Hulpbronne vir N&O

in die Republiek van Suid-Afrika

1991/92

RESULTATE VAN OPNAMEPROGRAM NO 17

Resources for R&D

in the Republic of South Africa

1991/92

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Voorwoord

Die resultate van die nasionale opname van die hulpbronne (fondse en mannekrag) wat gedurende die 1991/92 finansiële jaar en die 1991 akademiese jaar aan navorsing en ontwikkeling in Suid Afrika gewy is, word hiermee beskikbaar gestel.

Inligting is gesamentlik deur die Stigting vir Navorsingsontwikkeling (SNO) en die Sentrum vir Wetenskapontwikkeling (SWO), namens die Departement van Nasionale Opvoeding, ingewin.

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Die resultate is gebaseer op antwoorde van die meederheid van staats-, universiteits- en technikondepartemente, museums, navorsingsinstitute, die sakesektor, ens. Almal wat hulp of inligting verskaf het word hartlik bedank.

Preface

The results of the national survey of the resources (funds and manpower) devoted to research and development in South Africa during the 1991/92 financial year and the 1991 academic year are published in this report.

Information was gathered jointly by the Foundation for Research Development (FRD) and the Centre for Science Development (CSD) on behalf of the Department of National Education.

Business sector, non-profit sector and science councils (excluding the HSRC) and final preparation

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The survey results are based on responses from numerous goverment, university and technikon departments, museums, research institutes, the business sector etc. Sincere thanks to everyone who helped or contributed information.

CONTENTS

		PAGE
GUIDE TO THE TABLES		9
SUMMARY		9
COMMENT		11
DEFINITIONS		15
SECTION 1. SUMMARIES OF MAIN TABLES		
1.1	Expenditure and manpower devoted to R&D	29
1.2.1	International comparison of expenditure and manpower devoted to R&D in major industrial countries	30
1.2.2	International comparison of expenditure devoted to R&D in developing and comparable economies, as a percentage of GDP	31
1.3	Expenditure by research organisations on all scientific and technological activities, according to the scientific field	32
1.3.1	Expenditure by research organisations on all scientific and technological activities, according to sector distribution (%) of performers	33
1.4	Expenditure on R&D according to performers and sources of funds	34
1.4.1	Expenditure on R&D according to performers and sources of funds, sector distribution (%)	35
1.5	Expenditure on R&D according to main research fields (with analysis by type of research)	36
1.6	Expenditure on R&D according to main field of application	37
1.7	Expenditure on R&D according to scientific field and type of R&D	38
1.7.1	Expenditure on R&D according to performers and type of R&D, sector distribution (%)	39
1.8	Expenditure on R&D according to scientific field and type of expenditure	40
1.9	Man years devoted to R&D and ratio of technicians to researchers according to scientific field	41
1.10	Labour cost, man years and number of persons involved in R&D according to geographical region	42
SECTION 2. MAIN TABLES		
2.1	Expenditure by research organisations on all scientific and technological activities, according to activity, type of expenditure and performers	45
2.2	Expenditure on R&D according to performers and sources of funds: Government sector	48
2.3	Expenditure on R&D according to performers and sources of funds: Tertiary education sector	54
2.4	Expenditure on R&D according to performers and sources of funds: Business enterprise sector	57
2.5	Expenditure on R&D according to performers and sources of funds: Non-profit sector	59
2.6	Expenditure on R&D according to performers and type of expenditure	60
2.7	Expenditure on R&D according to performers and type of R&D	63
2.8	Expenditure on R&D according to fields of application and performers	66
2.9	Expenditure on R&D according to research fields and performers: All sectors	70
2.10	Expenditure on R&D according to research fields and performers: Government sector	75
2.11	Expenditure on R&D according to research fields and performers: Tertiary education sector	80
2.12	Expenditure on R&D according to research fields and performers: Business enterprise sector	85
2.13	Expenditure on R&D according to research fields and performers: Non-profit sector	90
2.14	Expenditure on R&D according to multi-disciplinary fields and performers	95
2.15	Expenditure by research organisations on scientific and technological activities (excluding R&D), according to activities and performers: natural and human sciences	96

2.16	Manpower devoted to R&D according to type of staff and employers	99
2.17	Academic qualifications of researchers according to employers and qualificaton groups	102
2.18	Labour cost of R&D according to research fields and performers	105
2.19	Man years devoted to R&D according to research fields and performers	110
2.20	Number of persons involved in R&D according to research fields and performers	115

SECTION 3. GRAPHIC TEN YEAR OVERVIEW 1983/84 - 1991/92

3.1	Expenditure on R&D per sector	123
3.2	Expenditure on R&D, per sector in constant (1991) Rands	123
3.3	Expenditure on R&D, as percentage of gross domestic product	123
3.4	Expenditure on R&D, type of R&D in constant (1991) Rands	123
3.5	Expenditure on R&D, type of R&D in constant (1991) Rands: Basic research, by sector	123
3.6	Expenditure on R&D, type of expenditure in constant (1991) Rands: All sectors	124
3.7	Expenditure on R&D, type of expenditure, percentages: Government sector	124
3.8	Expenditure on R&D, type of expenditure, percentages: Tertiary education sector	124
3.9	Expenditure on R&D, type of expenditure, percentages: Business enterprise sector	124
3.10	Expenditure on R&D, type of expenditure, percentages: Non-profit sector	124
3.11	Sources of external funds for R&D, percentages: Government sector	125
3.12	Sources of external funds for R&D, percentages: Tertiary education sector	125
3.13	Sources of external funds for R&D, percentages: Business enterprise sector	125
3.14	Sources of external funds for R&D, percentages: Non-profit sector	125
3.15	Man years expended on R&D, type of staff: All sectors	126
3.16	Man years expended on R&D, type of staff: Government sector	126
3.17	Man years expended on R&D, type of staff: Tertiary education sector	126
3.18	Man years expended on R&D, type of staff: Business enterprise sector	126
3.19	Man years expended on R&D, type of staff: Non-profit sector	126
3.20	Main research field, contribution by sector in constant (1991) Rands: Engineering	127
3.21	Main research field, contribution by sector in constant (1991) Rands: Chemistry	127
3.22	Main research field, contribution by sector in constant (1991) Rands: Physics	127
3.23	Main research field, contribution by sector in constant (1991) Rands: Astronomy, surveying	127
3.24	Main research field, contribution by sector in constant (1991) Rands: Agriculture, biology, forestry	127
3.25	Main research field, contribution by sector in constant (1991) Rands: Economic sciences	127
3.26	Main field of application, contribution by sector in constant (1991) Rands: Energy and energy sources	134
3.27	Main field of application, contribution by sector in constant (1991) Rands: Water resources	128
3.28	Main field of application, contribution by sector in constant (1991) Rands: Protection of the environment	128
3.29	Main field of application, contribution by sector in constant (1991) Rands: Medical services	128

Guide to the Tables

Item	Table where item occurs
Performers, by sector (government, tertiary education, business, non-profit)	1.3.1, 1.4, 1.4.1, 1.7.1, 1.9, 2.1, 2.6, 2.7, 2.8, 2.9, 2.14, 2.15, 2.16, 2.17, 2.18, 2.19, 2.20
Performers, sector detail	
Government (with sub-sectors)	2.6, 2.7, 2.10, 2.17
Government, individual organisations	2.2
Tertiary education, 4 provinces	2.11
Tertiary education, list of universities	2.3
Business enterprise (with sub-sectors)	2.4, 2.6, 2.7, 2.12, 2.17
Non-profit (with sub-sectors)	2.5, 2.13
Type of expenditure, (labour cost, overheads, other running expenses, equipment)	1.8, 2.6
Type of expenditure, (all running expenses, equipment)	2.1
Sources of funds, (four main sectors)	1.4, 1.4.1, 2.2, 2.3, 2.4, 2.5
Type of R&D, (basic, applied, development)	1.5, 1.7, 1.7.1, 2.7
Research fields, main	1.5
Research fields, in detail	2.9, 2.10, 2.11, 2.12, 2.13, 2.18, 2.19, 2.20
Fields of application, main	1.6
Fields of application, in detail	2.8
Multi-disciplinary fields	2.14
Type of staff, (researchers, technicians, support-staff)	2.16
Man years	1.1, 1.2.1, 1.9, 1.10, 2.16, 2.19
Number of persons	1.10, 2.16, 2.17, 2.20
Labour cost	1.10, 2.16, 2.18
Qualifications of researchers	2.17
Scientific and technological activities, (R&D, other, total)	1.3, 1.3.1, 2.1
Scientific and technological activities, (excluding R&D, detail)	2.15
Geographical distribution	1.10, 2.11
International comparison	1.2.1, 1.2.2

Summary

The total expenditure on research and development (R&D) in South Africa amounted to R2 786 million during the 1991/92 financial year, in real terms approximately 20% more than in 1989/90. This represents 1,04% of the gross domestic product at factor cost. This rise can be partly explained by the more complete coverage of the private sector.

During the same year a total of 37 755 people devoted 22 223 man years to R&D. This means that the persons involved in R&D devoted an average of 59% of their time to R&D.

The research field engineering received 33,7% of total R&D funds. The second largest share was allocated to R&D in agriculture, biology and forestry (14,1%), followed by chemistry (7,9%) the philosophical, social and human sciences (7,7%), and technology (7,6%).

The most important field of application was manufacturing, construction, trade and business activities (32,1%), followed by general advancement of knowledge (15,5%), agriculture and related activities (12,3%), and mining and quarrying (10,9%).

COMMENT

INTERNATIONAL COMPARISONS

Leading industrialised countries devote a significantly larger part of their resources (manpower and funds) to R&D than South Africa (Table 1.2.1). However, when compared to other developing countries, South Africa is about average (Table 1.2.2).

The contribution of South Africa's business sector to R&D financing is comparable to the industrialised countries, with the exception of Germany and Japan where the business sectors spend the highest proportion of funds. However, the governments of these two countries do comparatively little research into military and defence affairs which would affect the relative proportions spent by the four sectors.

Table 1.2.1 further indicates that the government sector in South Africa undertakes a relatively higher proportion of R&D in the fields of industrial development, agriculture and social development than is the case with the industrialised countries.

R&D IN SOUTH AFRICA

The resources allocated to R&D in 1991/92 in South Africa are summarised in Section 1 of this report. A ten year overview is provided in Section 3 in graphical form. The figures in Section 3 show:

- the total expenditure on R&D;
- the amounts (in real terms) allocated to R&D by the four economic sectors;
- R&D expenditure as a percentage of GDP;
- the type of R&D done (basic research, applied research or experimental development);
- the type of expenditure;
- sources of funds, and
- the total number of man years devoted to R&D.

There are a number of areas in the survey results that deserve comment:

Total Expenditure
Figure 3.1 shows that total expenditure on R&D increased by 57% between 1989/90 and 1991/92 in comparison with an increase of 34% between 1987/88 and 1989/90. This increase is mostly accounted for by the larger number of companies surveyed in the business sector, where R&D expenditure increased by 98% between 1989/90 and 1991/92. This increase also accounts for the surge in R&D expenditure, expressed as a percentage of GDP (Fig. 3.3). In the preceding surveys this index showed a downward trend reaching a low of 0.86 in 1989/90. In the present survey it has exceeded the 1% level for the first time.

Type of R&D
Most R&D conducted in South Africa is applied research (42,9%), followed by experimental development (37,4%) (Table 1.7.1 and Fig. 3.4). Basic research (19,6%) is largely accounted for in the tertiary education sector (12,9%). Most applied research takes place in the business and government sectors (18,5% and 13,8% respectively), while the bulk of experimental development is undertaken by the business sector (25,6%).

Type of Expenditure
Labour cost remains the largest single item of expenditure in all four sectors (Figs 3.6-3.10). Expenditure on equipment is relatively low in all the sectors, but highest in the business sector (13,2%).

Source of Funds
Figure 3.12 shows the percentage funding to the tertiary education sector from the government and business sectors has decreased slightly. However, R&D in the government sector is attracting increased funding from the business sector (Fig. 3.11). Figure 3.13 indicates a large increase in funding to the business sector from the government sector. This may be due to the close links between government and previously government-run industries which now fall in the business sector.

Man Years and Labour Cost
Figure 3.15 shows that the total number of man years devoted to R&D in 1991/92 has increased by 22% since 1989/90, whilst the labour cost (in real terms) increased by 28,8% (Fig. 3.6).

Figure 3.17 shows that researchers (in terms of man years) comprise the largest component of the R&D staff in the tertiary education sector, while the government and business sectors tend to have a more even ratio of researchers, technicians and other support staff (Figs 3.16 and 3.18).

Research fields
Engineering, accounting for 33,7% of the total R&D expenditure (Table 1.5 and Fig 3.20), remains by far the most important field of research in the country, particularly in the business sector. Relatively little engineering R&D takes place in the tertiary education sector, and there has been a slight decrease of R&D in this field in the government sector.

The second largest research field is agriculture, which has steadily increased over the past decade to reach 14,1% of the total R&D expenditure in 1991/92.

Fields of Application
The most important field of application was manufacturing, construction, trade and business activities (32,1%). This is a result of most research carried out in the field of engineering having direct application to the manufacturing industry. The same applies to the application of research to agriculture and related activities, which receives a high proportion of funds in the research fields as well as the fields of application (14,1% and 12,3% respectively).

Expenditure on R&D benefiting the energy field shows a steady decline since 1983/84 with a slight increase in the present survey (Fig. 3.26). However, R&D benefiting the protection of the environment (Fig. 3.28) has been receiving increasing attention, especially from the business and non-profit sectors.

DEFINITIONS

A. BACKGROUND

The increasing allocation of funds and resources to research and development (R&D) by industrialised countries in the 1950's created a need for a standard method of measurement to make international comparisons possible.

The first steps were taken at a conference in Frascati, Italy, in June 1963 when the members of the Organisation of Economic Cooperation and Development (OECD), representing virtually all the Western European nations plus the United States and Canada, adopted the "Proposed standard practice for surveys of research and development" (commonly known as the Frascati Manual).

South Africa began its own survey of research and development in 1964, observing the guidelines of the Frascati Manual. The survey is carried out and published every two years for the Chief Directorate: Science Planning of the Department of National Education.

The definitions and explanations which follow are derived largely from the Frascati Manual[1].

B. DEFINITIONS AND EXPLANATIONS OF RESEARCH AND DEVELOPMENT (R&D)

"Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications." (Frascati p.25).

R&D thus aims at increasing scientific and technological knowledge and/or devising new applications. It contains a large element of creative novelty or innovation and invariably uses scientific methods.

Routine activities needed for the support of R&D therefore are included with the R&D.

B.1 Types of Research and Development

B.1.1 Basic Research

"Basic research is creative investigation (experimental, descriptive or theoretical) carried out with the primary objective of obtaining new knowledge of the underlying bases of phenomena and observable facts" (Frascati p.54).

B.1.2 Applied Research

"Applied research is also original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective." (Frascati p.54).

The aim of applied research may be to determine practical uses of results of basic research, and may include the development of new methods of achieving specific and predetermined aims. Applied research has a specific and practical objective in view.

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[1] The measurement of scientific and technical activities: proposed practice for surveys of research and experimental development, 4th edition. Paris, OECD, 1981. 186p.

B.1.3 Experimental Development

"Experimental development is systematic work, drawing on existing knowledge gained from research and practical experience, that is directed to producing new materials, products and devices, to installing new processes, systems and services, and to improving substantially those already produced or installed." (Frascati p.55).

Research increases scientific and technological knowledge, while experimental development brings about new applications or substantially adapts and improves existing technology.

B.1.3.1 Distinction between experimental development and implementation

The practical rule is that development ends when it is decided to begin implementation or routine application. The approach of the National Science Foundation in Washington is followed:

> "If the primary objective of the work is to make (substantial) technical improvements on a product, service, process, system, method, procedure or approach, then the work falls within the definition of R&D. If, on the other hand, the product, etc., is substantially set and the primary objective is to develop markets, to render services, to do pre-production planning or to get a production control system working smoothly, then the work is no longer R&D" (Frascati p.34).

Applying this criterion, the following borderline cases may be identified:

B.1.3.1.1 *Prototypes*

A prototype is a basic model, processing all the essential characteristics of the intended new service, process, system, material, product or device and which is usually modified and improved after testing. The design, construction and testing of prototypes are considered R&D, but work done after final testing is not.

B.1.3.1.2 *Pilot plants*

The construction and operation of a pilot plant is a part of R&D as long as the immediate aim is not routine application, but rather the evaluation of hypotheses; the development of new product, service or system specifications; the design of special equipment and structures required by a new process; and/or preparing guidelines for routine operation. As soon as a final decision is reached about the product, etc., the cost of the pilot plant no longer falls under R&D.

B.1.3.1.3 *Trial runs and trouble-shooting*

After a prototype has been satisfactorily tested, the costs of the first trial runs should not be attributed to R&D, since the primary objective is no longer to make further improvements, but to ensure smooth progress. The first units of a trial run for a mass production series should not be considered as R&D prototypes, even if they are loosely described as such.

After a new product, service, process or system has been turned over for implementation and production, there may still be technical problems, some of which may demand further R&D. Such "feed-back" R&D should be included under R&D.

Trouble-shooting is not be regarded as R&D, though it may indicate a need for further R&D.

B.1.4 Examples of basic and applied research and experimental development in natural and human sciences

Basic research	Applied research	Experimental development
• Determination of the amino-acid sequence of an antibody molecule	Determination of the amino-acid sequence of an antibody molecule in order to distinguish between antibodies of various diseases.	Devising a method for synthesising the antibody for a particular disease, based on the knowledge of its structure, and clinically testing the effectiveness of the synthesised anti-body on patients who have agreed to accept experimental advanced treatment.
• Study of the influence of psychological factors on diseases.	Study of psychological factors (stress, etc.) causing stomach ulcers with a view to obtaining information required for the development of adequate treatment methods.	Development of a new method of treatment for stomach ulcers caused by psychological factors.
• Study of the absorption of electromagnetic radiation by a crystal.	Study of the absorption of electromagnetic radiation by a crystal under varying conditions (e.g. temperature, impurities, concentration, etc.), in order to obtain some given properties of radiation detection (sensitivity, rapidity etc.).	Preparation of a device using such crystals in order to obtain better detectors of radiation than those already existing (in the special range concerned).
• Study the factors determining the regional variations in economic growth.	Study of the factors determining regional variations in economic growth in order to prepare appropriate policy.	The development of operational models based upon laws revealed through research for the modification of regional disparities.

C. MANPOWER INVOLVED IN R&D

This survey includes all persons involved in research and development, regardless of the level of responsibility, whether managers, administrators of R&D or clerical staff providing direct support.

C.1 Occupational Categories

For this survey three occupational categories are used namely, researchers, technicians or similar personnel and other supporting staff.

C.1.1 *Researchers*

A researcher is regarded as a person who:

- can work fully or fairly independently, and
- can accept responsibility and/or
- can supervise the R&D involved, especially the posing of hypotheses and the interpretation and reporting of results.

Examples: Promotors, supervisors, researchers, assistant researchers, professional officers, economists, research students, etc.

C.1.2 *Technicians or similar personnel*
These are persons who, under supervision of a researcher, perform technical duties directly related to the R&D concerned.

Examples: Technicians, research assistants, technical assistants, testers, programmers, cartographers, photographers, interviewers (specialised) etc.

C.1.3 *Other supporting staff*
These are persons who provided other direct services to the relevant R&D.

Examples: Secretarial and clerical workers, typists, tradesmen, laboratory workers, librarians, semi-skilled and unskilled assistants directly associated with R&D.

D. TYPES OF R&D EXPENDITURE

D.1 Labour Costs
Labour costs comprise the salary or wages of an employee, as well as other forms of remunerations such as bonuses, holiday pay, and the employer's contribution to a pension and medical fund and subsidies.

The labour cost for students receiving remuneration or research grants is also included.

D.2 Overhead Costs
These are current expenditure that cannot easily be allocated to individual units or activities. It may include the following: technical services, printing and duplicating services, postage, insurance, financial services, entertainment, etc., as well as a portion of the labour cost of persons providing an indirect service to R&D.

D.3 Other Running Expenses
These include all other current expenditures that can be allocated to individual units or activities. For example: expenditure on books, periodicals, and reference material; subscriptions to libraries; replacement of office furniture and fittings; the imputed or actual costs of small prototypes or models made outside the organisation; office and laboratory supplies; etc. It does not include depreciation of capital assets.

D.4 Capital Expenditure on Apparatus and Equipment
This is expenditure on major items of apparatus and equipment, fixed assets and plant, plus major improvements, modifications, repairs and renovations. It should reflect actual expenditure in the survey year, regardless of the method of finance, the period over which this may be written off, or whether for replacement or addition to assets.

Where a new or improved capital asset is only partly used for R&D, the amount allocated to R&D is based on the ratio between its use for R&D and other purposes.

D.5 External Funds
To avoid double-counting on a national scale, the survey distinguishes between internal and external funds.

Thus, if organisation A pays organisation B to do R&D (whether by grant, contract, or donation), then organisation B includes that R&D in its report and indicates the amount and source of the funds received. Organisation A does not report on either the nature of the R&D done by B or the amount paid for it.

E. OTHER SCIENTIFIC AND TECHNOLOGICAL ACTIVITIES PERFORMED BY RESEARCH DIVISIONS

Scientific and technological activities, other than R&D, are mainly concerned with the collection, distribution and utilisation of scientific and technological knowledge and are reported on separately if they are not in direct support of current R&D.

The following items fall outside the scope of this survey: secondary education, apprenticeship training, except for the R&D programme, production and distribution of goods, and general routine services to other institutions, e.g. routine medical, clerical and administrative services.

Other scientific and technological activities are the following:

E.1 Scientific and technological information and documentation
This refers to all library and documentation activities concerned with the recording, collection, evaluation, arrangement, storage, retrieval, processing, translation, provision and use of information in the field of S&T. It likewise covers the organisation or attendance of scientific and technical meetings (conferences, congresses, seminars, etc).

E.2 Training and education by research divisions
This comprises all training and education of S&T manpower by research divisions, including specialised advanced training courses for scientific and technical manpower. The research training of students as an integral part of R&D at universities and technikons, however, is regarded as R&D proper.

E.3 General purpose data collection
This includes the systematic routine collection of data which can be used eventually as raw material for scientific work in broader context. The compilation, processing, and initial interpretation or analysis of the collected data is also included. Normally only established methodologies, procedures and techniques are used.

Such activities may be directed towards:

- the exploration and systematic survey of the earth and its natural resources, such as routine topographical mapping and geological, hydrological, oceanographic, meteorological and other technical surveying, including routine astronomical observation, and prospecting for oil and other mineral resources;

- the systematic gathering of data on human, social and economic phenomena, which in most cases will be routine statistics relating to the population and to the economy, e.g. censuses of population, censuses of production and distribution at the national level, market studies, production and sales statistics at the enterprises level.

In exploration of minerals the following are regarded as R&D proper:

- the development of new survey methods and techniques;
- surveying conducted as an integral part of an R&D project on geological phenomena.

E.4 Scientific collection and conservation activities
The scientific and conservation activities of museums, zoological gardens, botanical gardens, nature conservation bodies and aquariums, which cannot be regarded as R&D or entered elsewhere, are included in this item.

E.5 Testing, standardisation and quality control by research division
This refers to the establishment of national standards, the calibration of secondary standards, and testing and analysis (physical, biological, bacteriological, chemical and statistical) of materials, components, products, processes, soils, atmospheres, etc. Examples: testing physical properties of materials, radio-activity, qualities of soils, performance of engineering products, safety equipment, strength of fibres and other materials, masses and measures, the routine evaluation of psychometric tests and clinical testing of new drugs.

Routine testing and quality control which is performed chiefly as part of the production process is excluded.

E.6 Patenting and licensing activities
This comprises the work involved in obtaining patents and other intellectual property, and the granting of patent and licensing rights to outside organisations.

E.7 Specialised medical and para-medical care, and clinical activities
These activities refer to routine investigation and normal application of specialised medical and para-medical knowledge in hospitals and clinics. Although closely related to R&D, as they usually consist of the application of recent results of R&D and/or imply the use of advanced methods, techniques and technical devices, these activities are reported on here as separate of R&D.

E.8 Technical and scientific advisory services
These activities use established scientific, technical and managerial knowledge to advise and assist customers, other departments of an organisation, or independent users. Examples: extension and advisory services for farmers and firms, the preparation and performance of non-R&D projects, consulting, and feasibility studies.

E.9 Policy-related activities (at all levels - national, regional, local and organisational)
Typical activities included here are, *inter alia*, the analysis and appraisal of existing programmes, policies and operations of institutions (such as legislative commissions of inquiry concerned with general government or department policy or operations) and the continuous analysis and monitoring of external phenomena (e.g. defence and security analyses).

As the purpose of such activities is to assist in decision-making and, since only established methodologies are usually employed in such studies, they are excluded from R&D proper. However, where an appreciable amount of research is involved (perhaps to develop or modify operational models or to develop new models) the appropriate portion should be allocated to R&D.

AFDELING 1.
OPSOMMINGS VAN HOOFTABELLE

SECTION 1.
SUMMARIES OF MAIN TABLES

TABEL 1.1 : Besteding en mannekrag gewy aan N&O
TABLE 1.1 : Expenditure and manpower devoted to R&D

ITEM	WETENSKAPGEBIED/ SCIENTIFIC FIELD	1991/92		1989/90	
		R(000)	%	R(000)	%
N&O-besteding/ R&D expenditure	Natuurwetenskappe/ Natural sciences.....	2 402 352	86,2	1 508 023	85,0
	Geesteswetenskappe/ Human sciences....	383 734	13,8	266 423	15,0
	TOTAAL/ TOTAL	2 786 087	100,0	1 774 447	100,0
		Manjare/Man years	%	Manjare/Man years	%
Mannekrag/ Manpower	Natuurwetenskappe/ Natural sciences.....	18 594	83,7	14 995	82,5
	Geesteswetenskappe/ Human sciences....	3 630	16,3	3 180	17,5
	TOTAAL/ TOTAL	22 223	100,0	18 175	100,0
		R(000)		R(000)	
N&O-besteding per manjaar/ R&D expenditure per man year	Natuurwetenskappe/ Natural sciences.....	129		101	
	Geesteswetenskappe/ Human sciences....	106		84	
	Natuur- en Geesteswetenskappe/ Natural and Human Sciences	125		98	
			%		%
N&O-besteding as persentasie van BBP/ R&D expenditure as percentage of GDP	Natuurwetenskappe/ Natural sciences.....		0,898		0,729
	Geesteswetenskappe/ Human sciences....		0,144		0,129
	TOTAAL/ TOTAL		1,042		0,858
Bruto Binnelandse Produk teen faktorkoste/* Gross Domestic Product at factor cost		267 377 000		206 804 000	

* SA Reserwebank Kwartaalblad, Sept 1992/
SA Reserve Bank Quarterly, Sept 1992

TABEL 1.2.1 : Internasionale vergelyking van besteding en mannekrag gewy aan N&O in vernaamste nywerheidslande
TABLE 1.2.1 : International comparison of expenditure and manpower devoted to R&D in major industrial countries

ITEM	EENHEID/ UNIT	JAAR/ YEAR	LAND/ COUNTRY					
			RSA	VSA/ USA	Duitsland/ Germany	Frankryk/ France	VK/ UK	Japan
N&O-besteding/ R&D expenditure	US$* (mil)	1991	1009	-	-	-	-	-
		1989	677	-	-	-	-	-
		1988	-	137 816	24 578	17 511	17 042	50 987
Persentasie van BBP/ Percentage of GDP	%	1991	1,04	-	-	-	-	-
		1989	0,86	-	-	-	-	-
		1988	-	2,86	2,83	2,29	2,20	2,91
Navorsers (nav.) manjare/ Researchers (res.) man years	1 000	1991	12,1	-	-	-	-	-
		1989	9,9	-	-	-	-	-
		1988	-	949,2	165,6	115,2	127,4	535,0
Besteding per nav. manjaar/ Expenditure per res. man year	$1 000*	1991	83,4	-	-	-	-	-
		1989	68,4	-	-	-	-	-
		1988	-	145,2	148,4	152,0	133,8	95,3
Nav. manjare per 10 000 werkers/ Res. man years per 10 000 workers		1991	10,9	-	-	-	-	-
		1989	9,1	-	-	-	-	-
		1988	-	77,0	56,0	48,0	46,0	87,0
Sakesektorfinansiering van N&O/ Business sector financing of R&D	%	1991	46,8	-	-	-	-	-
		1989	41,9	-	-	-	-	-
		1988	-	49,2	64,1	43,3	51,4	70,5
Owerheidsektor N&O-besteding/ Government sector R&D expenditure**								
- Bevordering van kennis/ Advancement of knowledge	%	1989	21,0	11,0	53,4	43,0	41,7	53,9
- Nywerheidsontwikkeling/ Industrial development	%	1989	41,6	0,6	14,6	21,1	16,8	4,9
- Energie/ Energy	%	1989	3,1	11,3	7,3	5,6	6,0	23,4
- Gesondheid/ Health	%	1989	5,4	37,5	4,0	5,2	9,6	2,8
- Landbou ens./ Agriculture etc	%	1989	12,1	5,5	2,4	6,5	7,2	3,9
- Maatskaplike ontwikkeling/ Social development	%	1989	7,1	3,2	2,9	0,8	3,8	1,1
- Ander/ Other	%	1989	9,7	30,9	15,4	17,8	14,9	10,0
TOTAAL/ TOTAL			100,0	100,0	100,0	100,0	100,0	100,0

* VSA-dollars teen heersende pryse en wisselkoerse/ US dollars at current prices and exchange rates
** Verdediging uitgesluit/ Excluding defence

Bronne/ Sources : Annual Review of Government Funded R&D, 1991, HMSO, Cabinet Office, UK
OECD in Figures, Statistics of the Member Countries, Paris, 1991
Resources for R&D 1989/90, Pretoria, 1991

TABEL 1.2.2 : Internasionale vergelyking van besteding gewy aan N&O in ontwikkelende en vergelykbare ekonomieë, as persentasie van BBP
TABLE 1.2.2 : International comparison of expenditure devoted to R&D in developing and comparable economies, as percentage of GDP

LAND/ COUNTRY	N&O as % van BBP/ R&D as % of GDP
RSA (1991)	1,04
Korea (1990)	1,83
Kanada/ Canada (1990)	1,37
Denemarke/ Denmark (1990)	1,53
Australië/ Australia (1990)	1,31
Taiwan (1990)	1,41
Nieu-Seeland/ New Zealand (1990)	0,93
Indië/ India (1990)	0,88
Ierland/ Ireland (1990)	0,79
Brasilië/ Brazil (1990)	0,39
Mexiko/ Mexico (1990)	0,21
Turkye/ Turkey (1990)	0,14
Égipte/ Egypt (1990)	0,20

Bronne/ Sources : OECD in Figures, Statistics of the member countries, Paris, 1991
: The World Competitiveness Report, The World Economic Forum, Geneva, 1992

TABEL 1.3 : Besteding deur navorsingsinstellings aan alle wetenskaplike en tegnologiese (W&T) aktiwiteite volgens wetenskapgebied

TABLE 1.3 : Expenditure by research organisations on all scientific and technological (S&T) activities according to scientific field

WETENSKAPGEBIED/ SCIENTIFIC FIELD	N&O/ R&D	ANDER W&T-AKTIWITEITE/ OTHER S&T ACTIVITIES #	TOTAAL/ TOTAL #
	R(000)	R(000)	R(000)
1991/92			
NATUURWETENSKAPPE/ NATURAL SCIENCES.....	2 402 352	323 697	2 726 049
GEESTESWETENSKAPPE/ HUMAN SCIENCES.....	383 734	18 439	402 173
TOTAAL/ TOTAL	2 786 087	342 136	3 128 222
Persentasie van BBP/ Percentage of GDP (R 267 377 000 000)	1,04	0,13	1,17
1989/90			
NATUURWETENSKAPPE/ NATURAL SCIENCES.....	1 508 023	292 064	1 800 087
GEESTESWETENSKAPPE/ HUMAN SCIENCES.....	266 423	*	* 266 423
TOTAAL/ TOTAL	1 774 447	* 292 064	* 2 066 510
Persentasie van BBP/ Percentage of GDP (R 206 804 000 000)	0,86	0,14	1,00

* Gegewens vir ander W&T aktiwiteite ten opsigte van die geesteswetenskappe is nie beskikbaar nie / Data for other S&T activities for human sciences not available

\# Gegewens vir ander W&T aktiwiteite ten opsigte van die tersiêre onderwyssektor is nie beskikbaar nie / Data for other S&T activities for the tertiary education sector not available

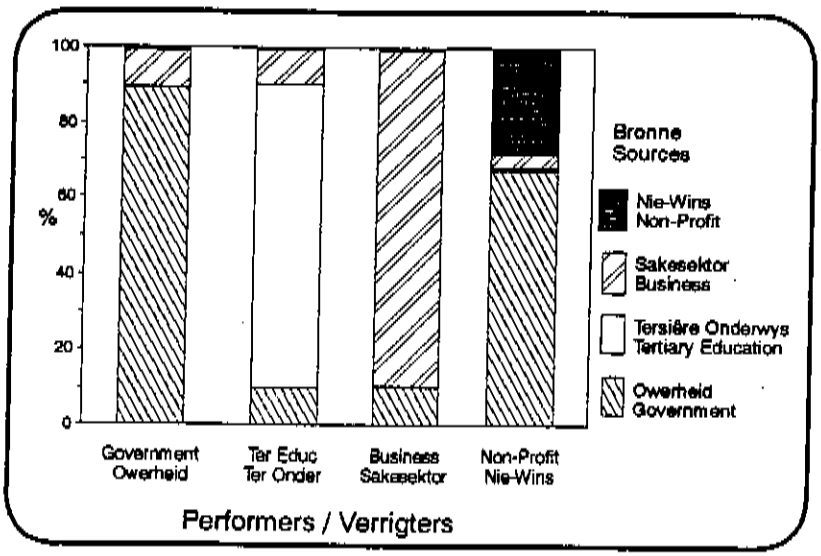
TABEL 1.3.1 : Besteding deur navorsingsinstellings aan alle wetenskaplike en tegnologiese (W&T) aktiwiteite volgens sektorverdeling (%) van verrigters

TABLE 1.3.1 : Expenditure by research organisations on all scientific and technological (S&T) activities according to sector distribution (%) of performers

VERRIGTINGSEKTOR/ PERFORMANCE SECTOR	N&O/ R&D	ANDER W&T-AKTIWITEITE/ OTHER S&T ACTIVITIES	TOTAAL/ TOTAL
	%	%	%
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES			
Owerheidsektor/ Government sector	24,1	6,7	30,8
Tersiêre onderwyssektor/ Tertiary education sector	22,1	#	# 22,1
Sakesektor/ Business enterprise sector	41,5	4,2	45,7
Nie-winssektor/ Non-profit sector	1,4	0,1	1,4
TOTAAL/ TOTAL	89,1	11,0	100,0
NATUURWETENSKAPPE/ NATURAL SCIENCES			
Owerheidsektor/ Government sector	21,9	6,4	28,3
Tersiêre onderwyssektor/ Tertiary education sector	13,6	#	# 13,6
Sakesektor/ Business enterprise sector	40,5	3,9	44,3
Nie-winssektor/ Non-profit sector	0,8	0,0	0,8
TOTAAL/ TOTAL	76,8	10,3	87,0
GEESTESWETENSKAPPE/ HUMAN SCIENCES			
Owerheidsektor/ Government sector	2,2	0,2	2,4
Tersiêre onderwyssektor/ Tertiary education sector	8,4	#	# 8,4
Sakesektor/ Business enterprise sector	1,0	0,4	1,4
Nie-winssektor/ Non-profit sector	0,6	0,0	0,6
TOTAAL/ TOTAL	12,2	0,6	12,8

Gegewens vir ander W&T aktiwiteite ten opsigte van die tersiêre onderwyssektor is nie beskikbaar nie / Data for other S&T activities for the tertiary education sector not available

TABEL 1.4 : Besteding aan N&O volgens verrigters en bronne van fondse
TABLE 1.4 : Expenditure on R&D according performers and sources of funds

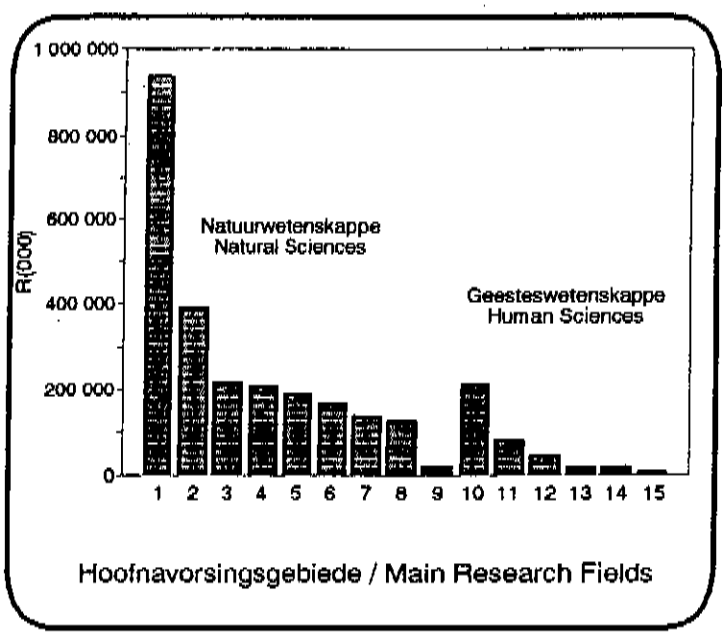


VERRIGTINGSEKTOR/ PERFORMANCE SECTOR	BRONNE VAN FONDSE/ SOURCES OF FUNDS 1991/92					1989/90
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-wins-sektor en buiteland/ Non-profit sector and foreign	Totaal/ Total	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)	R(000)
OWERHEIDSEKTOR/ GOVERNMENT SECTOR						
Natuurwetenskappe/ Natural Sciences....	606 221	0	74 365	5 159	685 745	510 600
Geesteswetenskappe/ Human Sciences...	66 157	0	2 782	335	69 273	67 408
TOTAAL/ TOTAL	672 378	0	77 147	5 494	755 018	578 008
TERSIÊRE ONDERWYSSEKTOR/ TERTIARY EDUCATION SECTOR						
Natuurwetenskappe/ Natural Sciences....	61 798	313 672	49 129	2 239	426 839	339 833
Geesteswetenskappe/ Human Sciences...	7 116	238 785	16 753	947	263 601	177 732
TOTAAL/ TOTAL	68 914	552 457	65 882	3 186	690 439	517 565
SAKESEKTOR/ BUSINESS ENTERPRISE SECTOR						
Natuurwetenskappe/ Natural Sciences....	133 136	709	1 128 449	3 685	1 265 979	640 071
Geesteswetenskappe/ Human Sciences...	650	0	30 866	126	31 643	16 879
TOTAAL/ TOTAL	133 786	709	1 159 315	3 812	1 297 622	656 951
NIE-WINSSEKTOR/ NON-PROFIT SECTOR						
Natuurwetenskappe/ Natural Sciences....	16 121	292	811	6 566	23 790	17 520
Geesteswetenskappe/ Human Sciences...	12 324	0	812	6 082	19 218	4 403
TOTAAL/ TOTAL	28 444	292	1 623	12 648	43 008	21 923
GROOTTOTAAL/ GRAND TOTAL	903 523	553 457	1 303 967	25 139	2 786 087	1 774 447

TABEL 1.4.1 : Besteding aan N&O volgens verrigters en bronne van fondse
TABLE 1.4.1 : Expenditure on R&D according performers and sources of funds

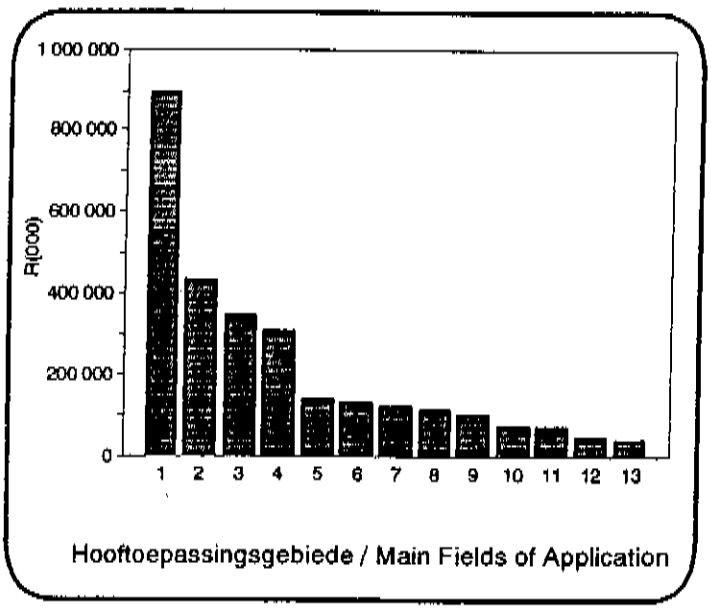
VERRIGTINGSEKTOR/ PERFORMANCE SECTOR	BRONNE VAN FONDSE/ SOURCES OF FUNDS 1991/92					1989/90
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-wins-sektor en buiteland/ Non-profit sector and foreign	Totaal/ Total	Totaal/ Total
	%	%	%	%	%	%
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES						
Owerheidsektor/ Government sector	24,1	0,0	2,8	0,2	27,1	32,6
Tersiêre onderwyssektor/ Tertiary education sector	2,5	19,8	2,4	0,1	24,8	29,2
Sakesektor/ Business enterprise sector	4,8	0,0	41,6	0,1	46,6	37,0
Nie-winssektor/ Non-profit sector	1,0	0,0	0,1	0,5	1,5	1,2
TOTAAL/ TOTAL	32,4	19,8	46,9	0,9	100,0	100,0
NATUURWETENSKAPPE/ NATURAL SCIENCES						
Owerheidsektor/ Government sector	21,8	0,0	2,7	0,2	24,6	28,8
Tersiêre onderwyssektor/ Tertiary education sector	2,2	11,3	1,8	0,1	15,3	19,2
Sakesektor/ Business enterprise sector	4,8	0,0	40,5	0,1	45,4	36,1
Nie-winssektor/ Non-profit sector	0,6	0,0	0,0	0,2	0,9	1,0
TOTAAL/ TOTAL	29,4	11,3	45,0	0,6	86,2	85,0
GEESTESWETENSKAPPE/ HUMAN SCIENCES						
Owerheidsektor/ Government sector	2,4	0,0	0,1	0,0	2,5	3,8
Tersiêre onderwyssektor/ Tertiary education sector	0,3	8,6	0,6	0,0	9,5	10,0
Sakesektor/ Business enterprise sector	0,0	0,0	1,1	0,0	1,1	1,0
Nie-winssektor/ Non-profit sector	0,4	0,0	0,0	0,2	0,7	0,2
TOTAAL/ TOTAL	3,1	8,6	1,8	0,2	13,8	15,0

TABEL 1.5 : Besteding aan N&O volgens hoofnavorsingsgebiede (met ontleding volgens soort navorsing)
TABLE 1.5 : Expenditure on R&D according to main research fields (with analysis by type of research)



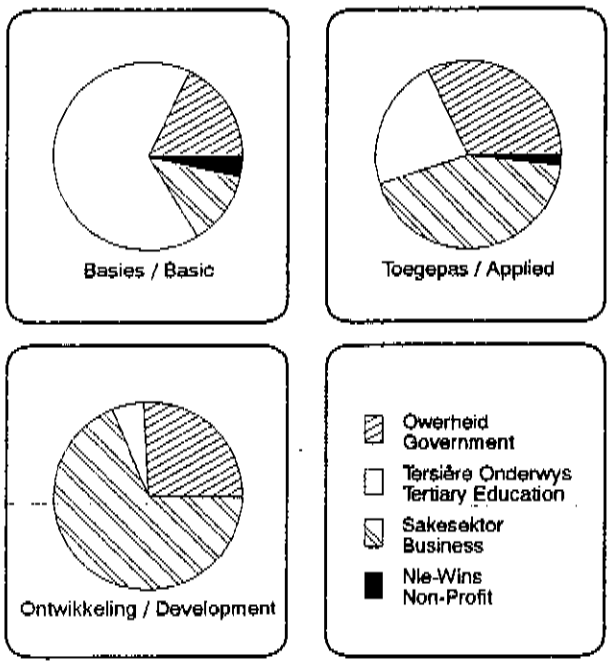
HOOFNAVORSINGSGEBIEDE/ MAIN RESEARCH FIELDS	R(000)	(% van totaal) (% of total)	ONTLEDING VOLGENS SOORT NAVORSING ANALYSIS BY TYPE OF RESEARCH		
			Basiese/ Basic %	Toegepaste/ Applied %	Ontwikkeling/ Development %
1. Ingenieurswese/ Engineering	938 696	(33,7)	5,9	33,7	60,4
2. Landbou, biologie en bosbou/ Agriculture, biology and forestry	393 396	(14,1)	19,1	58,3	22,6
3. Chemie/ Chemistry	219 579	(7,9)	18,9	45,1	36,0
4. Tegnologie/ Technology	212 430	(7,6)	3,9	38,1	58,0
5. Geneeskunde/ Medical sciences	192 981	(6,9)	29,0	58,8	12,2
6. Aardwetenskappe/ Earth sciences	166 077	(6,0)	33,0	58,2	8,9
7. Fisika/ Physics	137 768	(4,9)	31,2	34,1	34,7
8. Wiskundige wetenskappe/ Mathematical sciences	123 043	(4,4)	20,7	32,7	46,6
9. Astronomie en landmeetkunde/ Astronomy and land surveying	18 382	(0,7)	55,8	32,5	11,8
10. Wysgerige, sosiale en menswetenskappe/ Philosophical, social and human sciences	215 096	(7,7)	46,6	41,4	12,0
11. Ekonomiese wetenskappe/ Economic sciences	83 624	(3,0)	29,5	57,9	12,6
12. Tale/ Languages	48 115	(1,7)	71,2	25,3	3,5
13. Staatswetenskappe/ Political sciences	18 643	(0,7)	34,5	60,0	5,6
14. Kunste/ Arts	17 366	(0,6)	61,2	30,8	8,0
15. Toekomskunde/ Future studies	890	(0,0)	3,2	67,3	29,5
TOTAAL/ TOTAL	2 786 087	(100,0)			

TABEL 1.6 : Besteding aan N&O volgens hooftoepassingsgebiede
TABLE 1.6 : Expenditure on R&D according to main fields of application



HOOFTOEPASSINGSGEBIEDE/ MAIN FIELDS OF APPLICATION	1991/92		1989/90
	R(000)	%	%
1. Fabriekswese, konstruksie, handel en sakebedrywighede/ Manufacturing, construction, trade and business activities	893 705	32,1	30,7
2. Algemene kennisbevordering/ General advancement of knowledge	431 540	15,5	20,9
3. Landbou, jag, veeartsenydienste, bosbou en visserye/ Agriculture, hunting, veterinary services, forestry and fishing	343 758	12,3	12,1
4. Mynwese en steengroewe/ Mining and quarrying	304 877	10,9	10,8
5. Geneeskundige dienste/ Medical services	133 724	4,8	5,4
6. Vervoer, opberging en kommunikasie/ Transport, storage and communication	127 951	4,6	1,5
7. Sosiale ontwikkeling en dienste/ Social development and services	118 455	4,3	4,3
8. Energie en energiebronne, uitgeslote minerale/ Energy and energy sources, excluding minerals	110 683	4,0	3,1
9. Beskerming van die omgewing/ Protection of the environment	74 042	2,7	2,5
10. Onderwysdienste en voorligting/ Education and guidance	69 531	2,5	2,8
11. Waterbronne en waterbenutting/ Water resources and water utilisation	36 123	1,3	1,6
12. Eksplorering en evaluering van die aarde, see, atmosfeer en ruimte/ Exploration and assessment of the earth, seas, atmosphere and space	43 666	1,6	0,8
13. Navorsing nie elders vermeld nie/ Research not classified elsewhere	98 032	3,5	3,2
TOTAAL/ TOTAL	2 786 087	100,0	100,0

TABEL 1.7 : Besteding aan N&O volgens wetenskapgebied en soort N&O
TABLE 1.7 : Expenditure on R&D according to scientific field and type of R&D

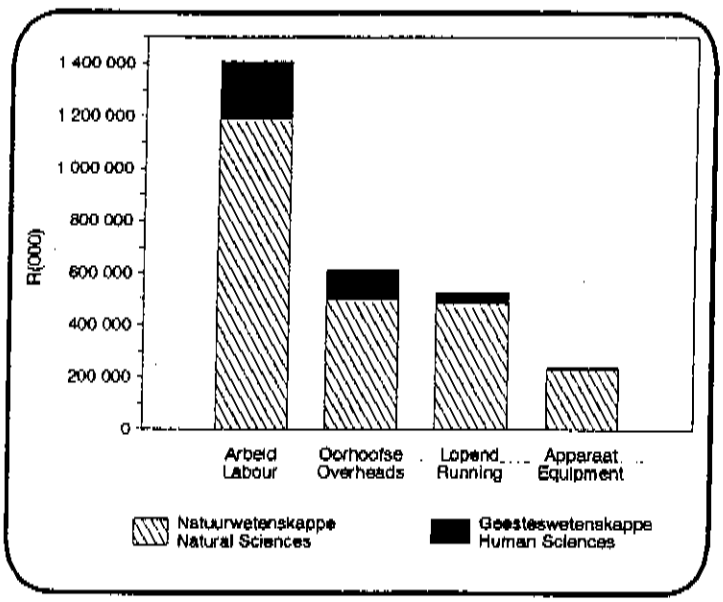


WETENSKAPGEBIED/ SCIENTIFIC FIELD	SOORT N&O/ TYPE OF R&D			
	Basiese/ Basic	Toegepaste/ Applied	Ontwikkeling/ Development	Totaal/ Total
1991/92	R(000) (%)	R(000) (%)	R(000) (%)	R(000) (%)
Natuurwetenskappe/ Natural Sciences.....	369 867 (13,3%)	1 029 236 (36,9%)	1 003 249 (36,0%)	2 402 352 (86,2%)
Geesteswetenskappe/ Human Sciences.....	176 382 (6,3%)	166 740 (6,0%)	40 613 (1,5%)	383 734 (13,8%)
TOTAAL/ TOTAL	546 249 (19,6%)	1 195 976 (42,9%)	1 043 862 (37,5%)	2 786 087 (100,0%)
1989/90	R(000) (%)	R(000) (%)	R(000) (%)	R(000) (%)
Natuurwetenskappe/ Natural Sciences.....	253 899 (14,3%)	746 827 (42,1%)	507 298 (28,6%)	1 508 023 (85,0%)
Geesteswetenskappe/ Human Sciences.....	117 303 (6,6%)	103 180 (5,8%)	45 940 (2,6%)	266 423 (15,0%)
TOTAAL/ TOTAL	371 201 (20,9%)	850 007 (47,9%)	553 238 (31,2%)	1 774 447 (100,0%)

TABEL 1.7.1 : Besteding aan N&O volgens verrigters en soort N&O
TABLE 1.7.1 : Expenditure on R&D according to performers and type of R&D

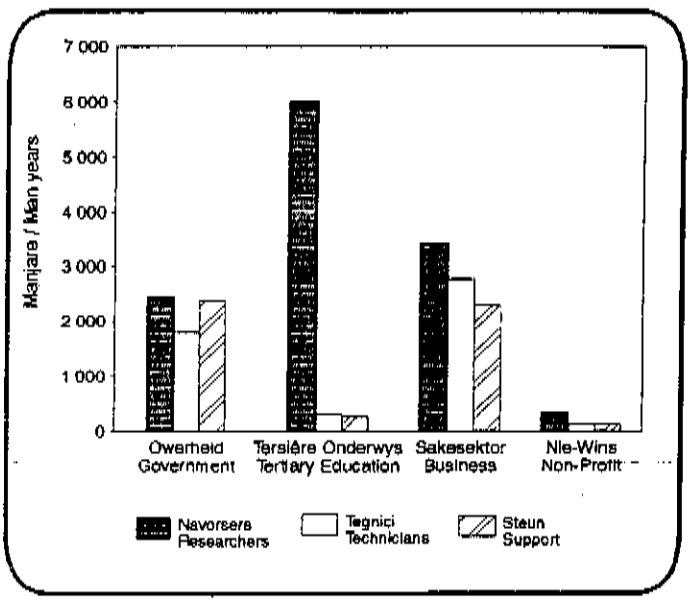
VERRIGTERS/ PERFORMERS	SOORT N&O/ TYPE OF R&D			
	Basiese/ Basic	Toegepaste/ Applied	Ontwikkeling/ Development	Totaal/ Total
	(%)	(%)	(%)	(%)
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES				
Owerheidsektor/ Government sector	3,5	13,9	9,7	27,1
Tersiêre onderwyssektor/ Tertiary education sector	12,9	9,8	2,0	24,8
Sakesektor/ Business enterprise sector	2,5	18,5	25,6	46,6
Nie-winssektor/ Non-profit sector	0,7	0,7	0,1	1,5
TOTAAL/ TOTAL	19,6	42,9	37,4	100,0
NATUURWETENSKAPPE/ NATURAL SCIENCES				
Owerheidsektor/ Government sector	3,2	12,4	9,0	24,6
Tersiêre onderwyssektor/ Tertiary education sector	7,4	6,5	1,4	15,3
Sakesektor/ Business enterprise sector	2,3	17,6	25,6	45,4
Nie-winssektor/ Non-profit sector	0,4	0,5	0,0	0,9
TOTAAL/ TOTAL	13,3	37,0	36,0	86,2
GEESTESWETENSKAPPE/ HUMAN SCIENCES				
Owerheidsektor/ Government sector	0,3	1,5	0,7	2,5
Tersiêre onderwyssektor/ Tertiary education sector	5,5	3,3	0,6	9,5
Sakesektor/ Business enterprise sector	0,2	0,9	0,1	1,1
Nie-winssektor/ Non-profit sector	0,4	0,3	0,0	0,7
TOTAAL/ TOTAL	6,4	6,0	1,4	13,8

TABEL 1.8 : Besteding aan N&O volgens wetenskapgebied en soort besteding
TABLE 1.8 : Expenditure on R&D according to scientific field and type of expenditure



WETENSKAPGEBIED/ SCIENTIFIC FIELD	SOORT BESTEDING/ TYPE OF EXPENDITURE				
	Arbeids-koste/ Labour costs	Oorhoofse koste/ Overheads	Ander lopende Other running	Apparaat/ Equipment	Totaal/ Total
1991/92	R(000) (%)	R(000) (%)	R(000) (%)	R(000) (%)	R(000) (%)
Natuurwetenskappe/ Natural Sciences.....	1 190 071 (42,7%)	499 763 (17,9%)	479 038 (17,2%)	233 480 (8,4%)	2 402 352 (86,2%)
Geesteswetenskappe/ Human Sciences.....	219 037 (7,9%)	108 990 (3,9%)	48 423 (1,7%)	7 285 (0,3%)	383 734 (13,8%)
TOTAAL/ TOTAL	1 409 108 (50,6%)	608 753 (21,8%)	527 461 (18,9%)	240 764 (8,6%)	2 786 087 (100,0%)
1989/90	R(000) (%)	R(000) (%)	R(000) (%)	R(000) (%)	R(000) (%)
Natuurwetenskappe/ Natural Sciences.....	674 324 (38,0%)	357 504 (20,1%)	325 187 (18,3%)	151 009 (8,5%)	1 508 023 (85,0%)
Geesteswetenskappe/ Human Sciences.....	154 940 (8,7%)	87 922 (5,0%)	20 776 (1,2%)	2 785 (0,2%)	266 423 (15,0%)
TOTAAL/ TOTAL	829 264 (46,7%)	445 426 (25,1%)	345 963 (19,5%)	153 794 (8,7%)	1 774 447 (100,0%)

TABEL 1.9 : Manjare gewy aan N&O en verhouding van tegnici tot navorsers volgens wetenskapgebied
TABLE 1.9 : Man years devoted to R&D and ratio of technicians to researchers according to scientific field



WETENSKAPGEBIED/ SCIENTIFIC FIELD	Manjare, alle tipes personeel/ Man years, all types of staff		Manjare navorsers/ Man years researchers		Verhouding van tegnici tot navorsers#/ Ratio of technicians to researchers#	
1991/92						
Natuurwetenskappe/ Natural Sciences	18 594		8 881		0,55	
Geesteswetenskappe/ Human Sciences	3 630		3 221		0,04	
TOTAAL/ TOTAL	22 223		12 102		0,41	
1989/90						
Natuurwetenskappe/ Natural Sciences	14 995		7 161		0,62	
Geesteswetenskappe/ Human Sciences	3 180		2 758		0,04	
TOTAAL/ TOTAL	18 175		9 919		0,46	
1991/92 SEKTORVERDELING 1991/92 SECTOR DISTRIBUTION	NW* NS	GW* HS	NW* NS	GW* HS	NW* NS	GW* HS
Owerheidsektor/ Government sector	6 149	524	2 026	402	0,88	0,06
Tersiêre onderwyssektor/ Tertiary education sector	3 854	2 679	3 431	2 553	0,07	0,01
Sakesektor/ Business enterprise sector	8 270	210	3 253	143	0,85	0,10
Nie-winssektor/ Non-profit sector	321	215	171	123	0,46	0,36

* NW = Natuurwetenskappe; NS = Natural Sciences; GW = Geesteswetenskappe; HS = Human Sciences
\# Tegnici-manjare gedeel deur navorsers-manjare/ Technician man years divided by researcher man years

TABEL 1.10 : Arbeidskoste, manjare, en aantal persone betrokke by N&O volgens geografiese gebied
TABLE 1.10 : Labour cost, man years and number of persons involved in R&D according to geographical region

GEOGRAFIESE GEBIED/ GEOGRAPHIC REGION	Arbeidskoste/ Labour Cost R(000)		Manjare/ Man Years		Aantal persone/ Number of Persons	
	NW/NS*	GW/HS*	NW/NS*	GW/HS*	NW/NS*	GW/HS*
1. Pretoria-Witwatersrand-Vaaldriehoek/ Pretoria-Witwatersrand-Vaal Triangle	819 705	135 233	11 698	2 029	17 023	4 766
2. Westelike Kaapprovinsie/ Western Cape Province	174 395	34 502	3 106	737	5 170	2 013
3. Natal + Kwazulu/ Natal + KwaZulu	72 766	23 693	1 288	414	2 678	1 195
4. Oranje-Vrystaat + QwaQwa/ Orange Free State + QwaQwa	54 315	10 161	737	160	1 250	392
5. Noord-Kaap + Wes-Transvaal/ Northern Cape + Western Transvaal	33 136	6 223	982	95	1 207	315
6. Oostelike Kaap + Ciskei/ Eastern Cape + Ciskei	21 517	8 709	480	182	838	490
7. Oostelike Transvaal + KaNgwane/ Eastern Transvaal + KaNgwane	11 784	77	233	2	236	4
8. Noordelike Transvaal/ Northern Transvaal	2 455	440	70	12	139	39
TOTAAL/ TOTAL	1 190 071	219 037	18 594	3 630	28 540	9 215

* NW = Natuurwetenskappe; NS = Natural Sciences; GW = Geesteswetenskappe; HS = Human Sciences

AFDELING 2.
HOOFTABELLE

SECTION 2.
MAIN TABLES

TABEL 2.1 : Besteding deur navorsingsinstellings aan alle wetenskaplike en tegnologiese aktiwiteite (W&T) volgens aktiwiteite, soort besteding en verrigters

TABLE 2.1 : Expenditure by research organisations on all scientific and technological activities (S&T) according to activity, type of expenditure and performers

AKTIWITEITE EN SOORT BESTEDING/ ACTIVITIES AND TYPE OF EXPENDITURE	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES					
N&O/ R&D	755 018	690 439	1 297 622	43 007	2 786 087
Lopende besteding/ Current Expenditure.....	717 976	660 377	1 126 485	40 484	2 545 322
Apparaat en toerusting/ Apparatus and equipment.....	37 042	30 062	171 137	2 523	240 764
ANDER W&T/ OTHER S&T	208 174	#	132 203	1 758	# 342 136
Binne navorsingsverband/ Research related	82 384	#	17 883	1 668	# 101 935
Lopende besteding/ Current Expenditure.....	78 717	#	15 569	1 398	# 95 683
Apparaat en toerusting/ Apparatus and equipment.....	3 667	#	2 315	270	# 6 251
Buite navorsingsverband/ Non-research related	125 791	#	114 320	90	# 240 201
Lopende besteding/ Current Expenditure.....	122 336	#	98 963	90	# 221 389
Apparaat en toerusting/ Apparatus and equipment.....	3 455	#	15 358	0	# 18 812
TOTAAL/ TOTAL	963 193	690 439	1 429 825	44 765	3 128 222
Lopende besteding/ Current Expenditure.....	919 029	660 377	1 241 016	41 972	2 862 394
Apparaat en toerusting/ Apparatus and equipment.....	44 164	30 062	188 809	2 793	265 828
Persentasie (%)/ Percentage (%)	31	22	46	1	100

Gegewens vir ander W&T aktiwiteite ten opsigte van die tersiêre onderwyssektor is nie beskikbaar nie / Data for other S&T activities for the tertiary education sector not available

TABEL 2.1 (vervolg) : Besteding deur navorsingsinstellings aan alle wetenskaplike en tegnologiese aktiwiteite (W&T) volgens aktiwiteite, soort besteding en verrigters
TABLE 2.1 (contd) : Expenditure by research organisations on all scientific and technological activities (S&T) according to activity, type of expenditure and performers

AKTIWITEITE EN SOORT BESTEDING/ ACTIVITIES AND TYPE OF EXPENDITURE	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUURWETENSKAPPE/ NATURAL SCIENCES					
N&O/ R&D	685 745	426 839	1 265 979	23 790	2 402 352
Lopende besteding/ Current Expenditure.....	649 239	399 425	1 097 509	22 699	2 168 872
Apparaat en toerusting/ Apparatus and equipment.....	36 505	27 414	168 470	1 091	233 480
ANDER W&T/ OTHER S&T	201 095	#	121 186	1 416	# 323 697
Binne navorsingsverband Research related	79 562	#	17 342	1 356	# 98 259
Lopende besteding/ Current Expenditure.....	76 028	#	15 142	1 196	# 92 367
Apparaat en toerusting/ Apparatus and equipment.....	3 534	#	2 200	160	# 5 893
Buite navorsingsverband Non-research related	121 533	#	103 844	60	# 225 437
Lopende besteding/ Current Expenditure.....	118 188	#	88 651	60	# 206 899
Apparaat en toerusting/ Apparatus and equipment.....	3 345	#	15 193	0	# 18 538
TOTAAL/ TOTAL	886 839	426 839	1 387 165	25 205	2 726 049
Lopende besteding/ Current Expenditure.....	843 455	399 425	1 201 303	23 955	2 468 138
Apparaat en toerusting/ Apparatus and equipment.....	43 384	27 414	185 862	1 251	257 911
Persentasie (%)/ Percentage (%)	33	16	51	1	100

Gegewens vir ander W&T aktiwiteite ten opsigte van die tersiêre onderwyssektor is nie beskikbaar nie / Data for other S&T activities for the tertiary education sector not available

TABEL 2.1 (vervolg) : **Besteding deur navorsingsinstellings aan alle wetenskaplike en tegnologiese aktiwiteite (W&T) volgens aktiwiteite, soort besteding en verrigters**

TABLE 2.1 (contd) : **Expenditure by research organisations on all scientific and technological activities (S&T) according to activity, type of expenditure and performers**

AKTIWITEITE EN SOORT BESTEDING/ ACTIVITIES AND TYPE OF EXPENDITURE	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
GEESTESWETENSKAPPE/ HUMAN SCIENCES					
N&O/ R&D	69 273	263 601	31 643	19 218	383 734
Lopende besteding/ Current Expenditure	68 736	260 953	28 975	17 786	376 450
Apparaat en toerusting/ Apparatus and equipment	537	2 648	2 667	1 432	7 285
ANDER W&T/ OTHER S&T	7 080	#	11 017	342	# 18 439
Binne navorsingsverband Research related	2 822	#	541	312	# 3 675
Lopende besteding/ Current Expenditure	2 689	#	426	202	# 3 317
Apparaat en toerusting/ Apparatus and equipment	133	#	115	110	# 358
Buite navorsingsverband Non-research related	4 258	#	10 476	30	# 14 764
Lopende besteding/ Current Expenditure	4 149	#	10 311	30	# 14 490
Apparaat en toerusting/ Apparatus and equipment	109	#	165	0	# 274
TOTAAL/ TOTAL	76 353	263 601	42 660	19 560	402 173
Lopende besteding/ Current Expenditure	75 574	260 953	39 713	18 017	394 257
Apparaat en toerusting/ Apparatus and equipment	779	2 648	2 947	1 542	7 917
Persentasie (%)/ Percentage (%)	19	66	11	5	100

Gegewens vir ander W&T aktiwiteite ten opsigte van die tersiêre onderwyssektor is nie beskikbaar nie / Data for other S&T activities for the tertiary education sector not available

TABEL 2.2 : Besteding aan N&O volgens verrigters en bronne van fondse : Owerheidsektor
TABLE 2.2 : Expenditure on R&D according to performers and sources of funds : Government sector

VERRIGTERS/ PERFORMERS	BRONNE VAN FONDSE/ SOURCES OF FUNDS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor en buiteland/ Non-profit sector and foreign	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES					
Staatsdepartemente/ Government departments	266 343	0	1 659	159	268 161
Landbou/ Agriculture	148 920	0	1 659	0	150 579
Omgewingsake/ Environment Affairs	35 719	0	0	0	35 719
Volksraad: Landbou-ontwikkeling/ Assembly: Agricultural Development	35 527	0	0	0	35 527
Mineraal en Energiesake/ Mineral and Energy Affairs	30 775	0	0	0	30 775
Nasionale Gesondheid en Bevolkingsontwikkeling/ National Health and Population Development	5 758	0	0	159	5 917
Volksraad: Onderwys en Kultuur/ Assembly: Education and Culture	5 198	0	0	0	5 198
Kommissie vir Administrasie/ Commission for Administration	1 864	0	0	0	1 864
Waterwese en Bosbou/ Water Affairs and Forestry	1 498	0	0	0	1 498
Mannekrag/ Manpower	734	0	0	0	734
Verteenwoordigers: Gesondheidsdienste en Welsyn/ Representatives: Health Services and Welfare	158	0	0	0	158
Afgevaardigdes: Onderwys en Kultuur/ Delegates: Education and Culture	129	0	0	0	129
Volksraad: Gesondheidsdienste en Welsyn/ Assembly: Health Services and Welfare	63	0	0	0	63
Provinsiale administrasies/ Provincial administrations	8 521	0	0	0	8 521
Plaaslike owerhede/ Local authorities	1 277	0	0	0	1 277

TABEL 2.2 (vervolg) : Besteding aan N&O volgens verrigters en bronne van fondse : Owerheidsektor
TABLE 2.2 (contd) : Expenditure on R&D according to performers and sources of funds : Government sector

VERRIGTERS/ PERFORMERS	BRONNE VAN FONDSE/ SOURCES OF FUNDS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-wins-sektor en buiteland/ Non-profit sector and foreign	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUUR- EN GEESTESWETENSKAPPE (vervolg)/ NATURAL AND HUMAN SCIENCES (continued)					
Statutêre wetenskaprade en ander outonome owerheidsliggame/ Statutory science councils and other autonomous government institutions	396 237	0	75 487	5 335	477 059
WNNR/ CSIR	217 376	0	64 260	2 363	283 999
MINTEK (Raad vir Mineraaltegnologie/ Council for Mineral Technology)	49 680	0	9 585	2 265	61 530
RGN/ HSRC (Raad vir Geesteswetenskaplike Navorsing/ Human Sciences Research Council)	42 783	0	579	217	43 579
SNO/ FRD*	38 380	0	10	0	38 390
MNR/ MRC (Mediese Navorsingsraad/ Medical Research Council)	35 094	0	191	235	35 521
Sentrale Ekonomiese Adviesdiens/ Central Economic Advisory Service	4 187	0	0	0	4 187
Nasionale Parkeraad/ National Parks Board	2 961	0	0	105	3 066
Natalse Parkeraad/ Natal Parks Board	2 550	0	0	0	2 550
Afrika-instituut/ Africa Institute	2 490	0	0	0	2 490
Natalse Haaieraad/ Natal Sharks Board	653	0	0	0	653
SABS (SA Buro vir Standaarde/ SA Bureau of Standards)	82	0	862	150	1 094
TOTAAL/ TOTAL	672 378	0	77 147	5 494	755 018
Persentasie (%)/ Percentage (%)	89,0	0,0	10,0	1,0	100,0

* Voorheen by WNNR ingesluit/ Previously included with CSIR

TABEL 2.2 (vervolg) : Besteding aan N&O volgens verrigters en bronne van fondse : Owerheidsektor
TABLE 2.2 (contd) : Expenditure on R&D according to performers and sources of funds : Government sector

VERRIGTERS/ PERFORMERS	BRONNE VAN FONDSE/ SOURCES OF FUNDS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor en buiteland/ Non-profit sector and foreign	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUURWETENSKAPPE/ NATURAL SCIENCES					
Staatsdepartemente/ Government departments	258 418	0	1 659	159	260 236
Landbou/ Agriculture	148 920	0	1 659	0	150 579
Omgewingsake/ Environment Affairs	35 719	0	0	0	35 719
Volksraad: Landbou-ontwikkeling/ Assembly: Agricultural Development	35 527	0	0	0	35 527
Mineraal en Energiesake/ Mineral and Energy Affairs	30 775	0	0	0	30 775
Nasionale Gesondheid en Bevolkingsontwikkeling/ National Health and Population Development	5 758	0	0	159	5 917
Waterwese en Bosbou/ Water Affairs and Forestry	1 498	0	0	0	1 498
Verteenwoordigers: Gesondheidsdienste en Welsyn/ Representatives: Health Services and Welfare	158	0	0	0	158
Volksraad: Gesondheidsdienste en Welsyn/ Assembly: Health Services and Welfare	63	0	0	0	63
Provinsiale administrasies/ Provincial administrations	8 521	0	0	0	8 521
Plaaslike owerhede/ Local authorities	837	0	0	0	837

TABEL 2.2 (vervolg) : Besteding aan N&O volgens verrigters en bronne van fondse : Owerheidsektor
TABLE 2.2 (contd) : Expenditure on R&D according to performers and sources of funds : Government sector

VERRIGTERS/ PERFORMERS	BRONNE VAN FONDSE/ SOURCES OF FUNDS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-wins-sektor en buiteland/ Non-profit sector and foreign	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUURWETENSKAPPE (vervolg)/ NATURAL SCIENCES (continued)					
Statutêre wetenskaprade en ander outonome owerheidsliggame/ Statutory science councils and other autonomous government institutions	338 445	0	72 706	5 000	416 151
WNNR/ CSIR	210 493	0	62 225	2 288	275 005
MINTEK (Raad vir Mineraaltegnologie/ Council for Mineral Technology)	48 811	0	9 418	2 225	60 453
SNO/ FRD*	37 899	0	10	0	37 909
MNR/ MRC (Mediese Navorsingsraad/ Medical Research Council)	35 094	0	191	235	35 521
Nasionale Parkeraad/ National Parks Board	2 863	0	0	102	2 965
Natalse Parkeraad/ Natal Parks Board	2 550	0	0	0	2 550
Natalse Haaieraad/ Natal Sharks Board	653	0	0	0	653
SABS (SA Buro vir Standaarde/ SA Bureau of Standards)	82	0	862	150	1 094
TOTAAL/ TOTAL	606 221	0	74 365	5 159	685 745
Persentasie (%)/ Percentage (%)	88,0	0,0	11,0	1,0	100,0

* Voorheen by WNNR ingesluit/ Previously included with CSIR

TABEL 2.2 (vervolg) : Besteding aan N&O volgens verrigters en bronne van fondse : Owerheidsektor
TABLE 2.2 (contd) : Expenditure on R&D according to performers and sources of funds : Government sector

VERRIGTERS/ PERFORMERS	BRONNE VAN FONDSE/ SOURCES OF FUNDS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie wins-sektor en buiteland/ Non-profit sector and foreign	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
GEESTESWETENSKAPPE/ HUMAN SCIENCES					
Staatsdepartemente/ Government departments	7 925	0	0	0	7 925
Volksraad: Onderwys en Kultuur/ Assembly: Education and Culture	5 198	0	0	0	5 198
Kommissie vir Administrasie/ Commission for Administration	1 864	0	0	0	1 864
Mannekrag/ Manpower	734	0	0	0	734
Afgevaardigdes: Onderwys en Kultuur/ Delegates: Education and Culture	129	0	0	0	129
Provinsiale administrasies/ Provincial administrations	0	0	0	0	0
Plaaslike owerhede/ Local authorities	440	0	0	0	440

TABEL 2.2 (vervolg) : Besteding aan N&O volgens verrigters en bronne van fondse : Owerheidsektor
TABLE 2.2 (contd) : Expenditure on R&D according to performers and sources of funds : Government sector

VERRIGTERS/ PERFORMERS	BRONNE VAN FONDSE/ SOURCES OF FUNDS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-wins-sektor en buiteland/ Non-profit sector and foreign	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
GEESTESWETENSKAPPE (vervolg)/ HUMAN SCIENCES (continued)					
Statutêre wetenskaprade en ander outonome owerheidsliggame/ Statutory science councils and other autonomous government institutions	57 792	0	2 782	335	60 908
RGN/ HSRC (Raad vir Geesteswetenskaplike Navorsing/ Human Sciences Research Council)...	42 783	0	579	217	43 579
WNNR/ CSIR...	6 883	0	2 035	75	8 993
Sentrale Ekonomiese Adviesdiens/ Central Economic Advisory Service...	4 187	0	0	0	4 187
Afrika-instituut/ Africa Institute...	2 490	0	0	0	2 490
MINTEK (Raad vir Mineraaltegnologie/ Council for Mineral Technology)...	869	0	168	40	1 077
SNO/ FRD* ...	481	0	0	0	481
Nasionale Parkeraad/ National Parks Board...	98	0	0	3	101
TOTAAL/ TOTAL	66 157	0	2 782	335	69 273
Persentasie (%)/ Percentage (%)	96,0	0,0	4,0	0,0	100,0

* Voorheen by WNNR ingesluit/ Previously included with CSIR

TABEL 2.3 : Besteding aan N&O volgens verrigters en bronne van fondse : Tersiêre onderwyssektor
TABLE 2.3 : Expenditure on R&D according to performers and sources of funds : Tertiary education sector

VERRIGTERS/ PERFORMERS	BRONNE VAN FONDSE/ SOURCES OF FUNDS					
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor en buiteland/ Non-profit sector and foreign	Totaal/ Total	% van groot-totaal/ % of grand total
	R(000)	R(000)	R(000)	R(000)	R(000)	%
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES						
Universiteite/ Universities						
Kaapstad/ Cape Town	19 533	64 682	9 744	1 816	95 775	13,9
Pretoria	6 379	76 598	11 011	51	94 039	13,6
Witwatersrand	9 238	77 023	154	351	86 765	12,6
Stellenbosch	4 569	52 175	16 510	370	73 624	10,7
Natal	7 533	57 895	5 836	99	71 364	10,3
Oranje-Vrystaat/ Orange Free State	6 535	46 354	13 502	0	66 390	9,6
Randse Afrikaanse	4 500	42 295	1 436	66	48 298	7,0
Suid-Afrika/ South Africa	107	34 135	0	0	34 242	5,0
Potchefstroom	4 374	20 215	2 038	9	26 636	3,9
Rhodes	2 828	14 667	5 066	181	22 743	3,3
Port Elizabeth	2 240	11 833	366	53	14 491	2,1
Durban-Westville	662	11 791	81	108	12 642	1,8
Medunsa	55	9 693	27	59	9 834	1,4
Wes-Kaapland/ Western Cape	20	9 779	10	10	9 819	1,4
Vista	0	8 361	0	0	8 361	1,2
Zoeloeland/ Zululand	40	3 920	3	5	3 967	0,6
Noorde/ North	176	3 359	91	9	3 636	0,5
TOTAAL/ TOTAL	68 789	544 774	65 876	3 186	682 625	98,9
Persentasie (%)/ Percentage (%)	10	80	10	0	100	
Technikons	126	7 682	6	0	7 814	1,1
Persentasie (%)/ Percentage (%)	2	98	0	0	100	
GROOTTOTAAL/ GRAND TOTAL	68 914	552 457	65 882	3 186	690 439	100,0
Persentasie (%)/ Percentage (%)	10	80	10	0	100	

TABEL 2.3 (vervolg) : Besteding aan N&O volgens verrigters en bronne van fondse : Tersiêre onderwyssektor
TABLE 2.3 (contd) : Expenditure on R&D according to performers and sources of funds : Tertiary education sector

VERRIGTERS/ PERFORMERS	BRONNE VAN FONDSE/ SOURCES OF FUNDS					
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor en buiteland/ Non-profit sector and foreign	Totaal/ Total	% van groot-totaal/ % of grand total
	R(000)	R(000)	R(000)	R(000)	R(000)	%
NATUURWETENSKAPPE/ NATURAL SCIENCES						
Universiteite/ Universities						
Kaapstad/ Cape Town	18 308	40 580	7 000	1 159	67 047	15,7
Pretoria	6 040	50 591	9 671	37	66 339	15,5
Witwatersrand	8 599	51 092	154	337	60 182	14,1
Stellenbosch	3 905	31 128	13 208	369	48 611	11,4
Oranje-Vrystaat/ Orange Free State	5 759	31 960	9 960	0	47 679	11,2
Natal	7 200	35 468	4 425	73	47 167	11,1
Randse Afrikaanse	2 486	17 029	1 414	16	20 945	4,9
Potchefstroom	3 824	10 482	1 523	3	15 831	3,7
Rhodes	2 588	8 070	1 350	134	12 141	2,8
Medunsa	0	9 225	9	59	9 293	2,2
Port Elizabeth	2 144	6 519	305	41	9 010	2,1
Durban-Westville	613	4 409	34	6	5 062	1,2
Suid-Afrika/ South Africa	2	4 065	0	0	4 068	1,0
Wes-Kaapland/ Western Cape	0	3 494	0	0	3 494	0,8
Noorde/ North	174	2 473	70	1	2 717	0,6
Zoeloeland/ Zululand	35	1 004	1	5	1 046	0,2
Vista	0	800	0	0	800	0,2
TOTAAL/ TOTAL	61 678	308 391	49 123	2 239	421 431	98,7
Persentasie (%)/ Percentage (%)	15	73	12	1	100	
Technikons	121	5 281	6	0	5 407	1,3
Persentasie (%)/ Percentage (%)	2	98	0	0	100	
GROOTTOTAAL/ GRAND TOTAL	61 798	313 672	49 129	2 239	426 839	100,0
Persentasie (%)/ Percentage (%)	14	73	12	1	100	

TABEL 2.3 (vervolg) : Besteding aan N&O volgens verrigters en bronne van fondse : Tersiêre onderwyssektor
TABLE 2.3 (contd) : Expenditure on R&D according to performers and sources of funds : Tertiary education sector

VERRIGTERS/ PERFORMERS	BRONNE VAN FONDSE/ SOURCES OF FUNDS					
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor en buiteland/ Non-profit sector and foreign	Totaal/ Total	% van groottotaal/ % of grand total
	R(000)	R(000)	R(000)	R(000)	R(000)	%
GEESTESWETENSKAPPE/ HUMAN SCIENCES						
Universiteite/ Universities						
Suid-Afrika/ South Africa	104	30 070	0	0	30 174	11,4
Kaapstad/ Cape Town	1 225	24 103	2 744	657	28 728	10,9
Pretoria	339	26 007	1 340	14	27 700	10,5
Randse Afrikaanse	2 014	25 266	23	50	27 353	10,4
Witwatersrand	639	25 930	0	14	26 583	10,1
Stellenbosch	664	21 046	3 302	1	25 014	9,5
Natal	333	22 427	1 411	26	24 197	9,2
Oranje-Vrystaat/ Orange Free State	776	14 394	3 541	0	18 711	7,1
Potchefstroom	550	9 734	516	6	10 805	4,1
Rhodes	241	6 597	3 716	48	10 602	4,0
Durban-Westville	49	7 382	47	102	7 580	2,9
Vista	0	7 561	0	0	7 561	2,9
Wes-Kaapland/ Western Cape	20	6 284	10	10	6 324	2,4
Port Elizabeth	96	5 314	60	11	5 481	2,1
Zoeloeland/ Zululand	5	2 916	1	0	2 922	1,1
Noorde/ North	2	886	22	8	918	0,3
Medunsa	55	468	18	0	541	0,2
TOTAAL/ TOTAL	7 111	236 383	16 753	947	261 194	99,1
Persentasie (%)/ Percentage (%)	3	91	6	0	100	
Technikons	5	2 401	0	0	2 406	0,9
Persentasie (%)/ Percentage (%)	0	100	0	0	100	
GROOTTOTAAL/ GRAND TOTAL	7 116	238 785	16 753	947	263 601	100,0
Persentasie (%)/ Percentage (%)	3	91	6	0	100	

TABEL 2.4 : Besteding aan N&O volgens verrigters en bronne van fondse : Sakesektor
TABLE 2.4 : Expenditure on R&D according to performers and sources of funds : Business enterprise sector

VERRIGTERS/ PERFORMERS	BRONNE VAN FONDSE/ SOURCES OF FUNDS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor en buiteland/ Non-profit sector and foreign	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES					
Private ondernemings/ Private enterprises	129 901	709	880 356	3 812	1 014 777
Onafhanklike nywerheidnavorsingsinstitute en -laboratoria/ Independent industrial research institutes and laboratories	2 526	0	149 057	0	151 582
Staatsondernemings en landboubeheerrade/ Public corporations and agricultural control boards	1 359	0	129 903	0	131 262
TOTAAL/ TOTAL	133 786	709	1 159 315	3 812	1 297 622
Persentasie (%)/ Percentage (%)	10	0	89	0	100
NATUURWETENSKAPPE/ NATURAL SCIENCES					
Private ondernemings/ Private enterprises	129 651	709	872 819	3 685	1 006 865
Onafhanklike nywerheidnavorsingsinstitute en -laboratoria/ Independent industrial research institutes and laboratories	2 125	0	149 057	0	151 182
Staatsondernemings en landboubeheerrade/ Public corporations and agricultural control boards	1 359	0	106 573	0	107 932
TOTAAL/ TOTAL	133 136	709	1 128 449	3 685	1 265 979
Persentasie (%)/ Percentage (%)	11	0	89	0	100

TABEL 2.4 (vervolg) : Besteding aan N&O volgens verrigters en bronne van fondse : Sakesektor
TABLE 2.4 (contd) : Expenditure on R&D according to performers and sources of funds : Business enterprise sector

VERRIGTERS/ PERFORMERS	BRONNE VAN FONDSE/ SOURCES OF FUNDS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor en buiteland/ Non-profit sector and foreign	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
GEESTESWETENSKAPPE/ HUMAN SCIENCES					
Private ondernemings/ Private enterprises	250	0	7 536	126	7 912
Onafhanklike nywerheidnavorsingsinstitute en -laboratoria/ Independent industrial research institutes and laboratories	401	0	0	0	401
Staatsondernemings en landboubeheerrade/ Public corporations and agricultural control boards	0	0	23 330	0	23 330
TOTAAL/ TOTAL	650	0	30 866	126	31 643
Persentasie (%)/ Percentage (%)	2	0	98	0	100

TABEL 2.5 : Besteding aan N&O volgens verrigters en bronne van fondse
TABLE 2.5 : Expenditure on R&D according to performers and sources of funds

: Nie-winssektor
: Non-profit sector

VERRIGTERS/ PERFORMERS	BRONNE VAN FONDSE/ SOURCES OF FUNDS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-wins-sektor en buiteland/ Non-profit sector and foreign	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES					
Verklaarde inrigtings/ Grants-in-aid declared institutions	16 543	0	279	5 210	22 031
Ander organisasies sonder winsoogmerk/ Other non-profit organisations	11 902	292	1 344	7 438	20 976
TOTAAL/ TOTAL	28 444	292	1 623	12 648	43 008
Persentasie (%)/ Percentage (%)	66	1	4	29	100
NATUURWETENSKAPPE/ NATURAL SCIENCES					
Verklaarde inrigtings/ Grants-in-aid declared institutions	11 665	0	279	1 074	13 018
Ander organisasies sonder winsoogmerk/ Other non-profit organisations	4 455	292	532	5 492	10 772
TOTAAL/ TOTAL	16 121	292	811	6 566	23 790
Persentasie (%)/ Percentage (%)	68	1	3	28	100
GEESTESWETENSKAPPE/ HUMAN SCIENCES					
Verklaarde inrigtings/ Grants-in-aid declared institutions	4 877	0	0	4 136	9 013
Ander organisasies sonder winsoogmerk/ Other non-profit organisations	7 446	0	812	1 946	10 204
TOTAAL/ TOTAL	12 324	0	812	6 082	19 218
Persentasie (%)/ Percentage (%)	64	0	4	32	100

TABEL 2.6 : Besteding aan N&O volgens verrigters en soort besteding
TABLE 2.6 : Expenditure on R&D according to performers and type of expenditure

VERRIGTERS/ PERFORMERS	SOORT BESTEDING/ TYPE OF EXPENDITURE				
	Arbeids-koste/ Labour costs	Oorhoofse koste/ Overheads	Restant van lopende besteding/ Balance of current expenditure	Totale lopende besteding/ Total current expenditure	Apparaat en toerusting/ Apparatus and equipment
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES					
Owerheidsektor/ Government sector	335 747	203 729	178 500	717 976	37 042
Staatsdepartemente/ Government departments	155 366	44 222	51 234	250 821	17 340
Provinsiale administrasies/ Provincial administrations	4 883	287	2 860	8 030	491
Plaaslike owerhede/ Local authorities	831	118	318	1 267	10
Outonome owerheidsliggame/ Autonomous government institutions	174 668	159 102	124 088	457 858	19 202
Tersiêre onderwyssektor/ Tertiary education sector	341 904	216 657	101 817	660 377	30 062
Sakesektor/ Business enterprise sector	703 578	180 612	242 295	1 126 485	171 137
Private ondernemings/ Private enterprises	577 932	137 442	155 368	870 741	144 036
Onafhanklike nywerheidnavorsingsinstitute en laboratoria/ Independent industrial research institutes and laboratories	56 058	28 673	53 867	138 598	12 985
Staatsondernemings en landboubeheerrade/ Public corporations and agricultural control boards	69 588	14 497	33 060	117 145	14 117
Nie-winssektor/ Non-profit sector	27 879	7 755	4 849	40 484	2 523
TOTAAL/ TOTAL	1 409 108	608 753	527 461	2 545 322	240 764
Persentasie (%)/ Percentage (%)	51	22	19	91	9

TABEL 2.6 (vervolg) : Besteding aan N&O volgens verrigters en soort besteding
TABLE 2.6 (contd) : Expenditure on R&D according to performers and type of expenditure

VERRIGTERS/ PERFORMERS	SOORT BESTEDING/ TYPE OF EXPENDITURE				
	Arbeids-koste/ Labour costs	Oorhoofse koste/ Overheads	Restant van lopende besteding/ Balance of current expenditure	Totale lopende besteding/ Total current expenditure	Apparaat en toerusting/ Apparatus and equipment
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUURWETENSKAPPE/ NATURAL SCIENCES					
Owerheidsektor/ Government sector	299 222	189 892	160 126	649 239	36 505
Staatsdepartemente/ Government departments	148 265	43 828	50 909	243 002	17 234
Provinsiale administrasies/ Provincial administrations	4 883	287	2 860	8 030	491
Plaaslike owerhede/ Local authorities	468	90	270	828	9
Outonome owerheidsliggame/ Autonomous government institutions	145 606	145 687	106 087	397 380	18 771
Tersiêre onderwysektor/ Tertiary education sector	190 848	128 602	79 974	399 425	27 414
Sakesektor/ Business enterprise sector	684 618	177 286	235 605	1 097 509	168 470
Private ondernemings/ Private enterprises	574 263	136 293	153 864	864 421	142 444
Onafhanklike nywerheidnavorsingsinstitute en laboratoria/ Independent industrial research institutes and laboratories	55 854	28 625	53 867	138 347	12 835
Staatsondernemings en landboubeheerrade/ Public corporations and agricultural control boards	54 500	12 368	27 873	94 742	13 191
Nie-winssektor/ Non-profit sector	15 383	3 982	3 333	22 699	1 091
TOTAAL/ TOTAL	1 190 071	499 763	479 038	2 168 872	233 480
Persentasie (%)/ Percentage (%)	50	21	20	90	10

TABEL 2.6 (vervolg) : Besteding aan N&O volgens verrigters en soort besteding
TABLE 2.6 (contd) : Expenditure on R&D according to performers and type of expenditure

VERRIGTERS/ PERFORMERS	SOORT BESTEDING/ TYPE OF EXPENDITURE				
	Arbeids-koste/ Labour costs	Oorhoofse koste/ Overheads	Restant van lopende besteding/ Balance of current expenditure	Totale lopende besteding/ Total current expenditure	Apparaat en toerusting/ Apparatus and equipment
	R(000)	R(000)	R(000)	R(000)	R(000)
GEESTESWETENSKAPPE/ HUMAN SCIENCES					
Owerheidsektor/ Government sector	36 525	13 837	18 374	68 736	537
Staatsdepartemente/ Government departments	7 101	394	324	7 820	106
Provinsiale administrasies/ Provincial administrations	0	0	0	0	0
Plaaslike owerhede/ Local authorities	363	28	48	439	1
Outonome owerheidsliggame/ Autonomous government institutions	29 061	13 415	18 002	60 478	430
Tersiêre onderwysektor/ Tertiary education sector	151 056	88 055	21 843	260 953	2 648
Sakesektor/ Business enterprise sector	18 960	3 325	6 690	28 975	2 667
Private ondernemings/ Private enterprises	3 669	1 148	1 503	6 320	1 592
Onafhanklike nywerheidnavorsingsinstitute en laboratoria/ Independent industrial research institutes and laboratories	203	48	0	251	149
Staatsondernemings en landboubeheerrade/ Public corporations and agricultural control boards	15 088	2 129	5 187	22 404	926
Nie-winsektor/ Non-profit sector	12 496	3 773	1 516	17 786	1 432
TOTAAL/ TOTAL	219 037	108 990	48 423	376 450	7 285
Persentasie (%)/ Percentage (%)	57	28	13	98	2

TABEL 2.7 : Besteding aan N&O volgens verrigters en soort N&O
TABLE 2.7 : Expenditure on R&D according to performers and type of R&D

VERRIGTERS/ PERFORMERS	SOORT BESTEDING/ TYPE OF EXPENDITURE			
	Basiese navorsing/ Basic research	Toegepaste navorsing/ Applied research	Ontwikkeling/ Development	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES				
Owerheidsektor/ Government sector	98 081	386 971	269 966	755 018
Staatsdepartemente/ Government departments	36 032	171 087	61 042	268 161
Provinsiale administrasies/ Provincial administrations	807	7 056	658	8 521
Plaaslike owerhede/ Local authorities	114	1 048	114	1 277
Outonome owerheidsliggame/ Autonomous government institutions	61 128	207 780	208 151	477 059
Tersiêre onderwyssektor/ Tertiary education sector	359 788	273 757	56 895	690 439
Sakesektor/ Business enterprise sector	68 633	514 449	714 540	1 297 622
Private ondernemings/ Private enterprises	54 091	336 609	624 078	1 014 777
Onafhanklike nywerheidnavorsingsinstitute en laboratoria/ Independent industrial research institutes and laboratories	7 087	79 640	64 855	151 582
Staatsondernemings en landboubeheerrade/ Public corporations and agricultural control boards	7 455	98 200	25 608	131 262
Nie-winssektor/ Non-profit sector	19 747	20 800	2 461	43 008
TOTAAL/ TOTAL	546 249	1 195 976	1 043 862	2 786 087
Persentasie (%)/ Percentage (%)	20	43	37	100

TABEL 2.7 (vervolg) : Besteding aan N&O volgens verrigters en soort N&O
TABLE 2.7 (contd) : Expenditure on R&D according to performers and type of R&D

VERRIGTERS/ PERFORMERS	SOORT BESTEDING/ TYPE OF EXPENDITURE			
	Basiese navorsing/ Basic research	Toegepaste navorsing/ Applied research	Ontwikkeling/ Development	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
NATUURWETENSKAPPE/ NATURAL SCIENCES				
Owerheidsektor/ Government sector	90 179	346 066	249 499	685 745
Staatsdepartemente/ Government departments	35 248	166 174	58 814	260 236
Provinsiale administrasies/ Provincial administrations	807	7 056	658	8 521
Plaaslike owerhede/ Local authorities	0	837	0	837
Outonome owerheidsliggame/ Autonomous government institutions	54 124	172 000	190 027	416 151
Tersiêre onderwyssektor/ Tertiary education sector	206 721	180 788	39 329	426 839
Sakesektor/ Business enterprise sector	63 155	489 738	713 086	1 265 979
Private ondernemings/ Private enterprises	51 952	331 617	623 296	1 006 865
Onafhanklike nywerheidnavorsingsinstitute en laboratoria/ Independent industrial research institutes and laboratories	7 087	79 389	64 705	151 182
Staatsondernemings en landboubeheerrade/ Public corporations and agricultural control boards	4 116	78 731	25 085	107 932
Nie-winssektor/ Non-profit sector	9 811	12 644	1 335	23 790
TOTAAL/ TOTAL	369 867	1 029 236	1 003 249	2 402 352
Persentasie (%)/ Percentage (%)	15	43	42	100

TABEL 2.7 (vervolg) : Besteding aan N&O volgens verrigters en soort N&O
TABLE 2.7 (contd) : Expenditure on R&D according to performers and type of R&D

VERRIGTERS/ PERFORMERS	SOORT BESTEDING/ TYPE OF EXPENDITURE			
	Basiese navorsing/ Basic research	Toegepaste navorsing/ Applied research	Ontwikkeling/ Development	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
GEESTESWETENSKAPPE/ HUMAN SCIENCES				
Owerheidsektor/ Government sector	7 902	40 905	20 467	69 273
Staatsdepartemente/ Government departments	784	4 913	2 228	7 925
Provinsiale administrasies/ Provincial administrations	0	0	0	0
Plaaslike owerhede/ Local authorities	114	211	114	440
Outonome owerheidsliggame/ Autonomous government institutions	7 003	35 781	18 124	60 908
Tersiêre onderwyssektor/ Tertiary education sector	153 067	92 969	17 565	263 601
Sakesektor/ Business enterprise sector	5 478	24 711	1 454	31 643
Private ondernemings/ Private enterprises	2 139	4 991	782	7 912
Onafhanklike nywerheidnavorsingsinstitute en laboratoria/ Independent industrial research institutes and laboratories	0	251	150	401
Staatsondernemings en landboubeheerrade/ Public corporations and agricultural control boards	3 339	19 468	523	23 330
Nie-winssektor/ Non-profit sector	9 936	8 156	1 126	19 218
TOTAAL/ TOTAL	176 382	166 740	40 613	383 734
Persentasie (%)/ Percentage (%)	46	43	11	100

TABEL 2.8 : Besteding aan N&O volgens toepassingsgebiede en verrigters
TABLE 2.8 : Expenditure on R&D according to fields of application and performers

TOEPASSINGSGEBIEDE/ FIELDS OF APPLICATION	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Landbou, jag, veeartsenykundige dienste, bosbou en visserye/ Agriculture, hunting, veterinary services, forestry and fishing	213 269	46 314	80 930	3 245	343 758
Landbou, jag en landboudienste/ Agriculture, hunting and agricultural services	152 160	29 590	52 471	1 383	235 603
Veeartsenykundige dienste/ Veterinary services	15 958	7 801	7 219	0	30 978
Bosbou en houtkappery/ Forestry and logging	9 609	1 747	17 916	0	29 272
Binnelandse visserye/ Inland fisheries	564	2 518	40	127	3 248
Seevisserye/ Sea fisheries	34 639	2 111	1 146	1 736	39 633
Algemeen/ General	339	2 547	2 138	0	5 025
Mynwese en steengroefwerk/ Mining and quarrying	57 684	7 900	239 293	0	304 877
Goud- en uraanerts en steenkool/ Gold and uranium ore and coal	30 143	4 680	103 708	0	138 530
Ander mynbedrywighede en steengroefwerk/ Other mining and quarrying	12 188	1 616	122 210	0	136 015
Algemeen/ General	15 353	1 604	13 375	0	30 332
Fabriekwese, konstruksie, handel en sakebedrywighede/ Manufacturing, construction, trade and business activities	214 543	73 229	604 378	1 556	893 705
Voedsel, drank en tabak/ Food, beverages and tobacco	14 394	2 335	45 669	0	62 398
Tekstiel-, klerasie- en leernywerhede/ Textile, clothing and leather industries	6 504	272	7 234	0	14 010
Hout, houtprodukte en meubels/ Wood, wood products and furniture	3 096	275	5 706	0	9 076
Papier en papierprodukte; drukwerk en uitgewery/ Paper and paper products; printing and publishing	3 181	690	3 082	0	6 953

TABEL 2.8 (vervolg) : Besteding aan N&O volgens toepassingsgebiede en verrigters
TABLE 2.8 (contd) : Expenditure on R&D according to fields of application and performers

TOEPASSINGSGEBIEDE/ FIELDS OF APPLICATION	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Chemikalieë en chemiese, petroleum-, steenkool-, rubber- en plastiekprodukte/ Chemicals and chemical, petroleum, coal rubber and plastic products	28 615	8 910	150 533	189	188 247
Nie-metaalhoudende mineraalprodukte/ Non-metallic mineral products	10 044	911	30 377	0	41 332
Basiese metaalnywerhede/ Basic metal industries	29 080	2 655	46 216	0	77 951
Gefabriseerde metaalprodukte, masjinerie en toerusting/ Fabricated metal products, machinery and equipment	82 161	16 790	275 500	310	374 761
Ander vervaardigingsnywerhede/ Other manufacturing industries	11 596	2 654	18 765	492	33 508
Subtotaal Vervaardiging/ Subtotal Manufacturing	188 670	35 492	583 082	991	808 235
Boukonstruksie/ Building construction	7 221	1 122	2 236	119	10 699
Dam- en waterwerkekonstruksie/ Dam and waterworks construction	2 138	1 231	452	0	3 821
Ander siviele ingenieurskonstruksie/ Other civil engineering construction	5 481	2 665	2 900	0	11 045
Subtotaal Konstruksie/ Subtotal Construction	14 840	5 017	5 588	119	25 565
Handel en dienste/ Trade and services	10 285	27 228	9 792	406	47 711
Algemene bevordering van handel en nywerheid/ General promotion of industry and trade	747	5 491	5 915	40	12 193
Energie en energiebronne/ Energy and energy sources	1 136	10 560	98 690	297	110 683

TABEL 2.8 (vervolg) : Besteding aan N&O volgens toepassingsgebiede en verrigters
TABLE 2.8 (contd) : Expenditure on R&D according to fields of application and performers

TOEPASSINGSGEBIEDE/ FIELDS OF APPLICATION	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Waterbronne en -benutting/ Water resources and utilisation	14 669	9 277	12 087	90	36 123
Bogrondse waterstelsels/ Overground water systems	1 430	2 942	292	30	4 694
Onderaardse water/ Underground water	2 160	569	295	30	3 053
Watersuiwering en uitvloeiselbehandeling/ Water purification and effluent treatment	5 256	2 792	7 740	0	15 787
Ander/ Other	5 824	2 974	3 760	30	12 588
Vervoer, opberging en kommunikasie/ Transport, storage and communication	28 203	4 792	94 955	0	127 951
Vervoer en opberging/ Transport and storage	23 801	2 380	32 988	0	59 169
Kommunikasie/ Communication	4 402	2 413	61 967	0	68 782
Ander/ Other	0	0	0	0	0
Beskerming van die omgewing/ Protection of the environment	35 146	14 174	18 705	6 017	74 042
Geneeskundige dienste/ Medical services	53 162	64 894	10 705	4 963	133 724
Onderwys- en voorligtingsdienste/ Educational and guidance services	31 230	30 390	4 451	3 459	69 531
Openbare bestuur/ Public management	26 745	15 637	19 200	3 500	65 082
Publieke administrasie/ Public administration	934	3 546	1 396	10	5 886
Binnelandse wet en orde/ Internal law and order and justice	1 330	2 060	0	3 181	6 570
Die nasionale ekonomie/ The national economy	3 350	2 030	11 016	10	16 406
Mannekragbenutting/ Manpower utilisation	14 145	2 696	349	10	17 200
Volkereverhoudings/ Ethnic relations	997	883	6	39	1 925
Internasionale verhoudings/ International relations	914	1 434	4 458	90	6 896
Stads- en streekbeplanning/ Urban and rural planning	4 508	2 968	1 759	161	9 396
Ander openbare bestuursaspekte/ Other public management	568	20	216	0	803

TABEL 2.8 (vervolg) : Besteding aan N&O volgens toepassingsgebiede en verrigters
TABLE 2.8 (contd) : Expenditure on R&D according to fields of application and performers

TOEPASSINGSGEBIEDE/ FIELDS OF APPLICATION	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-wins-sektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Maatskaplike en kulturele sake/ Social and cultural affairs	5 699	30 490	3 969	7 155	47 312
Maatskaplike dienslewering/ Social work service	801	5 113	125	422	6 461
Kulturele terrein/ Cultural field	414	7 290	267	4 367	12 339
Massamedia/ Mass media	981	2 024	3 409	0	6 413
Sport en vryetydsbesteding/ Sport, recreation and utilisation of leisure	333	1 675	13	1 074	3 095
Verbruikersaangeleenthede/ Consumer affairs	458	1 411	0	0	1 869
Werksomstandighede en arbeidsverhoudings/ Improved working conditions and labour relations	1 283	2 756	9	6	4 054
Kommunikasie in die samelewing/ Communication in society	1 428	9 003	147	135	10 713
Biblioteekdienste/ Library and information services	0	599	0	782	1 381
Ander maatskaplike en kulturele sake/ Other social and cultural affairs	0	619	0	369	988
Religieuse terrein/ Religious field	0	6 057	0	4	6 061
Verkenning en evaluering van die aarde, see, atmosfeer en ruimte/ Exploration and assessment of the earth, seas, atmosphere and space	26 752	15 854	913	148	43 666
Algemene bevordering van kennis/ General advancement of knowledge	35 416	355 370	30 280	10 474	431 540
Navorsing nie elders vermeld nie/ Research not classified elsewhere	11 364	5 502	79 066	2 100	98 032
TOTAAL/ TOTAL	755 018	690 439	1 297 622	43 008	2 786 087
Persentasie (%)/ Percentage (%)	27	25	47	2	100

TABEL 2.9 : Besteding aan N&O volgens navorsingsgebiede en verrigters : Alle sektore
TABLE 2.9 : Expenditure on R&D according to research fields and performers : All sectors

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-wins-sektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Astronomie en landmeetkunde/ Astronomy and surveying	10 286	6 608	1 423	65	18 382
Astronomie/ Astronomy	7 934	1 200	0	0	9 134
Opmeetkunde/ Surveying	0	247	369	0	615
Geodesie/ Geodesy	290	323	0	0	614
Fotogrammetrie/ Photogrammetry	612	512	0	0	1 124
Stads- en streekbeplanning/ Town and regional planning	1 449	4 069	1 054	0	6 573
Diverse/ Miscellaneous	0	257	0	65	322
Landbou, biologie en bosbou/ Agriculture, biology and forestry	193 946	91 407	91 289	16 754	393 396
Landbou-ekonomie en -voorligting/ Agricultural economics and extension	1 772	7 119	1 795	0	10 686
Veekunde/ Animal science	26 289	6 615	3 785	0	36 690
Plantkunde/ Botany	18 382	13 146	5 980	7 687	45 195
Bosbou/ Forestry	13 351	108	13 403	51	26 913
Genetika/ Genetics	17 428	6 421	11 884	214	35 949
Plantpatologie/ Plant pathology	11 777	5 034	9 664	0	26 475
Mikrobiologie/ Microbiology	13 349	12 603	15 972	58	41 982
Plantproduksie/ Plant production	38 616	6 202	19 162	0	63 980
Grondkunde/ Soil science	14 101	3 224	2 264	42	19 631
Dierkundige wetenskappe/ Zoological science	31 443	22 173	6 229	4 744	64 589
Marienebiologie/ Marine biology	2 482	4 261	948	3 285	10 976
Varswaterbiologie en limnologie/ Freshwater biology and limnology	4 955	4 500	203	673	10 332
Aardwetenskappe/ Earth Sciences	88 225	38 978	37 690	1 184	166 077
Weerkunde en landbouweerkunde/ Meteorology and agricultural meteorology	5 794	3 163	3 286	0	12 243
Aardrykskunde/ Geography	0	9 024	0	0	9 024
Geologie/ Geology	23 887	16 178	9 289	1 121	50 475
Metallurgiese chemie en geochemie/ Metallurgical chemistry and geochemistry	20 680	3 189	11 494	0	35 364
Geofisika/ Geophysics	6 287	2 912	11 065	0	20 264
Oseanografie/ Oceanography	26 537	1 992	1 470	0	29 999
Hidrologie/ Hydrology	5 040	2 520	1 087	63	8 709

TABEL 2.9 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Alle sektore
TABLE 2.9 (contd) : Expenditure on R&D according to research fields and performers : All sectors

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Wiskundige wetenskappe/ Mathematical sciences	15 760	35 088	72 195	0	123 043
Wiskunde/ Mathematics	68	10 620	34	0	10 722
Toegepaste wiskunde/ Applied mathematics	0	6 686	112	0	6 798
Statistiek/ Statistics	3 162	7 432	2 302	0	12 895
Biometrie/ Biometrics	824	799	18	0	1 641
Operasionele navorsing/ Operational research	0	700	2 080	0	2 780
Rekenaarwetenskap/ Computer science	11 706	8 852	67 649	0	88 207
Geneeskunde/ Medical sciences	53 808	111 425	23 256	4 492	192 981
Tandheelkunde/ Dental science	158	3 237	150	0	3 544
Interne menslike geneeskunde/ Internal human medicine	0	8 203	2 237	242	10 681
Obstetrie en ginekologie/ Obstetrics and gynaecology	0	5 105	0	0	5 105
Chirurgie en anestesiologie/ Surgery and anaesthetics	0	10 953	231	0	11 184
Omvattende geneeskunde en onchoterapie/ Comprehensive medicine and oncotherapy	33 772	9 222	812	587	44 392
Pediatrie/ Paediatrics	0	4 815	231	0	5 046
Psigiatrie/ Psychiatry	0	994	0	0	994
Anatomie en histologie/ Anatomy and histology	266	3 668	281	0	4 216
Fisiologie/ Physiology	650	7 521	147	176	8 495
Mediese biochemie/ Medical biochemistry	892	5 744	0	71	6 707
Patologie/ Pathology	983	3 794	1 877	468	7 122
Farmasie/ Pharmacy	68	9 271	11 281	20	20 640
Geneeskundige interdissiplinêre vakrigtings/ Medical interdisciplinary subject fields	8 114	23 678	58	2 878	34 727
Aanvullende gesondheidswetenskappe/ Supplementary health sciences	58	4 172	2 508	51	6 788
Verpleegkunde/ Nursing science	5	3 908	0	0	3 913
Veeartsenykunde/ Veterinary science	8 842	7 142	3 443	0	19 426
Chemie/ Chemistry	59 420	40 260	119 236	663	219 579
Analitiese chemie/ Analytical chemistry	23 649	7 086	37 546	0	68 281
Biochemie/ Biochemistry	3 651	10 115	5 263	393	19 422
Anorganiese chemie/ Inorganic chemistry	13 348	7 577	10 152	0	31 077
Organiese chemie/ Organic chemistry	18 698	9 084	61 926	270	89 978
Fisiese en teoretiese chemie/ Physical and theoretical chemistry	73	6 398	4 350	0	10 821

TABEL 2.9 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Alle sektore
TABLE 2.9 (contd) : Expenditure on R&D according to research fields and performers : All sectors

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Fisika/ Physics	27 996	23 881	85 891	0	137 768
Teoretiese fisika/ Theoretical physics	0	5 360	0	0	5 360
Akoestiek/ Acoustics	0	793	1 248	0	2 041
Atoom- en molekuulfisika/ Atomic and molecular physics	716	1 079	0	0	1 795
Atmosferiese fisika/ Atmospheric physics	734	1 596	2 112	0	4 442
Elektrisiteit en magnetisme/ Electricity and magnetism	2 162	1 308	8 191	0	11 660
Kernfisika/ Nuclear physics	14 945	3 483	0	0	18 429
Lig- en elektromagnetiese golwe/ Light and electromagnetic waves	3 089	1 822	49 672	0	54 582
Vastetoestand-fisika/ Solid state physics	3 150	6 702	22 194	0	32 046
Algemene fisika/ General physics	3 201	1 738	2 473	0	7 412
Tegnologie/ Technology	55 684	8 768	147 978	0	212 430
Voedseltegnologie/ Food technology	9 618	1 207	10 059	0	20 885
Wyntegnologie en wynkunde/ Wine technology and oenology	899	353	4 194	0	5 447
Fermentasietegnologie/ Fermentation technology	560	94	3 233	0	3 887
Watertegnologie/ Water technology	4 829	2 497	17 304	0	24 629
Tabaktegnologie/ Tobacco technology	0	0	1 869	0	1 869
Pulp- en papiertegnologie/ Pulp and paper technology	901	195	8 207	0	9 304
Verpakkingstegnologie/ Packing technology	0	0	5 923	0	5 923
Tekstiel- en leertegnologie/ Textile and leather technology	6 276	116	3 213	0	9 605
Brandstoftegnologie/ Fuel technology	295	309	14 196	0	14 801
Boutegnologie/ Building technology	7 481	104	346	0	7 932
Verftegnologie/ Paint technology	612	21	1 496	0	2 129
Keramiektegnologie/ Ceramic technology	4 617	519	11 293	0	16 429
Houttegnologie/ Timber technology	1 008	771	784	0	2 564
Huishoudkunde/ Domestic science	0	880	0	0	880
Yster- en staaltegnologie/ Iron and steel technology	7 384	8	5 265	0	12 657
Plastiek- en polimeertegnologie/ Plastics and polymer technology	4 556	787	10 169	0	15 513
Partikeltegnologie/ Particle technology	2 154	71	10 887	0	13 111
Diverse tegnologieë/ Miscellaneous technologies	4 493	835	39 540	0	44 868

TABEL 2.9 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Alle sektore
TABLE 2.9 (contd) : Expenditure on R&D according to research fields and performers : All sectors

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Ingenieurswese/ Engineering	180 620	70 422	687 022	631	938 696
Landbou-ingenieurswese/ Agricultural engineering	5 640	167	467	0	6 274
Argitektuur/ Architecture	0	4 879	57	92	5 028
Chemiese ingenieurswese/ Chemical engineering	5 911	5 636	77 476	0	89 024
Siviele ingenieurswese/ Civil engineering	12 347	6 443	9 579	67	28 436
Elektriese ingenieurswese/ Electrical engineering	10 377	13 196	71 324	405	95 302
Elektronika/ Electronics	34 228	10 985	220 420	0	265 632
Meganiese ingenieurswese/ Mechanical engineering	18 441	10 334	75 809	67	104 652
Bedryfs- en vervaardigingsingenieurswese/ Industrial and manufacturing engineering	13 310	1 308	21 800	0	36 418
Metallurgiese ingenieurswese/ Metallurgical engineering	12 308	4 442	104 862	0	121 613
Mynbou-ingenieurswese/ Mining engineering	34 399	1 411	43 157	0	78 968
Diverse ingenieurswese/ Miscellaneous engineering	33 659	11 620	62 071	0	107 349
Wysgerige, sosiale en menswetenskappe/ Philosophical, social and human sciences	48 190	146 763	6 618	13 525	215 096
Sielkunde/ Psychology	12 988	23 400	263	56	36 708
Sosiologie/ Sociology	2 631	10 611	117	0	13 359
Demografie/ Demography	5 123	1 094	663	209	7 089
Kriminologie/ Criminology	2 370	2 489	0	209	5 068
Maatskaplike werk/ Welfare work	1 178	3 463	0	631	5 272
Argeologie en Menslike Paleontologie/ Archaeology and human palaeontology	0	6 004	0	1 524	7 528
Antropologie Etnologie/ Anthropology Ethnology	1 812	5 088	39	877	7 816
Opvoedkunde/ Education	16 014	33 007	832	1 011	50 864
Filosofie/ Wysbegeerte/ Philosophy	0	5 229	0	0	5 229
Teologie/ Theology	0	12 511	0	0	12 511
Geskiedenis/ History	812	10 858	739	2 600	15 009
Kommunikasiekunde en Joernalistiek/ Communication science and journalism	3 961	3 030	3 957	79	11 027
Biblioteek- en Inligtingkunde/ Library and information science	0	2 615	0	1 961	4 576
Regsgeleerdheid/ Law	1 286	23 885	0	3 210	28 381
Afrikaanse kultuur- en volkskunde/ Afrikaans culture and folklore	0	533	0	1 137	1 670
Bewegingskunde/ Movement science	0	1 939	0	0	1 939
Rekreasiekunde/ Recreation science	15	1 007	9	20	1 050

TABEL 2.9 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Alle sektore
TABLE 2.9 (contd) : Expenditure on R&D according to research fields and performers : All sectors

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Ekonomiese wetenskappe/ Economic sciences	16 026	43 798	22 845	955	83 624
Bedryfsekonomie/ Business economics	140	6 877	4 143	0	11 160
Vervoerekonomie/ Transport economics	2 384	2 382	3 419	391	8 577
Ekonomie/ Economics	6 698	12 966	12 643	489	32 796
Bedryfsleiding en -administrasie/ Business leadership and administration	1 652	6 206	1 250	67	9 175
Mannekragnavorsing/ Manpower research	4 805	5 746	1 275	7	11 833
Rekeningkunde en verwante vakke/ Accounting and related subjects	347	9 621	115	0	10 083
Staatswetenskappe/ Political sciences	4 985	10 425	2 105	1 128	18 643
Staatsleer/ Political science	2 693	6 018	709	547	9 966
Publieke administrasie/ Public administration	572	2 468	698	581	4 320
Ontwikkelingsadministrasie en -politiek/ Development administration and politics	1 720	1 939	698	0	4 357
Tale/ Languages	0	47 909	0	206	48 115
Taalkunde/ Linguistics	0	20 598	0	0	20 598
Letterkunde/ Literature	0	27 311	0	206	27 517
Kunste/ Arts	0	13 962	0	3 404	17 366
Beeldende kunste/ Fine arts	0	3 574	0	465	4 039
Uitvoerende kunste/ Performing arts	0	2 779	0	0	2 779
Musiek/ Music	0	4 622	0	0	4 622
Boukuns/ Architecture	0	248	0	149	397
Toegepaste kuns/ Applied art	0	502	0	1 436	1 938
Kunsgeskiedenis/ History of art	0	2 237	0	1 354	3 591
Toekomskunde/ Future studies	72	743	74	0	890
TOTAAL/ TOTAL	755 018	690 439	1 297 622	43 007	2 786 087
Persentasie (%)/ Percentage (%)	27	25	47	2	100

TABEL 2.10 : Besteding aan N&O volgens navorsingsgebiede en verrigters : **Owerheidsektor**
TABLE 2.10 : Expenditure on R&D according to research fields and performers : **Government sector**

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Staats-departemente en -bedrywe/ Government departments and industries	Provinsiale administrasies/ Provincial administrations	Plaaslike owerhede/ Local authorities	Outonome owerheids-liggame/ Autonomous government institutions	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Astronomie en landmeetkunde/ Astronomy and surveying	0	0	837	9 449	10 286
Astronomie/ Astronomy	0	0	0	7 934	7 934
Opmeetkunde/ Surveying	0	0	0	0	0
Geodesie/ Geodesy	0	0	0	290	290
Fotogrammetrie/ Photogrammetry	0	0	0	612	612
Stads- en streekbeplanning/ Town and regional planning	0	0	837	612	1 449
Diverse/ Miscellaneous	0	0	0	0	0
Landbou, biologie en bosbou/ Agriculture, biology and forestry	153 346	8 521	0	32 078	193 946
Landbou-ekonomie en -voorligting/ Agricultural economics and extension	1 597	0	0	175	1 772
Veekunde/ Animal science	26 289	0	0	0	26 289
Plantkunde/ Botany	14 123	2 504	0	1 756	18 382
Bosbou/ Forestry	0	0	0	13 351	13 351
Genetika/ Genetics	13 794	0	0	3 634	17 428
Plantpatologie/ Plant pathology	9 908	0	0	1 869	11 777
Mikrobiologie/ Microbiology	10 045	0	0	3 304	13 349
Plantproduksie/ Plant production	38 616	0	0	0	38 616
Grondkunde/ Soil science	14 018	0	0	83	14 101
Dierkundige wetenskappe/ Zoological science	24 057	3 789	0	3 597	31 443
Marieneblologie/ Marine biology	0	104	0	2 378	2 482
Varswaterbiologie en limnologie/ Freshwater biology and limnology	899	2 125	0	1 931	4 955
Aardwetenskappe/ Earth Sciences	61 162	0	0	27 064	88 225
Weerkunde en landbouweerkunde/ Meteorology and agricultural meteorology	5 733	0	0	61	5 794
Aardrykskunde/ Geography	0	0	0	0	0
Geologie/ Geology	18 010	0	0	5 877	23 887
Metallurgiese chemie en geochemie/ Metallurgical chemistry and geochemistry	5 913	0	0	14 767	20 680
Geofisika/ Geophysics	5 553	0	0	734	6 287
Oseanografie/ Oceanography	25 803	0	0	734	26 537
Hidrologie/ Hydrology	150	0	0	4 890	5 040

TABEL 2.10 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Owerheidsaktor
TABLE 2.10 (contd) : Expenditure on R&D according to research fields and performers : Government sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Staats-departemente en -bedrywe/ Government departments and industries	Provinsiale administrasies/ Provincial administrations	Plaaslike owerhede/ Local authorities	Outonome owerheids-liggame/ Autonomous government institutions	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Wiskundige wetenskappe/ Mathematical sciences	1 839	0	0	13 921	15 760
Wiskunde/ Mathematics	0	0	0	68	68
Toegepaste wiskunde/ Applied mathematics	0	0	0	0	0
Statistiek/ Statistics	0	0	0	3 162	3 162
Biometrie/ Biometrics	763	0	0	61	824
Operasionele navorsing/ Operational research	0	0	0	0	0
Rekenaarwetenskap/ Computer science	1 076	0	0	10 630	11 706
Geneeskunde/ Medical sciences	13 508	0	0	40 299	53 808
Tandheelkunde/ Dental science	158	0	0	0	158
Interne menslike geneeskunde/ Internal human medicine	0	0	0	0	0
Obstetrie en ginekologie/ Obstetrics and gynaecology	0	0	0	0	0
Chirurgie en anestesiologie/ Surgery and anaesthetics	0	0	0	0	0
Omvattende geneeskunde en onchoterapie/ Comprehensive medicine and oncotherapy	693	0	0	33 078	33 772
Pediatrie/ Paediatrics	0	0	0	0	0
Psigiatrie/ Psychiatry	0	0	0	0	0
Anatomie en histologie/ Anatomy and histology	0	0	0	266	266
Fisiologie/ Physiology	344	0	0	306	650
Mediese biochemie/ Medical biochemistry	448	0	0	444	892
Patologie/ Pathology	539	0	0	444	983
Farmasie/ Pharmacy	0	0	0	68	68
Geneeskundige interdissiplinêre vakrigtings/ Medical interdisciplinary subject fields	3 515	0	0	4 599	8 114
Aanvullende gesondheidswetenskappe/ Supplementary health sciences	58	0	0	0	58
Verpleegkunde/ Nursing science	5	0	0	0	5
Veeartsenykunde/ Veterinary science	7 747	0	0	1 094	8 842
Chemie/ Chemistry	13 602	0	0	45 817	59 420
Analitiese chemie/ Analytical chemistry	11 642	0	0	12 008	23 649
Biochemie/ Biochemistry	1 961	0	0	1 690	3 651
Anorganiese chemie/ Inorganic chemistry	0	0	0	13 348	13 348
Organiese chemie/ Organic chemistry	0	0	0	18 698	18 698
Fisiese en teoretiese chemie/ Physical and theoretical chemistry	0	0	0	73	73

TABEL 2.10 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Owerheidsektor
TABLE 2.10 (contd) : Expenditure on R&D according to research fields and performers : Government sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Staatsdepartemente en -bedrywe/ Government departments and industries	Provinsiale administrasies/ Provincial administrations	Plaaslike owerhede/ Local authorities	Outonome owerheidsliggame/ Autonomous government institutions	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Fisika/ Physics	1 731	0	0	26 265	27 996
Teoretiese fisika/ Theoretical physics	0	0	0	0	0
Akoestiek/ Acoustics	0	0	0	0	0
Atoom- en molekuulfisika/ Atomic and molecular physics	0	0	0	716	716
Atmosferiese fisika/ Atmospheric physics	0	0	0	734	734
Elektrisiteit en magnetisme/ Electricity and magnetism	0	0	0	2 162	2 162
Kernfisika/ Nuclear physics	0	0	0	14 945	14 945
Lig- en elektromagnetiese golwe/ Light and electromagnetic waves	1 731	0	0	1 358	3 089
Vastetoestand-fisika/ Solid state physics	0	0	0	3 150	3 150
Algemene fisika/ General physics	0	0	0	3 201	3 201
Tegnologie/ Technology	8 649	0	0	47 035	55 684
Voedseltegnologie/ Food technology	7 749	0	0	1 869	9 618
Wyntegnologie en wynkunde/ Wine technology and oenology	899	0	0	0	899
Fermentasietegnologie/ Fermentation technology	0	0	0	560	560
Watertegnologie/ Water technology	0	0	0	4 829	4 829
Tabaktegnologie/ Tobacco technology	0	0	0	0	0
Pulp- en papiertegnologie/ Pulp and paper technology	0	0	0	901	901
Verpakkingstegnologie/ Packing technology	0	0	0	0	0
Tekstiel- en leertegnologie/ Textile and leather technology	0	0	0	6 276	6 276
Brandstoftegnologie/ Fuel technology	0	0	0	295	295
Boutegnologie/ Building technology	0	0	0	7 481	7 481
Verftegnologie/ Paint technology	0	0	0	612	612
Keramiektegnologie/ Ceramic technology	0	0	0	4 617	4 617
Houttegnologie/ Timber technology	0	0	0	1 008	1 008
Huishoudkunde/ Domestic science	0	0	0	0	0
Yster- en staaltegnologie/ Iron and steel technology	0	0	0	7 384	7 384
Plastiek- en polimeertegnologie/ Plastics and polymer technology	0	0	0	4 556	4 556
Partikeltegnologie/ Particle technology	0	0	0	2 154	2 154
Diverse tegnologieë/ Miscellaneous technologies	0	0	0	4 493	4 493

TABEL 2.10 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Owerheidsektor
TABLE 2.10 (contd) : Expenditure on R&D according to research fields and performers : Government sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Staats-departemente en -bedrywe/ Government departments and industries	Provinsiale administrasies/ Provincial administrations	Plaaslike owerhede/ Local authorities	Outonome owerheids-liggame/ Autonomous government institutions	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Ingenieurswese/ Engineering	6 399	0	0	174 221	180 620
Landbou-ingenieurswese/ Agricultural engineering	5 640	0	0	0	5 640
Argitektuur/ Architecture	0	0	0	0	0
Chemiese ingenieurswese/ Chemical engineering	0	0	0	5 911	5 911
Siviele ingenieurswese/ Civil engineering	0	0	0	12 347	12 347
Elektriese ingenieurswese/ Electrical engineering	0	0	0	10 377	10 377
Elektronika/ Electronics	0	0	0	34 228	34 228
Meganiese ingenieurswese/ Mechanical engineering	0	0	0	18 441	18 441
Bedryfs- en vervaardigingsingenieurswese/ Industrial and manufacturing engineering	0	0	0	13 310	13 310
Metallurgiese ingenieurswese/ Metallurgical engineering	0	0	0	12 308	12 308
Mynbou-ingenieurswese/ Mining engineering	759	0	0	33 640	34 399
Diverse ingenieurswese/ Miscellaneous engineering	0	0	0	33 659	33 659
Wysgerige, sosiale en menswetenskappe/ Philosophical, social and human sciences	5 831	0	0	42 359	48 190
Sielkunde/ Psychology	441	0	0	12 548	12 988
Sosiologie/ Sociology	0	0	0	2 631	2 631
Demografie/ Demography	0	0	0	5 123	5 123
Kriminologie/ Criminology	0	0	0	2 370	2 370
Maatskaplike werk/ Welfare work	0	0	0	1 178	1 178
Argeologie en Menslike Paleontologie/ Archaeology and human palaeontology	0	0	0	0	0
Antropologie Etnologie/ Anthropology Ethnology	0	0	0	1 812	1 812
Opvoedkunde/ Education	5 327	0	0	10 687	16 014
Filosofie/ Wysbegeerte/ Philosophy	0	0	0	0	0
Teologie/ Theology	0	0	0	0	0
Geskiedenis/ History	0	0	0	812	812
Kommunikasiekunde en Joernalistiek/ Communication science and journalism	0	0	0	3 961	3 961
Biblioteek- en Inligtingkunde/ Library and information science	0	0	0	0	0
Regsgeleerdheid/ Law	63	0	0	1 223	1 286
Afrikaanse kultuur- en volkskunde/ Afrikaans culture and folklore	0	0	0	0	0
Bewegingskunde/ Movement science	0	0	0	0	0
Rekreasiekunde/ Recreation science	0	0	0	15	15

TABEL 2.10 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Owerheidsektor
TABLE 2.10 (contd) : Expenditure on R&D according to research fields and performers : Government sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Staats-departemente en -bedrywe/ Government departments and industries	Provinsiale administrasies/ Provincial administrations	Plaaslike owerhede/ Local authorities	Outonome owerheids-liggame/ Autonomous government institutions	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Ekonomiese wetenskappe/ Economic sciences	1 522	0	347	14 157	16 026
Bedryfsekonomie/ Business economics	0	0	0	140	140
Vervoerekonomie/ Transport economics	0	0	0	2 384	2 384
Ekonomie/ Economics	0	0	0	6 698	6 698
Bedryfsleiding en -administrasie/ Business leadership and administration	0	0	0	1 652	1 652
Mannekragnavorsing/ Manpower research	1 522	0	0	3 283	4 805
Rekeningkunde en verwante vakke/ Accounting and related subjects	0	0	347	0	347
Staatswetenskappe/ Political sciences	572	0	93	4 320	4 985
Staatsleer/ Political science	0	0	93	2 600	2 693
Publieke administrasie/ Public administration	572	0	0	0	572
Ontwikkelingsadministrasie en -politiek/ Development administration and politics	0	0	0	1 720	1 720
Tale/ Languages	0	0	0	0	0
Taalkunde/ Linguistics	0	0	0	0	0
Letterkunde/ Literature	0	0	0	0	0
Kunste/ Arts	0	0	0	0	0
Beeldende kunste/ Fine arts	0	0	0	0	0
Uitvoerende kunste/ Performing arts	0	0	0	0	0
Musiek/ Music	0	0	0	0	0
Boukuns/ Architecture	0	0	0	0	0
Toegepaste kuns/ Applied art	0	0	0	0	0
Kunsgeskiedenis/ History of art	0	0	0	0	0
Toekomskunde/ Future studies	0	0	0	72	72
TOTAAL/ TOTAL	268 161	8 521	1 277	477 059	755 018
Persentasie (%)/ Percentage (%)	36	1	0	63	100

TABEL 2.11 : Besteding aan N&O volgens navorsingsgebiede en verrigters : Tersiêre onderwyssektor
TABLE 2.11 : Expenditure on R&D according to research fields and performers : Tertiary education sector

NAVORSINGSGEBIËDE/ RESEARCH FIELDS	VERRIGTERS (Tersiêre onderwysrigtings)/ PERFORMERS (Tertiary education institutes)				
	Inrigtings in die Kaap-provinsie/ Institutions in the Cape Province	Inrigtings in die Oranje-Vrystaat/ Institutions in the Orange Free State	Inrigtings in Transvaal/ Institutions in Transvaal	Inrigtings in Natal/ Institutions in Natal	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Astronomie en landmeetkunde/ Astronomy and surveying	2 316	1 482	1 895	915	6 608
Astronomie/ Astronomy	860	0	340	0	1 200
Opmeetkunde/ Surveying	15	0	0	231	247
Geodesie/ Geodesy	192	0	129	3	323
Fotogrammetrie/ Photogrammetry	505	0	7	0	512
Stads- en streekbeplanning/ Town and regional planning	745	1 482	1 162	681	4 069
Diverse/ Miscellaneous	0	0	257	0	257
Landbou, biologie en bosbou/ Agriculture, biology and forestry	28 442	18 221	27 037	17 707	91 407
Landbou-ekonomie en -voorligting/ Agricultural economics and extension	924	1 065	2 078	3 052	7 119
Veekunde/ Animal science	2 180	762	2 193	1 481	6 615
Plantkunde/ Botany	4 238	348	4 443	4 118	13 146
Bosbou/ Forestry	108	0	0	0	108
Genetika/ Genetics	1 025	4 115	1 261	21	6 421
Plantpatologie/ Plant pathology	677	1 758	1 811	788	5 034
Mikrobiologie/ Microbiology	4 210	4 019	2 261	2 113	12 603
Plantproduksie/ Plant production	1 710	2 087	1 356	1 049	6 202
Grondkunde/ Soil science	276	600	1 015	1 333	3 224
Dierkundige wetenskappe/ Zoological science	8 726	1 828	9 700	1 919	22 173
Marienebiologie/ Marine biology	2 890	0	283	1 088	4 261
Varswaterbiologie en limnologie/ Freshwater biology and limnology	1 478	1 639	637	746	4 500
Aardwetenskappe/ Earth Sciences	13 511	5 274	14 488	5 705	38 978
Weerkunde en landbouweerkunde/ Meteorology and agricultural meteorology	306	942	1 915	0	3 163
Aardrykskunde/ Geography	4 590	828	1 709	1 897	9 024
Geologie/ Geology	3 390	3 474	7 203	2 111	16 178
Metallurgiese chemie en geochemie/ Metallurgical chemistry and geochemistry	2 110	0	566	514	3 189
Geofisika/ Geophysics	15	0	2 898	0	2 912
Oseanografie/ Oceanography	1 471	0	7	514	1 992
Hidrologie/ Hydrology	1 630	31	190	669	2 520

TABEL 2.11 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Tersiêre onderwyssektor
TABLE 2.11 (contd) : Expenditure on R&D according to research fields and performers : Tertiary education sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS (Tersiêre onderwysrigtings)/ PERFORMERS (Tertiary education institutes)				
	Inrigtings in die Kaap-provinsie/ Institutions in the Cape Province	Inrigtings in die Oranje-Vrystaat/ Institutions in the Orange Free State	Inrigtings in Transvaal/ Institutions in Transvaal	Inrigtings in Natal/ Institutions in Natal	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Wiskundige wetenskappe/ Mathematical sciences	11 699	3 831	15 900	3 659	35 088
Wiskunde/ Mathematics	4 440	568	4 456	1 157	10 620
Toegepaste wiskunde/ Applied mathematics	2 601	657	2 617	811	6 686
Statistiek/ Statistics	1 068	2 078	3 638	648	7 432
Biometrie/ Biometrics	503	0	46	250	799
Operasionele navorsing/ Operational research	320	132	214	34	700
Rekenaarwetenskap/ Computer science	2 769	397	4 928	758	8 852
Geneeskunde/ Medical sciences	27 161	22 932	51 048	10 284	111 425
Tandheelkunde/ Dental science	371	110	2 696	59	3 237
Interne menslike geneeskunde/ Internal human medicine	1 225	2 758	2 072	2 147	8 203
Obstetrie en ginekologie/ Obstetrics and gynaecology	1 281	916	2 759	150	5 105
Chirurgie en anestesiologie/ Surgery and anaesthetics	2 742	1 612	5 658	942	10 953
Omvattende geneeskunde en onchoterapie/ Comprehensive medicine and oncotherapy	1 350	1 556	4 707	1 609	9 222
Pediatrie/ Paediatrics	1 018	660	1 749	1 388	4 815
Psigiatrie/ Psychiatry	23	330	419	222	994
Anatomie en histologie/ Anatomy and histology	1 214	69	2 283	102	3 668
Fisiologie/ Physiology	2 839	1 211	3 183	288	7 521
Mediese biochemie/ Medical biochemistry	3 571	186	1 497	490	5 744
Patologie/ Pathology	912	836	1 709	338	3 794
Farmasie/ Pharmacy	1 690	4 713	1 714	1 154	9 271
Geneeskundige interdissiplinêre vakrigtings/ Medical interdisciplinary subject fields	7 196	6 834	8 679	968	23 678
Aanvullende gesondheidswetenskappe/ Supplementary health sciences	1 030	367	2 669	106	4 172
Verpleegkunde/ Nursing science	458	690	2 438	321	3 908
Veeartsenykunde/ Veterinary science	241	85	6 816	0	7 142
Chemie/ Chemistry	15 673	6 382	14 029	4 176	40 260
Analitiese chemie/ Analytical chemistry	3 475	260	2 775	575	7 086
Biochemie/ Biochemistry	2 637	2 240	3 745	1 493	10 115
Anorganiese chemie/ Inorganic chemistry	3 411	1 507	2 002	657	7 577
Organiese chemie/ Organic chemistry	4 411	2 147	1 614	912	9 084
Fisiese en teoretiese chemie/ Physical and theoretical chemistry	1 739	228	3 893	539	6 398

TABEL 2.11 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Tersiêre onderwysektor
TABLE 2.11 (contd) : Expenditure on R&D according to research fields and performers : Tertiary education sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS (Tersiêre onderwysrigtings)/ PERFORMERS (Tertiary education institutes)				
	Inrigtings in die Kaap-provinsie/ Institutions in the Cape Province	Inrigtings in die Oranje-Vrystaat/ Institutions in the Orange Free State	Inrigtings in Transvaal/ Institutions in Transvaal	Inrigtings in Natal/ Institutions in Natal	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Fisika/ Physics	6 682	2 839	10 334	4 026	23 881
Teoretiese fisika/ Theoretical physics	1 348	505	1 922	1 585	5 360
Akoestiek/ Acoustics	0	355	0	438	793
Atoom- en molekuulfisika/ Atomic and molecular physics	420	0	290	369	1 079
Atmosferiese fisika/ Atmospheric physics	197	505	456	438	1 596
Elektrisiteit en magnetisme/ Electricity and magnetism	719	151	0	438	1 308
Kernfisika/ Nuclear physics	1 406	0	1 772	305	3 483
Lig- en elektromagnetiese golwe/ Light and electromagnetic waves	691	668	304	158	1 822
Vastetoestand-fisika/ Solid state physics	1 471	505	4 579	148	6 702
Algemene fisika/ General physics	430	150	1 011	146	1 738
Tegnologie/ Technology	5 446	763	2 031	528	8 768
Voedseltegnologie/ Food technology	322	398	436	51	1 207
Wyntegnologie en wynkunde/ Wine technology and oenology	353	0	0	0	353
Fermentasietegnologie/ Fermentation technology	6	0	88	0	94
Watertegnologie/ Water technology	2 004	208	116	169	2 497
Tabaktegnologie/ Tobacco technology	0	0	0	0	0
Pulp- en papiertegnologie/ Pulp and paper technology	172	0	0	24	195
Verpakkingstegnologie/ Packing technology	0	0	0	0	0
Tekstiel- en leertegnologie/ Textile and leather technology	15	64	5	32	116
Brandstoftegnologie/ Fuel technology	39	0	246	24	309
Boutegnologie/ Building technology	0	0	55	49	104
Verftegnologie/ Paint technology	0	0	21	0	21
Keramiektegnologie/ Ceramic technology	489	0	3	27	519
Houttegnologie/ Timber technology	771	0	0	0	771
Huishoudkunde/ Domestic science	373	42	430	34	880
Yster- en staaltegnologie/ Iron and steel technology	8	0	0	0	8
Plastiek- en polimeertegnologie/ Plastics and polymer technology	472	0	309	6	787
Partikeltegnologie/ Particle technology	0	0	0	71	71
Diverse tegnologieë/ Miscellaneous technologies	422	50	321	42	835

TABEL 2.11 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Tersiêre onderwyssektor
TABLE 2.11 (contd) : Expenditure on R&D according to research fields and performers : Tertiary education sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS (Tersiêre onderwysrigtings)/ PERFORMERS (Tertiary education institutes)				
	Inrigtings in die Kaap-provinsie/ Institutions in the Cape Province	Inrigtings in die Oranje-Vrystaat/ Institutions in the Orange Free State	Inrigtings in Transvaal/ Institutions in Transvaal	Inrigtings in Natal/ Institutions in Natal	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Ingenieurswese/ Engineering	31 700	1 812	29 796	7 115	70 422
Landbou-ingenieurswese/ Agricultural engineering	43	0	123	1	167
Argitektuur/ Architecture	1 887	305	2 087	601	4 879
Chemiese ingenieurswese/ Chemical engineering	2 861	277	1 352	1 146	5 636
Siviele ingenieurswese/ Civil engineering	2 715	22	3 122	585	6 443
Elektriese ingenieurswese/ Electrical engineering	4 408	552	5 955	2 282	13 196
Elektronika/ Electronics	6 175	54	3 565	1 190	10 985
Meganiese ingenieurswese/ Mechanical engineering	4 170	426	4 573	1 165	10 334
Bedryfs- en vervaardigingsingenieurswese/ Industrial and manufacturing engineering	904	0	347	56	1 308
Metallurgiese ingenieurswese/ Metallurgical engineering	589	68	3 783	1	4 442
Mynbou-ingenieurswese/ Mining engineering	0	0	1 403	9	1 411
Diverse ingenieurswese/ Miscellaneous engineering	7 948	107	3 486	79	11 620
Wysgerige, sosiale en menswetenskappe/ Philosophical, social and human sciences	39 683	19 005	68 903	19 172	146 763
Sielkunde/ Psychology	6 367	3 208	10 363	3 462	23 400
Sosiologie/ Sociology	3 126	1 496	3 393	2 596	10 611
Demografie/ Demography	504	2	588	0	1 094
Kriminologie/ Criminology	783	120	1 506	80	2 489
Maatskaplike werk/ Welfare work	692	502	1 745	525	3 463
Argeologie en Menslike Paleontologie/ Archaeology and human palaeontology	2 749	109	3 107	39	6 004
Antropologie Etnologie/ Anthropology Ethnology	1 331	461	2 158	1 138	5 088
Opvoedkunde/ Education	8 110	5 923	15 590	3 384	33 007
Filosofie/ Wysbegeerte/ Philosophy	1 771	428	2 470	560	5 229
Teologie/ Theology	3 410	1 396	6 780	925	12 511
Geskiedenis/ History	3 262	1 283	3 952	2 361	10 858
Kommunikasiekunde en Joernalistiek/ Communication science and journalism	789	512	1 486	243	3 030
Biblioteek- en Inligtingkunde/ Library and information science	611	133	1 202	669	2 615
Regsgeleerdheid/ Law	5 235	2 705	12 974	2 972	23 885
Afrikaanse kultuur- en volkskunde/ Afrikaans culture and folklore	257	0	277	0	533
Bewegingskunde/ Movement science	576	422	781	160	1 939
Rekreasiekunde/ Recreation science	110	305	533	59	1 007

TABEL 2.11 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Tersiêre onderwyssektor
TABLE 2.11 (contd) : Expenditure on R&D according to research fields and performers : Tertiary education sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS (Tersiêre onderwysrigtings)/ PERFORMERS (Tertiary education institutes)				
	Inrigtings in die Kaap-provinsie/ Institutions in the Cape Province	Inrigtings in die Oranje-Vrystaat/ Institutions in the Orange Free State	Inrigtings in Transvaal/ Institutions in Transvaal	Inrigtings in Natal/ Institutions in Natal	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Ekonomiese wetenskappe/ Economic sciences	13 989	3 166	21 253	5 390	43 798
Bedryfsekonomie/ Business economics	1 520	1 023	4 201	133	6 877
Vervoerekonomie/ Transport economics	240	82	2 061	0	2 382
Ekonomie/ Economics	4 478	1 294	4 368	2 825	12 966
Bedryfsleiding en -administrasie/ Business leadership and administration	3 019	250	1 702	1 235	6 206
Mannekragnavorsing/ Manpower research	2 328	69	2 959	389	5 746
Rekeningkunde en verwante vakke/ Accounting and related subjects	2 403	448	5 961	808	9 621
Staatswetenskappe/ Political sciences	2 523	495	6 311	1 096	10 425
Staatsleer/ Political science	1 713	272	3 167	866	6 018
Publieke administrasie/ Public administration	533	100	1 655	179	2 468
Ontwikkelingsadministrasie en -politiek/ Development administration and politics	276	123	1 489	51	1 939
Tale/ Languages	15 268	3 960	21 516	7 165	47 909
Taalkunde/ Linguistics	7 109	2 106	9 268	2 115	20 598
Letterkunde/ Literature	8 159	1 855	12 247	5 050	27 311
Kunste/ Arts	5 096	1 878	4 217	2 772	13 962
Beeldende kunste/ Fine arts	1 618	280	882	794	3 574
Uitvoerende kunste/ Performing arts	615	544	623	997	2 779
Musiek/ Music	1 951	687	1 368	616	4 622
Boukuns/ Architecture	245	1	2	0	248
Toegepaste kuns/ Applied art	109	20	153	221	502
Kunsgeskiedenis/ History of art	558	345	1 189	145	2 237
Toekomskunde/ Future studies	56	0	687	0	743
TOTAAL/ TOTAL	219 245	92 041	289 445	89 708	690 439
Persentasie (%)/ Percentage (%)	32	13	42	13	100

TABEL 2.12 : Besteding aan N&O volgens navorsingsgebiede en verrigters : Sakesektor
TABLE 2.12 : Expenditure on R&D according to research fields and performers : Business enterprise sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS			
	Private ondernemings/ Private enterprises	Onafhanklike nywerheid-navorsings-institute en -laboratoria/ Independent industrial research institutes and laboratories	Staats-ondernemings en landbou beheerrade/ Public corporations and control boards	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
Astronomie en landmeetkunde/ Astronomy and surveying	376	0	1 047	1 423
Astronomie/ Astronomy	0	0	0	0
Opmeetkunde/ Surveying	369	0	0	369
Geodesie/ Geodesy	0	0	0	0
Fotogrammetrie/ Photogrammetry	0	0	0	0
Stads- en streekbeplanning/ Town and regional planning	7	0	1 047	1 054
Diverse/ Miscellaneous	0	0	0	0
Landbou, biologie en bosbou/ Agriculture, biology and forestry	73 984	14 811	2 494	91 289
Landbou-ekonomie en -voorligting/ Agricultural economics and extension	731	17	1 047	1 795
Veekunde/ Animal science	3 687	98	0	3 785
Plantkunde/ Botany	5 980	0	0	5 980
Bosbou/ Forestry	7 308	6 095	0	13 403
Genetika/ Genetics	11 884	0	0	11 884
Plantpatologie/ Plant pathology	6 777	2 027	860	9 664
Mikrobiologie/ Microbiology	15 827	77	68	15 972
Plantproduksie/ Plant production	16 630	2 027	505	19 162
Grondkunde/ Soil science	237	2 027	0	2 264
Dierkundige wetenskappe/ Zoological science	4 203	2 027	0	6 229
Marienebiologie/ Marine biology	516	418	14	948
Varswaterbiologie en limnologie/ Freshwater biology and limnology	203	0	0	203
Aardwetenskappe/ Earth Sciences	24 548	8 704	4 438	37 690
Weerkunde en landbouweerkunde/ Meteorology and agricultural meteorology	1 267	0	2 019	3 286
Aardrykskunde/ Geography	0	0	0	0
Geologie/ Geology	7 923	1 249	117	9 289
Metallurgiese chemie en geochemie/ Metallurgical chemistry and geochemistry	6 926	2 748	1 820	11 494
Geofisika/ Geophysics	6 183	4 707	175	11 065
Oseanografie/ Oceanography	1 353	0	117	1 470
Hidrologie/ Hydrology	897	0	190	1 087

TABEL 2.12 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Sakesektor
TABLE 2.12 (contd) : Expenditure on R&D according to research fields and performers : Business enterprise sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS			
	Private ondernemings/ Private enterprises	Onafhanklike nywerheid-navorsings-institute en -laboratoria/ Independent industrial research institutes and laboratories	Staats-ondernemings en landbou beheerrade/ Public corporations and control boards	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
Wiskundige wetenskappe/ Mathematical sciences	67 158	2 248	2 788	72 195
Wiskunde/ Mathematics	34	0	0	34
Toegepaste wiskunde/ Applied mathematics	112	0	0	112
Statistiek/ Statistics	226	1 124	951	2 302
Biometrie/ Biometrics	18	0	0	18
Operasionele navorsing/ Operational research	243	0	1 837	2 080
Rekenaarwetenskap/ Computer science	66 525	1 124	0	67 649
Geneeskunde/ Medical sciences	20 749	2 508	0	23 256
Tandheelkunde/ Dental science	150	0	0	150
Interne menslike geneeskunde/ Internal human medicine	2 237	0	0	2 237
Obstetrie en ginekologie/ Obstetrics and gynaecology	0	0	0	0
Chirurgie en anestesiologie/ Surgery and anaesthetics	231	0	0	231
Omvattende geneeskunde en onchoterapie/ Comprehensive medicine and oncotherapy	812	0	0	812
Pediatrie/ Paediatrics	231	0	0	231
Psigiatrie/ Psychiatry	0	0	0	0
Anatomie en histologie/ Anatomy and histology	281	0	0	281
Fisiologie/ Physiology	147	0	0	147
Mediese biochemie/ Medical biochemistry	0	0	0	0
Patologie/ Pathology	1 877	0	0	1 877
Farmasie/ Pharmacy	11 281	0	0	11 281
Geneeskundige interdissiplinêre vakrigtings/ Medical interdisciplinary subject fields	58	0	0	58
Aanvullende gesondheidswetenskappe/ Supplementary health sciences	0	2 508	0	2 508
Verpleegkunde/ Nursing science	0	0	0	0
Veeartsenykunde/ Veterinary science	3 443	0	0	3 443
Chemie/ Chemistry	109 576	2 954	6 706	119 236
Analitiese chemie/ Analytical chemistry	31 681	2 609	3 255	37 546
Biochemie/ Biochemistry	5 016	152	95	5 263
Anorganiese chemie/ Inorganic chemistry	8 302	0	1 850	10 152
Organiese chemie/ Organic chemistry	61 230	84	611	61 926
Fisiese en teoretiese chemie/ Physical and theoretical chemistry	3 347	108	894	4 350

TABEL 2.12 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Sakesektor
TABLE 2.12 (contd) : Expenditure on R&D according to research fields and performers : Business enterprise sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS			
	Private ondernemings/ Private enterprises	Onafhanklike nywerheid-navorsings-institute en -laboratoria/ Independent industrial research institutes and laboratories	Staats-ondernemings en landbou beheerrade/ Public corporations and control boards	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
Fisika/ Physics	31 135	42 677	12 078	85 891
Teoretiese fisika/ Theoretical physics	0	0	0	0
Akoestiek/ Acoustics	1 248	0	0	1 248
Atoom- en molekuulfisika/ Atomic and molecular physics	0	0	0	0
Atmosferiese fisika/ Atmospheric physics	754	0	1 358	2 112
Elektrisiteit en magnetisme/ Electricity and magnetism	2 570	5 621	0	8 191
Kernfisika/ Nuclear physics	0	0	0	0
Lig- en elektromagnetiese golwe/ Light and electromagnetic waves	25 540	15 614	8 518	49 672
Vastetoestand-fisika/ Solid state physics	752	21 443	0	22 194
Algemene fisika/ General physics	271	0	2 202	2 473
Tegnologie/ Technology	123 620	21 796	2 562	147 978
Voedseltegnologie/ Food technology	8 011	2 049	0	10 059
Wyntegnologie en wynkunde/ Wine technology and oenology	4 194	0	0	4 194
Fermentasietegnologie/ Fermentation technology	2 956	277	0	3 233
Watertegnologie/ Water technology	11 136	6 168	0	17 304
Tabaktegnologie/ Tobacco technology	1 869	0	0	1 869
Pulp- en papiertegnologie/ Pulp and paper technology	8 207	0	0	8 207
Verpakkingstegnologie/ Packing technology	5 923	0	0	5 923
Tekstiel- en leertegnologie/ Textile and leather technology	2 330	883	0	3 213
Brandstoftegnologie/ Fuel technology	14 104	92	0	14 196
Boutegnologie/ Building technology	346	0	0	346
Verftegnologie/ Paint technology	1 480	0	16	1 496
Keramiektegnologie/ Ceramic technology	7 130	4 164	0	11 293
Houttegnologie/ Timber technology	784	0	0	784
Huishoudkunde/ Domestic science	0	0	0	0
Yster- en staaltegnologie/ Iron and steel technology	5 249	0	16	5 265
Plastiek- en polimeertegnologie/ Plastics and polymer technology	9 089	44	1 035	10 169
Partikeltegnologie/ Particle technology	2 768	8 119	0	10 887
Diverse tegnologieë/ Miscellaneous technologies	38 046	0	1 494	39 540

TABEL 2.12 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Sakesektor
TABLE 2.12 (contd) : Expenditure on R&D according to research fields and performers : Business enterprise sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS			
	Private ondernemings/ Private enterprises	Onafhanklike nywerheid-navorsings-institute en -laboratoria/ Independent industrial research institutes and laboratories	Staats-ondernemings en landbou beheerrade/ Public corporations and control boards	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
Ingenieurswese/ Engineering	555 719	55 484	75 819	687 022
Landbou-ingenieurswese/ Agricultural engineering	467	0	0	467
Argitektuur/ Architecture	57	0	0	57
Chemiese ingenieurswese/ Chemical engineering	53 526	155	23 795	77 476
Siviele ingenieurswese/ Civil engineering	5 237	150	4 192	9 579
Elektriese ingenieurswese/ Electrical engineering	62 859	0	8 465	71 324
Elektronika/ Electronics	207 789	184	12 446	220 420
Meganiese ingenieurswese/ Mechanical engineering	67 794	2 187	5 828	75 809
Bedryfs- en vervaardigingsingenieurswese/ Industrial and manufacturing engineering	20 089	207	1 505	21 800
Metallurgiese ingenieurswese/ Metallurgical engineering	79 153	16 196	9 513	104 862
Mynbou-ingenieurswese/ Mining engineering	43 157	0	0	43 157
Diverse ingenieurswese/ Miscellaneous engineering	15 591	36 405	10 075	62 071
Wysgerige, sosiale en menswetenskappe/ Philosophical, social and human sciences	1 085	17	5 517	6 618
Sielkunde/ Psychology	60	0	204	263
Sosiologie/ Sociology	104	0	13	117
Demografie/ Demography	0	0	663	663
Kriminologie/ Criminology	0	0	0	0
Maatskaplike werk/ Welfare work	0	0	0	0
Argeologie en Menslike Paleontologie/ Archaeology and human palaeontology	0	0	0	0
Antropologie Etnologie/ Anthropology Ethnology	39	0	0	39
Opvoedkunde/ Education	6	0	825	832
Filosofie/ Wysbegeerte/ Philosophy	0	0	0	0
Teologie/ Theology	0	0	0	0
Geskiedenis/ History	739	0	0	739
Kommunikasiekunde en Joernalistiek/ Communication science and journalism	137	17	3 804	3 957
Biblioteek- en Inligtingkunde/ Library and information science	0	0	0	0
Regsgeleerdheid/ Law	0	0	0	0
Afrikaanse kultuur- en volkskunde/ Afrikaans culture and folklore	0	0	0	0
Bewegingskunde/ Movement science	0	0	0	0
Rekreasiekunde/ Recreation science	0	0	9	9

TABEL 2.12 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Sakesektor
TABLE 2.12 (contd) : Expenditure on R&D according to research fields and performers : Business enterprise sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS			
	Private ondernemings/ Private enterprises	Onafhanklike nywerheid-navorsings-institute en -laboratoria/ Independent industrial research institutes and laboratories	Staats-ondernemings en landbou beheerrade/ Public corporations and control boards	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
Ekonomiese wetenskappe/ Economic sciences	6 742	384	15 719	22 845
Bedryfsekonomie/ Business economics	2 786	33	1 323	4 143
Vervoerekonomie/ Transport economics	2 142	0	1 277	3 419
Ekonomie/ Economics	1 294	63	11 286	12 643
Bedryfsleiding en -administrasie/ Business leadership and administration	164	200	886	1 250
Mannekragnavorsing/ Manpower research	242	87	946	1 275
Rekeningkunde en verwante vakke/ Accounting and related subjects	115	0	0	115
Staatswetenskappe/ Political sciences	11	0	2 094	2 105
Staatsleer/ Political science	11	0	698	709
Publieke administrasie/ Public administration	0	0	698	698
Ontwikkelingsadministrasie en -politiek/ Development administration and politics	0	0	698	698
Tale/ Languages	0	0	0	0
Taalkunde/ Linguistics	0	0	0	0
Letterkunde/ Literature	0	0	0	0
Kunste/ Arts	0	0	0	0
Beeldende kunste/ Fine arts	0	0	0	0
Uitvoerende kunste/ Performing arts	0	0	0	0
Musiek/ Music	0	0	0	0
Boukuns/ Architecture	0	0	0	0
Toegepaste kuns/ Applied art	0	0	0	0
Kunsgeskiedenis/ History of art	0	0	0	0
Toekomskunde/ Future studies	74	0	0	74
TOTAAL/ TOTAL	1 014 777	151 582	131 262	1 297 622
Persentasie (%)/ Percentage (%)	78	12	10	100

TABEL 2.13 : Besteding aan N&O volgens navorsingsgebiede en verrigters : Nie-winssektor
TABLE 2.13 : Expenditure on R&D according to research fields and performers : Non-profit sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS			
	Verklaarde kulturele inrigtings/ Declared cultural institutions	Ander kulturele inrigtings/ Other cultural institutions	Ander/ Other	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
Astronomie en landmeetkunde/ Astronomy and surveying	0	65	0	65
Astronomie/ Astronomy	0	0	0	0
Opmeetkunde/ Surveying	0	0	0	0
Geodesie/ Geodesy	0	0	0	0
Fotogrammetrie/ Photogrammetry	0	0	0	0
Stads- en streekbeplanning/ Town and regional planning	0	0	0	0
Diverse/ Miscellaneous	0	65	0	65
Landbou, biologie en bosbou/ Agriculture, biology and forestry	11 891	2 352	2 512	16 754
Landbou-ekonomie en -voorligting/ Agricultural economics and extension	0	0	0	0
Veekunde/ Animal science	0	0	0	0
Plantkunde/ Botany	7 055	145	487	7 687
Bosbou/ Forestry	0	0	51	51
Genetika/ Genetics	214	0	0	214
Plantpatologie/ Plant pathology	0	0	0	0
Mikrobiologie/ Microbiology	0	0	58	58
Plantproduksie/ Plant production	0	0	0	0
Grondkunde/ Soil science	0	0	42	42
Dierkundige wetenskappe/ Zoological science	3 511	1 076	157	4 744
Marienebiologie/ Marine biology	555	1 044	1 686	3 285
Varswaterbiologie en limnologie/ Freshwater biology and limnology	556	86	31	673
Aardwetenskappe/ Earth Sciences	1 035	86	63	1 184
Weerkunde en landbouweerkunde/ Meteorology and agricultural meteorology	0	0	0	0
Aardrykskunde/ Geography	0	0	0	0
Geologie/ Geology	1 035	86	0	1 121
Metallurgiese chemie en geochemie/ Metallurgical chemistry and geochemistry	0	0	0	0
Geofisika/ Geophysics	0	0	0	0
Oseanografie/ Oceanography	0	0	0	0
Hidrologie/ Hydrology	0	0	63	63

TABEL 2.13 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Nie-winssektor
TABLE 2.13 (contd) : Expenditure on R&D according to research fields and performers : Non-profit sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS			
	Verklaarde kulturele inrigtings/ Declared cultural institutions	Ander kulturele inrigtings/ Other cultural institutions	Ander/ Other	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
Wiskundige wetenskappe/ Mathematical sciences	0	0	0	0
Wiskunde/ Mathematics	0	0	0	0
Toegepaste wiskunde/ Applied mathematics	0	0	0	0
Statistiek/ Statistics	0	0	0	0
Biometrie/ Biometrics	0	0	0	0
Operasionele navorsing/ Operational research	0	0	0	0
Rekenaarwetenskap/ Computer science	0	0	0	0
Geneeskunde/ Medical sciences	0	546	3 947	4 492
Tandheelkunde/ Dental science	0	0	0	0
Interne menslike geneeskunde/ Internal human medicine	0	0	242	242
Obstetrie en ginekologie/ Obstetrics and gynaecology	0	0	0	0
Chirurgie en anestesiologie/ Surgery and anaesthetics	0	0	0	0
Omvattende geneeskunde en onchoterapie/ Comprehensive medicine and oncotherapy	0	0	587	587
Pediatrie/ Paediatrics	0	0	0	0
Psigiatrie/ Psychiatry	0	0	0	0
Anatomie en histologie/ Anatomy and histology	0	0	0	0
Fisiologie/ Physiology	0	0	176	176
Mediese biochemie/ Medical biochemistry	0	0	71	71
Patologie/ Pathology	0	0	468	468
Farmasie/ Pharmacy	0	0	20	20
Geneeskundige interdissiplinêre vakrigtings/ Medical interdisciplinary subject fields	0	546	2 332	2 878
Aanvullende gesondheidswetenskappe/ Supplementary health sciences	0	0	51	51
Verpleegkunde/ Nursing science	0	0	0	0
Veeartsenykunde/ Veterinary science	0	0	0	0
Chemie/ Chemistry	0	0	663	663
Analitiese chemie/ Analytical chemistry	0	0	0	0
Biochemie/ Biochemistry	0	0	393	393
Anorganiese chemie/ Inorganic chemistry	0	0	0	0
Organiese chemie/ Organic chemistry	0	0	270	270
Fisiese en teoretiese chemie/ Physical and theoretical chemistry	0	0	0	0

TABEL 2.13 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Nie-winssektor
TABLE 2.13 (contd) : Expenditure on R&D according to research fields and performers : Non-profit sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS			
	Verklaarde kulturele inrigtings/ Declared cultural institutions	Ander kulturele inrigtings/ Other cultural institutions	Ander/ Other	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
Fisika/ Physics	0	0	0	0
Teoretiese fisika/ Theoretical physics	0	0	0	0
Akoestiek/ Acoustics	0	0	0	0
Atoom- en molekuulfisika/ Atomic and molecular physics	0	0	0	0
Atmosferiese fisika/ Atmospheric physics	0	0	0	0
Elektrisiteit en magnetisme/ Electricity and magnetism	0	0	0	0
Kernfisika/ Nuclear physics	0	0	0	0
Lig- en elektromagnetiese golwe/ Light and electromagnetic waves	0	0	0	0
Vastetoestand-fisika/ Solid state physics	0	0	0	0
Algemene fisika/ General physics	0	0	0	0
Tegnologie/ Technology	0	0	0	0
Voedseltegnologie/ Food technology	0	0	0	0
Wyntegnologie en wynkunde/ Wine technology and oenology	0	0	0	0
Fermentasietegnologie/ Fermentation technology	0	0	0	0
Watertegnologie/ Water technology	0	0	0	0
Tabaktegnologie/ Tobacco technology	0	0	0	0
Pulp- en papiertegnologie/ Pulp and paper technology	0	0	0	0
Verpakkingstegnologie/ Packing technology	0	0	0	0
Tekstiel- en leertegnologie/ Textile and leather technology	0	0	0	0
Brandstoftegnologie/ Fuel technology	0	0	0	0
Boutegnologie/ Building technology	0	0	0	0
Verftegnologie/ Paint technology	0	0	0	0
Keramiektegnologie/ Ceramic technology	0	0	0	0
Houttegnologie/ Timber technology	0	0	0	0
Huishoudkunde/ Domestic science	0	0	0	0
Yster- en staaltegnologie/ Iron and steel technology	0	0	0	0
Plastiek- en polimeertegnologie/ Plastics and polymer technology	0	0	0	0
Partikeltegnologie/ Particle technology	0	0	0	0
Diverse tegnologieë/ Miscellaneous technologies	0	0	0	0

TABEL 2.13 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Nie-winssektor
TABLE 2.13 (contd) : Expenditure on R&D according to research fields and performers : Non-profit sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS			
	Verklaarde kulturele inrigtings/ Declared cultural institutions	Ander kulturele inrigtings/ Other cultural institutions	Ander/ Other	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
Ingenieurswese/ Engineering	92	0	539	631
Landbou-ingenieurswese/ Agricultural engineering	0	0	0	0
Argitektuur/ Architecture	92	0	0	92
Chemiese ingenieurswese/ Chemical engineering	0	0	0	0
Siviele ingenieurswese/ Civil engineering	0	0	67	67
Elektriese ingenieurswese/ Electrical engineering	0	0	405	405
Elektronika/ Electronics	0	0	0	0
Meganiese ingenieurswese/ Mechanical engineering	0	0	67	67
Bedryfs- en vervaardigingsingenieurswese/ Industrial and manufacturing engineering	0	0	0	0
Metallurgiese ingenieurswese/ Metallurgical engineering	0	0	0	0
Mynbou-ingenieurswese/ Mining engineering	0	0	0	0
Diverse ingenieurswese/ Miscellaneous engineering	0	0	0	0
Wysgerige, sosiale en menswetenskappe/ Philosophical, social and human sciences	6 477	2 506	4 542	13 525
Sielkunde/ Psychology	0	0	56	56
Sosiologie/ Sociology	0	0	0	0
Demografie/ Demography	0	0	209	209
Kriminologie/ Criminology	0	0	209	209
Maatskaplike werk/ Welfare work	0	0	631	631
Argeologie en Menslike Paleontologie/ Archaeology and human palaeontology	1 266	258	0	1 524
Antropologie Etnologie/ Anthropology Ethnology	766	111	0	877
Opvoedkunde/ Education	242	543	227	1 011
Filosofie/ Wysbegeerte/ Philosophy	0	0	0	0
Teologie/ Theology	0	0	0	0
Geskiedenis/ History	1 680	920	0	2 600
Kommunikasiekunde en Joernalistiek/ Communication science and journalism	0	79	0	79
Biblioteek- en Inligtingkunde/ Library and information science	1 455	506	0	1 961
Regsgeleerdheid/ Law	0	0	3 210	3 210
Afrikaanse kultuur- en volkskunde/ Afrikaans culture and folklore	1 068	68	0	1 137
Bewegingskunde/ Movement science	0	0	0	0
Rekreasiekunde/ Recreation science	0	20	0	20

TABEL 2.13 (vervolg) : Besteding aan N&O volgens navorsingsgebiede en verrigters : Nie-winssektor
TABLE 2.13 (contd) : Expenditure on R&D according to research fields and performers : Non-profit sector

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS			
	Verklaarde kulturele inrigtings/ Declared cultural institutions	Ander kulturele inrigtings/ Other cultural institutions	Ander/ Other	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)
Ekonomiese wetenskappe/ Economic sciences	0	82	873	955
Bedryfsekonomie/ Business economics	0	0	0	0
Vervoerekonomie/ Transport economics	0	54	337	391
Ekonomie/ Economics	0	21	468	489
Bedryfsleiding en -administrasie/ Business leadership and administration	0	0	67	67
Mannekragnavorsing/ Manpower research	0	7	0	7
Rekeningkunde en verwante vakke/ Accounting and related subjects	0	0	0	0
Staatswetenskappe/ Political sciences	0	212	917	1 128
Staatsleer/ Political science	0	212	335	547
Publieke administrasie/ Public administration	0	0	581	581
Ontwikkelingsadministrasie en -politiek/ Development administration and politics	0	0	0	0
Tale/ Languages	206	0	0	206
Taalkunde/ Linguistics	0	0	0	0
Letterkunde/ Literature	206	0	0	206
Kunste/ Arts	2 331	1 073	0	3 404
Beeldende kunste/ Fine arts	242	223	0	465
Uitvoerende kunste/ Performing arts	0	0	0	0
Musiek/ Music	0	0	0	0
Boukuns/ Architecture	88	61	0	149
Toegepaste kuns/ Applied art	1 247	189	0	1 436
Kunsgeskiedenis/ History of art	754	600	0	1 354
Toekomskunde/ Future studies	0	0	0	0
TOTAAL/ TOTAL	22 031	6 921	14 055	43 008
Persentasie (%)/ Percentage (%)	51	16	33	100

TABEL 2.14 : Besteding aan N&O volgens veeldissiplinêre gebiede en verrigters
TABLE 2.14 : Expenditure on R&D according to multi-disciplinary fields and performers

MULTI-DISSIPLINêRE GEBIEDE/ MULTIDISCIPLINARY FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-wins-sektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUURWETENSKAPPE/ NATURAL SCIENCES					
Toepaslike (intermediêre, of lae vlak) tegnologie/ Appropriate (intermediate, or low level) technology	15 893	4 393	138 889	185	159 360
Materiaalnavorsing/ Materials research	67 630	15 613	69 009	0	152 252
Mikro-elektronika/ Micro-electronics	36 985	2 296	34 021	0	73 302
Water navorsing (alle aspekte)/ Water research (all aspects)	36 516	11 751	14 538	1 012	63 817
Ekosisteemnavorsing/ Ecosystems research	34 915	8 941	6 416	1 641	51 913
Biotegnologie (behalwe rekombinante DNS)/ Biotechnology (excluding recombinant DNA)	25 549	6 269	16 462	738	49 019
Natuurlewebestuurnavorsing/ Wildlife management research	33 379	3 046	242	3 969	40 636
Outomatisasie (behalwe robotika)/ Automation (excluding robotics)	10 237	2 068	17 635	0	29 940
Rekombinante DNS/ Recombinant DNA	14 282	5 445	2 118	356	22 200
Bio-ingenieurswese (behalwe biotegnologie en rekombinante DNS)/ Bio-engineering (excluding biotechnology and recombinant DNA)	10 181	341	3 343	37	13 901
Hersirkulering van materiale/Recycling of materials	4 071	392	2 481	0	6 943
Robotika/ Robotics	0	813	1 579	0	2 393
Ander navorsing/ Other research	11 527	0	77 957	0	89 484
TOTAAL/TOTAL	301 164	61 368	384 690	7 937	755 160
Persentasie (%)/Percentage (%)	40	8	51	1	100
Persentasie van alle N&O verrig deur sektor (%)/ Percentage of all R&D performed by sector (%)	40	9	30	18	27

TABEL 2.15 : Besteding deur navorsingsinstellings aan wetenskaplike en tegnologiese aktiwiteite (N&O uitgesluit) volgens aktiwiteite en verrigters
TABLE 2.15 : Expenditure by research organisations on scientific and technological activities (excluding R&D) according to activities and performers

AKTIWITEITE/ ACTIVITIES	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector #	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total #
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES					
Binne navorsingsverband/ Research-related	82 384	#	17 883	1 668	101 935
Inligting en dokumentering/ Information and documentation	32 880	#	8 663	717	42 260
Opleiding en onderwys/ Training and education	5 967	#	4 144	537	10 648
Algemene dataversameling/ General purpose data collection	39 755	#	4 952	150	44 857
Wetenskaplike versamelings/ Scientific collections	3 781	#	125	264	4 170
Buite navorsingsverband/ Non-research-related	125 791	#	114 320	90	240 201
Toetsing, standaardisasie en gehaltebeheer/ Testing, standardisation and quality control	35 184	#	53 520	50	88 754
Patent- en lisensiëringsaktiwiteite/ Patenting and licensing activities	2 049	#	1 906	0	3 955
Gespesialiseerde geneeskundige en para-geneeskundige sorg, en kliniese aktiwiteite/ Specialised medical and para-medical care, and clinical activities	0	#	588	10	598
Adviesdienste/ Advisory services	73 368	#	57 383	0	130 751
Beleidsverwante aktiwiteite/ Policy related activities	15 189	#	924	30	16 143
TOTAAL/ TOTAL	208 174	#	132 203	1 758	342 136
Persentasie (%)/ Percentage (%)	61	#	39	1	100

Gegewens vir ander W&T aktiwiteite ten opsigte van die tersiêre onderwyssektor is nie beskikbaar nie / Data for other S&T activities for the tertiary education sector not available

TABEL 2.15 (vervolg) : Besteding deur navorsingsinstellings aan wetenskaplike en tegnologiese aktiwiteite (N&O uitgesluit) volgens aktiwiteite en verrigters
TABLE 2.15 (contd) : Expenditure by research organisations on scientific and technological activities (excluding R&D) according to activities and performers

AKTIWITEITE/ ACTIVITIES	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector #	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total #
	R(000)	R(000)	R(000)	R(000)	R(000)
NATUURWETENSKAPPE/ NATURAL SCIENCES					
Binne navorsingsverband/ Research-related	79 562	#	17 342	1 356	98 259
Inligting en dokumentering/ Information and documentation	31 824	#	8 252	645	40 720
Opleiding en onderwys/ Training and education	5 791	#	4 107	417	10 315
Algemene dataversameling/ General purpose data collection	38 272	#	4 871	102	43 245
Wetenskaplike versamelings/ Scientific collections	3 674	#	113	193	3 979
Buite navorsingsverband/ Non-research-related	121 533	#	103 844	60	225 437
Toetsing, standaardisasie en gehaltebeheer/ Testing, standardisation and quality control	33 973	#	53 507	50	87 530
Patent- en lisensiëringsaktiwiteite/ Patenting and licensing activities	1 990	#	1 902	0	3 892
Gespesialiseerde geneeskundige en para-geneeskundige sorg, en kliniese aktiwiteite/ Specialised medical and para-medical care, and clinical activities	0	#	588	10	598
Adviesdienste/ Advisory services	71 045	#	46 936	0	117 982
Beleidsverwante aktiwiteite/ Policy related activities	14 524	#	911	0	15 435
TOTAAL/ TOTAL	201 095	#	121 186	1 416	323 697
Persentasie (%)/ Percentage (%)	62	#	37	0	100

Gegewens vir ander W&T aktiwiteite ten opsigte van die tersiêre onderwyssektor is nie beskikbaar nie / Data for other S&T activities for the tertiary education sector not available

TABEL 2.15 (vervolg) : Besteding deur navorsingsinstellings aan wetenskaplike en tegnologiese aktiwiteite (N&O uitgesluit) volgens aktiwiteite en verrigters
TABLE 2.15 (contd) : Expenditure by research organisations on scientific and technological activities (excluding R&D) according to activities and performers

AKTIWITEITE/ ACTIVITIES	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector #	Sakesektor/ Business enterprise sector	Nie-winsektor/ Non-profit sector	Totaal/ Total #
	R(000)	R(000)	R(000)	R(000)	R(000)
GEESTESWETENSKAPPE/ HUMAN SCIENCES					
Binne navorsingsverband/ Research-related	2 822	#	541	312	3 675
Inligting en dokumentering/ Information and documentation	1 056	#	411	72	1 539
Opleiding en onderwys/ Training and education	176	#	37	120	333
Algemene dataversameling/ General purpose data collection	1 482	#	82	48	1 612
Wetenskaplike versamelings/ Scientific collections	107	#	12	72	191
Buite navorsingsverband/ Non-research-related	4 258	#	10 476	30	14 764
Toetsing, standaardisasie en gehaltebeheer/ Testing, standardisation and quality control	1 211	#	13	0	1 224
Patent- en lisensiëringsaktiwiteite/ Patenting and licensing activities	59	#	3	0	63
Gespesialiseerde geneeskundige en para-geneeskundige sorg, en kliniese aktiwiteite/ Specialised medical and para-medical care, and clinical activities	0	#	0	0	0
Adviesdienste/ Advisory services	2 323	#	10 447	0	12 769
Beleidsverwante aktiwiteite/ Policy related activities	665	#	13	30	707
TOTAAL/ TOTAL	7 080	#	11 017	342	18 439
Persentasie (%)/ Percentage (%)	38	#	60	2	100

Gegewens vir ander W&T aktiwiteite ten opsigte van die tersiêre onderwyssektor is nie beskikbaar nie / Data for other S&T activities for the tertiary education sector not available

TABEL 2.16 : Mannekrag gewy aan N&O volgens soort mannekrag en werkgewers
TABLE 2.16 : Manpower devoted to R&D according to type of staff and employers

SOORT MANNEKRAG/ TYPE OF MANPOWER	WERKGEWERS/ EMPLOYERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES					
Navorsers/ Researchers					
Aantal persone/ Number of persons	3 127	14 540	4 688	502	22 857
Manjare/ Man years	2 428	5 984	3 395	294	12 102
Arbeidskoste R(000)/ Labour costs R(000)	185 612	323 376	404 546	20 538	934 072
Tegnici/ Technicians					
Aantal persone/ Number of persons	2 129	962	3 444	255	6 790
Manjare/ Man years	1 810	289	2 785	122	5 006
Arbeidskoste R(000)/ Labour costs R(000)	89 964	13 179	186 775	4 696	294 614
Ander ondersteunende personeel/ Other supporting staff					
Aantal persone/ Number of persons	3 185	1 012	3 659	252	8 108
Manjare/ Man years	2 436	260	2 300	119	5 115
Arbeidskoste R(000)/ Labour costs R(000)	60 171	5 349	112 257	2 645	180 423
TOTAAL/ TOTAAL					
Aantal persone/ Number of persons	8 441	16 514	11 791	1 009	37 755
Manjare/ Man years	6 674	6 533	8 481	536	22 223
Arbeidskoste R(000)/ Labour costs R(000)	335 747	341 904	703 578	27 879	1 409 108

TABEL 2.16 (vervolg) : Mannekrag gewy aan N&O volgens soort mannekrag en werkgewers
TABLE 2.16 (contd) : Manpower devoted to R&D according to type of staff and employers

SOORT MANNEKRAG/ TYPE OF MANPOWER	WERKGEWERS/ EMPLOYERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
NATUURWETENSKAPPE/ NATURAL SCIENCES					
Navorsers/ Researchers					
Aantal persone/ Number of persons	2 549	7 527	4 440	239	14 756
Manjare/ Man years	2 026	3 431	3 253	171	8 881
Arbeidskoste R(000)/ Labour costs R(000)	154 277	175 263	389 980	11 062	730 582
Tegnici/ Technicians					
Aantal persone/ Number of persons	2 091	811	3 426	116	6 444
Manjare/ Man years	1 785	252	2 770	79	4 886
Arbeidskoste R(000)/ Labour costs R(000)	88 588	11 661	185 361	2 826	288 437
Ander ondersteunende personeel/ Other supporting staff					
Aantal persone/ Number of persons	3 019	630	3 577	113	7 340
Manjare/ Man years	2 338	171	2 247	70	4 827
Arbeidskoste R(000)/ Labour costs R(000)	56 356	3 924	109 277	1 495	171 052
TOTAAL/ TOTAAL					
Aantal persone/ Number of persons	7 660	8 968	11 443	468	28 540
Manjare/ Man years	6 149	3 854	8 270	321	18 594
Arbeidskoste R(000)/ Labour costs R(000)	299 222	190 848	684 618	15 383	1 190 071

TABEL 2.16 (vervolg) : Mannekrag gewy aan N&O volgens soort mannekrag en werkgewers
TABLE 2.16 (contd) : Manpower devoted to R&D according to type of staff and employers

SOORT MANNEKRAG/ TYPE OF MANPOWER	WERKGEWERS/ EMPLOYERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
GEESTESWETENSKAPPE/ HUMAN SCIENCES					
Navorsers/ Researchers					
Aantal persone/ Number of persons	578	7 013	248	263	8 101
Manjare/ Man years	402	2 553	143	123	3 221
Arbeidskoste R(000)/ Labour costs R(000)	31 334	148 114	14 566	9 476	203 490
Tegnici/ Technicians					
Aantal persone/ Number of persons	38	151	18	139	346
Manjare/ Man years	25	37	15	44	120
Arbeidskoste R(000)/ Labour costs R(000)	1 376	1 518	1 413	1 870	6 177
Ander ondersteunende personeel/ Other supporting staff					
Aantal persone/ Number of persons	166	382	82	139	768
Manjare/ Man years	98	89	53	49	289
Arbeidskoste R(000)/ Labour costs R(000)	3 815	1 424	2 981	1 150	9 370
TOTAAL/ TOTAAL					
Aantal persone/ Number of persons	781	7 546	348	541	9 215
Manjare/ Man years	524	2 679	210	215	3 630
Arbeidskoste R(000)/ Labour costs R(000)	36 525	151 056	18 960	12 496	219 037

TABEL 2.17 : Akademiese kwalifikasies van navorsers volgens werkgewers en kwalifikasiegroepe
TABLE 2.17 : Academic qualifications of researchers according to employers and qualification groups

WERKGEWERS/ EMPLOYERS	KWALIFIKASIEGROEPE/ QUALIFICATION GROUPS					
	Nagraadse kwalifikasies/ Post-graduate qualifications	B-graad/ B-degree	Na sekondêre kwalifikasies/ Post secondary qualifications	Sekondêre kwalifikasies/ Secondary qualifications	Ander kwalifikasies/ Other qualifications	Totaal/ Total
NATUUR- EN GEESTESWETENSKAPPE/ NATURAL AND HUMAN SCIENCES						
Owerheidsektor/ Government sector	2 450	538	115	24	0	3 127
Staatsdepartemente/ Government departments	1 145	104	31	4	0	1 284
Provinsiale administrasies/ Provincial administrations	71	0	0	0	0	71
Plaaslike owerhede/ Local authorities	1	2	0	0	0	3
Outonome owerheidsliggame/ Autonomous government institutions	1 233	432	84	20	0	1 769
Tersiêre onderwyssektor/ Tertiary education sector	13 278	960	273	28	1	14 540
Sakesektor/ Business enterprise sector	2 755	1 389	461	70	13	4 688
Private ondernemings/ Private enterprises	2 160	1 171	373	52	13	3 769
Onafhanklike nywerheidnavorsingsinstitute en laboratoria/ Independent industrial research institutes and laboratories	269	73	37	2	0	381
Staatsondernemings en landboubeheerrade/ Public corporations and agricultural control boards	326	145	51	16	0	538
Nie-winssektor/ Non-profit sector	397	74	20	6	5	502
TOTAAL/ TOTAL	18 880	2 961	869	128	19	22 857
Persentasie (%)/ Percentage (%)	83	13	4	1	0	100

TABEL 2.17 (vervolg) : Akademiese kwalifikasies van navorsers volgens werkgewers en kwalifikasiegroepe
TABLE 2.17 (contd) : Academic qualifications of researchers according to employers and qualification groups

WERKGEWERS/ EMPLOYERS	KWALIFIKASIEGROEPE/ QUALIFICATION GROUPS					
	Nagraadse kwalifikasies/ Post-graduate qualifications	B-graad/ B-degree	Na sekondêre kwalifikasies/ Post secondary qualifications	Sekondêre kwalifikasies/ Secondary qualifications	Ander kwalifikasies/ Other qualifications	Totaal/ Total
NATUURWETENSKAPPE/ NATURAL SCIENCES						
Owerheidsektor/ Government sector	2 046	382	102	20	0	2 549
Staatsdepartemente/ Government departments	1 031	70	27	2	0	1 130
Provinsiale administrasies/ Provincial administrations	71	0	0	0	0	71
Plaaslike owerhede/ Local authorities	1	0	0	0	0	1
Outonome owerheidsliggame/ Autonomous government institutions	943	312	75	18	0	1 348
Tersiêre onderwyssektor/ Tertiary education sector	6 670	641	201	15	0	7 527
Sakesektor/ Business enterprise sector	2 578	1 342	450	59	12	4 440
Private ondernemings/ Private enterprises	2 133	1 167	372	51	12	3 736
Onafhanklike nywerheidnavorsingsinstitute en laboratoria/ Independent industrial research institutes and laboratories	252	73	37	2	0	364
Staatsondernemings en landboubeheerrade/ Public corporations and agricultural control boards	193	102	41	6	0	341
Nie-winssektor/ Non-profit sector	199	23	13	0	4	239
TOTAAL/ TOTAL	11 493	2 387	767	94	16	14 756
Persentasie (%)/ Percentage (%)	78	16	5	1	0	100

TABEL 2.17 (vervolg) : Akademiese kwalifikasies van navorsers volgens werkgewers en kwalifikasiegroepe
TABLE 2.17 (contd) : Academic qualifications of researchers according to employers and qualification groups

WERKGEWERS/ EMPLOYERS	KWALIFIKASIEGROEPE/ QUALIFICATION GROUPS					
	Nagraadse kwalifikasies/ Post-graduate qualifications	B-graad/ B-degree	Na sekondêre kwalifikasies/ Post secondary qualifications	Sekondêre kwalifikasies/ Secondary qualifications	Ander kwalifikasies/ Other qualifications	Totaal/ Total
GEESTESWETENSKAPPE/ HUMAN SCIENCES						
Owerheidsektor/ Government sector	404	156	13	4	0	578
Staatsdepartemente/ Government departments	114	34	4	2	0	154
Provinsiale administrasies/ Provincial administrations	0	0	0	0	0	0
Plaaslike owerhede/ Local authorities	0	2	0	0	0	2
Outonome owerheidsliggame/ Autonomous government institutions	290	120	9	2	0	421
Tersiêre onderwyssektor/ Tertiary education sector	6 608	319	72	13	1	7 013
Sakesektor/ Business enterprise sector	177	47	11	11	1	248
Private ondernemings/ Private enterprises	27	4	1	1	1	33
Onafhanklike nywerheidnavorsingsinstitute en laboratoria/ Independent industrial research institutes and laboratories	17	0	0	0	0	17
Staatsondernemings en landboubeheerrade/ Public corporations and agricultural control boards	133	43	10	10	0	197
Nie-winssektor/ Non-profit sector	198	51	7	6	1	263
TOTAAL/ TOTAL	7 387	574	102	34	3	8 101
Persentasie (%)/ Percentage (%)	91	7	1	0	0	100

TABEL 2.18 : Arbeidskoste van N&O volgens navorsingsgebiede en verrigters
TABLE 2.18 : Labour cost of R&D according to research fields and performers

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Astronomie en landmeetkunde/ Astronomy and surveying	5 545	2 917	808	19	9 289
Astronomie/ Astronomy	4 650	635	0	0	5 285
Opmeetkunde/ Surveying	0	145	56	0	201
Geodesie/ Geodesy	128	171	0	0	298
Fotogrammetrie/ Photogrammetry	150	249	0	0	398
Stads- en streekbeplanning/ Town and regional planning	618	1 670	752	0	3 040
Diverse/ Miscellaneous	0	48	0	19	66
Landbou, biologie en bosbou/ Agriculture, biology and forestry	116 842	37 683	45 028	11 575	211 128
Landbou-ekonomie en -voorligting/ Agricultural economics and extension	1 321	3 427	1 189	0	5 937
Veekunde/ Animal science	20 581	2 695	1 931	0	25 207
Plantkunde/ Botany	12 105	5 579	2 235	6 035	25 954
Bosbou/ Forestry	3 264	64	6 287	43	9 658
Genetika/ Genetics	9 576	2 129	4 638	112	16 456
Plantpatologie/ Plant pathology	6 511	2 026	4 796	0	13 333
Mikrobiologie/ Microbiology	6 911	4 697	8 920	24	20 552
Plantproduksie/ Plant production	26 013	2 441	9 522	0	37 976
Grondkunde/ Soil science	8 964	1 399	1 321	28	11 713
Dierkundige wetenskappe/ Zoological science	18 365	9 859	3 665	3 354	35 243
Marienebiologie/ Marine biology	878	1 825	436	1 581	4 720
Varswaterbiologie en limnologie/ Freshwater biology and limnology	2 353	1 540	89	397	4 380
Aardwetenskappe/ Earth Sciences	33 351	17 596	17 196	1 010	69 152
Weerkunde en landbouweerkunde/ Meteorology and agricultural meteorology	2 508	1 813	1 710	0	6 030
Aardrykskunde/ Geography	0	4 427	0	0	4 427
Geologie/ Geology	9 684	6 683	5 340	967	22 674
Metallurgiese chemie en geochemie/ Metallurgical chemistry and geochemistry	10 593	1 470	4 074	0	16 137
Geofisika/ Geophysics	2 255	970	4 589	0	7 814
Oseanografie/ Oceanography	7 039	987	1 064	0	9 089
Hidrologie/ Hydrology	1 272	1 246	420	43	2 981

TABEL 2.18 (vervolg) : Arbeidskoste van N&O volgens navorsingsgebiede en verrigters
TABLE 2.18 (contd) : Labour cost of R&D according to research fields and performers

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Wiskundige wetenskappe/ Mathematical sciences	4 983	19 465	50 736	0	75 183
Wiskunde/ Mathematics	17	6 437	15	0	6 468
Toegepaste wiskunde/ Applied mathematics	0	3 167	73	0	3 240
Statistiek/ Statistics	773	4 493	951	0	6 217
Biometrie/ Biometrics	538	422	12	0	971
Operasionele navorsing/ Operational research	0	354	1 365	0	1 719
Rekenaarwetenskap/ Computer science	3 655	4 592	48 320	0	56 568
Geneeskunde/ Medical sciences	29 719	54 274	9 427	2 171	95 592
Tandheelkunde/ Dental science	144	1 695	25	0	1 864
Interne menslike geneeskunde/ Internal human medicine	0	3 691	633	114	4 438
Obstetrie en ginekologie/ Obstetrics and gynaecology	0	2 593	0	0	2 593
Chirurgie en anestesiologie/ Surgery and anaesthetics	0	4 870	95	0	4 965
Omvattende geneeskunde en onchoterapie/ Comprehensive medicine and oncotherapy	19 259	4 867	276	423	24 825
Pediatrie/ Paediatrics	0	2 687	95	0	2 782
Psigiatrie/ Psychistry	0	517	0	0	517
Anatomie en histologie/ Anatomy and histology	154	1 762	46	0	1 962
Fisiologie/ Physiology	363	3 617	49	81	4 110
Mediese biochemie/ Medical biochemistry	595	2 643	0	49	3 287
Patologie/ Pathology	663	2 126	1 004	313	4 106
Farmasie/ Pharmacy	17	4 954	4 522	9	9 501
Geneeskundige interdissiplinêre vakrigtings/ Medical interdisciplinary subject fields	3 841	9 858	24	1 180	14 903
Aanvullende gesondheidswetenskappe/ Supplementary health sciences	53	2 469	1 311	3	3 835
Verpleegkunde/ Nursing science	5	2 394	0	0	2 399
Veeartsenykunde/ Veterinary science	4 627	3 531	1 347	0	9 505
Chemie/ Chemistry	22 813	16 127	60 989	329	100 259
Analitiese chemie/ Analytical chemistry	9 587	2 974	18 925	0	31 486
Biochemie/ Biochemistry	1 846	3 960	2 973	228	9 007
Anorganiese chemie/ Inorganic chemistry	5 595	2 906	5 455	0	13 956
Organiese chemie/ Organic chemistry	5 768	3 479	31 664	101	41 011
Fisiese en teoretiese chemie/ Physical and theoretical chemistry	18	2 809	1 972	0	4 799

TABEL 2.18 (vervolg) : Arbeidskoste van N&O volgens navorsingsgebiede en verrigters
TABLE 2.18 (contd) : Labour cost of R&D according to research fields and performers

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Fisika/ Physics	12 049	11 157	30 619	0	53 825
Teoretiese fisika/ Theoretical physics	0	2 532	0	0	2 532
Akoestiek/ Acoustics	0	324	949	0	1 274
Atoom- en molekuulfisika/ Atomic and molecular physics	353	479	0	0	832
Atmosferiese fisika/ Atmospheric physics	179	785	1 275	0	2 240
Elektrisiteit en magnetisme/ Electricity and magnetism	529	737	3 159	0	4 425
Kernfisika/ Nuclear physics	7 282	1 539	0	0	8 821
Lig- en elektromagnetiese golwe/ Light and electromagnetic waves	1 389	829	19 122	0	21 339
Vastetoestand-fisika/ Solid state physics	1 026	3 142	4 902	0	9 071
Algemene fisika/ General physics	1 290	790	1 211	0	3 291
Tegnologie/ Technology	21 098	3 858	69 532	0	94 488
Voedseltegnologie/ Food technology	4 968	542	5 896	0	11 406
Wyntegnologie en wynkunde/ Wine technology and oenology	580	81	2 235	0	2 896
Fermentasietegnologie/ Fermentation technology	137	38	1 608	0	1 782
Watertegnologie/ Water technology	1 180	918	6 406	0	8 504
Tabaktegnologie/ Tobacco technology	0	0	1 200	0	1 200
Pulp- en papiertegnologie/ Pulp and paper technology	220	105	3 488	0	3 813
Verpakkingstegnologie/ Packing technology	0	0	3 655	0	3 655
Tekstiel- en leertegnologie/ Textile and leather technology	1 534	66	1 763	0	3 364
Brandstoftegnologie/ Fuel technology	72	129	6 439	0	6 640
Boutegnologie/ Building technology	1 829	66	242	0	2 137
Verftegnologie/ Paint technology	150	15	796	0	961
Keramiektegnologie/ Ceramic technology	1 129	242	5 419	0	6 790
Houttegnologie/ Timber technology	246	369	310	0	925
Huishoudkunde/ Domestic science	0	536	0	0	536
Yster- en staaltegnologie/ Iron and steel technology	4 191	4	3 119	0	7 315
Plastiek- en polimeertegnologie/ Plastics and polymer technology	1 114	266	5 186	0	6 566
Partikeltegnologie/ Particle technology	1 222	31	3 457	0	4 710
Diverse tegnologieë/ Miscellaneous technologies	2 525	451	18 312	0	21 288

TABEL 2.18 (vervolg) : Arbeidskoste van N&O volgens navorsingsgebiede en verrigters
TABLE 2.18 (contd) : Labour cost of R&D according to research fields and performers

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Ingenieurswese/ Engineering	52 821	27 770	400 283	280	481 155
Landbou-ingenieurswese/ Agricultural engineering	4 500	101	269	0	4 870
Argitektuur/ Architecture	0	3 290	27	79	3 395
Chemiese ingenieurswese/ Chemical engineering	1 445	2 143	43 047	0	46 636
Siviele ingenieurswese/ Civil engineering	3 019	3 037	4 709	25	10 790
Elektriese ingenieurswese/ Electrical engineering	4 028	5 353	46 936	151	56 468
Elektronika/ Electronics	8 436	3 868	148 792	0	161 096
Meganiese ingenieurswese/ Mechanical engineering	4 509	4 119	42 289	25	50 942
Bedryfs- en vervaardigingsingenieurswese/ Industrial and manufacturing engineering	3 254	529	16 084	0	19 867
Metallurgiese ingenieurswese/ Metallurgical engineering	5 892	1 646	55 194	0	62 732
Mynbou-ingenieurswese/ Mining engineering	8 733	825	11 442	0	21 000
Diverse ingenieurswese/ Miscellaneous engineering	9 005	2 860	31 493	0	43 358
Wysgerige, sosiale en menswetenskappe/ Philosophical, social and human sciences	24 123	82 827	2 597	9 294	118 841
Sielkunde/ Psychology	6 084	11 218	99	23	17 423
Sosiologie/ Sociology	851	6 408	68	0	7 327
Demografie/ Demography	1 810	490	396	132	2 827
Kriminologie/ Criminology	853	1 392	0	132	2 376
Maatskaplike werk/ Welfare work	561	1 982	0	481	3 024
Argeologie en Menslike Paleontologie/ Archaeology and human palaeontology	0	2 122	0	1 226	3 348
Antropologie Etnologie/ Anthropology Ethnology	705	2 989	27	698	4 418
Opvoedkunde/ Education	10 262	19 139	537	588	30 526
Filosofie/ Wysbegeerte/ Philosophy	0	2 897	0	0	2 897
Teologie/ Theology	0	7 137	0	0	7 137
Geskiedenis/ History	329	6 425	277	1 585	8 616
Kommunikasiekunde en Joernalistiek/ Communication science and journalism	2 302	1 738	1 190	37	5 267
Biblioteek- en Inligtingkunde/ Library and information science	0	1 606	0	964	2 571
Regsgeleerdheid/ Law	359	15 532	0	2 563	18 454
Afrikaanse kultuur- en volkskunde/ Afrikaans culture and folklore	0	329	0	857	1 186
Bewegingskunde/ Movement science	0	896	0	0	896
Rekreasiekunde/ Recreation science	9	526	5	9	549

TABEL 2.18 (vervolg) : Arbeidskoste van N&O volgens navorsingsgebiede en verrigters
TABLE 2.18 (contd) : Labour cost of R&D according to research fields and performers

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
	R(000)	R(000)	R(000)	R(000)	R(000)
Ekonomiese wetenskappe/ Economic sciences	9 890	25 022	14 815	509	50 236
Bedryfsekonomie/ Business economics	66	4 019	2 229	0	6 315
Vervoerekonomie/ Transport economics	583	838	1 207	180	2 808
Ekonomie/ Economics	4 995	7 177	9 720	299	22 191
Bedryfsleiding en -administrasie/ Business leadership and administration	882	3 171	832	25	4 910
Mannekragnavorsing/ Manpower research	3 053	3 322	767	5	7 146
Rekeningkunde en verwante vakke/ Accounting and related subjects	311	6 494	60	0	6 865
Staatswetenskappe/ Political sciences	2 462	6 098	1 501	698	10 760
Staatsleer/ Political science	1 183	3 268	505	367	5 324
Publieke administrasie/ Public administration	541	1 618	498	331	2 988
Ontwikkelingsadministrasie en -politiek/ Development administration and politics	737	1 213	498	0	2 448
Tale/ Languages	0	28 618	0	137	28 756
Taalkunde/ Linguistics	0	12 091	0	0	12 091
Letterkunde/ Literature	0	16 527	0	137	16 664
Kunste/ Arts	0	8 166	0	1 858	10 024
Beeldende kunste/ Fine arts	0	1 932	0	307	2 238
Uitvoerende kunste/ Performing arts	0	1 642	0	0	1 642
Musiek/ Music	0	2 870	0	0	2 870
Boukuns/ Architecture	0	105	0	72	178
Toegepaste kuns/ Applied art	0	284	0	968	1 251
Kunsgeskiedenis/ History of art	0	1 333	0	511	1 844
Toekomskunde/ Future studies	50	325	46	0	421
TOTAAL/ TOTAL	335 747	341 904	703 578	27 879	1 409 108
Persentasie (%)/ Percentage (%)	24	24	50	2	100

TABEL 2.19 : Manjare bestee aan N&O volgens navorsingsgebiede en verrigters
TABLE 2.19 : Man years devoted to R&D according to research fields and performers

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
Astronomie en landmeetkunde/ Astronomy and surveying	79	69	5	0	154
Astronomie/ Astronomy	65	11	0	0	76
Opmeetkunde/ Surveying	0	2	1	0	3
Geodesie/ Geodesy	2	4	0	0	6
Fotogrammetrie/ Photogrammetry	2	8	0	0	11
Stads- en streekbeplanning/ Town and regional planning	10	43	5	0	58
Diverse/ Miscellaneous	0	0	0	0	1
Landbou, biologie en bosbou/ Agriculture, biology and forestry	3 138	820	736	239	4 933
Landbou-ekonomie en -voorligting/ Agricultural economics and extension	26	50	13	0	89
Veekunde/ Animal science	507	48	53	0	607
Plantkunde/ Botany	267	130	38	110	546
Bosbou/ Forestry	49	1	84	1	136
Genetika/ Genetics	327	39	100	2	467
Plantpatologie/ Plant pathology	210	41	83	0	334
Mikrobiologie/ Microbiology	190	126	122	0	439
Plantproduksie/ Plant production	767	49	153	0	970
Grondkunde/ Soil science	200	19	20	1	241
Dierkundige wetenskappe/ Zoological science	524	233	62	78	897
Marienebiologie/ Marine biology	16	48	7	39	110
Varswaterbiologie en limnologie/ Freshwater biology and limnology	55	35	1	8	98
Aardwetenskappe/ Earth Sciences	609	373	191	23	1 196
Weerkunde en landbouweerkunde/ Meteorology and agricultural meteorology	61	20	16	0	97
Aardrykskunde/ Geography	0	100	0	0	100
Geologie/ Geology	188	168	48	22	426
Metallurgiese chemie en geochemie/ Metallurgical chemistry and geochemistry	179	28	33	0	240
Geofisika/ Geophysics	46	15	76	0	137
Oseanografie/ Oceanography	115	20	13	0	148
Hidrologie/ Hydrology	20	23	4	2	49

TABEL 2.19 (vervolg) : Manjare bestee aan N&O volgens navorsingsgebiede en verrigters
TABLE 2.19 (contd) : Man years devoted to R&D according to research fields and performers

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
Wiskundige wetenskappe/ Mathematical sciences	79	330	480	0	888
Wiskunde/ Mathematics	0	95	0	0	95
Toegepaste wiskunde/ Applied mathematics	0	64	1	0	65
Statistiek/ Statistics	12	61	10	0	83
Biometrie/ Biometrics	9	6	0	0	16
Operasionele navorsing/ Operational research	0	6	12	0	18
Rekenaarwetenskap/ Computer science	57	97	456	0	611
Geneeskunde/ Medical sciences	517	946	143	46	1 652
Tandheelkunde/ Dental science	1	34	1	0	35
Interne menslike geneeskunde/ Internal human medicine	0	58	6	1	66
Obstetrie en ginekologie/ Obstetrics and gynaecology	0	40	0	0	40
Chirurgie en anestesiologie/ Surgery and anaesthetics	0	90	1	0	91
Omvattende geneeskunde en onchoterapie/ Comprehensive medicine and oncotherapy	287	86	4	9	386
Pediatrie/ Paediatrics	0	44	1	0	45
Psigiatrie/ Psychiatry	0	9	0	0	9
Anatomie en histologie/ Anatomy and histology	2	32	1	0	36
Fisiologie/ Physiology	11	62	1	1	75
Mediese biochemie/ Medical biochemistry	11	51	0	1	62
Patologie/ Pathology	12	30	18	6	65
Farmasie/ Pharmacy	0	92	75	0	167
Geneeskundige interdissiplinêre vakrigtings/ Medical interdisciplinary subject fields	61	178	0	27	266
Aanvullende gesondheidswetenskappe/ Supplementary health sciences	2	38	14	0	54
Verpleegkunde/ Nursing science	0	41	0	0	41
Veeartsenykunde/ Veterinary science	130	62	21	0	214
Chemie/ Chemistry	392	397	781	8	1 577
Analitiese chemie/ Analytical chemistry	180	67	212	0	458
Biochemie/ Biochemistry	47	99	45	6	198
Anorganiese chemie/ Inorganic chemistry	81	75	72	0	228
Organiese chemie/ Organic chemistry	84	91	422	1	598
Fisiese en teoretiese chemie/ Physical and theoretical chemistry	0	65	30	0	95

TABEL 2.19 (vervolg) : Manjare bestee aan N&O volgens navorsingsgebiede en verrigters
TABLE 2.19 (contd) : Man years devoted to R&D according to research fields and performers

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
Fisika/ Physics	139	193	321	0	653
Teoretiese fisika/ Theoretical physics	0	43	0	0	43
Akoestiek/ Acoustics	0	6	15	0	21
Atoom- en molekuulfisika/ Atomic and molecular physics	3	10	0	0	14
Atmosferiese fisika/ Atmospheric physics	3	13	14	0	29
Elektrisiteit en magnetisme/ Electricity and magnetism	8	14	33	0	55
Kernfisika/ Nuclear physics	70	29	0	0	99
Lig- en elektromagnetiese golwe/ Light and electromagnetic waves	27	15	190	0	231
Vastetoestand-fisika/ Solid state physics	14	52	55	0	122
Algemene fisika/ General physics	14	12	14	0	39
Tegnologie/ Technology	396	88	985	0	1 468
Voedseltegnologie/ Food technology	143	8	105	0	256
Wyntegnologie en wynkunde/ Wine technology and oenology	14	2	32	0	49
Fermentasietegnologie/ Fermentation technology	2	1	27	0	30
Watertegnologie/ Water technology	18	29	72	0	119
Tabaktegnologie/ Tobacco technology	0	0	12	0	12
Pulp- en papiertegnologie/ Pulp and paper technology	3	2	35	0	41
Verpakkingstegnologie/ Packing technology	0	0	46	0	46
Tekstiel- en leertegnologie/ Textile and leather technology	23	1	30	0	54
Brandstoftegnologie/ Fuel technology	1	3	76	0	80
Boutegnologie/ Building technology	28	1	6	0	35
Verftegnologie/ Paint technology	2	0	15	0	18
Keramiektegnologie/ Ceramic technology	17	7	101	0	126
Houttegnologie/ Timber technology	4	10	4	0	18
Huishoudkunde/ Domestic science	0	7	0	0	7
Yster- en staaltegnologie/ Iron and steel technology	66	0	33	0	99
Plastiek- en polimeertegnologie/ Plastics and polymer technology	17	8	76	0	100
Partikeltegnologie/ Particle technology	19	0	48	0	68
Diverse tegnologieë/ Miscellaneous technologies	38	9	264	0	310

TABEL 2.19 (vervolg) : Manjare bestee aan N&O volgens navorsingsgebiede en verrigters
TABLE 2.19 (contd) : Man years devoted to R&D according to research fields and performers

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
Ingenieurswese/ Engineering	801	639	4 629	4	6 073
Landbou-ingenieurswese/ Agricultural engineering	65	1	4	0	70
Argitektuur/ Architecture	0	46	0	2	48
Chemiese ingenieurswese/ Chemical engineering	22	49	464	0	535
Siviele ingenieurswese/ Civil engineering	46	62	61	0	169
Elektriese ingenieurswese/ Electrical engineering	63	128	482	2	675
Elektronika/ Electronics	127	106	1 534	0	1 767
Meganiese ingenieurswese/ Mechanical engineering	68	109	615	0	792
Bedryfs- en vervaardigingsingenieurswese/ Industrial and manufacturing engineering	49	17	217	0	283
Metallurgiese ingenieurswese/ Metallurgical engineering	92	33	689	0	814
Mynbou-ingenieurswese/ Mining engineering	133	10	208	0	350
Diverse ingenieurswese/ Miscellaneous engineering	136	79	354	0	569
Wysgerige, sosiale en menswetenskappe/ Philosophical, social and human sciences	353	1 574	30	155	2 113
Sielkunde/ Psychology	103	306	1	0	410
Sosiologie/ Sociology	14	107	1	0	123
Demografie/ Demography	5	7	3	3	19
Kriminologie/ Criminology	14	29	0	3	46
Maatskaplike werk/ Welfare work	10	34	0	14	58
Argeologie en Menslike Paleontologie/ Archaeology and human palaeontology	0	105	0	24	128
Antropologie Etnologie/ Anthropology Ethnology	1	53	1	18	72
Opvoedkunde/ Education	161	312	4	13	490
Filosofie/ Wysbegeerte/ Philosophy	0	51	0	0	51
Teologie/ Theology	0	132	0	0	132
Geskiedenis/ History	2	121	2	30	156
Kommunikasiekunde en Joernalistiek/ Communication science and journalism	37	35	18	1	91
Biblioteek- en Inligtingkunde/ Library and information science	0	30	0	22	52
Regsgeleerdheid/ Law	5	221	0	21	248
Afrikaanse kultuur- en volkskunde/ Afrikaans culture and folklore	0	6	0	7	12
Bewegingskunde/ Movement science	0	17	0	0	17
Rekreasiekunde/ Recreation science	0	8	0	0	9

TABEL 2.19 (vervolg) : Manjare bestee aan N&O volgens navorsingsgebiede en verrigters
TABLE 2.19 (contd) : Man years devoted to R&D according to research fields and performers

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-wins-sektor/ Non-profit sector	Totaal/ Total
Ekonomiese wetenskappe/ Economic sciences	136	374	170	9	689
Bedryfsekonomie/ Business economics	1	59	33	0	93
Vervoerekonomie/ Transport economics	9	11	12	3	34
Ekonomie/ Economics	61	121	107	6	296
Bedryfsleiding en -administrasie/ Business leadership and administration	15	54	7	0	77
Mannekragnavorsing/ Manpower research	46	51	11	0	109
Rekeningkunde en verwante vakke/ Accounting and related subjects	4	77	0	0	81
Staatswetenskappe/ Political sciences	35	103	9	15	162
Staatsleer/ Political science	17	61	3	10	92
Publieke administrasie/ Public administration	7	23	3	5	39
Ontwikkelingsadministrasie en -politiek/ Development administration and politics	10	18	3	0	31
Tale/ Languages	0	469	0	3	472
Taalkunde/ Linguistics	0	197	0	0	197
Letterkunde/ Literature	0	271	0	3	275
Kunste/ Arts	0	156	0	33	188
Beeldende kunste/ Fine arts	0	44	0	8	52
Uitvoerende kunste/ Performing arts	0	29	0	0	29
Musiek/ Music	0	50	0	0	50
Boukuns/ Architecture	0	3	0	2	6
Toegepaste kuns/ Applied art	0	5	0	12	17
Kunsgeskiedenis/ History of art	0	23	0	11	34
Toekomskunde/ Future studies	1	4	1	0	6
TOTAAL/ TOTAL	6 674	6 533	8 481	536	22 223
Persentasie (%)/ Percentage (%)	30	29	38	2	100

TABEL 2.20 : **Aantal persone betrokke by N&O volgens navorsingsgebiede en verrigters (toegedeel volgens navorsingsgebied van vernaamste betrokkenheid)**
TABLE 2.20 : **Number of persons involved in R&D according to research fields and performers (allocated to research field of main involvement)**

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winsektor/ Non-profit sector	Totaal/ Total
Astronomie en landmeetkunde/ Astronomy and surveying	86	161	14	1	261
Astronomie/ Astronomy	67	22	0	0	90
Opmeetkunde/ Surveying	0	6	1	0	7
Geodesie/ Geodesy	2	12	0	0	14
Fotogrammetrie/ Photogrammetry	4	25	0	0	29
Stads- en streekbeplanning/ Town and regional planning	12	94	13	0	119
Diverse/ Miscellaneous	0	2	0	1	3
Landbou, biologie en bosbou/ Agriculture, biology and forestry	3 568	1 619	1 331	296	6 814
Landbou-ekonomie en -voorligting/ Agricultural economics and extension	26	92	31	0	149
Veekunde/ Animal science	512	124	80	0	716
Plantkunde/ Botany	306	268	39	120	734
Bosbou/ Forestry	93	10	86	2	190
Genetika/ Genetics	341	77	109	2	529
Plantpatologie/ Plant pathology	241	77	201	0	519
Mikrobiologie/ Microbiology	236	204	142	2	584
Plantproduksie/ Plant production	773	106	308	0	1 188
Grondkunde/ Soil science	214	50	134	1	399
Dierkundige wetenskappe/ Zoological science	707	452	179	117	1 454
Marienebiologie/ Marine biology	27	97	17	42	183
Varswaterbiologie en limnologie/ Freshwater biology and limnology	93	63	5	9	170
Aardwetenskappe/ Earth Sciences	737	675	298	38	1 749
Weerkunde en landbouweerkunde/ Meteorology and agricultural meteorology	65	44	31	0	140
Aardrykskunde/ Geography	0	220	0	0	220
Geologie/ Geology	193	256	69	37	554
Metallurgiese chemie en geochemie/ Metallurgical chemistry and geochemistry	180	50	76	0	307
Geofisika/ Geophysics	49	32	85	0	166
Oseanografie/ Oceanography	214	29	22	0	266
Hidrologie/ Hydrology	37	44	15	2	97

TABEL 2.20 (vervolg) : Aantal persone betrokke by N&O volgens navorsingsgebiede en verrigters (toegedeel volgens navorsingsgebied van vernaamste betrokkenheid)
TABLE 2.20 (contd) : Number of persons involved in R&D according to research fields and performers (allocated to research field of main involvement)

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
Wiskundige wetenskappe/ Mathematical sciences	131	842	755	0	1 728
Wiskunde/ Mathematics	0	238	0	0	239
Toegepaste wiskunde/ Applied mathematics	0	137	2	0	138
Statistiek/ Statistics	22	174	16	0	213
Biometrie/ Biometrics	14	25	1	0	39
Operasionele navorsing/ Operational research	0	22	20	0	42
Rekenaarwetenskap/ Computer science	94	246	716	0	1 057
Geneeskunde/ Medical sciences	588	2 923	192	108	3 811
Tandheelkunde/ Dental science	6	152	2	0	160
Interne menslike geneeskunde/ Internal human medicine	0	200	9	14	223
Obstetrie en ginekologie/ Obstetrics and gynaecology	0	151	0	0	151
Chirurgie en anestesiologie/ Surgery and anaesthetics	0	331	1	0	332
Omvattende geneeskunde en onchoterapie/ Comprehensive medicine and oncotherapy	297	241	4	19	561
Pediatrie/ Paediatrics	0	119	1	0	121
Psigiatrie/ Psychiatry	0	53	0	0	53
Anatomie en histologie/ Anatomy and histology	2	98	3	0	103
Fisiologie/ Physiology	12	173	1	4	189
Mediese biochemie/ Medical biochemistry	14	113	0	3	130
Patologie/ Pathology	16	104	20	9	149
Farmasie/ Pharmacy	0	201	107	1	309
Geneeskundige interdissiplinêre vakrigtings/ Medical interdisciplinary subject fields	80	440	0	57	577
Aanvullende gesondheidswetenskappe/ Supplementary health sciences	3	216	14	1	234
Verpleegkunde/ Nursing science	1	164	0	0	165
Veeartsenykunde/ Veterinary science	156	167	29	0	352
Chemie/ Chemistry	535	740	986	11	2 272
Analitiese chemie/ Analytical chemistry	248	131	310	0	689
Biochemie/ Biochemistry	56	191	50	7	303
Anorganiese chemie/ Inorganic chemistry	100	134	94	0	327
Organiese chemie/ Organic chemistry	132	167	499	4	801
Fisiese en teoretiese chemie/ Physical and theoretical chemistry	1	117	34	0	152

TABEL 2.20 (vervolg) : Aantal persone betrokke by N&O volgens navorsingsgebiede en verrigters (toegedeel volgens navorsingsgebied van vernaamste betrokkenheid)
TABLE 2.20 (contd) : Number of persons involved in R&D according to research fields and performers (allocated to research field of main involvement)

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
Fisika/ Physics	169	394	410	0	973
Teoretiese fisika/ Theoretical physics	0	84	0	0	84
Akoestiek/ Acoustics	0	11	25	0	36
Atoom- en molekuulfisika/ Atomic and molecular physics	3	30	0	0	34
Atmosferiese fisika/ Atmospheric physics	5	24	21	0	51
Elektrisiteit en magnetisme/ Electricity and magnetism	15	31	48	0	95
Kernfisika/ Nuclear physics	72	60	0	0	131
Lig- en elektromagnetiese golwe/ Light and electromagnetic waves	36	29	225	0	290
Vastetoestand-fisika/ Solid state physics	21	95	75	0	191
Algemene fisika/ General physics	18	29	15	0	62
Tegnologie/ Technology	519	245	1 215	0	1 979
Voedseltegnologie/ Food technology	163	34	153	0	350
Wyntegnologie en wynkunde/ Wine technology and oenology	14	12	37	0	63
Fermentasietegnologie/ Fermentation technology	4	1	30	0	35
Watertegnologie/ Water technology	34	49	100	0	183
Tabaktegnologie/ Tobacco technology	0	0	26	0	26
Pulp- en papiertegnologie/ Pulp and paper technology	6	6	50	0	62
Verpakkingstegnologie/ Packing technology	0	0	54	0	54
Tekstiel- en leertegnologie/ Textile and leather technology	44	7	43	0	94
Brandstoftegnologie/ Fuel technology	2	7	84	0	93
Boutegnologie/ Building technology	52	7	12	0	72
Verftegnologie/ Paint technology	4	1	16	0	22
Keramiektegnologie/ Ceramic technology	32	15	112	0	159
Houttegnologie/ Timber technology	7	19	9	0	35
Huishoudkunde/ Domestic science	0	47	0	0	47
Yster- en staaltegnologie/ Iron and steel technology	67	0	35	0	102
Plastiek- en polimeertegnologie/ Plastics and polymer technology	32	16	102	0	150
Partikeltegnologie/ Particle technology	19	2	57	0	79
Diverse tegnologieë/ Miscellaneous technologies	38	20	294	0	353

TABEL 2.20 (vervolg) : Aantal persone betrokke by N&O volgens navorsingsgebiede en verrigters (toegedeel volgens navorsingsgebied van vernaamste betrokkenheid)
TABLE 2.20 (contd) : Number of persons involved in R&D according to research fields and performers (allocated to research field of main involvement)

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
Ingenieurswese/ Engineering	1 327	1 369	6 241	14	8 952
Landbou-ingenieurswese/ Agricultural engineering	65	4	10	0	79
Argitektuur/ Architecture	0	143	0	6	149
Chemiese ingenieurswese/ Chemical engineering	41	87	566	0	694
Siviele ingenieurswese/ Civil engineering	86	150	153	1	391
Elektriese ingenieurswese/ Electrical engineering	82	250	759	6	1 096
Elektronika/ Electronics	237	237	2 063	0	2 537
Meganiese ingenieurswese/ Mechanical engineering	128	239	834	1	1 203
Bedryfs- en vervaardigingsingenieurswese/ Industrial and manufacturing engineering	93	45	315	0	452
Metallurgiese ingenieurswese/ Metallurgical engineering	104	54	801	0	959
Mynbou-ingenieurswese/ Mining engineering	253	21	330	0	604
Diverse ingenieurswese/ Miscellaneous engineering	238	140	410	0	788
Wysgerige, sosiale en menswetenskappe/ Philosophical, social and human sciences	548	4 149	47	388	5 132
Sielkunde/ Psychology	150	763	2	2	917
Sosiologie/ Sociology	22	296	3	0	322
Demografie/ Demography	34	25	7	10	76
Kriminologie/ Criminology	19	76	0	10	105
Maatskaplike werk/ Welfare work	11	126	0	103	239
Argeologie en Menslike Paleontologie/ Archaeology and human palaeontology	0	111	0	44	155
Antropologie Etnologie/ Anthropology Ethnology	12	157	2	34	204
Opvoedkunde/ Education	237	918	9	43	1 208
Filosofie/ Wysbegeerte/ Philosophy	0	128	0	0	128
Teologie/ Theology	0	323	0	0	323
Geskiedenis/ History	6	314	3	60	383
Kommunikasiekunde en Joernalistiek/ Communication science and journalism	47	119	22	3	191
Biblioteek- en Inligtingkunde/ Library and information science	0	85	0	46	131
Regsgeleerdheid/ Law	10	589	0	22	621
Afrikaanse kultuur- en volkskunde/ Afrikaans culture and folklore	0	16	0	10	26
Bewegingskunde/ Movement science	0	77	0	0	77
Rekreasiekunde/ Recreation science	0	26	0	1	27

TABEL 2.20 (vervolg) : Aantal persone betrokke by N&O volgens navorsingsgebiede en verrigters (toegedeel volgens navorsingsgebied van vernaamste betrokkenheid)
TABLE 2.20 (contd) : Number of persons involved in R&D according to research fields and performers (allocated to research field of main involvement)

NAVORSINGSGEBIEDE/ RESEARCH FIELDS	VERRIGTERS/ PERFORMERS				
	Owerheid-sektor/ Government sector	Tersiêre onderwys-sektor/ Tertiary education sector	Sakesektor/ Business enterprise sector	Nie-winssektor/ Non-profit sector	Totaal/ Total
Ekonomiese wetenskappe/ Economic sciences	189	1 246	274	25	1 733
Bedryfsekonomie/ Business economics	2	200	52	0	253
Vervoerekonomie/ Transport economics	17	43	24	6	90
Ekonomie/ Economics	70	314	135	18	537
Bedryfsleiding en -administrasie/ Business leadership and administration	21	164	21	1	207
Mannekragnavorsing/ Manpower research	75	153	41	0	269
Rekeningkunde en verwante vakke/ Accounting and related subjects	4	372	1	0	378
Staatswetenskappe/ Political sciences	42	279	26	44	390
Staatsleer/ Political science	19	148	9	28	205
Publieke administrasie/ Public administration	12	75	8	16	111
Ontwikkelingsadministrasie en -politiek/ Development administration and politics	11	55	8	0	75
Tale/ Languages	0	1 347	0	7	1 354
Taalkunde/ Linguistics	0	574	0	0	574
Letterkunde/ Literature	0	773	0	7	780
Kunste/ Arts	0	516	0	77	594
Beeldende kunste/ Fine arts	0	133	0	13	146
Uitvoerende kunste/ Performing arts	0	117	0	0	117
Musiek/ Music	0	162	0	0	162
Boukuns/ Architecture	0	6	0	7	12
Toegepaste kuns/ Applied art	0	28	0	32	60
Kunsgeskiedenis/ History of art	0	70	0	25	96
Toekomskunde/ Future studies	2	9	1	0	12
TOTAAL/ TOTAL	8 441	16 514	11 791	1 009	37 755
Persentasie (%)/ Percentage (%)	22	44	31	3	100

AFDELING 3.
GRAFIESE TIENJAAR-OORSIG 1983/84 - 1991/92

SECTION 3.
GRAPHIC TEN YEAR OVERVIEW 1983/84 - 1991/92

Expenditure on R&D/Besteding aan N&O

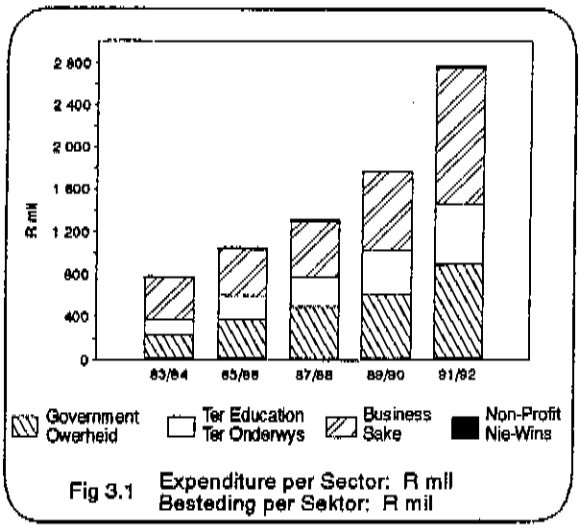


Fig 3.1 Expenditure per Sector: R mil
Besteding per Sektor: R mil

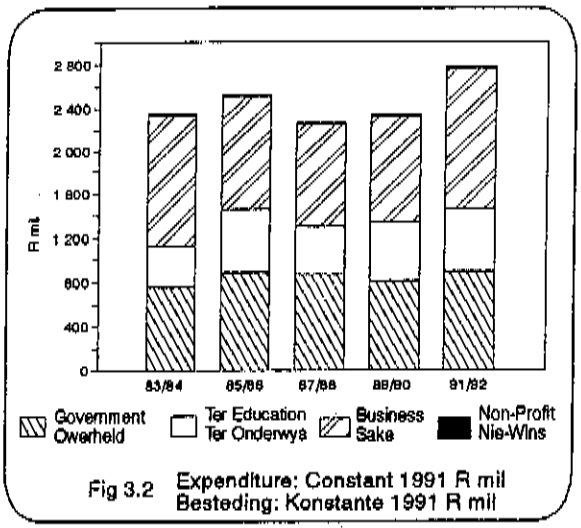


Fig 3.2 Expenditure: Constant 1991 R mil
Besteding: Konstante 1991 R mil

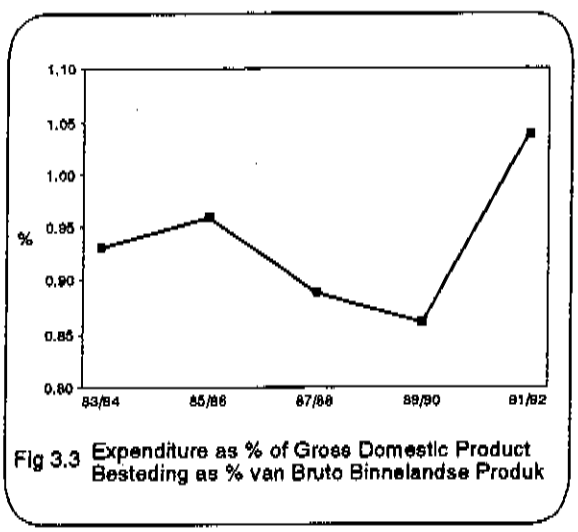


Fig 3.3 Expenditure as % of Gross Domestic Product
Besteding as % van Bruto Binnelandse Produk

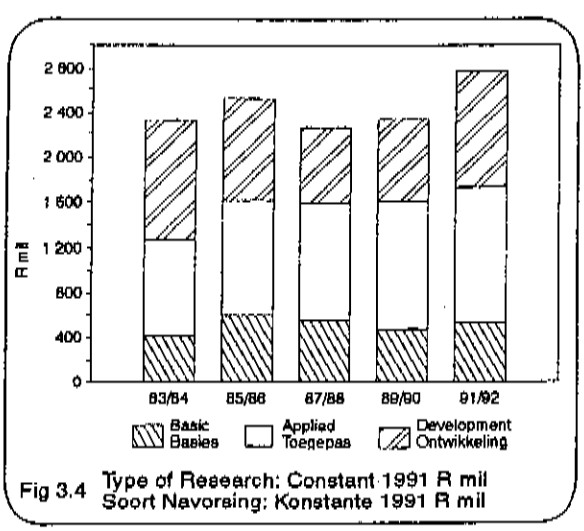


Fig 3.4 Type of Research: Constant 1991 R mil
Soort Navorsing: Konstante 1991 R mil

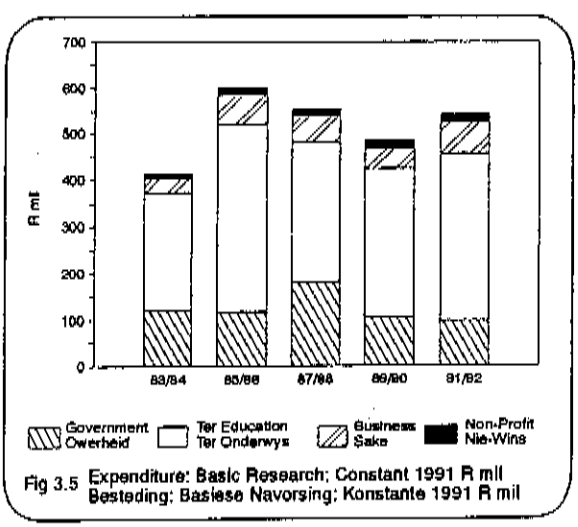


Fig 3.5 Expenditure: Basic Research; Constant 1991 R mil
Besteding: Basiese Navorsing; Konstante 1991 R mil

Expenditure on R&D: Type of Expenditure
Besteding aan N&O: Soort Besteding

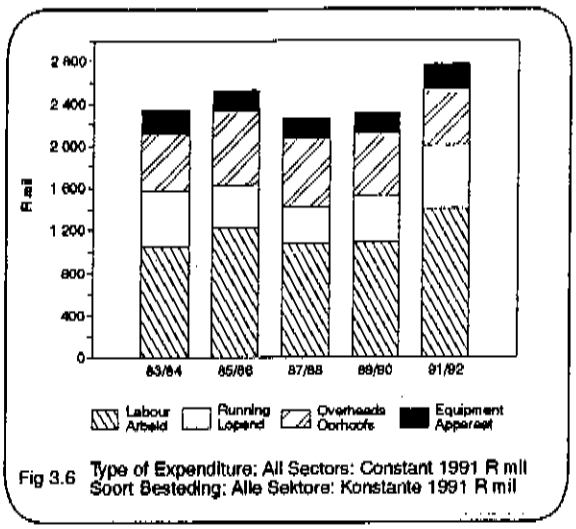


Fig 3.6 Type of Expenditure: All Sectors: Constant 1991 R mil
Soort Besteding: Alle Sektore: Konstante 1991 R mil

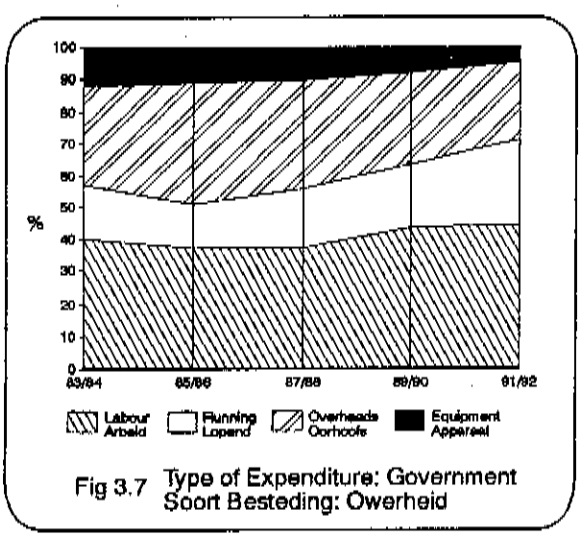


Fig 3.7 Type of Expenditure: Government
Soort Besteding: Owerheid

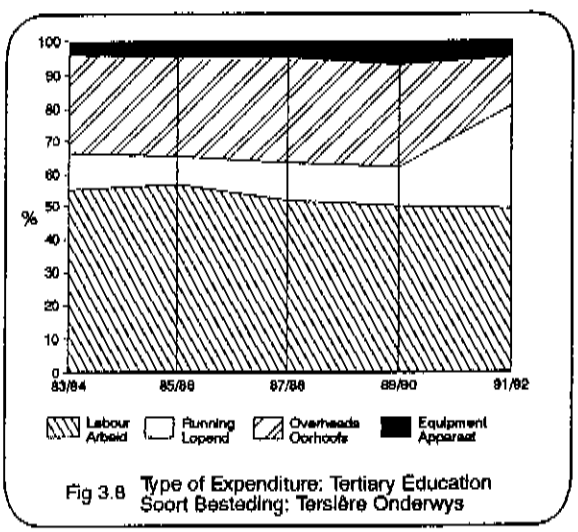


Fig 3.8 Type of Expenditure: Tertiary Education
Soort Besteding: Terslêre Onderwys

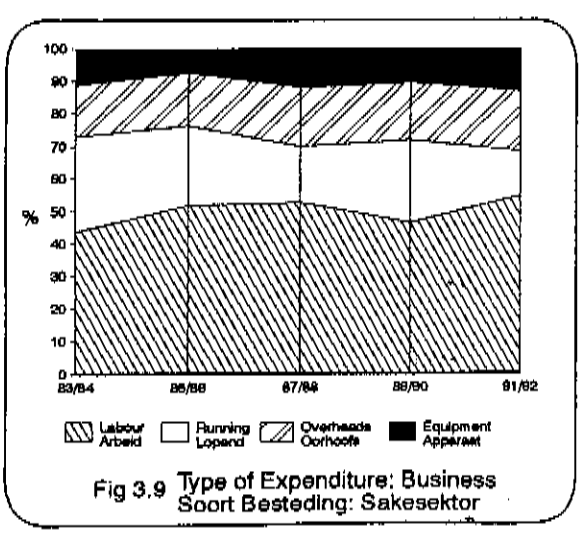


Fig 3.9 Type of Expenditure: Business
Soort Besteding: Sakesektor

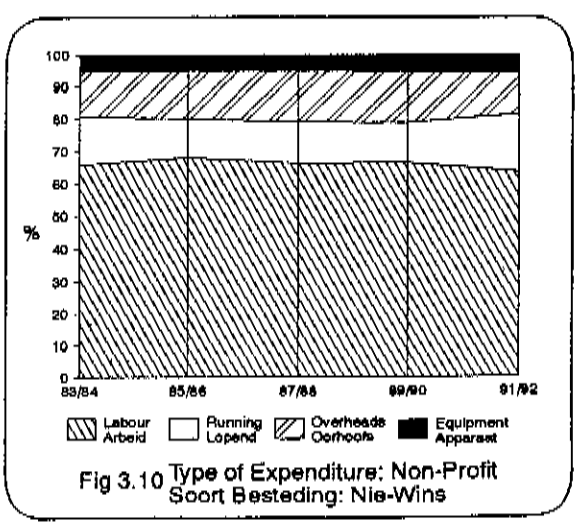


Fig 3.10 Type of Expenditure: Non-Profit
Soort Besteding: Nie-Wins

Sources of External Funds for R&D
Bronne van Eksterne Fondse vir N&O

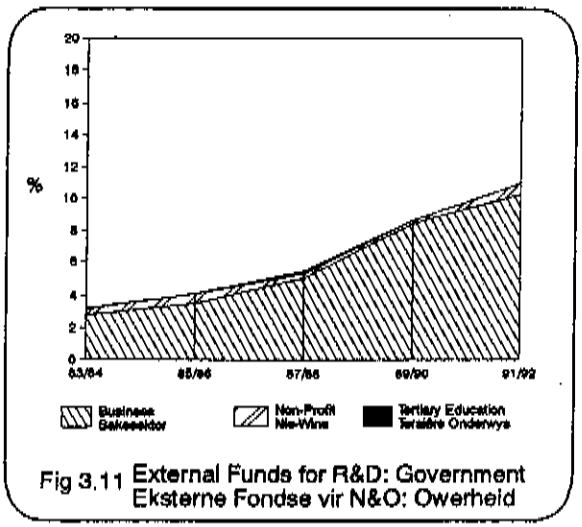


Fig 3.11 External Funds for R&D: Government
Eksterne Fondse vir N&O: Owerheid

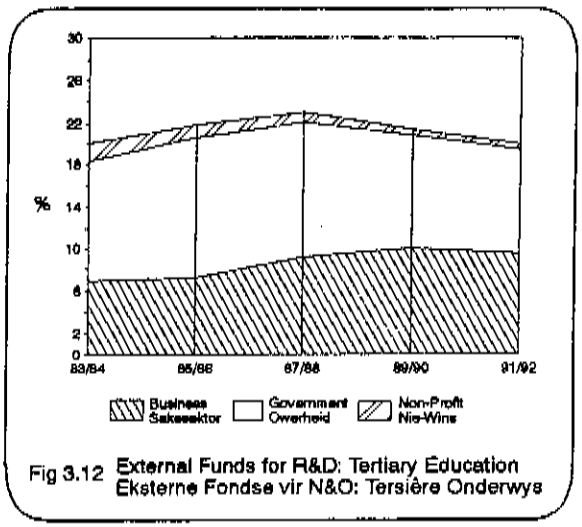


Fig 3.12 External Funds for R&D: Tertiary Education
Eksterne Fondse vir N&O: Tersiêre Onderwys

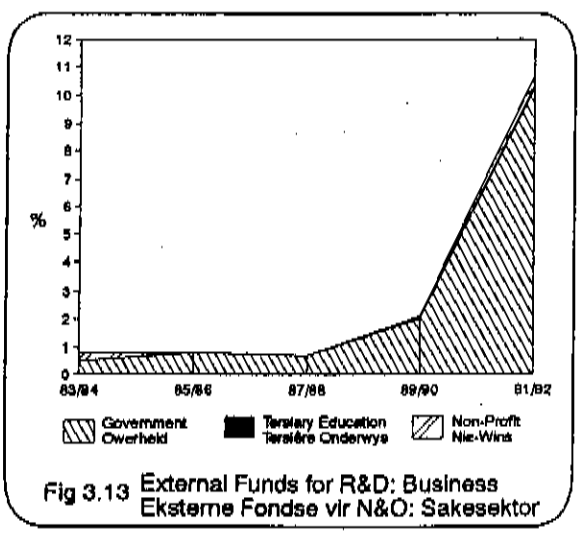


Fig 3.13 External Funds for R&D: Business
Eksterne Fondse vir N&O: Sakesektor

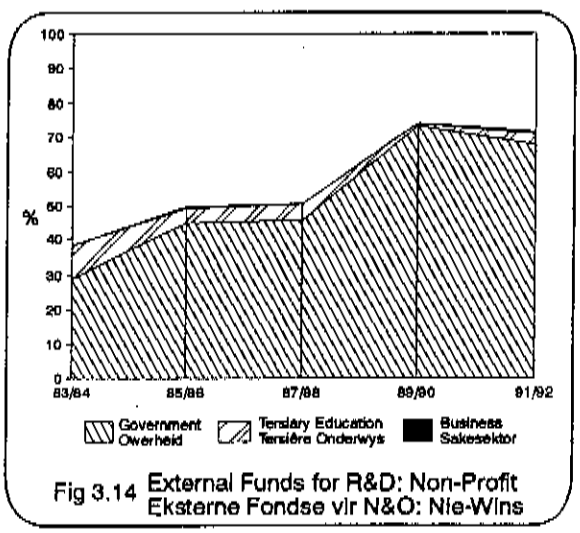


Fig 3.14 External Funds for R&D: Non-Profit
Eksterne Fondse vir N&O: Nie-Wins

Man Years Expended on R&D/Manjare aan N&O Gewy

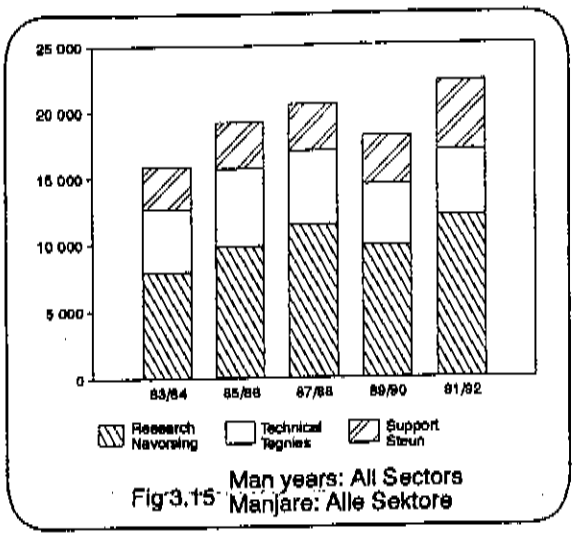


Fig 3.15 Man years: All Sectors
Manjare: Alle Sektore

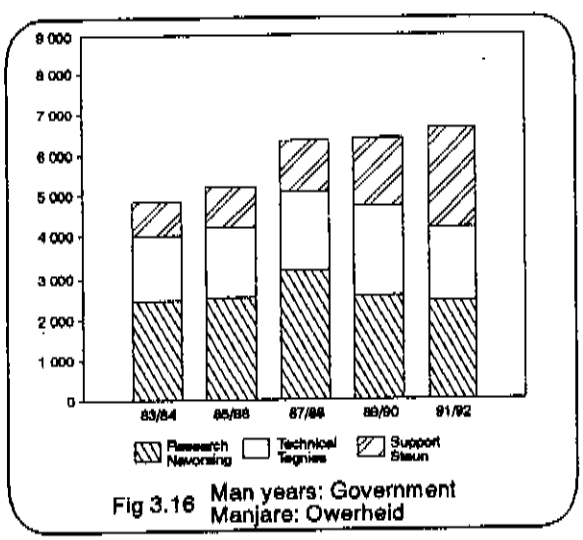


Fig 3.16 Man years: Government
Manjare: Owerheid

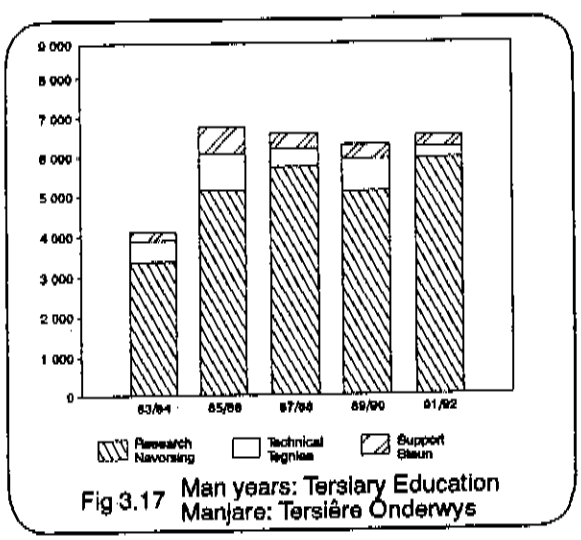


Fig 3.17 Man years: Tersiary Education
Manjare: Tersiêre Onderwys

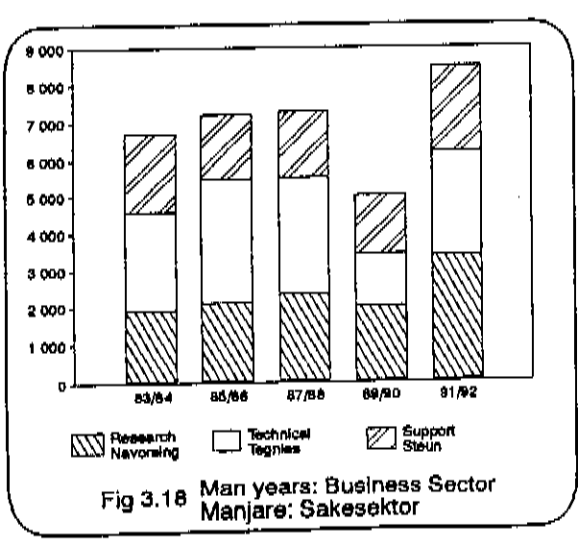


Fig 3.18 Man years: Business Sector
Manjare: Sakesektor

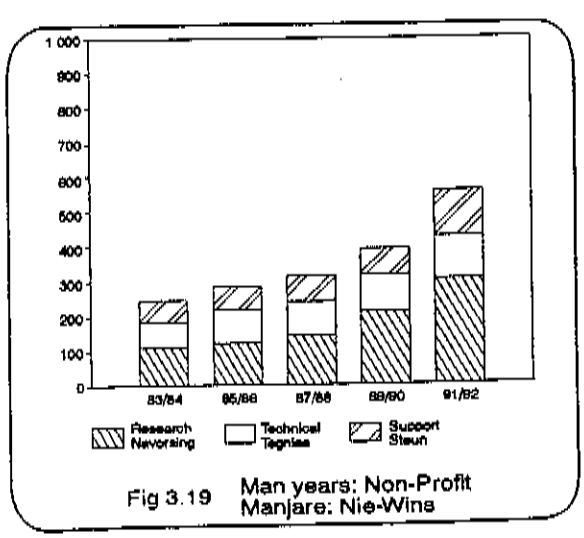


Fig 3.19 Man years: Non-Profit
Manjare: Nie-Wins

Research Fields, Constant (1991) Rands 000's
Navorsingsgebiede, Konstante (1991) Rand 000'e

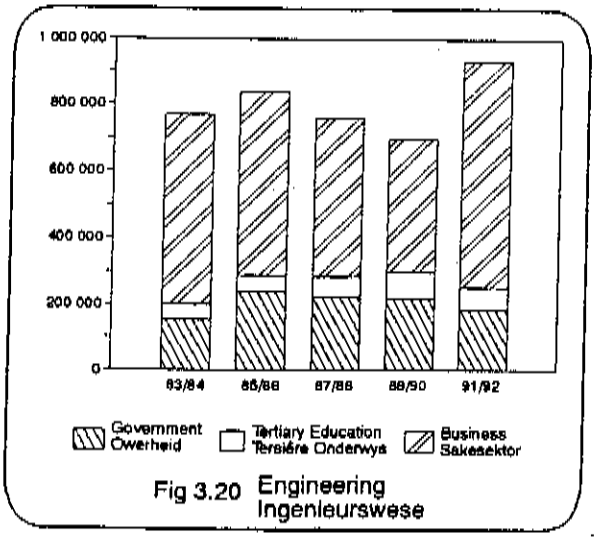


Fig 3.20 Engineering
Ingenieurswese

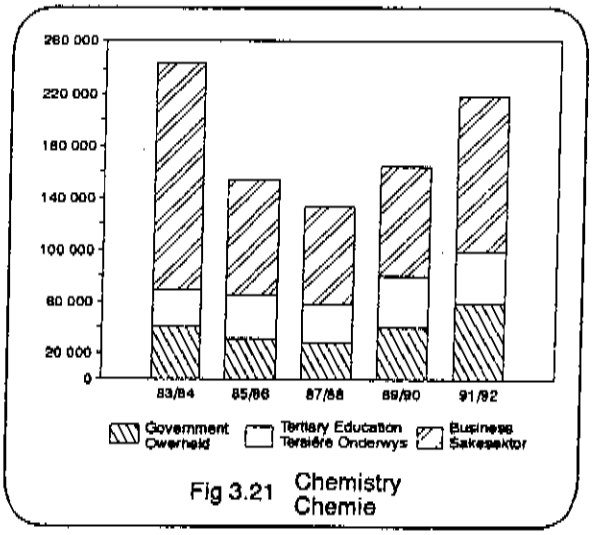


Fig 3.21 Chemistry
Chemie

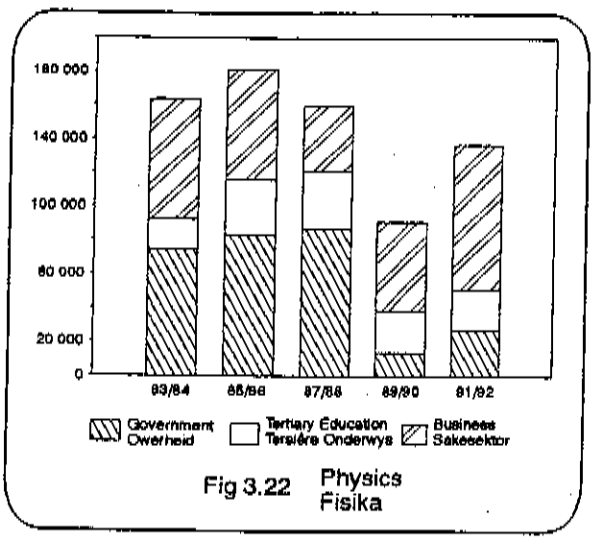


Fig 3.22 Physics
Fisika

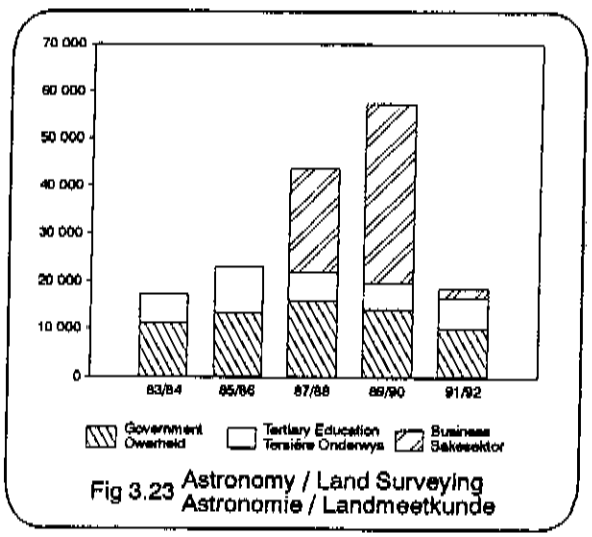


Fig 3.23 Astronomy / Land Surveying
Astronomie / Landmeetkunde

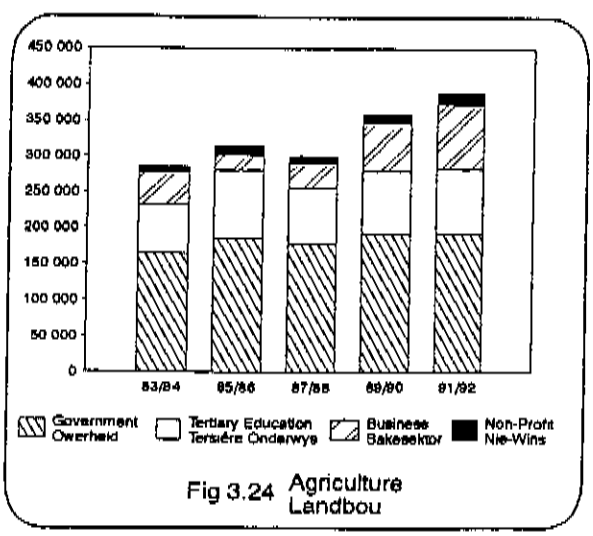


Fig 3.24 Agriculture
Landbou

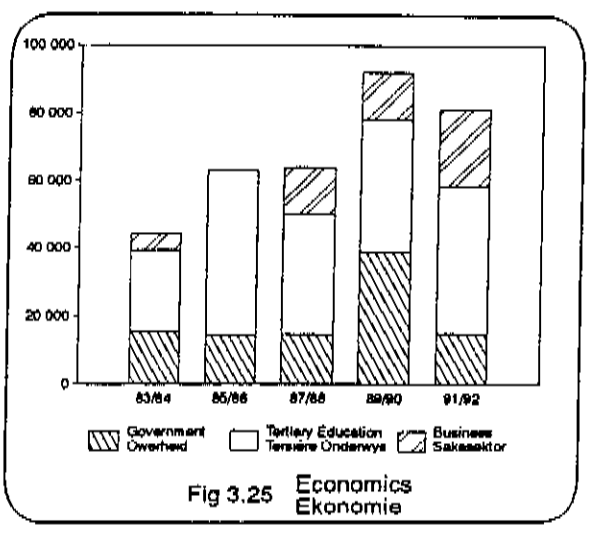


Fig 3.25 Economics
Ekonomie

Main Fields of Application, Constant (1991) Rands 000's
Hoofpassingsgebiede, Konstante (1991) Rand 000'e

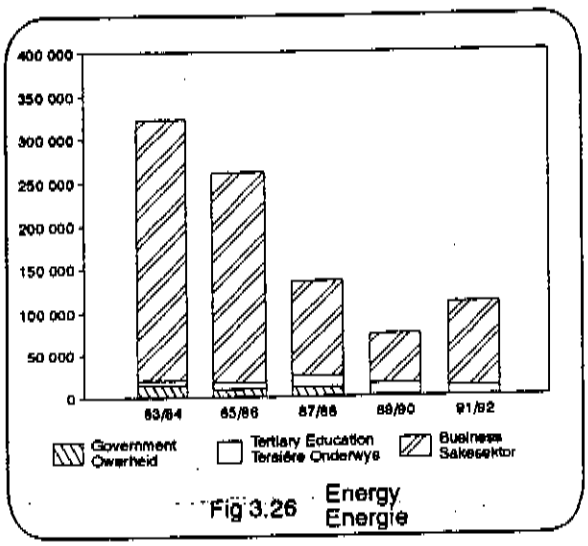


Fig 3.26 Energy
Energie

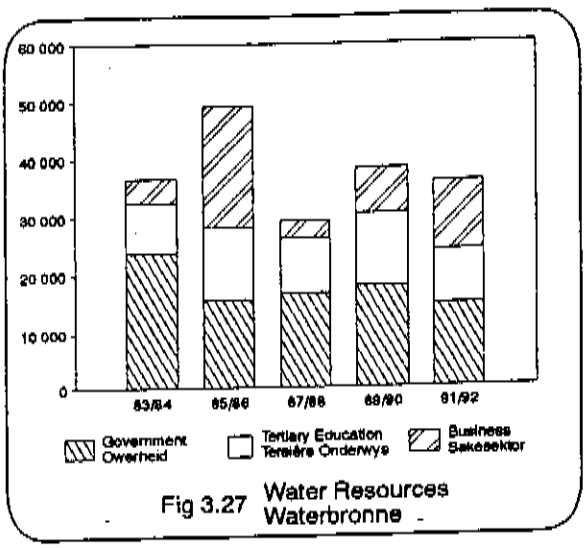


Fig 3.27 Water Resources
Waterbronne

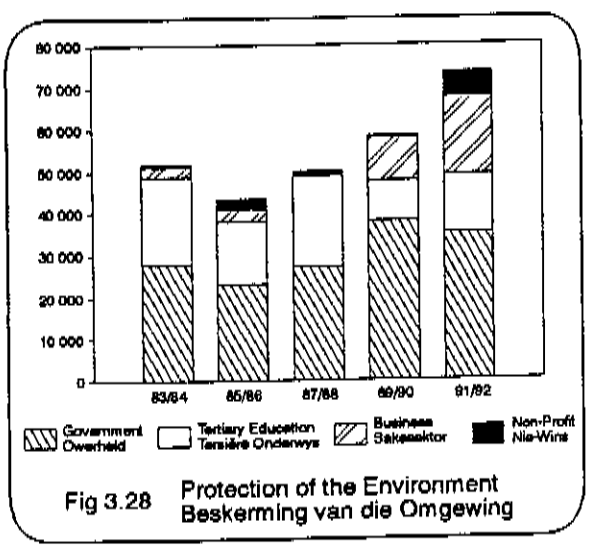


Fig 3.28 Protection of the Environment
Beskerming van die Omgewing

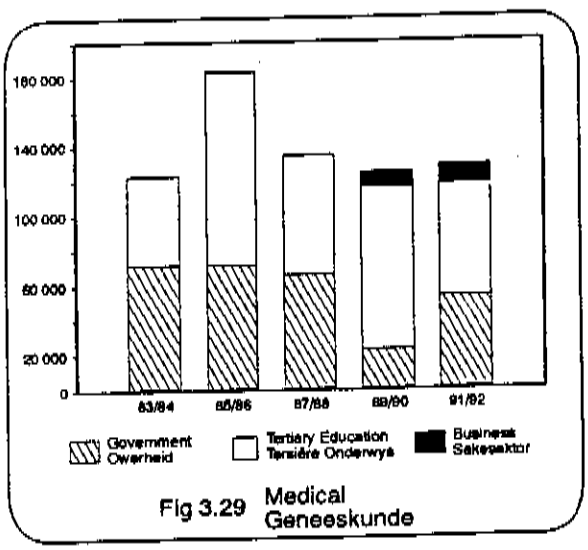


Fig 3.29 Medical
Geneeskunde