasaí agus comhairle le haghaidh fiontraíochta, trádála, eolaíochta, teicneolaíochta agus nuála. Is é an comhlacht é a bhfuil comhactaí dlíthiúla an stáit maidir le cur-chun-cinn tionscail agus forbairt teicneolaíochta dílsithe ann. Is é an comhlacht é freisin trína dciomnaítear cumhachtaí ar Fhiontraíocht Éireann le tionscail dúchais a chur chus cinn agus ar ghníomhaireacht Forbartha Tionscail na hÉireann (GFT Éireann) le hinfheistíocht isteach sa tir a chur chun tosaight. Is iad feighmeanna Fhorfáis:

- comhairle a chur ar an Aire ó thaobh cúrsaí a bhaineann le forbairt tionscail sa Stát
- comhairle maidir le forbairt agus comhordú polasaithe a chur ar fáil d'Fhiontraíocht Éireann, d'GFT Éireann agus d'aon fhoras eile dá leithéid (a bunaíodh go reachtúil) a d'fhéadfadh an tAire a ainmniú trí ordú
- forbairt na tionsclaíochta, na teicneolaíochta, na margaíochta agus acmhainní daonna a spreagadh sa Stát
- bunú agus forbairt gnóthas tionsclaíoch ón iasacht a spreagadh sa Stát, agus
- Fiontraíocht Éireann agus GFT Éireann a chomhairliú agus a chomhordú ó thaobh a gcuid feidhmeanna.

Forfás is the national policy and advisory board for enterprise, trade, science, technology and innovation. It is the body in which the State's legal powers for industrial promotion and technology development have been vested. It is also the body through which powers are delegated to Enterprise Ireland for the promotion of indigenous industry and to IDA Ireland for the promotion of inward investment.. The broad functions of Forfás are to:

- advise the Minister on matters relating to the development of industry in the State
- to advise on the development and co-ordination of policy for Enterprise Ireland, IDA Ireland and such other bodies (established by or under statute) as the Minister may by order designate
- encourage the development of industry, technology, marketing and human resources in the State
- encourage the establishment and development in the State of industrial undertakings from outside the State, and
- advise and co-ordinate Enterprise Ireland and IDA Ireland in relation to their functions.

Board Members

Science & Technology Budget

Review of State Expenditure on Science & Technology 1990 - 1999

Incorporating financial expenditures in 1998 and allocations for 1999 by Government to Institutions engaged in any activity related to science and technology.

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Forfás

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Introduction

The 'Science and Technology Budget' – the annual Forfás publication on State expenditure on science and technology – provides details of the allocations made by Government to scientific and technological (S&T) activities. In all, 43 government departments/agencies are included in the 1999 S&T Budget.

The total value of the S&T Budget in 1999 amounts to £932m (€1,183m), an increase of £46.5m (€59.0m) or 5.2% over the 1998 level. All of the increase is accounted for by public funds, which rose from £729m (€926m) outturn in 1998 to an allocation of £776m (€985m) this year; the balance of £156m (€198m) arises from income earned from the activities of the departments and agencies.

While the total figure is large, the coverage of the S&T Budget is very wide and includes S&T-based activities such as those of Met Eireann, Geological Survey and some elements of the Office of Public Works. The 'real science' element of the S&T Budget is considerably smaller than the total, and this year a clearer overall picture is presented by focusing sections of the report on different activities within the overall total.

Research and Development

The levels of R&D performed in the various Government Departments and their agencies is not the same as the total amounts they fund. An individual Department or its agencies might perform little or no R&D themselves while providing funding to other performers in either the public or private sectors.

The allocation for performance of R&D in 1999 is £61.8m (€78.5m), up from £58.2m (€73.9m) last year. Nearly £13m (€17m) of this is earned income so that the public funds invested amount to £49m (€62m) in 1999.

In terms of funding, the Departments and their agencies are allocating £176m (€224m) to R&D in 1999, up from £155m (€196m) in 1998. A significant proportion of this increase represents additional support for R&D in enterprises via the Department of Enterprise, Trade and Employment.

S&T for the Productive Sectors

This section details the support from government departments and agencies for scientific and technological activities other than research and development. These include information and advisory services, scientific and technical services, education and training, and technology transfer. These activities are to support the productive sectors of the economy – industry, agriculture, environment, marine and forestry, energy and transportation.

Education and Health

Educational activities, which include all third level education in the field of science and technology, account for 61% of the total S&T Budget in 1999. S&T courses in the Universities and Institutes of Technology are the major performers.

General Public Service

Activities concerned with science and technology undertaken by the Government in support of regulatory and statutory activities are included in this section. They account for 6.0% of the total budget.

Economic and Social Activities

Government expenditure on economic and social activities (2% of total budget) includes economic forecasting and modelling, social policy, policies for rural development, and the analysis of poverty and its causes.

Total S&T Budget

The funding matrix for the total S&T Budget overleaf illustrates the funding sources for all S&T activities included in the budget.

EU Support for S&T

This section details the major financial impact of EU programmes on the Irish science and technology landscape. The CSF contribution now accounts for 18% of the total S&T Budget.

Indicative Distribution of Government Funds for Science and Technology, 1999, £m

	Research & Development						S&T Info	Tech. Services	S&T Ed. & Train.	Tech. Transfer	Other S&T	Total
Sources of Funds:	Business	Third Level (1) £m	PATS(2) £m	Extra-mural £m	Govern-ment £m	Total £m	£m	£m	£m	£m	£m	£m
Exchequer Direct	3.2	23.6	2.0	7.2	40.0	76.0	25.4	68.1	350.5	1.3	65.0	586.3
Exchequer Indirect		21.7				21.7						21.7
CSF funds	48.7	14.6	5.9	0.0	9.2	78.4	7.8	5.7	72.7	2.8	0.6	167.9
EU contracts	0.0	17.0	3.6	0.0	3.6	24.1	10.3	1.3	0.0	0.0	0.1	26.0
Business	0.0	7.0	4.2	0.0	5.6	16.9	0.3	12.1	0.1	0.0	0.3	39.5
Other earned income	0.0	12.0	3.7	0.0	3.4	19.1	10.7	20.2	36.7	0.0	3.4	90.2
Total	52.0	95.9	19.3	7.2	61.8	236.2	54.5	107.5	460.0	4.1	69.4	931.6

(1) Science and Technology departments only

(2) AMT Ireland is classified under S&T information and technical services

Indicative Distribution of Government Funds for Science and Technology, 1999, €m

	Research & Development						S&T Info	Tech. Services	S&T Ed. & Train.	Tech. Transfer	Other S&T	Total
Sources of Funds:	Business	Third Level (1) €m	PATS(2) €m	Extra-mural €m	Govern-ment €m	Total €m	€m	€m	€m	€m	€m	€m
Exchequer Direct	4.1	30.0	2.5	9.1	50.8	96.5	32.2	86.5	445.0	1.6	82.6	744.4
Exchequer Indirect		27.5				27.5						27.5
CSF funds	61.9	18.6	7.5	0.0	11.7	99.6	9.8	7.2	92.3	3.5	0.7	213.2
EU contracts	0.0	21.5	4.6	0.0	4.5	30.6	13.1	1.7	0.0	0.0	0.1	33.0
Business	0.0	8.9	5.3	0.0	7.2	21.4	0.3	15.3	0.1	0.0	0.4	50.2
Other earned income	0.0	15.2	4.7	0.0	4.3	24.2	13.6	25.7	46.6	0.0	4.4	114.5
Total	66.0	121.8	24.5	9.1	78.5	299.9	69.2	136.5	584.0	5.2	88.2	1182.9

(1) Science and Technology departments only

(2) AMT Ireland is classified under S&T information and technical services

1. Introduction

The purpose of the 'Science and Technology (S&T) Budget' is to monitor the public spend on science and technology and to provide details about the performance of the many public sector organisations which are involved in scientific and technological activities in some way.

The total S&T Budget increased from an outturn of £885m (€1124m) in 1998 to an allocation of £931.6m (€1182.1m) in 1999, an increase of 5.2%. Above average increases were recorded for research and development activities (+11.5%) and for other supports to industry in terms of information and technical services (+25.3%).

Once again this year the major emphasis in this report is placed on research and development, it being a vital element of the total S&T spend. The R&D element is important because it is the most discretionary component of the 'S&T Budget' compared to other Government expenditures in support of regulatory and statutory functions. Although only accounting for approximately 25% of the overall budget, it is capable of exerting an influence disproportionate to its size.

In addition to this, the role of research has become increasingly relevant in modern society where the complexity and technology-content of most activities offers significant opportunities for innovation based solutions to complex problems. This is reinforced by the findings of the Technology Foresight Exercise which recommends that priority be given to making Ireland a centre for research excellence in certain niche areas.

2. Research and Development

Total public funding of research and development in the economy increased from an outturn of £154.5m (€196.2m) in 1998 to an allocation of £176.1m (€223.6m) in 1999. This net increase of £21.6m (€27.4m) is composed of a gross increase in a number of areas totalling £32.0m (€40.7m) and a reduction of £9m (€11m) in the Department of Education and Science allocation to research.

The increased allocations to R&D (£32.0m) (€40.7m) consists mainly of additional funding for the research and technological innovation (RTI) scheme operated by Enterprise Ireland on behalf of the Department of Enterprise, Trade and Employment. All of this is EU money, from the Community Support Framework, and matched by funds from the companies being grant aided to undertake R&D or technology transfer activities. The total allocation in this RTI scheme in 1999 is £29.0m (€36.8m), up from £11.2m (€14.2m) in 1998. This scheme finishes with the end of the current CSF programme in 1999.

The explanation for the reduction is derived from the Department of Education and Science's scheduling of its spending of the £45m (€57m) for research contained in the £280m (€356m) Scientific and Technological Education (Investment) Fund. The draw down was £21m(€27m) in 1998, £13m(€17m) in 1999 and the balance in 2000. All of this funding is for capital purposes and is a first step in addressing the equipment and facilities deficit in the research capabilities of the third level colleges. The new £180m(€229m) programme for research in third level colleges announced in November 1998 incorporates this £45m(€57m).

3. Other S&T Activities

Outside the area of research and development there were increased allocations to science and technology this year in four main areas:

- Industry related activities: +£13.8m(€17.5m) or 25.3%. These were accounted for by increased allocations to training activities in FAS (+£9.2m)(€11.7m) and by the Department of Enterprise, Trade and Employment's subscription to the European Space Agency (+£3.4m)(€4.3m) which is paid every second year.
- Agriculture related activities: +£3.8m(€4.8m) or 7.3%. Most of the increase (£3m)(€4m) relates to the functions of the Department of Agriculture and Food.
- General Public Service activities: +£8.3m(€10.5m) or 18%. The biggest increase here was for the Central Statistics Office (+£3.5m(€4.4m) or 21%).
- Economic and Social activities: +£4.7m(€6.0m) or 146%. This was accounted for totally by spending by the Department of Social, Community and Family Affairs on the planning and development of new computer systems for the administration of social welfare services.

4. Funding of Irish Science and Technology

Between 1990 and 1999 the total value of the 'Science and Technology Budget' increased from £348m(€442m) to £931.6m(€1182.9m). In that period the percentage of the total which is funded by the Exchequer remained broadly constant around 65%, while the EU contribution increased from 8% to 18% at the expense of private (earned) funds which declined from 27% to 17%. Nearly two thirds (64%) of the increase over this period was accounted for by additional expenditures on education and training for science and engineering. A further 17% increase occurred in industry-related S&T and there were lesser percentage increases for agriculture, marine, environment, health, and general public service S&T activities. The decline in private funding of public sector science and technology activities over the period mainly reflects the recent changes in the way third level education is funded and the abolition of tuition fees. Public funding of R&D increased from £51.9m(€65.9m) in 1990 to £176.1m(€223.6m) in 1999, an increase of 240%.

The EU contribution to public sector S&T in Ireland grew again in 1999, from £141.8m(€180.0m) outturn in 1998 to £168m(€213m) anticipated in 1999. This increase is mainly due to the extra funding allocated for grants to industry for R&D projects under the RTI initiative.

1. INTRODUCTION

The 1990s have seen an unprecedented reappraisal of Irish science, technology and education policies. New arrangements for policy advice and co-ordination, including Inter-departmental and Cabinet Committees on Science, Technology and Innovation and new funding mechanisms for Higher Education (HE) college-based research activities, have been established. The Government has also established the Irish Council for Science, Technology and Innovation (ICSTI) to advise it on the strategic direction of science and technology policy, embracing all aspects including scientific research, third-level education, technology and R&D in industry, financing for innovation, public awareness of S&T, and prioritisation of state spending on S&T.

Recent significant developments that will affect the S&T landscape are:

- The Department of Education and Science have establishing a £180m(€229m) Programme for Research in Third Level Institutions 1999-2001. The aim of this programme is to put in place formal mechanisms to develop a high quality research environment in Ireland
- The ICSTI Technology Foresight Exercise has urged the strategic investments in research, science and technology to effectively underpin Ireland's development as a knowledge society.

As a result changes have been made to the 'Science & Technology Budget' – the annual Forfás publication on State Expenditure on Science and Technology – to reflect the new situation. The changes are not radical ones but they have been made in response to some of the work of ICSTI on public expenditure priorities. For the most part the changes are to the way in which the data are presented, giving greater prominence and emphasis than in the past to research and development. Arising from the greater visibility of, and interest in, the S&T Budget a number of government departments have requested changes in the coverage of the data relating to their activities. As far as possible, without too great an impact on the long-established time series of S&T Budget data, those requests have been complied with.

This document provides details of the allocations made by Government to scientific and technological (S&T) activities. In all, 43 government departments/agencies are included in the 1999 S&T Budget. The information on which the analysis is based was supplied by government departments, offices, agencies and other recipient institutions following finalisation of the overall government estimates for the public services for 1999, and after the operating institutions had decided on the distribution of their allocations over their programmes.

Figure 1 indicates the public sector organisations funding and performing S&T activities in 1999.

FIGURE 1. GOVERNMENT DEPARTMENTS/AGENCIES FUNDING S&T, 1999

DEPARTMENTS	AGENCY	DEPARTMENTS	AGENCY
Agriculture & Food	Teagasc	Education & Science	HEA DIAS
Enterprise, Trade & Employment	Forfás Enterprise Ireland IDA Ireland NMRC Patents Office NMAC FÁS Innovation Centre NSAI	Environment & Local Government Social, Community and Family Affairs Arts, Heritage, Gaeltacht and the Islands	EPA NRA Údarás na Gaeltachta Museum
Public Enterprise	GSI RPII Met Eireann	Health & Children	HRB Postgraduate Medical & Dental Board
Marine & Natural Resources	Marine Institute BIM Central Fisheries Board COFORD	Taoiseach	NESC

OFFICES	CSO	OPW	Central Bank	State Laboratory	Ordnance Survey
INCORPORATED COMPANIES	ESRI	Shannon Development		SRAI	

See appendix 3 for explanation of acronyms.

Section 2 of this report examines research and development for the public sector in 1999. Section 3 considers other public sector activities related to the productive sectors of the economy. Section 4 covers S&T education, training and health, while Section 5 include a range of other public sector S&T activities. Section 6 is concerned with science and technology activities undertaken by the Government in support of economic and social activities.

Section 7 brings together the total S&T picture for the public sector, including non-exchequer monies – mainly fees and other earned income – of institutions which operate science and technology programmes. The last section examines the influence of the European Union in supporting public sector sciences and technology in Ireland via its Community Support Framework initiatives.

Research and development (R&D) in all countries is performed in three distinct sectors of the economy – the business sector, the universities and technological institutes of the third level sector, and the government sector. The State both funds R&D activities performed in all three sectors and also arranges for R&D to be performed within the state sector in order to promote its own strategic objectives. This section examines both performance and funding of R&D by the State.

2.1 Performance of R&D in the Government Sector

Table 1 gives the profile of R&D performance in the government sector. The total 1999 allocation is £61.8m(€78.5m), representing about 0.4% of total government budget allocations of over £14 billion (€18 billion). Indeed, nearly £12.6m(€16.0m) of the total comes from earned income, so that the public investment in R&D, which is performed in the state sector, is only £49.2m(€62.5m). There was an increase in total R&D spend in 1999 of £3.5m(€4.4m) (7.5%) over the 1998 outturn.

Table 1 Performance of Research and Development in the Government Sector

Performing Department/Agency	1998 Source of funds					1999 Source of funds				
	Exchequer £'000	CSF £'000	Private £'000	Total £'000	% Total %	Exchequer £'000	CSF £'000	Private £'000	Total £'000	% Total %
Department of Agriculture & Food	1,412	132	395	1,939	**3.3%**	2,616	345	493	3,454	**5.6%**
- Teagasc	12,579	4,872	5,929	23,380	**40.1%**	12,042	4,888	5,747	22,677	**36.7%**
Department of the Marine & Natural Resources	430	0	6	436	**0.7%**	400	0	6	406	**0.7%**
- COFORD	36	110	0	146	**0.3%**	40	120	0	160	**0.3%**
- Marine Institute	5,859	2,004	1,362	9,225	**15.8%**	7,835	1,340	1,245	10,419	**16.9%**
- Salmon Research Agency of Ireland	492	63	69	624	**1.1%**	558	118	53	728	**1.2%**
Department of Health and Children	509	0	0	509	**0.9%**	643	0	0	643	**1.0%**
- Health Research Board	4,851	0	370	5,221	**9.0%**	4,935	0	665	5,600	**9.1%**
Department of Enterprise, Trade & Employment	0	0	0	0	**0.0%**	125	375	0	500	**0.8%**
- FÁS	703	493	0	1,196	**2.1%**	741	521	0	1,262	**2.0%**
- Enterprise Ireland	557	416	608	1,580	**2.7%**	544	429	607	1,580	**2.6%**
- Innovation Centre	247	110	0	357	**0.6%**	252	105	0	357	**0.6%**
- National Microelectronics Applications Centre	0	32	486	518	**0.9%**	0	35	425	460	**0.7%**
Department of Environment & Local Government	124	0	0	124	**0.2%**	94	0	0	94	**0.2%**
- Environmental Protection Agency	949	712	1,097	2,758	**4.7%**	952	773	1,107	2,832	**4.6%**
- National Roads Authority	573	0	101	674	**1.2%**	545	0	77	622	**1.0%**
Department of Finance										
- Economic and Social Research Institute	1,610	0	1,485	3,095	**5.3%**	1,683	0	1,703	3,386	**5.5%**

Table 1 Performance of Research and Development in the Government Sector

Performing Department/Agency	1998 Source of funds Exchequer £'000	1998 CSF £'000	1998 Private £'000	1998 Total £'000	1998 % Total %	1999 Source of funds Exchequer £'000	1999 CSF £'000	1999 Private £'000	1999 Total £'000	1999 % Total %
Department of Social, Community & Family Affairs	1,932	0	39	1971	**3.4%**	2,181	0	20	2,201	**3.6%**
Department of Education & Science										
- Dublin Institute for Advanced Studies	1,122	32	250	1,404	**2.4%**	1,088	32	213	1,333	**2.2%**
Department of Arts, Heritage, Gaeltacht & the Islands	820	98	0	918	**1.6%**	820	98	0	918	**1.5%**
- Natural History Museum	350	0	0	350	**0.6%**	169	0	0	169	**0.3%**
Department of Public Enterprise										
- Met Eireann	514	13	102	629	**1.1%**	572	15	104	690	**1.1%**
- Radiological Protection Institute of Ireland	116	0	175	291	**0.5%**	169	0	126	294	**0.5%**
Department of the Taoiseach										
- National Economic and Social Council	379	0	10	389	**0.7%**	454	0	10	464	**0.8%**
Central Bank	251	0	0	251	**0.4%**	380	0	0	380	**0.6%**
Valuation and Ordnance Survey Office	260	0	0	260	**0.4%**	180	0	0	180	**0.3%**
Total	**36,676**	**9,086**	**12,483**	**58,245**	**100.0%**	**40,016**	**9,194**	**12,601**	**61,811**	**100.0%**

* Where there are transfers from one S&T agency/department to another the funds are accounted for in the performing agency

Table 1A Performance of Research and Development in the Government Sector

Performing Department/Agency	1998 Source of funds Exchequer €'000	1998 CSF €'000	1998 Private €'000	1998 Total €'000	1998 % Total %	1999 Source of funds Exchequer €'000	1999 CSF €'000	1999 Private €'000	1999 Total €'000	1999 % Total %
Department of Agriculture & Food	1,793	168	501	2,462	**3.3%**	3,322	438	626	4,385	**5.6%**
- Teagasc	15,972	6,186	7,528	29,686	**40.1%**	15,290	6,206	7,297	28,793	**36.7%**
Department of the Marine & Natural Resources	546	0	8	554	**0.7%**	508	0	8	515	**0.7%**
- COFORD	46	140	0	185	**0.3%**	51	152	0	203	**0.3%**
- Marine Institute	7,439	2,544	1,729	11,713	**15.8%**	9,948	1,701	1,581	13,229	**16.9%**
- Salmon Research Agency of Ireland	625	80	88	792	**1.1%**	708	150	67	924	**1.2%**
Department of Health and Children	646	0	0	646	**0.9%**	816	0	0	816	**1.0%**
- Health Research Board	6,159	0	470	6,629	**9.0%**	6,266	0	844	7,110	**9.1%**

Table 1A Performance of Research and Development in the Government Sector

Performing Department/Agency	1998 Source of funds Exchequer €'000	CSF €'000	Private €'000	Total €'000	% Total %	1999 Source of funds Exchequer €'000	CSF €'000	Private €'000	Total €'000	% Total %
Department of Enterprise, Trade & Employment	0	0	0	0	**0.0%**	159	476	0	635	**0.8%**
- FÁS	893	626	0	1,519	**2.1%**	941	661	0	1,602	**2.0%**
- Enterprise Ireland	707	528	772	2,006	**2.7%**	691	545	771	2,006	**2.6%**
- Innovation Centre	314	140	0	453	**0.6%**	320	133	0	453	**0.6%**
- National Microelectronics Applications Centre	0	41	617	658	**0.9%**	0	44	540	584	**0.7%**
Department of Environment and Local Government	157	0	0	157	**0.2%**	119	0	0	119	**0.2%**
- Environmental Protection Agency	1,205	904	1,393	3,502	**4.7%**	1,209	981	1,406	3,596	**4.6%**
- National Roads Authority	728	0	128	856	**1.2%**	692	0	98	790	**1.0%**
Department of Finance										
- Economic and Social Research Institute	2,044	0	1,885	3,930	**5.3%**	2,137	0	2,162	4,299	**5.5%**
Department of Social, Community& Family Affairs	2,453	0	49	2,503	**3.4%**	2,769	0	25	2,795	**3.6%**
Department of Education & Science										
- Dublin Institute for Advanced Studies	1,425	41	317	1,783	**2.4%**	1,381	41	270	1,692	**2.2%**
Department of Arts, Heritage, Gaeltacht & the Islands	1,041	124	0	1,166	**1.6%**	1,041	124	0	1,166	**1.5%**
- Natural History Museum	444	0	0	444	**0.6%**	215	0	0	215	**0.3%**
Department of Public Enterprise										
- Met Eireann	653	16	129	799	**1.1%**	726	19	132	876	**1.1%**
- Radiological Protection Institute of Ireland	147	0	222	370	**0.5%**	215	0	160	373	**0.5%**
Department of the Taoiseach										
- National Economic and Social Council	481	0	13	494	**0.7%**	576	0	13	589	**0.8%**
Central Bank	319	0	0	319	**0.4%**	482	0	0	482	**0.6%**
Valuation and Ordnance Survey Office	330	0	0	330	**0.4%**	228	0	0	228	**0.3%**
Total	**46,569**	**11,537**	**15,850**	**73,956**	**100.0%**	**50,810**	**11,674**	**16,000**	**78,484**	**100.0%**

* Where there are transfers from one S&T agency/department to another the funds are accounted for in the performing agency

The major component of public sector R&D performance is Teagasc, which accounts for 36.7% of the total. When R&D performed directly by the Department of Agriculture and Food is included this percentage increases to 42.3%. Other significant performers are the Marine Institute (16.9%), the Health Research Board (9.1%), the Economic and Social Research Institute (5.5%) and the Environmental Protection Agency (4.6%).

2.2 Funding of R&D by the State

Table 2 shows the Government funding of R&D, which can be performed either in the Government sector itself, in the business sector or in third level education colleges. The total allocation is £176.1m(€223.6m), up from £154.5m(€196.2m) in 1998 (an increase of 14.0%). This increase is mainly accounted for by an additional £19m(€24m) for R&D grants for enterprises via the Department of Enterprise, Trade and Employment. The source of this funding comes from a revised EU scheme, Research, Technology and Innovation Measure (RTI) which was approved by the EU in 1997. This was to ensure availability of additional money, as funds allocated by the EU for Measure 1 of the Research and Development Sub Programme and Measure 3 of the Food Programme were fully allocated by the middle of 1997.

Table 2 Public Funding of Research and Development

		1998			1999		
Funding Department/Agency	**Performing Organisation**	**Exchequer**	**CSF**	**Public Funding**	**Exchequer**	**CSF**	**Public Funding**
		£'000	**£'000**	**£'000**	**£'000**	**£'000**	**£'000**
Enterprise, Trade & Employment	Enterprise Ireland	2,595	18,492	21,087	2,309	39,662	41,971
	PAT's	2,032	6,102	8,134	1,959	5,881	7,840
	Higher Education Authority	1,710	5,131	6,841	1,705	5,115	6,820
	IDA Ireland	112	6,232	6,344	50	6,000	6,050
	Shannon Development	629	3,139	3,768	1,095	4,000	5,095
	NMRC	707	2,122	2,829	645	1,933	2,578
	FAS	703	493	1,196	741	521	1,262
	Údarás na Gaeltachta		791	791		900	900
	Dept. of Enterprise, Trade & Employment	13		13	149	375	524
	Innovation Centre	247	110	357	252	105	357
	ESRI	132		132	52		52
	NMAC	7	54	61	5	51	55
	DIAS	6	17	23	6	17	23
Sub-total		**8,893**	**42,683**	**51,576**	**8,967**	**64,560**	**73,527**
Education & Science	Higher Education Authority	21,055		21,055	22,196		22,196
	Education & Science	27,078		27,078	18,093		18,093
	DIAS	1,111		1,111	1,077		1,077
	ESRI	71		71	38		38
Sub-total		**49,315**	**0**	**49,315**	**41,404**	**0**	**41,404**

Table 2 Public Funding of Research and Development

Funding Department/Agency	Performing Organisation	1998 Exchequer	1998 CSF	1998 Public Funding	1999 Exchequer	1999 CSF	1999 Public Funding
		£'000	£'000	£'000	£'000	£'000	£'000
Agriculture & Food	Teagasc	12,962	4,763	17,725	12,418	4,810	17,228
	Higher Education Authority	1,581	4,699	6,280	1,770	5,118	6,888
	Department of Agri and Food	3,376	132	3,508	3,829	345	4,174
	Enterprise Ireland	35	105	140	38	116	154
	ESRI	12		12			
Sub-total		**17,966**	**9,699**	**27,665**	**18,055**	**10,389**	**28,444**
Marine & Natural Resources	Marine Institute	5,809	2,004	7,813	7,822	1,340	9,162
	Salmon Research Agency	494	68	562	563	118	681
	Higher Education Authority	246	738	984	157	472	629
	Marine & Natural Resources	430		430	400		400
	Enterprise Ireland	51	152	204	50	148	197
	COFORD	36	110	146	40	120	160
	Arts, Heritage & Gaeltacht and the Islands	33	98	131	33	98	131
	Teagasc	28	83	110	26	78	103
	DIAS	5	15	20	5	15	20
	ESRI	18		18	10		10
Sub-total		**7,150**	**3,268**	**10,418**	**9,105**	**2,388**	**11,493**
Health & Children	Health Research Board	4,851	0	4,851	4,935	0	4,935
	Health & Children	509	0	509	643	0	643
	ESRI	239	0	239	259	0	259
Sub-total		**5,599**	**0**	**5,599**	**5,837**	**0**	**5,837**

Table 2 Public Funding of Research and Development

Funding Department/Agency	Performing Organisation	1998 Exchequer £'000	1998 CSF £'000	1998 Public Funding £'000	1999 Exchequer £'000	1999 CSF £'000	1999 Public Funding £'000
Environment & Local Government	Environmental Protection Agency	981	712	1,693	982	773	1,755
	National Roads Authority	573		573	545		545
	Higher Education Authority		162	162		300	300
	Environment & Local Gov	155		155	136		136
	Met Eireann	10		10	57		57
	Marine Institute	50		50	13		13
	ESRI	11		11	7		7
	Teagasc		26	26			0
Sub-total		**1,780**	**874**	**2,654**	**1,740**	**1,073**	**2,813**
Arts, Heritage, Gaeltacht & the Islands	Údarás na Gaeltachta	927		927	1,000		1,000
	Dept. of Arts, Heritage, etc	841		841	833		833
	Natural History Museum	350		350	169		169
Sub-total		**2,118**	**0**	**2,118**	**2,002**	**0**	**2,002**
Public Enterprise	Met Eireann	504	13	517	514	15	529
	R.P.I.I.	116		116	169	0	169
Sub-total		**620**	**13**	**632**	**683**	**15**	**698**
Social, Community & Family Affairs	Social, Community etc	2,505		2,505	7,554		7,554
	ESRI	102		102	89		89
Sub-total		**2,608**	**0**	**2,608**	**7,643**	**0**	**7,643**
Finance	E. S. R. I.	1,025	0	1,025	1,229	0	1,229
Taoiseach	N. E. S. C.	379	0	379	454	0	454
Central Bank	Central Bank	251	0	251	380	0	380
Ordnance Survey	Ordnance Survey	260	0	260	180	0	180
Total		**97,964**	**56,537**	**154,501**	**97,678**	**78,425**	**176,103**
%Total		**63%**	**37%**	**100%**	**55%**	**45%**	**100%**

* Public funds are exchequer & CSF funds

Table 2A Public Funding of Research and Development

Funding Department/Agency	Performing Organisation	1998 Exchequer	1998 CSF	1998 Public Funding	1999 Exchequer	1999 CSF	1999 Public Funding
		€'000	€'000	€'000	€'000	€'000	€'000
Enterprise, Trade & Employment	Enterprise Ireland	3,295	23,480	26,775	2,932	50,360	53,292
	PAT's	2,580	7,748	10,328	2,487	7,467	9,955
	Higher Education Authority	2,171	6,515	8,686	2,165	6,495	8,660
	IDA Ireland	142	7,913	8,055	63	7,618	7,682
	Shannon Development	799	3,986	4,784	1,390	5,079	6,469
	NMRC	897	2,694	3,592	819	2,454	3,273
	FAS	893	626	1,519	941	661	1,602
	Údarás na Gaeltachta		1,004	1,004		1,143	1,142
	Dept. of Enterprise, Trade & Employment	16		16	189	476	665
	Innovation Centre	314	140	453	320	133	453
	ESRI	168		168	66		66
	NMAC	9	69	77	6	65	70
	DIAS	8	22	29	8	21	29
Sub-total		**11,292**	**54,196**	**65,488**	**11,386**	**81,974**	**93,360**
Education & Science	Higher Education Authority	26,734		26,734	28,183		28,183
	Education & Science	34,382		34,382	22,973		22,973
	DIAS	1,411		1,411	1,367		1,367
	ESRI	90		90	48		48
Sub-total		**62,617**	**0**	**62,617**	**52,572**	**0**	**52,572**
Agriculture & Food	Teagasc	16,458	6,048	22,506	15,768	6,107	21,875
	Higher Education Authority	2,007	5,966	7,974	2,247	6,498	8,746
	Department of Agri & Food	4,287	168	4,454	4,862	438	5,300
	Enterprise Ireland	44	133	178	48	147	195
	ESRI	15		15			
Sub-total		**22,812**	**12,315**	**35,127**	**22,925**	**13,191**	**36,116**

Table 2A Public Funding of Research and Development

Funding Department/Agency	Performing Organisation	1998 Exchequer	1998 CSF	1998 Public Funding	1999 Exchequer	1999 CSF	1999 Public Funding
		€'000	€'000	€'000	€'000	€'000	€'000
Marine & Natural Resources	Marine Institute	7,376	2,544	9,920	9,932	1,701	11,633
	Salmon Research Agency	627	86	714	715	150	865
	Higher Education Authority	312	937	1,249	199	599	799
	Marine & Natural Resources	546		546	508		508
	Enterprise Ireland	65	193	259	63	188	250
	COFORD	46	140	185	51	152	203
	Arts, Heritage & Gaeltacht etc.	42	124	166	42	124	166
	Teagasc	35	105	140	33	99	131
	DIAS	6	19	25	6	19	25
	ESRI	23		23	13		13
Sub-total		**9,079**	**4,149**	**13,228**	**11,561**	**3,032**	**14,593**
Health & Children	Health Research Board	6,159	0	6,159	6,266	0	6,266
	Health & Children	646	0	646	816	0	816
	ESRI	303	0	303	329	0	329
Sub-total		**7,109**	**0**	**7,109**	**7,411**	**0**	**7,411**
Environment and Local Government	Environmental Protection Agency	1,246	904	2,150	1,247	981	2,228
	National Roads Authority	727		727	692		692
	Higher Education Authority		206	206		381	381
	Environment & Local Gov	197		197	173		173
	Met Eireann	13		13	72		72
	Marine Institute	63		63	16		16
	ESRI	14		14	9		9
	Teagasc		33	33			0
Sub-total		**2,260**	**1,110**	**3,370**	**2,209**	**1,362**	**3,572**

Table 2A Public Funding of Research and Development

Funding Department/Agency	Performing Organisation	1998 Exchequer	1998 CSF	1998 Public Funding	1999 Exchequer	1999 CSF	1999 Public Funding
		€'000	€'000	€'000	€'000	€'000	€'000
Arts, Heritage, Gaeltacht and the Islands	Údarás na Gaeltachta	1,177		1,177	1,270		1,270
	Dept. of Arts, Heritage, etc	1,068		1,068	1,058		1,058
	Natural History Museum	444		444	215		215
Sub-total		**2,689**	**0**	**2,689**	**2,542**	**0**	**2,542**
Public Enterprise	Met Eireann	640	16	656	653	19	672
	R.P.I.I.	147		147	215	0	215
Sub-total		**787**	**16**	**802**	**867**	**19**	**886**
Social, Community & Family Affairs	Social, Community etc	3,181		3,181	9,592		9,592
	ESRI	129		129	113		113
Sub-total		**3,311**	**0**	**3,311**	**9,705**	**0**	**9,705**
Finance	E. S. R. I.	1,301	0	1,301	1,560	0	1,560
Taoiseach	N. E. S. C.	481	0	481	576	0	576
Central Bank	Central Bank	318	0	319	482	0	482
Ordnance Survey	Ordnance Survey	330	0	330	228	0	228
Total		**124,389**	**71,787**	**196,176**	**124,025**	**99,579**	**223,605**
%Total		**63%**	**37%**	**100%**	**55%**	**45%**	**100%**

* Public funds are exchequer & CSF funds

Of the total of £176.1m(€223.6m) some £78m(€99m), or 45%, comes from the EU via the Community Support Framework initiative. In some areas this reliance on EU support is even more critical; for example, the R&D activities funded by the Department of Enterprise, Trade and Employment are 88% funded by the CSF. A major proportion of that Department's activities are in the form of grants to industry - £51m(€65m) out of £74m(€94m) total - which are heavily EU-dependent.

2.3 International Comparisons on Public Sector R&D

It is generally useful to compare the performance of a country in any major area of activity with what is happening in that area in other countries of a similar size and stage of development. In the case of Ireland it is difficult to identify any exact comparator economies. As recently as ten years ago the whole of Ireland was classified with Greece, Portugal and parts of Spain and Italy, as an underdeveloped region of Europe. This has changed today, mainly due to the performance of a number of high growth, high technology industrial sectors. Again, there are relatively few countries with a similar industrial profile to Ireland. Nevertheless, international comparisons should be made and it would be unwise to discount totally the findings from such comparisons on the grounds that conditions here are very different form elsewhere. Such international comparisons are now common in relation to national competitiveness indicators, and research and development is a widely accepted measure of competitiveness.

Table 3 shows both the performance of R&D in the public sector (excluding the higher education sector) and the funding of R&D by the Government (this would fund R&D performed not only in the public sector but also in the business sector and in the higher education sector).

Table 3 R&D Performance and Funding by the Government Sector for Selected Countries (1997 or nearest)

	Public Sector R&D Performance (%GDP)	Government Funding of Civil R&D (% GDP)
New Zealand	0.41	0.49
Finland	0.40	1.00
Netherlands	0.38	0.81
Denmark	0.32	0.76
Norway	0.30	0.88
Portugal	0.16	0.51
Sweden	0.13	0.96
Greece	0.13	0.34
Ireland (1999)	**0.10**	**0.29**

Source: OECD

There is a wide variation in approaches and results between the different countries. Most of the countries except Sweden have a similar profile, performing a significant level of R&D in the public sector and funding still more in other sectors. Sweden has a tradition, as has Ireland, of having very little R&D performed in the public sector; however, in comparison it has a substantial investment in third level research, almost twice as much as a percentage of GDP as any other OECD country. Irish economic policy has concentrated more on attracting inward investment and has been so successful at this that economic growth rates are the envy of the world.

3. SCIENCE AND TECHNOLOGY FOR THE PRODUCTIVE SECTORS

Section 2 presented data on R&D across the whole public sector. In this section we look at other science and technology (S&T) activities, apart from R&D, which are performed in support of the productive sectors of the economy. The sectors considered are industry, agriculture, environment, energy, transport and the marine & forestry areas.

3.1 Industry

Table 4 shows the S&T allocations (including earned income) to various government departments and agencies to support industrial activity. FÁS accounts for over a third of the total, providing industrial training programmes. The substantial increase in training expenditure by FÁS, 60% increase over 1998, reflects the Government's commitment of investing in people to secure the economy's future.

The necessity for such investment is emphasised, in the National Competitiveness Council report - 'Annual Competitiveness Report 1998', to ensure that human resources are sufficient to sustain competitiveness in the years ahead.

Enterprise Ireland accounts for about one quarter of the total, providing a range of services in industrial technologies for enterprises as well as aids to technology transfer through its Technology Transfer and Partnerships programme and the Technology Placements programmes (Techstart and Techman).

Table 4 1999 Science & Technology Allocations (including earned income) by Industry Objective

	Information & Specialist Advisory Services	Scientific & Technical Services	Education & Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % change**
FÁS	0	0	24,655	0	0	24,655	15,414
	0%	0%	100%	0%	0%	100%	60%
Enterprise Ireland	2,462	8,873	1,157	3,810	964	17,266	16,654
	14%	51%	7%	22%	6%	100%	4%
NSAI	0	11,515	0	0	0	11,515	10,057
	0%	100%	0%	0%	0%	100%	14%
Dept of Enterprise, Trade & Employment	440	200	0	0	5,366	6,006	2,625
	7%	3%	0%	0%	89%	100%	129%
Patents Office	2,797	0	0	0	270	3,067	3,260
	91%	0%	0%	0%	9%	100%	-6%
Teagasc	1,067	738	0	0	0	1,805	2,785
	59%	41%	0%	0%	0%	100%	-35%
Shannon Development	0	0	1,740	0	0	1,740	1,501
	0%	0%	100%	0%	0%	100%	16%
National Microelectronics Research Centre	0	0	0	0	970	970	969
	0%	0%	0%	0%	100%	100%	0%
Forfás (inc. NAB)	0	482	0	0	0	482	459
	0%	100%	0%	0%	0%	100%	5%
National Microelectronics Applications Centre	84	42	42	31	31	230	214
	36%	18%	18%	14%	14%	100%	7%
Total	**7,423**	**21,850**	**27,594**	**3,841**	**7,601**	**68,309**	**54,461**
	11%	**32%**	**40%**	**6%**	**11%**	**100%**	**25%**

Table 4A 1999 Science & Technology Allocations (including earned income) by Industry Objective

Agency/ Department	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % change
FÁS	0	0	31,305	0	0	31,305	19,572
	0%	0%	100%	0%	0%	100%	60%
Enterprise Ireland	3,126	11,266	1,469	4,838	1,224	21,923	21,146
	14%	51%	7%	22%	6%	100%	4%
NSAI	0	14,621	0	0	0	14,621	1,270
	0%	100%	0%	0%	0%	100%	14%
Dept. of Enterprise, Trade & Employment	559	254	0	0	6,813	7,626	3,333
	7%	3%	0%	0%	89%	100%	129%
Patents Office	3,551	0	0	0	343	3,894	4,139
	91%	0%	0%	0%	9%	100%	-6%
Teagasc	1,355	937	0	0	0	2,292	3536
	59%	41%	0%	0%	0%	100%	-35%
Shannon Development	0	0	2,209	0	0	2,209	1,906
	0%	0%	100%	0%	0%	100%	16%
National Microelectronics	0	0	0	0	1,232	1,232	1,230
Research Centre	0%	0%	0%	0%	100%	100%	0%
Forfás (inc. NAB)	0	612	0	0	0	612	583
	0%	100%	0%	0%	0%	100%	5%
National Microelectronics	107	53	53	39	39	292	272
Applications Centre	36%	18%	18%	14%	14%	100%	7%
Total	**9,425**	**27,744**	**35,037**	**4,877**	**9,651**	**86,734**	**69,151**
	11%	**32%**	**40%**	**6%**	**11%**	**100%**	**25%**

3.2 Agriculture

Table 5 shows the S&T allocations (including earned income) to government departments and agencies to support activities in the agriculture area. The major players here are the Department of Agriculture and Food (51%) and Teagasc (49%). The Department operates a number of veterinary laboratories, three dairy science laboratories, as well as classification, testing and certification schemes in relation to meat and crop production. The major activity in Teagasc is an advice service to farmers at enterprise level.

Table 5 1999 Science & Technology Allocations (including earned income) by Agriculture Objective

	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % change
Teagasc	25,012	1,596	0	0	0	26,608	25,604
	94%	6%	0%	0%	0%	100%	4%
Department of Agriculture & Food	2,312	25,685	0	0	0	27,997	24,404
	6%	94%	0%	0%	0%	100%	15%
Total	**27,324**	**27,281**	**0**	**0**	**0**	**54,605**	**50,009**
	50%	**50%**	**0%**	**0%**	**0%**	**100%**	**9%**

Table 5A 1999 Science & Technology Allocations (including earned income) by Agriculture Objective

	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % change
Teagasc	31,759	2,026	0	0	0	33,785	32,510
	94%	8%	0%	0%	0%	100%	4%
Department of Agriculture & Food	2,936	32,613	0	0	0	35,549	30,987
	6%	92%	0%	0%	0%	100%	15%
Total	**34,694**	**34,640**	**0**	**0**	**0**	**69,334**	**63,498**
	50%	**50%**	**0%**	**0%**	**0%**	**100%**	**9%**

3.3 Environment

Table 6 shows the science and technology allocations (including earned income) for activities broadly categorised as environment-related. The major components are the specialist advice, monitoring and laboratory services and other activities of the Environmental Protection Agency, as well as the technical services in environment management of Enterprise Ireland and Teagasc.

Table 6 1999 Science & Technology Allocations (including earned income) by Environmental Objective

	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % change
Environmental Protection Agency	1,458	7,532	0	0	0	8,990	8,448
	16%	84%	0%	0%	0%	100%	6%
Enterprise Ireland	24	2,388	0	0	0	2,412	2,412
	1%	99%	0%	0%	0%	100%	0%
Radiological Protection Institute of Ireland	585	294	0	0	192	1,072	1,109
	55%	27%	0%	0%	18%	100%	-3%
Teagasc	497	344	0	0	0	841	834
	59%	41%	0%	0%	0%	100%	1%
Dept. of Arts, Heritage, Gaeltacht & the Islands	759	0	0	0	0	759	759
	100%	0%	0%	0%	0%	100%	0%
Dept. of the Environment and Local Government	29	50	0	0	0	79	96
	37%	63%	0%	0%	0%	100%	-18%
Total	**3,353**	**10,608**	**0**	**0**	**192**	**14,153**	**13,658**
	24%	**75%**	**0%**	**0%**	**1%**	**100%**	**4%**

Table 6A 1998 Science & Technology Allocations (including earned income) by Environmental Objective

	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total Outturn	1998
Agency/ Department	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % change
Environmental Protection Agency	1,851	9,564	0	0	0	11,415	10,727
	16%	84%	0%	0%	0%	100%	6%
Enterprise Ireland	30	3,032	0	0	0	3,063	3,063
	1%	99%	0%	0%	0%	100%	0%
Radiological Protection Institute of Ireland	743	373	0	0	244	1,361	1,408
	55%	27%	0%	0%	18%	100%	-3%
Teagasc	631	437	0	0	0	1,068	1,059
	59%	41%	0%	0%	0%	100%	1%
Dept. of Arts, Heritage, Gaeltacht & the Islands	964	0	0	0	0	964	964
	100%	0%	0%	0%	0%	100%	0%
Dept. of the Environment and Local Government	37	63	0	0	0	100	122
	37%	63%	0%	0%	0%	100%	-18%
Total	**4,257**	**13,469**	**0**	**0**	**244**	**17,971**	**17,342**
	24%	**75%**	**0%**	**0%**	**1%**	**100%**	**4%**

3.4 Marine and Forestry

Table 7 shows the science and technology allocations (including earned income) for activities in the marine, fisheries and forestry areas.

Education and training now accounts for 24% of the expenditure with the majority of the spending undertaken by An Bord Iascaigh Mhara. The Board's training programmes are geared to developing practical skills with respect to efficiency, safety, and management functions in order to support the maintenance and expansion of sustainable employment in sea fishing, aquaculture, processing and distribution. The Marine Institute are engaged in formulating a National Marine STI Policy and preparing a strategy to implement this policy.

Enterprise Ireland, in the forestry section, provides technical advice, consultancy services, training and assistance with new product and process development was provided to the Irish timber industry to identify opportunities for Irish timber and develop new applications and standards.

Table 7 1999 Science & Technology Allocations (including earned income) by Marine & Natural Resources objective

Agency/ Department	Information and Specialist Advisory Services £'000 % activity	Scientific and Technical Services £'000 % activity	Education and Training £'000 % activity	Technology Transfer £'000 % activity	Other Activities £'000 % activity	Total £'000 % activity	1998 Outturn £'000 % change
Environmental Protection Agency	1,851	9,564	0	0	0	11,415	10,727
	16%	84%	0%	0%	0%	100%	7%
Bord Iascaigh Mhara	0	48	1,601	0	609	2,258	2,376
	0%	2%	71%	0%	27%	100%	-5%
Central and Regional Fisheries Board	0	1,446	0	0	0	1,446	1,446
	0%	100%	0%	0%	0%	100%	0%
Marine Institute	0	612	0	0	1,195	1,807	1,017
	0%	34%	0%	0%	66%	100%	78%
Salmon Research Agency of Ireland	25	10	4	0	58	98	110
	26%	11%	4%	0%	59%	100%	-11%
COFORD	0	0	0	105	179	284	222
	0%	0%	0%	37%	63%	100%	28%
Enterprise Ireland	31	779	0	0	0	809	809
	4%	96%	0%	0%	0%	100%	0%
Total	**56**	**2,895**	**1,605**	**105**	**2,041**	**6,702**	**5,980**
	1%	**43%**	**24%**	**2%**	**30%**	**100%**	**12%**

Table 7A 1999 Science & Technology Allocations (including earned income) by Marine & Natural Resources objective							
	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total Outturn	1998
Agency/ Department	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % change
Bord Iascaigh Mhara	0	61	2,033	0	773	2,867	3,017
	0%	2%	71%	0%	27%	100%	-5%
Central and Regional Fisheries Board	0	1,836	0	0	0	1,836	1,836
	0%	100%	0%	0%	0%	100%	0%
Marine Institute	0	777	0	0	1517	2,294	1,291
	0%	34%	0%	0%	66%	100%	78%
Salmon Research Agency of Ireland	32	13	5	0	74	124	140
	26%	11%	4%	0%	59%	100%	-11%
COFORD	0	0	0	133	227	361	282
	0%	0%	0%	37%	63%	100%	28%
Enterprise Ireland	39	989	0	0	0	1027	1,027
	4%	96%	0%	0%	0%	100%	0%
Total	**71**	**3,676**	**2,038**	**133**	**2,591**	**8,510**	**7,593**
	1%	**43%**	**24%**	**2%**	**30%**	**100%**	**12%**

3.5 Energy

Table 8 shows science and technology allocations (including earned income) for activities related to energy. The major element here is the energy technology promotion activities of the Irish Energy Centre in Enterprise Ireland. The Department of Marine and Natural Resources operate an Exploration and Mining Division and a Petroleum Affairs Division, which provides the technical expertise necessary for promotion, monitoring and controlling of petroleum exploration and development activities by private enterprise under licence to the Department.

Table 8 1999 Science & Technology Allocations (including earned income) by Energy objective

	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total Outturn	1998
Agency/ Department	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % change
Enterprise Ireland	4,287	102	0	0	0	4,389	4,025
	98%	2%	0%	0%	0%	100%	9%
Department of Marine and Natural Resources	822	166	0	0	18	1,006	568
	82%	17%	0%	0%	2%	100%	77%
Total	**5,109**	**268**	**0**	**0**	**18**	**5,395**	**4,593**
	95%	**5%**	**0%**	**0%**	**0%**	**100%**	**17%**

Table 8A 1999 Science & Technology Allocations (including earned income) by Energy objective

	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total Outturn	1998
Agency/ Department	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % change
Enterprise Ireland	5,443	129	0	0	0	5,573	5,110
	98%	2%	0%	0%	0%	100%	9%
Department of Marine and Natural Resources	1,044	211	0	0	23	1,277	721
	82%	17%	0%	0%	2%	100%	77%
Total	**6,487**	**340**	**0**	**0**	**23**	**6,850**	**5,832**
	95%	**5%**	**0%**	**0%**	**0%**	**100%**	**17%**

3.6 Transportation

Table 9 shows science and technology allocations (including earned income) in support of national transportation objectives. The activity relates to the work of the National Roads Authority in planning and supervising the construction, improvement and maintenance of network of national roads. It amounts to £1.2m(€1.5m) overall.

Table 9 1999 Science & Technology Allocations (including earned income) by Transportation

	Information and Specialist Advisory Services	Scientific And Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % change
National Roads Authority	225 19%	863 72%	52 4%	62 5%	0 0%	1,202 100%	1,255 -4%

Table 9A 1999 Science & Technology Allocations (including earned income) by Transportation

	Information and Specialist Advisory Services	Scientific And Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % change
National Roads Authority	286 19%	1,096 72%	66 4%	79 5%	0 0%	1,526 100%	1,594 -4%

4. EDUCATION AND HEALTH ACTIVITIES

The S&T Budget incorporates data relating to scientific and technological activities undertaken in a broader social context. The major components of this relate to educational and health activities.

Table 10 shows the science and technology allocations (including earned income) for education and training activities. S&T courses in the universities and institutes of technology are the major performers.

The passing of the Scientific and Technological Education (Investment) Fund Bill 1997 has resulted in the establishment of a £250m(€317m) fund over 3 years, which will be used to develop technology education at all levels ranging from primary schools to advanced research. This Fund has led to significant increases in the level of education and training activity in both the Department of Education and Science (accounting for 22% of total 1999 allocation) and the Higher Education Authority (accounting for 7.5% of total 1999 allocation).

Table 10 1999 Science and Technology Allocations (including earned income) by Education & Training objective

	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % activity	£'000 % change
Department of Education & Science	0 0%	0 0%	247,009 100%	0 0%	97 0%	247,106 100%	290,337 -15%
Higher Education Authority	0 0%	0 0%	179,450 79%	0 0%	47,544 21%	226,994 100%	194,144 17%
Postgraduate Medical & Dental Board	0 0%	0 0%	3,840 100%	0 0%	0 0%	3,840 100%	2,076 85%
Dublin Institute for Advanced Studies	50 9%	30 5%	0 0%	0 0%	471 85%	551 100%	480 15%
Total	**50**	**30**	**430,299**	**0**	**48,112**	**478,491**	**487,037**
	0%	**0%**	**90%**	**0%**	**10%**	**100%**	**-2%**

Table 10A 1999 Science and Technology Allocations (including earned income) by Education & Training Objective

Agency/ Department	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	£'000 % change
Department of Education & Science	0	0	313,637	0	123	313,760	368,652
	0%	0%	100%	0%	0%	100%	-15%
Higher Education Authority	0	0	227,854	0	60,368	288,223	246,512
	0%	0%	79%	0%	21%	100%	17%
Postgraduate Medical and Dental Board	0	0	4,876	0	0	4,876	2,636
	0%	0%	100%	0%	0%	100%	85%
Dublin Institute for Advanced Studies	63	38	0	0	598	700	609
	9%	5%	0%	0%	85%	100%	15%
Total	**63**	**38**	**546,367**	**0**	**61,090**	**607,558**	**618,409**
	0%	**0%**	**90%**	**0%**	**10%**	**100%**	**-2%**

Activities in the area of health are shown in Table 11. Science and technology activities in the Health sector are dominated by the activities of the Department of Health and Children. In the Department of Health and Children, the scientific and technical services of £4.6m(€5.8m) relates mainly to the activities of the Irish Medicines Board, which is self-funding from earned income and receives no public funds. The other departmental activities relate to the various health advisory functions it operates and to the National Cancer Registry Board.

Table 11 1999 Science & Technology Allocations (including earned income) by Health Objective

	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % change**
Health Research Board	0 0%	220 73%	83 27%	0 0%	0 0%	303 100%	232 31%
Dept. of Health & Children	4,001 47%	4,580 53%	0 0%	0 0%	14 0%	8,595 100%	7,602 13%
Radiological Protection Institute of Ireland	332 43%	332 43%	0 0%	0 0%	112 14%	775 100%	694 12%
Total	**4,333**	**5,132**	**83**	**0**	**126**	**9,673**	**8,528**
	45%	**53%**	**1%**	**0%**	**1%**	**100%**	**13%**

Table 11A 1999 Science & Technology Allocations (including earned income) by Health Objective

	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	**€'000 % activity**	**€'000 % activity**	**€'000 % activity**	**€'000 % activity**	**€'000 % activity**	**€'000 % activity**	**€'000 % change**
Health Research Board	0 0%	279 73%	105 27%	0 0%	0 0%	385 100%	295 31%
Dept. of Health & Children	5,080 47%	5,815 53%	0 0%	0 0%	18 0%	10,913 100%	9,652 13%
Radiological Protection Institute of Ireland	422 43%	422 43%	0 0%	0 0%	142 14%	984 100%	881 12%
Total	**5,502**	**6,516**	**105**	**0**	**160**	**12,282**	**10,828**
	45%	**53%**	**1%**	**0%**	**1%**	**100%**	**13%**

5. GENERAL PUBLIC SERVICE ACTIVITIES

This area is concerned with science and technology activities undertaken by the Government in support of regulatory and statutory activities. These are listed in Table 12.

The Office of Public Work's capital allocations to buildings for S&T activities are also included. In line with the objective of the institutes classified in this area, almost 80% of the area's activities are devoted to the provision of S&T services and technical information.

Table 12 1999 Science & Technology Allocations (including earned income) by General Public Services Objective

	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % change**
Central Statistics Office	0 0%	15,161 76%	0 0%	0 0%	4,671 24%	19,832 100%	16,350 21%
Ordnance Survey	0 0%	10,206 91%	0 0%	0 0%	1,015 9%	11,221 100%	9,764 15%
Met Eireann	4,991 47%	4,599 44%	240 2%	95 1%	633 6%	10,559 100%	9,888 7%
Office of Public Works	0 0%	0 0%	0 0%	0 0%	4,070 100%	4,070 100%	2,589 57%
State Laboratory	0 0%	3,782 99%	39 1%	0 0%	0 0%	3,821 100%	3,305 16%
Geological Survey of Ireland	0 0%	2,836 100%	0 0%	0 0%	0 0%	2,836 100%	2,390 19%
Forfás	973 100%	0 0%	0 0%	0 0%	0 0%	973 100%	866 12%
Dept. of the Environment & Local Government	0 0%	741 99%	4 1%	0 0%	0 0%	745 100%	625 19%
Radiological Protection Institute ofIreland	100 43%	100 43%	0 0%	0 0%	34 15%	233 100%	181 29%
Total	**6,064** **11%**	**37,424** **69%**	**283** **1%**	**95** **0%**	**10,424** **19%**	**54,290** **100%**	**45,958** **18%**

Table 12A 1999 Science & Technology Allocations (including earned income) by General Public Services Objective							
	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % activity	€'000 % change
Central Statistics Office	0	19,250	0	0	5,931	25,181	20,760
	0%	76%	0%	0%	24%	100%	21%
Ordnance Survey	0	12,959	0	0	1,289	14,248	12,398
	0%	91%	0%	0%	9%	100%	15%
Met Eireann	6,337	5,839	305	121	804	13,407	12,555
	47%	44%	2%	1%	6%	100%	7%
Office of Public Works	0	0	0	0	5,168	5,168	3,287
	0%	0%	0%	0%	100%	100%	57%
State Laboratory	0	4,802	49	0	0	4,852	4,196
	0%	99%	1%	0%	0%	100%	16%
Geological Survey of Ireland	0	3,601	0	0	0	3,601	3,035
	0%	100%	0%	0%	0%	100%	19%
Forfás	1,235	0	0	0	0	1,235	1,100
	100%	0%	0%	0%	0%	100%	12%
Dept. of the Environment and Local Government	0	941	5	0	0	946	794
	0%	99%	1%	0%	0%	100%	19%
Radiological Protection Institute of Ireland	127	127	0	0	43	296	230
	43%	43%	0%	0%	15%	100%	29%
Total	**7,700**	**47,519**	**359**	**121**	**13,236**	**68,934**	**58,355**
	11%	**69%**	**1%**	**0%**	**19%**	**100%**	**18%**

6. ECONOMIC AND SOCIAL ACTIVITIES

This area is concerned with science and technology activities undertaken by the Government in support of economic and social activities. These are listed in Table 13.Science and technology activities in the Economic and Social sector are dominated by the activities of the Department of Social, Community and Family Affairs and the Economic and Social Research Institute.

Table 13 1999 Science and Technology Allocations (including earned income) by Economic & Social Objective

	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % activity**	**£'000 % change**
Economic and Social Research Institute	186	1,115	39	0	0	1,340	1,289
	14%	83%	3%	0%	0%	100%	4%
Dept. of Social, Community And Family Affairs	358	0	17	0	937	1,312	1,395
	27%	0%	1%	0%	71%	100%	-6%
Natural History Museum	0	0	1	0	0	1	0
	0%	0%	100%	0%	0%	100%	0%
Total	**544**	**1,115**	**57**	**0**	**937**	**2,653**	**2,684**
	21%	**42%**	**2%**	**0%**	**35%**	**100%**	**-1%**

Table 13A 1999 Science and Technology Allocations (including earned income) by Economic & Social Objective

	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total	1998 Outturn
Agency/ Department	**€'000 % activity**	**€'000 % activity**	**€'000 % activity**	**€'000 % activity**	**€'000 % activity**	**€'000 % activity**	**€'000 % change**
Economic and Social Research Institute	236	1,416	49	0	0	1,701	1,637
	14%	83%	3%	0%	0%	100%	4%
Dept. of Social, Community and Family Affairs	455	0	22	0	1,190	1,666	1,771
	27%	0%	1%	0%	71%	100%	-6%
Natural History Museum	0	0	1	0	0	1	0
	0%	0%	100%	0%	0%	100%	0%
Total	**691**	**1,416**	**72**	**0**	**1,190**	**3,369**	**3,408**
	21%	**42%**	**2%**	**0%**	**35%**	**100%**	**-1%**

7.1 Total Funding and Trends

The previous five sections of this report have detailed public expenditure on science and technology under five broad classifications:

- Research and development activities
- Other S&T activities in support of industry, agriculture and food, the environment, marine and forestry, energy and transportation
- Education and health
- Other public service activities
- Economic and social activities

The total of these five components constitutes the State Investment in Science and Technology for 1999 (the 'Science and Technology Budget'). Funding for these activities come from three sources – the exchequer, the Community Support Framework (CSF) of the EU, and income earned by the agencies/departments implementing science and technology programmes.

The total value of the science and technology budget in 1999 amounts to £932m(€1,183) and Table 14 identifies the sources of funding for 1990, 1995, 1998 and 1999.

Table 14 Government funding of Science and Technology by source of funds, current prices

	1990 Outturn		1995 Outturn		1998 Outturn		1999 Allocation	
	£m	%	£m	%	£m	%	£m	%
Exchequer funds	226.13	65%	377.85	63%	587.28	66%	607.99	65%
EU Contribution	28.05	8%	72.76	12%	141.80	16%	167.93	18%
Total public funds	254.18	73%	450.60	75%	729.08	82%	775.93	83%
Earned income	94.10	27%	151.25	25%	156.11	18%	155.72	17%
Total	**348.28**	**100%**	**601.85**	**100%**	**885.19**	**100%**	**931.65**	**100%**

Table 14A Government funding of Science and Technology by Source of Funds, Current Prices

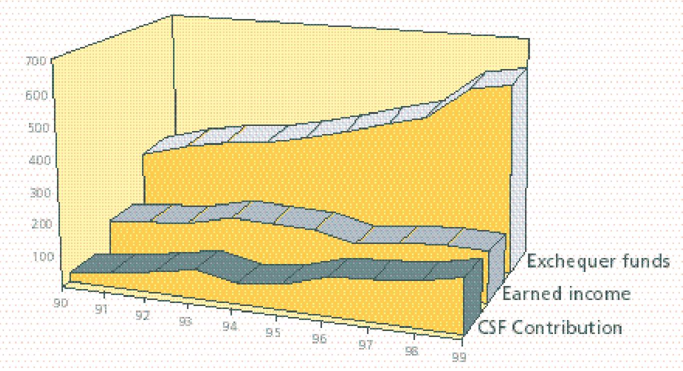
	1990 Outturn		1995 Outturn		1998 Outturn		1999 Allocation	
	€m	%	€m	%	€m	%	€m	%
Exchequer funds	287.13	65%	479.77	63%	745.69	66%	771.99	65%
EU Contribution	35.62	8%	92.39	12%	180.05	16%	213.23	18%
Total public funds	322.74	73%	572.14	75%	925.74	82%	985.23	83%
Earned income	119.48	27%	192.05	25%	198.22	18%	197.72	17%
Total	**442.22**	**100%**	**764.19**	**100%**	**1123.96**	**100%**	**1182.95**	**100%**

There was a total increase of £46.5m(€59.0m), or 5.2% over the 1998 level. All of the increase is accounted for by public funds, as earned income has remained relatively constant since 1995. The main elements of the increase in 1999 is the additional resources provided by the Department of Enterprise, Trade & Employment for research grants to industry via Enterprise Ireland and for training support via FÁS.

In 1999 the EU contribution to Irish S&T will increase further to £168m(€213m) or 18% of the total, up from a level of 16% in 1998. This contribution comes via the Community Support Framework and consists of three separate funds – the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the European Agriculture, Guidance and Guarantee Fund (EAGGF). Further details are provided in Appendix 2.

Figure 2 illustrates the trends in funding in the recent past.

Figure 2 Distribution of Government Supported S&T by Sources of Funds, 1999 prices, £m



The above graph relates to the table overleaf. This shows values in Irish pounds and the Euro equivalents.
All conversions to Euro were made using the irrevocably fixed conversion rate (1 Euro = 0.787564 Irish pounds).

	CSF Contribution		Earned Income		Exchequer Funds		Total	
1999 prices								
	IR £m	**€m**	**IR £m**	**€m**	**IR £m**	**€m**	**IR £m**	**€m**
1990	34	43	113	143	272	345	419	532
1991	44	56	124	157	302	383	470	597
1992	64	81	136	173	329	418	528	670
1993	90	114	164	208	338	429	593	753
1994	64	81	163	207	364	462	590	749
1995	77	98	161	204	402	510	640	813
1996	117	149	131	166	434	551	682	866
1997	127	161	150	190	477	606	754	957
1998	143	182	157	199	591	750	890	1,130
1999	168	213	156	198	608	772	932	1,183

In real terms exchequer funds grew by 10.2% on average per annum between 1990 and 1998. A further real increase of 2.9% is expected in 1999. Earned income grew by 4.2% on average per annum between 1990 and 1998, although the allocations for 1999 show a decrease of 0.8% over the 1998 outturn.

7.2 Funding by Type of Cost

Table 15 shows that when exchequer and CSF funds are combined, public current monies have a real growth on average of 10.9% per annum in the 9-year period to 1999. Public capital monies have increased significantly in 1999 due to the HEA's investment in skills initiative programme (£17m)(€22m), the HEA's equipment renewal grants scheme (£5m)(€6m) and the Department of Education's Science and Technology Education Investment fund (£53m)(€67m).

Table 15 Government funding of Science and Technology by type of costs, current prices

	1990		1995		1998		1999	
	£m	**%**	**£m**	**%**	**£m**	**%**	**£m**	**%**
Public * current monies	234.33	67%	424.54	71%	561.90	63%	657.94	71%
Public capital monies	19.85	6%	26.06	4%	167.17	19%	117.99	13%
Total public funds	**254.18**	**73%**	**450.60**	**75%**	**729.08**	**82%**	**775.93**	**83%**
Earned income	94.10	27%	151.25	25%	156.11	18%	155.72	17%
Total	**348.28**	**100%**	**601.85**	**100%**	**885.19**	**100%**	**931.65**	**100%**

* Public monies are exchequer + CSF funds

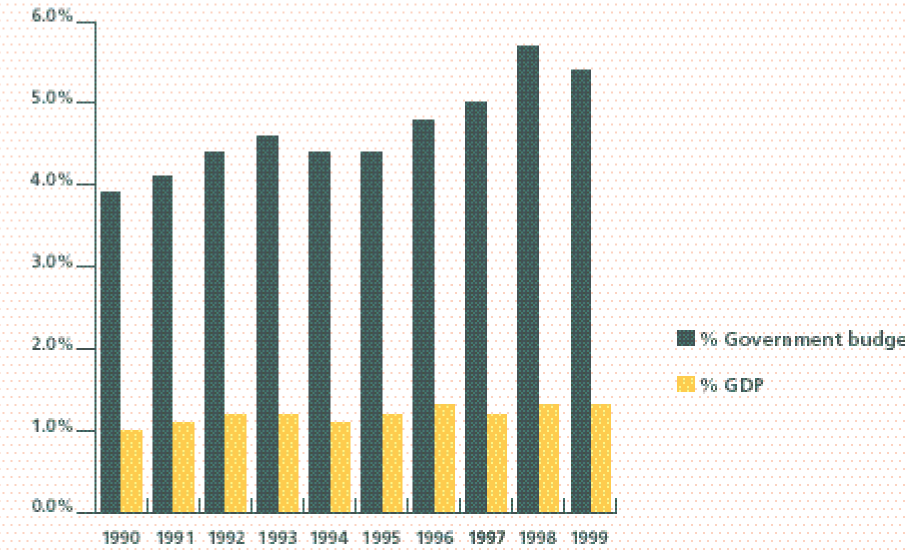
Table 15A Government funding of Science and Technology by type of costs, current prices								
	1990		1995		1998		1999	
	€m	%	€m	%	€m	%	€m	%
Public * current monies	297.54	67%	539.06	71%	713.47	63%	835.41	71%
Public capital monies	25.20	6%	33.09	4%	212.26	19%	149.82	13%
Total public funds	**322.74**	**73%**	**572.14**	**75%**	**925.74**	**82%**	**985.23**	**83%**
Earned income	119.48	27%	192.05	25%	198.22	18%	197.72	17%
Total	**442.22**	**100%**	**764.19**	**100%**	**1123.9**	**100%**	**1182.95**	**100%***

Public monies are exchequer + CSF funds

7.3 Comparison with GDP and Total Government Budgets

Public funding for S&T as a percentage of total government budgets increased steadily since 1991 to reach 5.4% in 1999 (Figure 3). This positive trend reflects the government's commitment to science and technology given the extraordinary performance of the Irish economy in recent years. Public funds for S&T as a percentage of GDP have also grown since 1990, and have returned to the levels achieved in the mid-1980s.

Figure 3 Public* funding of S&T: % Government budget, % GDP 1990-1999



*Exchequer+CSF

7.4 Government Departments/Agencies funding science and technology

Table 16 presents each Department/Agency's allocation to S&T analysed by source of funds. Some agencies are extremely reliant on non-exchequer sources for their income in the form of CSF funds and earned income while others are funded entirely from exchequer sources. In all, 8 agencies receive less than half of their S&T funds from direct exchequer sources, the balance being made up to a greater or lesser extent by CSF funds and earned income. The most significant agencies in this regard are Enterprise Ireland, IDA Ireland, Shannon Development, COFORD and the NMRC.

Table 16 1999 Science and Technology Allocation to Departments/Agencies by source of funds

	Exchequer	CSF funds	Total public	Earned income	Total
	£'000	£'000	£'000	£'000	£'000
Department of Education and Science	214,908	50,291	265,199	0	265,199
- Dublin Institute for Advanced Studies	1,617	32	1,649	235	1,884
- Higher Education Authority	203,914	20,728	224,642	69,146	293,788
Department of Enterprise, Trade & Employment	5,825	705	6,530	0	6,530
- FÁS	14,665	11,252	25,917	0	25,917
- Enterprise Ireland	14,475	55,061	69,536	17,572	87,108
- Forfás (inc. NAB)	1,220	0	1,220	235	1,455
- I.D.A	50	6,000	6,050	0	6,050
- Innovation Centre	656	275	931	0	931
- National Microelectronics Applications Centre	25	75	100	610	710
- National Microelectronics Research Centre	1,615	1,933	3,548	6,047	9,595
- N.S.A.I	3,740	0	3,740	7,775	11,515
- Patents Office	-2,265	0	-2,265	5,332	3,067
- Shannon Development	2,835	4,000	6,835	0	6,835
Department of Agriculture and Food	23,515	2,349	25,864	6,800	32,664
- Teagasc	26,558	10,325	36,883	15,449	52,332
Central Statistics Office	18,462	0	18,462	1,370	19,832
Department of Health and Children	4,770	0	4,770	4,468	9,238
- Health Research Board	5,238	0	5,238	665	5,903
- Postgraduate Medical & Dental Board	3,840	0	3,840	0	3,840

Table 16 1999 Science and Technology Allocation to Departments/Agencies by source of funds

	Exchequer	CSF funds	Total public	Earned income	Total
	£'000	£'000	£'000	£'000	£'000
Department of Marine and Natural Resources	906	0	906	506	1,412
- Bord Iascaigh Mhara	1,232	976	2,208	50	2,258
- Central & Regional Fisheries Board	1,114	314	1,428	18	1,446
- COFORD	111	333	444	0	444
- Marine Institute	9,440	1,340	10,780	1,446	12,226
- Salmon Research Agency of Ireland	600	118	718	113	831
Department of Public Enterprise					
- Geological Survey of Ireland	2,649	6	2,655	181	2,836
- Met Eireann	5,726	48	5,774	5,475	11,249
- Radiological Protection Institute of Ireland	1,724	0	1,724	650	2,374
Department of Environment and Local Government	960	0	960	0	960
- Environmental Protection Agency	6,652	773	7,425	4,427	11,852
- N.R.A	1,654	0	1,654	170	1,824
Ordnance Survey Office	6,401	0	6,401	5,000	11,401
Department of Social, Community and Family Affairs	8,845	0	8,845	41	8,886
Department of Finance					
- Economic and Social Research Institute	2,796	0	2,796	1,930	4,726
Office of Public Works	4,070	0	4,070	0	4,070
Department of Arts, Heritage, Gaeltacht and the Islands	1,625	98	1,723	0	1,723
- Natural History Museum	170	0	170	0	170
- Údarás na Gaeltachta	1,000	900	1,900	0	1,900
State Laboratory	3,821	0	3,821	0	3,821
Department of the Taoiseach					
- National Economic and Social Council	454	0	454	10	464
Central Bank	380	0	380	0	380
Total	**607,993**	**167,932**	**775,925**	**155,721**	**931,646**

* Where there are transfers from one S&T agency/department to another the funds are accounted for in the performing agency.

Note: Earned income assigned to the Higher Education Authority refers to funds which the colleges under its aegis receive by way of fees for education courses and income generated from contract research activity. These funds are not allocated by the HEA to colleges.

Table 16A 1999 Science and Technology Allocation to Departments/Agencies by source of funds

	Exchequer	CSF funds	Total public	Earned income	Total
	€'000	€'000	€'000	€'000	€'000
Department of Education and Science	272,877	63,856	336,733	0	336,733
- Dublin Institute for Advanced Studies	2,053	41	2,094	298	2,392
- Higher Education Authority	258,917	26,319	285,236	87,797	373,034
Department of Enterprise, Trade & Employment	7,396	895	8,291	0	8,291
- FÁS	18,621	14,287	32,908	0	32,908
- Enterprise Ireland	18,379	69,913	88,292	22,312	110,604
- Forfas (inc. NAB)	1,549	0	1,549	298	1,847
- I.D.A	63	7,618	7,682	0	7,682
- Innovation Centre	833	349	1,182	0	1,182
- National Microelectronics Applications Centre	32	95	127	774	901
- National Microelectronics Research Centre	2,051	2,454	4,505	7,678	12,183
- N.S.A.I	4,749	0	4,749	9,872	14,621
- Patents Office	-2,876	0	-2,876	6,770	3,894
- Shannon Development	3,600	5,079	8,679	0	8,679
Department of Agriculture and Food	29,858	2,983	32,840	8,634	41,475
- Teagasc	33,722	13,110	46,832	19,616	66,448
Central Statistics Office	23,442	0	23,442	1,739	25,181
Department of Health and Children	6,057	0	6,057	5,673	11,730
- Health Research Board	6,651	0	6,651	844	7,495
- Postgraduate Medical & Dental Board	4,876	0	4,876	0	4,876
Department of Marine and Natural Resources	1,150	0	1,150	642	1,793
- Bord Iascaigh Mhara	1,564	1,239	2,804	63	2,867
- Central & Regional Fisheries Board	1,414	399	1,813	22	1,836
- COFORD	141	423	564	0	564
- Marine Institute	11,986	1,701	13,688	1,836	15,524
- Salmon Research Agency of Ireland	762	150	912	143	1,055

Table 16A 1999 Science and Technology Allocation to Departments/Agencies by source of funds

	Exchequer	CSF funds	Total public	Earned income	Total
	€'000	€'000	€'000	€'000	€'000
Department of Public Enterprise					
- Geological Survey of Ireland	3,363	8	3,371	230	3,601
- Met Eireann	7,270	61	7,331	6,951	14,283
- Radiological Protection Institute of Ireland	2,189	0	2,189	825	3,014
Department of Environment and Local Government	1,219	0	1,219	0	1,219
- Environmental Protection Agency	8,446	981	9,428	5,621	15,049
- N.R.A	2,100	0	2,100	216	2,316
Ordnance Survey Office	8,128	0	8,128	6,349	14,476
Department of Social, Community and Family Affairs	11,231	0	11,231	52	11,283
Department of Finance					
- Economic and Social Research Institute	3,550	0	3,550	2,450	6,001
Office of Public Works	5,168	0	5,168	0	5,168
Department of Arts, Heritage, Gaeltacht and the Islands	2,063	124	2,188	0	2,188
- Natural History Museum	216	0	216	0	216
- Údarás na Gaeltachta	1,270	1,143	2,412	0	2,412
State Laboratory	4,852	0	4,852	0	4,852
Department of the Taoiseach					
- National Economic and Social Council	576	0	576	13	589
Central Bank	482	0	482	0	482
Total	**771,992**	**213,230**	**985,221**	**197,725**	**1,182,946**

* Where there are transfers from one S&T agency/department to another the funds are accounted for in the performing agency.

Note: Earned income assigned to the Higher Education Authority refers to funds which the colleges under its aegis receive by way of fees for education courses and income generated from contract research activity. These funds are not allocated by the HEA to colleges.

Table 17 looks at the changes which have occurred at agency/departmental level with regard to public funding of S&T since 1998. This year saw the continuation of funds committed under the present series of Operational Programmes and the trend of expenditure set in 1998 is continued into 1999. The main increase in public expenditure in 1999 occurred in Enterprise Ireland (£21.4m)(€27.2m), due to increased funding to its CSF supported programmes. The other significant increases occurred in FAS (£9.3m)(€11.8m), the Department of Social, Community and Family Affairs (£5.0m)(€6.4m), the Department of Agriculture & Food (£3.4m)(€4.3m) and the Department Enterprise Trade & Employment (£3.9m)(€5.0m) due to it's increased contribution to the European Space Agency.

The education sector has also seen significant changes in public expenditure, with the Higher Education Authority showing and increase of £38.2m(€48.5m) and the Department of Education and Science showing a decrease of £52.2m(€66.3m). The reason for these variances is due to draw down of the government's Science and Technology Education Investment Fund.

Table 17 1999 Science and Technology Allocation to Agencies/ Departments (*) by type of costs

	Public Funds**			Increase in current public funds
	Capital	Current	Total Public	over 1998 outturn
	£'000	£'000	£'000	%
Department of Education and Science	76,323	188,876	265,199	11%
- Dublin Institute for Advanced Studies	0	1,649	1,649	1%
- Higher Education Authority	30,861	193,781	224,642	10%
Department of Enterprise, Trade & Employment	700	5,830	6,530	596%
- FÁS	0	25,917	25,917	56%
- Enterprise Ireland	725	68,811	69,536	46%
- Forfás (incl. NAB)	0	1,220	1,220	13%
- IDA Ireland	0	6,050	6,050	-5%
- Innovation Centre	0	931	931	6%
- National Microelectronics Applications Centre	0	100	100	0%
- National Microelectronics Research Centre	505	3,043	3,548	1%
- NSAI	127	3,613	3,740	97%
- Patents Office	0	-2,265	-2,265	-17%
- Shannon Development	0	6,835	6,835	30%
Department of Agriculture and Food	0	25,864	25,864	15%
- Teagasc	516	36,367	36,883	-3%
Central Statistics Office	711	17,751	18,462	21%

Table 17 1999 Science and Technology Allocation to Agencies/ Departments (*) by type of costs

	Public Funds**			Increase in current public funds
	Capital	Current	Total Public	over 1998 outturn
	£'000	£'000	£'000	%
Department of Marine and Natural Resources	0	906	906	-9%
- Board Iascaigh Mhara	824	1,384	2,208	-5%
- Central and Regional Fisheries Board	0	1,428	1,428	0%
- COFORD	0	444	444	21%
- Marine Institute	1,398	9,382	10,780	9%
- Salmon Research Agency of Ireland	189	529	718	-6%
Department of Health and Children	0	4,770	4,770	35%
- Health Research Board	0	5,238	5,238	3%
- Postgraduate Medical and Dental Board	0	3,840	3,840	85%
Department of Public Enterprise				
- Geological Survey of Ireland	87	2,568	2,655	19%
- Met Eireann	515	5,259	5,774	22%
- Radiological Protection Institute of Ireland	196	1,528	1,724	12%
Department of Environment and Local Government	0	960	960	10%
- Environmental Protection Agency	216	7,209	7,425	10%
- National Roads Authority	0	1,654	1,654	-4%
Office of Public Works	4,070	0	4,070	0%
Ordinance Survey Office	0	6,401	6,401	67%
Department of Arts, Heritage, Gaeltacht and the Islands	0	1,723	1,723	0%
- Natural History Museum	22	148	170	48%
- Údarás na Gaeltachta	0	1,900	1,900	11%
Department of Social, Community and Family Affairs	0	8,845	8,845	130%
State Laboratory	0	3,821	3,821	16%
Department of Finance				
- Economic and Social Research Institute	0	2,796	2,796	5%
Department of the Taoiseach				
- National Economic and Social Council	0	454	454	20%
Central Bank	0	380	380	51%
Total	**117,985**	**657,940**	**775,925**	

* Where there are transfers from one S&T agency/department to another the funds are accounted for in the performing agency

** Public funds are exchequer & CSF funds

Table 17A 1999 Science and Technology Allocation to Agencies/Departments (*) by type of costs				
	Public Funds**			Increase in current public funds
	Capital	Current	Total Public	over 1998 outturn
	€'000	€'000	€'000	%
Department of Education and Science	96,910	239,823	336,733	11%
- Dublin Institute for Advanced Studies	0	2,094	2,094	1%
- Higher Education Authority	39,185	246,051	285,237	10%
Department of Enterprise, Trade & Employment	889	7,403	8,291	596%
- FÁS	0	32,908	32,908	56%
- Enterprise Ireland	921	87,372	88,293	46%
- Forfás (incl. NAB)	0	1,549	1,549	13%
- IDA Ireland	0	7,682	7,682	-5%
- Innovation Centre	0	1,182	1,182	6%
- National Microelectronics Applications Centre	0	127	127	0%
- National Microelectronics Research Centre	641	3,864	4,505	1%
- NSAI	161	4,588	4,749	97%
- Patents Office	0	-2,876	-2,876	-17%
- Shannon Development	0	8,679	8,679	30%
Department of Agriculture and Food	0	32,841	32,841	15%
- Teagasc	655	46,177	46,832	-3%
Central Statistics Office	903	22,539	23,442	21%
Department of Marine and Natural Resources	0	1,150	1,150	-9%
- Board Iascaigh Mhara	1,046	1,757	2,804	-5%
- Central and Regional Fisheries Board	0	1,813	1,813	0%
- COFORD	0	564	564	21%
- Marine Institute	1,775	11,913	13,688	9%
- Salmon Research Agency of Ireland	240	672	912	-6%

Table 17A 1999 Science and Technology Allocation to Agencies/Departments (*) by type of costs

	Public Funds**			Increase in current public funds over 1998 outturn
	Capital	Current	Total Public	
	€'000	€'000	€'000	%
Department of Health and Children	0	6,057	6,057	35%
- Health Research Board	0	6,651	6,651	3%
- Postgraduate Medical and Dental Board	0	4,876	4,876	85%
Department of Public Enterprise				
- Geological Survey of Ireland	110	3,261	3,371	19%
- Met Eireann	654	6,678	7,331	22%
- Radiological Protection Institute of Ireland	249	1,940	2,189	12%
Department of Environment and Local Government	0	1,219	1,219	10%
- Environmental Protection Agency	274	9,154	9,428	10%
- National Roads Authority	0	2,100	2,100	-4%
Office of Public Works	5,168	0	5,168	0%
Ordinance Survey Office	0	8,128	8,128	67%
Department of Arts, Heritage, Gaeltacht and the Islands	0	2,188	2,188	0%
- Natural History Museum	28	188	216	48%
- Údarás na Gaeltachta	0	2,413	2,413	11%
Department of Social, Community and Family Affairs	0	11,231	11,231	130%
State Laboratory	0	4,852	4,852	16%
Department of Finance				
- Economic and Social Research Institute	0	3,550	3,550	5%
Department of the Taoiseach				
- National Economic and Social Council	0	576	576	20%
Central Bank	0	483	483	51%
Total	**149,810**	**835,411**	**985,222**	

* Where there are transfers from one S&T agency/department to another the funds are accounted for in the performing agency

** Public funds are exchequer & CSF funds

7.5 Funding by activity

Expenditure on the different S&T activities has been detailed in the previous sections.

Figure 4 illustrates how funding of S&T is distributed across the range of activities in 1999. Education and training accounts for 49% of the total and research and development accounting for 25%, an increase of £25m(€32m) over 1998. Figure 5 illustrates the trend in activity funding over time. Education and training has shown an increase from the 1990 level of it's percentage of the total expenditure (42%) and research and development has also increased from it's share in 1990 (23%).

Figure 4 1999 Distribution of S&T funding by S&T activity (including earned income)

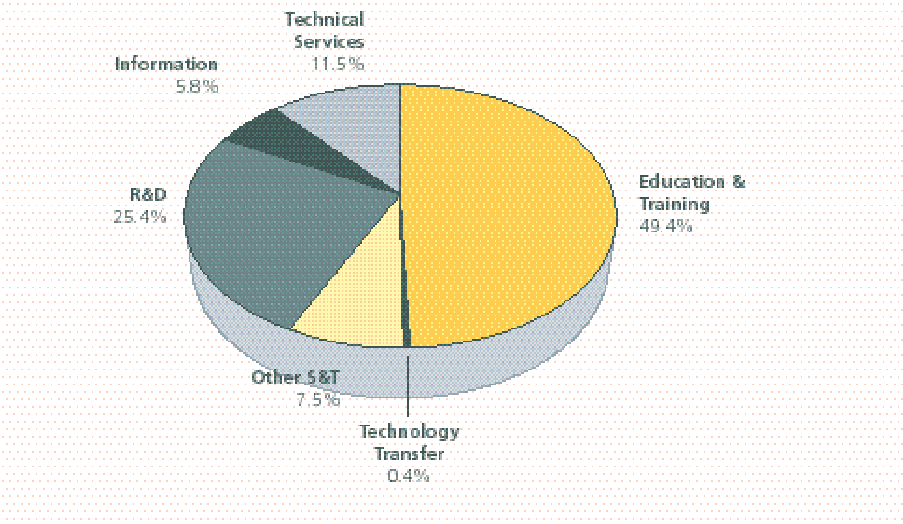
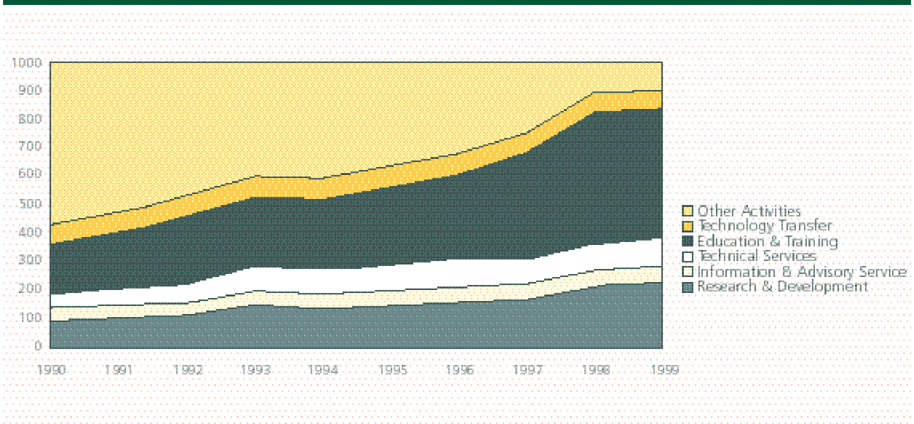


Figure 5 Funding of S&T activities (including earned income) 1999 prices, £m



The previous graphs relates to the table overleaf. This shows values in Irish pounds and euro equivalents. All conversions to euro were made using the irrevocably fixed conversion rate (1 euro = 0.787564 Irish pounds).

1999 Prices	Research & Development		Information & Advisory Services		Technical Services		Education & Training		Technology Transfer		Other Activities	
	IR£m	€m	IR£m	€m	IR£m	€m	IR£m	€m	IR£m	€m	IR£m	€m
1990	95	120	32	41	53	67	176	223	5	6	60	76
1991	102	129	35	44	68	86	193	245	6	8	65	82
1992	113	143	37	47	70	89	235	298	6	8	68	86
1993	1489	189	45	57	81	103	245	311	5	6	67	85
1994	135	171	48	61	89	113	246	312	3	4	69	88
1995	143	182	52	66	91	115	282	358	4	5	67	85
1996	158	201	51	65	101	128	297	377	5	6	70	89
1997	170	216	51	65	90	114	372	472	4	5	67	85
1998	212	269	51	65	100	127	463	588	4	5	60	76
1999	229	291	54	69	100	127	456	579	4	5	65	82

7.6 Public Funding Trends by Objective

Table 18 examines how the different objectives are funded since 1990. The industry area earns almost two-thirds of its S&T public funds from the CSF in 1999, this contrasts with the 1990 breakdown. This analysis depicts a decrease of 25% in exchequer funding's percentage of total public expenditure. While there has been an increase in exchequer support (£16.6m) (€ 21.1m) since 1990, CSF support has increased by £61.2m (€77.7m).

The agriculture area now receives 19% of its funds from the CSF, while in the marine and forestry area it accounts for 20%. This is in contrast to 1990 where these areas were almost completely funded by the exchequer.

Education and manpower has also benefited from CSF funding as Table 18 depicts a increase of 8% in CSF funding's percentage of total public expenditure. In contrast to the industry area actual exchequer funding has increased by £288m (€366m) as opposed to increased CSF funding of £63m (€80m).

Table 18 Public * expenditure on science and technology by objective, current prices

		1990 outturn £'000	1995 outturn £'000	1998 outturn £'000	1999 allocation £'000
Education and Manpower **	**Total**	**146,804**	**262,132**	**509,647**	**497,760**
	% Exchequer	93%	92%	86%	85%
	% CSF Funds	7%	8%	14%	15%
Industry	**Total**	**42,009**	**68,950**	**84,668**	**119,845**
	% Exchequer	60%	39%	38%	35%
	% CSF Funds	40%	61%	62%	65%
Agriculture	**Total**	**22,297**	**40,899**	**50,256**	**54,100**
	% Exchequer	100%	79%	82%	81%
	% CSF Funds	0%	21%	18%	19%
General Public Services	**Total**	**22,073**	**40,177**	**33,657**	**43,634**
	% Exchequer	100%	100%	100%	99%
	% CSF Funds	0%	0%	0%	1%
Marine~ & Forestry	**Total**	**4,527**	**7,790**	**14,647**	**16,844**
	% Exchequer	96%	83%	73%	80%
	% CSF Funds	4%	17%	27%	20%
Environment	**Total**	**5,410**	**8,642**	**13,444**	**14,153**
	% Exchequer	97%	92%	85%	86%
	% CSF Funds	3%	8%	15%	14%
Economic and Social	**Total**	**3,976**	**10,360**	**7,483**	**12,645**
	% Exchequer	100%	100%	100%	100%
	% CSF Funds	0%	0%	0%	0%
Health	**Total**	**3,916**	**7,094**	**9,076**	**10,513**
	% Exchequer	100%	100%	100%	100%
	% CSF Funds	0%	0%	0%	0%
Energy	**Total**	**2,466**	**2,764**	**4,475**	**4,777**
	% Exchequer	58%	80%	70%	68%
	% CSF Funds	42%	20%	30%	32%
Transportation	**Total**	**703**	**1,794**	**1,725**	**1,654**
	% Exchequer	100%	100%	100%	100%
	% CSF Funds	0%	0%	0%	0%
Total	**Total**	**254,181**	**450,602**	**729,078**	**775,925**
	% Exchequer	**89%**	**84%**	**81%**	**78%**
	% CSF Funds	**11%**	**16%**	**19%**	**22%**

* Public funds are Exchequer + CSF funds

** Funds allocated to research in the higher education sector are accounted in Education and Manpower

~ The Marine area includes freshwater as well as seawater activities

Table 18A Public * expenditure on science and technology by objective, current prices

		1990 outturn €'000	1995 outturn €'000	1998 outturn €'000	1999 allocation €'000
Education and Manpower **	**Total**	**186,403**	**332,839**	**647,118**	**632,025**
	% Exchequer	93%	92%	86%	85%
	% CSF Funds	7%	8%	14%	15%
Industry	**Total**	**53,340**	**87,548**	**107,506**	**152,172**
	% Exchequer	60%	39%	38%	35%
	% CSF Funds	40%	61%	62%	65%
Agriculture	**Total**	**28,311**	**51,931**	**63,812**	**68,693**
	% Exchequer	100%	79%	82%	81%
	% CSF Funds	0%	21%	18%	19%
General Public Services	**Total**	**28,027**	**51,014**	**42,736**	**55,404**
	% Exchequer	100%	100%	100%	99%
	% CSF Funds	0%	0%	0%	1%
Marine~ & Forestry	**Total**	**5,748**	**9,891**	**18,598**	**21,387**
	% Exchequer	96%	83%	73%	80%
	% CSF Funds	4%	17%	27%	20%
Environment	**Total**	**6,869**	**10,973**	**17,070**	**17,971**
	% Exchequer	97%	92%	85%	86%
	% CSF Funds	3%	8%	15%	14%
Economic and Social	**Total**	**5,048**	**13,154**	**9,501**	**16,056**
	% Exchequer	100%	100%	100%	100%
	% CSF Funds	0%	0%	0%	0%
Health	**Total**	**4,972**	**9,007**	**11,524**	**13,349**
	% Exchequer	100%	100%	100%	100%
	% CSF Funds	0%	0%	0%	0%
Energy	**Total**	**3,131**	**3,510**	**5,682**	**6,065**
	% Exchequer	58%	80%	70%	68%
	% CSF Funds	42%	20%	30%	32%
Transportation	**Total**	**893**	**2,278**	**2,190**	**2,100**
	% Exchequer	100%	100%	100%	100%
	% CSF Funds	0%	0%	0%	0%
Total	**Total**	**322,743**	**572,146**	**925,738**	**985,221**
	% Exchequer	**89%**	**84%**	**81%**	**78%**
	% CSF Funds	**11%**	**16%**	**19%**	**22%**

* Public funds are Exchequer + CSF funds

** Funds allocated to research in the higher education sector are accounted in Education and Manpower

~ The Marine area includes freshwater as well as seawater activities

7.7 Matrix of Science & Technology funding sources

Figure 6 illustrates the funding sources for all S&T activities comprising the science and technology budget.

This Figure identifies the sectors in receipt of Government funds for research and development. Indirect government funds for research in the third level sector are derived from the HEA's grant-in-aid to academic departments in the universities. In 1999 it is an estimated £21.7m(€27.6m) compared to the direct public (exchequer and CSF funds) funding of research in all third level colleges which amounts to £38.2m(€48.5m). The business sector also provides funds for research in the third level sector and the figures quoted here refer to business funds which match public funds for joint third level-industry research.

CSF funds are allocated to support R&D in the business sector to the value of £48.7m(€61.8m) compared to direct exchequer support of £3.2m(€4.1m). Income from other sources for research is indicated. Receipts from EU contracts and business account for 32% of the direct funds for research in third level colleges.

7.8 Transfer payments between Departments/Agencies

The science and technology infrastructure is very complex with a range of agencies/departments donating and receiving funds from each other to fund various S&T activities. Table 19 outlines the flows of funds for 1999. Some of these flows come about when agencies are requested to carry out specific activities on behalf of another government institution, while others result from contracts won on a competitive basis.

Figure 6 Indicative Distribution of Government Funds for Science and Technology, 1999, £m

Sources of Funds:		Research & Development						S&T Info	Tech. Services	S&T Ed. & Train.	Tech. Transfer	Other S&T	Total
		Business	Third Level [1] £m	PATS[2] £m	Extra-mural £m	Govern-ment £m	Total £m	£m	£m	£m	£m	£m	£m
Exchequer	Direct	3.2	23.6	2.0	7.2	40.0	76.0	25.4	68.1	350.5	1.3	65.0	586.3
	Indirect		21.7				21.7						21.7
CSF funds		48.7	14.6	5.9	0.0	9.2	78.4	7.8	5.7	72.7	2.8	0.6	167.9
EU contracts		0.0	17.0	3.6	0.0	3.6	24.1	10.3	1.3	0.0	0.0	0.1	26.0
Business		0.0	7.0	4.2	0.0	5.6	16.9	0.3	12.1	0.1	0.0	0.3	39.5
Other earned income		0.0	12.0	3.7	0.0	3.4	19.1	10.7	20.2	36.7	0.0	3.4	90.2
Total		52.0	95.9	19.3	7.2	61.8	236.2	54.5	107.5	460.0	4.1	69.4	931.6

(1) Science and Technology departments only

(2) AMT Ireland is classified under S&T information and technical services

Figure 6A Indicative Distribution of Government Funds for Science and Technology, 1999, €m

Sources of Funds:		Research & Development						S&T Info	Tech. Services	S&T Ed. & Train.	Tech. Transfer	Other S&T	Total
		Business	Third Level [1] €m	PATS[2] €m	Extra-mural €m	Govern-ment €m	Total €m	€m	€m	€m	€m	€m	€m
Exchequer	Direct	4.1	30.0	2.5	9.1	50.8	96.5	32.2	86.5	445.0	1.6	82.6	744.4
	Indirect		27.5				27.5						27.5
CSF funds		61.9	18.6	7.5	0.0	11.7	99.6	9.8	7.2	92.3	3.5	0.7	213.2
EU contracts		0.0	21.5	4.6	0.0	4.5	30.6	13.1	1.7	0.0	0.0	0.1	33.0
Business		0.0	8.9	5.3	0.0	7.2	21.4	0.3	15.3	0.1	0.0	0.4	50.2
Other earned income		0.0	15.2	4.7	0.0	4.3	24.2	13.6	25.7	46.6	0.0	4.4	114.5
Total		66.0	121.8	24.5	9.1	78.5	299.9	69.2	136.5	584.0	5.2	88.2	1182.9

(1) Science and Technology departments only

(2) AMT Ireland is classified under S&T information and technical services

Table 19 Planned Transfer payments between S&T organisation for S&T activities, 1999, £'000

From: / To:	Dept Agriculture	C&RFB	COFORD	Dept. Ent, T & E	Dept. Education	Dept. Pub Ent	Enterprise Ireland	Dept. Environ	Dept. Health	HEA	Dept. Marine	Marine Institute	NRA	SFADCo	Dept Soc Wel	DACG	OPW	Grand Total
DACG		131																131
C&RFB												8				142	50	200
D. I. A. S.				23								20						43
Enterprise Ireland	154		102	52,607		4,389					175	43						57,470
EPA								773										773
ESRI				72	52			9	358		14				123			628
GSI												8						8
HEA	6,888		392	6,820	3,942			300				237						18,579
HRB									80									80
IDA				6,000														6,000
Innov Centre														299				299
MAC				100														100
Marine Institute		776						13										789
Met Eireann													165					165
NMRC				2,578			850			970								4,398
NSAI				1,947														1,947
SRAI												106						106
SFADCo				5,720														5,720
Teagasc	2,650		116					0				13						2,779
Údarás na G				900														900
Grand Total	**9,692**	**907**	**610**	**76,767**	**3,994**	**4,389**	**850**	**1,095**	**438**	**970**	**189**	**435**	**165**	**299**	**123**	**142**	**50**	**101,115**

Table 19A Planned Transfer payments between S&T organisation for S&T activities, 1999, €'000

From: To:	Dept Agriculture	C&RFB	COFORD	Dept. Ent, T & E	Dept. Education	Dept. Pub Ent	Enterprise Ireland	Dept. Environ	Dept. Health	HEA	Dept. Marine	Marine Institute	NRA	SFADCo	Dept Soc Wel	DACG	OPW	Grand Total
DACG		166																166
C&RFB												10				180	63	254
D. I. A. S.				29								25						54
Enterprise Ireland	195		129	66,797		5,573					222	55						72,972
EPA								981										981
ESRI				91	66			11	455		18				156			797
GSI												10						10
HEA	8,746		498	8,660	5,005			381				301						23,590
HRB									102									102
IDA				7,618														7,618
Innov Centre														380				380
MAC				127														127
Marine Institute		985						16									1,002	
Met Eireann													209					209
NMRC				3,273			1,079			1,232								5,584
NSAI				2,472														2,472
SRAI												135						134
SFADCo				7,263														7,263
Teagasc	3,365		147					0				16						3,529
Údarás na G				1,143														1,143
Grand Total	**12,306**	**1152**	**774**	**97,474**	**5,071**	**5,573**	**1,079**	**1,390**	**556**	**1,232**	**240**	**552**	**209**	**380**	**156**	**180**	**63**	**128,390**

8. EU SUPPORT FOR SCIENCE AND TECHNOLOGY

The major financial impact of EU programmes on the Irish science and technology landscape has been well documented. The total EU support for the RTD (research and technological development) component of the current Community Support Framework (CSF) amounts to £354m(€449m) between 1994 and 1999, or roughly 8% of the total EU funds allocated. For the Industry Operational Programme alone the EU contribution to R&D is £264m(€335m) or 32% of the total EU funds for the Programme.

STIAC pointed out that government support for S&T prior to the first Community Support Framework (CSF) in 1989 was inadequate and a major cause of low industrial innovation and a poorly functioning national system of innovation. The Government decision to give a high profile to science and technology in the CSF for 1989-1993 enabled a wide range of new initiatives to be introduced; these included the Programmes in Advanced Technology (to link university expertise with industry), the industry research and development initiative (to support R&D projects in enterprises), and a range of mechanisms to improve the technological performance of indigenous industry - Technology Audits, Placements, the Technology Transfer and Partnerships programme. The CSF for 1994-1999 also contains a major science and technology element, enabling these initiatives to continue and also providing some new money for basic research in the colleges and to support a new technology management initiative in industry.

As can be seen in Table 14 (p.28), Exchequer funding of science and technology has remained constant at around 65% of the total annual spend between 1990 and 1999. The CSF contribution has increased in real terms by £134m(€170m) (397%) since 1990, to a £168m(€213m) allocation in 1999, 18% of the total.

8.1 EU Support by Objective

Public support for science and technology, according to the objective of the spending, was outlined in section 7.6. Table 20 illustrates the impact of CSF support by activity by objective. EU support is concentrated in four objectives- Industry, Education & Training, Agriculture and Marine.

Industry (£77.9m)(€ 98.9m)

This sector accounts for 46% of the total CSF contribution to science and technology activities carried out in the state. Further analysis reveals that £59.5m(€ 75.6m) (86%) of this total supports public expenditure on research and development.

Education and Training: (£72.7m)(€92.3m)

This sector has accounted for 60%, on average, of public expenditure on science and technology from 1990 to 1999. The majority of the CSF contribution in this area supports education and training activity (82.5%) with £12.7m(€16.1m) supporting third level research and development.

Agriculture: (£10.1m)(€12.8m)

The influence of CSF funding in the agriculture area has had a significant impact over a six year period. In 1993 there was no CSF involvement, now the exchequer in 1999 accounts for 81% of public expenditure. Teagasc, the national body providing advisory, research, education and training services to the agriculture and food industry, receives 28% of it's public funding from the CSF in 1999.

Marine & Forestry: (£3.4m)(€4.32m)

In 1990 CSF funding accounted for 4% (£0.2m)(€0.3m) of public funding in this area, this figure has increased to 20% (£3.4m)(€4.3m) in 1999. The Marine Institute, which co-ordinates and promotes marine research and development receives £1.3m(€1.7m) from CSF funding.

Table 20 1999 Science and Technology Allocations by activity and by objective

		Research and Development	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total
		£'000	£'000	£'000	£'000	£'000	£'000	£'000
Industry	Exchequer	9,858	-404	8,388	15,668	1,139	7,306	41,955
	CSF	59,456	1,128	2,467	11,892	2,677	270	77,890
	Public*	69,314	724	10,855	27,560	3,816	7,576	119,845
Education and Manpower **	Exchequer	45,766	46	30	333,580		45,614	425,036
	CSF	12,710			60,014			72,724
	Public	58,476	46	30	393,594		45,614	497,760
Agriculture	Exchequer	11,919	13,739	18,357				44,015
	CSF	2,778	5,021	2,286				10,085
	Public	14,697	18,760	20,643				54,100
Marine~ & Forestry	Exchequer	9,000	39	1,968	774	26	1,669	13,476
	CSF	1,743	5	431	798	79	312	3,368
	Public	10,743	44	2,399	1,572	105	1,981	16,844
Environment	Exchequer	3,897	2,647	5,541			146	12,231
	CSF	1,348	84	491				1,922
	Public	5,244	2,731	6,032			146	14,153

Table 20 1999 Science and Technology Allocations by activity and by objective

		Research and Development	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total
		£'000	£'000	£'000	£'000	£'000	£'000	£'000
Energy	Exchequer		3,014	243			6	3,263
	CSF		1,502	12				1,514
	Public		4,516	255			6	4,777
General Public Services	Exchequer	877	1,369	31,360	239	72	9,289	43,205
	CSF	390	18	15	2	1	4	429
	Public	1,266	1,387	31,375	241	72	9,293	43,634
Economic and Social	Exchequer	10,240	507	920	57		921	12,645
	CSF							
	Public	10,240	507	920	57		921	12,645
Health	Exchequer	5,578	4,217	548	83		87	10,513
	CSF							
	Public	5,578	4,217	548	83		87	10,513
Transportation	Exchequer	545	209	791	50	59		1,654
	CSF							
	Public	545	209	791	50	59		1,654
Total	Exchequer	97,678	25,384	68,147	350,451	1,296	65,038	607,993
	CSF	78,425	7,757	5,703	72,706	2,756	586	167,932
	Public	176,103	33,141	73,849	423,157	4,052	65,624	775,925

* Public funds are Exchequer + CSF funds

** Funds allocated to research in the higher education sector are accounted in Education and Manpower

~ The Marine area includes freshwater as well as seawater activities

Table 20A 1999 Science and Technology Allocations by activity and by objective

		Research and Development	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total
		€'000	€'000	€'000	€'000	€'000	€'000	€'000
Industry	Exchequer	12,517	-513	10,651	19,894	1,446	9,277	53,272
	CSF	75,493	1,432	3,132	15,100	3,399	343	98,900
	Public*	88,011	919	13,783	34,994	4,845	9,619	152,172
Education and Manpower **	Exchequer	58,111	58	38	423,559		57,918	539,684
	CSF	16,138			76,202			92,340
	Public	74,249	58	38	499,761		57,918	632,025
Agriculture	Exchequer	15,134	17,445	23,309				55,887
	CSF	3,527	6,375	2,903				12,805
	Public	18,661	23,820	26,211				68,693
Marine~ & Forestry	Exchequer	11,428	49	2,499	983	33	2,119	17,111
	CSF	2,213	6	547	1,013	100	396	4,276
	Public	13,641	56	3,046	1,996	133	2,515	21,387
Environment	Exchequer	4,948	3,361	7,036			185	15,530
	CSF	1,712	107	623				2,440
	Public	6,658	3,468	7,659			185	17,971
Energy	Exchequer		3,827	309			8	4,143
	CSF		1,907	15				1,922
	Public		5,734	324			8	6,065
General Public Services	Exchequer	1,113	1,738	39,819	303	91	11,795	54,859
	CSF	495	23	19	3	1	5	545
	Public	1,607	1,761	39,838	306	91	11,800	55,404
Economic and Social	Exchequer	13,002	644	1,168	72		1,169	16,056
	CSF							
	Public	13,002	644	1,168	72		1,169	16,056

Table 20A 1999 Science and Technology Allocations by activity and by objective

		Research and Development	Information and Specialist Advisory Services	Scientific and Technical Services	Education and Training	Technology Transfer	Other Activities	Total
		€'000	€'000	€'000	€'000	€'000	€'000	€'000
Health	Exchequer	7,083	5,354	696	105		110	13,349
	CSF							
	Public	7,083	5,354	696	105		110	13,349
Transportation	Exchequer	692	265	1,004	64	75		2,100
	CSF							
	Public	692	265	1,004	64	75		2,100
Total	Exchequer	124,025	32,231	86,529	444,981	1646	82,581	771992
	CSF	99,579	9,849	7,241	92,318	3499	744	213230
	Public	223,605	42,080	93,769	537,299	5,145	83,325	985,221

* Public funds are Exchequer + CSF funds

** Funds allocated to research in the higher education sector are accounted in Education and Manpower

~ The Marine area includes freshwater as well as seawater activities

Introduction

The EU Community Support Framework (CSF) consists of a series of Operational Programmes many of which have Measures in support of S&T initiatives. These Operational Programmes are listed below with their appropriate source of funds.

The Community Support Framework comprises a number of individual funds, all of which support S&T activity to a greater or lesser extent. These funds are the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the European Agriculture, Guidance and Guarantee Fund (EAGGF). This appendix describes in detail the S&T programmes receiving CSF support.

Table 1. Operational Programmes and their Funding sources

Operational Programme	Funding source
Industrial Development	ERDF, EAGGF, ESF
Agriculture, Rural Development and Forestry	EAGGF, ERDF, ESF
Fisheries	ERDF
Environmental services	ERDF
Economic infrastructure	ERDF
Human Resources Development	ESF, ERDF

Table 2 presents a list of Operational Programmes, Sub-Programmes and Measures which have an S&T component and which are included in the science budget.

Table 2. List of RTD-Related Activities in the Community Support Framework 1994-1999 covered In the Science Budget

Operational Programme for Industrial Development	
Sub-Programme 3: Research and Development	
Measure 1:	Industry R&D Initiative
Measure 2:	Industry/Third Level Co-operation Services
Sub-measure 1:	*Capability Support*
Sub-measure 2:	*Technology Services*
Sub-measure 3:	*Technology Service Centres*
Sub-measure 4:	*PATs*
Measure 3:	Human Resource Development
Sub-measure 1:	*Graduate Training*
Sub-measure 2:	*Enterprise Development*
Sub-measure 3:	*RTD Management Development*
Measure 4:	Research Support
Sub-Programme 6: Development of the Food Industry	
Measure 3:	Research and Development
Sub-measure 1:	*In-Company Research and Development*
Sub-measure 2:	*Institutional Research and Development*
Operational Programme for Agriculture, Rural Development and Forestry	
Sub-Programme 1: Structural Improvement and Rural Development	
Measure 5:	Research
Sub-measure (a):	*Research in Sustainable Agriculture and Rural Development*
Sub-measure (b):	*Research Stimulus Fund*
Sub-Programme 2: Forestry	
Measure 2:	Forestry Development
Sub-measure (b):	Research and Development

Operational Programme for Fisheries

Measure	Research
Sub-Measure 1:	*Research Vessel Capability*
Sub-Measure 2:	*National Marine Research Laboratories*
Sub-Measure 3:	*Fisheries/Aquaculture R&D*
Sub-Measure 4:	*Marine Food Processing*
Sub-Measure 5:	*National Marine Survey*
Sub-Measure 6:	*Marine Technology Development*
Sub-Measure 7:	*Evaluation of STRIDE OP*

Operational Programme for Environmental Services

Sub-Programme 4: Environmental Monitoring, Research and Development

Measure 1:	Environmentally Sustainable Resource Management
Measure 2:	Cleaner Production

Operational Programme for Economic Infrastructure

Sub-Programme 1: Energy

Measure 2:	Energy Efficiency/Conservation

Operational Programme for Human Resources Development

Sub-Programme 1: Initial Education and Training

Advanced Technical Skills Programme

Sub-Programme 5: Measure to Improve the Quality of Training Provision

Measure 5:	Vocational Training Infrastructure
Sub-measure 1:	*Third Level Capital*
-	*Dublin Institute of Technology, Regional Technical Colleges and Vocational Education Committee Colleges Sector*
-	*University Sector*

At the start of the CSF 1994-1999 yearly targets of funding were set. These are presented in Table 3, as an indication of the level of support given by the individual Operational Programmes. Timing differences which have occurred in some areas limit the direct comparability of these data with those presented in the science budget analysis.

Table 3: Research and Technology Development Expenditure, CSF 1994-1999 Breakdown by Measure and Year							
IR£m	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**Total**
Research and Development Sub-Programme							
(Sub-Programme 3, OP for Industrial Development							
Measure 1: Industry R&D Initiative							
Total	*26.914*	*30.295*	*30.060*	*29.735*	*29.735*	*29.665*	*176.404*
Measure 2: Industry/Third Level Co-operation Services							
Total	*30.867*	*31.962*	*31.962*	*31.262*	*32.552*	*32.942*	*191.657*
Measure 3: Human Resource Development							
Total	*1.295*	*2.826*	*2.826*	*2.826*	*2.826*	*2.826*	*15.425*
Measure 4: Research Support							
Total	*2.750*	*3.090*	*3.140*	*3.640*	*4.474*	*5.020*	*22.114*
Total Measures 1-4							
Total	61.826	68.173	67.988	67.463	69.697	70.453	405.601
Food Research and Development							
(Measure 3, Sub-Programme 6, OP for Industrial Development)							
Total	12.883	12.363	12.226	13.078	14.027	14.194	78.771
Agriculture and Rural Development Research							
(Measure 5, Sub-Programme 1, OP for Agriculture, Rural Development and Forestry)							
Total	6.801	6.239	6.239	6.239	6.238	6.238	37.992
Forestry Research and Development							
(Sub-measure (b), Measure 2, Sub-Programme 2, OP for Agriculture, Rural Devel. and Forestry)							
Total	1.000	1.000	1.000	1.000	1.000	1.000	6.000
Marine Research							
(Measure 8, OP for Fisheries)							
Total	1.358	1.722	1.198	1.198	1.268	1.578	8.322
Environmental Monitoring, Research and Development							
(Sub-Programme 4, OP for Environmental Services)							
Measure 1: Environmentally Sustainable Resource Management							
Total	*0.938*	*0.510*	*0.420*	*0.420*	*0.420*	*0.385*	*3.092*
Measure 2: Cleaner Production							
Total	*0*	*0.321*	*0.411*	*0.411*	*0.411*	*0.447*	*2.001*
Total Measures 1-2							
Total	0.938	0.831	0.831	0.831	0.831	0.832	5.093
Energy Efficiency/Conservation							
(Sub-Programme 1, Measure 2, OP for Economic Infrastructure)							
Total	2.345	4.286	6.873	6.873	6.955	6.793	34.124
Advanced Technical Skills Expenditure							
(in Sub-Programme 1, OP for Human Resourced Development)							
Total	10.087	7.871	7.871	7.871	7.871	7.871	49.439
TOTAL PLANNED EXPENDITURE	**97.239**	**102.486**	**104.225**	**104.552**	**107.887**	**108.958**	**625.342**

Figures may not sum due to rounding.

Table 3A: Research and Technology Development Expenditure, CSF 1994-1999
Breakdown by Measure and Year

IR€m	1994	1995	1996	1997	1998	1999	Total
Research and Development Sub-Programme							
(Sub-Programme 3, OP for Industrial Development)							
Measure 1: Industry R&D Initiative							
Total	*34.174*	*38.467*	*38.168*	*37.756*	*37.756*	*37.667*	*223.987*
Measure 2: Industry/Third Level Co-operation Services							
Total	*39.193*	*40.583*	*40.583*	*39.695*	*41.333*	*41.828*	*243.354*
Measure 3: Human Resource Development							
Total	*1.644*	*3.588*	*3.588*	*3.588*	*3.588*	*3.588*	*19.586*
Measure 4: Research Support							
Total	*3.492*	*3.923*	*3.987*	*4.622*	*5.681*	*6.374*	*28.079*
Total Measures 1-4							
Total	78.503	86.562	86.327	85.660	88.497	89.457	515.007
Food Research and Development							
(Measure 3, Sub-Programme 6, OP for Industrial Development)							
Total	16.358	15.698	15.524	16.606	17.811	18.023	100.019
Agriculture and Rural Development Research							
(Measure 5, Sub-Programme 1, OP for Agriculture, Rural Development and Forestry)							
Total	8.635	7.922	7.922	7.922	7.921	7.921	48.240
Forestry Research and Development							
(Sub-measure (b), Measure 2, Sub-Programme 2, OP for Agriculture, Rural Devel. and Forestry)							
Total	1.270	1.270	1.270	1.270	1.270	1.270	7.618
Marine Research							
(Measure 8, OP for Fisheries)							
Total	1.724	2.186	1.521	1.521	1.610	2.004	10.567
Environmental Monitoring, Research and Development							
(Sub-Programme 4, OP for Environmental Services)							
Measure 1: Environmentally Sustainable Resource Management							
Total	*1.191*	*0.648*	*0.533*	*0.533*	*0.533*	*0.489*	*3.926*
Measure 2: Cleaner Production							
Total	*0.000*	*0.408*	*0.522*	*0.522*	*0.522*	*0.568*	*2.541*
Total Measures 1-2							
Total	1.191	1.055	1.055	1.055	1.055	1.056	6.467
Energy Efficiency/Conservation							
(Sub-Programme 1, Measure 2, OP for Economic Infrastructure)							
Total	2.978	5.442	8.727	8.727	8.831	8.625	43.329
Advanced Technical Skills Expenditure							
(in Sub-Programme 1, OP for Human Resourced Development)							
Total	12.808	9.994	9.994	9.994	9.994	9.994	62.775
TOTAL PLANNED EXPENDITURE	**123.468**	**130.130**	**132.338**	**132.754**	**136.988**	**138.348**	**794.021**

Figures may not sum due to rounding.

Methodological Note

The information given in this document relates to 43 institutions in receipt of monies from the exchequer for the performance or support of scientific, technological and related activities in every field and is based on the information supplied by these institutions.

In order to ensure consistency of analysis the database has been adjusted back to 1990 to take account of changes that agencies/departments have recorded.

The recently formed Irish Council for Science, Technology and Innovation has identified as one of its priorities an examination of public funding of science and technology. It is anticipated that further methodological changes may result from this work. The areas of change may include a greater emphasis on funders of S&T in the analysis and a move towards using GDP as a deflator rather than CPI as is currently used.

In general, institutions and information relating to them are listed separately. In a few cases an institution is listed with its parent department or organisation but identified separately.

Where practicable the programmes of the various institutions have been separated and categorised in accordance with international practice into relevant scientific and technological activities i.e.:

- research and development (R&D)
- information and specialist advisory services
- scientific and technical services
- training (including courses) and
- technology transfer.

However, in many instances, especially in institutions with few staff, institutions operate several programmes jointly, sharing resources in an administratively appropriate unit. In these circumstances the programmes, as described here, do not represent truly independent programmes. Consequently, the data should be interpreted with caution if expansions or contractions are being considered.

Expenditure data for specific programmes refer to the 1998 outturn costs of programmes and to the expected costs in 1999. The outturn costs are mainly funded by matching grant-in-aid or voted monies. Where programmes are funded in other ways these monies are noted separately. In these instances the expenditure (cost) data shown includes both exchequer and other income contributions.

Expenditures are based on unaudited figures, except in a few cases where they are identical with a Vote by the Oireachtas. For convenience, general overheads, where shown, are distributed in proportion to programmes' expenditures. Programmes are attributed to the institution most directly involved, that is to those actually operating them, but not necessarily funding them. An example of the latter is the Department of Enterprise, Trade and Employment, which funds, but does not operate or manage many programmes. Only their own administrative costs are attributed to the funding institutions in such cases.

Numbers of staff involved on individual S&T programmes are shown only where a reasonable subdivision is possible. Where institutions are involved in funding a large number of external R&D (or similar) personnel, data on these external personnel are not given.

In some cases it is possible to give an indication of output, e.g. numbers of grants awarded, samples analysed etc. per annum. The information given relates to 1998 unless otherwise stated.

Apportionment problems arise in the third level sector (mainly the monies distributed by the Higher Education Authority and the Department of Education to institutes of technology). In the case of the HEA, total funds are first apportioned between S&T faculties and non-S&T faculties in the colleges. (Expenditure on non-S&T faculties is not included in this document).

The extent and cost of the R&D work undertaken in colleges, and funded out of the HEA's general block grant, is determined indirectly from surveys of academic staff in colleges. These surveys are carried out by Forfás on a multi-annual basis and the corresponding cost data are, of necessity, based on historical estimates. The HEA funding of academic departments was isolated from administration and support services within colleges. Co-efficients of research time derived from Forfás surveys are now applied to funding of academic departments only, not including the administration and support services as had been included in the past. In the case of RTCs, costs are apportioned between S&T departments and second level activities; the latter are not included.

Definitions of S&T Activities

i) **Research:** Original, experimental or theoretical investigations under-taken to acquire new knowledge, with or without a particular application or use in view.

ii) **Development:** Systematic work drawing on existing knowledge gained from research and/or practical experience, that is directed to producing new products, processes, systems, services, varieties and breeds and to improving substantially already existing ones. Data collection conducted solely or primarily as part of the research and development (R&D) process included under "research" or "development" as appropriate.

iii) **Information and Specialist Advisory Services:** Provision of information via **formalised scientific and technical information and documentation (STID) services** includes all expenditure (manpower and materials) involved in acquiring, controlling or transmitting information to users with the involvement of staff whose primary function is in formalised STID services, e.g. provision of S&T information, advice, liaison.

Specialist advice, information analysis, libraries, publications and documentation services, translations, technical seminars and conferences. Provision of information **via non-formalised STID services** includes expenditures on providing know how and expertise by members of staff who, while not specifically engaged in formalised STID services, provide specialist advice, liaison, consultancy or other general information services.

iv) **Technical Services:** Specialised support services of a scientific or technical nature generally provided by centralised laboratories or facilities, and can be of a routine or non-routine nature. Essentially they comprise the technical back-up analytical, diagnostic and data collection/processing services.

v) **Training:** Education and training of third level or equivalent students in science and technology disciplines.

vi) **Technology Transfer:** Activities which are directed solely or primarily towards the transfer and adoption of new technology, generally in enterprises. The horizontal transfer of technology, primarily from abroad, but also from colleges to enterprises is included here.

vii) **Other S&T Activities:** Activities which cannot be conveniently grouped under the above headings can be included here e.g. grants to international organisations, policy planning units etc.

viii) **Extramural Expenditure:** Monies spent on S&T activities carried out on behalf of the reporting institution by a third party.

Other Definitions

ix) **Third Level Education:** All Universities and Institutes of Technology.

x) **Public Funds:** Exchequer monies and funds from the Community Support Framework.

BIM	Bord Iascaigh Mhara - The Irish Sea Fisheries Board
C&RFB	Central and Regional Fisheries Boards
COFORD	National Council for Forest Research and Development
CSF	Community Support Framework
CSO	Central Statistics Office
DACG	Department of Arts, Heritage, Gaeltacht and the Islands
DAgri	Department of Agriculture and Food
DEduc	Department of Education and Science
Dept Ent, T & E	Department of Enterprise, Trade and Employment
Dept Environ	Department of the Environment and Local Government
Dept Pub Ent	Department of Public Enterprise
DIAS	Dublin Institute for Advanced Studies
DMar	Department of the Marine and Natural Resources
Dept Soc Wel	Department of Social, Community and Family Affairs
EAGGF	European Agriculture Guidance and Guarantee Fund
EOLAS	Eolas - The Irish Science and Technology Agency
EPA	Environmental Protection Agency
ERDF	European Regional Development Fund
ESF	European Social Fund
ESRI	Economic and Social Research Institute
EU	European Union
FÁS	FÁS - the National Training and Employment Authority
Forfás	Forfás - the Policy and Advisory board for Industrial Development
GSI	Geological Survey of Ireland
HEA	Higher Education Authority
HRB	Health Research Board
IDA	Industrial Development Agency Ireland
Innov Centre	Innovation Centre
MAC	National Microelectronics Applications Centre
NAB	National Accreditation Board
NESC	National Economic and Social Council
NMRC	National Microelectronics Research Centre
NRA	National Roads Authority
NSAI	National Standards Authority of Ireland
OPW	Office of Public Works
OST	Office of Science and Technology - Department of Enterprise, Trade and Employment
RPII	Radiological Protection Institute of Ireland
SFADCo	Shannon Development
SRAI	Salmon Research Agency of Ireland
UN	United Nations
Udaras na G	Údarás na Gaeltachta

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